



TRAFFIC IMPACT ASSESSMENT

**Proposed Mixed Use Development
Gran Central, 134 -142 Parramatta Road, Granville**

Reference: 19.236r02v03
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1. INTRODUCTION

TRAFFIX has been commissioned by Starryland Pty Ltd to undertake a Traffic Impact Assessment of a proposed mixed-use development at 134-142 Parramatta Road, 26-38 Good Street and 59-61 Cowper Street in Granville. The Development Application seeks approval for a 25 storey building comprising of 373 residential units and 1,035m² gross floor area of retail space. The development is located within the City of Parramatta local government area and has been assessed under that Council's controls.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects prepared separately. The proposed development is of a scale that will require referral of the Development Application to the Roads and Maritime Services under the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

The report is structured as follows:

- ▶ Section 2: Describes the site and its location
- ▶ Section 3: Documents existing traffic conditions
- ▶ Section 4: Describes the proposed development
- ▶ Section 5: Assesses the parking requirements
- ▶ Section 6: Assesses traffic impacts
- ▶ Section 7: Discusses access and internal design aspects
- ▶ Section 8: Presents the overall study conclusions



2. LOCATION AND SITE

The site is known as 134-142 Parramatta Road, 26-38 Good Street and 59-61 Cowper Street in Granville, on the southwest corner of the intersection of Parramatta Road and Good Street. In a regional context, it is located approximately 150 metres northwest of Granville Station and 1.6 kilometres southeast of the Parramatta central business district.

The site is irregularly shaped in configuration and has a site area of approximately 5,150m². It has a northern frontage of 88 metres to Parramatta Road, an eastern frontage of 62 metres to Good Street, a southern frontage of 78 metres to Cowper Street and a 62 metre boundary to the west to two neighbouring developments, a car yard and a mixed-use development.

The site is a consolidation of seven properties

- ▶ 142 Parramatta Road: A car yard approximately 315m² in area. Vehicular access is provided from Parramatta Road. This property is zoned as B4 – Mixed Use.
- ▶ 138 Parramatta Road:- A bulky goods retail store with approximately 1700m² in site area. The development is a two-storey building with an approximate Gross Floor Area (GFA) of 1700m². Vehicular access to the site's carpark is from Cowper Street. This property is zoned as B4 – Mixed Use.
- ▶ 134 Parramatta Road & 38-44 Good Street: A car yard with a site area of approximately 1233m². Vehicular access is provided from Parramatta Road and the site is zoned as B4 – Mixed Use.
- ▶ 26-30 Good Street: Accommodates specialty retail shops with approximately 554m² site area and approximately 375m² retail GFA. Access to the site's rear carpark area is from Cowper Street. The property is zones as B4-Mixed Use.
- ▶ 32 Good Street: Accommodates two specialty retail shops with approximately 525m² site area and approximately 517m² retail GFA. Access



to the site's rear carpark area is from Cowper Street. The site is zoned as B4 – Mixed Use.

- ▶ 59 Cowper Street: A residential dwelling with approximately 292m² site area. A vehicular access is provided from Cowper Street. This site is zoned as B4 – Mixed Use.
- ▶ 61 Cowper Street: An empty lot with approximately 302m² in site area. This property is zoned as B4 – Mixed Use.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix A** which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

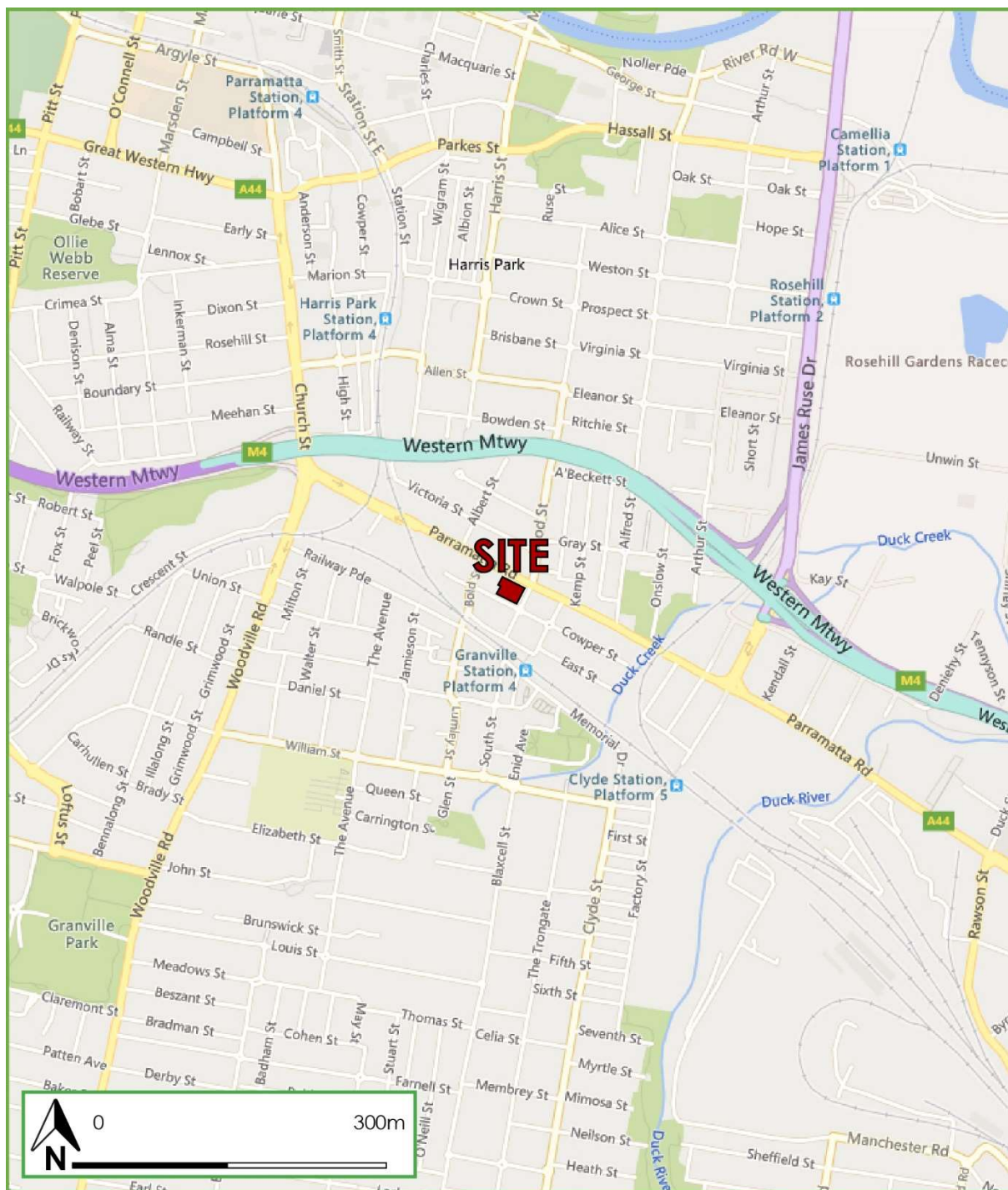


Figure 1: Location Plan

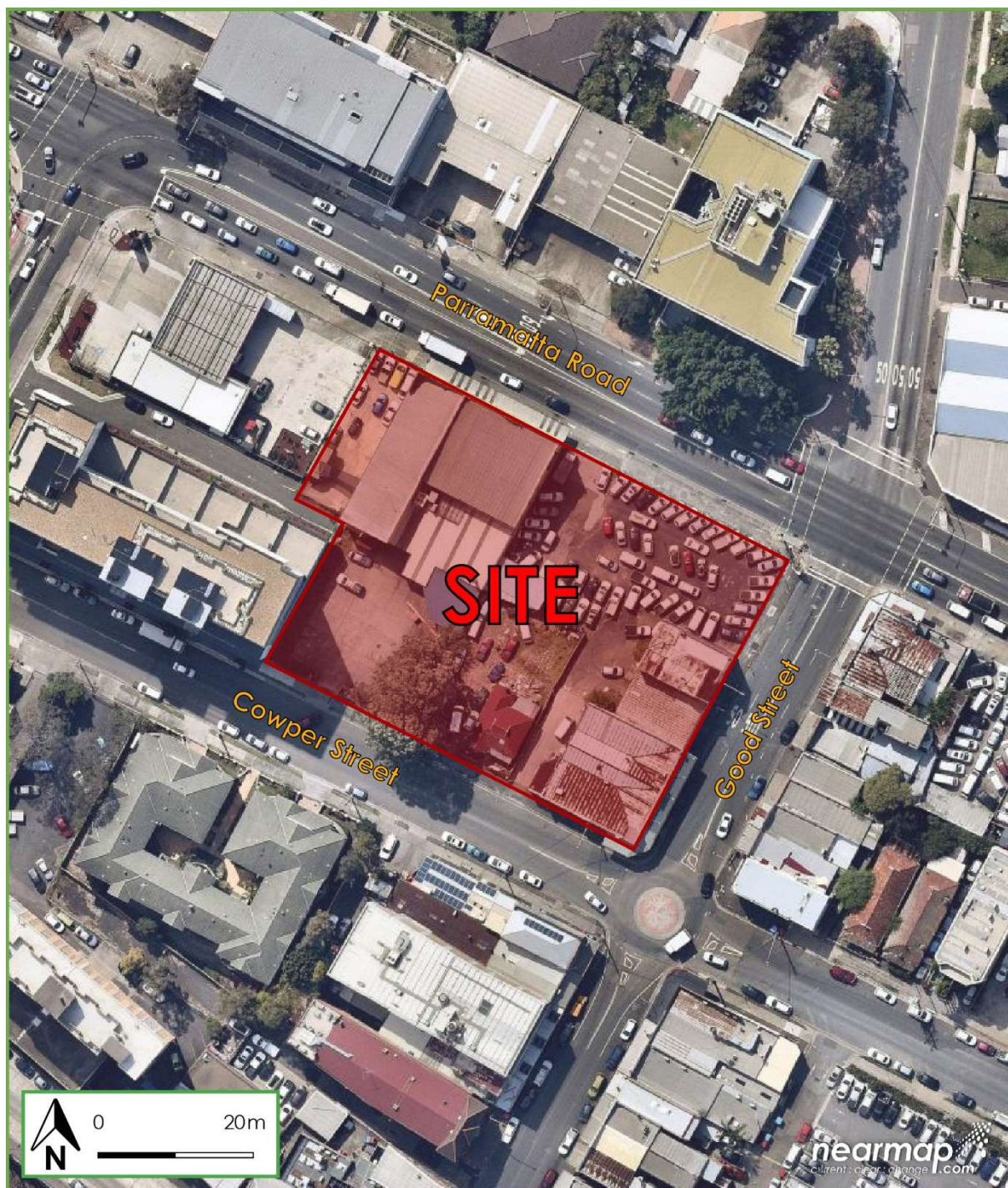


Figure 2: Site Plan



3. EXISTING TRAFFIC CONDITIONS

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- ▶ **Parramatta Road:** part of a RMS State Highway (HW 5), Parramatta Road that generally runs in an east-west direction connecting Sydney CBD in the east and Granville in the west. It is subject to a 60km/h speed zoning local to the site. Within the vicinity of the site, it generally consists of two traffic lanes in either direction separated by a median; The kerbside lanes have clearway restrictions between 6:00am - 7:00pm on weekdays and between 8:00am and 8:00pm on weekends.
- ▶ **Bold Street:** part of an unclassified regional road (7101), generally running in a north-south direction between Parramatta Road in the north and Bridge Street in the south. It is subject to a 50km/h speed zoning. Bold Street carries three lanes of traffic in a northerly direction and two lanes of traffic in a southerly direction; however, the kerbside lane heading north is restricted to a Bus Lane at all times.
- ▶ **Cowper Street:** a local road that traverses in an east-west direction between Good Street in the east and Bold Street in the west. It is subject to a 50km/h speed zoning, carries a single lane of traffic in each direction and permits time restricted parking along both sides of the road.
- ▶ **Good Street:** a local road that generally traverses in a north-south direction starting Parramatta Road in the north and Bridge Street in the south. It is subject to a speed zoning of 50km/h and carries a single lane of traffic in each direction. Time restricted kerbside parking is predominately permitted along both sides of this road.
- ▶ **Unnamed Laneway** a local laneway that traverses in an east-west direction, between Bold Street in the west and terminating at the subject site. The unnamed laneway provides a 6.0 metre wide carriageway and allows for two-way flow of traffic, with no parking restrictions. A median on Bold Street restricts movements on the unnamed laneway to left-in and left-out only.

The site is conveniently located with respect to the local and arterial road networks serving the region, with connections to the east and west via Parramatta Road.



Figure 3: Road Hierarchy



3.2 Public Transport

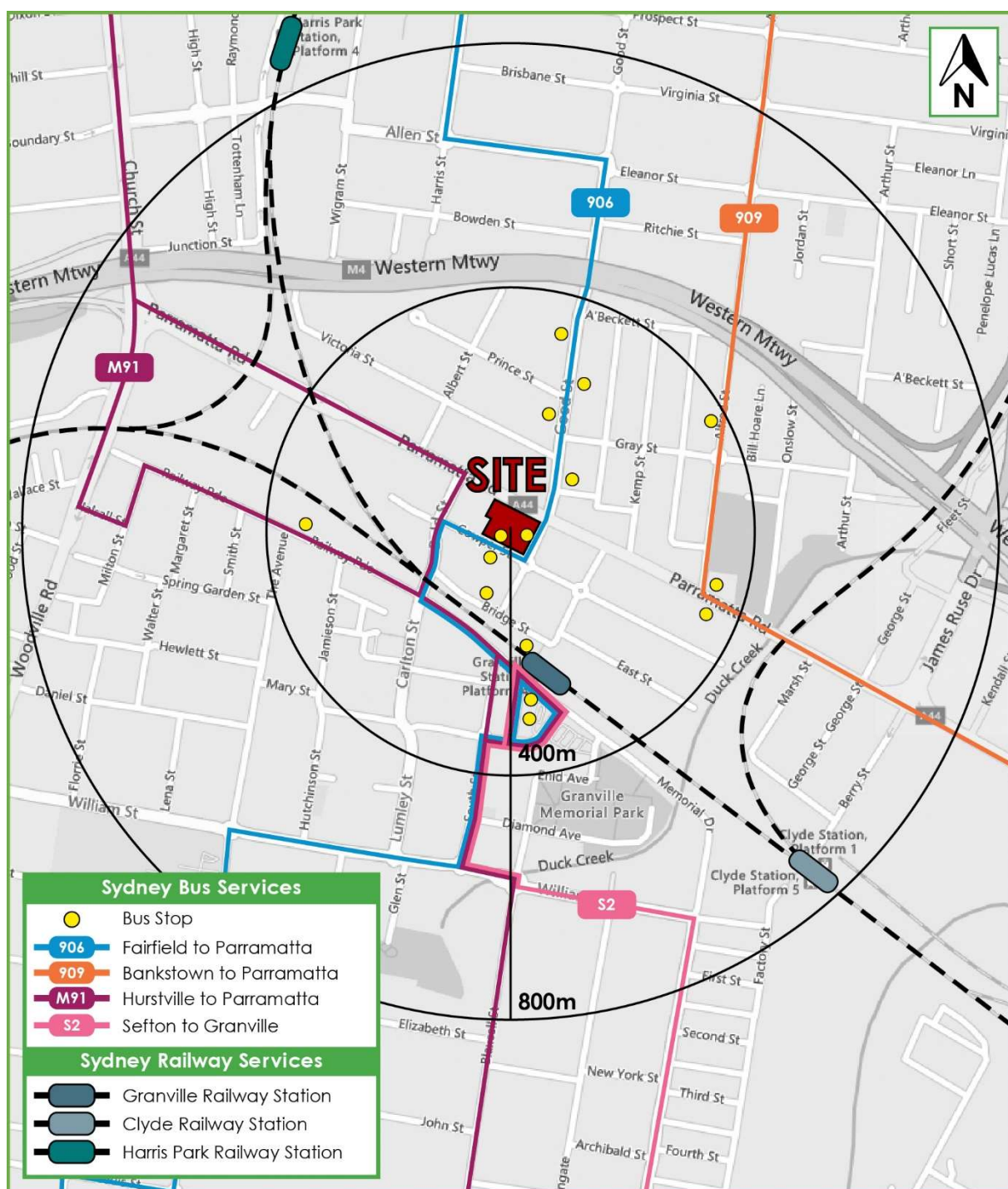
The public transport network operating in the locality is illustrated in **Figure 4**. It is evident that the site is located approximately 150 metres northwest of Granville Railway Station, which is serviced by the following lines:

- ▶ T1 North Shore, Northern and Western Line, operating between Emu Plains and Sydney central business district
- ▶ T2 Inner West and Leppington Line, operating between Parramatta and Sydney central business district.

The site is also within 400 metres of bus stops on Good Street, Parramatta Road, Railway Parade, Cowper Street, Kemp Street and Memorial Drive which are serviced by the following routes:

- ▶ 906 – Fairfield to Parramatta
- ▶ 909 – Bankstown to Parramatta
- ▶ M91 – Hurstville to Parramatta via Padstow and Chester
- ▶ S2 – Sefton to Granville

It is evident the site therefore benefits from excellent connections to public transportation, located approximately 150m from Granville Railway Station and within close proximity of a number of bus stops in the area.



3.3 Key Intersections

Three (3) key intersections have been identified in the vicinity of the site. These intersections are located at the junction of main thoroughfares that will be utilised by users associated with the proposed development.

