Traffic Engineering

Hill Street, Southport

NorthWest Healthcare Properties

About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

No.	Author	Reviewed/Approved	Description	Date
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1 Introduction

1.1 Background

TTM Consulting has been engaged by NorthWest Healthcare Properties to prepare a traffic engineering report investigating a proposed Private Hospital. It is understood that a Development Application will be lodged with Economic Development Queensland (EDQ).

1.2 Scope

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

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

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

- Parklands Priority Development Area Development Scheme:
- Australian Standard 2890

1.3 Site Location

The site is located at Hill Street, Southport, near the intersection of Nexus Way, as shown in Figure 1.1. The property description is Lot 12 on SP275512. The site has road frontages to Hill Street and Nexus Way, and is currently unoccupied.

This is located within the Parkland Priority Development Area (PDA) and the site is therefore assessed by EDQ.

Figure 1.1: Site location

1.4 Development Profile

The proposed land uses for this development is a medical facility over 8 levels and basement parking, totalling 14,523m^2 of GFA.

1.5 Access

The development plan includes the following access arrangements:

- Hill Street Access located on the western side of the subject site. The characteristics of this access include:
  - 14.4m wide at the property boundary
  - Priority control
  - All turns permitted
  - Separate sections for car and service vehicle access

1.6 Parking

The development proposal includes the following parking supply:

- 176 visitor/general spaces, which are located in basement
- 4 PWD spaces, located on basement level 1

Of the 176 standard parking bays, 8, or approximately 5%, are identified as small car bays.

2 Existing Transport Infrastructure

2.1 The Road Network

Most roads in the immediate vicinity of the site are administered by EDQ through the local PDA, the exceptions being Parklands Drive, which is administered by Gold Coast City Council. The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 2.1.

Table 2.1: Local Road Hierarchy

Road	Speed Limit	Lanes	Classification	Road Authority
Hill Street	40kph	2 (undivided, plus parking)	District Access	EDQ
Nexus Way	40kph	2 (undivided, plus parking)	Arterial	EDQ
Fraser Street	40kph	2 (undivided, plus parking)	Local Road	EDQ
Parklands Drive	50kph	2 (divided, plus auxiliary lanes)	Distributor	GCCC

Hill Street has a 6.5m wide carriageway at the site frontage, with indented kerbs to provide for parking and loading. All intersections on the site frontage are priority controlled.

2.2 Road Planning

The traffic immediately local to the site operates within the Southport PDA. The PDA network is fully developed in the vicinity of the site to allow traffic to circulate and access properties. This includes Local Area Traffic Management considerations, such as reduced speed limits (40km/hr) and indented parking. There is no further development required to the local road network.

TTM have reviewed the Local Government Infrastructure Planning in the vicinity of the subject site and have identified no works that will impact the site traffic operation.

2.3 Public Transport and Pedestrian Facilities

Light Rail

Gold Coast University station, on the Gold Coast Light Rail line, is located approximately 100m to the south of the site. Services operate every 7.5 minutes (approximately) in peak periods and every 10 to 15 minutes off-peak.

Buses

GCUH bus stop is located approximately 100m to the south of the site, with regular services to surrounding suburbs. This services 6 routes with buses departing every few minutes throughout the day.

Pedestrians

Formal pedestrian footpaths are located on both sides of all roads in the vicinity the site. There is a continuous pedestrian path connecting the site to the Gold Coast University station, including signal controlled crossing of Parklands Blvd.

Cyclists

Dedicated on street and off street cycle lanes are located along Parklands Blvd. This connects to the site along fully sealed verges on Nexus Way, providing for low speed shared us area and on street cycling in a 40km/hr local traffic area.

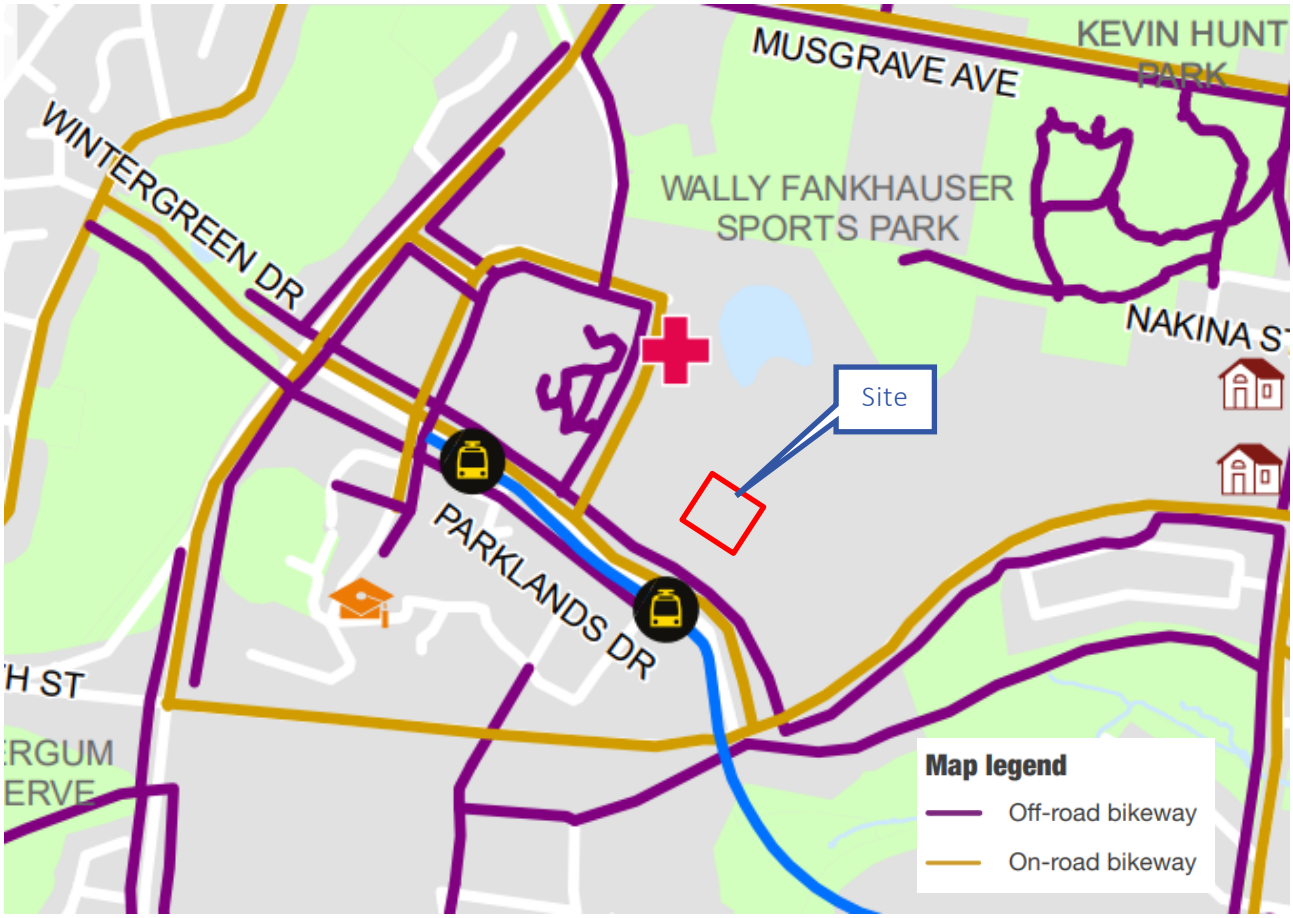

Figure 2.1: Cycle facilities

3 Car Parking Arrangements

3.1 Parking Supply Requirement

The Parklands PDA provides specific paring outcomes to achieve the following criteria:

> *"makes adequate provision for the number and nature of vehicles expected while promoting GCLR use through reduced provision of car parking…."*

To meet this requirement the PDA prescribes a range of parking applicable to non-residential development. This is a general minimum of 1 space per 100m^2, to a maximum of 1 space per 50m^2. For the proposed 14,523m^2 development, this provides a compliant parking range between 145 and 290 spaces.

