



Private Hospital East Tower 12 Frederick Street, St Leonards Transport Impact Assessment

Client // Dexus Projects Pty Ltd
Office // NSW
Reference // 16S9001000
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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	31/05/16	Final	Jessica Szeto	Ken Hollyoak	Brett Maynard	Brett Maynard
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1. Introduction

The report relates to the traffic and parking aspects of a proposed private hospital development at 12 Frederick Street, St Leonards. It has been prepared by GTA Consultants on behalf of Dexu Projects Pty Ltd to accompany the development application to the Department of Planning and Environment seeking approval for the proposed development at 12 Frederick Street, St Leonards.

1.1 Secretary's Environmental Assessment Requirements

The Department of Planning and Environment (DoPE) has issued the Secretary's Environmental Assessment Requirements (SEARs) on 29 April 2016 (SSD 7543) for the preparation of a transport and accessibility assessment for the proposed development. The issues raised in the SEARs have been considered during the preparation of this transport assessment report, as shown in Table 1.1.

Table 1.1: Secretary's Environmental Assessment Requirements

Issues	Report Section
The existing and proposed pedestrian and bicycle routes and facilities within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles.	Refer to Section 2 and 5.
An estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips.	Refer to Section 5.
The adequacy of public transport to meet the likely future demand of the proposed development.	Refer to Section 5.
Impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site.	Refer to Section 5.
Measures to promote travel choices that support sustainable travel such as a location-specific sustainable travel plan, provision of end-of trip facilities, green travel plans and wayfinding strategies.	Refer to Section 6. It is expected that any approval of the proposed development will include a consent condition for a green travel plan to promote environmentally sustainable travel methods to and from the site. As such, this report has provided a framework for a future green travel plan to be prepared prior to the occupation of the development.
The daily and peak (AM, PM and events) vehicle movements impact on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvements works (if required).	Refer to Section 5. Based on the anticipated use of the site, special events are not expected to occur.
The proposed walking and cycling access arrangements and connections to public transport services.	Refer to Section 6.
The proposed access arrangements, including car pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks.	Refer to Section 3 and 5.
Proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of relevant parking codes and Australian Standards.	Refer to Section 4 and 6.

Issues	Report Section
Provision of end of trip facilities (i.e. showers, lockers, change rooms etc.) for the use of employees who choose to walk or cycle to/from work as well as undertake activities during work hours.	Refer to Section 6.
Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times).	Refer to Section 3.
Traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport and the cumulative impact of nearby construction projects, including the preparation of draft Construction Traffic Management Plan to demonstrate the proposed management of the impacts.	This is addressed in a separate report <i>North Shore Private Hospital, 12 Frederick Street St Leonards, CTMP - Main Works</i> (GTA Consultants, 31/05/16).

The remainder of the report is set out as follows:

- Chapter 2 discusses the existing road network conditions surrounding the site
- Chapter 3 describes the proposed development
- Chapter 4 assesses the parking demand
- Chapter 5 examines the traffic and transport impacts arising from the proposed development
- Chapter 6 provides a framework for the preparation of a green travel plan, and
- Chapter 7 presents the conclusions of the investigation.

1.2 References

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

- an inspection of the site and its surrounds
- Willoughby City Council Development Control Plan (DCP)
- 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 Standard/ New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- traffic and car parking surveys undertaken as referenced in the context of this report
- plans for the proposed development prepared by Health Projects International Architects and Health Facility Planners
- other documents and data as referenced in this report.

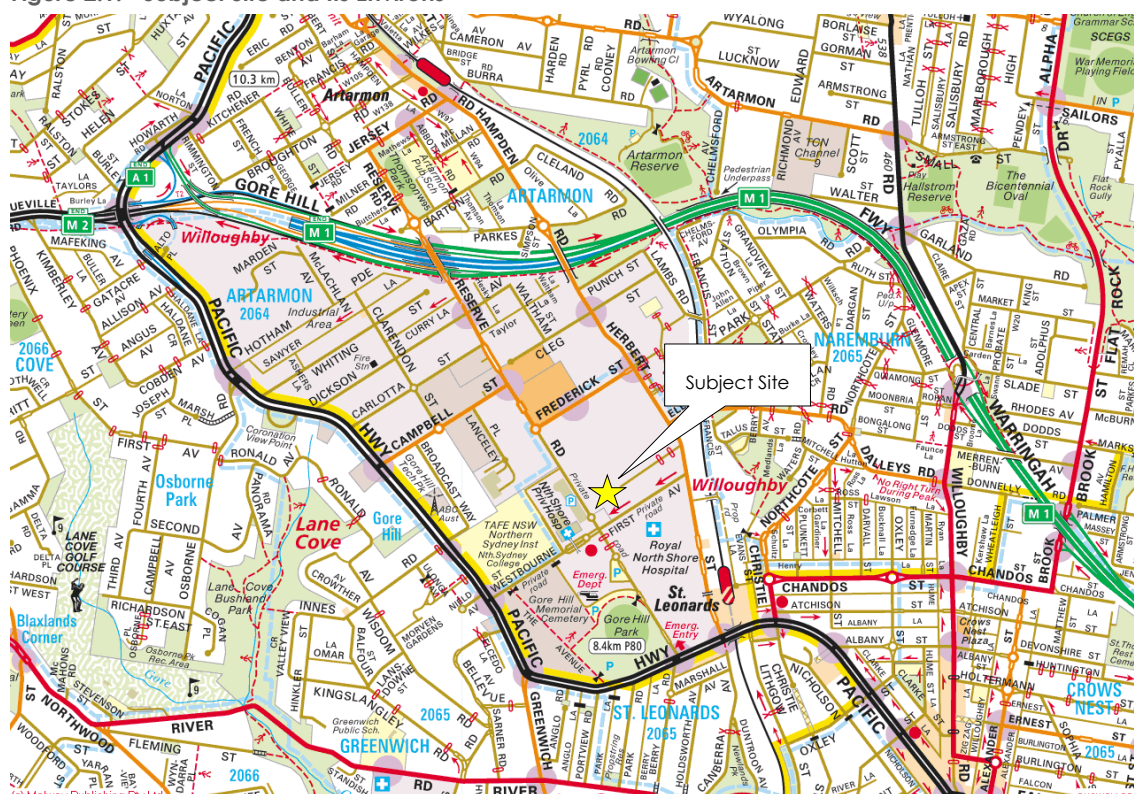
2. Existing Conditions

2.1 Site Description

The subject site is located at 12 Frederick Street, St Leonards, east of the North Shore Private Hospital, and is generally bounded by Frederick Street, Reserve Road and Westbourne Street along the northern, western and southern boundary respectively.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and Its Environs



(Reproduced with permission from Sydway Publishing Pty Ltd)

The subject site is currently occupied by a commercial/industrial building with a combined floor area of approximately 15,000m².

Land uses in the vicinity of the subject site are predominately health infrastructure facilities, notably the Royal North Shore Hospital and North Shore Private Hospital to the south and west of the site respectively. Other land uses in the vicinity generally consist of general and light industrial uses.

2.2 Road Network

The subject site is surrounded by a network of roads and has a frontage along Reserve Road, Westbourne Street and Frederick Street to the western, southern and northern boundary, respectively. Below is a description of these roads.

Reserve Road

Reserve Road functions as a two-way collector road between Frederick Street and Jersey Road and is generally aligned in a north-south direction. It is a private road between Frederick Street and Pacific Highway with a posted speed limit of 20 km/h, providing the linkage from Pacific Highway to the Royal North Shore Hospital

No through traffic is permitted to travel via Reserve Road past the roundabout near Westbourne Street. A "restricted staff" parking area relating to the North Shore Hospital is provided past this point. It is noted that southbound vehicles are also not permitted to continue past the restricted staff parking area from the northern end of Reserve Road, as shown in Figure 2.3.

Figure 2.2: Reserve Road / Westbourne Street roundabout (looking north)



Figure 2.3: Reserve Road (looking south)



Westbourne Street

Westbourne Street functions as a two-way private road and is generally aligned in an east-west direction. 90 degree parking is made available on the north side of the road, accommodating for up to approximately 75 spaces. This road provides linkage between Herbert Street and Reserve Road with a pedestrian crossing provided on both ends of Westbourne Street.

Figure 2.4: Westbourne Street (looking west)



Frederick Street

Frederick Street functions as a two-way collector road and aligns in an east-west direction to the northern boundary of the site. Kerbside parking is permitted on both sides of the road and is generally well-utilised based on site observations. Vehicle access to the subject site is provided directly off Frederick Street via the existing driveway, as shown in Figure 2.6.

Figure 2.5: 12 Frederick Street (subject site)



Figure 2.6: Frederick Street (looking towards the internal access road)



2.2.1 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Campbell Street / Pacific Highway (signalised)
- Herbert Street / Cleg Street (signalised)
- Herbert Street / Frederick Street (signalised)
- Herbert Street / Pacific Highway (signalised)
- Herbert Street / Westbourne Street (unsignalised)
- Reserve Road / Campbell Street (signalised)
- Reserve Road / Frederick Street (unsignalised)

2.3 Traffic Volumes

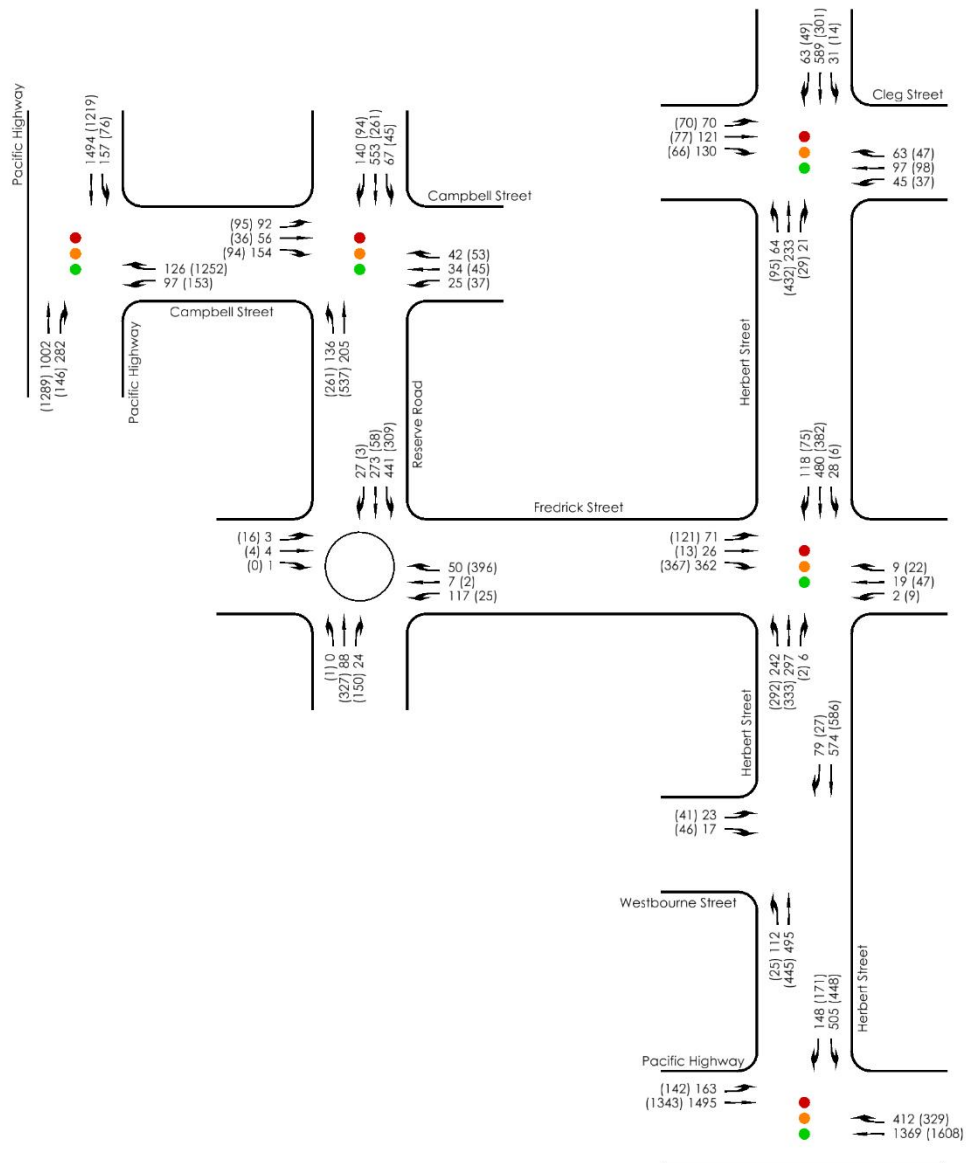
GTA Consultants commissioned traffic movement counts on abovementioned seven (7) intersections on a normal weekday during the following peak periods:

- 7:00am and 9:00am (morning peak)
- 4:00pm and 6:00pm (evening peak)

The AM and PM peak hour traffic volumes are summarised in Figure 2.7.

Figure 2.7: Existing AM / PM Peak Hour Traffic Volumes

10(10) = AM(PM)



2.4 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION¹, a computer based modelling package which calculates intersection performance.

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

Table 2.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

¹ Program used under license from Akcelik & Associates Pty Ltd.

Table 2.1: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

In terms of the intersection analysis results reported, the following typical approach is adopted for the purposes of documenting intersection performance:

- **Signalised Intersections** – The overall intersection performance is recorded
- **Unsignalised intersections** – The worst leg of the intersection is recorded

2.4.1 Pre-Development Analysis

An intersection analysis of the nominated study intersections has been conducted for the existing conditions. Table 2.2 presents a summary of the existing operation of the intersection, with full results presented in Appendix A of this report.

Table 2.2: Existing Operating Conditions

Intersection	Priority Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St / Pacific Hwy	Signalised	AM	0.87	20	166	B
		PM	0.59	16	103	B
Herbert St / Cleg St	Signalised	AM	0.90	15	74	B
		PM	0.50	11	33	A
Herbert St / Frederick St	Signalised	AM	0.90	28	136	B
		PM	0.87	24	109	B
Herbert St / Pacific Hwy	Signalised	AM	0.76	28	198	B
		PM	0.74	27	182	B
Herbert St / Westbourne St	Roundabout	AM	0.69	32	79	C
		PM	0.62	31	53	C
Reserve Rd / Campbell St	Signalised	AM	0.90	25	163	B
		PM	0.74	22	78	B
Reserve Rd / Frederick St	Roundabout	AM	0.51	11	31	A
		PM	0.53	16	34	B

On the basis of the above assessment, the nominated study intersections currently operate satisfactory at a Level of Service of C or better.

2.5 Car Parking

Ticketed on-street parking is provided along Westbourne Road and Herbert Street, typically restricted to 2 to 4 hour duration parking. Unrestricted parking is provided along Frederick Street accommodating for up to approximately 45 vehicles along both sides of the street between

Herbert Street and Reserve Road. Based on site observations, parking demand in the vicinity was observed to be generally moderate to high with a relatively low turnover rate.

Further, it is noted that there are numerous off-street public car parks made available in the vicinity, notably the multi-storey Royal North Shore Hospital Car Park operated by Wilson Parking.

Overall, parking in the vicinity of the subject site is generally restricted to short-term parking, with parking observed to be in high demand. It is noted that there are limited long-term on-street parking made available in the area.

2.6 Public Transport

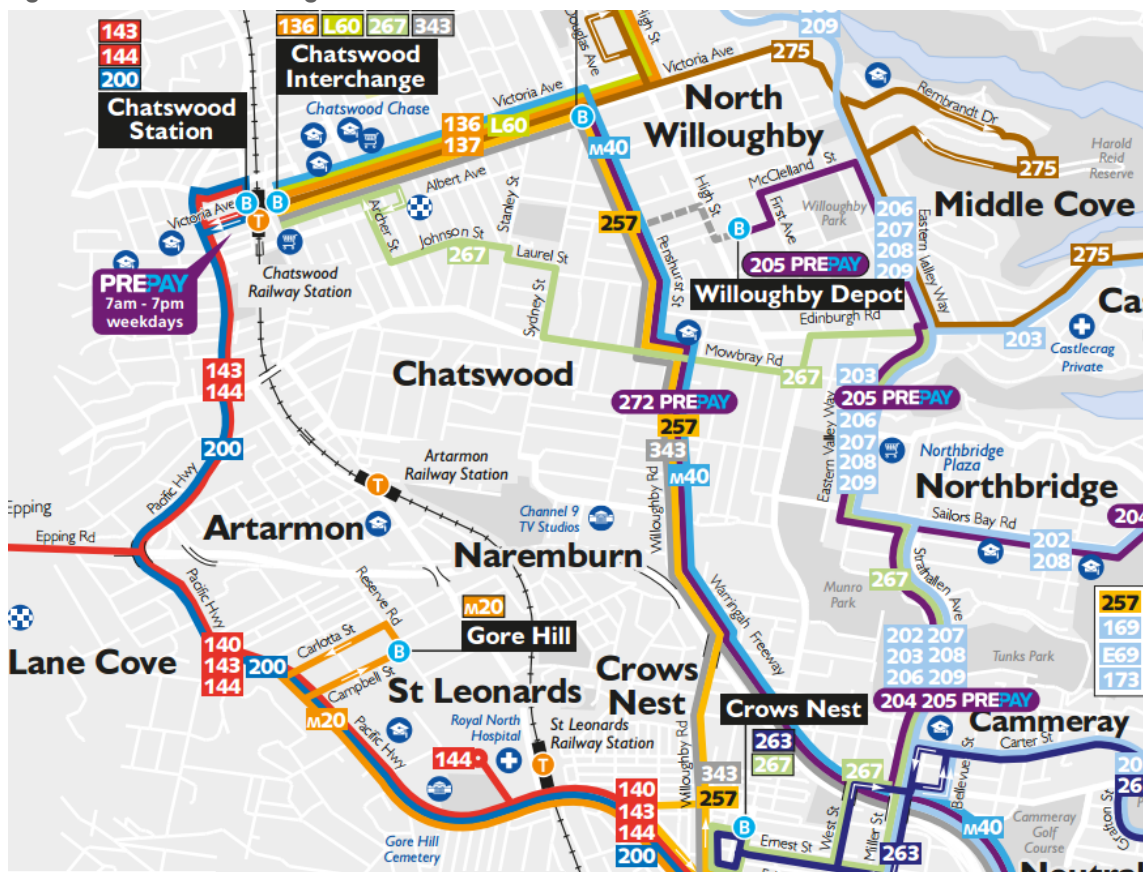
The subject site is well serviced by high frequency public transport services, being located well within the typical 800m catchment radius of a Railway Station, that being 500m from the St Leonards Railway Station.

The St Leonards Railway Station is serviced by the T1 Line, providing linkage to Richmond / Emu Plains / Epping and Chatswood / Hornsby / Berowra areas. These train services generally operate at a frequency of about 3 minutes during peak times and 5-10 minutes out of peak times.

Further to this, numerous bus services operate within the vicinity of the subject site, including the metrobus M20 which operates every 10 minutes during the peak periods and every 15-20 minutes out of peak.

A review of the public transport available in the vicinity of the site is summarised in Figure 2.8.

Figure 2.8: State Transit Region Guide



Source: State Transit, Sydney Buses – Region Guide Northern Beaches & Lower North Shore

Notwithstanding this, the Hillsbus also operates four routes via St Leonards, providing linkage to Rouse Hill, Riley T-way, Dural and West Pennant Hills.

Overall, high frequency public transport services are provided in the vicinity of the subject site. Additionally, Council operates a free shuttle bus within the Artarmon area, providing linkage through St Leonards Station to the Artarmon industrial area. This service encourages the use of public transport for staff and visitors to the area, notably for Hospital staff.