3.3.1 Parramatta Road and Good Street

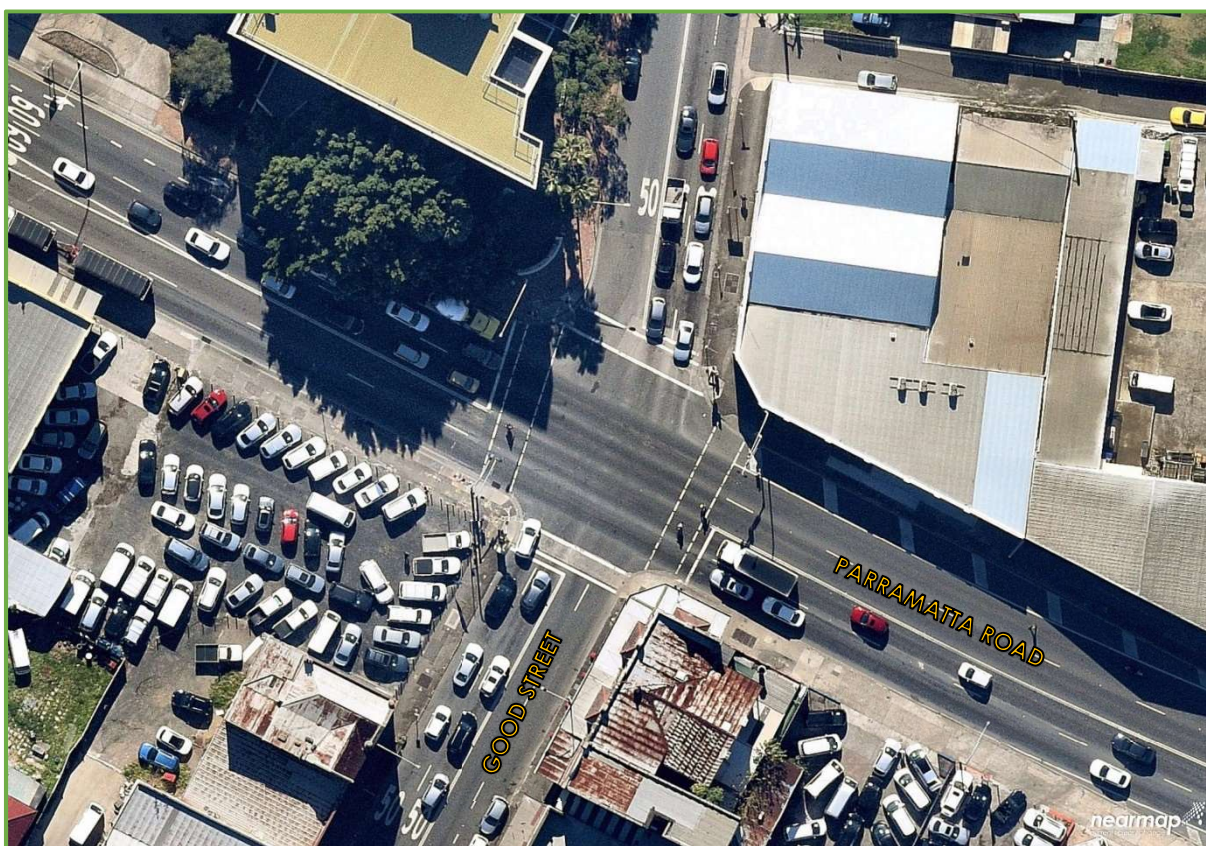


Figure 5: Intersection of Parramatta Road and Good Street (Source: NearMap)

It can be seen from **Figure 5** that the intersection of Parramatta Road and Good Street is a signalised four-legged intersection with all approaches providing signalised pedestrian crossings. The main attributes of each approach are outlined below:

► Parramatta Road (east and west legs)

- The eastbound approach provides one (1) left turn only lane and two (2) through lanes. Right turns onto Good Street are prohibited.
- The westbound approach provides two (2) through lanes. Right turns onto Good Street are prohibited.

► Good Street (north and south legs)

- The northbound approach provides two (2) through lanes. Right turns onto Parramatta Road are prohibited.
- The southbound approach provides two (2) through lanes. Right turns onto Parramatta Road are prohibited.

3.3.2 Parramatta Road and Bold Street

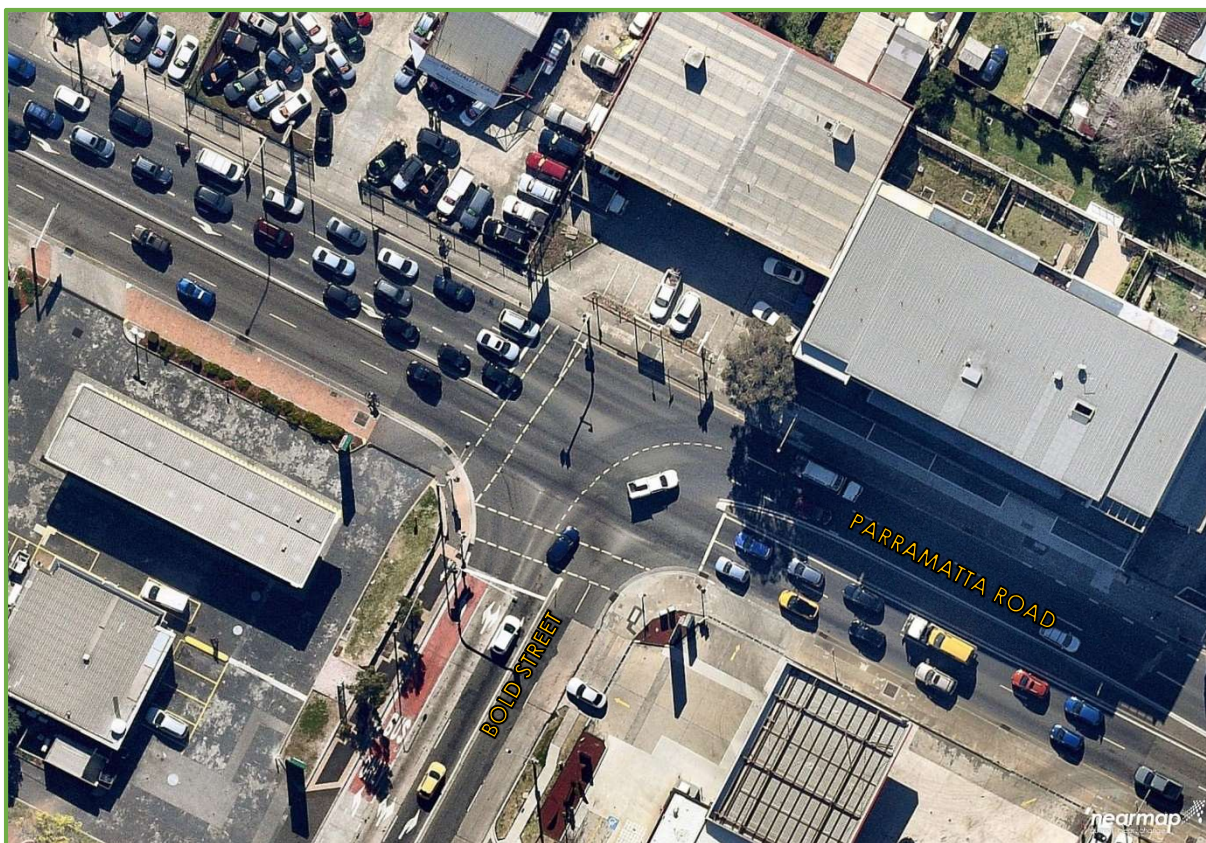


Figure 6: Intersection of Parramatta Road and Bold Street West (Source: NearMap)

It can be seen from **Figure 6** that the intersection of Parramatta Road and Bold Street is a three-legged intersection. The intersection is signalised with all approaches providing signalised pedestrian crossings. The main attributes of each approach are outlined below:

- ▶ Parramatta Road (east and west legs)
 - The eastbound approach provides two (2) through lanes and a designated right-turn lane.
 - The westbound approach provides two (2) through lanes.
- ▶ Bold Street (south leg)
 - The northbound approach provides three (3) lanes, the kerbside lane is a dedicated bus lane at all times and allows for left turns onto Parramatta Road, the middle lane allows for both left and right turns onto Parramatta Road and the right-most lane is a dedicated right turn only lane.

3.3.3 Bold Street and Cowper Street

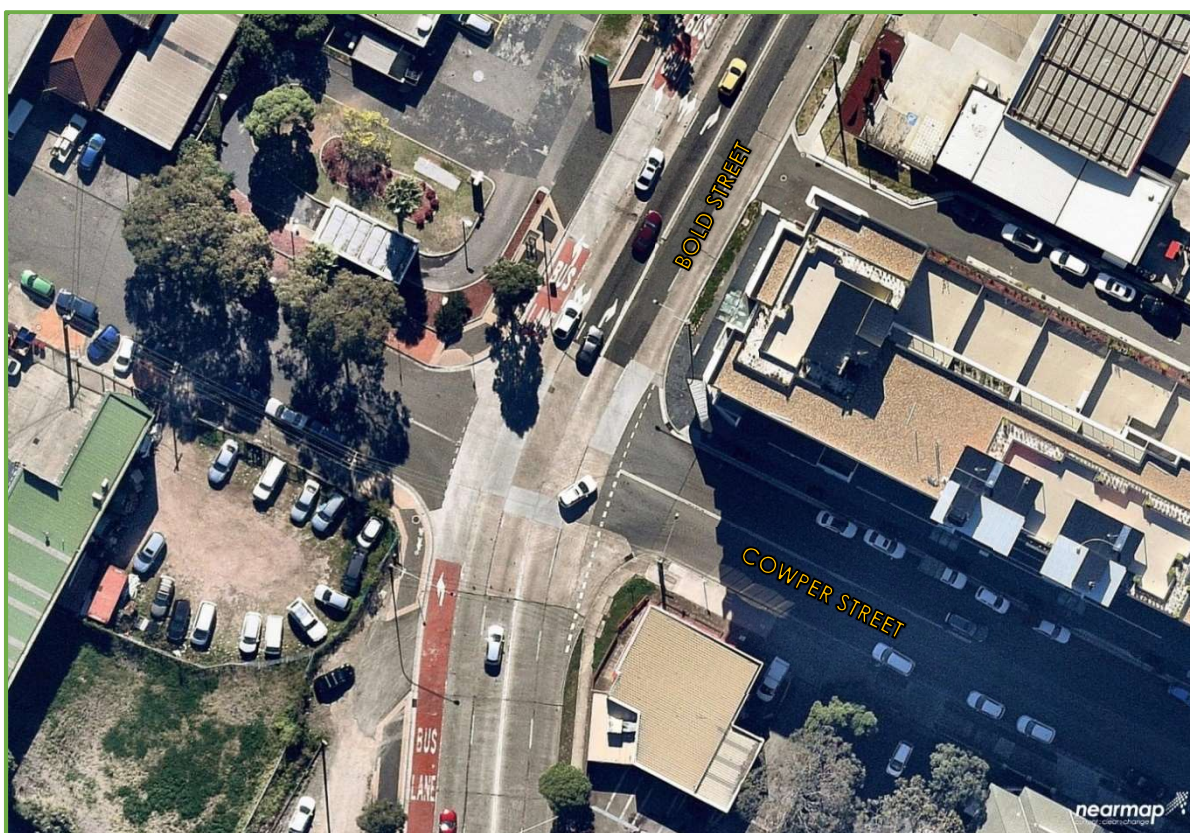


Figure 7: Intersection of Bold Street and Cowper Street (Source: NearMap)



It can be seen from **Figure 7** that the intersection Bold Street and Cowper Street is a four-legged intersection. The intersection is priority-controlled with Cowper Street the minor legs. The main attributes of each approach are outlined below:

► Bold Street (north and south legs)

- The northbound approach provides two (2) through lanes and a dedicated bus lane that only allows for left turns onto Cowper Street. Left and right turns onto Cowper Street are permitted.
- The southbound approach provides two (2) through lanes and permits left and right turns onto Cowper Street

► Cowper Street (east and west legs)

- The eastbound approach provides a single lane and permits left and right turns onto Bold Street.
- The westbound approach provides a single lane and permits left and right turns onto Bold Street.



4. DESCRIPTION OF PROPOSED DEVELOPMENT

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. In summary, the development for which approval is now sought is a 24-storey mixed use development comprising of the following components:

- ▶ 373 residential apartments, consisting of:
 - 130 x one-bedroom apartments
 - 217 x two-bedroom apartments; and
 - 26 x three-bedroom apartments;
- ▶ 1,035m² gross floor area of retail space; and
- ▶ The following parking provisions:
 - 347 car parking spaces;
 - 5 x car share spaces; and
 - 1 x loading bay, suitable for an 8.8m Medium Rigid Vehicle

Vehicular access to the development will be provided from Cowper Street for two-way access and from the unnamed laneway from Bold Street for one-way entry only.

The parking requirements and traffic impacts arising from the development are discussed in **Section 5** and **Section 6**. Reference should be made to the architectural drawings prepared by PBD Architects, to which plans for all parking levels are presented in **Appendix B**.



5. PARKING REQUIREMENTS

5.1 Car Parking

Section 4.3.7.1 of the Parramatta Development Control Plan (DCP) 2011 stipulates specific controls for the subject site, which is a strategic precinct for 'land on the corner of Parramatta Road, Good Street and Cowper Street, Granville'. The applicable parking rates have been summarised in **Table 1**.

Table 1: DCP Parking Rates and Provision

Type	No / GFA	Maximum Car Parking Rate	Maximum Spaces Permitted ¹	Spaces Provided
Residential				
One-bedroom	130	0.9 spaces per unit	416	314
Two-bedroom	217	1.2 spaces per unit		
Three-bedroom	26	1.5 spaces per unit		
Visitors	373	0.2 spaces per dwelling	74	33 spaces, including: 19 visitor spaces 3 staff spaces 11 shared spaces
Retail				
All Tenancies	1,035m²	Maximum of 1 space per 50m² GFA	20	
Total			510	347

¹Number of parking spaces rounded down to the next whole number..

It can be seen that the proposed development is permitted to provide a maximum of 510 parking spaces, including 416 resident spaces, 74 visitor spaces and 20 retail parking spaces. In response, provision for 347 parking spaces has been made which complies with the site specific controls of the DCP.

Notwithstanding, the allocation of parking spaces has been based in consideration of other planning policies which apply to the subject site, including:

- ▶ *The Parramatta Road Corridor Urban Transformation Strategy 2016 (PRCUTS)*, prepared by UrbanGrowth NSW (in conjunction with the Department of Planning and Transport for NSW), is a 30-year plan for land use planning, development decisions and long-term infrastructure delivery programs within the Parramatta Road Corridor. It takes into consideration the



future development of the area and recommends maximum parking rates based on proximity to railway stations or Rapid Bus Route stops.

- ▶ The general parking controls under Section 3 of the Parramatta Development Control Plan 2011, where specifically for developments within the Granville Town Centre, Table 3.6.2 permits a maximum of 40% of resident visitor parking can be used in the calculations for retail parking provided that these areas are shared.

The basis for allocating parking spaces for the proposed development and relevant planning policy/strategy is outlined in **Table 2** below.

Table 2: Parking Allocation

Type	Strategy	No / GFA	Maximum Car Parking Rate	Maximum Spaces Permitted ¹	Spaces Provided
Residential					
One-bedroom	PRCUTS / Site Specific DCP	130	0.5 spaces per unit (PRCUTS) 0.9 spaces per unit (DCP)	291 - 416	314
Two-bedroom		217	0.9 spaces per unit (PRCUTS) 1.2 spaces per unit (DCP)		
Three-bedroom		26	1.2 spaces per unit (PRCUTS) 1.5 spaces per unit (DCP)		
Visitors	Design Competition	373	(As proposed during Design Competition)	30	30 visitor spaces (including 11 shared) and 5 car share spaces
Retail and Commercial					
All Tenancies	PRCUTS	1,035m ²	Maximum of 1 space per 70m ² GFA	14	3 dedicated spaces and 11 shared visitor spaces

¹Number of parking spaces rounded down to the next whole number.

Having regard for the above parking rates, the provision of parking spaces is generally consistent with the PRCUTS, noting:

- ▶ The resident parking allocation of 314 parking spaces lies between the range of provisions stipulated under the PRCUTS and site specific DCP. Accordingly, it is expected to account for the expected rate of car ownership given the proximity to public transport services.



- ▶ A total of 30 visitor parking spaces have been achieved by with no more than 40% of the provision shared with retail use, as permissible under the DCP. This is consistent with the provision reviewed during the Design Competition Stage which was proposed in conjunction of five (5) car share spaces.
- ▶ A total of 14 retail parking spaces have been achieved with 11 parking spaces being shared with visitor use, which is consistent with the PRCUTS rates. It is expected that the majority of retail tenancies will not trade during evenings when peak visitor demands would occur.

Overall, the allocation of parking spaces complies with the individual and collective requirements of the site specific DCP, which specifies maximum rates for all uses. The provisions are also generally consistent with the parking rates under the PRCUTS, which recommends reduced parking rates for developments in the Parramatta Road corridor with good access to public transport.

5.2 Accessible Parking

Section 4.3.7.1 of the DCP requires that medium and high-density residential developments on the subject site are to incorporate a minimum of one (1) accessible space for every adaptable/accessible unit. It is understood the proposed development provides 38 adaptable parking spaces and therefore a minimum requirement for 38 accessible parking spaces arises for resident use. In response, provision for 38 accessible parking spaces has been made, thereby complying with the DCP requirement. In addition, a single accessible visitor parking space has also been provided.

Section 4.3.7.1 also requires that a minimum of 1% of all spaces all retail parking spaces are to be provided as accessible spaces. While no requirement for accessible parking would arise based on the provision of 18 retail parking spaces, a single accessible parking space has been provided for this use.

5.3 Car Share

Section 4.3.7.1 of the DCP requires development on the subject site provide a minimum of one car share space. In response, provision for five (5) car share spaces are proposed which is complies with and is superior to the minimum requirements.



5.4 Bicycle Parking

Section 4.3.7.1 of the DCP specifies the following bicycle parking rates for the subject site:

- ▶ 1 space per dwelling and 1 visitor space per 10 dwellings for the residential component
- ▶ 1 space per 250m² GFA for the retail component with 2 spaces + 1 per 100m² GFA for visitors.

Accordingly, the bicycle parking required under the DCP is a total of 426 spaces including 373 spaces for the residential component including 37 spaces for visitors, plus an additional 16 spaces for the retail component with 4 spaces for employees and 12 spaces for visitors.

The development provides a total of 428 spaces in the form of secure storage cages and vertical bicycle racks including 373 spaces for residents, 38 spaces for residential visitors, 5 spaces for retail staff and 12 spaces for retail visitors. Part 3.6.2 of the DCP specifies that Bicycle parking facilities may be located in storage areas if good access is provided. In this regard the development meets the requirement of the DCP, promoting alternative modes of transport for residents and tenants, in line with Council and state government objectives.

