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Coles Schofields
Railway Terrace, Schofields
Transport Impact Assessment

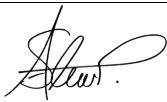
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Transport Impact Assessment

Document Quality Information

Client	Coles Group Property Developments Pty Ltd
Job Number	18S390
Issue	A
Date	20/12/2017
Details	Final
Prepared By	Danielle Cruickshank
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1. Introduction

1.1 Background

A development application (DA) is to be lodged with Blacktown City Council for a proposed Coles development on land located at Schofields, a major centre within the Alex Avenue Precinct of the North West Priority Growth Area (NWPGA). The proposed development incorporates approximately 7,250m² of gross floor area consisting of a Coles supermarket, child care centre and other food and specialty retail land uses. A McDonalds restaurant has previously received approval on the site and does not form part of this DA.

This development will primarily be assessed against the Blacktown City Council Growth Centre Precincts Development Control Plan 2010 (BCC Growth Centre DCP 2010) with reference to Schedule 1 Alex Avenue Precinct.

It has been estimated that this development would cater for approximately 95 new employees at any one time.

PeopleTrans was commissioned by Coles Group Property Developments Ltd in September 2017 to undertake a transport impact assessment of the proposed development.

1.2 Scope and Objectives of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- (1) the active transport requirements (pedestrians and cyclists)
- (2) the public transport near the site
- (3) the adequacy of the proposed parking supply (cars, motorcycles, bicycles) and layout
- (4) the service vehicle requirements
- (5) the transport generating characteristics of the proposed development
- (6) the suitability of the proposed access
- (7) the transport impact of the proposal on the surrounding road network.

2. Schofields in 2036

2.1 Site Location and Existing Conditions

The development site is located on a greenfield site in Schofields within the Alex Avenue Precinct of the North West Priority Growth Area (NWPGA). The study area is shown in more detail in Figure 2.1 and Figure 2.2, with photos from the site shown in Figure 2.3 and Figure 2.4.

Figure 2.1: Study Area Map

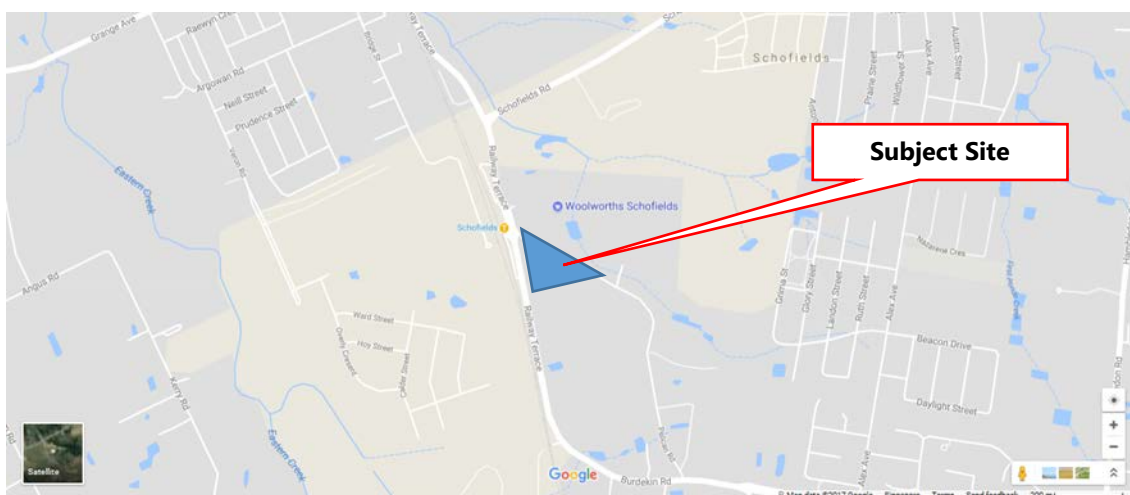


Figure 2.2: Study Area Aerial



Figure 2.3: Existing Site (Facing South)



Figure 2.4: Existing Site (Facing North)



The site is currently bordered by Railway Terrace to the west and Pelican Road to the northeast. There is a Woolworths supermarket located to the north of the study area with Schofields railway station located to the west. Other land surrounding the study area is predominantly undeveloped greenfield land.

2.2 Alex Avenue Precinct Planning

The controls defining the future development of the Alex Avenue precinct, in which the study area is located, are outlined in the Blacktown City Council Growth Centre Precincts Development Control Plan 2016, which includes Appendices and the Alex Avenue Precinct Schedule One.

It is anticipated that up to 90,000 new homes will be developed in the North West Priority Growth Area over the next 20 years. Within the Alex Avenue precinct, up to 6,300 new homes will be developed to cater for a population of 18,000.

The DCP states that the Alex Avenue precinct is to contain a local centre, which is to accommodate approximately 25,000 to 30,000m² of retail gross floor area and provide jobs for approximately 1,150 people. This is to include a range of retail, commercial, entertainment, recreation and community uses.

2.3 Zoning and Schofields Town Centre

The Alex Avenue Precinct Final Indicative Layout Plan (ILP) is shown in Figure 2.5. The study area within the overall ILP is shown in more detail in Figure 2.6.

Figure 2.5: Alex Avenue Final Indicative Layout Plan

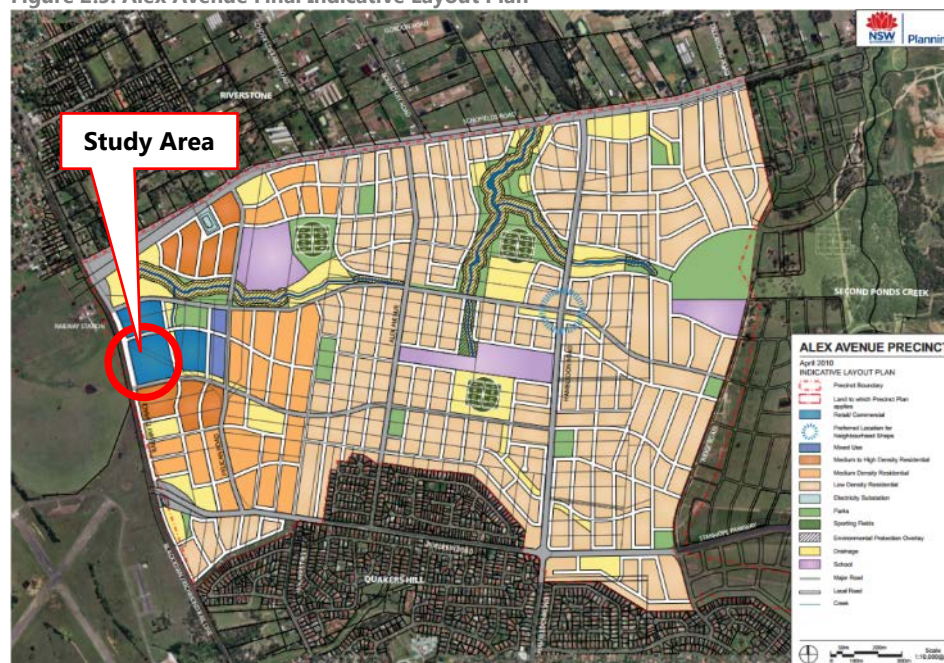


Figure 2.6: Extract of the Alex Avenue Final Indicative Layout Plan - Study Area

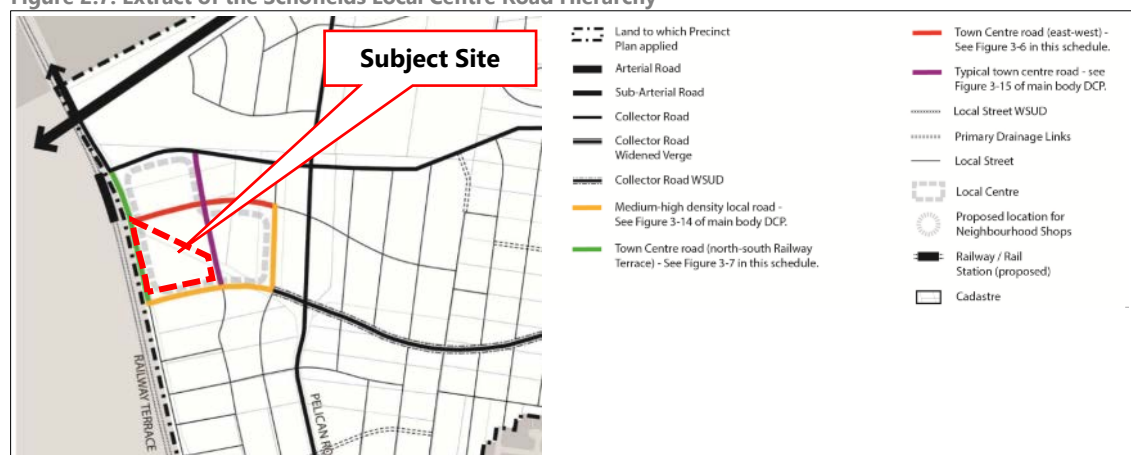


The ILP shows that the study area is zoned Retail/Commercial and is within the local centre for the precinct. This centre is to include approximately 25,000 to 30,000m² of commercial and retail floor area, of which this DA is proposed to provide approximately 7,250m² GFA.

2.4 Future Road Network

The DCP Schedule One outlines the proposed road hierarchy, layout and design for the Alex Avenue Precinct, including within the Schofields local centre. An extract of the proposed road hierarchy for the local centre is shown in Figure 2.7.

Figure 2.7: Extract of the Schofields Local Centre Road Hierarchy



2.4.1 Adjoining Roads

Details of the roads near the site, as shown in Figure 2.7, are provided in Table 2.1.

Table 2.1: Summary of Adjoining Roads

Road Name	Classification	Orientation	Configuration	Width
Railway Terrace	Town Centre road (north-south)	North-South	Divided carriageway, two-lanes in each direction, no on-street parking	16.9m (incl. 3.5m median)
Manchester Drive	Town Centre road (east-west)	East-West	Two-lane two-way undivided carriageway with on-street parking	12m
Jacqui Avenue	Medium-high density local road	East-West	Two-lane two-way undivided carriageway with on-street parking	11m
Minerva Road	Typical town centre road	North-South	Two-lane two-way undivided carriageway with on-street parking and bicycle lanes	15.4m

2.4.2 Surrounding Intersections

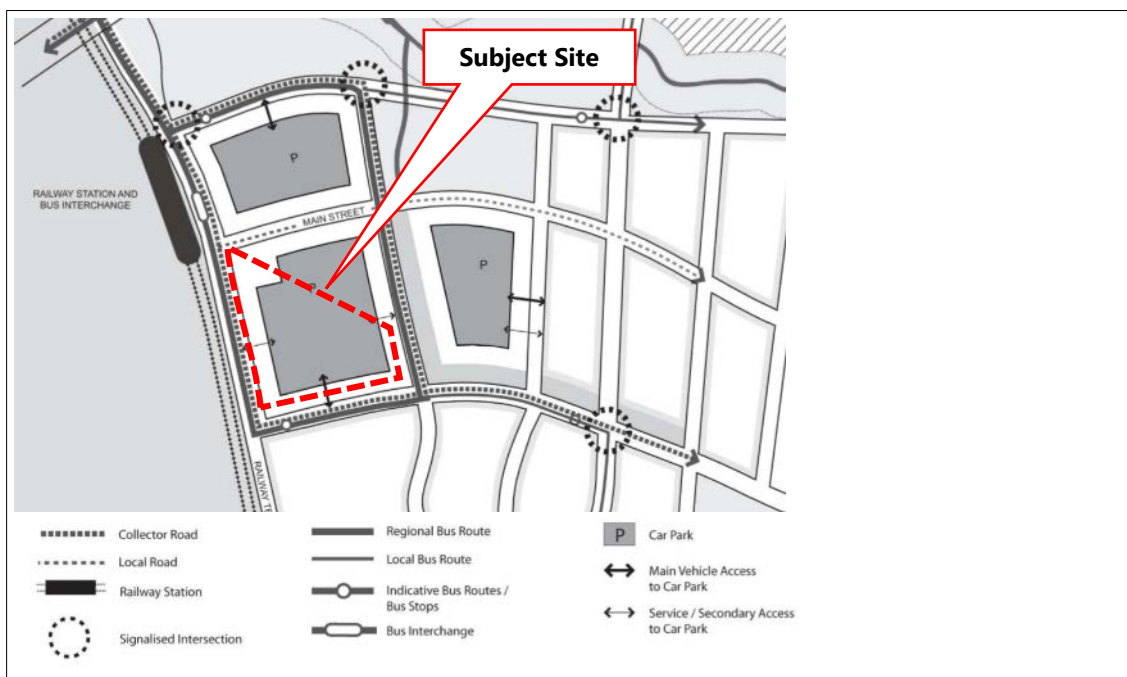
The proposed intersections near the site are summarised in Table 2.2.

Table 2.2: Proposed Intersections Near the Site

Intersection	Intersection Control
Railway Terrace / Schofields Road	Signalised Intersection
Railway Terrace / Manchester Drive	Signalised Intersection
Railway Terrace / Jacqui Avenue	Signalised Intersection
Jacqui Avenue / Minerva Road	Priority control
Minerva Road / Jacqui Avenue	Roundabout

Traffic circulation and parking within the local centre is shown in Figure 2.8.

Figure 2.8: Traffic Circulation and Parking in the Local Centre



2.5 Future Public Transport

The Schofields local centre advocates for a pedestrian and public transport orientated environment with walking and cycling taking priority over vehicles.

Rail transport is to be integrated with other transport modes through the provision of a rail-bus interchange that would have direct pedestrian access to the main street and retail core.

The new station and bus interchange was built at Schofields as part of the Quakers Hill to Schofields Duplication project and opened in 2011. This is located immediately northwest of the study area.

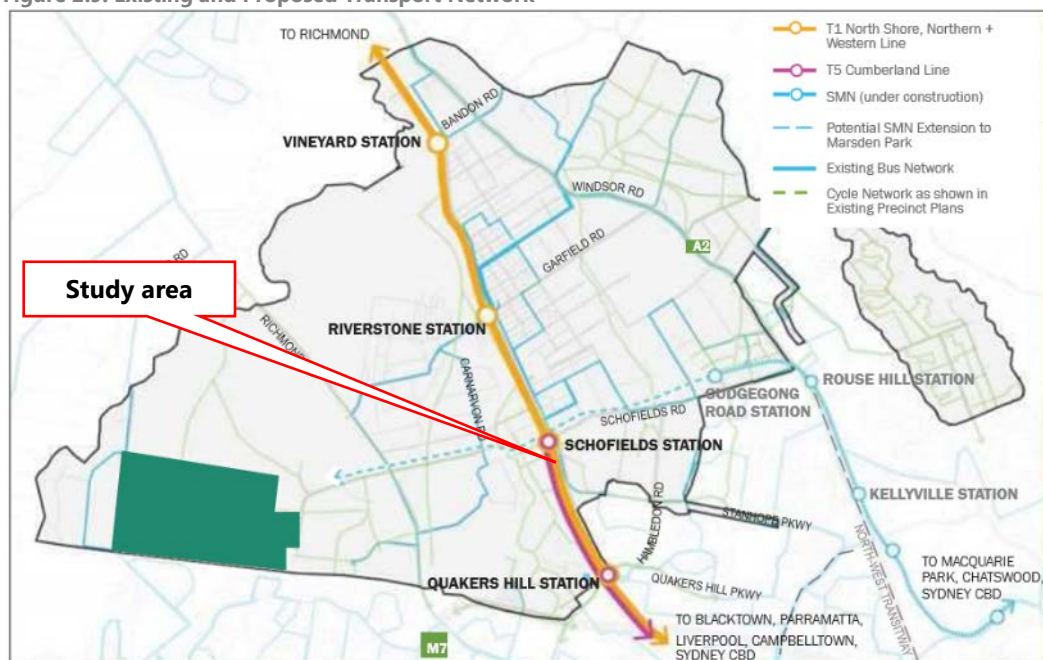
Figure 2.8 shows the rail and bus services in the local centre. This figure shows that the bus interchange is located opposite the railway station on Railway Terrace to the north of Manchester Drive. The indicative locations of the bus routes and stops are also shown. It is proposed that bus services would run along Railway Terrace, Jacqui Avenue and Minerva Road near the site, with a bus stop located on Jacqui Avenue to the east of Railway Terrace.

2.5.1 North West Priority Growth Area Integrated Transport and Land Use Plan

The North West Priority Growth Area (NWPGA) Integrated Transport and Land Use Plan, released in 2016, outlines the revised structure plan for the NWPGA which coordinates land use planning, environmental management and transport infrastructure investment in the area which is in line with other current transport and land use strategies. The five key strategic elements discussed in the plan include public transport (rail and bus) and an active transport network.

This report recommends the creation of an extension of the Southwest Metro Network (SMN) from Rouse Hill to Marsden Park via Schofields. Along with the existing T1 Western Line, this would place Schofields at the axis of two major rail lines, creating the potential for the formation of a new transport hub. This is shown in Figure 2.9.

Figure 2.9: Existing and Proposed Transport Network



A transport hub at Schofields would also support integration with rapid bus and suburban bus routes proposed for the NWPGA, with trains on the Richmond line providing rapid links to/from Blacktown, Parramatta and Sydney CBD via the Western Line. The proposed rapid bus and suburban bus routes are shown in Figure 2.10 and Figure 2.11.

Figure 2.10: Proposed Rapid Bus Route

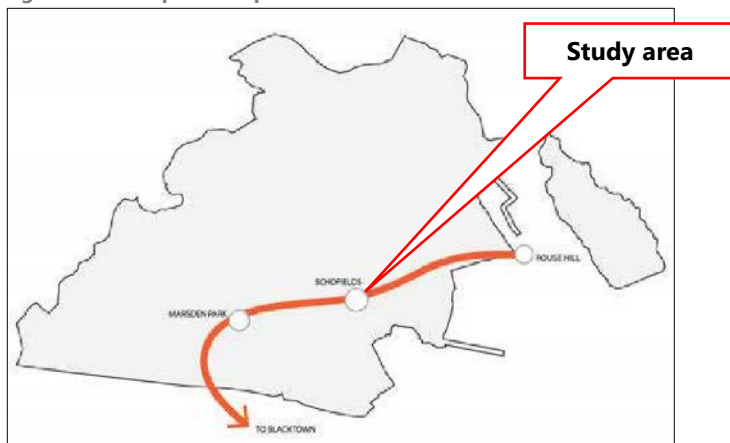
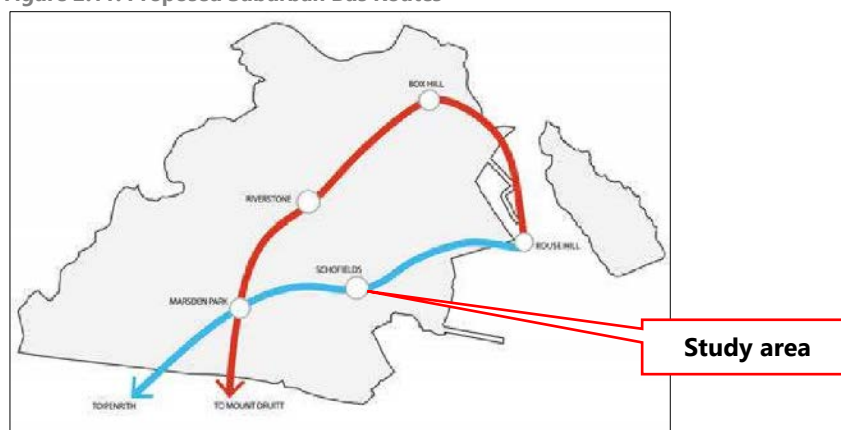


Figure 2.11: Proposed Suburban Bus Routes



2.6 Future Pedestrian and Cycle Facilities

A review of the future pedestrian and cycle facilities near the subject site is provided in the following sections.

2.6.1 Paths and Lanes

The Blacktown Growth Centres DCP outlines a number of key design principles for the provision of pedestrian and cycleways within the Schofields local centre. This includes:

- ◆ Providing a pedestrian focused Main Street which acts as the focal point for the centre.
- ◆ Large format retail premises (supermarkets and discount department stores) to have pedestrian access to the Main Street.
- ◆ An interconnected street block network with small block sizes and mid-block connections which maximise pedestrian movement and connections to key destinations including parks, plazas and transport nodes.

- ♦ The provision of a high amenity pedestrian environment through streetscape design with regards to solar access, shade and shelter, good natural light, landscaping and footpath design, and management of vehicular traffic.
- ♦ Direct pedestrian access from the rail-bus interchange to the main street and retail core.

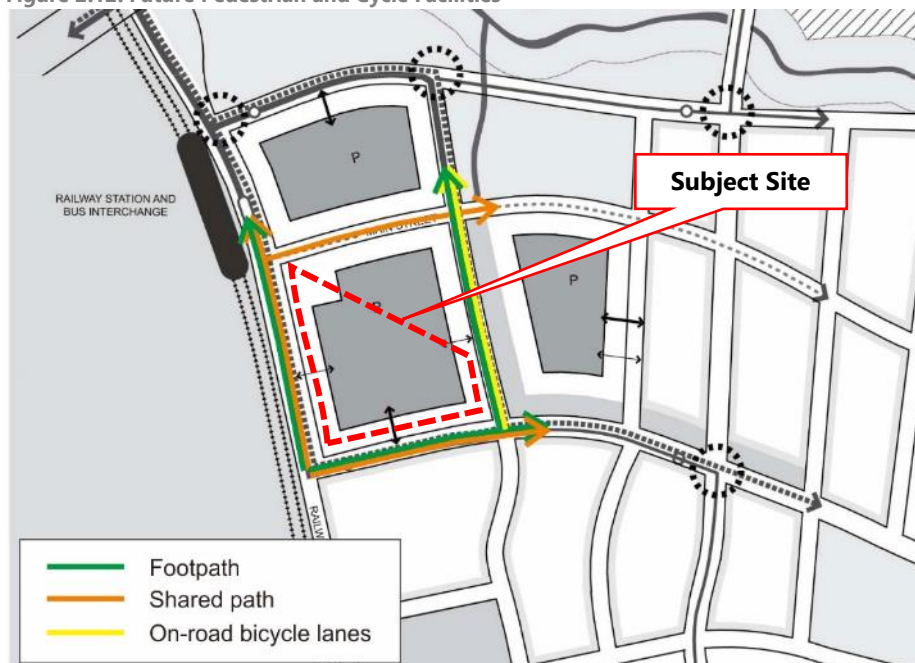
The layout of roadways by hierarchy is shown in the DCP, and is summarised in Table 2.3 with regards to pedestrian and cycle facilities.

Table 2.3: Summary of Pedestrian and Cycle Paths

Road Name	Classification	Configuration	Pedestrian and Cycle Facilities
Railway Terrace	Town Centre road (north-south)	Divided carriageway, two-lanes in each direction	1.5m wide footpath on one side of carriageway, 2.5m wide shared path on other side of carriageway
Manchester Drive	Town Centre road (east-west)	Two-lane two-way undivided carriageway	Shared path within a 4.75m wide verge on both sides of carriageway
Jacqui Avenue	Medium-high density local road	Two-lane two-way undivided carriageway	1.5m wide footpath on one side of carriageway, 2.5m wide shared path on other side of carriageway
Minerva Road	Typical town centre road	Two-lane two-way undivided carriageway	Footpath within a 4.5m wide verge on both sides of carriageway, on-road bicycle lanes provided in both directions

Table 2.3 shows that each of the roads surrounding the development site has provision for both pedestrian and cycle facilities in the form of footpaths, shared paths and/or on-street bicycle lanes. This is presented in Figure 2.12.

Figure 2.12: Future Pedestrian and Cycle Facilities



Source: Blacktown Growth Centres DCP

An excerpt of the Blacktown City Council Bike Plan is provided in Figure 2.13.

Figure 2.13: Blacktown City Council Bike Plan – Study Area

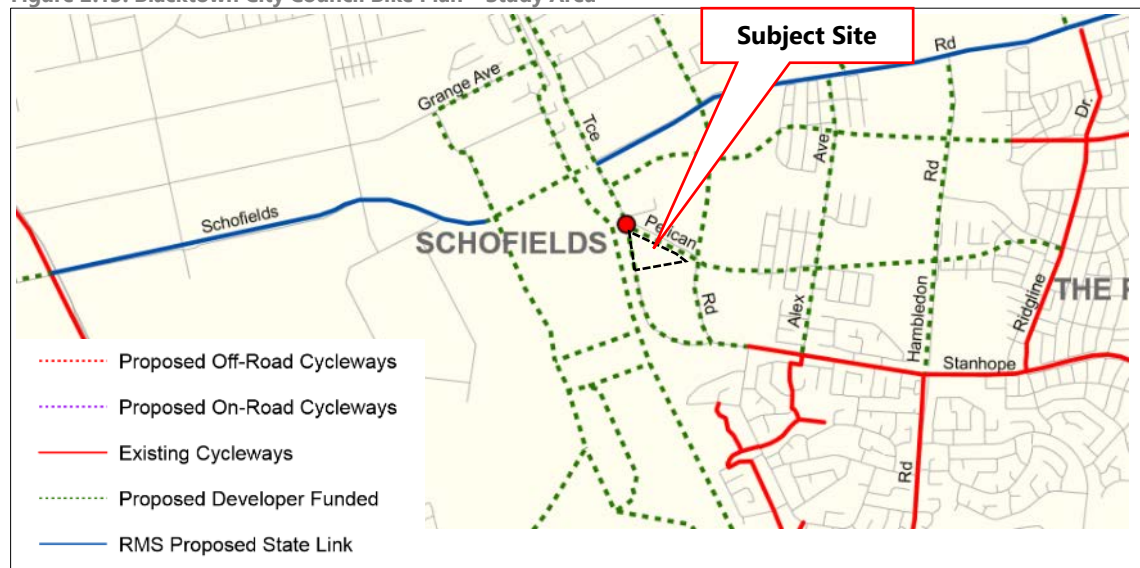


Figure 2.13 shows that there is a state bicycle route link proposed by RMS along Schofields Road to the north of the study area. There are developer-funded cycleways shown around the Schofields local centre on Railway Terrace and Jacqui Avenue. However, it is noted that the bike plan was prepared before Pelican Road was realigned in the DCP and as such the proposed cycleways on Manchester Drive and Minerva Road are not shown in the bike plan.

2.6.2 Bicycle Parking

The DCP does not give specific rates for the provision of bicycle parking for new developments within the centres. However, it does state that bicycle parking is to be in secure and accessible locations, and there should be weather protection for any bicycle parking provided for employees. More information on bicycle parking is provided later in this report.

3. Future Road Network Traffic Volumes

3.1 Background Studies Undertaken

In 2009, a traffic study for the NWPGA was prepared entitled *North West Growth Centre, Indicative Layout Plan Revision, Traffic and Transport Model Year 2036* (prepared by Road Delay Solutions). The purpose of this study was to provide traffic flow projections associated with revision to the Riverstone and Alex Avenue ILPs.

The outcome of this study included an updated traffic model containing traffic volumes for the future model year 2036.

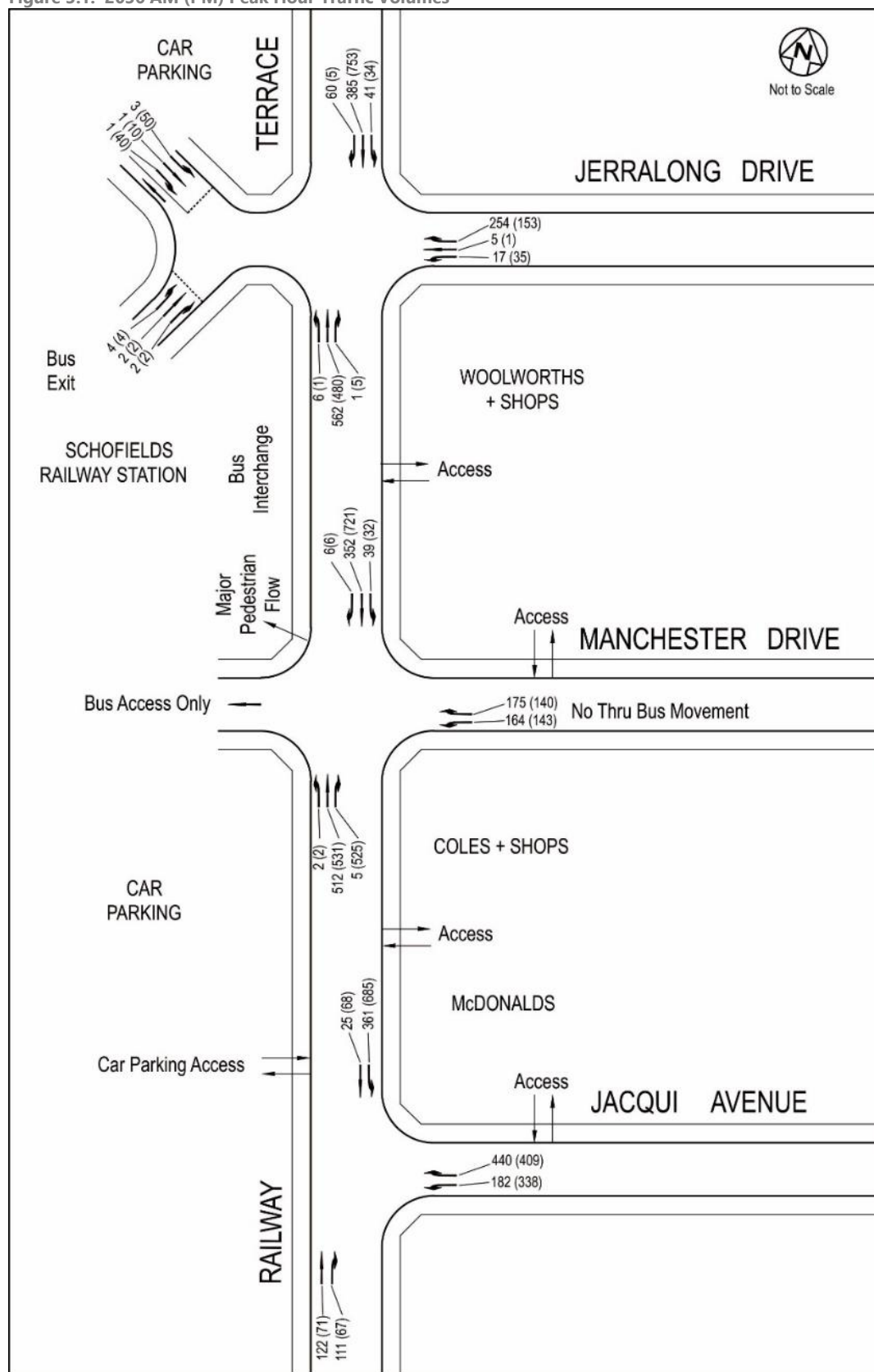
Another report which identifies future road network traffic volumes near the Schofields local centre is the North West Priority Growth Area Integrated Transport and Land Use Plan released in 2016. This report outlines the revised structure plan for the NWPGA which coordinates land use planning, environmental management and transport infrastructure investment in the area which is in line with the details of the NSW Long Term Transport Master Plan, 2012 (LTTMP), A Plan for Growing Sydney and other current transport and land use strategies, with particular emphasis on five key strategic elements, including road network.