2.7 Pedestrian and Cycle Infrastructure

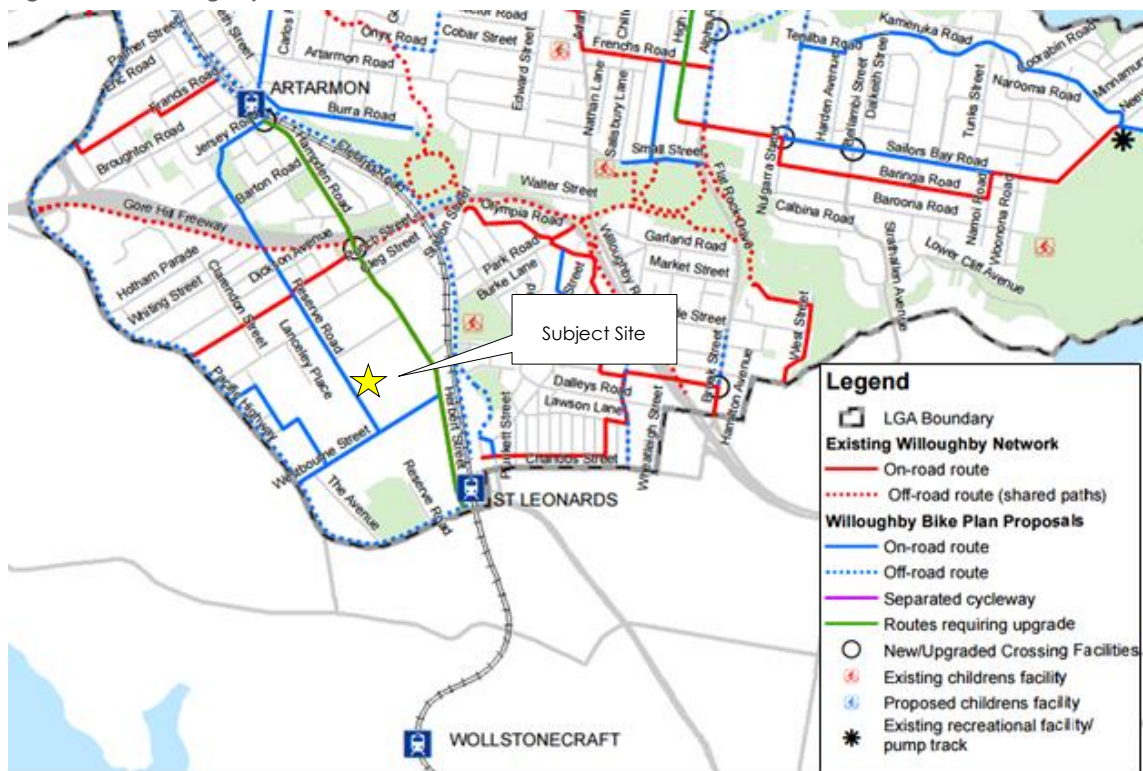
In the immediate vicinity of the site, pedestrian paths are located as follows:

- Frederick Street (both sides) – 1.5-3.5m wide path, providing access to the retail and commercial uses in the vicinity of the site
- Westbourne Street (both sides) – 1.5-3.0m wide path, providing linkage to the Royal North Shore and North Shore Private Hospitals and to the TAFE NSW St Leonards Campus
- Reserve Road (both sides) – 1.5-2.0m wide path, predominately providing access to the Royal North Shore Hospital and other local points of interest including bus stops.

In addition, it is noted that there are several pedestrian crossings currently installed along Westbourne Street, near the intersection with Reserve Road, providing pedestrians with right of way at these locations.

Further, there are currently limited cycle routes made available in the vicinity of the site. However, as part of Willoughby City Council's Bike Plan, several new cycle routes are proposed to be implemented in the near future. An extract of Council's proposed bike network is shown in Figure 2.9.

Figure 2.9: Willoughby Bike Plan



Source: Willoughby City Council –Proposed Bike Network 2012 (extract)

3. Development Proposal

3.1 Proposal Description

The development seeks to construct a private hospital on land located on 12 Frederick Street, St Leonards, near the southern boundary to accommodate the following:

- 128 inpatient beds
- 3 Endoscopy Operating theatres
- Bridge link to the existing North Shore Private Hospital
- Minor ground floor ancillary retail facilities
- Future specialist medical consulting suites (warm shell)
- Future supporting Radiology/ Diagnostic Image centre or commercial tenancies (cold shell).

It is anticipated that the development would consist of 166 staff members, comprising the following:

- 20 medical practitioners
- 146 other employees, including nurses, administration staff and maintenance workers.

Furthermore, three basement levels of car parking are proposed to provide a total of 220 car parking spaces, with the following car parking breakdown:

- 211 standard parking spaces
- 9 accessible parking spaces.

3.2 Vehicle Access

Currently, vehicle access to the site is provided off the internal private access road via the existing driveway at Frederick Street. As part of the proposal, three new vehicular crossovers are proposed, two on Westbourne Street and one on Reserve Road.

A new single 7.6m wide two-way vehicular crossover is proposed off Westbourne Street, near the south-east corner of the site, providing vehicular access to the basement car parks. It is noted that all service vehicles would access the site to the loading dock area via this vehicular crossover from Westbourne Street.

In addition, a drop-off area is proposed to be implemented adjacent to the main entry near the southern boundary along Westbourne Street. Vehicle access to the drop-off area is proposed via a new 9.0m wide vehicular crossover on Westbourne Street at the south-west corner.

Furthermore, four dedicated ambulance vehicle bays are proposed within the site, with access proposed off Reserve Street via a new 6.0m wide two-way vehicular crossover.

3.3 Loading Areas

There are three loading bays currently proposed within the site, each accommodating vehicles up to and including 12.5m long Heavy Rigid Vehicles (HRV). Additionally, it is anticipated that waste collection activities would be undertaken on-site within the dedicated loading bays.

The loading bay had been designed to cater for a 12.5m HRV to reverse into and exit in a forward direction. The swept path assessment of a 12.5m HRV accessing and exiting the site in a forward direction is enclosed in Appendix B.

Based on the swept path assessment, it is noted that one of the loading bays (positioned closest to the driveway access) will require a 12.5m HRV to exit in a skewed manner to avoid the columns along its frontage (i.e. to veer left before exiting right into the driveway access). On that basis, it is therefore recommended to relocate the two columns within the loading dock to improve service vehicle accessibility, notably for egress vehicle movements (refer to Appendix B).

In addition, the swept path assessments conducted for such 12.5m HRVs indicate that such vehicles would need to manoeuvre in close proximity to the boom gates on Lower Ground 02 Level to access the loading dock appropriately. Thus, any queues greater than one standard vehicle (i.e. a 95th percentile vehicle) at the boom gate access on the Lower Ground 02 Floor would likely impede on service vehicle movements by restricting the available space for manoeuvrability purposes. It is noted that further resolution of the car park access control point and interaction with both the car park and loading dock will be undertaken during detailed design. Notwithstanding this, a loading dock management plan (including an appropriate system to alert drivers) is recommended to mitigate any potential safety issues at this location.

4. Car Parking

4.1 Car Parking Requirements

The car parking provision requirements for different development types are set out in the Willoughby City Council DCP. A review of the car parking requirement rates for the proposed development is summarised in Table 4.1.

Table 4.1: DCP Parking Requirements

Use	Type	Size	DCP Parking Rate	DCP Parking Requirement
Hospital	Staff Parking	128 hospital beds 20 medical officers 146 other employees	1 space per registered practitioner, plus 1 space per 2 other employees.	93 spaces
	Visitor Parking		1 space per 3 beds for visitors.	42 spaces
Future medical suites	Staff Parking	23 rooms/ health care professionals 6 support staff	1 space per health care professional, plus 1 space per 2 other employees.	26 spaces
	Patient Parking	23 rooms/ health care professional	1 space per health care professional.	23 spaces
Future Commercial/ Office space	-	772m² of office space	1 space per 110m ² *	7 spaces
Retail	-	192m² of retail space	1 space per 25m ²	7 spaces
Total				198 spaces

* The proposed development is located within a railway precinct, as defined in C4.1E of the Willoughby Council DCP.

On the above basis, a total of 198 car parking spaces need to be provided for the proposed development. This includes provision for future supporting facilities within the development in line with the relevant DCP rates, although noting that these facilities would support the hospital function and associated consultations, and are likely to have a lower parking demand than stand-alone similar facilities.

The development provides 220 car parking spaces, which is a surplus of 22 parking spaces when considering the DCP parking requirements.

In addition to the above requirements, it is noted that approximately 24 on-street car parking spaces would need to be removed to accommodate the new vehicular crossovers at Westbourne Street and Reserve Road. The surplus of car parking spaces is expected to accommodate the loss of on-street parking associated with the proposal.

Thus, the proposed car parking provision is considered to be appropriate for its size and anticipated use.

4.2 Car Parking Layout Review

The car park layout has been reviewed against the requirements of the Willoughby City Council's 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
- height clearances
- internal queuing
- pick-up / set-down area
- parking for persons with disabilities.

This review indicates that the proposed car parking layout is expected to operate satisfactorily.

The 220 car parking spaces are proposed to be located in the basement car park levels, which would be accessed directly off Westbourne Street via two new driveways in the south-east corner of the site.

The 220 car parking spaces comprise 211 standard parking spaces and 9 accessible parking spaces.

The 211 parking spaces are proposed as 90 degree Class 3 parking facilities with dimensions of 2.6m wide by 5.4m long spaces, with a minimum aisle width of 5.8m, in accordance with AS2890.1:2004.

The 9 accessible parking spaces have been designed with dimensions of 2.4m wide by 5.4m long spaces, with an associated shared space with the same dimensions, as set out in AS2890.6:2009.

Clearance heights within the car park basement level exceed 2.2m and are a minimum of 2.5m above the disabled parking spaces and 4.5m within the loading dock area.

The car park and associated elements are capable of complying with the design requirements set out in the Australian Standards, namely AS2890.1:2004, AS2890.2:2004 and AS2890.6:2009. It is noted that further resolution of the LG2 car park access control point and associated vehicle manoeuvring during detailed design, due to coordination with structure. However, it is anticipated that an appropriate solution can be developed.

5. Traffic Impact Assessment

5.1 Traffic Generation

Traffic generation estimates for the proposed development have been sourced from the *Guide to Traffic Generating Developments* (RMS, 2002).

The following design trip rates have been used to calculate the anticipated traffic generation of the subject development (i.e. for a private hospital).

- Morning Peak

$$-10.21 + 0.47 \times \text{No. of Beds} + 0.06 \times \text{No. of Day Staff}$$

- Evening Peak

$$-2.84 + 0.25 \times \text{No. of Beds} + 0.40 \times \text{No. of Day Staff}$$

As noted earlier, the development accommodates the following:

- 128 hospital beds and
- 166 staff members.

It is anticipated that there would be an average of 127 staff in place per day shift (i.e. morning and evening) and 19 staff across the overnight shift.

On the above basis, the traffic generation of the development have been summarised in Table 5.1. Ancillary and/or future uses have not been considered in the traffic generation estimates, but would have a negligible impact on peak period traffic volumes.

Table 5.1: Traffic Generation Estimates

Use	Size	Morning Peak	Evening Peak
Private Hospital	128 hospital beds 127 day staff members	58 vehicle trips	80 vehicle trips

Based on the indicative trip generation estimates associated with the proposed development, the site would generate an additional 58 and 80 vehicle movements in the morning and evening peak respectively, which equates to approximately 1 vehicle every minute.

Daily traffic would typically be approximately 7-10 times the peak hour traffic, which results in a daily traffic generation of approximately 600 vehicles.

5.2 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:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- configuration of access points to the site.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

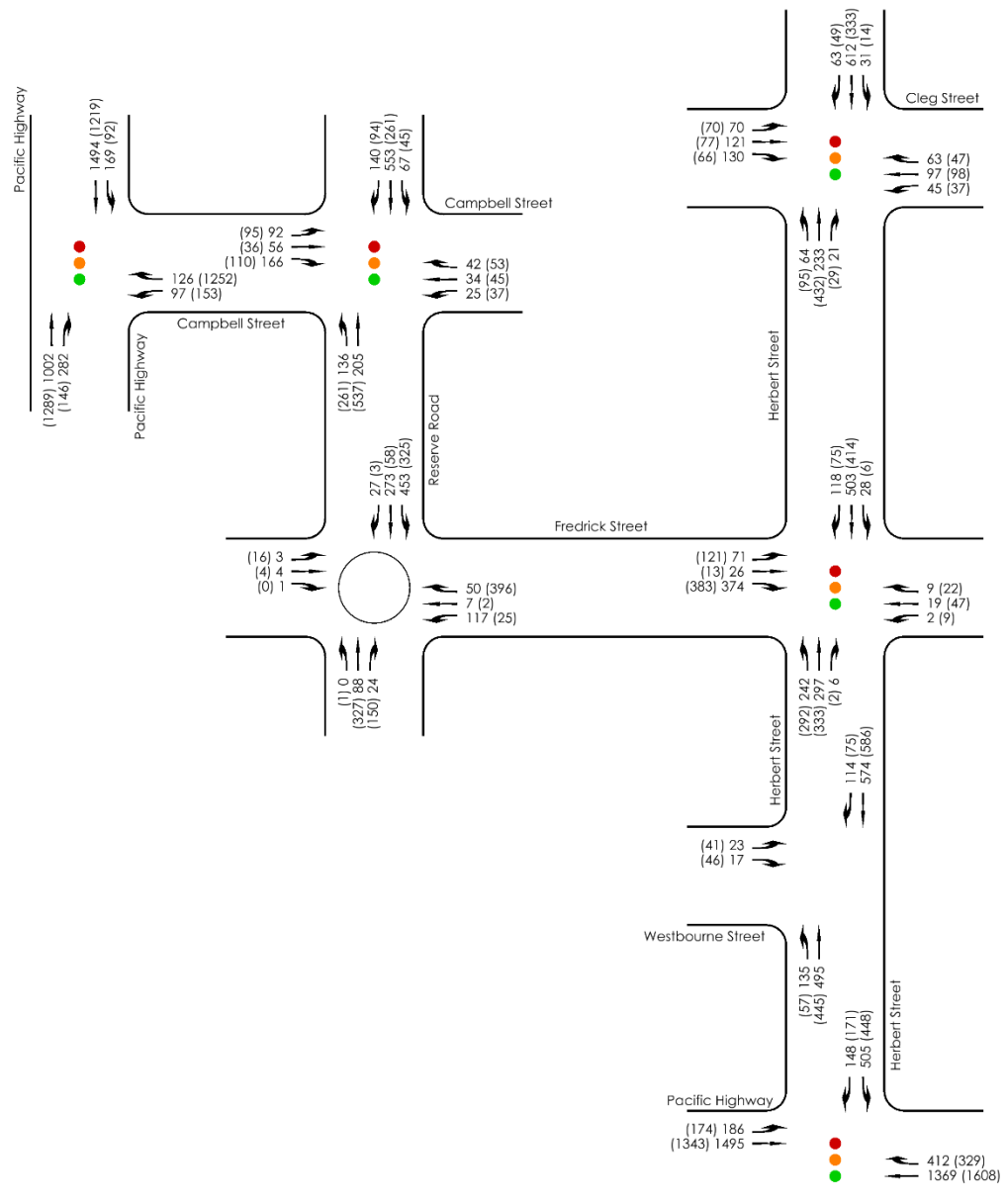
- Pacific Highway 40%
- Herbert Street 40%
- Campbell Street 20%

Further, it has been assumed that all traffic movements associated with the site are inbound vehicle movements both in the morning and evening network peak times. The additional development traffic for each intersection results in a maximum of 32 additional vehicles an hour (or 1 vehicle every 2 minutes) on any intersection movement.

Notwithstanding the above, it is noted that a small portion of vehicles may potentially travel via Westbourne Street from Pacific Highway (i.e. impacting upon the Westbourne Street/ Reserve Road intersection). However, this route is not expected to generate high usage due to the "Left Turn Only" restrictions at the Westbourne Street/ Reserve Road intersection for eastbound vehicles, as well as the general Westbourne Street layout and signage. Thus, any traffic associated with the development travelling via the Westbourne Street/ Reserve Road intersection would be low, with negligible impacts and could not be expected to result in any operational or safety issues at this intersection, given the low to moderate existing traffic volumes.

The surrounding local road network following the full development of the site is shown in Figure 5.1.

Figure 5.1: Post Development AM / PM Peak Hour Site Generated Traffic Volumes
 10(10) = AM(PM)



5.3 Traffic Impact

5.3.1 Post-Development Analysis

The anticipated development traffic associated with the proposed development has been examined using SIDRA INTERSECTION to assess the intersection performance at the 7 nominated study intersections. The results of the analysis have been summarised Table 5.2.

Table 5.2: Future Operating Conditions

Intersection	Priority Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St / Pacific Hwy	Signalised	AM	0.88	20	167	B
		PM	0.59	16	105	B
Herbert St / Cleg St	Signalised	AM	0.90	15	78	B
		PM	0.50	11	36	A
Herbert St / Frederick St	Signalised	AM	0.93	31	156	C
		PM	0.90	25	123	B
Herbert St / Pacific Hwy	Signalised	AM	0.76	28	198	B
		PM	0.74	27	182	B
Herbert St / Westbourne St	Roundabout	AM	0.74	34	98	C
		PM	0.67	35	73	C
Reserve Rd / Campbell St	Signalised	AM	0.90	26	163	B
		PM	0.74	22	78	B
Reserve Rd / Frederick St	Roundabout	AM	0.52	11	32	A
		PM	0.53	16	34	B

The assessment of post development traffic conditions of the site indicate that the nominated study intersections would continue to operate satisfactory at a Level of Service of C or better.

As noted previously, a small portion of development traffic may travel via Westbourne Street/ Reserve Road intersection and therefore, this assessment has undertaken a conservative assessment by assuming all development traffic from the subject site would travel via the above 7 nominated intersections.

Therefore, the proposed development is not anticipated to generate any adverse traffic impacts or any operational or safety issues on the surrounding local network.

5.3.2 Intersection Performance Comparison

A comparison between the pre-development and post-development conditions is summarised in Table 5.3. As noted previously, the nominated intersections will continue to operate satisfactorily (and typically at the same performance levels) following the full development of the site. There are minor additional queues and delays at some intersections that would typically not be noticeable to drivers.

Table 5.3: Pre and Post Development Intersection Performance Comparison

Intersection	Priority Type	Peak	Degree of Saturation (DoS)	Average Delay (sec)	95 th Percentile Queue (m)	Level of Service (LoS)
Campbell St / Pacific Hwy	Signalised	AM	+ 0.01	0	+ 1	B
		PM	0	0	+ 2	B
Herbert St / Cleg St	Signalised	AM	0	0	+ 4	B
		PM	0	0	+ 3	A
Herbert St / Frederick St	Signalised	AM	+ 0.03	+ 3	+ 20	B → C
		PM	+ 0.03	+ 1	+ 14	B
Herbert St / Pacific Hwy	Signalised	AM	0	0	0	B
		PM	0	0	0	B
Herbert St / Westbourne St	Roundabout	AM	+ 0.05	+ 2	+ 19	C
		PM	+ 0.05	+ 4	+ 20	C
Reserve Rd / Campbell St	Signalised	AM	0	+ 1	0	B
		PM	0	0	0	B
Reserve Rd / Frederick St	Roundabout	AM	+ 0.01	0	+ 1	A
		PM	0	0	0	B

5.4 Transport Impact

The proposed development is expected to generate a moderate level of public transport, pedestrian and cycle trips, typically from staff and employee trips to the development. Based on the anticipated use of the site (i.e. a private hospital), it can be expected that a majority of visitor trips made to the site would be via car travel.

Notwithstanding the above, the Bureau of Transport Statistics indicates that based on 2011 Journey to Work (JTW) data the mode shares for employed residents living in Chatswood and St Leonards are as follows:

- Vehicle driver / passenger – 45%
- Train – 33%
- Bus – 7%
- Walk – 13%
- Other – 2%

Based on a daily average of 127 staff, the expected public transport and pedestrian trips is summarised in Table 5.4.

Table 5.4: Estimated Public Transport and Pedestrian Trips

Mode of Travel	No. of Staff Trips
Train	42 trips
Bus	9 trips
Pedestrian	17 trips
Total	68 trips

Table 5.4 indicates that the proposed development would generate approximately 51 public transport trips (i.e. 42 train trips and 9 bus trips) and 17 pedestrian trips. It is noted that these are two way trips and therefore, it can be expected that there would approximately 34 public transport and pedestrian trips in both morning and evening peak times.

Thus, it is expected that existing infrastructure would have adequate capacity to accommodate this moderate demand in public transport and pedestrian trips associated with the proposed development.

5.5 Agency Consultation

As required by the Secretary's Environmental Assessment Requirements, the proposed development was discussed with Roads and Maritime Services in early 2015 during the development of the site layout and initial assessment of transport impacts. No specific comments were received at the time (noting the minor transport impacts as detailed above), however it is anticipated that Transport for NSW and Roads and Maritime Services would be consulted further during design development and in relation to the anticipated conditions of consent (including preparation of the Green Travel Plan).