5.5 Motorcycle Parking

Section 4.3.7.1 of the DCP requires motorcycle parking to be provided at a rate of one motorcycle parking space for every 25 car parking spaces on-site. This equates to a requirement for 14 motorcycle parking spaces in the case of the proposed development, based on the provision of 347 car parking spaces. In response, provision for a single motorcycle parking space has been made which is nominally deficient by 13 spaces. Notwithstanding, this is considered acceptable in light of parking levels being designed to optimise the number of car parking spaces.

5.6 Car Wash Bay

Section 4.3.7.1 of the DCP does not stipulate any requirement for a car wash bay on the subject site. Notwithstanding, a single visitor parking space has been designed as a car wash bay.



5.7 Refuse Collection and Servicing

The proposed development will accommodate a single loading bay that can accommodate an 8.8m Medium Rigid Vehicle. This will accommodate all demands including retail, waste collection vehicles and removalist vehicles. Prior to issue of an Occupation Certificate, a Loading Dock Management Plan could be drafted to schedule and manage use of the loading bay.



6. TRAFFIC AND TRANSPORT IMPACTS

6.1 Existing Site Generation

The subject site is an amalgamation of several lots with differing land uses, the traffic generation of the existing land uses are as follows:

6.1.1 Residential

The site accommodates a single low density residential dwelling within part of the site area. In August 2013, RMS released Technical Direction TDT 2013/04a, which provides revised trip generation advice for a number of land uses based on survey data obtained since 2009. One of the land uses covered by TDT 2013/04a is low density residential development. The average Sydney weekday trip rates provided by TDT 2013/04a have been adopted for assessing the traffic generating potential of the subject development. The relevant trip rates are as follows:

- ▶ 0.95 vehicle trips per unit during the morning peak hour; and
- ▶ 0.99 vehicle trips per unit during the evening peak hour.

Application of these trip rates to the single low density residential dwelling on site results in the following trip generation:

- ▶ 1 veh/hr (0 in, 1 out) during the morning peak hour; and
- ▶ 1 veh/hr (1 in, 0 out) during the evening peak hour.

6.1.2 Retail (Specialty Shop)

The Roads and Maritime Guide to Trip Generating Developments (RMSGTGD) presents traffic generation rates for 'specialty retail' uses. This component attracts a trip rate of 4.6 trips/100m² of GLFA in the Thursday PM peak period based on trip rates for 'specialty retail' uses such as corner shops, cafes and restaurants. The application of this rate to the 892m² GFA of retail area results in the following trip generation:

- ▶ 14 veh/hr in the morning peak (11 in, 3 out) assuming 33% of the evening peak, associated mainly with staff arrivals; and



- ▶ 41 veh/hr (21 in, 20 out) during the Thursday evening peak hour.

6.1.3 Bulky Goods Retail Stores

The existing site also accommodates bulky good retail stores. The RMS Technical Direction TDT 2013/04a, revised trip generation advice for this land use based on six surveys conducted in 2009. The evening peak hour rate of 2.7 trips/100m², provided by TDT 2013/04a have been adopted. Application of this rate to the 1700m² of bulky goods retail area results in the following trip generation:

- ▶ 15 veh/hr in the morning peak (12 in, 3 out) assuming 33% of the evening peak, associated mainly with staff arrivals; and
- ▶ 46 veh/hr (23 in, 23 out) during the Thursday evening peak hour.

6.1.4 Car Yard

The RMSGTGD presents an evening peak hour trip generation rate of 0.7 trips/100m² for Motor Showroom uses. Application of this rate to the 1548m² of car yard results in the following trip generation:

- ▶ 4 veh/hr in the morning peak (3 in, 1 out) assuming 33% of the evening peak, associated mainly with staff arrivals; and
- ▶ 11 veh/hr (6 in, 5 out) during the Thursday evening peak hour.

6.1.5 Combined Existing Trip Generation

The combined trip generation of the existing development can be summarised as follows:

- ▶ 34 veh/hr (26 in, 8 out) during the morning peak hour; and
- ▶ 99 veh/hr (51 in, 48 out) during the evening peak hour.

6.2 Development Trip Generation

The impacts of the proposed development on the external road network have been assessed having regard for the indicative yield scenarios as summarised in **Section 4** above. This



assessment has been undertaken in accordance with the requirements of the RMS Guideline to Traffic Generating Developments (2002) and as such, the traffic generation rates published in the RMS Guide have been adopted for each individual land use. The result of this assessment is summarised below.

6.2.1 Residential

The RMS Technical Direction TDT 2013/04a provides revised trip generation advice for a number of land uses, one being high density residential development. The average Sydney weekday trip rates provided by TDT 2013/04a have been adopted for assessing the traffic generating potential of the subject development. The relevant trip rates are as follows:

- ▶ 0.19 vehicle trips per unit during the morning peak hour; and
- ▶ 0.15 vehicle trips per unit during the evening peak hour.

Application of these trip rates to the 373 residential units proposed, and adopting an 80:20 split, results in the following predicted trip generation volumes:

- ▶ 71 veh/hr (14 in, 57 out) during the morning peak hour; and
- ▶ 56 veh/hr (45 in, 11 out) during the evening peak hour.

6.2.2 Retail

This component attracts a trip rate of 4.6 trips/100m² of GLFA in the Thursday PM peak period based on the RMSGTGD trip rates for 'specialty retail' uses such as corner shops, cafes and restaurants. The application of this rate to the 1,035m² GFA of retail area results in the following trip generation:

- ▶ 16 veh/hr in the morning peak (13 in, 3 out) assuming 33% of the evening peak, associated mainly with staff arrivals; and
- ▶ 48 veh/hr (24 in, 24 out) during the Thursday evening peak hour.



6.2.3 Combined Development Generation

The combined generation of the residential and retail components can be summarised as follows:

- ▶ 87 veh/hr (27 in, 60 out) during the morning peak hour; and
- ▶ 104 veh/hr (69 in, 35 out) during the evening peak hour.

6.3 Net Traffic Impact

When accounting for the existing uses of the site, the proposed development will generate:

- ▶ 53 veh/hr (1 in, 52 out) during the morning peak hour; and
- ▶ 5 veh/hr (18 in, -13 out) during the evening peak hour

6.4 Traffic Distribution

In order to estimate the expected distribution of traffic to and from the subject development, percentage splits have been adopted further below. It is emphasised that the PM peak period impacts are negligible and that conditions will not change at any intersection. However, the PM peak period has been assessed for completeness, noting that traffic movements (not just volumes) have altered slightly at some intersections.

Inbound Movements

- ▶ 11% arrive to the development from the south west via Bold Street and Cowper Street from Local Government Areas (LGAs) such as Cumberland, Fairfield, Canterbury and Bankstown.
- ▶ 24% arrive to the development from the north west via Parramatta Road (eastbound) and Bold Street from LGAs such as Parramatta, Blacktown and Canada Bay.
- ▶ 65% arrive to the development from the north east via Parramatta Road (westbound) and Bold Street from LGAs such as Parramatta, Sydney and Ryde.

Outbound Movements

- ▶ 22% leave the development heading north via Good Street to LGAs such as Parramatta and The Hills Shire.



- ▶ 43% leave the development heading south west via Bold Street and Cowper Street to LGAs such as Cumberland, Fairfield and Canterbury
- ▶ 24% leave the development heading north west via Parramatta Road (eastbound) and Bold Street to LGAs such as Parramatta, Blacktown and Canada Bay.
- ▶ 11% leave the development heading north east via Parramatta Road (westbound) and Bold Street to LGAs such as Sydney, Ryde and North Sydney.

The above distribution has been used to determine the additional traffic during the evening peak period at the two key intersections to add to the existing SIDRA model.

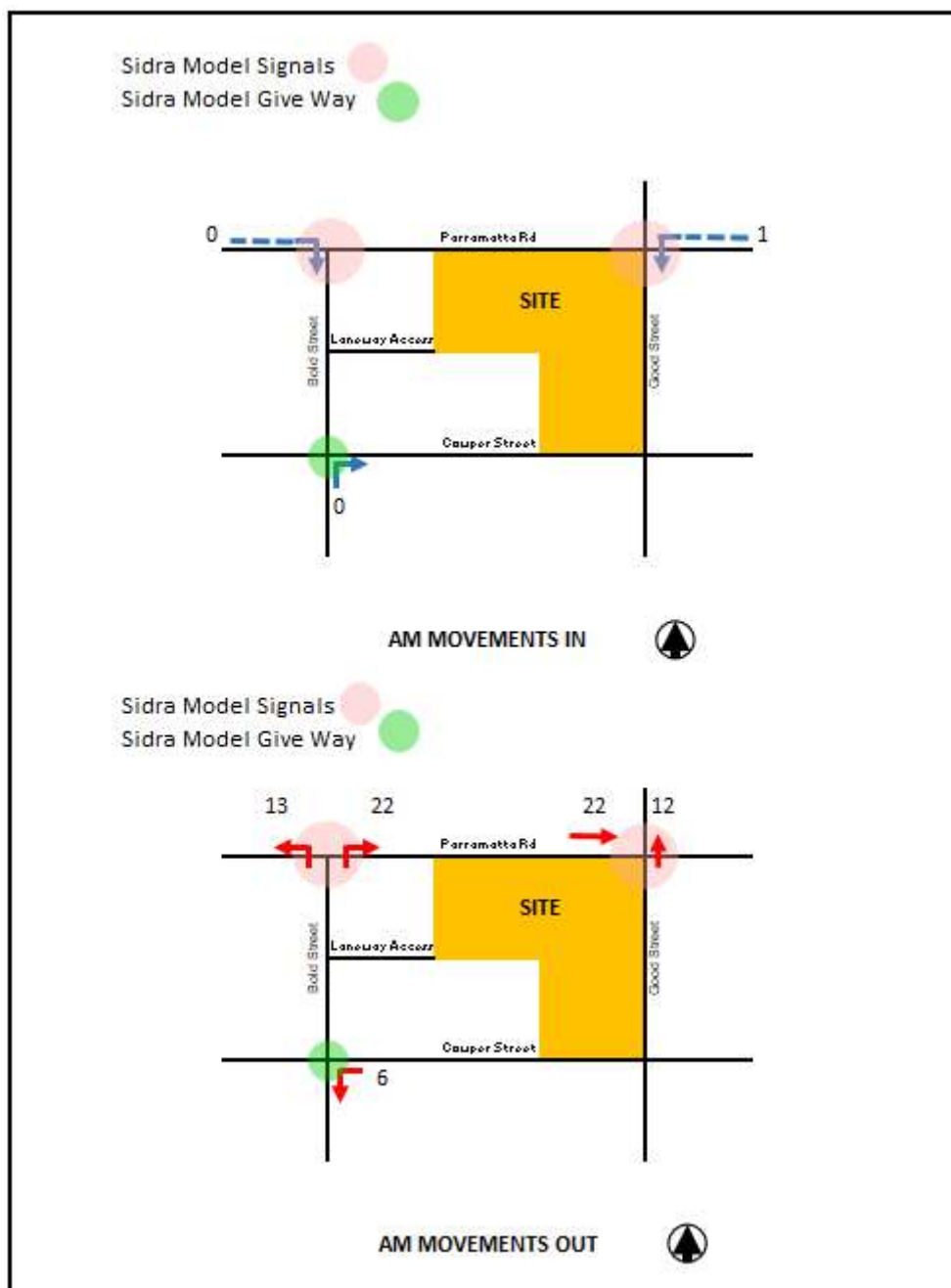


Figure 8: AM peak Period Distribution (Vehicle trips per hour)

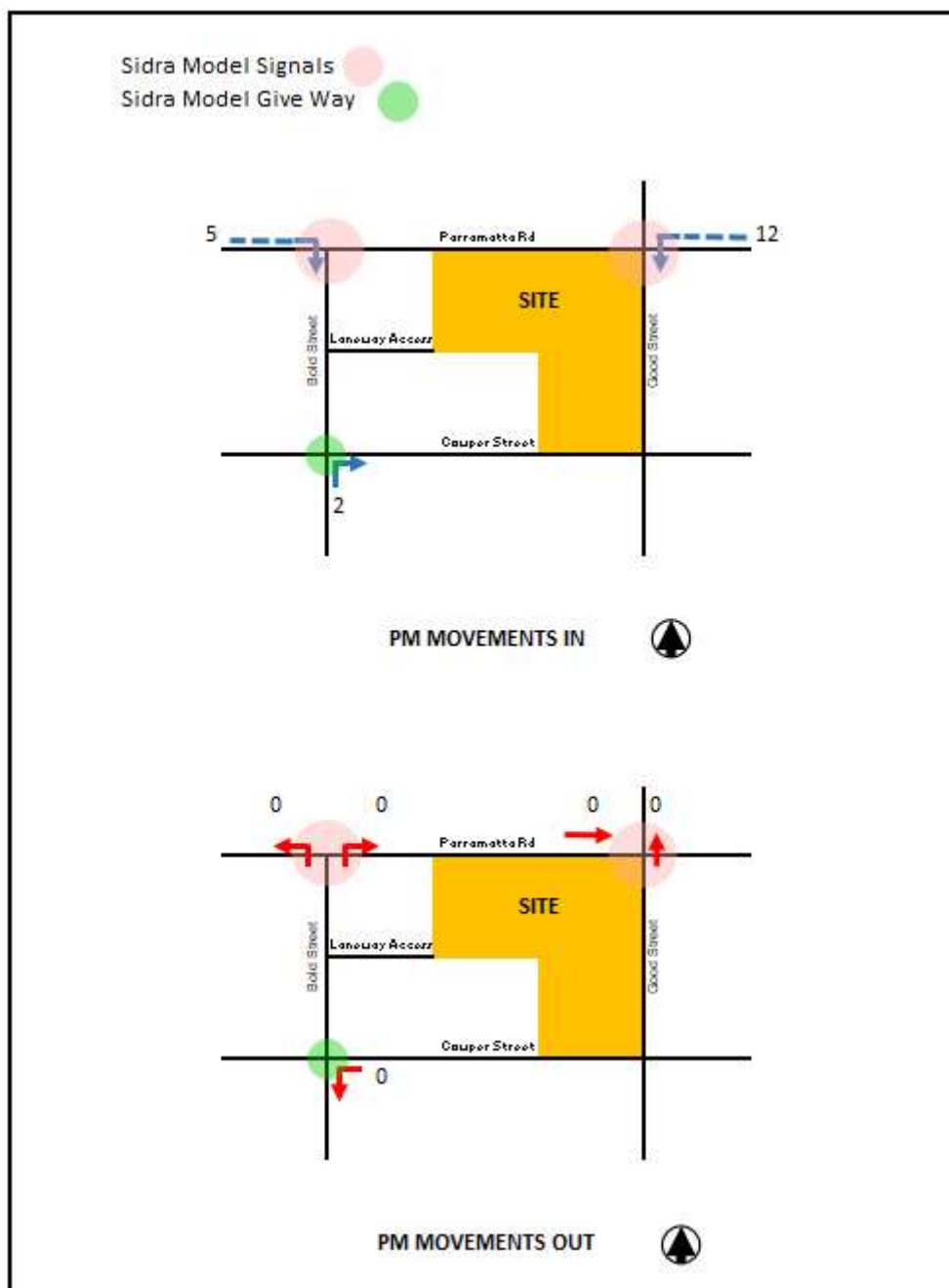


Figure 9: PM peak Period Distribution (Vehicle trips per hour)



6.5 Peak Period Intersection Performance

Traffic surveys were undertaken of the intersections mentioned above, which are considered to be most critical in relation to the site. These counts were undertaken on 12 March 2019 during the network peak periods, being between 6:30am and 9:00am (Morning Peak Period) and 4:30pm and 6:30pm (Evening peak period).

The traffic volumes in these surveys formed the base case volumes for software modelling undertaken to assess intersection performance characteristics under existing traffic conditions. The SIDRA Intersection 8 model produces a range of outputs, the most useful of which are the Degree of Saturation (DoS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted using the following explanations:

DoS - the DoS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DoS approaches 1, it is usual to attempt to keep DoS to less than 0.9. When DoS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DoS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS - this is a comparative measure which provides an indication of the operating performance of an intersection.

The traffic impacts arising from the proposed development during the morning and evening peak period have been assessed by loading the distributed traffic volumes into the SIDRA Intersection model. The results of this software modelling are summarised in **Table 3** below, with detailed outputs provided in **Appendix C** for individual lanes and approaches.



Table 3: Existing and Proposed Intersection Performance

Intersection	Control	Scenario	Period	Degree of Saturation (DoS)	Average Delay	Level of Service
Intersection of Parramatta Road and Good Street	Signal	Existing	AM	1.141	105.3	F
			PM	0.839	28.5	B
		Existing + Development	AM	1.142	107.9	F
			PM	0.839	28.6	C
Intersection of Parramatta Road and Bold Street	Signal	Existing	AM	0.897	49.4	D
			PM	1.094	112.8	F
		Existing + Development	AM	0.929	56.5	D
			PM	1.094	112.7	F
Intersection of Bold Street and Cowper Street	Priority*	Existing	AM	0.644	71.3	F
			PM	0.781	83.6	F
		Existing + Development	AM	0.648	71.8	F
			PM	0.782	83.8	F

* LoS for priority intersections based on the worst performing movement in accordance with RMS Guide to Traffic Generating Development.

In summary, the additional vehicle trips from the proposed development will result in the intersections performing similarly to existing conditions, with increases in delays limited to only a maximum of 7.1 seconds. Furthermore it is emphasised that the PM peak period generation will be negligible.

Notwithstanding a summary of the performance for each intersection during the AM peak period is provided below:

- **Parramatta Road and Good Street:** This intersection experiences a LoS of F in both the scenarios, however it should be noted that the development traffic only causes an additional delay of 2.6 seconds, indicating that the intersection is not sensitive to the particular movements associated with the proposed development.
- **Parramatta Road and Bold Street:** The intersection experiences a LoS of D in the existing during the morning peak with an increase in the average delay by 7.1 seconds. Critically, this LoS is maintained with the development volumes, with the intersection therefore operating within capacity.



