148-150 Great Western Highway Westmead
Traffic Assessment

St George Community Housing Limited

Reference: 13SYT0038
September 14

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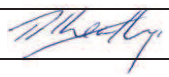
		Name	Signature		
1	K Martinez	T Wheatley		Final	19/09/2014
2	K Martinez	T Wheatley		Revised	22/09/2014
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1. Introduction

1.1. Background

TTM Consulting has been engaged by St George Community Housing Limited to prepare a traffic engineering report investigating a proposed multi-unit residential development. It is understood that a Development Application will be lodged with Holroyd City Council.

1.2. Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand
- Parking layout to provide efficient and safe internal manoeuvring
- Identification of likely traffic volumes and traffic distribution from the future development
- Identification of likely traffic impact of development on the public road network
- Access configuration to provide efficient and safe manoeuvring between the site and the public road network
- Suitability of access and internal facilities to provide for pedestrian and cyclist operation
- Access to suitable level of public transport

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- Holroyd City Council Planning Scheme, specifically:
  - Development Control Plan 2014
- Australian Standard 2890

1.3. Site Location

The site is located at 148-150 Great Western Highway, Westmead, as shown in Figure 1-1. The property description is Lot 32 on DP1075176. The site has road frontages to Great Western Highway and Broxbourne Street, and is currently unoccupied.

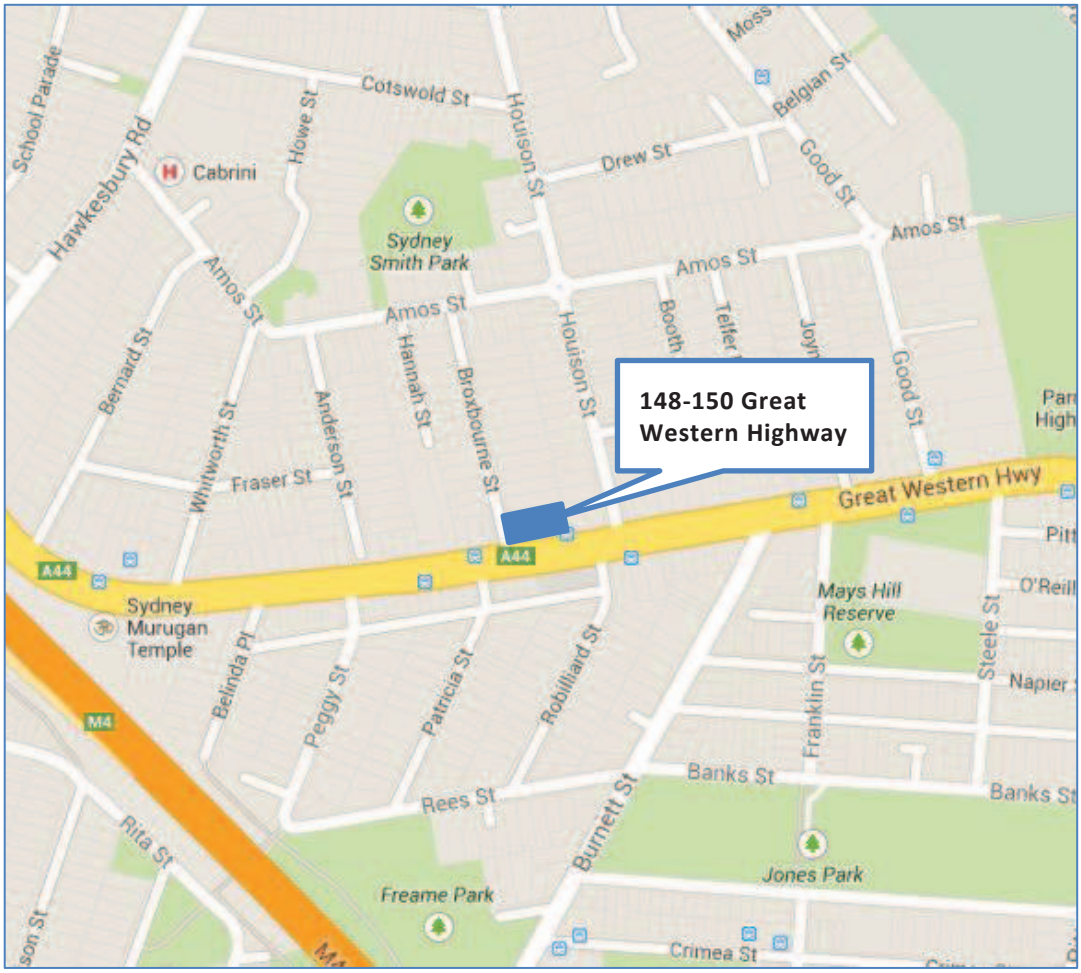


Figure 1-1: Site location

2. The Proposed Development

2.1. Development Profile

The proposed land uses for this development are summarised in Table 2.1.

Table 2.1: Proposed land uses

Use	Area/Qty
Affordable Rental Housing Units:	
– 1 bedroom	21
– 2 bedroom	50
– 3 bedroom	1
TOTAL	**72**
Community Facility	59 m^2

2.2. Access

The development plan includes the following access arrangements:

- Broxbourne Street access located at the west side of the subject site. The characteristics of this access include:
  - Two-way driveway access
  - 6m wide at the property boundary
  - All turns permitted

2.3. Parking

The development proposal includes the following parking supply:

- 26 resident spaces
- 1 PWD spaces (general)
- 11 PWD spaces (adaptable housing)
- 84 Bicycle spaces

3. Existing Transport Infrastructure

3.1. The Road Network

The roads in the immediate vicinity of the site are administered by Holroyd City Council (HCC) and Roads Maritime Services (RMS). The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 3.1.

Table 3.1: Local Road Hierarchy

Road	Speed Limit	Lanes	Classification	Road Authority
Houison Street	50kph	2 (undivided, plus on-street parking)	Local	Council
Broxbourne Street	50kph	2 (undivided, plus on-street parking)	Local	Council
Good Street	50kph	2 (undivided, plus on-street parking)	Local	Council
Great Western Highway	60kph	4 (undivided, plus bus lane)	Arterial	RMS

Broxbourne Street has a 10.5m wide carriageway at the site frontage. The intersections of Broxbourne Street / Great Western Highway and Houison Street / Great Western Highway are both priority controlled intersections.

3.2. Road Planning

TTM have discussed the planning of the future road network in the vicinity of the subject site with Holroyd City Council and Roads and Maritime Services.

It is understood that Holroyd City Council require a 5.5m 'clear zone' along the Great Western Highway frontage (from the curb line) for potential future use. As a result, no built form can be proposed within this zone.

Council / RMS did not specify any other works in the vicinity of the site which will impact upon or be impacted by the proposed development.

A standard condition of approval will be the construction/repair and reinstatement of pedestrian footpaths across the frontage of the site subsequent to construction activity on the site.

3.3. Public Transport and Pedestrian Facilities

Bus stops are located on Great Western Highway fronting the development site, with regular services to/from Liverpool and Parramatta. Bus services (Western Sydney Buses) operate every 10 minutes (approximately) in the peak periods and every 15-20 minutes in the off peak.

Formal pedestrian footpaths are located on both sides of Great Western Highway and Broxbourne Street fronting the development site. A signalised pedestrian crossing is located on Great Western Highway, fronting the development site.

4. Car Parking Arrangements

4.1. Parking Supply Requirement

Parking requirements for this type of development are identified in Table 4.1. The requirements for the residential component are taken from the Affordable Rental Housing SEPP (ARHSEPP). The requirement for the community facility is based on the parking rates for Commercial use from the RMS (RTA) *Guide to Traffic Generating Development*.

Table 4.1: Parking Supply Requirement

Land Use	ARHSEPP / RMS Requirement	Extent	Requirement	Provision
Apartments: – 1 bedroom – 2 bedroom – 3 bedroom **TOTAL**	 0.4 spaces / unit 0.5 spaces / unit 1 space / unit	 21 Units 50 Units 1 Unit	 8.4 spaces 25 spaces 1 spaces **34.4 spaces**	 **35 spaces**
PWD for adaptable housing	1 space / unit	15% of 72 Units	11 spaces (included in above total)	**11 spaces** (included in above total)
Community Facility	1 space / 20m2 GLA (min.) 1 space / 10m2 GLA (max.)	59 m^2 59 m^2	3 spaces 6 spaces	**3 spaces**

The parking rates for Commercial use vary according to the zone. For the B6 zone, the minimum rate is 1 space / 20m^2 GLA and maximum is 1 space / 10m^2 GLA. The proposed community facility of 59m^2 could have a customer visit pattern similar to these uses, suggesting a minimum of 3 and maximum of 6 spaces. However, a reduction is sought on the basis that a proportion of customers would be from within the building and, therefore, will not require additional parking. It is estimated that half of the clients of the facility will be from within the building, therefore, requiring only half the number of car parking spaces. 2 spaces are provided for visitors and 1 space is for staff of the facility, acknowledging that some visitors and staff will arrive by bus.