The above parking supply is to include PWD parking in communal parking areas. The BCA requirement for PWD parking in a Class 9a building varies between 1 per 100 regular staff spaces and 1 per 50 patient parking. As such, PWD parking provision is conservatively based on a rate of approximately 1 per 50 ordinary spaces .

The development proposes 180 parking spaces, which is compliant with the range identified in the PDA. This includes 4 PWD spaces, consistent with the appropriate rate of 1 per 50 ordinary spaces.

3.2 Car Park Layout

Table 3.1 identifies the characteristics of the proposed parking area with respect to the Australian Standards requirements. The last column identifies the compliance of each design aspect. Where compliance with Council is not achieved, further information is provided below

Table 3.1: Parking Design Requirements

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Parking space length: – Standard bay – Tandem bay – Small Car	 5.4m 10.8m 5.0m	 5.4m 10.8m 5.0m	 Compliant Compliant Compliant
Parking space width: – Staff – Visitor – Small Car	 2.4m 2.6m 2.3m	 2.6m 2.6m 2.3m	 Compliant Compliant Compliant
Aisle Width: – Parking aisle – Circulation aisle/ramp	 5.8m 6.1m (wall to wall)	 5.8m 6.1m	 Compliant Compliant
Parking envelope clearance - Column adjacent to bay	Located between 0.6m and 1.75m of aisle	Located between 0.6m and 1.8m of aisle	Performance Solution
Parking envelope clearance – space adjacent to wall	Space 0.3m clear of wall	Space 0.3m clear of wall	Compliant

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Maximum Gradient: – PWD parking – Parking bay – Parking aisle – Ramp	 1:40 (2.5%) 1:20 (5.0%) 1:16 (6.25%) 1:5 (20%)	 Level Level Level 1:5	 Compliant Compliant Compliant Compliant
Maximum Change in Grade	1:8 (12.5%) summit 1:6.67 (15.0%) sag	1:8 maximum	Compliant
Height Clearance – General Min. – Over PWD bay	 2.2m (2.3m PWD) 2.5m	 2.3m 2.5m	 Compliant Compliant
Parking Aisle Extension	1m beyond last bay	1m beyond last bay	Compliant

The proposed carpark layout generally complies with Australian Standard Requirements; however the following issues are resolved with alternative solutions.

Column Location

AS2890.1 requires columns be located between 0.75m and 1.75m from the aisle. The development proposal provides columns generally between 0.6m and 1.8m. This is suitable for the proposed development parking spaces as parking spaces are typically located off-set 100mm from the columns. As such, this additional width ensure that columns are located outside the AS2890.1 parking envelope. An example of this is provided in Figure 3.1.

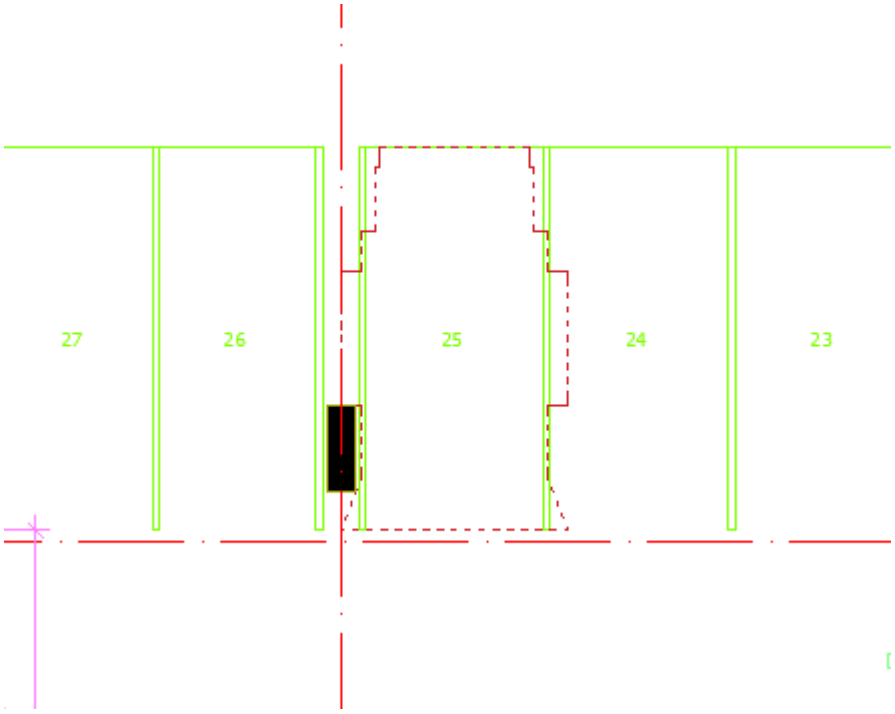

Figure 3.1: AS2890.1 Car Park Envelope Comparison

In addition to this, TM has identified a location where internal sight distances will be limited. On Basement Level 1 the ramp down to B2 runs parallel to an adjacent parking aisle. Sight distance from 2 outbound vehicles operating simultaneously on these two parallel approaches will be limited. As such, a convex mirror is proposed to allow the two approaching traffic flows to identify each other.

