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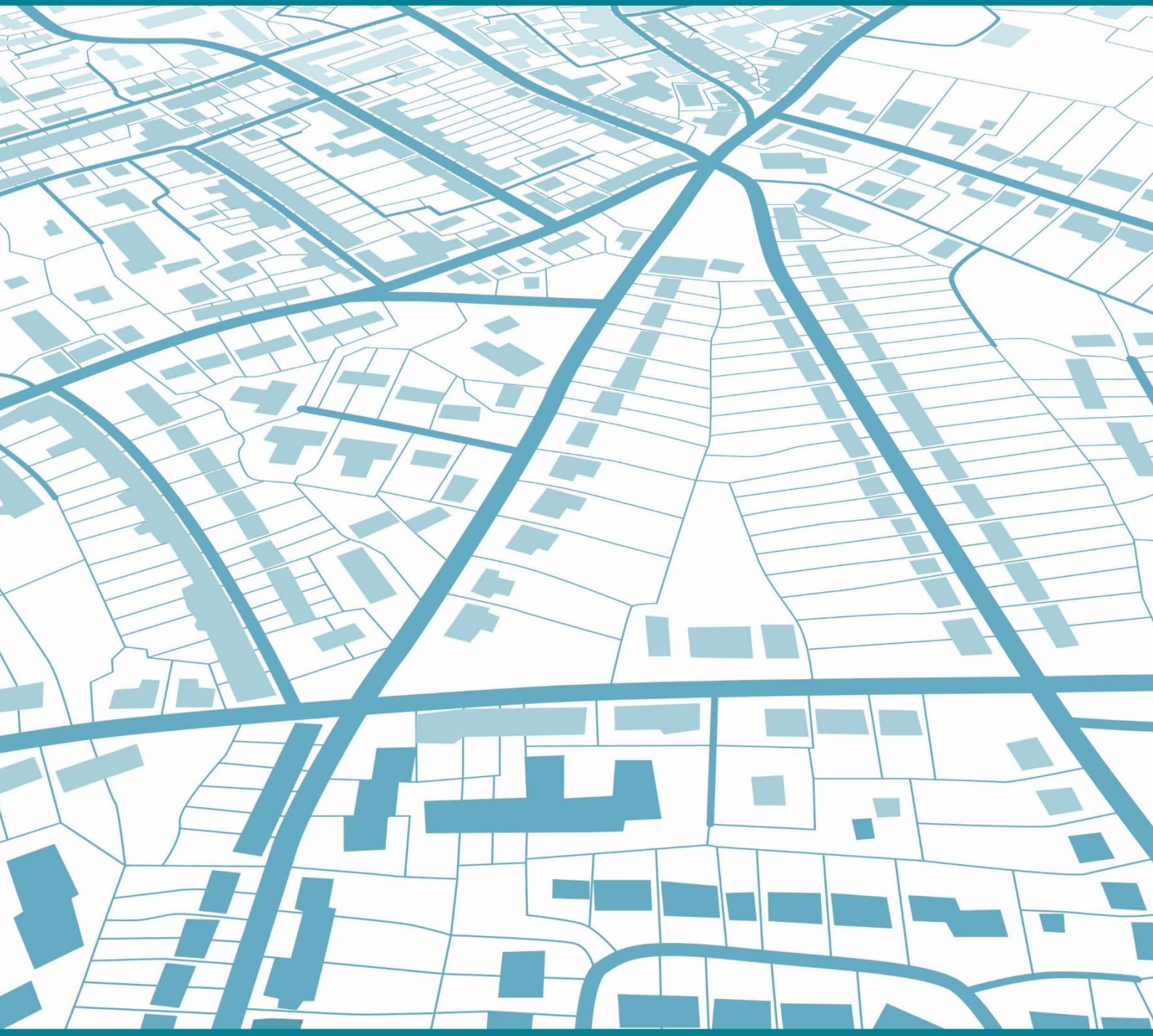

49 Frenchs Forest Road East, Frenchs Forest (Building 9) Proposed Oncology Centre

Assessment of Traffic and Parking Implications

Ref: 19020
Date: December 2019
Issue: F

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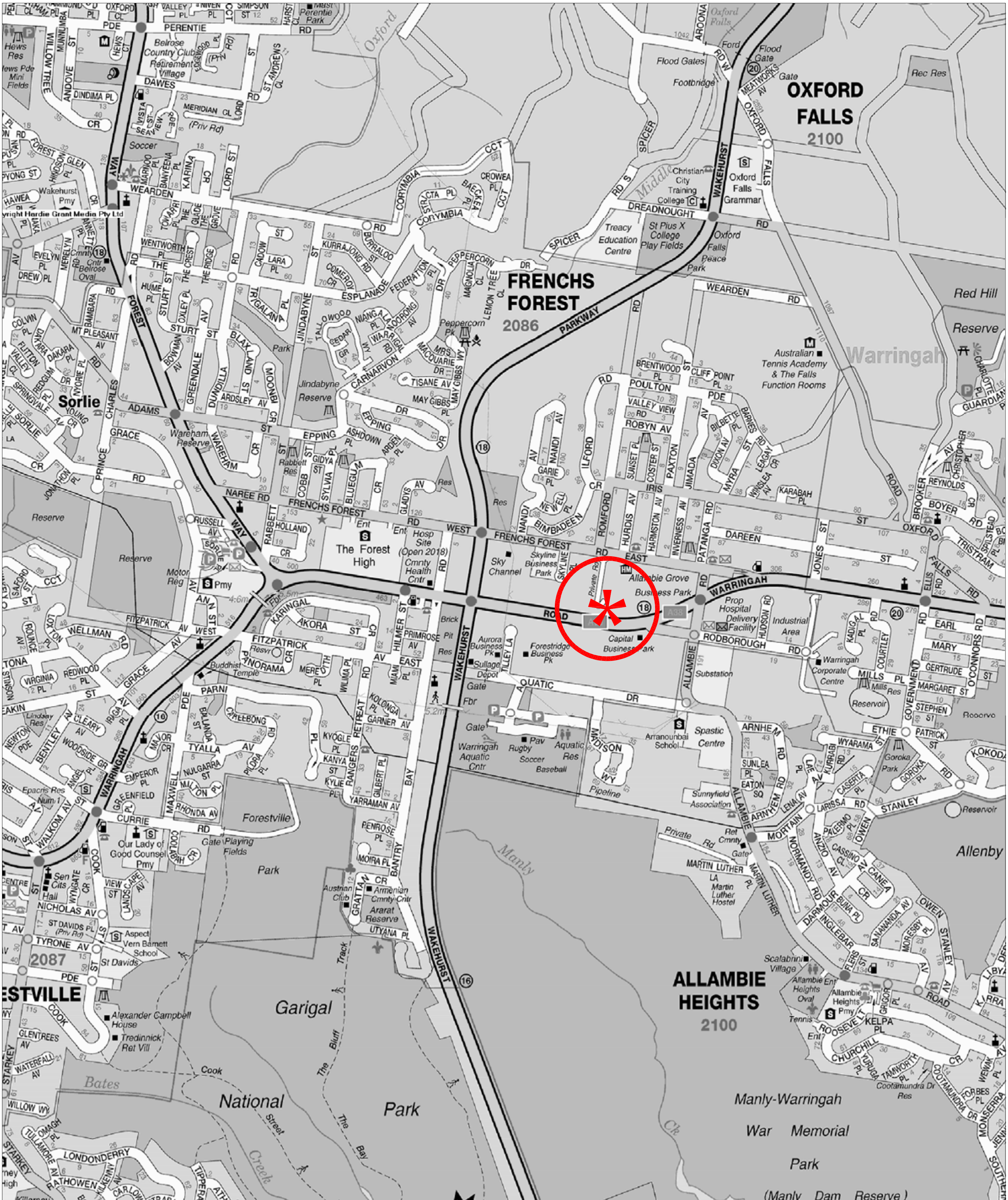
1.0 Introduction

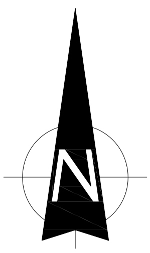
This report has been prepared to accompany a Development Application to Northern Beaches Council for a proposed Cancer Treatment Centre on a site in Frenchs Forest Road East, Frenchs Forest (Figure 1).

The site is conveniently located in relation to public transport services and access to/from the arterial road system and will respond to the medical needs of the community and complement the Northern Beaches Medical to the west of the site.

The purpose of this report is to:

- describe the site, its context and the proposed development scheme
- describe the existing road network and traffic conditions
- assess the adequacy of the proposed parking provision
- assess the potential traffic implications
- assess the vehicle access, internal circulation and servicing arrangements





LOCATION

FIG 1

2.0 Proposed Development

2.1 Site, Context and Existing Use

The development site (Figure 2) is Lot 7 in DP 1020015, which occupies a rectangularly shaped area of some 1,774m² and has a frontage to the northern side of Warringah Road. The site is currently used as a storage as part of the Northern Beaches Hospital Stage 2 Road Network Enhancement project with construction vehicle access provided on the Warringah Road frontage.

The surrounding areas to the north comprise traditional residential dwellings while the area to the west, east and south generally comprises a mixture of old and new industrial and commercial buildings. Interspersed within this mixture are schools, aquatic centre, hotel, fast food and a small shopping precinct.

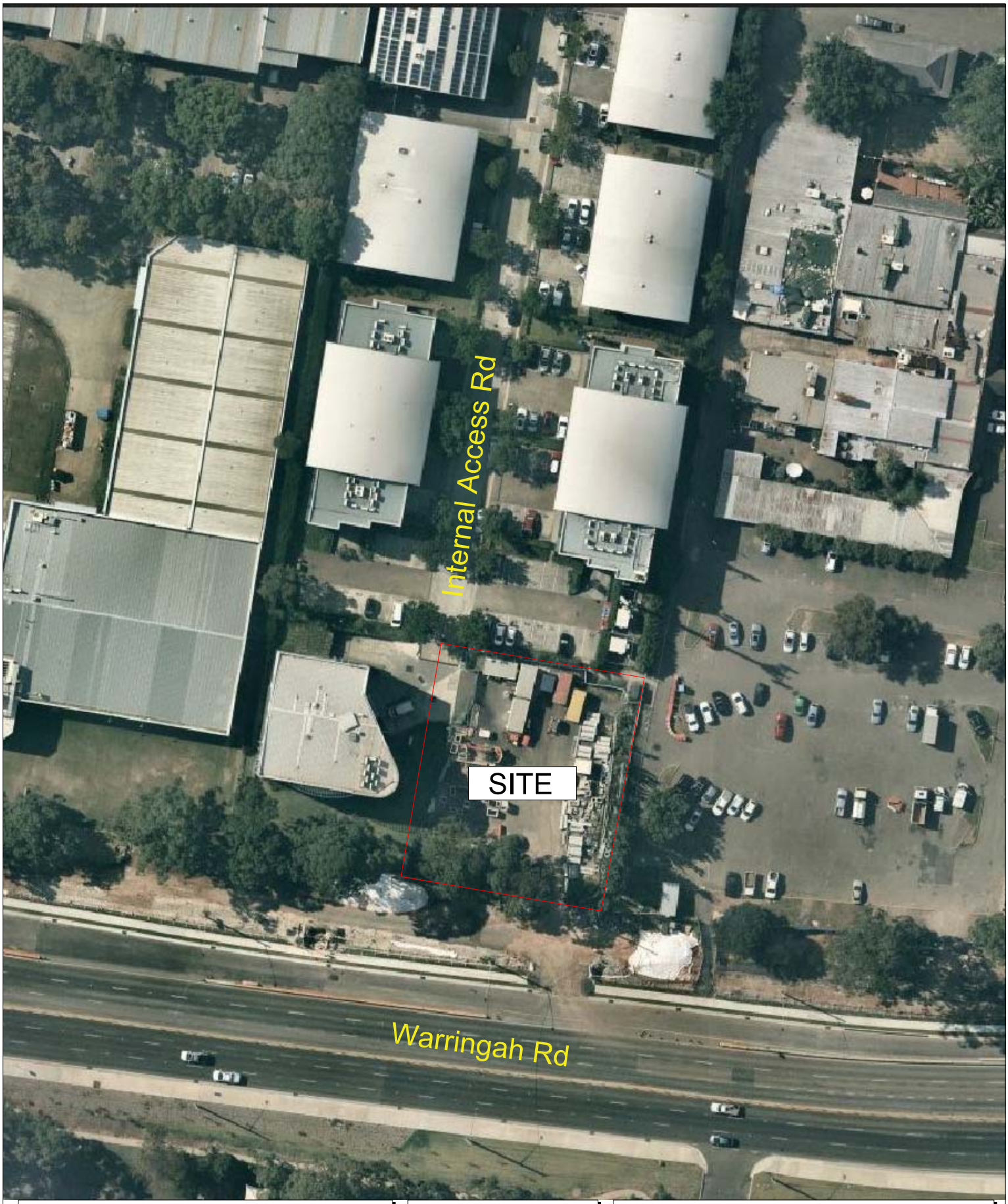
Vehicular access to the site is provided from Frenchs Forest Road East via two driveways. The eastern driveway provides for entry and the western driveway provides for exiting vehicles. All turning movements are permitted at the site driveways.

The adjacent lot (39 Frenchs Forest Road East) has been approved and will comprise of:

- modifications to the hotel to provide 2,329m^2 GFA
- a new Dan Murphy's of 1,368m^2 to replace the existing drive-through bottle shop
- an accommodation building with 100 rooms
- on-site parking of some 271 cars.

2.2 Proposed Development Scheme

The proposed development scheme involves a proposed Cancer Treatment Centre on Building 9 lot with a total GFA of 1,976m^2. Access is proposed via on the southern end of a right-of-way connection to the existing Business Park service road onto



LEGEND

N

SITE

FIG 2

Frenchs Forest Road East.

The proposed development is for:

- a new four-storey building for radiation oncology, including a total of 18 rooms used to see patients with the following breakdown:

    - 7 consulting rooms
    - 2 interview rooms
    - 1 CT/PET CT room
    - 1 MRI room
    - 1 'radiation' bunker
    - 2 nurse/treat rooms
    - 2 treatment rooms
    - 1 intermittent needle therapy/education room
    - 2 blood bay rooms

- provision of 75 car parking (2 disabled) spaces over 4 basement levels
- an ambulance bay
- a porte-cochere

The expected staffing breakdown is summarised in the following:

Group	FTE
Consulting RO	3
Consulting MO/haematology	4
Patient Service Officers	6
Nurses cover both MO/RO	7
Radiation Therapists	5
Engineers	1
Physicists	1
Pathologists	1
Pharmacists	1
Allied Health	1
Management/additional administration	3
Imaging suite – radiographer	1
Imaging suite – support staff	3
Total	**37***

** The projected number will be lower with provision for staff on holiday/sick leave*

The anticipated numbers of peak hourly and daily patient visitation for the proposed

development are summarised in the following:

Department		Daily Patient Visitation	Hourly Patient Visitation
RO		40	4
MO		36 - 48	3 - 4
Consulting		55	11
Imaging/SIM		3	3
Imaging suite	PET	5	1
	Gamma	5	1
Total		**144 - 156**	**23 - 24**

The unique elements of the proposed development involve:

- radiation oncology, medical oncology and support services for the management and treatment of cancer.
- no overnight stays with the hold bays only to facilitate observation prior to patient transfer off site.
- treatment of patients is through booked appointments only
- average treatment time for ROs is 15 minutes with the patient being on site for some 30 minutes
- a maximum of 1 patient being treated in the bunker, 1 patient waiting and 1 patient preparing to leave.
- some patients will come from the adjacent hospitals and arriving via ambulance/patient transport services, rideshares, taxis and being dropped-off.

The proposed operating hours are between 7 am and 7 pm and 6 days a week with no patients booked after 5pm. There would be occasional after-hours emergency treatment of 1 patient per 3 months. This is only for emergency spinal compression where immediate treatment is the only relief.

Vehicle access from the service road will be provided on the north-western site frontage.

Details of the proposed scheme are shown on the plans prepared by Team2, which accompany the Development Application and are reproduced in part in Appendix A.

3.0 Existing Road Network and Traffic Conditions

3.1 Road Network

The road network serving the site (Figure 3) comprises:

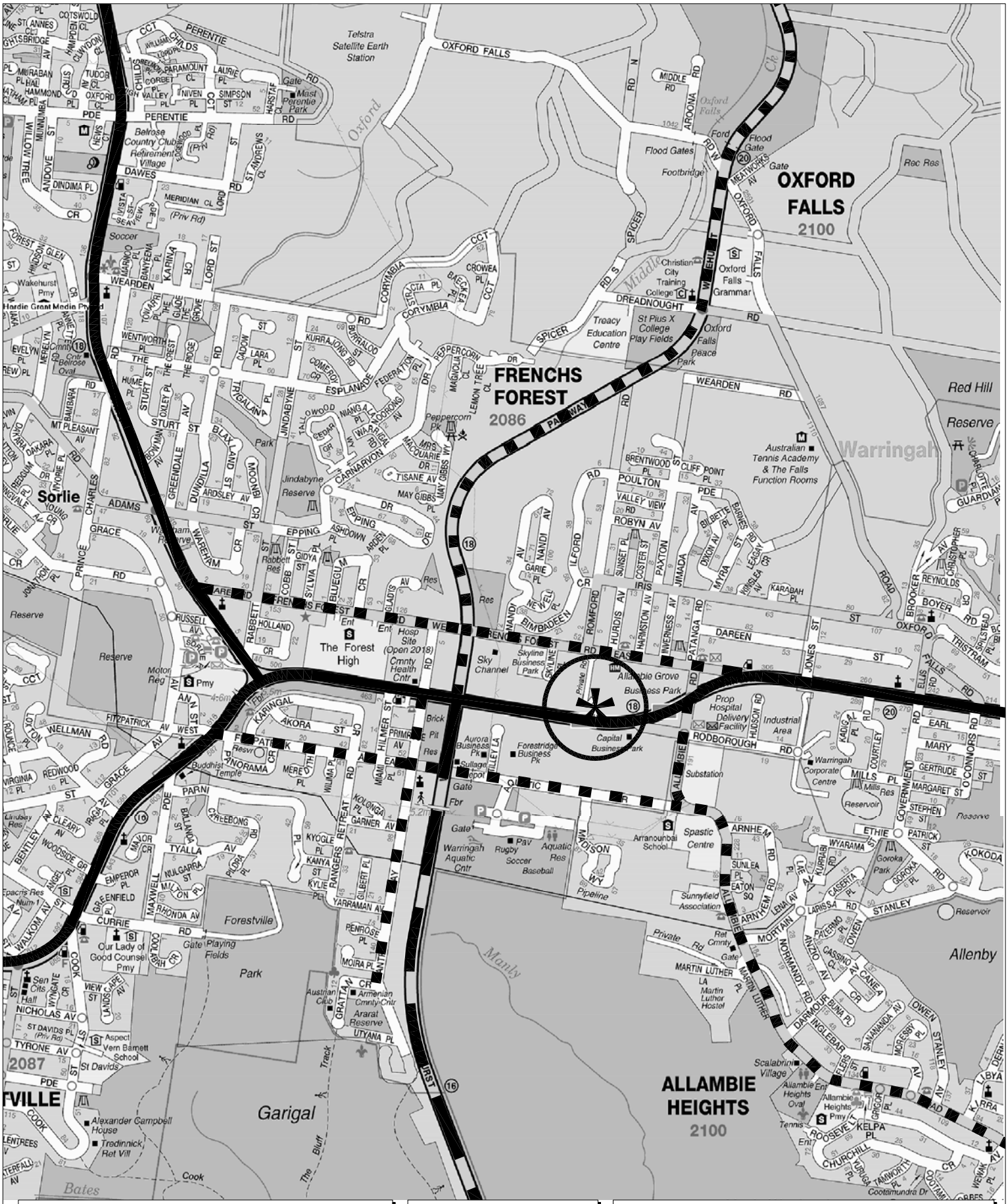
- *Warringah Road* – a State Road and arterial route connecting between Pittwater Road at Brookvale and across Roseville Bridge to Eastern Valley Way and Pacific Highway via Boundary Road
- *Forest Way* – a State Road and arterial route connecting between Warringah Road and Mona Vale Road
- *Wakehurst* Parkway – a State Road and arterial/sub-arterial route connecting between Pittwater Road at Narrabeen and Sydney Road at Balgowlah
- *Allambie* Road – a Regional Road and major collector road route connecting between Warringah Road and Condamine Street at North Manly
- *Frenchs Forest* Road East – a collector road route and connects to Warringah Road in the east and Wakehurst Parkway in the west.

Frenchs Forest Road East has a carriageway width of some 13m in the vicinity of the site and provides two traffic lanes in each direction. The road intersects with Romford Road/egress of the service road to form a signalised intersection, north of the site.

