UPS
URBAN PLANNING SERVICES

19-21 ANNE AVENUE, BROADBEACH

DEVELOPMENT APPLICATION - FEBRUARY 2025 - JOB NO. 3631

SECTION 3 : SPECIALIST REPORTS



ATTACHMENT 5

Traffic Impact Assessment
prepared by Rytenskild Traffic Engineering



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rytenskild
Traffic Engineering

TRANSPORT IMPACT ASSESSMENT

PROPOSED MULTIPLE DWELLING DEVELOPMENT

19 – 21 ANNE AVENUE, BROADBEACH

Prepared for

MARY ANNE DEVELOPMENTS

10 FEBRUARY 2025

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1.0 INTRODUCTION

Rytenskild Traffic Engineering (RTE) has been engaged by Mary Anne Developments to review the transport elements of its proposed multiple dwelling development at Broadbeach.

This report forms part of a Development Application to the City of Gold Coast. The following issues have been addressed as part of the study:

- Car parking supply and design;
- On-site traffic circulation;
- Access and servicing arrangements;
- Provision for pedestrians and cyclists.
- Transport network infrastructure impact.

Responses to the Transport code and the Driveways and vehicular crossings code are provided as Appendices C and D.

2.0 SUBJECT SITE AND ROAD NETWORK

2.1 Subject Location

As shown in Figure 2.1, the subject site is located on the northern side of Anne Avenue. The site is identified as Lot 1 – 4 on BUP1114 and has a site area of approximately 1,032m^2.

The site is located within the mapped area of the Transport Hub, and is within 450 metres walking distance of the Broadbeach South light rail station.

2.2 Local Road Network

To the west, Anne Avenue connects to Surf Parade via a priority-controlled T junction, with Surf Parade as the priority. Surf Parade and Anne Avenue are identified as local roads, and comprise of two lanes (one in each direction). Surf Parade functions as a distributor road in the local road network, whereas Anne Avenue provides for local access.

To the east, Anne Avenue connects to Old Burleigh Road via a priority controlled T junction, with Old Burleigh Road as the priority. Old Burleigh Road is identified as a local road, and comprises of two lanes (one in each direction). Similar to Surf Parade, Old Burleigh Road has a distributor function in the surrounding road network.

Images of the surrounding road network are shown in Figures 2.2 – 2.4.

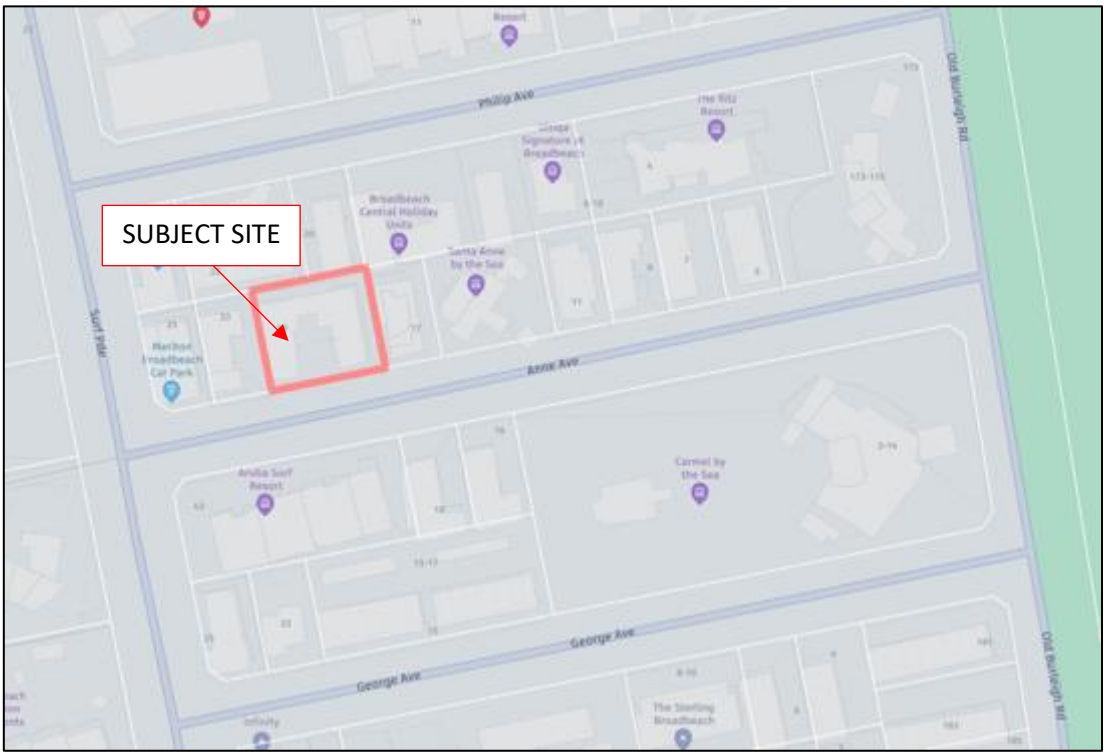




FIGURE 2.1 – LOCATION OF SUBJECT SITE



FIGURE 2.2 – IMAGES OF THE SURROUNDING ROAD NETWORK



FIGURE 2.3 – IMAGE OF THE SURF PARADE / ANNE AVENUE INTERSECTION



FIGURE 2.4 – IMAGE OF THE OLD BURLEIGH ROAD / ANNE AVENUE INTERSECTION

2.3 Survey Traffic Volumes

RTE carried out peak period traffic counts at the Surf Parade / Anne Avenue and Old Burleigh Road / Anne Avenue intersections on a typical weekday (Friday) in November 2024.

The full traffic survey is provided in Appendix A, with peak period traffic volumes summarised in Figure 2.5.

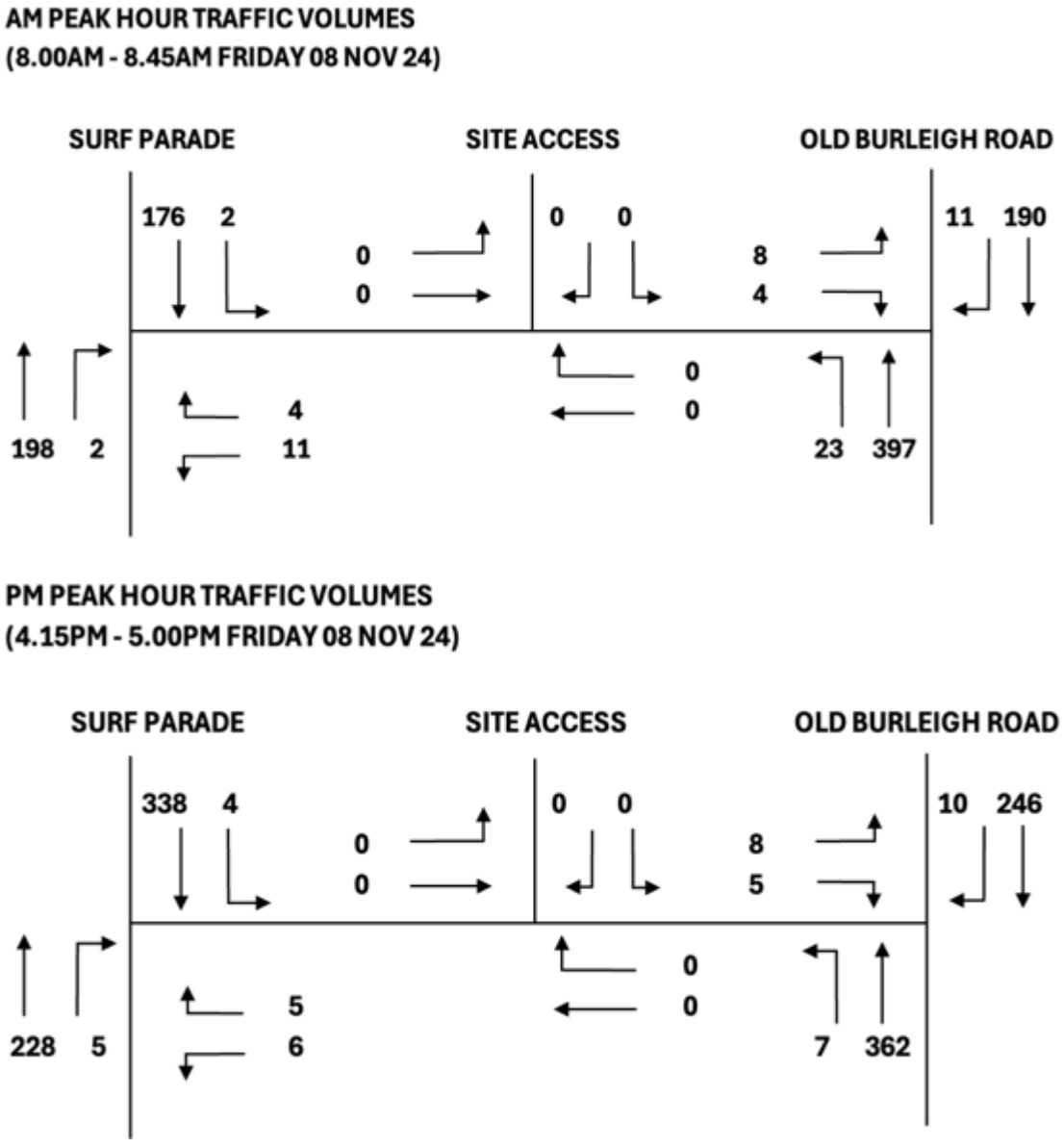


FIGURE 2.5 – SURVEYED PEAK HOUR TRAFFIC VOLUMES AT THE SURVEYED INTERSECTIONS

3.0 DEVELOPMENT PROPOSAL

The proposed plan of development is for a multiple dwelling development comprising of 56x three-bedroom units (168 bedrooms).

The proposal provides a total of 106 car parking spaces are proposed to be provided over two podium levels, ground floor and two basement levels. A breakdown of the proposed car parking supply is as follows:

Resident Car Parking:	100 spaces
Residential Visitors:	6 spaces
Total:	**106 spaces**

Access is proposed to be gained via two crossovers located at either end of the road frontage. The western crossover will provide for access to visitor parking and basement level resident parking, whereas the eastern crossover will provide for access to resident parking on the podium levels.

The proposed podium levels, ground and basement parking levels are shown in Figures 3.1 – 3.5.

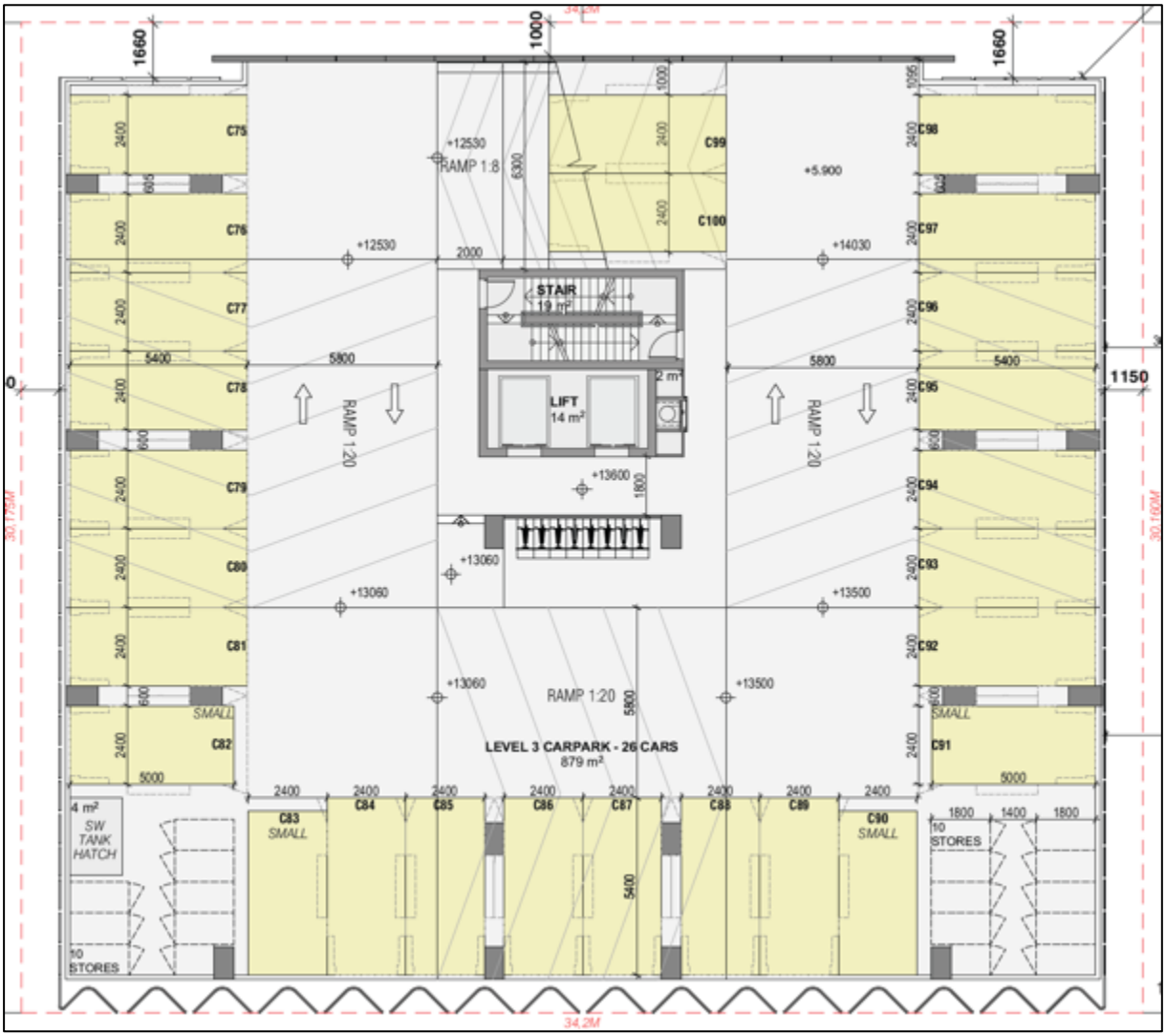


FIGURE 3.1 – PROPOSED LEVEL TWO FLOOR PLAN

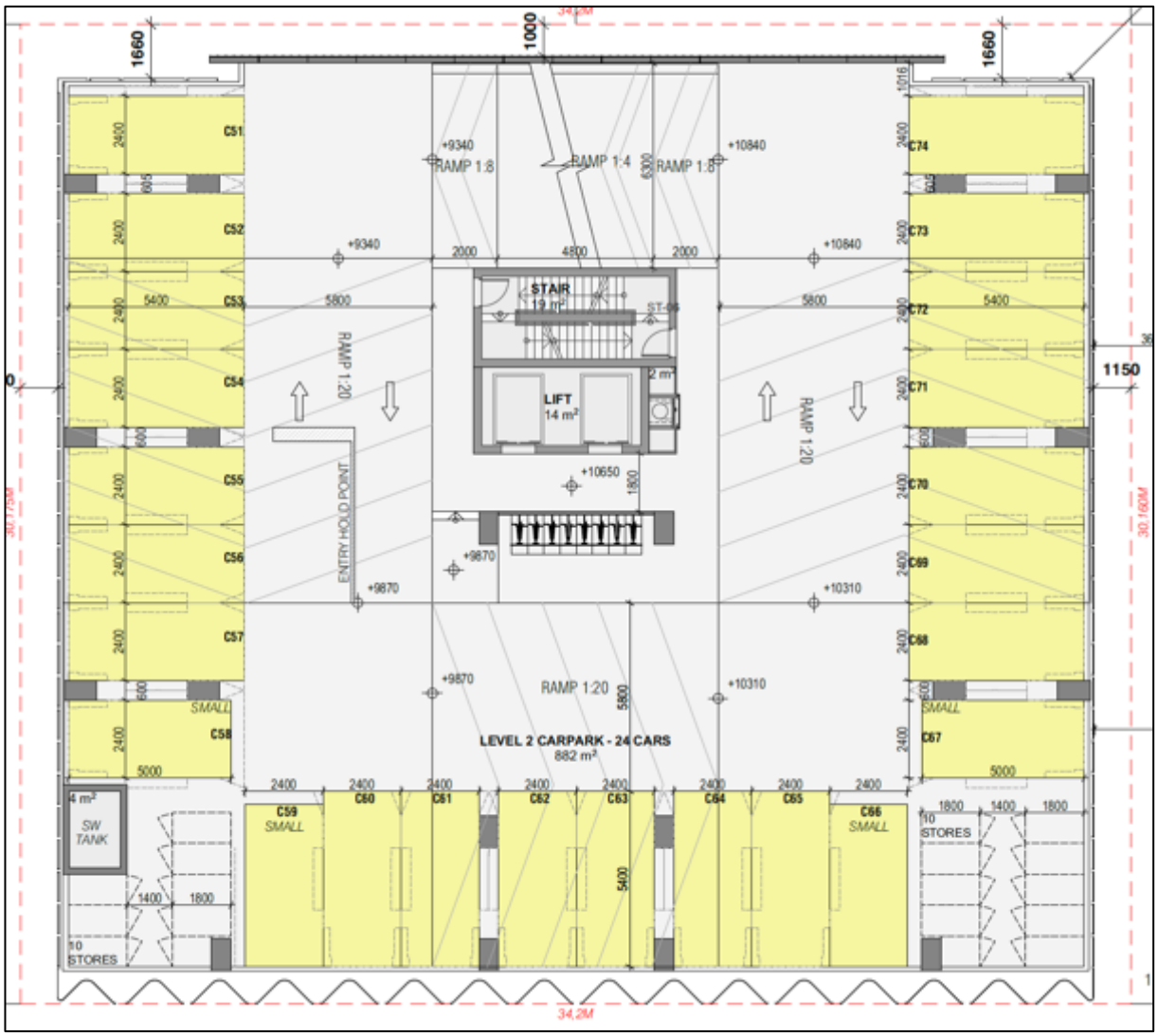


FIGURE 3.2 – PROPOSED LEVEL ONE FLOOR PLAN

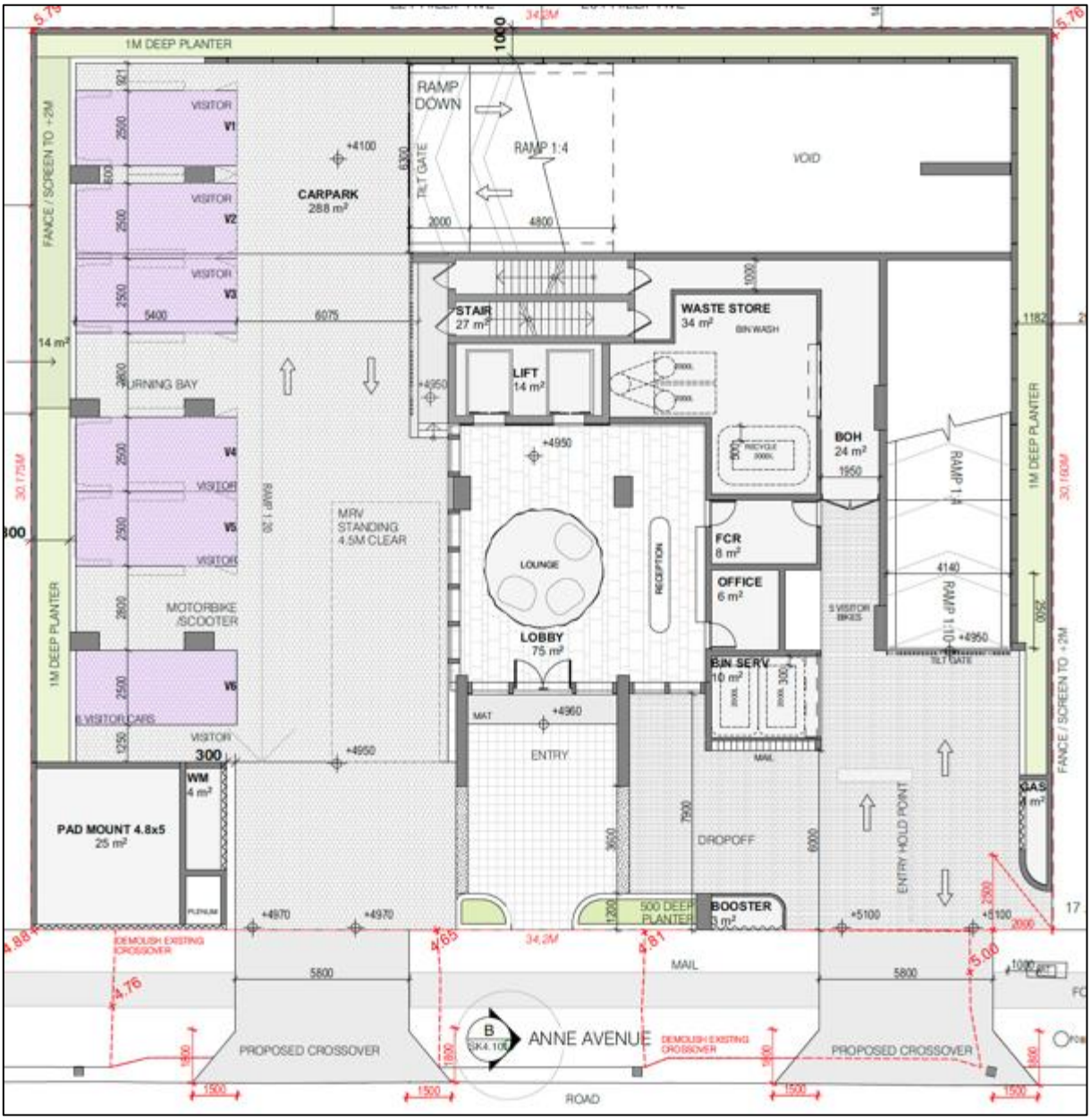


FIGURE 3.3 – PROPOSED GROUND FLOOR PLAN

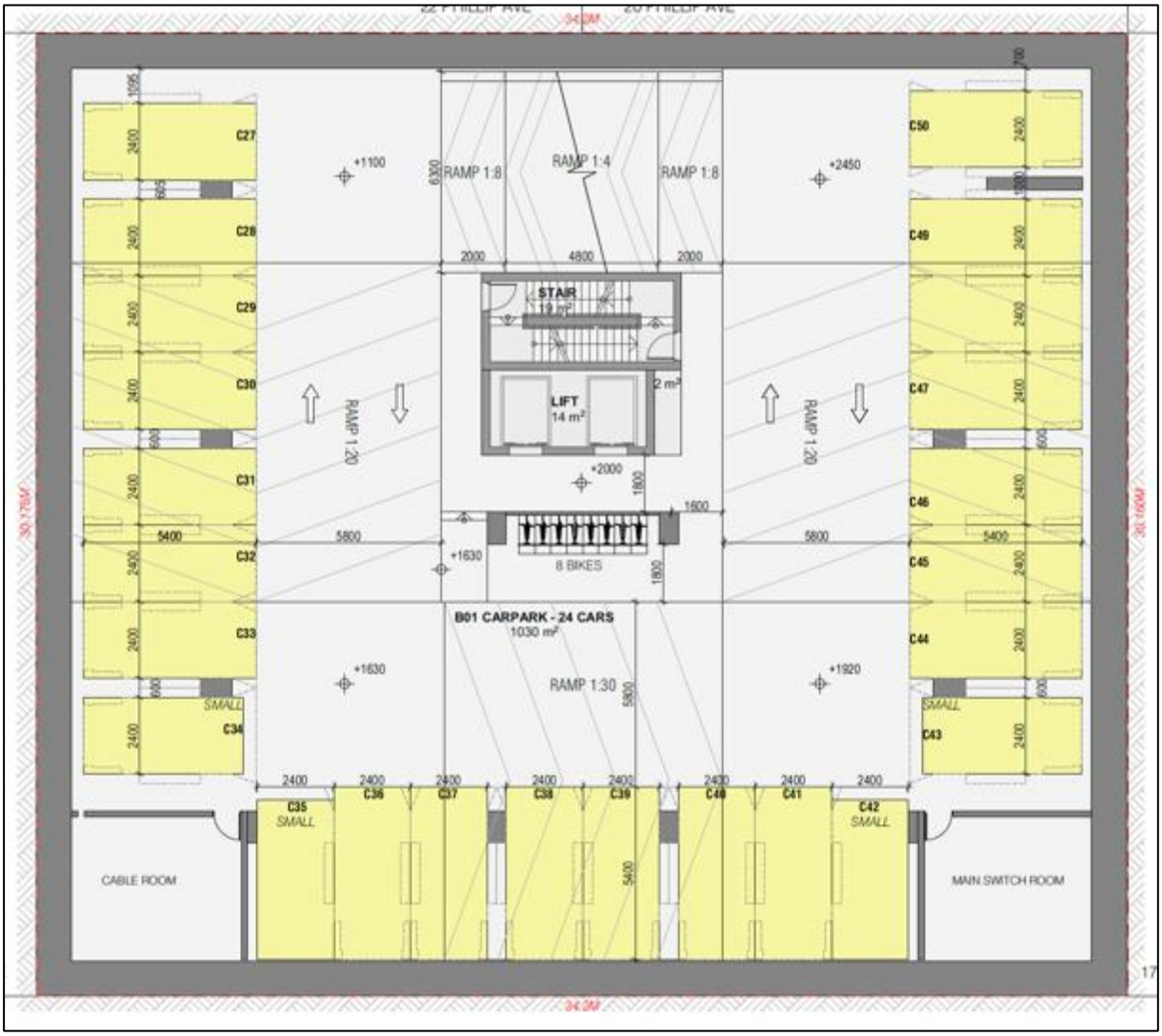


FIGURE 3.4 – PROPOSED BASEMENT LEVEL ONE PLAN



FIGURE 3.5 – PROPOSED BASEMENT LEVEL TWO PLAN

4.0 CAR PARKING

4.1 Car Parking Supply

In accordance with the Gold Coast City Plan, *9.4.13 Transport code, Table 9.4. 13-4: Car parking rates for Centre Zone (within 800 metres of a light rail station),* the following rate applies to the proposed development:

Residential – permanent/long-term accommodation:
0.9 per unit or dwelling and 1 per 10 units or dwelling for visitors.
*A minimum of 17.5% residential parking, excluding visitor, is to be unbundled.

Application of the above rates results in the following Acceptable Outcome:

Table 4.1: Acceptable Outcome for Parking

Component	Acceptable Outcome
Multiple Dwelling: 56 units	50.4 (51) spaces
Visitor Parking: 56 units	5.6 (6) spaces
TOTAL	**57 spaces**

The proposal provides a total of 106 car parking spaces, including 6 spaces for visitors, and therefore meets the Acceptable Outcome.

4.2 Car Parking Design

The geometric layout of the proposed parking facilities generally complies with the relevant requirements specified by the Transport Code.

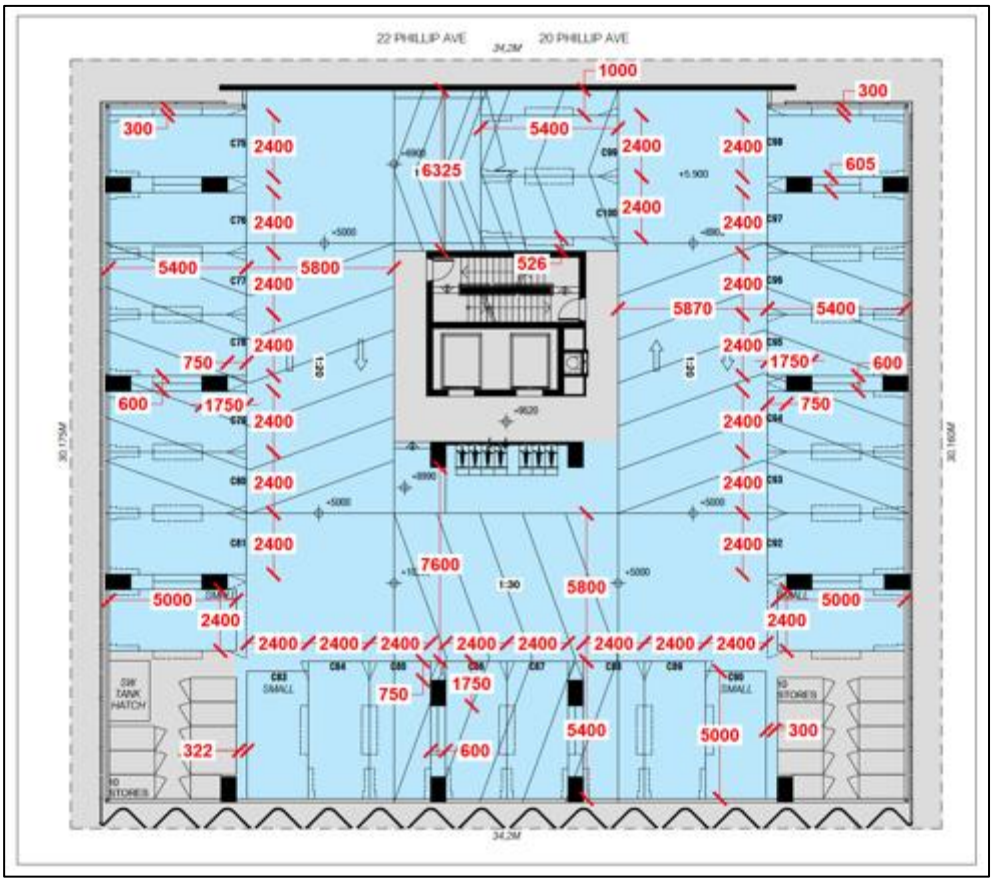
The proposed car park has been designed with the following characteristics:

Table 4.2 – Car Parking Design Characteristics

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Parking space length: - Resident (regular) - Visitor	 5.4 metres 5.4 metres	 5.4 metres 5.4 metres	 Compliant Compliant
Parking space width: - Resident - Visitor	 2.4 metres 2.5 metres	 2.4 metres 2.5 metres	 Compliant Compliant
Aisle Width: - Parking aisle - Circulation aisle (one-way)_	 5.8 metres 3.6 metres	 5.8 metres N/A	 Compliant N/A
Maximum Gradient - Parking Bay - Parking Aisle - Ramp	 1:20 (5.0%) 1:16 (6.25%) 1:40 (2.5%)	 <1:20 (5.0%) <1:20 (5.0%) <1:4 (25%)	 Compliant
Maximum Change in Grade Ramp Grade	1:8 (12.5%) summit 1:6.67 (15.0%) sag 1:4 (25%)	<1:8 (12.5%) summit <1:8 (12.5%) sag 1:4 (25%)	Compliant Compliant
Height Clearance - General Min. - Absolute Min.	 2.2 metres N/A	 >2.2 metres	 Compliant
Parking Aisle Extension	1 metre beyond last bay or 8m adj. aisle	Combination	Alternative Solution

The proposed car parking dimensions are shown in Figures 4.1 - 4.3.

A swept path analysis has been carried out using AutoTURN in accordance with AS2890.1:2004. Vehicle manoeuvring paths (B50, B85 and B99) are shown in Figures 4.4 – 4.9.



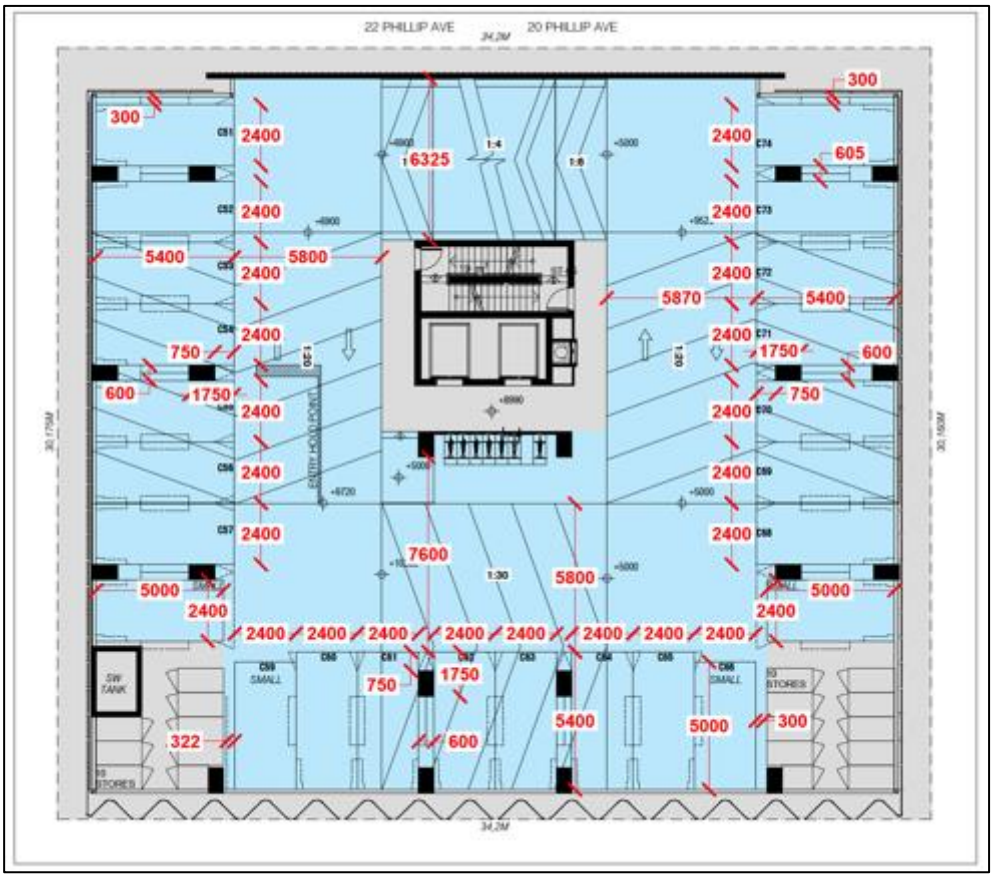


FIGURE 4.1 – PROPOSED CAR PARKING LAYOUT AND DIMENSIONS (PODIUM LEVELS ONE & TWO)

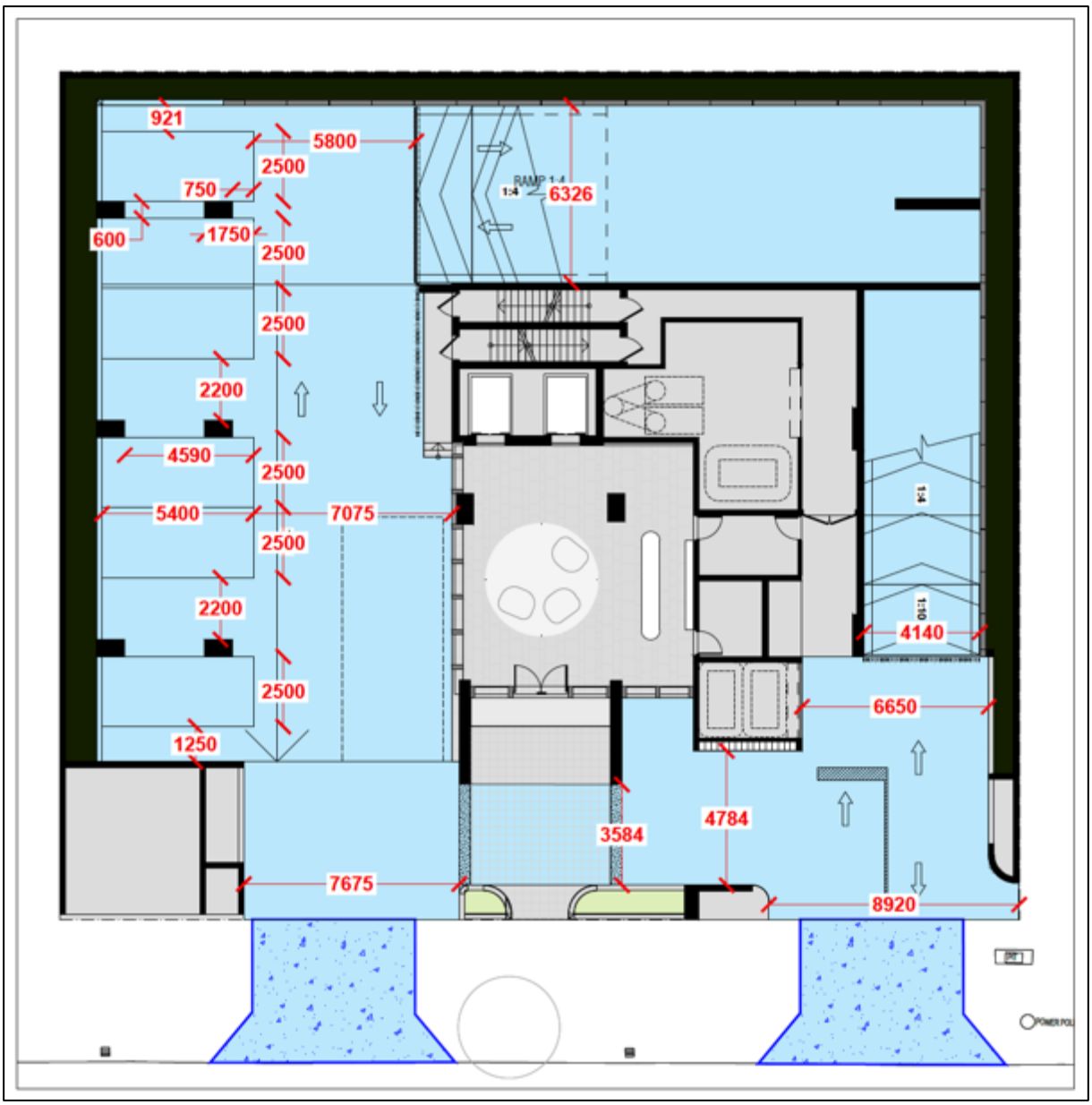


FIGURE 4.2 – PROPOSED CAR PARKING LAYOUT AND DIMENSIONS (GROUND FLOOR)

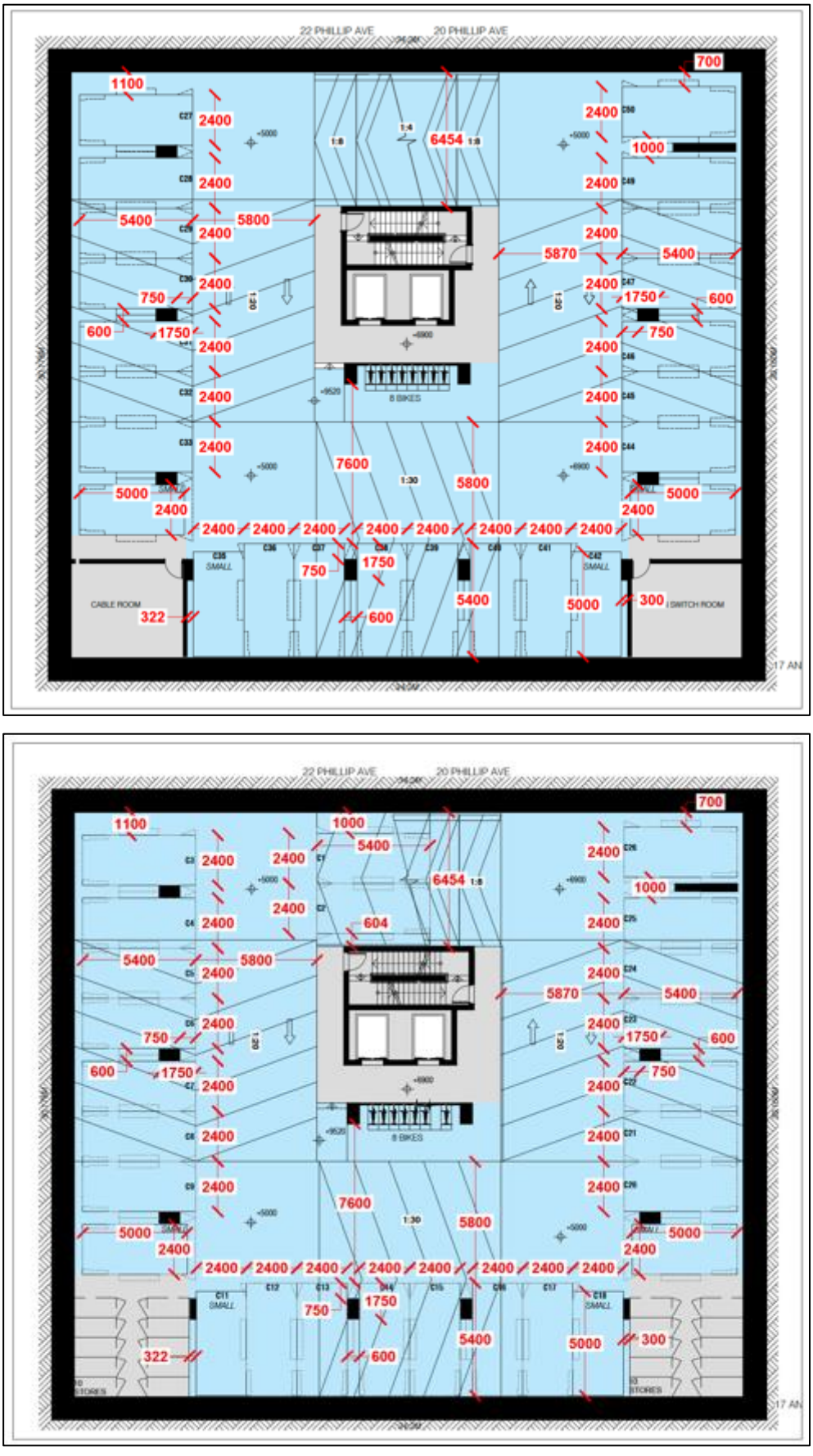


FIGURE 4.3 – PROPOSED CAR PARKING LAYOUT AND DIMENSIONS (BASEMENT LEVELS ONE & TWO)