The above parking supply is to include PWD parking in the proposed development. Under Council's DCP, 15% of units are to be adaptable, i.e., 11 units. Therefore, 11 PWD parking spaces have been provided for adaptable units and one for visitors to the community facility.

The above parking supply is considered adequate for the development.

4.2. Car Park Layout

Table 4.2 identifies the characteristics of the proposed parking area with respect to the Council requirements. The last column identifies the compliance of each design aspect. Where compliance with Council is not achieved, further information is provided below

Table 4.2: Parking Design Requirements

Design Aspect	Council Requirement	Alternative Requirement (AS2890.1)	Provision	Compliance
Parking space width: – Standard bay – PWD – PWD*	 2.4m (min) 2.4m (min) 3.8m (min)	 2.4m (min) 2.4m (min) n/a	 2.4m (min) 2.4m (min) 3.8m	Council Compliant
Parking space length: – Standard bay – PWD – PWD*	 5.5m (min) 5.5m (min) 5.5m (min)	 5.4m (min) 5.4m (min) 5.4m (min)	 5.4m 5.4m 5.4m	Alternative Solution
Aisle Width: Parking aisle Circulation aisle/ramp	 6.2m (min) 6.5m (min)	 5.8m (min)	 5.8m	Alternative Solution
Straight Ramps Two way ramps	6.5m (min)	6.0m (min)	6.0m	Alternative Solution
Parking envelope clearance - Column intrusion	0.25m into bay within 0.3m & 0.2m into bay within 1.2m of front of bay	0.25m into bay within 0.3m & 0.2m into bay within 1.2m of front of bay	none	Council Compliant
Parking envelope clearance - Column adjacent to bay	Located between 0.75m and 1.75m of aisle	Located between 0.75m and 1.75m of aisle	Located between 0.75m and 1.75m of aisle	Council Compliant
Parking envelope clearance – space adjacent to wall	Space 0.3m clear of wall	Space 0.3m clear of wall	Space 0.3m clear of wall	Council Compliant
Maximum Gradient: PWD parking Parking bay Parking aisle Ramp	 1:40 (2.5%) 1:20 (5.0%) 1:16 (6.25%) 1:5 (20%)	 1:40 (2.5%) 1:20 (5.0%) 1:16 (6.25%) 1:5 (20%)	 0% 0% 0% 15.16%	Council Compliant
Maximum Ramp Transitions	8%	12.5% summit 15.0% sag	7.58%	Council Compliant
Height Clearance: General Min. Over PWD bay Absolute Min.	 2.3m 2.5m	 2.2m 2.5m NA	 2.3m 2.5m	Council Compliant
Parking Aisle Extension	1m beyond last bay	1m beyond last bay	3.6m wide PWD	Alternative Solution

Note: * - Adaptable Housing Standard in accordance with Council's DCP

Swept path analysis for cars using the car park has been undertaken. There are some locations where inbound and outbound cars will need to give way to each other. However, given the size

of the car park, the likelihood of cars needing to pass each other is relatively low; i.e., on average, less than 1 car per minute enters or leaves the car park. The swept paths are provided in Appendix B.

The proposed car park layout generally complies with Council Requirements; however, the following issues are resolved with alternative solutions.

- **Parking Space Length**

Council's DCP requires a minimum of 5.5m parking space length. The proposed layout complies with the AS2890.1 of 5.4m parking space length, which is considered suitable.

- **Blind Aisle Extension**

AS2890.1 requires a 1m extension at the end of blind aisles to assist with reversing out of parking spaces. The development includes 3.6m wide adaptable parking spaces against the wall at the end of the western blind aisle. Since these are at least 1m wider than a general parking space, they already allow enough extra room to reverse out of the parking space into the end of the blind aisle. Therefore, the design of the blind aisle is considered suitable for the proposed development.

- **Two way ramp**

Council's DCP requires a 6.5m wide ramp (kerb to kerb) for a two way ramp; however, the design complies with AS2890.1. Due to the low number of vehicle movements from the proposed development, the design for the two way ramp is considered suitable for the development.

5. Existing Traffic Volumes

5.1. Peak Hour

TTM Data conducted an intersection movement survey at the Great Western Highway / Broxbourne Street and Great Western Highway / Good Street intersections, from 7:00 to 10:00am and 16:00 to19:00pm on Thursday 27th February 2014. The peak hours were found to be 07:45 to 08:45am and 16:00 to 17:00pm at the Great Western Highway / Broxbourne Street intersection, and Great Western Highway / Good Street intersection. The results of the survey are shown below in Figure 5-1.

Heavy Vehicles and buses content on Great Western Highway were approximately 3-7%.

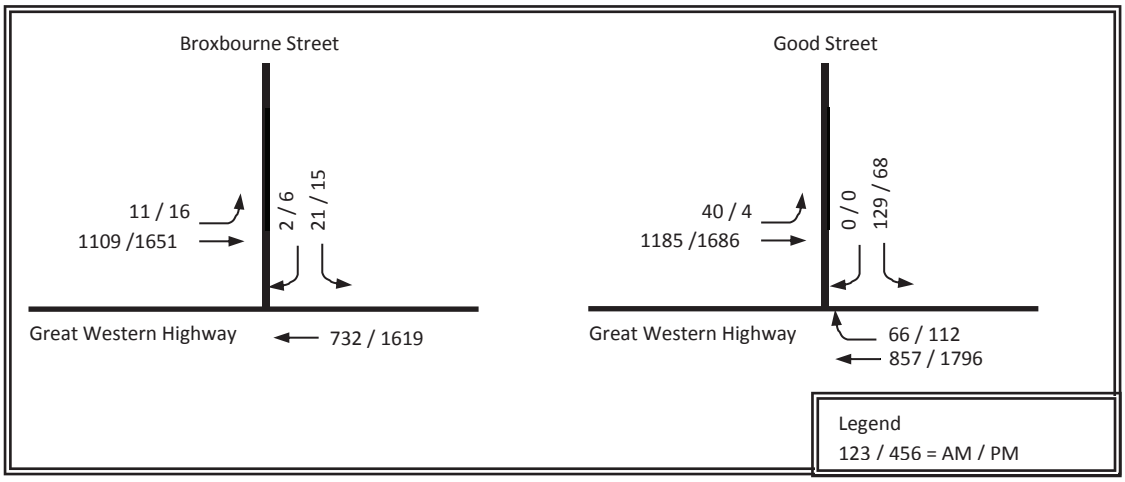


Figure 5-1: Existing (Surveyed) Peak Hour Traffic Volumes 2011

6. Estimated Future Transport Demands

6.1. Development Scenarios

For the purpose of assessing the future traffic demands TTM has adopted an annual growth rate of 1.5%. This is based on expected development of the local area.

TTM has identified three assessment periods for the road network as follows:

Current Traffic Scenario

This scenario includes the 2014 traffic volumes modelled over the existing road network. This analysis has been performed for both the AM and PM Peaks.

Opening Year (2016) Traffic Scenario

This analysis incorporates a 1.5% per annum increase in the background traffic volume for a period of 2 years from the most recent survey. For the base case scenario, the existing road network has been analysed.

2026 Traffic Scenario

This analysis incorporates a 1.5% per annum increase in the background traffic volume for a period of (10 years past opening year).

6.2. Estimated Development Traffic Generation

6.2.1. Proposed Development Traffic Volume

The RMS (RTA) *Guide to Traffic Generating Developments* recommends using specific generation rates, for planning purposes, for different development types. Application of these rates to the proposed development, results in the following estimate of development site traffic generation:

AM Peak Hour

AM peak hour traffic generation for peak medium density residential flat building (Larger units and town houses) = 0.5 – 0.65vph / dwelling = 36 vph (in+out)

AM peak hour traffic generation for the community facility (Office and Commercial rate) = 2 vph / 100m2 gfa = 2 vph (in+out)

Total Development AM peak hour traffic generation = 38 vph (in+out)

PM Peak Hour

PM peak hour traffic generation for peak medium density residential flat building (Larger units and town houses) = 0.5 – 0.65vph / dwelling = 36 vph (in+out)

PM peak hour traffic generation for the community facility (Office and Commercial rate) = 2 vph / 100m2 gfa = 2 vph (in+out)

Total Development PM peak hour traffic generation = 38 vph (in+out)

The above traffic generation rates have been used to provide a conservative analysis. The actual traffic generation is likely to be more in line with the traffic generation rate for high density residential flat buildings in Metropolitan Sub-Regional Centres = 0.29vph / dwelling = 21vph (in+out).