3.2 Traffic Controls

The existing traffic controls, which have been applied to the road system serving the site (Figure 4) comprise:

- the traffic signals at the intersections of:
    - Romford Road/Business Park Service road/Frenchs Forest Road East
    - Warringah Road/Wakehurst Parkway



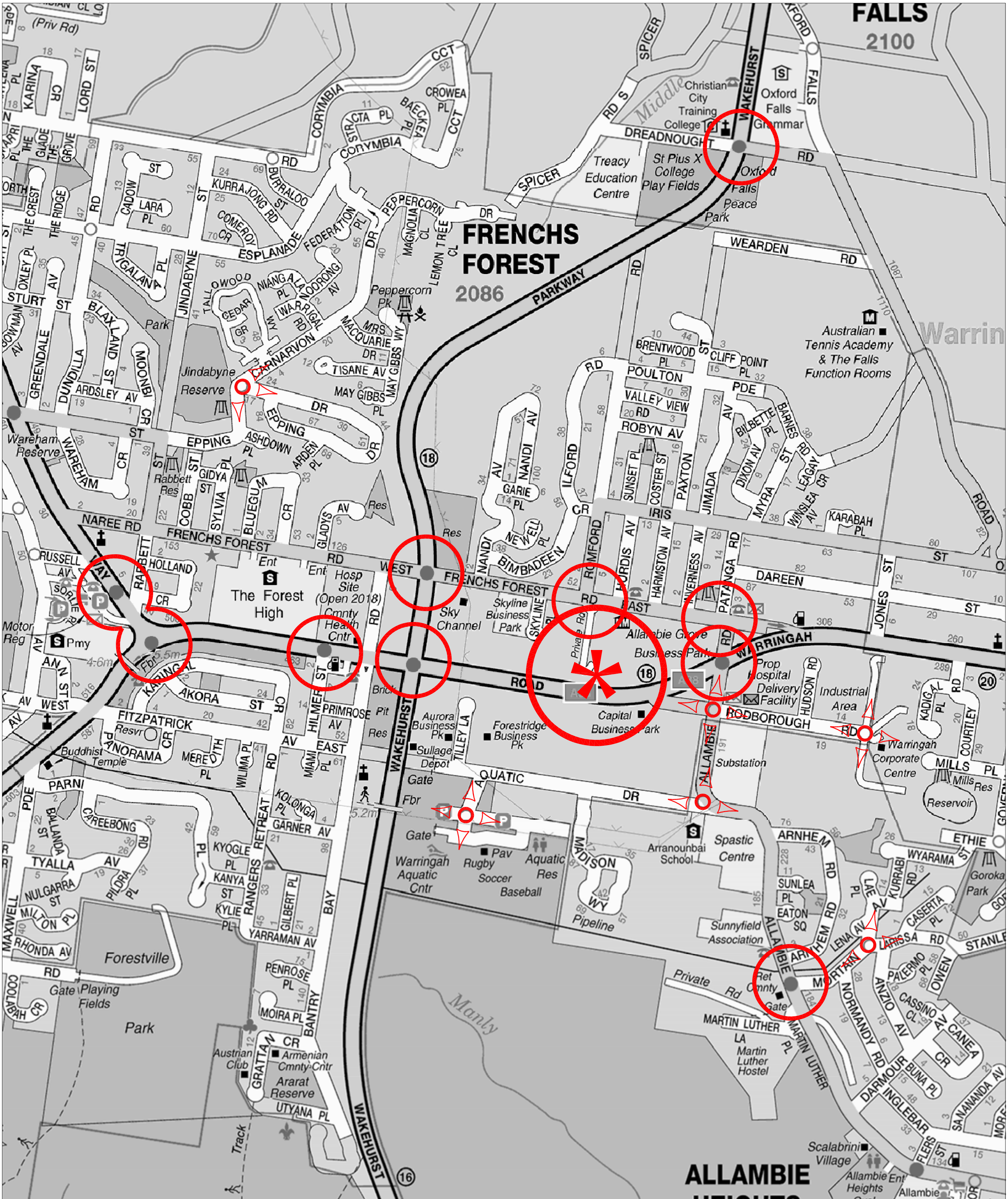
LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

N

ROAD NETWORK

FIG 3



Legend

TRAFFIC SIGNAL CONTROL

ROUNDABOUT

Traffic Controls

Fig 4

- Wakehurst Parkway/Frenchs Forest Road East
- Allambie Road/Frenchs Forest Road East
- Warringah Road/Frenchs Forest Road East
- Allambie Road/Warringah Road
- Patanga Road/Frenchs Forest Road East

❖ the give-way sign along Frenchs Forest Road East at the intersections of:

- Nandi Avenue
- Skyline Place
- Hurdis Avenue
- Harmston Avenue
- Inverness Avenue

❖ the 60 kmph speed restriction on the Highway and 50 kmph speed restriction on the local and collector roads

3.3 Traffic Conditions

An indication of traffic conditions on the road system serving the area is provided by data[1] published by RMS and surveys undertaken as part of other studies. The data published by RMS is expressed in terms of Annual Average Daily Traffic (AADT) is provided in the following:

	AADT
Warringah Road East of Daines Parade, Beacon	53,683

Traffic surveys have been undertaken at the Romford Road/Business Park Service road/Frenchs Forest Road East intersection during the Friday AM and PM peak periods. Based on the survey, it was determined that the AM and PM peak hours occur at the following hours:

[1] *Traffic Volume Data for Sydney Region*
Roads and Maritime Services

- AM Peak: 7.45 am – 8.45 am
- PM Peak: 4.45pm – 5.45pm

The operational performance of this intersection has been assessed using SIDRA and the results indicating satisfactory performances are provided in Appendix B and summarised in the following, while the criteria for interpreting the results are reproduced overleaf:

AM Peak		PM Peak	
LOS	**AVD**	**LOS**	**AVD**
B	22.2s	B	16.3s

The results of the SIDRA assessments indicate that this intersection operates satisfactorily and traffic conditions in the area are also generally quite satisfactory with vehicle and pedestrian movements facilitated by the traffic signal.

3.4 Transport Services

The site is ideally located in relation to bus services, which include the high-frequency bus services operated along the Warringah Road. Public transport services for the site area are provided by the bus routes operated by Sydney Buses and Forest Coach Lines with the principal routes being:

136	-	Mona Vale to Chatswood
169	-	Cromer to Wynyard
173	-	Narraweena/Cromer to Wynyard
193	-	Manly Wharf to Skyline
280	-	Mona Vale to Chatswood
E69	-	Manly Wharf to Skyline

In summary, it is apparent that the site is readily accessible by public transport, and it is likely that many staff will use public transport services for their daily commute to/from work and visitation to the site.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
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	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

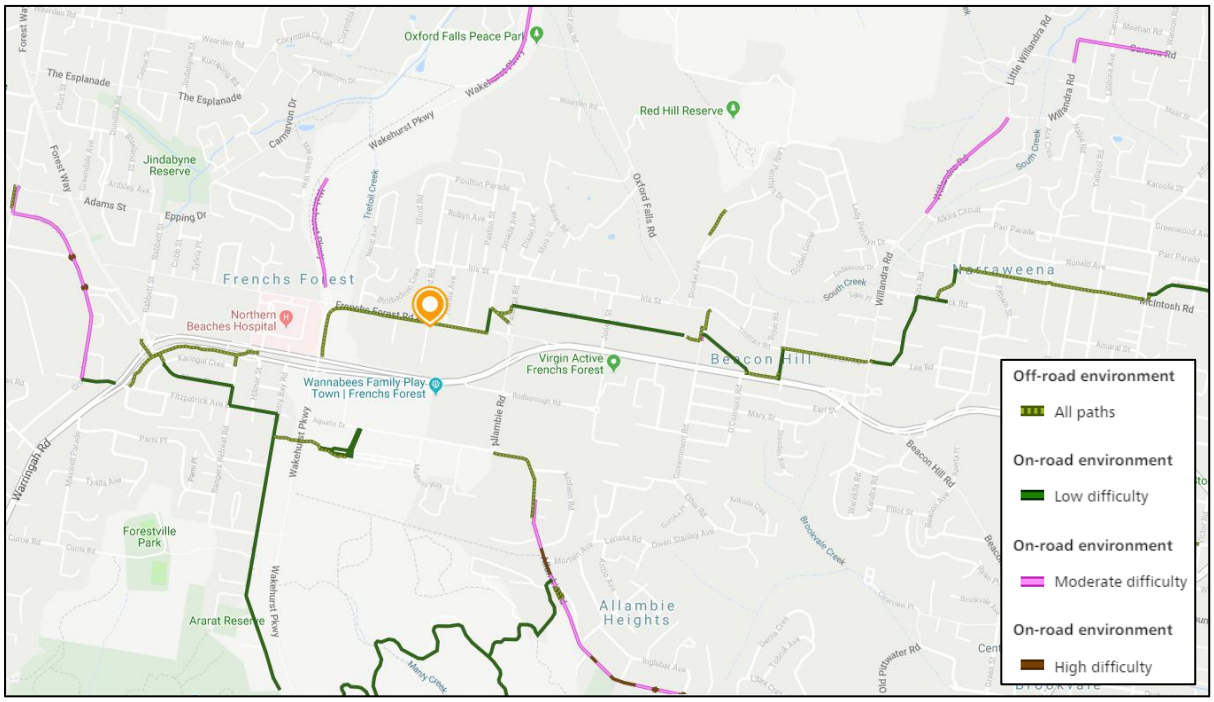
[1] *the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs*

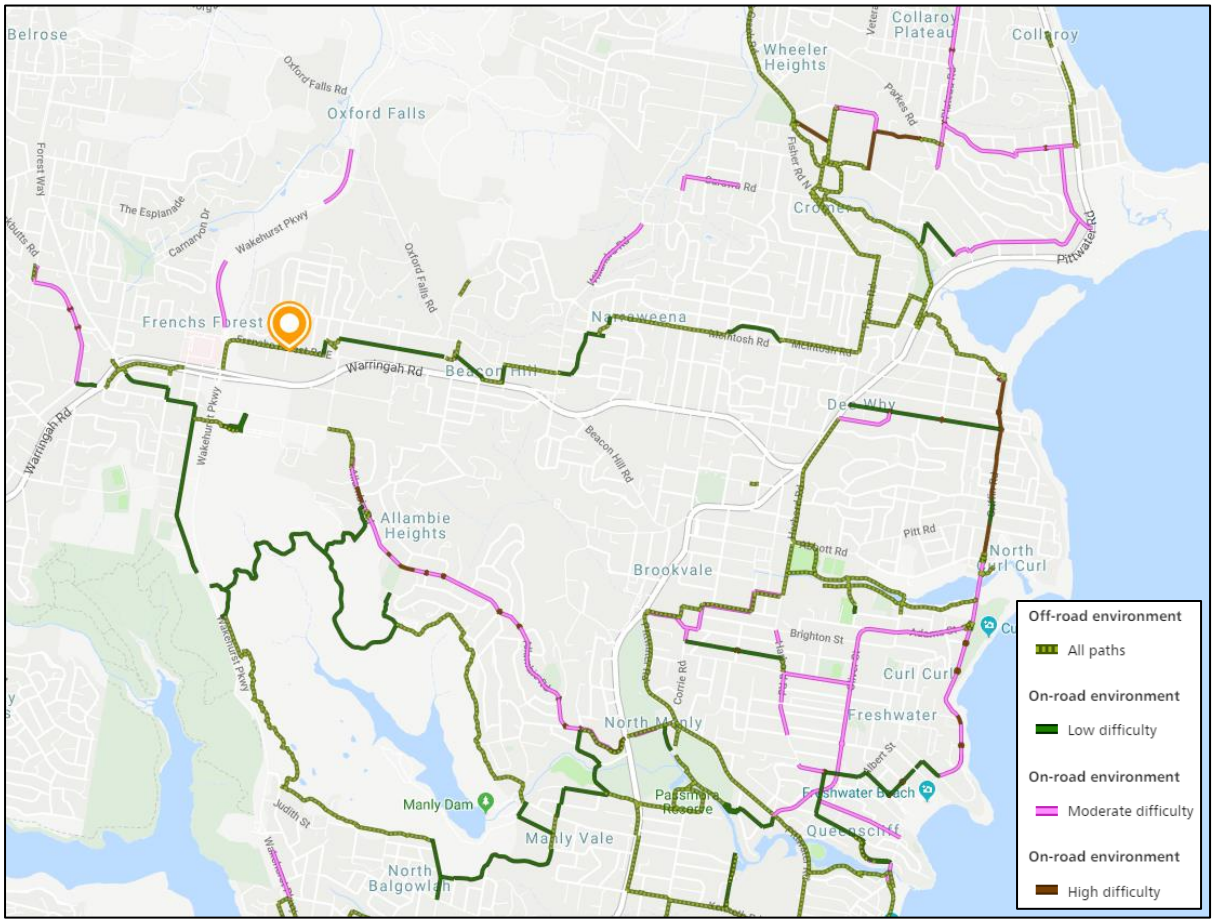
Details of the available public transport services are provided in Appendix C.

3.5 Walking and Cycling Infrastructure

There are generally established 1.5m wide pedestrian footpaths and 3m wide shared paths on the northern and southern sides of the Frenchs Forest Road East respectively.1.2-1.5m-wide pedestrian footpaths are available on both sides of the other surrounding local roads in the vicinity of the site. The signalised pedestrian crossing at the intersection of Frenchs Forest Road East/Romford Road/service road provides formal crossing facilities in the immediate vicinity of the site.

Frenchs Forest Road East provides for an off-road local bicycle route that links with other on-road regional routes to the north and east. The local area is also served by local on-road routes along Inverness Avenue, Darren Street and Oxford Falls Road, ensuring a high level of local area accessibility to key destinations, including Cromer, Dee Why Wheeler Heights, Collaroy Plateau, Collaroy, Beacon Hill, Narraweena, Curl Curl, Brookvale, Manly and Queenscliff. Details of the surrounding bicycle network are provided in the following figure.





3.6 Existing Travel Circumstance

TTPA has undertaken travel mode surveys at the following comparable oncology centres in the Sydney area:

- Concord - 375A-377 Concord Road, Concord West
- Waratah Private Hospital, Level 6, 31 Dora Street, Hurstville
- The Mater Hospital, 25 Rocklands Road, North Sydney
- Building/1/49 Frenchs Forest Rd E, Frenchs Forest

Similar to the Frenchs Forest site, the above centres are located in convenient proximity to public transport services and they have adequate parking spaces available to accommodate the parking demands of these oncology centres. The aggregated results of the surveys are as follows:

Mode	Patient	Staff
Car (Driver)	59%	54%
Car (Passenger)	24%	-
Taxi	1%	-
Bus	-	20%
Train	7%	13%
Walk	9%	13%
Total	**100%**	**100%**

The survey results indicate the following:

Patient

- 59% patients drove to the centre to/from the centres
- 25% patients were dropped off/picked up at/from the centre
- 17% patients used “active transport” (public transport/walk) to/from the centre

Based on the above, 83% of the patients travel to/from the centre with cars (either as a driver or a passenger).

Staff

- 54% staff drove to the centre to/from the centres
- 46% staff used “active transport’ (public transport/walk) to/from the centre

The Australian Bureau of Statistics (ABS) 2016 Census of Population and Housing – Place of Work by Method of Travel (NSW) data provides the most robust indication of existing staff travel patterns for the Frenchs Forest – Belrose localities. A summary of the current mode shares for staff are shown as follows:

Train/Bus	8%
Walk	2%
Car Driver	83%
Car Passenger	4%
Bicycle	1%
Other (Motorcycle, Taxi, Car Share)	3%

4.0 Parking

4.1 Car Parking

Council's DCP Rate

Council's DCP specifies the following car parking provision in relation to a medical centre:

Medical Centre - 4 car spaces per 100m^2 GFA

Based on the above rate and a gross floor area of 1,976m^2, the proposed development is required to provide a total of 79 car spaces.

Empirical Rate

Notwithstanding the above, it is noted that the proposed oncology centre is a ***Fit for Purpose*** Medical Centre which treats all patients by appointment only and therefore, does not reflect the characteristics of a medical centre of the type assessed in the former RTA (now RMS) study which established the above criteria.

The proposed centre will have relatively larger treatment rooms (e.g., 150m^2 bunker, 56m^2 MRI room, and 52m^2 CT/PET CT room). The proposed operational requirement resembles a health care facility with the number of patients limited to the number of treatment rooms. As such, parking assessment based on Council's DCP (RMS criteria) for a "medical centre" use in relation to the GFA of the building is clearly not appropriate for the unique nature of the development.

Given that all patients will arrive in accordance with their appointment (not random arrivals as for a normal medical centre) and can only be treated based on the availability of the rooms, the parking requirement has been assessed based on the number of rooms (18) used to treat patients as follows:

- 7 consulting rooms
- 2 interview rooms
- 1 CT/PET CT room
- 1 MRI room
- 1 'radiation' bunker
- 2 nurse/treat rooms
- 2 treatment rooms
- 1 intermittent needle therapy/education room
- 2 blood bay rooms

Based on the projection data, it is assessed that the centre will only treat up to 24 patients at any one time with a maximum of 37 staff present.

The RMS Development Guidelines stress the desirability of "drawing a comparison with actual comparable types of development" and the DCP, in fact, specifies this in 13 separate categories in its parking provision criteria schedule. Accordingly, TTPA has undertaken travel mode surveys at the following comparable oncology centres in the Sydney area. To provide a conservative assessment, the following assumption/reference are made:

- some parking spaces are required for the drivers after dropping off the patients and prior to picking them up.
- The Australian Bureau of Statistics (ABS) 2016 Census of Population and Housing - Place of Work by Method of Travel (NSW) data for the Frenchs Forest - Belrose localities which indicate a higher vehicle usage of 83% driver.

On the basis of the above and the projected maximum number of patients and staff, it is assessed that the proposed centre will require a minimum of 51 car spaces:

- 83% of 24 patients: 20 car spaces for patient use
- 83% of 37 staff: 31 car spaces for staff

4.2 Adequacy of Car Parking Provision

The development proposes a total of 75 on-site car parking spaces, including 2 disabled spaces. While being marginally short of the DCP requirement of 79 spaces, on the basis of the empirical assessment above, the car parking provision is expected to be capable of accommodating the car parking demands associated with the proposed development of 51 cars.

It is proposed to provide the following 75-space parking allocation:

- 44 car spaces for patient use
- 31 car spaces for staff

The provision of 44 car spaces for patient use has included parking provision for the drivers (support persons and carers).

In addition, the overprovision of 24 car spaces will avoid any potential use of on- the off-street parking in the surrounding developments including the business park and the existing/future 39 Frenchs Forest Road East site.

4.3 Disabled Car Parking

Two spaces (inclusive of the 75 spaces) designated for the proposed development will be suitable for disabled drivers in accordance with BCA.

4.4 Ambulance & Service Vehicle Parking

A shared ambulance/patient transport/service vehicle space will also be provided on the ground level.

4.5 Bicycle Parking

Council's DCP does not provide any bicycle requirements for medical centre use. As such, reference has been made to the 'Planning Guidelines for Walking and Cycling'

(NSW Government 2004) which suggest the following bicycle parking provisions:

- Staff (long-term use) – 5% to 10% of practitioners, professional

Applying the above rates to 37 practitioners/professionals, the proposed development should provide a minimum total of 2 bicycle spaces.

The bicycle parking facilities are proposed to be located on the ground level with convenient access via Frenchs Forest Road East and the service road.

5.0 Traffic

There are no traffic generation criteria available in relation to the special nature of the proposed development. The possible comparable of 'Extended Hours Medical Centre' use as contained in the RTA Guide to Traffic Generating Development is not appropriate as that involves significant patient movements during the morning and afternoon peak periods (i.e., not the case with the proposed development). The traffic generated by the development during the morning and afternoon peak periods will be predominantly related to staff arrivals and departures, although not all staff will be present at the same time. To provide a conservative assessment, it is assumed that the following number of staff and patients will arrive and depart during the peak periods:

- all 37 staff
- all 24 patients.

The projected traffic generation outcomes for staff and patients are estimated as follows:

Staff

Travel Mode	Mode Share	Staff	Peak Hour Trip Generation			
			AM Peak		PM Peak	
			IN	OUT	IN	OUT
Train/Bus	8%	3	-			
Walk	2%	1	-			
Car Driver	83%	31	31	-	-	31
Car Passenger	4%	1	1	1	1	1
Bicycle	1%	0	-			
Other (Motorcycle, Taxi, Car Share)	3%	1	1	1	1	1
Total	**100%**	**37**	**33**	**2**	**2**	**33**

Patient

Travel Mode	Mode Share	Patient	Peak Hour Trip Generation			
			AM Peak		PM Peak	
			IN	OUT	IN	OUT
Train/Bus	7%	2	-			
Walk	9%	2	-			
Car Driver	59%	14	14	0	0	14
Car Passenger	24%	6	6	6	6	6
Bicycle	0%	0	-			
Other (Motorcycle, Taxi, Car Share)	1%	0	1	1	1	1
Total	**100%**	**24**	**21**	**7**	**7**	**21**

A summary of the traffic generation is provided in the following table:

Travel Mode	Peak Hour Trip Generation			
	AM Peak		PM Peak	
	IN	OUT	IN	OUT
Car Driver	45	0	0	45
Car Passenger	7	7	7	7
Other (Motorcycle, Taxi, Car Share)	2	2	2	2
Total	**54**	**9**	**9**	**54**

A SIDRA assessment was undertaken for the future intersection performance of Frenchs Forest Road East/Romford Road/egress of the business park service road. The assessment considered the traffic generated by the proposed development as well as the proposed development on 39 Frenchs Forest Road East. The traffic generated by the adjacent site was extracted from the Colston Budd Hunt & Kafes (now CBRK) traffic report dated September 2015. See the following figure.