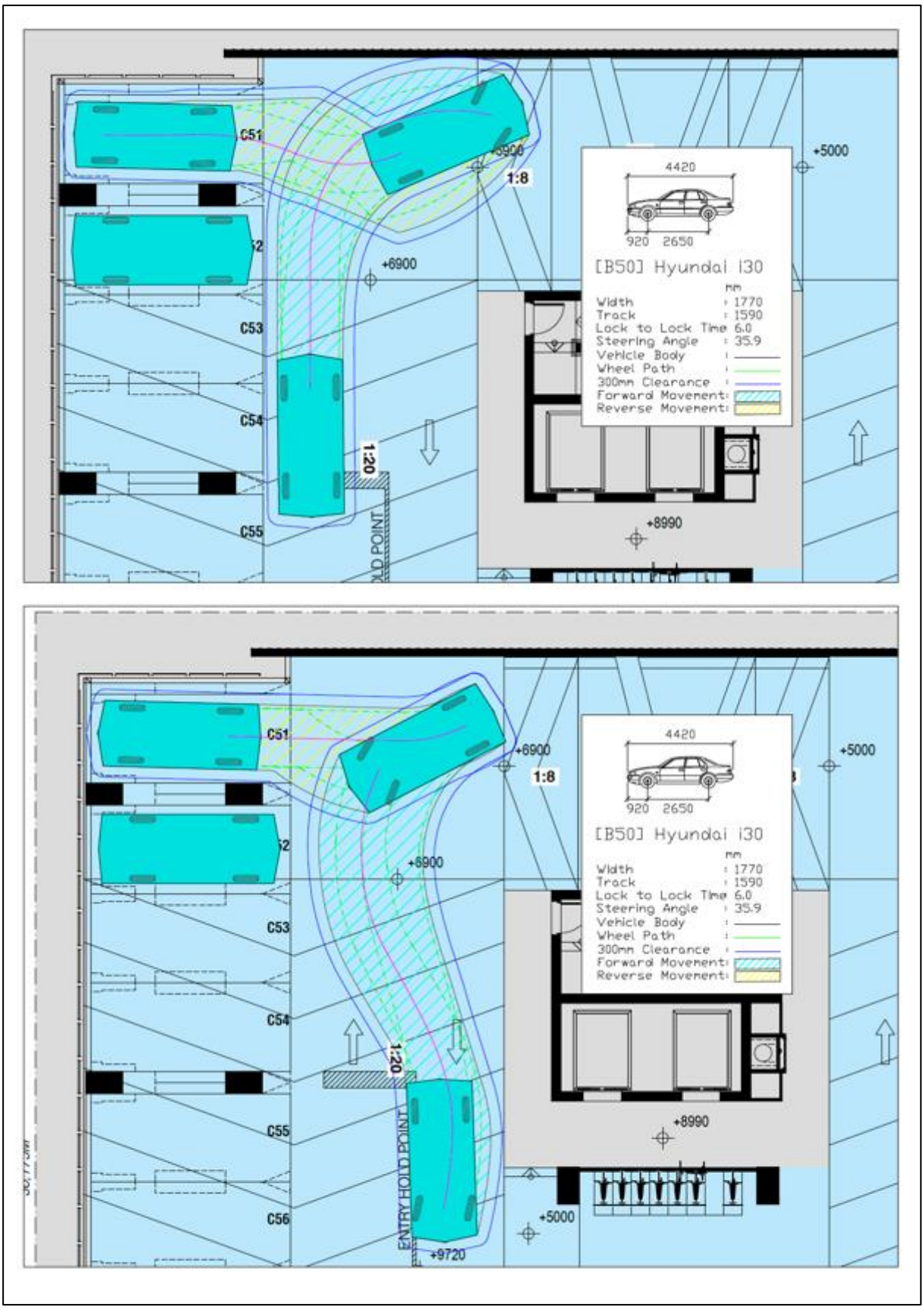


FIGURE 4.4 – B50 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

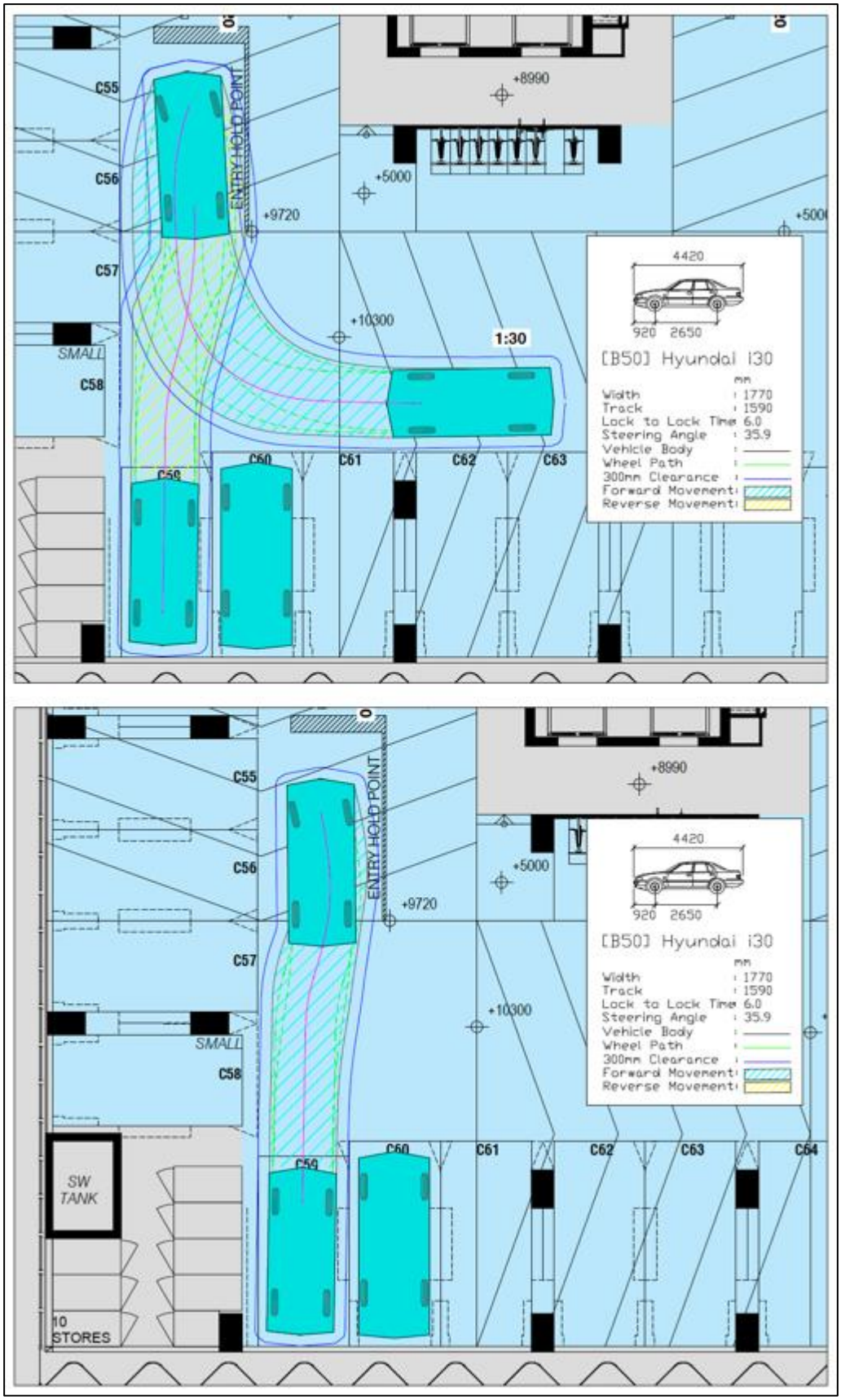


FIGURE 4.5 – B50 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

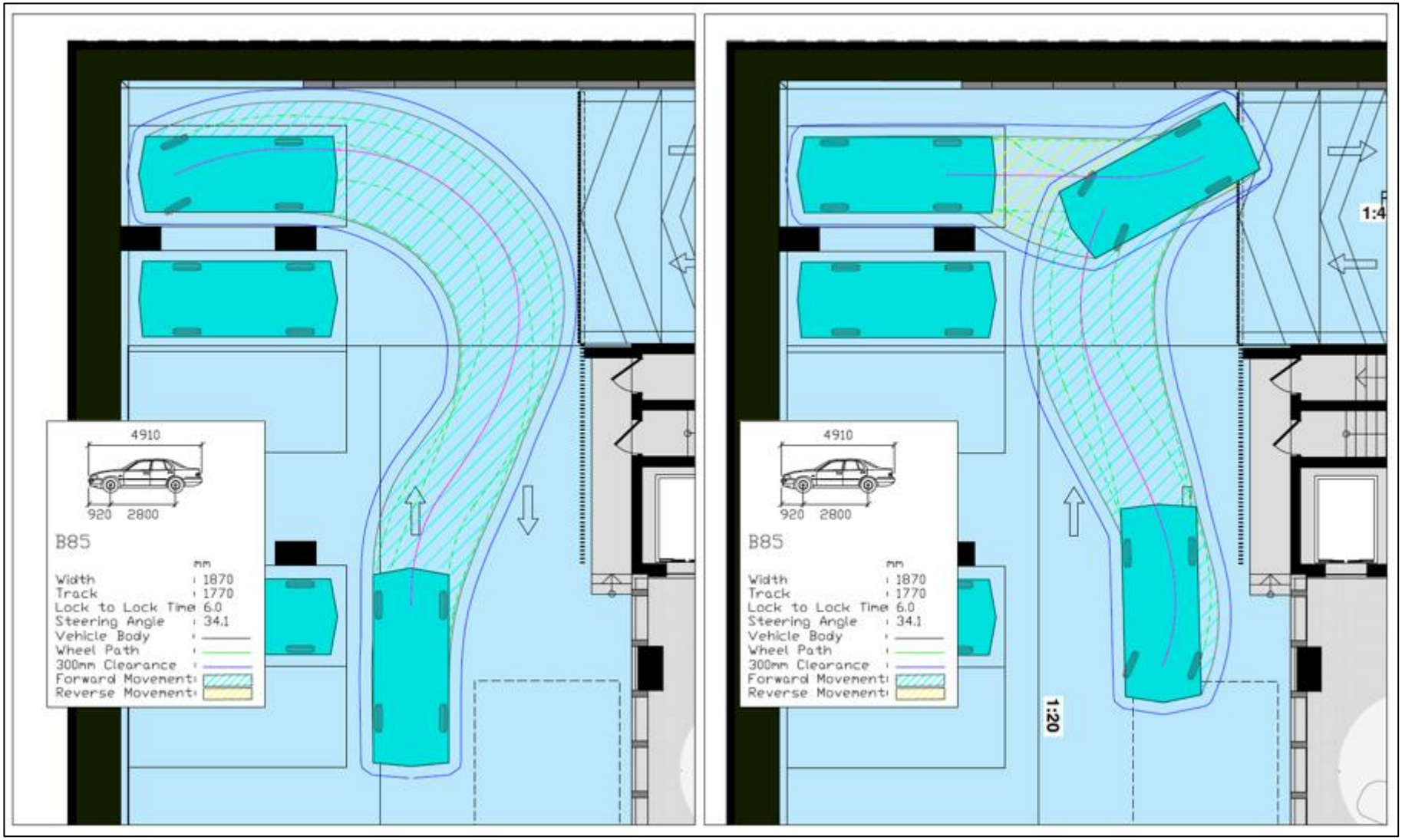


FIGURE 4.6 – B85 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

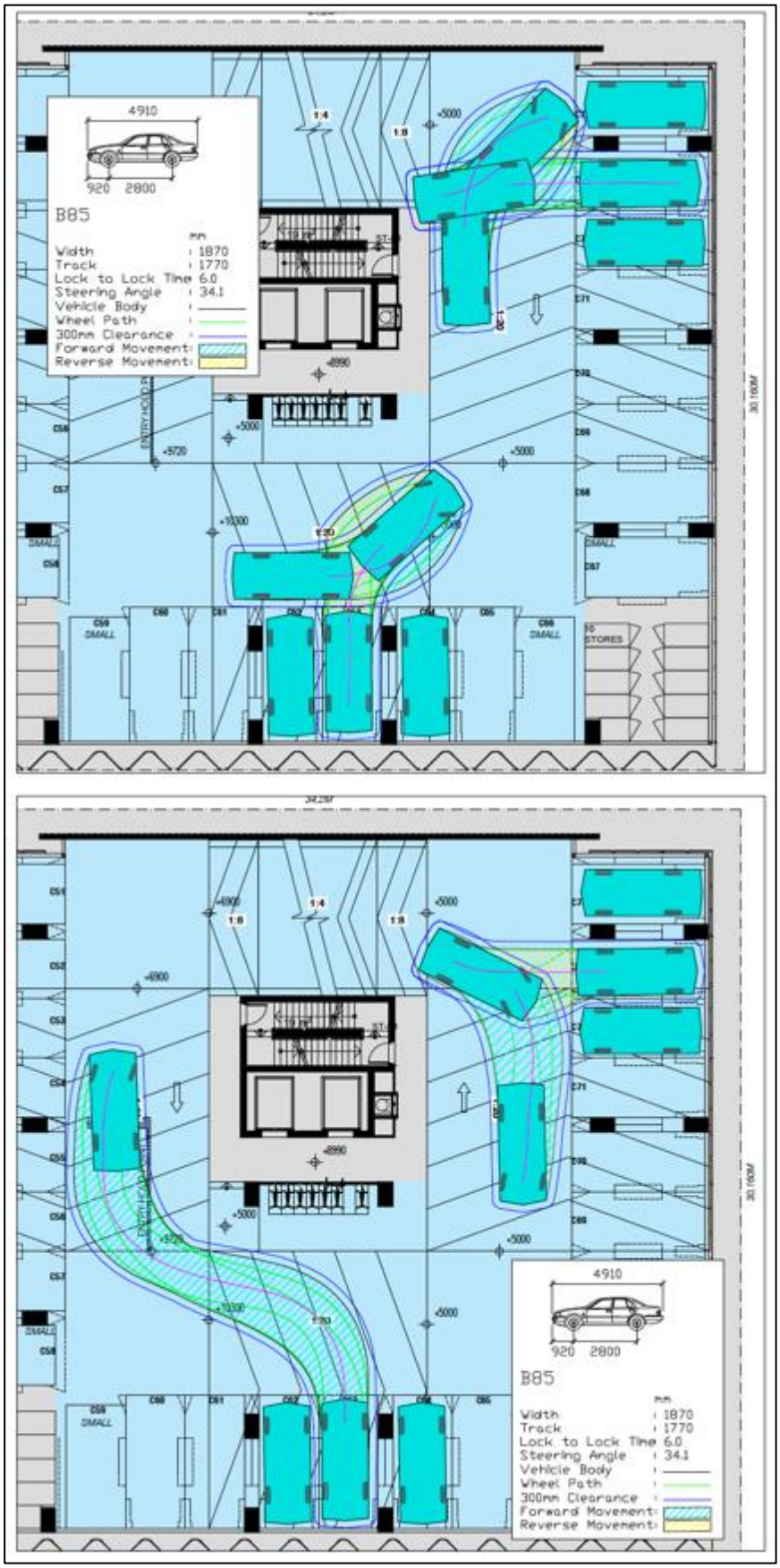


FIGURE 4.7 – B85 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

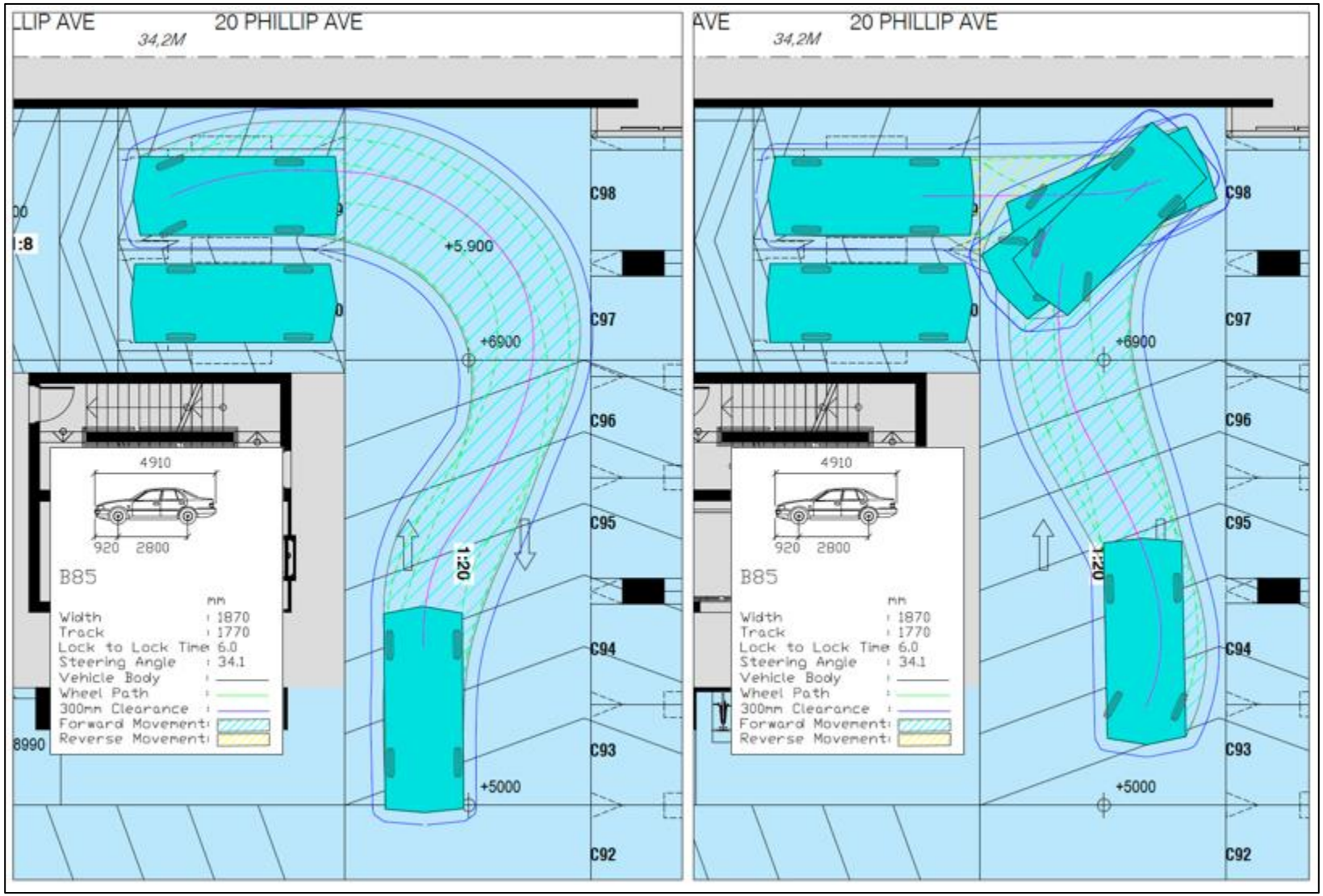


FIGURE 4.8 – B85 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

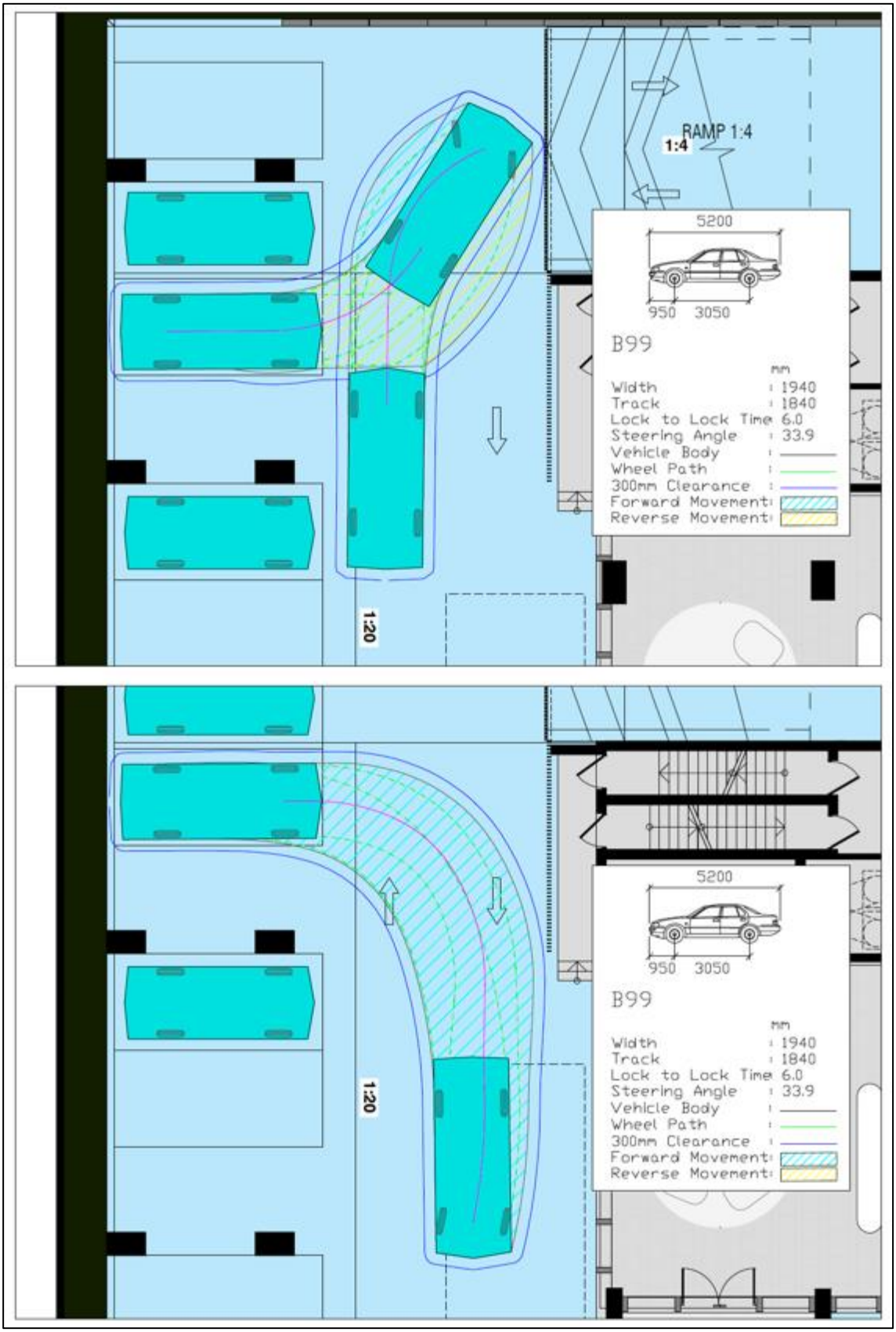


FIGURE 4.9 – B99 VEHICLE PATHS (CRITICAL CAR PARKING AND MANOEUVRES)

5.0 RAMP MANAGEMENT

5.1 Operations

The proposed basement car parking layouts generally provide for two vehicles to pass on ramps, with only a need for one driver to give way to another at corners, which is typical of two-lane ramp systems. Convex mirrors will be implemented to manage these arrangements as required.

The proposed ramp management arrangements are shown in Figures 5.1 – 5.4.

5.2 Vehicle Queuing

The proposal will generate in the order of 36 vehicle movements per hour during peak period (ie 168 bedrooms x 0.21 trips). During the critical afternoon peak hour, approximately 25 vehicles will enter the site and 11 vehicles will exit. This equates to approximately 1 vehicle arrival every 2.5 minutes.

Assuming a vehicle exits the site from Basement Level 2 or Podium Level 2 (worst case scenarios), the travel distance between the farthest level and ground floor, just past the vehicle standing to enter is approximately 60 metres. With the estimated travel speed of 5km/hr (1.35m/s), a vehicle exiting would clear each ramp in approximately 44 seconds, and therefore, 1 minute and 30 seconds for both basement or podium levels.

Based on the above, it is considered that the probability of a queue extending more than one vehicle during peak hour operation of the development is low. If such were to occur, there is sufficient space available for a second vehicle to queue clear of the frontage roadway without blocking the exit travel route from the site.

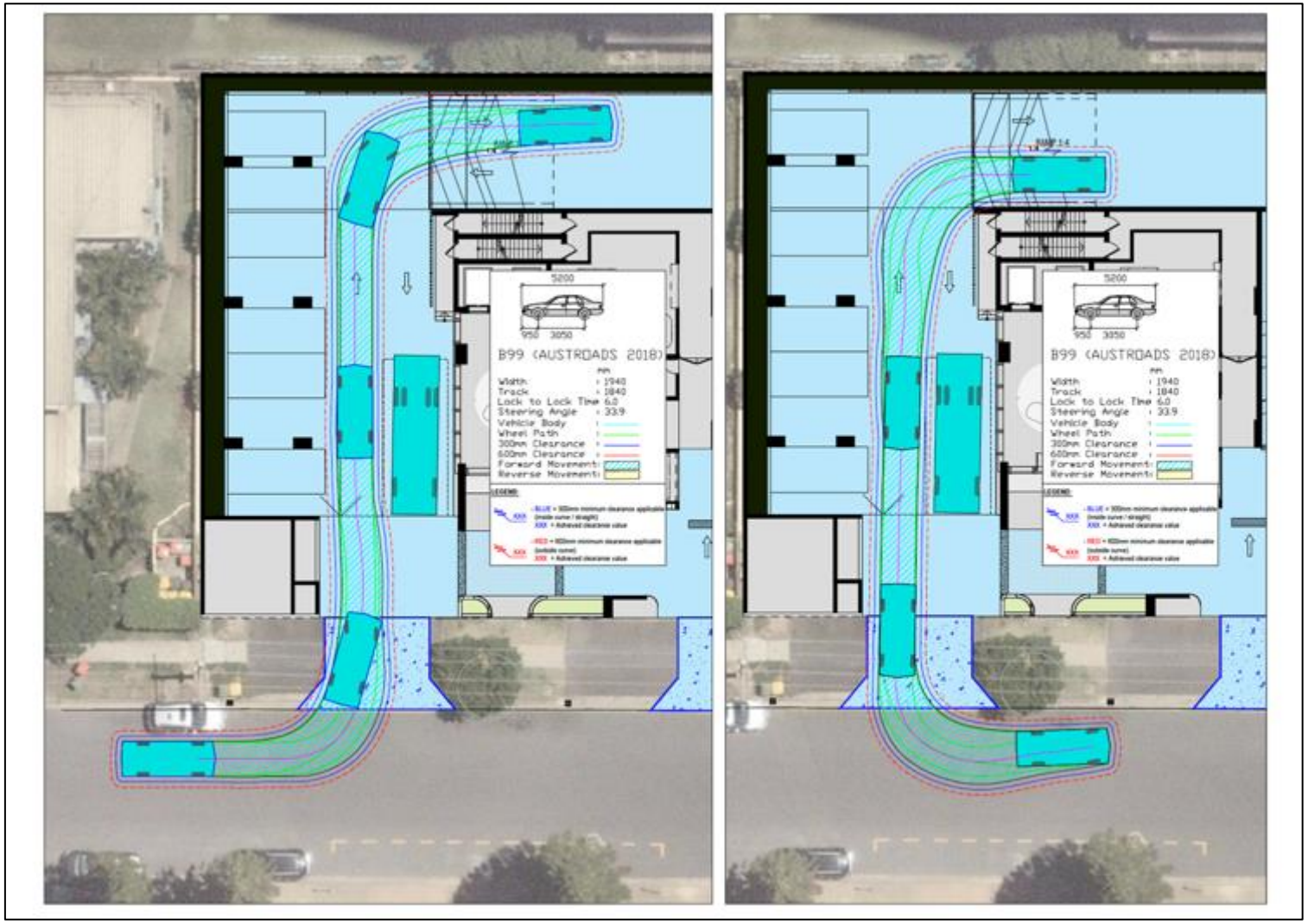


FIGURE 5.1 – B99 VEHICLE PATHS CIRCULATING (GROUND LEVEL)

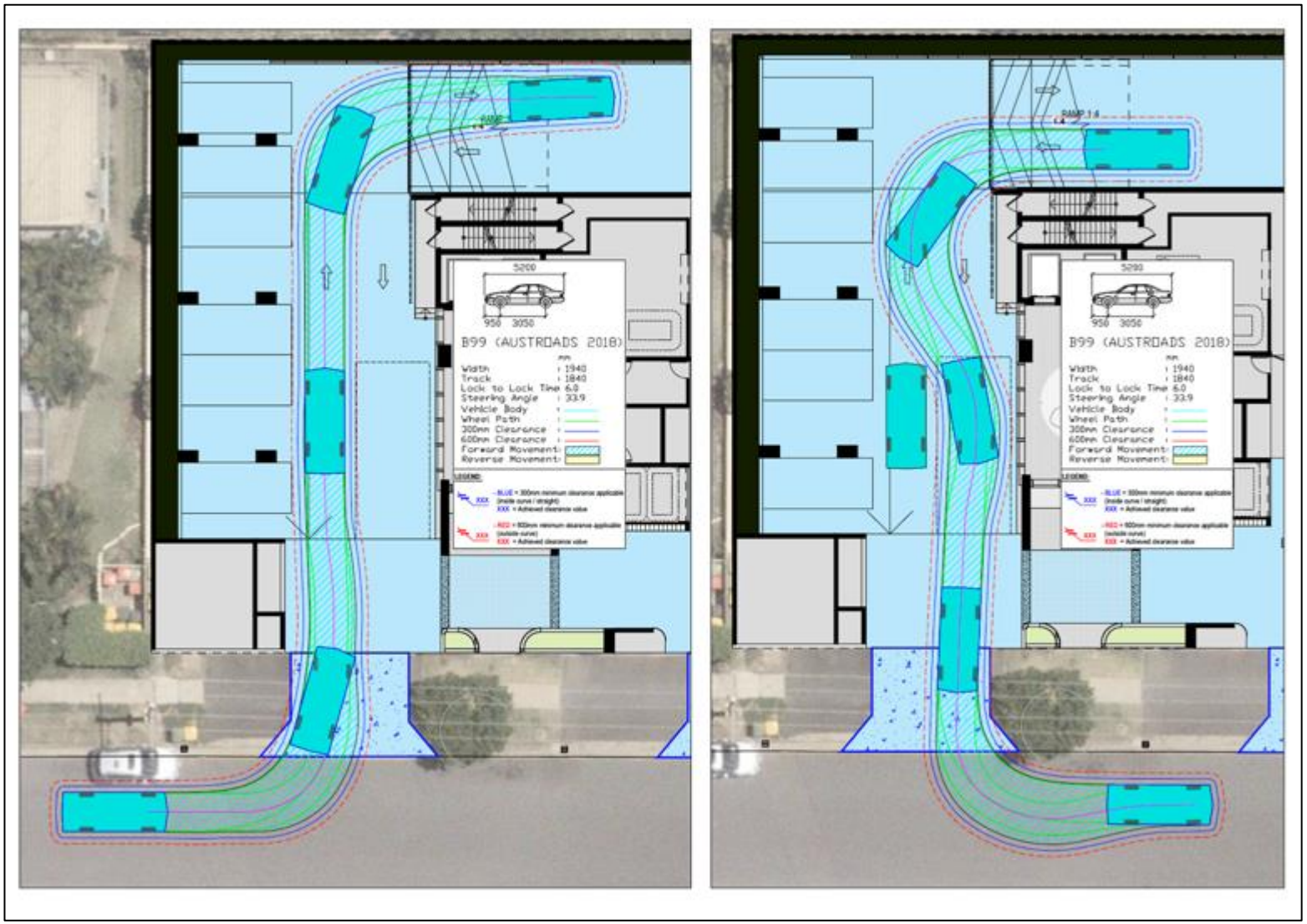


FIGURE 5.2 – B99 VEHICLE PATHS CIRCULATING (GROUND LEVEL)

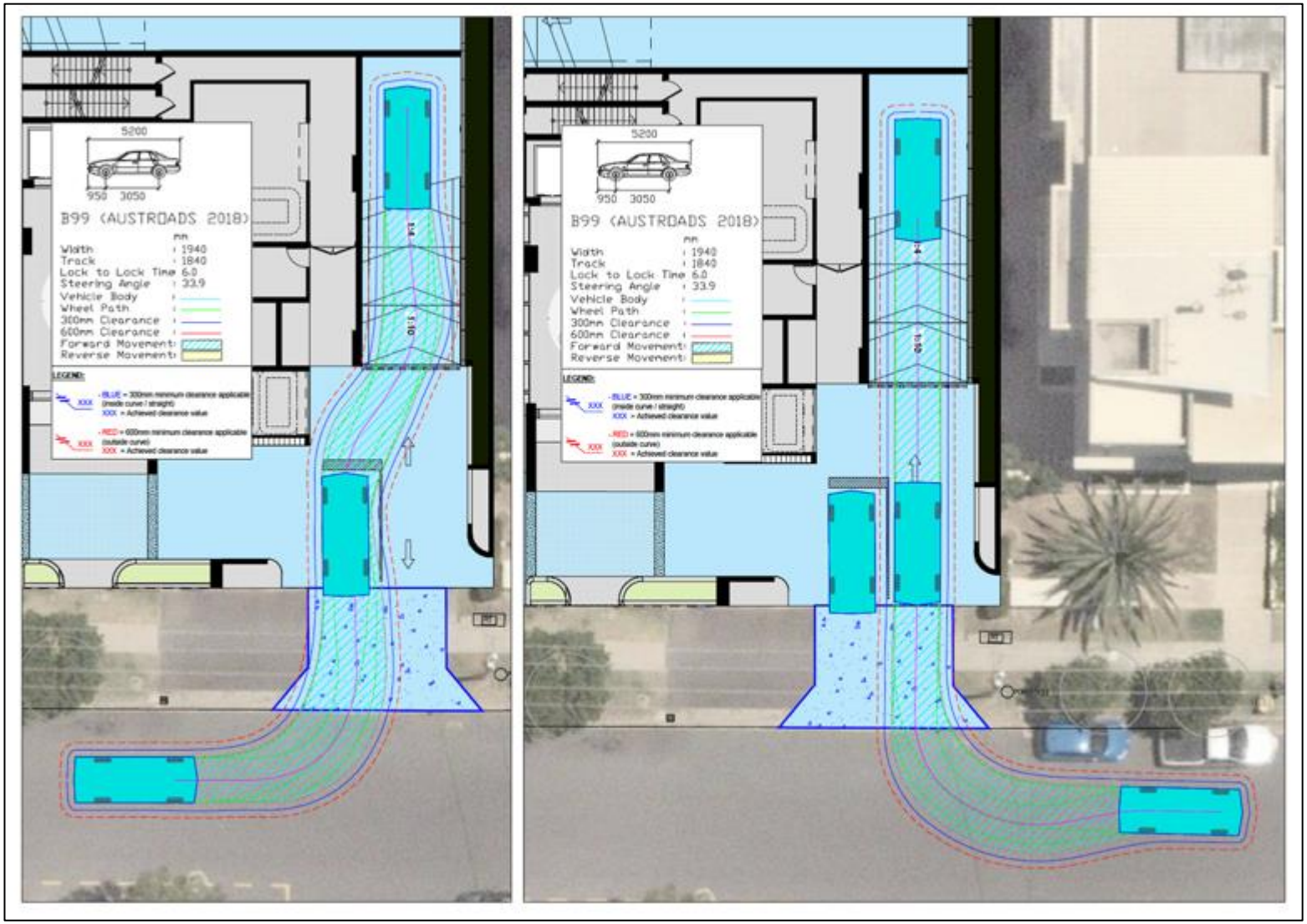


FIGURE 5.3 – B99 VEHICLE PATHS CIRCULATING (GROUND LEVEL)

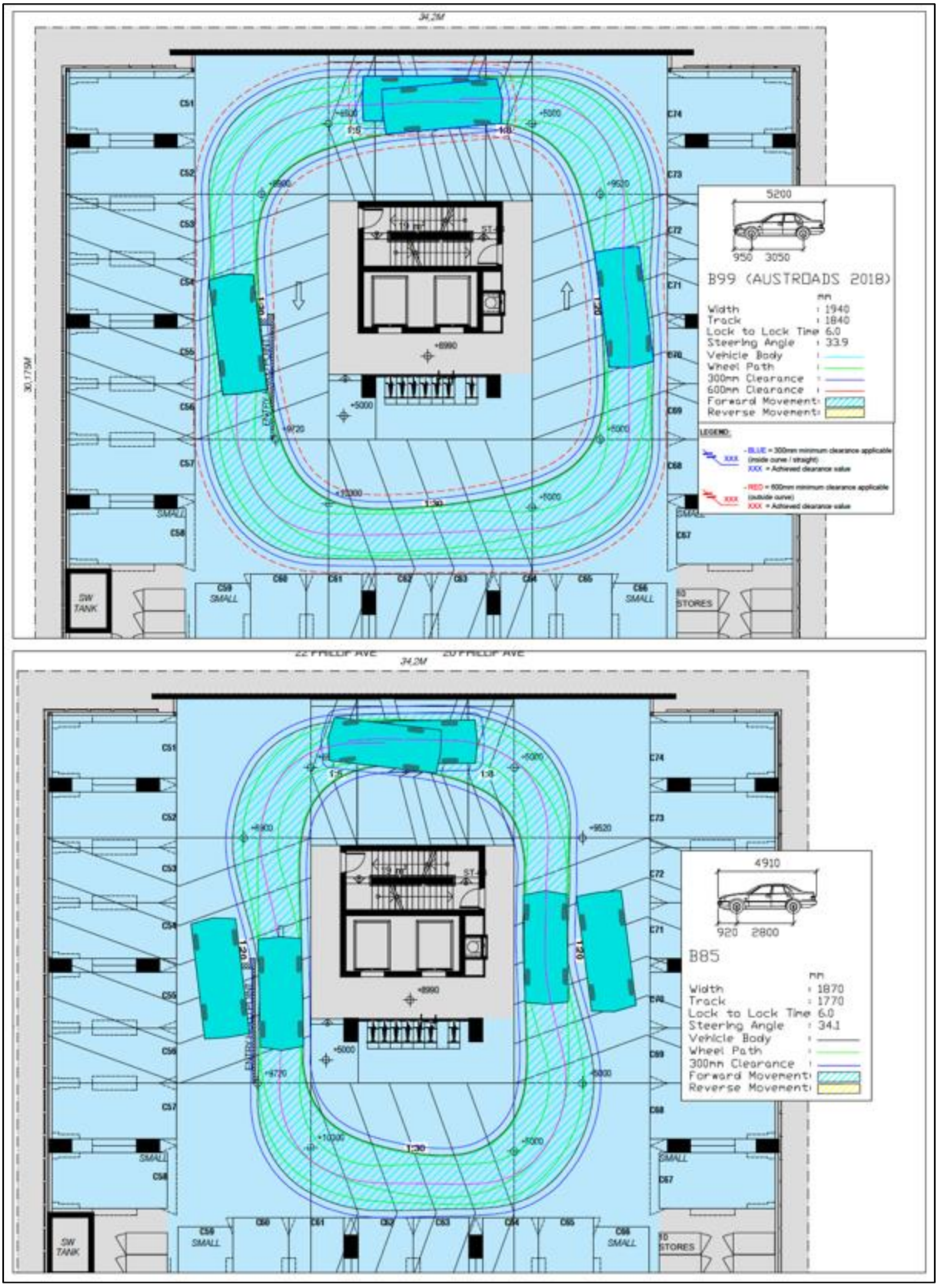


FIGURE 5.4 – B99 VEHICLE PATHS CIRCULATING (BASEMENT 1 AND 2)

6.0 PROPOSED ACCESS ARRANGEMENTS

Access is proposed via two crossovers located at either end of the road frontage.

As shown in Figure 6.1, a pedestrian sight splay in accordance with AS2890.1:2004. has been provided on each side of each crossover. The driveways have been designed in accordance with the IPWEA Standard Drawing RS-051.

