Reference: 0319l01v2

1 November 2016

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Attention: Joseph Scuderi – Senior Development Manager

Re: Proposed Residential Development – Building 3 & 4, 1-11 Neil Street, Merrylands

Dear Mr Scuderi,

Ason Group has been commissioned to provide traffic, transport and parking advice in support of two (2) Development Applications (DAs). These applications relate to two residential buildings (Building 3 and Building 4) located within the overall development site of 1-11 Neil Street, Merrylands (the Precinct). Within the Precinct are 4 residential developments, which have interrelated traffic, transportation and parking impacts. The Precinct is located within the Local Government Area of the newly formed Cumberland Council and has been assessed under that Council's controls.

The first DA includes the development of Building 3 up to 12 storeys, with 178 units and Building 4 in its entirety with 133 units, resulting in an overall total of 311 units (DA One). The second DA encompasses the addition of a further 4 storeys and 24 units above Building 3 (DA Two) resulting in a total of 335 units.

In this regard, Ason Group has undertaken two assessments of the traffic, access and parking implications of the Proposal. The first assessment takes into account DA One, this being a 311 unit development. The second assessment deals with DA Two, a 335-unit development. Ason Group has reviewed all relevant documentation available to us and the findings of our investigations are summarised herewith.

Site Location & Characteristics

The Precinct is located within the Cumberland Council LGA approximately 2.5 kilometres south of the Parramatta CBD, 300 metres northeast of the Merrylands Town Centre and 400 metres north of the Merrylands Train Station. In a more local context, the Precinct is located on the northern side of Neil Street and forms part of the Neil Street Precinct as identified in Council's adopted DCP.

The Precinct is irregular in its configuration and has a total area of approximately 15,700m^2. The Precinct has a northern boundary of approximately 180 metres to the existing Brickwork Gardens residential precinct, an eastern frontage of approximately 130 metres to the railway line servicing the Cumberland Line, a southern frontage of 110 metres to Neil Street and a western boundary of 100 metres to another development site approved for high-density residential development.

This application relates to the south-eastern portion of the Precinct only, adjacent to Neil Street. The Site that is the subject of this application has a total area of 8,625 m^2. A location and site plan is shown in **Figure 1** which gives an appreciation of the location of the Precinct and the adjacent developments within the Precinct.

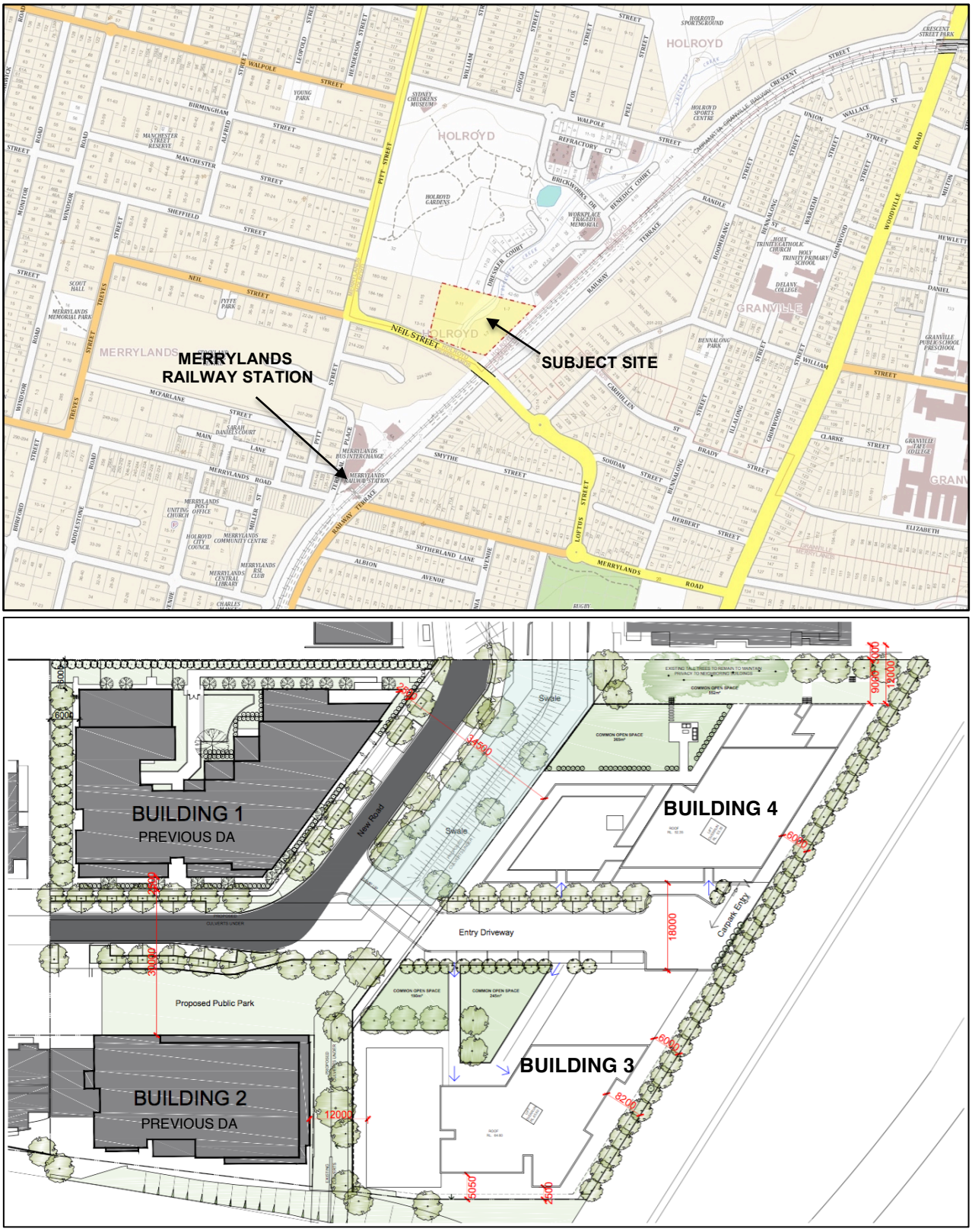


Figure 1: Location Plan and Site Plan

Source: SIX Viewer, 2015

Proposed Development

A detailed description of the current proposal that is the subject of this DA is provided in the Statement of Environmental Effects prepared by Willana Associates. Reference should also be made to the architectural plans prepared by Marchese Partners, of which, relevant plans are appended at a reduced scale to this statement at **Attachment 1**.

In summary, the development for which approval is currently being sought consists of the following options.

DA One

- Construction of 311 residential dwellings, comprising:
  - 118 x one bedroom units,
  - 168 x two bedroom units, and
  - 25 x three bedroom units.
- Construction of a 3 level basement car park accessed via a new access road forming an extension of Brickworks Drive and providing a total 442 car parking spaces.
- Provision of 34 visitor and 171 resident bicycle spaces located within the basement car park.

DA Two

- Construction of 335 residential dwellings, comprising:
  - 118 x one bedroom units,
  - 180 x two bedroom units, and
  - 37 x three bedroom units.
- Construction of a 3 level basement car park accessed via a new access road forming an extension of Brickworks Drive and providing a total 442 car parking spaces.
- Provision of 34 visitor and 171 resident bicycle spaces located within the basement car park.

The parking and traffic implications of the Proposal are discussed in the following sections.

Car Parking

Car parking for the Proposal has been assessed having regard for Council's DCP which provides minimum and maximum parking rates. The rates are summarised in **Table 1** while the requirements and proposed allocation are summarised in **Table 2** and **Table 3** below.