6. Green Travel Plan

6.1 Introduction

The Secretary's Environmental Assessment Requirements state that the proposed private hospital development at 12 Frederick Street, St Leonards, is to implement the design of ecologically sustainable development by including measures that promote travel choices that support sustainable travel, such as the following:

- *Location-specific sustainable travel plan*
- *Provision of end-of-trip facilities*
- *Green travel plans and wayfinding strategies.*

Thus, it is expected that any approval of the proposed development would include a consent condition requiring a green travel plan to be prepared to promote sustainable travel. As such, a green travel plan applicable to tenants and staff working on the site would be prepared prior to the occupation of the development. The section below provides a framework for the implementation of such a travel plan.

6.2 Travel Plan Framework

Transport is a necessary part of life, but it has economic, public health and environmental consequences. The transport sector is one of the fastest growing emissions sectors in Australia, and therefore is one of the key opportunities for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure a strong and prosperous community.

The physical infrastructure being provided as part of the development is only part of the solution. A green travel plan will ensure that the transport infrastructure, services and policies both within and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

6.3 What is a Green Travel Plan?

A green travel plan is a package of measures aimed at promoting sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car', but will encourage and support people's aspirations for carrying out their daily business in a more sustainable way. Travel plans can provide both:

- measures which restrict car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel, reduce the need to travel or make travelling more efficient (incentives or 'carrots').

The travel plan would promote the use of transport, other than the private car, provide choice for staff to travel to and from the site, which is more sustainable and environmentally friendly.

Indeed, there are a range of "non-car" transport options that are available at the site which have been described in this report.

6.4 Key Objectives

The aim of the green travel plan is to bring about better transport arrangements for working at the site. The key objectives of the travel plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of the car, in particular single car occupancy
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan will deliver the following benefits:

- enable higher mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

6.5 Site Specific Measures

The location of the site, in terms of its close proximity to a wide range of sustainable transport, is a key attribute in the justification of the development. The GTP will then put in place measures to raise awareness and further influence the travel patterns of those people working or visiting the development with a view to encouraging modal shift away from cars.

The following measures are proposed to encourage staff and visitors to reduce travel by private cars and adopt alternative and more sustainable travel modes:

- Compliance with the stringent parking controls applicable to the site.
- Provision of a Travel Access Guide (TAG) which would be given to all staff and visitors. This document has been based upon facilities currently available at the site.
- Public transport information boards to make staff and visitors more aware of the alternative transport options available (the format of such information boards would be based upon the travel access guide).
- Promotion of the availability of car sharing pods for trips that require the use of private vehicles.
- Provision of bicycle facilities including secure bicycle parking for staff, bicycle racks for visitors and shower and change room facilities.
- Connect staff working at the site to carpool together by creating a Carpooling club or registry/forum on the North Shore Private Hospital website.
- Replacement of existing GoGet car share pods within the site.

6.6 Travel Access Guide

A Travel Access Guide (TAG) provides information to staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map showing the site location and nearby transport nodes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure to be included in a welcome pack, available from reception or printed on the back of hospital stationery.

6.7 Information and Communication

Several opportunities exist to provide staff and visitors with information about nearby transport options. Connecting staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides Bus, train and ferry routes, timetables and journey planning are provided by Transport for New South Wales through their Transport Info website: <http://www.transportnsw.info>
- City of Sydney provides a number of services and a range of information to encourage people of all levels of experience to travel by bicycle: <http://sydneycycleways.net/>

Connecting staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

6.8 Monitoring of the GTP

There is no standard methodology for this but it is suggested that the GTP be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent upon the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g. yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do, any barriers to changing their behaviour, and their propensity to change.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP.

6.9 Summary

Future building owners/managers should be required to develop and utilise a travel plan to increase the use of sustainable transport by the staff working in the development. Although it is difficult to predict what measures might be achievable until the building is occupied, the above measures provide a framework for the development and implementation of a future travel plan for the site.

It is considered that it is appropriate that any development consent is conditioned to ensure that a travel plan is implemented prior to occupation of the development.

7. Conclusion

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

- i The proposed development generates a DCP parking requirement of 198 spaces, for those uses (including future facilities within the development) with nominated rates. These rates are considered conservative given the available public transport access in St Leonards and complementary nature of supporting facilities.
- ii Due to the loss of on-street parking as a result of the new vehicular crossover on Westbourne Street, the proposed supply of 220 car parking spaces is considered appropriate for its size and anticipated use.
- iii The proposed parking layout is generally consistent with the dimensional requirements as set out in the Willoughby City Council DCP and Australian/New Zealand Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009), subject to resolution of the LG2 access control point from Westbourne Street.
- iv The provision of three loading bays are provided within the site to accommodate vehicles up to and including 12.5m Heavy Rigid Vehicles (HRV).
- v All vehicles, including service and waste collection vehicles, will enter and exit the site in a forward direction.
- vi The site is expected to generate up to 58 and 80 vehicle movements in the morning and evening peak hour respectively.
- vii There is adequate capacity in the surrounding road network to cater for the traffic generated by the proposed development.
- viii Provision is made for all access arrangements to operate safely and efficiently into the future.
- ix A green travel plan should be prepared for the development prior to commencement of work.

Overall, the traffic and parking implications associated with the proposed development at 12 Frederick Street, St Leonards is considered minor and is not anticipated to result in any operational or safety issues on the surrounding local network.

Appendix A

SIDRA INTERSECTION Results

MOVEMENT SUMMARY



Site: Campbell St/Pacific Hwy (Ex-AM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1055	4.8	0.355	4.4	LOS A	9.7	70.9	0.32	0.29	56.0
3	R2	297	4.3	0.873	77.8	LOS F	22.8	165.5	1.00	1.19	25.3
Approach		1352	4.7	0.873	20.5	LOS B	22.8	165.5	0.47	0.49	44.2
East: Campbell St - E											
4	L2	102	5.2	0.195	41.5	LOS C	4.8	35.3	0.79	0.75	33.1
6	R2	133	6.3	0.303	61.9	LOS E	3.9	29.0	0.95	0.76	27.9
Approach		235	5.8	0.303	53.0	LOS D	4.8	35.3	0.88	0.75	30.0
North: Pacific Hwy - N											
7	L2	165	5.1	0.508	20.0	LOS B	19.5	144.2	0.59	0.60	43.7
8	T1	1573	7.4	0.508	14.7	LOS B	20.2	150.5	0.60	0.56	48.1
Approach		1738	7.1	0.508	15.2	LOS B	20.2	150.5	0.60	0.57	47.6
All Vehicles		3324	6.0	0.873	20.0	LOS B	22.8	165.5	0.57	0.55	44.4

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Campbell St/Pacific Hwy (Ex-PM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1357	3.9	0.455	4.9	LOS A	14.0	101.6	0.36	0.33	55.5
3	R2	154	6.2	0.382	19.8	LOS B	5.9	43.3	0.66	0.77	42.1
Approach		1511	4.1	0.455	6.4	LOS A	14.0	101.6	0.39	0.38	53.8
East: Campbell St - E											
4	L2	161	0.7	0.298	42.8	LOS D	7.9	55.5	0.82	0.77	32.8
6	R2	265	2.0	0.588	64.3	LOS E	8.2	58.3	0.99	0.80	27.5
Approach		426	1.5	0.588	56.1	LOS D	8.2	58.3	0.93	0.79	29.3
North: Pacific Hwy - N											
7	L2	80	2.6	0.388	18.7	LOS B	14.0	101.0	0.54	0.53	44.7
8	T1	1283	3.4	0.388	13.3	LOS A	14.3	103.0	0.54	0.50	49.1
Approach		1363	3.4	0.388	13.6	LOS A	14.3	103.0	0.54	0.50	48.8
All Vehicles		3300	3.5	0.588	15.8	LOS B	14.3	103.0	0.52	0.48	46.8

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Herbert St/Cleg St (Ex-AM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	67	6.3	0.067	11.9	LOS A	0.9	6.5	0.47	0.67	48.9
2	T1	245	0.9	0.272	4.3	LOS A	2.4	16.7	0.32	0.31	55.7
3	R2	22	9.5	0.272	10.0	LOS A	2.4	16.7	0.32	0.31	53.8
Approach		335	2.5	0.272	6.2	LOS A	2.4	16.7	0.35	0.38	54.0
East: Cleg St - E											
4	L2	47	4.4	0.116	13.3	LOS A	0.8	5.8	0.70	0.67	49.1
5	T1	102	2.1	0.580	22.4	LOS B	4.3	30.4	0.90	0.77	42.5
6	R2	66	3.2	0.580	31.1	LOS C	4.3	30.4	0.95	0.79	40.3
Approach		216	2.9	0.580	23.0	LOS B	4.3	30.4	0.87	0.76	43.0
North: Herbert St - N											
7	L2	33	0.0	0.111	11.0	LOS A	1.6	11.1	0.45	0.45	52.6
8	T1	620	0.7	0.556	7.5	LOS A	10.5	73.9	0.62	0.58	52.9
9	R2	66	0.0	0.556	13.4	LOS A	10.5	73.9	0.65	0.60	51.4
Approach		719	0.6	0.556	8.2	LOS A	10.5	73.9	0.61	0.57	52.7
West: Cleg St - W											
10	L2	74	1.4	0.181	17.2	LOS B	1.9	13.7	0.77	0.70	46.7
11	T1	127	2.5	0.895	31.5	LOS C	8.6	61.9	0.94	1.00	38.2
12	R2	137	4.6	0.895	44.1	LOS D	8.6	61.9	1.00	1.11	34.9
Approach		338	3.1	0.895	33.5	LOS C	8.6	61.9	0.93	0.98	38.2
All Vehicles		1607	1.8	0.895	15.1	LOS B	10.5	73.9	0.66	0.64	47.7

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Herbert St/Cleg St (Ex-PM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	100	4.2	0.098	12.0	LOS A	1.3	9.7	0.48	0.68	48.9
2	T1	455	1.2	0.444	4.3	LOS A	4.6	32.8	0.35	0.33	55.8
3	R2	31	0.0	0.444	9.8	LOS A	4.6	32.8	0.35	0.33	54.4
Approach		585	1.6	0.444	5.9	LOS A	4.6	32.8	0.37	0.39	54.4
East: Cleg St - E											
4	L2	39	2.7	0.088	15.8	LOS B	0.9	6.6	0.72	0.67	47.6
5	T1	103	4.1	0.439	21.5	LOS B	3.7	26.1	0.89	0.74	43.1
6	R2	49	0.0	0.439	29.4	LOS C	3.7	26.1	0.92	0.76	41.3
Approach		192	2.7	0.439	22.4	LOS B	3.7	26.1	0.86	0.73	43.4
North: Herbert St - N											
7	L2	15	0.0	0.066	10.9	LOS A	0.9	6.4	0.44	0.41	52.9
8	T1	317	1.0	0.330	6.3	LOS A	4.5	32.0	0.51	0.49	53.6
9	R2	52	0.0	0.330	12.0	LOS A	4.5	32.0	0.53	0.51	52.2
Approach		383	0.8	0.330	7.2	LOS A	4.5	32.0	0.51	0.49	53.4
West: Cleg St - W											
10	L2	74	1.4	0.102	8.2	LOS A	0.5	3.8	0.43	0.65	51.8
11	T1	81	2.6	0.501	23.3	LOS B	4.0	29.4	0.91	0.77	42.1
12	R2	69	6.1	0.501	30.0	LOS C	4.0	29.4	0.94	0.77	40.6
Approach		224	3.3	0.501	20.4	LOS B	4.0	29.4	0.76	0.73	44.3
All Vehicles		1384	1.8	0.501	10.9	LOS A	4.6	32.8	0.54	0.52	50.5

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: Herbert St/Frederick St (Ex-AM)**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	255	8.3	0.203	9.2	LOS A	2.9	21.6	0.36	0.67	50.6
2	T1	313	1.7	0.420	16.5	LOS B	7.9	56.3	0.77	0.66	47.2
3	R2	6	0.0	0.420	22.0	LOS B	7.9	56.3	0.77	0.66	46.2
Approach		574	4.6	0.420	13.3	LOS A	7.9	56.3	0.58	0.67	48.6
East: Carpark Access - E											
4	L2	2	0.0	0.020	41.1	LOS C	0.1	0.5	0.96	0.61	35.2
5	T1	20	5.3	0.183	34.2	LOS C	1.0	7.2	0.96	0.70	37.7
6	R2	9	0.0	0.183	39.7	LOS C	1.0	7.2	0.96	0.70	37.1
Approach		32	3.3	0.183	36.3	LOS C	1.0	7.2	0.96	0.69	37.3
North: Herbert St - N											
7	L2	29	3.6	0.269	20.2	LOS B	4.8	34.0	0.70	0.61	46.8
8	T1	505	1.3	0.898	29.8	LOS C	19.1	135.5	0.87	0.93	39.8
9	R2	124	3.4	0.898	44.0	LOS D	19.1	135.5	0.97	1.12	35.6
Approach		659	1.8	0.898	32.1	LOS C	19.1	135.5	0.88	0.95	39.2
West: Frederick St - W											
10	L2	75	7.0	0.253	30.1	LOS C	2.9	21.5	0.86	0.74	40.0
11	T1	27	0.0	0.253	24.5	LOS B	2.9	21.5	0.86	0.74	40.9
12	R2	381	2.8	0.862	41.8	LOS C	15.1	107.9	1.00	0.99	35.0
Approach		483	3.3	0.862	39.0	LOS C	15.1	107.9	0.97	0.94	36.0
All Vehicles		1747	3.1	0.898	27.9	LOS B	19.1	135.5	0.81	0.85	40.7

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: Herbert St/Frederick St (Ex-PM)**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	307	6.5	0.242	9.3	LOS A	3.6	26.6	0.37	0.68	50.6
2	T1	351	0.9	0.444	16.0	LOS B	8.7	61.5	0.76	0.66	47.5
3	R2	2	0.0	0.444	21.5	LOS B	8.7	61.5	0.76	0.66	46.5
Approach		660	3.5	0.444	12.9	LOS A	8.7	61.5	0.58	0.67	48.9
East: Carpark Access - E											
4	L2	9	11.1	0.096	42.3	LOS C	0.3	2.6	0.97	0.66	34.7
5	T1	49	4.3	0.450	35.4	LOS C	2.5	18.3	0.99	0.75	37.3
6	R2	23	0.0	0.450	40.9	LOS C	2.5	18.3	0.99	0.75	36.6
Approach		82	3.8	0.450	37.8	LOS C	2.5	18.3	0.99	0.74	36.8
North: Herbert St - N											
7	L2	6	33.3	0.189	20.0	LOS B	3.3	23.2	0.67	0.56	46.5
8	T1	402	0.5	0.631	18.3	LOS B	9.8	70.0	0.81	0.70	45.7
9	R2	79	6.7	0.631	26.3	LOS B	9.8	70.0	0.88	0.78	43.1
Approach		487	1.9	0.631	19.6	LOS B	9.8	70.0	0.82	0.71	45.2
West: Frederick St - W											
10	L2	127	0.8	0.352	30.7	LOS C	4.2	29.6	0.88	0.77	39.4
11	T1	14	7.7	0.352	25.2	LOS B	4.2	29.6	0.88	0.77	40.1
12	R2	386	1.6	0.867	42.2	LOS C	15.4	109.2	1.00	0.99	34.8
Approach		527	1.6	0.867	39.0	LOS C	15.4	109.2	0.97	0.94	36.0
All Vehicles		1757	2.5	0.867	23.8	LOS B	15.4	109.2	0.78	0.76	42.7

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY



Site: Herbert St/Pacific Hwy (Ex-AM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1441	4.0	0.500	19.7	LOS B	20.2	146.0	0.67	0.59	45.4
6	R2	434	2.2	0.649	58.1	LOS E	13.5	96.6	0.97	0.83	30.4
Approach		1875	3.6	0.649	28.6	LOS C	20.2	146.0	0.74	0.65	40.7
North: Herbert St - N											
7	L2	532	2.4	0.760	41.9	LOS C	27.8	198.3	0.89	0.85	34.9
9	R2	156	2.7	0.654	65.5	LOS E	9.7	69.6	1.00	0.82	28.7
Approach		687	2.5	0.760	47.2	LOS D	27.8	198.3	0.92	0.84	33.3
West: Pacific Highway - W											
10	L2	172	9.2	0.160	12.9	LOS A	3.5	26.8	0.45	0.69	48.2
11	T1	1574	5.6	0.548	20.4	LOS B	22.7	166.5	0.69	0.62	45.0
Approach		1745	5.9	0.548	19.7	LOS B	22.7	166.5	0.67	0.63	45.3
All Vehicles		4307	4.3	0.760	27.9	LOS B	27.8	198.3	0.74	0.67	40.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY



Site: Herbert St/Pacific Hwy (Ex-PM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1693	3.9	0.584	20.9	LOS B	25.1	181.7	0.71	0.64	44.7
6	R2	346	0.6	0.513	56.5	LOS E	10.5	73.7	0.94	0.81	30.8
Approach		2039	3.3	0.584	27.0	LOS B	25.1	181.7	0.75	0.67	41.5
North: Herbert St - N											
7	L2	472	0.9	0.577	40.5	LOS C	23.7	167.0	0.86	0.84	35.4
9	R2	180	0.0	0.741	67.7	LOS E	11.6	81.1	1.00	0.86	28.3
Approach		652	0.6	0.741	48.0	LOS D	23.7	167.0	0.90	0.84	33.1
West: Pacific Highway - W											
10	L2	149	9.9	0.140	12.8	LOS A	3.0	23.1	0.44	0.68	48.2
11	T1	1414	2.5	0.479	19.4	LOS B	19.2	137.0	0.66	0.59	45.5
Approach		1563	3.2	0.479	18.8	LOS B	19.2	137.0	0.64	0.60	45.7
All Vehicles		4254	2.9	0.741	27.2	LOS B	25.1	181.7	0.73	0.67	41.3

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY

▽ Site: Herbert St/Westbourne St (Ex-AM)

16S9001000 - 12 Frederick St, St Leonards
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	118	0.0	0.368	5.8	LOS A	1.1	7.9	0.08	0.11	57.0
2	T1	521	9.1	0.368	0.1	LOS A	1.1	7.9	0.08	0.11	58.6
Approach		639	7.4	0.368	1.1	NA	1.1	7.9	0.08	0.11	58.3
North: Herbert St - N											
8	T1	604	2.1	0.685	4.0	LOS A	11.1	78.6	0.49	0.47	55.0
9	R2	83	0.0	0.685	16.1	LOS B	11.1	78.6	0.49	0.47	53.1
Approach		687	1.8	0.685	5.4	NA	11.1	78.6	0.49	0.47	54.8
West: Westbourne St - W											
10	L2	24	0.0	0.166	16.4	LOS B	0.6	4.4	0.81	0.90	42.7
12	R2	18	0.0	0.166	32.0	LOS C	0.6	4.4	0.81	0.90	42.3
Approach		42	0.0	0.166	23.0	LOS B	0.6	4.4	0.81	0.90	42.5
All Vehicles		1368	4.4	0.685	4.0	NA	11.1	78.6	0.31	0.31	55.9

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

Vehicle movement LOS values are based on average delay per movement

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: Herbert St/Westbourne St (Ex-PM)

16S9001000 - 12 Frederick St, St Leonards
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	26	4.0	0.266	5.9	LOS A	0.2	1.7	0.02	0.03	57.8
2	T1	468	3.8	0.266	0.0	LOS A	0.2	1.7	0.02	0.03	59.6
Approach		495	3.8	0.266	0.3	NA	0.2	1.7	0.02	0.03	59.5
North: Herbert St - N											
8	T1	617	0.7	0.617	2.5	LOS A	7.5	53.1	0.48	0.35	57.3
9	R2	28	0.0	0.617	11.5	LOS A	7.5	53.1	0.48	0.35	55.2
Approach		645	0.7	0.617	2.9	NA	7.5	53.1	0.48	0.35	57.2
West: Westbourne St - W											
10	L2	43	0.0	0.328	20.1	LOS B	1.5	10.8	0.82	0.97	41.3
12	R2	48	0.0	0.328	31.1	LOS C	1.5	10.8	0.82	0.97	41.0
Approach		92	0.0	0.328	25.9	LOS B	1.5	10.8	0.82	0.97	41.1
All Vehicles		1232	1.9	0.617	3.6	NA	7.5	53.1	0.32	0.27	56.4