► Bold Street and Cowper Street:

Whilst this intersection is officially has a LoS of F, this is based on the worst performing movement associated with the western leg of Cowper Street. Notwithstanding, this western leg serves an extremely limited number of movements (only a few properties) where detailed outputs reveal the primary approaches on Bold Street performing with an LoS A. In any case the maximum increase in delay was assessed to be 0.5 seconds which will be indiscernible.

In summary, the proposed development will have minimal impacts during the AM peak period, with intersections maintaining similar performance, where the PM peak period impacts will be negligible noting the minor increase in traffic volumes.



7. ACCESS AND INTERNAL DESIGN ASPECTS

7.1 Site Vehicular Access

7.1.1 Access

The development proposes a total of 347 resident and staff parking spaces with access to Cowper Street and Bold Street, both local roads. Therefore, it would ordinarily require a Category 3 driveway under AS2890.1 (2004), being a separated entry and exit with a minimum entry width of 6.0 metres and exit width between 4.0 and 6.0 metres with a separation of between 1 and 3 metres. However, the standard states that when a car park has multiple access points, each access should be designed for the number of parking spaces effectively served by that access.

In response, the proposed development has two (2) access driveways:

- ▶ **Cowper Street:** A combined 6.6m entry-exit access driveway will be provided, adjacent to the western property boundary. It will facilitate entry and exit for cars and trucks. A swept path analysis has been undertaken for the largest design vehicle to enter the development, being an 8.8m Medium Rigid Vehicle. The results are presented in **Appendix D** and demonstrate satisfactory operation.
- ▶ **Unnamed Laneway:** An entry only access driveway has been proposed from the unnamed laneway accessed from Bold Street. It has a combined width of 6.8m, relying on a 3.4m easement. Traffic flow is proposed to be in an easterly direction and it is also proposed for visitors to enter the development via the laneway. A swept path analysis has been undertaken for the largest design vehicle to enter the development, being a B99 vehicle. The results are presented in **Appendix D** and demonstrate satisfactory operation.



The proposed access arrangements are therefore considered to effectively comply with the access requirements of AS2890.1 (2004) by allowing for the same number of entry and exit points as intended for a Category 3 access driveway facility, being two (2) entry lanes (6.0m width) and one exit lane (4.0m). As assessed in Section 6, It will enable traffic volumes for the proposed development to be distributed across the local road network, and in particular will reduce reliance on Cowper Street.

7.2 Internal Design

The internal car park complies with the requirements of AS2890.1 (2004), AS2890.2 (2018) and AS2890.6 (2009), with the following noteworthy characteristics:

7.2.1 Parking Modules

- ▶ All car parking spaces have been designed in accordance for a Class 1A user and are provided with a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m.
- ▶ 39 accessible parking spaces have been designed in accordance with AS2890.6 (2009), being 2.4m wide, 5.4m long and situated immediately adjacent to a dedicated shared area or the circulating aisle.
- ▶ The single adaptable parking space is designed in accordance with AS4299 (1995) being 3.8m wide and 5.4m long.
- ▶ All spaces located adjacent to obstructions of greater than 150mm in height are provided with an additional width of 300mm.
- ▶ Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1 (2004).
- ▶ All columns are located outside of the parking space design envelope shown in Figure 5.2 of AS 2890.1 (2004).

7.2.2 Ramps

- ▶ The internal ramps have a maximum gradient of 25% (1 in 4) with sag and summit transitions of 12.5% (1:8) respectively. These provisions satisfy the requirements of AS2890.1 (2004).



- ▶ The first 6.0 metres of the vehicular accesses within the property boundary provide a maximum grade of 5% (1:20) in accordance with AS2890.1 (2004) and AS2890.2 (2018).

7.2.3 Clear Head Heights

- ▶ A minimum clear head height of 2.2m is provided for all areas within the car park as required by AS 2890.1 (2004).
- ▶ A minimum clear head height of 2.5m is to be provided above all accessible spaces in accordance with AS 2890.6 (2009).

7.2.4 Loading

- ▶ A loading bay has been designed in accordance with AS2890.2 (2018) for the requirements of an 8.8m Medium Rigid Vehicle, and includes a minimum space width of 3.5m, space length of 8.8m. A swept path analysis has been presented in **Appendix D**, which demonstrates compliant manoeuvring.
- ▶ AS2890.2 (2018) nominally requires a head height clearance of 4.5m. Notwithstanding, the applicant's waste contractor has confirmed a minimum clearance of 3.8m will be sufficient for the development to be serviced.

7.2.5 Other Considerations

- ▶ Visual splays have been provided at the access driveway in accordance with Figure 3.3 of AS2890.1 (2004).

7.3 Summary

In summary, the internal configuration of the car park has been designed in accordance with AS 2890.1 (2004), AS2890.2 (2018) and AS 2890.6 (2009). It is however envisaged that a condition of consent would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.



8. CONCLUSIONS

In summary:

- ▶ The development application seeks approval to construct a 24 storey mixed use development at 134-142 Parramatta Road, 26-38 Good Street and 59-61 Cowper Street in Granville, containing 373 apartments and 1035m² gross floor space of retail space.
- ▶ The subject site has excellent access to public transport, being within 150 metres of Granville Station and 400 metres of bus stops that are serviced a multitude of routes.
- ▶ The *Parramatta Development Control Plan 2012* stipulates site specific controls, where parking rates restrict the proposed development to a maximum of 510 parking spaces. In response, provision for 347 parking spaces has been made, with the allocation of parking aligning with the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS), which recommends reduced parking rates for developments on the Parramatta Road Corridor and with good access to public transport.
- ▶ The traffic generation arising from the development has been assessed as a net change over existing conditions, and equates to an additional 53 vehicle trips per hour during the morning peak hour and an additional 5 vehicle trips in the evening peak hour. SIDRA modelling of the intersections of Parramatta Road and Good Street, Parramatta Road and Bold Street and Bold Street and Cowper Street demonstrate comparable performance with the addition of development volumes and with minimal increases in delays, particularly during PM peak period conditions.
- ▶ The internal design of the car park has been assessed to comply with the requirements of AS2890.1 (2004) and AS2890.2 (2018), and includes provision for additional parking facilities including car share spaces and a loading bay suitable for an 8.8m Medium Rigid Vehicle.

This Traffic Impact Assessment therefore demonstrates that the subject application is supportable on transport planning grounds. TRAFFIX anticipates an ongoing involvement during the development approval process.

APPENDIX A

Photographic Record



View looking south-west towards subject site from Parramatta Road.



View looking north-west towards subject site from intersection of Good Street and Cowper Street.



View looking south-east towards intersection of Parramatta Road and Good Street



View looking north-west toward intersection of Parramatta Road and Good Street



View looking south-west toward intersection of Parramatta Road and Bold Street



View looking north towards intersection of Bold Street and Cowper Street



View looking north at subject site from Cowper Street



View looking north towards unnamed laneway



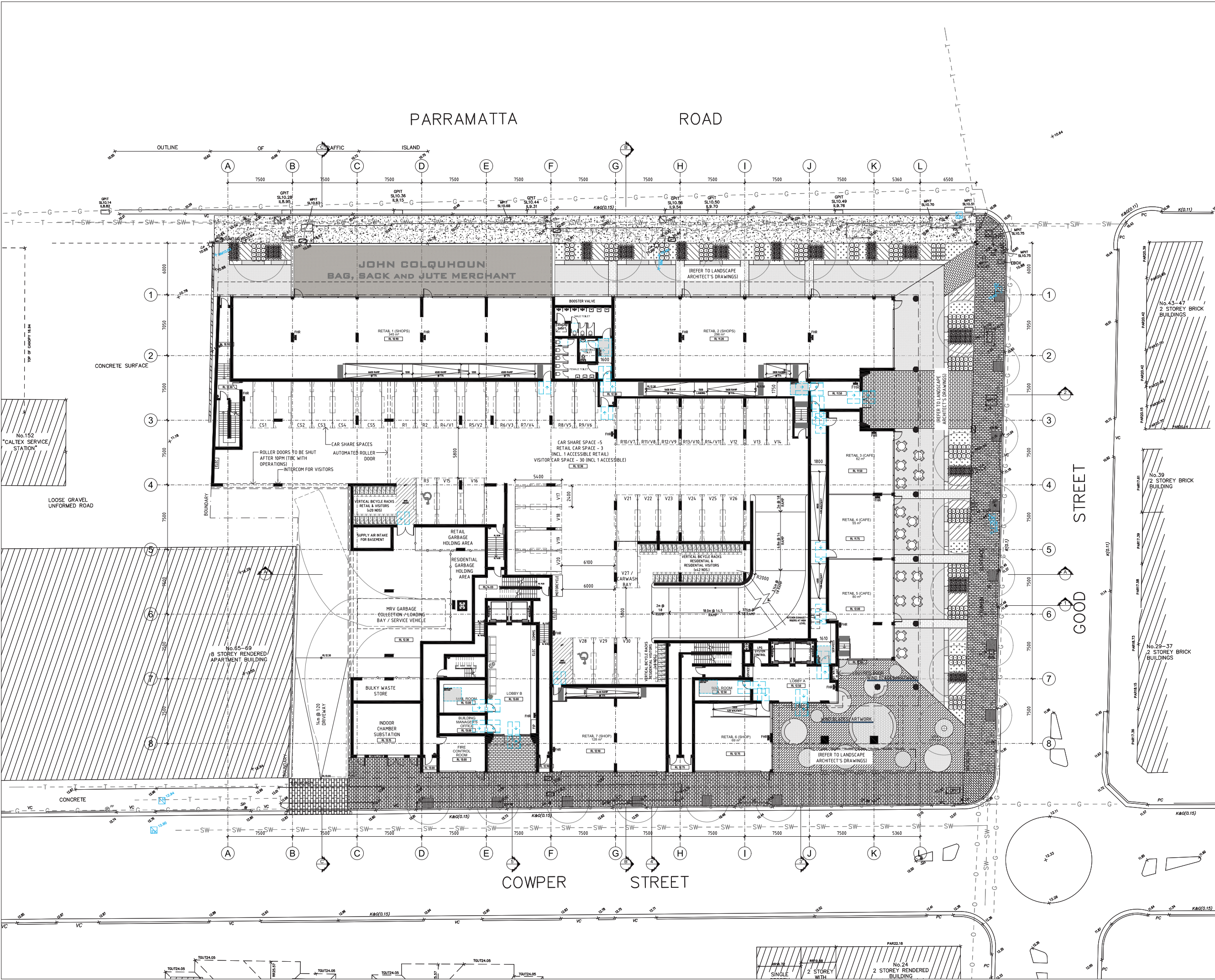
View looking south-east at unnamed laneway



View looking north-west from unnamed laneway towards Bold Street

APPENDIX B

Reduced Plans



GENERAL NOTES:

- ALL WORKS TO COMPLY WITH BUILDING CODE OF AUSTRALIA, REQUIREMENTS OF RELEVANT STATUTORY AUTHORITIES/ LOCAL GOVERNMENT & RELEVANT AUSTRALIAN BUILDING STANDARDS
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LEGEND:

AW AWNING
HW HIGHLIGHT WINDOW
CU A/C CONDENSER UNITS
FH FIRE HYDRANT
FHR FIRE HOSE REEL
FS FIRE STAIRS
MV MECHANICAL RISER TO FUTURE DETAIL
GC GARBAGE CHUTE
MB MAILBOX TO FUTURE DETAIL
OG OPAQUE GLASS
PB PLANTERBOX
R 240L RECYCLING BIN
SK SKYLIGHT
ST STORAGE
WT HOT WATER UNITS

MATERIALS LEGEND:

AFG ALUMINIUM FRAMED GLAZING
AW AWNING TO FUTURE DETAILS
FB FACE BRICK
GB FRAMELESS TOUGHENED GLASS BALUSTRADE (TO BCA/AUSTRALIAN STANDARDS)
Px PAINT FINISH TYPEx
RD ROLLER DOOR
RP RIVER PEBBLES
RW RENDERED WALL/SELECTED PAINT FINISH

ISSUE	DATE	DESCRIPTION
A	28.10.2019	DA LODGEMENT

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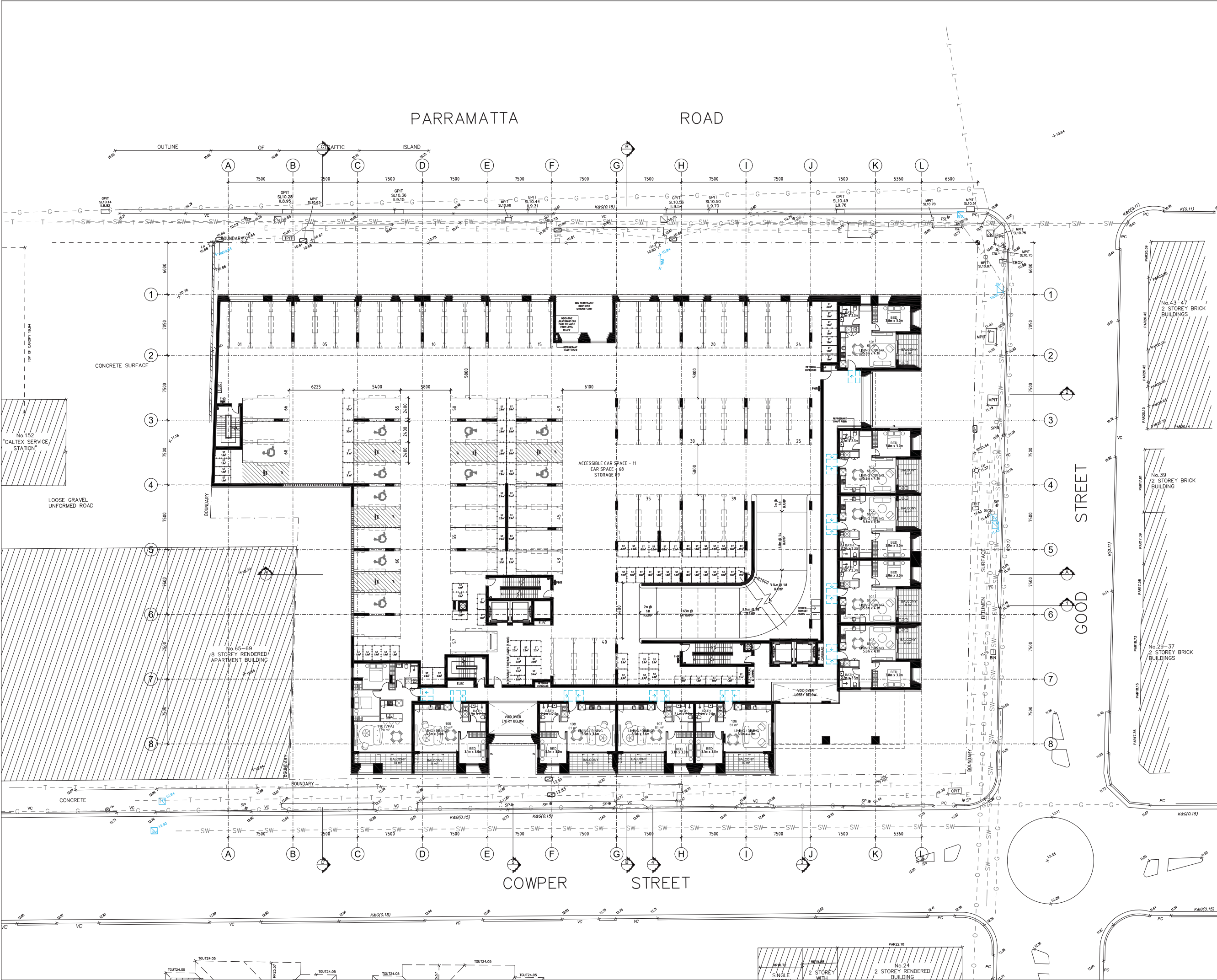
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PROJECT:
PROPOSED MIXED-USE DEVELOPMENT
GRAN CENTRAL, GRANVILLE
134-142 PARRAMATTA ROAD, 25-38 GOOD STREET AND 59-61 COWPER STREET, GRANVILLE

MAY 2019
DRAWING TITLE:
GROUND FLOOR PLAN

SCALE: 1:200@A1 / 1:400@A3	DRAWING NO: DA102	ISSUE: A
PROJECT NO: 1838		



GENERAL NOTES:

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LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
CU	A/C CONDENSER UNITS
PH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
GC	GARBAGE CHUTE
MB	MAILBOX TO FUTURE DETAIL
OG	OPAQUE GLASS
PB	PLANTERBOX
R	240L RECYCLING BIN
SK	SKYLIGHT
ST	STORAGE
WT	HOT WATER UNITS

MATERIALS LEGEND:

AFG	ALUMINIUM FRAMED GLAZING
AW	AWNING TO FUTURE DETAILS
FB	FACE BRICK
GB	FRAMELESS TOUGHENED GLASS BALUSTRADE (TO BCA/AUSTRALIAN STANDARDS)
Px	PAINT FINISH TYPEx
RD	ROLLER DOOR
RP	RIVER PEBBLES
RW	RENDERED WALL/SELECTED PAINT FINISH

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ISSUE	DATE	DESCRIPTION

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PROJECT:

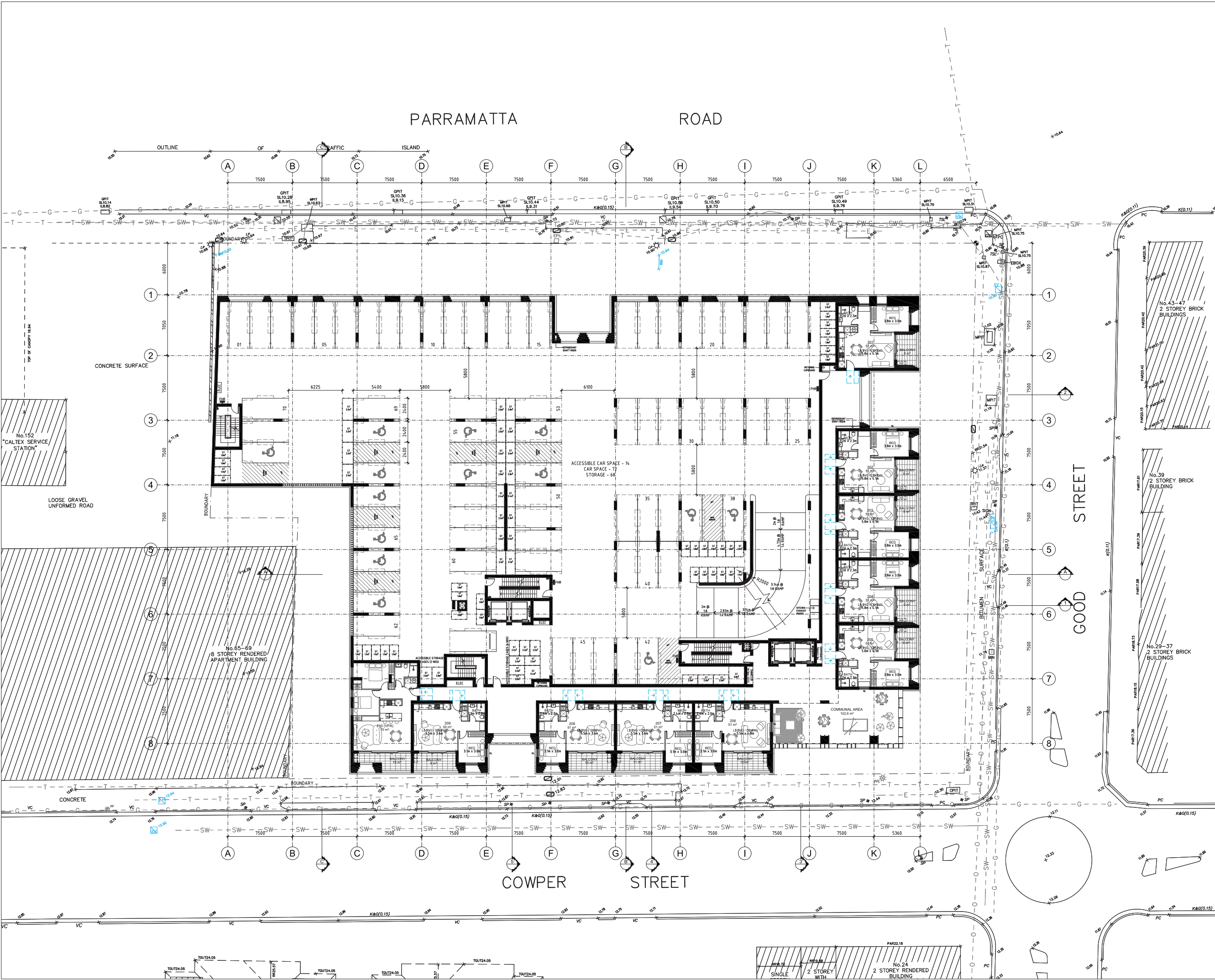
PROPOSED MIXED-USE DEVELOPMENT
GRAN CENTRAL, GRANVILLE
134-142 PARRAMATTA ROAD, 25-38 GOOD STREET AND 59-61 COWPER STREET, GRANVILLE

MAY 2019

DRAWING TITLE:

LEVEL 1 PLAN

SCALE:	DRAWING NO:	ISSUE:
1:200@A1 / 1:400@A3	DA103	A
PROJECT NO:		
1838		



GENERAL NOTES:

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LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
CU	A/C CONDENSER UNITS
PH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
GC	GARBAGE CHUTE
MB	MAILBOX TO FUTURE DETAIL
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ST	STORAGE
WT	HOT WATER UNITS

MATERIALS LEGEND:

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RD	ROLLER DOOR
RP	RIVER PEBBLES
RW	RENDERED WALL/SELECTED PAINT FINISH

A	28.10.2019	DA LODGEMENT
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Level 2, 52 Albion Street, Surry Hills NSW 2010

PROJECT:

PROPOSED MIXED-USE DEVELOPMENT

GRAN CENTRAL, GRANVILLE

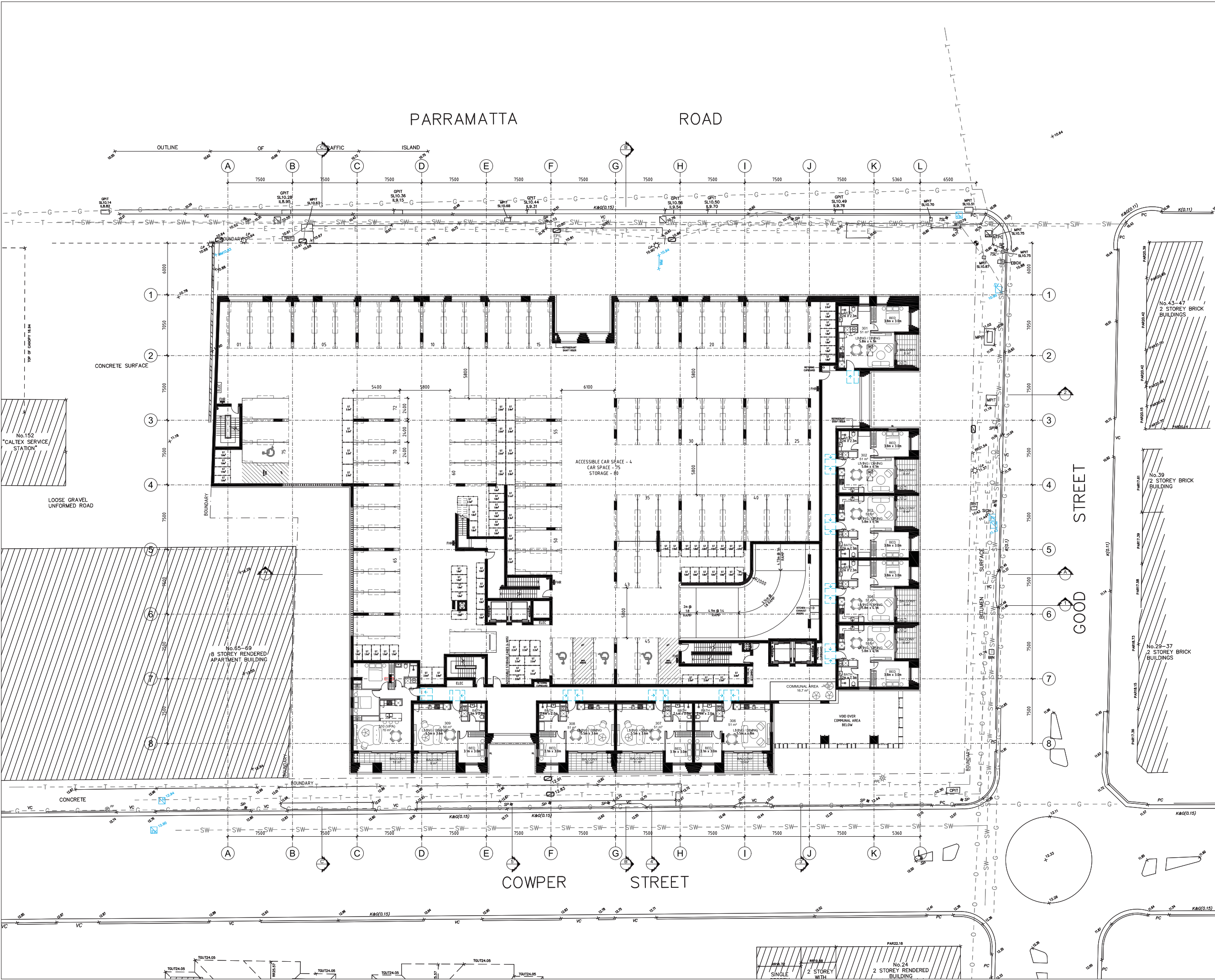
134-142 PARRAMATTA ROAD, 25-38 GOOD STREET AND 59-61 COWPER STREET, GRANVILLE

MAY 2019

DRAWING TITLE:

LEVEL 2 PLAN

SCALE:	DRAWING NO:	ISSUE:
1:200@A1 / 1:400@A3	DA104	A
PROJECT NO:		
1838		



GENERAL NOTES:

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LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
CU	A/C CONDENSER UNITS
PH	FIRE HYDRANT
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RD	ROLLER DOOR
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Level 2, 52 Albion Street, Surry Hills NSW 2010

PROJECT:

PROPOSED MIXED-USE DEVELOPMENT

GRAN CENTRAL, GRANVILLE

134-142 PARRAMATTA ROAD, 26-38 GOOD STREET AND 59-61 COWPER STREET, GRANVILLE

MAY 2019

DRAWING TITLE:

LEVEL 3 PLAN

SCALE:	DRAWING NO:	ISSUE:
1:200@A1 / 1:400@A3	DA105	A
PROJECT NO:		
1838		

APPENDIX C

SIDRA Outputs

USER REPORT FOR NETWORK SITE

 Project: 19.236m01v03 TRAFFIX Gran Central Network

Template: Layouts

 Site: 101 [101_EXAM_Parramatta Rd x Good St]

Network: 1 [EXAM]

101_Parramatta Road x Good Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

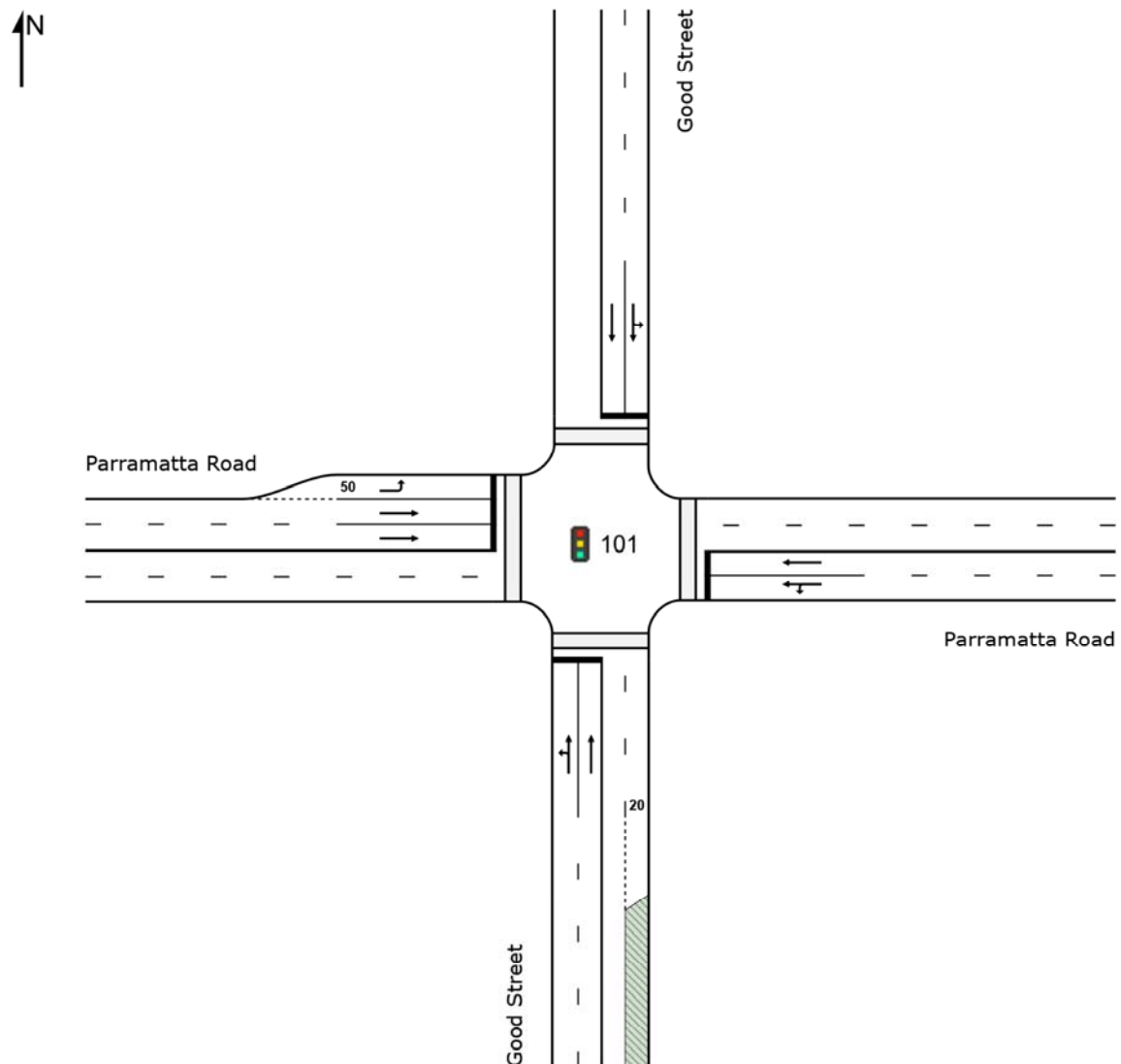
Phase Sequence: Custom

Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Site Layout



USER REPORT FOR NETWORK SITE

 **Project:** 19.236m01v03 TRAFFIX Gran Central Network

Template: Movement Summary

 **Site:** 101 [101_EXAM_Parramatta Rd x Good St]

 **Network:** 1 [EXAM]

101_Parramatta Road x Good Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Custom

Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Good Street														
1	L2	47	6.7	47	6.7	0.340	63.6	LOS E	1.9	13.7	0.93	0.76	0.93	3.9
2	T1	324	3.2	324	3.2	1.097	172.3	LOS F	23.9	171.6	1.00	1.58	1.96	10.6
Approach		372	3.7	372	3.7	1.097	158.4	LOS F	23.9	171.6	0.99	1.47	1.83	10.3
East: Parramatta Road														
4	L2	4	0.0	4	0.0	1.141	206.1	LOS F	64.2	499.8	1.00	1.80	2.08	8.2
5	T1	1392	13.2	1392	13.2	1.141	200.8	LOS F	64.2	499.8	1.00	1.80	2.08	7.5
Approach		1396	13.1	1396	13.1	1.141	200.8	LOS F	64.2	499.8	1.00	1.80	2.08	7.5
North: Good Street														
7	L2	25	4.2	25	4.2	0.256	60.9	LOS E	2.8	19.8	0.92	0.73	0.92	29.1
8	T1	389	1.6	389	1.6	1.139	185.3	LOS F	27.4	194.4	0.99	1.58	1.97	9.7
Approach		415	1.8	415	1.8	1.139	177.7	LOS F	27.4	194.4	0.99	1.52	1.91	10.4
West: Parramatta Road														
10	L2	374	1.1	374	1.1	0.335	18.1	LOS B	6.1	42.8	0.43	0.71	0.43	37.4
11	T1	1595	11.2	1595	11.2	0.718	10.9	LOS A	16.9	130.0	0.52	0.49	0.52	46.3
Approach		1968	9.3	1968	9.3	0.718	12.2	LOS A	16.9	130.0	0.51	0.53	0.51	44.1
All Vehicles		4151	9.3	4151	9.3	1.141	105.3	LOS F	64.2	499.8	0.76	1.14	1.29	14.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

USER REPORT FOR NETWORK SITE

 **Project: 19.236m01v03 TRAFFIX Gran Central Network**

Template: Movement Summary

 **Site: 102 [102_EXPM_Parramatta Rd x Good St]**

 **Network: 2 [EXPM]**

102_Parramatta Road x Good Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 145 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Custom

Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Good Street														
1	L2	35	0.0	35	0.0	0.112	48.8	LOS D	1.3	9.0	0.80	0.71	0.80	5.1
2	T1	278	0.4	278	0.4	0.560	50.3	LOS D	10.3	72.3	0.92	0.78	0.92	25.9
Approach		313	0.3	313	0.3	0.560	50.2	LOS D	10.3	72.3	0.91	0.78	0.91	24.5
East: Parramatta Road														
4	L2	12	0.0	12	0.0	0.645	26.2	LOS B	14.2	105.4	0.71	0.65	0.71	35.0
5	T1	1028	7.6	1028	7.6	0.645	20.7	LOS B	15.2	113.4	0.71	0.65	0.71	35.0
Approach		1040	7.5	1040	7.5	0.645	20.7	LOS B	15.2	113.4	0.71	0.65	0.71	35.0
North: Good Street														
7	L2	21	0.0	21	0.0	0.189	49.7	LOS D	3.1	21.6	0.82	0.68	0.82	32.1
8	T1	477	1.5	477	1.5	0.839	58.5	LOS E	17.9	127.0	0.97	0.91	1.06	22.3
Approach		498	1.5	498	1.5	0.839	58.1	LOS E	17.9	127.0	0.97	0.90	1.05	22.8
West: Parramatta Road														
10	L2	248	1.3	248	1.3	0.262	23.1	LOS B	4.6	32.5	0.47	0.71	0.47	34.8
11	T1	1688	4.1	1688	4.1	0.832	21.3	LOS B	17.9	130.0	0.72	0.67	0.72	38.1
Approach		1937	3.7	1937	3.7	0.832	21.5	LOS B	17.9	130.0	0.68	0.67	0.69	37.6
All Vehicles		3787	4.2	3787	4.2	0.839	28.5	LOS B	17.9	130.0	0.75	0.71	0.76	32.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

USER REPORT FOR NETWORK SITE

 Project: 19.236m01v03 TRAFFIX Gran Central Network

Template: Movement Summary

 Site: 103 [103_PRAM_Parramatta Rd x Good St]

Network: 3 [PRAM]

101_Parramatta Road x Good Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Custom

Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Good Street														
1	L2	47	6.7	47	6.7	0.340	63.6	LOS E	1.9	13.7	0.93	0.76	0.93	3.9
2	T1	337	3.1	337	3.1	1.139	204.5	LOS F	27.2	195.4	1.00	1.70	2.13	9.2
Approach		384	3.6	384	3.6	1.139	187.1	LOS F	27.2	195.4	0.99	1.59	1.98	9.0
East: Parramatta Road														
4	L2	5	0.0	5	0.0	1.142	206.7	LOS F	64.3	500.8	1.00	1.80	2.08	8.2
5	T1	1392	13.2	1392	13.2	1.142	201.4	LOS F	64.3	500.8	1.00	1.80	2.08	7.5
Approach		1397	13.1	1397	13.1	1.142	201.4	LOS F	64.3	500.8	1.00	1.80	2.08	7.5
North: Good Street														
7	L2	25	4.2	25	4.2	0.256	60.9	LOS E	2.8	19.8	0.92	0.73	0.92	29.1
8	T1	389	1.6	389	1.6	1.139	185.3	LOS F	27.4	194.4	0.99	1.58	1.97	9.7
Approach		415	1.8	415	1.8	1.139	177.7	LOS F	27.4	194.4	0.99	1.52	1.91	10.4
West: Parramatta Road														
10	L2	374	1.1	374	1.1	0.335	17.9	LOS B	6.0	42.3	0.42	0.70	0.42	37.5
11	T1	1618	11.1	1618	11.1	0.731	11.3	LOS A	17.0	130.0	0.54	0.50	0.54	46.0
Approach		1992	9.2	1992	9.2	0.731	12.5	LOS A	17.0	130.0	0.52	0.54	0.52	43.9
All Vehicles		4187	9.3	4187	9.3	1.142	107.9	LOS F	64.3	500.8	0.77	1.15	1.31	14.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

USER REPORT FOR NETWORK SITE

 Project: 19.236m01v03 TRAFFIX Gran Central Network

Template: Movement Summary

 Site: 104 [104_PRPM_Parramatta Rd x Good St]

Network: 4 [PRPM]

102_Parramatta Road x Good Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 145 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Custom

Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Good Street														
1	L2	35	0.0	35	0.0	0.112	48.8	LOS D	1.3	9.0	0.80	0.71	0.80	5.1
2	T1	278	0.4	278	0.4	0.560	50.3	LOS D	10.3	72.3	0.92	0.78	0.92	25.9
Approach		313	0.3	313	0.3	0.560	50.2	LOS D	10.3	72.3	0.91	0.78	0.91	24.5
East: Parramatta Road														
4	L2	24	0.0	24	0.0	0.653	27.0	LOS B	14.6	108.3	0.73	0.67	0.73	34.4
5	T1	1028	7.6	1028	7.6	0.653	21.1	LOS B	15.5	115.7	0.72	0.66	0.72	34.7
Approach		1053	7.4	1053	7.4	0.653	21.2	LOS B	15.5	115.7	0.72	0.66	0.72	34.7
North: Good Street														
7	L2	21	0.0	21	0.0	0.189	49.7	LOS D	3.1	21.6	0.82	0.68	0.82	32.1
8	T1	477	1.5	477	1.5	0.839	58.5	LOS E	17.9	127.0	0.97	0.91	1.06	22.3
Approach		498	1.5	498	1.5	0.839	58.1	LOS E	17.9	127.0	0.97	0.90	1.05	22.8
West: Parramatta Road														
10	L2	248	1.3	248	1.3	0.262	23.1	LOS B	4.6	32.5	0.47	0.71	0.47	34.8
11	T1	1688	4.1	1688	4.1	0.832	21.3	LOS B	17.9	130.0	0.72	0.67	0.72	38.1
Approach		1937	3.7	1937	3.7	0.832	21.5	LOS B	17.9	130.0	0.68	0.67	0.69	37.6
All Vehicles		3800	4.2	3800	4.2	0.839	28.6	LOS C	17.9	130.0	0.75	0.71	0.76	32.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

201_Parramatta Road x Bold Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

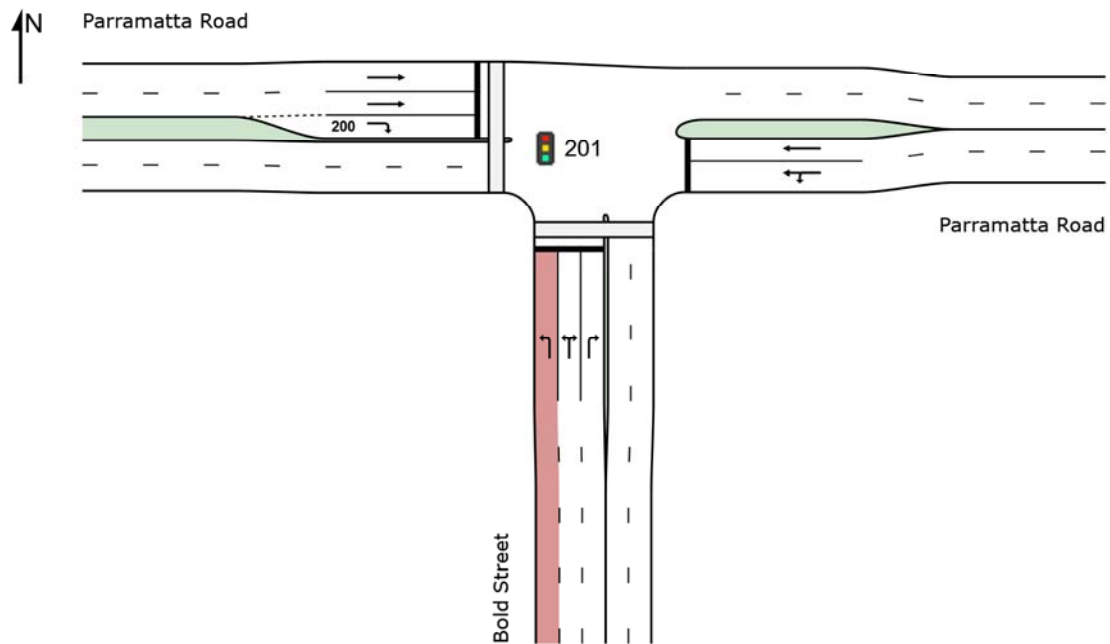
Phase Sequence: Parramatta Rd x Bold St - B 2 only

Reference Phase: Phase A

Input Phase Sequence: A, B2, C

Output Phase Sequence: A, B2, C

Site Layout



201_Parramatta Road x Bold Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Parramatta Rd x Bold St - B 2 only

Reference Phase: Phase A

Input Phase Sequence: A, B2, C

Output Phase Sequence: A, B2, C

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bold Street														
1	L2	227	9.7	227	9.7	0.884	58.9	LOS E	8.1	60.0	1.00	0.95	1.14	23.5
3	R2	626	4.2	626	4.2	0.884	64.4	LOS E	8.3	60.0	1.00	0.97	1.20	3.9
Approach		854	5.7	854	5.7	0.884	62.9	LOS E	8.3	60.0	1.00	0.97	1.18	10.7
East: Parramatta Road														
4	L2	43	17.1	38	17.0	0.836	47.2	LOS D	16.7	130.0	0.96	0.89	0.99	10.5
5	T1	1366	13.0	1217	13.0	0.836	42.0	LOS C	16.7	130.0	0.97	0.91	1.01	30.5
Approach		1409	13.1	1255 ^{N1}	13.1	0.836	42.2	LOS C	16.7	130.0	0.97	0.91	1.01	30.2
West: Parramatta Road														
11	T1	1331	11.9	1331	11.9	0.897	44.0	LOS D	36.7	283.1	0.96	0.99	1.09	27.0
12	R2	137	10.0	137	10.0	0.859	83.5	LOS F	6.3	48.1	1.00	0.93	1.31	18.0
Approach		1467	11.8	1467	11.8	0.897	47.7	LOS D	36.7	283.1	0.97	0.99	1.11	25.8
All Vehicles		3731	10.9	3576 ^{N1}	11.4	0.897	49.4	LOS D	36.7	283.1	0.98	0.96	1.09	24.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

202_Parramatta Road x Bold Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 145 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Parramatta Rd x Bold St - B2 Only

Reference Phase: Phase A

Input Phase Sequence: A, B2, C

Output Phase Sequence: A, B2, C

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bold Street														
1	L2	171	4.3	171	4.3	1.073	163.7	LOS F	8.4	60.0	1.00	1.22	1.83	11.3
3	R2	531	1.2	531	1.2	1.073	167.6	LOS F	8.5	60.0	1.00	1.24	1.87	1.5
Approach		701	2.0	701	2.0	1.073	166.7	LOS F	8.5	60.0	1.00	1.23	1.86	4.2
East: Parramatta Road														
4	L2	59	8.9	59	8.9	0.653	25.3	LOS B	13.3	99.4	0.61	0.57	0.61	18.3
5	T1	1021	7.4	1021	7.4	0.653	18.7	LOS B	13.3	99.4	0.60	0.55	0.60	41.9
Approach		1080	7.5	1080	7.5	0.653	19.0	LOS B	13.3	99.4	0.60	0.55	0.60	41.2
West: Parramatta Road														
11	T1	1332	4.7	1332	4.7	1.094	165.3	LOS F	58.8	428.1	1.00	1.61	1.85	10.6
12	R2	161	2.0	161	2.0	0.678	72.4	LOS F	6.9	48.9	1.00	0.83	1.03	19.9
Approach		1493	4.4	1493	4.4	1.094	155.3	LOS F	58.8	428.1	1.00	1.53	1.76	11.1
All Vehicles		3274	4.9	3274	4.9	1.094	112.8	LOS F	58.8	428.1	0.87	1.14	1.40	13.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

201_Parramatta Road x Bold Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Parramatta Rd x Bold St - B 2 only

Reference Phase: Phase A

Input Phase Sequence: A, B2, C

Output Phase Sequence: A, B2, C

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bold Street														
1	L2	241	9.2	241	9.2	0.914	65.7	LOS E	8.2	60.0	1.00	0.98	1.20	22.0
3	R2	649	4.1	649	4.1	0.914	72.1	LOS F	8.3	60.0	1.00	1.00	1.27	3.5
Approach		891	5.4	891	5.4	0.914	70.4	LOS E	8.3	60.0	1.00	1.00	1.25	9.9
East: Parramatta Road														
4	L2	43	17.1	38	17.0	0.850	49.3	LOS D	16.7	130.0	0.97	0.91	1.02	10.1
5	T1	1366	13.0	1216	13.0	0.850	44.2	LOS D	16.7	130.0	0.98	0.93	1.03	29.8
Approach		1409	13.1	1254 ^{N1}	13.1	0.850	44.4	LOS D	16.7	130.0	0.98	0.93	1.03	29.4
West: Parramatta Road														
11	T1	1331	11.9	1331	11.9	0.929	55.8	LOS D	41.0	316.4	1.00	1.09	1.21	23.5
12	R2	137	10.0	137	10.0	0.859	83.5	LOS F	6.3	48.1	1.00	0.93	1.31	18.0
Approach		1467	11.8	1467	11.8	0.929	58.4	LOS E	41.0	316.4	1.00	1.07	1.22	22.9
All Vehicles		3767	10.8	3612 ^{N1}	11.2	0.929	56.5	LOS D	41.0	316.4	0.99	1.00	1.16	22.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

202_Parramatta Road x Bold Street

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 145 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Parramatta Rd x Bold St - B2 Only

Reference Phase: Phase A

Input Phase Sequence: A, B2, C

Output Phase Sequence: A, B2, C

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Distance	Effective Queued	Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Bold Street														
1	L2	171	4.3	171	4.3	1.073	163.7	LOS F	8.4	60.0	1.00	1.22	1.83	11.3
3	R2	531	1.2	531	1.2	1.073	167.6	LOS F	8.5	60.0	1.00	1.24	1.87	1.5
Approach		701	2.0	701	2.0	1.073	166.7	LOS F	8.5	60.0	1.00	1.23	1.86	4.2
East: Parramatta Road														
4	L2	59	8.9	59	8.9	0.653	25.3	LOS B	13.3	99.4	0.61	0.57	0.61	18.3
5	T1	1021	7.4	1021	7.4	0.653	18.7	LOS B	13.3	99.4	0.60	0.55	0.60	41.9
Approach		1080	7.5	1080	7.5	0.653	19.0	LOS B	13.3	99.4	0.60	0.55	0.60	41.2
West: Parramatta Road														
11	T1	1332	4.7	1332	4.7	1.094	165.3	LOS F	58.8	428.1	1.00	1.61	1.85	10.6
12	R2	166	1.9	166	1.9	0.700	73.0	LOS F	7.2	50.9	1.00	0.84	1.05	19.8
Approach		1498	4.4	1498	4.4	1.094	155.1	LOS F	58.8	428.1	1.00	1.53	1.76	11.1
All Vehicles		3279	4.9	3279	4.9	1.094	112.7	LOS F	58.8	428.1	0.87	1.14	1.40	13.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

▽ Site: 301 [301_EXAM_Bold St x Cowper St]

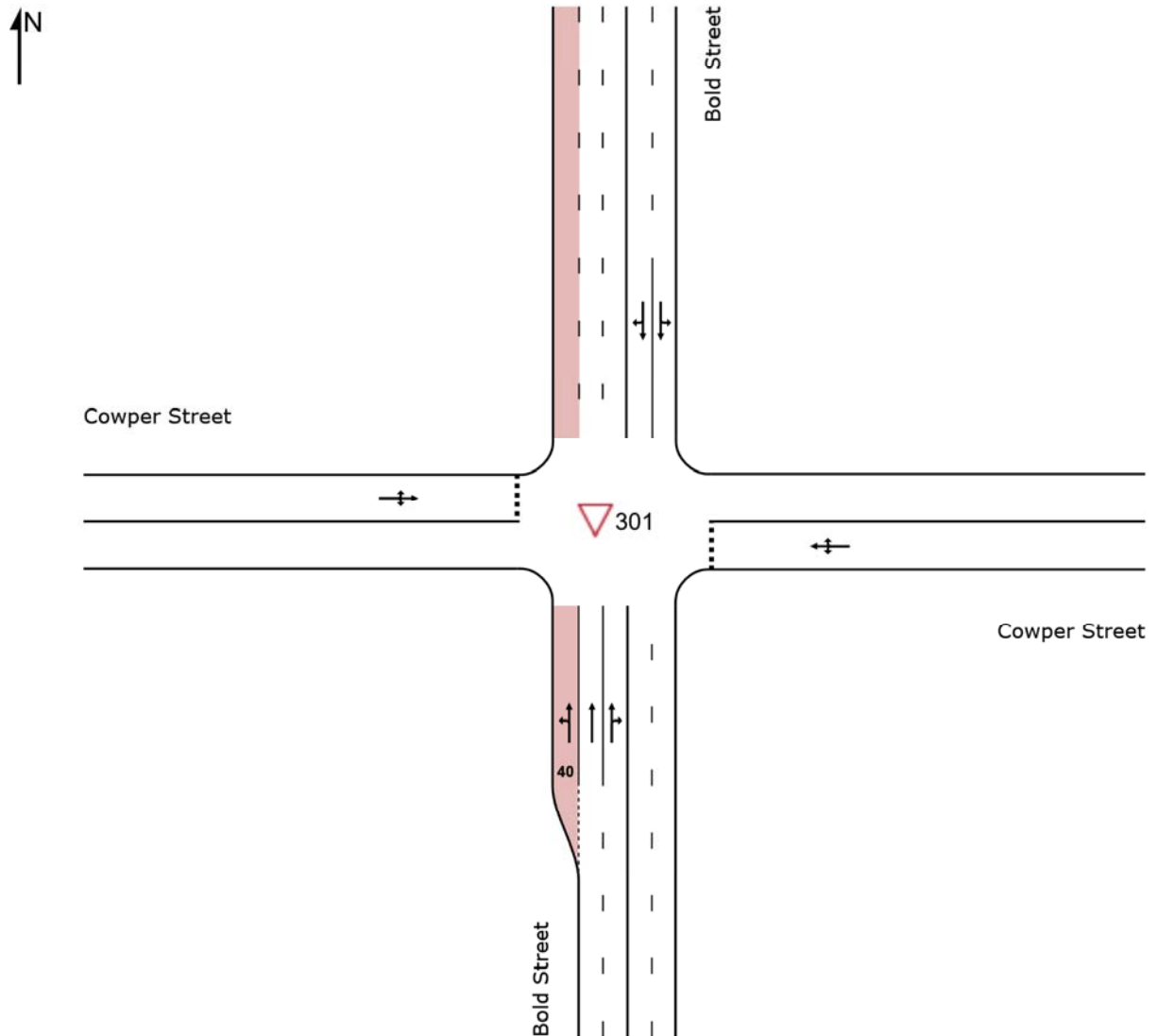
Network: 1 [EXAM]

301_Bold Street x Cowper Street

Site Category: (None)

Giveway / Yield (Two-Way)

Site Layout



301_Bold Street x Cowper Street

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Bold Street														
1	L2	8	0.0	8	0.0	0.005	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	35.4
2	T1	921	5.1	921	5.1	0.379	0.2	LOS A	17.3	126.8	0.06	0.08	0.06	52.3
3	R2	331	3.8	331	3.8	0.379	6.5	LOS A	5.9	43.0	0.27	0.36	0.27	42.6
Approach		1260	4.8	1260	4.8	0.379	1.9	NA	17.3	126.8	0.12	0.16	0.12	47.4
East: Cowper Street														
4	L2	345	3.0	345	3.0	0.644	13.2	LOS A	3.3	23.8	0.27	0.66	0.51	26.9
5	T1	2	50.0	2	50.0	0.644	71.3	LOS F	3.3	23.8	0.27	0.66	0.51	24.2
6	R2	39	5.4	39	5.4	0.644	52.5	LOS D	3.3	23.8	0.27	0.66	0.51	21.0
Approach		386	3.5	386	3.5	0.644	17.4	LOS B	3.3	23.8	0.27	0.66	0.51	26.4
North: Bold Street														
7	L2	12	9.1	11	9.0	0.054	4.3	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
8	T1	169	11.2	165	11.0	0.054	0.5	LOS A	0.0	0.3	0.06	0.05	0.06	55.0
9	R2	4	0.0	4	0.0	0.054	11.5	LOS A	0.0	0.3	0.12	0.03	0.12	28.2
Approach		185	10.8	181 ^{N1}	10.6	0.054	1.0	NA	0.0	0.3	0.06	0.05	0.06	53.5
West: Cowper Street														
10	L2	7	14.3	7	14.3	0.096	4.9	LOS A	0.1	0.5	0.00	0.55	0.00	12.8
11	T1	2	50.0	2	50.0	0.096	41.9	LOS C	0.1	0.5	0.00	0.55	0.00	21.6
12	R2	3	0.0	3	0.0	0.096	41.7	LOS C	0.1	0.5	0.00	0.55	0.00	20.5
Approach		13	16.7	13	16.7	0.096	20.3	LOS B	0.1	0.5	0.00	0.55	0.00	16.9
All Vehicles		1844	5.2	1840 ^{N1}	5.2	0.644	5.2	NA	17.3	126.8	0.14	0.25	0.19	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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 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.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

302_Bold Street x Cowper Street

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Bold Street														
1	L2	4	0.0	4	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	35.4
2	T1	739	1.7	739	1.7	0.295	0.2	LOS A	14.8	105.0	0.07	0.08	0.07	52.2
3	R2	251	0.0	251	0.0	0.295	6.6	LOS A	8.7	61.4	0.28	0.35	0.28	43.3
Approach		994	1.3	994	1.3	0.295	1.9	NA	14.8	105.0	0.12	0.15	0.12	48.0
East: Cowper Street														
4	L2	689	2.0	689	2.0	0.781	13.0	LOS A	7.8	55.5	0.36	0.67	0.65	28.9
5	T1	3	33.3	3	33.3	0.781	61.5	LOS E	7.8	55.5	0.36	0.67	0.65	26.2
6	R2	36	0.0	36	0.0	0.781	52.0	LOS D	7.8	55.5	0.36	0.67	0.65	23.0
Approach		728	2.0	728	2.0	0.781	15.1	LOS B	7.8	55.5	0.36	0.67	0.65	28.7
North: Bold Street														
7	L2	25	4.2	25	4.2	0.064	4.3	LOS A	0.0	0.0	0.00	0.12	0.00	48.9
8	T1	208	4.0	208	4.0	0.064	0.1	LOS A	0.0	0.1	0.02	0.06	0.02	56.7
9	R2	2	0.0	2	0.0	0.064	9.4	LOS A	0.0	0.1	0.04	0.01	0.04	29.9
Approach		236	4.0	236	4.0	0.064	0.7	NA	0.0	0.1	0.02	0.07	0.02	55.2
West: Cowper Street														
10	L2	7	14.3	7	14.3	0.244	9.2	LOS A	0.2	1.5	0.00	0.55	0.00	6.6
11	T1	1	0.0	1	0.0	0.244	21.7	LOS B	0.2	1.5	0.00	0.55	0.00	14.0
12	R2	7	28.6	7	28.6	0.244	83.6	LOS F	0.2	1.5	0.00	0.55	0.00	11.8
Approach		16	20.0	16	20.0	0.244	44.8	LOS D	0.2	1.5	0.00	0.55	0.00	9.8
All Vehicles		1974	2.0	1974	2.0	0.781	6.9	NA	14.8	105.0	0.20	0.34	0.30	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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 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.