Based on these two studies and an understanding of what specific developments are proposed within the Schofields Town Centre, Blacktown City Council provided PeopleTrans with 2036 peak hour traffic data for the following intersections:

- ◆ Railway Terrace / Jerralong Drive / Bus Exit and Car Park Entrance
- ◆ Railway Terrace / Manchester Drive
- ◆ Railway Terrace / Jacqui Avenue.

The data provided has been reproduced as Figure 3.1.

Figure 3.1: 2036 AM (PM) Peak Hour Traffic Volumes



Source: Blacktown City Council

3.2 2036 Intersection Operation

The operation of the key intersections within the study area have been assessed using Sidra Intersection, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by RMS, is vehicle delay. Sidra Intersection determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 3.1 shows the criteria that Sidra Intersection adopts in assessing the level of service.

Table 3.1 RMS Sidra Intersection Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	0 to 14.5	Good operation	Good operation
B	14.5 to 28.5	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28.5 to 42.5	Satisfactory	Satisfactory, but accident study required
D	42.5 to 56.5	Near capacity	Near capacity, accident study required
E	56.5 to 70.5	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70.5	Extra capacity required	Extreme delay, major treatment required

Table 3.2 presents a summary of the existing operation of the intersection, with full results presented in **Appendix A** of this report.

Table 3.2: 2036 Intersection Operating Conditions (Council Traffic Volumes)

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Railway Terrace / Jerralong Drive	AM	Railway Tce (S)	0.33	8	29	A
		Jerralong Dr (E)	0.67	28	54	B
		Railway Tce (N)	0.25	11	29	A
		Interchange	0.04	22	3	B
		Total	0.67	14	54	A
	PM	Railway Tce (S)	0.25	11	37	A
		Jerralong Dr (E)	0.41	31	38	C
		Railway Tce (N)	0.40	9	47	A
		Interchange	0.25	29	26	C
		Total	0.41	13	47	A
Railway Terrace / Manchester Drive	AM	Railway Tce (S)	0.29	8	25	A
		Manchester Drv (E)	0.40	25	33	B
		Railway Tce (N)	0.23	11	26	A
		Total	0.40	14	33	A
	PM	Railway Tce (S)	0.88	26	152	B
		Manchester Drv (E)	0.40	23	37	B
		Railway Tce (N)	0.88	41	124	C
		Total	0.88	31	152	C
Railway Terrace / Jacqui Avenue	AM	Railway Tce (S)	0.38	23	22	B
		Jacqui Ave (E)	0.54	16	70	B
		Railway Tce (N)	0.42	15	51	B
		Total	0.54	17	70	B
	PM	Railway Tce (S)	0.31	34	18	C
		Jacqui Ave (E)	0.39	14	62	A
		Railway Tce (N)	0.64	12	77	A
		Total	0.64	14.5	77	A

Table 3.2 indicates that based on the traffic volumes provided by council, all intersections are expected to operate with a satisfactory level of service following full development of the wider area.

The results show that at times during the peak hour, the queues at the intersection at Railway Terrace / Jacqui Avenue may affect the operation of the site driveways on Railway Terrace and on Jacqui Avenue.

The 95th percentile queue length of 77m on the north approach of the intersection during the PM peak hour may impact the access on Railway Terrace which is approximately 70m from Jacqui Avenue. Based on the data provided, this is not expected to result in significant problems at this location.

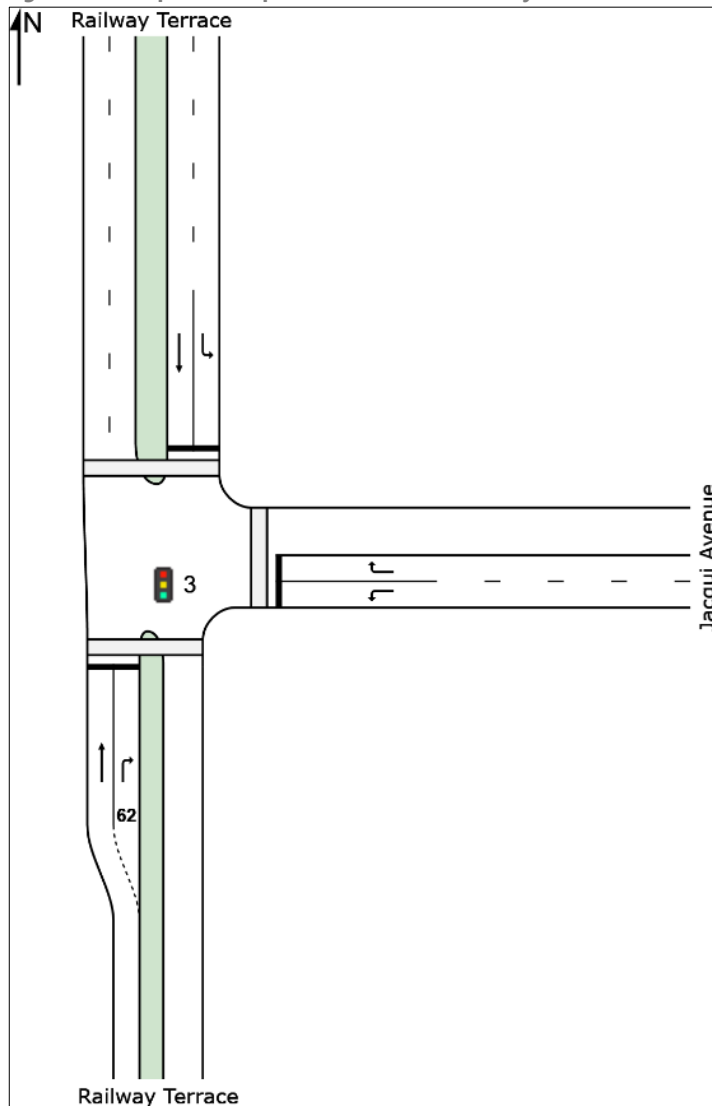
The 95th percentile queue length of 70m on the east approach of the intersection during the AM peak hour may impact the access on Railway Terrace which is approximately 53m from Jacqui Avenue.

During the busy times within the peak hour, this may impact vehicles turning left into or left out of the Railway Terrace access and may impact vehicles trying to turn right out of the Jacqui Avenue access.

3.2.1 Right turn lane into Jacqui Avenue

The intersection configuration proposed at the intersection of Railway Terrace / Jacqui Avenue is shown in Figure 3.2.

Figure 3.2: Proposed Jacqui Avenue Intersection Layout



Source: Blacktown.nsw.gov.au

Figure 3.2 indicates that one through lane and one right lane is proposed for northbound traffic on Railway Terrace at the intersection with Jacqui Avenue.

A review of the design indicates that the right turn lane into Jacqui Avenue is approximately 75m long with storage proposed of approximately 62m.

Initial traffic modelling for the Alex Avenue Precinct, which was undertaken by Road Delay Solutions in July 2009, identified estimated 2036 AM and PM peak hour traffic volumes. The volumes obtained from the strategic model output plots are provided in Figure 3.3 and Figure 3.4.

Figure 3.3: 2036 AM Peak Hour

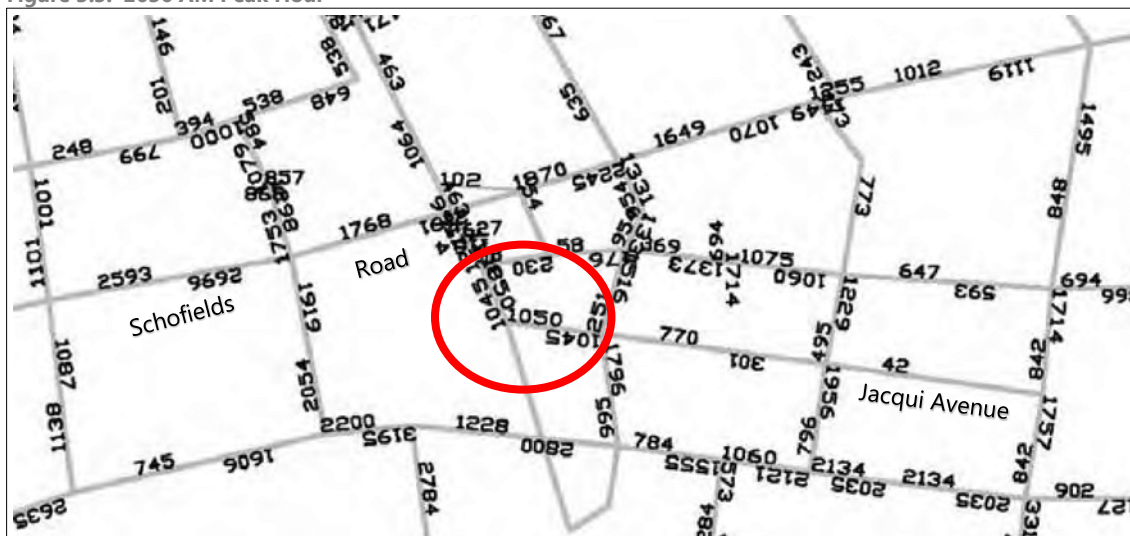


Figure 3.4: 2036 PM Peak Hour



A summary of the peak hour volumes from the strategic model is provided in Table 3.3.

Table 3.3: 2036 AM and PM Peak Hour Strategic Model Outputs / Council Volumes

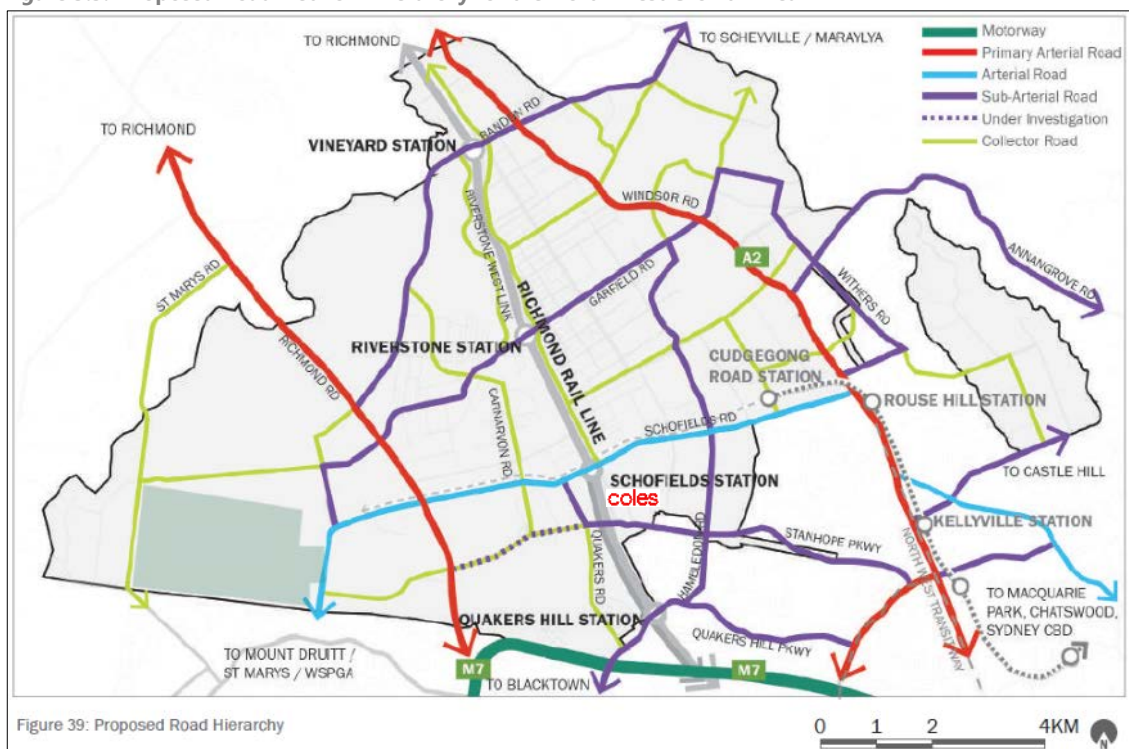
Peak Hour	2036 AM	2036 PM
Railway Terrace northbound (north of Jacqui Avenue)	1,305 / 562	1,305 / 480
Railway Terrace southbound (north of Jacqui Avenue)	1,045 / 386	1,093 [1] / 753
Jacqui Avenue Westbound (west of Minerva Road)	1,045 / 622	1,151 / 747
Jacqui Avenue eastbound (west of Minerva Road)	1,050 / 472	1,093 / 752

[1] the output plot is difficult to read and as such this value is an estimate.

The peak hour volume plots are from a strategic model and provide link volumes as opposed to turning movement data. These link volumes are based on the estimated number of residents and jobs in different zones within the wider Alex Avenue and Schofields Precincts.

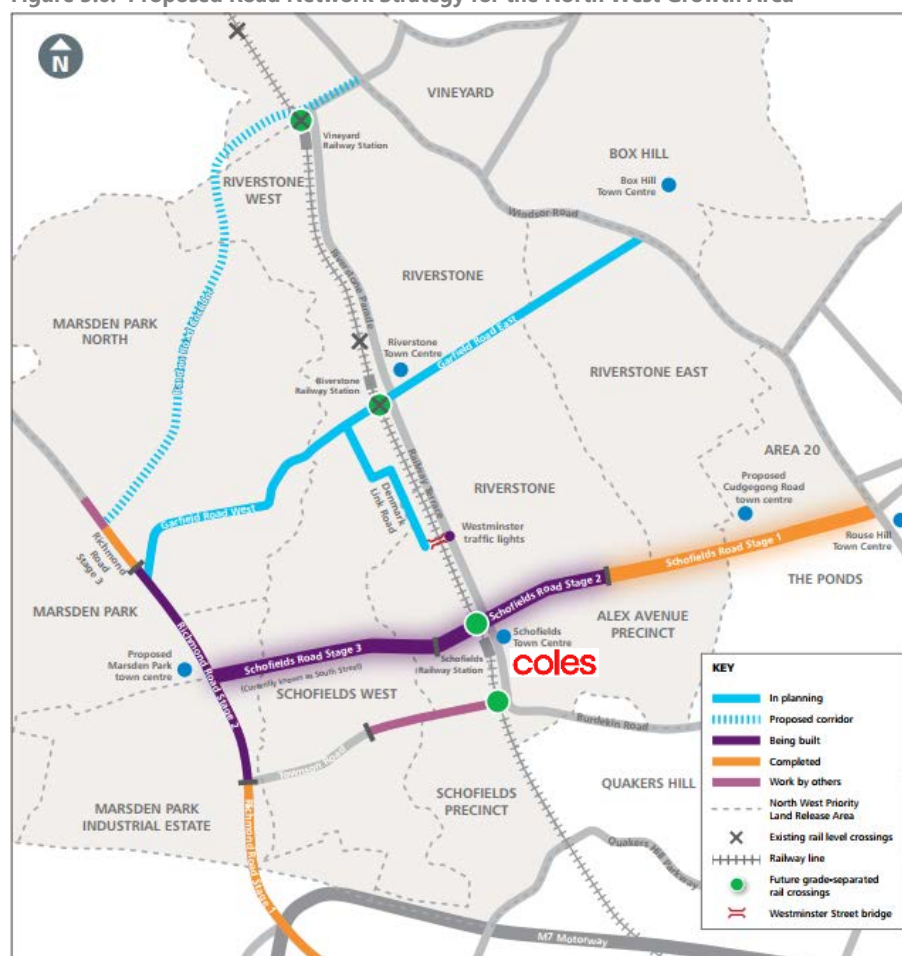
Discussions with Blacktown Council indicate that the aim for Railway Terrace is that it is a local centre north-south road with low speeds. A review of the road network at a regional level within the North West Priority Growth Area is shown in Figure 3.5 and Figure 3.6.

Figure 3.5: Proposed Road Network Hierarchy for the North West Growth Area



Source: North West Priority Growth Area Structure Plan Review, Exhibition Draft Report - Integrated Transport + Land Use Planning, November 2016

Figure 3.6: Proposed Road Network Strategy for the North West Growth Area



Source: Roads and Maritime Services Schofields Road Upgrade October 2016

In addition to providing local access to the Schofields Town Centre and Schofields Railway Station, at a regional level, Railway Terrace provides a north-south connection along the railway line from Burdekin Road to the north.

Based on a review of the Council traffic volumes for Railway Parade south of Jacqui Avenue, while Railway Terrace is not part of the regional road network (Figure 3.5) it is considered that the volumes provided by Council could potentially be lower than what would eventuate if congestion begins to occur at major intersections.

PeopleTrans has also reviewed the Council volumes in detail and has considered a number of changes to the assumptions to provide a conservative assessment and to undertake a sensitivity test on the right turn from Railway Terrace into Jacqui Avenue.

The PeopleTrans estimated traffic volumes are provided in Figure 3.7 and Figure 3.8 with the results of the modelling provided in Table 3.4.

Figure 3.7: PeopleTrans Estimated 2036 AM Volumes
(+150vph through, +150vph right)

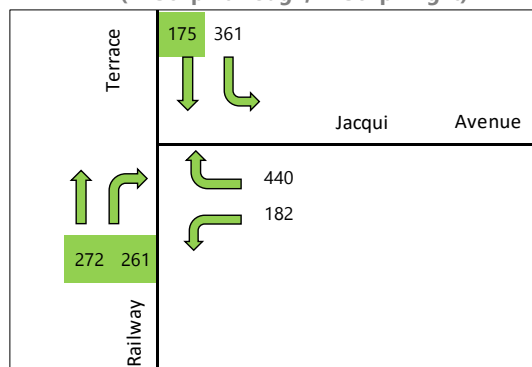


Figure 3.8: PeopleTrans Estimated 2036 PM Volumes
(+150vph through, +150vph right)

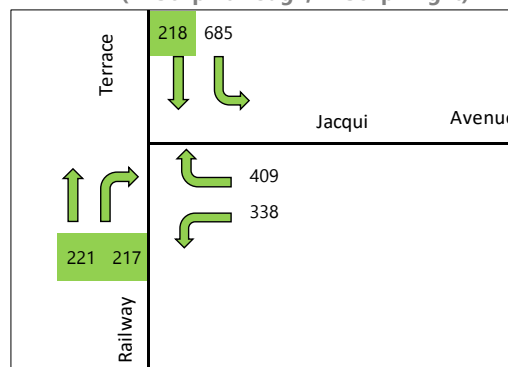


Table 3.4: Railway Parade / Jacqui Avenue Sensitivity Modelling (+150vph through / +150 right)

Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
AM	Railway Tce (S)	0.66	21	54 (R)	B
	Jacqui Ave (E)	0.69	22	86	B
	Railway Tce (N)	0.42	15	51	B
	Total	0.69	19	86	B
PM	Railway Tce (S)	0.56	24	54 (R)	B
	Jacqui Ave (E)	0.57	24	93	B
	Railway Tce (N)	0.64	12	77	A
	Total	0.64	19	93	B

The results show the intersection is expected to operate at Level of Service B during both the AM and PM peak hours. The queue in the right turn lane into Jacqui Avenue is expected to be contained within the storage length currently proposed with a queue length of 54m anticipated during the AM and PM peak hour.

The queue on Jacqui Avenue under the sensitivity testing increases to 86m during the AM peak hour and to 93m during the PM peak hour. This is not expected to result in a poor customer experience as customers will be able to enter the site via Minerva Road to avoid any queuing on Jacqui Avenue.

For customers exiting the site via the Jacqui Avenue driveway, there may be some minor delays for vehicles turning right, however there will be adequate capacity for vehicles to exit the site turning left or via Minerva Road.

The anticipated queue of up to 77m on the north approach of Railway Terrace is considered a conservative assessment as the volumes provided by Council anticipated a left turn volume of 685 vehicles at Jacqui Avenue and 32 at Manchester Drive. If delays become uneven at nearby intersections, it is likely that some drivers will start turning left at Manchester Drive to avoid the anticipated queues, reducing the left turn volume into Jacqui Avenue and balancing the queues between the two intersections.

During the PM peak hour, Table 3.2 indicates a queue in the right lane turning into Manchester Drive of 152m which is longer than the available storage. This means that the right turn into Jacqui Avenue is a critical link in the road network that must be retained as part of the future construction of the town centre.

In summary, based on the available information, the intersection of Railway Terrace / Jacqui Avenue is expected to operate with a satisfactory level of service and the proposed right turn lane is considered necessary and adequate to support the proposed development.

At busy times within the peak hour, there may be some minor delays for vehicles entering and exiting the site at the Railway Terrace driveway and some vehicles may experience delays in turning right out of the driveway onto Jacqui Avenue as a result of the queue back from the intersection with Railway Parade.

The access on Minerva Road provides additional capacity to support the access driveways on Railway Terrace and Jacqui Avenue and customers would be able to avoid delays by using this access during busy periods.

4. Proposed Development

4.1 Land Uses & People Occupancy

The proposed development includes the construction of a Coles supermarket, childcare centre and other food and specialty retail land uses. The development is proposed to be delivered in two stages, with Stage 1 consisting of 6,991.2m² and Stage 2 consisting 258.5m² providing for a total development of 7,249.7m². A McDonalds development was previously provided planning approval on the site and no changes are proposed to this development as part of this DA.

In people terms this is equivalent to approximately 95 employees and 67 children.

The proposed development is outlined in Table 4.1.

Table 4.1: Development Schedule

Stage	Use	Size (m2 GFA)	People Occupancy
1	Supermarket and liquor store	3,850.8	40 staff [1]
	Common Areas	997.9	Not applicable
	New shops – Stage 1	1,480.6	30 staff
	Childcare centre	425 [2]	7 staff and 67 children
	New Shops	236.9	6 staff
	Sub-Total	6,991.2	83 staff and 67 children
2	New shops – Stage 2	258.5	6 staff
	Sub-Total	258.5	6 staff
Stage 1 and 2 Total		7,249.7	89 staff and 67 children
Previous Approval	McDonalds restaurant and drive-through	399.5	6 staff
Total Site		7,649.2	95 staff and 67 children

[1] Estimate of 15-20 staff on-site at any one time provided by Coles. A maximum of 40 includes an allowance for shift change over

[2] Internal area only, excludes external area

The proposed site plans for the development, showing the location of vehicle access and car parking spaces are included in **Appendix B**.

4.2 Vehicle Access

There are three vehicle crossovers proposed for the site, as follows:

- ◆ Railway Terrace (western site boundary, approximately 70m north of Jacqui Avenue) – two-lane / two-way access. Lanes include left-in / left-out only.
- ◆ Jacqui Avenue (southern site boundary, approximately 53m east of Railway Terrace) – three-lane / two-way access. Lanes include one lane in and two lanes (left and right) out.
- ◆ Minerva Road (eastern site boundary, 53m north of Jacqui Avenue) – three-lane / two-way access to basement car park adjacent to the service vehicle only access. Lanes include one lane in and two lanes (left and right) out.

The suitability of the proposed access arrangements is discussed in Section 4.5 of this report.

4.3 Car Parking

The proposed development will provide 356 standard car parking spaces (including 13 disabled spaces). In addition to the 356 standard car parking spaces, the development also provides an additional 4 short-term parking spaces for drop-off and pick-up for a grand total of 360 parking spaces on-site. A breakdown of car parking spaces is provided in Table 4.2.

Table 4.2: Car Parking Provision

Location	Type	Parking Spaces
Ground floor car park	Standard long-term spaces	119
	Standard short-term spaces	7
	Emergency	1
	Childcare Drop-Off/ Pick-Up	7
	Taxi / Drop-Off/ Pick-up	2
	McDonalds Waiting Bays	2
	Parents with Prams	6
	Seniors	6
	Disabled	7
	Sub-Total Ground Floor	157
Centre Management	Centre Manager	1
	Sub-Total Centre Management	1
Basement car park	Standard Long-Term Spaces	182
	Electric Car Charging Spaces	2
	Parents with Prams	6
	Seniors	6
	Disabled	6
	Sub-Total Basement	202
Total		356 + 4 drop-off / pick-up and waiting spaces = 360 total spaces

In addition, 2 motorcycle / scooter parking spaces are proposed on the ground level car park.

The suitability of the car parking provision and layout is discussed in Section 6 of this report.

4.4 Bicycle Facilities

The development plans show the following:

- ◆ A secure staff bicycle parking area in the basement with a total of 5 secure bicycle parking spaces
- ◆ One location for visitor bicycle parking on the ground floor at the north of the site with the capacity for 6 visitor bicycle parking spaces.
- ◆ One location for visitor bicycle parking on the ground floor at the north of the site with the capacity for 6 visitor bicycle parking spaces.

The proposed development plans show the provision of male and female toilets and shower facilities provided on the eastern side of the building that may be used by staff that cycle to the proposed development.

Additional toilets, change rooms and lockers are provided for Coles staff adjacent to the loading dock.

The suitability of the bicycle provisions is discussed in Section 5.2 of this report.

4.5 Pedestrian Facilities

Pedestrian access to the site is proposed via the frontages of Railway Terrace and Jacqui Avenue.

Two marked pedestrian pathways travelling east-west through the site are proposed from the Railway Terrace frontage. A pedestrian footpath adjacent to the western boundary of the building is proposed along the length of the site running north-south, linking to Jacqui Avenue at the south end and towards the proposed new town plaza at the north end.

Pedestrian pathways are proposed to be marked in the basement car park which would direct pedestrians across the internal roadways to the lobby with escalators and a lift.

The suitability of the proposed pedestrian facilities is discussed in Section 5.3 of this report.

4.6 Loading Facilities

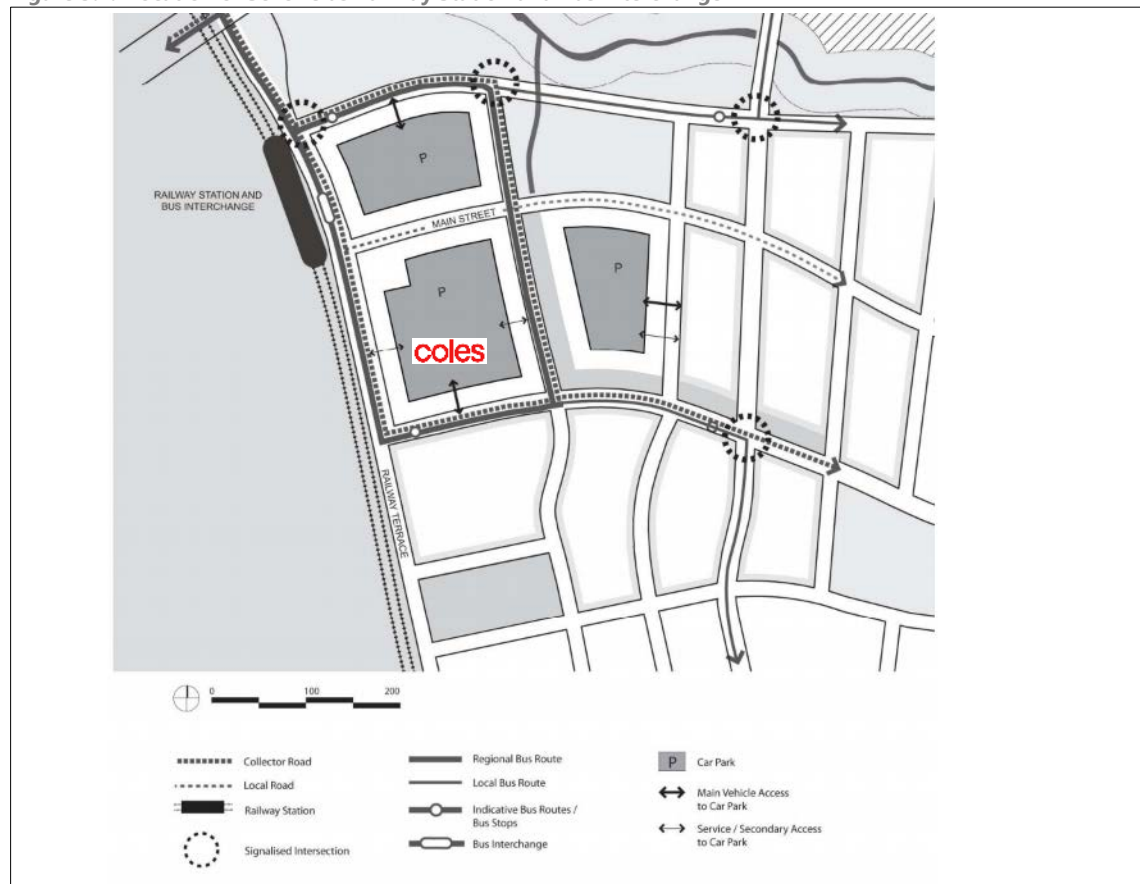
There are five loading areas proposed on the eastern side of the site. Access to the loading areas is via a crossover at Minerva Road, immediately south of the basement car park access. More information on proposed site loading areas is provided in Section 7 of this report.