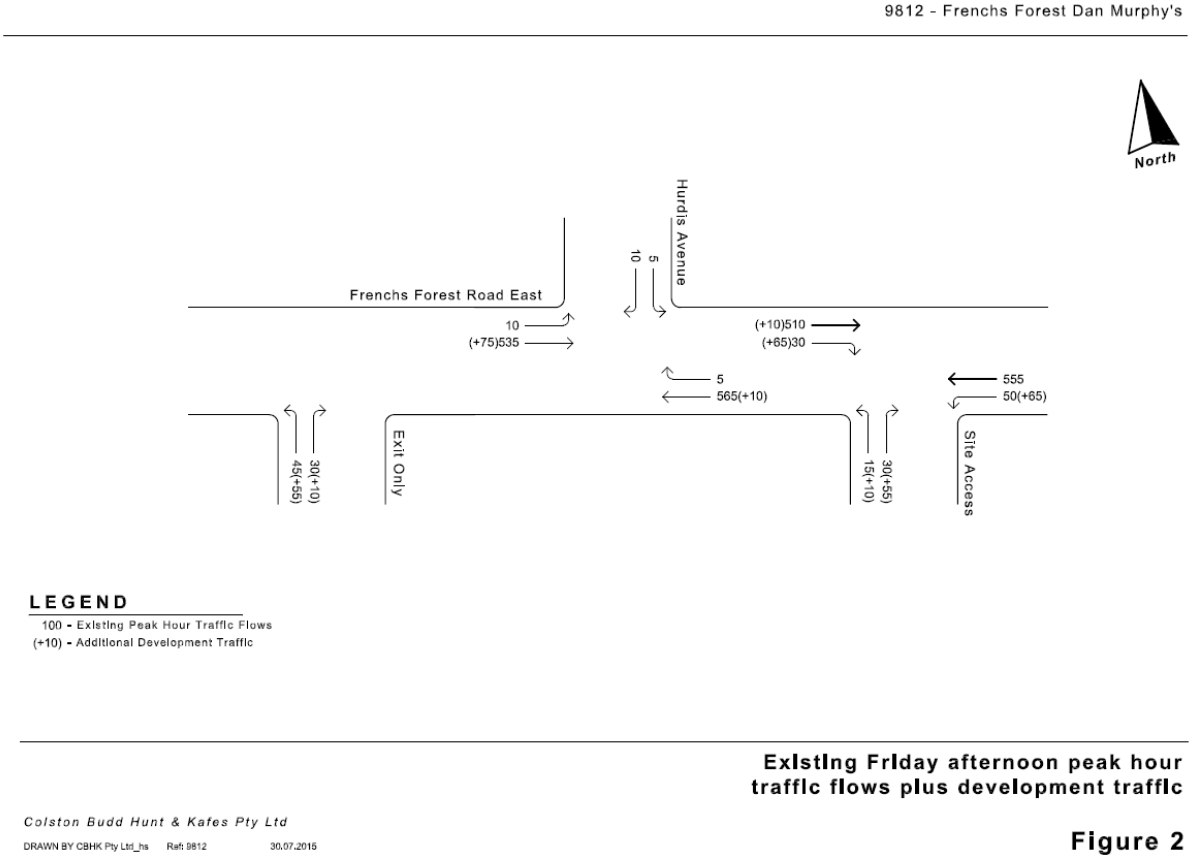


Figure 2

GTA Consultants "Northern Beaches Hospital, Stage 2 EIS – Network Enhancement Works, Traffic and Transport Impact report indicated that there would an increase of 5% in the AM peak and 4% in the PM peak over 10 years (2018 - 2028). To provide a conservative assessment, TTPA has reassessed the Frenchs Forest Road East/Romford Road/egress of the business park service road intersection based on 12% increase in traffic. The assessment detailed in Appendix B, reveals that satisfactory operations will continue as follows:

AM Peak		PM Peak	
LOS	**AVD**	**LOS**	**AVD**
B	22.9s	B	27.2s

In addition, the traffic generation of this order of magnitude being equivalent to some 1-2 vehicles every minute during the peak hours is minor in the context of the local and arterial road system and will not act to create unacceptable traffic congestion or conflict either at the vehicle access point or at adjacent intersections.

6.0 Access, Internal Circulation and Servicing

6.1 Access

Vehicle

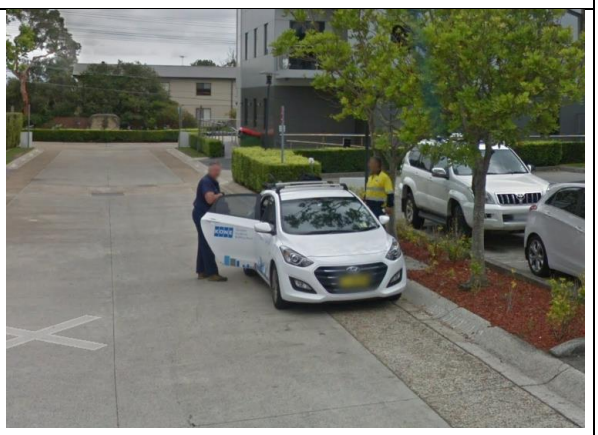
The proposed vehicle access to/from the existing service road comprises of a 5.5m wide driveway and the access ramp in accordance with AS2890.1. The driveway will be located at the southern end of the service road at the north-western site boundary. It is proposed to provide a roundabout at the end of the road to reduce the conflicts between the traffic movements associated with buildings 9 and 10. The driveway complies with the design and sight distance requirements of AS 2890.1 and the existing service road is straight and level at this location.

The existing service road on Frenchs Forest Road East will be utilised and it is noted that this access has operated satisfactorily for more than 10 years without any operational difficulties and further improved with the signalisation in 2018.

The basement carpark will not be publicly accessible Boom gates and swipe card/keypad system within a central island is proposed at the ground-level carpark driveway to ensure access by staff and patients of the centre only. Swipe card will be provided to all staff to activate the boom gate on entry. Carpark access for patients will have to be pre-booked with an access code to be provided upon booking during appointment.

Pedestrian

The proposed shared pedestrian/vehicle access through the existing right of way is consistent with the existing buildings in the business park which relied on the service road as pedestrian access. See the following figures.

Pedestrian accessing Building 1 from Frenchs Forest Road East	Pedestrian movements between Building 1 and Frenchs Forest Road East
	
Pedestrian movements between Building 1 and Frenchs Forest Road East	**Pedestrian activities on Service Road due on on-street parking**
	
Pedestrian accessing Building 10 from the service road and crossing the vehicle access point for access	**Pedestrian accessing Buildings 3 through 8 and 10 from the service road and crossing 9 vehicle access points for access**
	

The access road has traditionally operated without any pedestrian hazards/risks. On this basis, the shared pedestrian access is adequate, functional and safe for its intended purpose and role.

To ensure priorities to pedestrians and to highlight the presence of pedestrian activities within service road and the porte-cochere area, the development proposes a 1.1m-wide pedestrian pathway along the western frontage of the building between the service road and the main entrance of the building. The pathway will have TBB (give way line on the path) line marking and PS-4 (pedestrian pavement marker) with associated pedestrian warning (W6-9) and pedestrian crossing (R3-1) signs to indicate pedestrian-priority access. In addition, a flashing light system will be installed at the site access to warn pedestrians of exiting vehicles as well as the provision of speed humps on the service road and vehicle ramp to ensure low vehicle operating speed through the pedestrian pathway. The proposed traffic management plan for pedestrian safety is illustrated in Appendix D.

The swept path assessment for the service vehicle and ambulance provided in Appendix E, indicate that these vehicles are able to reverse from the shared parking space without encroaching onto the pedestrian pathway. Drivers using the porte-cochere will have a clear line of sight to pedestrian movements along the pathway with forward in and forward out manoeuvres.

The 5m wide porte-cochere area complies with AS2890.6.

6.2 Internal Circulation

The design of the proposed internal circulation arrangements generally accords with the requirements of AS2890.1 and AS2890.6. The proposed parking manoeuvring arrangements will be quite satisfactory as confirmed by the turning path assessment for a B85 and B99 car manoeuvres in the carpark which is provided in Appendix E.

Two-way concurrent movement is available along all ramps and generally within the circulation aisles. Where passing opportunities are limited within the circulation aisles, give-way pavement markers and signs are provided to ensure the car parking area

operates efficiently and users of the car park are aware of operation and priority protocols.

In addition to the above, convex mirrors are proposed within the carpark to ensure sufficient sight distance between entering and exiting vehicles.

The proposed signage and line-marking plans within the basement carpark are provided in Appendix F.

6.3 Servicing

Waste bins will be removed from the ground-level by up to 6.4m private contractor's small rigid waste vehicle (SRV) temporarily stopping at the shared ambulance/service space. The waste collection will take place outside of peak hours. Other servicing of the centre related to deliveries, courier activity, maintenance, etc. will only involve occasional small delivery vehicles (van, utes, etc.) can also be reliant on the shared space.

A loading/service management will be in place to ensure appropriate use and prevent overuse of the shared space. The objective is to always appropriately manage ambulance, service vehicle and trade vehicle activity so that no more than one vehicle is using the shared space at any one time.

Details of the turning path assessment for a 6.4m SRV and a 7.3m bariatric ambulance accessing the shared space are provided in Appendix E.

7.0 Workplace Travel Plan

7.1 Workplace Travel Plan

Workplace Travel Plans (WTPs) has proven to be a successful way of changing travel behaviour for residential, commercial and medical centre developments throughout Australia and overseas. A WTP is a way in which a development manages the transport needs of staff and visitors. The aim of the plan is to reduce the environmental impact of travel to and from a given site and in association with its operation. In essence, the plans encourage more efficient use of motor vehicles as well as alternatives to single-occupant car usage. The WTP would put in place measures to further influence the travel patterns of those people working at the development with a view to encouraging modal shift away from cars.

7.2 Actions

To reduce car parking demand from the development, the most straightforward actions should be addressed first:

i. Implementation of the WTP

- Appoint a Travel Plan Coordinator (TPC) to ensure the successful implementation and monitoring of the WTP.
- Conduct annual travel surveys to establish travel patterns in the area and assess the success of the WTP. This would be managed by the appointed TPC. Allow surveys to incorporate suggestions from staff to improve green travel arrangements.
- Create a site-specific WTP website.

ii. Increase walking, running and cycling to work and other destinations (errands, recreational, social) by staff.

- Implementation of a subsidised bicycle share membership plan (Lime, Mobike and oBike).

- Provision of bicycle spaces based on the Planning Guidelines for Walking and Cycling requirements.
- Provision of fully serviced end of trip facilities such as showers and changeroom (including supplying laundered towels, irons and ironing boards, hairdryers, toiletries, etc.).
- Provision of workplace toolkits including puncture repair equipment and bicycle pumps and a bicycle repair station.
- Promote bicycle-friendly shops in Frenchs Forest. A loyalty card program could be organised between staff who cycle and cafes/ shops.

iii. Increase public transport use:

- Provide interactive timetables with Live NSW traffic and public transport conditions on-site to promote public transport usage.
- Allow for access to umbrellas and ponchos in case of wet weather.
- Allocate space for an on-site kiosk station.

iv. Increase car share:

- Implementation of a carpool system, which could include encouraging staff to participate in a peak-hour car-pooling club to drive to a nearest station/bus interchange or common residence location during the peak hours. This may be coordinated by a 'transport champion,' an appointed worker, building manager or formally appointed TPC.
- Provide priority parking or reduced parking costs for staff that car-pool.

v. Increase staff and visitor awareness and knowledge of available transport options:

- Provision of a Transport Access Guide (TAG) which should be given to every staff and regular visitor. The TAG should include public transport timetables, stop/ station locations, walking times/ distances, etc.
- Provide real-time information on public transport arrival/ departure times with information screens in the lobby along with the local weather and a rolling

newsfeed. A similar display could be arranged to show bus departure times from the nearby bus stops along Frenchs Forest Road East.

- A half-yearly newsletter could be provided to every staff for up to two years after occupation bringing the latest news on sustainable travel initiatives in the area.

7.3 Monitoring and Reviewing

There is no standard methodology for the implementation and management of sustainable transport initiatives. However, as part of the WTP, these initiatives should be monitored to ensure that it is achieving the desired benefits. The monitoring of the WTP would require travel surveys to be undertaken with a focus to establish travel patterns, including mode share of trips to and from the site. The implementation of the WTP will need a formal TPC, who will have responsibility for developing, implementing and monitoring the WTP. The TPC will be an appointed staff member of the proposed development or an independent expert. It will also be necessary to provide feedback to staff, tenants and owners to ensure that they can see the benefits of sustainable transport.

There are several key elements to the development and implementation of a successful WTP. These include:

- Communication – Good communication is an essential part of the WTP. It will be necessary to explain the reason for adopting the plan, promote the benefits available and provide information about the alternatives to driving alone.
- Commitment – WTPs involve changing established habits or providing the impetus for people in new developments to choose a travel mode other than private car use. To achieve cooperation, it is essential to promote positively the wider objectives and benefits of the plan. This commitment includes the provision of the necessary resources to implement the plan, beginning with the introduction of the 'carrots' or incentives for changing travel modes upon occupation.
- Building consensus – It will be necessary to obtain broad support for the introduction of the plan from the tenants.

Once the plan has been adopted, it is essential to maintain interest in the scheme. Each new initiative in the plan will need to be publicised and marketing of the project will be important.

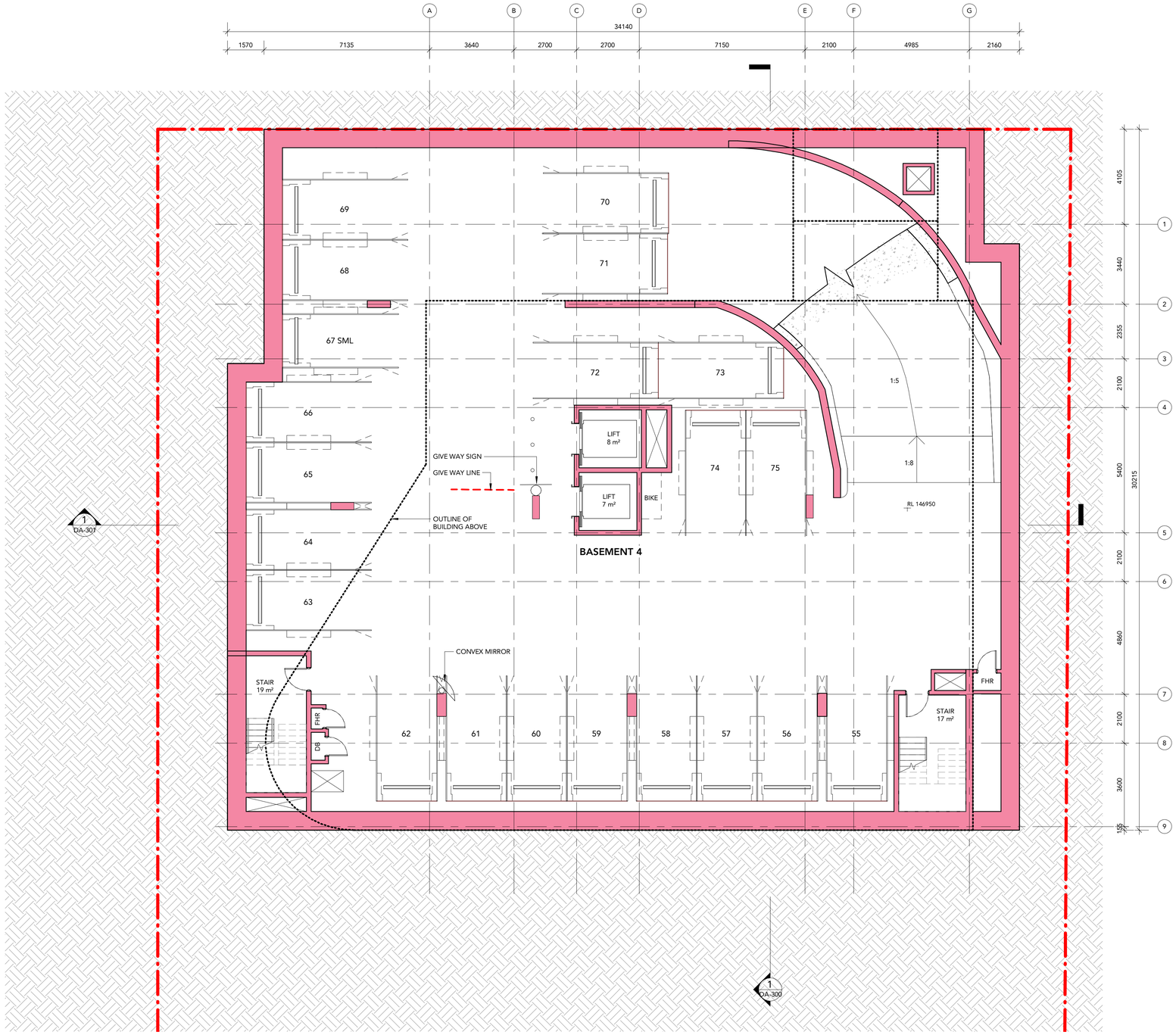
8.0 Conclusion

A Development Application is to be submitted to Northern Beaches Council for a proposed Oncology Centre on a site in Frenchs Forest Road East, Frenchs Forest. The traffic, transport and parking assessment provided in this report confirms that:

- the traffic generation of the proposed development will not present any adverse traffic implications and traffic-related environmental impacts
- the proposed parking provision will be adequate
- the existing vehicle access on Frenchs Forest Road East will be suitable and appropriate
- the proposed internal circulation and servicing arrangements will generally be in accordance with the current AS2890.1 and 6 design standards
- the proposed servicing arrangements are suitable

Appendix A

Architectural Plans



1 Floor Plan - Basement 4
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

Rev	Revision Description	Date
1	ISSUE FOR DA	04.12.19

DRAWING LEGEND:

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LEGENDS:

- PROPOSED WALLS & FLOORS
- NEIGHBOURING EXISTING BUILDINGS
- EXISTING PLANTING
- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

Client
GenesisCare
11/41-43 Bourke Rd
Alexandria NSW 2015

Builder
Erilyan
1/27 Hotham Parade
Artarmon NSW 2064

0 1 2 3 4 5
SCALE 1:100

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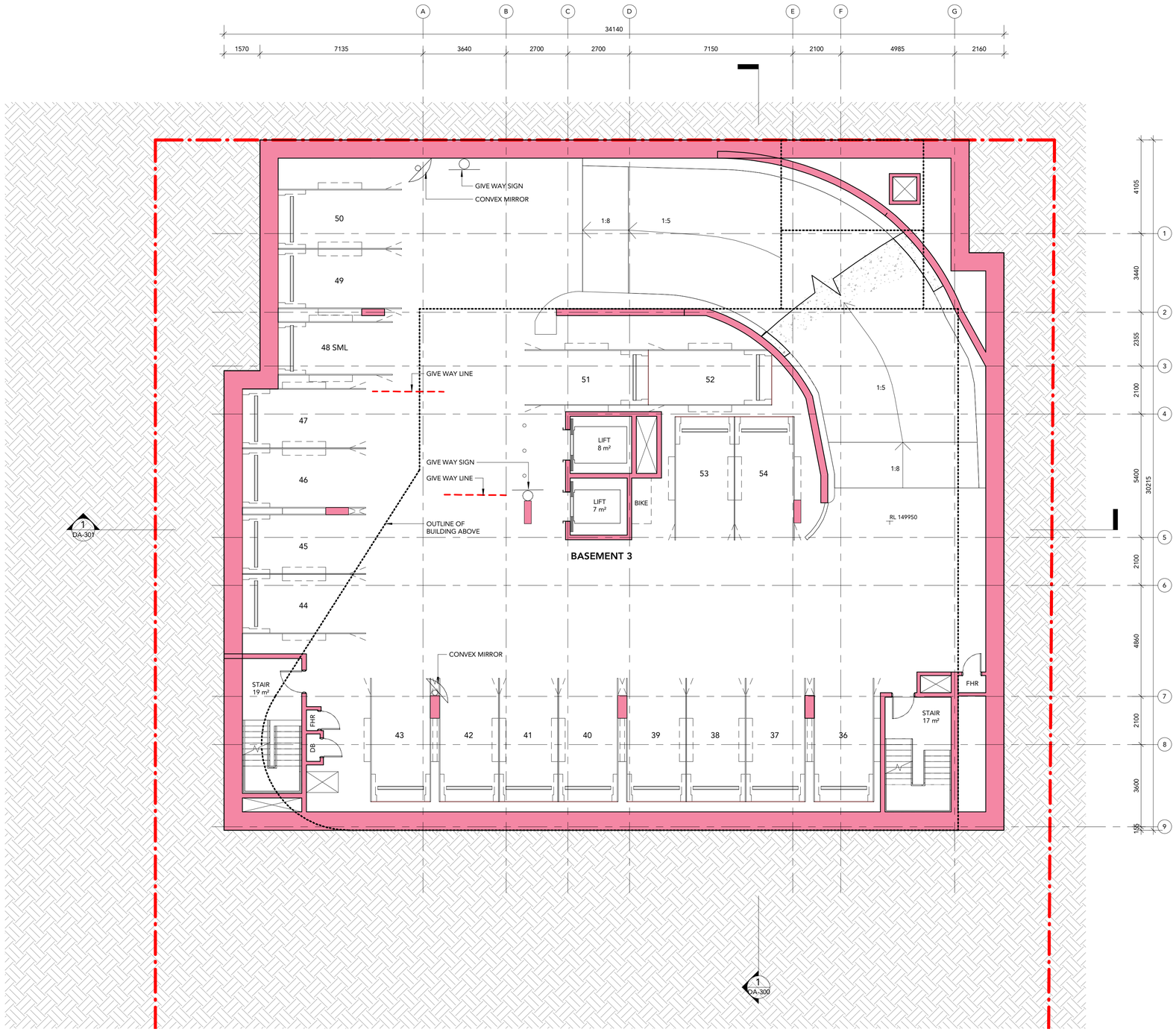
Reg Vic: 19340

Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 4

Project #:	Scale:	Drw:	Ckd:
856	As indicated @A1	Author	Checker

Drawing #: DA-099
Rev: 1



1 Floor Plan - Basement 3
Scale: 1 : 100

DRAWING STATUS:

DEVELOPMENT APPLICATION

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1	Preliminary DA Issue	23.08.19
2	Issue for Information	28.08.19
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- PROPOSED PLANTING
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Alexandria NSW 2015