Table 1: Relevant Residential Car Parking Rates

Unit Type	DCP Parking Rate Minimum	DCP Parking Rate Maximum
One Bedroom	0.8 spaces / unit	1 spaces / unit
Two Bedroom	1.0 spaces / unit	1.5 spaces / unit
Three Bedroom	1.2 spaces / unit	2.0 spaces / unit
Visitor	0.2 spaces / unit	0.5 spaces / unit

DA One

Table 2: Residential Car Parking Provisions

Unit Type	No.	DCP Parking Requirements Minimum	DCP Parking Requirements Maximum	Parking Proposed
One Bedroom	118	94.4	118	
Two Bedroom	168	168	252	375
Three Bedroom	25	30	50	
Visitor	311	63*	156*	67
Total Parking Provision		**356**	**576**	**442**

*rounded up to the nearest number as required by Council's DCP

Table 2 demonstrates that the Proposal requires parking ranging from 356 to 576 spaces based on Council's DCP. In response, the Proposal provides a total of 442 parking spaces of which 67 are dedicated for visitors, thereby providing superior parking provision to the minimum requirements of Council's DCP and in full compliance with the parking controls.

DA Two

Table 3: Residential Car Parking Provisions

Unit Type	No.	DCP Parking Requirements Minimum	DCP Parking Requirements Maximum	Parking Proposed
One Bedroom	118	94.4	118	
Two Bedroom	180	180	270	375
Three Bedroom	37	44.4	74	
Visitor	335	67	168*	67
Total Parking Provision		**386**	**630**	**442**

*rounded up to the nearest number as required by Council's DCP

Table 3 demonstrates that the Proposal requires a minimum of 386 parking spaces of which 67 are required for visitors. In addition, a maximum parking provision is permitted on site to accommodate 630 parking spaces with 168 spaces for visitor use. In response, the Proposal provides a total of 442 parking spaces of which 67 are dedicated for visitors, thereby providing a superior parking provision to the minimum requirements of Council's DCP and providing parking in compliance with the DCP parking range. It should be noted that the parking provision also complies with the RMS Guide to Traffic Generating Developments minimum parking requirements and SEPP 65.

The DCP requires a minimum of 1 car wash bay for all residential developments having 10 or more dwellings. In response, the application proposes 2 car wash bays located within basement car park, one for each building.

Accordingly, the proposed parking provision is considered supportable on traffic planning grounds and meets the minimum requirements outlined under Council's DCP.

Bicycle Parking

Council's DCP requires all new developments to provide bicycle parking at the following rates:

- 1 space per 2 units for residents.
- 1 space per 10 units for visitors.

DA One

Application of the above rates to the proposed development yield would therefore result in a minimum requirement of 159 bicycle spaces for residents and 32 spaces for visitors.

DA Two

Application of the above rates to the proposed development yield results in a minimum requirement of 168 bicycle spaces for residents and 34 spaces for visitors.

In response, the development provides 205 spaces, 171 spaces for residents and 34 spaces for residential visitors. These spaces have been provided in accordance with the requirements of AS2890.3 (1993) *Part 3: Bicycle Parking*.

Future Road Network and Site Access

The future Road Network for the Neil Street Precinct is shown in **Figure 2**. The future road network includes a new north-south road known as 'New Road 1', which is to form a future signalised intersection with Neil Street. New Road 1 bisects the approved development site at 13-15 Neil Street and provides future access to both the Neil Street Precinct to the north and the Gladstone Street Precinct to the south. In addition, an east-west road known as 'New Road 2' is proposed to link New Road 1 and Brickworks Street, bisecting the Site. The delivery of these roads and the signalisation of the intersection of New Road 1 and Neil Street are to be undertaken by Council and forms part of its Section 94 Plan.

Figure 2: Future Road Network

Traffic Impacts

For the purposes of assessing the traffic impacts, DA Two represents a worst case assessment due to the higher traffic generating potential related to the increased development yield (335 units). This has been adopted as the project modelled case.

The peak hour traffic generation of the proposed development has been assessed having regard for the RMS *Guide to Traffic Generating Developments Updated Traffic Surveys – Technical Direction 04a* (RMS Technical Direction 04a) dated August 2013. The RMS Guide provides the following average trip rates for high-density residential development:

- Morning peak hour: 0.19 peak hour vehicle trips per unit.
- Evening peak hour: 0.15 peak hour vehicle trips per unit.

Application of the above rates to the proposed 335 units results in a peak hour traffic generation of 64 vehicles / hour during the morning peak and 50 vehicles / hour during the evening peak.

It is proposed that all access to the development be provided via Brickworks Drive until such time that the Neil Street Precinct DCP road network is delivered by Council, in particular New Road 1, New Road 2 and the signalised intersection of New Road 1 with Neil Street. Accordingly, surveys and subsequent SIDRA intersection analysis has been undertaken at the key intersections of Walpole Street with Brickworks Drive and Walpole Street with Pitt Street to assess the "existing" and "existing + development" scenarios. The results of this analysis are summarised below and take into account the future operation of these intersections assuming full development of the overall site (Buildings 1-6 as shown in the Masterplan documentation), which includes approximately 730 residential units and a morning and evening peak hour traffic generation of 139 veh/hr and 110 veh/hr respectively.

Table 2: Intersection Operation – Existing & Existing + Development at Full Development

Intersection	Scenario	AM Peak			PM Peak		
		Degree of Saturation (DOS)	Average Delay (sec/veh)	Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec/veh)	Level of Service (LOS)
Pitt Street & Walpole St	Existing	0.710	13.0	A	0.554	13.8	A
	Existing + Development	0.713	13.1	A	0.601	14.0	A
Brickworks St & Walpole St	Existing	0.251	5.3	A	0.244	5.3	A
	Existing + Development	0.302	5.9	A	0.308	5.8	A

It is evident that the development of the overall site – in accordance with the Masterplan – will have no material impact on the operation of key intersection in the locality. Accordingly, the proposed application for 335 units can be readily accommodated within the existing road network.

It is reiterated that this modelling assessment incorporates the traffic impacts associated with DA Two and a total of 335 units. Taking into consideration that the full development of Building 3 and Building 4 (335 units) would be accommodated within the external road network, it is evident that DA One (311 units) would also be supportable.

The proposed development options are therefore supported on traffic planning grounds and the assessed intersections would continue to operate with similar delays and levels of service during the critical morning and evening peak periods.

Internal Design Aspects

Site Access

Site access is provided via the proposed intersection of New Road 2 and the private roadway permitting access the development. Swept path analysis has been undertaken of the proposed intersection, which demonstrates satisfactory access for both residential and servicing vehicles. Finally, it is noted that the driveway width where the property boundary meets New Road 2 is approximately 9.5m wide satisfying AS 2890.1 requirements for two-way flow. A swept path analysis has been appended in **Attachment 3**.

Parking Module Design

- All parking spaces are generally designed in accordance with a Class 1 user and which requires a minimum space length of 5.4m a minimum width of 2.4m and a minimum aisle width of 5.8 m.
- 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.
- All disabled parking spaces are designed in accordance with AS2890.6 (2009) Part 6: *Off-street parking for people with disabilities* or AS4299 *Adaptable Housing*. Spaces are provided with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m or a total clear width of 3.8m.
- All parallel parking spaces have been designed to an aisle width of 3.0m in accordance with Figure 2.5 of AS2890.1

Head Heights

- A minimum clear head height of 2.2m is required for all areas within the basement car park as required by AS2890.1. A clear head height of 2.5m is provided above all disabled spaces as required by AS2890.6.

Ramps

- The main access ramp providing access to the basement car park has a maximum gradient of 25% (1 in 4) with transitions of 12.5% (1 in 8), designed in accordance with AS2890.1.
- The main access ramp provides a minimum of 6.0m at grade of 1 in 20, which complies with AS2890.1.
- A swept path analysis detailing vehicles passing on all internal ramps has been appended in Attachment 3

Other Design Considerations

- All columns are required to be located outside of the parking space design envelope shown in Figure 5.2 of AS2890.1.
- Appropriate visual splays are to be provided in accordance with the requirements of Figure 3.3 of AS2890.1 at all accesses.

The internal design aspects of the proposed development comply with the relevant Australian Standards including AS2890.1. It is however envisaged that any minor non-compliances can be addressed prior to the issue of a Construction Certificate for the development in response to a condition of consent requiring compliance with AS2890.