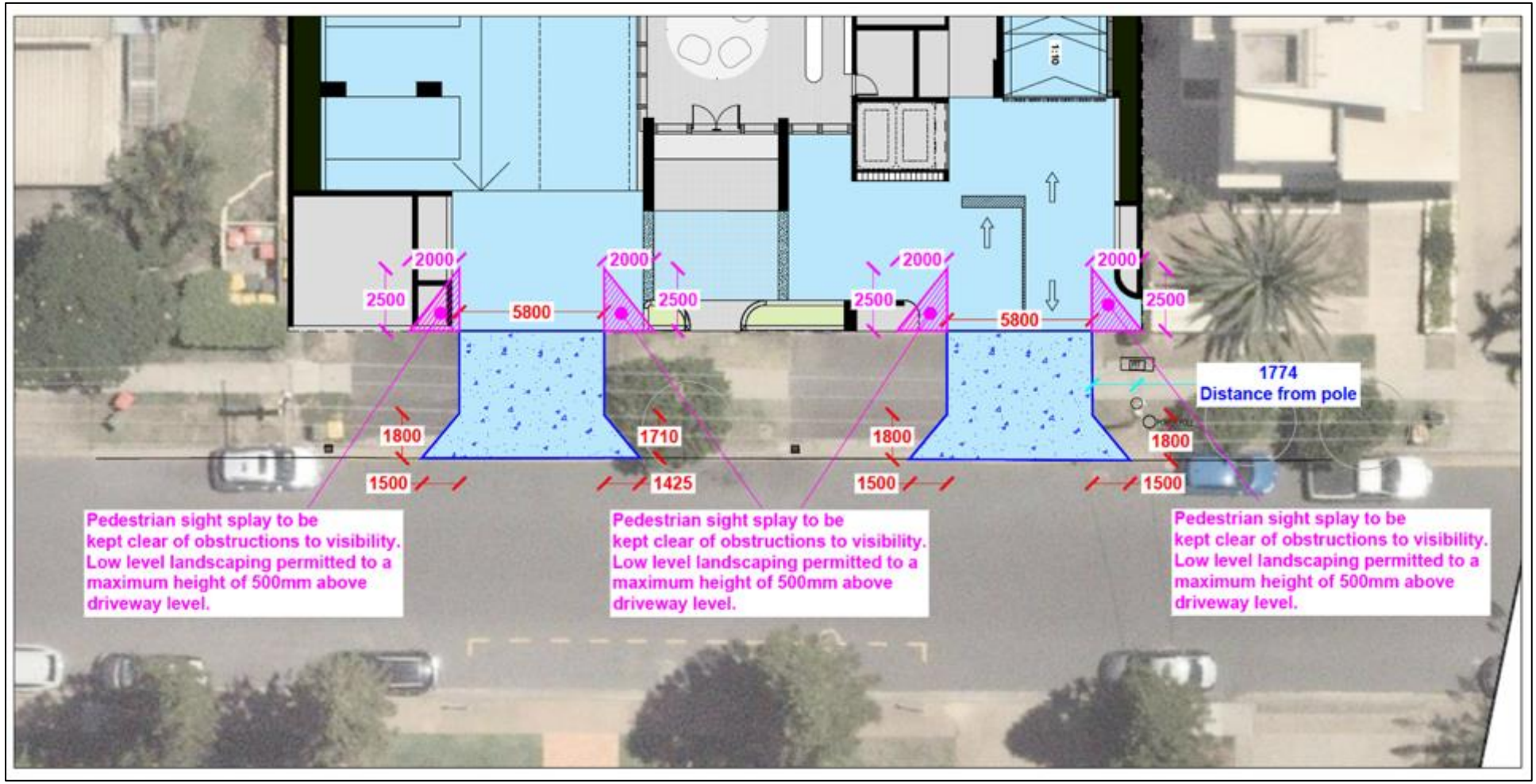


FIGURE 6.1 – PROPOSED LAYOUT AND DIMENSIONS OF VEHICLE CROSSOVERS

7.0 PROVISION FOR SERVICE VEHICLES

7.1 Acceptable Outcome

In accordance with Table 9.4.13-9 of the Transport Code, the proposal must provide satisfactory manoeuvring area suitable for service vehicles up to the size of a Medium Rigid Vehicle (MRV).

7.2 Proposed Outcome

The site allows for service vehicles up to the size of a Medium Rigid Vehicle (MRV) to load on-site. As shown in Figure 7.1, a MRV can satisfactorily stand on site without blocking access to the visitor parking and basement ramp.

A temporary bin storage area has been provided within five metres of the boundary. Bins will be serviced from the kerb.

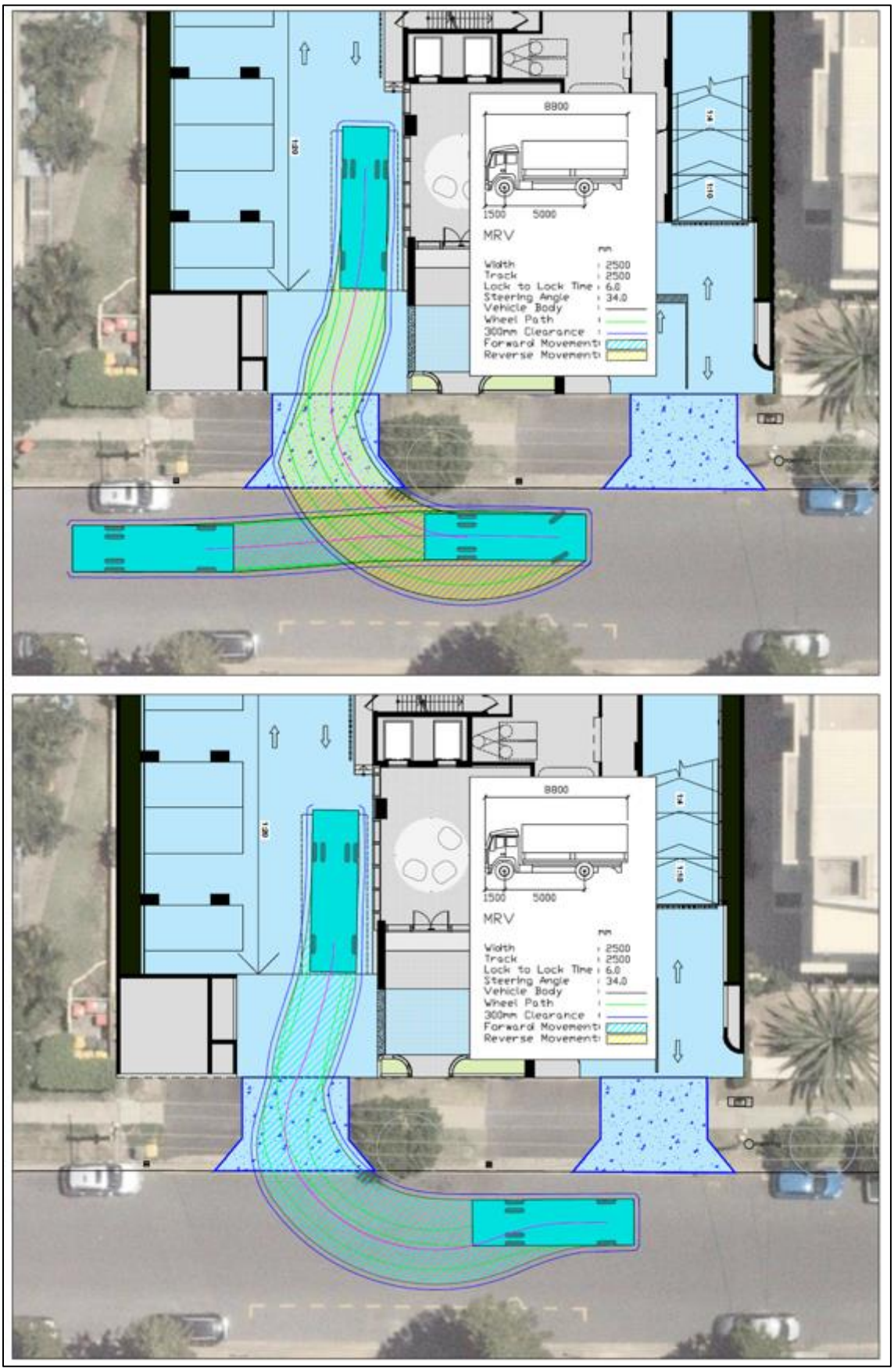


FIGURE 7.1 – MEDIUM RIGID VEHICLE (MRV) ACCESS AND MANOEUVRING

8.0 PROVISION FOR PEDESTRIANS AND BICYCLES

It is noted that the Transport Code nominates the following rates as an Acceptable Outcome for the provision of bicycle parking:

Multiple Dwelling:

- 1 space per unit for residents;
- 1 per 12 dwellings, to a maximum of 20 spaces

Given the scale of the development, application of the above rate would result in a relatively high number of residential bicycle spaces, of which a large proportion would not be used. As an alternative, it is recommended that the rates recommended by Austroads be complied with, which are:

Multiple Dwelling:

- 1 space per 3 units for residents;
- 1 space per 12 units for visitors.

Application of these rates results in the following requirements:

Table 8.1: Provision for Bicycle Parking Against Austroads Recommendations

Component	Required No. Spaces	Provided No. Spaces
Multiple Dwelling: 56 units	19 spaces	32 spaces
Visitor Parking: 56 units	5 spaces	5 spaces
TOTAL	**24 spaces**	**37 spaces**

As shown above, the proposal meets the bicycle parking requirements prescribed in Austroads recommendations. Bicycle parking has been designed in accordance with AS2890.3 with the following dimensions:

- Vertical parking - 1.2m x 0.5m
- Horizontal parking - 1.8m x 0.5m
- Parking aisle - 1.5m

The proposed ground floor plan provides good access for pedestrians, with dedicated entries linking the road frontage to the building entrance.

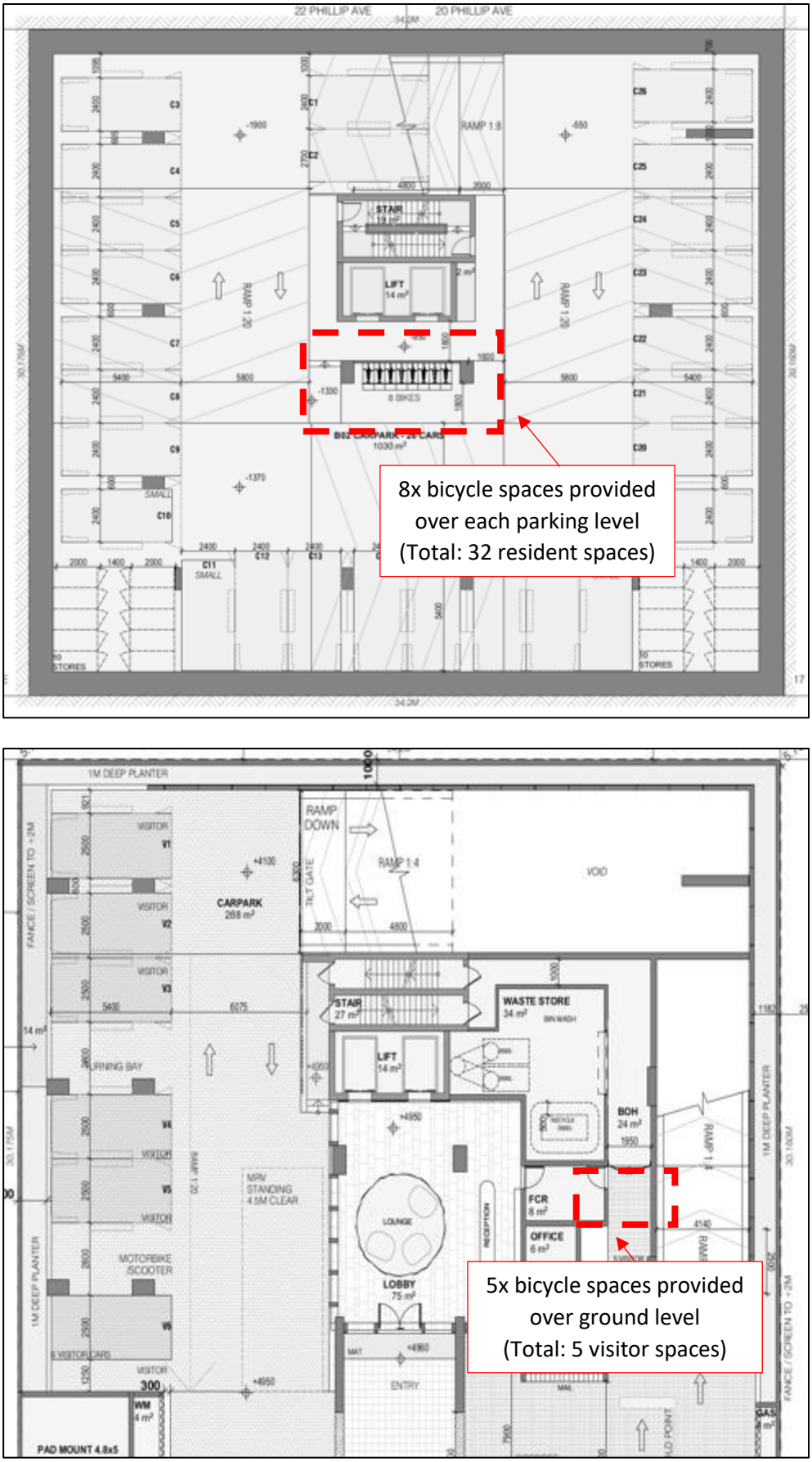


FIGURE 8.1 – PROPOSED BICYCLE PARKING PROVISIONS (PARKING LEVELS AND GROUND FLOOR)

9.0 DEVELOPMENT TRAFFIC ESTIMATES

9.1 Traffic Generation

In accordance with the *RMS: Guide to Traffic Generating Developments*, the following trip generations apply to the development.

High Density Residential Flat Dwellings:
0.21 peak hour trips per bedroom (morning peak hour)
0.15 peak hour trips per bedroom (afternoon peak hour)

Application of the above rate, the proposed development yields the following trip generation estimates:

Table 9.1 - Estimated Development Traffic Generation

Component	Proposed Scale	Unit	Peak hour rate / unit		Total trips (peak hour)		AM peak hour		PM peak hour	
			AM	PM	AM	PM	In	Out	In	Out
Multiple units	56	Unit	0.21	0.15	12	9	2	10	6	3

Peak Hour Distribution:Residential: AM – 20 /80, PM – 60 / 40

9.2 Traffic Distribution

Given the location of the site in the context of the surrounding road network, the following traffic distribution is considered reasonable:

- To and from the south via Surf Parade - 30%
- To and from the south via Old Burleigh Road - 10%
- To and from the north via Surf Parade - 40%
- To and from the north via Old Burleigh Road - 20%

Resultant estimates of peak hour development traffic movements are shown in Figure 9.1.

Design (development traffic + background volumes) peak hour traffic movements for the proposal are shown in Figure 9.2.

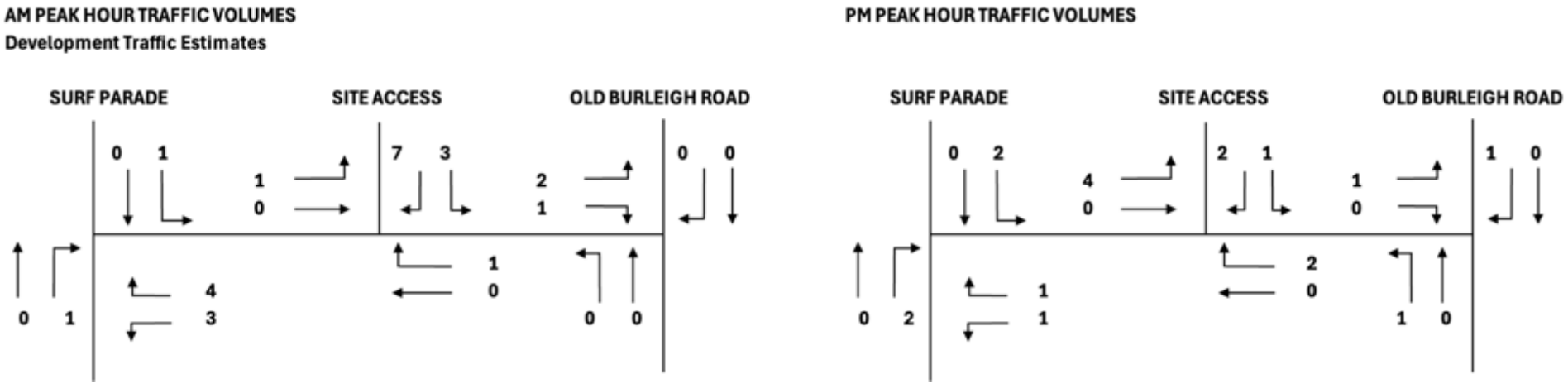


FIGURE 9.1 – PEAK HOUR DEVELOPMENT TRAFFIC ESTIMATES

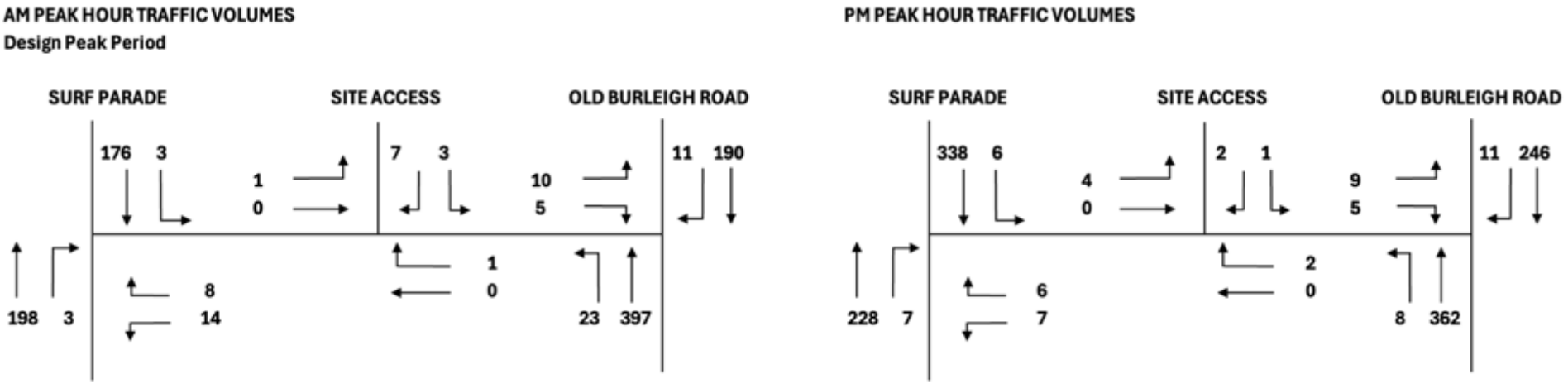


FIGURE 9.2 – DESIGN PEAK HOUR TRAFFIC ESTIMATES

9.3 Road Network Impact Assessment

An assessment of impacts has been prepared for the Surf Parade / Anne Avenue and Old Burleigh Road / Anne Avenue intersections.

The analysis was carried out for the base (without development) and design (with development) scenarios.

The results of the SIDRA analysis are presented in Appendix B and summarised below in Tables 9.2 – 9.3.

Table 9.2: SIDRA Results (Surf Parade / Anne Avenue intersection)

Scenario	Degree of Saturation	Total Average Delay (seconds)	Queue Length (metres)
AM Peak – without development	0.112	0.3	0.4
PM Peak – without development	0.191	0.3	0.4
AM Peak – with development	0.113	0.5	0.5
PM Peak – with development	0.192	0.4	0.5

Table 9.3: SIDRA Results (Old Burleigh Road / Anne Avenue intersection)

Scenario	Degree of Saturation	Total Average Delay (seconds)	Queue Length (metres)
AM Peak – without development	0.235	0.6	0.9
PM Peak – without development	0.206	0.4	0.7
AM Peak – with development	0.235	0.6	0.9
PM Peak – with development	0.206	0.4	0.8

As shown in Tables 9.2 – 9.3, the SIDRA modelling indicates the surrounding road network will function satisfactorily with the proposed development completed.

10.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

- The subject site is located on the northern side of Anne Avenue. The site is identified as Lot 1 – 4 on BUP1114 and has a site area of approximately 2,056m^2. The site is located within the mapped area of the Transport Hub, and is within 450 metres walking distance of the Broadbeach South light rail station.

- The proposed plan of development is for a multiple dwelling development comprising of 56x three-bedroom units.

- The proposal provides a total of 106 car parking spaces are proposed to be provided over two podium levels, ground floor and two basement levels.

- Under the Transport Code, the development requires a total of 57 car parking spaces, including 6 visitor spaces. The proposal provides a total of 106 car parking spaces, including 6 spaces for visitors, and therefore meets the Acceptable Outcome.

- The geometric layout of the proposed parking facilities has generally been designed to comply with the relevant requirements specified by the Transport Code.

- Access is proposed to be gained via two crossovers located at either end of the road frontage. A pedestrian sight splay in accordance with AS2890.1:2004. has been provided on both sides of each access. The driveways have been designed in accordance with the IPWEA Standard Drawing RS-051.

- In accordance with Table 9.4.13-9 of the Transport Code, the site allows for service vehicles up to the size of a Medium Rigid Vehicle (MRV) to load on-site. Swept path analysis indicates that a MRV can satisfactorily stand on the site.

- A temporary bin storage area has been provided within five metres of the boundary. Bins will be serviced from the kerb.

- The proposal meets the bicycle parking requirements prescribed in Austroads. The proposed ground floor plan provides good access for pedestrians, with dedicated entries linking the road frontage to the building entrance.

- The SIDRA modelling indicates the surrounding road network will function satisfactorily with the proposed development completed.

APPENDICES

APPENDIX A – SURVEYED TRAFFIC VOLUMES
APPENDIX B – SIDRA MODELLING RESULTS
APPENDIX C – RESPONSE TO TRANSPORT CODE
APPENDIX D – RESPONSE TO DRIVEWAYS AND VEHICULAR CROSSINGS CODE

APPENDIX A– SURVEYED TRAFFIC VOLUMES

MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
RTE ID:
Location: Old Burleigh Rd / Anne Ave
Date: Friday, 08 November 2024
Comments: Fine weather
Class Light

Time	N-Thru	N-Right	N-Left	S-Thru	S-Right	S-Left	E-Thru	E-Right	E-Left	W-Thru	W-Right	W-Left	Total	Cumul Tot
7:00	35	1		91		3					1	2	133	
7:15	37	2		77		4					2	2	124	
7:30	42	2		87		3					2	3	139	
7:45	39	1		90		5					1	2	138	534
8:00	55	3		99		6					2	2	167	701
8:15	57	3		100		5					1	1	167	611
8:30	45	3		101		6					0	3	158	630
8:45	33	2		97		6					1	2	141	633
9:00	45	2		96		4					0	1	148	614
9:15	52	1		90		3					1	3	150	597
9:30	59	2		95		3					2	2	163	602
9:45	62	1		99		4					1	1	168	629
10:00	57	2		90		3					0	1	153	634
10:15	38	2		75		3					1	0	119	603
10:30	42	1		77		2					2	1	125	565
10:45	51	1		68		2					1	2	125	522
AM PEAK HR	**190**	**11**	**0**	**397**	**0**	**23**	**0**	**0**	**0**	**0**	**4**	**8**	**633**	
Time	**N-Thru**	**N-Right**	**N-Left**	**S-Thru**	**S-Right**	**S-Left**	**E-Thru**	**E-Right**	**E-Left**	**W-Thru**	**W-Right**	**W-Left**	**Total**	**Cumul Tot**
14:00	44	4		88		2					2	2	142	
14:15	65	3		93		3					1	3	168	
14:30	59	3		98		2					1	3	166	
14:45	65	4		102		3					2	4	180	656
15:00	57	3		112		3					2	2	179	693
15:15	45	5		107		4					1	2	164	689
15:30	51	3		75		3					1	3	136	659
15:45	60	2		82		2					0	2	148	627
16:00	59	1		77		3					0	1	141	589
16:15	60	3		87		2					1	1	154	579
16:30	65	2		99		2					2	2	172	615
16:45	64	2		87		1					1	3	158	625
17:00	57	3		89		2					1	2	154	638
17:15	59	2		77		3					0	3	144	628
17:30	45	3		92		2					1	2	145	601
17:45	46	3		87		2					1	2	141	584
PM PEAK HR	**246**	**10**	**0**	**362**	**0**	**7**	**0**	**0**	**0**	**0**	**5**	**8**	**638**	

MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
RTE ID:
Location: Surf Parade / Anne Ave
Date: Friday, 08 November 2024
Comments: Fine weather
Class **Light**

Time	N-Thru	N-Right	N-Left	S-Thru	S-Right	S-Left	E-Thru	E-Right	E-Left	W-Thru	W-Right	W-Left	Total	Cumul Tot
7:00	45		1	41	1			1	1				90	
7:15	52		1	38	2			2	2				97	
7:30	45		2	45	1			3	3				99	
7:45	47		1	51	1			2	2				104	390
8:00	45		1	43	0			1	3				93	393
8:15	39		0	49	0			2	2				92	388
8:30	45		1	54	1			1	3				105	394
8:45	47		0	52	1			0	3				103	393
9:00	52		0	57	2			2	2				115	415
9:15	47		1	71	1			1	1				122	445
9:30	41		2	72	2			1	4				122	462
9:45	51		1	75	2			0	2				131	490
10:00	50		1	80	2			1	2				136	511
10:15	57		2	77	1			1	3				141	530
10:30	51		1	69	2			2	2				127	535
10:45	52		2	61	1			1	2				119	523
AM PEAK HR	**176**	**0**	**2**	**198**	**2**	**0**	**0**	**4**	**11**	**0**	**0**	**0**	**393**	
Time	**N-Thru**	**N-Right**	**N-Left**	**S-Thru**	**S-Right**	**S-Left**	**E-Thru**	**E-Right**	**E-Left**	**W-Thru**	**W-Right**	**W-Left**	**Total**	**Cumul Tot**
14:00	85		1	53	2			2	1				144	
14:15	77		2	64	1			1	1				146	
14:30	99		2	52	1			1	2				157	
14:45	91		1	59	2			0	1				154	601
15:00	92		0	65	0			2	2				161	618
15:15	87		1	72	1			1	1				163	635
15:30	79		2	69	1			2	2				155	633
15:45	101		1	47	2			3	2				156	635
16:00	95		2	55	1			2	1				156	630
16:15	95		0	61	2			2	2				162	629
16:30	87		2	63	2			2	2				158	632
16:45	89		0	55	1			0	1				146	622
17:00	67		2	49	0			1	1				120	586
17:15	77		1	51	2			0	2				133	557
17:30	59		1	53	2			1	2				118	517
17:45	54		2	37	1			2	1				97	468
PM PEAK HR	**338**	**0**	**4**	**228**	**5**	**0**	**0**	**5**	**6**	**0**	**0**	**0**	**586**	

APPENDIX B– SIDRA MODELLING RESULTS

SURF PARADE / ANNE AVENUE INTERSECTION

- Background AM peak hour (without proposal)
- Background AM peak hour (without proposal)
- Design (background plus proposal) AM peak hour (with proposal)
- Design (background plus proposal) PM peak hour (with proposal)

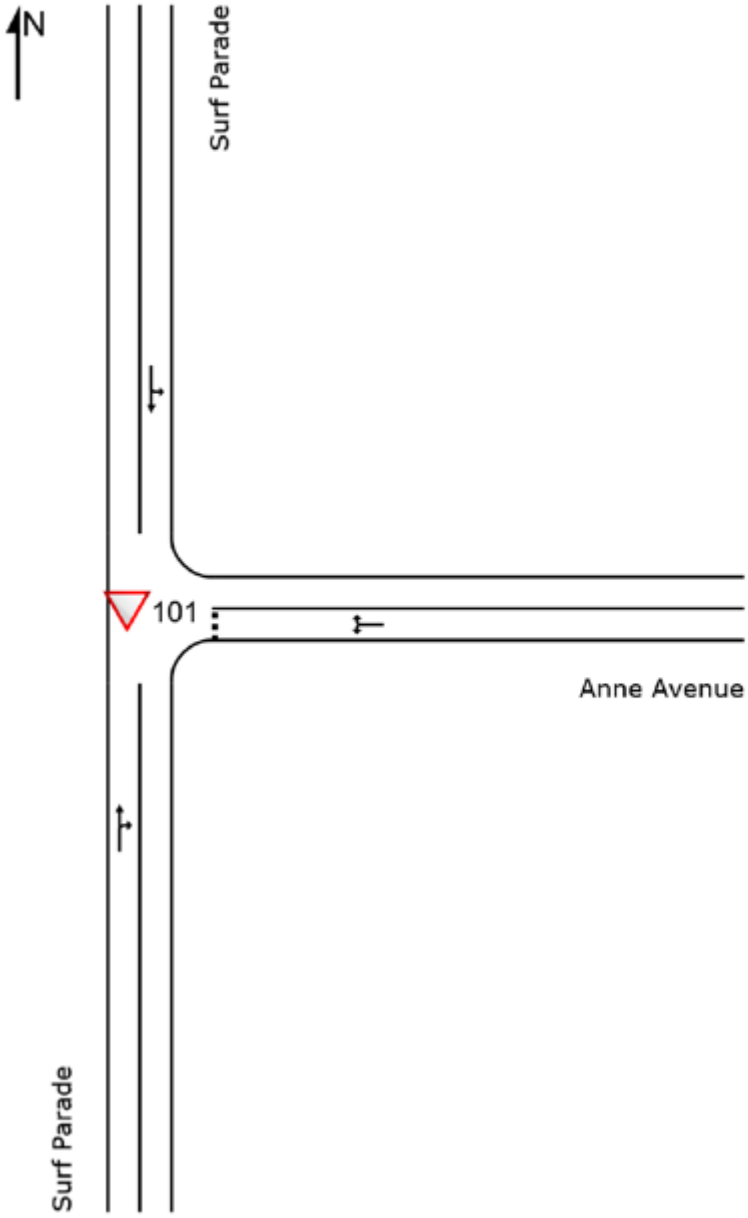
MODELLED LAYOUT

SITE LAYOUT

Site: 101 [Surveyed Peak Traffic AM (Site Folder: Surf Parade / Anne Avenue)]

Surf Parade / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Background AM peak hour (without proposal)

MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Traffic AM (Site Folder: Surf Parade / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Surf Parade / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Surf Parade															
2	T1	All MCs	208	5.0	208	5.0	0.112	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.9
3	R2	All MCs	2	5.0	2	5.0	0.112	5.6	LOS A	0.0	0.1	0.01	0.01	0.01	56.8
Approach			211	5.0	211	5.0	0.112	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.9
East: Anne Avenue															
4	L2	All MCs	12	5.0	12	5.0	0.014	6.2	LOS A	0.0	0.4	0.30	0.56	0.30	51.8
6	R2	All MCs	4	5.0	4	5.0	0.014	7.2	LOS A	0.0	0.4	0.30	0.56	0.30	51.5
Approach			16	5.0	16	5.0	0.014	6.4	LOS A	0.0	0.4	0.30	0.56	0.30	51.7
North: Surf Parade															
7	L2	All MCs	2	5.0	2	5.0	0.099	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
8	T1	All MCs	185	5.0	185	5.0	0.099	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach			187	5.0	187	5.0	0.099	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
All Vehicles			414	5.0	414	5.0	0.112	0.3	NA	0.0	0.4	0.02	0.03	0.02	59.5

Background PM peak hour (without proposal)

MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Traffic PM (Site Folder: Surf Parade / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Surf Parade / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Surf Parade															
2	T1	All MCs	240	5.0	240	5.0	0.132	0.0	LOS A	0.0	0.4	0.03	0.03	0.03	59.8
3	R2	All MCs	5	5.0	5	5.0	0.132	6.8	LOS A	0.0	0.4	0.03	0.03	0.03	56.7
Approach			245	5.0	245	5.0	0.132	0.2	NA	0.0	0.4	0.03	0.03	0.03	59.7
East: Anne Avenue															
4	L2	All MCs	6	5.0	6	5.0	0.014	6.9	LOS A	0.0	0.3	0.44	0.62	0.44	51.2
6	R2	All MCs	5	5.0	5	5.0	0.014	8.5	LOS A	0.0	0.3	0.44	0.62	0.44	50.9
Approach			12	5.0	12	5.0	0.014	7.6	LOS A	0.0	0.3	0.44	0.62	0.44	51.1
North: Surf Parade															
7	L2	All MCs	4	5.0	4	5.0	0.191	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
8	T1	All MCs	356	5.0	356	5.0	0.191	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			360	5.0	360	5.0	0.191	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			617	5.0	617	5.0	0.191	0.3	NA	0.0	0.4	0.02	0.03	0.02	59.6

Design (background plus proposal) AM peak hour (with proposal)

MOVEMENT SUMMARY

Site: 101 [Design Peak Traffic AM (Site Folder: Surf Parade / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Surf Parade / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Surf Parade															
2	T1	All MCs	208	5.0	208	5.0	0.113	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	59.9
3	R2	All MCs	3	5.0	3	5.0	0.113	5.7	LOS A	0.0	0.2	0.01	0.01	0.01	56.8
Approach			212	5.0	212	5.0	0.113	0.1	NA	0.0	0.2	0.01	0.01	0.01	59.8
East: Anne Avenue															
4	L2	All MCs	15	5.0	15	5.0	0.021	6.2	LOS A	0.1	0.5	0.31	0.57	0.31	51.8
6	R2	All MCs	8	5.0	8	5.0	0.021	7.2	LOS A	0.1	0.5	0.31	0.57	0.31	51.5
Approach			23	5.0	23	5.0	0.021	6.6	LOS A	0.1	0.5	0.31	0.57	0.31	51.7
North: Surf Parade															
7	L2	All MCs	3	5.0	3	5.0	0.100	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
8	T1	All MCs	185	5.0	185	5.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach			188	5.0	188	5.0	0.100	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			423	5.0	423	5.0	0.113	0.5	NA	0.1	0.5	0.02	0.04	0.02	59.3

Design (background plus proposal) PM peak hour (with proposal)

MOVEMENT SUMMARY

Site: 101 [Design Peak Traffic PM (Site Folder: Surf Parade / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Surf Parade / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Surf Parade															
2	T1	All MCs	240	5.0	240	5.0	0.133	0.1	LOS A	0.1	0.5	0.04	0.04	0.04	59.7
3	R2	All MCs	7	5.0	7	5.0	0.133	7.0	LOS A	0.1	0.5	0.04	0.04	0.04	56.6
Approach			247	5.0	247	5.0	0.133	0.3	NA	0.1	0.5	0.04	0.04	0.04	59.6
East: Anne Avenue															
4	L2	All MCs	7	5.0	7	5.0	0.016	6.9	LOS A	0.1	0.4	0.44	0.63	0.44	51.2
6	R2	All MCs	6	5.0	6	5.0	0.016	8.5	LOS A	0.1	0.4	0.44	0.63	0.44	50.9
Approach			14	5.0	14	5.0	0.016	7.6	LOS A	0.1	0.4	0.44	0.63	0.44	51.0
North: Surf Parade															
7	L2	All MCs	6	5.0	6	5.0	0.192	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
8	T1	All MCs	356	5.0	356	5.0	0.192	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			362	5.0	362	5.0	0.192	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			623	5.0	623	5.0	0.192	0.4	NA	0.1	0.5	0.02	0.04	0.02	59.5

OLD BURLEIGH ROAD / ANNE AVENUE INTERSECTION

- Background AM peak hour (without proposal)
- Background AM peak hour (without proposal)
- Design (background plus proposal) AM peak hour (with proposal)
- Design (background plus proposal) PM peak hour (with proposal)

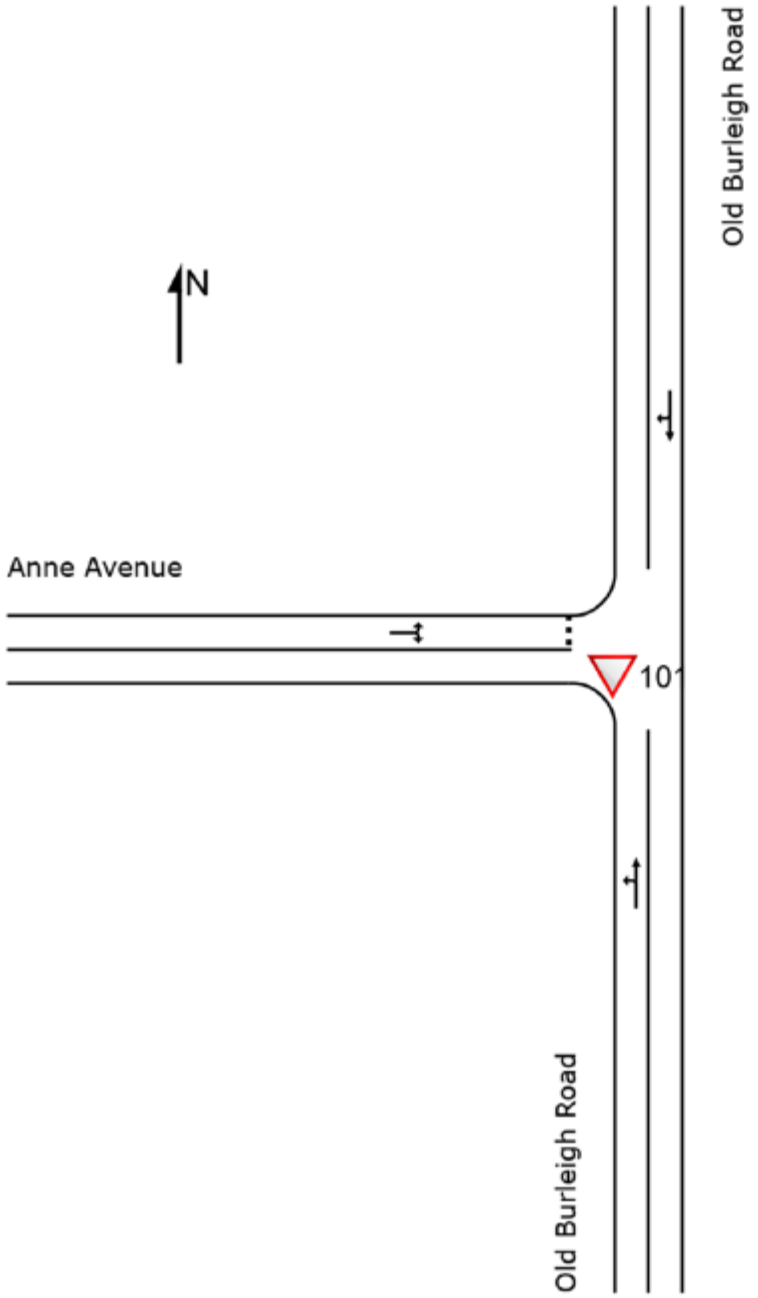
MODELLED LAYOUT

SITE LAYOUT

Site: 101 [Surveyed Peak Traffic AM (Site Folder: Old Burleigh Road / Anne Avenue)]

Old Burleigh Road / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Background AM peak hour (without proposal)

MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Traffic AM (Site Folder: Old Burleigh Road / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Burleigh Road / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Burleigh Road															
1	L2	All MCs	24	5.0	24	5.0	0.235	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	56.9
2	T1	All MCs	418	5.0	418	5.0	0.235	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach			442	5.0	442	5.0	0.235	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.4
North: Old Burleigh Road															
8	T1	All MCs	200	5.0	200	5.0	0.117	0.2	LOS A	0.1	0.9	0.07	0.09	0.07	59.4
9	R2	All MCs	12	5.0	12	5.0	0.117	7.5	LOS A	0.1	0.9	0.07	0.09	0.07	56.4
Approach			212	5.0	212	5.0	0.117	0.6	NA	0.1	0.9	0.07	0.09	0.07	59.2
West: Anne Avenue															
10	L2	All MCs	8	5.0	8	5.0	0.015	7.2	LOS A	0.1	0.4	0.46	0.64	0.46	51.1
12	R2	All MCs	4	5.0	4	5.0	0.015	8.8	LOS A	0.1	0.4	0.46	0.64	0.46	50.8
Approach			13	5.0	13	5.0	0.015	7.7	LOS A	0.1	0.4	0.46	0.64	0.46	51.0
All Vehicles			666	5.0	666	5.0	0.235	0.6	NA	0.1	0.9	0.03	0.06	0.03	59.2

Background PM peak hour (without proposal)

MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Traffic PM (Site Folder: Old Burleigh Road / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Burleigh Road / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Burleigh Road															
1	L2	All MCs	7	5.0	7	5.0	0.206	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
2	T1	All MCs	381	5.0	381	5.0	0.206	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			388	5.0	388	5.0	0.206	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Old Burleigh Road															
8	T1	All MCs	259	5.0	259	5.0	0.146	0.1	LOS A	0.1	0.7	0.05	0.06	0.05	59.6
9	R2	All MCs	11	5.0	11	5.0	0.146	7.2	LOS A	0.1	0.7	0.05	0.06	0.05	56.5
Approach			269	5.0	269	5.0	0.146	0.4	NA	0.1	0.7	0.05	0.06	0.05	59.5
West: Anne Avenue															
10	L2	All MCs	8	5.0	8	5.0	0.016	7.0	LOS A	0.1	0.4	0.45	0.63	0.45	51.1
12	R2	All MCs	5	5.0	5	5.0	0.016	8.9	LOS A	0.1	0.4	0.45	0.63	0.45	50.8
Approach			14	5.0	14	5.0	0.016	7.7	LOS A	0.1	0.4	0.45	0.63	0.45	51.0
All Vehicles			672	5.0	672	5.0	0.206	0.4	NA	0.1	0.7	0.03	0.04	0.03	59.4

Design (background plus proposal) AM peak hour (with proposal)

MOVEMENT SUMMARY

Site: 101 [Design Peak Traffic AM (Site Folder: Old Burleigh Road / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Burleigh Road / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Burleigh Road															
1	L2	All MCs	24	5.0	24	5.0	0.235	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	56.9
2	T1	All MCs	418	5.0	418	5.0	0.235	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach			442	5.0	442	5.0	0.235	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.4
North: Old Burleigh Road															
8	T1	All MCs	200	5.0	200	5.0	0.117	0.2	LOS A	0.1	0.9	0.07	0.09	0.07	59.4
9	R2	All MCs	12	5.0	12	5.0	0.117	7.5	LOS A	0.1	0.9	0.07	0.09	0.07	56.4
Approach			212	5.0	212	5.0	0.117	0.6	NA	0.1	0.9	0.07	0.09	0.07	59.2
West: Anne Avenue															
10	L2	All MCs	11	5.0	11	5.0	0.018	7.2	LOS A	0.1	0.5	0.46	0.64	0.46	51.1
12	R2	All MCs	5	5.0	5	5.0	0.018	8.9	LOS A	0.1	0.5	0.46	0.64	0.46	50.8
Approach			16	5.0	16	5.0	0.018	7.8	LOS A	0.1	0.5	0.46	0.64	0.46	51.0
All Vehicles			669	5.0	669	5.0	0.235	0.6	NA	0.1	0.9	0.03	0.06	0.03	59.1

Design (background plus proposal) PM peak hour (with proposal)

MOVEMENT SUMMARY

Site: 101 [Design Peak Traffic PM (Site Folder: Old Burleigh Road / Anne Avenue)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Burleigh Road / Anne Avenue
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Old Burleigh Road															
1	L2	All MCs	8	5.0	8	5.0	0.206	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.0
2	T1	All MCs	381	5.0	381	5.0	0.206	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			389	5.0	389	5.0	0.206	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Old Burleigh Road															
8	T1	All MCs	259	5.0	259	5.0	0.147	0.1	LOS A	0.1	0.8	0.05	0.06	0.05	59.5
9	R2	All MCs	12	5.0	12	5.0	0.147	7.2	LOS A	0.1	0.8	0.05	0.06	0.05	56.5
Approach			271	5.0	271	5.0	0.147	0.4	NA	0.1	0.8	0.05	0.06	0.05	59.4
West: Anne Avenue															
10	L2	All MCs	9	5.0	9	5.0	0.017	7.0	LOS A	0.1	0.4	0.45	0.63	0.45	51.1
12	R2	All MCs	5	5.0	5	5.0	0.017	8.9	LOS A	0.1	0.4	0.45	0.63	0.45	50.9
Approach			15	5.0	15	5.0	0.017	7.7	LOS A	0.1	0.4	0.45	0.63	0.45	51.0
All Vehicles			675	5.0	675	5.0	0.206	0.4	NA	0.1	0.8	0.03	0.05	0.03	59.4

APPENDIX C – RESPONSE TO TRANSPORT CODE

City Plan code template

9.4.13.1	This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.
9.4.13.2	**Please note:**
9.4.13.3	For assessment against the overall outcomes, refer to the appropriate code.
9.4.13.4	Impact assessable development requires assessment against the strategic framework prior to using this template.