5. Sustainable Transport

5.1 Public Transport

The site is accessible by public transport, with Schofields railway station and bus interchange located approximately 200m from the Railway Terrace site access. This is within the suggested distances of 400m for a bus stop and 800m for a railway station.

Figure 5.1: Location of Schofields Railway Station and Bus Interchange



The proposed development provides easy walking access to Schofields railway station and bus interchange. A bus stop is proposed on Jacqui Avenue adjacent to the site. The bus stop location has not been considered as part of this design however it is recommended that the bus stop be provided immediately east of the proposed site driveway on Jacqui Avenue rather than immediately west of the proposed driveway on Jacqui Avenue. PeopleTrans has contacted Transport for New South Wales however did not receive a formal response by the time of finalising this report. Discussion with Transport for New South Wales indicates that the final location of the bus stop would be subject to detailed discussion with Council and the bus operators and typically occurs at a later stage in the development process.

Based on this, PeopleTrans recommends that the bus stop is provided immediately east of the proposed Jacqui Avenue driveway. This is to ensure that access to the site is not blocked by buses stopping at the bus stop as this could potentially cause vehicle queuing back towards Railway Terrace.

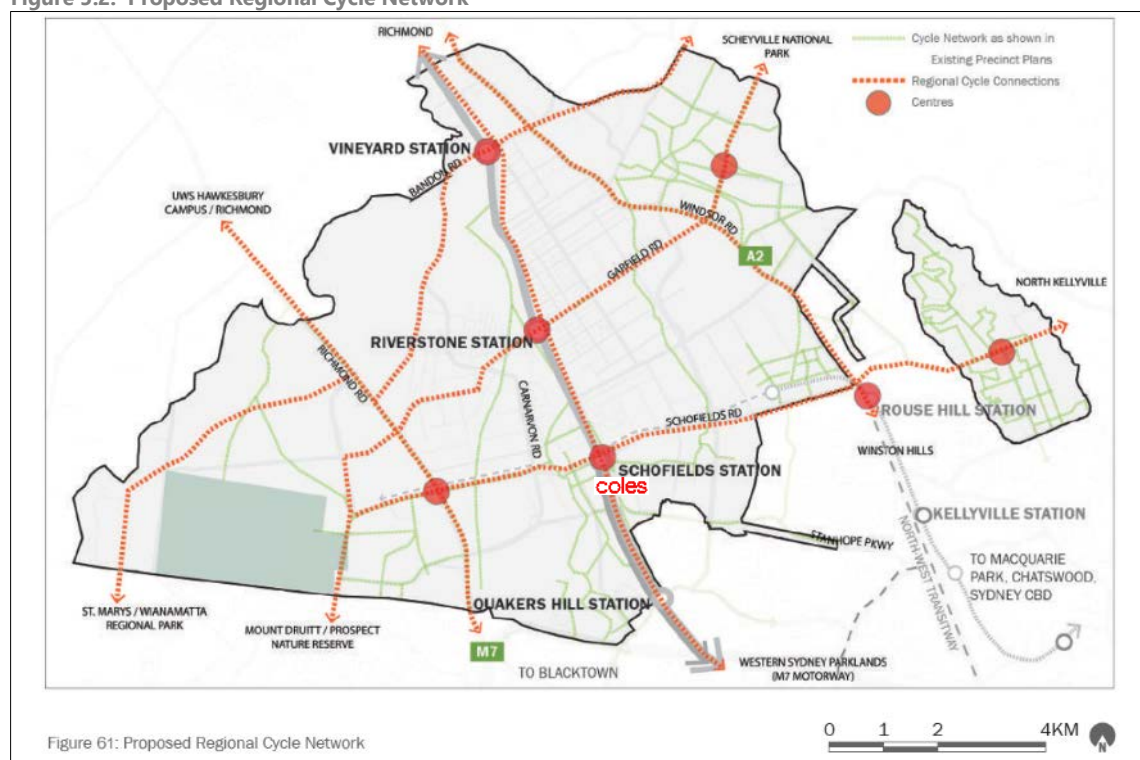
5.2 Cycling

The cycling aspects of the proposed development are described in the following sections.

5.2.1 Cycle Network Integration

The proposed regional cycle network is shown in Figure 5.2.

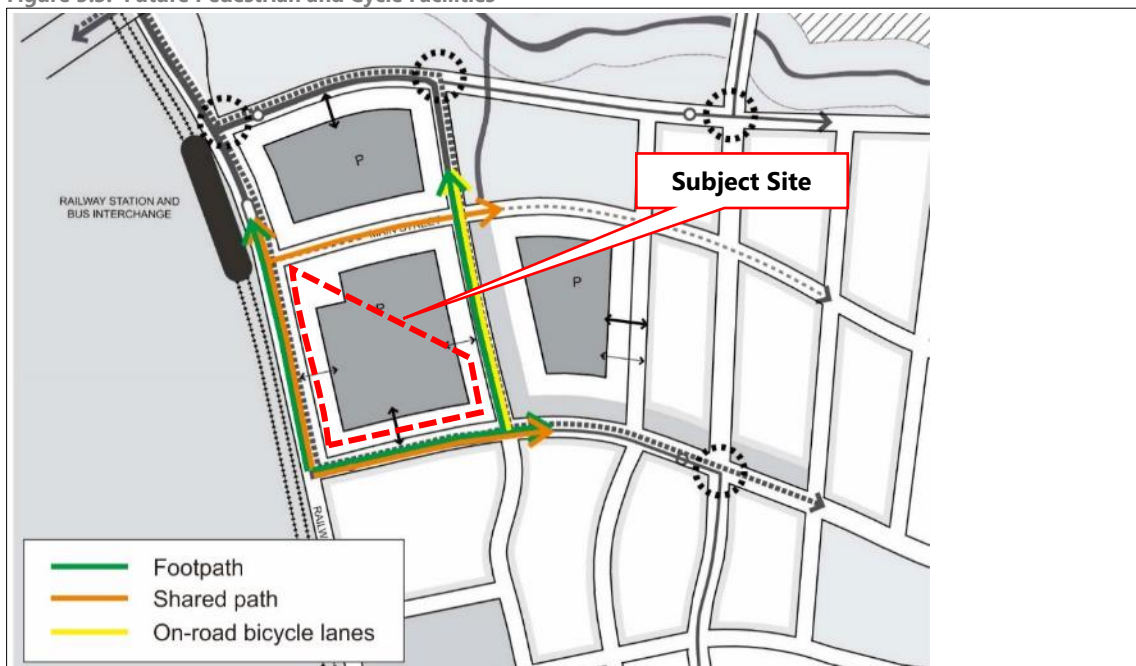
Figure 5.2: Proposed Regional Cycle Network



Source: North West Priority Growth Area Structure Plan Review, Exhibition Draft Report - Integrated Transport + Land Use Planning, November 2016

Figure 5.2 indicates that a regional cycle connection is proposed along Railway Terrace. Railway Terrace is proposed to connect with Schofields Road to the north and to the Western Sydney Parklands and the M7 to the south.

Figure 5.3: Future Pedestrian and Cycle Facilities



The proposed development supports the proposed construction of the regional and local cycle network.

5.2.2 Cycle end of trip facilities

There is no minimum requirement for cycle end of trip facilities outlined in the Blacktown DCP 2015. The DCP states that "*Applicants are encouraged to incorporate, in the design of their buildings, safe storage/parking areas for bicycles, with adequate shower and change facilities provided for staff (where appropriate).*" While there is a minimum bicycle parking requirement for industrial, business parking and bulky goods retailing, there is no minimum requirement for the development site.

As such, it is recommended that parking be provided in accordance with the NSW Planning guidelines for walking and cycling. The document nominates a value of 3-5% of staff spaces and 5-10% of staff for visitor spaces.

Based on a total of 95 staff expected to be working on-site at any one time, a minimum of 5 secure staff bicycle parking spaces and 10 visitor bicycle parking spaces are recommended.

The proposed secure bicycle cage in the basement can cater for 5 secure bicycle parking spaces and satisfies the staff requirement.

The proposed two visitor bicycle parking locations can cater for 12 visitor bicycle parking spaces which satisfies the minimum of 10 visitor bicycle parking spaces.

Based on the above, the proposed bicycle parking quantum is considered satisfactory.

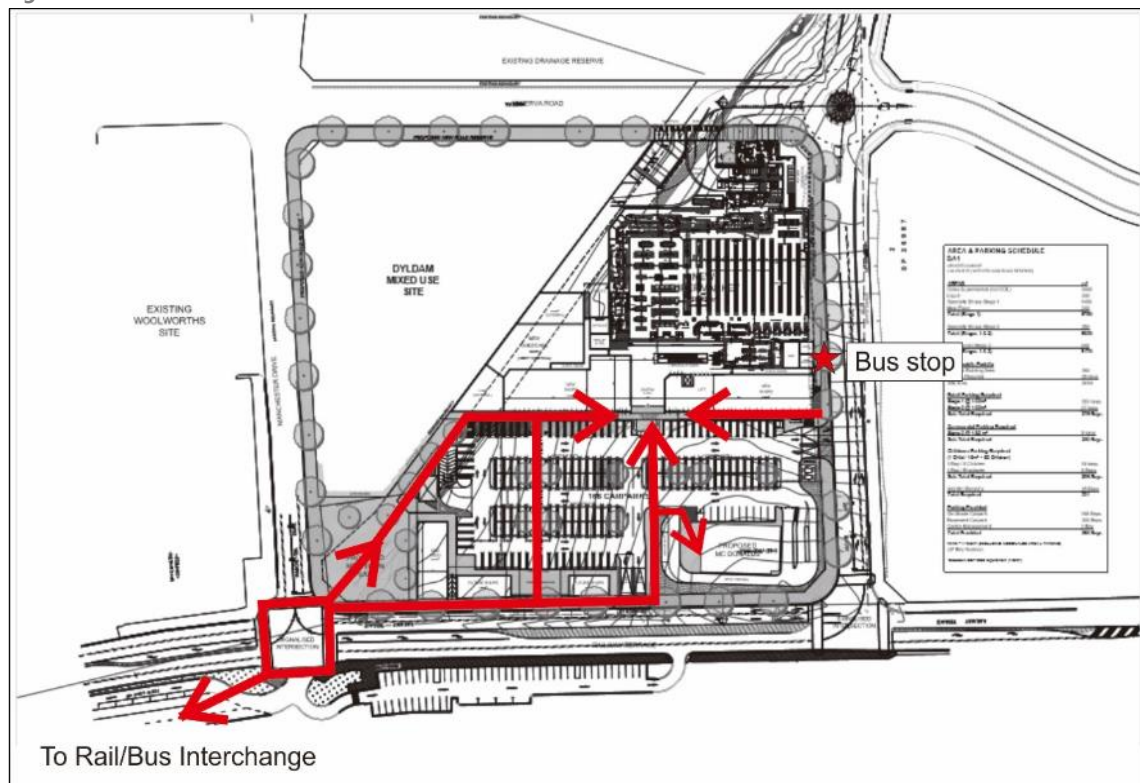
5.3 Walking

The site frontages of Railway Terrace and Jacqui Avenue are required to have pedestrian footpaths within the road verges. There are a number of locations where the development site would connect into these facilities and provide a direct pedestrian pathway through to the building entrances.

At the signalised intersections of Railway Terrace / Manchester Drive and Railway Terrace / Jacqui Avenue, pedestrian crossings are proposed on all legs of the intersections.

Figure 5.4 shows an overview of pedestrian access and circulation for the development site.

Figure 5.4: Site Plan Pedestrian Access and Circulation



The proposed pedestrian circulation and arrangements are considered satisfactory.

6. Car Parking

6.1 Car Parking Requirements

The car parking requirements for different development types are set out in the BCC Growth Centre DCP 2010 Schedule One Alex Avenue Precinct. Where there are land uses not specifically mentioned in this document, reference is to be made to the requirements set out in the Blacktown Development Control Plan 2015. A review of the car parking requirements and the floor area schedule for the proposed development is summarised in Table 6.1.

Table 6.1: Blacktown City Council Growth Centres DCP Car Parking Requirements

Table 6.1: Blacktown City Council Growth Centres DCP Car Parking Requirements				
Description	Use	Size	Minimum Parking Rate	Growth Centres DCP Parking Requirement (spaces)
Supermarket and liquor store	Retail shops/showrooms (greater than 200m ² GFA)	3,850.8m ² GFA	1 space per 22m ² GFA [3]	175.0
Common Areas	Common Areas	997.9m ² GFA		45.4
New shops – Stage 1	Retail shops/showrooms (greater than 200m ² GFA)	1,480.6m ² GFA		67.3
New shops – Stage 1	Restaurant / café	236.9m ² GFA		10.8
New shops – Stage 2	Retail shops/showrooms (greater than 200m ² GFA)	258.5m ² GFA		11.8
Sub-Total				311
Childcare centre	Child care centre	425m ² GFA 67 children 7 staff	1 space per 2 employees, plus 1 space per 10 children for parents and visitors [4]	11
McDonalds restaurant	Restaurant / café	399.5m ² GFA	Not Applicable	29 [2]
Total				351

[1] Estimated based on 75% of total area as dining area and a maximum of 6 employees on-site at any one time

[2] Based on the previous approval for the site

[3] Blacktown Growth Centres DCP

[4] Child Care Planning Guideline, August 2017, NSW Planning & Environment

Based on the above, the proposed development is required to provide a minimum of 351 car parking spaces.

6.2 McDonalds Car Parking

The previous approval for McDonalds indicated a requirement of 29 car parking spaces. This has been maintained as part of the overall site quantum. There are 27 car parking spaces which are closest to the proposed McDonalds restaurant as well as two waiting bays within the drive through.

For customers that propose to park and enter McDonalds if all 27 of the spaces that are closest to McDonalds are full, there are another 22 short-term and standard parking spaces adjacent to the "McDonalds" car parking.

Due to the nature of the site it is likely that parking will be shared across a number of uses. For example, some customers may park and shop at Coles before walking across to McDonalds to purchase goods

before leaving the site. Conversely, some McDonalds customers may decide to park close to McDonalds and then walk to Coles to purchase some goods. The sharing of parking in a mixed-use development is entirely appropriate and a satisfactory outcome for the operation of the development.

6.3 Adequacy of Parking Supply

The development proposes a total of 356 car parking spaces, which is in excess of Council's car parking requirements by 4 car parking spaces. In addition, the development also incorporates two drop-off / pick-up parking spaces which could be used by taxis or for dropping off and picking up customers and there are an additional two waiting spaces within the McDonalds drive through.

The total quantum of car parking spaces proposed on-site exceeds the minimum requirements and as such is considered satisfactory.

The total includes 13 disabled car parking spaces which is a total of 1 space per 26 parking spaces provided on-site.

The Blacktown DCP 2015 states the following in Section 6.4.8, Parking for persons with a disability:

"In all parking areas, Council wishes to encourage the provision of parking spaces for the disabled, located to allow convenient and safe access within sites. All parking areas must provide for disabled drivers in accordance with the provisions of the Building Code of Australia. Such spaces shall be clearly marked and signposted for this purpose."

Part D3, Table D3.5 of the Building Code of Australia nominates minimum car parking provision for people with a disability of 1 space per 50 car parking spaces. The proposed supply of 13 disabled parking spaces exceeds the Building Code of Australia's requirement and as such the provision is considered satisfactory.

6.4 Car Parking Layout Review

The car park layout has been reviewed against the requirements of the Blacktown Council's 2015 DCP and the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009). This assessment included a review of the following:

- ◆ bay and aisle width
- ◆ adjacent structures
- ◆ turnaround facilities
- ◆ circulation roads and ramps
- ◆ ramp grades
- ◆ internal queuing
- ◆ pick-up / set-down area
- ◆ parking for persons with disabilities
- ◆ motorcycle / motor scooter parking.

The height clearance in the basement should be a minimum of 2.2m throughout the car park with the exception of the height above disabled car parking spaces which should be a minimum of 2.5m.

The line marking proposed is based on the widths and dimensions within the Australian Standard however the lines between car parking spaces have been increased to encourage drivers to park closer to the centre of the parking spaces.

Car Parking

This review indicates that the proposed car parking layout is expected to operate satisfactorily and generally accords with AS/NZS2890.1:2004 and AS/NZS2890.6:2009).

To improve the operation of the car park, the following would need to be reviewed at a later stage:

- ◆ Wheel stop locations
- ◆ Trolley bay clearance to aisles
- ◆ Line marking at each intersection in the basement on the circulation roadway that connects the entry / exit ramp to the ground floor / basement ramp.

A swept path assessment has been undertaken of the ground floor, basement and loading dock and is provided in **Appendix C**.

7. Loading and Service Arrangements

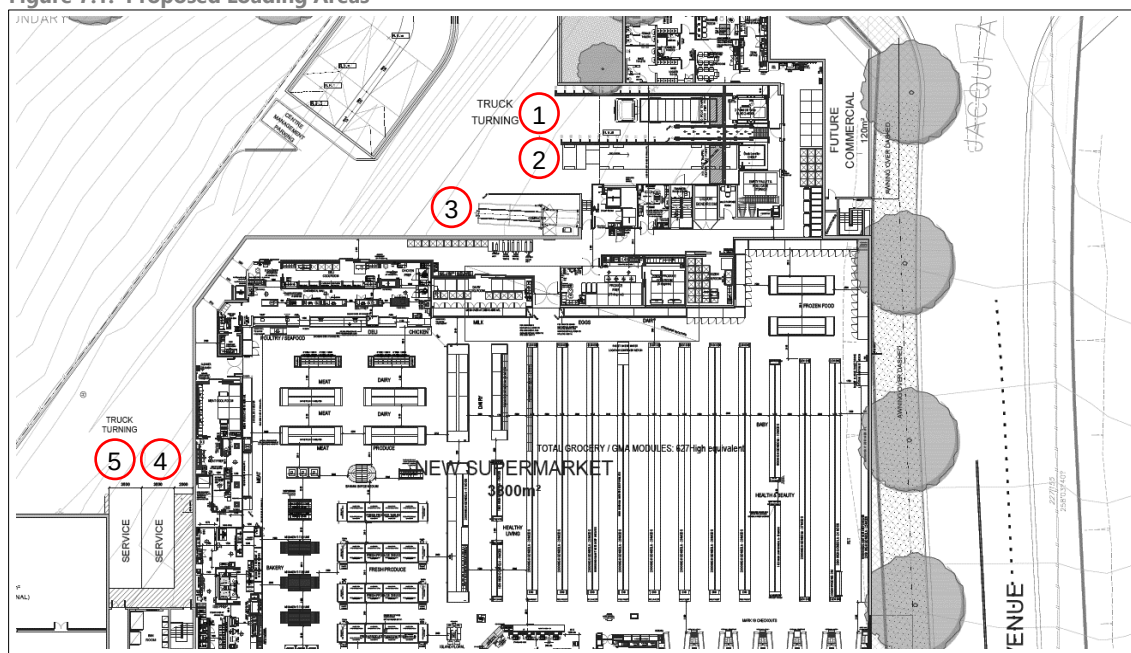
7.1 Loading Requirements

The Blacktown DCP 2015 does not outline specific loading requirements, but states that service vehicle areas should be provided off-street with convenient access. Also in larger developments, such as this one, service areas should operate independently of other parking areas.

7.2 Proposed Loading and Servicing Arrangements

The loading areas are shown in Figure 7.1.

Figure 7.1: Proposed Loading Areas



The loading areas shown in Figure 7.1 are described in more detail as follows:

- ◆ Loading Area 1 – Access designed for independent operation for up to a 12.5m heavy rigid vehicle.
- ◆ Loading Area 2 – Access designed for independent operation for up to a 19.0m semi-trailer
- ◆ Loading Area 3 – Access designed for up to a 12.5m heavy rigid vehicle. Area 3 cannot be used when a semi-trailer is reversing within the loading dock.
- ◆ Loading Area 4 and 5 – Access designed for independent operation for up to one 12.5m heavy rigid vehicle and one 8.8m MRV.

Vehicles would enter the site in a forward direction and be required to reverse into the loading bays and would exit the site in a forward direction. There is adequate manoeuvring space on site which ensures that vehicles would not need to undertake any reverse manoeuvres directly onto or from Minerva Road.

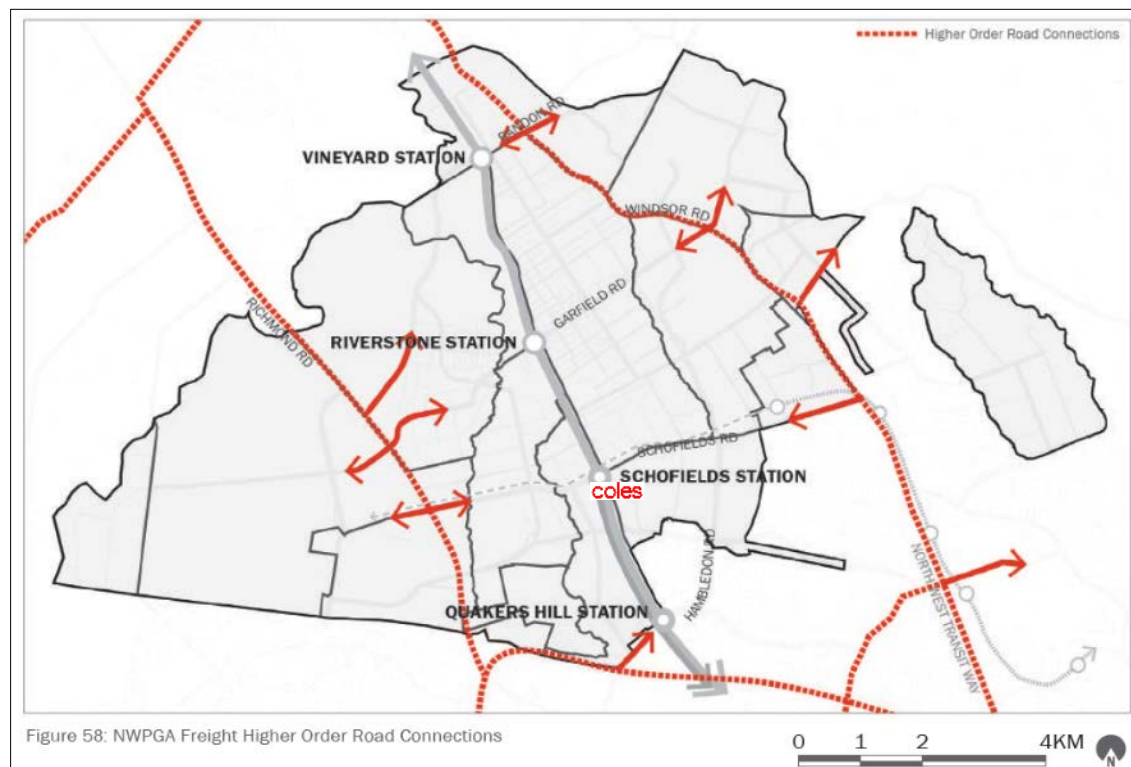
Swept path analysis of the loading and refuse areas has been completed and the findings are attached in **Appendix C**.

Based on the number of loading areas and the design of each loading area, the proposed loading arrangements for the site are considered satisfactory.

7.3 Access to the Site

The higher order roads which have been designated as freight roads within the North West Priority Growth Area are identified in Figure 7.2.

Figure 7.2: North West Priority Growth Area Freight Higher Order Road Connections



Source: North West Priority Growth Area Structure Plan Review, Exhibition Draft Report - Integrated Transport + Land Use Planning, November 2016

Information provided by Blacktown Council indicates that they require access via the following streets as outlined in Figure 7.3.

Figure 7.3: Proposed 19m Service Vehicle Access Route



Figure 7.3 indicates that access for 19m vehicles is proposed via:

- ◆ Jerralong Drive
- ◆ Minerva Road.

Based on the number of loading docks and their design, the proposed loading arrangements for the site are considered satisfactory.

7.3.1 Hours of Operation

Information provided by Coles indicates that the hours of operation proposed for the loading dock are 7:00am to 10:00pm Monday to Sunday.

7.3.2 Delivery and Service Vehicle Volumes

Information provided by Coles regarding the estimated daily deliveries is provided in Table 7.1.

Table 7.1: Estimated Daily Service Vehicle Volume

Type of Vehicle / Delivery	Daily Volume
Deliveries by 19 metre trucks	4-6 per day
Deliveries by direct suppliers (ie small trucks or vans):	8 per day (Monday to Friday)
	4-6 on Saturdays
	2 (bread and newspapers) on Sundays
Waste Vehicles	Daily service by waste vehicles

Table 7.1 indicates that Coles Schofields is estimated to receive up to 15 deliveries on a weekday with less service vehicles delivering on a Saturday and Sunday.

7.3.3 Access Staging

It is noted that access to the site via Jerralong Drive and Minerva Road is not currently possible as the roads are yet to be constructed and as a temporary measure, access to the site may be required via Jacqui Avenue and Minerva Road.

PeopleTrans has tested the swept paths of access via Jacqui Avenue and Minerva Road with the assessment provided in **Appendix D**.

The assessment shows that access via Railway Terrace, Jacqui Avenue and Minerva Road is physically possible and if Minerva Road is not constructed at the time that Coles is completed, 19m vehicle access could temporarily be provided via Jacqui Avenue and Minerva Road.

Temporary Vehicle Turning Arrangements

Due to the ownership of the nearby land, it is possible that until the entire Schofields town centre can be fully constructed, the access to the site will be via a 'dead-end' road. Under the unlikely scenario where a garbage truck travels down Minerva Road and is not travelling to the Coles loading dock, PeopleTrans has tested the ability for the garbage truck to turn around using the site driveway and exit to Minerva Road in a forward direction. The swept path assessment is shown in Figure 7.4 with more detail provided in **Appendix E**.

Figure 7.4: Proposed Garbage Vehicle Undertaking a 3-point Turn

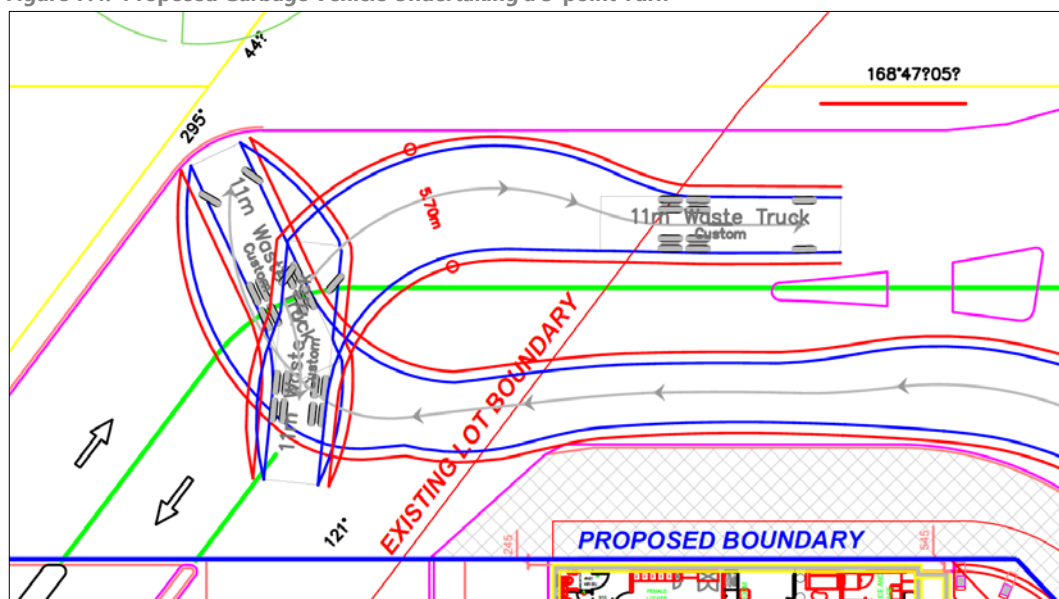


Figure 7.4 indicates that there is sufficient space for a garbage truck to enter Minerva Road, turn around using the site loading dock driveway and exit towards the intersection of Minerva Road / Jacqui Avenue in a forward direction. Given the temporary nature of this road layout and the unlikely possibility of this occurring, this is considered a satisfactory design outcome.

Access to the McDonalds Loading Dock

PeopleTrans has reviewed the access to the McDonalds loading dock. Information provided by McDonalds indicates that access for a 12.5m Heavy Rigid Vehicle (HRV) is required. An extract of the swept path assessment provided in **Appendix F** is provided in Figure 7.5.