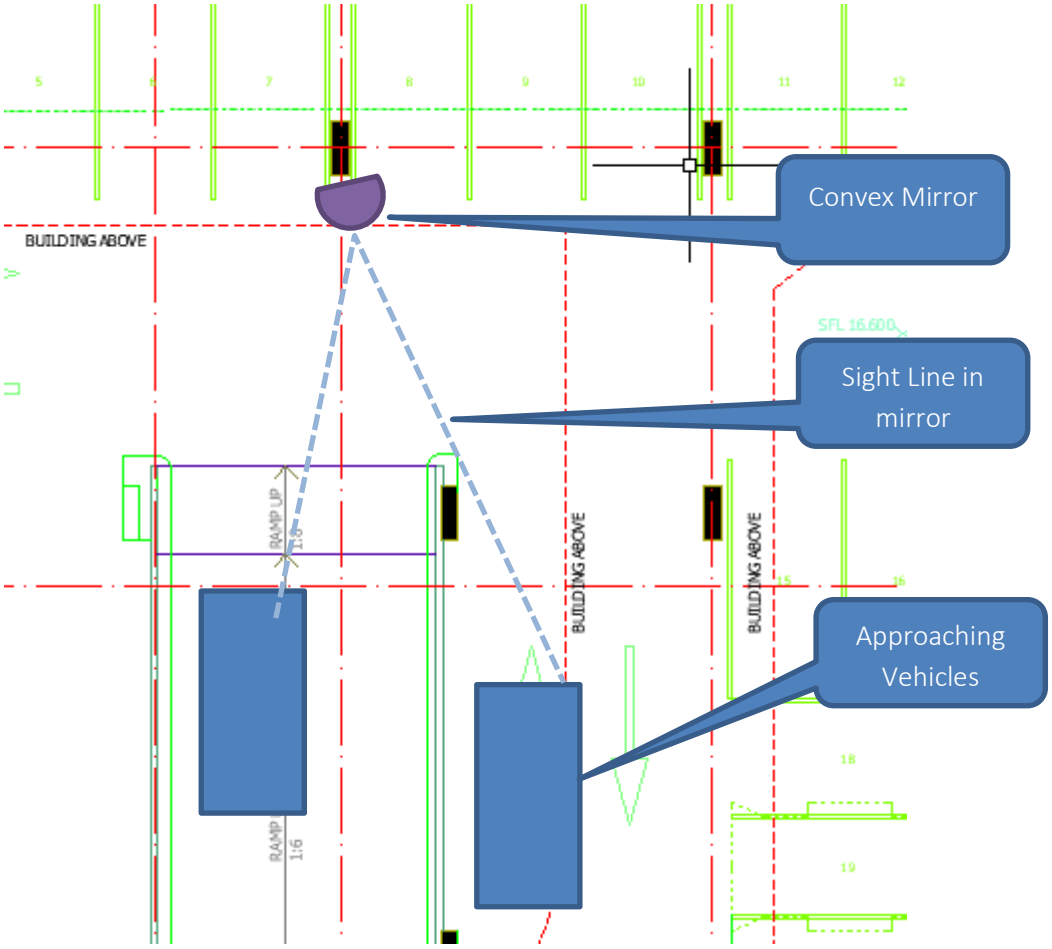

Figure 3.2: B1 Internal Ramp Sight Distance

4 Traffic Impact Assessment

The traffic arrangements for the proposed development have been provided within the constraints of the local PDA. This includes a significantly reduced parking supply to promote access via public transport and cycling. With this reduced parking supply, the proposed development is expected to produce a lower traffic generation rate comparative to a similar development within an unconstrained environment.

For reference, it is expected that the traffic generation of the proposed development would be directly equated to parking supply. For the staff use, a rate of 0.6 movements per space is applicable. This represents the relationship between standard commercial parking requirements (1 space per 30m^2) and standard traffic generation (1 trip per 50m^2). The rate for patients is expected to be significantly lower at peak time. Typically out patients will only arrive or depart during peak times. As such, a total rate of approximately 0.5 trips per space is considered appropriate.

This equates to a traffic generation rate for the site of approximately 90 vehicle movements per hour.

It is understood that the local road network, including all connections to Parklands Drive, have been developed and constructed to cater for the traffic generating potential of the full PDA. The proposed development, being compliant with the PDA with respect to traffic generating potential, is therefore already considered to be catered for in the local road network.

This is further demonstrated noting that from the site there are 4 access routes from the site to the arterial road network, with both Village Blvd and Parklands Drive accessible form the site and both of these providing connectivity to Smith Street and Olsen Ave. Each of these 4 routes connects to the arterial road network at fully signalised intersections. The distribution of the development traffic inbound and outbound along these 4 routes is expected to have negligible impact across the road network.

5 Site Access Arrangements

5.1 Car Park Access

The proposed Hill Street carpark access driveway requirements are specified in Table 5.1. It is noted the total crossover width is provided as 14.4m wide. However, this also allows direct access to a loading bay. The following assesses the car park section of the crossover only.

Table 5.1: Typical Driveway Requirements for the Hill Street Access

Design Aspect	AS2890 Requirement	Proposed Provision	Compliance
Distance from an intersection	6m from tangent point	8m	Compliant
Sight Distance - 40kph	Desirable – 55m Minimum - 35m	Clear to intersection slow points in both directions	Compliant/ Performance Solution
Design Type	Type 3 (median divided)	Type 3 (median divided)	Compliant
Entry and Exit Widths	6m Entry 4m to 6m Exit	3.3m Entry 3.3m Exit	Performance Solution Performance Solution
Minimum Queuing Provisions	Free influx of vehicles	30m (5 cars)	Compliant

The proposed access arrangements generally comply with AS2890.1 requirements, however the following issues are resolved with alternative solutions.

Cross Sectional

AS2890.1 requires 4m to 6m wide carriageways. The development proposal provides 3.3m wide separate inbound and outbound lanes. This is suitable for the proposed development as the traffic generated by the development is low compared to other potential uses serviced by 181 spaces. Given this and the local road environment, it would be considered practical to provide a Type 2 access driveway, which is suitable for this number of spaces servicing staff only.

A Type 2 access would be provided between 6m and 9m which is compliant with the provision. Further analysis of vehicle swept paths to this access are shown in Appendix B. This access will cater for some service vehicles, including Vans, small trucks and ambulances. Larger trucks, including refuse collection are provided for as discussed below.

5.2 Service Vehicle Access

Adjacent to the car park access is an access to the loading bay. Along the kerbline of Hill Street, these present as a single crossover. However, within the verge there is a 2m separation which allows pedestrians to stand between entry points to the building to observe vehicle movements. The access provides clear sight distance along Hill Street for both vehicles and pedestrians operating in the road reserve to identify service vehicle access movements.

Access to this loading bays will be less frequent at 1 to 2 vehicle per day. The provision allows separation of these larger vehicles on-site from smaller vehicles and internal pedestrian movements. The service vehicle access provides for reverse-in/froward -out movements only for larger vehicles. Vehicle swept paths to this access are shown in Appendix B.

All structures adjacent to the access driveway are set back 3.3m from the pedestrian path in the verge to ensure adequate sight lines are provided.

6 Service Vehicle Arrangements

To assess the required service arrangements for the development, TTM has referred to the Gold Coast City Council requirements for service vehicles. Other service vehicle provisions are generally in accordance with AS2890.2.

6.1 Council Requirements

The proposed Health Care Services require service vehicle access for an SRV, as per Table 9.4.13-9 of Council's Transport Code.

6.2 Estimated Service Vehicle Traffic Generation

Given the scale of development, larger service vehicle provisions are proposed. The general Council requirement for and SRV is catered for within the basement level of the development. This allows forward-in/forward-out access from the site for these regular service vehicles, with full internal manoeuvring to a dedicated service bay. This is catered for as the basement loading area will also cater for ambulance parking, Larger vehicles are catered for via a service bay directly accessible from Hill Street. This will service less frequent truck activities, including:

- Waste Collection
- Energex Transformer access
- Medium size deliveries for café
- Bulk deliveries given the larger scale of medical use.

6.3 Proposed Service Vehicle Arrangements and Their Adequacy

Appendix B identifies the swept paths for the following design vehicles:

- SRV access to B1
- Ambulance Access to B1
- Larger rear load refuse vehicle to Hill Street loading bay

All internal onsite design complies with 2890.2-2002 Parking Facilities Part 2 Off-street commercial design, allowing for the development to be adequately serviced by the proposed facilities.

From the ambulance swept path analysis is Appendix B it is noted that any median provision on the lower half of the entry ramp should be limited to paint marking only.

7 Active Transport

7.1 Public Transport

Access to public transport from the site is considered excellent due to the presence of the light rail station and bus interchange.

TTM consider the high availability of public transportation provisions in the vicinity of the site will satisfy the site's requirements for such facilities and support the reduced parking rate proposed under the PDA.

7.2 Pedestrian Access

Pedestrian access to the site is considered suitable with entry located on the south-eastern and north-western corners of the site frontage. The southern eastern corner, at the intersection of Hill Street and Nexus Way, orientated toward the light rail station to the south.

7.3 Cyclist Requirements

The site has suitable access to the wider Council cycling network, with dedicated on street and off-street cycle lanes located on Parkland Blvd.