Servicing

Garbage collection for the development is proposed to be undertaken within the confines of the property boundary in the proposed lay-by area. This will ensure that traffic flow entering and exiting the car park would not be obstructed whilst loading occurs. All bins will be brought to the kerb by the body corporate in accordance with Council's DCP 2013, Part A – Section 11.3 – "Residential Land Use Waste Management" – Control C8 which states *"At appropriate times, transport waste from the rooms to this area for collection. In each case the onus is upon the body corporate to ensure on-street placement".*

Consultation has been previously undertaken for the precinct with Council's Waste Management Team in accordance with Holroyd Council's DCP 2013, Part A – Section 11.3 – 'Residential Land Use Waste Management' – Control C12. Council's Waste Management team advised that its preference is to undertake garbage collection on-street.

Accordingly, the garbage collection area that is provided has been designed to accommodate an 8.8 metre Medium Rigid Vehicle. Swept path analysis demonstrates that the servicing vehicle is provided with sufficient space in the tuning area for the vehicle to access the loading bay and exit the site in a forward direction, thereby complying with AS 2890.2. At all other times this facility can be used as a pick up and drop off area and is also suitable for use by removalist vehicles.

Conclusion

In summary, the two development applications are supportable on traffic planning grounds. The following conclusions are applicable to both DA one and DA two.

- The development complies with the minimum car parking provisions for residents and visitor parking.
- Bicycle parking has been provided in accordance with DCP's requirements.
- The traffic assessment has been based on DA Two which proposes an additional 24 units and therefore a higher traffic generating development in comparison to DA One. Modelling analysis identifies that the application will not result in any material change in the performance of key intersections in the locality. The assessed intersection performance will continue to operate with similar levels of service and delays when compared to the masterplan approval for the site.

Should you have any questions or should you wish to discuss the application further please contact the undersigned.

Yours sincerely

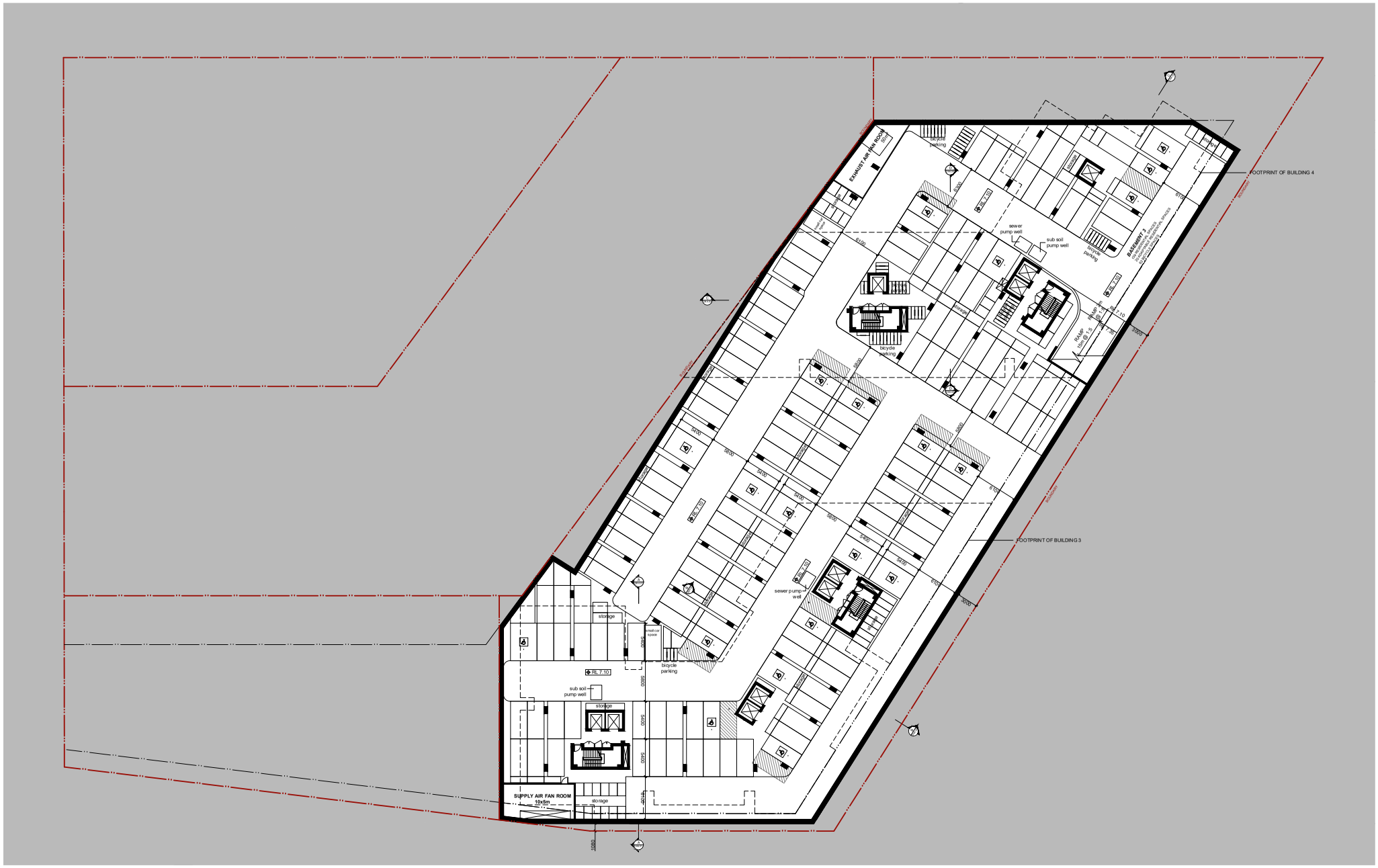
John Mulhaire
Senior Traffic Engineer – Ason Group
Email: john.mulhaire@asongroup.com.au

Attachment 1: Reduced Plans

Attachment 2: SIDRA Results

Attachment 3: Swept Paths

Attachment 1



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REVISION	DATE	DESCRIPTION	BY
A	2016.10.28	ISSUED FOR DEVELOPMENT APPLICATION	LP