Figure 7.5: Access to the McDonalds Loading Dock for a Heavy Rigid Vehicle

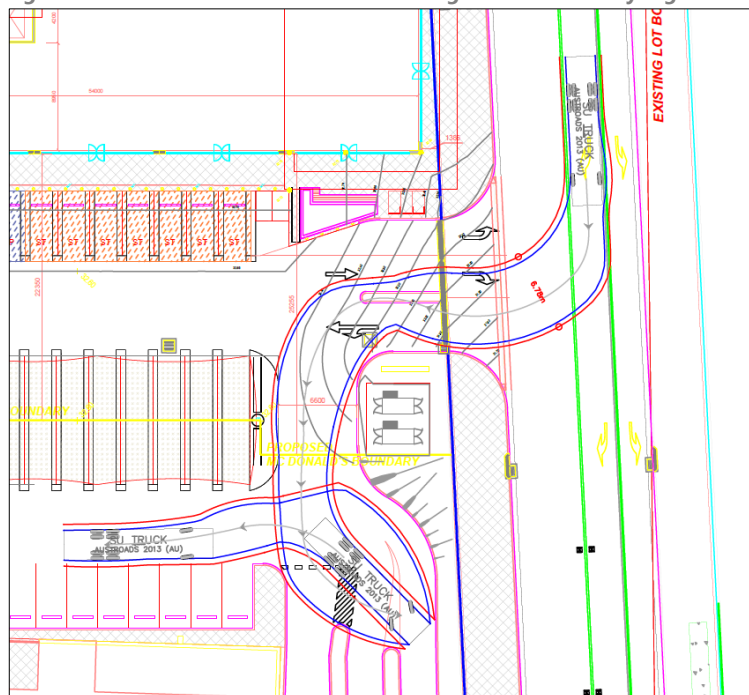


Figure 7.5 indicates that two-thirds of the entrance driveway is required to turn into the site. In accordance with Clause 3.2.4 (b) of AS2890.2:2002 this arrangement is considered satisfactory.

Access to the McDonalds loading dock can be provided in a 4-point turn. Ingress and egress has been tested for a 12.5m HRV for the following scenarios:

- ◆ Interim scenario – left turn into the site and right turn out of the site
- ◆ Final scenario – right turn into the site and left turn out of the site.

The final scenario is consistent with Figure 7.3 and the need to have no heavy vehicles use the intersection of Jacqui Avenue / Railway Terrace once the town centre road network is fully constructed.

Based on the above assessment, the proposed loading arrangements for the site are considered satisfactory. To minimise conflict between customer vehicles and loading vehicles, it is recommended that McDonalds deliveries occur in the early morning or late evening when customer activity is low.

8. Site Operational Assessment

8.1 Trip Generation

Traffic generation estimates for the proposed development have been sourced from the RTA Guide to Traffic Generating Developments and a previous Traffic Impact Assessment prepared by Arup dated 27/9/13.

Estimates of peak hour and daily traffic volumes resulting from the proposal are set out in Table 8.1.

Table 8.1: Traffic Generation Estimates

Use	Size	AM Peak Hour		PM Peak Hour	
		Traffic Generation Rate	Movements	Traffic Generation Rate	Movements
Coles and Liquorland	3,850.8 m ² GFA	2 movements / 100m ² GFA [1]	77	15.5 movements / 100m ² GFA [1]	597
New Shops (Stage 1 and 2)	1,739.1m ² GFA	2 movements / 100m ² GFA [1]	35	4.6 movements / 100m ² GFA [1]	80
New Shops	236.9m ² GFA	2 movements / 100m ² GFA [1]	5	4.6 movements / 100m ² GFA [1]	11
McDonalds	399.5m ² GFA	230 movements / site [1]	230	230 movements / site [1]	230
Child care centre	425m ² GFA 67 children 7 staff	0.8 movements / child [2]	54	0.7 movements / child [2]	47
Total			401		965
In		66%	265	50%	482
Out		34%	136	50%	483

[1] ARUP Traffic Impact Assessment dated 27/9/13

[2] RMS Guide to Traffic Generating Developments, October 2002 – assuming all movements during the peak hour instead of the peak 2-hours

Table 8.1 indicates that the site could potentially generate 401 vehicle movements in the AM peak hour with 965 vehicle movements during the PM peak hour.

8.2 Driveway Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- (1) configuration of the future regional road network
- (2) existing operation of intersections providing access between the local and arterial road network
- (3) distribution of households and nearby retail and commercial centres near the site
- (4) the likely distribution of employee's residences in relation to the site
- (5) number of car parking spaces served by each access.

After considering the relevant factors, the following driveway and directional distributions have been estimated as summarised in Table 8.2.

Table 8.2: Estimated Driveway Vehicle Volumes

Access (Estimated percentage of vehicle volumes)	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Railway Terrace Driveway (33%)	88	45	133	160	161	321
Jacqui Avenue Driveway (33%)	88	45	133	161	161	322
Minerva Road (34%)	89	46	135	161	161	322
Total	265	136	401	482	483	965

Table 8.2 indicates the estimated peak hour traffic volumes at each driveway location. The site has access to three separate roads; Railway Terrace, Jacqui Avenue and Minerva Road. The site also has two-way circulation between the basement levels which will enable vehicles to choose the access which has least congestion which will act to balance flows across the site.

It is estimated that the ground level access locations will carry a higher level of traffic compared to the percentage of car parking spaces. This has been assumed on the basis that customers are likely to be more attracted by the visible parking spaces on the ground level.

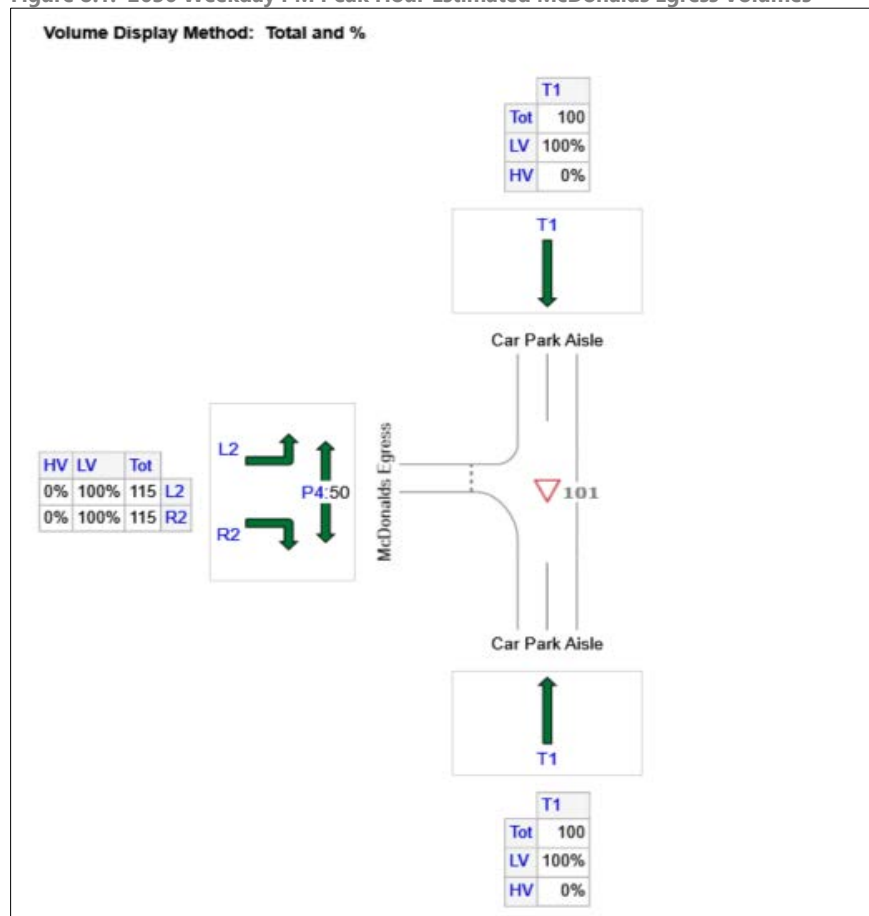
As the site has three access locations, if the site is particularly busy at a single access location, there is flexibility for vehicles to be able to move to another access location to either enter or exit the site.

Based on an estimated 322 vehicles at the Minerva Road access during the PM peak hour, this equates to approximately 1 vehicle every 11 seconds during the peak hour (in and out combined). This is considered satisfactory and should not compromise the safety or function or the surrounding road network.

8.3 McDonalds Egress

PeopleTrans has reviewed the potential operation of the egress from the McDonalds drive-through to determine whether there will be sufficient capacity to exit the drive-through onto the nearest car parking aisle. The assessment was undertaken for the weekday PM peak hour and was based on the volumes shown in Figure 8.1. An estimated 50 pedestrians during the peak hour was also assumed for exiting vehicles to give way to.

Figure 8.1: 2036 Weekday PM Peak Hour Estimated McDonalds Egress Volumes



Based on the volumes shown in Figure 8.1, PeopleTrans has undertaken modelling using Sidra 7. The results are provided in Table 8.3.

Table 8.3: 2036 PM Estimated McDonalds Egress Operation

Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
PM	Car Park Aisle (S)	0.06	0	0	A
	Car Park Aisle (N)	0.06	0	0	A
	McDonalds Egress	0.37	6.9	13	A
	Total	0.37	3.7	13	A

Table 8.3 indicates that the McDonalds egress is expected to operate well with 63% spare capacity and minimal queues and delays for exiting vehicles.

8.4 Potential Limited Jacqui Avenue Width

The ultimate cross-section of Jacqui Avenue is proposed to be two lanes exiting to Railway Terrace and one lane entering from Railway Terrace. To provide the ultimate cross-section, Council would be required to acquire land to the south of Jacqui Avenue.

If there are delays in acquiring the required land, it could result in a delay to the construction of the full width of Jacqui Avenue. To test whether the development could function in an interim arrangement

with a narrower cross-section on Jacqui Avenue, PeopleTrans has prepared a Sidra model of a modified Railway Terrace / Jacqui Avenue intersection. The proposed interim intersection is shown in Figure 8.2.

Figure 8.2: Potential Interim Jacqui Avenue Layout

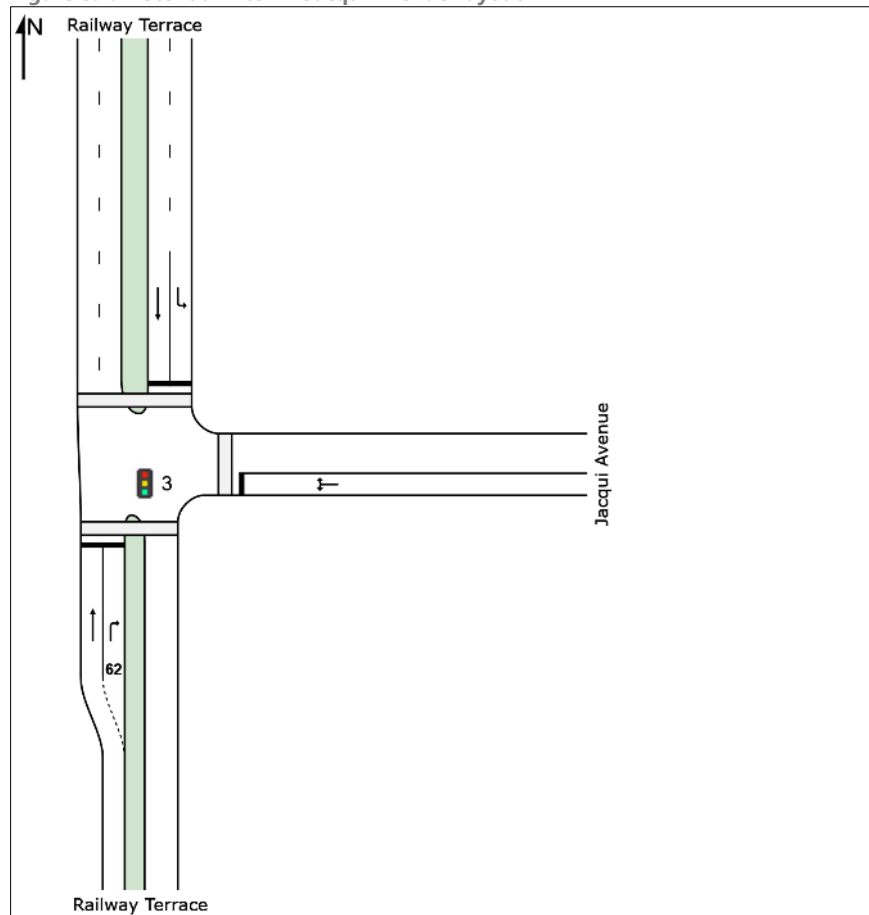
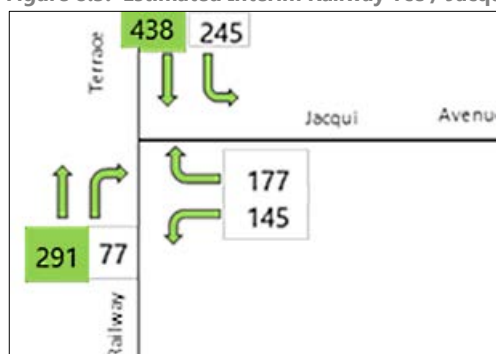


Figure 8.2 indicates that there is only one lane on Jacqui Avenue in each direction in this scenario. It is assumed in this scenario that Jacqui Avenue only provides access to the proposed development.

The interim volumes have been estimated based on the traffic generation for the site driveways as outlined in Table 8.2 as well as considering the re-routing of vehicles currently estimated to turn into Jacqui Avenue in the future. The estimated interim traffic volumes are provided in Figure 8.3.

Figure 8.3: Estimated Interim Railway Tce / Jacqui Ave Weekday PM Peak Hour Traffic Volumes



The traffic volumes highlighted in green have been increased to account for some vehicles redirected because Jacqui Avenue would not connect through to the developments east of Schofields. These volumes are considered to be conservatively high.

PeopleTrans has prepared a Sidra model of the worst-case PM peak hour scenario to understand whether the intersection of Railway Terrace / Jacqui Avenue could function under this interim layout. The results are provided in Table 8.4.

Table 8.4: Interim Weekday PM Railway Terrace / Jacqui Avenue (1-lane approach) Modelling

Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
PM	Railway Terrace (S)	0.32	12	38	A
	Jacqui Avenue (E)	0.79	33	76	C
	Railway Terrace (N)	0.48	11	48	A
	Total	0.79	16	79	B

Table 8.4 indicates that the interim layout of Jacqui Avenue / Railway Terrace is expected to operate with a satisfactory level of service. The anticipated queue on Jacqui Avenue of 76m is consistent with the estimated ultimate queue on Jacqui Avenue in 2036 under the full road layout.

While this could result in minor delays to vehicles exiting the site during the busiest time within the busiest peak hour, the proposed development is expected to still be able to function satisfactorily with a one-lane cross section on Jacqui Avenue until the land to the south of Jacqui Avenue can be acquired to provide the full cross-section.

It is recommended that the full width of Jacqui Avenue be provided prior to allowing connection through to other developments to the east of the Schofields town centre.

9. Conclusions

Based on the analysis and discussions presented within this report, the following conclusions are made:

- (1) The proposed development generates a parking requirement of 351 spaces.
- (2) The proposed supply of 356 parking spaces satisfies the minimum parking requirements. In addition, there are 2 drop off / pick up spaces and 2 waiting bays at the McDonalds for a total parking supply of 360 spaces.
- (3) The proposed parking layout is generally consistent with the dimensional requirements as set out in Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009). To improve the operation of the car park, the following would need to be reviewed at a later stage:
 - ♦ wheel stop locations
 - ♦ trolley bay clearance to aisles
 - ♦ line marking at each intersection in the basement on the circulation roadway that connects the entry / exit ramp to the ground floor / basement ramp.
- (4) The provision for bicycle facilities is considered satisfactory and in accordance with Australian Standard AS2890.3:2015.
- (5) A total of 5 loading docks are proposed within a single loading area with access from Minerva Road. Loading access has been designed for up to a 19.0m semi-trailer to enter the site and exit in a forward direction. The loading dock hours proposed are 7:00am to 10:00pm Monday to Sunday. The proposed loading arrangements are considered satisfactory in an accordance with Australian Standard AS2890.2:2002.
- (6) Access to the McDonalds loading dock has been provided for a 12.5m HRV. The proposed loading arrangements are considered satisfactory in an accordance with Australian Standard AS2890.2:2002. To minimise conflict between customer vehicles and loading vehicles, it is recommended that McDonalds deliveries occur in the early morning or late evening when customer activity is low.
- (7) The site is expected to generate up to 401 and 965 vehicle movements in the AM and PM peak hours respectively.
- (8) There is adequate capacity in the surrounding road network to cater for the traffic generated by the proposed development.
- (9) The right turn from Railway Terrace to Manchester Drive is likely to queue beyond the available storage and this means that the right turn from Railway Terrace to Jacqui Avenue is a critical road network requirement. The proposed right turn storage for the right turn from Railway Terrace to Jacqui Avenue is considered adequate to cater for the proposed development.
- (10) If Council cannot acquire the required land to provide a two-lane cross-section on Jacqui Avenue, the intersection of Railway Terrace / Jacqui Avenue could continue to function satisfactorily as a one-lane arrangement until the required land could be acquired. It is recommended that the full width of Jacqui Avenue be provided prior to allowing connection through to other developments to the east of the Schofields town centre.

Conclusions

- (11) A construction traffic management plan should be prepared for the development prior to commencement of work.

10. References

In preparing this report, reference has been made to the following:

- ◆ an inspection of the site and its surrounds
- ◆ Blacktown Council Development Control Plan (DCP) 2015 and Blacktown City Council Growth Centres DCP, November 2016
- ◆ plans for the proposed development prepared by Christiansen O'Brien Architects Drawing dated 19/12/2017, Revision [DA]:

Drawing No.	Rev.	Drawing Title
DA01	DA	Proposed Site Plan - Stage 2
DA01-1	DA	Proposed Site Plan - Stage 1
DA02	DA	Proposed Basement Plan

- ◆ Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- ◆ Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- ◆ Australian Standards, Parking Facilities, Part 3: Bicycle parking facilities AS 2890.3:2015
- ◆ Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- ◆ other documents and data as referenced in this report.

Appendix A

Sidra Results

MOVEMENT SUMMARY

Site: 1 [1 - Jerralong Dr / Railway Tce - AM]

18S390 - Coles Schofields

1 - Jerralong Drive / Railway Terrace Intersection

2036 AM

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
1	L2	6	2.0	0.327	12.8	LOS A	4.0	28.5	0.48	0.42	32.7
2	T1	592	2.0	0.327	8.2	LOS A	4.0	28.5	0.48	0.41	36.8
3	R2	1	2.0	0.002	16.2	LOS B	0.0	0.1	0.61	0.59	28.6
Approach		599	2.0	0.327	8.3	LOS A	4.0	28.5	0.48	0.41	36.8
East: Jerralong Drive											
4	L2	18	2.0	0.049	22.4	LOS B	0.5	3.6	0.77	0.65	25.5
5	T1	5	2.0	0.049	17.9	LOS B	0.5	3.6	0.77	0.65	25.0
6	R2	267	2.0	0.672	28.4	LOS B	7.6	54.3	0.95	0.86	24.2
Approach		291	2.0	0.672	27.9	LOS B	7.6	54.3	0.94	0.85	24.3
North: Railway Terrace											
7	L2	43	2.0	0.247	15.0	LOS B	3.9	27.7	0.64	0.57	34.5
8	T1	405	2.0	0.247	10.1	LOS A	4.0	28.2	0.63	0.54	34.4
9	R2	63	2.0	0.160	16.8	LOS B	1.2	8.6	0.66	0.70	27.6
Approach		512	2.0	0.247	11.4	LOS A	4.0	28.2	0.63	0.56	33.4
West: Interchange Access											
10	L2	7	57.1	0.039	23.1	LOS B	0.3	3.3	0.77	0.64	23.7
11	T1	3	66.7	0.039	18.0	LOS B	0.3	3.3	0.77	0.64	24.9
12	R2	3	66.7	0.039	23.1	LOS B	0.3	3.3	0.77	0.64	19.8
Approach		14	61.5	0.039	21.9	LOS B	0.3	3.3	0.77	0.64	23.1
All Vehicles		1415	2.6	0.672	13.5	LOS A	7.6	54.3	0.63	0.56	31.7

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 SUMMARY

Site: 1 [1 - Jerralong Dr / Railway Tce - PM]

18S390 - Coles Schofields

1 - Jerralong Drive / Railway Terrace Intersection

2036 PM

Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given 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: Railway Terrace											
1	L2	1	2.0	0.249	15.1	LOS B	5.2	37.3	0.57	0.48	30.1
2	T1	505	2.0	0.249	10.6	LOS A	5.2	37.3	0.57	0.48	34.3
3	R2	5	2.0	0.017	17.9	LOS B	0.1	0.8	0.57	0.63	27.5
Approach		512	2.0	0.249	10.6	LOS A	5.2	37.3	0.57	0.48	34.2
East: Jerralong Drive											
4	L2	37	2.0	0.080	27.9	LOS B	1.1	7.9	0.77	0.70	22.3
5	T1	1	2.0	0.080	23.3	LOS B	1.1	7.9	0.77	0.70	21.7
6	R2	161	2.0	0.409	31.6	LOS C	5.3	38.1	0.87	0.78	22.9
Approach		199	2.0	0.409	30.9	LOS C	5.3	38.1	0.85	0.77	22.8
North: Railway Terrace											
7	L2	36	2.0	0.404	13.1	LOS A	6.6	47.3	0.44	0.42	36.8
8	T1	793	2.0	0.404	8.4	LOS A	6.6	47.3	0.44	0.39	36.4
9	R2	5	2.0	0.012	16.5	LOS B	0.1	0.8	0.54	0.61	27.8
Approach		834	2.0	0.404	8.7	LOS A	6.6	47.3	0.44	0.40	36.4
West: Interchange Access											
10	L2	57	7.4	0.254	29.4	LOS C	3.5	26.2	0.82	0.74	20.9
11	T1	13	16.7	0.254	24.8	LOS B	3.5	26.2	0.82	0.74	21.3
12	R2	44	4.8	0.254	29.4	LOS C	3.5	26.2	0.82	0.74	18.6
Approach		114	7.4	0.254	28.9	LOS C	3.5	26.2	0.82	0.74	20.1
All Vehicles		1658	2.4	0.409	13.3	LOS A	6.6	47.3	0.55	0.49	31.7

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 SUMMARY

Site: 2 [2 - Manchester Dr / Railway Tce - AM]

18S390 - Coles Schofields

2 - Manchester Drive / Railway Terrace Intersection

2036 AM

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
1	L2	2	100.0	0.290	13.0	LOS A	3.5	25.1	0.47	0.40	32.4
2	T1	539	2.0	0.290	8.0	LOS A	3.5	25.1	0.47	0.40	37.0
3	R2	5	2.0	0.012	15.7	LOS B	0.1	0.6	0.60	0.62	30.2
Approach		546	2.4	0.290	8.1	LOS A	3.5	25.1	0.47	0.40	36.9
East: Manchester Drive											
4	L2	173	2.0	0.383	25.4	LOS B	4.3	30.9	0.87	0.78	24.6
6	R2	184	2.0	0.402	25.5	LOS B	4.7	33.2	0.88	0.78	22.7
Approach		357	2.0	0.402	25.4	LOS B	4.7	33.2	0.88	0.78	23.7
North: Railway Terrace											
7	L2	41	2.0	0.227	14.9	LOS B	3.5	25.1	0.63	0.57	32.1
8	T1	371	2.0	0.227	10.0	LOS A	3.6	25.6	0.62	0.53	34.3
9	R2	6	2.0	0.016	15.8	LOS B	0.1	0.8	0.61	0.63	25.1
Approach		418	2.0	0.227	10.6	LOS A	3.6	25.6	0.62	0.54	33.9
All Vehicles		1321	2.2	0.402	13.6	LOS A	4.7	33.2	0.63	0.55	31.2

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 SUMMARY



Site: 2 [2 - Manchester Dr / Railway Tce - PM]

18S390 - Coles Schofields

2 - Manchester Drive / Railway Terrace Intersection

2036 PM

Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Deg. HV %	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: Railway Terrace											
1	L2	2	100.0	0.242	13.0	LOS A	5.1	36.4	0.50	0.43	32.5
2	T1	559	2.0	0.242	8.0	LOS A	5.1	36.4	0.50	0.43	37.0
3	R2	553	2.0	0.884	44.0	LOS D	21.4	152.1	1.00	1.17	18.0
Approach		1114	2.2	0.884	25.9	LOS B	21.4	152.1	0.75	0.80	23.8
East: Manchester Drive											
4	L2	151	2.0	0.136	11.5	LOS A	2.5	17.5	0.45	0.66	33.6
6	R2	147	2.0	0.402	35.4	LOS C	5.2	36.7	0.92	0.78	18.8
Approach		298	2.0	0.402	23.4	LOS B	5.2	36.7	0.68	0.72	24.7
North: Railway Terrace											
7	L2	34	2.0	0.883	45.3	LOS D	17.2	122.3	1.00	1.05	17.0
8	T1	759	2.0	0.883	40.5	LOS C	17.4	124.2	1.00	1.05	17.9
9	R2	6	2.0	0.032	35.1	LOS C	0.2	1.5	0.85	0.66	16.0
Approach		799	2.0	0.883	40.6	LOS C	17.4	124.2	1.00	1.05	17.9
All Vehicles		2211	2.1	0.884	30.9	LOS C	21.4	152.1	0.83	0.88	21.5

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 SUMMARY



Site: 3 [3 - Jacqui Ave / Railway Tce - AM]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

2036 AM

Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
2	T1	128	2.0	0.250	19.1	LOS B	3.0	21.6	0.83	0.66	36.1
3	R2	117	2.0	0.382	28.2	LOS B	3.1	22.3	0.91	0.77	31.3
Approach		245	2.0	0.382	23.4	LOS B	3.1	22.3	0.87	0.71	33.7
East: Jacqui Avenue											
4	L2	192	2.0	0.224	14.9	LOS B	3.4	24.0	0.63	0.72	37.7
6	R2	463	2.0	0.542	17.1	LOS B	9.8	70.0	0.76	0.79	29.2
Approach		655	2.0	0.542	16.4	LOS B	9.8	70.0	0.72	0.77	32.4
North: Railway Terrace											
7	L2	380	2.0	0.415	14.9	LOS B	7.1	50.5	0.67	0.75	30.4
8	T1	26	2.0	0.051	17.8	LOS B	0.6	4.1	0.77	0.56	36.8
Approach		406	2.0	0.415	15.1	LOS B	7.1	50.5	0.68	0.74	31.1
All Vehicles		1306	2.0	0.542	17.3	LOS B	9.8	70.0	0.74	0.75	32.4

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.

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: 3 [3 - Jacqui Ave / Railway Tce - PM]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

2036 PM

Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
2	T1	75	2.0	0.194	29.3	LOS C	2.5	17.6	0.87	0.67	31.5
3	R2	71	2.0	0.305	38.8	LOS C	2.6	18.3	0.93	0.76	27.5
Approach		145	2.0	0.305	33.9	LOS C	2.6	18.3	0.90	0.71	29.4
East: Jacqui Avenue											
4	L2	356	2.0	0.324	13.1	LOS A	6.8	48.7	0.53	0.71	38.8
6	R2	431	2.0	0.392	13.5	LOS A	8.7	62.2	0.56	0.72	31.8
Approach		786	2.0	0.392	13.3	LOS A	8.7	62.2	0.55	0.72	35.8
North: Railway Terrace											
7	L2	721	2.0	0.643	10.4	LOS A	10.8	77.2	0.42	0.69	34.3
8	T1	72	2.0	0.186	29.2	LOS C	2.2	15.7	0.81	0.62	31.5
Approach		793	2.0	0.643	12.1	LOS A	10.8	77.2	0.45	0.68	33.8
All Vehicles		1724	2.0	0.643	14.5	LOS A	10.8	77.2	0.53	0.70	34.1

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.

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: 3 [3 - Jacqui Ave / Railway Tce - AM +150T +150R]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

2036 AM +150veh through and right

Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
2	T1	286	2.0	0.406	15.5	LOS B	6.4	45.2	0.79	0.67	38.1
3	R2	275	2.0	0.659	26.1	LOS B	7.6	53.9	0.93	0.85	32.2
Approach		561	2.0	0.659	20.7	LOS B	7.6	53.9	0.86	0.76	35.0
East: Jacqui Avenue											
4	L2	192	2.0	0.285	19.3	LOS B	4.0	28.7	0.75	0.75	35.3
6	R2	463	2.0	0.690	23.0	LOS B	12.1	85.9	0.91	0.85	25.6
Approach		655	2.0	0.690	21.9	LOS B	12.1	85.9	0.86	0.82	29.1
North: Railway Terrace											
7	L2	380	2.0	0.415	14.9	LOS B	7.1	50.5	0.67	0.75	30.4
8	T1	184	2.0	0.261	14.5	LOS B	3.8	27.3	0.74	0.61	38.7
Approach		564	2.0	0.415	14.8	LOS B	7.1	50.5	0.69	0.71	34.0
All Vehicles		1780	2.0	0.690	19.3	LOS B	12.1	85.9	0.81	0.77	32.7

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 SUMMARY



Site: 3 [3 - Jacqui Ave / Railway Tce - PM +150T +150R]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

2036 PM +150 veh through and right

Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Deg. Satn HV % 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: Railway Terrace										
2	T1	233	2.0 0.312	18.4	LOS B	6.3	45.2	0.74	0.62	36.5
3	R2	228	2.0 0.564	29.4	LOS C	7.6	54.2	0.88	0.81	30.8
Approach		461	2.0 0.564	23.9	LOS B	7.6	54.2	0.81	0.71	33.5
East: Jacqui Avenue										
4	L2	356	2.0 0.471	23.1	LOS B	10.2	72.5	0.78	0.79	33.4
6	R2	431	2.0 0.570	24.1	LOS B	13.0	92.6	0.82	0.81	25.0
Approach		786	2.0 0.570	23.7	LOS B	13.0	92.6	0.80	0.80	29.6
North: Railway Terrace										
7	L2	721	2.0 0.643	10.4	LOS A	10.8	77.2	0.42	0.69	34.3
8	T1	229	2.0 0.308	16.7	LOS B	5.2	36.8	0.61	0.51	37.4
Approach		951	2.0 0.643	11.9	LOS A	10.8	77.2	0.46	0.64	35.5
All Vehicles		2198	2.0 0.643	18.6	LOS B	13.0	92.6	0.66	0.71	32.6

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 SUMMARY



Site: 3 [3 - Jacqui Ave / Railway Tce - PM - Interim 1 lane access]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

Future PM - 1 lane Exiting Jacqui Avenue

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
2	T1	306	2.0	0.318	9.7	LOS A	5.4	38.2	0.63	0.54	41.8
3	R2	81	2.0	0.254	19.7	LOS B	1.8	12.5	0.73	0.73	35.0
Approach		387	2.0	0.318	11.8	LOS A	5.4	38.2	0.65	0.58	40.2
East: Jacqui Avenue											
4	L2	153	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	29.5
6	R2	186	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	21.3
Approach		339	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	25.7
North: Railway Terrace											
7	L2	258	2.0	0.325	15.1	LOS B	4.0	28.3	0.55	0.70	30.3
8	T1	461	2.0	0.479	8.2	LOS A	6.7	47.5	0.52	0.46	42.9
Approach		719	2.0	0.479	10.7	LOS A	6.7	47.5	0.53	0.54	39.3
All Vehicles		1445	2.0	0.793	16.1	LOS B	10.7	76.1	0.67	0.65	35.8

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.