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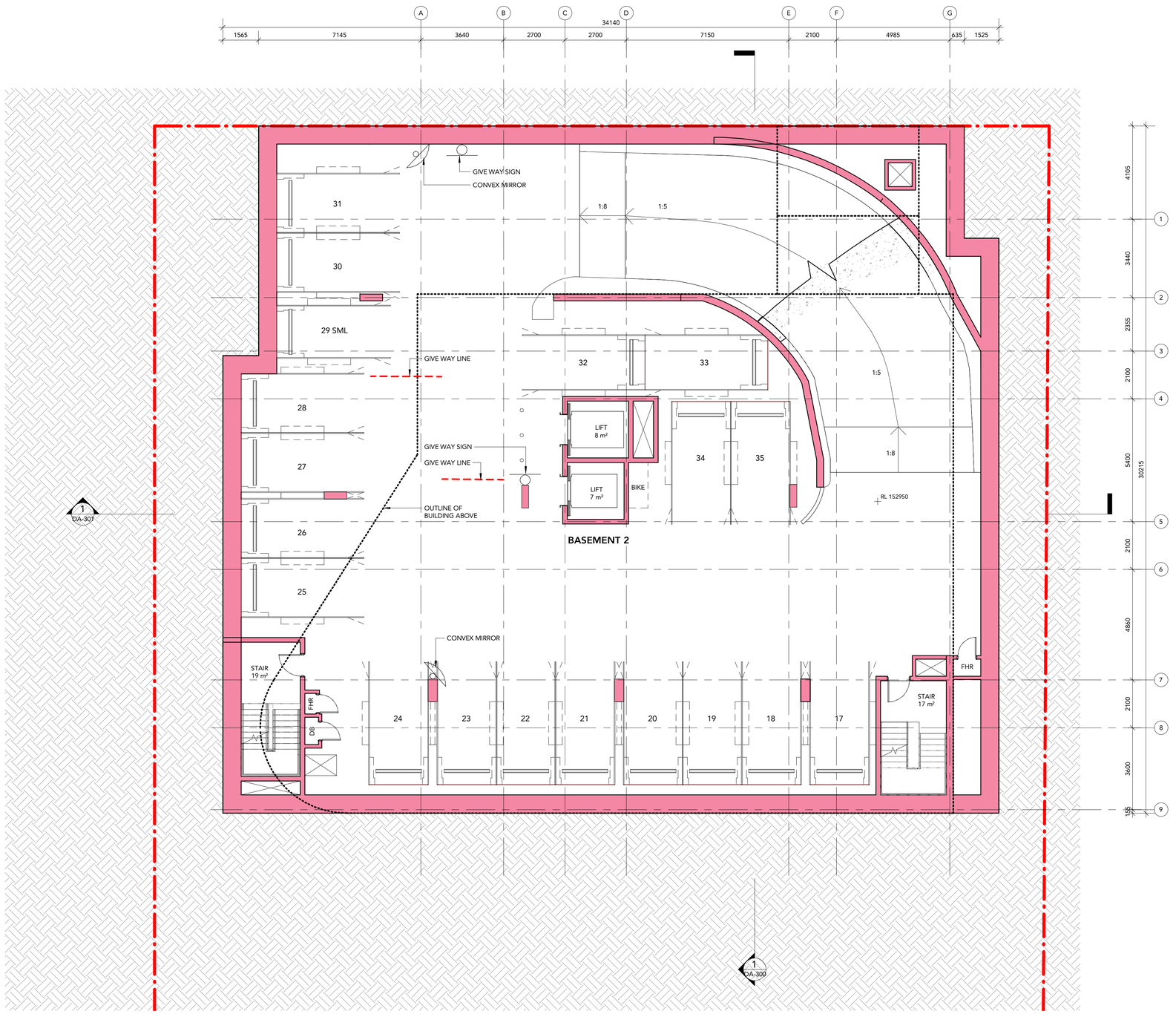
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 3

Project #:	Scale:	Drw:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-100
Rev: 6



1 Floor Plan - Basement 2
Scale: 1 : 100

DRAWING STATUS:

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- PROPOSED PLANTING
- DEMOLITION/EXCAVATION AREA

NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

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Project:
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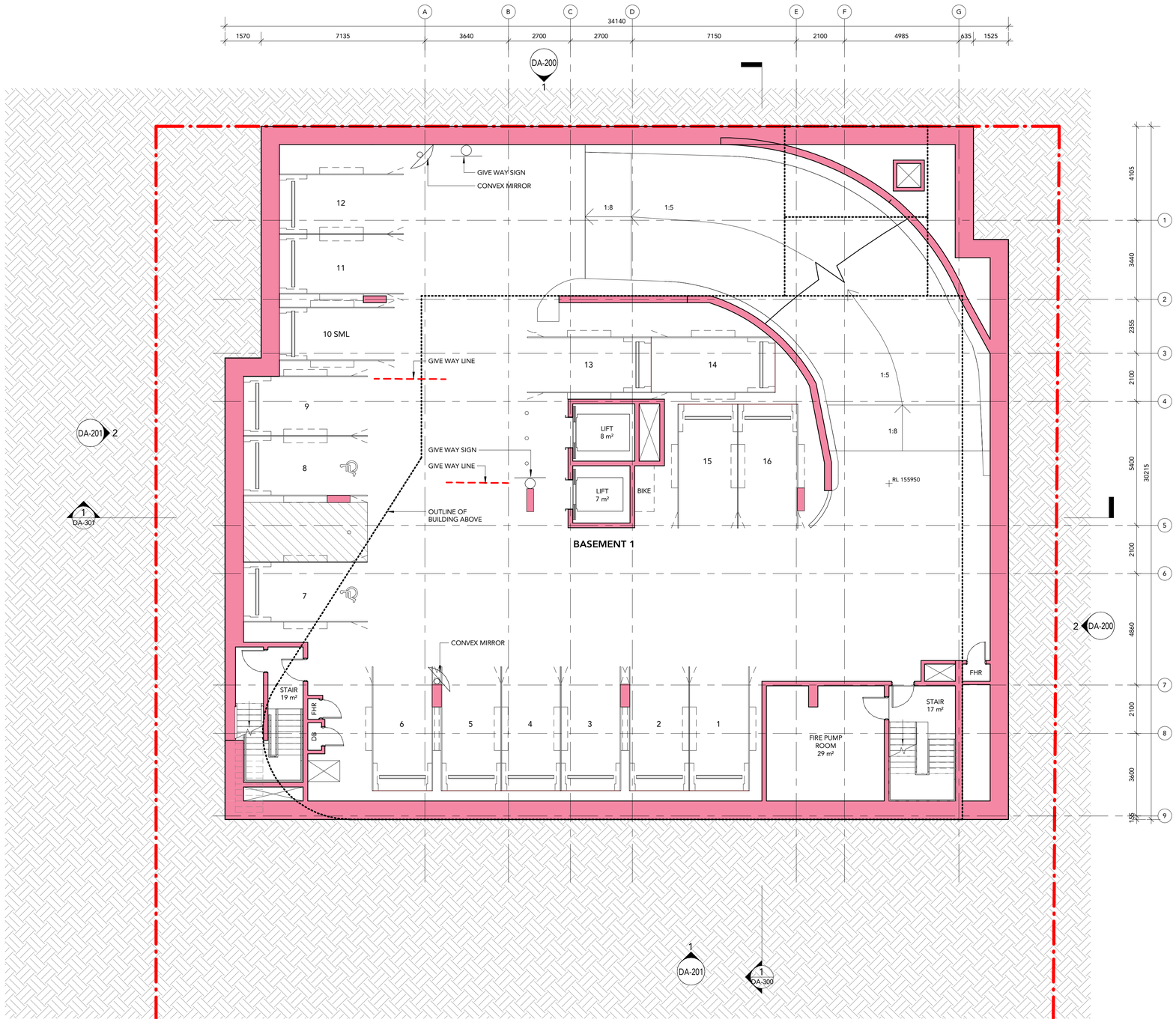
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 2

Project #:	Scale:	Drw:	Ckd:
856	As indicated @A1	Author	Checker

Drawing #: DA-101
Rev: 6



1 Floor Plan - Basement 1
Scale: 1 : 100

DRAWING STATUS:

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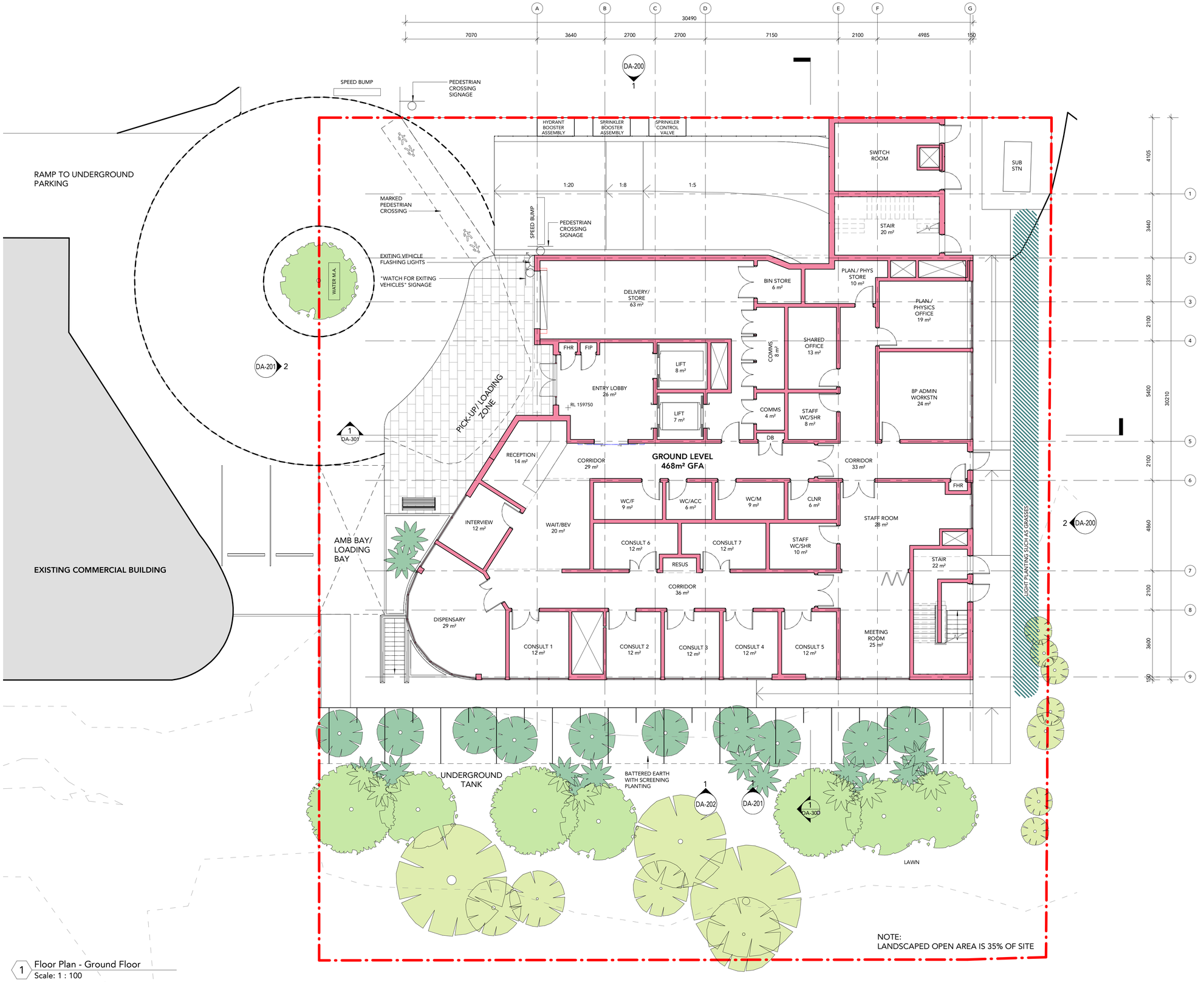
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - BASEMENT 1

Project #:	Scale:	Dwg:	Chd:
856	As indicated @A1	Author	Checker

Drawing #: DA-102
Rev: 6



1 Floor Plan - Ground Floor
Scale: 1 : 100

DRAWING STATUS:

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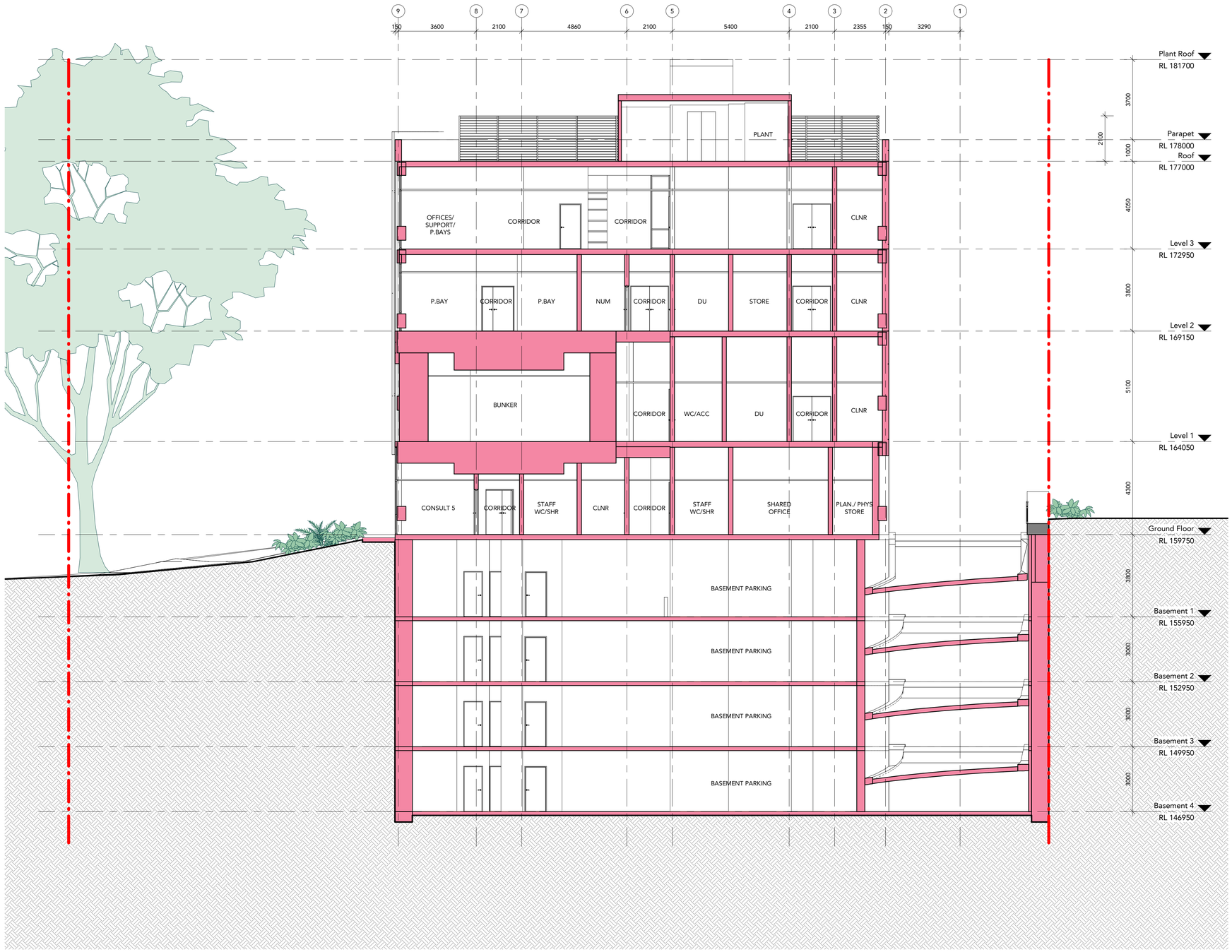
Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
FLOOR PLAN - GROUND

Project #:	Scale:	Drw:	Chk:
856	As indicated @A1	Author	Checker

Drawing #: DA-103
Rev: 6



1 Section 1
Scale: 1 : 100

NOTE:
IN REGARDS TO THE FL'S PLEASE REFER TO STATEMENT OF ENVIRONMENTAL EFFECTS

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Project:
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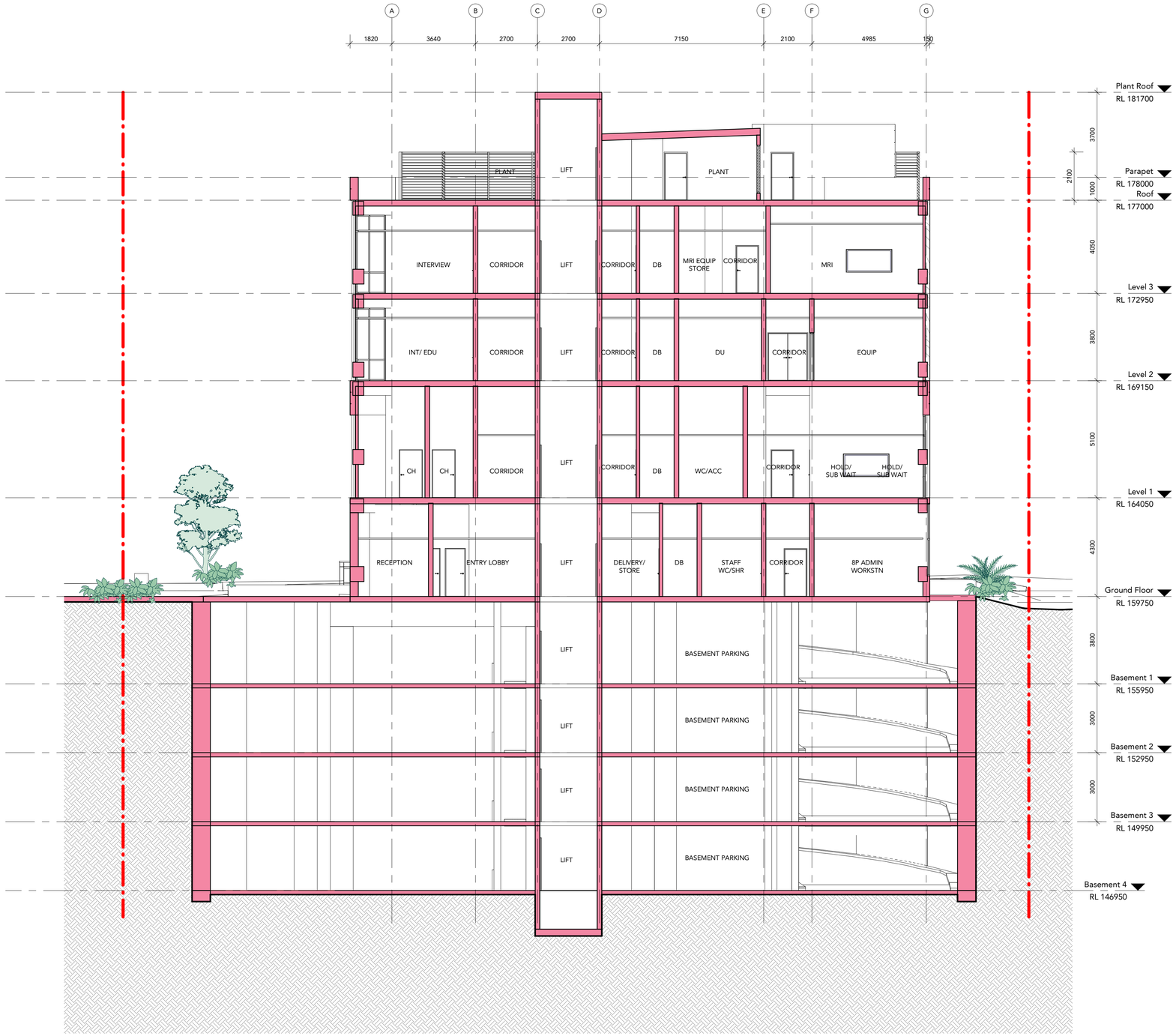
Warringah Road & Wakehurst Parkway

Title:
SECTIONS - SHEET 1

Project #:	Scale:	Drw:	Ckd:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-300
Rev: 4



1 Section 2
Scale: 1 : 100

NOTE:
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Project:
Project Maui Oncology
Warringah Road & Wakehurst Parkway

Title:
SECTIONS - SHEET 2

Project #:	Scale:	Dwn:	Chd:
856	1 : 100 @A1	Author	Checker

Drawing #: DA-301
Rev: 4

The level by level GFA's have been calculated using the following LEP definition

gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes—

(a) the area of a mezzanine, and

(b) habitable rooms in a basement or an attic, and

(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes—

(d) any area for common vertical circulation, such as lifts and stairs, and

(e) any basement—

(i) storage, and

(ii) vehicular access, loading areas, garbage and services, and

(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and

(g) car parking to meet any requirements of the consent authority (including access to that car parking), and

(h) any space used for the loading or unloading of goods (including access to it), and

(i) terraces and balconies with outer walls less than 1.4 metres high, and

(j) voids above a floor at the level of a storey or storey above.