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

Vehicle movement LOS values are based on average delay per movement

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

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

SIDRA Standard Delay Model 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.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY



Site: Reserve Rd/Campbell St (Ex-AM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	143	14.0	0.241	11.8	LOS A	2.3	17.6	0.64	0.68	49.6
2	T1	216	5.9	0.241	12.2	LOS A	3.5	25.7	0.70	0.61	49.4
Approach		359	9.1	0.241	12.1	LOS A	3.5	25.7	0.67	0.64	49.5
East: Bunning Access - E											
4	L2	26	0.0	0.170	35.3	LOS C	0.8	5.4	0.96	0.71	37.3
5	T1	36	0.0	0.506	31.1	LOS C	2.5	17.2	1.00	0.76	38.4
6	R2	44	0.0	0.506	36.6	LOS C	2.5	17.2	1.00	0.76	37.7
Approach		106	0.0	0.506	34.4	LOS C	2.5	17.2	0.99	0.75	37.8
North: Reserved Rd - N											
7	L2	71	1.5	0.240	16.5	LOS B	3.7	26.3	0.65	0.61	48.4
8	T1	582	2.4	0.898	26.8	LOS B	22.4	162.8	0.92	1.02	41.0
9	R2	147	10.0	0.898	37.2	LOS C	22.4	162.8	1.00	1.14	38.1
Approach		800	3.7	0.898	27.8	LOS B	22.4	162.8	0.91	1.00	41.0
West: Campbell St - W											
10	L2	97	30.4	0.272	27.1	LOS B	2.4	21.4	0.86	0.76	40.2
11	T1	59	0.0	0.729	28.8	LOS C	6.8	49.3	1.00	0.90	39.0
12	R2	162	5.2	0.729	34.4	LOS C	6.8	49.3	1.00	0.90	38.2
Approach		318	11.9	0.729	31.1	LOS C	6.8	49.3	0.96	0.86	38.9
All Vehicles		1583	6.3	0.898	25.4	LOS B	22.4	162.8	0.87	0.87	41.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	13.4	LOS B	0.1	0.1	0.67	0.67	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79	
All Pedestrians		158	18.7	LOS B			0.79	0.79	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Reserve Rd/Campbell St (Ex-PM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	275	5.7	0.743	22.7	LOS B	10.8	78.2	0.94	0.91	43.9
2	T1	568	2.8	0.743	20.1	LOS B	10.8	78.2	0.92	0.87	44.5
Approach		843	3.7	0.743	20.9	LOS B	10.8	78.2	0.92	0.88	44.3
East: Bunning Access - E											
4	L2	39	0.0	0.210	34.2	LOS C	1.1	7.9	0.95	0.72	37.8
5	T1	47	0.0	0.543	30.1	LOS C	3.1	21.9	0.99	0.78	38.9
6	R2	56	0.0	0.543	35.6	LOS C	3.1	21.9	0.99	0.78	38.1
Approach		142	0.0	0.543	33.4	LOS C	3.1	21.9	0.98	0.77	38.2
North: Reserved Rd - N											
7	L2	47	0.0	0.164	15.5	LOS B	2.4	17.5	0.61	0.57	49.1
8	T1	275	3.8	0.616	15.5	LOS B	7.1	51.4	0.81	0.70	46.6
9	R2	99	5.3	0.616	24.1	LOS B	7.1	51.4	0.92	0.78	43.7
Approach		421	3.8	0.616	17.5	LOS B	7.1	51.4	0.81	0.71	46.2
West: Campbell St - W											
10	L2	100	12.6	0.207	23.8	LOS B	2.3	17.8	0.80	0.75	42.0
11	T1	38	0.0	0.554	28.1	LOS B	4.0	28.7	0.98	0.79	39.3
12	R2	99	3.2	0.554	33.7	LOS C	4.0	28.7	0.98	0.79	38.5
Approach		237	6.7	0.554	28.6	LOS C	4.0	28.7	0.90	0.77	40.1
All Vehicles		1643	3.8	0.743	22.2	LOS B	10.8	78.2	0.90	0.81	43.5

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	12.7	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	21.7	LOS C	0.1	0.1	0.85	0.85	
All Pedestrians		158	19.6	LOS B			0.80	0.80	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY

 **Site: Reserved Rd/Frederick St (Ex-AM)**

16S9001000 - 12 Frederick St, St Leonards
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	93	3.4	0.119	6.6	LOS A	0.7	5.2	0.50	0.59	52.8
3	R2	25	0.0	0.119	9.8	LOS A	0.7	5.2	0.50	0.59	52.5
Approach		118	2.7	0.119	7.2	LOS A	0.7	5.2	0.50	0.59	52.7
East: Frederick St - E											
4	L2	123	0.9	0.395	6.9	LOS A	2.6	19.3	0.48	0.67	50.8
5	T1	7	0.0	0.395	7.2	LOS A	2.6	19.3	0.48	0.67	51.8
6	R2	263	9.6	0.395	10.8	LOS A	2.6	19.3	0.48	0.67	51.0
Approach		394	6.7	0.395	9.5	LOS A	2.6	19.3	0.48	0.67	51.0
North: Reserved Rd - N											
7	L2	464	2.7	0.512	4.7	LOS A	4.3	30.6	0.17	0.49	53.6
8	T1	287	0.0	0.512	5.0	LOS A	4.3	30.6	0.17	0.49	54.8
9	R2	28	18.5	0.512	8.5	LOS A	4.3	30.6	0.17	0.49	53.5
Approach		780	2.3	0.512	5.0	LOS A	4.3	30.6	0.17	0.49	54.0
West: Enterprise Centre - W											
10	L2	3	33.3	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	50.8
11	T1	4	0.0	0.010	6.7	LOS A	0.1	0.4	0.51	0.55	53.1
12	R2	1	0.0	0.010	10.0	LOS A	0.1	0.4	0.51	0.55	52.7
Approach		8	12.5	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	52.2
All Vehicles		1300	3.7	0.512	6.6	LOS A	4.3	30.6	0.29	0.56	52.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY

 **Site: Reserved Rd/Frederick St (Ex-PM)**

16S9001000 - 12 Frederick St, St Leonards
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	1	0.0	0.534	8.5	LOS A	4.8	33.9	0.78	0.73	50.5
2	T1	344	0.6	0.534	8.8	LOS A	4.8	33.9	0.78	0.73	51.4
3	R2	158	1.3	0.534	12.1	LOS A	4.8	33.9	0.78	0.73	51.1
Approach		503	0.8	0.534	9.8	LOS A	4.8	33.9	0.78	0.73	51.3
East: Frederick St - E											
4	L2	26	4.0	0.334	4.9	LOS A	2.2	16.1	0.21	0.61	51.2
5	T1	2	0.0	0.334	5.1	LOS A	2.2	16.1	0.21	0.61	52.3
6	R2	417	7.6	0.334	8.6	LOS A	2.2	16.1	0.21	0.61	51.7
Approach		445	7.3	0.334	8.3	LOS A	2.2	16.1	0.21	0.61	51.7
North: Reserved Rd - N											
7	L2	325	3.2	0.342	5.6	LOS A	2.1	15.1	0.37	0.57	53.1
8	T1	61	1.7	0.342	5.8	LOS A	2.1	15.1	0.37	0.57	54.2
9	R2	3	33.3	0.342	9.9	LOS A	2.1	15.1	0.37	0.57	52.4
Approach		389	3.2	0.342	5.7	LOS A	2.1	15.1	0.37	0.57	53.2
West: Enterprise Centre - W											
10	L2	17	6.3	0.041	12.7	LOS A	0.3	2.2	0.87	0.70	48.2
11	T1	4	0.0	0.041	12.6	LOS A	0.3	2.2	0.87	0.70	49.3
12	R2	1	0.0	0.041	15.9	LOS B	0.3	2.2	0.87	0.70	49.0
Approach		22	4.8	0.041	12.8	LOS A	0.3	2.2	0.87	0.70	48.5
All Vehicles		1360	3.7	0.534	8.2	LOS A	4.8	33.9	0.48	0.65	51.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_Existing.sip6

MOVEMENT SUMMARY



Site: Campbell St/Pacific Hwy (PD-AM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1055	4.8	0.355	4.4	LOS A	9.7	70.9	0.32	0.29	56.0
3	R2	297	4.3	0.877	79.3	LOS F	23.0	167.1	1.00	1.20	25.1
Approach		1352	4.7	0.877	20.8	LOS B	23.0	167.1	0.47	0.49	44.0
East: Campbell St - E											
4	L2	102	5.2	0.195	41.5	LOS C	4.8	35.3	0.79	0.75	33.1
6	R2	133	6.3	0.303	61.9	LOS E	3.9	29.0	0.95	0.76	27.9
Approach		235	5.8	0.303	53.0	LOS D	4.8	35.3	0.88	0.75	30.0
North: Pacific Hwy - N											
7	L2	178	4.7	0.511	20.0	LOS B	19.7	145.5	0.59	0.61	43.6
8	T1	1573	7.4	0.511	14.7	LOS B	20.4	152.1	0.60	0.56	48.1
Approach		1751	7.1	0.511	15.2	LOS B	20.4	152.1	0.60	0.57	47.6
All Vehicles		3337	6.0	0.877	20.2	LOS B	23.0	167.1	0.57	0.55	44.3

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY



Site: Campbell St/Pacific Hwy (PD-PM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1357	3.9	0.455	4.9	LOS A	14.0	101.6	0.36	0.33	55.5
3	R2	154	6.2	0.385	20.0	LOS B	6.0	44.0	0.67	0.77	42.0
Approach		1511	4.1	0.455	6.5	LOS A	14.0	101.6	0.39	0.38	53.8
East: Campbell St - E											
4	L2	161	0.7	0.298	42.8	LOS D	7.9	55.5	0.82	0.77	32.8
6	R2	265	2.0	0.588	64.3	LOS E	8.2	58.3	0.99	0.80	27.5
Approach		426	1.5	0.588	56.1	LOS D	8.2	58.3	0.93	0.79	29.3
North: Pacific Hwy - N											
7	L2	97	2.2	0.393	18.8	LOS B	14.2	102.5	0.54	0.54	44.5
8	T1	1283	3.4	0.393	13.3	LOS A	14.5	104.7	0.54	0.50	49.0
Approach		1380	3.4	0.393	13.7	LOS A	14.5	104.7	0.54	0.50	48.7
All Vehicles		3317	3.5	0.588	15.9	LOS B	14.5	104.7	0.53	0.48	46.7

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY

 **Site: Herbert St/Cleg St (PD-AM)**

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	67	6.3	0.067	11.9	LOS A	0.9	6.5	0.47	0.67	48.9
2	T1	245	0.9	0.275	4.9	LOS A	2.6	18.2	0.35	0.33	55.2
3	R2	22	9.5	0.275	10.5	LOS A	2.6	18.2	0.35	0.33	53.4
Approach		335	2.5	0.275	6.7	LOS A	2.6	18.2	0.37	0.40	53.7
East: Cleg St - E											
4	L2	47	4.4	0.116	13.1	LOS A	0.8	5.4	0.70	0.68	49.1
5	T1	102	2.1	0.581	22.5	LOS B	4.3	30.6	0.91	0.77	42.5
6	R2	66	3.2	0.581	31.1	LOS C	4.3	30.6	0.95	0.79	40.3
Approach		216	2.9	0.581	23.1	LOS B	4.3	30.6	0.87	0.76	43.0
North: Herbert St - N											
7	L2	33	0.0	0.115	11.1	LOS A	1.6	11.4	0.45	0.45	52.6
8	T1	644	0.7	0.573	7.6	LOS A	11.0	77.6	0.62	0.58	52.8
9	R2	66	0.0	0.573	13.5	LOS A	11.0	77.6	0.66	0.61	51.4
Approach		743	0.6	0.573	8.3	LOS A	11.0	77.6	0.62	0.58	52.7
West: Cleg St - W											
10	L2	74	1.4	0.183	17.2	LOS B	1.9	13.6	0.77	0.70	46.7
11	T1	127	2.5	0.901	32.3	LOS C	8.7	63.0	0.94	1.01	37.8
12	R2	137	4.6	0.901	45.0	LOS D	8.7	63.0	1.00	1.12	34.6
Approach		338	3.1	0.901	34.2	LOS C	8.7	63.0	0.93	0.99	38.0
All Vehicles		1632	1.8	0.901	15.3	LOS B	11.0	77.6	0.67	0.65	47.6

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Herbert St/Cleg St (PD-PM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	100	4.2	0.098	12.0	LOS A	1.3	9.7	0.48	0.68	48.9
2	T1	455	1.2	0.446	4.3	LOS A	4.7	32.9	0.35	0.33	55.8
3	R2	31	0.0	0.446	9.8	LOS A	4.7	32.9	0.35	0.33	54.4
Approach		585	1.6	0.446	5.9	LOS A	4.7	32.9	0.37	0.39	54.4
East: Cleg St - E											
4	L2	39	2.7	0.089	14.8	LOS B	0.8	6.0	0.71	0.66	48.1
5	T1	103	4.1	0.444	21.7	LOS B	3.7	26.5	0.89	0.74	43.0
6	R2	49	0.0	0.444	29.4	LOS C	3.7	26.5	0.92	0.76	41.3
Approach		192	2.7	0.444	22.3	LOS B	3.7	26.5	0.86	0.73	43.5
North: Herbert St - N											
7	L2	15	0.0	0.071	10.9	LOS A	1.0	6.9	0.44	0.41	53.0
8	T1	351	0.9	0.354	6.4	LOS A	5.0	35.5	0.52	0.49	53.6
9	R2	52	0.0	0.354	12.2	LOS A	5.0	35.5	0.54	0.51	52.1
Approach		417	0.8	0.354	7.3	LOS A	5.0	35.5	0.52	0.49	53.4
West: Cleg St - W											
10	L2	74	1.4	0.101	8.2	LOS A	0.5	3.8	0.43	0.65	51.8
11	T1	81	2.6	0.501	23.3	LOS B	4.0	29.4	0.91	0.77	42.1
12	R2	69	6.1	0.501	30.0	LOS C	4.0	29.4	0.94	0.77	40.6
Approach		224	3.3	0.501	20.4	LOS B	4.0	29.4	0.76	0.73	44.3
All Vehicles		1418	1.8	0.501	10.8	LOS A	5.0	35.5	0.54	0.52	50.6

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: Herbert St/Frederick St (PD-AM)**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	255	8.3	0.203	9.2	LOS A	2.9	21.6	0.36	0.67	50.6
2	T1	313	1.7	0.421	16.5	LOS B	7.9	56.4	0.77	0.66	47.2
3	R2	6	0.0	0.421	22.0	LOS B	7.9	56.4	0.77	0.66	46.2
Approach		574	4.6	0.421	13.3	LOS A	7.9	56.4	0.59	0.67	48.6
East: Carpark Access - E											
4	L2	2	0.0	0.020	41.1	LOS C	0.1	0.5	0.96	0.61	35.2
5	T1	20	5.3	0.183	34.2	LOS C	1.0	7.2	0.96	0.70	37.7
6	R2	9	0.0	0.183	39.7	LOS C	1.0	7.2	0.96	0.70	37.1
Approach		32	3.3	0.183	36.3	LOS C	1.0	7.2	0.96	0.69	37.3
North: Herbert St - N											
7	L2	29	3.6	0.280	20.3	LOS B	5.0	35.6	0.70	0.61	46.7
8	T1	529	1.2	0.933	35.2	LOS C	21.9	155.5	0.88	1.00	37.6
9	R2	124	3.4	0.933	52.3	LOS D	21.9	155.5	0.98	1.21	32.9
Approach		683	1.7	0.933	37.6	LOS C	21.9	155.5	0.89	1.02	37.0
West: Frederick St - W											
10	L2	75	7.0	0.253	30.1	LOS C	2.9	21.5	0.86	0.74	40.0
11	T1	27	0.0	0.253	24.5	LOS B	2.9	21.5	0.86	0.74	40.9
12	R2	394	2.7	0.890	45.0	LOS D	16.4	117.4	1.00	1.03	33.9
Approach		496	3.2	0.890	41.6	LOS C	16.4	117.4	0.97	0.97	35.0
All Vehicles		1784	3.1	0.933	30.9	LOS C	21.9	155.5	0.82	0.89	39.4

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY

 **Site: Herbert St/Frederick St (PD-PM)**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	307	6.5	0.242	9.3	LOS A	3.6	26.6	0.37	0.68	50.6
2	T1	351	0.9	0.445	16.0	LOS B	8.7	61.5	0.77	0.66	47.5
3	R2	2	0.0	0.445	21.5	LOS B	8.7	61.5	0.77	0.66	46.5
Approach		660	3.5	0.445	12.9	LOS A	8.7	61.5	0.58	0.67	48.9
East: Carpark Access - E											
4	L2	9	11.1	0.096	42.3	LOS C	0.3	2.6	0.97	0.66	34.7
5	T1	49	4.3	0.450	35.4	LOS C	2.5	18.3	0.99	0.75	37.3
6	R2	23	0.0	0.450	40.9	LOS C	2.5	18.3	0.99	0.75	36.6
Approach		82	3.8	0.450	37.8	LOS C	2.5	18.3	0.99	0.74	36.8
North: Herbert St - N											
7	L2	6	33.3	0.199	20.0	LOS B	3.4	24.5	0.67	0.56	46.4
8	T1	436	0.5	0.662	18.8	LOS B	10.8	77.1	0.82	0.72	45.4
9	R2	79	6.7	0.662	26.9	LOS B	10.8	77.1	0.90	0.80	42.8
Approach		521	1.8	0.662	20.0	LOS B	10.8	77.1	0.83	0.73	45.0
West: Frederick St - W											
10	L2	127	0.8	0.352	30.7	LOS C	4.2	29.6	0.88	0.77	39.4
11	T1	14	7.7	0.352	25.2	LOS B	4.2	29.6	0.88	0.77	40.1
12	R2	403	1.6	0.904	47.1	LOS D	17.3	122.7	1.00	1.05	33.3
Approach		544	1.5	0.904	42.7	LOS D	17.3	122.7	0.97	0.98	34.7
All Vehicles		1807	2.4	0.904	25.1	LOS B	17.3	122.7	0.79	0.78	42.0

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: Herbert St/Pacific Hwy (PD-AM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1441	4.0	0.500	19.7	LOS B	20.2	146.0	0.67	0.59	45.4
6	R2	434	2.2	0.649	58.1	LOS E	13.5	96.6	0.97	0.83	30.4
Approach		1875	3.6	0.649	28.6	LOS C	20.2	146.0	0.74	0.65	40.7
North: Herbert St - N											
7	L2	532	2.4	0.760	41.9	LOS C	27.8	198.3	0.89	0.85	34.9
9	R2	156	2.7	0.654	65.5	LOS E	9.7	69.6	1.00	0.82	28.7
Approach		687	2.5	0.760	47.2	LOS D	27.8	198.3	0.92	0.84	33.3
West: Pacific Highway - W											
10	L2	196	8.1	0.181	13.0	LOS A	4.1	30.7	0.46	0.69	48.1
11	T1	1574	5.6	0.552	20.4	LOS B	22.9	168.1	0.69	0.62	45.0
Approach		1769	5.8	0.552	19.6	LOS B	22.9	168.1	0.67	0.63	45.3
All Vehicles		4332	4.3	0.760	27.9	LOS B	27.8	198.3	0.74	0.67	41.0

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Herbert St/Pacific Hwy (PD-PM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1693	3.9	0.584	20.9	LOS B	25.1	181.7	0.71	0.64	44.7
6	R2	346	0.6	0.513	56.5	LOS E	10.5	73.7	0.94	0.81	30.8
Approach		2039	3.3	0.584	27.0	LOS B	25.1	181.7	0.75	0.67	41.5
North: Herbert St - N											
7	L2	472	0.9	0.577	40.5	LOS C	23.7	167.0	0.86	0.84	35.4
9	R2	180	0.0	0.741	67.7	LOS E	11.6	81.1	1.00	0.86	28.3
Approach		652	0.6	0.741	48.0	LOS D	23.7	167.0	0.90	0.84	33.1
West: Pacific Highway - W											
10	L2	183	8.0	0.169	12.9	LOS A	3.8	28.5	0.45	0.69	48.2
11	T1	1414	2.5	0.483	19.5	LOS B	19.4	138.6	0.66	0.59	45.5
Approach		1597	3.2	0.483	18.7	LOS B	19.4	138.6	0.64	0.60	45.8
All Vehicles		4287	2.8	0.741	27.1	LOS B	25.1	181.7	0.73	0.67	41.3