Internally, the site provided over 200m^2 of end of trip facilities, suitable to cater for cycle parking, lockers and showers as required

Cyclist access to these facilities is via either the car park entry which has grades of 1:6 and is shared with car park traffic. Alternatively, cyclists will have access to the goods lift to travel directly between the ground floor loading bay and the EoT area on B1. This lift is 3m deep and provides double sided access for cyclist to move straight through.

8 Summary and Conclusions

The proposed development has been designed such that it is compliant with respect to carpark access, circulation and scale when compared to the Parklands PDA requirement and AS2890.1.

Access for alternative modes of transport, including cyclists and access to public transport, is maximised, supporting the local PDA reduced parking rates and supporting to use of the light rail system, as identified in the PDA Scheme.

The access to the site is practically designed to allow single point on the frontage for all vehicle access, while maintaining separation on the site of light and heavy vehicles. This does require the largest trucks to reverse into the site. This is considered suitable given the infrequency of larger vehicle and a suitable road environment (low speed, low volume, high visibility). The car and truck access points are also suitably separate to allow pedestrians to effectively cross 2 separate access points with median separation.

Based on this assessment, TTM see no traffic issues which should prevent the approval f the proposed development.

Appendix A Proposed Site Plan

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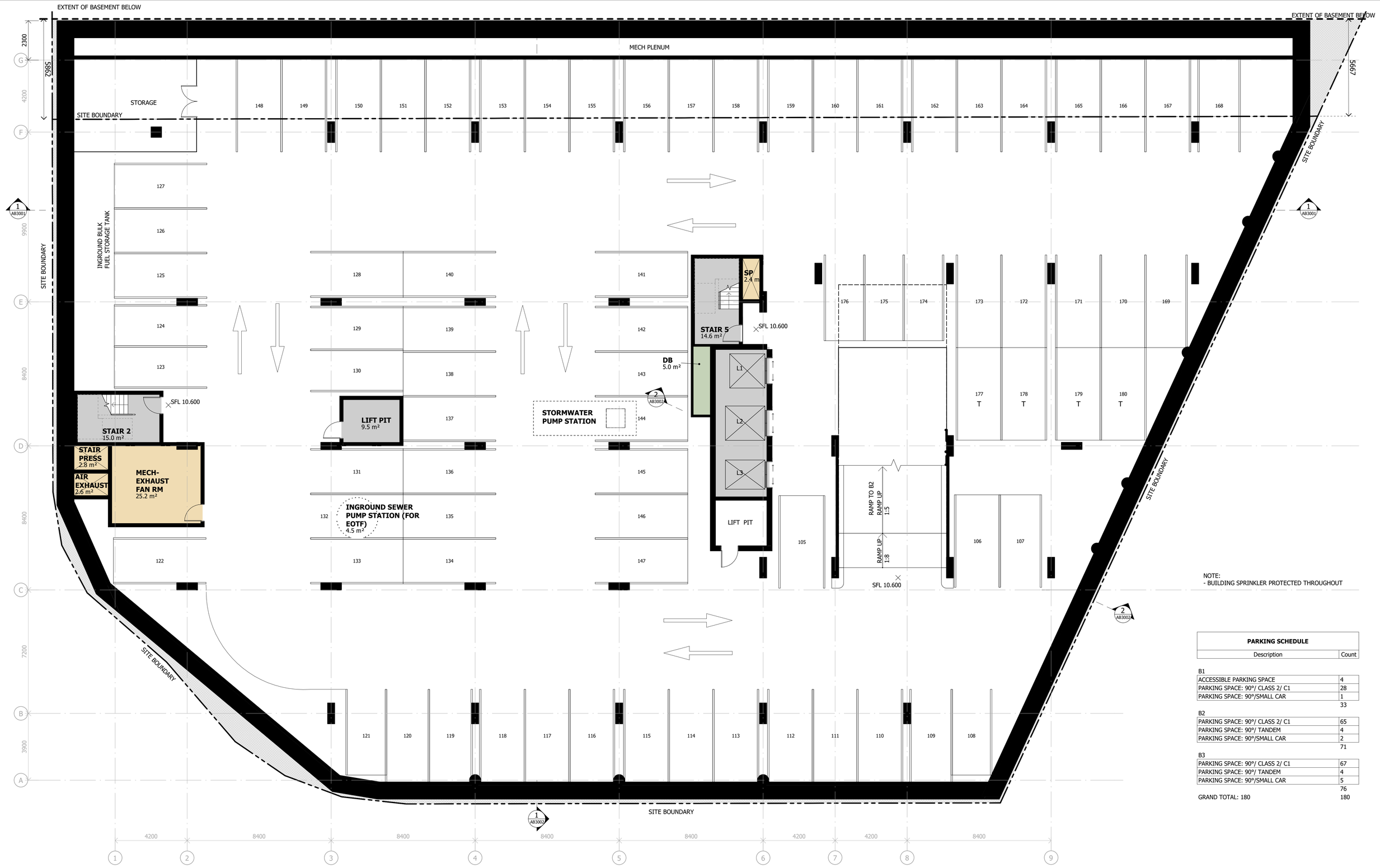

NOTE:
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PARKING SCHEDULE

Description	Count
B1	
ACCESSIBLE PARKING SPACE	4
PARKING SPACE: 90°/ CLASS 2/ C1	28
PARKING SPACE: 90°/SMALL CAR	1
	33
B2	
PARKING SPACE: 90°/ CLASS 2/ C1	65
PARKING SPACE: 90°/ TANDEM	4
PARKING SPACE: 90°/SMALL CAR	2
	71
B3	
PARKING SPACE: 90°/ CLASS 2/ C1	67
PARKING SPACE: 90°/ TANDEM	4
PARKING SPACE: 90°/SMALL CAR	5
	76
GRAND TOTAL: 180	180

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LEVEL B3 GENERAL ARRANGEMENT PLAN