6.3. Estimated Development Traffic Distribution

The distribution of development generation traffic is based on the following:

- 40% of development traffic is inbound in the AM Peak, with the remaining 60% outbound
- 60% of development traffic is inbound in the PM Peak, with the remaining 40% outbound

  (these are represented in Figure 6-2 as reduced vehicle movements past the site)
- The remaining traffic movements are based on corresponding movements in the survey data.
- Traffic travelling to the site from the east will turn right at Good Street since the alternative right turn is a longer journey via Hawkesbury Road.

The estimated distribution of development generated traffic is shown in **Figure 6-1**.

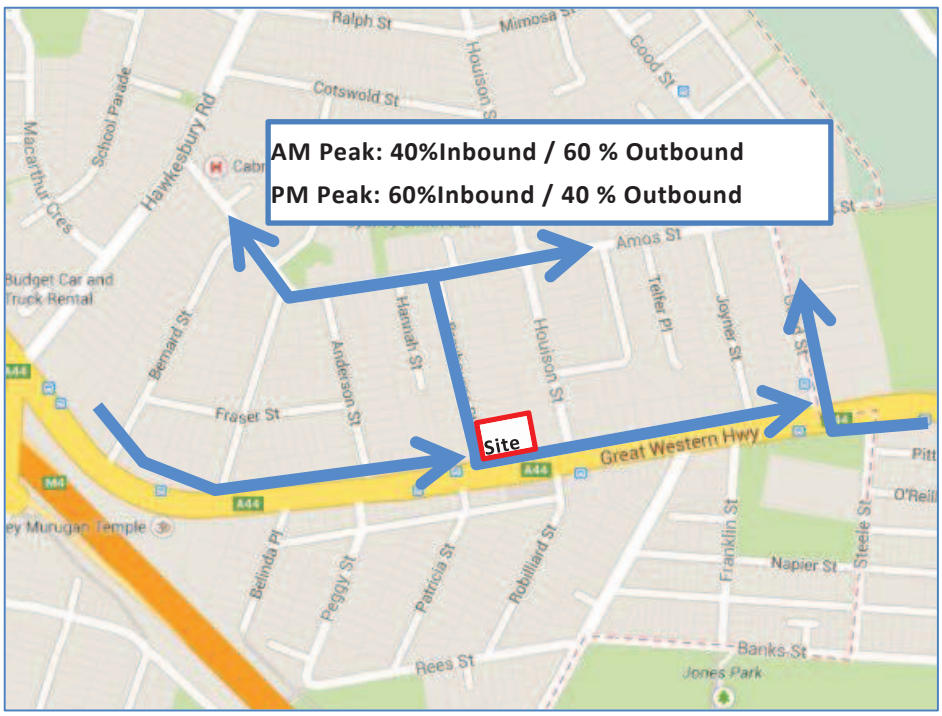


Figure 6-1: Estimated Distribution of Development Generated Traffic (AM Peak)

The traffic distribution shown in Figure 6-1 will result in local traffic movements generated by the proposed development as shown in Figure 6-2.

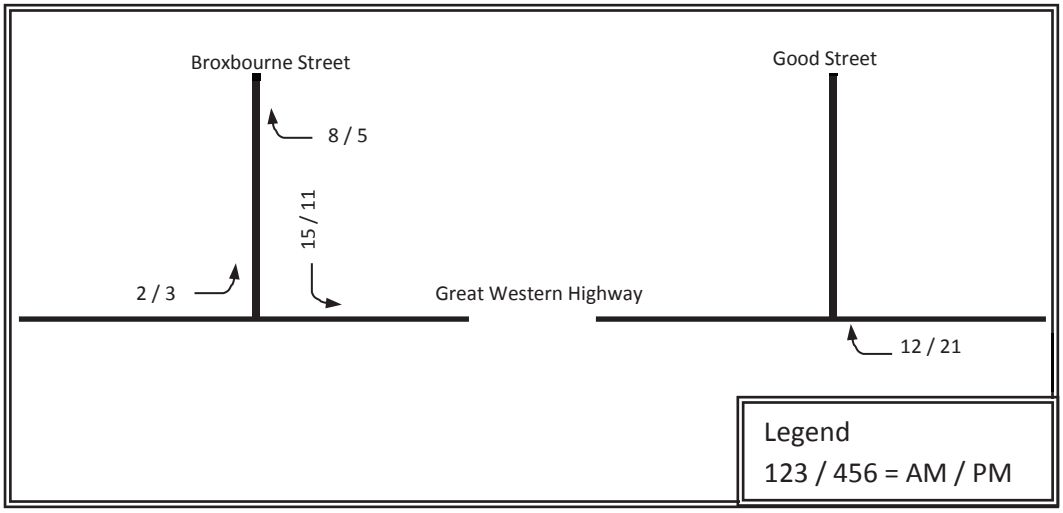


Figure 6-2: Local Traffic Movements as a Result of the Proposed Development

6.4. Opening Day (2016) Base Traffic Demands

Figure 6-3 shows the opening day (2016) base traffic demands, based on an application of an annual growth rate of 1.5% for a period of 2 years (i.e. 2 years past the date of the traffic surveys) to the 2014 traffic survey volumes.

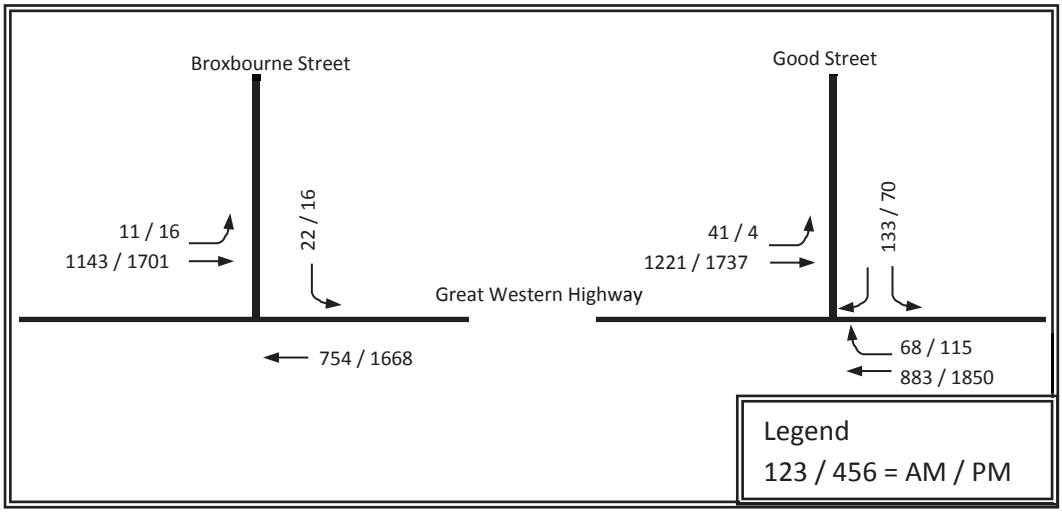


Figure 6-3: Estimated 2016 Peak Hour Traffic, Without Development (1.5% pa growth)

6.5. Opening Day (2016) Project Traffic Demands

The opening day project case scenario is obtained by the addition of the development traffic generation shown in Figure 6-2 to the base traffic volumes shown in Figure 6-3. These expected traffic movements are shown in Figure 6-4.