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

▽ Site: Herbert St/Westbourne St (PD-AM)

16S9001000 - 12 Frederick St, St Leonards
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Herbert St - S											
1	L2	142	0.0	0.386	5.8	LOS A	1.3	9.6	0.09	0.12	56.8
2	T1	521	9.1	0.386	0.1	LOS A	1.3	9.6	0.09	0.12	58.4
Approach		663	7.1	0.386	1.3	NA	1.3	9.6	0.09	0.12	58.1
North: Herbert St - N											
8	T1	604	2.1	0.737	5.2	LOS A	13.8	98.1	0.50	0.56	53.5
9	R2	120	0.0	0.737	18.2	LOS B	13.8	98.1	0.50	0.56	51.7
Approach		724	1.7	0.737	7.4	NA	13.8	98.1	0.50	0.56	53.2
West: Westbourne St - W											
10	L2	24	0.0	0.178	16.4	LOS B	0.7	4.6	0.82	0.90	42.2
12	R2	18	0.0	0.178	34.4	LOS C	0.7	4.6	0.82	0.90	41.8
Approach		42	0.0	0.178	24.1	LOS B	0.7	4.6	0.82	0.90	42.0
All Vehicles		1429	4.2	0.737	5.1	NA	13.8	98.1	0.32	0.37	54.9

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

Vehicle movement LOS values are based on average delay per movement

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

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

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

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

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

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY

▽ Site: Herbert St/Westbourne St (PD-PM)

16S9001000 - 12 Frederick St, St Leonards
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	60	1.8	0.291	5.8	LOS A	0.5	3.8	0.05	0.07	57.5
2	T1	468	3.8	0.291	0.0	LOS A	0.5	3.8	0.05	0.07	59.2
Approach		528	3.6	0.291	0.7	NA	0.5	3.8	0.05	0.07	59.0
North: Herbert St - N											
8	T1	617	0.7	0.671	3.5	LOS A	10.3	72.8	0.50	0.44	55.7
9	R2	79	0.0	0.671	13.4	LOS A	10.3	72.8	0.50	0.44	53.8
Approach		696	0.6	0.671	4.6	NA	10.3	72.8	0.50	0.44	55.5
West: Westbourne St - W											
10	L2	43	0.0	0.361	21.2	LOS B	1.7	11.7	0.84	0.99	40.1
12	R2	48	0.0	0.361	34.7	LOS C	1.7	11.7	0.84	0.99	39.8
Approach		92	0.0	0.361	28.4	LOS B	1.7	11.7	0.84	0.99	40.0
All Vehicles		1316	1.8	0.671	4.7	NA	10.3	72.8	0.34	0.33	55.3

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

Vehicle movement LOS values are based on average delay per movement

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

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

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

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

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

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MOVEMENT SUMMARY



Site: Reserve Rd/Campbell St (PD-AM)

16S9001000 - 12 Frederick St, St Leonards

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

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	143	14.0	0.241	11.8	LOS A	2.3	17.6	0.64	0.68	49.6
2	T1	216	5.9	0.241	12.2	LOS A	3.5	25.7	0.70	0.61	49.4
Approach		359	9.1	0.241	12.1	LOS A	3.5	25.7	0.67	0.64	49.5
East: Bunning Access - E											
4	L2	26	0.0	0.170	35.3	LOS C	0.8	5.4	0.96	0.71	37.3
5	T1	36	0.0	0.506	31.1	LOS C	2.5	17.2	1.00	0.76	38.4
6	R2	44	0.0	0.506	36.6	LOS C	2.5	17.2	1.00	0.76	37.7
Approach		106	0.0	0.506	34.4	LOS C	2.5	17.2	0.99	0.75	37.8
North: Reserved Rd - N											
7	L2	71	1.5	0.240	16.5	LOS B	3.7	26.3	0.65	0.61	48.4
8	T1	582	2.4	0.898	26.8	LOS B	22.4	162.8	0.92	1.02	41.0
9	R2	147	10.0	0.898	37.2	LOS C	22.4	162.8	1.00	1.14	38.1
Approach		800	3.7	0.898	27.8	LOS B	22.4	162.8	0.91	1.00	41.0
West: Campbell St - W											
10	L2	97	30.4	0.272	27.1	LOS B	2.4	21.4	0.86	0.76	40.2
11	T1	59	0.0	0.797	30.9	LOS C	7.5	54.4	1.00	0.96	38.1
12	R2	175	4.8	0.797	36.5	LOS C	7.5	54.4	1.00	0.96	37.4
Approach		331	11.5	0.797	32.7	LOS C	7.5	54.4	0.96	0.90	38.3
All Vehicles		1596	6.3	0.898	25.7	LOS B	22.4	162.8	0.87	0.88	41.8

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	13.4	LOS B	0.1	0.1	0.67	0.67	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79	
All Pedestrians		158	18.7	LOS B			0.79	0.79	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY



Site: Reserve Rd/Campbell St (PD-PM)

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 60 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	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	275	5.7	0.743	22.7	LOS B	10.8	78.2	0.94	0.91	43.9
2	T1	568	2.8	0.743	20.1	LOS B	10.8	78.2	0.92	0.87	44.5
Approach		843	3.7	0.743	20.9	LOS B	10.8	78.2	0.92	0.88	44.3
East: Bunning Access - E											
4	L2	39	0.0	0.210	34.2	LOS C	1.1	7.9	0.95	0.72	37.8
5	T1	47	0.0	0.543	30.1	LOS C	3.1	21.9	0.99	0.78	38.9
6	R2	56	0.0	0.543	35.6	LOS C	3.1	21.9	0.99	0.78	38.1
Approach		142	0.0	0.543	33.4	LOS C	3.1	21.9	0.98	0.77	38.2
North: Reserved Rd - N											
7	L2	47	0.0	0.164	15.5	LOS B	2.4	17.5	0.61	0.57	49.1
8	T1	275	3.8	0.616	15.5	LOS B	7.1	51.4	0.81	0.70	46.6
9	R2	99	5.3	0.616	24.1	LOS B	7.1	51.4	0.92	0.78	43.7
Approach		421	3.8	0.616	17.5	LOS B	7.1	51.4	0.81	0.71	46.2
West: Campbell St - W											
10	L2	100	12.6	0.207	23.8	LOS B	2.3	17.8	0.80	0.75	42.0
11	T1	38	0.0	0.622	28.8	LOS C	4.6	32.9	0.99	0.83	38.9
12	R2	116	2.7	0.622	34.4	LOS C	4.6	32.9	0.99	0.83	38.2
Approach		254	6.2	0.622	29.4	LOS C	4.6	32.9	0.92	0.80	39.7
All Vehicles		1660	3.8	0.743	22.4	LOS B	10.8	78.2	0.90	0.81	43.4

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	12.7	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	21.7	LOS C	0.1	0.1	0.85	0.85	
All Pedestrians		158	19.6	LOS B			0.80	0.80	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY

 **Site: Reserved Rd/Frederick St (PD-AM)**

16S9001000 - 12 Frederick St, St Leonards
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	93	3.4	0.119	6.6	LOS A	0.7	5.2	0.50	0.59	52.8
3	R2	25	0.0	0.119	9.8	LOS A	0.7	5.2	0.50	0.59	52.5
Approach		118	2.7	0.119	7.2	LOS A	0.7	5.2	0.50	0.59	52.7
East: Frederick St - E											
4	L2	123	0.9	0.395	6.9	LOS A	2.6	19.3	0.48	0.67	50.8
5	T1	7	0.0	0.395	7.2	LOS A	2.6	19.3	0.48	0.67	51.8
6	R2	263	9.6	0.395	10.8	LOS A	2.6	19.3	0.48	0.67	51.0
Approach		394	6.7	0.395	9.5	LOS A	2.6	19.3	0.48	0.67	51.0
North: Reserved Rd - N											
7	L2	477	2.6	0.520	4.7	LOS A	4.4	31.5	0.17	0.49	53.6
8	T1	287	0.0	0.520	5.0	LOS A	4.4	31.5	0.17	0.49	54.8
9	R2	28	18.5	0.520	8.5	LOS A	4.4	31.5	0.17	0.49	53.5
Approach		793	2.3	0.520	5.0	LOS A	4.4	31.5	0.17	0.49	54.0
West: Enterprise Centre - W											
10	L2	3	33.3	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	50.8
11	T1	4	0.0	0.010	6.7	LOS A	0.1	0.4	0.51	0.55	53.1
12	R2	1	0.0	0.010	10.0	LOS A	0.1	0.4	0.51	0.55	52.7
Approach		8	12.5	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	52.2
All Vehicles		1313	3.7	0.520	6.5	LOS A	4.4	31.5	0.29	0.56	52.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards-Mixed Use\Modelling\160505sid_16S9001000_PostDev.sip6

MOVEMENT SUMMARY

 **Site: Reserved Rd/Frederick St (PD-PM)**

16S9001000 - 12 Frederick St, St Leonards
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Reserved Rd - S											
1	L2	1	0.0	0.534	8.5	LOS A	4.8	33.9	0.78	0.73	50.5
2	T1	344	0.6	0.534	8.8	LOS A	4.8	33.9	0.78	0.73	51.4
3	R2	158	1.3	0.534	12.1	LOS A	4.8	33.9	0.78	0.73	51.1
Approach		503	0.8	0.534	9.8	LOS A	4.8	33.9	0.78	0.73	51.3
East: Frederick St - E											
4	L2	26	4.0	0.334	4.9	LOS A	2.2	16.1	0.21	0.61	51.2
5	T1	2	0.0	0.334	5.1	LOS A	2.2	16.1	0.21	0.61	52.3
6	R2	417	7.6	0.334	8.6	LOS A	2.2	16.1	0.21	0.61	51.7
Approach		445	7.3	0.334	8.3	LOS A	2.2	16.1	0.21	0.61	51.7
North: Reserved Rd - N											
7	L2	342	3.1	0.356	5.6	LOS A	2.2	16.0	0.37	0.57	53.1
8	T1	61	1.7	0.356	5.8	LOS A	2.2	16.0	0.37	0.57	54.2
9	R2	3	33.3	0.356	9.9	LOS A	2.2	16.0	0.37	0.57	52.4
Approach		406	3.1	0.356	5.7	LOS A	2.2	16.0	0.37	0.57	53.2
West: Enterprise Centre - W											
10	L2	17	6.3	0.041	12.7	LOS A	0.3	2.2	0.87	0.70	48.2
11	T1	4	0.0	0.041	12.6	LOS A	0.3	2.2	0.87	0.70	49.3
12	R2	1	0.0	0.041	15.9	LOS B	0.3	2.2	0.87	0.70	49.0
Approach		22	4.8	0.041	12.8	LOS A	0.3	2.2	0.87	0.70	48.5
All Vehicles		1377	3.7	0.534	8.2	LOS A	4.8	33.9	0.48	0.64	51.9

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

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

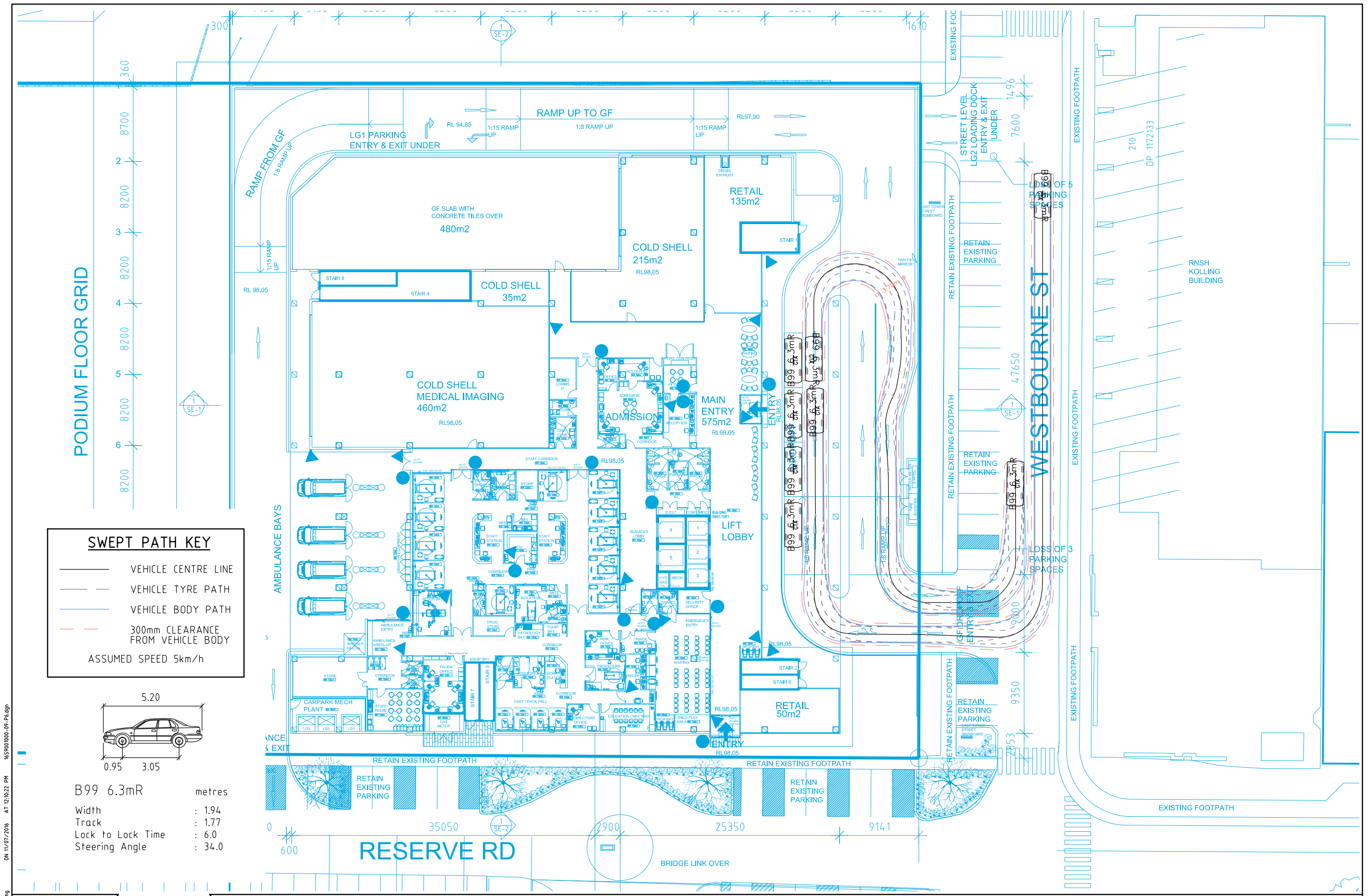
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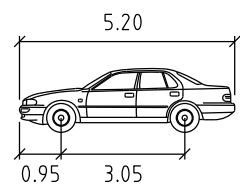
Appendix B

Swept Path Assessment



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



B99 6.3mR	metres
Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

16S9001000-09-P6.dgn
ON 11/07/2016 AT 12:02:22 PM
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Melbourne 03 9851 9600
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Townsville 07 4722 2765
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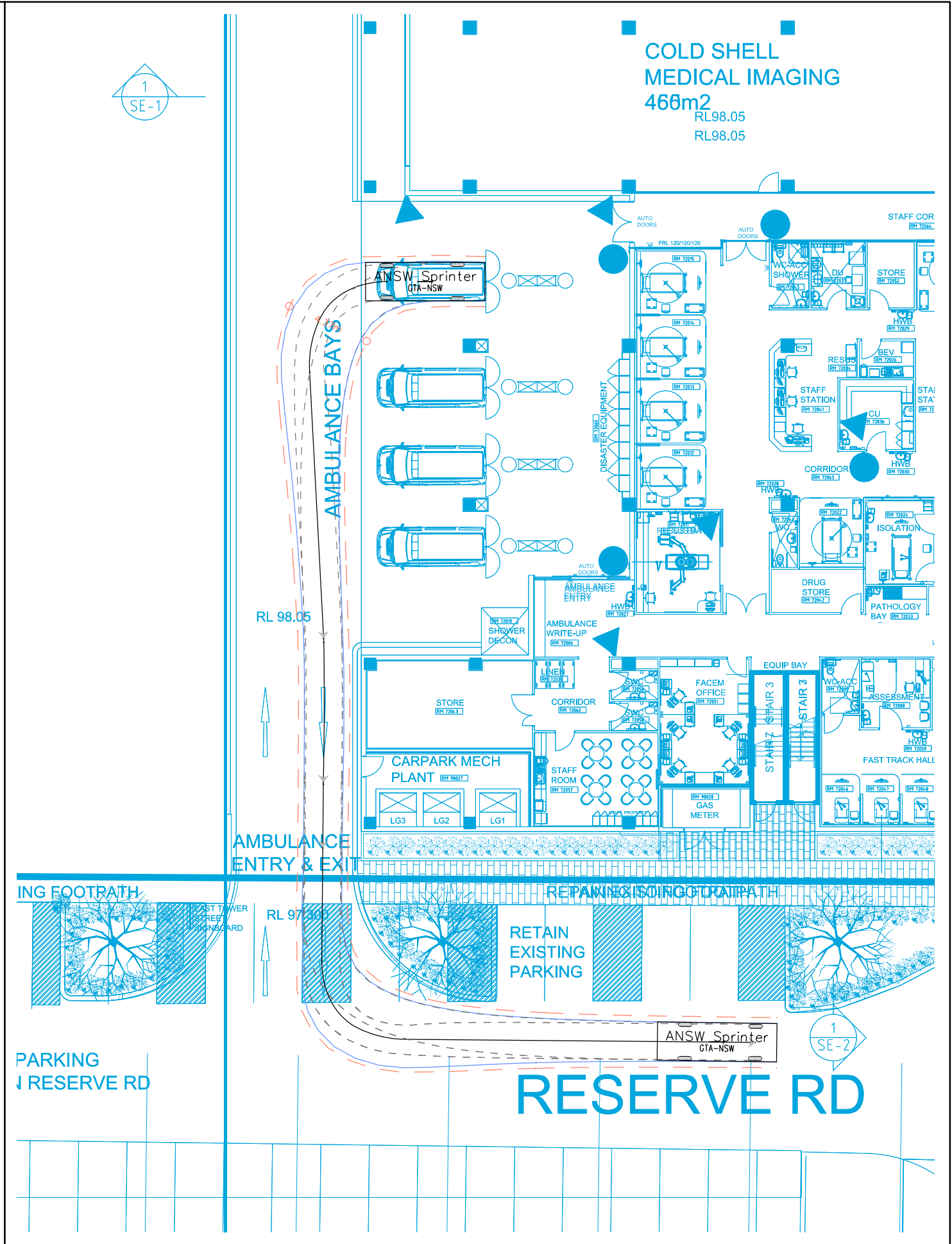
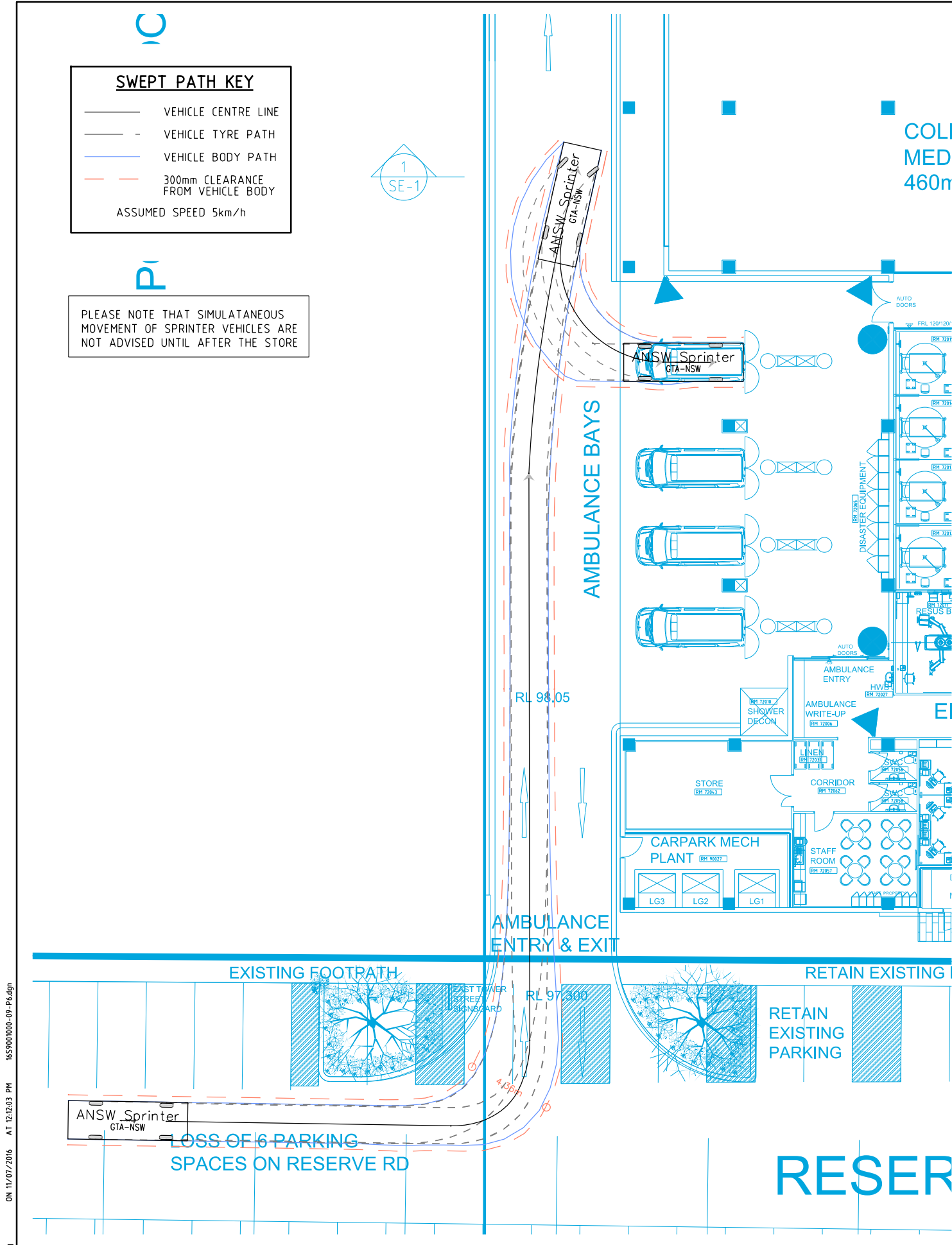