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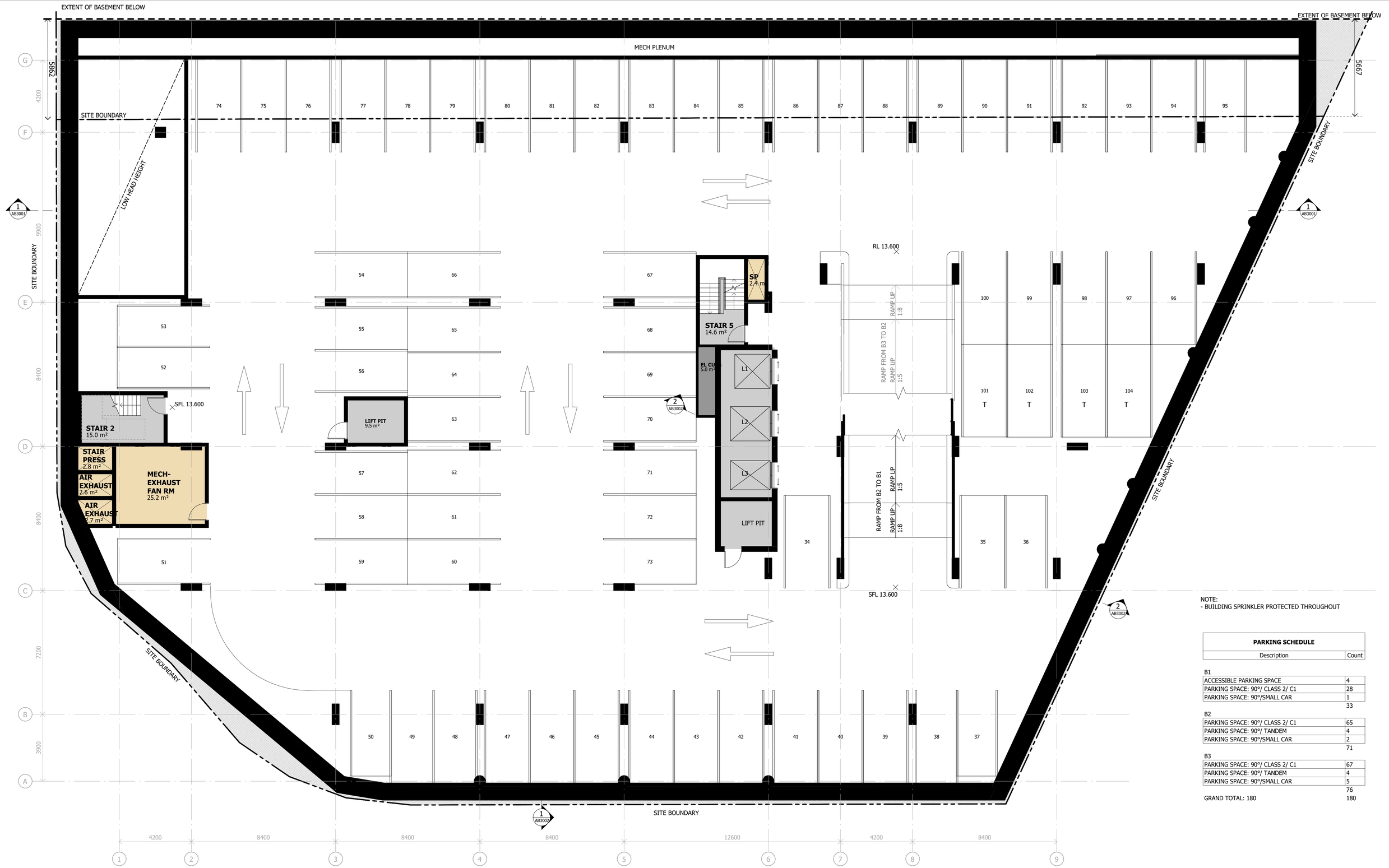

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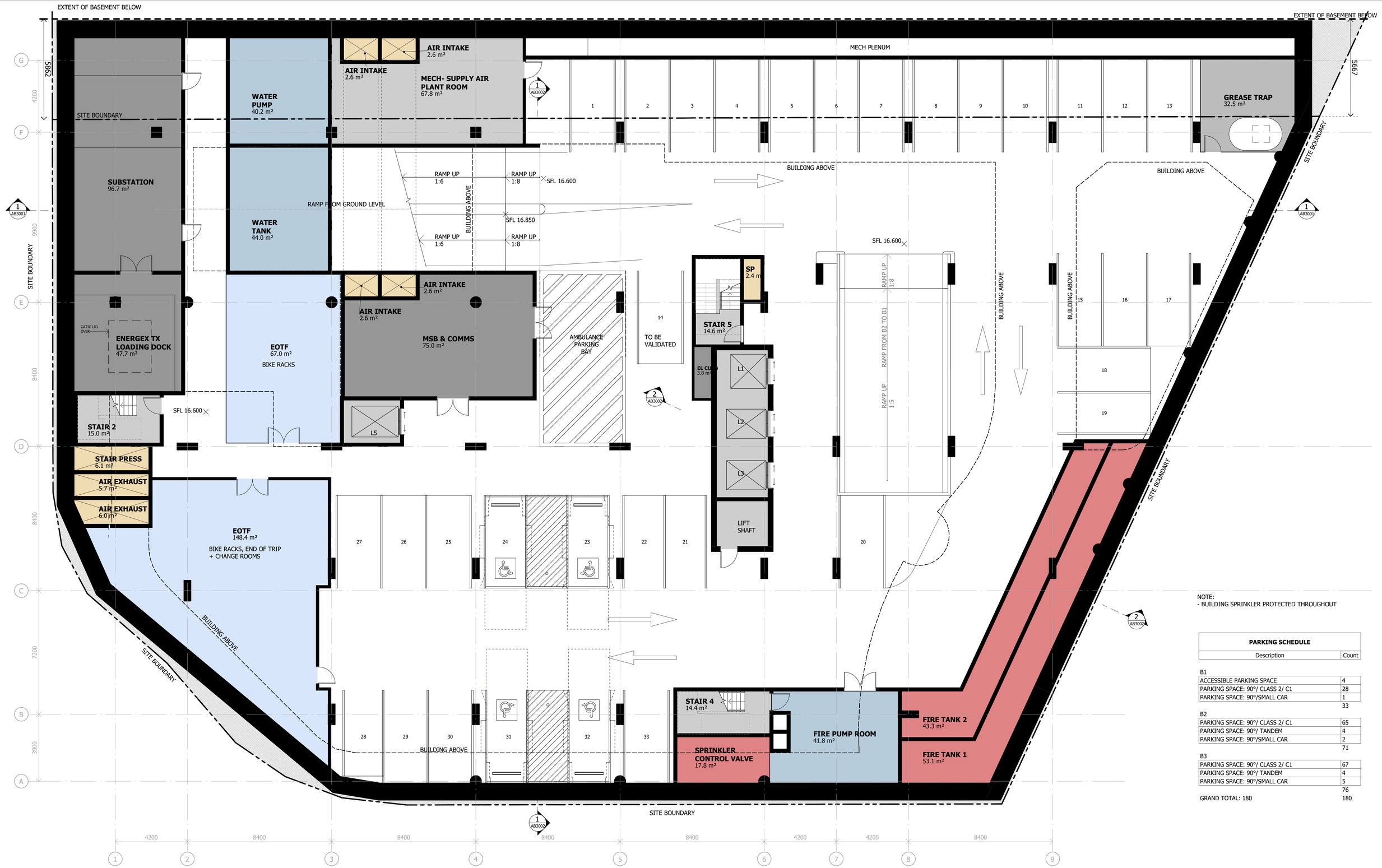

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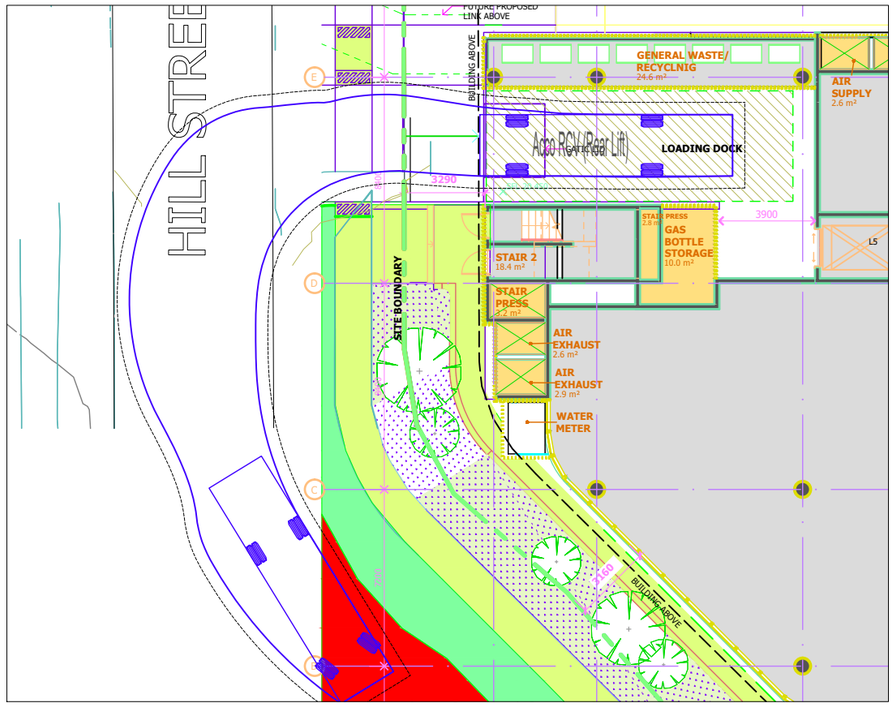
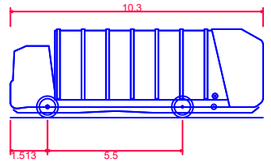
Appendix B Service Vehicle Swept Paths