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: 101 [McDonalds Egress - PM]

18S390 - Coles Schofields
McDonalds Egress
2036 PM
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Deg. HV %	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: Car Park Aisle											
2	T1	118	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	10.0
Approach		118	0.0	0.060	0.0	NA	0.0	0.0	0.00	0.00	10.0
North: Car Park Aisle											
8	T1	118	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	10.0
Approach		118	0.0	0.060	0.0	NA	0.0	0.0	0.00	0.00	10.0
West: McDonalds Egress											
10	L2	135	0.0	0.367	1.4	LOS A	1.9	13.4	0.46	0.40	9.8
12	R2	135	0.0	0.367	4.5	LOS A	1.9	13.4	0.46	0.40	12.6
Approach		271	0.0	0.367	2.9	LOS A	1.9	13.4	0.46	0.40	11.3
All Vehicles		506	0.0	0.367	1.6	NA	1.9	13.4	0.24	0.21	10.7

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.

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: 3 [3 - Jacqui Ave / Railway Tce - PM - Interim 1 lane access]

18S390 - Coles Schofields

3 - Jacqui Avenue / Railway Terrace Intersection

Future PM - 1 lane Exiting Jacqui Avenue

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Railway Terrace											
2	T1	306	2.0	0.318	9.7	LOS A	5.4	38.2	0.63	0.54	41.8
3	R2	81	2.0	0.254	19.7	LOS B	1.8	12.5	0.73	0.73	35.0
Approach		387	2.0	0.318	11.8	LOS A	5.4	38.2	0.65	0.58	40.2
East: Jacqui Avenue											
4	L2	153	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	29.5
6	R2	186	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	21.3
Approach		339	2.0	0.793	32.5	LOS C	10.7	76.1	1.00	0.95	25.7
North: Railway Terrace											
7	L2	258	2.0	0.325	15.1	LOS B	4.0	28.3	0.55	0.70	30.3
8	T1	461	2.0	0.479	8.2	LOS A	6.7	47.5	0.52	0.46	42.9
Approach		719	2.0	0.479	10.7	LOS A	6.7	47.5	0.53	0.54	39.3
All Vehicles		1445	2.0	0.793	16.1	LOS B	10.7	76.1	0.67	0.65	35.8

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.

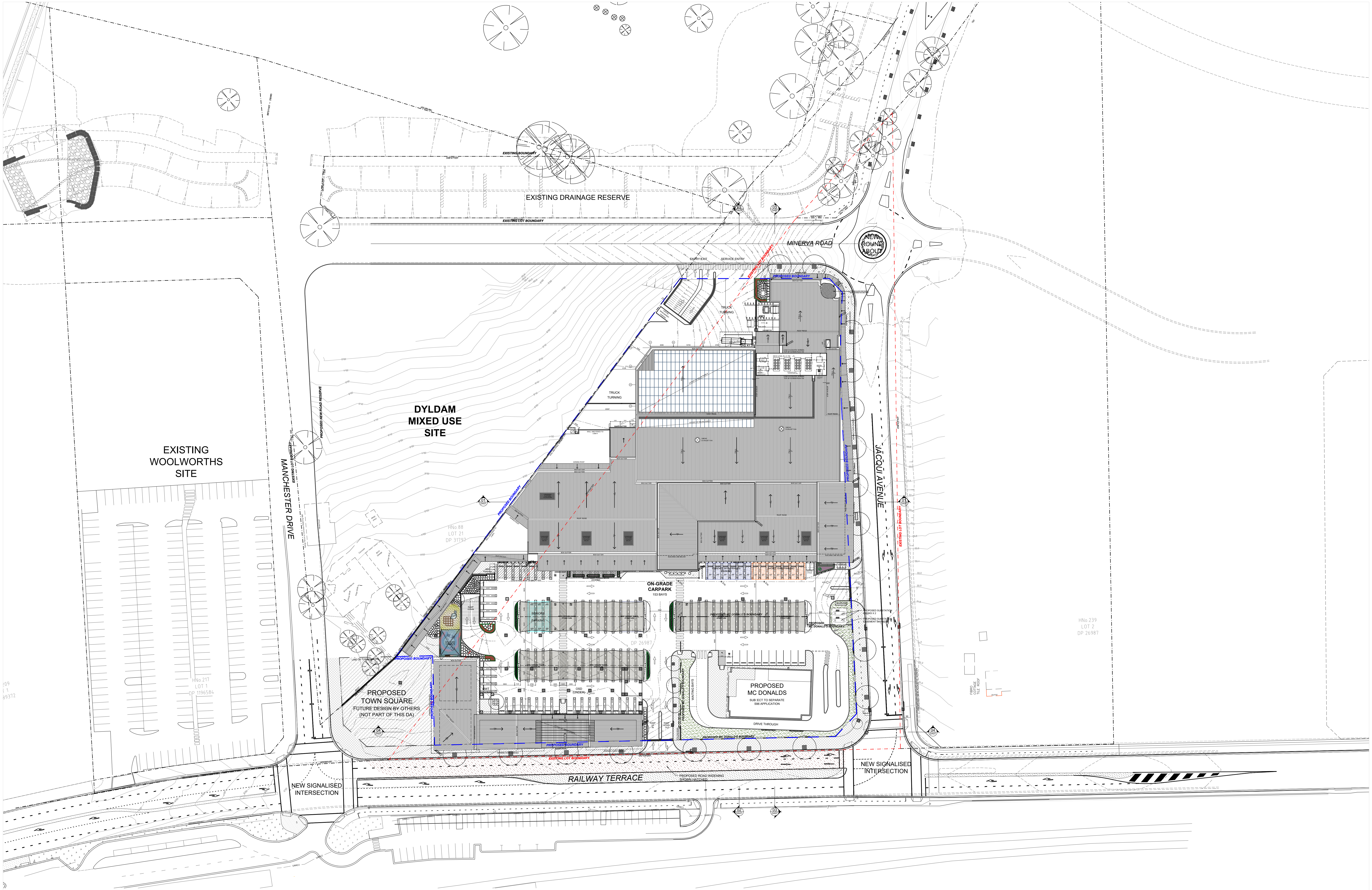
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

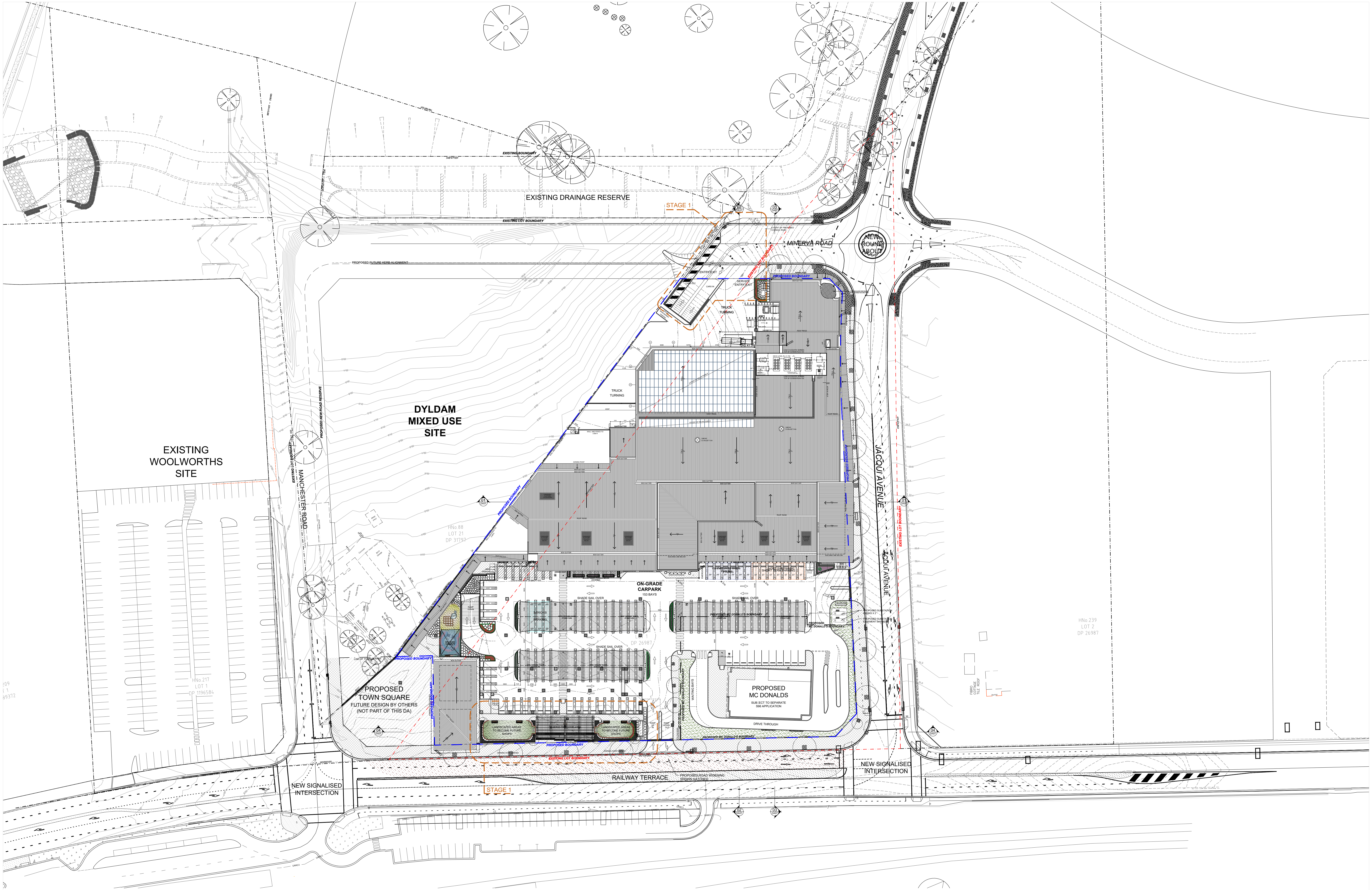
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

Appendix B

Assessed Site Plans







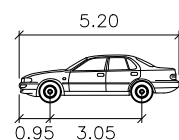
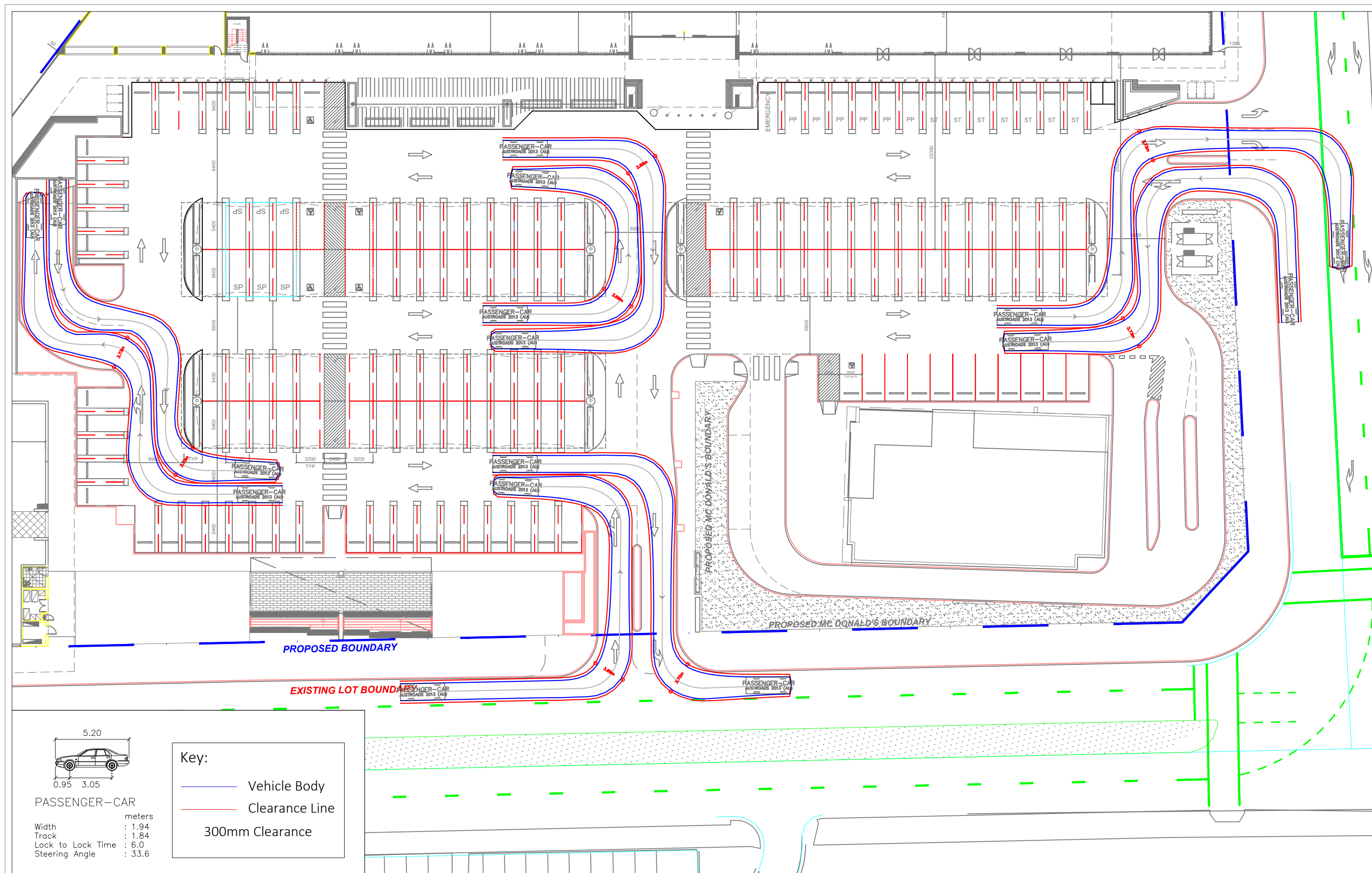
Appendix C

Ultimate Site Layout Swept Path Assessment

Ground Floor

Basement

Loading Dock



PASSENGER-CAR
 Width : 1.94
 Track : 1.84
 Lock to Lock Time : 6.0
 Steering Angle : 33.6

Key:

- Vehicle Body
- Clearance Line
- 300mm Clearance

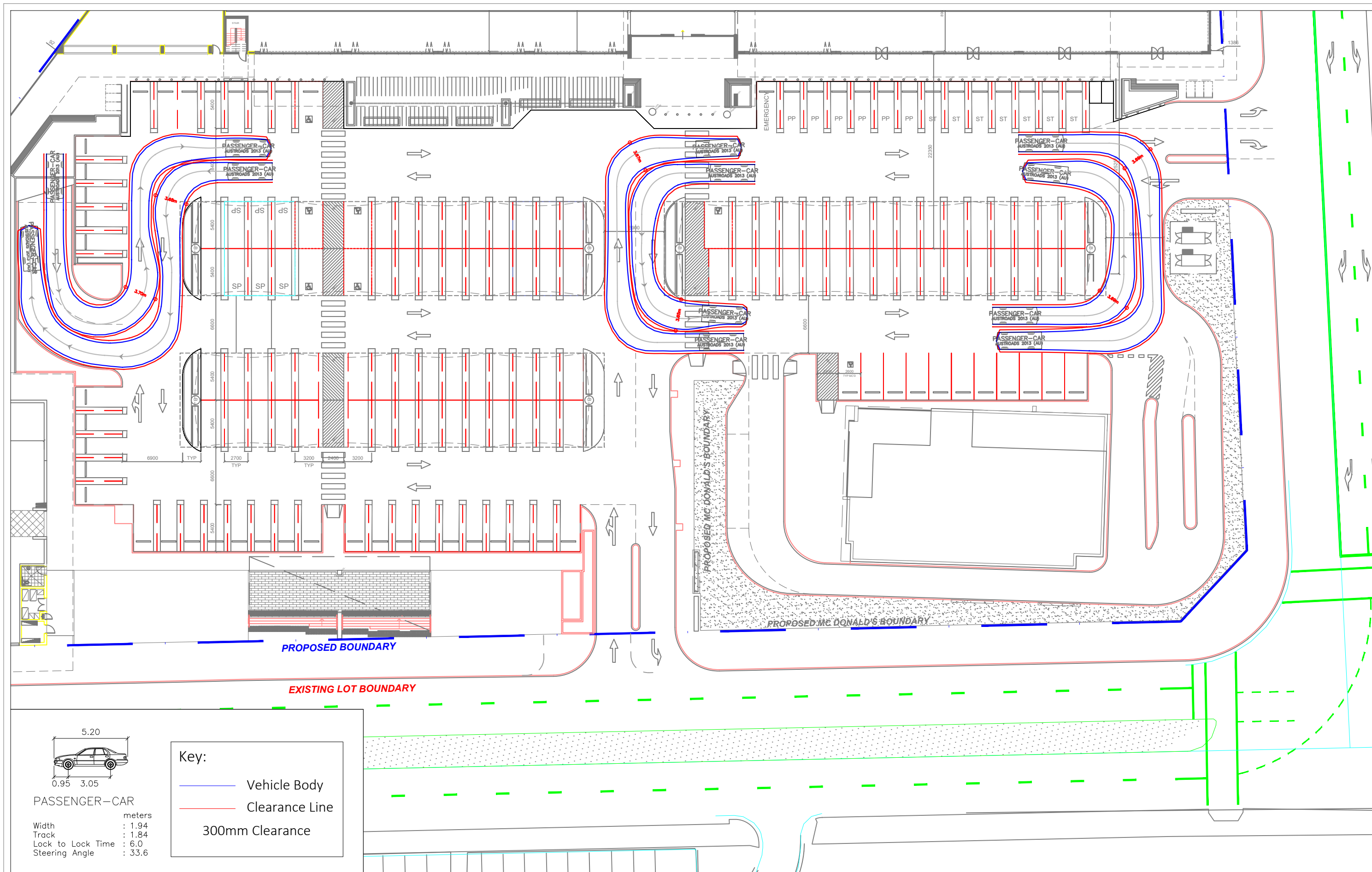


DRAWN: B.LI
 CHECKED: M. HOULDEN

0 4 8 12

DRAWING NO: 18S390-CS-01
 SCALE: 1:400 @ A3
 SHEET: 01 OF 04
 DATE: 19.12.2017

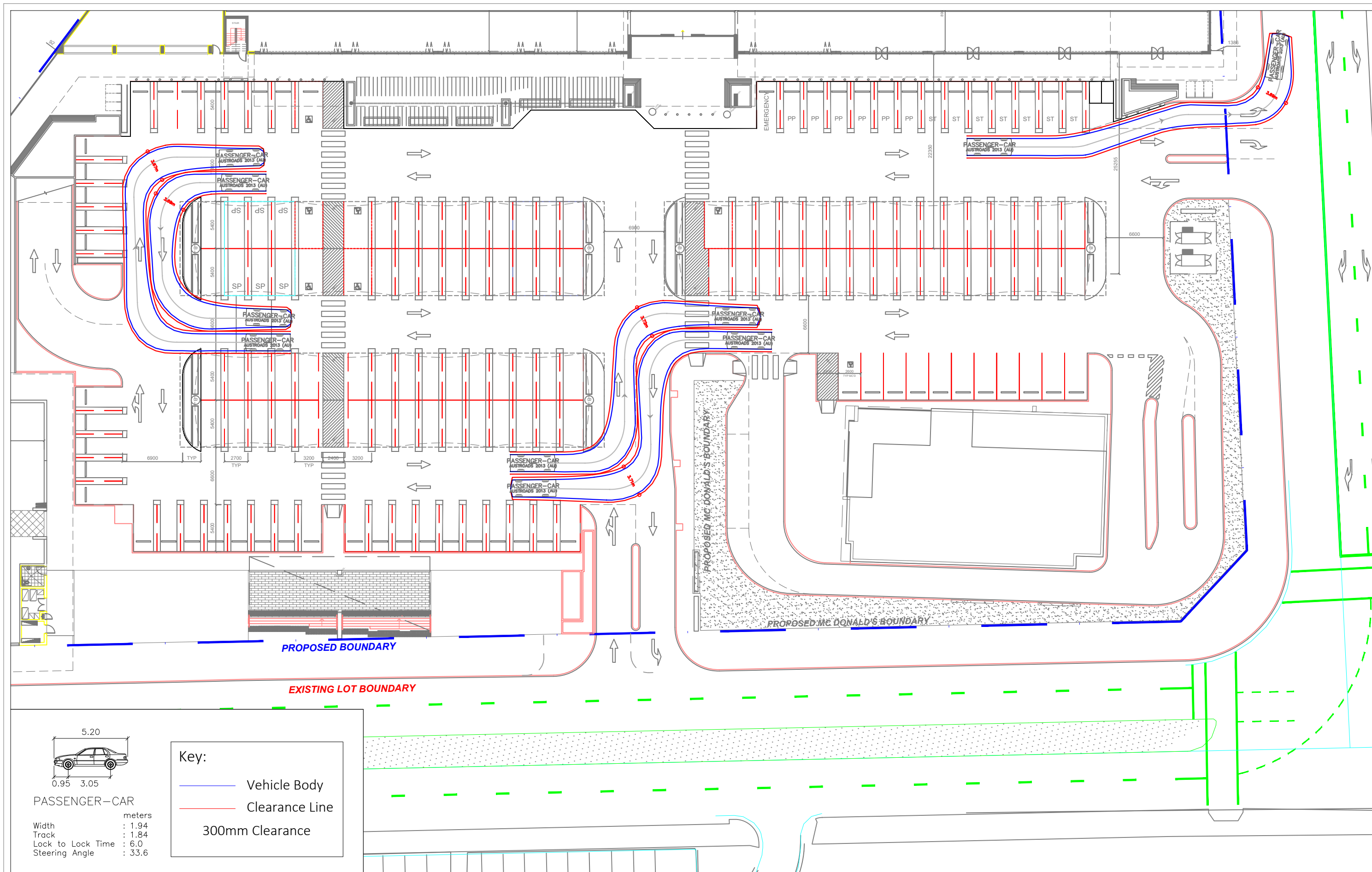
COLES SCHOFIELDS
 GROUND FLOOR CAR PARK
 SWEEP PATH ASSESSMENT



DRAWN: B.LI
CHECKED: M. HOULDEN
SCALE: 1:400 @ A3

DRAWING NO: 18S390-CS-01
SHEET: 02 OF 04
DATE: 19.12.2017

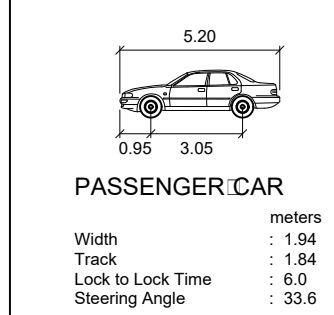
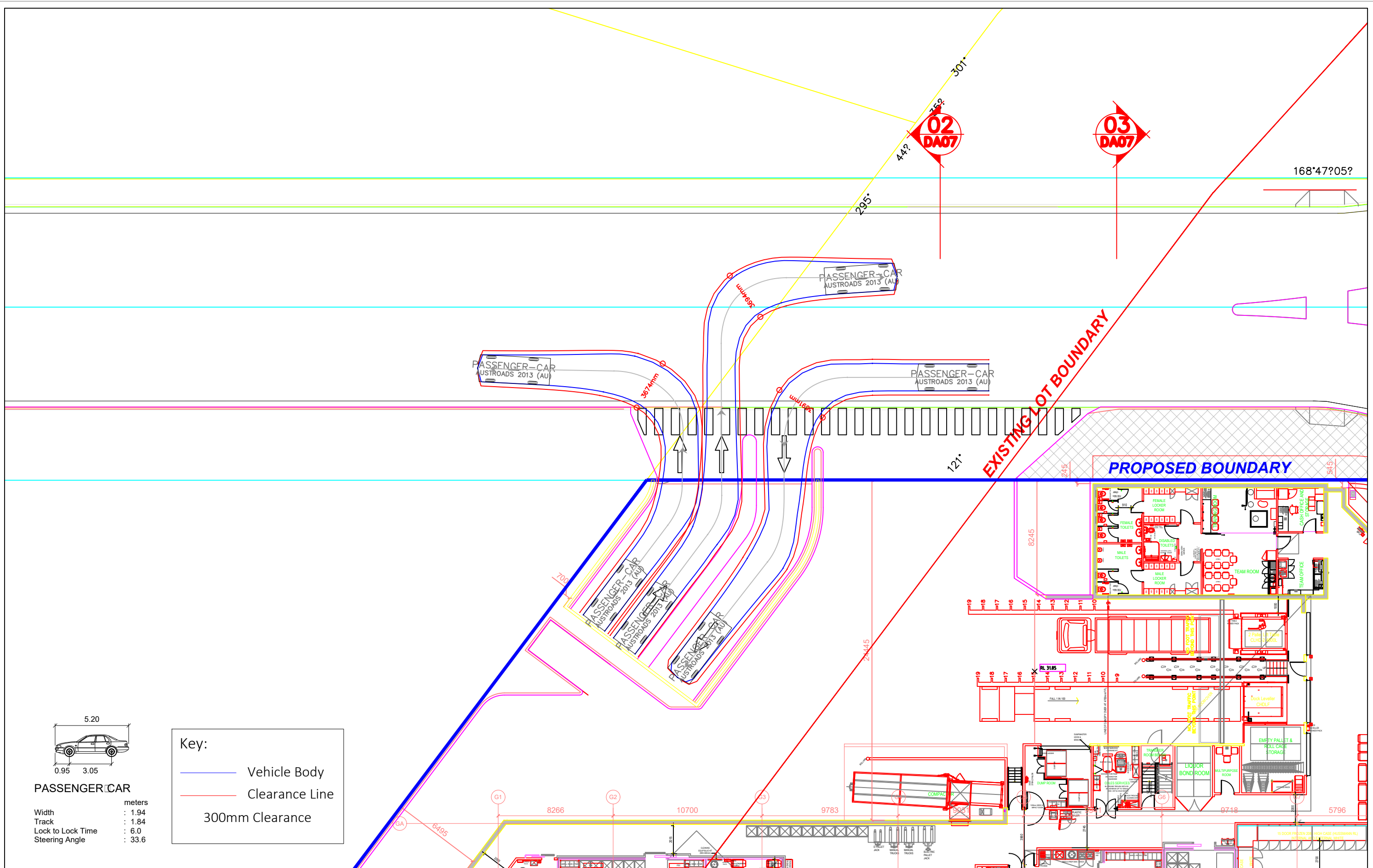
COLES SCHOFIELDS
GROUND FLOOR CAR PARK
SWEEP PATH ASSESSMENT



DRAWN: B.LI
CHECKED: M. HOULDEN

DRAWING NO: 18S390-CS-01
SHEET: 04 OF 04
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
GROUND FLOOR CAR PARK
SWEEP PATH ASSESSMENT



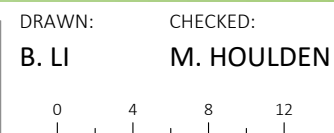
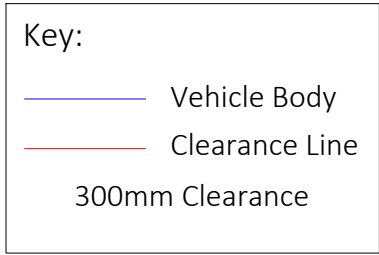
Key:

- Vehicle Body
- Clearance Line
- 300mm Clearance



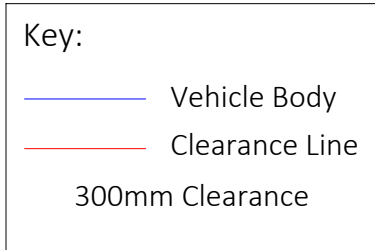
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 SHEET: 01 OF 02
 DATE: 19.12.2017