9.4.13 Transport code

9.4.13.1 Application

This code applies to assessing a material change of use for all development, except where:

(a) the development is listed as self-assessment; and

(b) establishing in an existing lawful non-residential premises; and

(c) involving:

  (i) no building work (other than an internal fit-out); or

  (ii) only minor building work; and

(d) the development results in no loss of car parking spaces.

When using this code, reference should be made to section 5.3.2 and, where applicable, section 5.3.3, in Part 5.

9.4.13.5 Purpose

(1) The purpose of the Transport code is to ensure transport needs associated with the development of land are met.

(2) The purpose of the code will be achieved through the following overall outcomes:

  (a) Development –

(i) ensures that onsite access and parking, manoeuvring and servicing areas are designed to result in a pedestrian focussed environment and promote a high quality public realm.

(b) To provide an integrated transport system that –

(ii) is convenient, efficient and flexible, being able to accommodate major events and provide a high level of connectivity between all activity centres, urban neighbourhoods, mixed use and industrial areas, inclusive of all modes, including active transport networks;

(iii) supports well designed urban development, which is concentrated within activity centres and urban neighbourhoods, that is easy to access via frequent public transport, walking and cycling, thereby reducing the need to travel by car;

(iv) supports community and privately operated transport services as viable alternatives to the private car;

(v) reduces congestion and car dependency and significantly increases levels of walking, cycling and public transport use; and

(vi) ensures existing and future transport corridors are protected.

(c) To provide active transport networks that –

(vii) are direct, safe, pleasant and comfortable to make walking and cycling an attractive alternative to the car;

(viii) ensure development within centres and urban neighbourhoods, including the light rail corridor have access to high quality active transport infrastructure including paths, bicycle parking and end of trip facilities;

(ix) are directly connected to local attractions and services;

(x) are clear and easily accessed; and

(xi) ensure the active transport infrastructure are completed in the early stages of development.

(d) To provide public transport networks that –

(xii) are of a standard and quality to provide an attractive alternative to the car;

(xiii) ensure district and regional level community uses are within walking distance of public transport facilities; and

(xiv) are clear and easily accessed.

(e) To provide road network that:

(xv) is developed and managed efficiently and meets the city's needs for the movement of people and goods, and can be safely shared by all users;

(xvi) ensures development impacts on amenity caused by traffic is consistent with the community's reasonable expectations for the intended use develops local road networks that are permeable and legible to facilitate a high level of connectivity, are safe and are shared with active and public transport.

(xvii) ensures developments are designed for safe and efficient waste collection, carried out with minimal disruption or impact to the road network; and

(xviii) Development within the Coomera Town Centre area provides an integrated network of predominantly public streets to ensure efficient movement of pedestrians, cyclists, vehicles and strong public transport connections in accordance with **strategic framework map 8**.

(f) Major freight corridors and haulage routes:

(xix) are protected from incompatible uses and ensure their safe and efficient operation.

(g) Navigable waterways:

(xx) support active and public transport facilities in waterfront locations for public water transport and enhance access to the city's waterways.

9.4.13.6 Criteria for assessment

Table 9.4.13-2: Transport code – for assessable development

Performance outcomes	Acceptable outcomes		Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
Car parking				
PO1 Development provides off-street car parking to accommodate for the parking demand. OR Where located in the Centre zone or the Southport Priority Development Area at rates that: (a) reduce congestion and car dependency; (b) maximise the efficiency of car parking provided; and (c) encourage alternative transport options such as walking, cycling and the use of public transport.	**AO1** Off- street car parking spaces are provided in accordance with the identified relevant table as follows:		**THE PROPOSAL MEETS THE AO – THE PROPOSAL PROVIDES A TOTAL OF 106 CAR PARKING SPACES, INCLUDING 6 SPACES FOR VISITORS.**	
	Location	**Off-street car parking rate**		
	All zones except: (a) Centre zone; (b) High density residential zone (where located in the Transport hub area in **Figure 9.4.13-1**); or (c) Special purposes zone – Special development	**Table 9.4.13-3**		

Performance outcomes	Acceptable outcomes		Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	area precinct – Southport Priority Development Area			
	Centre zone and High density residential zone where nominated in the Transport hub area in **Figure 9.4.13-1**	**Table 9.4.13-4**		
	Centre zone not nominated in the Transport hub area in **Figure 9.4.13-1**	**Table 9.4.13-5**		
	Special purposes zone – Special development area precinct – Southport Priority Development Area	**Table 9.4.13-6**		
	Note: Where off-street car parking cannot be reasonably provided, Council may consider improvements to active and public transport to offset the shortfall in car parking spaces.			
PO2 Development ensures that access to car parking spaces is provided for employees and bona fide visitors.	**AO2** Car parking spaces for employees and visitors does not have gateways, doors or similar devices which restrict vehicular access.		**THE PROPOSAL MEETS THE AO**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
PO3 Extensions to development are provided with additional car parking spaces to meet the increased parking demand. **Note: Additional car parking spaces are not required where it can be demonstrated that the existing parking on-site was in excess of the City Plan requirements at the time of approval or the applicable parking rates currently in effect or results in the loss of existing pedestrian and cycling facilities.**	**AO3** Extensions to development provide additional car parking spaces based on the increased GFA.	**N/A**	
Travel demand measures			
PO4 Development provides alternative modes of travel to reduce dependency on private vehicle usage.	**AO4.1** Development that is identified in the Transport hub area in **Figure 9.4.13-1: Transport hub area** has the option to apply travel demand measures in accordance with **Table 9.4.13-7: Travel demand measures**.	**N/A**	
	AO4.2 Development has the option to apply the car sharing travel demand measure in accordance with **Table 9.4.13-7: Travel demand measures**, where: : (a) located in the Centre zone and not identified in the Transport hub area in **Figure 9.4.13-1: Transport hub area**; or	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	(b) located in any another zone (except the Centre zone)		
Servicing			
PO5 Development accommodates for the required design service vehicle, including waste collection vehicles to service the development.	**AO5** Development is designed to cater for the largest service vehicle in accordance with **Table 9.4.13-9: Minimum class of service vehicle**.	**THE PROPOSAL MEETS THE AO – PROVISION FOR MRV TO STAND ON THE DRIVEWAY HAS BEEN PROVIDED.**	
PO6 Development is designed to ensure: (a) that areas are provided for loading and unloading of service vehicles; (b) that loading operations are contained wholly within the site; and (c) that pathways from service areas to tenancies are an appropriate width to allow for pallets and trolleys to manoeuvre without conflicting with doors, gates or landscaping.	**AO6.1** Development is designed to provide for the design service vehicle in accordance with **Table 9.4.13-8: Service vehicle requirements**.	**THE PROPOSAL MEETS THE AO**	
	AO6.2 Service areas are designed in accordance with *AS2890.2*.	**THE PROPOSAL MEETS THE AO**	
PO7 Development ensures that service vehicle routes to and from the development minimise impacts on residential safety and amenity.	**AO7** Development ensures that service vehicles use the shortest and most direct route to and from the major road network as identified on the **Functional road hierarchy network as shown on the Zone map** without impacting	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	upon residential amenity and safety of surrounding local area.		
Public transport network			
PO8 Development that attracts a high proportion of people using high frequency public transport incorporates on-site provision for integration with the public transport network. This includes appropriate pedestrian and cyclist linkages which are safe, attractive and convenient to use and connected with adjoining uses, public areas and the functional road hierarchy.	**AO8** Development provides for the integration of an off-road public passenger transport facility for the following land uses: (a) Air services; (d) Educational establishment (new and existing); (e) Hospital; (f) Major sport, recreation and entertainment facility; (g) Shop (2,000m² or greater); and (h) Tourist attraction.	**N/A**	
PO9 Development that attracts a reasonable proportion of people utilising public transport and is located within 400m walking distance of an existing or future: (i) bus stop on a high frequency public transport route; (j) light rail station; and (k) heavy rail station;	**AO9** Development that is located within 400m walking distance of a public passenger transport facility provide footpaths and crossing points to access the facility safely.	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
(l) provides appropriate pedestrian and cyclist linkages, including crossing points, which are safe, attractive and convenient to use and connect with public transport infrastructure.			
Active transport network			
PO10 Development ensures that adequate off-street bicycle parking and end-of-trip facilities are provided to encourage use and meet the needs and volumes of predicted pedestrian and cyclist users.	**AO10.1** Development provides off-street bicycle parking and end-of-trip facilities in accordance with **Table 9.4.13-10: Bicycle parking rates** and **Table 9.4.13-11: End-of-trip facilities for active travel users**. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**	**THE PROPOSAL MEETS AUSTROADS RECOMMENDATIONS.**	
	AO10.2 Development locates end-of-trip facilities within the site in close proximity to areas of bicycle parking and entrances to the site and/or building.	**N/A**	
	AO10.3 Signage for end-of-trip facilities and bicycle parking areas is provided within the site at: (a) ground level, external to buildings, identifying the location of bicycle parking areas; and	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	(b) at bicycle parking areas, indicating the location of end-of-trip facilities.		
PO11 Development ensures that access for pedestrians and cyclists from the street frontage and from any car parking or set down area to the main entry of the building is designed to provide safe movement. It should be convenient and clearly identifiable and avoid conflict with vehicle movements.	**AO11.1** Development with 20 dwellings or less and have a single road frontage, provides a footpath, separated from the extension of the access driveway, from the property boundary for a distance equivalent to the zone front setback.	**N/A**	
	AO11.2 Development with 20 dwellings or less and have more than 1 road frontage, provides a pedestrian and cyclist pathway from the primary road frontage that is separated from vehicle movements for a distance equivalent to the zone front setback.	**N/A**	
	AO11.3 Development with 21 dwellings or more provides for at least 1 continuous pedestrian and cyclist pathway from each road frontage that is separated from vehicle movements.	**THE PROPOSAL MEETS THE AO**	
	AO11.4 Pathways are to be designed and constructed in accordance with *AS1428.1*.	**THE PROPOSAL MEETS THE AO**	
	AO11.5 Where a non-residential land use is to occupy an established residential premises, there is no requirement to provide for a pathway from any road frontage.	**N/A**	
PO12	**AO12**	**THE PROPOSAL MEETS THE AO**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? **If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome**	Internal use
Development ensures that off-street bicycle parking areas are designed to be: (a) located outside pedestrian movements paths and be visible from the street (casual surveillance); (m) easily accessible from the road; (n) arranged so that parking and unparking manoeuvres in a car park do not damage adjacent bicycles; (o) close as practical to the cyclists ultimate destination; (p) well lit by appropriate lighting; and (q) protected from the weather.	Development provides bicycle parking within the site that is designed, constructed and maintained in accordance with the *Cycling Aspects of Austroads* and *AS2890.3* and the following: (b) employee and residential bicycle parking is provided to a User Class 2 classification accessed by users with a key or security device; (r) visitor (residential and non-residential) is provided to a User Class 3 classification, positioned at ground level in a visible line of sight to the developments main entry; and (s) ramps and pathways be provided as direct as possible from the roadway and/or pathways to the bicycle parking facilities.		
PO13 Development ensures that access for pedestrians and cyclists to and from the site is designed to be direct, safe, pleasant and comfortable environments that connect people with places of local interest, services, public transport facilities and neighbourhoods.	**AO13** Development provides for a disability access compliant shared path or footpath along the frontage of the site within the road reserve, designed and constructed in accordance with the **Functional road hierarchy network as shown on the Zone map** and **SC6.9 City Plan policy – Land development guidelines**. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or**	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	• **Multiple dwelling (where there are 3 dwellings or less).**		
PO14 Development contributes to the safe and efficient provision and operation of the bicycle network.	**AO14.1** Development that abuts a service road as shown on the **Bicycle network classification map** provides: (c) 2m on-road exclusive bike lane to be constructed along the full frontage of the site – development side only; and (t) on-road exclusive bicycle lanes (full-time; minimum 2.0 metres in width) through any new intersection with the required navigational aids such as (but not limited to) directional signage, route markers, pavement treatments and schematic signage. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less)**	**N/A**	
	AO14.2 Development that abuts a Principal route or District route as shown on the **Bicycle network classification map** provides a 3m off-road shared footpath to be constructed along the full frontage of the site – development side only. **Note: This AO does not apply to the following uses:** • **Dwelling house;**	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	• **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**		
	AO14.3 Development that abuts a Neighbourhood route as shown on **Bicycle network classification map** provides a 2.5m off-road shared footpath to be constructed along the full frontage of the site – development side only. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**	**N/A**	
	AO14.4 Development that abuts a Principal route, District route or Neighbourhood route as shown on **Bicycle network classification map** provides a 2m wide on-road cycle lanes. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**	**N/A**	
	AO14.5	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	Footpaths and on-road cycle lanes are designed and constructed in accordance with **SC6.9 City Plan policy – Land development guidelines**.		
	AO14.6 Development does not remove or compromise existing on-road and off-road bicycle and pedestrian infrastructure and facilities.	**N/A**	
Roads and freight			
PO15 Where new development creates public road, the road is to be constructed to an appropriate standard.	**AO15.1** Development provides public roads that are designed and constructed in accordance with **SC6.9 City Plan policy – Land development guidelines** and *Austroads*.	**N/A**	
	AO15.2 Development provides public roads which prevent the need for traffic calming devices to manage vehicle design speed, deter through traffic and create safe conditions for pedestrians and cyclists.	**N/A**	
PO16 Where development provides for an access easement, the easement: (d) is an adequate width; (u) is constructed to a standard appropriate to the situation; and (v) does not result in unreasonable detriment or	**AO16** No acceptable outcome provided.	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
nuisance to an adjacent premises.			
PO17 Development ensures that corner lots to a public roadway provide a corner truncation to ensure safety, functioning and visibility at the intersection.	**AO17.1** Development provides for a corner truncation, if not already provided, at each corner of a site to a public roadway.	**N/A**	
	AO17.2 Land required to provide a corner truncation made by three equal chords of a 6m radius (8m where in an Industrial estate) on the corner of the site to a public roadway must be dedicated to Council as road reserve.	**N/A**	
	AO17.3 At roundabouts and intersections, the truncation must be enlarged to maintain verge widths and sight line requirements.	**N/A**	
	AO17.4 In brownfield areas, the truncation must not reduce the size of the existing verge area.	**N/A**	
	AO17.5 At the entry/exit to a laneway, the truncation is an area made by one chord of a 2m radius.	**N/A**	
PO18 Development that provides a new intersection is designed to ensure: (e) safety and does not compromise the efficiency, function, convenience of use or capacity of the road network;	**AO18.1** Development that creates a new intersection within a public roadway ensures that the intersection is designed and constructed in accordance with *Austroads* and **SC6.9 City Plan policy – Land development guidelines**.	**N/A**	
	AO18.2	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
(w) verge areas that provide sufficient area for safe pedestrian and cycling movement; and (x) sufficient area to provide essential services and infrastructure, including traffic management.	In brownfield areas, verge areas are not to be reduced but may be widened to accommodate essential services and infrastructure, including bicycle and pedestrian pathways and public transport infrastructure.		
Ingress and egress			
PO19 Development ensures that all vehicles ingress and egress the site in a forward gear.	**AO19** Development is designed so that all vehicle classes enter and exit the site in a forward gear, unless otherwise stated in **Table 9.4.13-8: Service vehicle requirements.** **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**	**THE PROPOSAL MEETS THE AO**	
Integrated transport and land use			
PO20 Development is: (f) appropriately located to reduce the need to travel by car and is accessible by public transport, walking and cycling; and (y) designed to reduce impacts on the amenity, safety and operation of the road	**AO20** A Traffic Impact Assessment is prepared and submitted to Council in the following instances: (g) when the development is identified as "any other use not listed in this table" or "any other undefined use" in **Part 5 – Tables of assessment;** (z) when the development is freight dependent;	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
network through appropriate measures to ensure that the function and capacity of the road network is not compromised.	(aa) when vehicle access will be required to a road identified on the **Function road hierarchy map;** (bb) when vehicle access will be required to a service road as identified on the **Pacific motorway service road types overlay map**; (cc) when vehicle access will be required within 100m of a signalised intersection; (dd) when vehicle access will be required within 50m of a roundabout; or (ee) when a new intersection is proposed.		
PO21 Development is not located in areas that compromises future transport corridors, including roads, public transport and active transport.	**AO21** Land shown on **the zone maps** for the purposes of existing or future road network infrastructure, is to be dedicated to Council as public road.	**N/A**	
PO22 Staged development is planned, designed and constructed to ensure that: (h) the construction of active and public transport infrastructure occurs in initial stages of development; and (ff) adequate car parking is provided for each stage to support the function of the development.	**AO22** No acceptable outcome provided.	**N/A**	
PO23	**AO23**	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
Development within the Coomera Town Centre area provides an integrated network of predominantly public streets to ensure efficient movement of pedestrians, cyclists, vehicles and strong public transport connections in accordance with **strategic framework map 8**.	No acceptable outcome provided.		
General			
PO24 New development must ensure that continuous circulation aisles must be provided linking all driveways and intersections to provide access to car parking modules and service areas, and avoid the use of the road network when accessing different vehicular areas of the development.	**AO24.1** All car parking modules and service areas are accessed by circulation aisles.	**THE PROPOSAL MEETS THE AO**	
	AO24.2 Circulation aisles are not disconnected by car parking modules or service areas.	**THE PROPOSAL MEETS THE AO**	
	AO24.3 All access driveways are linked by circulation aisles free from parking manoeuvres.	**THE PROPOSAL MEETS THE AO**	
	AO24.4 All vehicles can circulate throughout the new development in a forward gear without performing reverse manoeuvres.	**THE PROPOSAL MEETS THE AO**	
PO25 Off street car parking areas are designed to: (a) provide a legible and efficient internal layout; (gg) ensure the safety and security of users;	**AO25.1** Off street car parking is designed, constructed, line marked and maintained in accordance with *AS2890.1*, *AS2890.2*. *AS2890.6* and *AS1428.1*.	**THE PROPOSAL MEETS THE AO**	
	AO25.2 The entry/exit to a driveway, internal to the property boundary of the development, is	**THE PROPOSAL MEETS THE AO**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
(hh) clearly distinguishable from pedestrian paths and entry points; (ii) be easily negotiated by vehicles and pedestrians including persons with a disability; (jj) ensure that there is no disruptions to or queues onto the public road network; (kk) provide sight distances from driveways to ensure visibility between vehicles on the driveway and pedestrians on the verge; and (ll) be marked and maintained to the current relevant standard.	separated by a central island containing an intercom or similar electronic access device. The intercom (or similar device) is to be setback 4m from the property boundary. OR The intercom: (b) is positioned on the right hand side of the access driveway against a wall; and (mm) setback 4m from the property boundary, internal to the development. **Note: The intercom system is only required where visitor car parking is provided behind a security gate.**		
	AO25.3 Development does not provide pavement humps or raised platforms in queuing areas.	THE PROPOSAL MEETS THE AO	
	AO25.4 Development is designed so that vehicles do not reverse across marked pedestrian crossings.	**THE PROPOSAL MEETS THE AO**	
PO26 Car parking spaces do not restrict any other space unless it is in a tandem arrangement where no inconvenience arises from its use.	**AO26.1** Tandem car parking (2 car spaces parked nose to tail) are counted as 1 space, except in the following cases: (i) the spaces are designated and signed for residential purposes of the same dwelling; or (nn) the spaces are designed and signed for the occupants of the site, in a single tenancy; or (oo) the off-street car parking is to be operated as a privately operated public car park	**N/A**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	with on-site management whereby the off-street tandem car parking spaces may be counted as no greater than 1.5 spaces.		
	AO26.2 The minimum length of a tandem car space is 10.4m.	**N/A**	
	AO26.3 The minimum length of a tandem garage is 11m.	**N/A**	
PO27 Development ensures that where provision is made for a porte cochere, it is designed to enable vertical clearance, manoeuvring, access and queuing of vehicles. The capacity of the porte cochere must accommodated vehicles entirely within the site, including the queuing of vehicles.	**AO27** The porte cochere is to be a minimum of 4.5m in height.	**N/A**	

APPENDIX D –RESPONSE TO DRIVEWAYS AND VEHICULAR CROSSINGS CODE

City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

Please note:

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

9.4.2 Driveways and vehicular crossings code

9.4.2.1 Application

This code applies to assessing operational work for vehicle crossing works and material change of use for any development involving vehicle access or driveway works where indicated within **Part 5 Tables of assessment**.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3,** in **Part 5**.

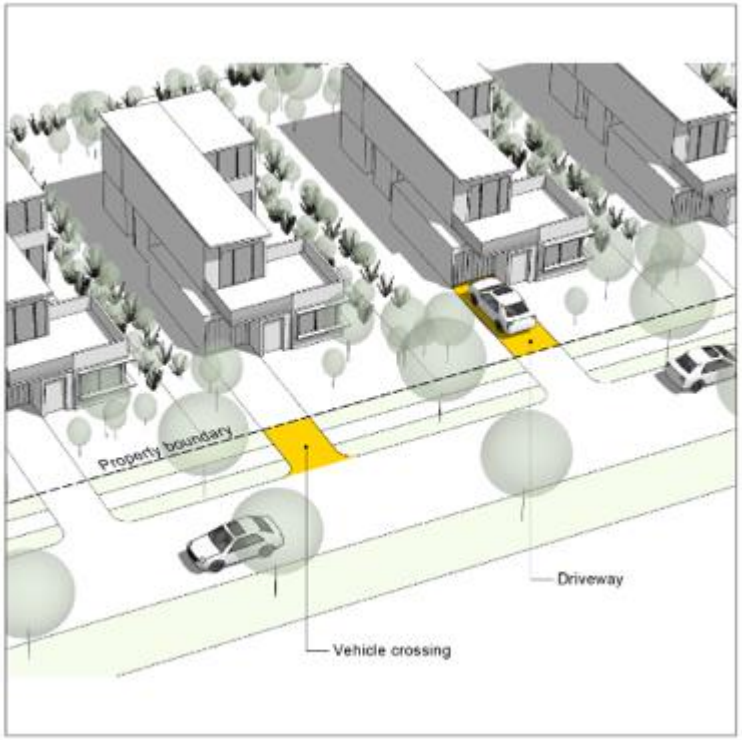


Figure 9.4.2-1
Illustration showing driveway and vehicle crossing for access to parking spaces

9.4.2.2 Purpose

(1) The purpose of the Driveways and vehicular crossings code is to provide design standards for the construction, repair or modification to a driveway and/or a vehicular crossing and to ensure that the decisions are compatible.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Vehicular crossings provide safe access from the edge of the road carriageway to the property boundary.

(b) Vehicular crossings are located and constructed to avoid adverse impacts on City or utility infrastructure.

(c) Vehicular crossings are constructed to a standard that is consistent with a standard vehicle.

(d) Vehicular crossings are designed to ensure that there is minimal loss of on-street car parking spaces.

(e) Driveways provide safe access from the property boundary to the on-site vehicle accommodation or standing area.

(f) Driveways are located to ensure damage to existing street trees located within the verge is avoided.

(g) Driveways are located to retain space for the future planting of street trees.

(h) The construction, location and design of vehicular crossings and driveways prevent interference with the safe movement of vehicles or the safe use of the footpath to maintain the amenity of the area.

(i) The design and construction of the driveway and vehicular crossing are such that vertical and horizontal alignments provide a continuous, smooth access of good rideability and clearance for vehicles and driveway and vehicular crossing do not cause adverse stormwater drainage impacts.

9.4.2.3 Specific benchmarks for assessment

Table 9.4.2-3: Driveways and vehicular crossings code – assessable development for driveways

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
Location			
PO1 The location of the driveway is considered at the design stage of the development to ensure it does not unnecessarily damage street trees and	**AO1** The design of the driveway: (a) does not cause damage to street trees in the verge; and	**THE PROPOSAL MEETS THE AO**	

<table>
<tr><th>Performance outcomes</th><th>Acceptable outcomes</th><th>Does the proposal meet the acceptable outcome?
If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome</th><th>Internal use</th></tr>
<tr><td>allows space for the planting of street trees within the verge.</td><td>(b) retains space for the planting of street trees within the verge.</td><td></td><td></td></tr>
<tr><td colspan="4">Design</td></tr>
<tr><td rowspan="4">PO2
The driveway is designed and constructed to ensure:
(a) safe access for a B85 vehicle (AS2890) from the property boundary to the on-site vehicle accommodation or standing area;
(b) it does not cause adverse stormwater drainage impacts on or off the site; and
(c) safe pedestrian movement in the proximity of the site.</td><td>AO2
The driveway is designed in accordance with the following design standards:</td><td>THE PROPOSAL MEETS THE AO</td><td></td></tr>
<tr><td>Land use</td><td>Design standard</td><td></td><td></td></tr>
<tr><td>• Dual occupancy
• Dwelling house
• Multiple dwellings (where the development is for townhouses)</td><td>Queensland Development Code – NMP 1.1 - Driveways</td><td></td><td></td></tr>
<tr><td>All other land uses</td><td>AS/NZS 2890.1:2004 – Parking facilities – Part 1: Off-street car parking</td><td></td><td></td></tr>
<tr><td></td><td>OR
Where particularly restrictive physical conditions exist and the above standard arrangements are not attainable, the design and construction of the proposed driveway is certified by a RPEQ having regard to the following:
(a) Disability Discrimination Act 1992;
(b) AS 2890.1;
(c) QUDM; and
(d) Good engineering practice.</td><td></td><td></td></tr>
</table>

Table 9.4.2-4: Driveways and vehicular crossings code – assessable development for vehicular crossings

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
Construction of vehicular crossings			
PO1 The vehicle crossing is designed and constructed to ensure: (a) safe access for a B85 vehicle (*AS2890*) from the road carriageway to the property boundary; (b) it does not cause adverse stormwater drainage impacts on or off the site; and (c) safe pedestrian movement in the proximity of the site.	**AO1** Prior to the use commencing a vehicular crossing is constructed to provide access from the road to the property. Either: (a) The vehicular crossing is designed and constructed in accordance with the relevant vehicular crossing standards drawing in **SC6.9 City Plan policy – Land development guidelines**; or (b) where particularly restrictive physical conditions exist and the above standard arrangements are not attainable, the design and construction of the proposed vehicular crossing is certified by a RPEQ having regard to the following: (i) *Disability Discrimination Act 1992*; (ii) *AS 2890.1*; (iii) *QUDM*; and (iv) Good engineering practice.	**WILL COMPLY**	
PO2 Location and construction of the vehicular crossing avoids damage to utility services, pathways, kerbs, road pavement and seal and other municipal infrastructure.	**AO2** The vehicular crossing is designed and constructed in accordance with the relevant vehicular crossing standards in **SC6.9 City Plan policy – Land development guidelines.**	**THE PROPOSAL MEETS THE AO**	

<table>
<tr><th>Performance outcomes</th><th>Acceptable outcomes</th><th>Does the proposal meet the acceptable outcome?
If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome</th><th>Internal use</th></tr>
<tr><td colspan="4">Maximum number of vehicular crossings per site</td></tr>
<tr><td>PO3
The number of vehicular crossings per site are minimised to avoid the loss of on-street car parking spaces and to prevent adverse interference with:
(a) the safety, capacity and operations of the existing or planned road network;
(b) the proposed driveway; and
(c) cycleways or pedestrian footpaths.</td><td>AO3
The maximum number of vehicular crossings per site, for the following land uses, is as follows:<table><tr><th>Land use</th><th>Maximum number of vehicular crossings per site</th></tr><tr><td>Dwelling house</td><td>1
OR
2 - when the road frontage at the kerb is at least 40m</td></tr><tr><td>Dual occupancy
Multiple dwelling</td><td>1
OR
2 - where the road frontage at the kerb is greater than 20m</td></tr><tr><td>Non–residential use</td><td>2</td></tr></table></td><td>THE PROPOSAL MEETS THE AO</td><td></td></tr>
<tr><td colspan="4">Separation distances</td></tr>
<tr><td>PO4
Vehicular crossings are appropriately separated from other vehicular crossings and side property boundaries to prevent interference with:
(a) the safety, capacity and operations of the existing or planned road network;
(b) adjoining properties; and</td><td>AO4
Vehicular crossings are separated from:<table><tr><th>Instance</th><th>Minimum distance (m)</th></tr><tr><td>Any other vehicular crossing</td><td>3m</td></tr><tr><td>Any side property boundary:
• for residential development</td><td>1.5m</td></tr></table></td><td>THE PROPOSAL MEETS THE AO</td><td></td></tr>
</table>

Performance outcomes	Acceptable outcomes		Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
(c) cycleways or pedestrian footpaths.	**of 2 dwellings or less**			
	• All other development	2m		
Location				
PO5 Vehicle access to a public roadway is safe and does not compromise the efficiency, function, convenience of use or capacity of the road network.	**AO5.1** The location of the vehicular crossing to a public roadway is consistent with *AS2890.1* and *AS2890.2*.		**THE PROPOSAL MEETS THE AO**	
	AO5.2 No new vehicular crossings are created on roads identified on the **Functional Road Hierarchy** as shown on the Zone maps or **the Pacific motorway service road types overlap map.**		**THE PROPOSAL MEETS THE AO**	
PO6 Vehicular crossings are located to: (a) avoid damage to existing street trees located within the verge; and (b) retain space for the future planting of street trees within the verge.	**AO6** No acceptable outcome provided.		**THE PROPOSAL MEETS THE AO**	
Sight distances and lines				
PO7 Vehicular crossings are designed to prevent conflict between vehicles with cyclists and pedestrians.	**AO7.1** Safe sight distances are provided, based on the vehicle speed at the vehicular crossing. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;**		**THE PROPOSAL MEETS THE AO**	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets either the performance outcome or overall outcome	Internal use
	• **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**		
	AO7.2 Vehicular crossings are designed to provide safe sight lines for vehicles exiting the vehicular crossing in accordance with *AS2890.2*. Where no service vehicle is required to access the site, including waste collection, the requirements for sight lines at the vehicular crossing are in accordance with *AS2890.1*. **Note: This AO does not apply to the following uses:** • **Dwelling house;** • **Secondary dwelling;** • **Dual occupancy; or** • **Multiple dwelling (where there are 3 dwellings or less).**	**THE PROPOSAL MEETS THE AO**	

ATTACHMENT 6

Engineering Services Report prepared by Arcadis



UPS
URBAN PLANNING SERVICES

ENGINEERING SERVICES REPORT

19-21 ANNE AVENUE, BROADBEACH

MARY ANNE DEVELOPMENTS



IMPROVING QUALITY OF **LIFE**

19-21 ANNE AVENUE, BROADBEACH

ENGINEERING SERVICES REPORT

Author	Ben Wieser
Checker	Ashley Shepherd
Approver	James Stockwell RPEQ20152



Project No	30265222
Report No	GA0001
Revision	01
Date	18/02/2025

This report has been prepared for Mary Anne Developments in accordance with the terms and conditions of appointment. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description
01	18/02/2025	Issue for Approval

Should you require any further information, please contact our Gold Coast office and ask to speak to the report author denoted above.

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APPENDIX B
Engineering Drawings
APPENDIX C
Before You Dig Maps
APPENDIX D
GCWW Correspondence

1 EXECUTIVE SUMMARY

Mary Anne Developments has commissioned Arcadis to prepare an Engineering Services Report (ESR) for a development application for the site located over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

The proposed development intended for the site involves the construction of a residential apartment building.

This report addresses the municipal engineering services component of the development and the engineering planning issues associated with the development application. This report demonstrates that the proposed development can connect to the local stormwater, potable water and sewerage reticulation systems as well as transport infrastructure. Additionally, Council's objectives for coastal front developments can be achieved.

Drainage

The site will manage stormwater through the use of private infrastructure. Stormwater will be discharged to the existing lawful point of discharge, being Anne Avenue. The Stormwater Management Plan '30265222-GA0002 - SBSMP' prepared by Arcadis should be referred to for further details of the proposed devices used to manage stormwater prior to discharging to the Lawful Point of Discharge (LPOD).

Potable Water

Potable water connection for the proposed development to Gold Coast Water and Waste's (GCWW) water supply network will be provided via the existing DN150 water main within the northern verge of Anne Avenue. The existing site's water meter(s) will be decommissioned, and a new master water meter assembly installed on-site.

Sewerage

Connection for the proposed development to GCWW's wastewater supply network will be provided via connection to the existing DN225 gravity sewer network within Anne Avenue. It is recommended that the existing property connection is further surveyed during detailed design to determine if of suitable condition for reuse, otherwise is to be decommissioned and replaced with a compliant connection. With reference to the below mentioned network assessment. no downstream network modifications are triggered as a sole result of the proposed development.

Network Loading

Calculations based on Equivalent Persons (EP's) illustrate that there is an increase in loading from the Council planned demand for potable water and wastewater services for the site. GCWW has advised that a sewer network capacity assessment is required to support this application, which has been prepared by Arcadis (reference 30265222-GA0003).

Vehicular Access and Roadworks

The existing Vehicular Cross Overs (VXOs) will be decommissioned and new VXOs will be provided from Anne Avenue. Relevelling of lids or relocation of comms / power services may be required to facilitate the VXOs. All pavement and verge areas shall be remediated at completion of works.

Coastal

The site is identified within the City's Coastal Erosion Overlay. City of Gold Coast Coastal Erosion Hazard Overlay Code has been completed which outlines specific requirements the development must adhere to such as but not limited to sand management.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located within Broadbeach, South-East Queensland, Australia over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

The site is bordered by apartment buildings to the north, east and west, and Anne Avenue to the south.

The total area of the site is approximately 1,032m^2.

The City of Gold Coast is the local government authority.

2.2 Land Usage

In its current state, the project site contains a residential apartment building with associated driveways. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

2.3 Topography and Features

The site topography grades towards Anne Avenue, south of the site. The site has a high point of approximately RL 6.32m AHD and a low point of RL 4.80m AHD. Refer to the site survey within Appendix A of this report for further information.

3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a residential apartment building, including:

- Residential apartments.
- Residential amenities.
- Ground level parking.
- 2 levels of podium parking.
- 2 levels of basement parking.

A plan extract of the proposed development has been provided in Figure 3-1.

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

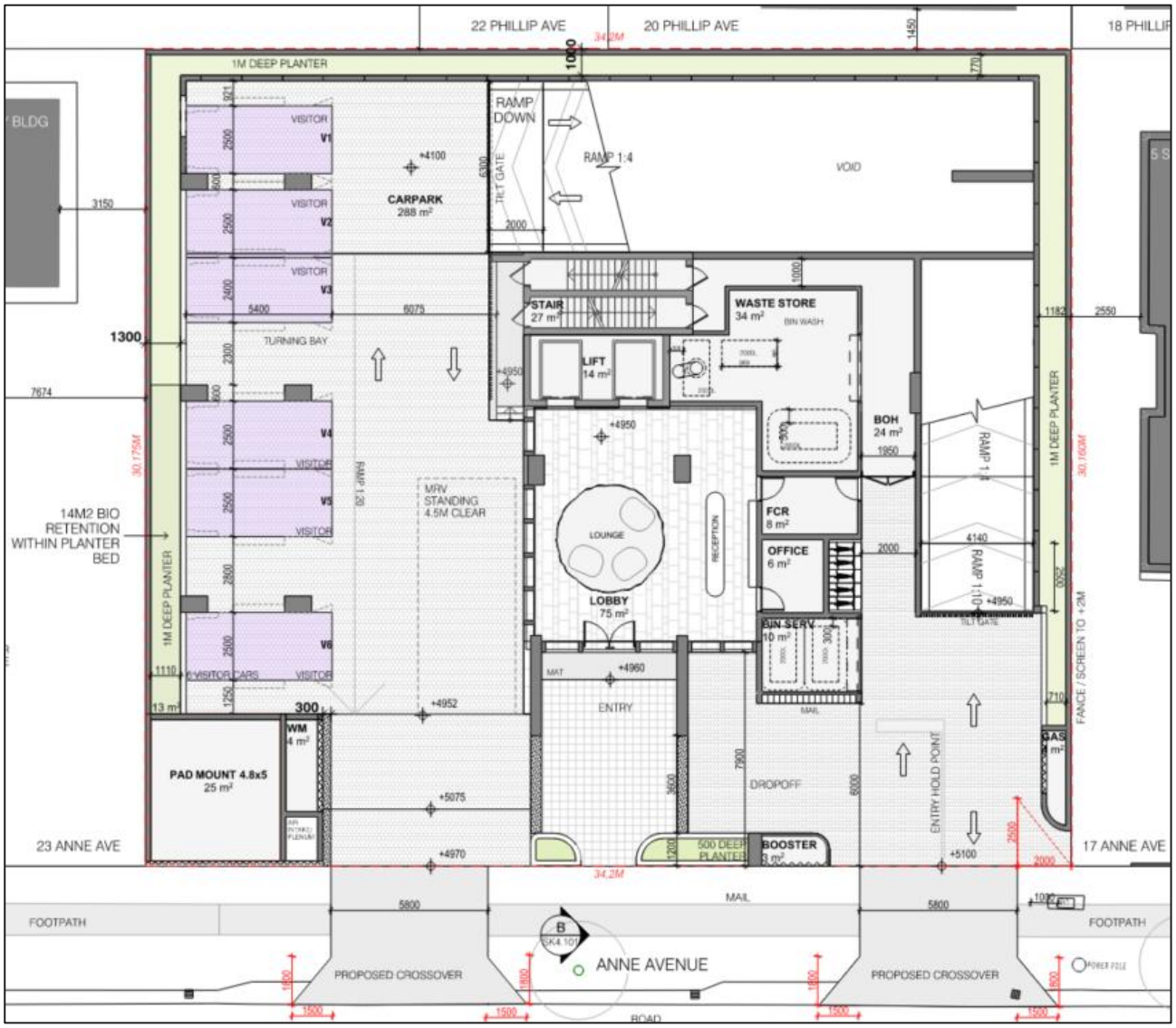


Figure 3-1 Proposed Development Ground Floor

4 INFRASTRUCTURE SERVICES

4.1 Stormwater Drainage

A Site Based Stormwater Management Plan (SBSMP) '30265222-GA0002 - SBSMP' has been prepared separately which addresses the stormwater management planning requirements for the development. The SBSMP should be referred to for a more in-depth analysis of prevailing stormwater constraints and opportunities, however a summary of key engineering requirements is provided herein.

4.1.1 Existing Stormwater Drainage

Stormwater runoff generated by the site is discharged to Anne Avenue via kerb adapters and overland flow. Local runoff in Anne Avenue, including runoff from the subject site, is captured by a gully pit approximately 50m west of the site at the intersection of Anne Avenue and Surf Parade. From the gully pit, runoff is conveyed west via a Council pit and pipe network and ultimately to the Nerang River. The pipe sizes within this network range from DN300 to DN1200.

No significant external catchments are identified to drain through the subject site.