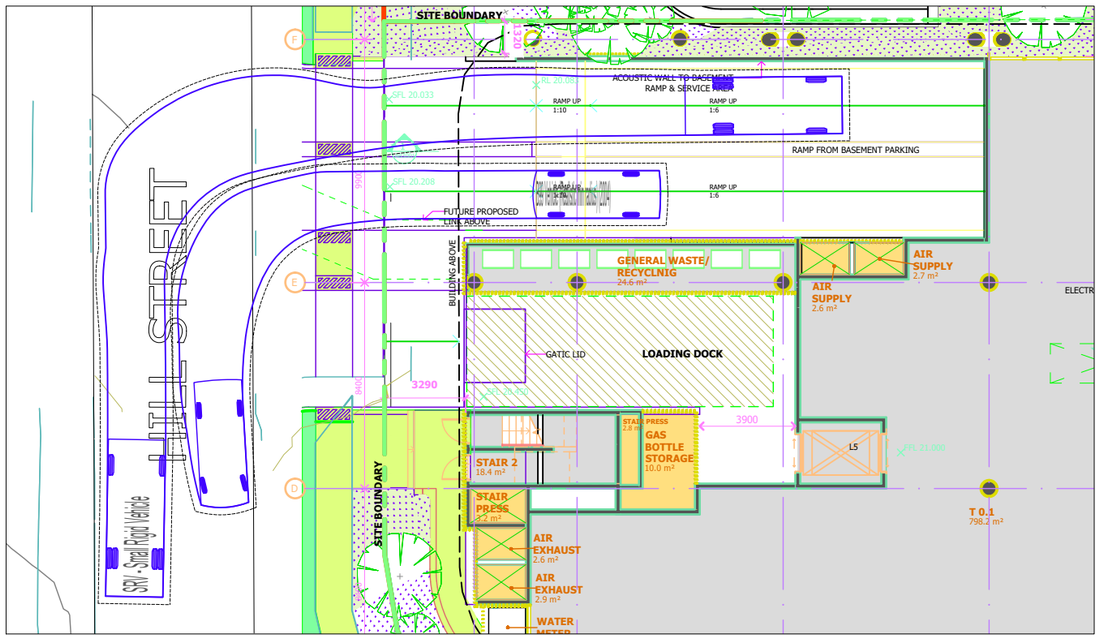


RCV ACCESS TO LOADING BAY

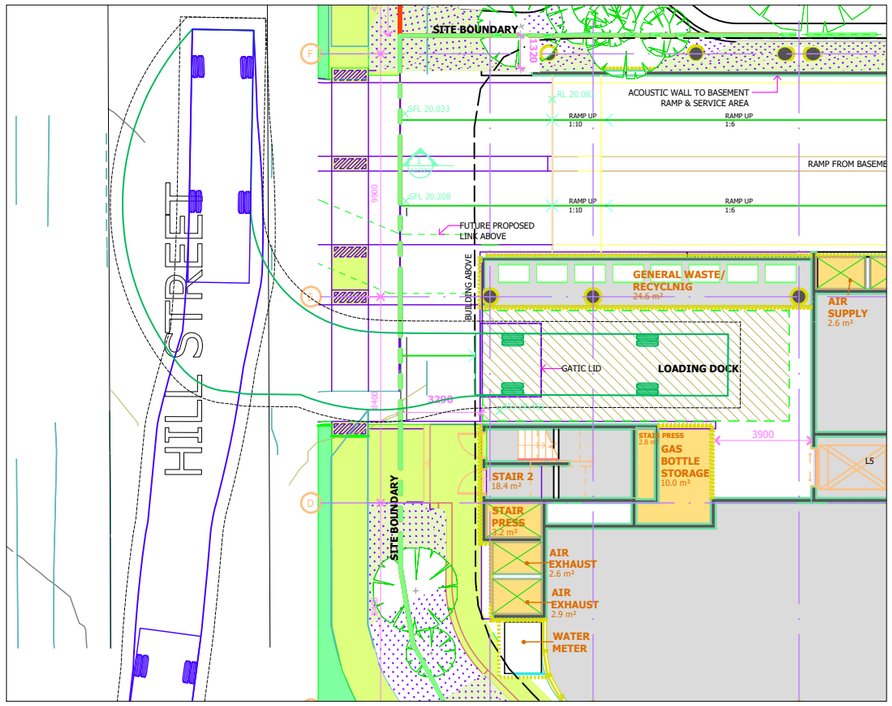


Acco RCV (Rear Lift)

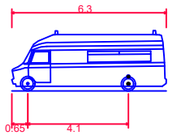
Overall Length	10.300m
Overall Width	2.500m
Overall Body Height	3.600m
Min Body Ground Clearance	0.200m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.500m
Design Speed Forward	5.0km/h
Clearance Envelope	0.5m



SRV ACCESS TO BASEMENT

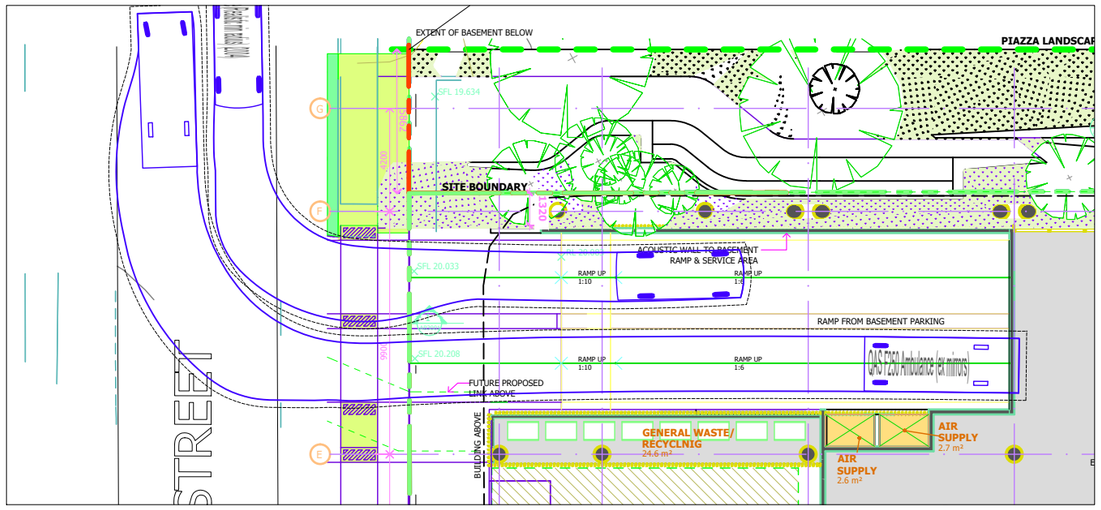


RCV EXIT FROM LOADING BAY

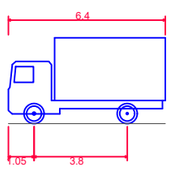


QAS F250 Ambulance (ex mirrors)