301_Bold Street x Cowper Street

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Bold Street														
1	L2	8	0.0	8	0.0	0.005	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	35.4
2	T1	921	5.1	921	5.1	0.379	0.2	LOS A	20.4	148.8	0.06	0.08	0.06	52.3
3	R2	331	3.8	331	3.8	0.379	6.5	LOS A	7.7	56.0	0.27	0.36	0.27	42.6
Approach		1260	4.8	1260	4.8	0.379	1.9	NA	20.4	148.8	0.12	0.16	0.12	47.4
East: Cowper Street														
4	L2	352	3.0	352	3.0	0.648	13.3	LOS A	3.4	24.5	0.27	0.66	0.52	26.9
5	T1	2	50.0	2	50.0	0.648	71.8	LOS F	3.4	24.5	0.27	0.66	0.52	24.1
6	R2	39	5.4	39	5.4	0.648	52.9	LOS D	3.4	24.5	0.27	0.66	0.52	20.9
Approach		393	3.5	393	3.5	0.648	17.5	LOS B	3.4	24.5	0.27	0.66	0.52	26.4
North: Bold Street														
7	L2	12	9.1	11	9.0	0.054	4.3	LOS A	0.0	0.0	0.00	0.07	0.00	49.0
8	T1	169	11.2	165	11.0	0.054	0.5	LOS A	0.0	0.3	0.06	0.05	0.06	55.0
9	R2	4	0.0	4	0.0	0.054	11.5	LOS A	0.0	0.3	0.12	0.03	0.12	28.2
Approach		185	10.8	181 ^{N1}	10.6	0.054	1.0	NA	0.0	0.3	0.06	0.05	0.06	53.5
West: Cowper Street														
10	L2	7	14.3	7	14.3	0.096	4.9	LOS A	0.1	0.5	0.00	0.55	0.00	12.8
11	T1	2	50.0	2	50.0	0.096	41.9	LOS C	0.1	0.5	0.00	0.55	0.00	21.6
12	R2	3	0.0	3	0.0	0.096	41.9	LOS C	0.1	0.5	0.00	0.55	0.00	20.5
Approach		13	16.7	13	16.7	0.096	20.3	LOS B	0.1	0.5	0.00	0.55	0.00	16.9
All Vehicles		1851	5.2	1846 ^{N1}	5.2	0.648	5.3	NA	20.4	148.8	0.14	0.26	0.20	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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 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.

^{N1} Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

302_Bold Street x Cowper Street

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: Bold Street														
1	L2	4	0.0	4	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	35.4
2	T1	739	1.7	739	1.7	0.295	0.2	LOS A	14.8	105.0	0.07	0.08	0.07	52.3
3	R2	253	0.0	253	0.0	0.295	6.6	LOS A	8.7	61.4	0.28	0.35	0.28	43.3
Approach		996	1.3	996	1.3	0.295	1.9	NA	14.8	105.0	0.12	0.15	0.12	47.9
East: Cowper Street														
4	L2	689	2.0	689	2.0	0.782	13.0	LOS A	7.8	55.7	0.36	0.67	0.65	28.8
5	T1	3	33.3	3	33.3	0.782	61.8	LOS E	7.8	55.7	0.36	0.67	0.65	26.2
6	R2	36	0.0	36	0.0	0.782	52.2	LOS D	7.8	55.7	0.36	0.67	0.65	22.9
Approach		728	2.0	728	2.0	0.782	15.1	LOS B	7.8	55.7	0.36	0.67	0.65	28.6
North: Bold Street														
7	L2	25	4.2	25	4.2	0.064	4.3	LOS A	0.0	0.0	0.00	0.12	0.00	48.9
8	T1	208	4.0	208	4.0	0.064	0.1	LOS A	0.0	0.1	0.02	0.06	0.02	56.7
9	R2	2	0.0	2	0.0	0.064	9.4	LOS A	0.0	0.1	0.04	0.01	0.04	29.9
Approach		236	4.0	236	4.0	0.064	0.7	NA	0.0	0.1	0.02	0.07	0.02	55.2
West: Cowper Street														
10	L2	7	14.3	7	14.3	0.245	9.3	LOS A	0.2	1.5	0.00	0.55	0.00	6.6
11	T1	1	0.0	1	0.0	0.245	21.8	LOS B	0.2	1.5	0.00	0.55	0.00	14.0
12	R2	7	28.6	7	28.6	0.245	83.8	LOS F	0.2	1.5	0.00	0.55	0.00	11.8
Approach		16	20.0	16	20.0	0.245	44.9	LOS D	0.2	1.5	0.00	0.55	0.00	9.8
All Vehicles		1976	2.0	1976	2.0	0.782	7.0	NA	14.8	105.0	0.20	0.34	0.30	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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.

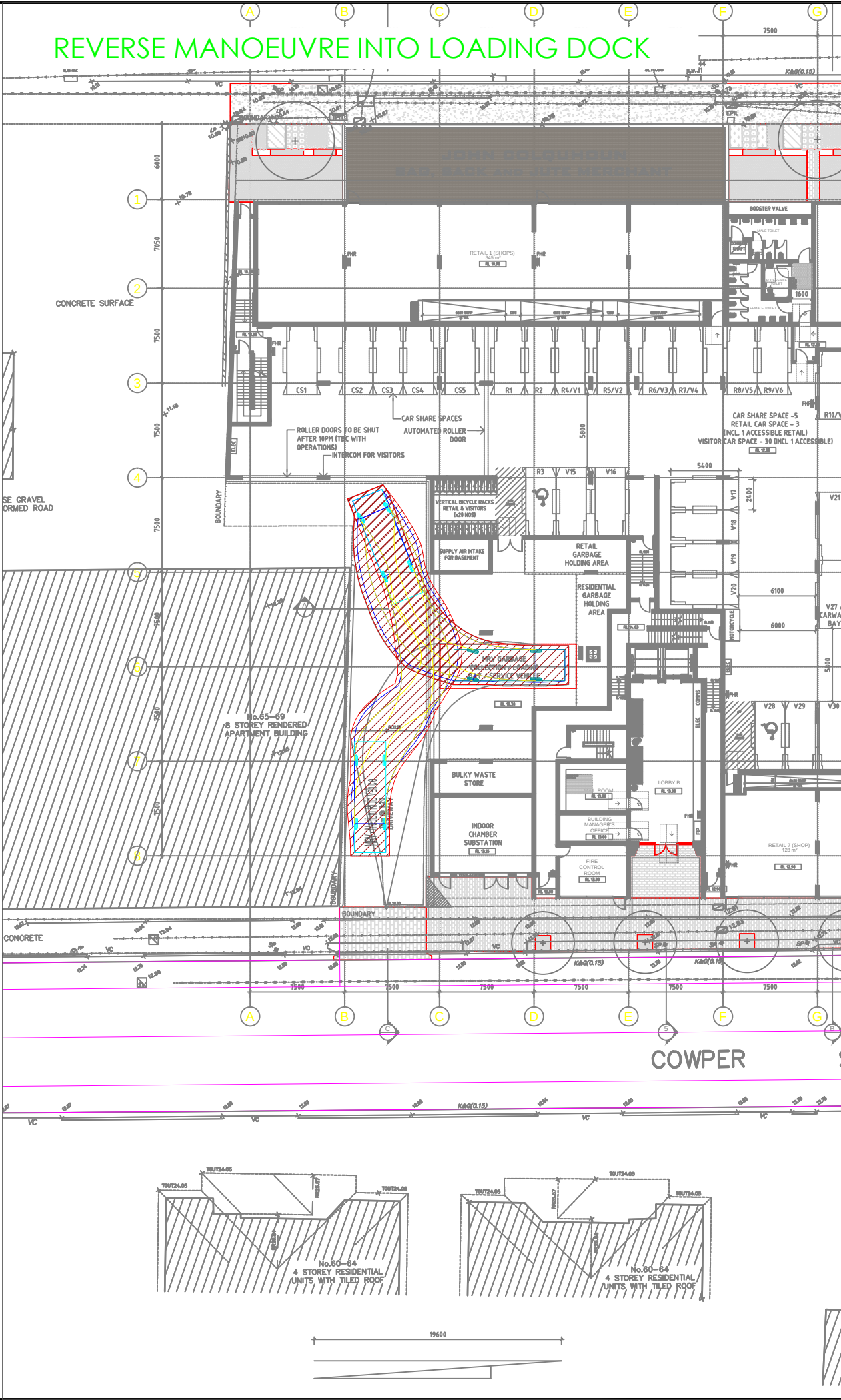
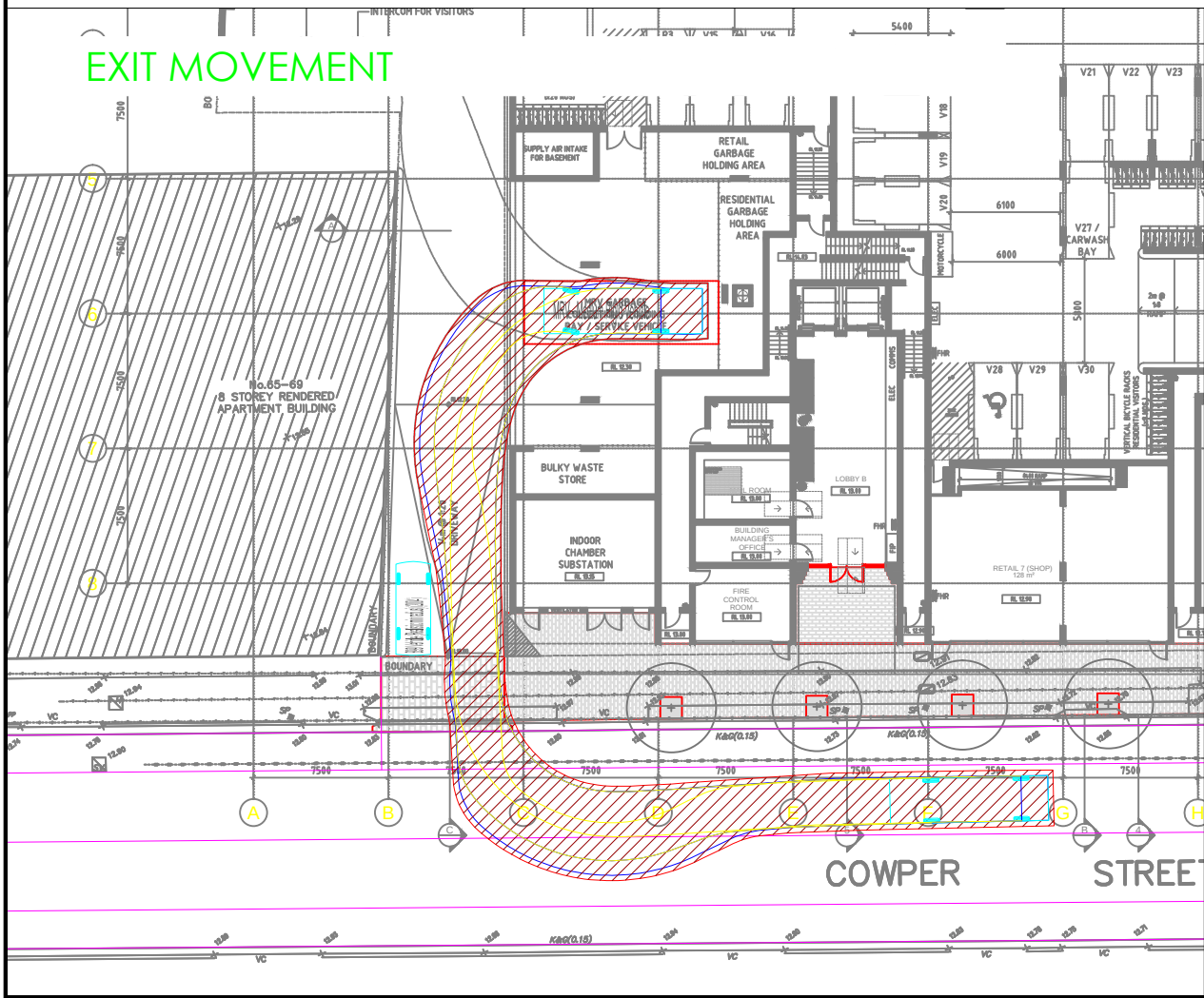
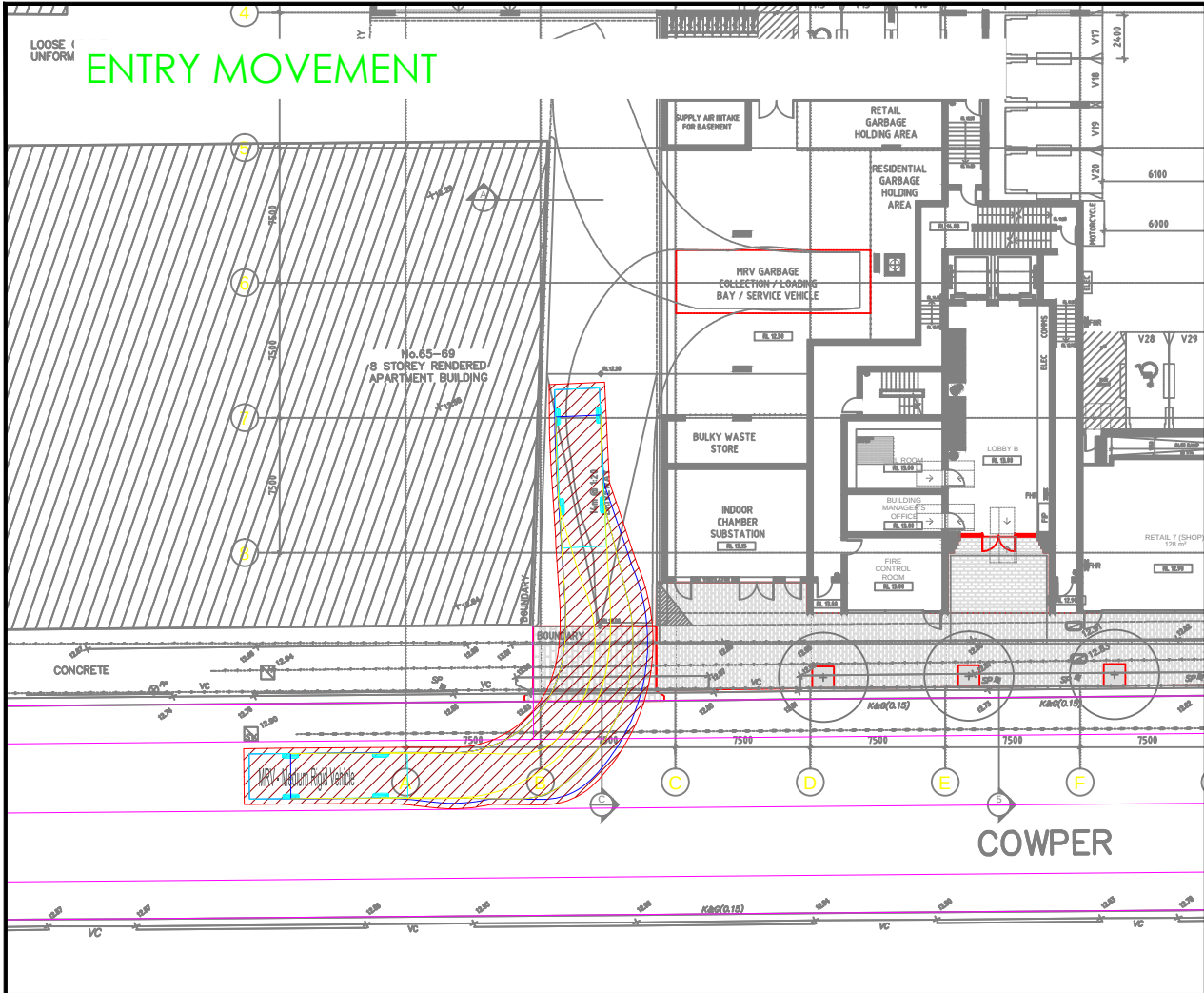
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D