Refer to the site survey provided within Appendix A.

4.1.2 Proposed Stormwater Drainage

The proposed development will manage stormwater via the use of private infrastructure to achieve Council's objectives. The site will maintain its discharge location being Anne Avenue via connection to a new manhole over existing stormwater drainage infrastructure and overland flow.

The SBSMP prepared by Arcadis should be referred to for further details on the exact methodology used to achieve Council objectives.

Refer to Engineering Drawings included in Appendix B for further details.

4.2 Development Network Loadings

The loading of the proposed development's Equivalent Persons (EP) has been estimated in accordance with City of Gold Coast's Water and Sewerage Demand Table. It should be understood that, due to the nature of the development and its location, the EP demand for both wastewater and water supply are calculated in the same manner.

The development has been assessed under two loading cases in order to better determine the anticipated impact it will have on the surrounding network. These cases are the:

- **Planned Demand** – A demand assigned to the site via the City of Gold Coast 2018 City Plan which is derived from GCWW 'Water and Sewerage Demand Table' and the property's net area.
- **Project Development Loading** – The calculated demand for the property based on proposed development yield and conversion rates from GCWW 'Water and Sewerage Demand Table'.

Table 4-1 Planned Demand

Category	Area (ha)	Conversion Rate	Planned Demand (EP)
RD8	0.1032	792EP/ha	81.73

Table 4-2 Projected Development Loading

Category	Quantity	Conversion Rate	Proposed Demand (EP)
Multi-Unit Dwelling 3+ bedroom	56	2.51	140.56
		Total	**140.56**

The proposed demand presents an increase of 58.83 EP compared to the planned demand.

GCWW has advised that a sewer network capacity assessment is required. Refer to Appendix D for further information, and the sewer network capacity assessment (SNCA) prepared by Arcadis (report reference 30265222-GA0003 - SNCA).

4.3 Water Network

4.3.1 Existing Potable Water

The following existing water mains and fittings have been identified adjacent to the development site from both CoGC ArcGIS mapping (online), field survey (Appendix A) and site inspection.

- 1 x DN150 water main within the northern verge of Anne Avenue (adjacent the site).
- 1 x DN100 water main within the southern verge of Anne Avenue.

4.3.2 Planned Potable Water

The overlay within the City Plan for trunk water supply infrastructure indicates that there are no planned upgrades within the immediate vicinity of the site.

4.3.3 Proposed Potable Water

Connection for the proposed development to the GCWW's supply network will be provided via connection to the DN150 main within the northern verge of Anne Avenue.

The fire and potable water meters will be located on site and above ground if larger than or including 50mm in size. Provision for a master meter arrangement, consisting of DN50 potable meter (mechanical) and DN150 fire meter (magflow/ultrasonic) has been made within development plans. A building hydraulic engineer will need to confirm the metering requirements during detailed design and where required adjustments to the master meter spatial allowance. All existing water meters will be decommissioned as part of these works, and a new master meter(s) installed.

Refer to Engineering Drawings included in Appendix B for further details.

4.3.4 Internal Water Network

The developer shall, as part of the building approval works, construct an internal water reticulation service for the proposed development in accordance with the relevant building code requirements.

A water network design will be undertaken by a qualified hydraulic engineer for the proposed development to determine adequate levels of services for all internal firefighting flows and services demands.

A qualified hydraulic engineer shall design the internal fire sprinkler service (if necessary) to cater for the fire services of the proposed development. The site is permitted to draw 15L/s for 2 hours from the municipal network, in accordance with the SEQ DSS Guidelines, unless otherwise approved by GCWW in the development approval or via supporting boundary pressure testing and request documents subsequent to the development approval.

4.4 Sewer Network

4.4.1 Existing Sewer

The following existing sewerage supply infrastructure has been identified adjacent to the development site from both CoGC ArcGIS mapping (online) and field survey (Appendix A).

- 1 x DN225 gravity sewer main within Anne Avenue.
- 1 x DN1050 gravity sewer manhole within Anne Avenue.

4.4.2 Planned Sewer

The overlay within the City Plan for trunk sewerage infrastructure indicates that there are no planned upgrades within the immediate vicinity of the site.

4.4.3 Proposed Sewer

Connection for the proposed development to the GCWW's wastewater network will be provided via connection to the DN225 gravity sewer network within Anne Avenue.

Reuse of an existing sewer connection is recommended to be investigated in detailed design. This is subject to further survey, CCTV, condition assessment, detailed design and Council OPW approval. No survey or online mapping information is available for the existing sewer property connection at the time of this report. Should building codes/standards require a larger sewer pipe diameter than the municipal system fronting the site, a private structure that facilitates a reduction in pipe size will be required on-site.

Should the existing sewer connection be unsuitable for reuse, a new connection is proposed to the DN225 gravity sewer network within Anne Avenue.

All existing property connections that are made redundant by the development will be decommissioned at the boundary.

Refer to Engineering Drawings included in Appendix B for further details.

4.4.4 Internal Sewer Network

The developer shall, as part of the building approval works, construct an internal sewer reticulation service for the proposed development in accordance with the relevant building code requirements.

4.5 Other Services

The following other services have been identified within the vicinity of the site:

- Communications.
- Overhead power.
- Gas.

Refer to Appendix A and Appendix C for further information.

It is recommended that coordination and procurement of relevant approvals is undertaken with the asset owners for any necessary connection and modification works.

5 ROADS AND ACCESS

The proposed development will remove the existing Vehicular Cross Overs (VXOs) and install new VXOs from Anne Avenue. These VXOs will be heavy-duty VXOs in accordance with IPWEA DRG RSD-102.

The proposed VXOs target a minimum 1m clearance to the existing power pole, Telstra pit and lintel of the eastern adjoining stormwater inlet.

Relevelling or upgrading of lids, or relocation of comms / power services may be required to facilitate the standardised verge grading / VXO works.

All new and reinstated footpaths and other verge works must be designed in compliance with Council standards and be approved for Operational Works prior to construction. It is envisaged that verge and footpath reinstatement will need to occur to facilitate civil connections, standard verge grading as well as any electrical works or temporary construction VXOs.

Further details and necessary approvals are to be sought during the Operational Works Phase.

Refer to Engineering Drawings included in Appendix B for further details.

6 COASTAL EROSION

Investigations have identified that the site is within the City of Gold Coast Coastal Erosion Hazard Overlay, shown in Figure 6-1 below. A review has been undertaken of the proposed development site to determine the relationship to relevant CoGC Council requirements for its Coastal Hazard Overlay Code.

Council's coastal overlay code has been completed which outlines specific requirements the development must adhere to such as but not limited to sand management.



Figure 6-1 CoGC Coastal Erosion Hazard Overlay

7 CONCLUSION

This report has concluded that the site can readily connect to the existing engineering services. Future Operational Works and Building Works applications will be sought to permit the works to be undertaken.

Stormwater

- Stormwater will be managed on-site through private infrastructure.
- Stormwater will be discharged to the existing lawful point of discharge being Anne Avenue.

Potable Water

- Potable water connection for the proposed development to Gold Coast Water and Waste's (GCWW) water supply network will be provided via the existing DN150 water main within the northern verge of Anne Avenue.

Sewer

- Proposed connection is via connection to the existing DN225 gravity sewer network within Anne Avenue.
- It is recommended that the existing property connection is further surveyed during detailed design to determine if of suitable condition for reuse, otherwise is to be decommissioned.

Network Loading

- GCWW has confirmed that a sewer network capacity assessment is required, refer to the SNCA prepared by Arcadis.

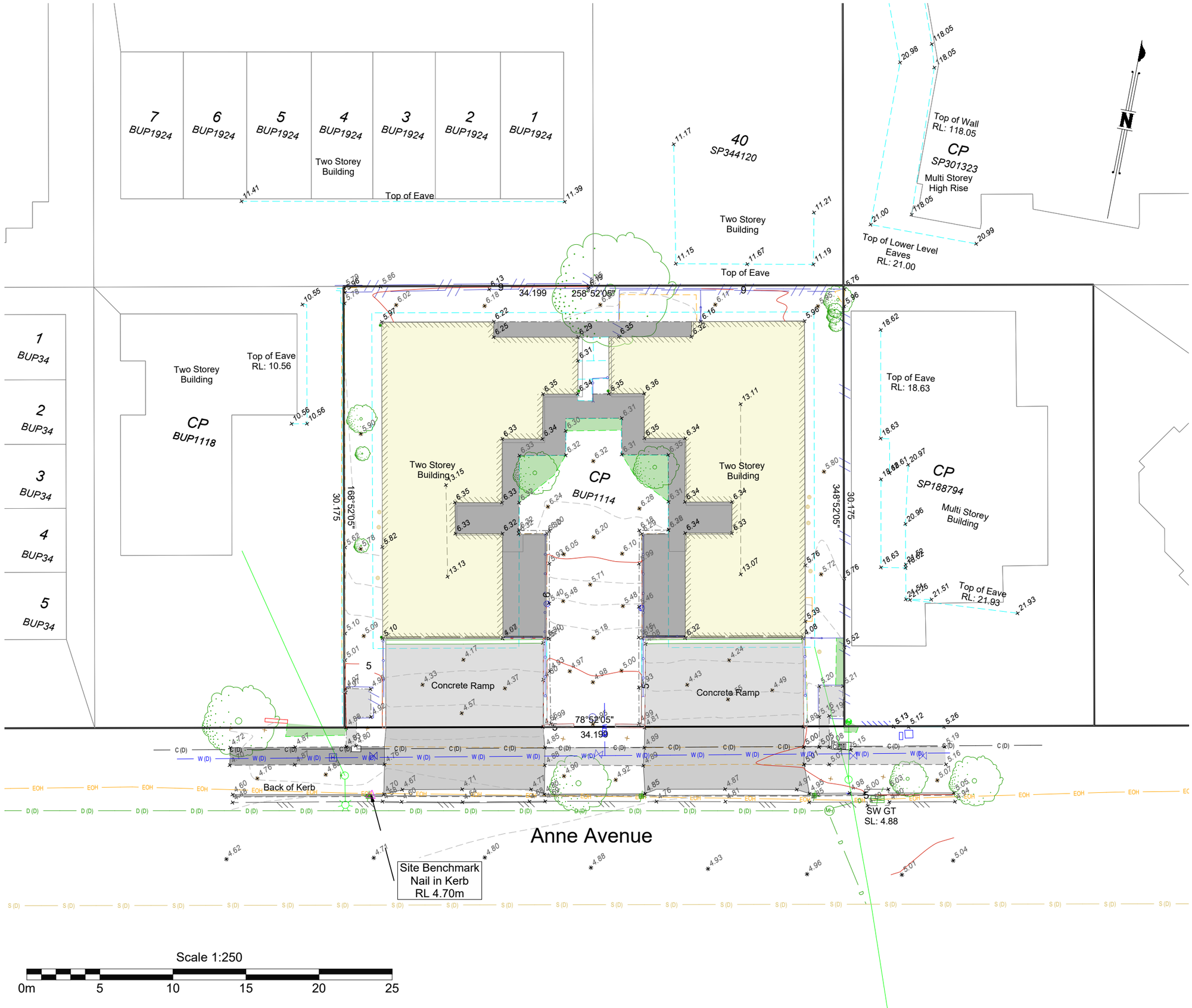
Roads and Footpaths

- New vehicular cross overs will be installed.
- Relevelling or upgrading of lids or relocation of comms / power services may be required to facilitate the VXOs.

Coastal Overlays

- The proposed works demonstrates compliance with Council's coastal erosion overlay code.

APPENDIX A
Survey



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LEGEND:

- Road: Kerb Back, Kerb Invert, Edge of Bitumen, Edge of Gravel, Road Crown, Traffic Park Meter, Traffic Light, Traffic Pit, Traffic Sign, Traffic Post Box
- Structures: Building Line, Roof Ridgeline, Fence Line, Gate, Hand Rail, Cattle Grid, Bollard
- Sewer: Sewer Line, Valve, Inspection Opening, Manhole
- Electrical: Electricity Line, Overhead Line, Pits/Manholes, Pole, Street Light, Light In-Ground
- Water: Water Line, Meter, Valve, Fire Hydrant, Tap, Sprinkler
- Fuel: Fuel Line, Fitting
- Terrain: Driveway, Footpath, Slab Edge, Retaining Wall Base, Retaining Wall Top, Change of Grade, Top of Bank, Toe of Bank, Waterline, Garden Edge, Creek Toe of Bank, Creek Top of Bank, Creek Invert, Creek Waterline, Tree, Tree Canopy, Control Point/PSM
- Drainage: Drainage line, Open Drain, Manhole, Field Inlet, Downpipe
- Communications: Communication Line, Overhead Line, Pits/Manholes, Pillar
- Gas: Gas Line, Valve, Marker
- General: Pothole
- Subsurface Utility - QL: * QL-A (H±50mm,V±50mm), * QL-B (H±300mm,V±500mm), * QL-C (H±300mm,2D), * QL-D (Exist Record)

NOTES:

1. Drawn to scale on an A3 sheet.
2. Contour Interval... 0.25m
3. All levels are in metres on the Australian Height Datum referred to PSM549 - RL 4.398 AHD situated in Surf Pde /Phillip Ave.
4. All Boundaries are vide title and subject to confirmation by survey.
5. The Location of Underground services are in accordance with AS5488:2019, the Australian Standard for classification of Subsurface Utility Information (SUI). The exact nature and location of these services should be confirmed prior to construction.
6. Area vide title :1032 m²
7. Field Survey Completed on: 21/11/2024

Level datum: AHD Derived (PSM549)
Horiz datum: MGA Derived DCDB (B83824)
Coord Origin: DCDB (SE Cnr Lot BUP1114)
GDA System: GDA2020 Coordinate System: Plane 1:1
Meridian: + 10°00'04" B83824

Title:

VERIFICATION PLOT

Detail Survey of 19-21 Anne Ave, Broadbeach CP on BUP1114

Client:	**Bassar Construction Group Pty Ltd**		
Locality:	Broadbeach		
Local Gov:	Council of the City of Gold Coast		
Surveyed By:	KW	Approved:	RC
Date Created:	27/11/24	Scale:	1:250
File Ref:			241836P
Plan No:	**241836_S001_VER**	Rev:	**A**

A3

APPENDIX B
Engineering Drawings

PROPOSED BIO-RETENTION AREA ON GROUND LEVEL. REFER SBSMP PREPARED BY ARCADIS REFERENCE 30265222-GA0002.

PROPOSED DETENTION TANK ON LOWER PODIUM. REFER SBSMP PREPARED BY ARCADIS REFERENCE 30265222-GA0002.

PROVISION FOR VERTICALLY STACKED DN150 FIRE DN100 POTABLE WATER METERS, 600mm CLEAR TO COUNCIL INFRASTRUCTURE.

PRIVATE INTERNAL SERVICES BY FUTURE BUILDING HYDRAULICS.

PROVISIONAL ENERGEX LEAD-IN PIT LOCATION.

EXISTING HYDRANT TO BE RELOCATED (INCLUDING ADDITIONAL HYDRANTS FOR MAXIMUM SPACING) IF REQUIRED BY ELECTRICAL WORKS.

2x NEW VXOS IN ACCORDANCE WITH IPWEA RSD-102.

MIN. 1m CLEARANCE FROM EXISTING INFRASTRUCTURE.

CONNECT TO EXISTING DN150 WATER MAIN.

NEW MANHOLE OVER EXISTING DN375 STORMWATER MAIN - REFER SBSMP FOR FURTHER DETAILS.

DEMOLITION OF EXISTING VXO & RELEVELLING OF PIT LIDS WHERE NECESSARY (RELEVANT AUTHORITY APPROVALS TO BE OBTAINED).

SURVEY TO DETERMINE EXISTING SEWER CONNECTION DIAMETER, DEPTH AND CONDITION INCLUDING CCTV TO INVESTIGATE REUSE. ALTERNATIVELY PROVIDE NEW SEWER CONNECTION TO EXISTING MAIN WITHIN ANNE AVENUE.

REINSTATEMENT OF KERB, CHANNEL AND VERGE (INCLUDING FOOTPATH) WHERE DISTURBED.

PAVEMENT TO BE REINSTATED WHERE DISTURBED BY SITE WORKS.

Two Storey Building

Top of Eave RL: 10.56

Top of Eave RL: 18.63

Multi Storey Building

CP SP188794

Top of Eave RL: 21.93

Eaves RL: 21.00

Anne Avenue

Back of Kerb

Site Bench Mark Nail in Kerb RL 4.70m

SW GT SL: 4.88

LOUNGE

RECEPTION

RECYCLE 2000L

2000L

30.175

34.199

6.5m

1.15m

1.18m

3.4m

1.2m

1.35m

1.97m

NOTES

1. PROPOSED SERVICES SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED FIELD SURVEY, DESIGN AND APPROVAL BY AUTHORITIES.
2. REFER TO PROJECT SURVEY AND OTHER ASSET INFORMATION FOR LOCATION OF EXISTING SERVICES AND ASSUMPTIONS.

LEGEND

- SITE BOUNDARY
- EXISTING SURFACE LEVEL
- EXISTING STORMWATER DRAINAGE
- EXISTING SEWERAGE RETICULATION
- EXISTING SEWER RISING MAIN
- EXISTING WATER RETICULATION
- EXISTING COMMS RETICULATION
- EXISTING ELECTRICAL
- EXISTING OVERHEAD ELECTRICAL
- EXISTING FIBRE OPTIC
- EXISTING GAS
- PROPOSED STORMWATER DRAINAGE
- PROPOSED SEWERAGE RETICULATION
- PROPOSED WATER RETICULATION
- FUTURE PRIVATE STORMWATER
- FUTURE PRIVATE SEWER
- FUTURE PRIVATE WATER
- SERVICE TO BE DECOMMISSIONED
- EASEMENT
- PROPOSED VXO / FOOTPATH
- STORMWATER MANAGEMENT DEVICE REFER SBSMP FOR FURTHER DETAILS
- EDGE OF BASEMENT WALL

Issue	Description	DR	CH	VE	Date
01	ORIGINAL ISSUE	BW	AS	JS	18.02.25

100mm on Original

Scales: 0 1 2 4 6 8 10m — 1 : 100

Architect: BDA ARCHITECTURE

Surveyor: BENNETT + BENNETT

Client: MARY ANNE DEVELOPMENTS

Status: PRELIMINARY — NOT TO BE USED FOR CONSTRUCTION

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Original Issue Signatures

Drawn	B. WIESER	Original Size	A1
Designed	B. WIESER	Height Datum	AHD
Project Manager	J. STOCKWELL	Grid	LOCAL
Verified	J. STOCKWELL		

Project: 19-21 ANNE AVENUE BROADBEACH

Title: ENGINEERING SERVICES LAYOUT PLAN

ARCADIS
Arcadis Australia Pacific Pty Limited
P O Box, 1653
Southport QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5532 3933
Fax No: +61 7 5591 4778
www.arcadis.com

Project No.	Folder Prefix	Zone	Stage	Phase	Discipline	Type	Drawing No.	Issue
30265222	DACAC	AA01	DA	-	CV	DRG	0001	01

APPENDIX C
Before You Dig Maps

Map Symbology

Pipe

- Low pressure
- Medium pressure
- High pressure
- Transmission pressure
- Critical main (behind pipe)
- Proposed (pressure by colour)
- LPG (pressure by colour)
- Abandoned
- Idle/inactive
- Sleeve
- Casing (behind pipe)

Area

- BYDA area of interest

Pipe code and material

C* (for example, C2)	Cast iron
CU	Copper
N2	Nylon
P*	Polyethylene (PE)
P6, P7, P9–P12	Medium density PE
P2, P4, P8	High density PE
S*	Steel
W2	Wrought galv iron
W3	PE coat wrought galv iron

Object

- Valve
- Buried valve
- Regulator
- Gas supplied = yes
- CP rectifier terminal
- CP test station
- CP anode
- CP bond wire
- Syphon
- Trace wire point

Abbreviation

BoK	Back of kerb	FoK	Front of kerb
C	Depth of cover	Galv	Galvanized
CP	Cathodic protection	NTI	Not tied in

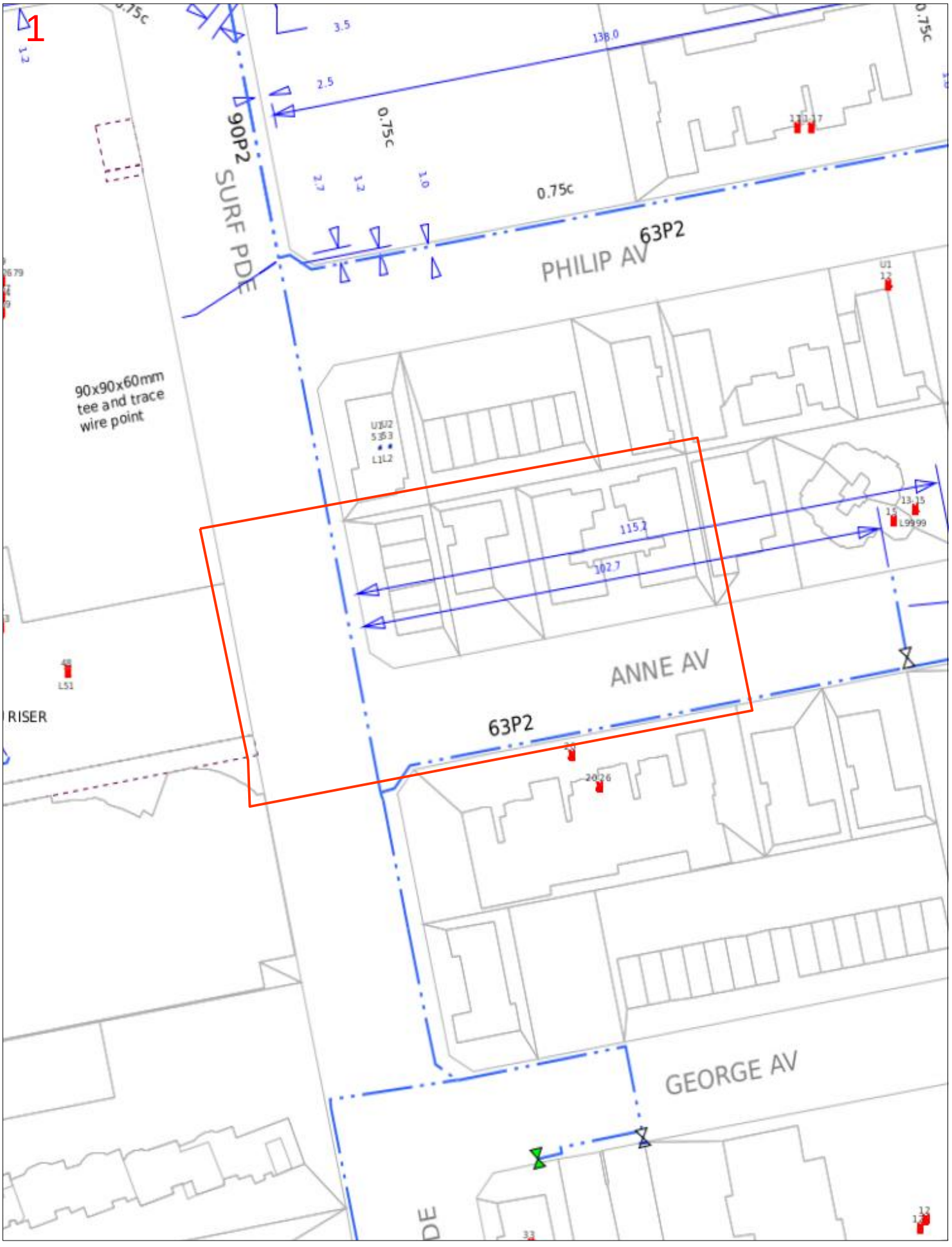
Example

Pipe	
40P6 in 80C2	40 mm high pressure medium density poly in an 80 mm cast iron casing
63S8	63 mm medium pressure steel

Pipe code

Pipe diameter in millimetres is shown before pipe code.
40P6 = 40 mm nominal diameter

This map was created in colour and should be printed in colour



Scale 1: 700 map

Map Sources: Esri, Garmin, HERE, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

N

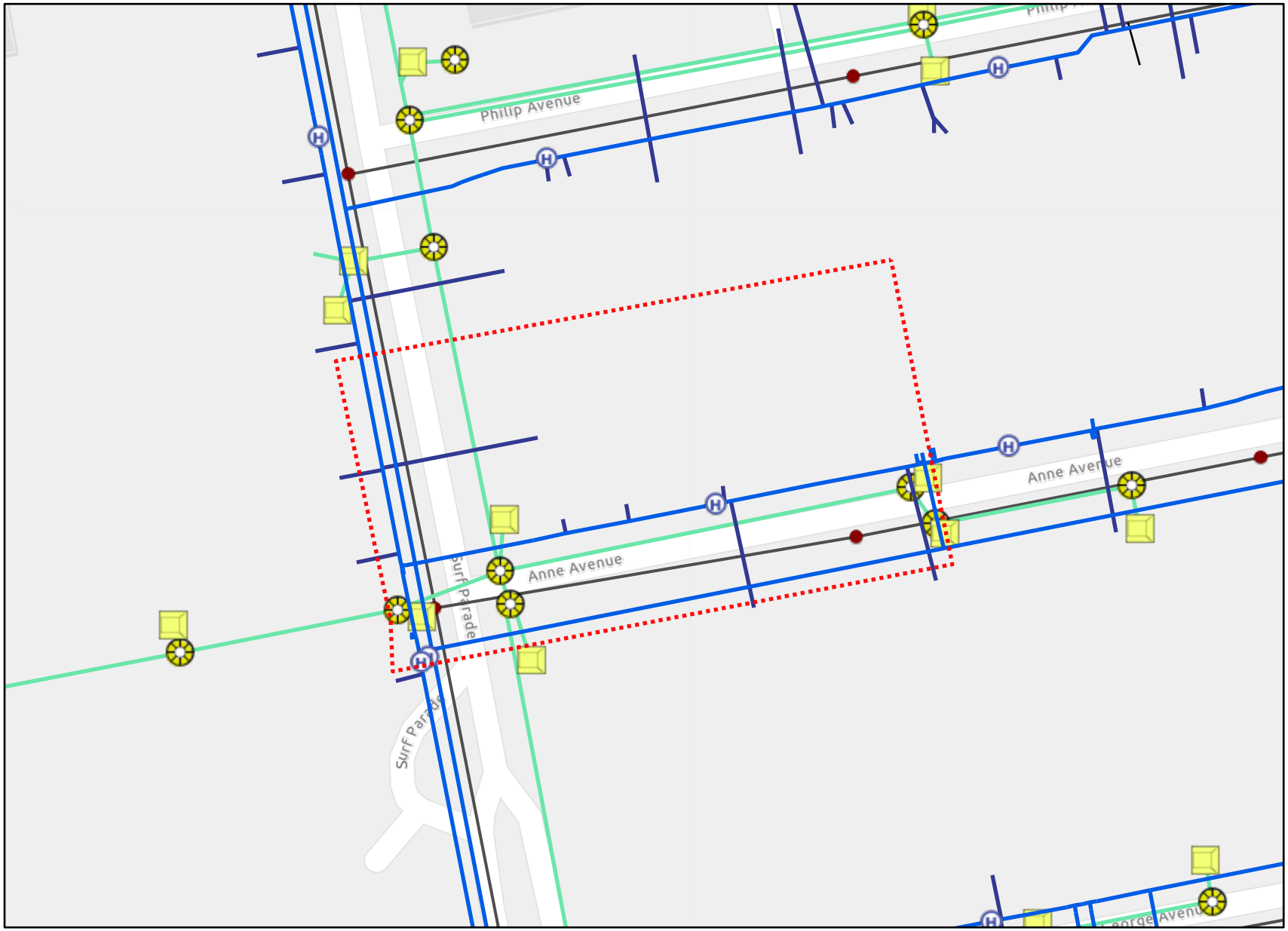
Enquiry Area

Map Key Area

CITY OF GOLDCOAST.

Job # 38387603
Seq # 249437635
Provided by City of Gold Coast

BEFORE YOU DIG www.byda.com.au



Legend

- BYDA Enquiry
- Water Hydrant
- Water Pipe
- Potable Water Connection
- Stormwater Drainage Pipe
- Stormwater Inlet Gully
- Stormwater Manhole
- Sewer Connection
- Sewer Pipe Non Pressure
- Sewer Manhole
- Fibre Optic Pit
- Fibre Optic Cable
- GCCC Boundary

Esri Community Maps Contributors, Department of Resources, DESI, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

Disclaimer: The Plan is provided in response to a Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of Gold Coast City Council infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

In an emergency contact City of Gold Coast on 1300 465 326

10/01/25 (valid for 30 days)

Plans generated by SmarterWX™ Automate

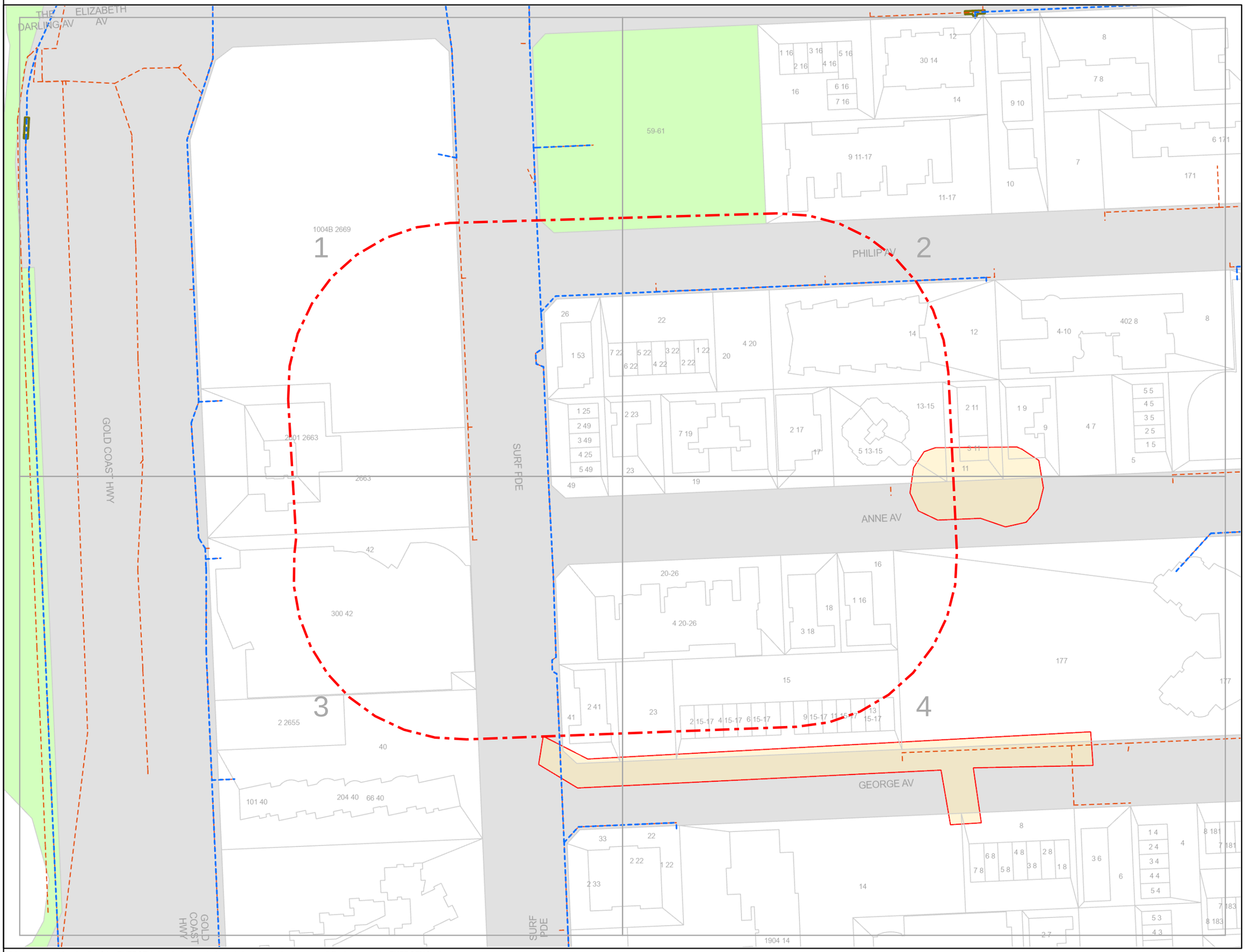
0 10 20 40 m

N

Scale 1:1,000

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 249437638
Date: 10/01/2025

Scale: 1:1025
Tile No: **OVERVIEW**

CAUTION - HIGH VOLTAGE

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category "D" Plan

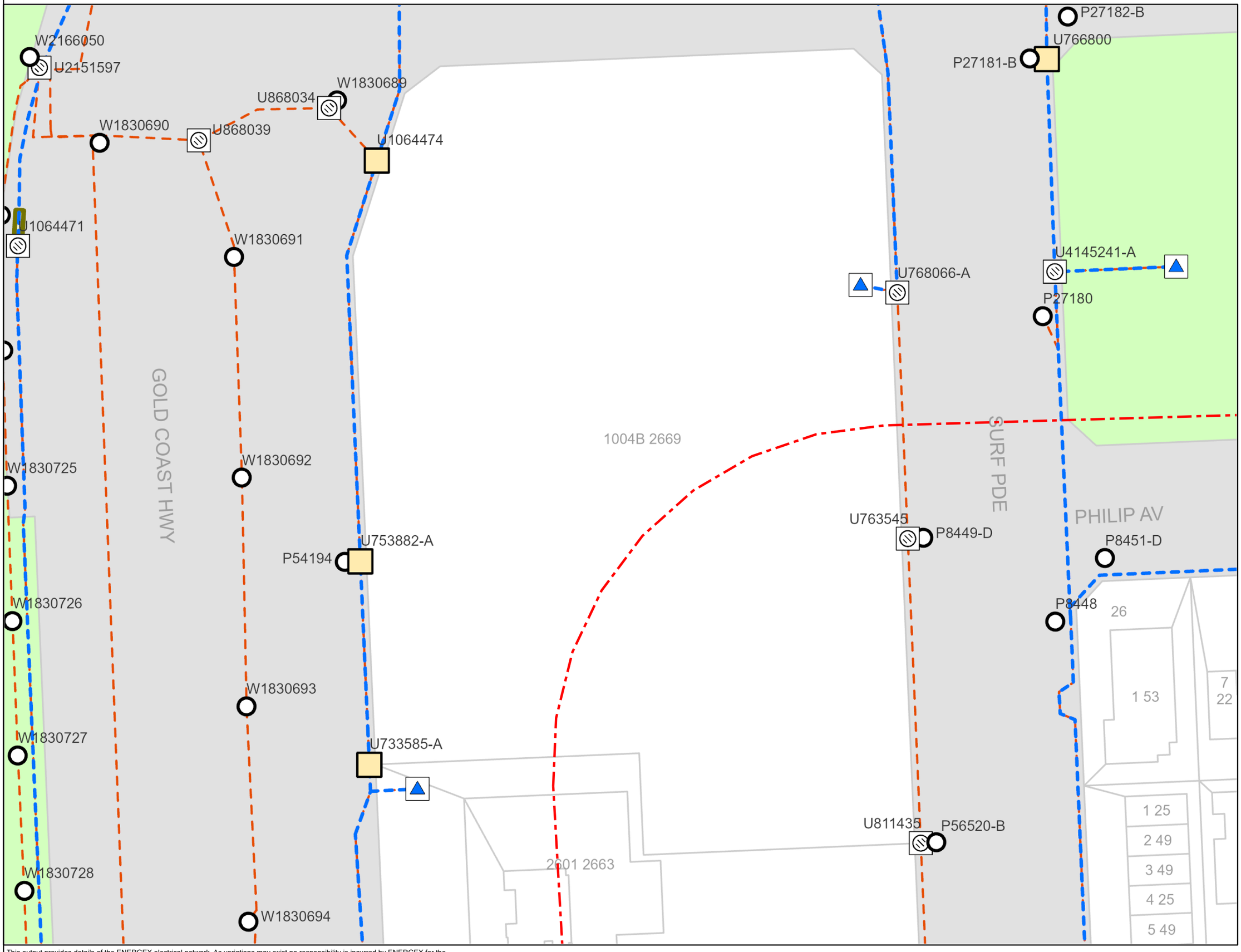
N
W E
S

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Energex nor Pelican Corp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



BYDA

Sequence: 249437638
Date: 10/01/2025

Scale: 1:500
Tile No: **Tile No: 1**

CAUTION - HIGH VOLTAGE

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

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W E
S

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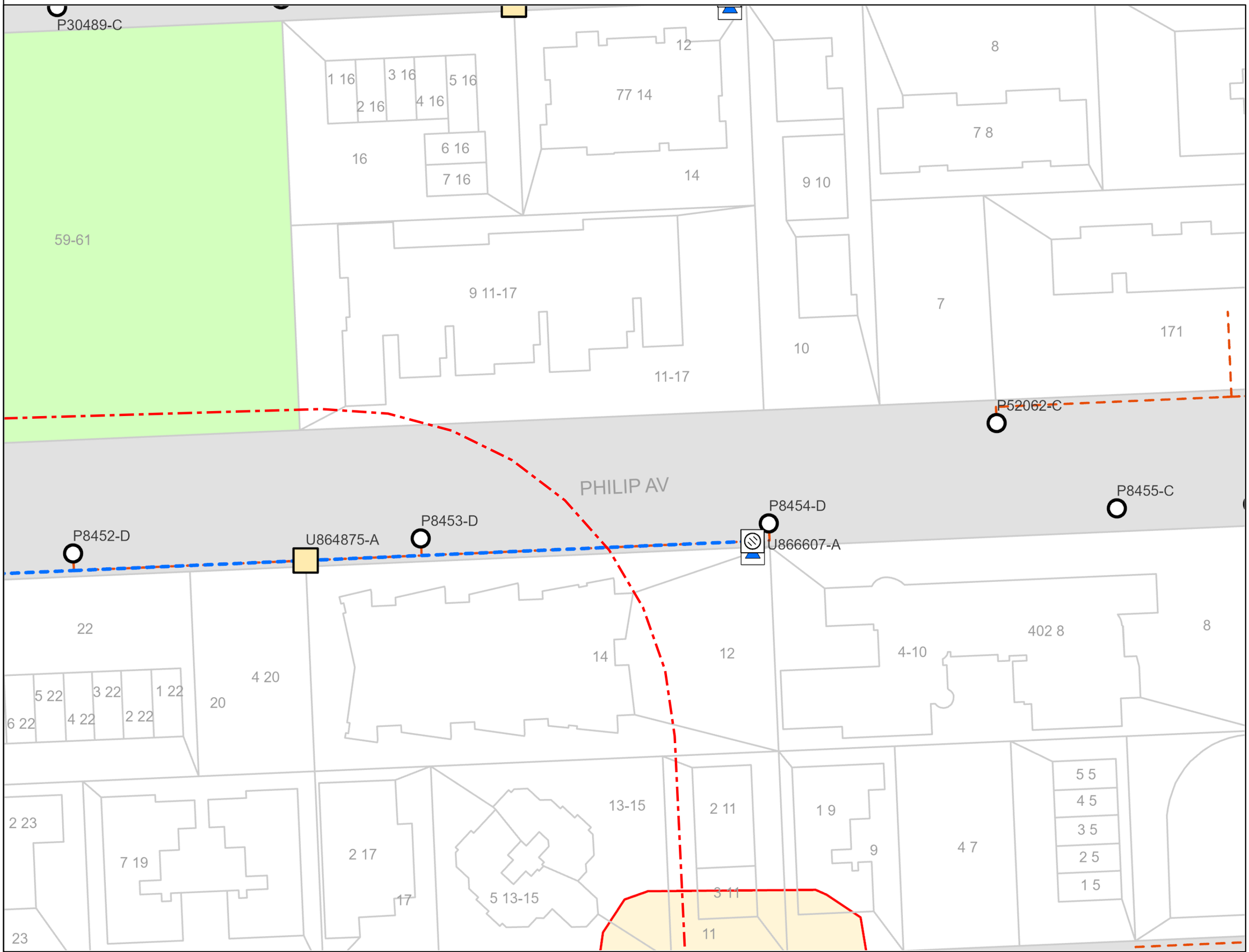
All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 249437638
Date: 10/01/2025