PRELIMINARY PLAN
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NOTIFICATION

12 FREDERICK STREET, ST LEONARDS
DROP OFF AREA
SWEPT PATH ASSESSMENT

DATE:	11/07/2016	SCALE:	1:400@A3
APPROVED:	BDM	DRAWING NO.	16S9001000-09-01-P6
		SHEET:	01 OF 15





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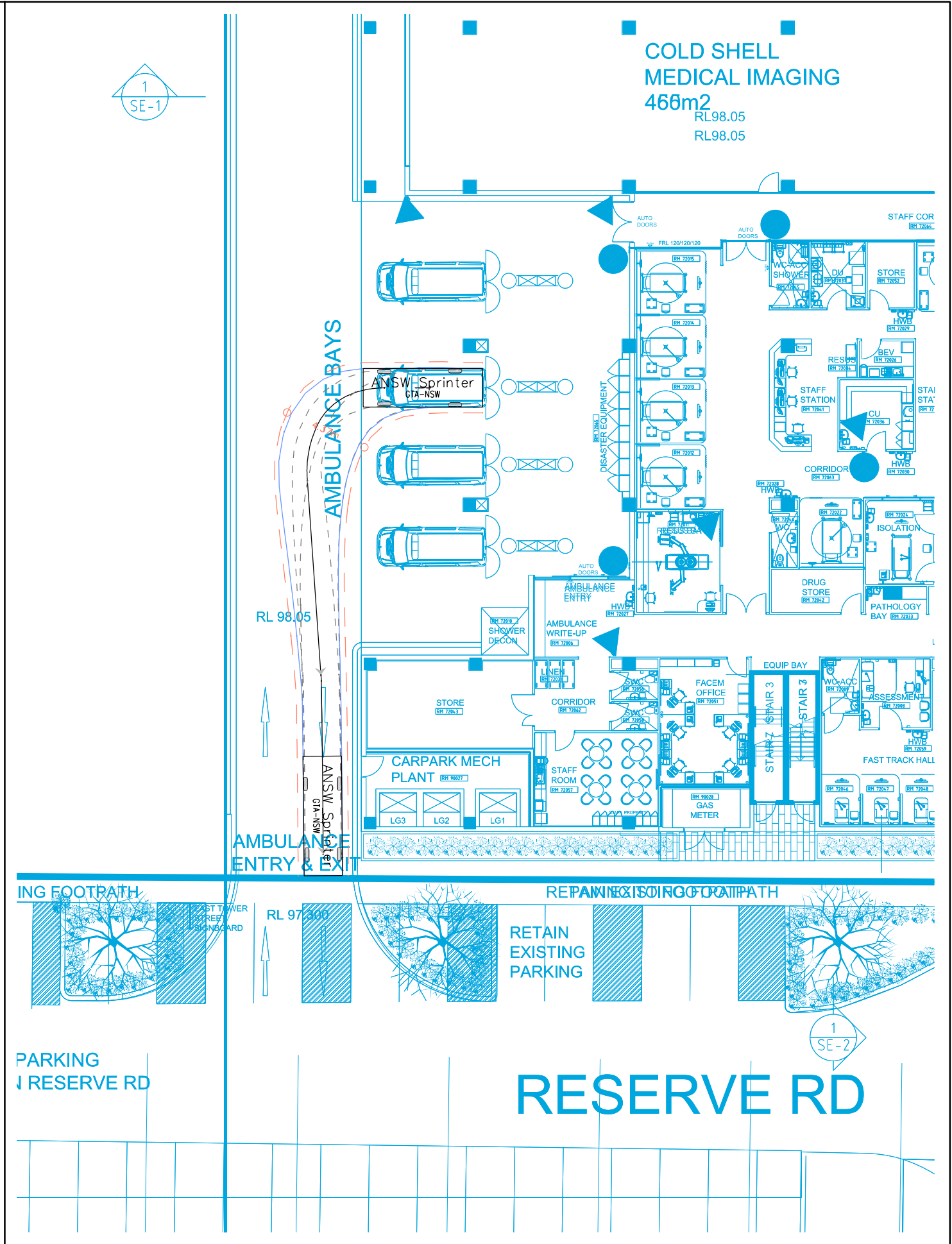
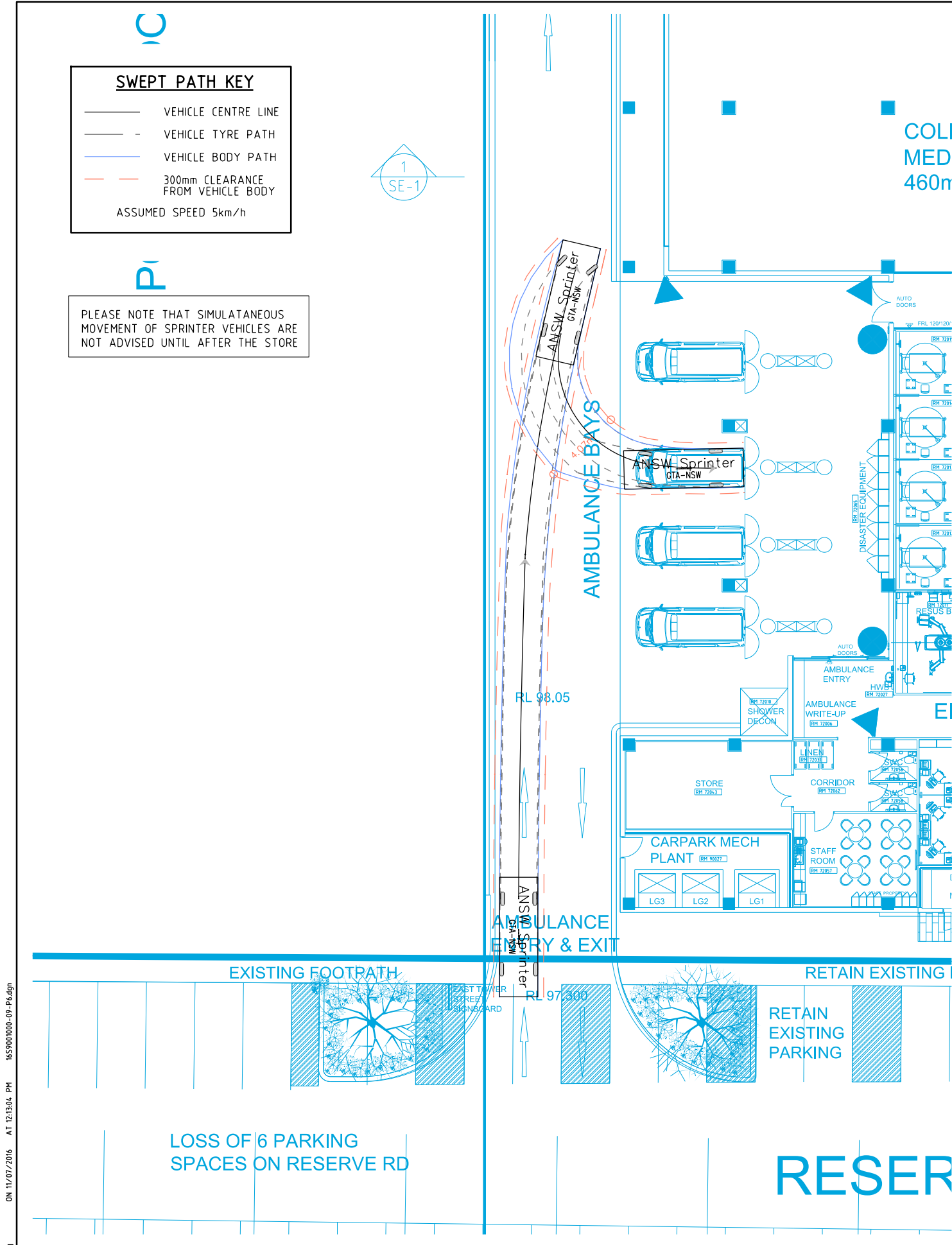
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12 FREDERICK STREET, ST LEONARDS
AMBULANCE PARKING
SWEPT PATH ASSESSMENT

DATE: 11/07/2016 SCALE: 1:250@A3
APPROVED: BDM DRAWING NO. 16S9001000-09-02-P6 SHEET: 02 OF 15



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 ON 11/07/2016 AT 12:34 PM
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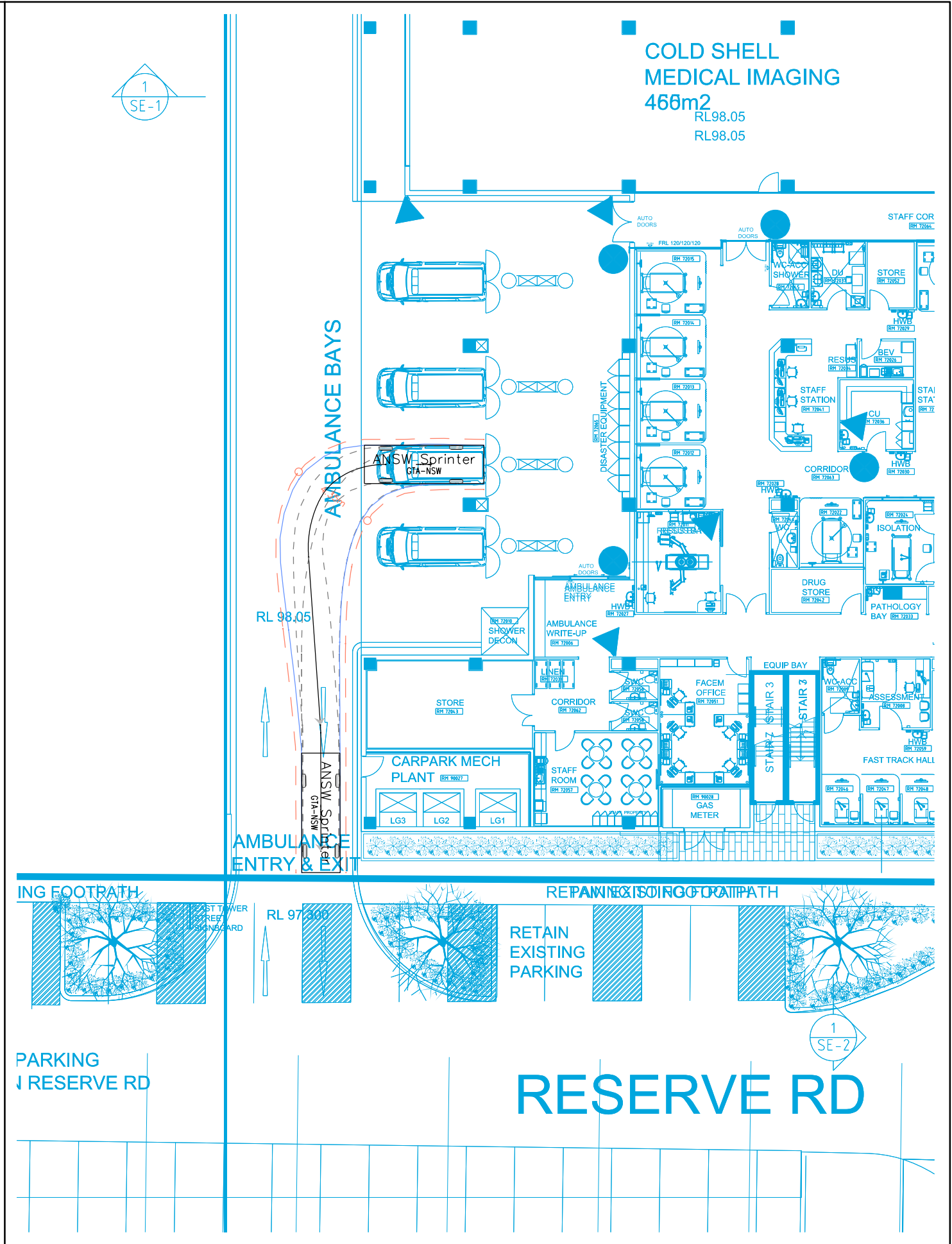
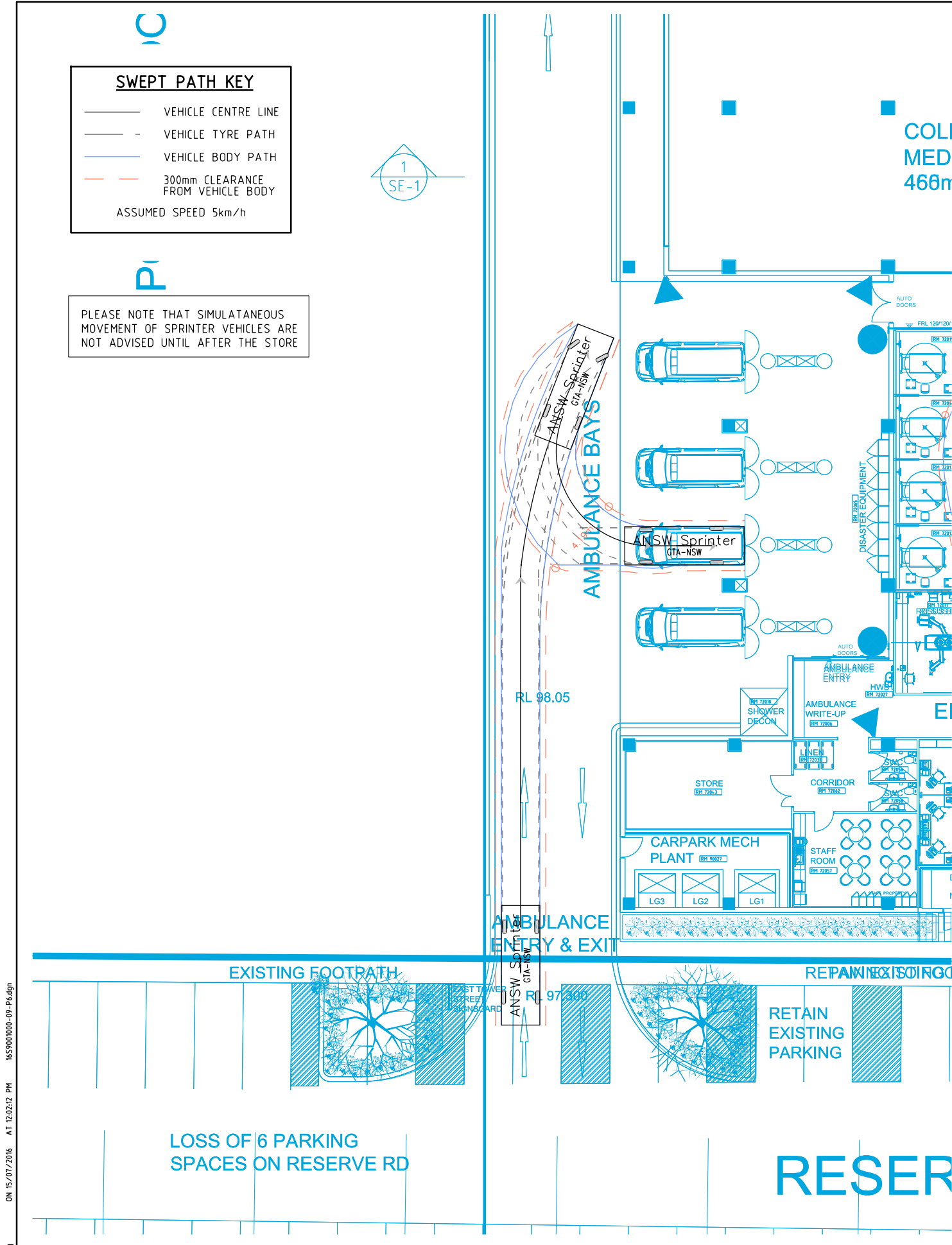
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12 FREDERICK STREET, ST LEONARDS
 AMBULANCE PARKING
 SWEPT PATH ASSESSMENT

DATE: 11/07/2016
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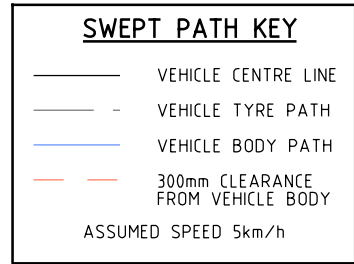
12 FREDERICK STREET, ST LEONARDS
AMBULANCE PARKING
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:250@A3