marchesepartners

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SUITE 2201, LEVEL 22, TOWER TWO
WESTFIELD, BONDI JUNCTION

PROJECT
THE MILLS
BUILDINGS 3-4
1-11 NEIL STREET, MERRYLANDS

DRAWING TITLE
BASEMENT 3 FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
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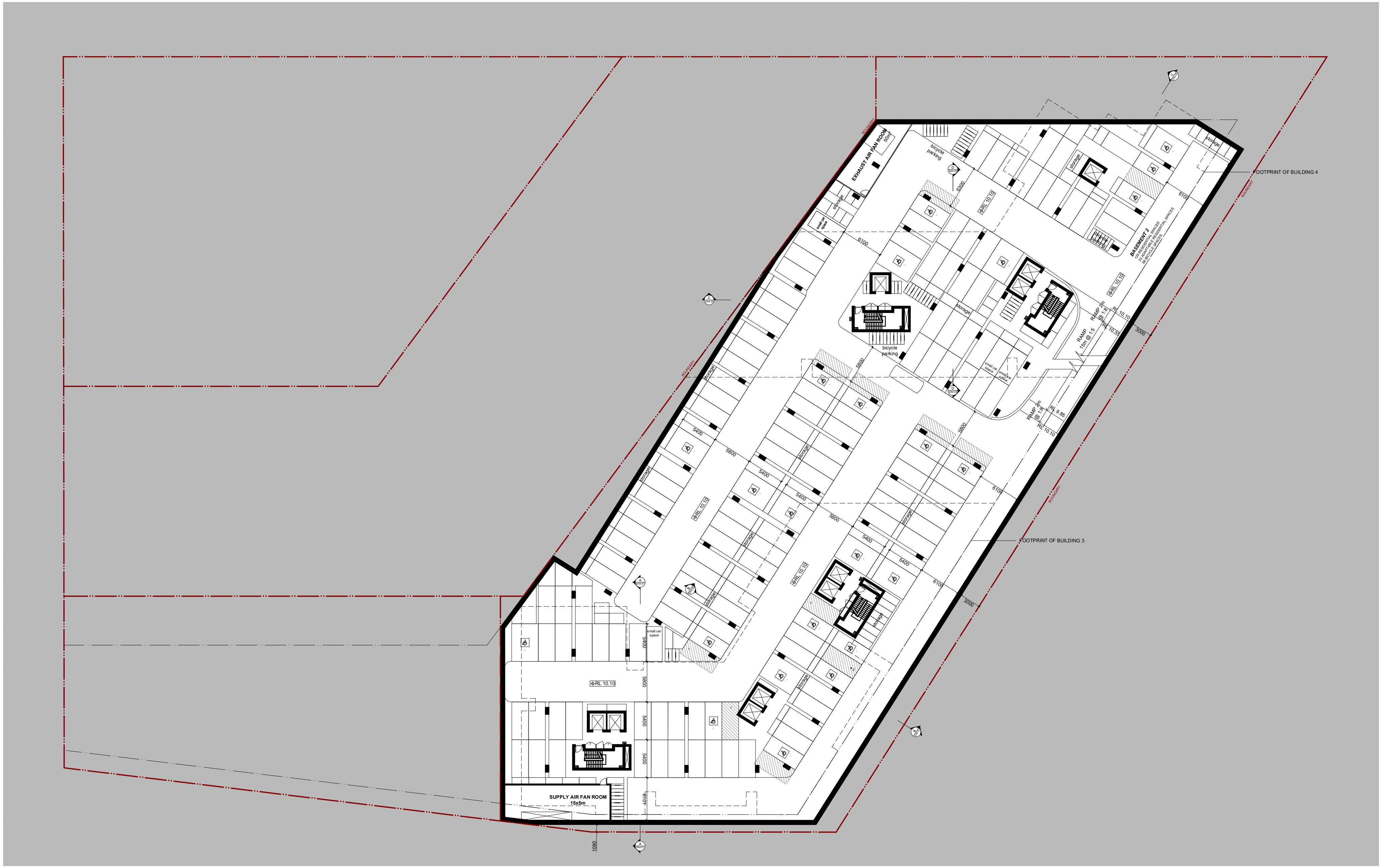
JOB	DRAWING	REVISION
14001	DA2.01	A



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WESTFIELD, BONDI JUNCTION

PROJECT
THE MILLS
BUILDINGS 3-4
1-11 NEIL STREET, MERRYLANDS

DRAWING TITLE
BASEMENT 2 FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
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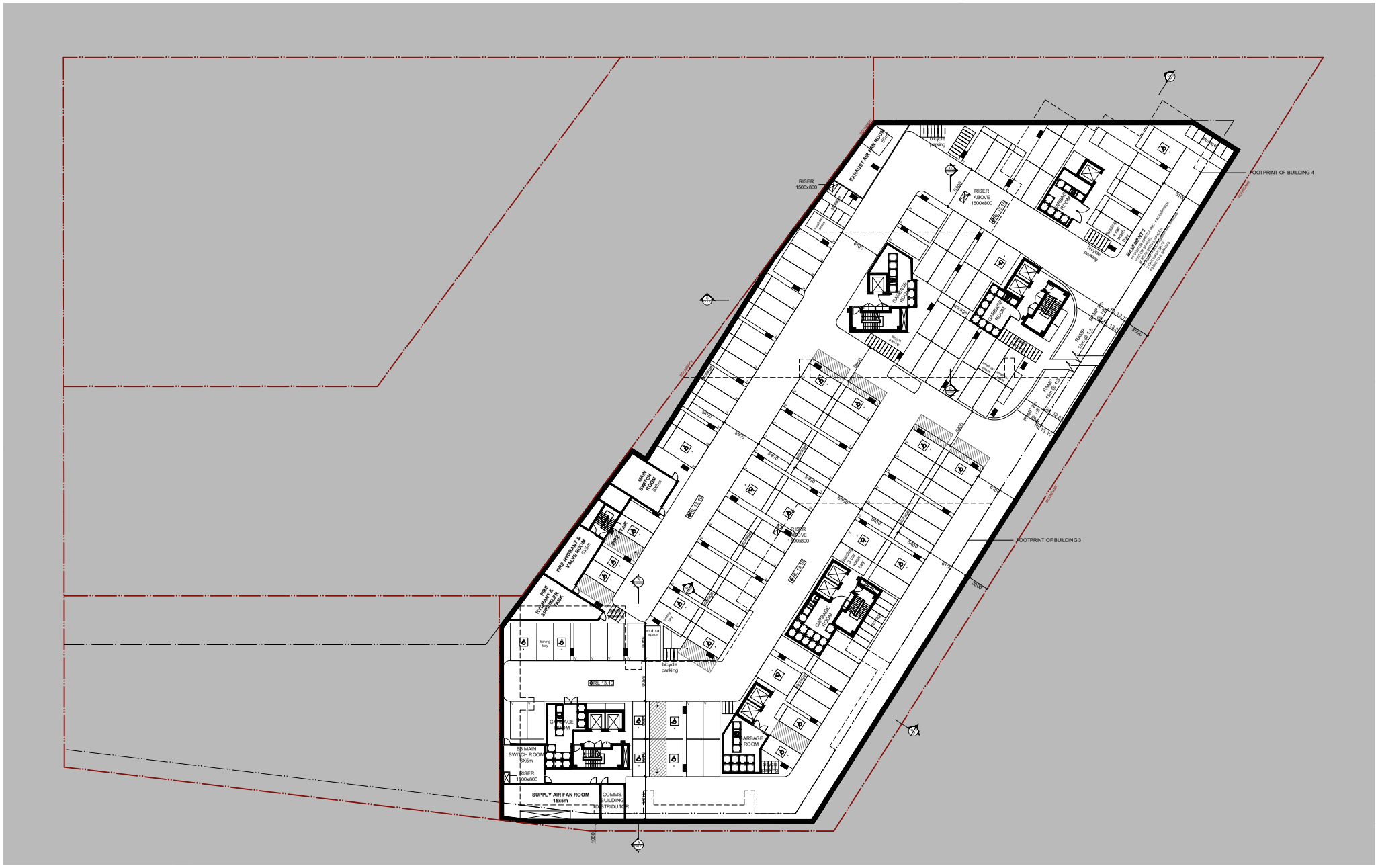
JOB	DRAWING		REVISION
14001	DA2.02		A



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PROJECT
THE MILLS
BUILDINGS 3-4
1-11 NEIL STREET, MERRYLANDS

DRAWING TITLE
BASEMENT 1 FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING	REVISION
14001	DA2.03	A

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PROJECT
THE MILLS
BUILDINGS 3-4
1-11 NEIL STREET, MERRYLANDS

DRAWING TITLE
BUILDING 4 GROUND FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
1:125@A1 1:250@A3	03/08/2016	BO	MS

JOB	DRAWING	REVISION
14001	DA2.14	A

Attachment 2

MOVEMENT SUMMARY

Site: 1 [BASE AM Walpole x Brickworks]

INTERSECTION: Walpole St x Brickworks Dr LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: n/a
PERIOD: Weekday AM RUN TIME: 60 minutes
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Brickworks Dr (South)											
1	L2	57	2.0	0.092	4.9	LOS A	0.4	3.2	0.23	0.58	42.3
3	R2	51	2.0	0.092	7.9	LOS A	0.4	3.2	0.23	0.58	42.8
Approach		107	2.0	0.092	6.3	LOS A	0.4	3.2	0.23	0.58	42.5
East: Walpole St (East)											
4	L2	7	2.0	0.066	5.0	LOS A	0.3	2.3	0.10	0.48	43.6
5	T1	81	2.0	0.066	4.8	LOS A	0.3	2.3	0.10	0.48	49.8
Approach		88	2.0	0.066	4.8	LOS A	0.3	2.3	0.10	0.48	49.4
West: Walpole St (West)											
11	T1	314	2.0	0.251	5.0	LOS A	1.5	10.7	0.21	0.49	49.0
12	R2	21	2.0	0.251	8.1	LOS A	1.5	10.7	0.21	0.49	42.5
Approach		335	2.0	0.251	5.2	LOS A	1.5	10.7	0.21	0.49	48.7
All Vehicles		531	2.0	0.251	5.3	LOS A	1.5	10.7	0.19	0.51	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [BASE PM Walpole x Brickworks]