Scale: 1:500
Tile No: **Tile No: 2**

CAUTION - HIGH VOLTAGE

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

N
W E
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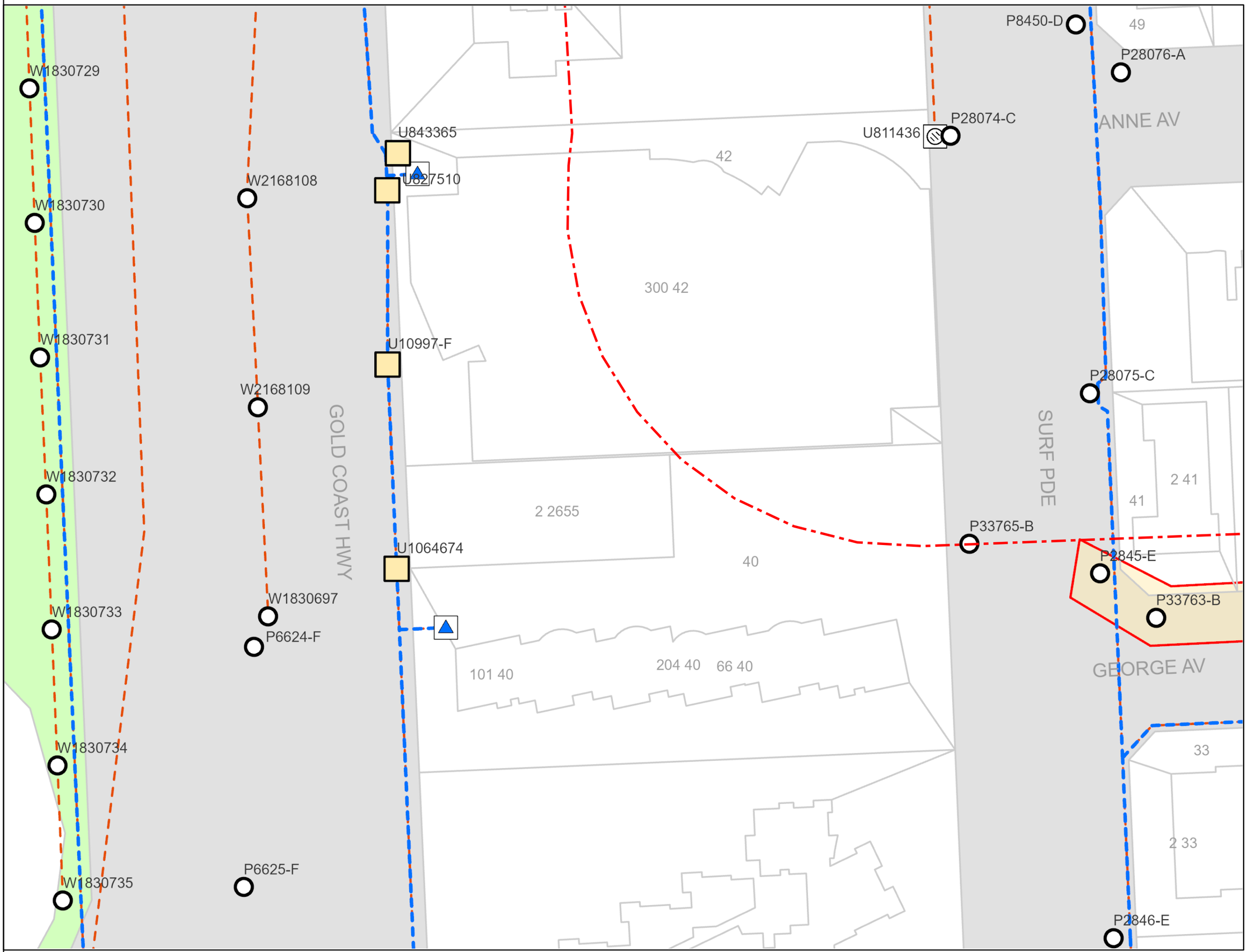
For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 249437638
Date: 10/01/2025

Scale: 1:500
Tile No: **Tile No: 3**

CAUTION - HIGH VOLTAGE

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category "D" Plan

N
W E
S

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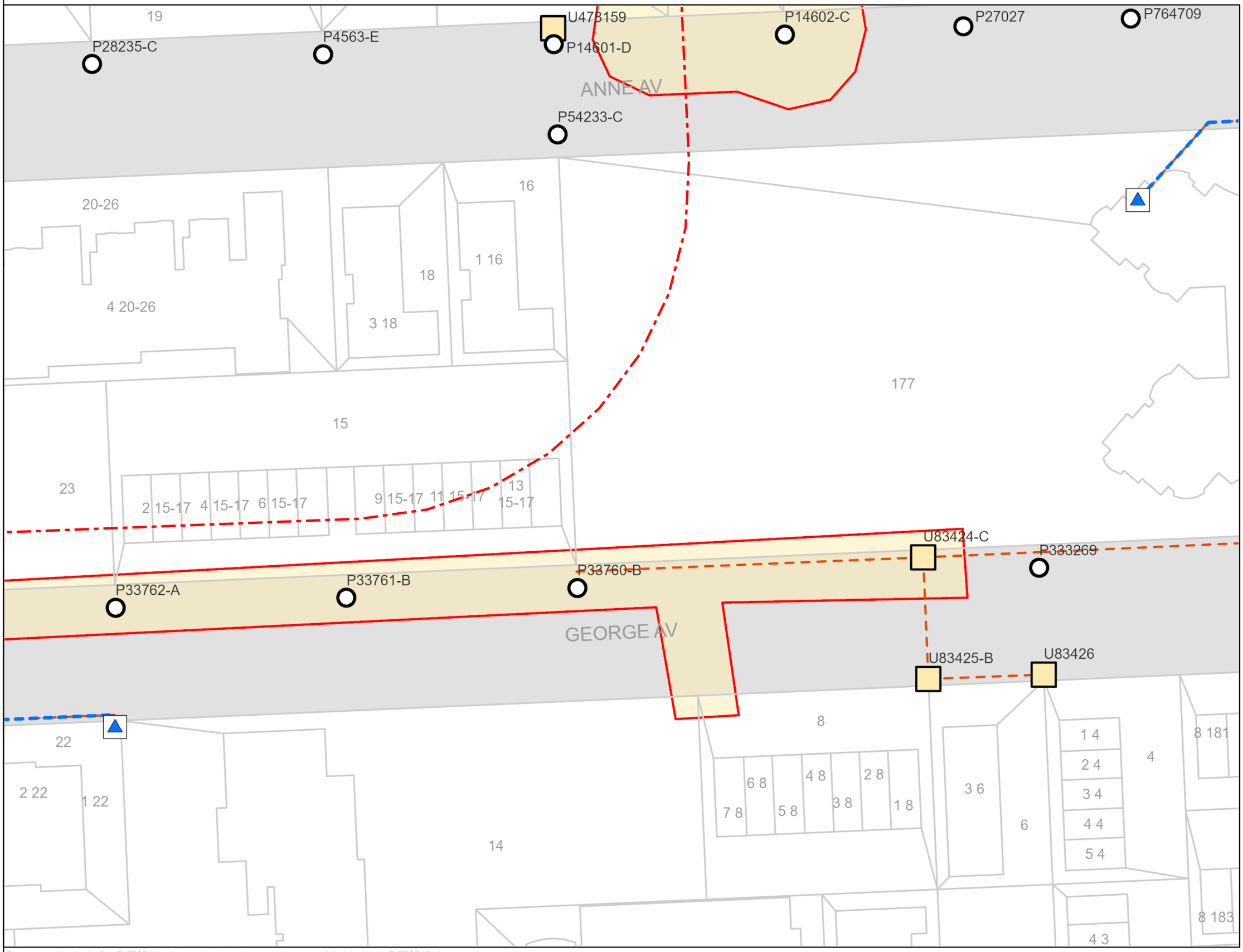
All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX BYDA map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please Call 13 19 62



energex

BYDA

Sequence: 249437638
Date: 10/01/2025

Scale: 1:500
Tile No: **Tile No: 4**

CAUTION - HIGH VOLTAGE

LEGEND

- Substation
- Cable Marker
- Pit
- Pole
- Pillar
- LV Cable (up to 1kV)
- HV Cable (1kV – <33kV)
- HV Cable (33kV and over)
- Pit Boundary
- Planned Work Area

AS5488 Category “D” Plan

N
W E
S

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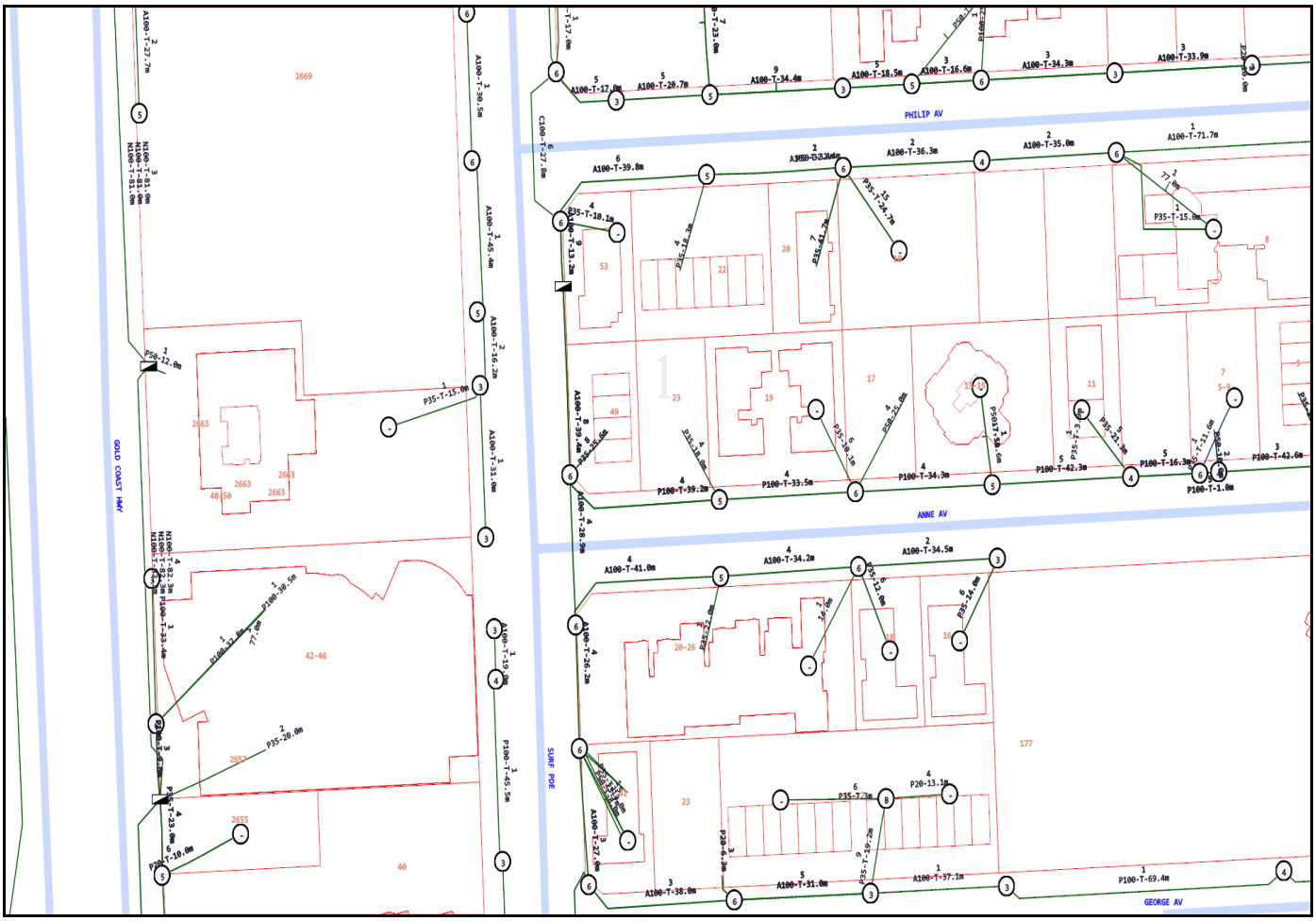
This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

LEGEND

34	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

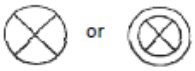
LEGEND



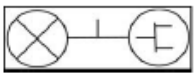
Exchange
(Major Cable Present)



Footway Access Chamber
(can vary from 1-lid to 12-lid)



Pillar / Cabinet
(above ground / free standing)



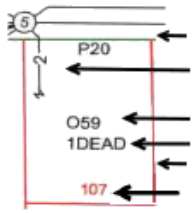
Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V Electricity

OC — Other Carrier Telecommunications Cable/Asset

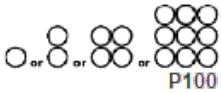
Dist — Distribution cables in Main Cable ducts

MC — Main Cable ducts on a Distribution plan

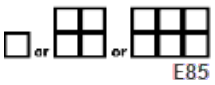
▲ — Blocked or damaged duct.



Roadside / Front Boundary
2 pair lead-in to property from pit in street 1
pair working (pair ID 059)
1 pair dead (i.e. spare, not connected)
Side / Rear Property Boundary
Property Number



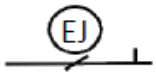
Single to multiple round conduit
Configurations 1,2,4,9 respectively
(attached text denotes conduit type and size)



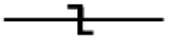
Multiple square conduit
Configurations 2, 4, 6 respectively
(attached text denotes conduit type and size)



Cable Jointing Pit
(number / Letter indicating Pit Type)



Elevated Joint
(above ground joint on buried cable)



Telstra Plant in shared Utility trench



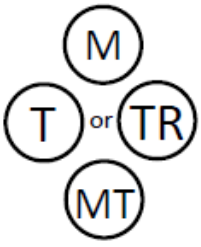
Aerial Cable



Aerial Cable
(attached to joint Use Pole eg. Power)



Direct Buried Cable



Marker Post Installed

Buried Transponder

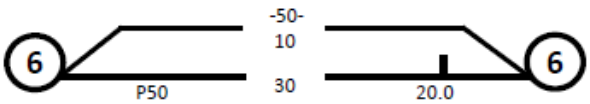
Marker Post, Transponder

Optical Fibre cable direct buried

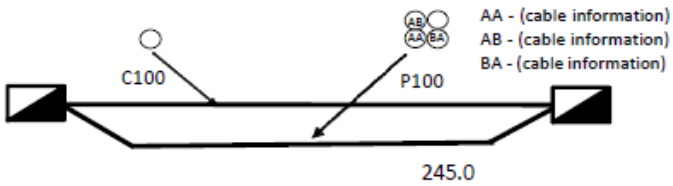
Some examples of conduit type and size:

A - Asbestos cement, P - PVC / Plastic, C - Concrete,
GI - Galanised iron, E - Earthenware
Conduit sizes *nominally* range from 20mm to 100mm
P50 50mm PVC conduit
P100 100mm PVC conduit
A100 100mm asbestos cement conduit

Some Examples of how to read Telstra Plans



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits. approximately 20.0m apart, with a direct buried 30-pair cable along the same route



AA - (cable information)
AB - (cable information)
BA - (cable information)

Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along

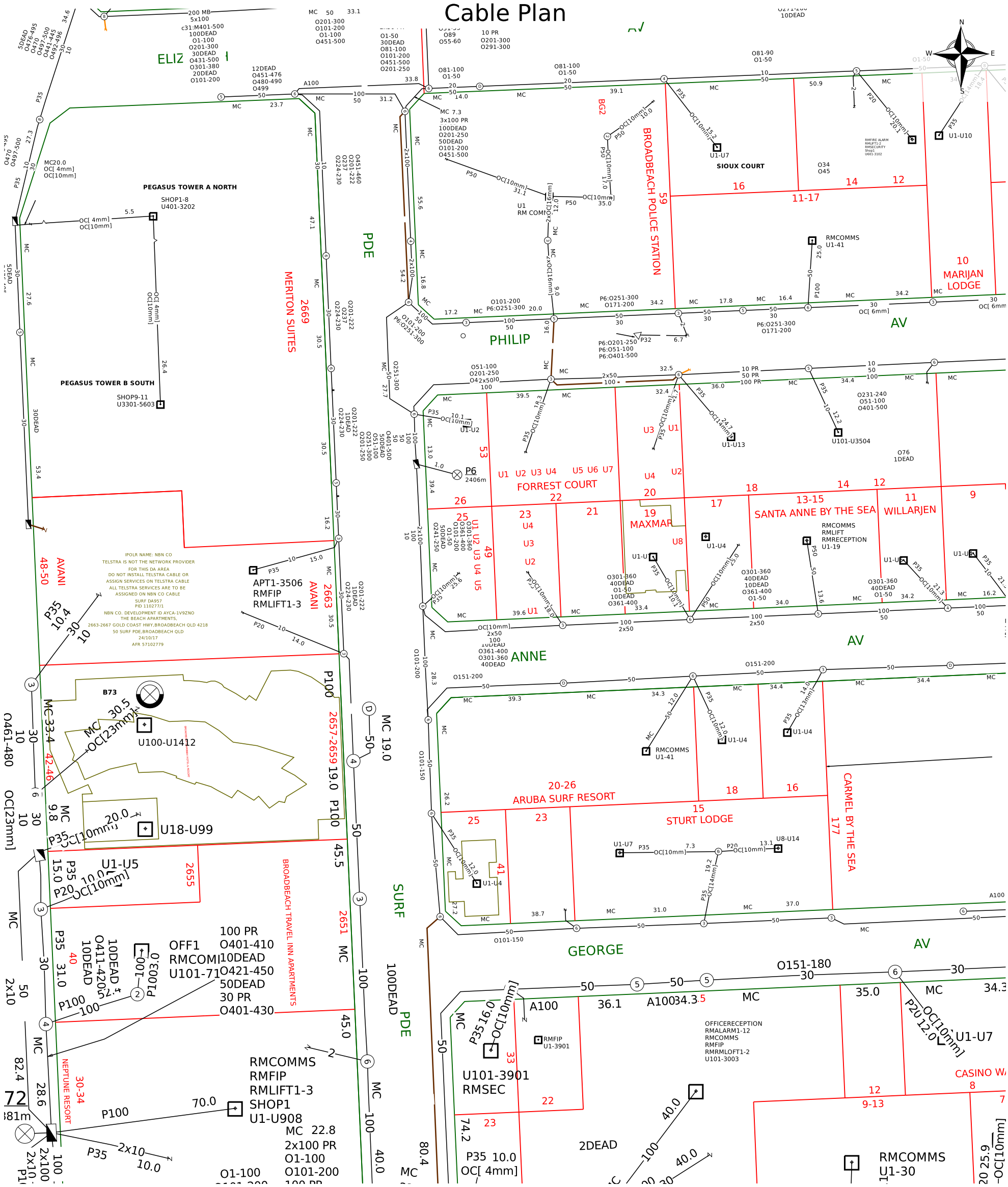
Protect our Network:

by maintaining the following distances from our assets:

- 1.0m Mechanical Excavators, Farm Ploughing, Tree Removal
- 500mmVibrating Plate or Wacker Packer Compactor
- 600mm Heavy Vehicle Traffic (over 3 tonnes) not to be driven across Telstra ducts or plant.
- 1.0mJackhammers/Pneumatic Breakers
- 2.0m Boring Equipment (in-line, horizontal and vertical)

For more info contact a CERTLOC Certified Locating Organisation (CLO) or Telstra Location Intelligence Team 1800 653 935

Cable Plan



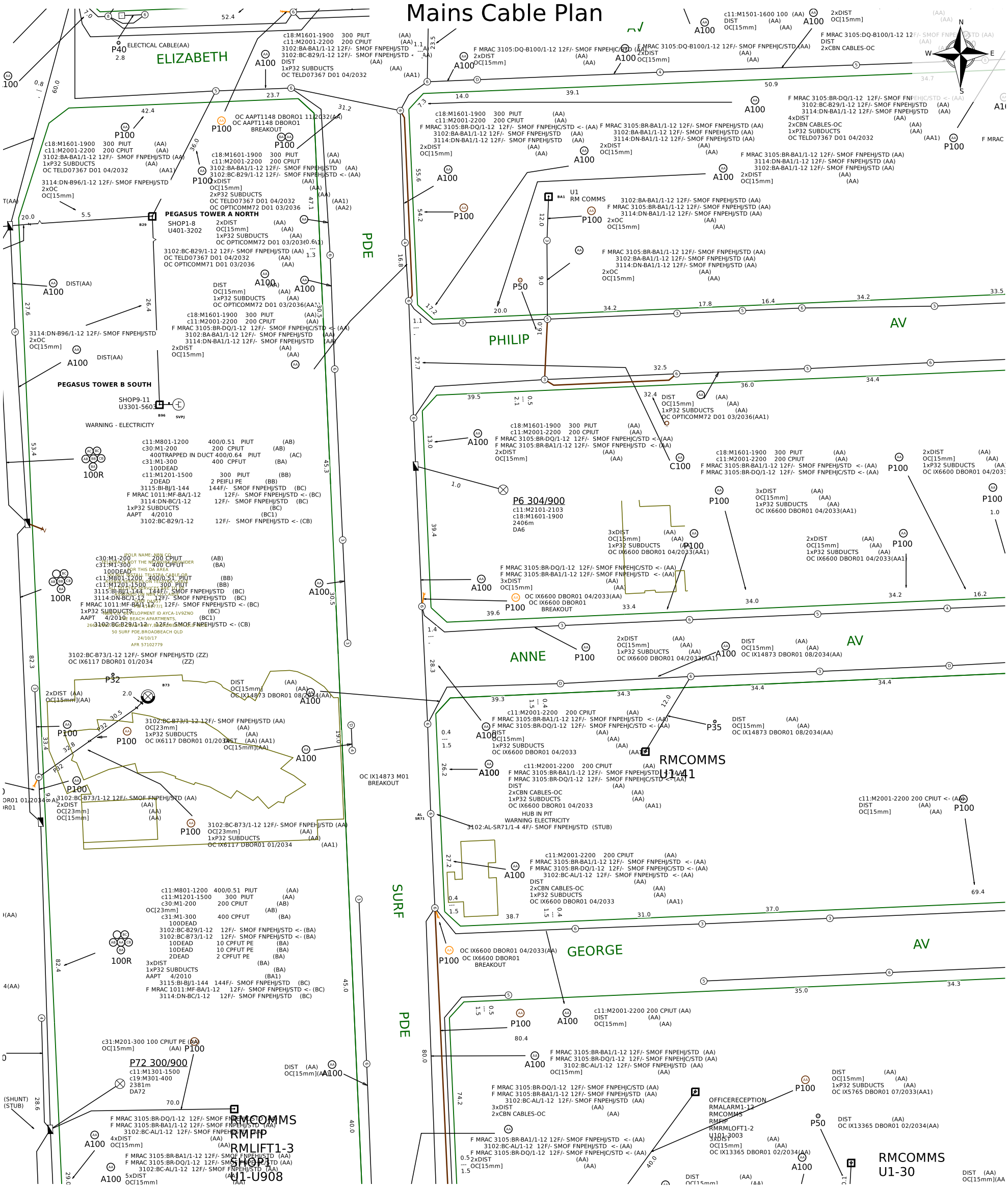
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-c Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 249437639
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 11/01/2025 12:16:25	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-c
Ph - 13 22 03
Email - Telstra.Plans@team.telstra.com
Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 11/01/2025 12:16:30

Sequence Number: 249437639

CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

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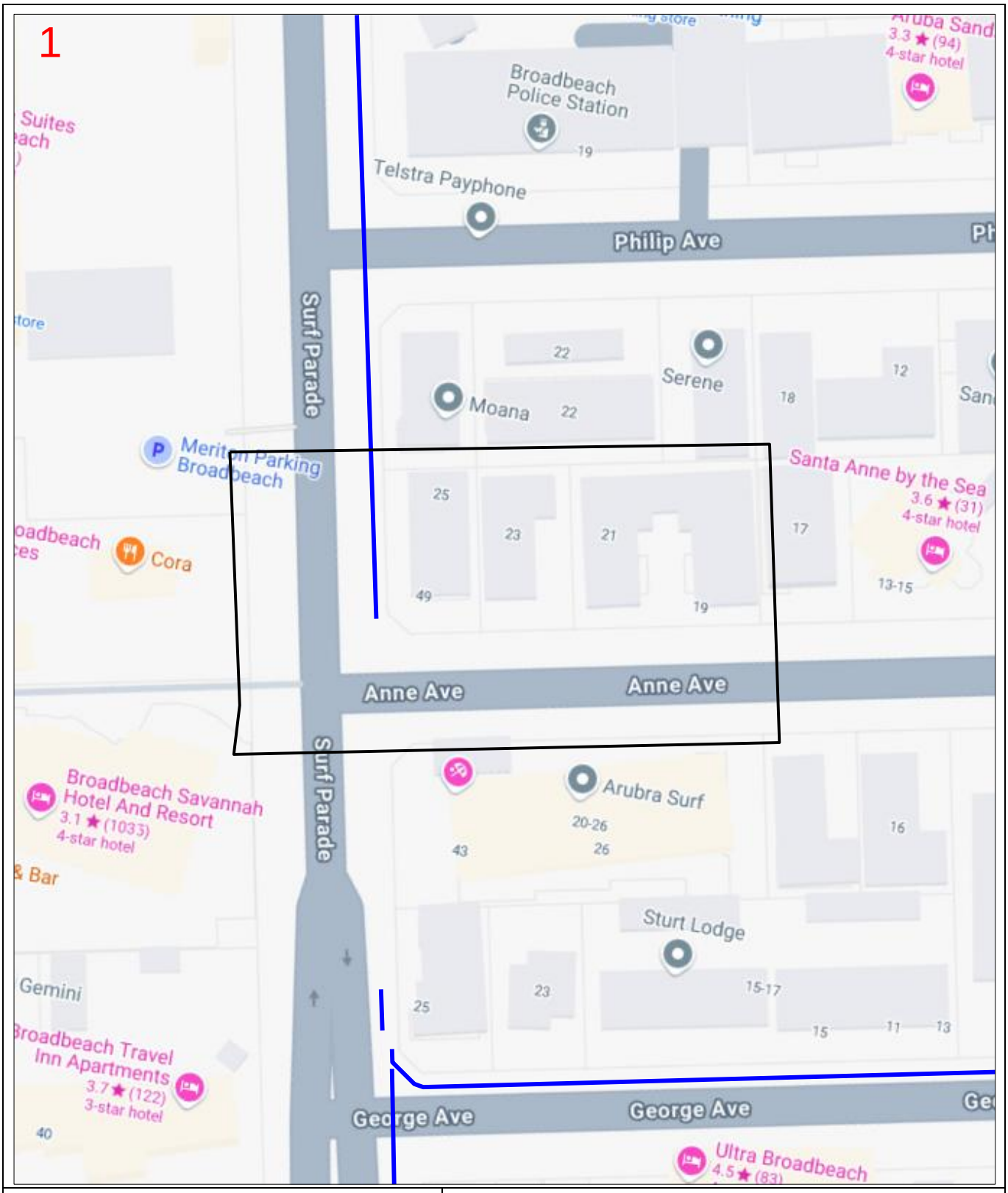

Enquiry Number: 249437636

Map Sheet: 1

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area	◇		
AAPT/PowerTel Pit	●	TransACT Pit	●
AAPT/PowerTel Duct	／	TransACT Duct	／
DDA Pit	●	SOUL Pattinson Telecoms Pit	●
DDA Duct	／	SOUL Pattinson Telecoms Duct	／
Agile/Adam Pit	●	PIPE Networks Pit	●
Agile/Adam Duct	／	PIPE Networks Duct	／

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APPENDIX D
GCWW Correspondence

Wieser, Ben

From: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Sent: Wednesday, 15 January 2025 8:59 AM
To: Wieser, Ben
Cc: Stockwell, James
Subject: RE: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

Follow Up Flag: Follow up
Flag Status: Flagged

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Hi Ben,

Based on the information provided below, the network teams have advised that;

Water network capacity assessment WOULD NOT BE required.
Sewer network capacity assessment WOULD BE required.

Kind regards,

Brioni Gallo
Business Administration Officer – Water and Waste Assessment
City Development

P: 07 5582 8340
cityofgoldcoast.com.au

CITY OF
GOLDCOAST.

From: Wieser, Ben <Ben.Wieser@arcadis.com>
Sent: Friday, 10 January 2025 10:04 AM
To: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Cc: Stockwell, James <James.Stockwell@arcadis.com>
Subject: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

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Hi GCWDA,

Our client is investigating the site "**19-21 Anne Avenue, Broadbeach**".

Accordingly, we are hoping to seek early input from GCWW on whether network assessment(s) would be required to support a future DA.

- From concept plans, the proposed demand is currently calculated to be **140.56 EP, comprising of 100% residential**.
- Can GCWW please confirm whether any network assessments are required?

Should you require any further information, please let us know.



ATTACHMENT 7

Stormwater Management Plan prepared by Arcadis



UPS
URBAN PLANNING SERVICES

ARCADIS

SITE BASED STORMWATER MANAGEMENT PLAN

19-21 ANNE AVENUE, BROADBEACH

MARY ANNE DEVELOPMENTS



IMPROVING QUALITY OF **LIFE**

19-21 ANNE AVENUE, BROADBEACH

SITE BASED STORMWATER MANAGEMENT PLAN

Author	Ben Wieser
Checker	Ashley Shepherd
Approver	James Stockwell RPEQ20152



Project No	30265222
Report No	GA0002
Revision	01
Date	18/02/2025

This report has been prepared for Mary Anne Developments in accordance with the terms and conditions of appointment. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description
01	18/02/2025	Issue for Approval

Should you require any further information, please contact our Gold Coast office and ask to speak to the report author denoted above.

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APPENDIX D

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APPENDIX E

Bio-Retention Checklist

APPENDIX F

Healthy Waters Code

GLOSSARY OF TERMS

Australia Rainfall and Runoff (ARR) 2019 recommends adaptation of new terminology relating to storm events summarised in Table A below. As recommended, this report documents data with respect to AEP (%).

The following definitions should be noted:

- EY = Number of exceedances per year.
- AEP = Annual Exceedance Probability.
- AEP (1 in x) = 1/AEP.
- ARI = Average Recurrence Interval (years).

The below table should be refereed to for a comparison of storm events.

Table A – Storm Events Terminology

EY	AEP (%)	AEP (1 in ….)	ARI
1	63.21	1.58	1
0.69	50	2	1.44
0.5	39.35	2.54	2
0.22	20	5	4.48
0.2	18.13	5.52	5
0.11	10	10	9.49
0.05	5	20	20
0.02	2	50	50
0.01	1	100	100

ASSOCIATED MODELLING FILES

For internal reference, the following modelling file packages are associated with this report.

- 30265222-EDA0001-01 - DRAINS
- 30265222-EDB0001-01 - MUSIC

1 EXECUTIVE SUMMARY

Mary Anne Developments has commissioned Arcadis to prepare a Site Based Stormwater Management Plan (SBSMP) for a development application for the site located over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

The proposed development intended for the site involves the construction of a residential apartment building.

This report demonstrates the proposed development will be constructed and operated in accordance with the Water Sensitive Urban Design (WSUD) Requirements of Council, the South-East Queensland State Planning Policy (SPP), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM), Australian Rainfall and Runoff (2019) and the Environmental Protection (Water) Policy (2009). The primary objectives of this Site Based Stormwater Management Plan (SBSMP) are achieved as follows:

Lawful Point of Discharge (LPoD)

The site proposes to maintain the existing LPoD being Anne Avenue. The site proposes to discharge stormwater to Anne Avenue after receiving appropriate treatment on site.

Stormwater Quantity

This report includes a hydrological assessment which estimates that the proposed development (without mitigation) may increase peak flow rates discharging to the existing drainage system within Anne Avenue. Therefore, on-site detention has been provided to mitigate the peak flow rates to existing peak flow rates.

Stormwater Quality

A stormwater quality assessment is provided which demonstrates that a specially tailored treatment system will be required in order to meet the pollutant removal targets of City of Gold Coast (CoGC) during the operational phase of the proposed development. A bio-retention treatment system is proposed.

All the stormwater quality controls detailed in this document are contained within the development site and will remain a private asset of the property owner. Regular maintenance of the treatment devices must be undertaken to ensure the continuing performance of the stormwater quality treatment train.

Waterway Stability

The development is proposing to discharge into a hard lined kerb, pit and piped stream and therefore waterway stability is not applicable.

Erosion and Sediment Control

Construction phase sediment control devices are to be implemented during construction works in accordance with requirements associated with Type 3 sediment discharge zones, comprising of a vehicle shakedown, sediment fences and gully inlet protection.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located within Broadbeach, South-East Queensland, Australia over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

The site is bordered by apartment buildings to the north, east and west, and Anne Avenue to the south.

The total area of the site is approximately 1,032m^2.

The City of Gold Coast is the local government authority.

2.2 Land Usage

In its current state, the project site contains a residential apartment building with associated driveways. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

2.3 Topography and Features

The site topography grades towards Anne Avenue, south of the site. The site has a high point of approximately RL 6.32m AHD and a low point of RL 4.80m AHD. Refer to the site survey within Appendix A of this report for further information.

3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a residential apartment building, including:

- Residential apartments.
- Residential amenities.
- Ground level parking.
- 2 levels of podium parking.
- 2 levels of basement parking.

A plan extract of the proposed development has been provided in Figure 3-1.

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

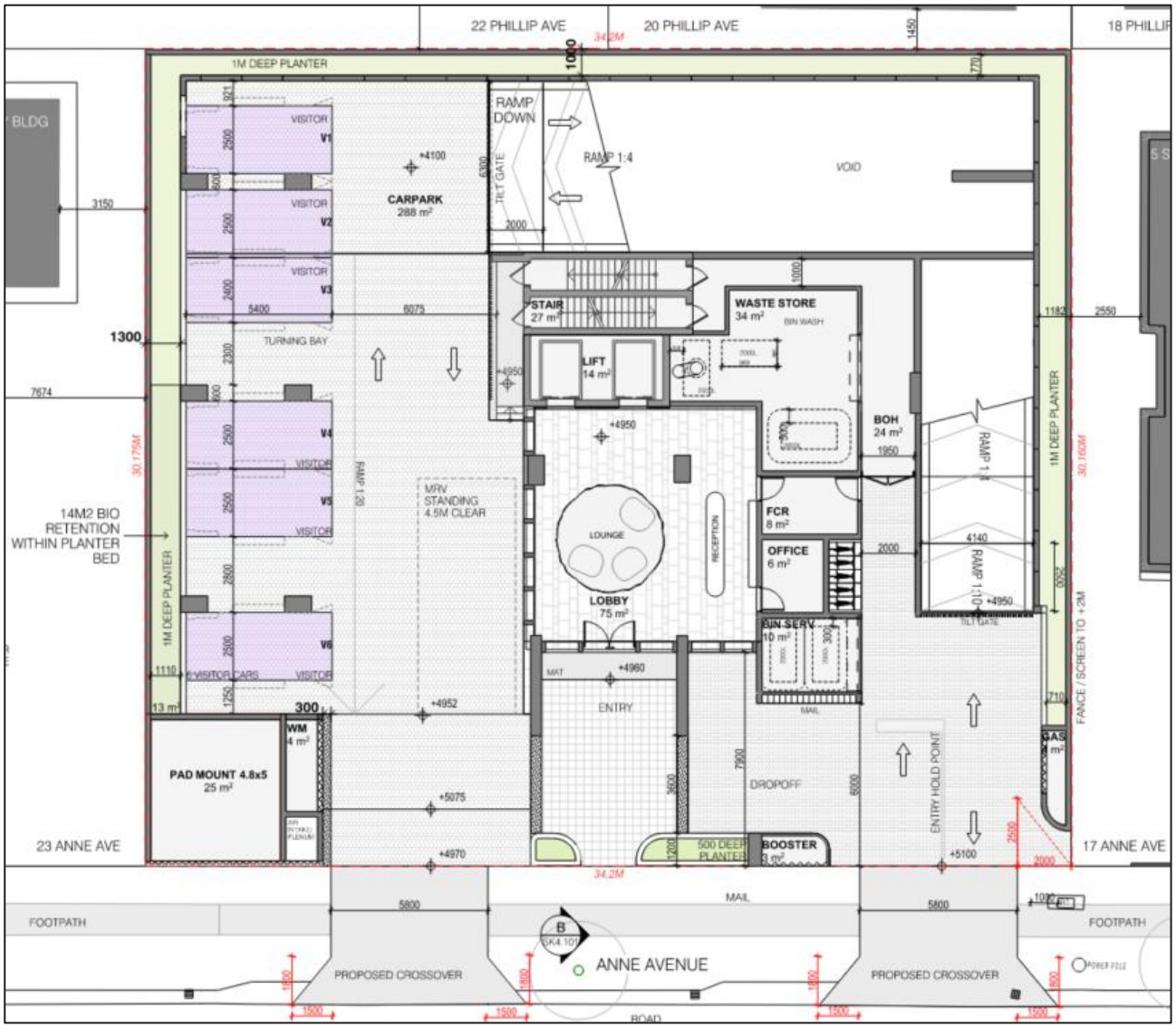


Figure 3-1 Proposed Development Ground Floor

4 STORMWATER MANAGEMENT OBJECTIVES

In accordance with QUDM and the City Plan Healthy Waters code, the following stormwater management components have been investigated.

- Lawful point of discharge (LPOD) | Section 5 of this report.
- Stormwater Quantity, including waterway stability where applicable | Section 5 & 6 of this report.
- Stormwater Quality Operational Phase | Refer to Section 7 of this report.
- Stormwater Quality Construction Phase | Refer to Section 8 of this report.

The Healthy Waters Code has been completed as part of this development application package as a stand-alone document and is also included in Appendix F of this report.

5 LAWFUL POINT OF DISCHARGE AND DRAINAGE

5.1 Existing Stormwater Drainage

Stormwater runoff generated by the site is discharged to Anne Avenue via kerb adapters and overland flow. Local runoff in Anne Avenue, including runoff from the subject site, is captured by a gully pit approximately 50m west of the site at the intersection of Anne Avenue and Surf Parade. From the gully pit, runoff is conveyed west via a Council pit and pipe network and ultimately to the Nerang River. The pipe sizes within this network range from DN300 to DN1200.

It is noted that the depth to invert of the DN375 stormwater main within Anne Avenue fronting the site is approximately 1m below the pavement as per site survey (Appendix A).

No significant external catchments are identified to drain through the subject site.

Refer to Figure 5-1 below and the site survey provided within Appendix A.

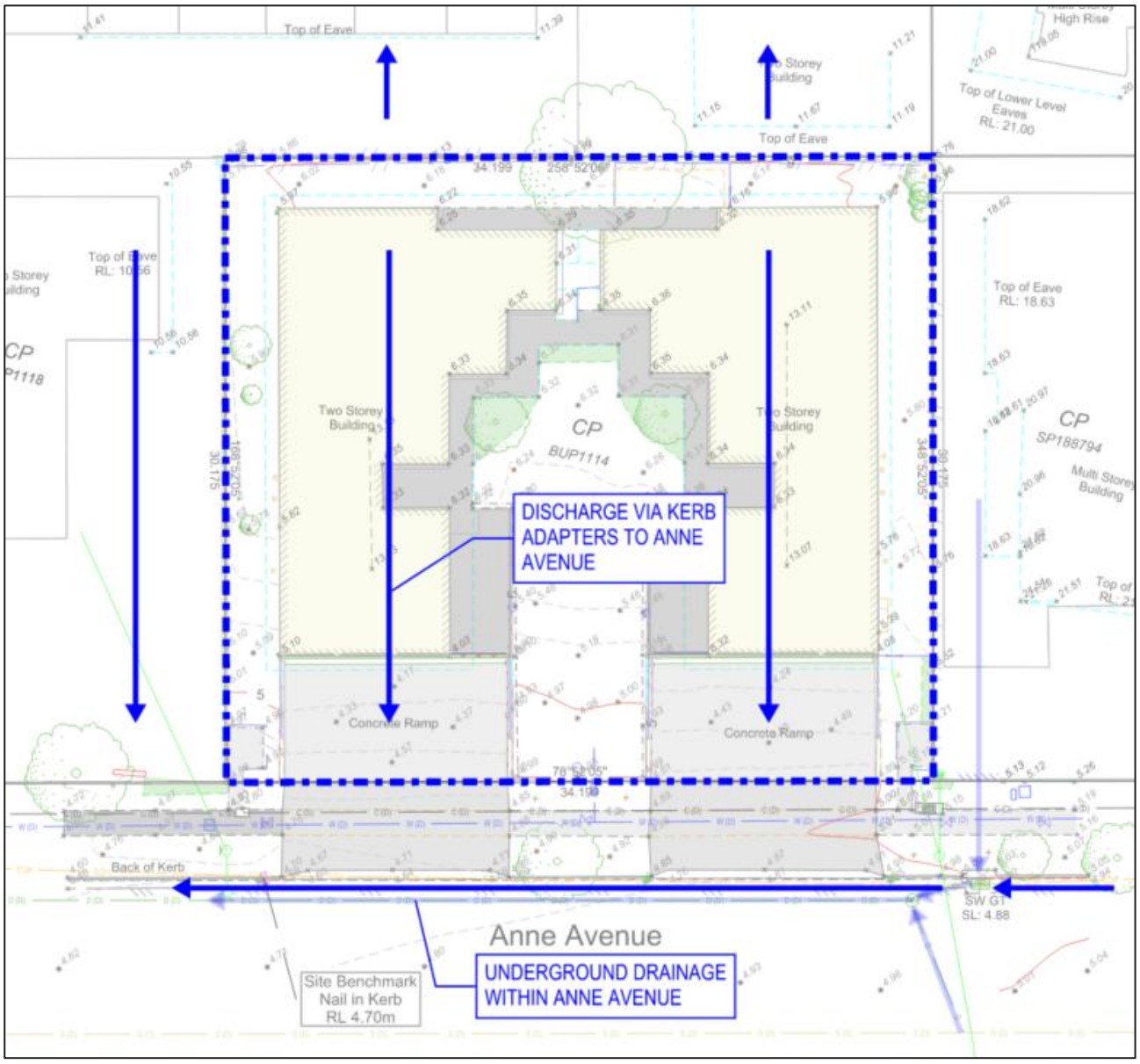


Figure 5-1 Existing Stormwater Catchments

5.2 Proposed Drainage Characteristics and LPOD Test

In the developed case, the site demonstrates compliance with the QUDM as follows:

The location of the discharge is under the lawful control of the local government or other statutory authority from whom permission to discharge has been received. This will include park, drainage or road reserve, stormwater drainage easement.