APPROVED: BDM
DRAWING NO. 16S9001000-09-04-P6

SHEET: 04 OF 15





PLEASE NOTE THAT SIMULTANEOUS MOVEMENT OF SPRINTER VEHICLES ARE NOT ADVISED UNTIL AFTER THE STORE



AMBULANCE BAYS

AMBULANCE ENTRY & EXIT

EXISTING FOOTPATH

RETAIN EXISTING

LOSS OF 6 PARKING SPACES ON RESERVE RD

RESERVE

COLI MED 460m



AMBULANCE BAYS

AMBULANCE ENTRY & EXIT

EXISTING FOOTPATH

REPAIR & ISOLATION FOOTPATH

RESERVE RD

COLD SHELL MEDICAL IMAGING 466m2
RL98.05
RL98.05

PARKING RESERVE RD

RETAIN EXISTING PARKING

12 FREDERICK STREET, ST LEONARDS
AMBULANCE PARKING
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:250@A3

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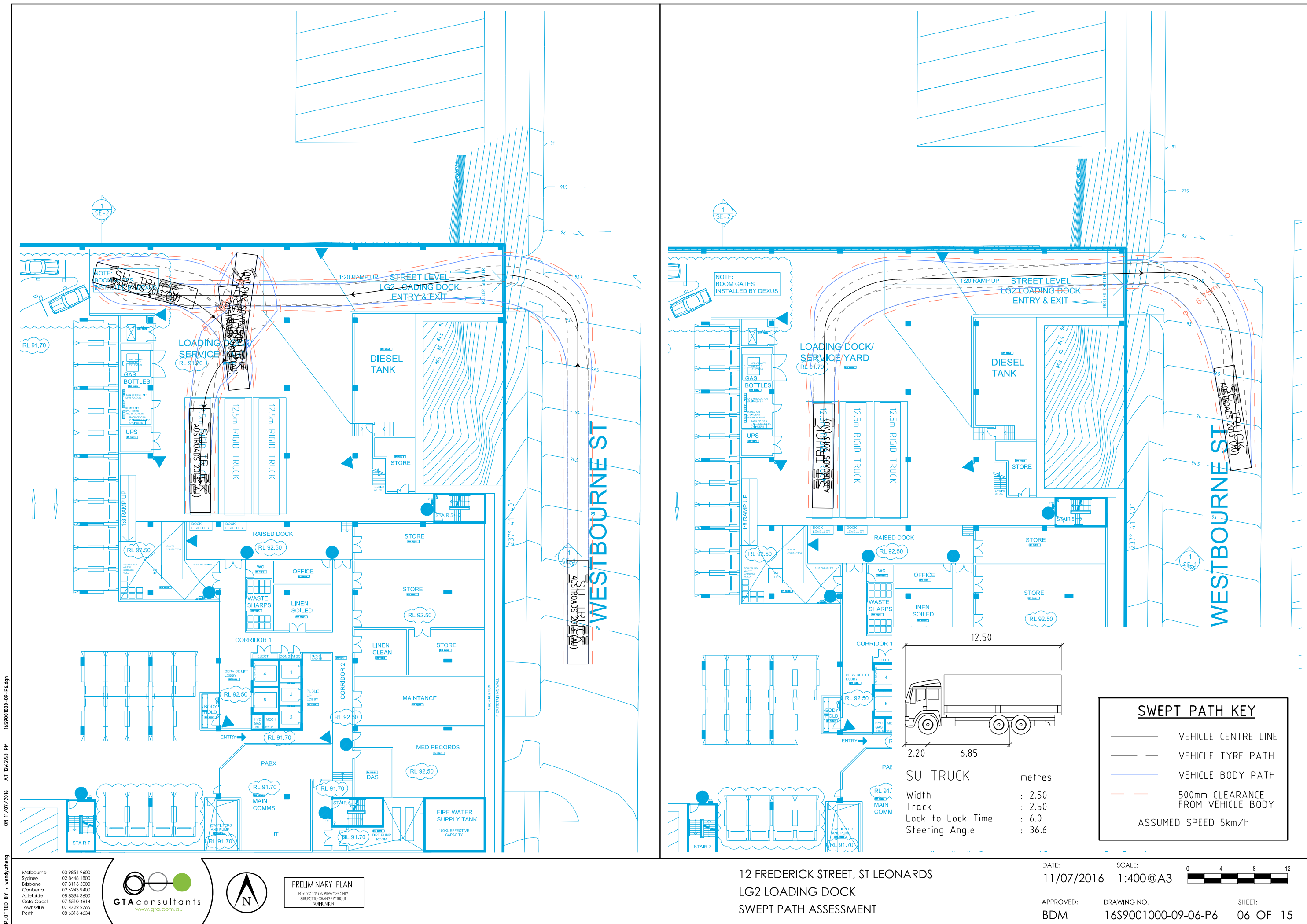
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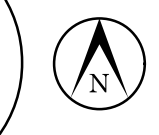


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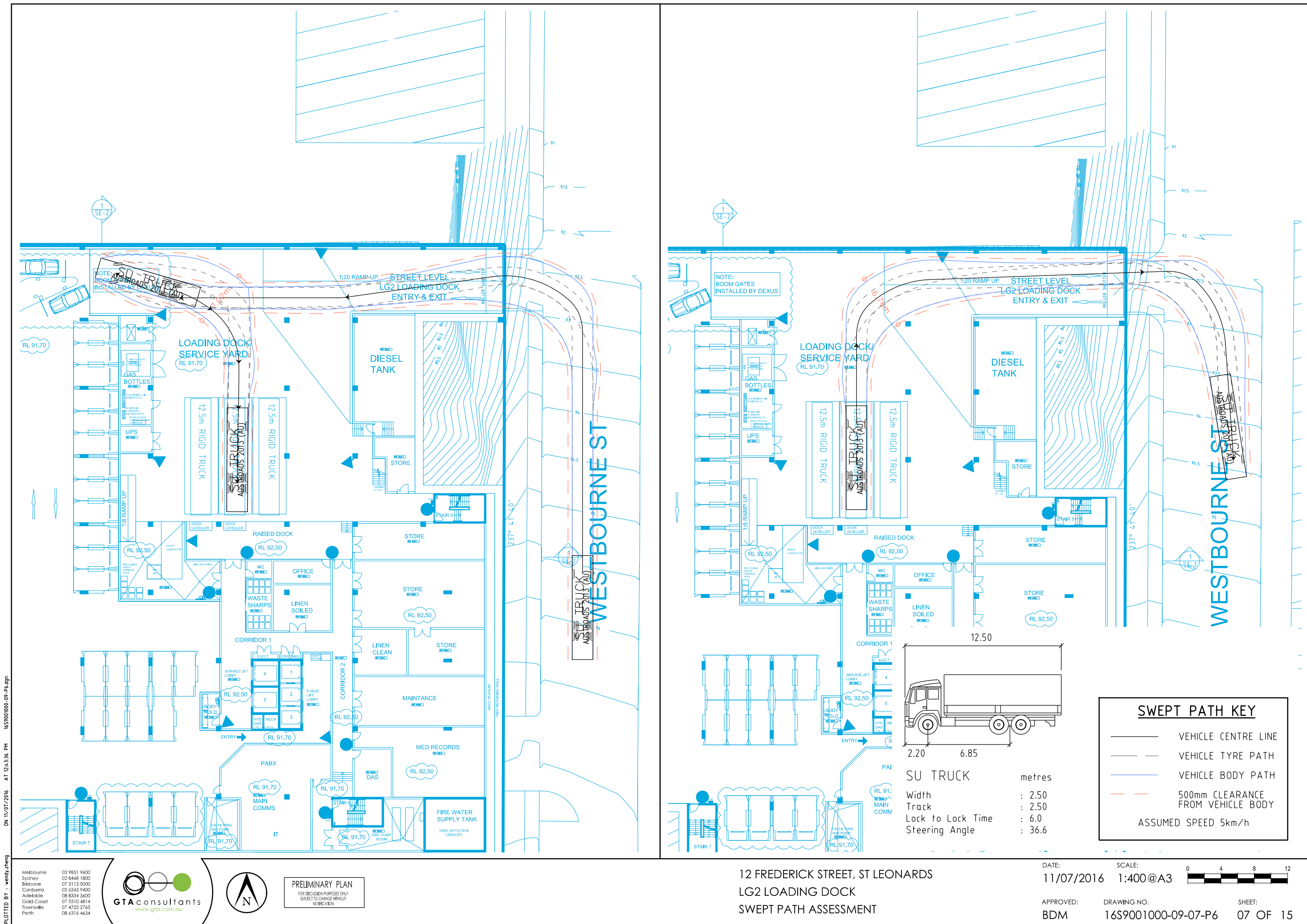
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12 FREDERICK STREET, ST LEONARDS
LG2 LOADING DOCK
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:400@A3
APPROVED: BDM
DRAWING NO. 16S9001000-09-06-P6
SHEET: 06 OF 15



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12 FREDERICK STREET, ST LEONARDS
LG2 LOADING DOCK
SWEEP PATH ASSESSMENT

SU TRUCK		metres
Width	: 2.50	
Track	: 2.50	
Lock to Lock Time	: 6.0	
Steering Angle	: 36.6	

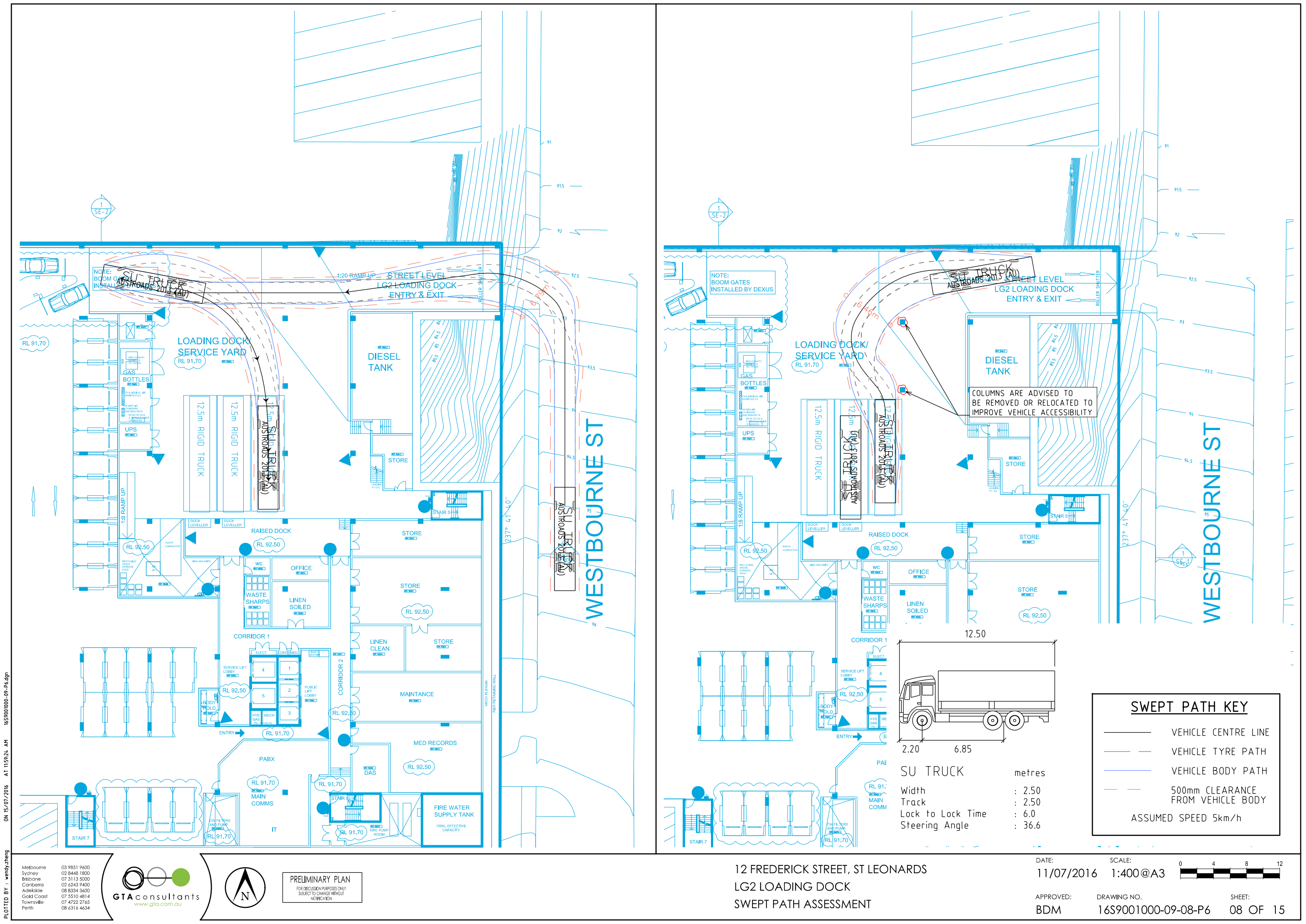
SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

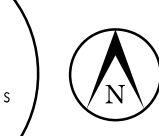
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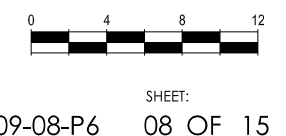
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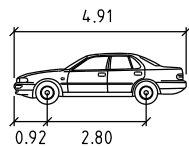
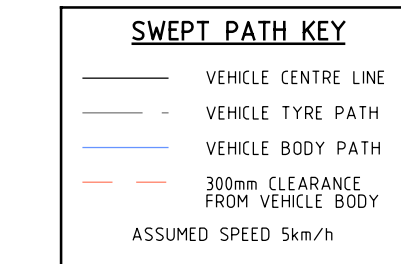
PRELIMINARY PLAN
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NOTIFICATION

12 FREDERICK STREET, ST LEONARDS
LG2 LOADING DOCK
SWEEP PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:400@A3
APPROVED: BDM
DRAWING NO. 16S9001000-09-08-P6
SHEET: 08 OF 15

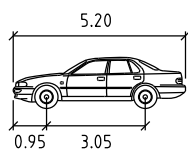


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B85 metres

Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.0



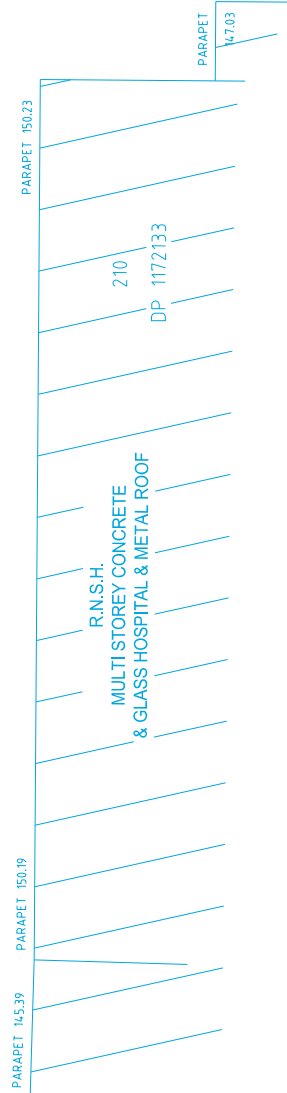
B99 6.3mR metres

Width : 1.94
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.0



RESERVE RD

WESTBOURNE ST



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Townsville 07 4722 2765
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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT
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12 FREDERICK STREET, ST LEONARDS
LG1 CAR PARK
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:400@A3

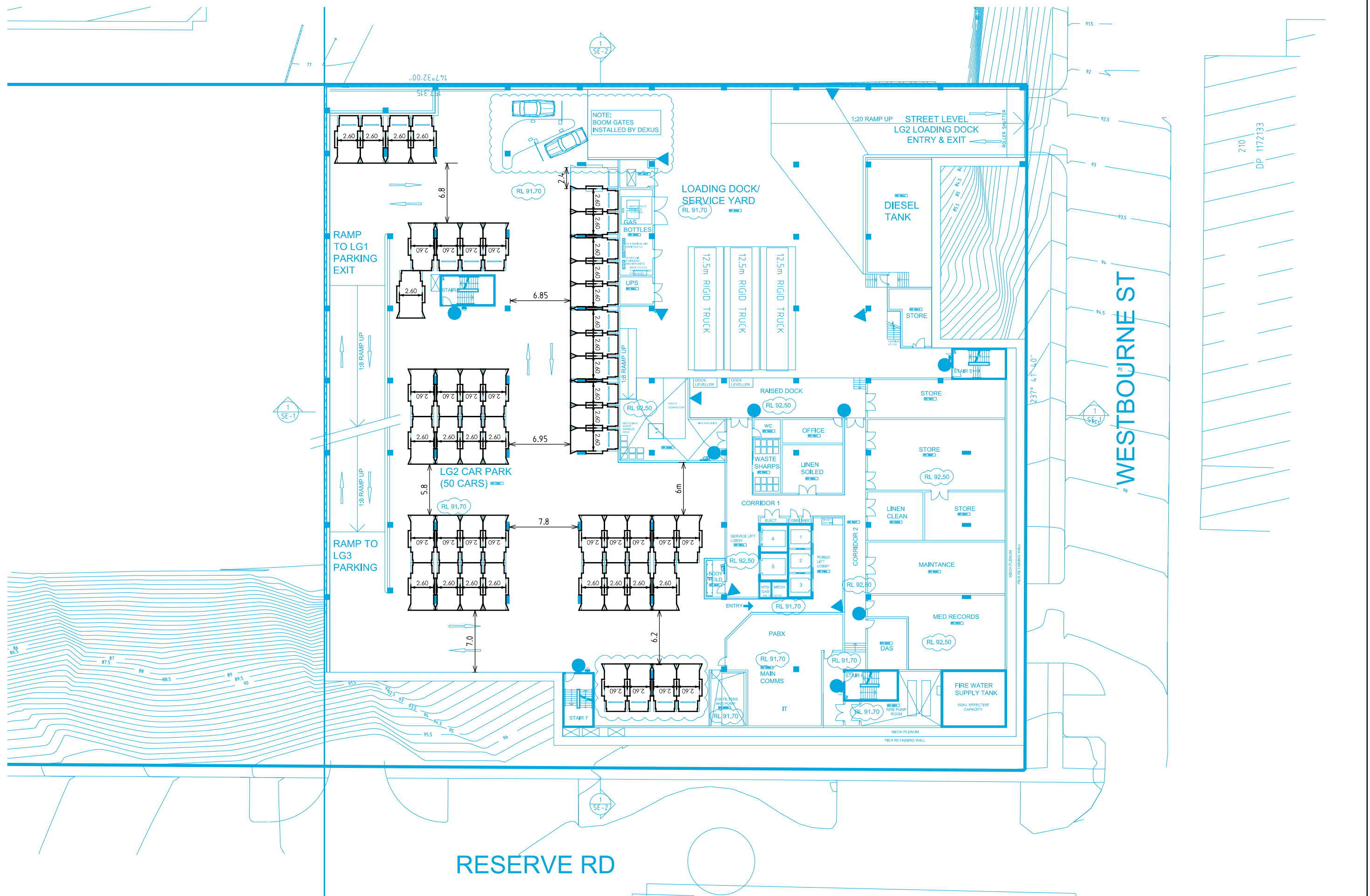
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SHEET: 10 OF 15



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PLOTTED BY : wendy.zheng



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Brisbane 07 3113 5000
Canberra 02 6243 9400
Adelaide 08 8334 3600
Gold Coast 07 5510 4814
Townsville 07 4722 2765
Perth 08 6316 4634



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT
NOTIFICATION

12 FREDERICK STREET, ST LEONARDS
LG2 CAR PARK
CAR PARK COMPLIANCE

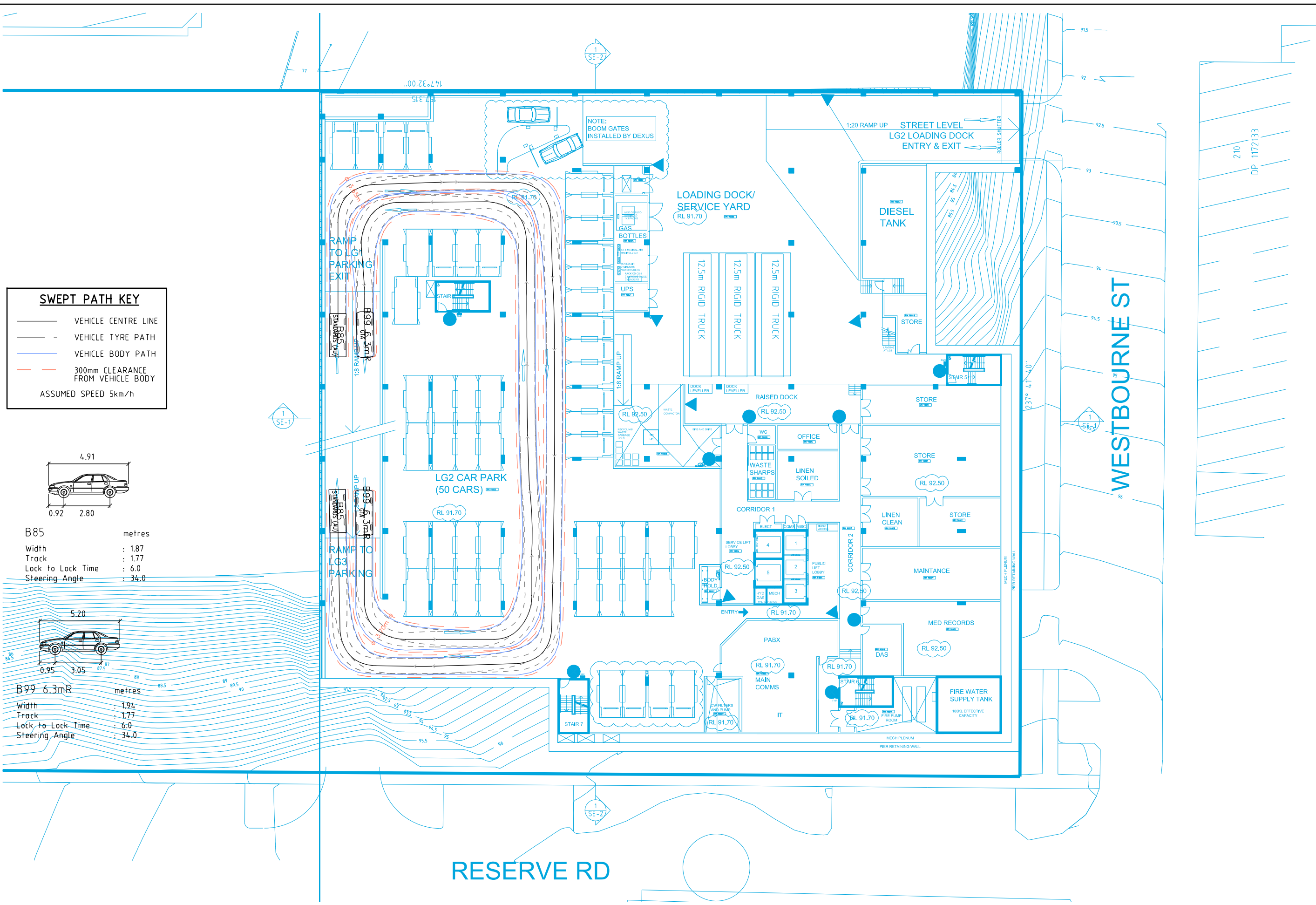
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DRAWING NO. 16S9001000-09-11-P6