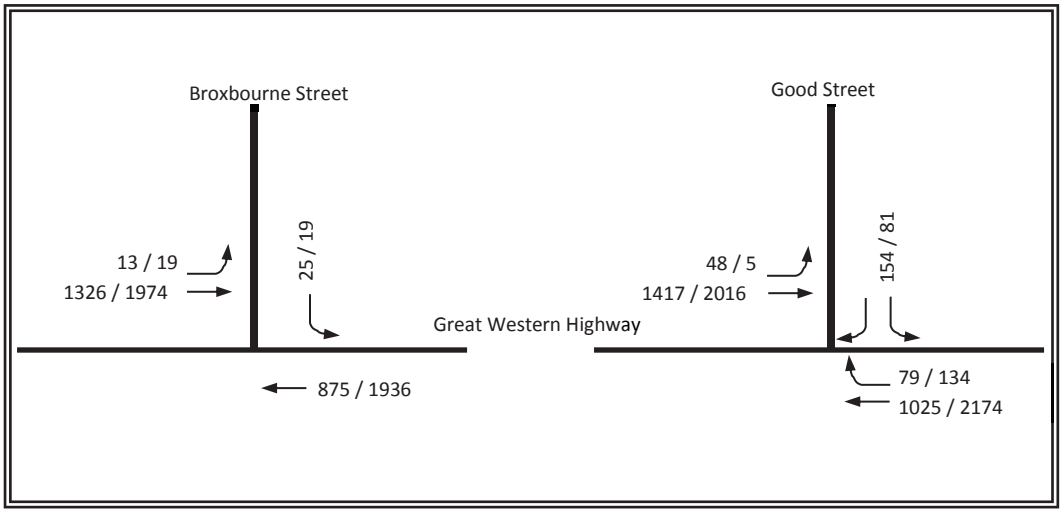


Figure 6-4: Estimated 2016 Peak Hour Traffic, With Development

6.6. Future (2026) Base Traffic Demands

Figure 6-5 shows the future (2026) base traffic demands, based on an application of an annual growth rate of 1.5% for a period of 12 years (i.e. 10 years past an assumed 2016 completion date of the project) to the 2014 traffic volumes.

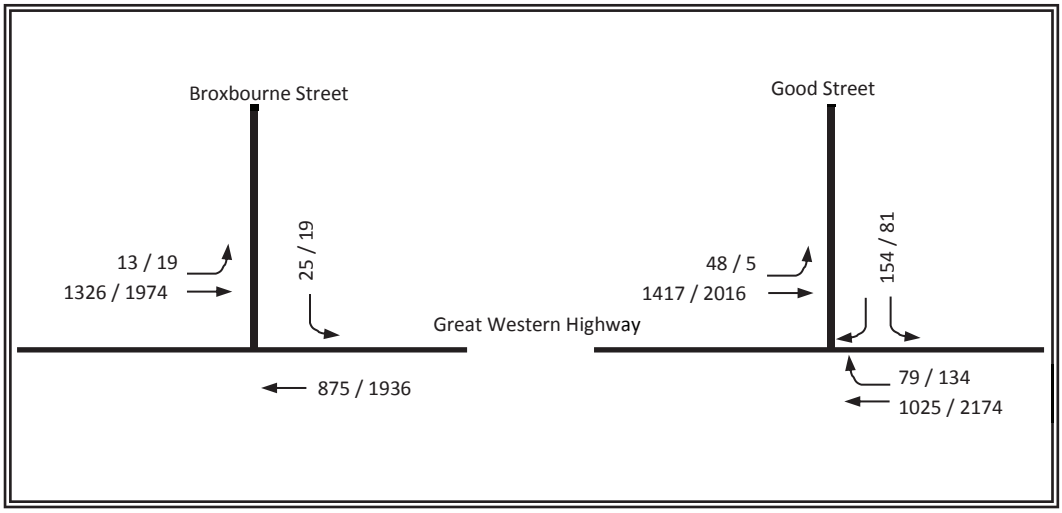


Figure 6-5: Estimated 2026 Peak Hour Traffic, Without Development (1.5% pa growth)

6.7. Future (2026) Project Traffic Demands

The future project case scenario is obtained by the addition of development traffic generation shown in Figure 6-2 to the base traffic volumes shown in Figure 6-5. These expected traffic movements are shown in Figure 6-6.

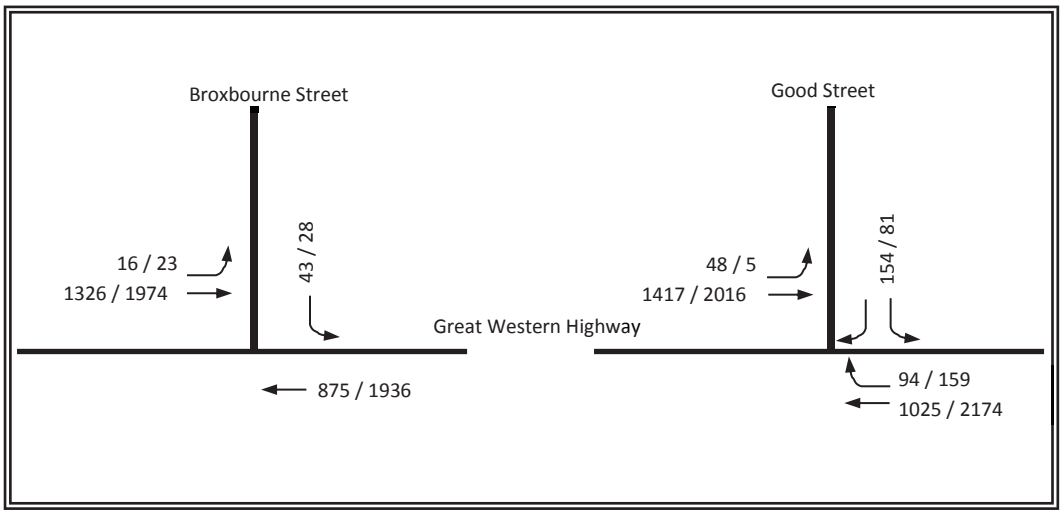


Figure 6-6: Estimated 2026 Peak Hour Traffic, With Development

7. Road Network Performance

TTM has assessed the performance of these intersections utilising SIDRA analysis software (V6.1). For each intersection the summary of these results are below, with detailed results attached.

7.1. Analysis of Great Western Highway / Broxbourne Street

The Sidra layout identified for this intersection is shown in Figure 7-1.

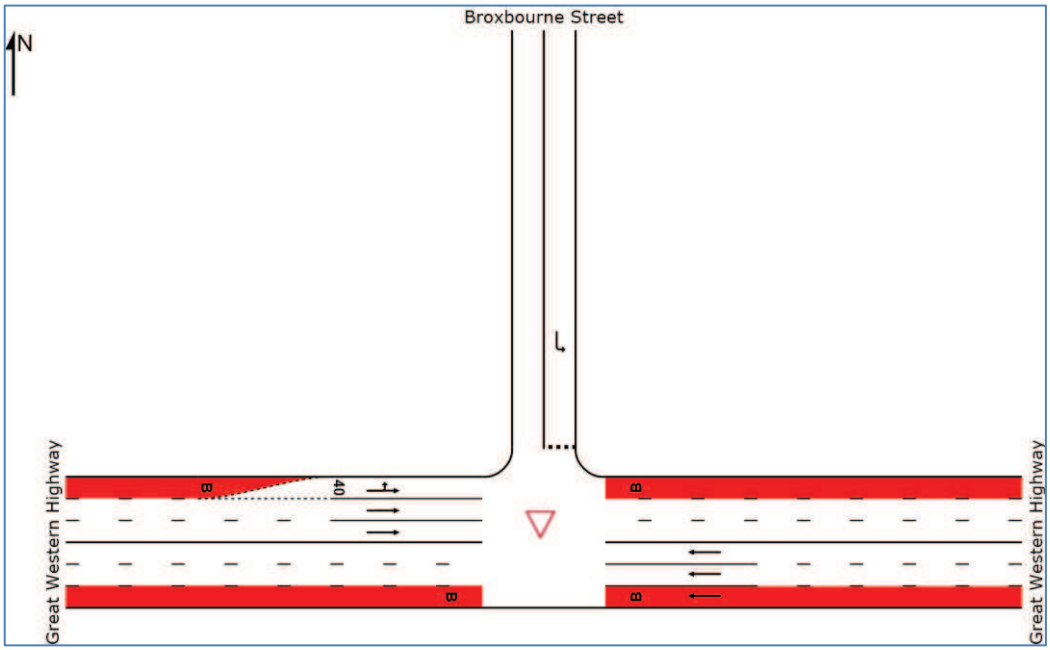


Figure 7-1: Great Western Highway / Broxbourne Street Intersection Layout

Table 7.1 gives a summary of the outputs for the various traffic cases applied to the intersection. The detailed outputs for this analysis are provided in Appendix C.

Table 7.1: Summary of Sidra Outputs (Great Western Highway and Broxbourne Street Intersection)

Case	Degree of Saturation	Average Delay (worst Case)	Level of Service	95th Percentile Critical Queue (m)		
				East	North	West
AM Base 2014	45.3%	5.6	A	0	0.5	0
AM Project Case 2016	46.7%	5.6	A	0	0.8	0
AM Project Case 2026	54.2%	5.6	A	0	1.0	0
PM Base 2014	44.0%	5.5	A	0	0.4	0
PM Project Case 2016	45.3%	5.5	A	0	0.6	0
PM Project Case 2026	52.6%	5.5	A	0	0.7	0

As shown in Table 7.1, the existing intersection is sufficient to cater for any significant traffic increases.