The site will maintain its discharge location being Anne Avenue via connection to a new manhole (constructed on the existing DN375 drainage line fronting the site) and overland flow. Should existing services within the verge be prohibitive to the connection, kerb discharge can be accepted, consistent with the existing scenario.

At a minimum, 4EY flows from the site catchment areas are to be directed to the stormwater quality treatment system as documented in Section 7 of this report.

To achieve Council's Stormwater Quality objectives (Section 7 of this report) and due to outlet constraints, low flows from the lower ground areas are proposed to be pumped to the quality treatment system, prior to gravity discharge to the LPoD. It is recommended that:

- A duty-duty pump arrangement be adopted to prolong pump lifespan (and therefore maintenance) as well as mitigate the negligible risk of mechanical failure.
- A diversion is investigated for the private drainage network to limit ground floor flows to the pump to the rate identified in Section 7 of this report (5 L/s), with excess flows discharging to the LPOD. This reduces reliance on the pump.

These outcomes will be technically addressed by a building hydraulic engineer during the detailed design for Building Approval phase.

It is noted that no pumped discharge directed to the kerb or municipal piped drainage system is proposed.

Figure 5-2 below illustrates the proposed drainage philosophy for the site, which is adopted for the purposes of detailed calculations in subsequent reporting sections. Further details can be found on Engineering Drawings in Appendix B.

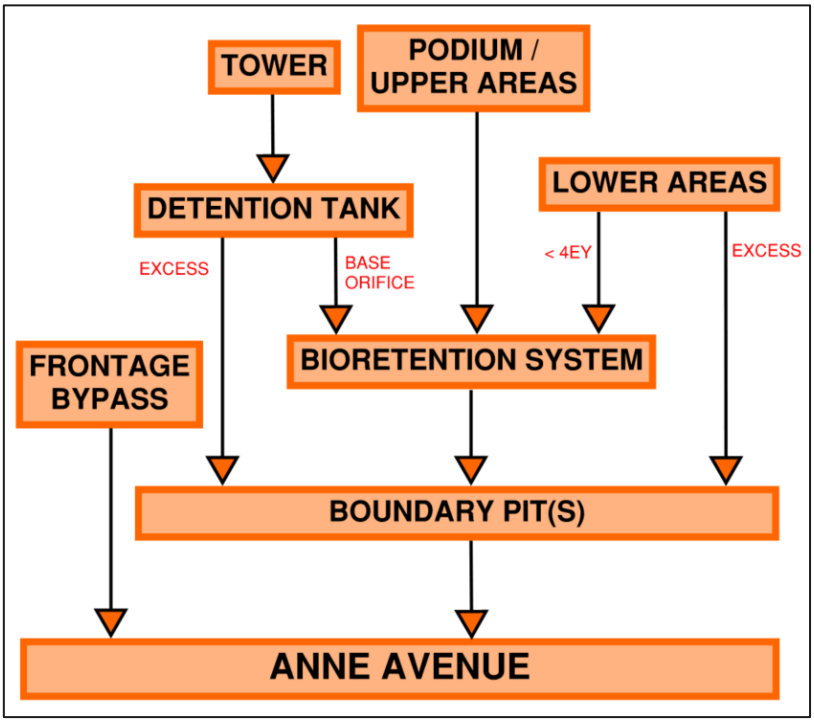


Figure 5-2 Drainage Schematic

That in discharging in that location, the discharge will not cause an actionable nuisance. In general terms this implies no worsening as a result of discharge.

Sections 6, 7 and 8 of this report provide detailed calculations and discussions illustrating no actionable nuisance anticipated.

6 STORMWATER QUANTITY

6.1 Objective

Stormwater discharge from the development must be detained to pre-development flow rates for the median storm event up to and including the 1% AEP ("no-worsening"). To ensure the proposed development matches existing stormwater characteristics prior to discharging, appropriate infrastructure, in the form of on-site detention will be implemented to cater for all storm events up to and including the 1% AEP event.

6.2 Methodology and Assessment

The hydrological assessment presented in this report has been undertaken in accordance with the methodology documented in the Australia Rainfall & Runoff 2019. This methodology incorporates an ensemble approach (i.e., 10 temporal distribution per storm duration) and uses the design rainfall inputs sourced from the AR&R (2016) data hub.

For the site catchment identified as having an increase in peak flow rates when developed, a hydrologic model was created using DRAINS. The median storm event was determined via an investigation of multiple storm distributions for durations ranging from 10mins to 3hours.

It should be understood that the median results of each ensemble have been extracted to determine peak flows for the assessed catchments, as is standard practice.

6.2.1 Catchment Locality

In accordance with CoGC's City Plan SC6.11.4.4.3 & ARR2019, Rainfall Intensities Frequency Duration data were obtained from The Bureau of Meteorology (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016). The Latitude and Longitude used for the site is summarised in Table 6-1 below.

Table 6-1 Site Latitude and Longitude

Parameter	Value
Latitude	-28.0323
Longitude	153.4325

6.2.2 Catchment Summary

The site was assessed under three cases:

- **Existing Scenario** – The site in its existing state.
- **Developed Scenario** – The site in its developed state per the proposal, without detention.
- **Mitigated Scenario** – The site in its developed state per the proposal, with detention.

It should be noted that:

- Catchment areas only consider deep planting to be pervious. All other planter beds are considered impervious to remain conservative for future phases of the project.
- Catchments are represented using the ILSAX hydrological model to represent urbanised catchment conditions per ARR 2019 recommendations.

The following catchment details in Table 6-2 were determined from the site survey within Appendix A and the architectural plans, which can be found within the full development application package.

Catchment markups have been provided in Appendix C and D for existing and developed scenarios respectively.

Table 6-2 Modelling Catchment Details

Scenario	Area (ha)	Impervious Fraction (%)	Time of Concentration (min)
Existing	0.103	76	5,7
Developed	0.103	100	5,7
D1 (To Detention)*	0.045	100	5,7
D2 (Bypass Detention)*	0.058	100	5,7

**Detailed assessment for the mitigated scenario (D = D1 + D2).*

6.2.3 Detention System Design

Table 6-3 presents the design details for the proposed onsite detention system for the site which is required to achieve the objective of no post development increase up to the 1% AEP event at the assessment point. The detention system has been iteratively optimised to ensure peak performance.

Table 6-3 Summary of Proposed Detention System Parameters

Parameters	Detention System
Minimum System Areas	2m^2 Detention Floor 1.21m^2 Outlet Zone including weir wall = Total 3.21m^2 (min)
Internal Water Height	2.05m*
Outlet Orifices and Weirs	60mm circular orifice IL @ base of detention 60mm circular orifice IL @ 1.10m above the base of detention 60mm circular orifice IL @ 1.50m above the base of detention 1.80m wide weir @ 2.00m above the base of detention
Outlet Orifice Screening	Provide Maximesh Rh3030 for orifice diameters 150 mm or less with a minimum area of 50 times the orifice area.

**Height of water in a 1% AEP event with orifice blockage. Refer Section 6.3.1.*

Engineering Drawings within Appendix B should be referred to for further details of the detention system.

6.2.4 DRAINS Model Setup

An image of the DRAINS model setup has been provided below for ease of reference.

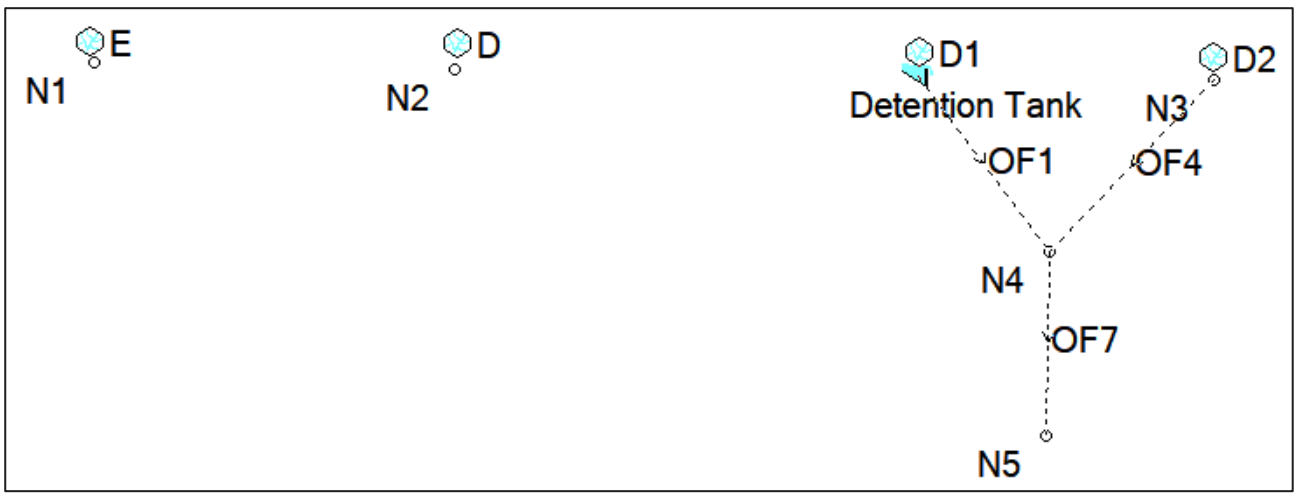


Figure 6-1 DRAINS Model Setup (Existing, Developed, Mitigated Scenarios Left to Right)

6.2.5 Model Results

The following results have been captured from the DRAINS model. Table 6-4 below summarises the peak flow rates for each identified critical storm across the assessed AEP range at the assessment point for the catchment.

Table 6-4 Summary of DRAINS Hydrologic Results

Scenario	AEP (%)	63.2	50	20	10	5	2	1
Existing	Median Flow (m^3/s)	0.025	0.029	0.041	0.052	0.059	0.068	0.076
Developed	Median Flow (m^3/s)	0.031	0.035	0.048	0.057	0.065	0.072	0.080
Mitigated	Median Flow (m^3/s)	0.025	0.028	0.040	0.050	0.058	0.067	0.076

**The base detention outlet is to be directed to the bio-retention for stormwater quality treatment. This outlet in isolation manages flows up to the 63.2% AEP flow event (water height 0.92m), exceeding the minimum low flow event for treatment (4EY). Refer Engineering Drawings within Appendix B.*

6.3 Objective Discussion

The above hydrologic investigation and runoff-routing exercise has demonstrated that suitable measures can be included in the design of the proposed development to ensure that there is no increase in median discharge flow rates being directed off-site to existing infrastructure for 63.2% AEP events to 1% AEP events in accordance with QUDM and ARR2019.

6.3.1 Sensitivity Test – Orifice Blockage Scenario

A sensitivity test has been undertaken by removing the orifice flows from the DRAINS model and relying on the capacity of the proposed weir to simulate a 100% orifice blockage scenario. The water depth within the detention system in this scenario is **2.05m**.

7 STORMWATER QUALITY (OPERATION)

7.1 Objectives

The following operational water quality objectives are set out by Council:

- Gross Pollutants (>5mm) – 90% reduction in mean annual load.
- Total Suspended Solids (TSS) – 80% reduction in mean annual load.
- Total Phosphorous (TP) – 60% reduction in mean annual load.
- Total Nitrogen (TN) – 45% reduction in mean annual load.

7.2 Proposed Stormwater Treatment Devices

WSUD aims to minimise the impact of a development on the natural water cycle by reducing the export of pollutants, sediments and nutrients from the site into the natural watercourse. To treat the stormwater runoff from the site, various treatment devices can be used throughout the development area and these concepts can be integrated into the overall design of the road layouts, road cross sections, stormwater layouts and water supply reticulation systems. Stormwater from each development stage will follow a specially designed stormwater quality treatment train prior to discharge from the site, which will ensure compliance with the water quality objectives.

A treatment train has been proposed for the site which comprises of several individually designed treatment devices that collectively contribute to the achievement of whole site water quality objectives. It should be noted that pools and transformers have been excluded from the quality treatment areas.

7.3 Modelling

Modelling of the site was undertaken using the 'Model for Urban Stormwater Improvement Conceptualisation (MUSIC)' as promoted by CoGC and the South East Queensland Healthy Waterways Partnership. The development was modelled using the split catchment approach. An appropriate type of land use was applied to all surface types within the developed catchments; where individual treatment devices were assigned the relevant modelling treatment parameters. Consequently, a treatment train was established for each site, ensuring that water discharging from site adheres to the specified Water Quality Objectives.

Meteorological data for input into MUSIC was obtained from Hinze Dam Rainfall Station 40584 from the Bureau of Meteorology. Six-minute time step rainfall data was obtained for the climate period from 1/1/1976 to 31/12/1985. The catchment parameters of the MUSIC modelling are specified within the Water by Design MUSIC Modelling Guidelines Version 3 (2018) and have been modelled as such.

7.3.1 Pollutant Source Node Details

The pollutant source node parameters input into the MUSIC model were determined using the Water by Design MUSIC Modelling Guidelines Version 3 (2018), specifically Tables 3.7 and 3.8 for urban residential surface types. It is noted that all base flow parameters for roof surfaces are adopted as 0.00 or N/A.

Approximate landscape imperviousness was considered for ground areas to ensure an accurate generation of pollutants.

A summary of the source these nodes have been provided in Table 7-1 below. The developed catchment markup provided in Appendix D informed the modelled catchment areas.

Table 7-1 Summary of Source Node Details

MUSIC Source Node	Area (ha)*	Imperviousness (%)
Roof	0.032	100%
Upper Ground	0.056	81%
Ground	0.013	41%
Ground (Bypass)	0.002	100%

7.3.2 Treatment Device Details – Bio-retention

A bio-retention area is a vegetated region where runoff is filtered through a filter media layer (e.g. sandy loam) as it percolates downwards to receiving underlying drainage. Specific vegetation is to be incorporated into the landscaping of bio-retention areas which effectively reduce nutrient loads. Appendix A of Healthy Waterways' Water Sensitive Urban Design Technical Guidelines for South East Queensland provides guidance on selecting appropriate plant species for systems where plants have a functional role in stormwater treatment.

A typical example of a bio-retention area in operation with suitable vegetation is presented in Figure 7-1 below.

A typical section, further standard details and maintenance checklist are provided in Appendix B and E respectively.



Figure 7-1 Example of an Urban Bio-Retention Basin (Courtesy Water by Design)

General parameters for the bioretention system have been modelled as per Table 7-2 below.

Table 7-2 Bioretention Design Parameters

Parameter	Bio-retention Basin
Minimum Filter Media Area (m^2)	11.5m^2 *
Minimum Ponding Surface Area (m^2)	11.5m^2 *
Extended Detention Depth Within Ponding Area(m)	0.30
Minimum Filter Media Depth (m) (excluding transition layer and under drainage)	0.70
Underdrainage Layers (m)	0.30
Minimum Saturated Hydraulic Conductivity (mm/hour)	200
Maximum Filter Media Total Nitrogen (mg/kg)	400
Maximum Filter Media Orthophosphate (mg/kg)	30

**Excludes outlet protection and collection pits.*

7.3.3 Low Flow Splits

A low flow split has been modelled for the lower ground areas directed to the basement pump. This has been modelled using a generic node with a high flow bypass. No treatment reduction is applied to the node.

The treatment objectives are achieved with a **high flow bypass of 5 L/s for lower ground areas**. Refer to Section 5.2 for recommendations for future building hydraulics / detailed design.

7.3.4 Model Layout and Results

A diagrammatical view and pollutant reduction results can be found in Figure 7-2 below.

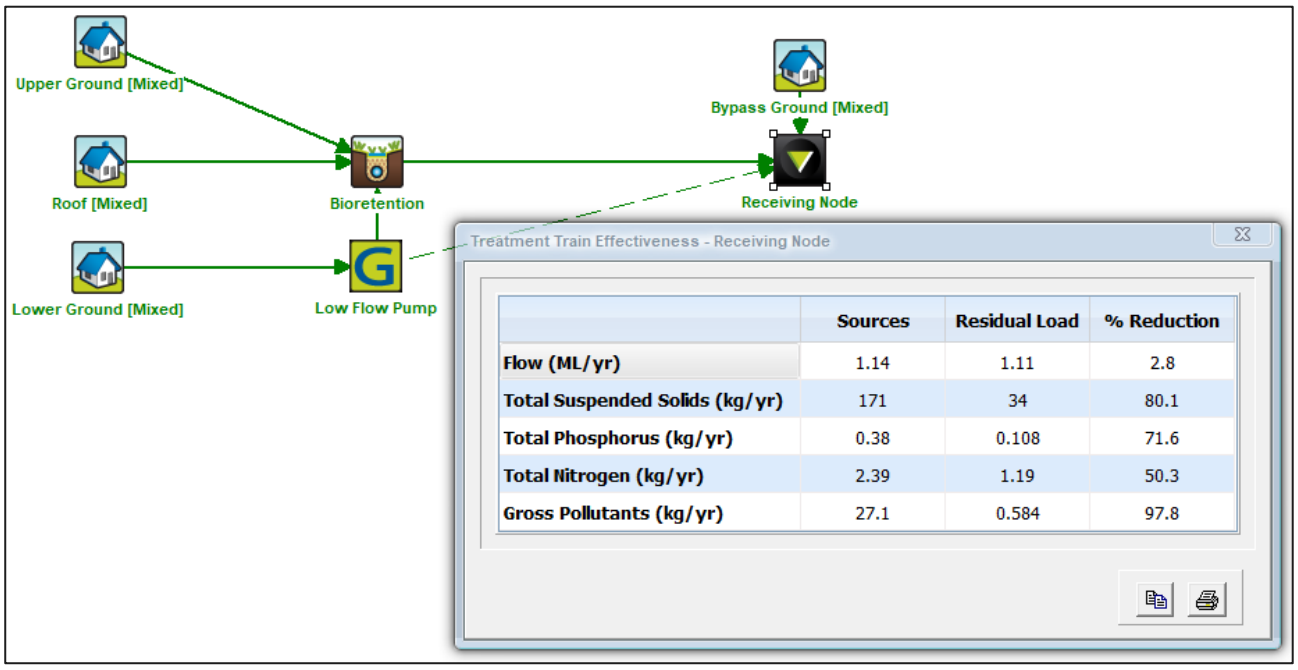


Figure 7-2 MUSIC Model Layout and Results

8 STORMWATER QUALITY (CONSTRUCTION)

8.1 Water Quality Objectives

Table 8-1 Construction Phase Quality Objectives (SPP and CoGC LDG)

Pollutant	Criteria
Drainage Control	Design life and design storm of temporary drainage works: • Disturbed area open for <12 months—1 in 2 ARI. • Disturbed area open for 12-24 months—1 in 5 ARI. • Disturbed area open for > 24 months—1 in 10 ARI.
Erosion Control	• Minimise exposure of disturbed soils at any time. • Avoid or minimise large construction activities in the wet season. • Divert water run-off from undisturbed areas around disturbed areas. • Use erosion risk ratings to determine appropriate erosion control measures.
Sediment Control	Use soil loss rates to determine appropriate sediment control measures Design storm for sediment control basins should be based on retaining the maximum sediment quantity for the maximum volume of water run-off Site discharge during sediment basin dewatering should not exceed 50 mg/L TSS and pH between 6.5–8.5
Stormwater Drainage / Flow Management	Hydraulics and hydrology—Take all reasonable and practicable measures to minimise significant changes to the natural waterway hydraulics and hydrology from: • peak flow for the one-year and 100-year ARI event (respectively for aquatic ecosystems and flood protection). • run-off frequency and volumes entering receiving waters. • Uncontrolled release of contaminated stormwater.
Water Quality Outcomes	Stormwater flows from undisturbed and disturbed areas—manage to help protect environmental values Coarse sediment—coarse sediment is retained on site Fine sediment—Site discharge during sediment basin dewatering has a TSS concentration less than 50 mg/L Turbidity—Site discharge during sediment basin dewatering has a turbidity (NTU) less than 10% above receiving waters turbidity— measured immediately upstream of the site Nutrients (N & P)—Nitrogen and phosphorus are managed through sediment control. pH—Site discharge during sediment basin dewatering has a pH range 6.5–8.5 Litter and other waste—Prevent litter/waste entering the site, the stormwater system or watercourses that discharge from the site. Also minimise or sufficiently contain on-site litter and waste production and regularly clear waste bins Hydrocarbons and other contaminants—Hydrocarbons and other contaminants are prevented from entering the stormwater system or internal watercourses that discharge from the site. Wash down water—Wash down water is prevented from entering the stormwater system or internal watercourses that discharge from the site Cations and anions—Cations and anions including aluminium, iron and Sulfate are managed as required under an approved acid Sulfate soil management plan

Table 8-1 provides the construction phase stormwater quality objectives outline by the State Planning Policy. Additional relevant acts, policies and information that may be useful for construction phase planning include:

- Environmental Protection Act (1994).
- Environmental Protection (Water) Policy (2009).
- Queensland Development Code, Sediment and Erosion Control (2010).
- Best Practice Erosion and Sediment Control for Building and Construction Sites Guidelines (2008).

8.2 Erosion and Sediment Control Plan Purpose

During the construction phase it shall be the Principal Contractor's responsibility to ensure the objectives of Table 8-1 are achieved.

The following section of this report provides a suggested framework for an Erosion and Sediment Control Plan. This includes recommended actions and responses for specific activities; monitoring and reporting; and construction of specifically designed site-specific sediment basins.

8.3 Specific Activities

8.3.1 Erosion and Sediment Control of Disturbed Land

During the construction phase it shall be the Principal Contractor's responsibility to ensure the following:

- Diversion of any clean water runoff that may interfere with land disturbance by the use of earth bunds, or other control devices deemed appropriate by a suitable supervisor.
- Reduction of sediment migration from disturbed land parcels by implementing silt fences, sediment basins or other control devices as deemed appropriate by a suitable supervisor.
- Where cut to fill operations produce a spoil it is recommended that the excess material be placed upstream of the excavation location to ensure any sediment runoff is directed back into the trench. Earth bunds or sediment fences may be required to control direction of sediment flow should the spoil be placed on the downstream side of the excavation site.
- Control measures such as a gully pit sediment barrier shall be installed around inlet pits where required reducing the potential for sediment discharge into the surrounding stormwater system.
- Any sediment deposited from construction vehicles will be swept up and removed.
- Erosion and sediment control devices may only be removed once disturbed lands which they are protecting are rehabilitated and capable of resisting further erosion.

8.3.2 Spoil and Stockpile Management

It shall be the Principal Contractor's responsibility to oversee the following controls during the construction phase unless otherwise specified:

- The placement of spoil and stockpile material shall be kept at a maximum distance from stormwater inlets, gutters and stormwater pipes to reduce unnecessary sediment migration into nearby infrastructure.
- Spoil and stockpile material shall be placed in a way that reduces the likelihood of sedimentation, erosion and slippage. Advice from an appropriate project manager/representative shall be sought in this instance.
- Spoil or stockpile material that is deemed a contaminant shall be placed on a designated zone of either fill material, plastic or concrete with the installation of appropriate containment devices. Advice from an appropriate project manager/representative shall be sought in this instance as the resulting control will be highly dependent on the severity of contamination.
- It shall be the Project Manager's responsibility to foresee and develop appropriate control measures to prevent the impacts of spoil and stockpile material prior to construction activities. Monitoring and reporting shall also be required during the implementation of any given device associated with spoil and stockpile management.

8.3.3 Erosion Control

It shall be the Principal Contractor's responsibility to oversee the following controls during the construction phase:

- Traffic of any type shall be kept away from areas of rehabilitation to promote stabilisation of the zone.
- Where wind and water are acknowledged as potential erosion sources temporary protection shall be installed. Such measures only apply to zones of spoil, stockpile and land disturbance which are unlikely to receive works within a period of 6-8 weeks. Further advice from an appropriate project manager/representative shall be sought in this instance as the resulting control will be highly dependent on the disturbance type and erosion source.
- Once viable, final landscaping shall be undertaken on applicable zones to increase stability.

8.3.4 Personnel Training

It shall be the Principal Contractor's responsibility to oversee the following training protocols during the construction phase:

- Environmental management and incident reporting is to be included on all site induction courses.
- All personnel are to receive adequate training in workplace health and safety issues, environmental management, best practice erosion and sediment control practices, incident reporting procedures and where applicable site inspection and maintenance procedures.

8.3.5 Miscellaneous

It is the Principal Contractor's responsibility to ensure erosion and sediment controls are operated and maintained in an effective operational condition. These structures are not allowed to accumulate sediment volume in excess of 70% sediment storage design capacity as per Section 6 of the Urban Stormwater Quality Planning Guidelines 2010.

- Sediment removed from control measures must be disposed of in a manner approved by the local Council that does not cause pollution and forms part of the Contractor's obligation.
- Any chemicals, fuel or oil stored on site shall be stored under cover in a bounded area or placed sufficiently above ground level to prevent contamination of surface water.
- A waste concrete receptor (disposal area) must be established if significant concreting is to occur on site. The site must be surrounded by perimeter bunds and be clearly signed.
- A general waste collection area shall be established which is to include appropriate pollutant runoff controls, dependent on the nature of the waste.

8.4 Project Personnel Responsibilities

A description of the key personnel involved with implementing the Erosion and Sediment Control Plan are listed in Table 8-2. It is recommended that all parties involved attend a pre-construction conference to discuss and clarify all issues associated with sediment and erosion control as well as this plan.

Table 8-2 Project Personnel Responsibilities

Project Role	Responsibilities
Superintendent	• Authorisation of this plan; and • Review and monitoring of this plan.
Contractor / Site Manager	• Implementation of this plan; • Monitoring of this plan; • Supervising any activities or requirements required by this plan; • Ensuring all personnel are aware of the contractual agreements associated with this plan.
All Personnel	• Ensuring they are aware of the contractual agreements associated with this plan; and • Informing appropriate personnel of any issues that may arise with respect to the desired sediment and erosion control measures.

8.5 Monitoring and Responsibility

8.5.1 All Personnel

It is the obligation of all personnel to report any failures in the erosion and sediment control works utilised during the project life cycle. Any identified errors within the sediment and erosion control system shall be reported in writing to a relevant project manager. A formal inquiry shall be undertaken in accordance with the reported issue as well as the relevant party procedures (i.e., Principal Contractor).

8.5.2 Contractor/Contractor's Foreman

It shall be the responsibility of the Contractor and Contractor's Foreman to monitor and report on the erosion and sediment control measures utilised in the construction phase. Inspections are to be undertaken:

- On a daily basis during earthworks, land disturbance, spoil or stockpile activities and rain events.
- Weekly during site inactivity.
- Within 24 hours prior to expected rainfall and 18 hours prior to intense rainfall events.

The following shall be inspected or reported on:

- Erosion and sediment control devices are in the correct location and are working as defined by this plan.
- Drainage systems both internal and external to the site are operating effectively or to pre-construction efficiencies.
- Spilled material is removed if it can potentially mobilise via stormwater runoff or wind.
- Stabilisation of disturbed land parcels has been undertaken in an effective manner.
- Excess sediment has been removed from erosion and sediment measures appropriately if the device is operation ineffectively or requires decommissioning.
- It is understood that repairs, maintenance or reinstallation may be required if any control measures are operating inadequately, or if infrastructure is damaged due to inefficient operation of the outlined measures.

8.5.3 Environmental Representative

It shall be the responsibility of the environment representative to periodically inspect and report on the effectiveness of the erosion and sediment controls during the construction phase of the project. Technical advice shall be given to personnel outlying any uncertainty with regards to the applicability, installation, operation, maintenance, removal or rehabilitation of any sediment and erosion control.

8.6 Construction Phase Sediment Control Devices

As the site has been assessed as a single catchment, it is appropriate to approach the assessment of construction phase sediment devices in a similar manner.

In accordance with the Best Practice Erosion and Sediment Control Manual (IECA 2009) the construction phase catchment has been classified to determine the level of sediment and erosion control techniques required. The site is identified as per Table 4.4.6 (IECA 2009) to be closest to the Southport locality and therefore attracts an average monthly rainfall depth of 56m to 205mm.

As the extent of soil disturbance is minimal, Type 3 techniques will be used in accordance with Table 4.5.3. This will require control techniques such as a vehicle shakedown at the site entry, and sediment fences. Specific detailed design plans will be formulated at respective future phases of the development such as operational works.

9 ASSET MAINTENANCE AND HANDOVER

All the stormwater quality controls detailed in this document are contained within the development site and will remain an asset of the development's property owner, Body Corporate or similar internal authority.

The below denotes the anticipated access location for the proposed treatment devices.

- **Detention tank:** Accessed from upper podium parking above.
- **Bio-retention system:** Access from west ground floor driveway.

Additional information including integration drawings and maintenance checklist can be found in Appendix B and Appendix E respectively.

10 CONCLUSION

This SBSMP has been prepared to provide a design proposal and guide to the stormwater management techniques for the site.

The primary objectives of this report are achieved as follows:

Lawful Point of Discharge (LPoD)

- The site proposes to maintain the LPoD (Anne Avenue) after receiving appropriate treatment on site.

Stormwater Quantity

- The hydrological assessment undertaken has determined a suitable detention system to mitigate peak developed flow rates to the peak existing flow rates.

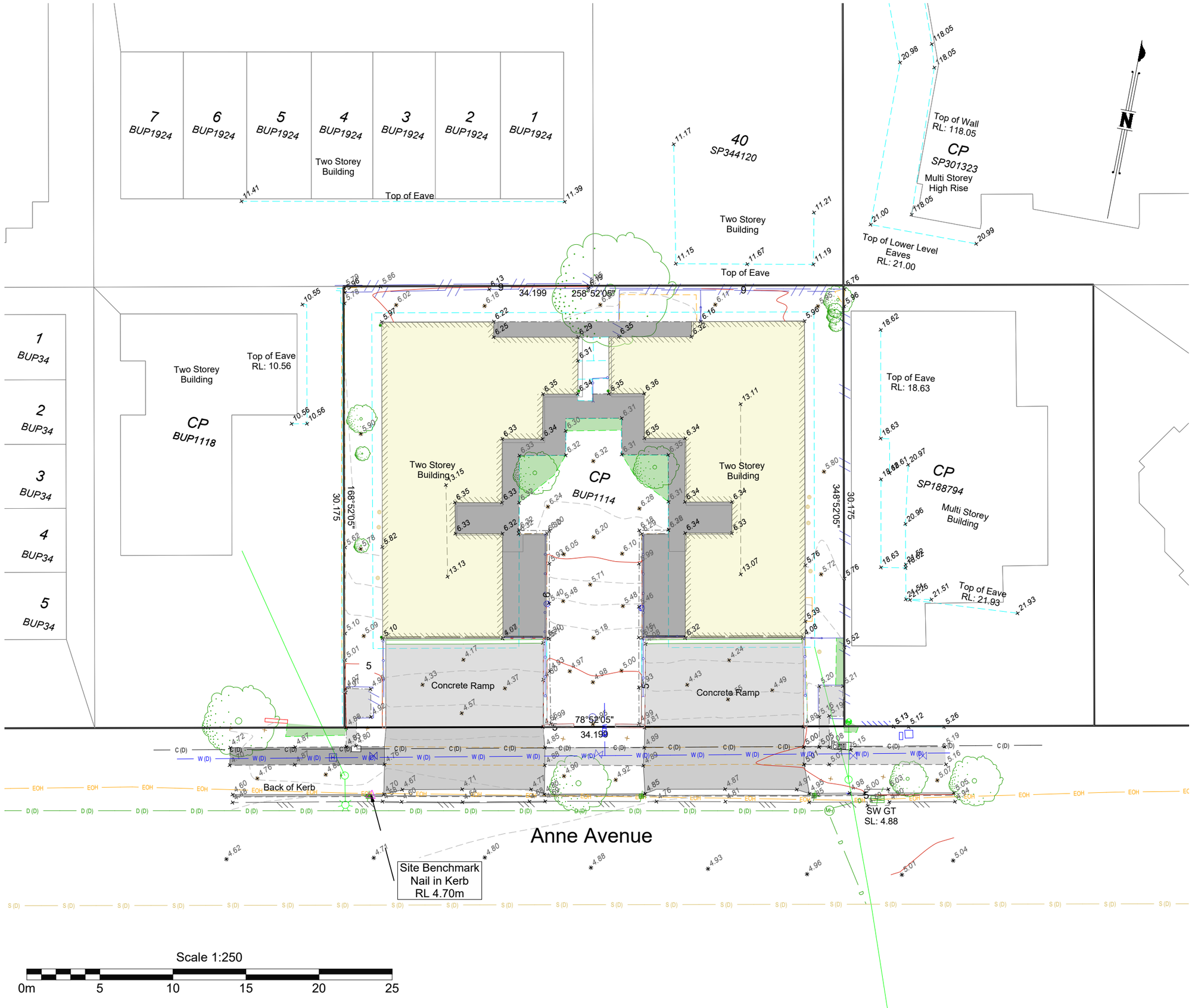
Stormwater Quality

- A bio-retention system is proposed to meet operational phase stormwater quality objectives.

Erosion and Sediment Control

- Type 3 sediment discharge techniques will be used comprising of a vehicle shakedown, sediment fences and gully inlet protection.

APPENDIX A
Survey



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LEGEND:

- Road: Kerb Back, Kerb Invert, Edge of Bitumen, Edge of Gravel, Road Crown, Traffic Park Meter, Traffic Light, Traffic Pit, Traffic Sign, Traffic Post Box
- Structures: Building Line, Roof Ridgeline, Fence Line, Gate, Hand Rail, Cattle Grid, Bollard
- Sewer: Sewer Line, Valve, Inspection Opening, Manhole
- Electrical: Electricity Line, Overhead Line, Pits/Manholes, Pole, Street Light, Light In-Ground
- Water: Water Line, Meter, Valve, Fire Hydrant, Tap, Sprinkler
- Fuel: Fuel Line, Fitting
- Terrain: Driveway, Footpath, Slab Edge, Retaining Wall Base, Retaining Wall Top, Change of Grade, Top of Bank, Toe of Bank, Waterline, Garden Edge, Creek Toe of Bank, Creek Top of Bank, Creek Invert, Creek Waterline, Tree, Tree Canopy, Control Point/PSM
- Drainage: Drainage line, Open Drain, Manhole, Field Inlet, Downpipe
- Communications: Communication Line, Overhead Line, Pits/Manholes, Pillar
- Gas: Gas Line, Valve, Marker
- General: Pothole
- Subsurface Utility - QL: * QL-A (H±50mm,V±50mm), * QL-B (H±300mm,V±500mm), * QL-C (H±300mm,2D), * QL-D (Exist Record)

NOTES:

1. Drawn to scale on an A3 sheet.
2. Contour Interval... 0.25m
3. All levels are in metres on the Australian Height Datum referred to PSM549 - RL 4.398 AHD situated in Surf Pde /Phillip Ave.
4. All Boundaries are vide title and subject to confirmation by survey.
5. The Location of Underground services are in accordance with AS5488:2019, the Australian Standard for classification of Subsurface Utility Information (SUI). The exact nature and location of these services should be confirmed prior to construction.
6. Area vide title :1032 m²
7. Field Survey Completed on: 21/11/2024

Level datum: AHD Derived (PSM549)
Horiz datum: MGA Derived DCDB (B83824)
Coord Origin: DCDB (SE Cnr Lot BUP1114)
GDA System: GDA2020 Coordinate System: Plane 1:1
Meridian: + 10°00'04" B83824

Title:

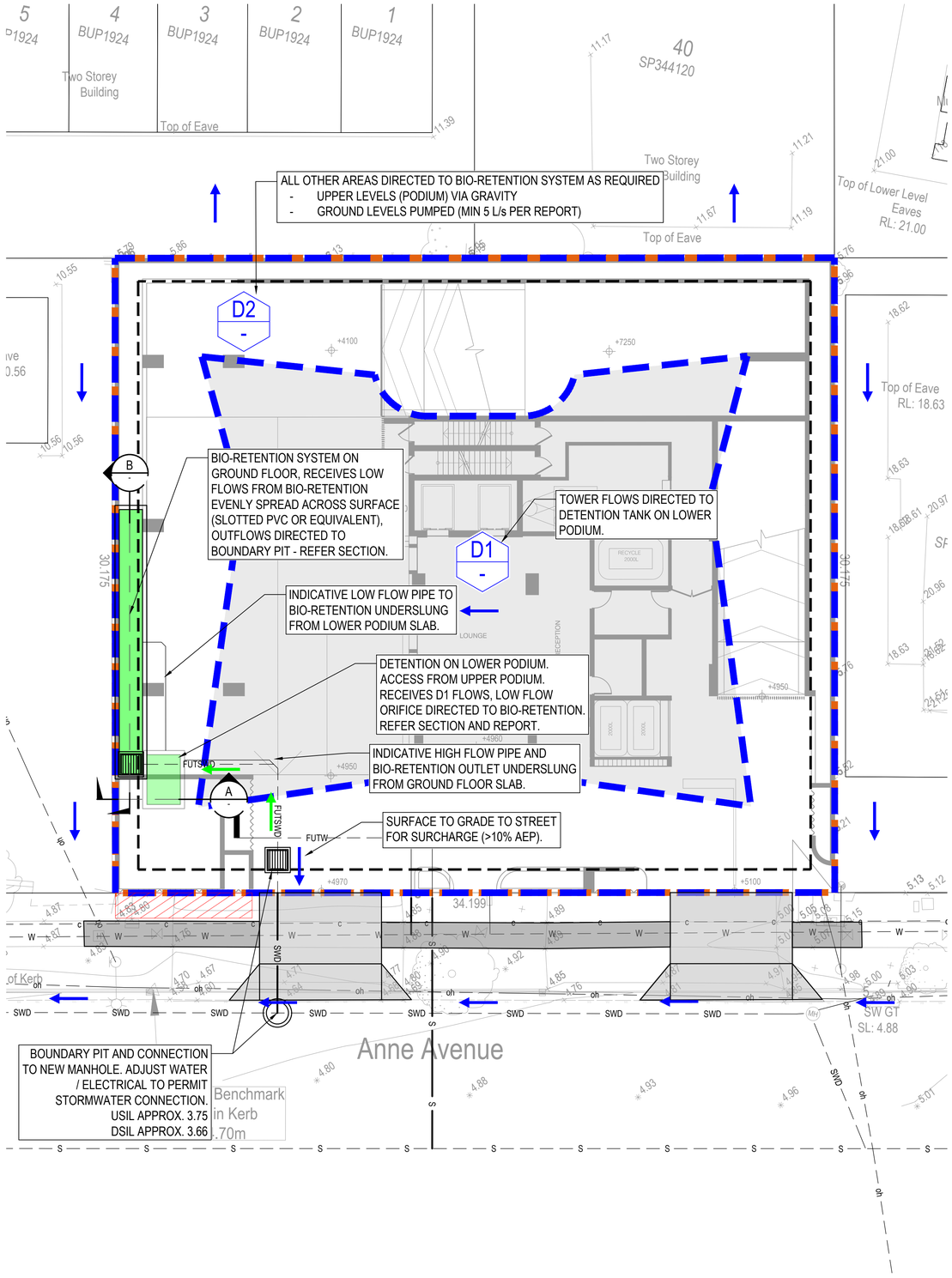
VERIFICATION PLOT

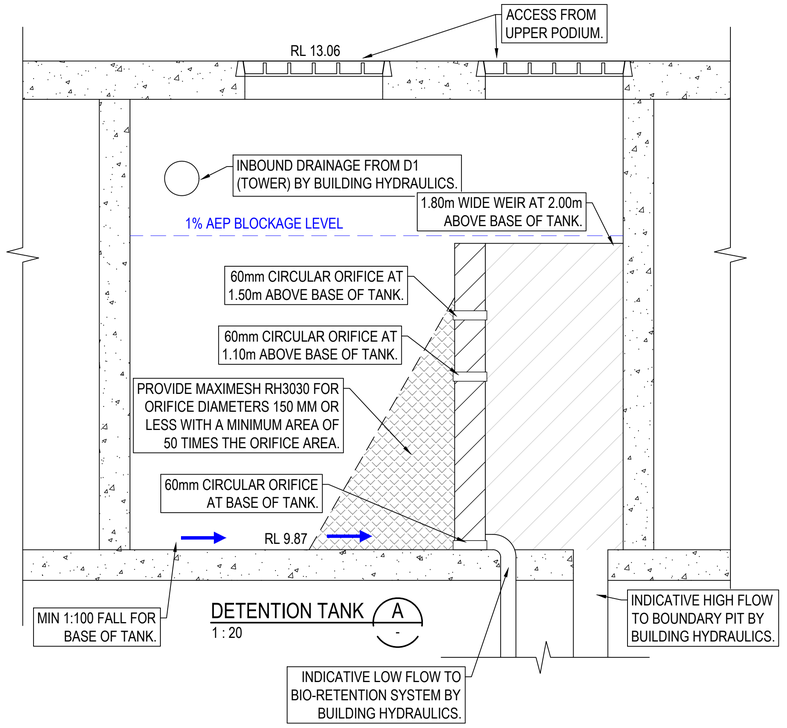
Detail Survey of
19-21 Anne Ave, Broadbeach
CP on BUP1114

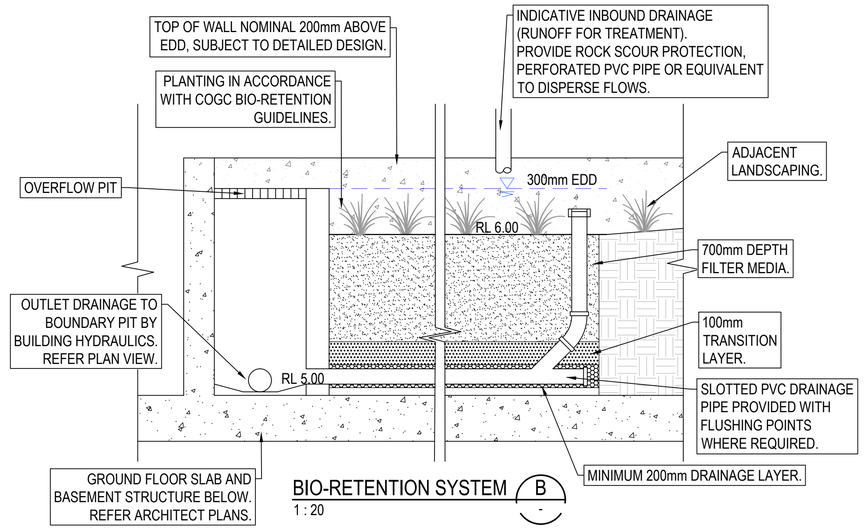
Client:	**Bassar Construction Group Pty Ltd**		
Locality:	Broadbeach		
Local Gov:	Council of the City of Gold Coast		
Surveyed By:	KW	Approved:	RC
Date Created:	27/11/24	Scale:	1:250
File Ref:			241836P
Plan No:	**241836_S001_VER**	Rev:	**A**

A3

APPENDIX B
Engineering Drawings







NOTES

1. PROPOSED SERVICES SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED FIELD SURVEY, DESIGN AND APPROVAL BY AUTHORITIES.
2. REFER TO PROJECT SURVEY AND OTHER ASSET INFORMATION FOR LOCATION EXISTING SERVICES AND ASSUMPTIONS.
3. INTERNAL DRAINAGE IS INDICATIVE AND SUBJECT TO BUILDING HYDRAULIC ENGINEER DESIGN.
4. REFER TO STORMWATER MANAGEMENT PLAN FOR MANAGEMENT DEVICE DETAILS AND SPECIFICATIONS.