SHEET: 11 OF 15





SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

B85 metres

Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.0

B99 6.3mR metres

Width : 1.94
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.0

16S9001000-09-P6.dgn
ON 15/07/2016 AT 12:33:03 PM
PLOTTED BY : wendy.zheng

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Townsville 07 4722 2765
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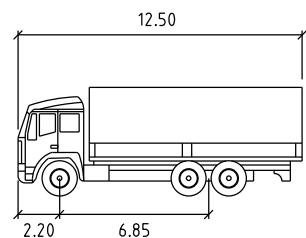


PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
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12 FREDERICK STREET, ST LEONARDS
LG2 CAR PARK
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:400@A3

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SHEET: 12 OF 15

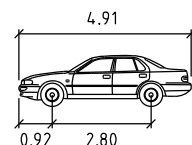
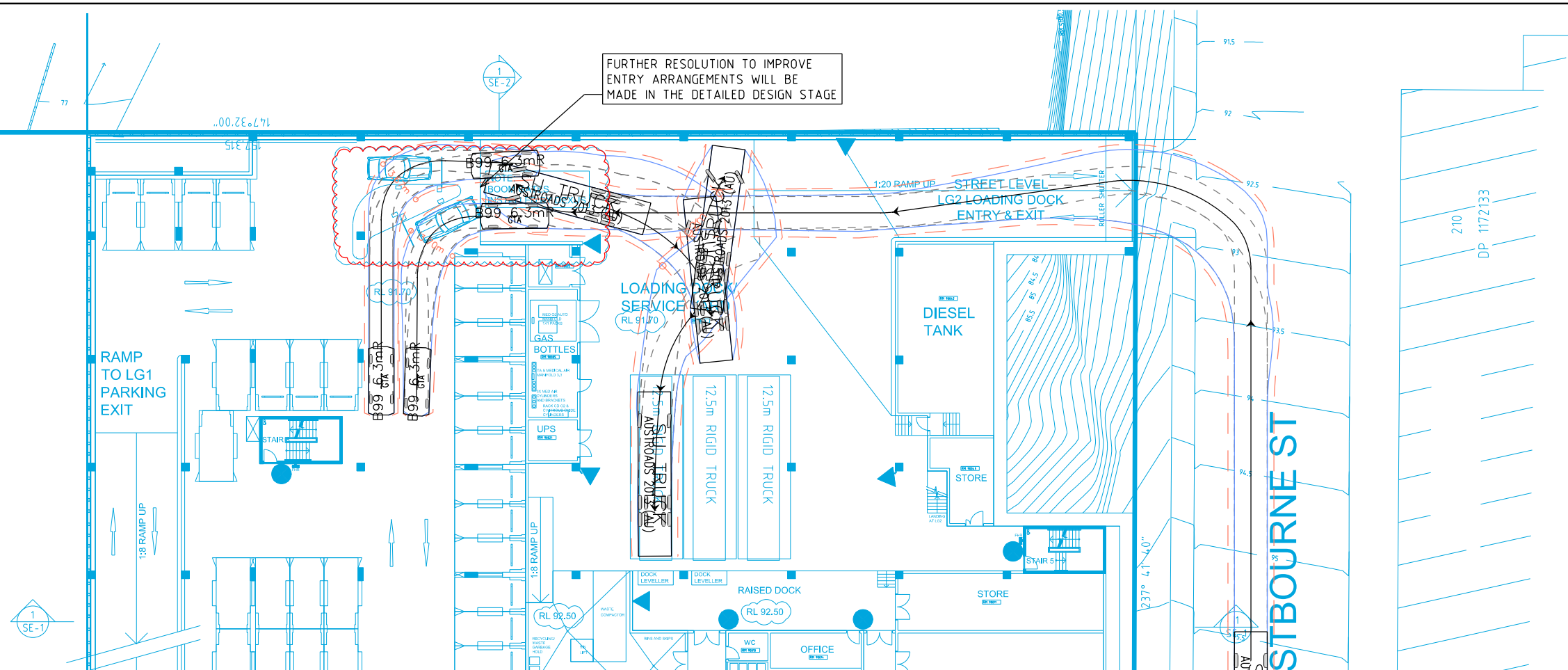


SU TRUCK metres

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

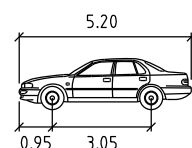
SWEPT PATH KEY

- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



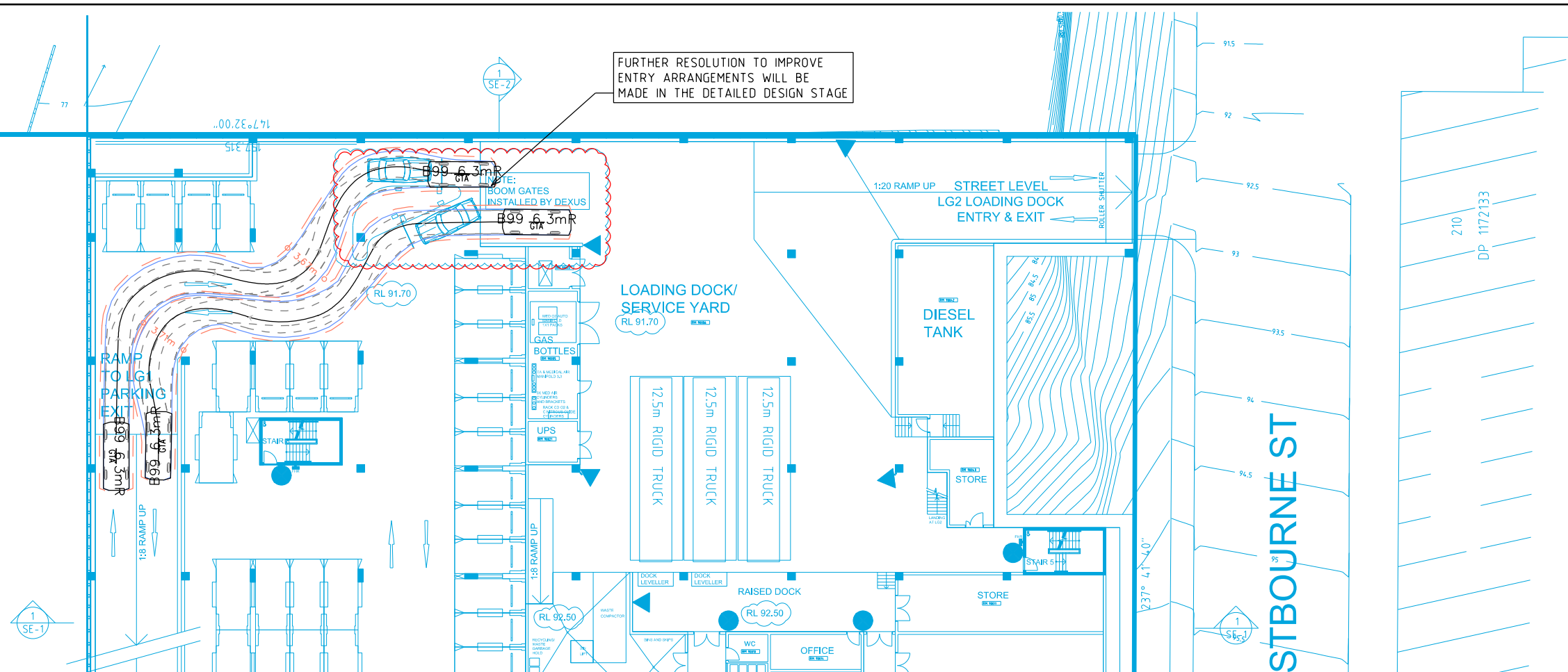
B85 metres

Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0



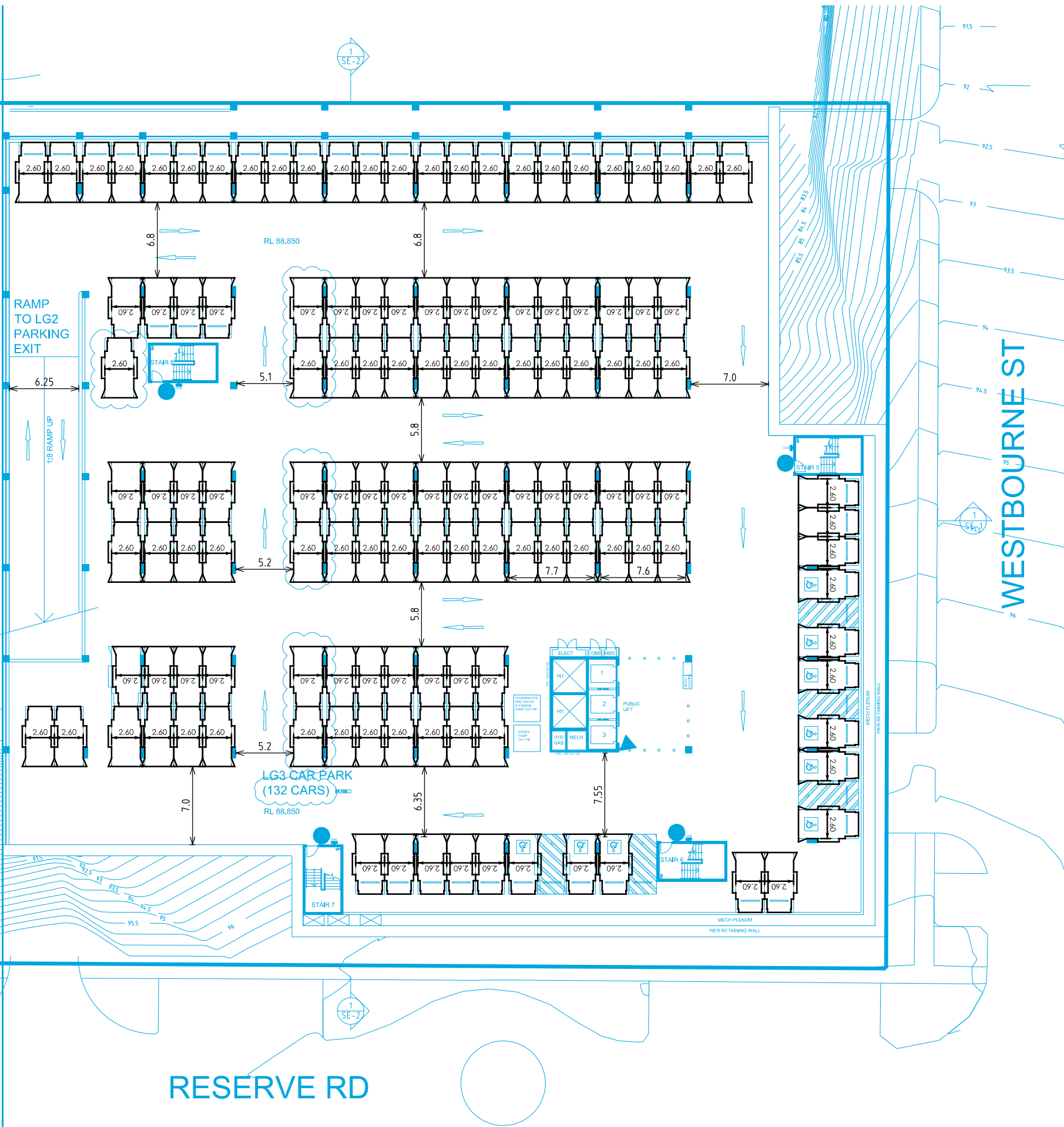
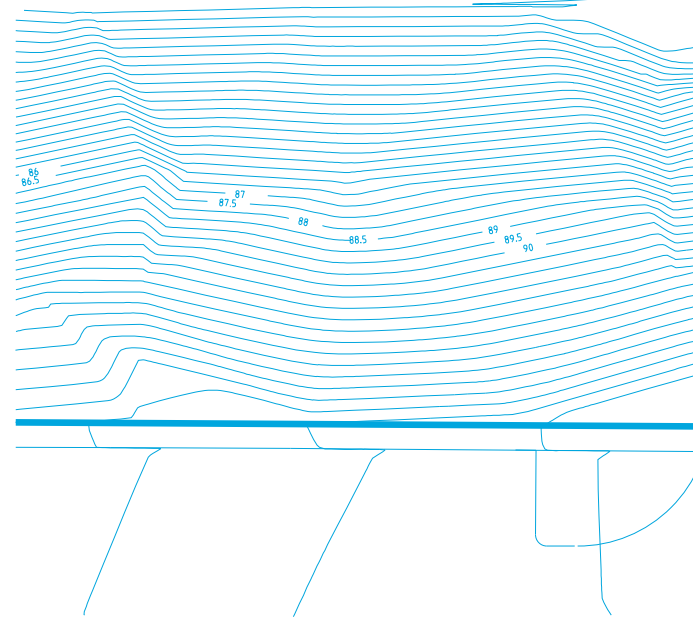
B99 6.3mR metres

Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

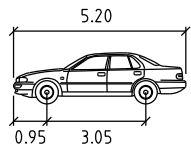
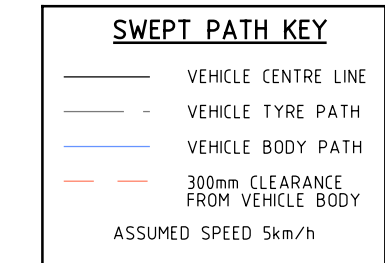


12 FREDERICK STREET, ST LEONARDS
LG2 CAR PARK
SWEPT PATH ASSESSMENT

DATE: 11/07/2016 SCALE: 1:400@A3
APPROVED: BDM DRAWING NO. 16S9001000-09-13-P6 SHEET: 13 OF 15

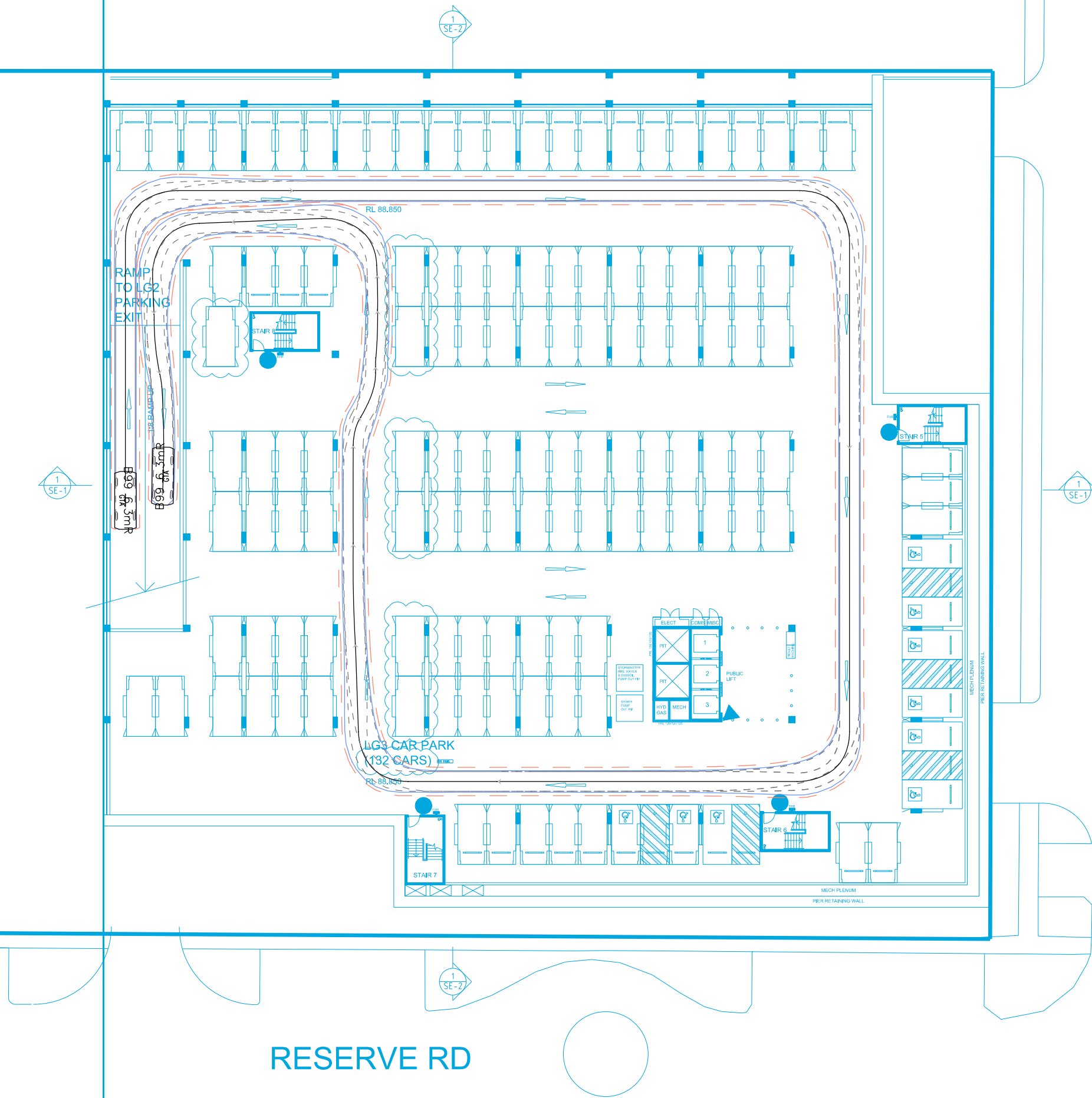


16S9001000-09-P6.dgn
ON 11/07/2016 AT 23:27 PM
PLOTTED BY : wendy.zheng



B99 6.3mR metres

Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0



RESERVE RD

WESTBOURNE ST

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Canberra 02 6243 9400
Adelaide 08 8334 3600
Gold Coast 07 5510 4814
Townsville 07 4722 2765
Perth 08 6316 4634



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT
NOTIFICATION

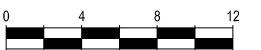
12 FREDERICK STREET, ST LEONARDS
LG3 CAR PARK
SWEPT PATH ASSESSMENT

DATE: 11/07/2016
SCALE: 1:400@A3

APPROVED:
BDM

DRAWING NO.
16S9001000-09-15-P6

SHEET:
15 OF 15



Melbourne

A Level 25, 55 Collins Street
PO Box 24055
MELBOURNE VIC 3000
P +613 9851 9600
E melbourne@gta.com.au

Sydney

A Level 6, 15 Help Street
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
E sydney@gta.com.au

Brisbane

A Level 4, 283 Elizabeth Street
BRISBANE QLD 4000
GPO Box 115
BRISBANE QLD 4001
P +617 3113 5000
E brisbane@gta.com.au

Canberra

A Tower A, Level 5,
7 London Circuit
Canberra ACT 2600
P +612 6243 4826
E canberra@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
E adelaide@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37, 1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
E townsville@gta.com.au

Perth

A Level 27, 44 St Georges Terrace
PERTH WA 6000
P +618 6361 4634
E perth@gta.com.au