Swept Path Analysis



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
PBD Architects

Client
Starryland NSW Pty Ltd

Scale / Plan Orientation

0 4 8 12 16m
1:400 @ A3

Project Description
Gran Central

Drawing Prepared By



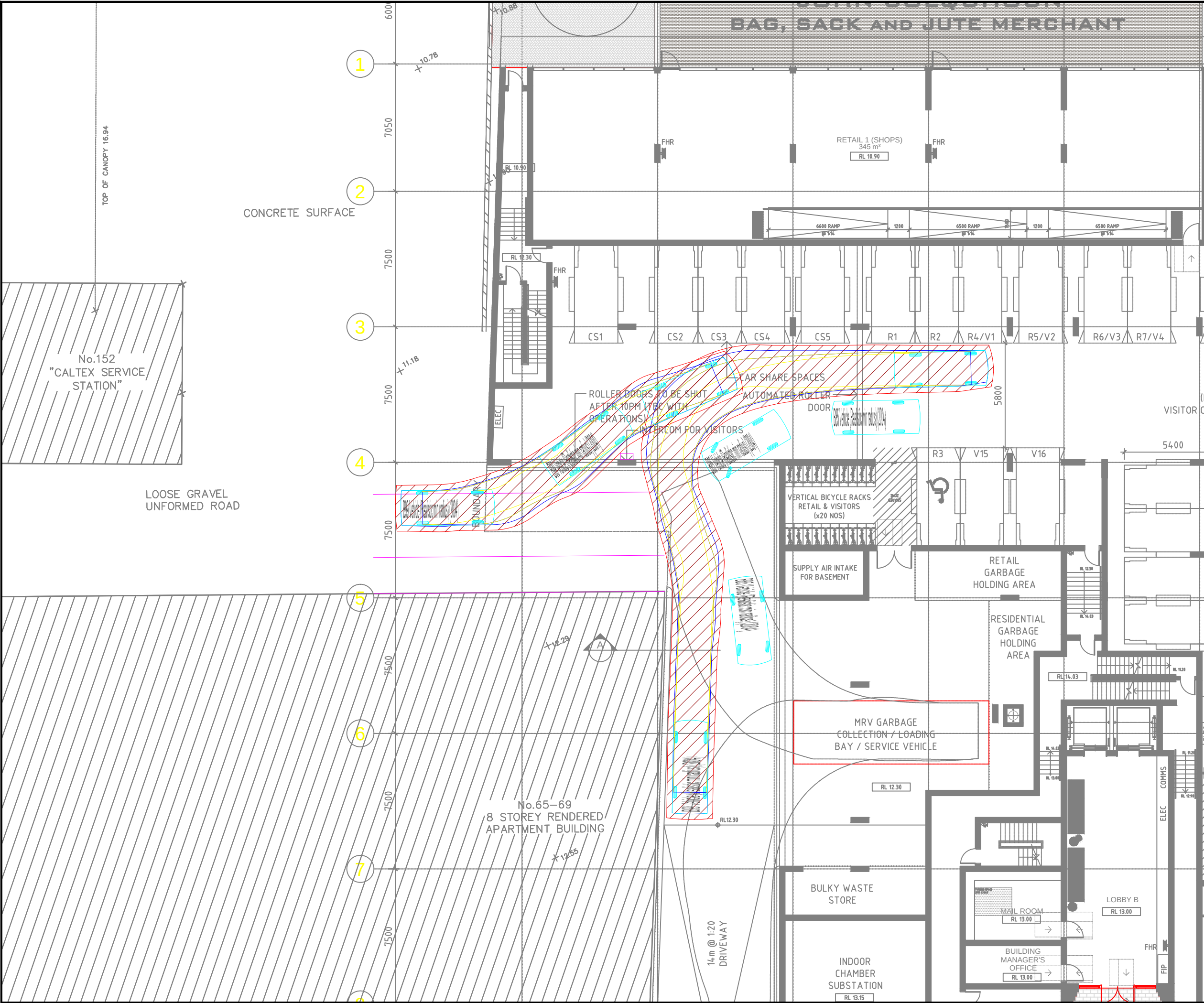
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Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Ground Floor
8.8m Medium Rigid Vehicle

Drawn: SW	Checked: KB	Date: 29 Oct 19
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19.236d05v01 TRAFFIX [191028 Plans] Design Review.dwg

Project No. 19.236	Drawing Phase DA	Drawing No. TX.01	Rev. A
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Notes:

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TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

PBD Architects

Client

Starryland NSW Pty Ltd

Scale / Plan Orientation

0 2 4 6 8m

1:200 @ A3

Project Description

Gran Central

Drawing Prepared By



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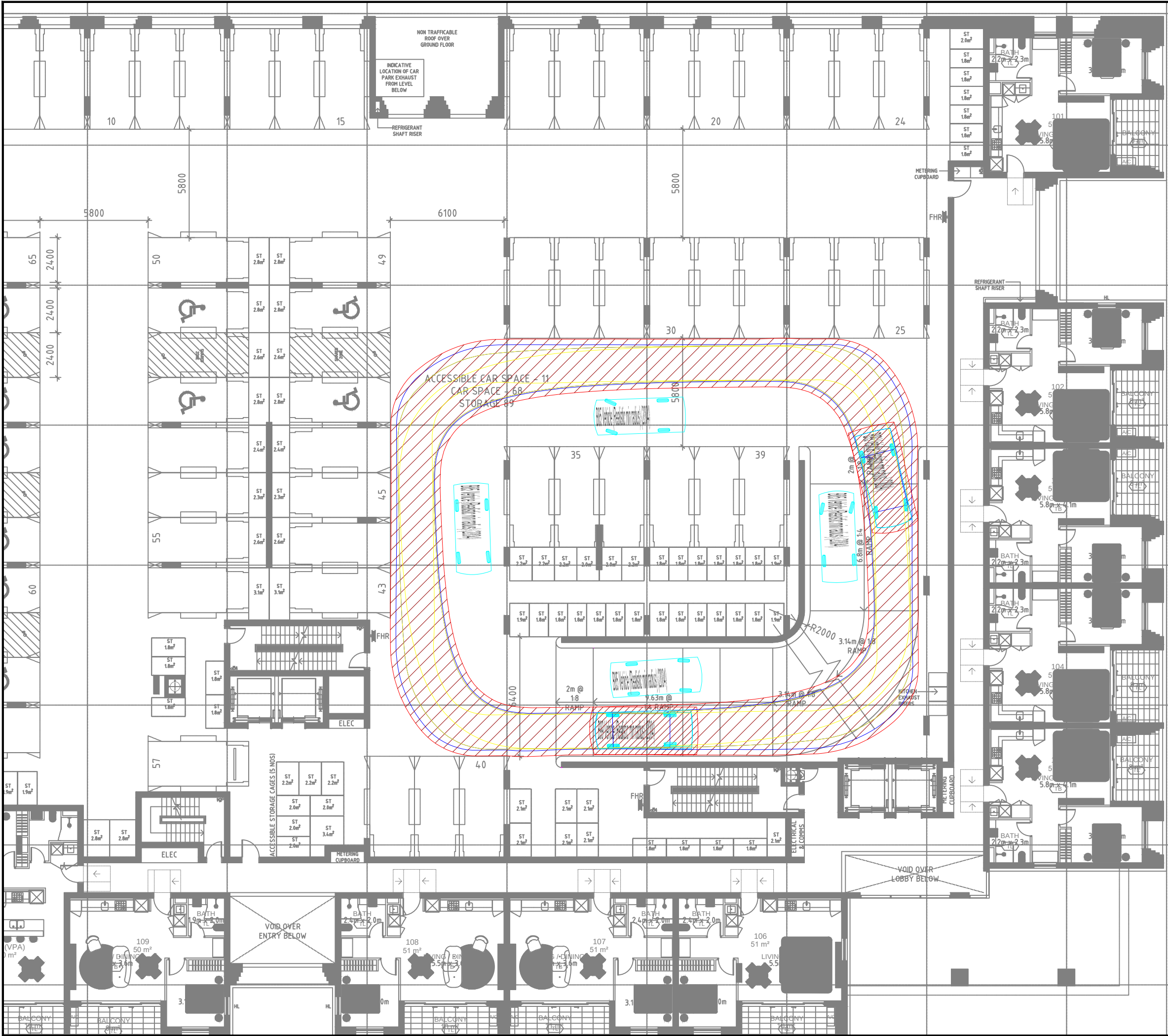
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Drawing Title

Ground Floor
Entry and Exit Movements
B99 and B85 Design Vehicles

Drawn: SW	Checked: KB	Date: 29 Oct 19	
19.236d05v01 TRAFFIX [191028 Plans] Design Review.dwg			
Project No.	Drawing Phase	Drawing No.	Rev.
19.236	DA	TX.02	A



Notes:

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Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev. Revision Note By. Date

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
PBD Architects

Client
Starryland NSW Pty Ltd

Scale / Plan Orientation

0 2 4 6 8m

1:200 @ A3

Project Description
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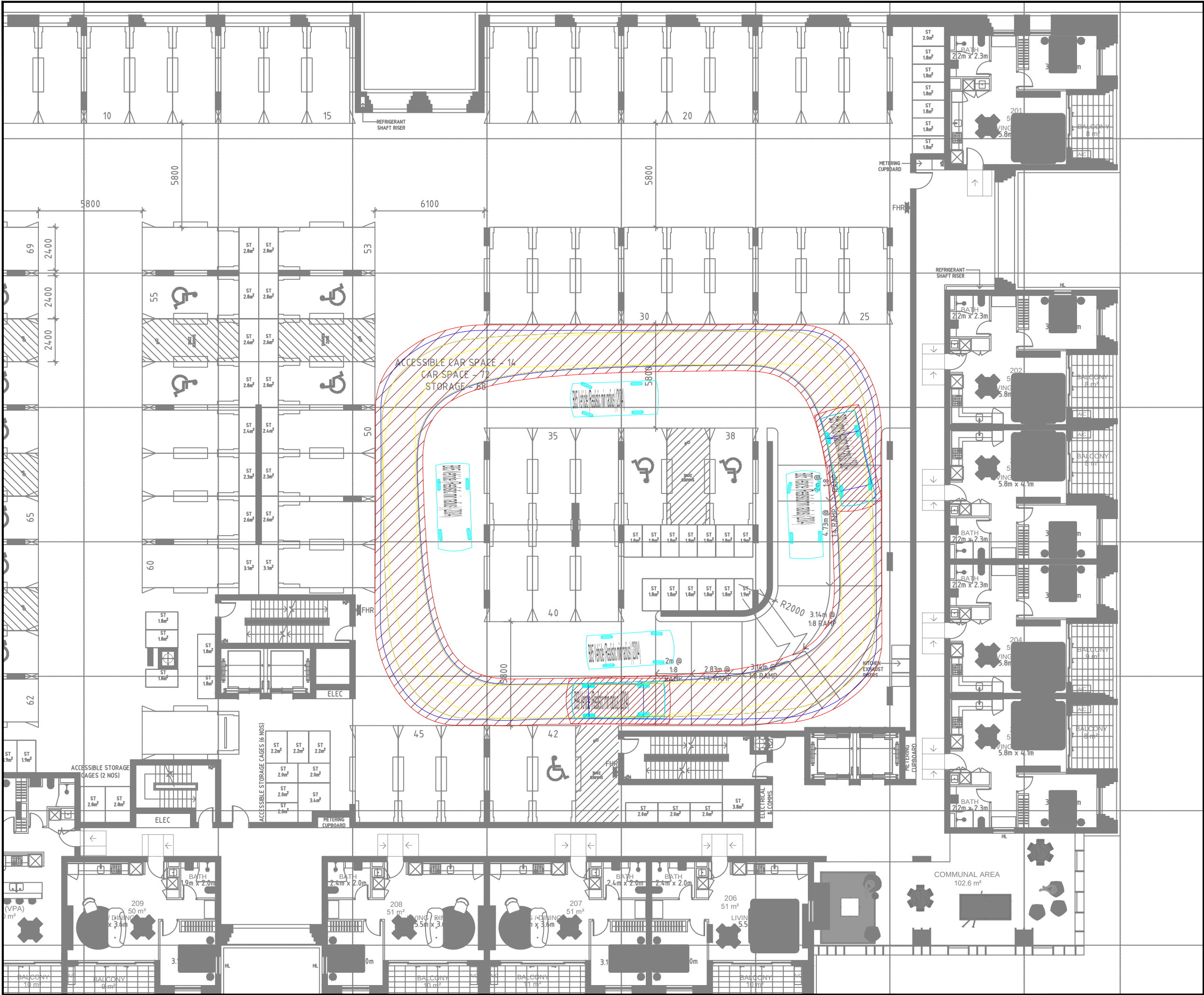
t: +61 2 8324 8700
f: +61 2 9830 4481
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Drawing Title
Level 1
Circulation
B99 and B85 Design Vehicles

Drawn: SW Checked: KB Date: 29 Oct 19

19.236d05v01 TRAFFIX [191028 Plans] Design Review.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
19.236	DA	TX.05	A



Notes:

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Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

PBD Architects

Client

Starryland NSW Pty Ltd

Scale / Plan Orientation

0 2 4 6 8m

1:200 @ A3

Project Description

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Drawing Prepared By



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Strawberry Hills, NSW 2012

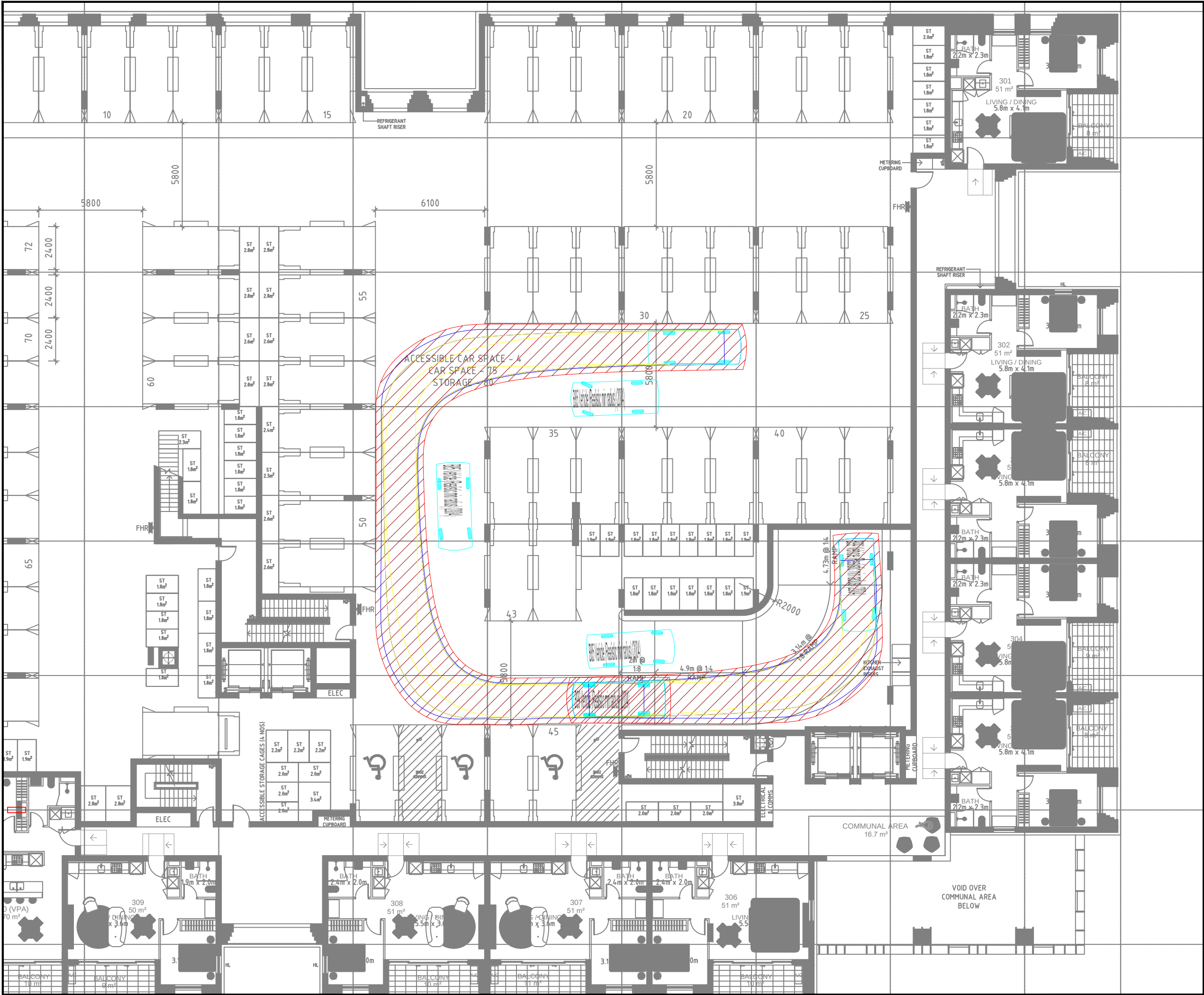
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w: www.traffix.com.au

Drawing Title

Level 2
Circulation
B99 and B85 Design Vehicles

Drawn: SW	Checked: KB	Date: 29 Oct 19
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Project No.	Drawing Phase	Drawing No.	Rev.
19.236	DA	TX.06	A



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (AS/NZS 2890.1:2004 Parking facilities - Off-street car parking, and/or AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

PBD Architects

Client

Starryland NSW Pty Ltd

Scale / Plan Orientation

0 2 4 6 8m

1:200 @ A3

Project Description

Gran Central

Drawing Prepared By



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Drawing Title

Level 3
Circulation
B99 and B85 Design Vehicles

Drawn: SW	Checked: KB	Date: 29 Oct 19
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19.236d05v01 TRAFFIX [191028 Plans] Design Review.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
19.236	DA	TX.07	A