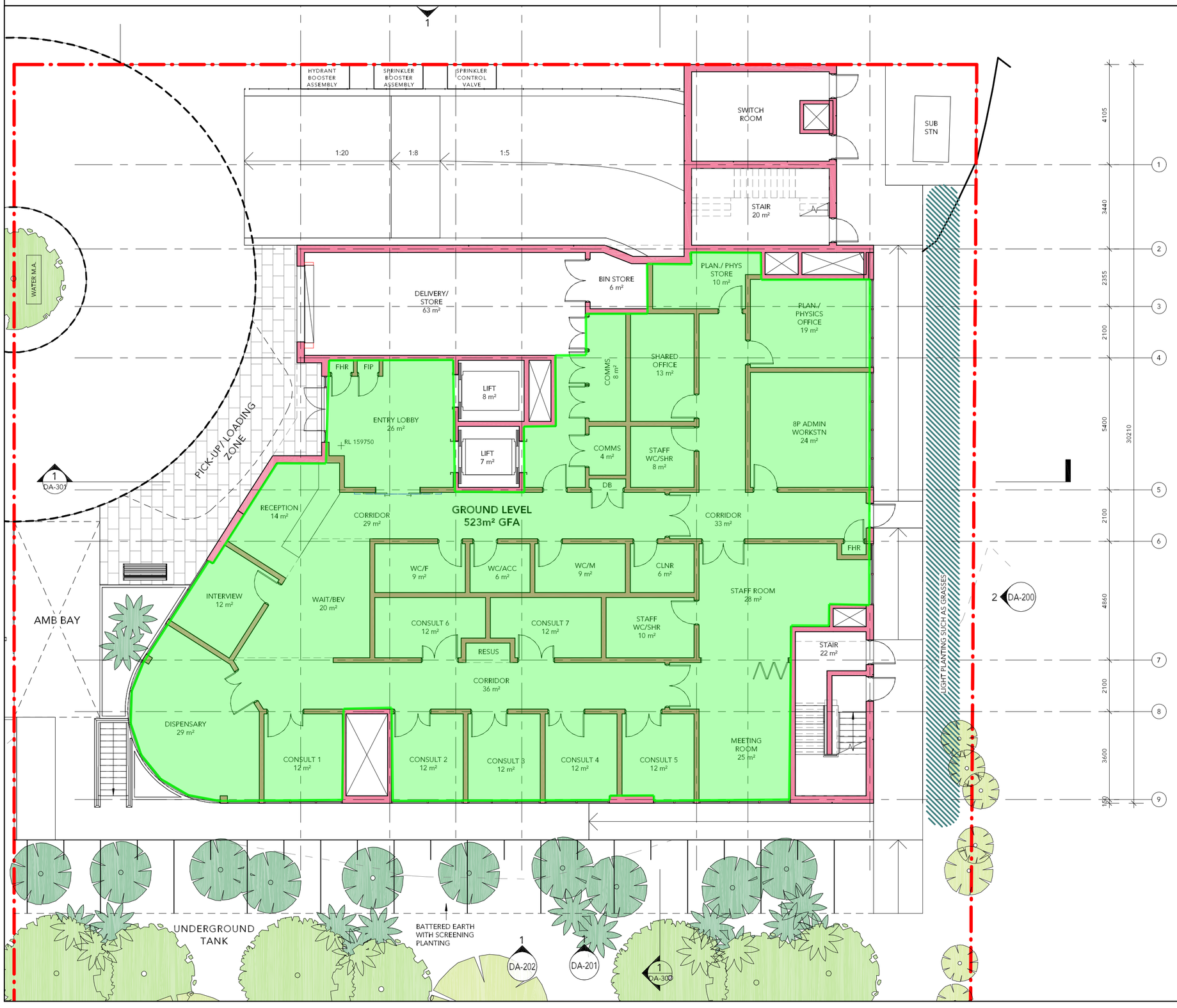
- Ground = 468m2
- Level 1 = 457m2
- Level 2 = 525 m2
- Level 3 = 526 m2

Total = 1,976m2

Ground Level GFA

Project: Erilyan Tenders
Building: 424 - GenesisCare 'Maui' Frenchs Forest

Drawing: 00 Architectural (19.08.19)\856-DA-103-FLOOR PLAN - GROUND-4
Filename: S:\1. ERILYAN\04. Estimating\11. CostX Drawings\424 - GenesisCare 'Maui' Frenchs Forest\00 Architectural (19.08.19)\856-DA-103-FLOOR PLAN - GROU



Legend

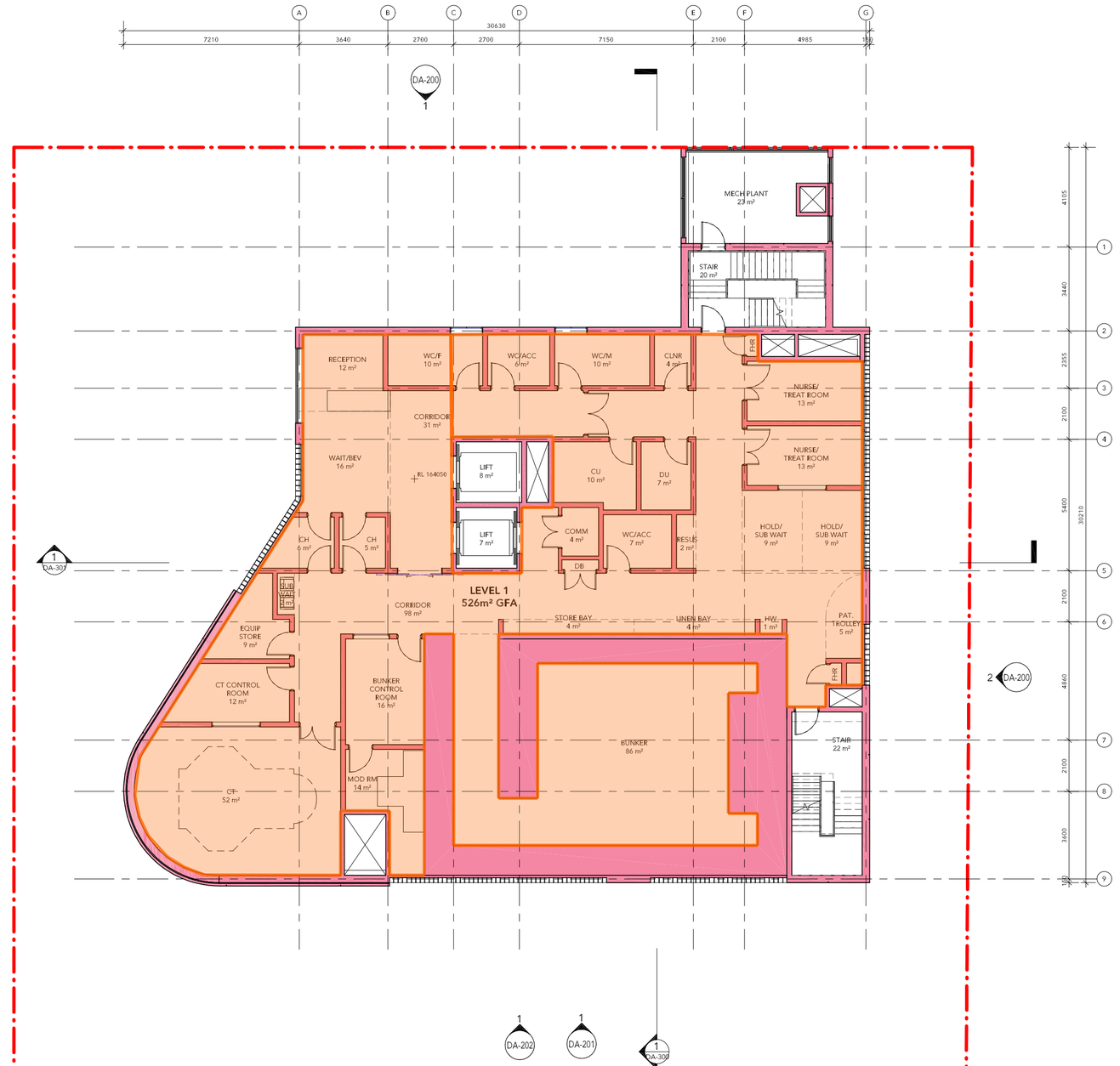
Standard

GFA - Ground Level 468 m2

Level 1 GFA

Project: Erilyan Tenders
Building: 424 - GenesisCare 'Maui' Frenchs Forest

Drawing: 00 Architectural (19.08.19)\856-DA-104-FLOOR PLAN - LEVEL 1-3
Filename: S:\1. ERILYAN\04. Estimating\11. CostX Drawings\424 - GenesisCare 'Maui' Frenchs Forest\00 Architectural (19.08.19)\856-DA-104-FLOOR PLAN - LEVE



RCIAL BUILDING

el 1

DRAWING STATUS:

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NOTE: EASEMENTS SUBJECT TO FINAL SURVEY

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Builder
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Artarmon NSW 2064

SCALE 1:100

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Reg Vic: 19340

Project
Project Maui Oncology

Legend

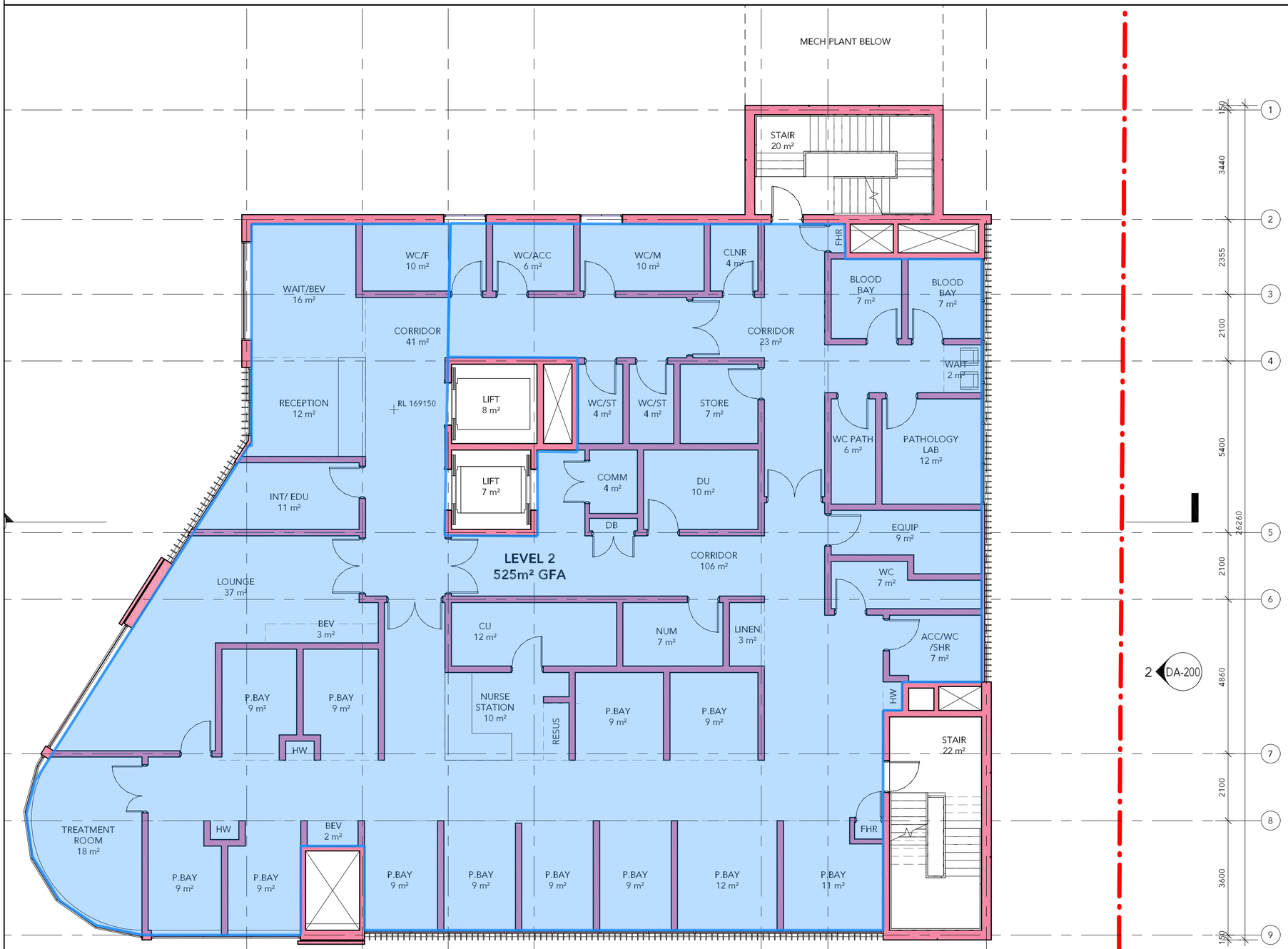
Standard

GFA - Level 1 - 457 m2

Level 2 GFA

Project: Erilyan Tenders
Building: 424 - GenesisCare 'Maui' Frenchs Forest

Drawing: 00 Architectural (19.08.19)\856-DA-105-FLOOR PLAN - LEVEL 2-3
Filename: S:\1. ERILYAN\04. Estimating\11. CostX Drawings\424 - GenesisCare 'Maui' Frenchs Forest\04 Architectural (19.08.2019)\856-DA-105-FLOOR PLAN - LE



Legend

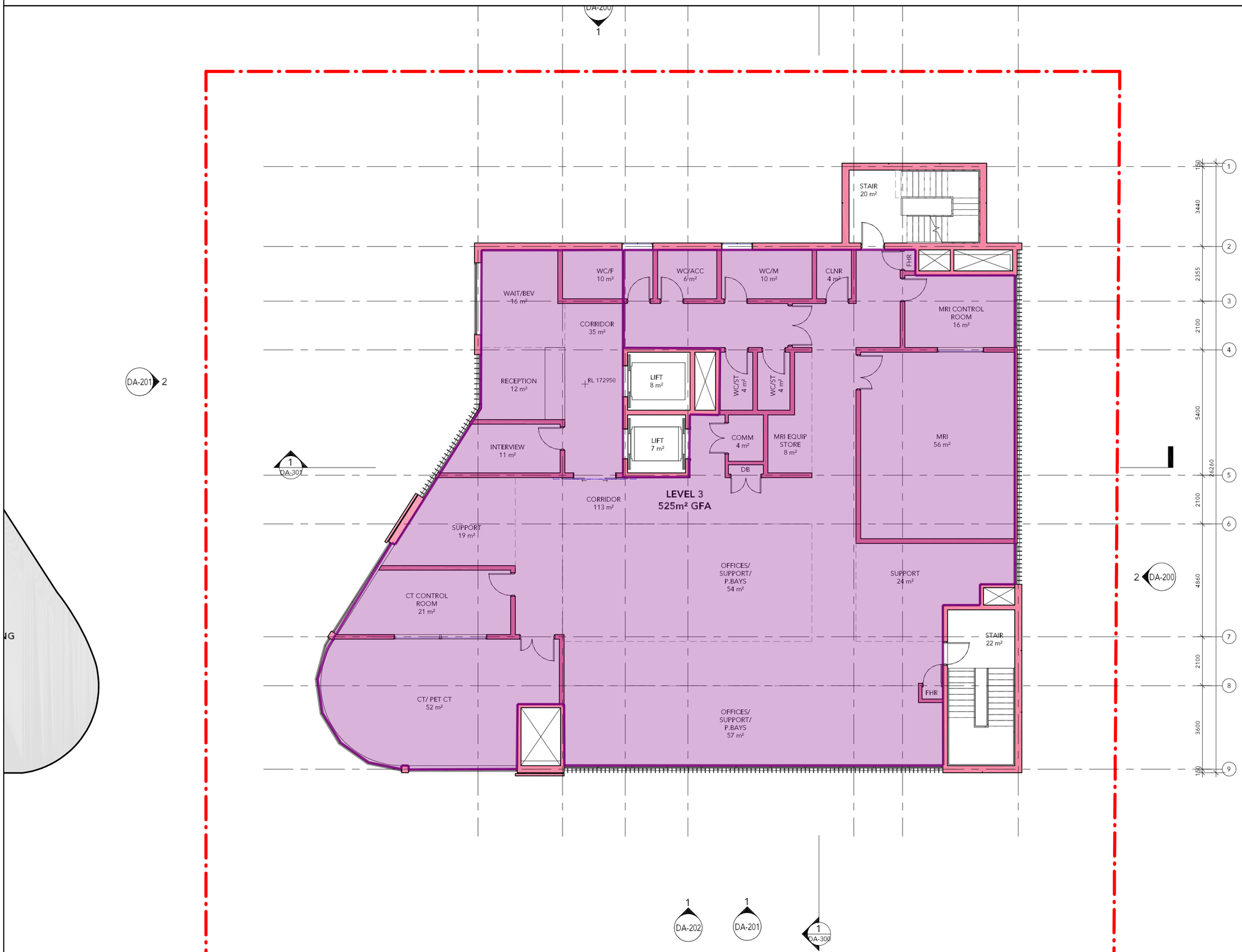
Standard

GFA - Level 2 525 m2

Level 3 GFA

Project: Erilyan Tenders
Building: 424 - GenesisCare 'Maui' Frenchs Forest

Drawing: 00 Architectural (19.08.19)\856-DA-106-FLOOR PLAN - LEVEL 3-3
Filename: S:\1. ERILYAN\04. Estimating\11. CostX Drawings\424 - GenesisCare 'Maui' Frenchs Forest\00 Architectural (19.08.19)\856-DA-106-FLOOR PLAN - LEVE



Legend

Standard

GFA - Level 3 526 m2

CostX

Appendix B

SIDRA Output

MOVEMENT SUMMARY

Site: 101 [EX AM ROMFORD RD/FRENCHS FOREST ROAD E]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: SITE ACCESS												
1	L2	12	4.0	0.104	48.4	LOS D	0.6	4.0	0.97	0.67	0.97	21.5
2	T1	1	4.0	0.104	45.0	LOS D	0.6	4.0	0.97	0.67	0.97	22.9
3	R2	12	4.0	0.096	48.5	LOS D	0.5	3.7	0.97	0.67	0.97	20.9
Approach		24	4.0	0.104	48.3	LOS D	0.6	4.0	0.97	0.67	0.97	21.3
East: FRENCHS FOREST ROAD E												
5	T1	692	4.0	0.551	20.0	LOS B	15.4	111.4	0.79	0.70	0.79	41.9
6	R2	78	4.0	0.551	29.0	LOS C	9.8	70.7	0.83	0.74	0.83	39.8
Approach		769	4.0	0.551	20.9	LOS B	15.4	111.4	0.79	0.70	0.79	41.7
North: ROMFORD RD												
7	L2	118	4.0	0.542	36.6	LOS C	10.0	72.4	0.91	0.82	0.91	35.0
9	R2	143	4.0	0.542	36.5	LOS C	10.0	72.4	0.91	0.82	0.91	35.2
Approach		261	4.0	0.542	36.5	LOS C	10.0	72.4	0.91	0.82	0.91	35.1
West: FRENCHS FOREST ROAD E												
10	L2	87	4.0	0.434	22.8	LOS B	11.1	80.6	0.72	0.66	0.72	43.7
11	T1	678	4.0	0.434	17.2	LOS B	11.3	81.5	0.72	0.64	0.72	43.7
Approach		765	4.0	0.434	17.9	LOS B	11.3	81.5	0.72	0.64	0.72	43.7
All Vehicles		1820	4.0	0.551	22.2	LOS B	15.4	111.4	0.78	0.69	0.78	40.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		158	39.3	LOS D			0.94	0.94

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: 101 [EX PM ROMFORD RD/FRENCHS FOREST ROAD E]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: SITE ACCESS												
1	L2	49	4.0	0.419	50.3	LOS D	2.3	16.6	1.00	0.74	1.00	21.1
2	T1	1	4.0	0.419	46.8	LOS D	2.3	16.6	1.00	0.74	1.00	22.5
3	R2	27	4.0	0.227	49.4	LOS D	1.2	8.8	0.98	0.71	0.98	20.7
Approach		78	4.0	0.419	49.9	LOS D	2.3	16.6	0.99	0.73	0.99	20.9
East: FRENCHS FOREST ROAD E												
5	T1	740	4.0	0.475	12.7	LOS A	13.2	95.7	0.64	0.58	0.64	47.0
6	R2	83	4.0	0.475	20.4	LOS B	8.5	61.5	0.68	0.65	0.68	44.5
Approach		823	4.0	0.475	13.5	LOS A	13.2	95.7	0.65	0.59	0.65	46.7
North: ROMFORD RD												
7	L2	59	4.0	0.465	44.2	LOS D	5.4	39.2	0.96	0.79	0.96	32.3
9	R2	72	4.0	0.465	44.2	LOS D	5.4	39.2	0.96	0.79	0.96	32.5
Approach		131	4.0	0.465	44.2	LOS D	5.4	39.2	0.96	0.79	0.96	32.4
West: FRENCHS FOREST ROAD E												
10	L2	93	4.0	0.379	16.5	LOS B	9.7	70.1	0.58	0.56	0.58	47.7
11	T1	736	4.0	0.379	11.0	LOS A	9.8	70.9	0.58	0.53	0.58	48.3
Approach		828	4.0	0.379	11.6	LOS A	9.8	70.9	0.58	0.54	0.58	48.2
All Vehicles		1860	4.0	0.475	16.3	LOS B	13.2	95.7	0.65	0.59	0.65	44.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		158	39.3	LOS D			0.94	0.94

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: 101 [FUT AM ROMFORD RD/FRENCHS FOREST ROAD E]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: SITE ACCESS												
1	L2	19	2.0	0.164	48.8	LOS D	0.9	6.3	0.97	0.69	0.97	21.4
2	T1	1	2.0	0.164	45.4	LOS D	0.9	6.3	0.97	0.69	0.97	22.8
3	R2	18	2.0	0.145	48.8	LOS D	0.8	5.5	0.97	0.69	0.97	20.8
Approach		38	2.0	0.164	48.7	LOS D	0.9	6.3	0.97	0.69	0.97	21.2
East: FRENCHS FOREST ROAD E												
5	T1	851	4.0	0.690	21.2	LOS B	21.7	156.8	0.85	0.77	0.86	41.2
6	R2	87	4.0	0.690	33.3	LOS C	11.7	84.5	0.90	0.83	0.94	37.7
Approach		938	4.0	0.690	22.3	LOS B	21.7	156.8	0.85	0.77	0.87	40.8
North: ROMFORD RD												
7	L2	132	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	33.9
9	R2	160	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	34.1
Approach		292	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	34.0
West: FRENCHS FOREST ROAD E												
10	L2	98	4.0	0.531	22.6	LOS B	14.7	106.7	0.74	0.69	0.74	43.9
11	T1	883	4.0	0.531	17.0	LOS B	14.9	107.8	0.74	0.67	0.74	43.8
Approach		981	4.0	0.531	17.6	LOS B	14.9	107.8	0.74	0.67	0.74	43.8
All Vehicles		2249	4.0	0.690	22.9	LOS B	21.7	156.8	0.82	0.73	0.83	40.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		158	39.3	LOS D			0.94	0.94

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: 101 [FUT AM ROMFORD RD/FRENCHS FOREST ROAD E]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: SITE ACCESS												
1	L2	19	2.0	0.164	48.8	LOS D	0.9	6.3	0.97	0.69	0.97	21.4
2	T1	1	2.0	0.164	45.4	LOS D	0.9	6.3	0.97	0.69	0.97	22.8
3	R2	18	2.0	0.145	48.8	LOS D	0.8	5.5	0.97	0.69	0.97	20.8
Approach		38	2.0	0.164	48.7	LOS D	0.9	6.3	0.97	0.69	0.97	21.2
East: FRENCHS FOREST ROAD E												
5	T1	851	4.0	0.690	21.2	LOS B	21.7	156.8	0.85	0.77	0.86	41.2
6	R2	87	4.0	0.690	33.3	LOS C	11.7	84.5	0.90	0.83	0.94	37.7
Approach		938	4.0	0.690	22.3	LOS B	21.7	156.8	0.85	0.77	0.87	40.8
North: ROMFORD RD												
7	L2	132	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	33.9
9	R2	160	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	34.1
Approach		292	4.0	0.662	39.5	LOS C	11.9	86.1	0.96	0.84	0.97	34.0
West: FRENCHS FOREST ROAD E												
10	L2	98	4.0	0.531	22.6	LOS B	14.7	106.7	0.74	0.69	0.74	43.9
11	T1	883	4.0	0.531	17.0	LOS B	14.9	107.8	0.74	0.67	0.74	43.8
Approach		981	4.0	0.531	17.6	LOS B	14.9	107.8	0.74	0.67	0.74	43.8
All Vehicles		2249	4.0	0.690	22.9	LOS B	21.7	156.8	0.82	0.73	0.83	40.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		158	39.3	LOS D			0.94	0.94

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.