Overall Length	6.300m
Overall Width	2.220m
Overall Body Height	2.461m
Min Body Ground Clearance	0.189m
Max Track Width	1.670m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	8.500m
Design Speed Forward	5.0km/h
Clearance Envelope	0.3m

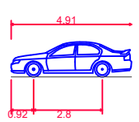


AMBULANCE EXIT FROM BASEMENT



SRV - Small Rigid Vehicle

Overall Length	6.400m
Overall Width	2.330m
Overall Body Height	3.500m
Min Body Ground Clearance	0.398m
Track Width	2.330m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.100m
Design Speed Forward	5.0km/h
Clearance Envelope	0.3m



B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	01-06-22	ORIGINAL ISSUE	SC		SC

SCALE 0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: NW HEALTH

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003
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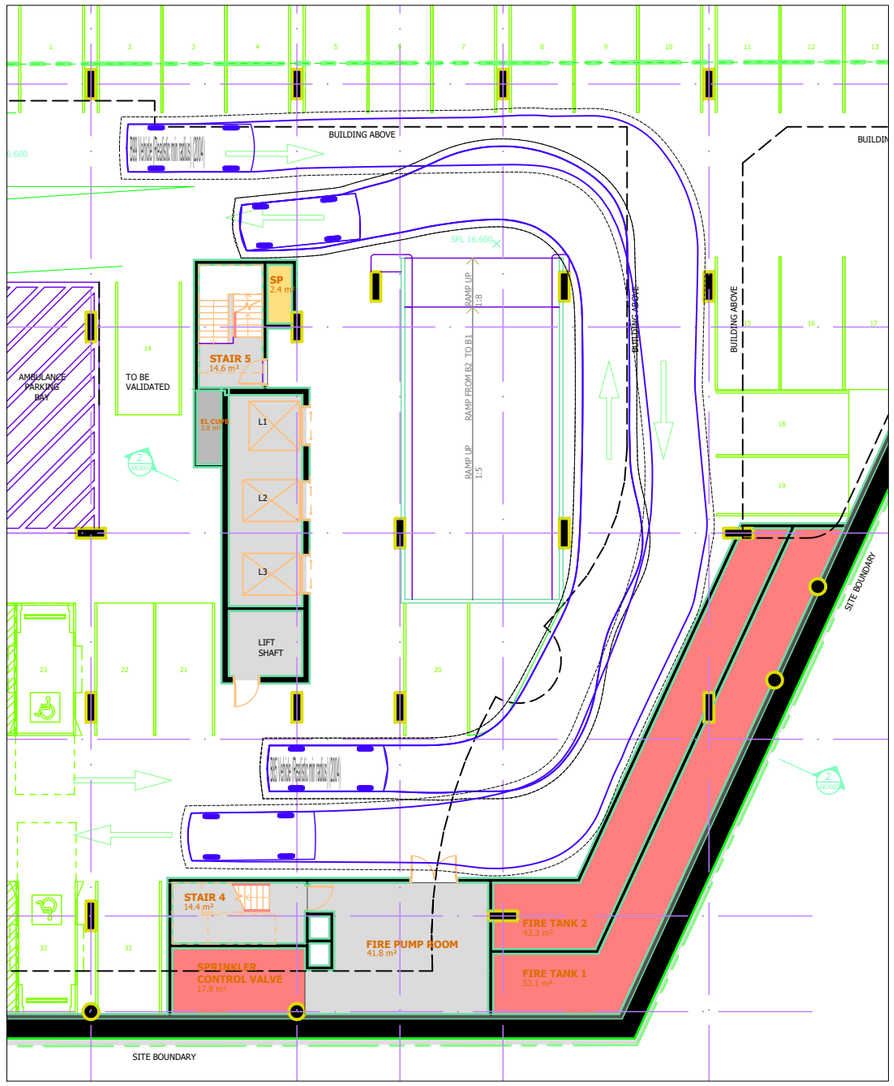
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

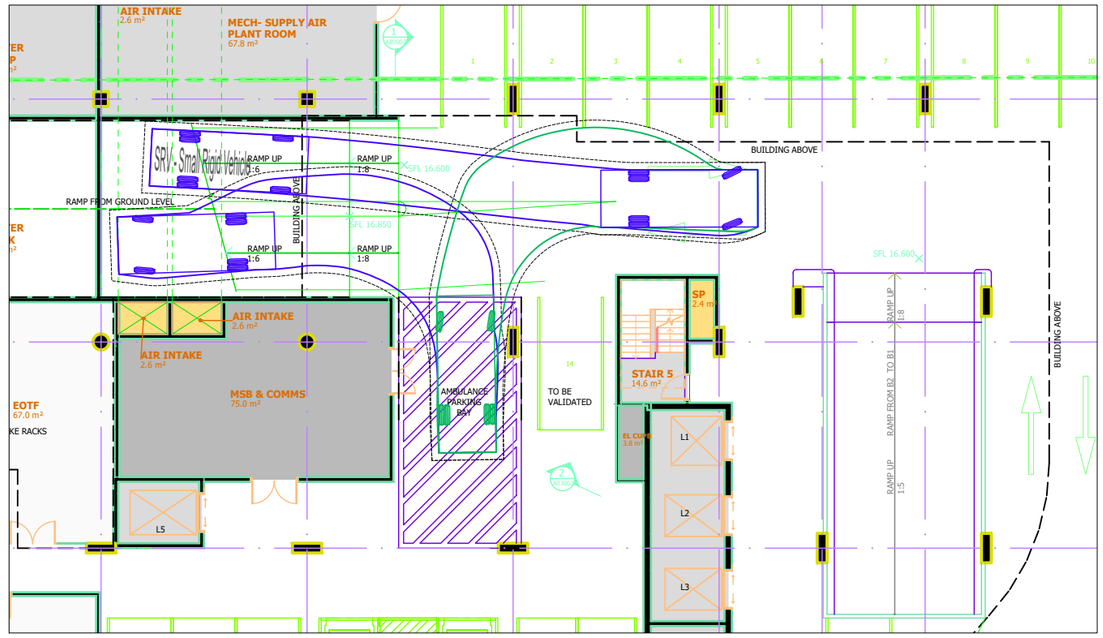
PROJECT: **HILL STREET, SOUTHPORT**

DRAWING TITLE: **VEHCLE ACCESS ARRANGMENTS**
SWEPT PATH ANALYSIS

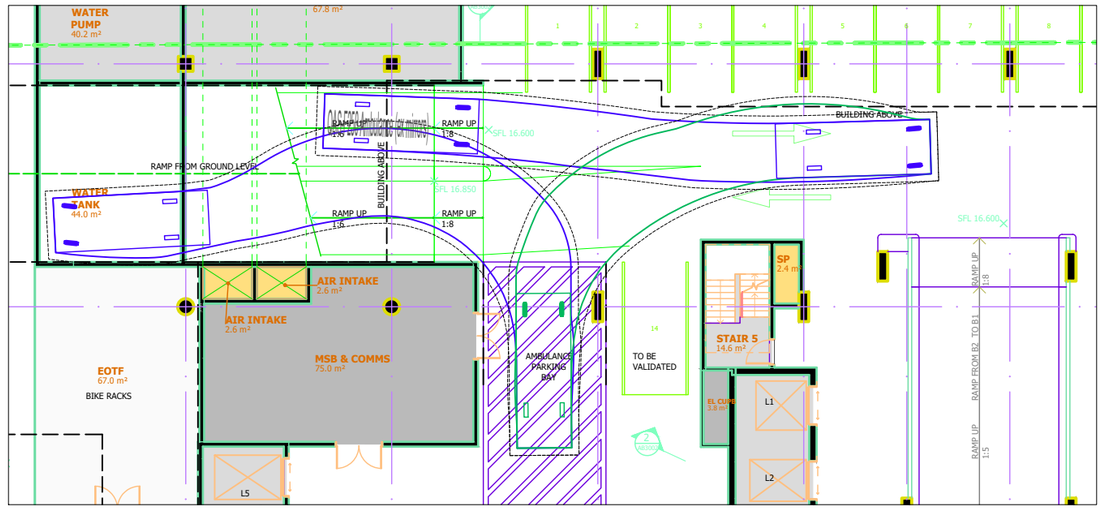
PROJECT NUMBER	ORIGINAL SIZE
21BRT0000	A3
DRAWING NUMBER	REVISION
21BRT0000-11	A
DATE	SHEET
1 Jun 2022	1 OF 1