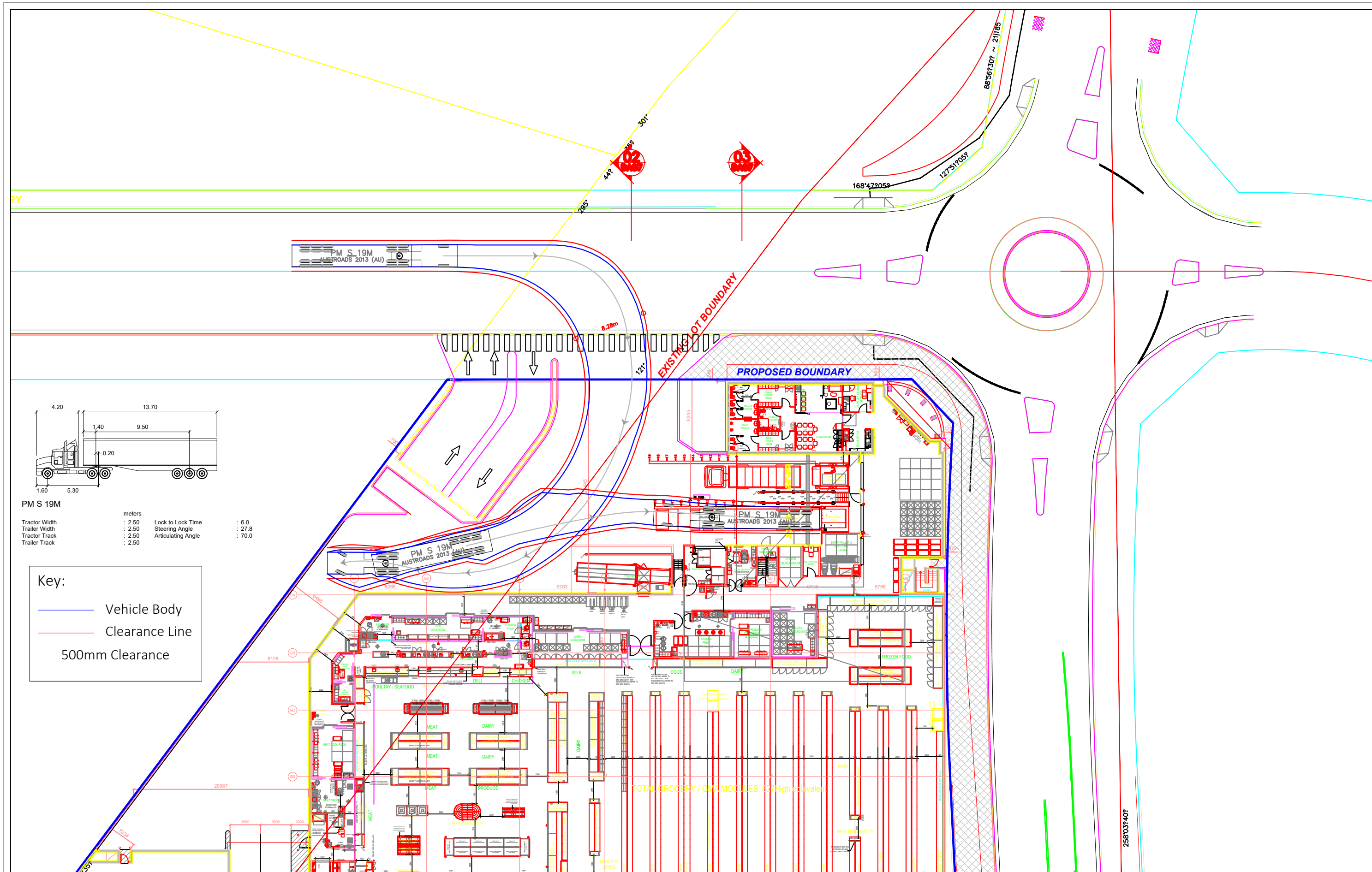
COLES SCHOFIELDS
BASEMENT CAR PARK - STAGE 2 ACCESS
SWEPT PATH ASSESSMENT



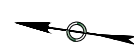
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SHEET: 01 OF 02
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
BASEMENT CAR PARK
SWEPT PATH ASSESSMENT





peopletrans

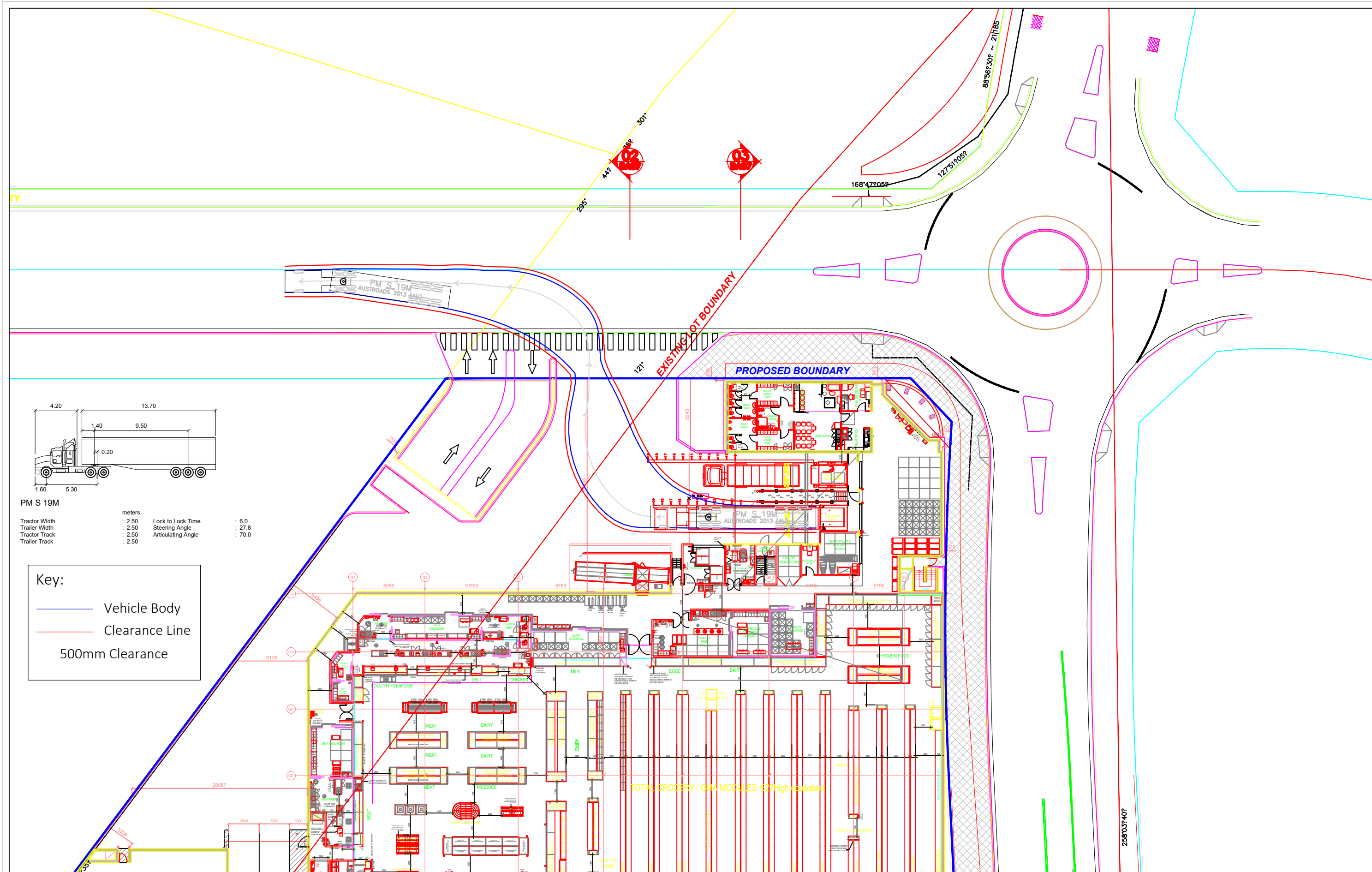


DRAWN: B. LI
CHECKED: M. HOULDEN

0 4 8 12

DRAWING NO: 18S390-CS-03a
SHEET: 01 OF 08
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEEP PATH ASSESSMENT



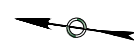
PM S 19M

	metres		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance

peopletrans



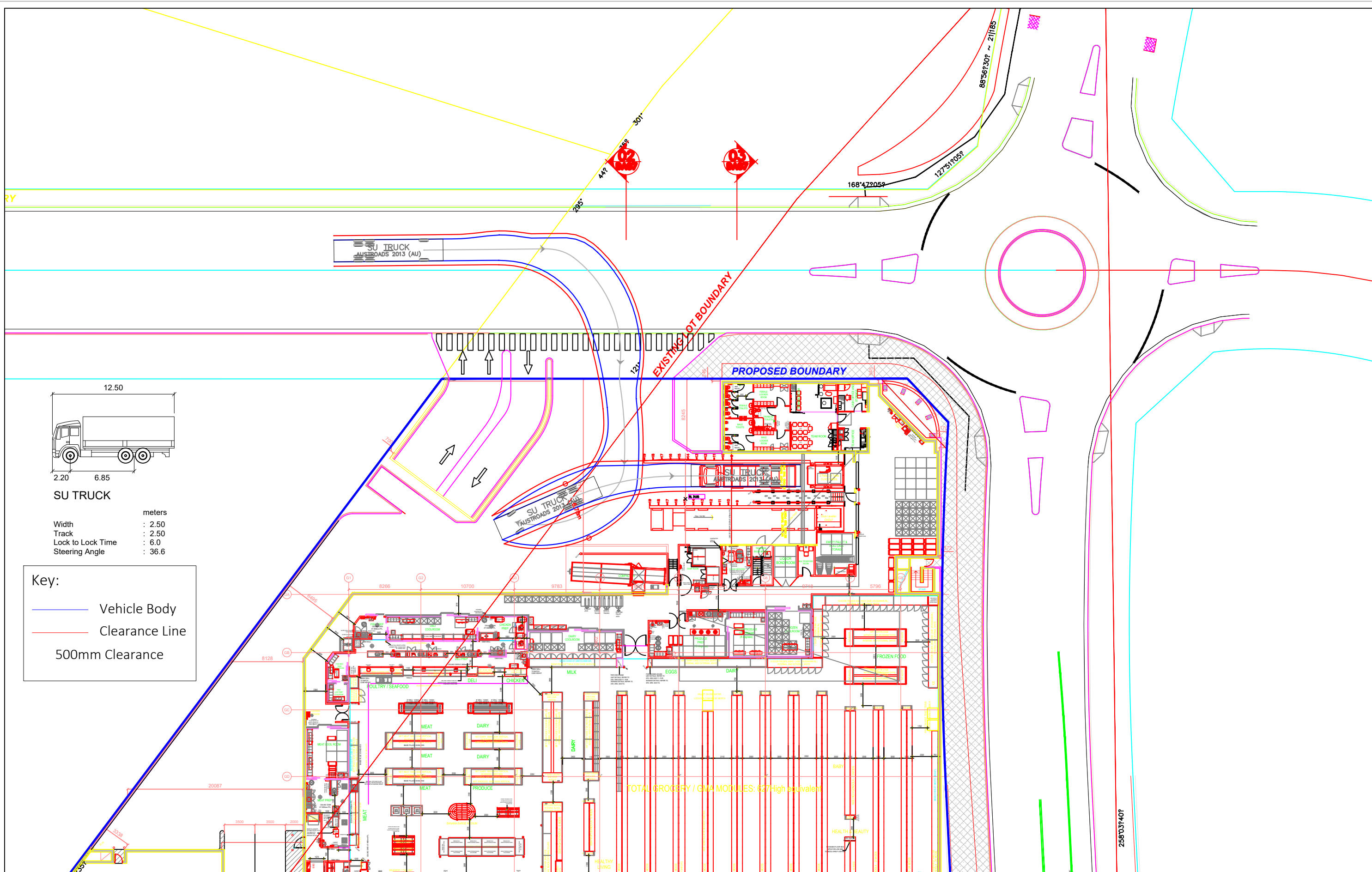
DRAWN: B. LI
CHECKED: M. HOULDEN

DRAWING NO: 18S390-CS-03a
SHEET: 02 OF 08

SCALE: 1:400 @ A3
DATE: 19.12.2017

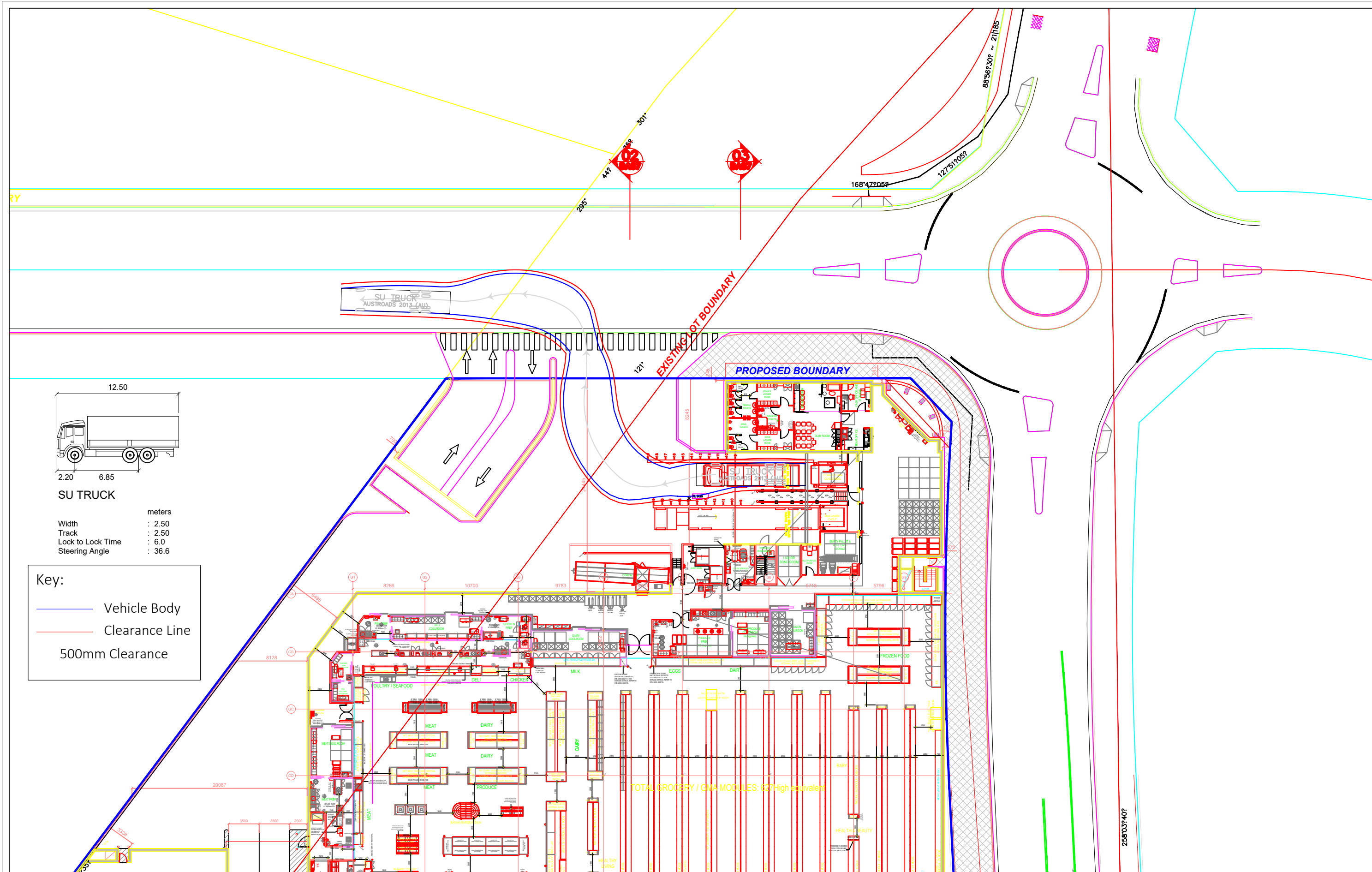
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COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEEP PATH ASSESSMENT

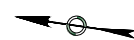


DRAWN: B. LI	CHECKED: M. HOULDEN	DRAWING NO: 18S390-CS-03a	SHEET: 03 OF 08
SCALE: 1:400 @ A3		DATE: 19.12.2017	

COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEEP PATH ASSESSMENT



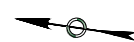
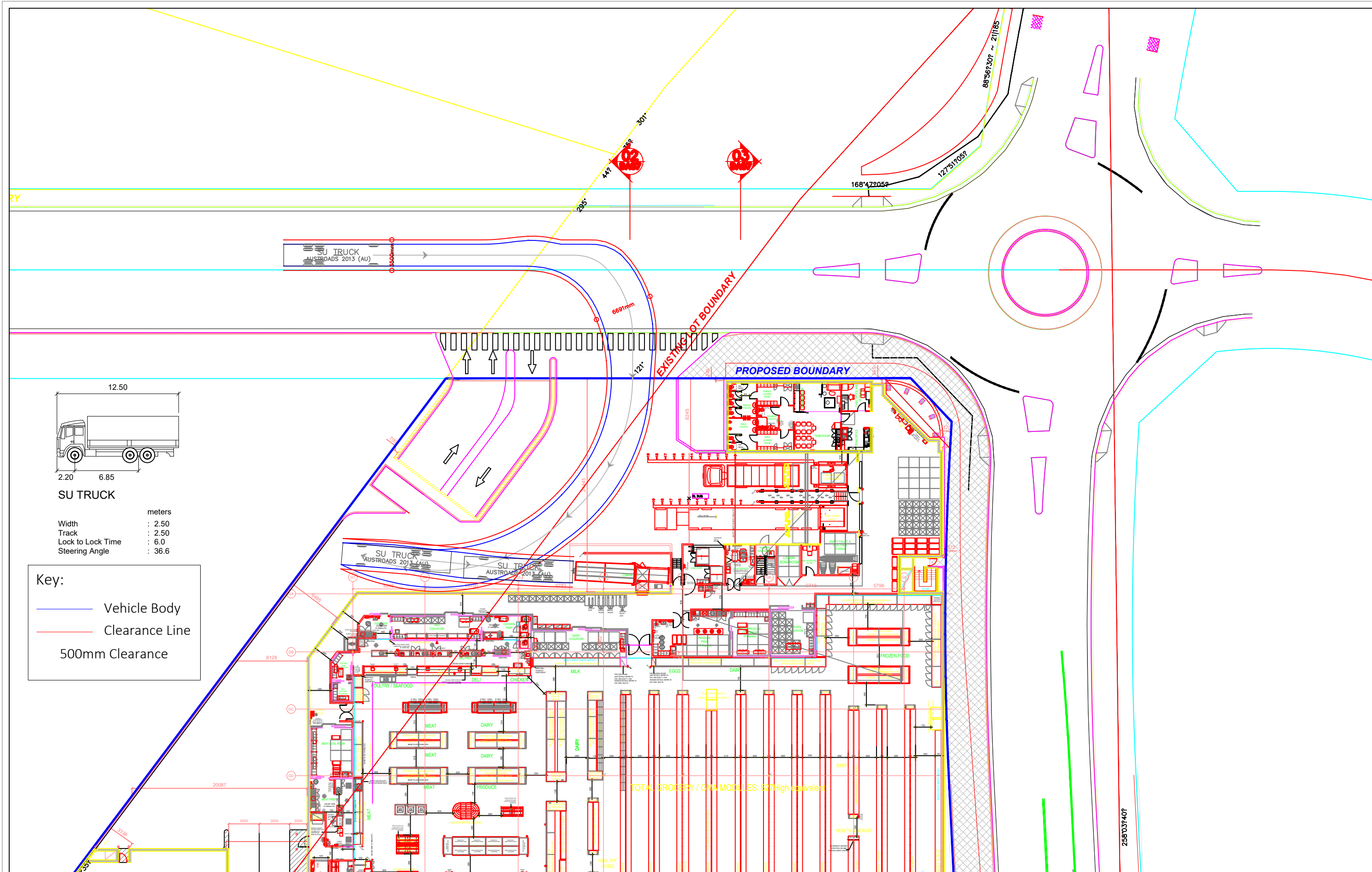
peopletrans



DRAWN: B. LI
CHECKED: M. HOULDEN

DRAWING NO: 18S390-CS-03a
SHEET: 04 OF 08
SCALE: 1:400 @ A3
DATE: 19.12.2017

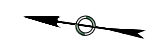
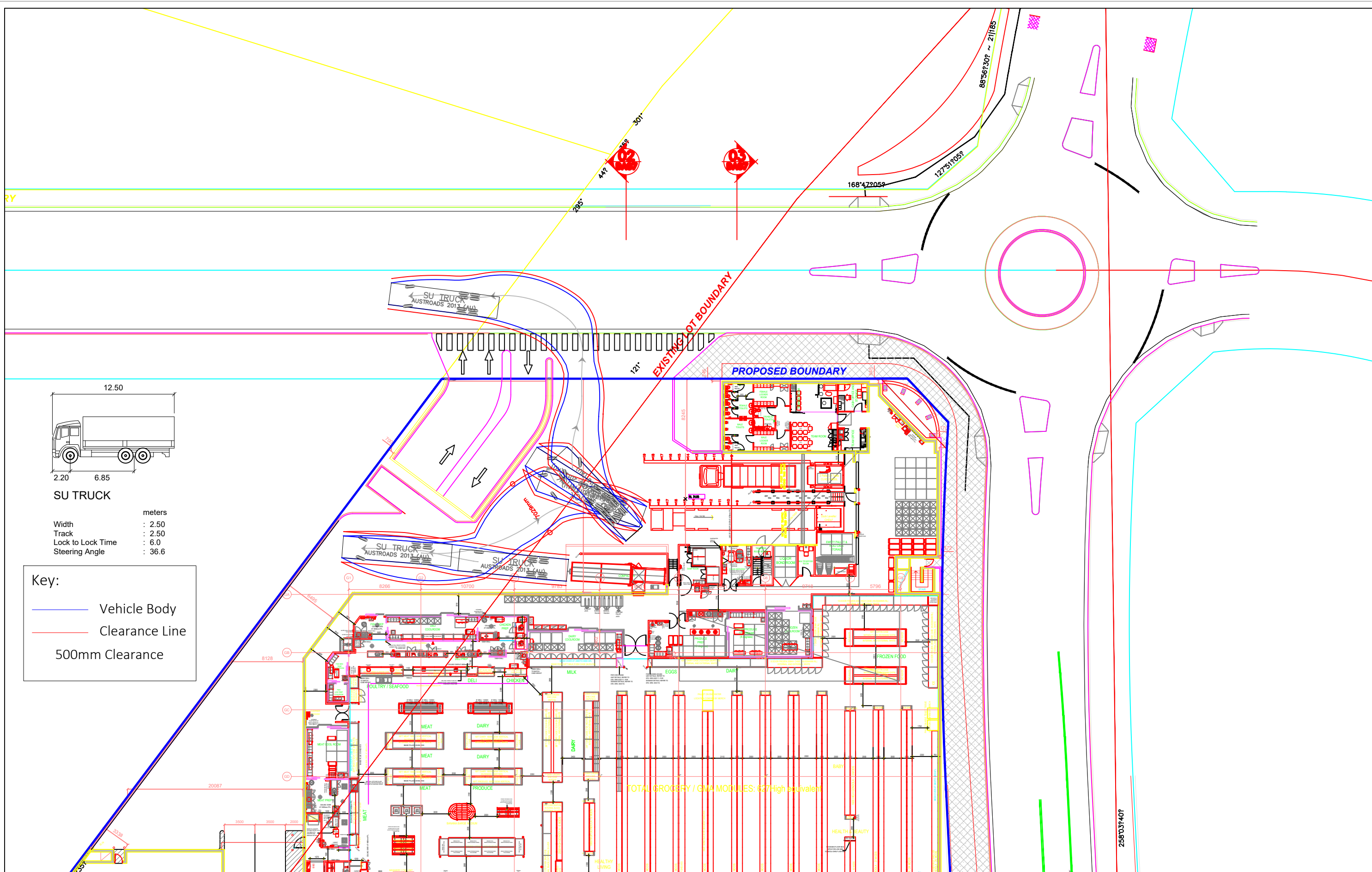
COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEPT PATH ASSESSMENT



DRAWN: B. LI
CHECKED: M. HOULDEN

DRAWING NO: 18S390-CS-03a
SHEET: 05 OF 08
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEPT PATH ASSESSMENT



DRAWN:	CHECKED:	DRAWING NO:	SHEET:
B. LI	M. HOULDEN	18S390-CS-03a	06 OF 08
SCALE:		DATE:	
1:400 @ A3		19.12.2017	

COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEPT PATH ASSESSMENT

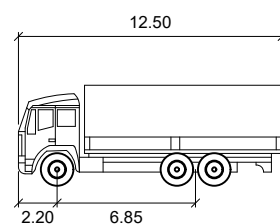
168°47'05.9" EXISTING LOT BOUNDARY

168°47'20.52"

EXISTING LOT BOUNDARY

PROPOSED BOUNDARY

PROPOSED BOUNDARY

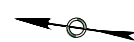


SU TRUCK

Width : 2.50
Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 36.6

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance



DRAWN: B. LI
CHECKED: M. HOULDEN

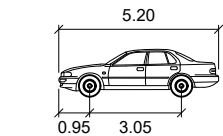
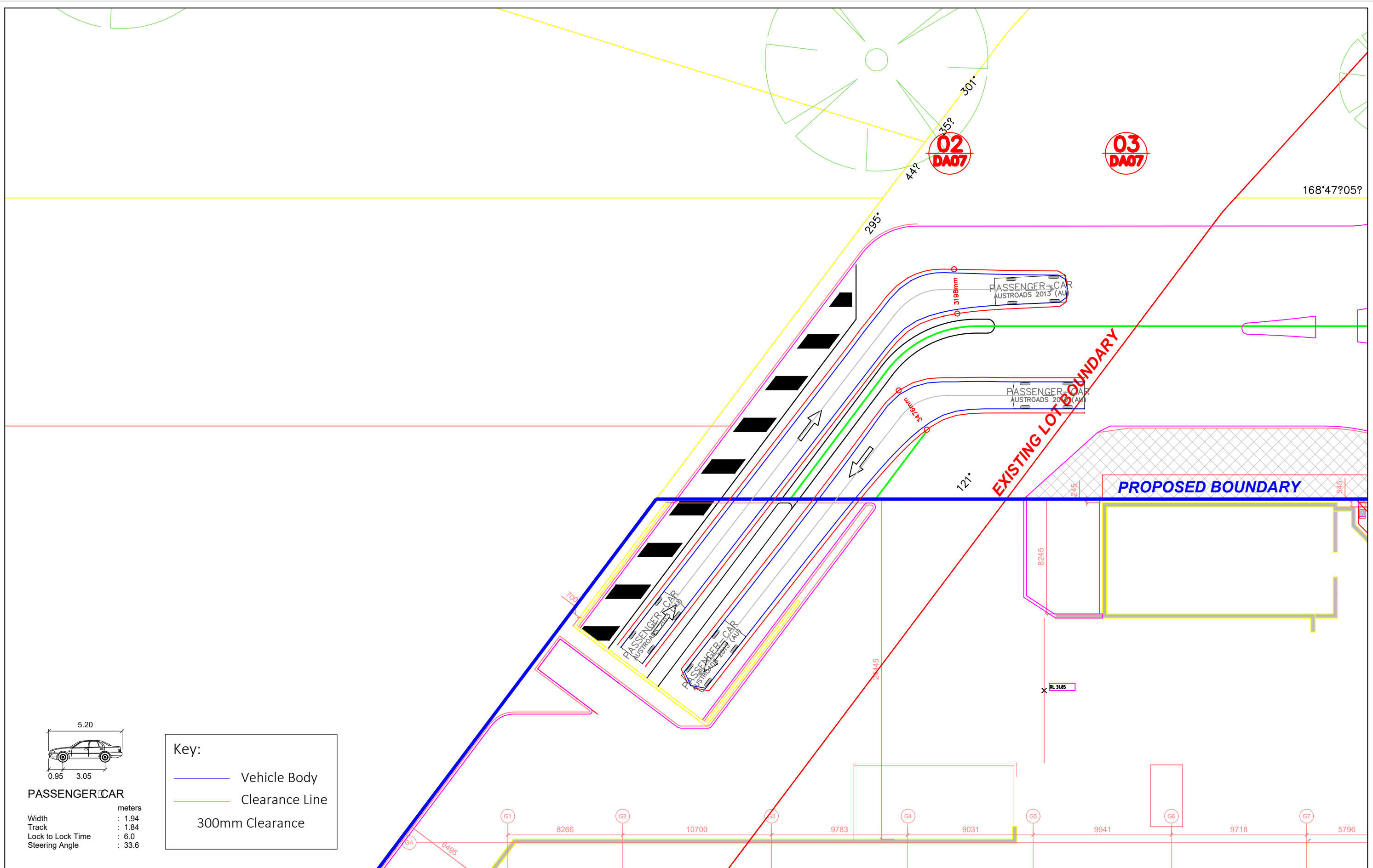
DRAWING NO: 18S390-CS-03a
SHEET: 07 OF 08

SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 2
SWEEP PATH ASSESSMENT

Appendix D

Interim Road Layout Swept Path Assessment

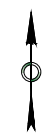


PASSENGER CAR

	metres
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

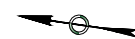
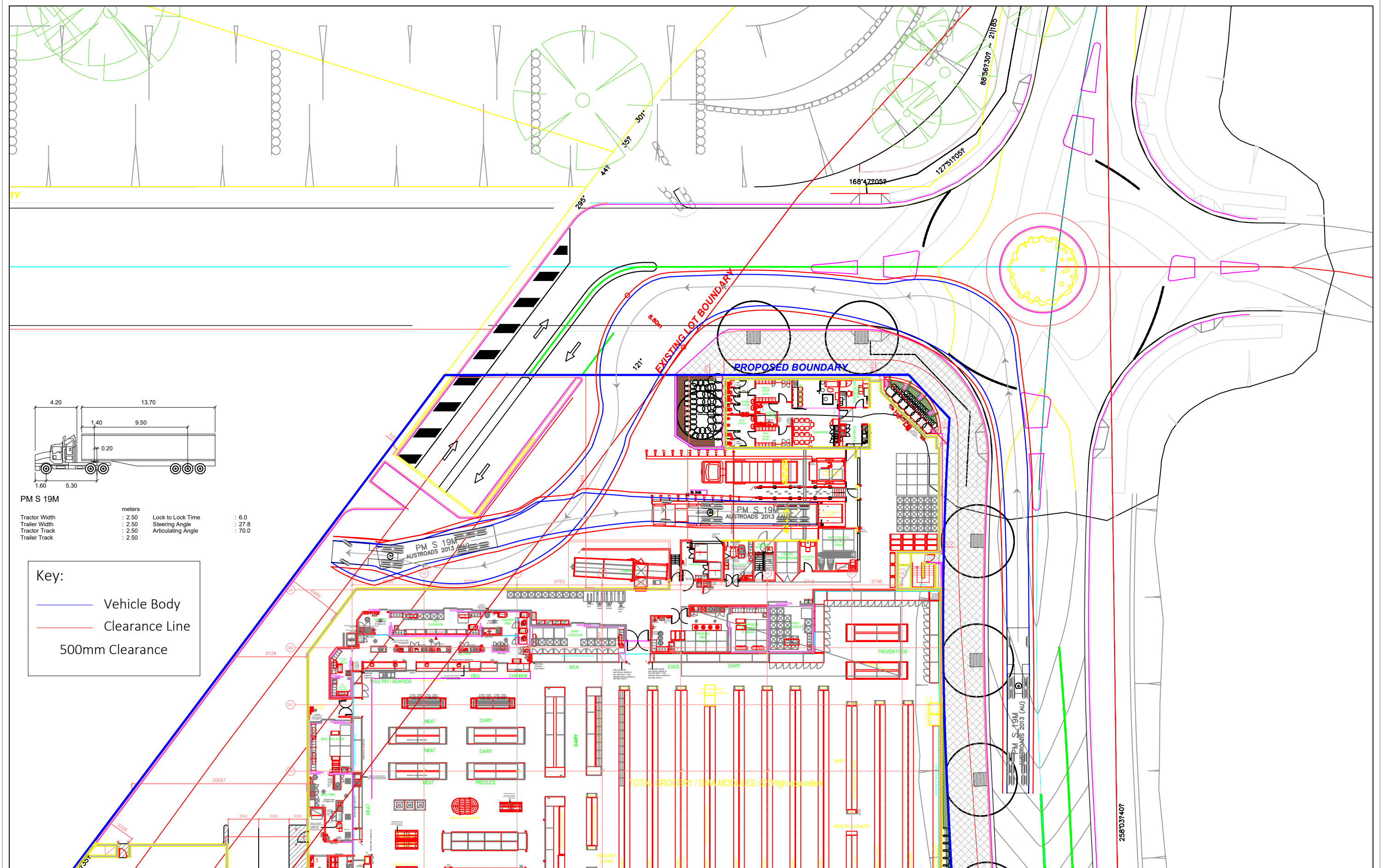
Key:

- Vehicle Body
- Clearance Line
- 300mm Clearance



DRAWN: B. LI	CHECKED: M. HOULDEN	DRAWING NO: 18S390-CS-02b	SHEET: 01 OF 01
SCALE: 1:400 @ A3		DATE: 19.12.2017	

COLES SCHOFIELDS
BASEMENT CAR PARK - STAGE 1 ACCESS
SWEPT PATH ASSESSMENT

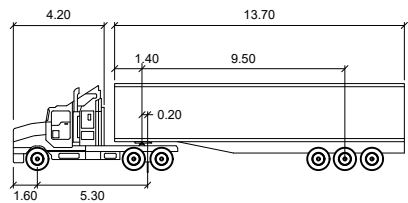
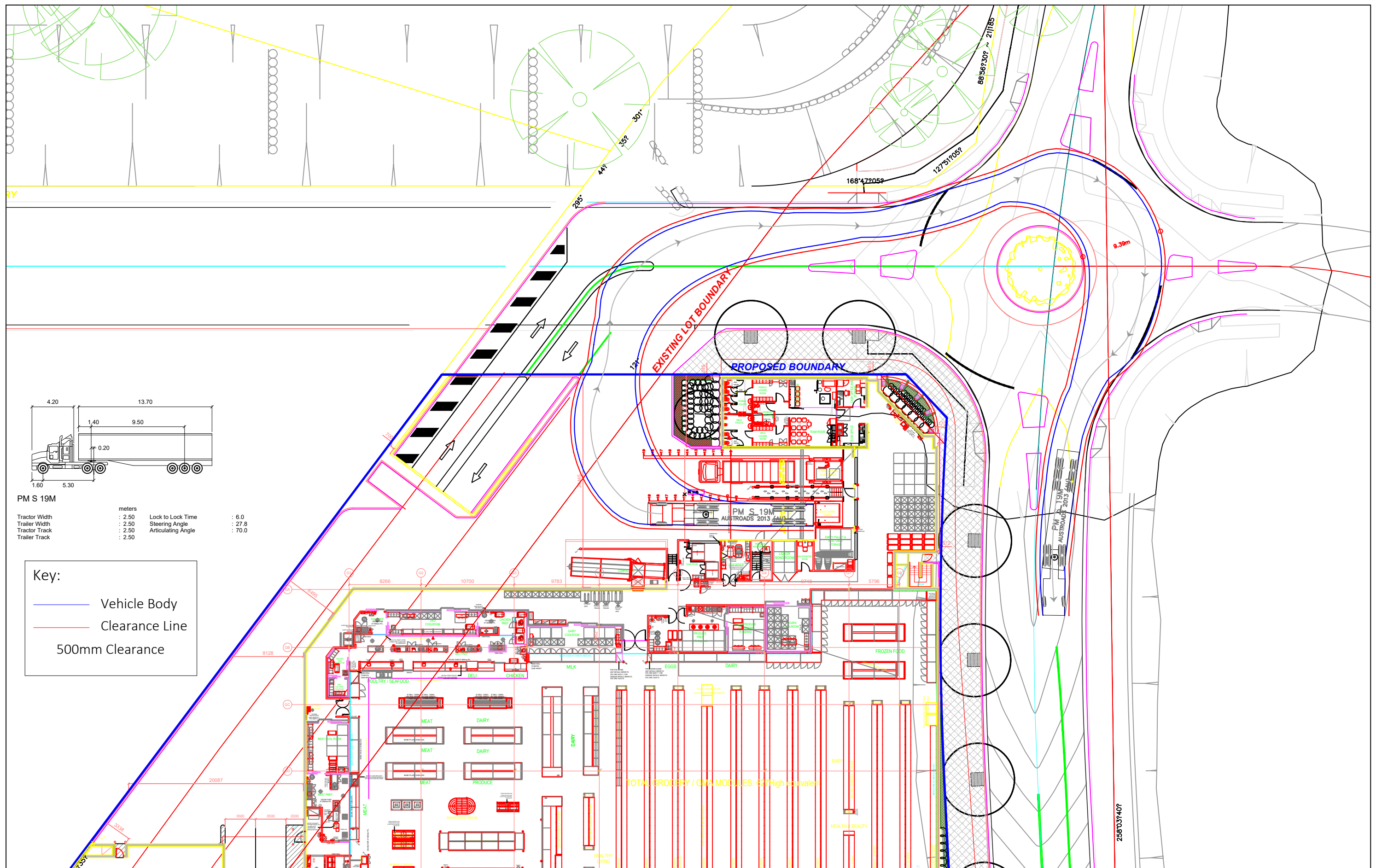


DRAWN: B. LI
CHECKED: M. HOULDEN

0 4 8 12

DRAWING NO: 18S390-CS-03b
SHEET: 01 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT

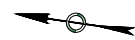


PM S 19M

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance

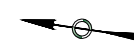
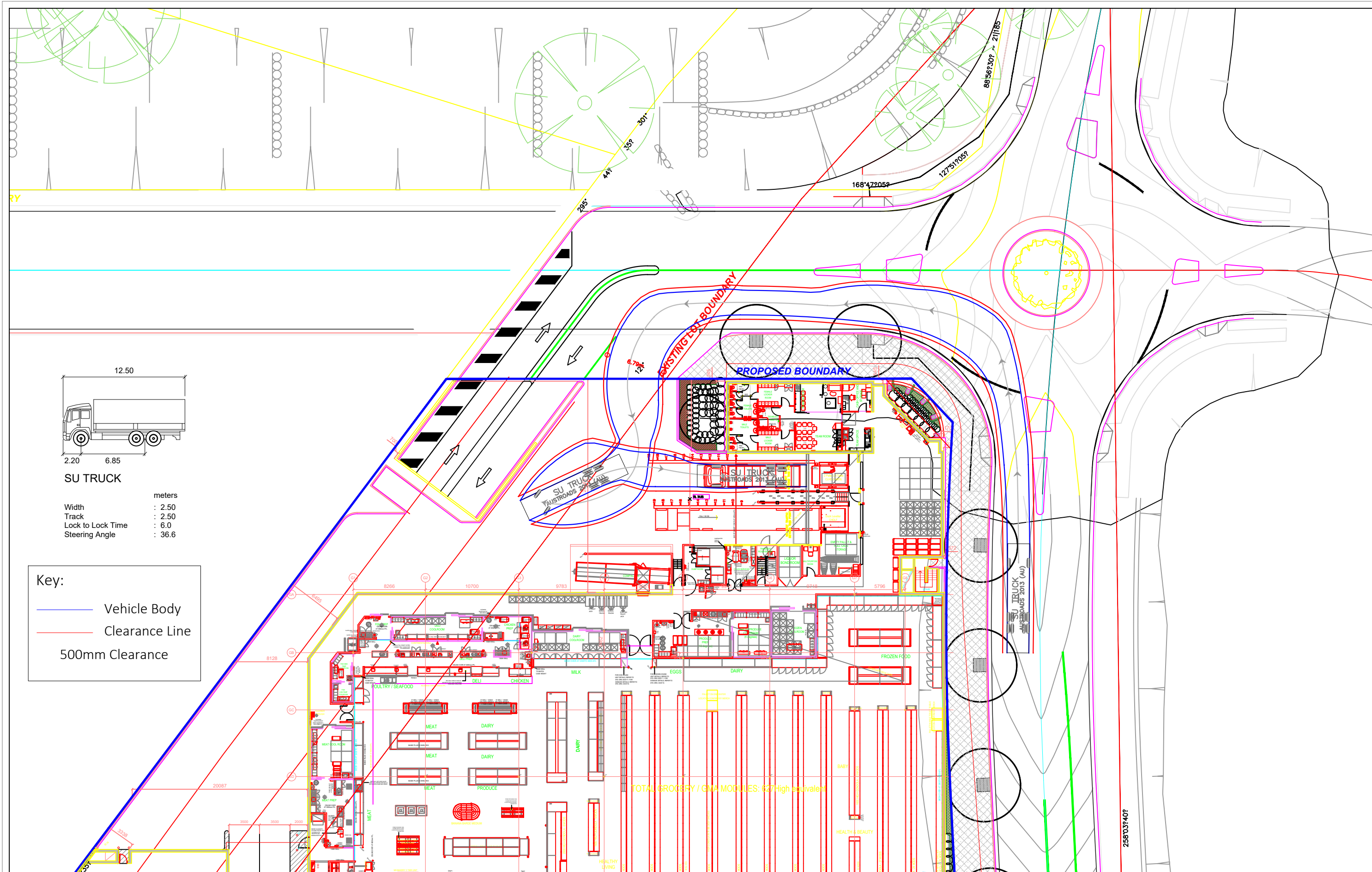


DRAWN: B. LI
CHECKED: M. HOULDEN



DRAWING NO: 18S390-CS-03b
SHEET: 02 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

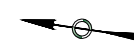
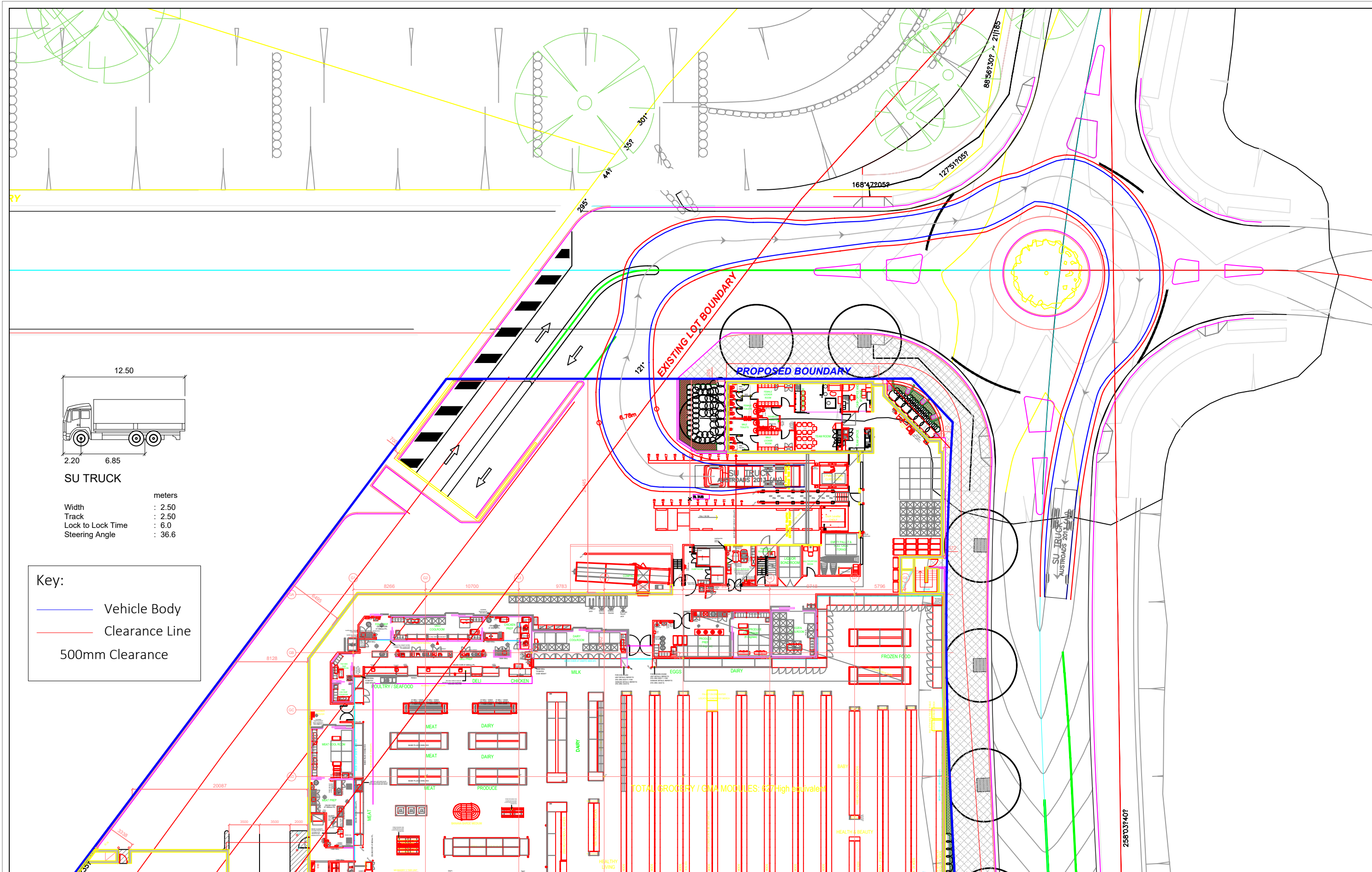
COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT



DRAWN: B. LI
CHECKED: M. HOULDEN

DRAWING NO: 18S390-CS-03b
SHEET: 03 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT

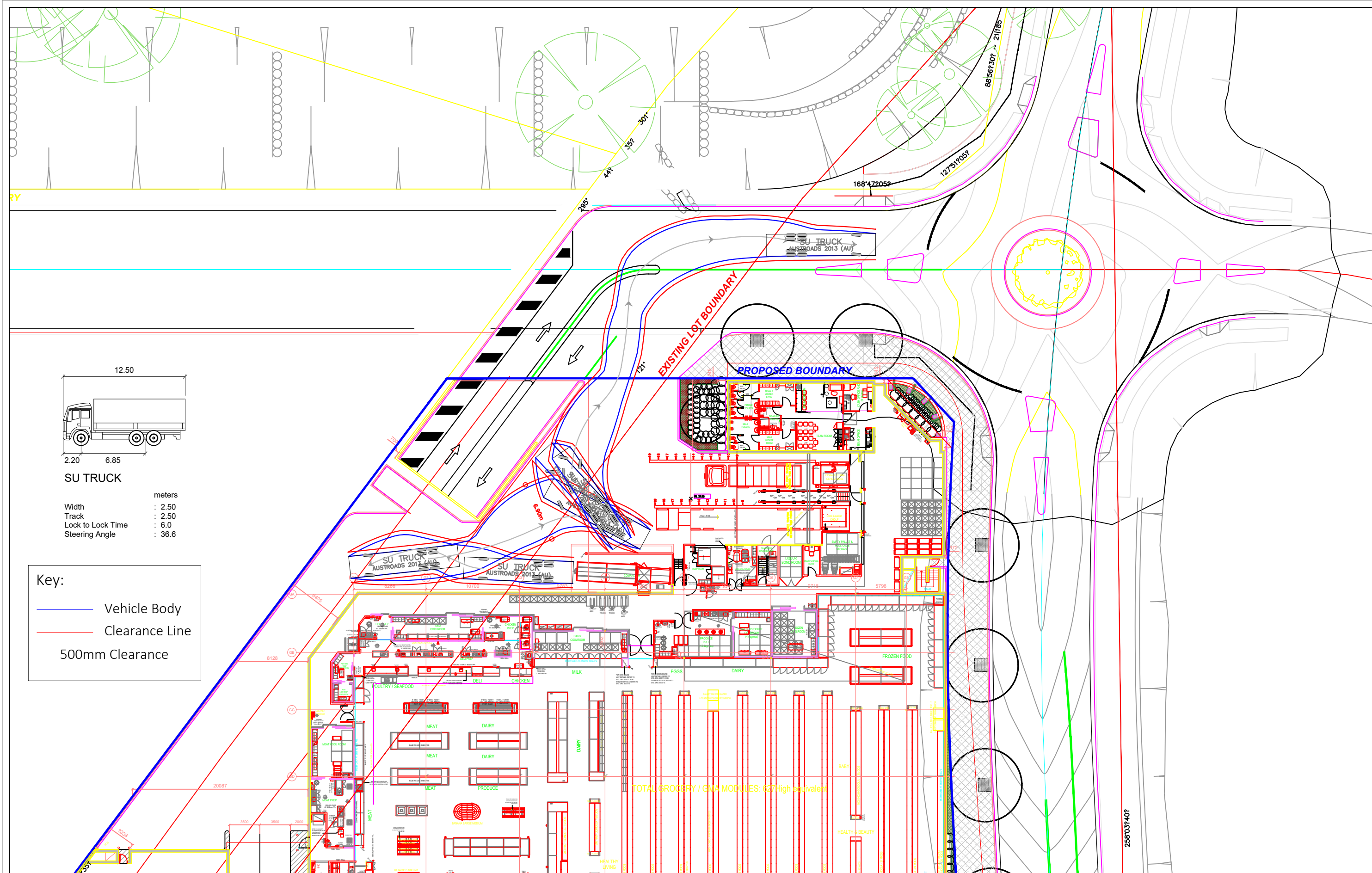


DRAWN: B. LI
CHECKED: M. HOULDEN

0 4 8 12

DRAWING NO: 18S390-CS-03b
SHEET: 04 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

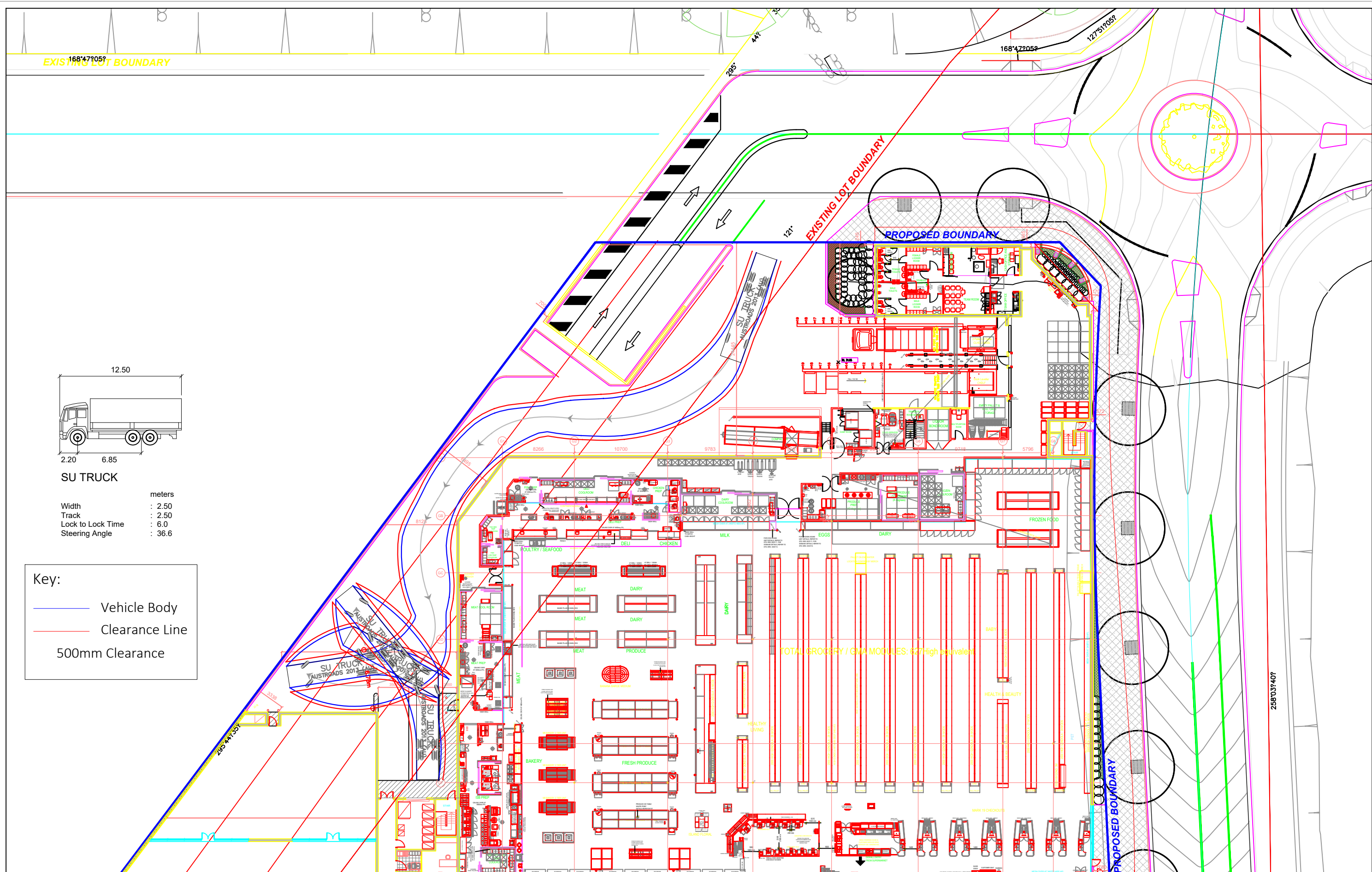
COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT



DRAWN: B. LI
CHECKED: M. HOULDEN
SCALE: 1:400 @ A3

DRAWING NO: 18S390-CS-03b
SHEET: 06 OF 10
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT



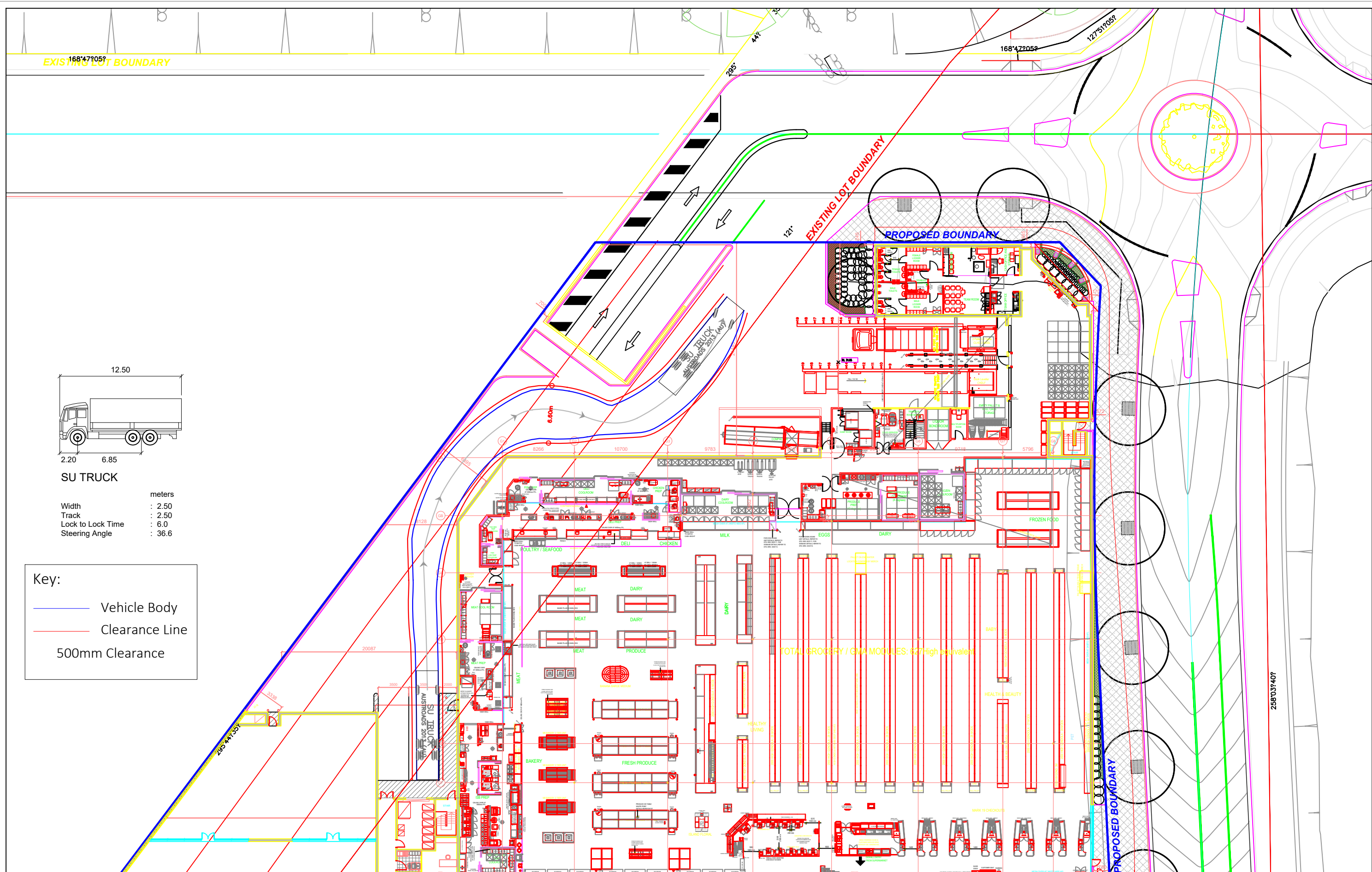
DRAWN:
B. LI

CHECKED:
M. HOULDEN

DRAWING NO:
18S390-CS-03b
SCALE:
1:400 @ A3

SHEET:
07 OF 10
DATE:
19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEPT PATH ASSESSMENT