Appendix C

Transport Services

Buses around the Northern Beaches

T Train · B Bus · F Ferry · L Light Rail

City

- B Catch a B1 B-Line bus from Warringah Mall, Pittwater Rd, Stand B to City Wynyard.
- F Catch an F1 ferry from Manly Wharf to Circular Quay.

Manly

- B Catch a bus from Warringah Mall, Pittwater Rd, Stand A to Manly.

Palm Beach

- B Catch a B1 B-Line bus from Warringah Mall, Pittwater Rd, Stand C to Mona Vale.

  Change at Mona Vale for connecting bus services to Palm Beach.

Chatswood

- B Catch a B1 B-Line bus to Neutral Bay Junction.

  Change at Neutral Bay Junction for a 143, 144 or 257 bus to Chatswood.

*Images from Destination NSW

Palm Beach Wharf · Palm Beach Ocean Place L90 L99 · PALM BEACH · WHALE BEACH · CLAREVILLE · North Avalon Beach Careel Head Rd E88 L90 199 · AVALON BEACH · Avalon Beach Avalon Pde 188 191 E88 192 · SCOTLAND ISLAND · Scotland Island Wharf · Church Point Wharf · CHURCH POINT · BILGOLA PLATEAU · BILGOLA BEACH · NEWPORT · McCarrs Creek McCarrs Creek Rd 156 · BAYVIEW · Bayview Garden Village Annam Rd 155 · MONA VALE · B1 Mona Vale 133 145 153 E54 E60 E85 · WARRIEWOOD · Warriewood · ELANORA HEIGHTS · North Narrabeen Garden St E83 · Narrabeen · Narrabeen Waterloo St 155 182 · Collaroy · Collaroy Plateau Hall Ave 140 E80 · Wheeler Heights Lantana Ave 140 E78 · Cromer Heights Maybrook Manor E78 E79 · Cromer South Creek Rd 158 185 · Narrawena Athol St 173 E69 · Dee Why · Dee Why Howard Ave E76 · Dee Why Pacific Pde 177 · Brookvale Warringah Mall 133 143 E89 E80 · Brookvale Pittwater Rd E69 E83 · Warringah Mall · Manly Vale · Seaforth Battle Bvd · Manly · Manly Wharf · NORTH HEAD · North Head North Fort Museum · Spit Junction · Neutral Bay Junction · Chatswood Station · Artarmon · St Leonards · Crows Nest Burlington St · North Sydney Station · Neutral Bay Wharf · Mosman Wharf · Mosman Jn · Mosman Balmoral Heights · Mosman Balmoral Beach · Spit Junction Punch St · Cammeray Boneberg Rd · Cremorne Point Wharf · McMahons Point Wharf · Milsons Point Wharf · South Mosman Wharf · Mosman Clifton Gardens · Mosman Chowder Bay · Taronga Zoo Bradleys Head Rd · Taronga Zoo Wharf · Watsons Bay Wharf · Garden Island Wharf · Circular Quay Wharf · City Wynyard B1

Towards Gordon Macquarie Park · Towards Hornsby · Towards Macquarie University · Towards Parramatta River

NORTH

B-Line stop · Bus route terminus · XXX Bus route number · Train station · Ferry wharf

For real time service and connection information plan your trip at **transportnsw.info**

NSW GOVERNMENT · Transport

1809BMR-E-BLR-A3P-WCAG

Sydney rail network

NSW GOVERNMENT | Transport

M Metro T Trains

Sydney metro and train lines

M *Metro North West Line* — Chatswood, Tallawong

T1 *North Shore & Western Line* — North Shore, Western, Richmond

T2 *Inner West & Leppington Line* — Inner West, Leppington, City

T3 *Bankstown Line* — Liverpool, Lidcombe, City

T4 *Eastern Suburbs & Illawarra Line* — Eastern Suburbs, Illawarra, Cronulla

T5 *Cumberland Line* — Leppington, Richmond

T6 *Carlingford Line* — Carlingford, Clyde

T7 *Olympic Park Line* — Olympic Park, Lidcombe

T8 *Airport & South Line* — Airport, South, City

T9 *Northern Line* — Northern, Gordon

Stop · Interchange · Interchange · End of line

NORTH

Line under construction

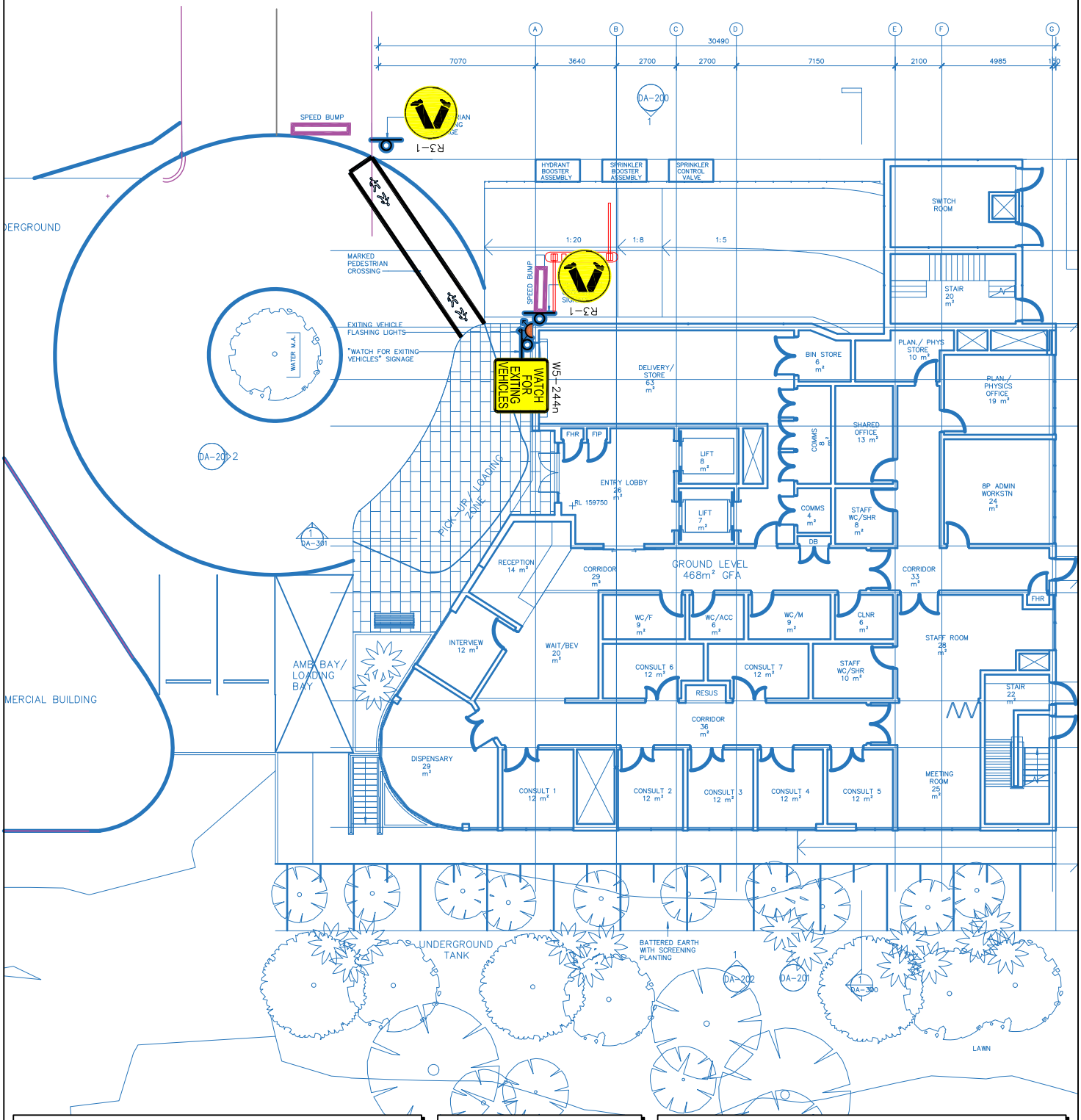
Check timetables and trip planners for train services and connections

Visit **transportnsw.info**

1812TMS-E-MWT-A4P

Appendix D

Proposed Traffic Management Plan



LINE MARKING SCHEDULE

RMS LINETYPE TB

RMS PAVEMENT MARKER PS-4

LEGEND

SIGN

CONVEX MIRROR - 600MM

SPEED HUMP

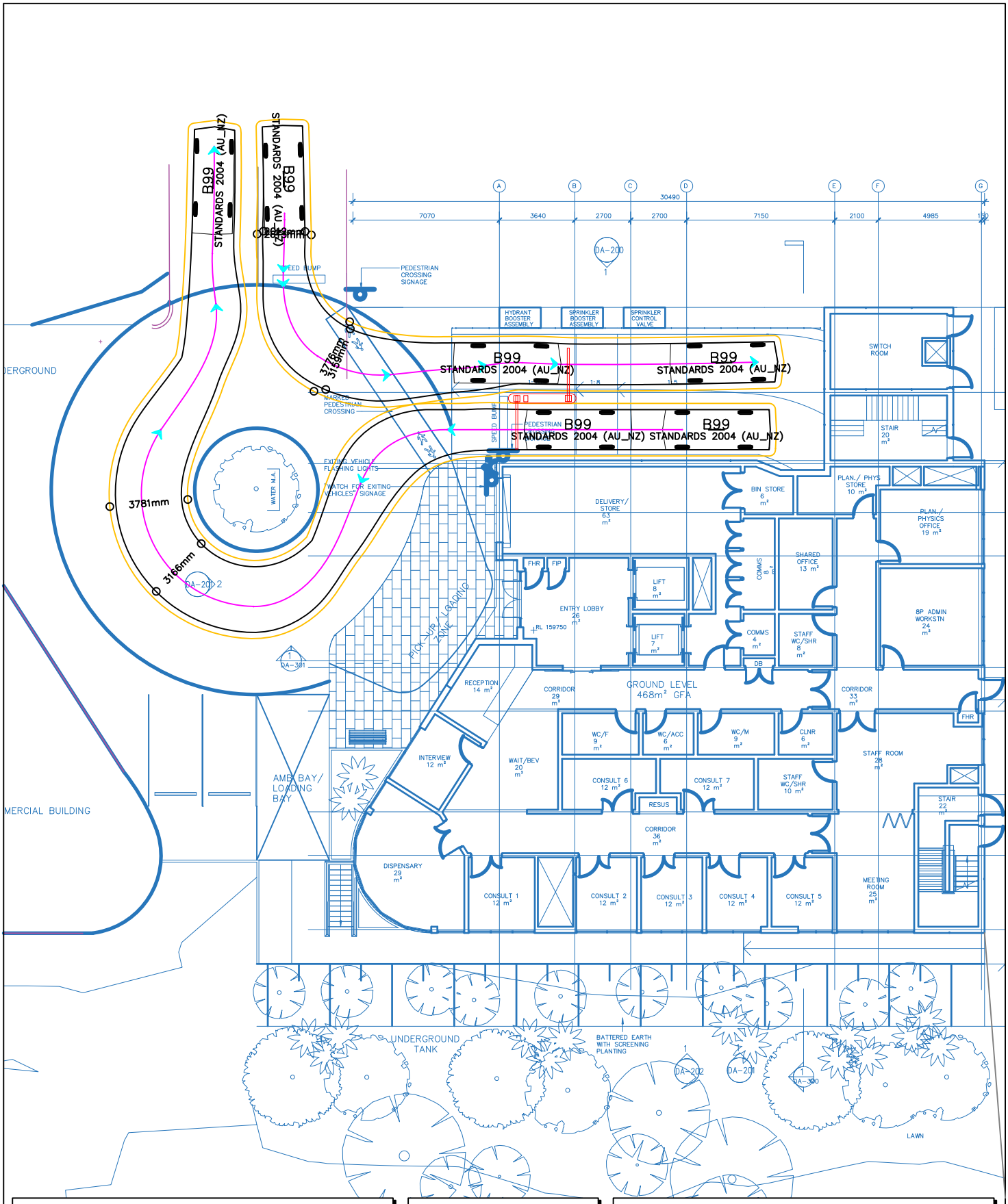
FLASHING WARNING LIGHT SYSTEM

PROPOSED PEDESTRIAN TRAFFIC MANAGEMENT PLAN ON GROUND LEVEL

Fig 1

Appendix E

Turning Path Assessment



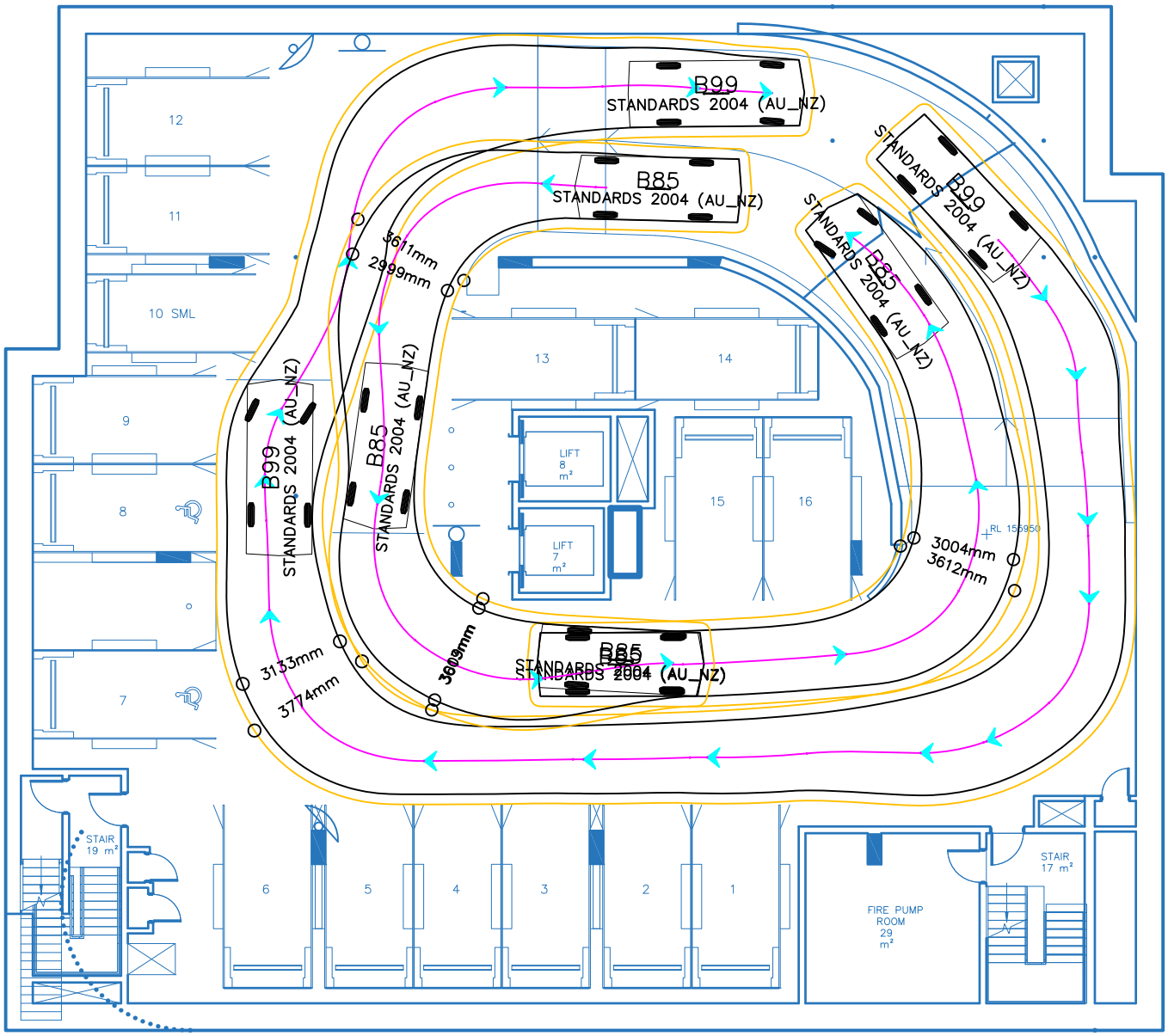
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTURN PRO10 in conjunction with AutoCAD 2018. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF B99 VEHICLES ENTERING & EXITING THE SITE

SP 1



LEGEND

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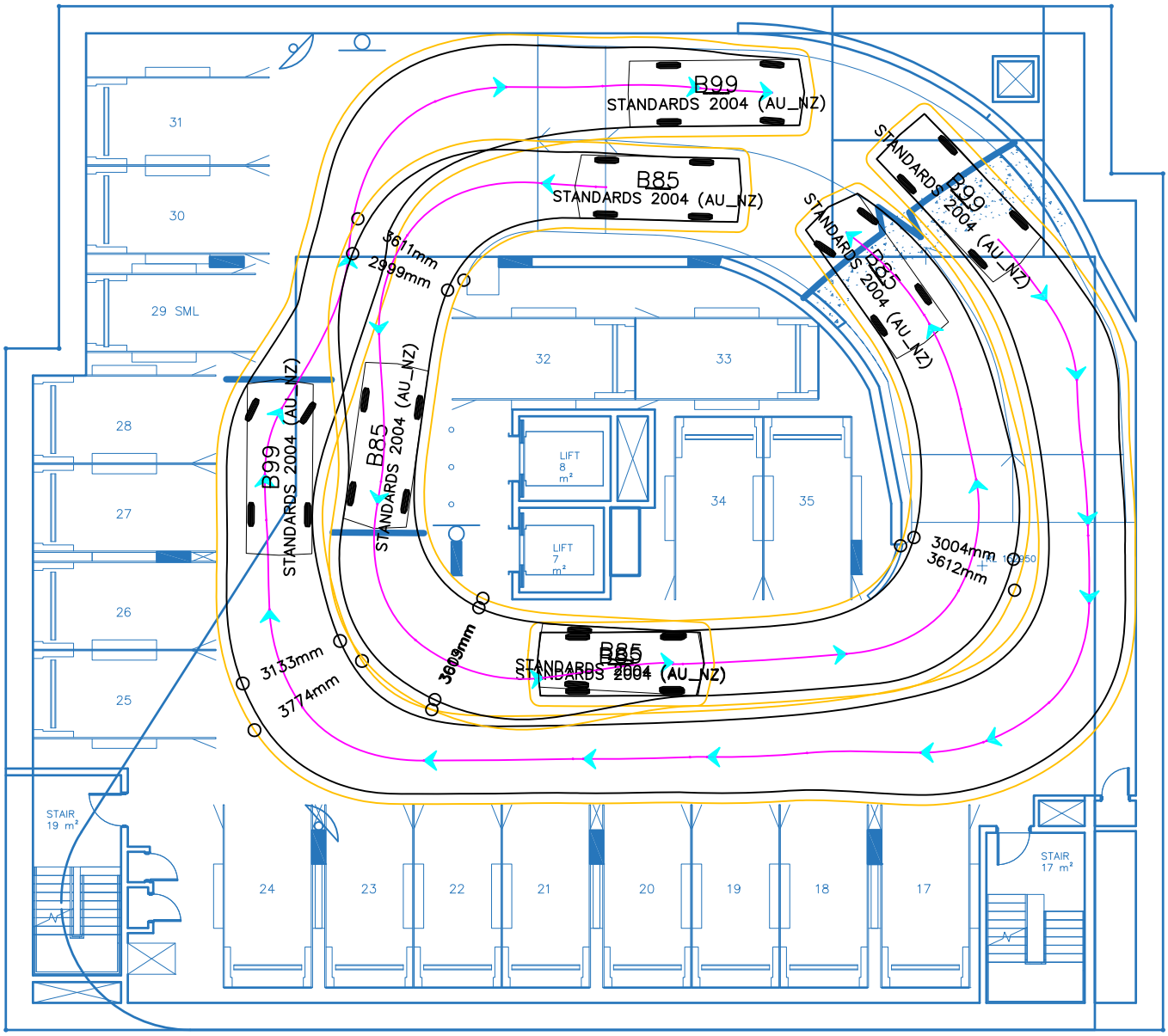
N