7.2. Analysis of Great Western Highway / Good Street

The Sidra layout identified for this intersection is shown in Figure 7-2.

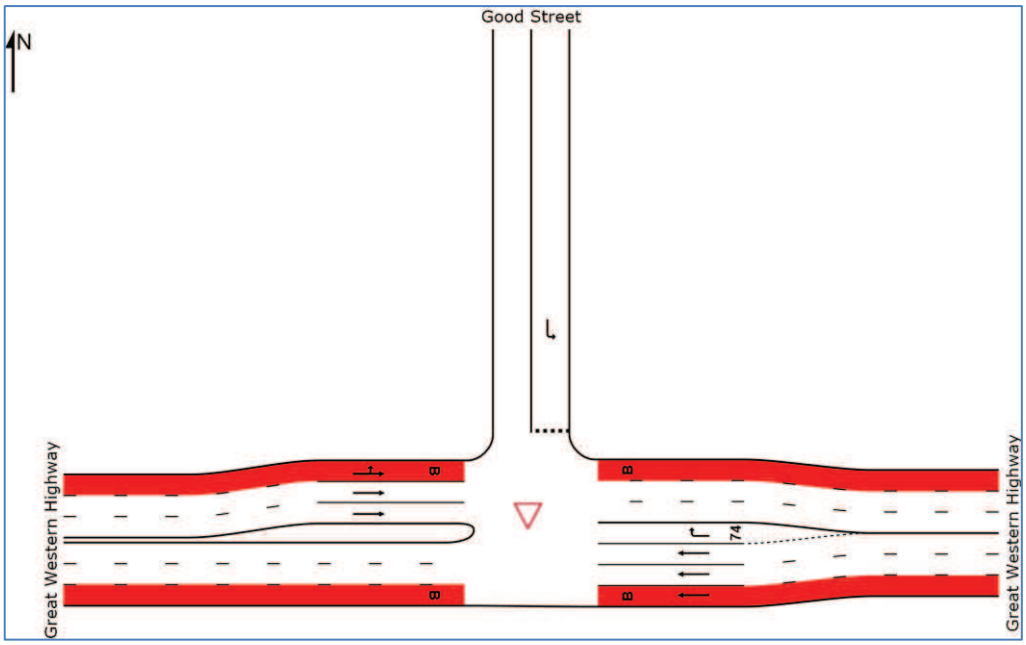


Figure 7-2: Great Western Highway / Good Street Intersection Layout

Table 7.2 gives a summary of the outputs for the various traffic cases applied to the intersection. The detailed outputs for this analysis are provided in Appendix C.

Table 7.2: Summary of Sidra Outputs (Great Western Highway and Good Street Intersection)

Case	Degree of Saturation	Average Delay	Level of Service	95th Percentile Critical Queue (m)		
				East	North	West
AM Base 2014	85.3%	106.1	F	24.4	3.4	0
AM Project Case 2016	116.0%	269.0	F	85.6	3.5	0
AM Project Case 2026	258.5%%	1561.5	F	320.3	4.2	0
PM Base 2014	56.2%	29.8	C	15.2	1.8	0
PM Project Case 2016	72.8%	38.2	C	23.3	1.8	0
PM Project Case 2026	121.1%	257.6	F	170.9	2.1	0

The analysis shows that the existing intersection already has significant delays from only the right turn movements from the east on Great Western Highway, as shown in Table 7.2. Delays for this turn increase significantly as development traffic is added and background traffic increases.

However, the signalised intersection of Great Western Highway and Burnett Street is located 150m west of Good Street, and during the phasing change at this intersection, it allows time for right turn movements on to Good Street from the east on Great Western Highway. This behaviour has been observed on site.

It has also been observed that when traffic queues back to the west from Pitt Street, traffic is able to turn right into Good Street through the gap in the stationary queue of traffic. It is expected that this practice will continue in the future as traffic volumes increase, so the delays predicted by the Sidra model are not likely to occur.

Therefore, the existing intersection is considered suitable to cater for expected increases in traffic generated by the development.

7.3. Analysis Conclusions

Great Western High / Broxbourne Street Intersection

The above analysis shows that there is ample spare capacity at the Great Western Highway and Broxbourne Street intersection in all cases; therefore, the development traffic will have no significant impact on the operation of this intersection and the intersection is considered suitable to cater for expected increases in traffic generated by the development.

Great Western High / Good Street Intersection

The above analysis shows that there are delays at the Great Western Highway and Good Street intersection in all cases; however, site observations reveal that there are opportunities for traffic to turn right that are not modelled by Sidra. The right turn arrangement at the intersection is expected to continue to operate as currently observed, and is, therefore, considered suitable to cater for expected increases in traffic generated by the development.

8. Site Access Arrangements

8.1. Access Requirements

The proposed development access driveway requirements are specified in Table 8.1.

Table 8.1: Typical Driveway Requirements for the proposed access

Design Aspect	Requirement	Proposed Provision	Compliance
Distance from a minor intersection	6m (min)	26m	Compliant
Distance from another driveway	Not specified	Approximately 5m north to existing driveway	Compliant
Sight Distance	Ideally 69m for 50kph design speed or 45m as an absolute minimum	No permanent obstructions within this distance	Compliant
Width/ Entry and Exit Widths	6.0-9.0m for category 2 (combined)	6.0m	Compliant
Minimum Queuing Provisions	The greater of a minimum of 2 cars or 3% of capacity	Greater than 12.0m from footpath to conflict point at bottom of ramp	Compliant

8.2. Proposed Access Arrangements and Their Adequacy

The proposed access arrangements comply with all Council Requirements and are, therefore, considered suitable for the proposed development.

9. Service Vehicle Arrangements

To assess the service vehicle requirements for the development, TTM has reviewed the service vehicle needs against the proposed arrangements.

9.1. Council Requirements

Specific service vehicle capacity requirements are not specified by Council. As such, the service vehicle requirements have been estimated by TTM based on practical operational requirements of the site as per Section 9.2.

9.2. Estimated Service Vehicle Traffic Generation

It is expected that service vehicle traffic generation will be limited to the following:

- Waste collection – garbage collection trucks
- Deliveries to residents – delivery vans
- Residents moving furniture in/out of units – removals trucks
- Maintenance and gardening – van or ute and trailer

9.3. Proposed Service Vehicle Arrangements and Their Adequacy

Garbage collection trucks will empty bins from the kerb side in the same way that collection occurs for the adjacent properties on Broxbourne Street and Great Western Highway.

Deliveries to residents, moving of furniture in/out of units, and maintenance/gardening contractors will utilise existing on-street parking in Broxbourne Street. These servicing events are infrequent and are not expected to significantly impact the amenity of the street.

Overall, the proposed service vehicle arrangements are considered adequate to meet the needs of the proposed development.

10. Public and Active Transport

10.1. Public Transport

Access to public transport is considered reasonable, due to the presence of bus stop located on Great Western Highway fronting the development site. Bus routes 810X, 811X and T80 serves to and from Liverpool and Parramatta.

10.2. Pedestrian Access

Pedestrian access to the site is considered acceptable with signalised pedestrian crossing on Great Western Highway, fronting the development site. Pedestrian facilities are available along the site frontage.

11. Summary and Conclusions

11.1. Development Access

The proposed access complies with the Australia Standards of a two way 6m wide driveway; therefore, it is considered suitable for the development.

11.2. Car Parking Arrangements

The proposed parking supply for the site is generally consistent with Holroyd City Council accepted parking requirements. It is proposed that a reduced parking supply will be provided for the proposed site in accordance with the ARHSEPP; which is considered acceptable given the target market of the site and the location of significant public transport infrastructure in proximity to the site; a bus stop is located on Great Western Highway fronting the proposed development.

The basement car park layouts, as a minimum, comply with AS2890 requirements. Overall, TTM considers the proposed car parking arrangements for this development are adequate.

11.3. Impact on Surrounding Road Network

Assessment of the proposed development indicates that the development will not have a significant impact on the future road network. As such, no further mitigating road works are required.

11.4. Service Vehicle Arrangements

Servicing for this development will be facilitated on Broxbourne Street, off Great Western Highway. There will be very few service vehicle demands for the site and will accommodated in the existing on-street parking without adversely affecting the amenity of the street.