INTERSECTION: Walpole St x Brickworks Dr LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: n/a
PERIOD: Weekday PM RUN TIME: 60 minutes
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Brickworks Dr (South)											
1	L2	28	2.0	0.045	5.9	LOS A	0.2	1.5	0.43	0.61	41.8
3	R2	15	2.0	0.045	8.9	LOS A	0.2	1.5	0.43	0.61	42.2
Approach		43	2.0	0.045	7.0	LOS A	0.2	1.5	0.43	0.61	41.9
East: Walpole St (East)											
4	L2	47	2.0	0.244	5.1	LOS A	1.4	9.9	0.20	0.49	42.9
5	T1	279	2.0	0.244	5.0	LOS A	1.4	9.9	0.20	0.49	49.2
Approach		326	2.0	0.244	5.0	LOS A	1.4	9.9	0.20	0.49	48.5
West: Walpole St (West)											
11	T1	181	2.0	0.158	4.8	LOS A	0.9	6.6	0.10	0.52	49.1
12	R2	51	2.0	0.158	7.8	LOS A	0.9	6.6	0.10	0.52	42.6
Approach		232	2.0	0.158	5.4	LOS A	0.9	6.6	0.10	0.52	47.9
All Vehicles		601	2.0	0.244	5.3	LOS A	1.4	9.9	0.17	0.51	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [BASE+DEV AM Walpole x Brickworks]

INTERSECTION: Walpole St x Brickworks Dr LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: With Development
PERIOD: Weekday AM RUN TIME: 60 minutes
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Brickworks Dr (South)											
1	L2	126	2.0	0.194	4.9	LOS A	1.1	7.6	0.25	0.58	42.2
3	R2	113	2.0	0.194	7.9	LOS A	1.1	7.6	0.25	0.58	42.7
Approach		239	2.0	0.194	6.3	LOS A	1.1	7.6	0.25	0.58	42.4
East: Walpole St (East)											
4	L2	17	2.0	0.079	5.1	LOS A	0.4	2.9	0.18	0.48	43.0
5	T1	81	2.0	0.079	5.0	LOS A	0.4	2.9	0.18	0.48	49.3
Approach		98	2.0	0.079	5.0	LOS A	0.4	2.9	0.18	0.48	48.5
West: Walpole St (West)											
11	T1	314	2.0	0.302	5.5	LOS A	1.9	13.4	0.34	0.54	48.1
12	R2	48	2.0	0.302	8.5	LOS A	1.9	13.4	0.34	0.54	41.4
Approach		362	2.0	0.302	5.9	LOS A	1.9	13.4	0.34	0.54	47.3
All Vehicles		699	2.0	0.302	5.9	LOS A	1.9	13.4	0.29	0.55	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [BASE+DEV PM Walpole x Brickworks]

INTERSECTION: Walpole St x Brickworks Dr LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: With Development
PERIOD: Weekday PM RUN TIME: 60 minutes
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total 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: Brickworks Dr (South)											
1	L2	48	2.0	0.077	6.0	LOS A	0.4	2.8	0.45	0.63	41.7
3	R2	25	2.0	0.077	9.0	LOS A	0.4	2.8	0.45	0.63	42.1
Approach		74	2.0	0.077	7.0	LOS A	0.4	2.8	0.45	0.63	41.8
East: Walpole St (East)											
4	L2	97	2.0	0.308	5.5	LOS A	1.9	13.3	0.32	0.52	42.1
5	T1	279	2.0	0.308	5.4	LOS A	1.9	13.3	0.32	0.52	48.5
Approach		376	2.0	0.308	5.4	LOS A	1.9	13.3	0.32	0.52	47.2
West: Walpole St (West)											
11	T1	181	2.0	0.201	4.8	LOS A	1.2	8.8	0.14	0.55	48.4
12	R2	104	2.0	0.201	7.9	LOS A	1.2	8.8	0.14	0.55	41.8
Approach		285	2.0	0.201	6.0	LOS A	1.2	8.8	0.14	0.55	46.3
All Vehicles		735	2.0	0.308	5.8	LOS A	1.9	13.3	0.26	0.54	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [BASE AM Pitt x Walpole]

INTERSECTION: Pitt St x Walpole St LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: n/a
PERIOD: Weekday AM RUN TIME: 60 minutes
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Pitt St (South)											
2	T1	760	2.0	0.547	5.6	LOS A	8.9	63.3	0.62	0.57	54.7
3	R2	297	2.0	0.547	12.2	LOS A	4.8	34.3	0.80	0.77	44.6
Approach		1057	2.0	0.547	7.5	LOS A	8.9	63.3	0.67	0.62	52.3
East: Walpole St (East)											
4	L2	119	2.0	0.160	11.8	LOS A	1.6	11.3	0.65	0.69	42.9
6	R2	34	2.0	0.190	28.7	LOS C	0.8	5.8	0.95	0.71	36.7
Approach		153	2.0	0.190	15.5	LOS B	1.6	11.3	0.72	0.70	41.1
North: Pitt St (North)											
7	L2	29	2.0	0.710	28.2	LOS B	6.8	48.6	0.98	0.89	39.9
8	T1	513	2.0	0.710	22.6	LOS B	6.9	48.8	0.98	0.89	44.2
Approach		542	2.0	0.710	22.9	LOS B	6.9	48.8	0.98	0.89	44.0
All Vehicles		1752	2.0	0.710	13.0	LOS A	8.9	63.3	0.77	0.71	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		158	19.4	LOS B			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [BASE PM Pitt x Walpole]

INTERSECTION: Pitt St x Walpole St LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: n/a
PERIOD: Weekday PM RUN TIME: 60 minutes
Signals - Fixed Time Isolated Cycle Time = 65 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Pitt St (South)											
2	T1	764	2.0	0.547	6.5	LOS A	11.3	80.7	0.60	0.54	54.1
3	R2	221	2.0	0.547	13.6	LOS A	4.3	30.6	0.79	0.76	43.6
Approach		985	2.0	0.547	8.1	LOS A	11.3	80.7	0.64	0.59	52.1
East: Walpole St (East)											
4	L2	287	2.0	0.554	22.1	LOS B	7.3	51.7	0.89	0.80	36.5
6	R2	46	2.0	0.212	33.8	LOS C	1.4	10.0	0.94	0.73	34.7
Approach		334	2.0	0.554	23.7	LOS B	7.3	51.7	0.90	0.79	36.2
North: Pitt St (North)											
7	L2	21	2.0	0.548	22.0	LOS B	10.4	73.8	0.82	0.72	43.4
8	T1	818	2.0	0.548	16.4	LOS B	10.4	74.0	0.82	0.71	47.7
Approach		839	2.0	0.548	16.5	LOS B	10.4	74.0	0.82	0.71	47.6
All Vehicles		2158	2.0	0.554	13.8	LOS A	11.3	80.7	0.75	0.67	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	26.8	LOS C	0.1	0.1	0.91	0.91
P2	East Full Crossing	53	17.0	LOS B	0.1	0.1	0.72	0.72
P3	North Full Crossing	53	26.8	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		158	23.6	LOS C			0.85	0.85

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [BASE+DEV AM Pitt x Walpole]