SWEPT PATH ANALYSIS OF B99 VEHICLES ENTERING & B85 VEHICLES EXITING GROUND AND BASEMENT LEVEL 1

SP 2



LEGEND

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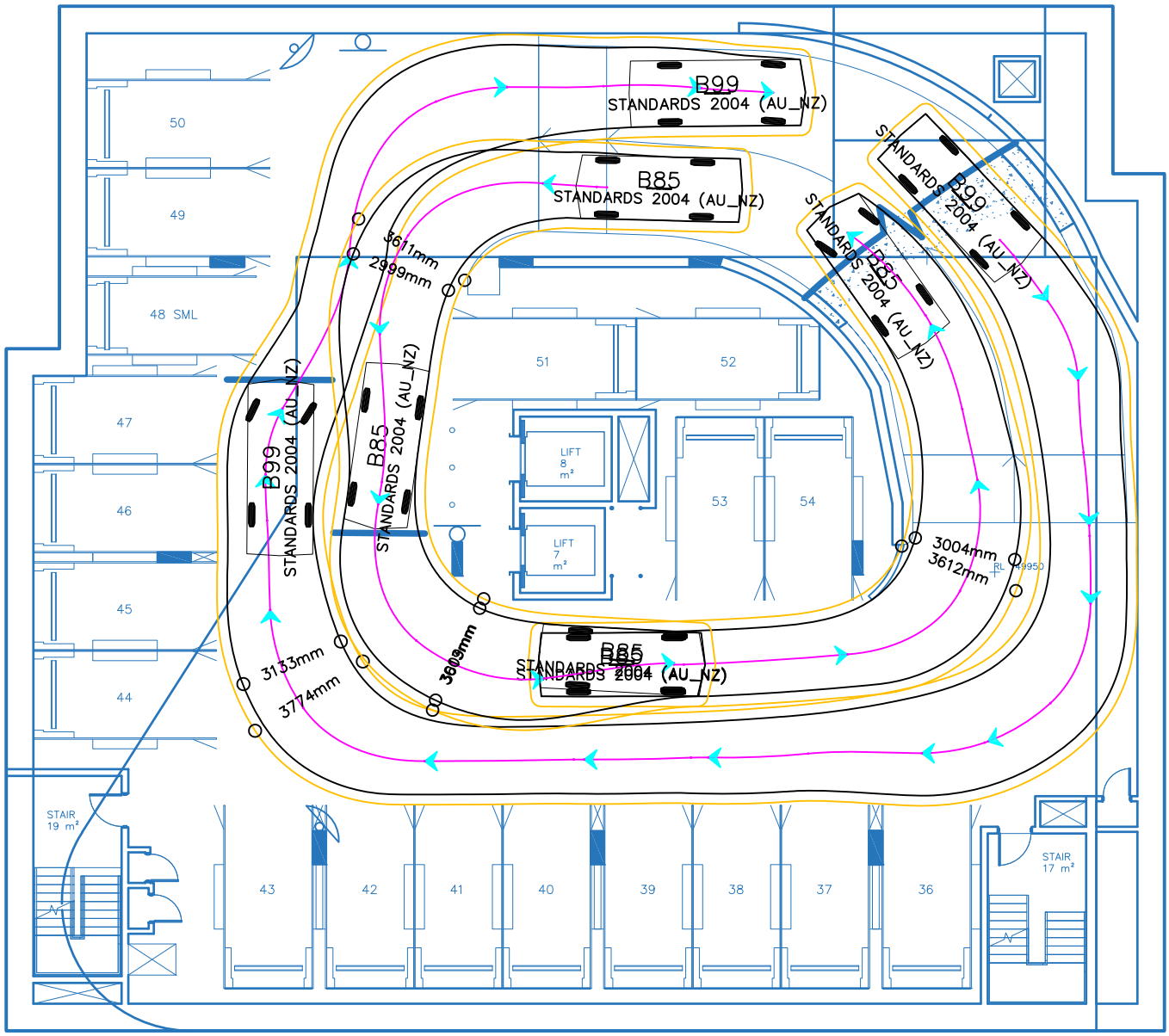
N

SWEPT PATH ANALYSIS OF B99 VEHICLES ENTERING & B85 VEHICLES EXITING BASEMENT LEVELS 1 AND 2

SP 3



LEGEND

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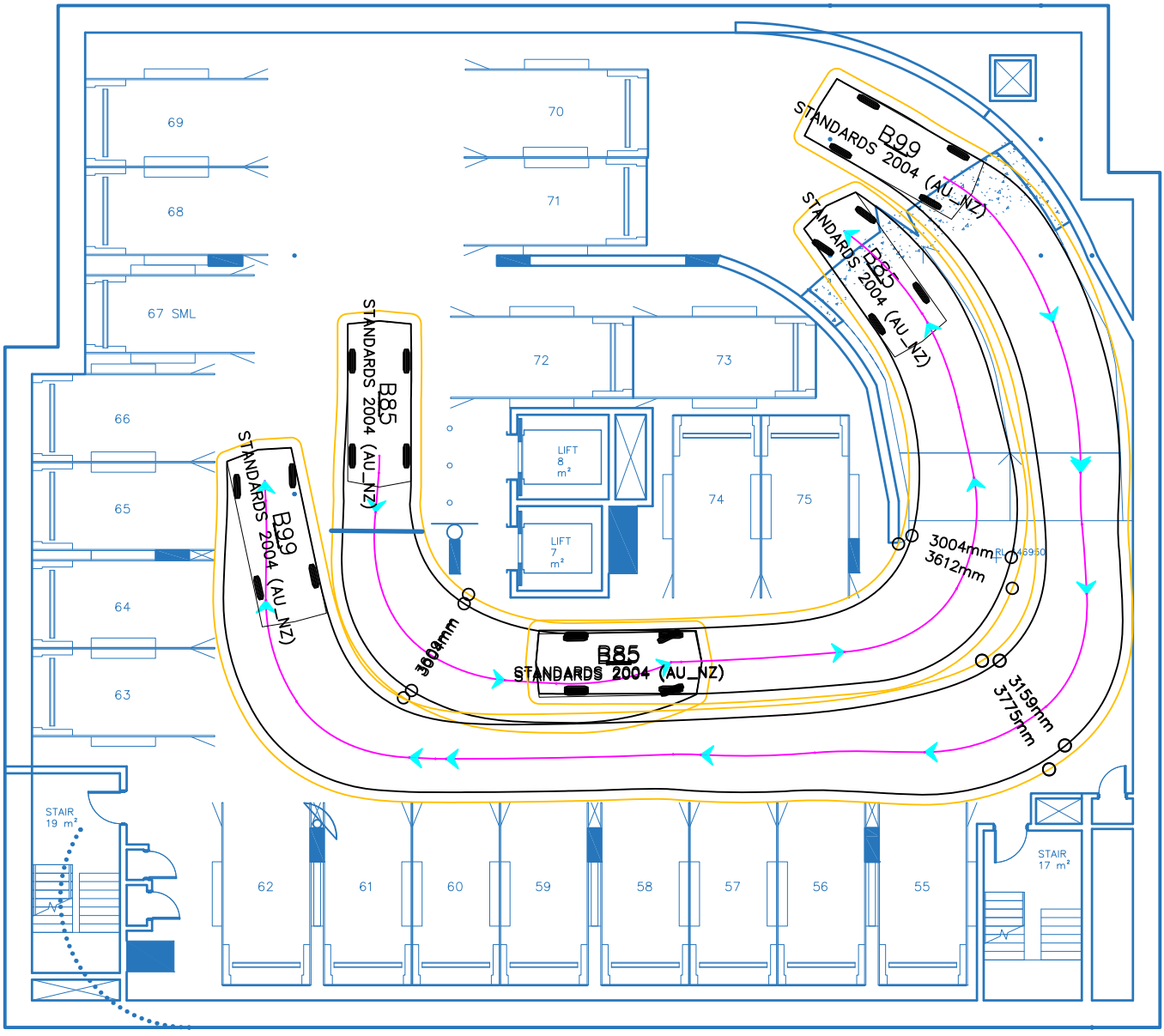
N

SWEPT PATH ANALYSIS OF B99 VEHICLES ENTERING & B85 VEHICLES EXITING BASEMENT LEVEL 3

SP 4



LEGEND

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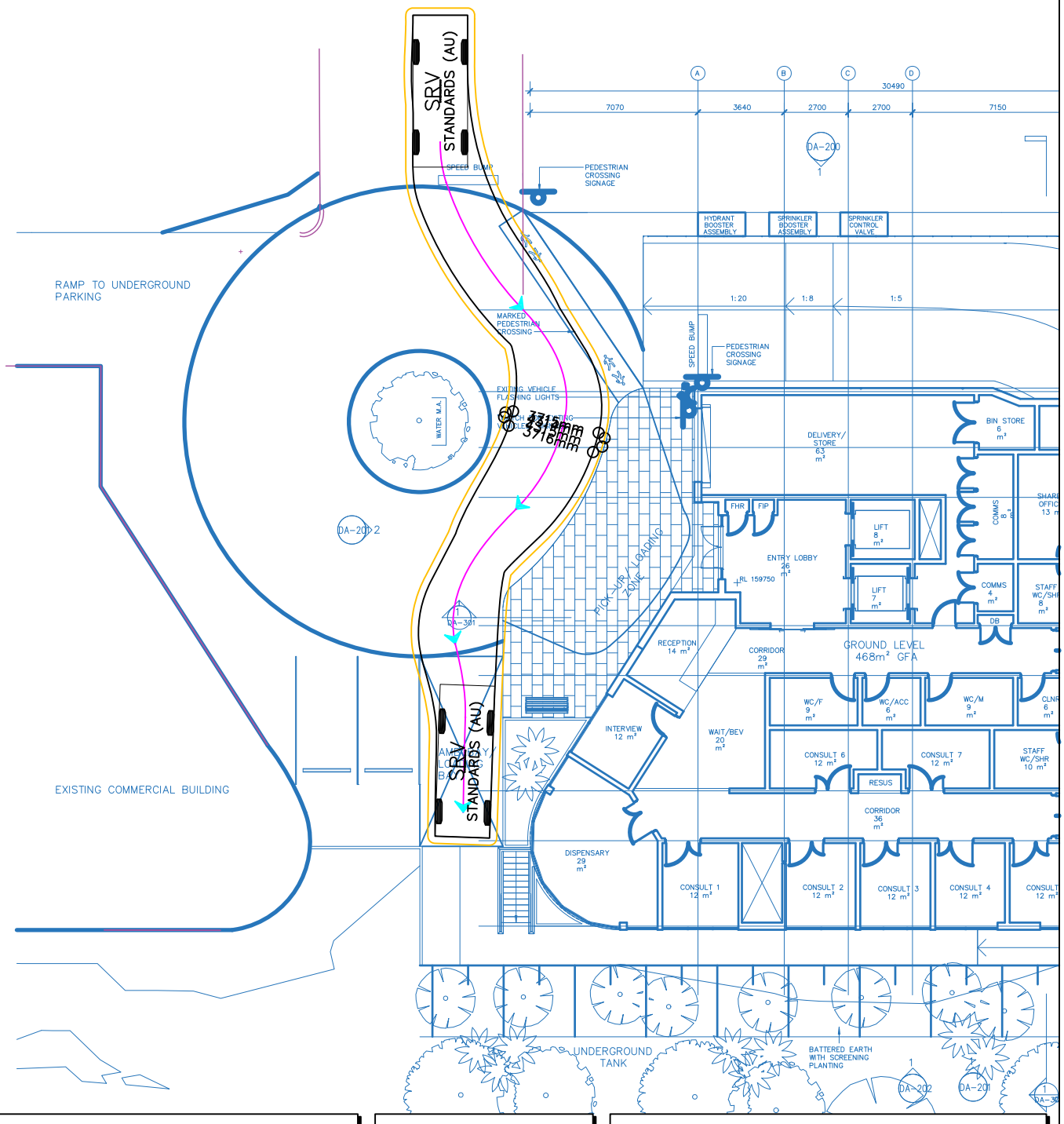
N

SWEPT PATH ANALYSIS OF B99 VEHICLES ENTERING & B85 VEHICLES EXITING BASEMENT LEVEL 4

SP 5



LEGEND

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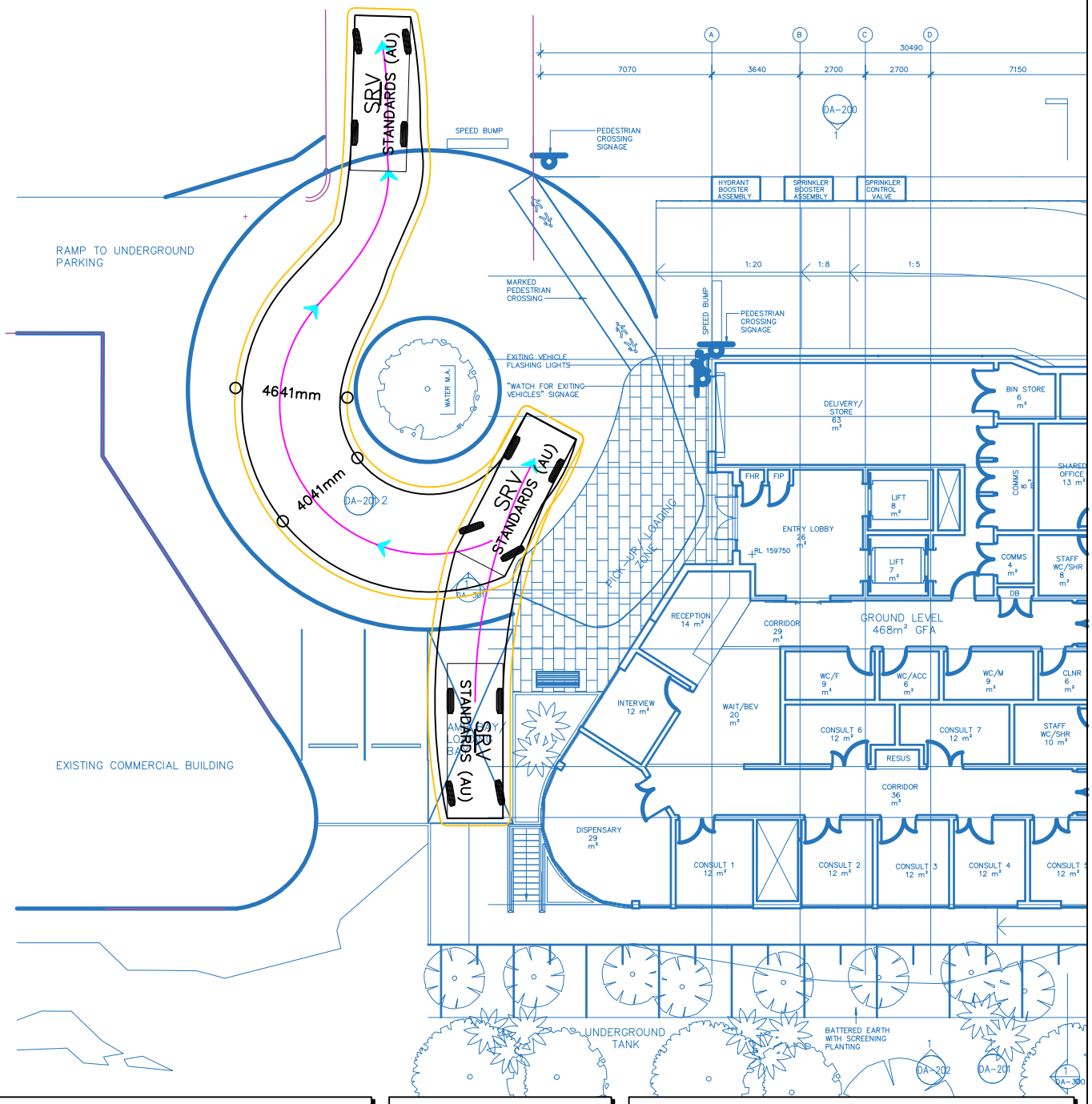
N

SWEPT PATH ANALYSIS OF A 6.4M SMALL RIGID VEHICLE STOPPING TEMPORARILY ON THE DROP-OFF ZONE AT THE GROUND LEVEL

SP 6



LEGEND

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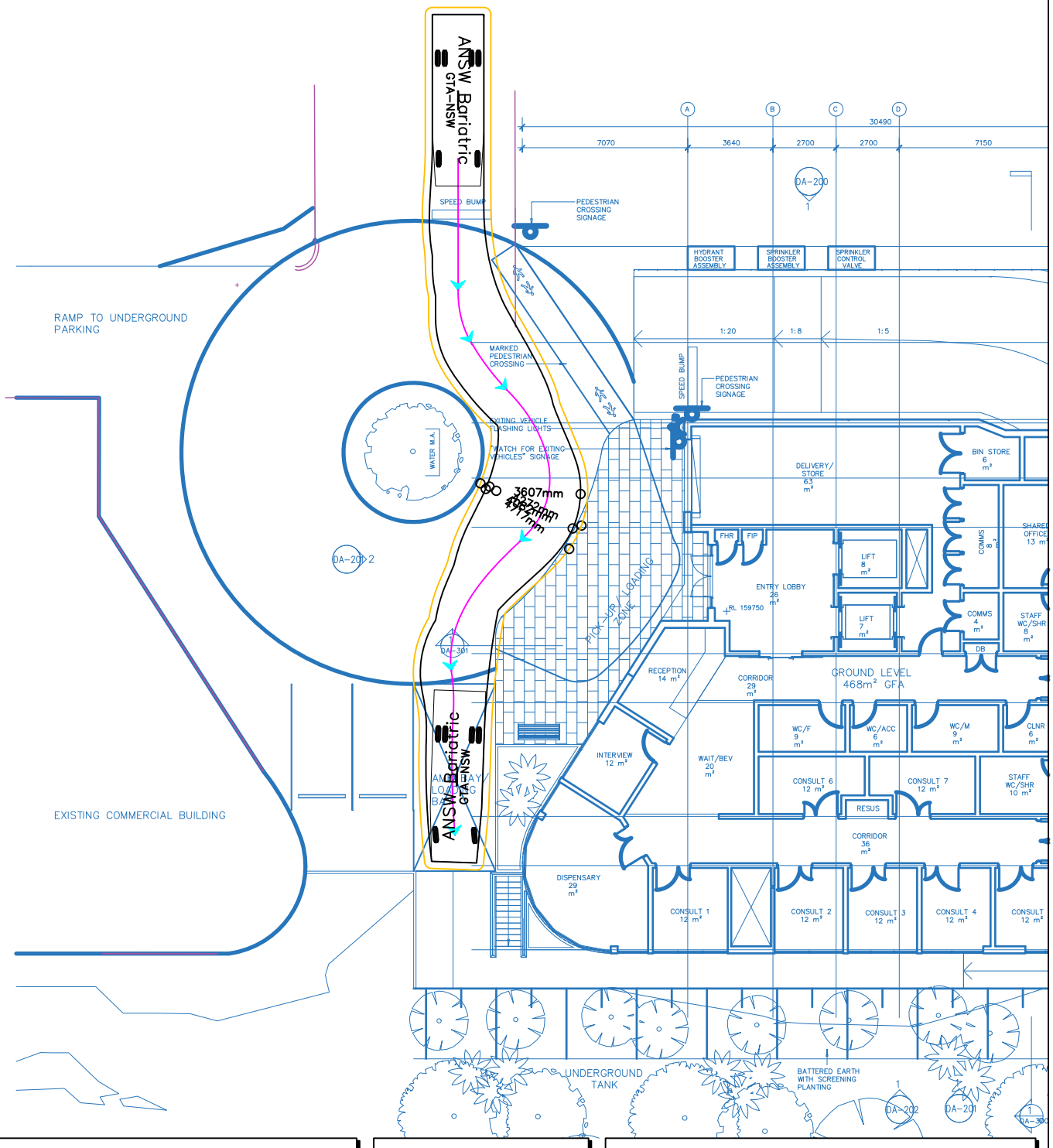
N