Overall, the proposed service vehicle arrangements are considered adequate to meet the needs of the proposed development.

11.5. Public Transport

The current public transport infrastructure is considered adequate for the development.

11.6. Conclusion

Based on the assessment contained within this report, TTM see no traffic engineering reason why the relevant approvals should not be granted.

Appendix A Proposed Site Plan

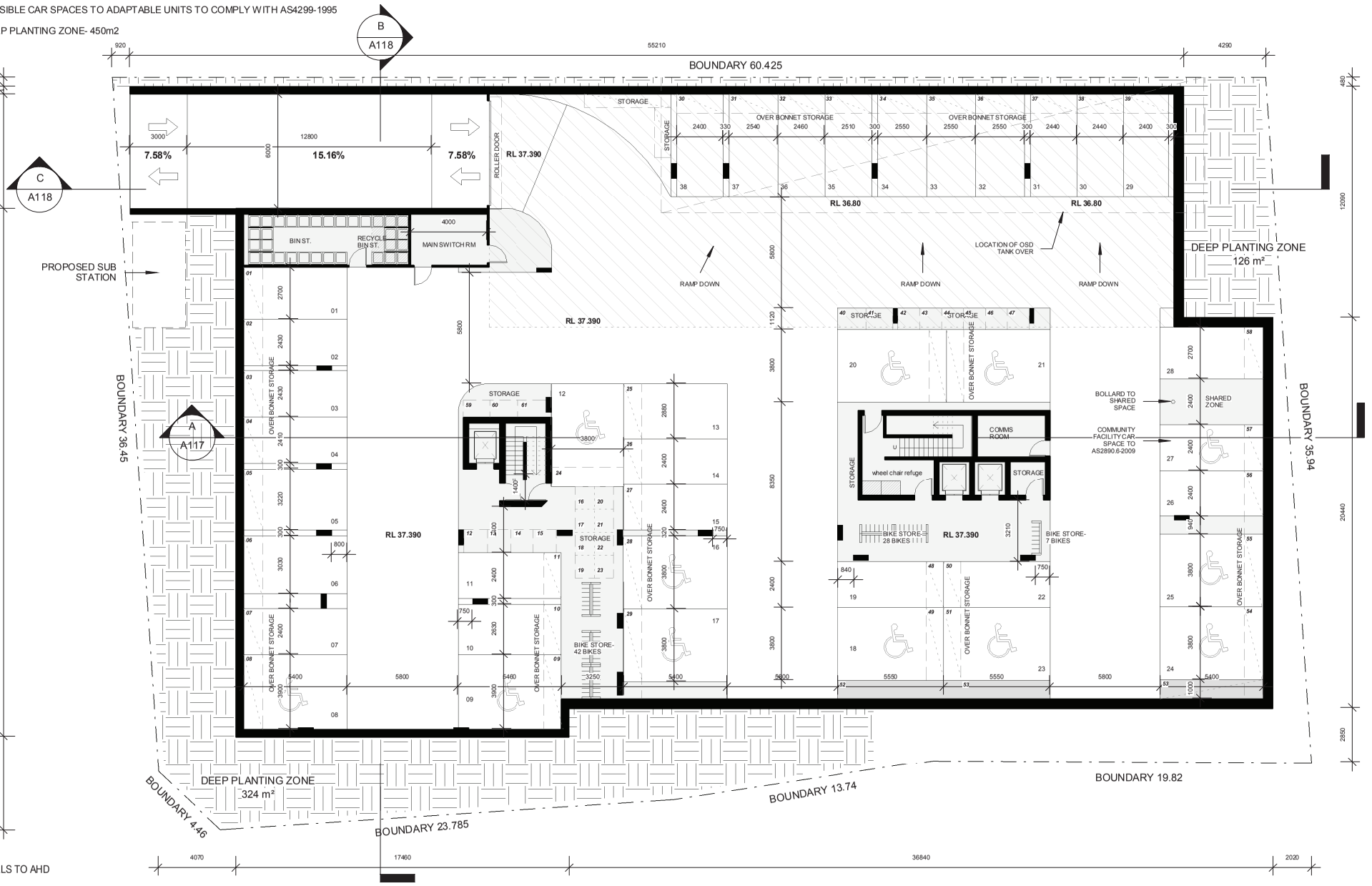
NOTE: BIKE RACKS - 10 PER RACK= 75 SPACES

STORAGE UNITS TO BASEMENT - 61 UNITS

STORAGE UNITS TO BE NO GREATER THAN 1m DEEP OVER ALL ACCESSIBLE SPACES

ALL ACCESSIBLE CAR SPACES TO ADAPTABLE UNITS TO COMPLY WITH AS4299-1995

TOTAL DEEP PLANTING ZONE- 450m2



NOTE: ALL LEVELS TO AHD

Rev.	Date	Description	Dr.	Chk.	Dr.	Rev.	Date	Description	Dr.	Chk.	Dr.
DA01	12.09.14	DA Submission									

Status

Key Plan

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HBO+EMTB
Architecture
Interior Design
Urban Design
Landscape Design
Workspace Solutions
Heritage
Planning

green building council australia member

Client: St George Community Housing

Project: 148-150 Great Western Hwy, Westmead

Drawing Title: Basement Carpark

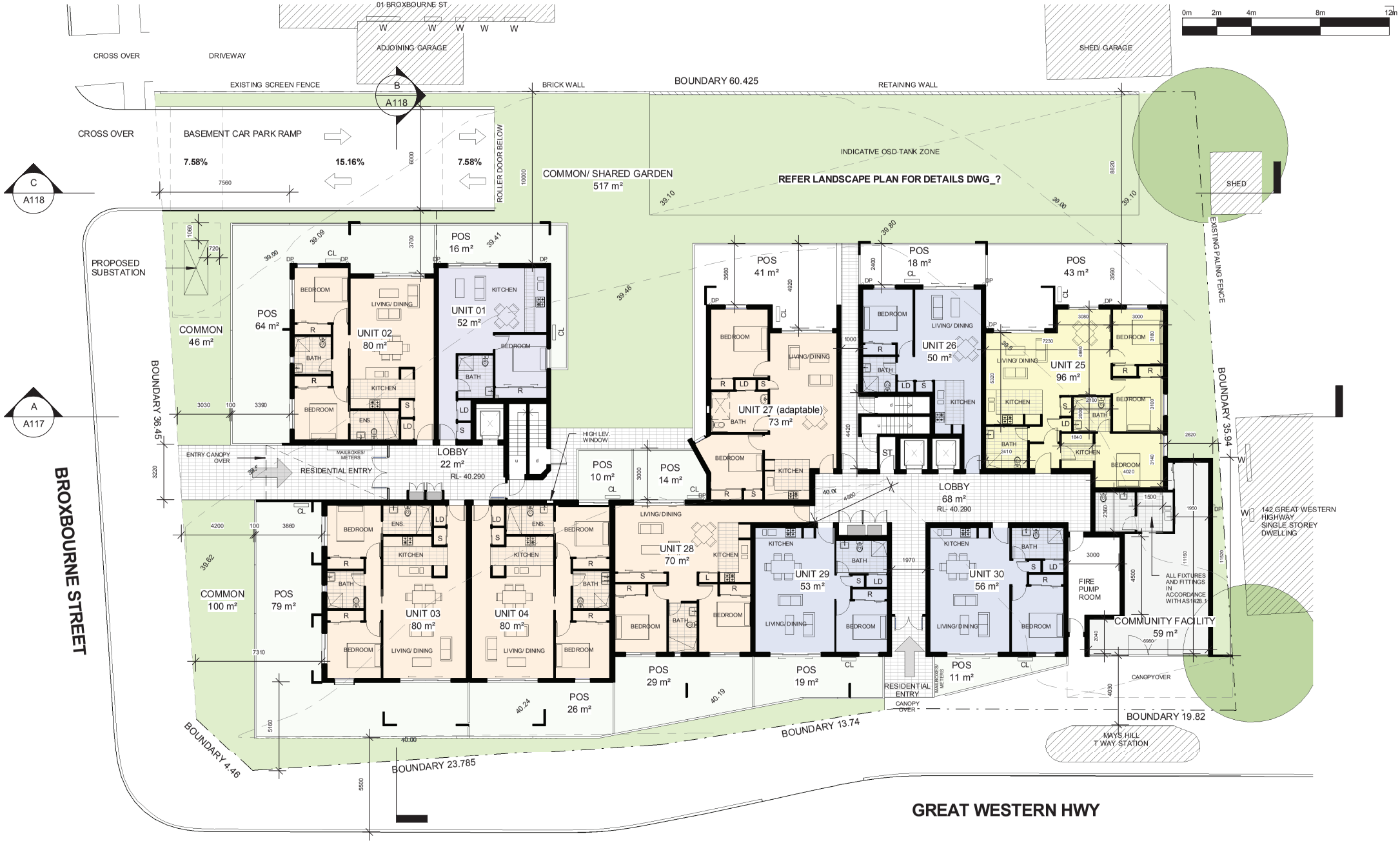
File Ref: V:\SYA\NAA-003762-000 SGCH Westmead\8 Design\8_3 Concept_Schematic\Revit Westmead-140901- DA SUBMISSION.rvt