INTERSECTION: Pitt St x Walpole St LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: With Development
PERIOD: Weekday AM RUN TIME: 60 minutes
Signals - Fixed Time Isolated Cycle Time = 50 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Pitt St (South)											
2	T1	760	2.0	0.562	5.7	LOS A	9.3	66.0	0.63	0.57	54.7
3	R2	322	2.0	0.562	12.3	LOS A	5.0	35.4	0.80	0.77	44.3
Approach		1082	2.0	0.562	7.6	LOS A	9.3	66.0	0.68	0.63	52.0
East: Walpole St (East)											
4	L2	173	2.0	0.221	11.4	LOS A	2.3	16.1	0.65	0.71	43.1
6	R2	49	2.0	0.279	29.1	LOS C	1.2	8.7	0.96	0.73	36.6
Approach		222	2.0	0.279	15.3	LOS B	2.3	16.1	0.72	0.71	41.2
North: Pitt St (North)											
7	L2	32	2.0	0.713	28.3	LOS B	6.9	48.9	0.99	0.89	39.8
8	T1	513	2.0	0.713	22.7	LOS B	6.9	49.1	0.99	0.89	44.1
Approach		544	2.0	0.713	23.0	LOS B	6.9	49.1	0.99	0.89	43.9
All Vehicles		1848	2.0	0.713	13.1	LOS A	9.3	66.0	0.78	0.72	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
P2	East Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		158	19.4	LOS B			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [BASE+DEV PM Pitt x Walpole]

INTERSECTION: Pitt St x Walpole St LAYOUT: Existing
BASELINE FLOWS: 2015 DEVELOPMENT FLOWS: With Development
PERIOD: Weekday PM RUN TIME: 60 minutes
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Pitt St (South)											
2	T1	764	2.0	0.588	6.6	LOS A	11.8	84.3	0.63	0.57	54.2
3	R2	269	2.0	0.588	13.9	LOS A	4.3	30.9	0.84	0.79	42.8
Approach		1034	2.0	0.588	8.5	LOS A	11.8	84.3	0.68	0.63	51.6
East: Walpole St (East)											
4	L2	304	2.0	0.572	20.7	LOS B	7.0	49.8	0.89	0.82	37.3
6	R2	49	2.0	0.239	32.3	LOS C	1.4	10.0	0.94	0.73	35.3
Approach		354	2.0	0.572	22.3	LOS B	7.0	49.8	0.90	0.80	37.0
North: Pitt St (North)											
7	L2	25	2.0	0.601	22.6	LOS B	10.2	72.9	0.87	0.75	43.0
8	T1	818	2.0	0.601	17.0	LOS B	10.3	73.1	0.87	0.75	47.3
Approach		843	2.0	0.601	17.2	LOS B	10.3	73.1	0.87	0.75	47.2
All Vehicles		2231	2.0	0.601	14.0	LOS A	11.8	84.3	0.79	0.70	47.5

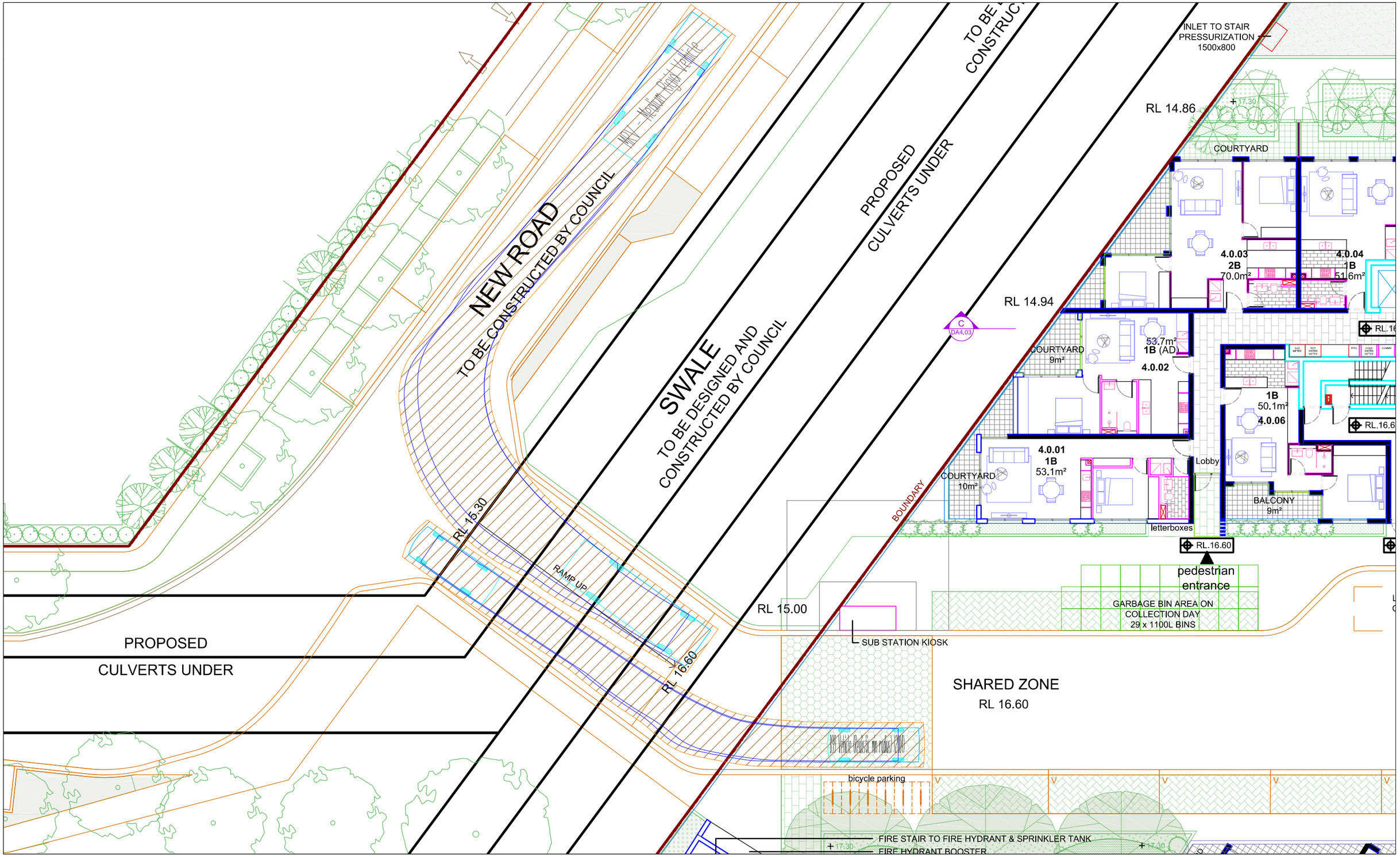
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard 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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
P2	East Full Crossing	53	17.7	LOS B	0.1	0.1	0.77	0.77
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		158	22.1	LOS C			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Attachment 3



Revision notes:

Rev:	Date:	Notes:

Drawn By: TL

Client: Landmark Group

Project: 0319 1-11 Neil St, Merrylands

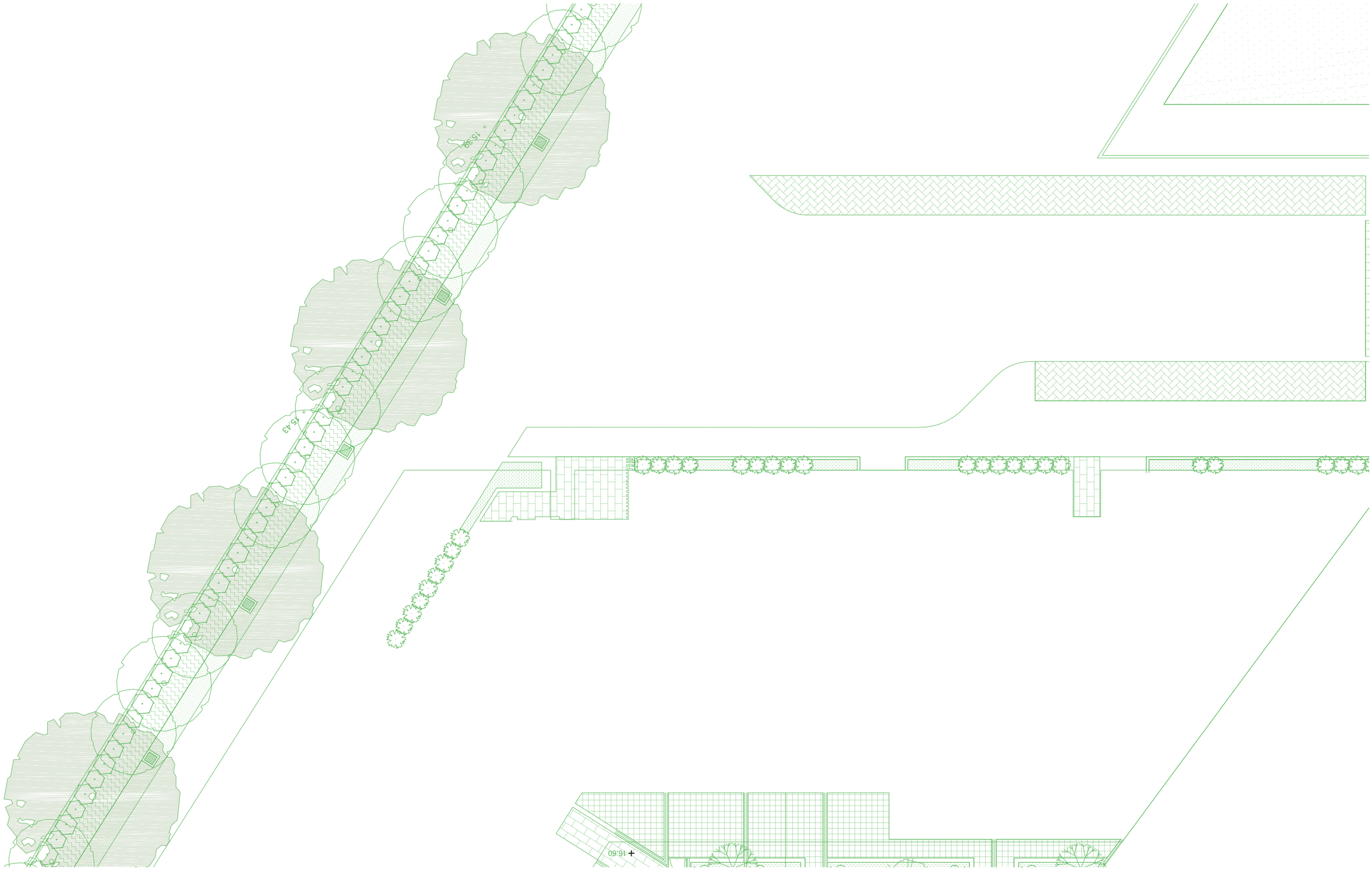
Drawing Title: Ground Floor Site Access

Date: 26 October 2016

Scale @ A3: 1:200

Drawing Number: 01

asongroup
Suite 1202, Level 12, 220 George Street
Sydney NSW 2000
info@asongroup.com.au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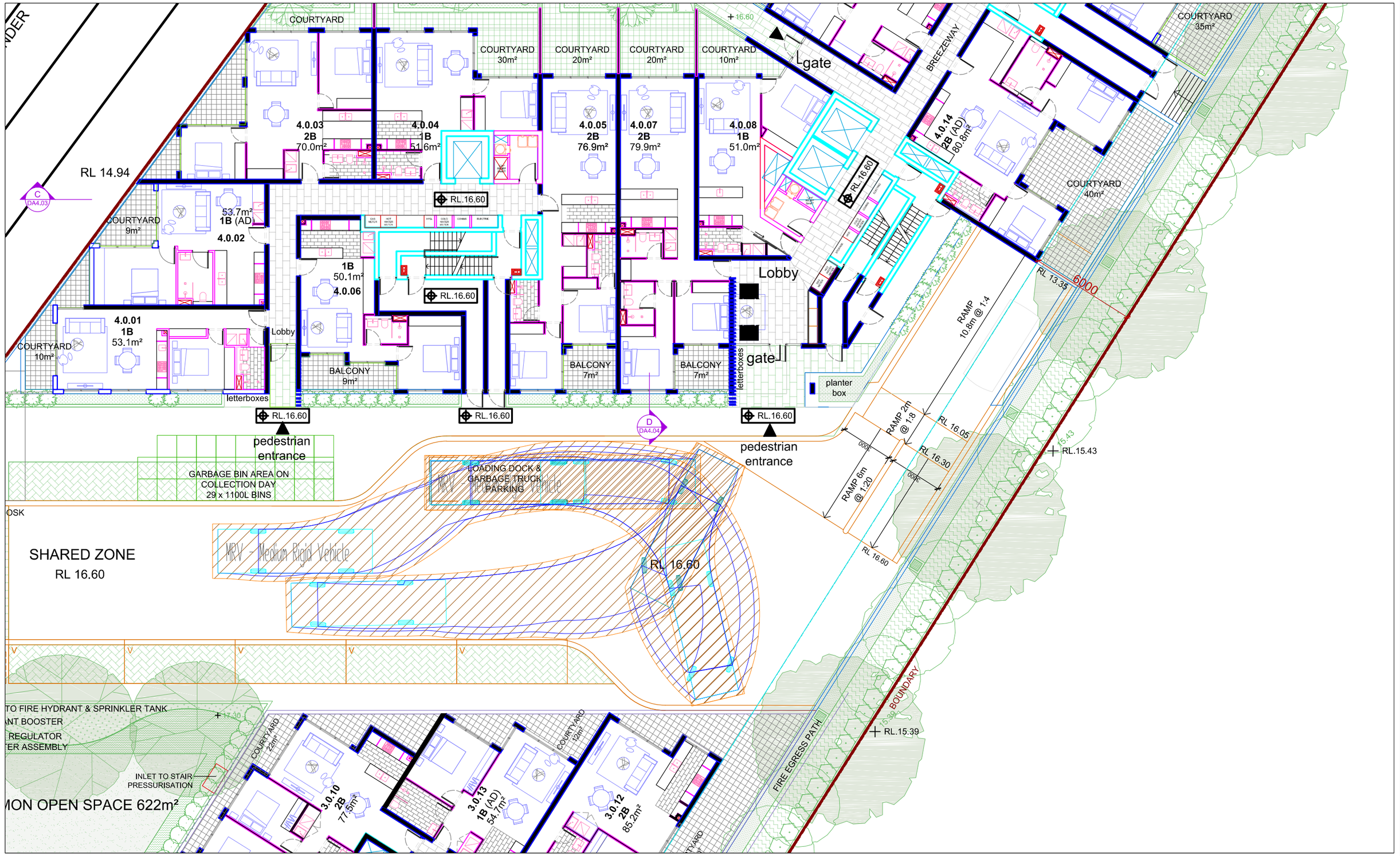

Revision notes:

Rev:	Date:	Notes:

Drawn By: TL

Client: Landmark Group

Project: 0319 1-11 Neil St, Merrylands

Drawing Title: Ground Floor Basement Access

Date: 26 October 2016

Scale @ A3: 1:200

Drawing Number: 03

asongroup
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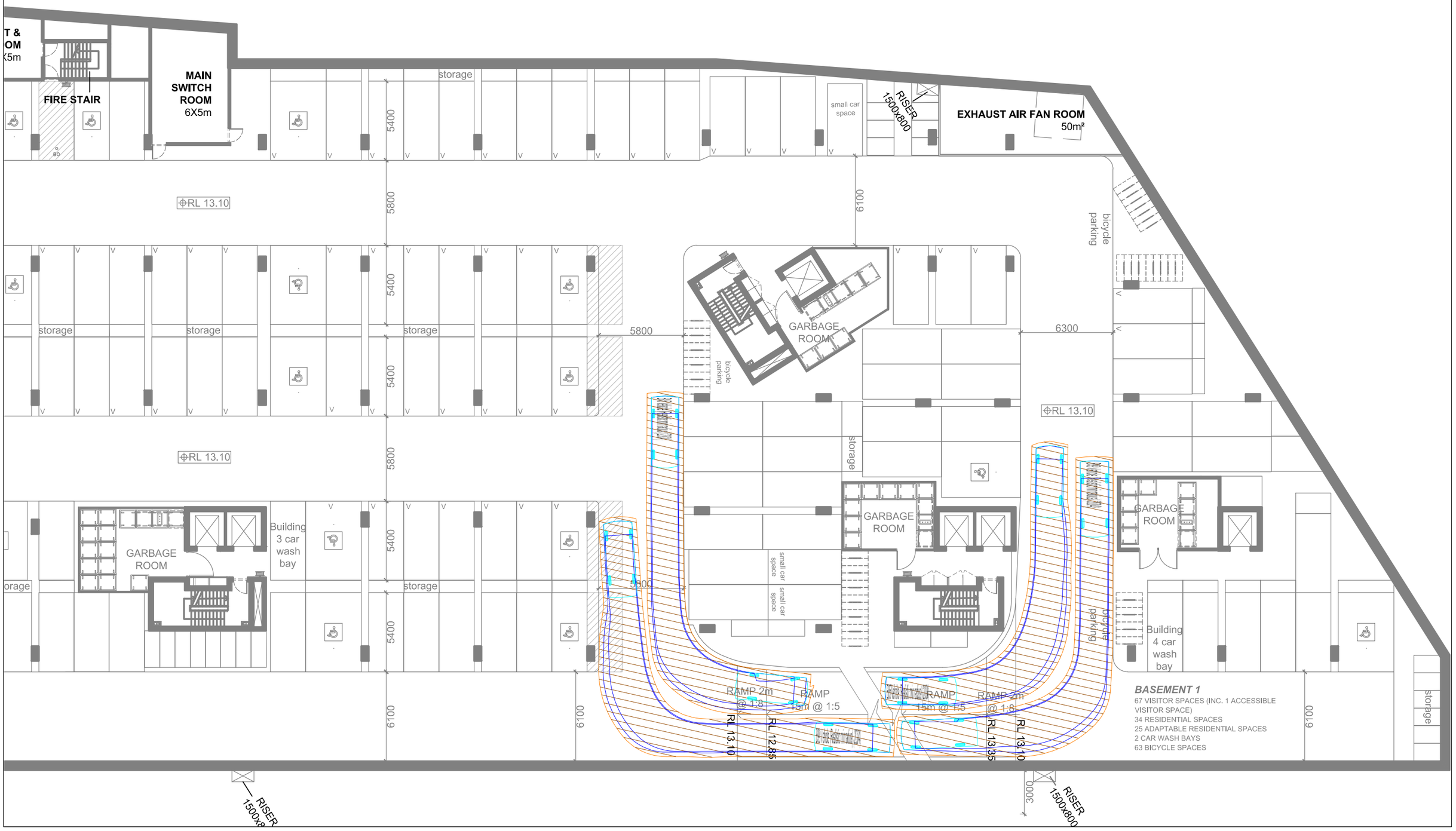

Revision notes:

Rev:	Date:	Notes:

Drawn By: TL

Client: Landmark Group

Project: 0319
1-11 Neil St, Merrylands

Drawing Title: Basement Level 1
Ramp Swept Path Analysis

Date: 26 October 2016

Scale @ A3: 1:250

Drawing Number: 04

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storage
storage
small car space
EXHAUST AIR FAN ROOM
50m²
5400
5800
6100
RL 10.10
bicycle parking
storage
storage
storage
5800
6300
RL 10.10
bicycle parking
storage
small car space
small car space
storage
storage
6088
6069
RAMP 2m @ 1:8
RAMP 2m @ 1:8
RAMP 12m @ 1:5
RL 10.10
RL 9.85
RL 10.35
RL 10.10
RL 10.10
bicycle parking
storage
6100
6100
3000
3000

BASEMENT 2
129 RESIDENTIAL SPACES
23 ADAPTABLE RESIDENTIAL SPACES
68 BICYCLE SPACES

Revision notes:

Rev:	Date:	Notes:

Drawn By: TL

Client: Landmark Group

Project: 0319 1-11 Neil St, Merrylands

Drawing Title: Basement Level 2 Ramp Swept Path Analysis

Date: 26 October 2016

Scale @ A3: 1:250

Drawing Number: 05

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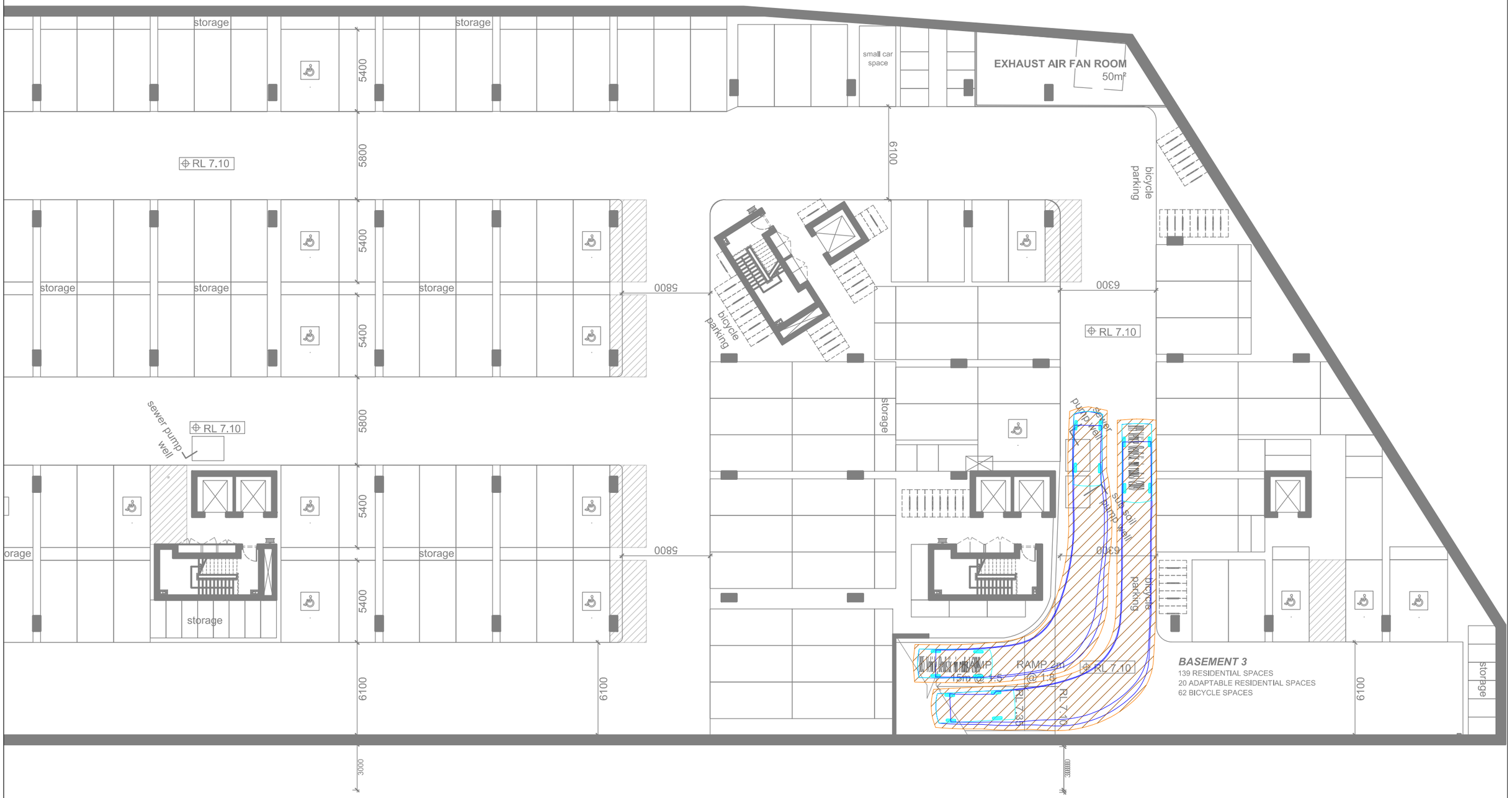

Revision notes:

Rev:	Date:	Notes:

Drawn By: TL

Client: Landmark Group

Project: 0319 1-11 Neil St, Merrylands

Drawing Title: Basement Level 3 Ramp Swept Path Analysis

Date: 26 October 2016

Scale @ A3: 1:250

Drawing Number: 06

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