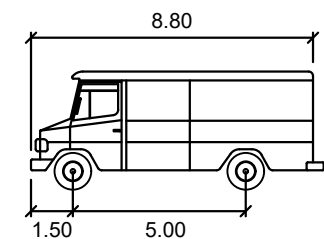
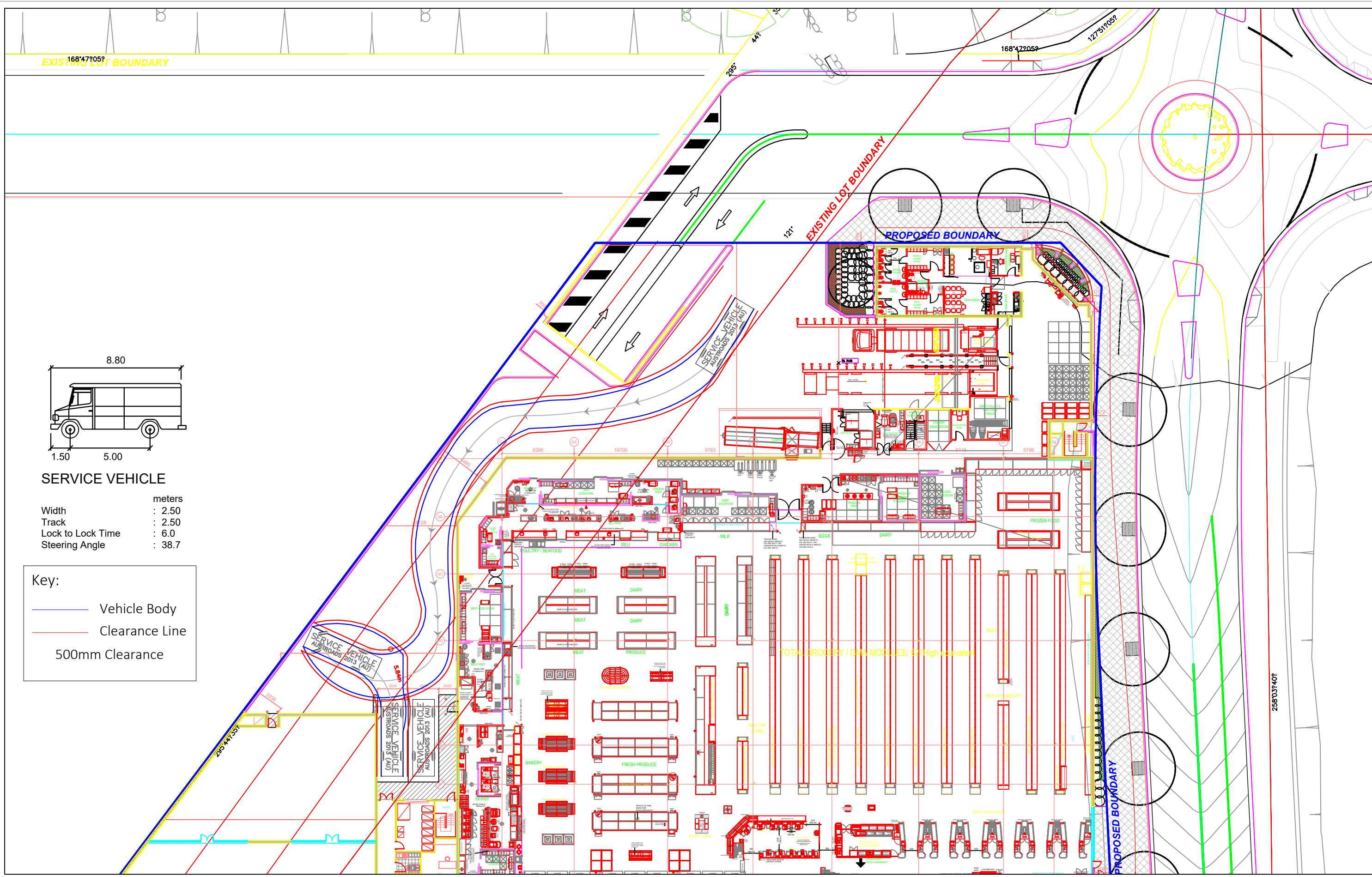
DRAWN:
B. LI

CHECKED:
M. HOULDEN

DRAWING NO:
18S390-CS-03b
SCALE:
1:400 @ A3

SHEET:
07 OF 10
DATE:
19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEPT PATH ASSESSMENT

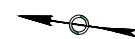


SERVICE VEHICLE

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance

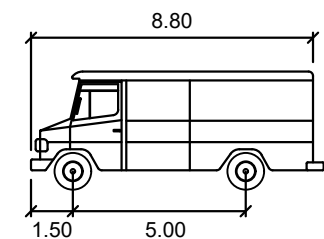
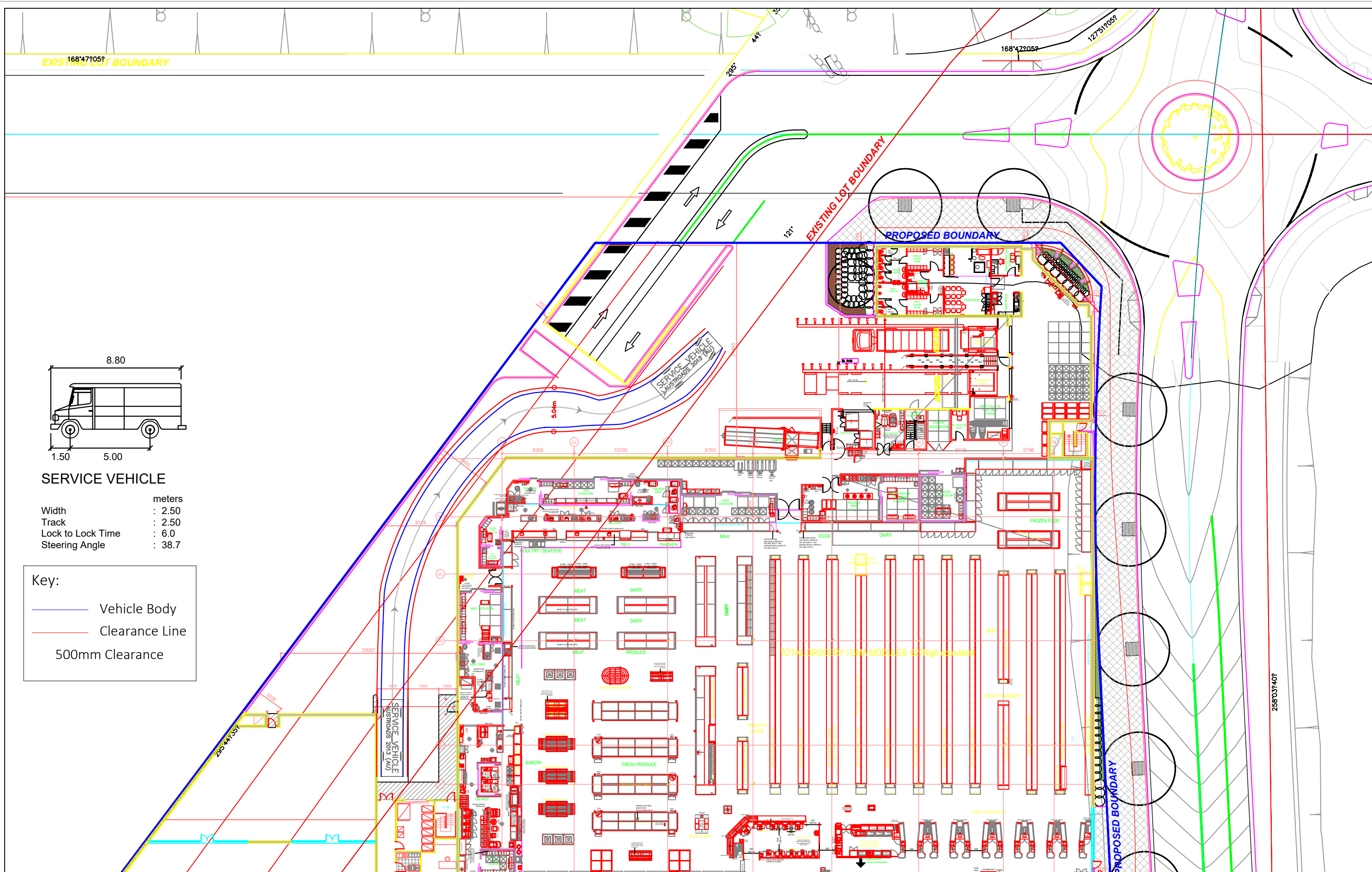


DRAWN:
B. LI

CHECKED:
M. HOULDEN

DRAWING NO: 18S390-CS-03b
SHEET: 09 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT

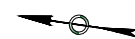


SERVICE VEHICLE

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance



DRAWN: B. LI
CHECKED: M. HOULDEN

0 4 8 12

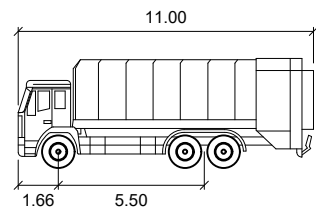
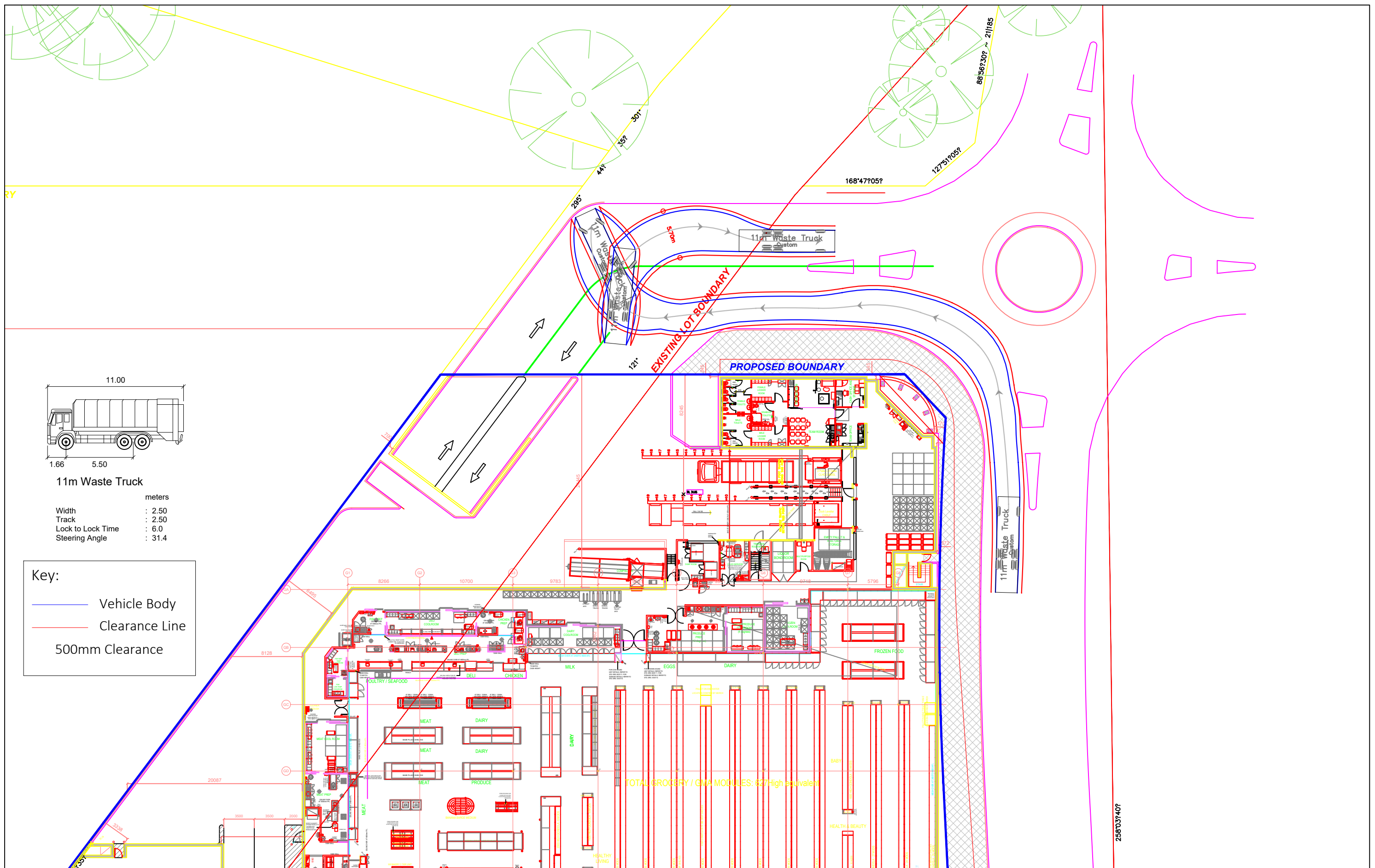
DRAWING NO: 18S390-CS-03b
SHEET: 10 OF 10
SCALE: 1:400 @ A3
DATE: 19.12.2017

COLES SCHOFIELDS
LOADING DOCK - STAGE 1
SWEEP PATH ASSESSMENT



Appendix E

Minerva Road Interim Swept Path Assessment



11m Waste Truck

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 31.4

Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance



DRAWN:	CHECKED:	DRAWING NO:	SHEET:
B. LI	M. HOULDEN	18S390-CS-04	01 OF 01
SCALE:		DATE:	
1:400 @ A3		19.12.2017	

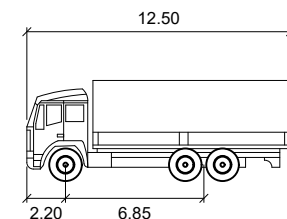
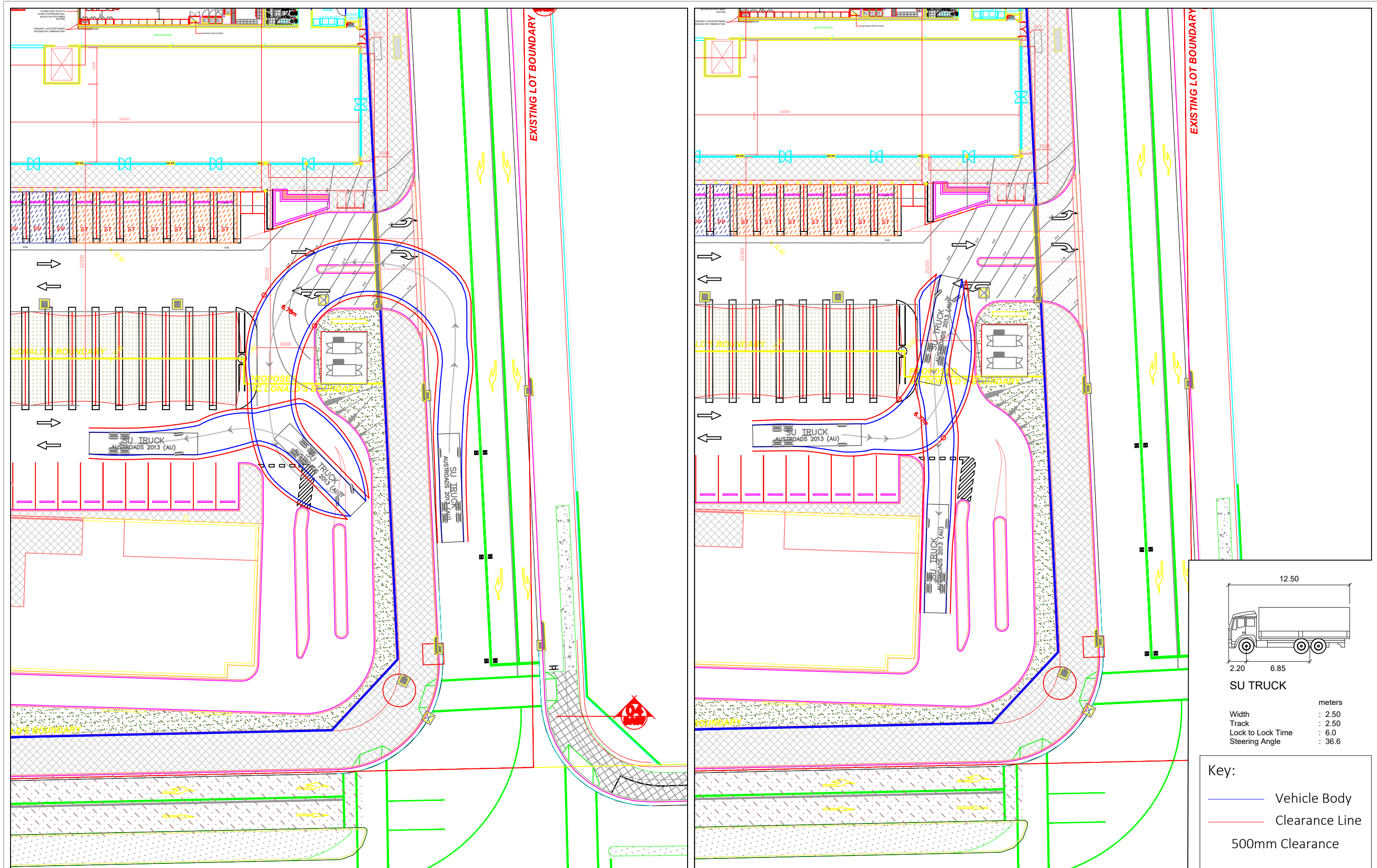
0 4 8 12

COLES SCHOFIELDS
GARBAGE TRUCK 3-POINT TURN
SWEEP PATH ASSESSMENT



Appendix F

McDonalds Loading Dock Swept Path Assessment

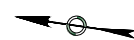


SU TRUCK

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

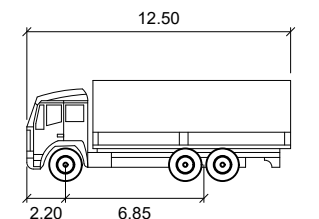
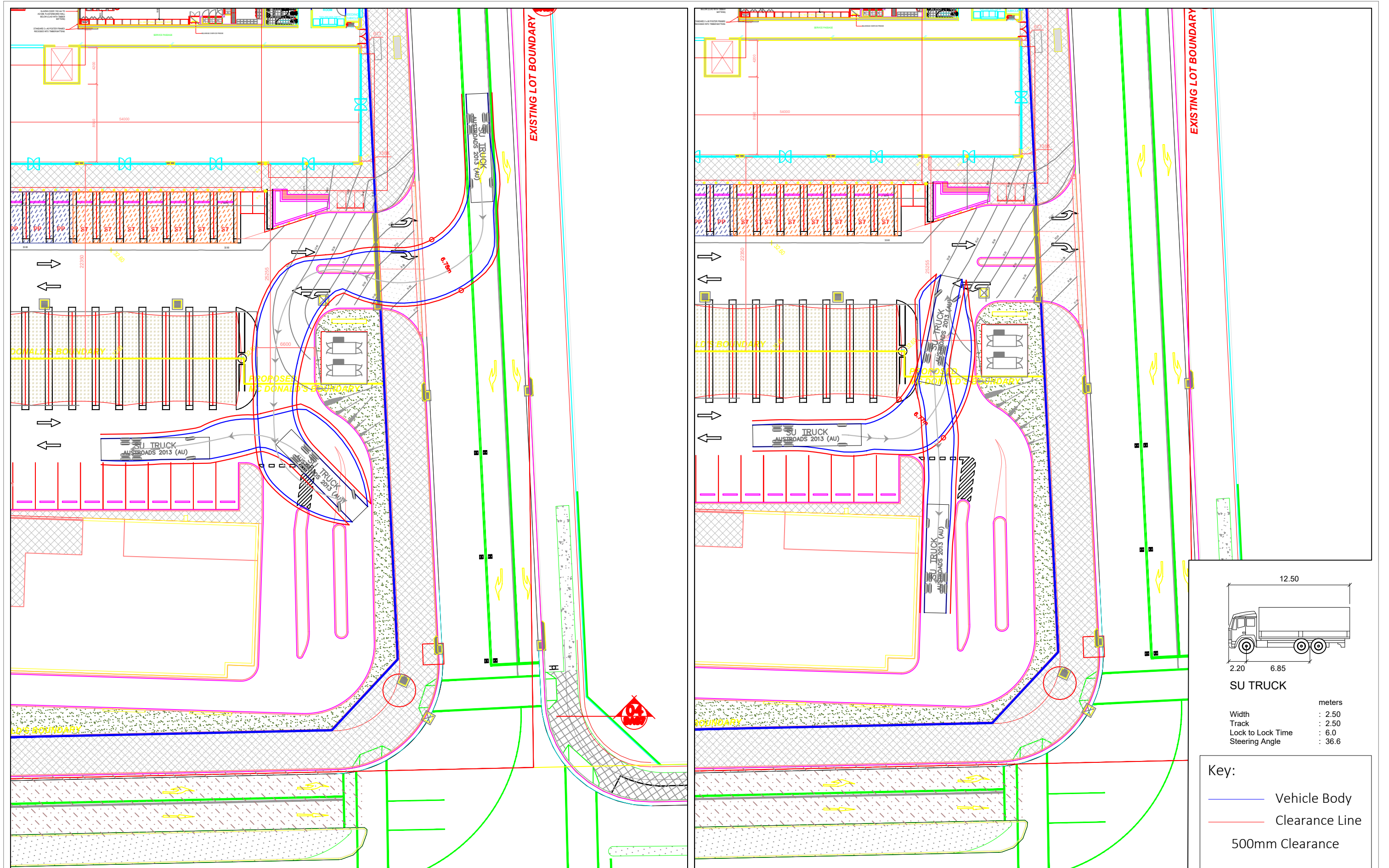
Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance



DRAWN:	CHECKED:	DRAWING NO:	SHEET:
B. LI	M. HOULDEN	18S390-CS-05	01 OF 03
SCALE:		DATE:	
1:400 @ A3		19.12.2017	

COLES SCHOFIELDS
McDONALDS LOADING AREA - STAGE 1
SWEPT PATH ASSESSMENT

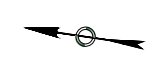


SU TRUCK

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

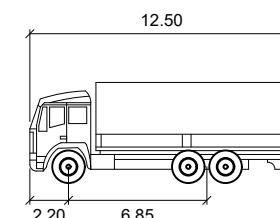
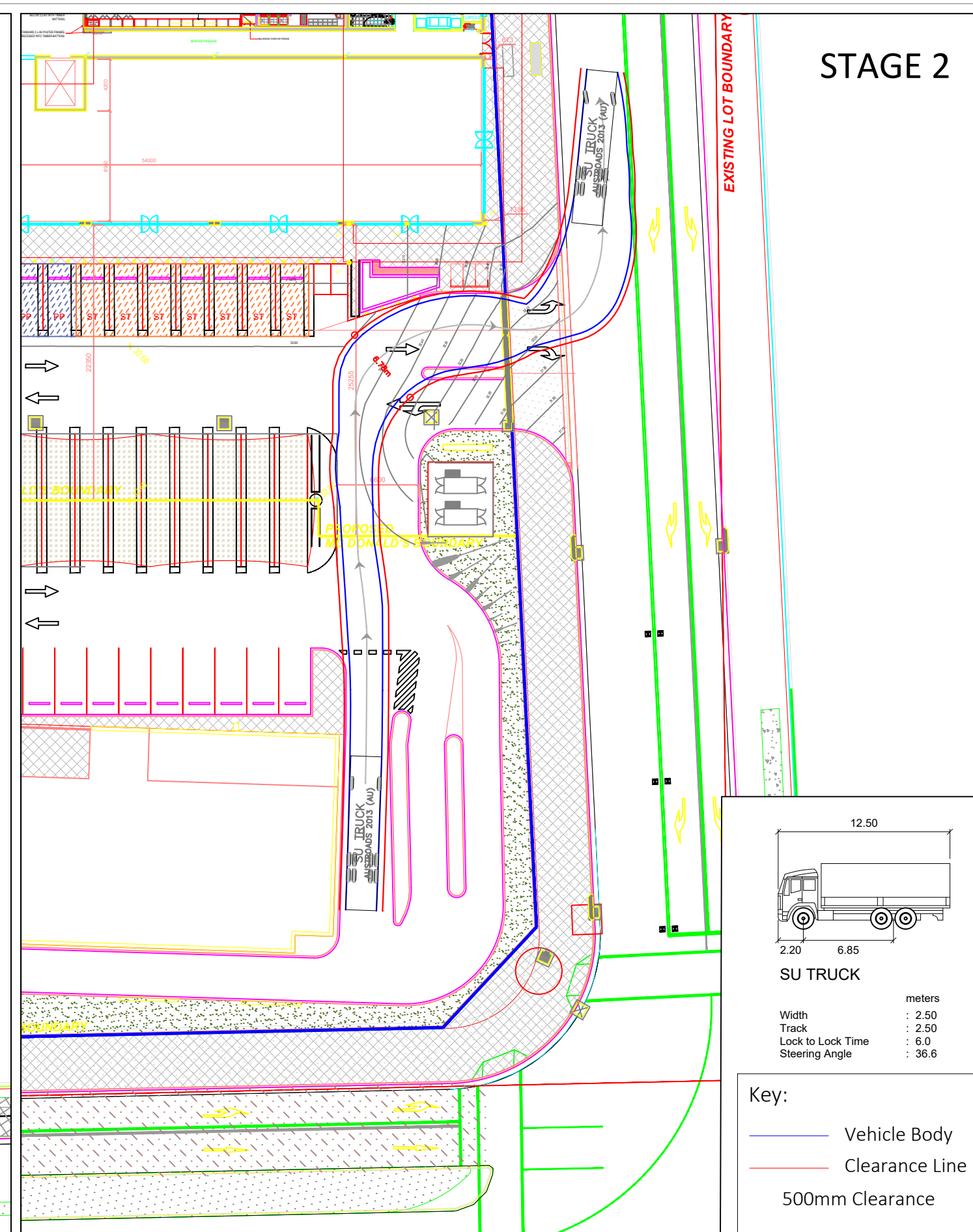
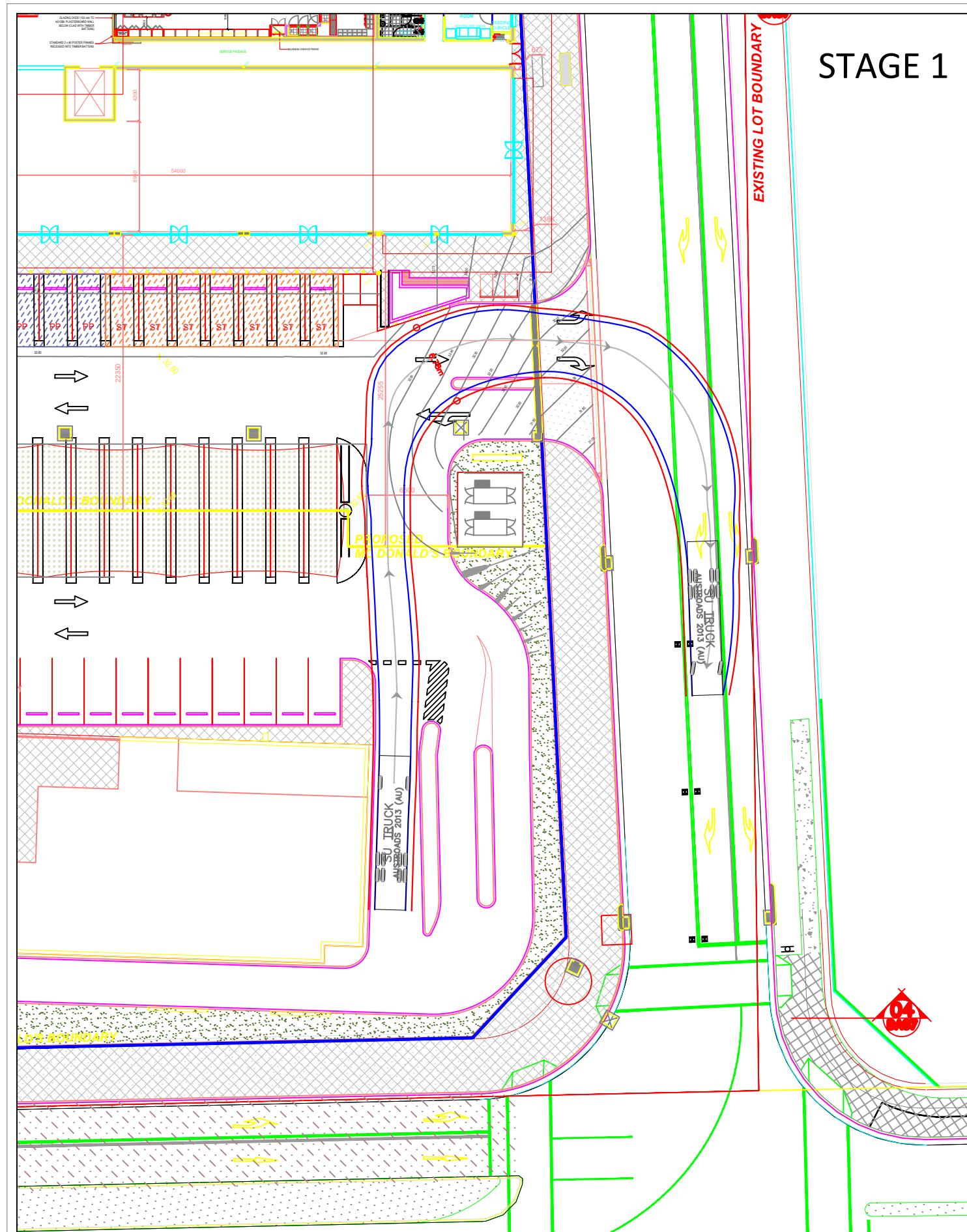
Key:

- Vehicle Body
- Clearance Line
- 500mm Clearance



DRAWN:	CHECKED:	DRAWING NO:	SHEET:
B. LI	M. HOULDEN	18S390-CS-05	02 OF 03
SCALE:		DATE:	
1:400 @ A3		19.12.2017	

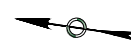
COLES SCHOFIELDS
McDONALDS LOADING AREA STAGE 2
SWEPT PATH ASSESSMENT



SU TRUCK

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

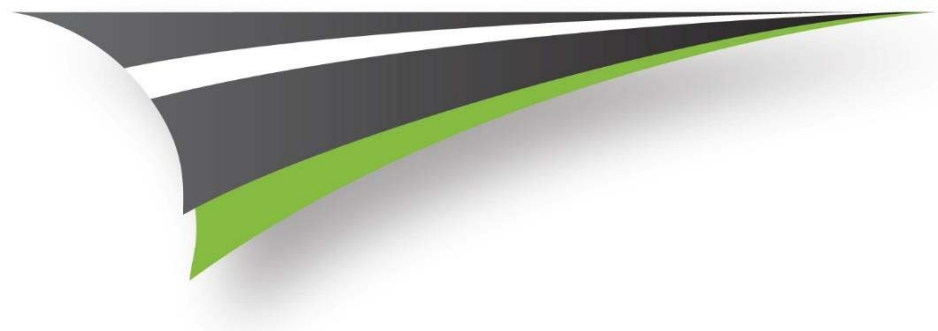
- Key:**
- Vehicle Body
 - Clearance Line
 - 500mm Clearance



DRAWN:	CHECKED:	DRAWING NO:	SHEET:
B. LI	M. HOULDEN	18S390-CS-05	03 OF 03
SCALE:		DATE:	
1:400 @ A3		19.12.2017	

COLES SCHOFIELDS
McDONALDS LOADING AREA
SWEPT PATH ASSESSMENT

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