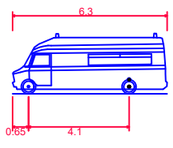
BASEMENT 1 CIRCULATION



SRV ACCESS TO BASEMENT LOADING



AMBULANCE ACCESS TO BASEMENT LOADING



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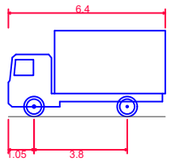
Design Speed Forward	5.0km/h
Clearance Envelope	0.3m



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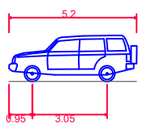
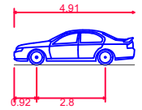


B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m



B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	01-06-22	ORIGINAL ISSUE	SC		SC

SCALE 0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT
NW HEALTH

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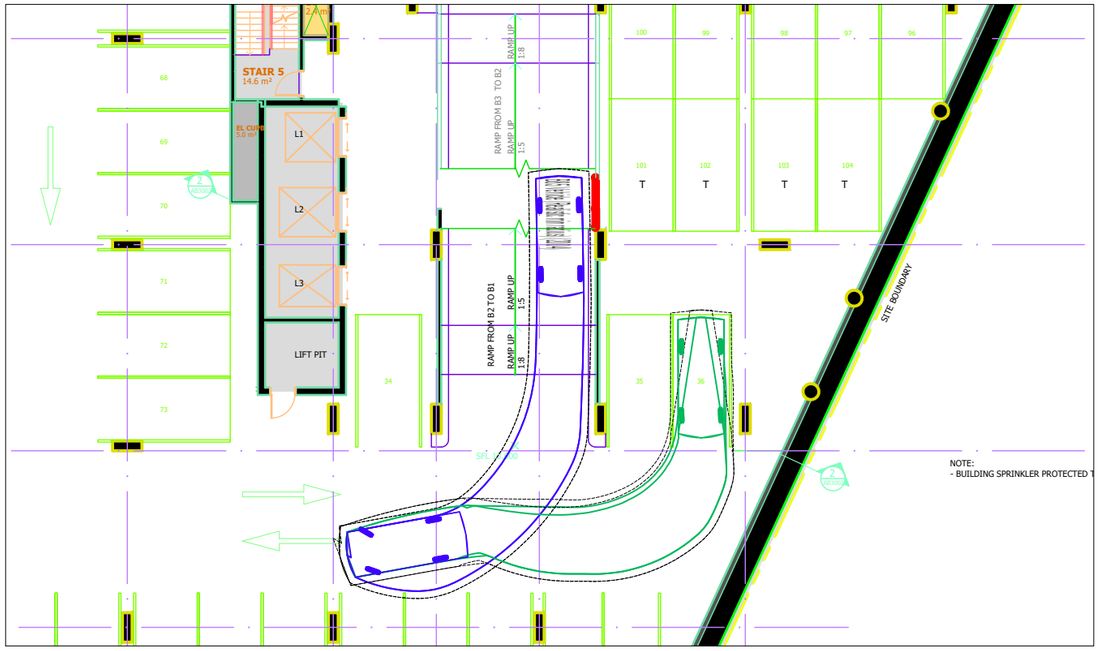
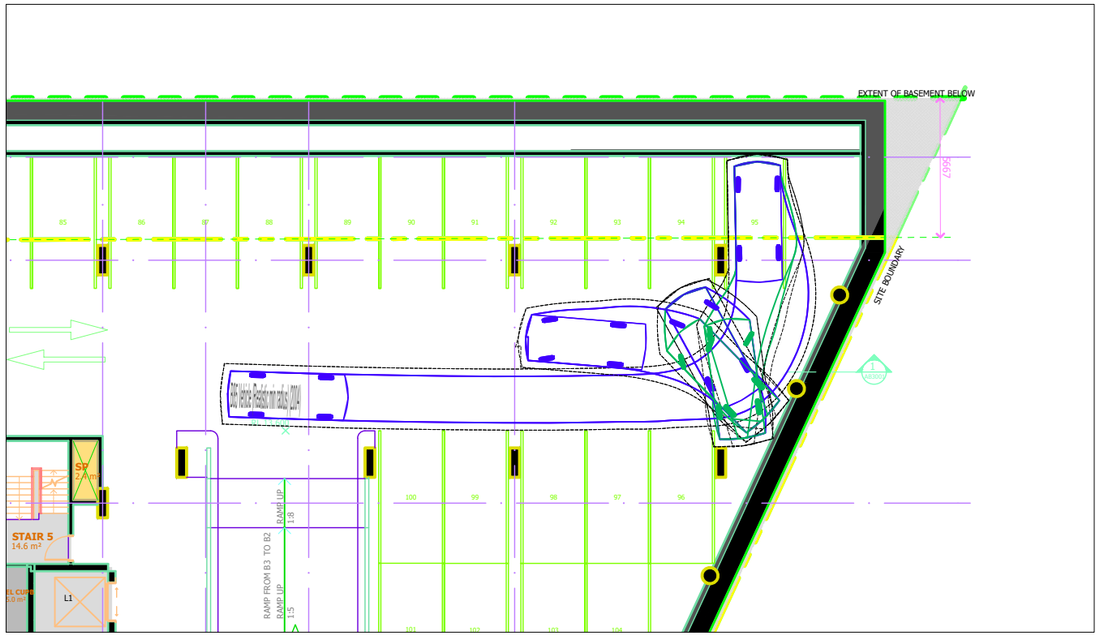
PROJECT
HILL STREET, SOUTHPORT

DRAWING TITLE
BASEMENT 1 VEHICLE ACCESS
SWEPT PATH ANALYSIS

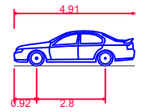
PROJECT NUMBER	ORIGINAL SIZE
21BRT0000	A3
DRAWING NUMBER	REVISION
21BRT0000-12	A
DATE	SHEET
1 Jun 2022	1 OF 1



ACCESS TO SPACE 36



ACCESS TO SPACE 95



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Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	01-06-22	ORIGINAL ISSUE	SC		SC

SCALE
0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT
NW HEALTH

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PROJECT
HILL STREET, SOUTHPORT

DRAWING TITLE
BASEMENT 2 CARPARK ACCESS
SWEPT PATH ANALYSIS

PROJECT NUMBER	ORIGINAL SIZE
21BRT0000	A3
DRAWING NUMBER	REVISION
21BRT0000-13	A
DATE	SHEET
1 Jun 2022	1 OF 1