Scale: 1 : 200

Job No: 003762

Drawing No: A104

Rev: DA01



NOTE: ALL LEVELS TO AHD
CL- FOLDING CLOTHES LINE: 7.5m
POS- PRIVATE OPEN SPACE

REFER DRAWING A133-136 FOR TYPCIAL ADAPTABLE UNIT TYPE

Rev.	Date	Description	Dr.	Chk.	Dr.	Rev.	Date	Description	Dr.	Chk.	Dr.
DA01	12.09.14	DA Submission									

SGCH

Status

Key Plan

Hoadley Budge Ophert & Edwards Madigan Torzillo Briggs Pty Ltd
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HBO+EMTB
Architecture
Interior Design
Urban Design
Landscape Design
Workspace Solutions
Heritage
Planning

green building council australia member

Client: St George Community Housing

Project: 148-150 Great Western Hwy, Westmead

Drawing Title: Ground Floor Plan

File Ref: V:\SYA\NAA-003762-000 SGCH Westmead\8 Design\8_3 Concept_Schematic\Revit Westmead\140901- DA SUBMISSION.rvt

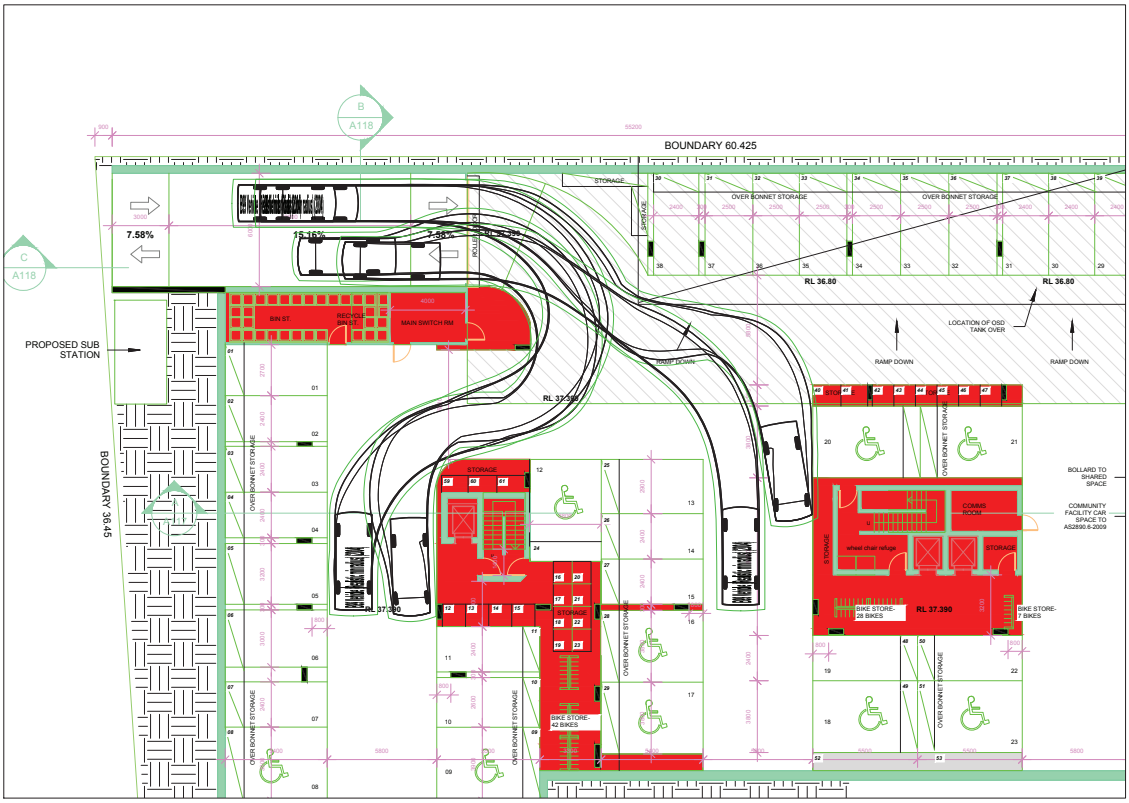
Scale: 1 : 200

Job No: 003762

Drawing No: A105

Rev: DA01

Appendix B Vehicle Swept Paths



TTM CONSULTING PTY LTD
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148-150 GREAT WESTERN HIGHWAY WESTMEAD

SWEPT PATH ANALYSIS

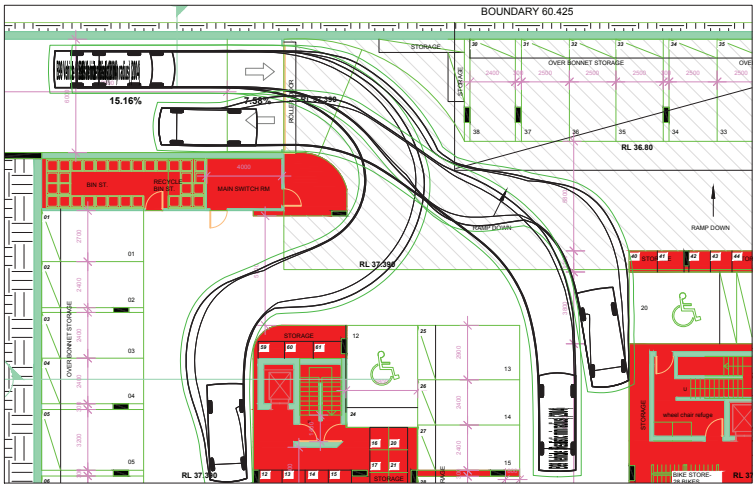
TTM REFERENCE 13SYT0038-SK03

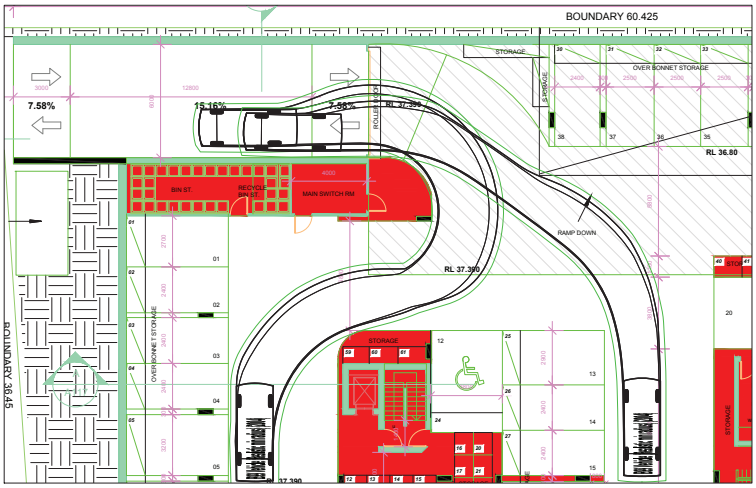
DRAWN RG

CHECKED TW

DATE 19 SEPT 2014

SCALE 1:200 AT ORIGINAL SIZE





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148-150 GREAT WESTERN HIGHWAY WESTMEAD

SWEPT PATH ANALYSIS

TTM REFERENCE
13SYT0038-SK03

DRAWN RG
CHECKED TW

DATE
19 SEPT 2014

SCALE 1:200 AT ORIGINAL SIZE

Appendix C Sidra Intersection Analysis

MOVEMENT SUMMARY

Site: 2014 AM - Base

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	771	9.3	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		771	9.3	0.200	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Broxbourne Street											
7	L2	22	0.0	0.017	4.7	LOS A	0.1	0.5	0.09	0.50	49.4
Approach		22	0.0	0.017	4.7	LOS A	0.1	0.5	0.09	0.50	49.4
West: Great Western Highway											
10	L2	17	6.3	0.027	5.6	LOS A	0.0	0.0	0.00	0.17	55.1
11	T1	1738	5.6	0.027	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1755	5.6	0.453	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2547	6.7	0.453	0.1	NA	0.1	0.5	0.00	0.01	59.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2014 PM - Base