SWEPT PATH ANALYSIS OF A 6.4M SMALL RIGID VEHICLE EXITING THE DROP-OFF ZONE AT THE GROUND LEVEL

SP 7



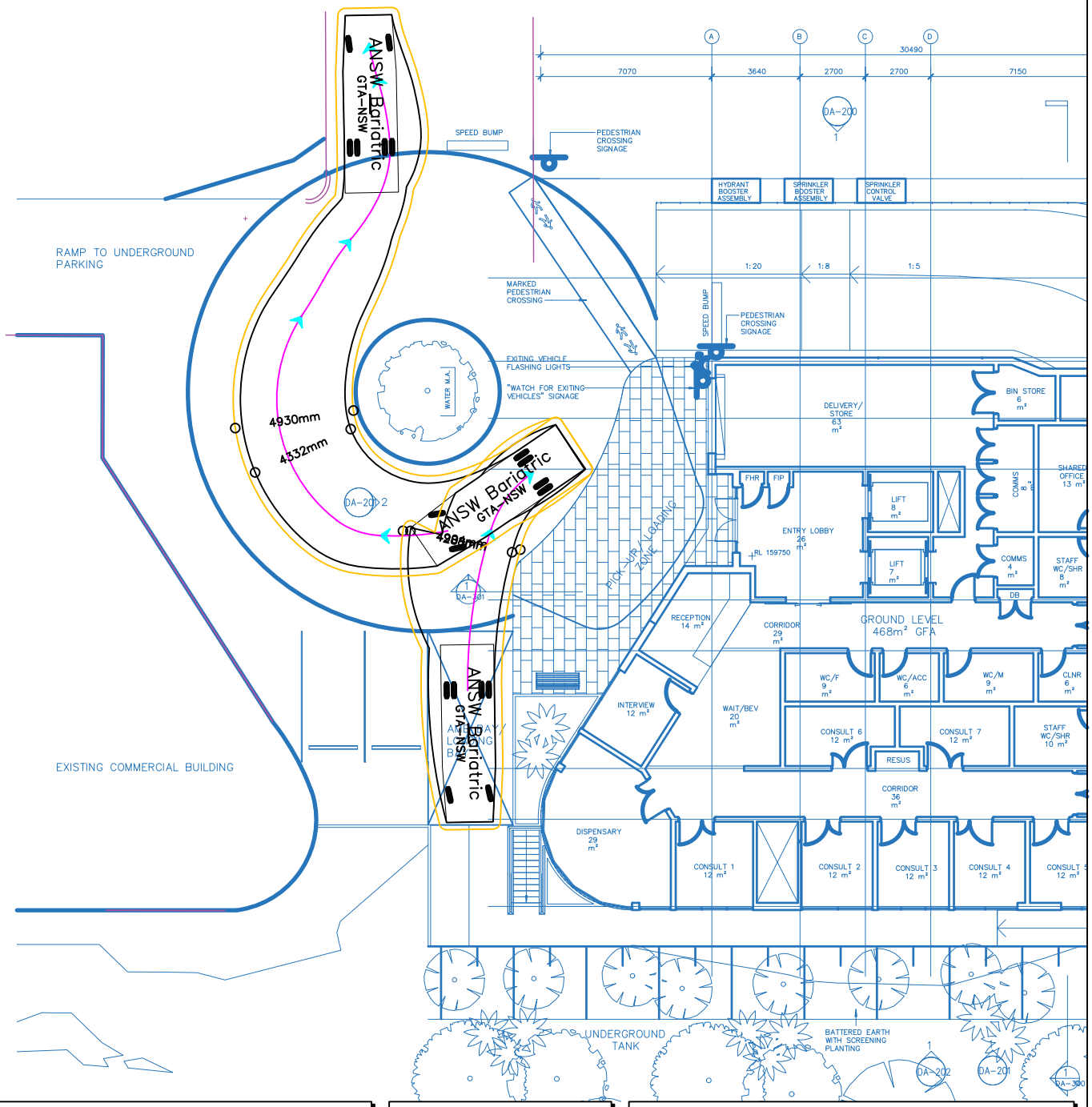
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTURN PRO10 in conjunction with AutoCAD 2018. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF A 7.3M BARIATRIC AMBULANCE ENTERING THE AMBULANCE SPACE AT THE GROUND LEVEL

SP 8



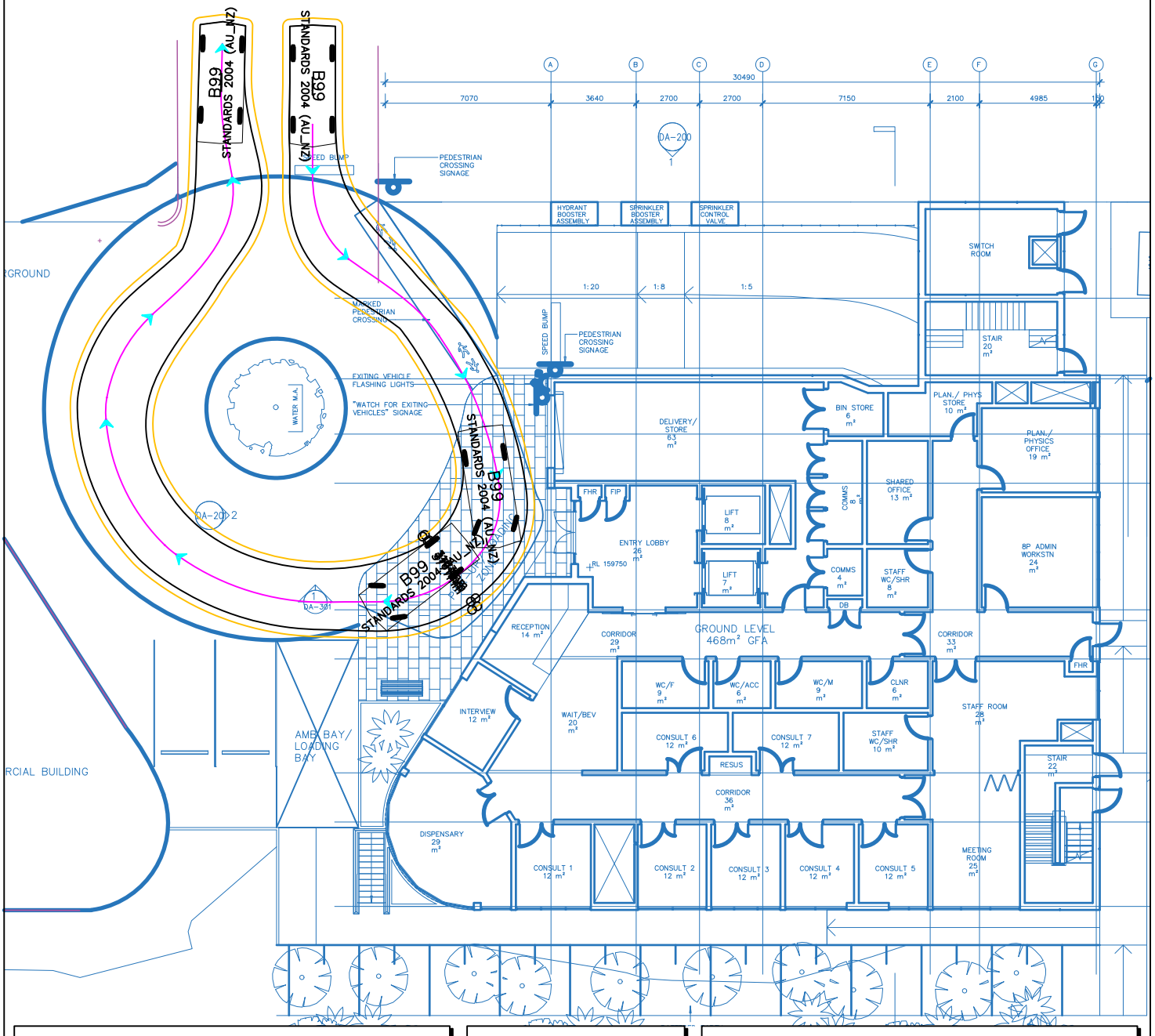
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTURN PRO10 in conjunction with AutoCAD 2018. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF A 7.3M BARIATRIC AMBULANCE EXITING THE AMBULANCE SPACE AT THE GROUND LEVEL

SP 9



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTURN PRO10 in conjunction with AutoCAD 2018. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

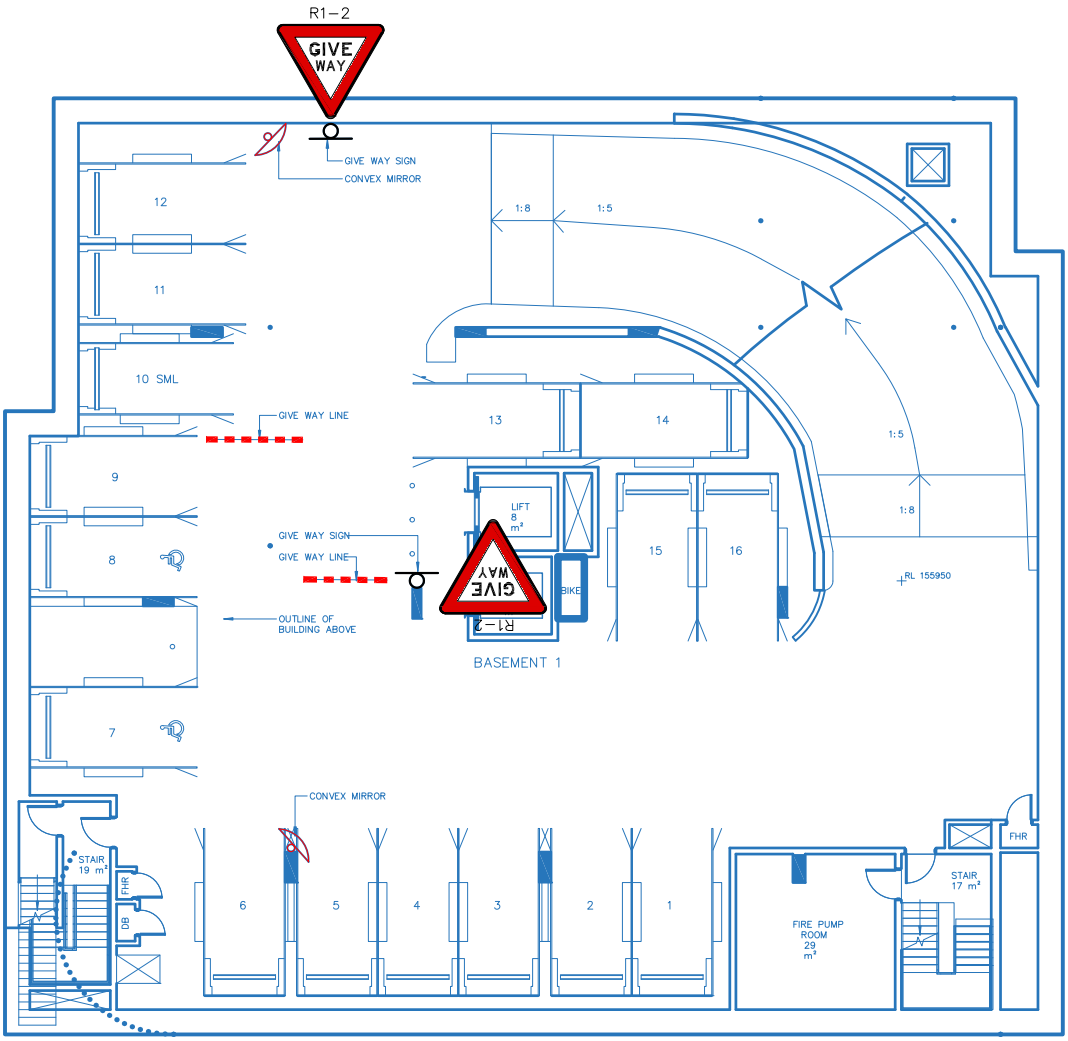
N

SWEPT PATH ANALYSIS OF A B99 VEHICLE ENTERING AND EXITING THE PORTE COCHERE AT THE GROUND LEVEL

SP 10

Appendix F

Proposed Signage and Line-marking Plan



LINE MARKING SCHEDULE

RMS LINETYPE TB

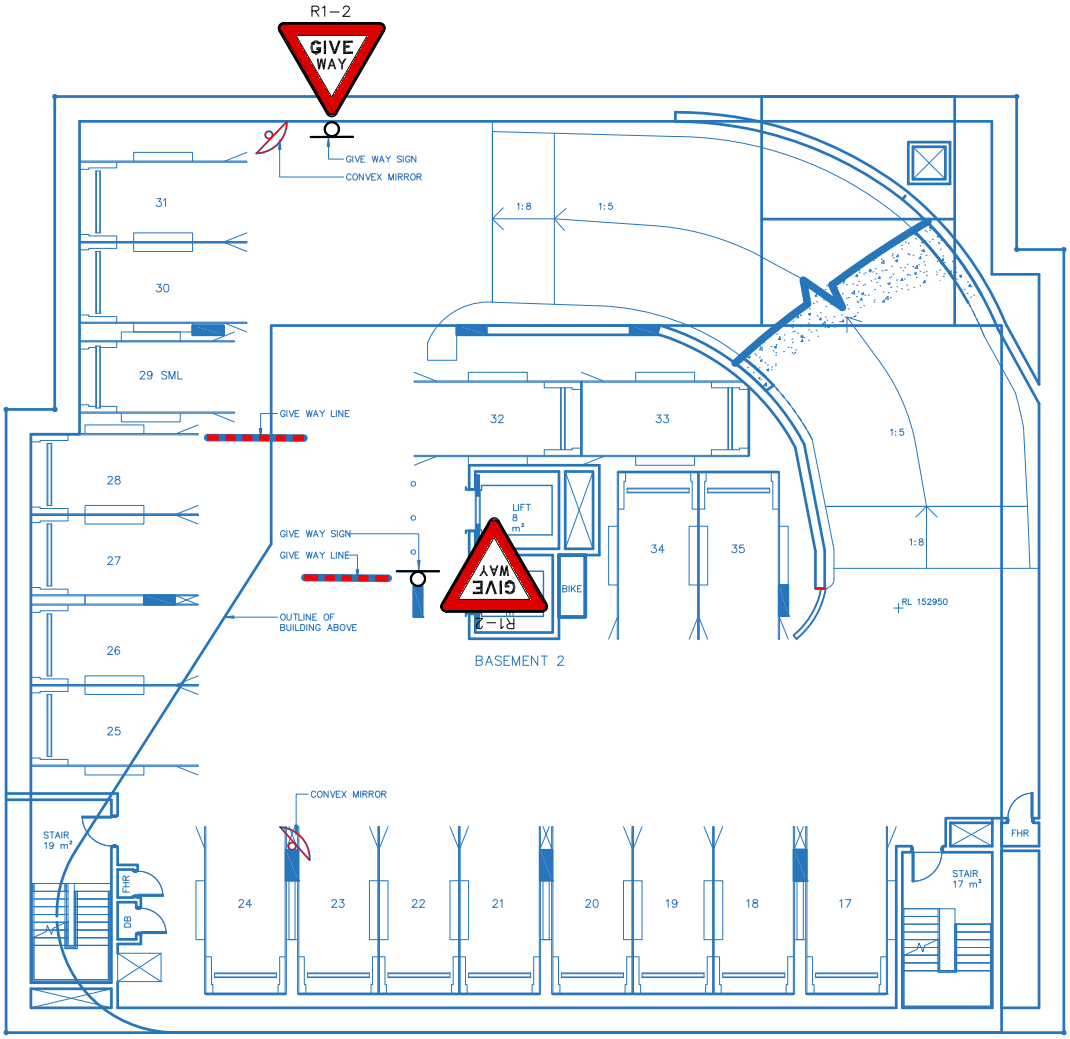
LEGEND

SIGN

CONVEX MIRROR - 600MM

PROPOSED SIGNAGE & LINE-MARKING ON BASEMENT 1

Fig 1



LINE MARKING SCHEDULE

RMS LINETYPE TB

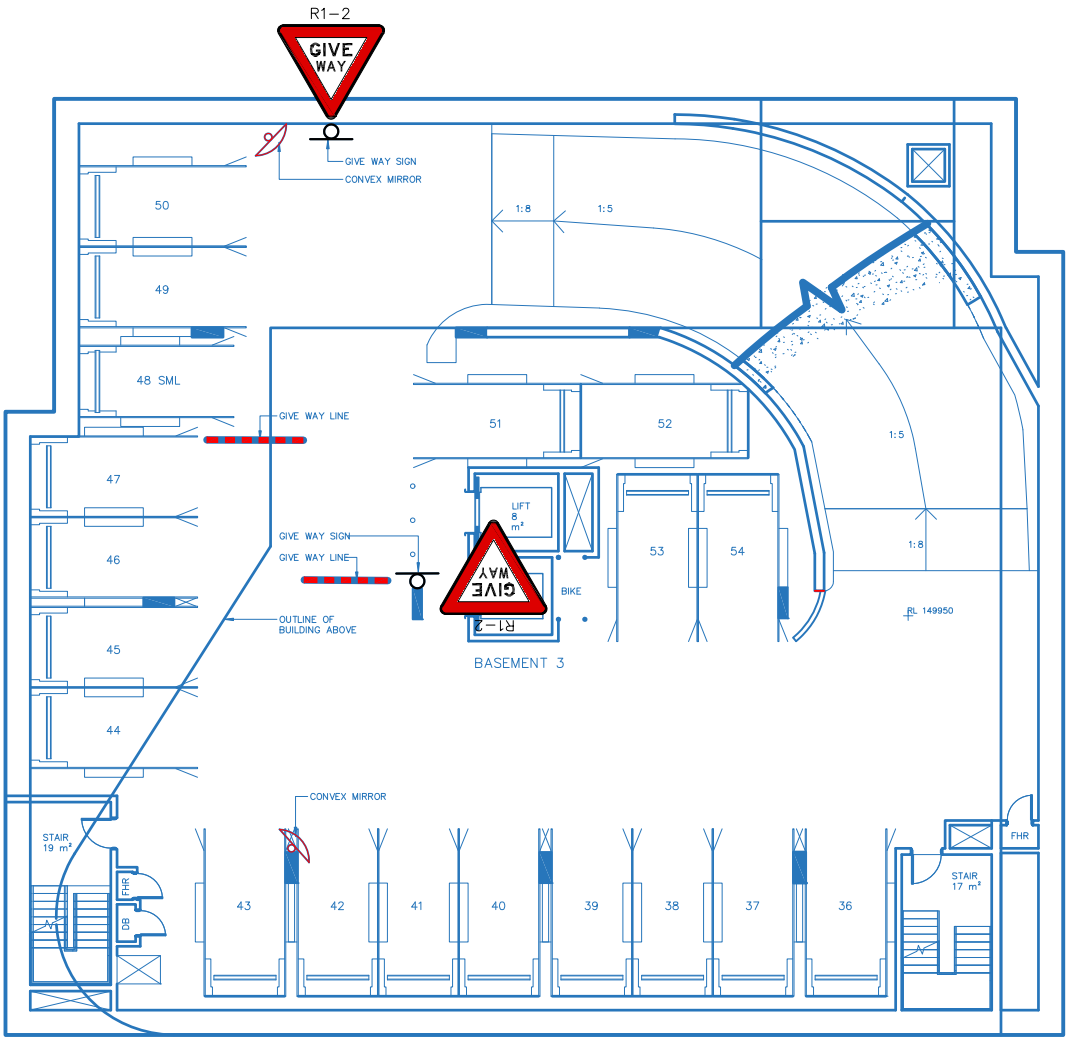
LEGEND

SIGN

CONVEX MIRROR - 600MM

PROPOSED SIGNAGE & LINE-MARKING ON BASEMENT 2

Fig 2



LINE MARKING SCHEDULE

RMS LINETYPE TB

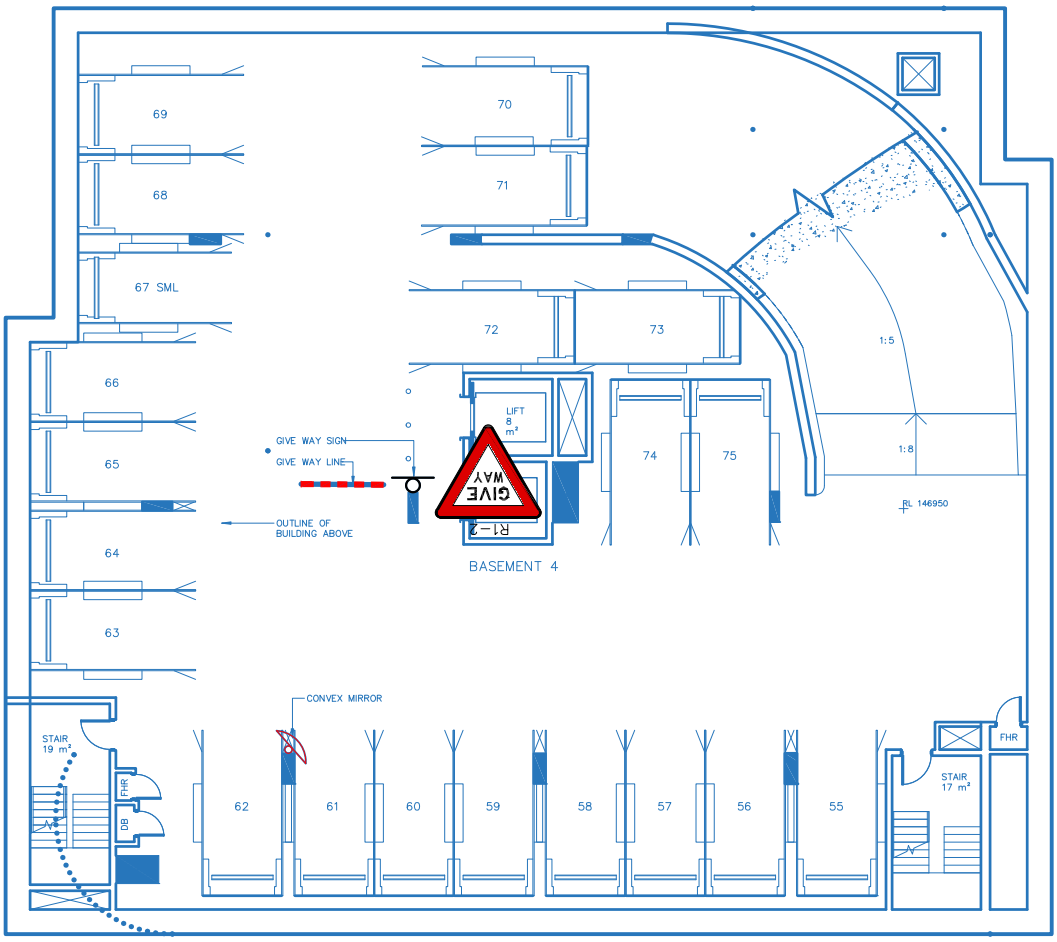
LEGEND

SIGN

CONVEX MIRROR - 600MM

PROPOSED SIGNAGE & LINE-MARKING ON BASEMENT 3

Fig 3



LINE MARKING SCHEDULE

RMS LINETYPE TB

LEGEND

SIGN

CONVEX MIRROR - 600MM

N

PROPOSED SIGNAGE & LINE-MARKING ON BASEMENT 4

Fig 4