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	1704	3.3	0.013	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1704	3.3	0.440	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Broxbourne Street											
7	L2	16	6.7	0.013	4.7	LOS A	0.0	0.4	0.09	0.50	49.1
Approach		16	6.7	0.013	4.7	LOS A	0.0	0.4	0.09	0.50	49.1
West: Great Western Highway											
10	L2	12	0.0	0.023	5.5	LOS A	0.0	0.0	0.00	0.13	55.6
11	T1	1167	4.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1179	3.9	0.299	0.1	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		2899	3.6	0.440	0.1	NA	0.0	0.4	0.00	0.00	59.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2016 AM + Traffic Generation

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	794	9.3	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		794	9.3	0.206	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Broxbourne Street											
7	L2	39	0.0	0.030	4.7	LOS A	0.1	0.8	0.10	0.50	49.4
Approach		39	0.0	0.030	4.7	LOS A	0.1	0.8	0.10	0.50	49.4
West: Great Western Highway											
10	L2	21	5.6	0.030	5.6	LOS A	0.0	0.0	0.00	0.19	54.9
11	T1	1791	5.6	0.030	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1812	5.6	0.467	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2644	6.6	0.467	0.2	NA	0.1	0.8	0.00	0.01	59.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2016 PM + Traffic Generation

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	1756	3.3	0.014	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1756	3.3	0.453	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Broxbourne Street											
7	L2	25	5.0	0.020	4.7	LOS A	0.1	0.6	0.09	0.50	49.2
Approach		25	5.0	0.020	4.7	LOS A	0.1	0.6	0.09	0.50	49.2
West: Great Western Highway											
10	L2	14	0.0	0.025	5.5	LOS A	0.0	0.0	0.00	0.15	55.4
11	T1	1203	4.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1217	3.9	0.308	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2998	3.6	0.453	0.1	NA	0.1	0.6	0.00	0.01	59.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2026 AM + Traffic Generation

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	921	9.3	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		921	9.3	0.239	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Broxbourne Street											
7	L2	45	0.0	0.035	4.7	LOS A	0.1	1.0	0.11	0.50	49.4
Approach		45	0.0	0.035	4.7	LOS A	0.1	1.0	0.11	0.50	49.4
West: Great Western Highway											
10	L2	24	5.0	0.035	5.6	LOS A	0.0	0.0	0.00	0.19	54.9
11	T1	2078	5.7	0.035	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		2102	5.6	0.542	0.1	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		3068	6.7	0.542	0.2	NA	0.1	1.0	0.00	0.01	59.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2026 PM + Traffic Generation

Great Western Highway / Broxbourne Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	2038	3.3	0.016	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		2038	3.3	0.526	0.1	NA	0.0	0.0	0.00	0.00	59.8
North: Broxbourne Street											
7	L2	29	4.0	0.023	4.7	LOS A	0.1	0.7	0.10	0.50	49.2
Approach		29	4.0	0.023	4.7	LOS A	0.1	0.7	0.10	0.50	49.2
West: Great Western Highway											
10	L2	17	0.0	0.029	5.5	LOS A	0.0	0.0	0.00	0.16	55.3
11	T1	1396	3.9	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1413	3.9	0.357	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		3480	3.5	0.526	0.1	NA	0.1	0.7	0.00	0.01	59.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2014 AM Base Case

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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
East: Great Western Highway											
5	T1	902	7.9	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	69	4.5	0.853	106.1	LOS F	3.4	24.4	0.99	1.21	21.8
Approach		972	7.7	0.853	7.6	NA	3.4	24.4	0.07	0.09	53.2
North: Good Street											
7	L2	136	4.7	0.107	5.7	LOS A	0.5	3.4	0.10	0.54	53.1
Approach		136	4.7	0.107	5.7	LOS A	0.5	3.4	0.10	0.54	53.1
West: Great Western Highway											
10	L2	4	0.0	0.020	5.5	LOS A	0.0	0.0	0.00	0.05	57.5
11	T1	1775	5.0	0.020	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1779	5.0	0.461	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2886	5.9	0.853	2.9	NA	3.4	24.4	0.03	0.06	57.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2014 PM Base Case

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	1891	3.2	0.013	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
6	R2	118	3.6	0.562	29.8	LOS C	2.1	15.2	0.90	1.06	39.8
Approach		2008	3.2	0.562	1.8	NA	2.1	15.2	0.05	0.06	58.1
North: Good Street											
7	L2	72	7.4	0.057	5.7	LOS A	0.2	1.8	0.10	0.54	53.0
Approach		72	7.4	0.057	5.7	LOS A	0.2	1.8	0.10	0.54	53.0
West: Great Western Highway											
10	L2	42	2.5	0.040	5.6	LOS A	0.0	0.0	0.00	0.30	55.1
11	T1	1247	3.3	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1289	3.3	0.318	0.2	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		3369	3.3	0.562	1.3	NA	2.1	15.2	0.03	0.05	58.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2016 AM + Traffic Generation

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	929	7.9	0.019	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	85	4.1	1.160	269.0	LOS F	11.8	85.6	1.00	1.80	11.1
Approach		1015	7.6	1.160	22.6	NA	11.8	85.6	0.08	0.15	43.7
North: Good Street											
7	L2	140	4.7	0.110	5.7	LOS A	0.5	3.5	0.10	0.54	53.1
Approach		140	4.7	0.110	5.7	LOS A	0.5	3.5	0.10	0.54	53.1
West: Great Western Highway											
10	L2	4	0.0	0.021	5.5	LOS A	0.0	0.0	0.00	0.05	57.5
11	T1	1828	5.0	0.021	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1833	5.0	0.475	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		2987	5.9	1.160	8.0	NA	11.8	85.6	0.03	0.08	52.9

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2016 PM + Traffic Generation

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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
East: Great Western Highway											
5	T1	1947	3.2	0.014	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
6	R2	144	3.2	0.728	38.2	LOS C	3.2	23.3	0.94	1.17	36.4
Approach		2092	3.2	0.728	2.7	NA	3.2	23.3	0.06	0.08	57.3
North: Good Street											
7	L2	74	7.4	0.059	5.7	LOS A	0.2	1.8	0.10	0.54	53.0
Approach		74	7.4	0.059	5.7	LOS A	0.2	1.8	0.10	0.54	53.0
West: Great Western Highway											
10	L2	43	2.5	0.041	5.6	LOS A	0.0	0.0	0.00	0.30	55.1
11	T1	1285	3.3	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1328	3.3	0.328	0.2	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		3494	3.3	0.728	1.8	NA	3.2	23.3	0.04	0.07	58.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2026 AM + Traffic Generation

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	1079	7.9	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	99	4.3	2.585	1561.5	LOS F	44.1	320.3	1.00	2.47	2.3
Approach		1178	7.6	2.585	131.2	NA	44.1	320.3	0.08	0.21	19.0
North: Good Street											
7	L2	162	4.6	0.128	5.8	LOS A	0.6	4.2	0.12	0.54	53.1
Approach		162	4.6	0.128	5.8	LOS A	0.6	4.2	0.12	0.54	53.1
West: Great Western Highway											
10	L2	5	0.0	0.025	5.5	LOS A	0.0	0.0	0.00	0.06	57.5
11	T1	2122	5.0	0.025	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		2127	5.0	0.551	0.1	NA	0.0	0.0	0.00	0.00	59.8
All Vehicles		3467	5.9	2.585	44.9	NA	44.1	320.3	0.03	0.10	34.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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: 2026 PM + Traffic Generation

Great Western Highway / Good Street
Existing Layout
Giveway / Yield (Two-Way)

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Great Western Highway											
5	T1	2260	3.2	0.016	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
6	R2	167	3.3	1.211	257.6	LOS F	23.8	170.9	1.00	2.55	11.5
Approach		2427	3.2	1.211	17.9	NA	23.8	170.9	0.07	0.18	46.3
North: Good Street											
7	L2	85	7.5	0.068	5.8	LOS A	0.3	2.1	0.11	0.54	53.0
Approach		85	7.5	0.068	5.8	LOS A	0.3	2.1	0.11	0.54	53.0
West: Great Western Highway											
10	L2	51	2.1	0.048	5.6	LOS A	0.0	0.0	0.00	0.30	55.0
11	T1	1492	3.3	0.048	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
Approach		1542	3.3	0.381	0.2	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		4055	3.3	1.211	10.9	NA	23.8	170.9	0.04	0.12	50.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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.