LEGEND

- SITE BOUNDARY
- 4.25 EXISTING SURFACE LEVEL
- SWD EXISTING STORMWATER DRAINAGE
- S EXISTING SEWERAGE RETICULATION
- RM EXISTING SEWER RISING MAIN
- W EXISTING WATER RETICULATION
- c EXISTING COMMS RETICULATION
- e EXISTING ELECTRICAL
- oh EXISTING OVERHEAD ELECTRICAL
- fo EXISTING FIBRE OPTIC
- g EXISTING GAS
- SWD PROPOSED STORMWATER DRAINAGE
- S PROPOSED SEWERAGE RETICULATION
- W PROPOSED WATER RETICULATION
- FUTS FUTURE PRIVATE SEWER
- FUTSWD FUTURE PRIVATE STORMWATER
- FUTW FUTURE PRIVATE WATER
- SERVICE TO BE DECOMMISSIONED
- PROPOSED VXO / FOOTPATH
- 1/1 STORMWATER CATCHMENT AND LABEL
- DIRECTION OF FLOW
- INDICATIVE MAINTENANCE ACCESS
- PROPOSED STORMWATER SWALE
- TREATMENT DEVICE
- BYPASS AREA
- EDGE OF BASEMENT WALL

Issue	Description	DR	CH	VE	Date
01	ORIGINAL ISSUE	BW	AS	JS	18.02.25

Scales

0 2.5 5 7.5 10 12.5m
1 : 125

0 0.5 1 1.5 2m
1 : 20

100mm on Original

Architect: BDA ARCHITECTURE

Surveyor: BENNETT + BENNETT

Client: MARY ANNE DEVELOPMENTS

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

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Original Issue Signatures

Drawn	B. WIESER	Original Size	A1
Designed	B. WIESER	Height Datum	AHD
Project Manager	J. STOCKWELL	Grid	LOCAL
Verified	J. STOCKWELL		

Project: 19-21 ANNE AVENUE BROADBEACH

Title: STORMWATER MANAGEMENT LAYOUT PLAN

ARCADIS
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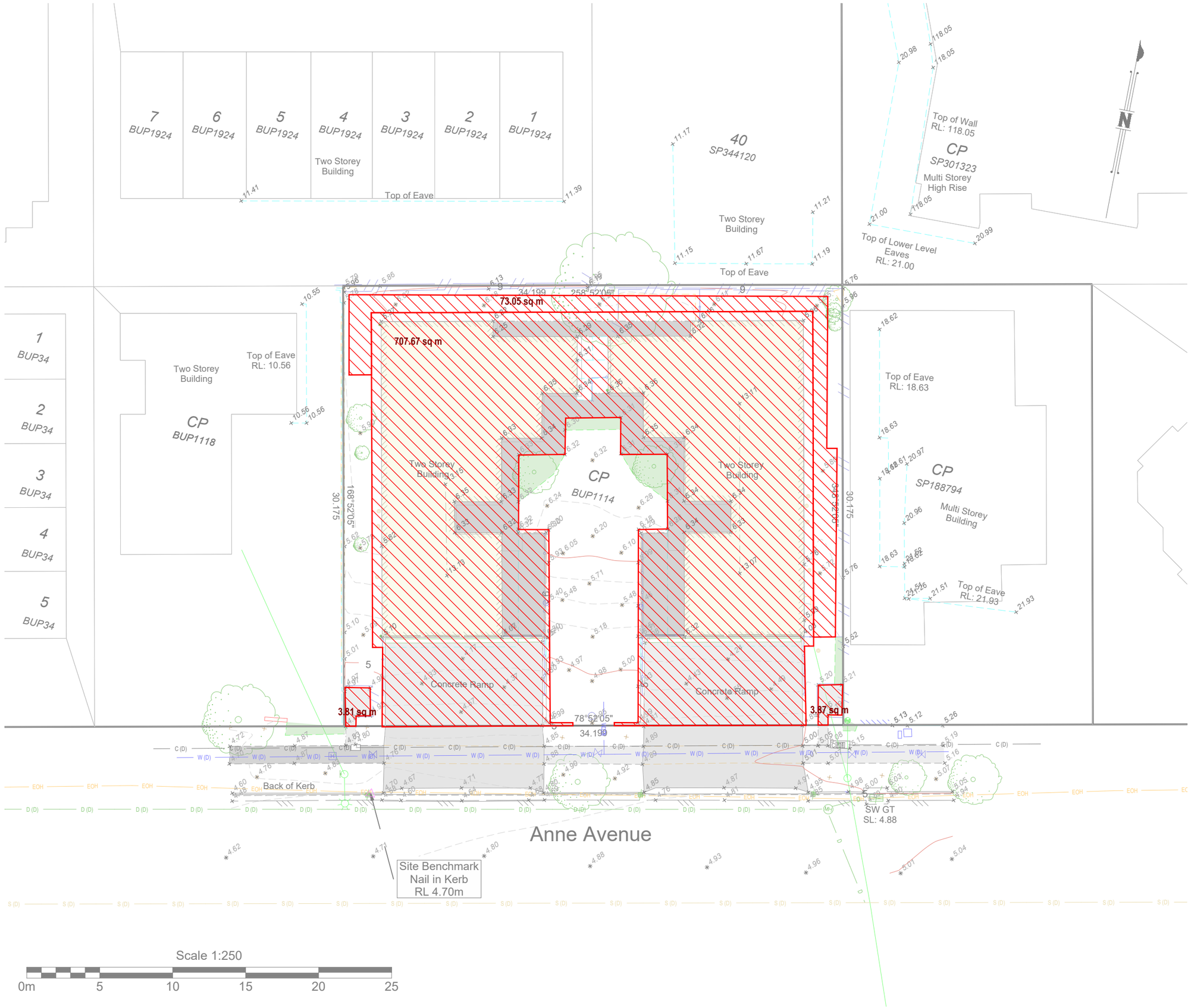
Southport QLD 4215
ABN 76 104 485 289
Tel No: +61 7 5532 3933
Fax No: +61 7 5591 4778
www.arcadis.com

Project No.	Folder Prefix	Zone | Stage | Phase	Discipline	Type	Drawing No.	Issue
30265222	DACAC	AA01DA	CV	DRG	0002	01

Date Plotted: 17 Feb 2025 - 01:55PM File Name: C:\Users\bw84462\ARCADIS\103057913 - 19-21 Anne Avenue, Broadbeach - Project\D-DigEng\DA-Drawings\30265222 - Drawing Set.dwg V1

APPENDIX C
Existing Catchment Areas



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LEGEND:

- Road: Kerb Back, Kerb Invert, Edge of Bitumen, Edge of Gravel, Road Crown, Traffic Park Meter, Traffic Light, Traffic Pit, Traffic Sign, Traffic Post Box
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- Electrical: Electricity Line, Overhead Line, Pits/Manholes, Pole, Street Light, Light In-Ground
- Water: Water Line, Meter, Valve, Fire Hydrant, Tap, Sprinkler
- Fuel: Fuel Line, Fitting
- Terrain: Driveway, Footpath, Slab Edge, Retaining Wall Base, Retaining Wall Top, Change of Grade, Top of Bank, Toe of Bank, Waterline, Garden Edge, Creek Toe of Bank, Creek Top of Bank, Creek Invert, Creek Waterline, Tree, Tree Canopy, Control Point/PSM
- Drainage: Drainage line, Open Drain, Manhole, Field Inlet, Downpipe
- Communications: Communication Line, Overhead Line, Pits/Manholes, Pillar
- Gas: Gas Line, Valve, Marker
- General: Pothole
- Subsurface Utility - QL: * QL-A (H±50mm,V±50mm), * QL-B (H±300mm,V±500mm), * QL-C (H±300mm,2D), * QL-D (Exist Record)

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Coord Origin: DCDB (SE Cnr Lot BUP1114)
GDA System: GDA2020 Coordinate System: Plane 1:1
Meridian: + 10°00'04" B83824

Title:

VERIFICATION PLOT

Detail Survey of 19-21 Anne Ave, Broadbeach CP on BUP1114

Client:	**Bassar Construction Group Pty Ltd**		
Locality:	Broadbeach		
Local Gov:	Council of the City of Gold Coast		
Surveyed By:	KW	Approved:	RC
Date Created:	27/11/24	Scale:	1:250
File Ref:			241836P
Plan No:	**241836_S001_VER**	Rev:	**A**

APPENDIX D
Developed Catchment Areas

LEGEND

ROOF =	3.48 sq m
ROAD =	3.48 sq m
PERVIOUS GROUND =	3.48 sq m
BYPASS =	3.48 sq m

74.7 sq m
879.65 sq m
25.33 sq m
449.84 sq m
323.66 sq m
2.4 sq m
2.39 sq m
77.51 sq m
19.79 sq m
1.01 sq m
2.88 sq m

2 STOREY BLDG
2 STOREY BLDG
5 STOREY BLDG
22 PHILLIP AVE
20 PHILLIP AVE
23 ANNE AVE
17 ANNE AVE
ANNE AVENUE
FOOTPATH
FOOTPATH
ROAD
VISITOR BIKE
6 VISITOR CARS
MOTORBIKE / SCOOTER
5 VISITOR BIKES
14M2 BIO RETENTION WITHIN PLANTER BED
1M DEEP PLANTER
FANCE / SCREEN TO +2M
RAMP DOWN
RAMP 1:4
RAMP 1:20
RAMP 1:10
TILT GATE
VOID
CARPARK 288 m²
STAIR 27 m²
LIFT 14 m²
WASTE STORE 34 m²
BIN WASH
BOH 24 m²
FCR 8 m²
OFFICE 6 m²
LOBBY 75 m²
BIN SERV 10 m²
WM 4 m²
PAD MOUNT 4.8x5 25 m²
GAS 4 m²
BOOSTER 3 m²
LOUNGE
RECEPTION
MAT
ENTRY
MAIL
DROPOFF
ENTRY HOLD POINT
MRV STANDING 4.5M CLEAR
TURNING BAY
DEMOLISH EXISTING CROSSOVER
PROPOSED CROSSOVER
DEMOLISH EXISTING CROSSOVER
PROPOSED CROSSOVER
POWER POLE
PIT
SK4.101
B SK4.101

LEVEL 1 - GROUND

DRAFT

CLIENT Mary Anne Developments	DISCLAIMER These drawings are conceptual design drawings only. The information contained herewith is subject to design development and further input from independant planning, structural, services and other technical consultants.	COPYRIGHT Copyright in this drawing is the property of BDA Architecture and may not be retained, copied in whole or in part or used other than for the specific uses, licence and site for which it has been prepared and issued.	PROJECT NAME 19-21 ANNE AVENUE TOWER	DRAWING LEVEL 1 - GROUND	PROJECT NO.: 562200 SCALE: 1:150 @ A3 DATE: 3/02/2025	DRAWING NO. SK2.103	ISSUE		50 Peerless Avenue, Broadbeach QLD 4218 Phone: 07 5555 2600 Email: bda@bdaarch.com.au bda architecture

APPENDIX E
Bio-Retention Checklist

BIORETENTION BASIN CONSTRUCTION INSPECTION CHECKLIST

Asset I.D.		Inspected By:	
Site:		Date:	
		Time:	
Constructed By:		Weather:	
		Contact During Visit:	

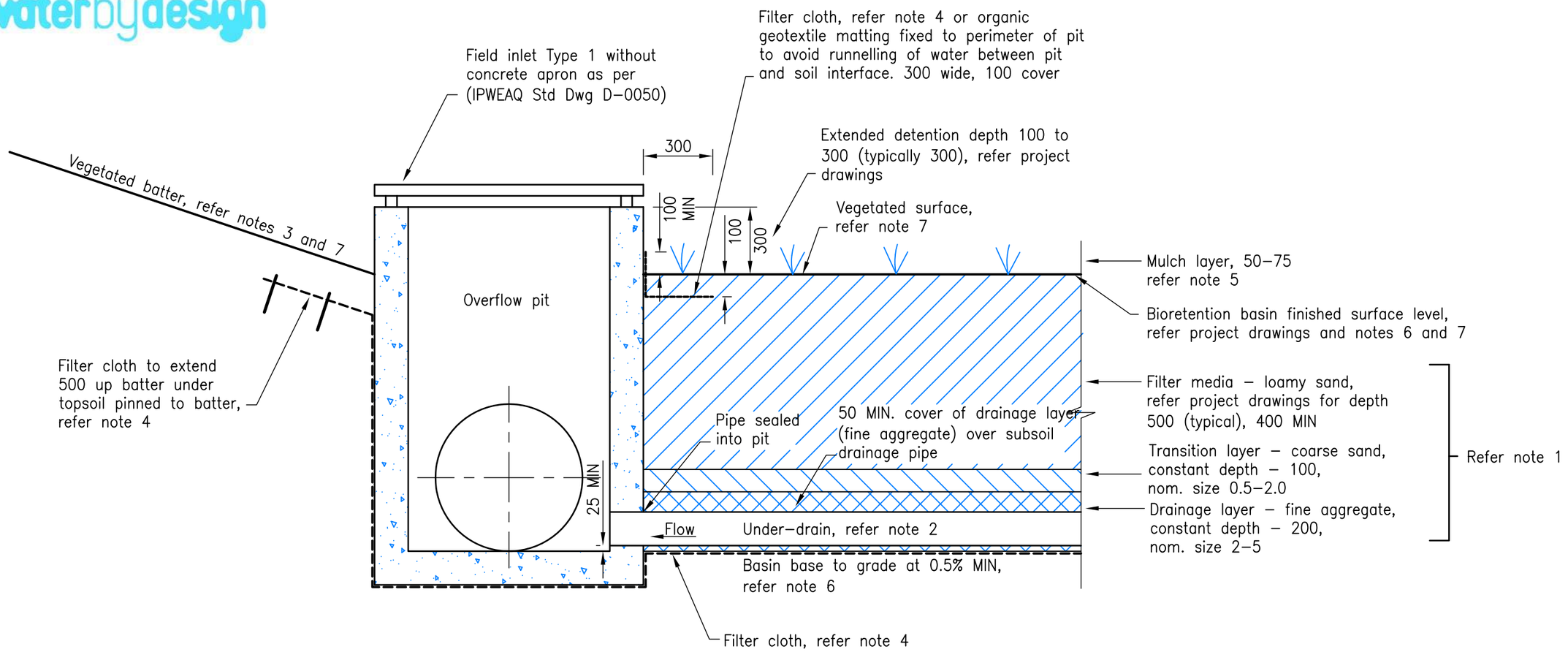
Items inspected	Checked Y	Checked N	Satisfactory Y	Satisfactory N	Items inspected	Checked Y	Checked N	Satisfactory Y	Satisfactory N
DURING CONSTRUCTION & ESTABLISHMENT									
A. FUNCTIONAL INSTALLATION					Structural components				
Preliminary Works					15. Location and configuration of inflow systems as designed				
1. Erosion and sediment control plan adopted					16. Location and levels of overflow pits as designed				
2. Temporary traffic/safety control measures					17. Under-drainage connected to overflow pits as designed				
3. Location same as plans					18. Concrete and reinforcement as designed				
4. Site protection from existing flows					19. Set down to correct level for flush kerbs (streetscape applications only)				
Earthworks and Filter Media					20. Kerb opening width as designed				
5. Bed of basin correct shape and slope									
6. Batter slopes as plans					B. SEDIMENT & EROSION CONTROL (IF REQUIRED)				
7. Dimensions of bioretention area as plans					21. Stabilisation immediately following earthworks and planting of terrestrial landscape around basin				
8. Confirm surrounding soil type with design					22. Silt fences and traffic control in place				
9. Confirm filter media specification in accordance with Step 4					23. Temporary protection layers in place				
9. Provision of liner (if required)									
10. Under-drainage installed as designed					C. OPERATIONAL ESTABLISHMENT				
11. Drainage layer media as designed					24. Temporary protection layers and associated silt removed				
12. Transition layer media as designed (if required)					Vegetation				
14. Extended detention depth as designed					25. Planting as designed (species and densities)				
					26. Weed removal and watering as required				

FINAL INSPECTION									
1. Confirm levels of inlets and outlets					6. Check for uneven settling of banks				
2. Confirm structural element sizes					7. Under-drainage working				
3. Check batter slopes					8. Inflow systems working				
4. Vegetation as designed					9. Maintenance access provided				
5. Bioretention filter media surface flat and free of clogging									

COMMENTS ON INSPECTION
ACTIONS REQUIRED
Inspection officer signature:

BIORETENTION BASIN MAINTENANCE CHECKLIST				
Inspection Frequency:	1 to 6 monthly	Date of Visit:		
Location:				
Description:				
Asset I.D.				
Site Visit by:				
INSPECTION ITEMS:		Y	N	Action Required (details)
Sediment accumulation at inflow points?				
Litter within basin?				
Erosion at inlet or other key structures?				
Traffic damage present?				
Evidence of dumping (e.g. building waste)?				
Vegetation condition satisfactory (density, weeds etc)?				
Watering of vegetation required?				
Replanting required?				
Mowing/slashing required?				
Clogging of drainage points (sediment or debris)?				
Evidence of ponding?				
Damage/vandalism to structures present?				
Surface clogging visible?				
Drainage system inspected?				
Resetting of system required?				
COMMENTS				

BIORETENTION BASIN ASSET TRANSFER CHECKLIST		
Asset I.D.		
Asset Location:		
Construction by:		
'On-maintenance' Period:		
TREATMENT	Y	N
System appears to be working as designed visually?		
No obvious signs of under-performance?		
MAINTENANCE	Y	N
Maintenance plans and indicative maintenance costs provided for each asset?		
Vegetation establishment period completed (2 years)?		
Inspection and maintenance undertaken as per maintenance plan?		
Inspection and maintenance forms provided?		
ASSET INSPECTED FOR DEFECTS AND/OR MAINTENANCE ISSUES AT TIME OF ASSET TRANSFER	Y	N
Sediment accumulation at inflow points?		
Litter within basin?		
Erosion at inlet or other key structures?		
Traffic damage present?		
Evidence of dumping (e.g. building waste)?		
Vegetation condition satisfactory (density, weeds etc)?		
Watering of vegetation required?		
Replanting required?		
Mowing/slashing required?		
Clogging of drainage points (sediment or debris)?		
Evidence of ponding?		
Damage/vandalism to structures present?		
Surface clogging visible?		
Drainage system inspected?		
COMMENTS/ACTIONS REQUIRED FOR ASSET TRANSFER		
ASSET INFORMATION	Y	N
Design Assessment Checklist provided?		
As constructed plans provided?		
Copies of all required permits (both construction and operational) submitted?		
Proprietary information provided (if applicable)?		
Digital files (e.g. drawings, survey, models) provided?		
Asset listed on asset register or database?		



BIORETENTION BASIN OVERFLOW PIT DETAIL

NOTES:

1. Bioretention media specification shall be in accordance with the Facility for Advancing Biofiltration "Guidelines for Soil Filter Media in Bioretention Systems". Bioretention hydraulic conductivity shall be in accordance with the Facility for Advancing Biofiltration 'Practice Note 1: In Situ Measurement of Hydraulic Conductivity". The number of samples to be tested shall be in accordance with the "Water Sensitive Urban Design Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands (Water by Design).
2. Under–drain: slotted rigid pipe (uPVC or similar to AS 2439.1) or approved equivalent, 0.5% MIN. grade. Refer project drawings for diameter and invert level (Typically ø100–150). Pipe should not be installed with a filter sock surrounding pipe. Under–drainage pipes shall be sealed into pits using grout or other approved watertight seal.
3. Refer to project drawings for vegetated batter slopes (1 in 3 MAX, 1 in 4 typical) and batter topsoil requirements.
4. Filter cloth – non–woven geotextile. Filter cloth not to be placed between any filter layers. Impervious liner may be required subject to soil testing requirements in accordance with the "Water Sensitive Urban Design Technical Design Guidelines" (Water by Design).
5. Basin finished surface level is top of filter media. Surface to be mulched and planted as per landscape drawings.
6. Construction tolerances as documented in the "Water Sensitive Urban Design Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands" (Water by Design) must be achieved. Construction tolerances must be noted on project plans. Invert levels of pits, pipes and base levels must be noted on project drawings.
7. Refer landscape drawings for plant specification. Plant specification and density shall be in accordance with the "Water Sensitive Urban Design Technical Design Guidelines" (Water by Design).
8. All dimensions are in millimetres unless otherwise noted.

These drawings have been developed in consultation between the participating councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate council

Rv.	DATE	REVISIONS
A	13/01/2010	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA
QUEENSLAND DIVISION INC.
STANDARD DRAWINGS

BIORETENTION STANDARD PROFILE
OVERFLOW PIT

DRAWING No.
WSUD–001
Rv. A

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2. Under–drain: slotted rigid pipe (uPVC or similar to AS 2439.1) or approved equivalent, 0.5% MIN. grade. Refer project drawings for diameter and invert level (typically Ø100–150). Pipe joins should be glued using plumbing cement. Pipe should not be installed with a filter sock surrounding pipe. Under–drainage pipes shall be sealed into pits using grout or other approved watertight seal.

3. Refer to project drawings for vegetated batter slopes (1 in 3 MAX, 1 in 4 typical) and batter topsoil requirements.

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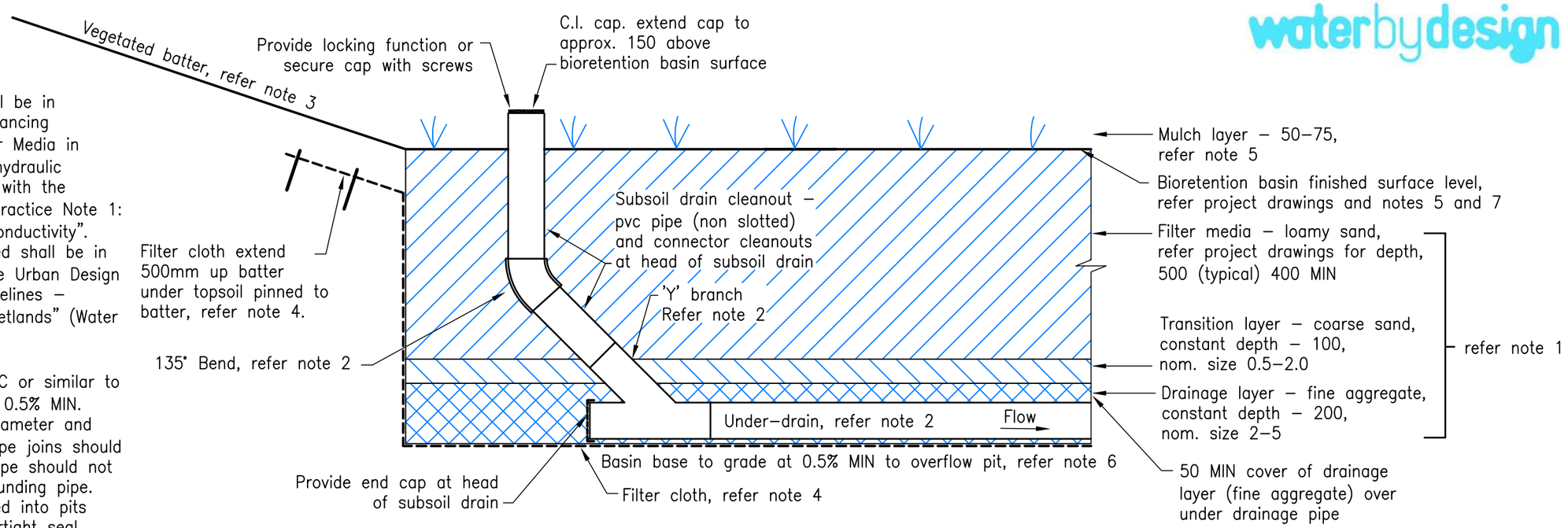
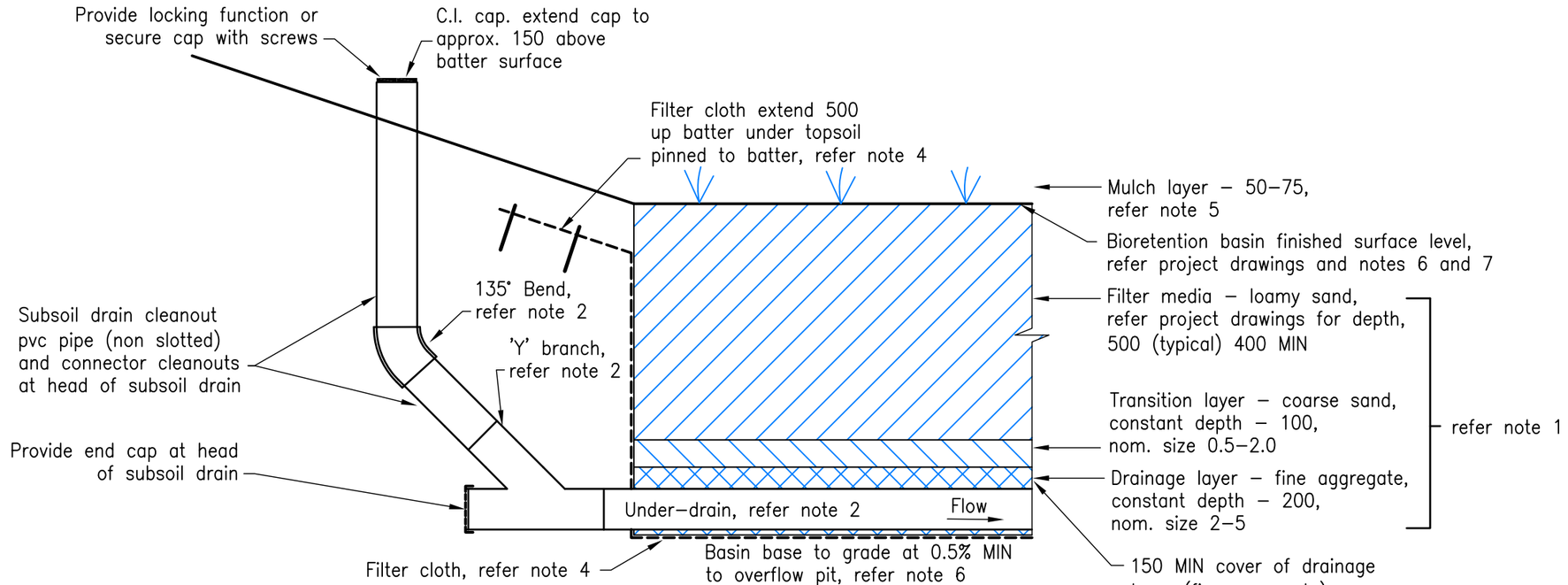


BIORETENTION UNDER–DRAIN CLEANOUT – IN BASIN



BIORETENTION UNDER–DRAIN CLEANOUT – IN BATTER

These drawings have been developed in consultation between the participating councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate council

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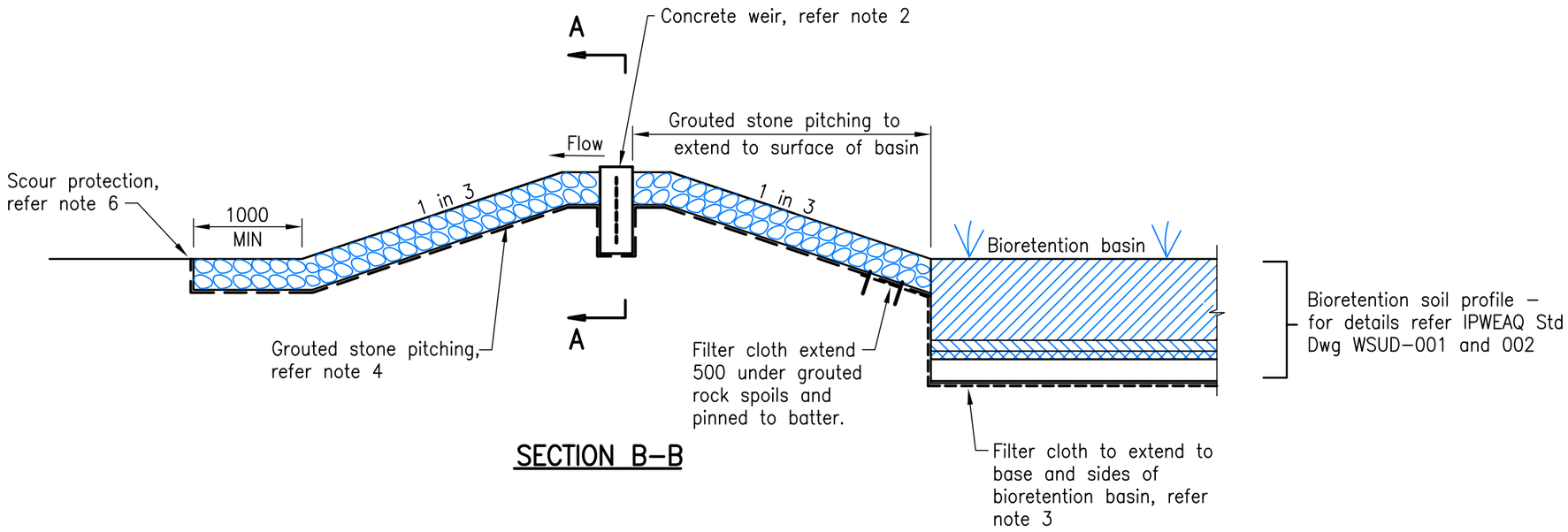
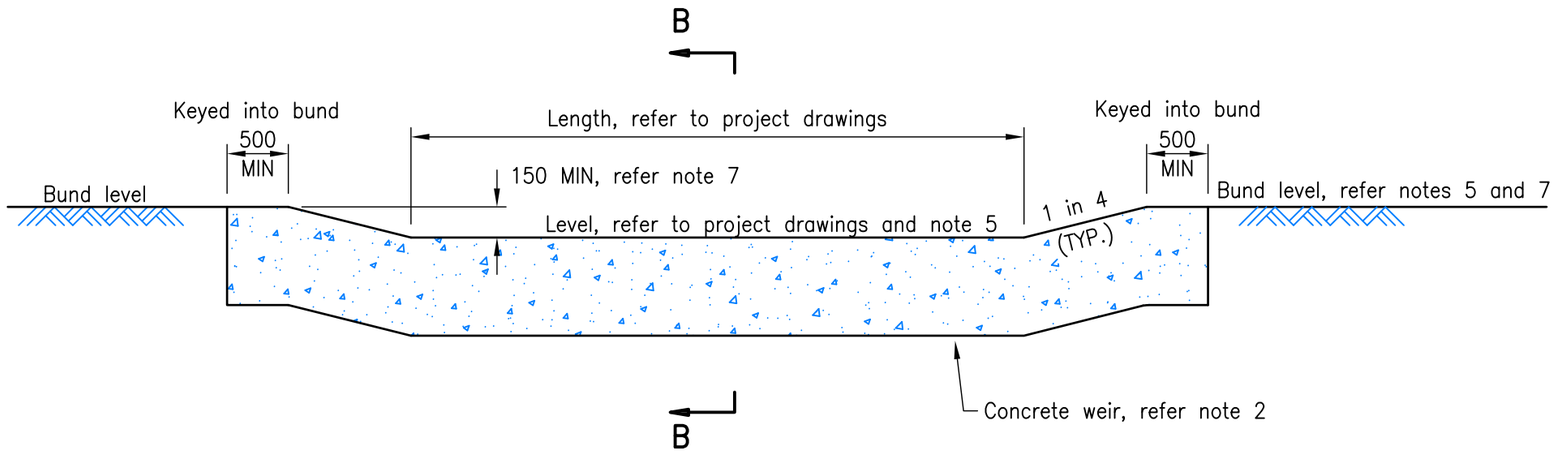
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA
QUEENSLAND DIVISION INC.
STANDARD DRAWINGS

BIORETENTION STANDARD PROFILE
UNDERDRAIN CLEANOUT

DRAWING No.
WSUD–003
A



SECTION B–B



SECTION A–A

NOTES:

1. Insitu material to be tested and approved by geotechnical engineer prior to weir construction.
2. Concrete weir – 300 wide x 800 high concrete (N32) with SL81 mesh placed centrally.
3. Filter cloth – non–woven geotextile. Filter cloth not to be placed between any filter layers. Impervious liner may be required subject to soil testing requirements in accordance with the "Water Sensitive Urban Design Technical Design Guidelines" (Water by Design).
4. Grouted stone pitching – stones 75–100, 300 thick on filter cloth, refer note 3. Refer landscape drawings and project drawings for plant specification and details. Geotechnical engineer to confirm compaction requirements for bund subsoil. Option to drill 100 cores through to subsoil to provide voids for planting (subject to flow velocities and local government requirements). Refer landscape drawings for planting details.
5. Construction tolerances as documented in the "Water Sensitive Urban Design Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands" (Water by Design) must be achieved. Construction tolerances and bund levels must be noted on project plans.
6. For extent and details of scour protection refer to project drawings.
7. Bund level, refer to project drawings for minimum freeboard requirements. Bund levels must be noted on project drawings.
8. All dimensions are in millimetres unless otherwise noted.

These drawings have been developed in consultation between the participating councils.
BEFORE USE, the user shall confirm that the drawing has been adopted by the appropriate council

Rv.	DATE	REVISIONS
A	13/01/2010	ORIGINAL ISSUE

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA
QUEENSLAND DIVISION INC.
STANDARD DRAWINGS

BIORETENTION BASIN
WEIR DETAILS

DRAWING No.

WSUD–006

Rv. A

APPENDIX F
Healthy Waters Code

City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

Please note:

Note: In accordance with Section 2.1 of City Plan, an assessment against State interest - Water quality (policies 4 and 5) of the State Planning Policy 2017 is required as the Healthy water development code does not fully integrate this State interest. A response table for policies 4 and 5 have been included below.

For assessment against the overall outcomes, refer to the appropriate code.

Note: The whole of the planning scheme is identified as the assessment benchmark for impact assessable development. This specifically includes assessment of impact assessable development against this strategic framework. The strategic framework may contain intentions and requirements that are additional to and not necessarily repeated in zone, overlay or other codes. In particular, the performance outcomes in zone codes address only a limited number of aspects, predominantly related to built form. Development that is impact assessable must also be assessed against the overall outcomes of the code as well as the strategic framework.

9.4.5 Healthy waters code

9.4.5.1 Application

This code applies to assessing material change of use, reconfiguring a lot or operational work for development where indicated within:

(1) **Part 5 Tables of assessment**; and

(2) **Table 9.4.5.1-1: Development triggers for applying the Healthy waters code.**

Table 9.4.5.1-1: Development triggers for applying the Healthy waters code

Topic	Assessment triggers	Applicable assessment benchmarks
Erosion and sediment control	All development.	For accepted development subject to requirements: **RO1, RO2**
		For assessable development: **PO1, PO2**
Stormwater quality and	For residential land uses involving one or more of the following:	For accepted development subject to requirements:

Topic	Assessment triggers	Applicable assessment benchmarks
waterway stability	(a) 3 or more dwellings; or (b) a land area greater than 1,200m^2; or (c) a newly constructed road (previously unformed road) exceeding 30m in total length; or (d) 200m^2 or more of uncovered new or refurbished car park area including parking bays and circulation driveways; or (e) the creation of high polluting outdoor activities (including Bulk landscape supplies, Garden centres, Tourist parks, Transport depots, Warehouses and Wholesale nurseries).	**RO3, RO5** For assessable development: **PO3, PO4, PO8 – PO13**
	For non-residential land uses involving one or more of the following: (a) a land area greater than 1,200m^2; or (b) a newly constructed road (previously unformed road) exceeding 30m in total length; or (c) 200m^2 or more of uncovered new or refurbished car park area including parking bays and circulation driveways; or (d) the creation of high polluting outdoor activities (including Bulk landscape supplies, Garden centres, Tourist parks, Transport depots, Warehouses and Wholesale nurseries).	For accepted development subject to requirements: **RO4, RO5** For assessable development: **PO3, PO4, PO8 – PO14**
Stormwater quantity	For residential activities, development associated with the creation of 3 or more dwellings, resulting in either: (a) an increase in the total impervious area; or (b) an alteration of upstream conveyance or change to existing discharge location or condition.	For accepted development subject to requirements: **RO3, RO6, RO7** For assessable development: **PO5 – PO14**
	For all other land uses, development that results in either: (a) an increase in the total impervious area; or (b) an alteration of upstream conveyance or change to existing discharge location or condition.	For accepted development subject to requirements: **RO4, RO6, RO7** For assessable development: **PO5 – PO14**
Woongoolba flood mitigation catchment area	Development that is code or impact assessable, on land within the 'Woongoolba flood mitigation catchment area' on the **Water catchments and dual supply system area overlay map**.	For assessable development: **PO15**

This code does not apply in the following instances:

(1) where the development involves internal works or minor building works to a lawfully established building; or

(2) a sales office.

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3**, in **Part 5**.

9.4.5.2 Purpose

(1) The purpose of the Healthy waters code is to:

(a) protect the quality of the city's waters and watercourses by managing the impacts of development on quality and quantity of surface and ground water runoff; and

(b) ensure that development does not cause adverse impact on people and/or property.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Total water cycle management and water sensitive urban design (WSUD) principles are:

(i) implemented to contribute to biodiversity areas and green space values within the city and promote co-location of assets; and

(ii) integrated into the landscape so as to maintain watercourse health, biodiversity and ecosystems.

(b) Development avoids or minimises disturbance to existing landforms, surface drainage, watercourses and groundwater.

(c) Impacts to public health and safety hazards are minimised.

(d) Adverse impacts to people and/or property are prevented and stormwater is safely managed within urban areas.

(e) Development protects existing overland flow paths and watercourses of environmental value.

(f) Development limits the quantity of key pollutants discharged in stormwater to protect the quality of receiving waters.

(g) Development avoids adverse impacts to downstream properties or environmental value from stormwater peak discharge.

(h) Development avoids or minimises adverse impacts on the environmental values of receiving waters from the release and mobilisation of nutrients and sediments.

(i) The drainage capacity of the Woongoolba Flood Mitigation Scheme Area for rainfall events up to 1 in 10 year 72 hours is maintained (contained within the Scheme drains within a 4 day period) and this capacity is not to be eroded due to cumulative impact of development.

9.4.5.3 Specific benchmarks for assessment

PART B – ASSESSABLE DEVELOPMENT BENCHMARKS

Table 9.4.5-3: Healthy waters code – for assessable development

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome	Internal use

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
Erosion and sediment control			
PO1 Stormwater discharge from a development site achieves the construction phase water quality objectives of **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.	**AO1** No acceptable outcome provided.	**AO1- COMPLIES** A stormwater management plan has been prepared which addresses the construction phase stormwater quality management for the proposed development. Refer to Section 8 of the SBSMP, report reference 30265222-GA0002.	
PO2 Erosion, sediment and dust is appropriately managed during the construction phase.	**AO2** The level of risk for soil erosion and sediment pollution to the environment is determined by an erosion hazard assessment, completed by a suitably-qualified person in accordance with the criteria in **Table 9.4.5-4: Erosion hazard assessment**. Where the erosion hazard assessment has a risk score of: (a) less than or equal to 10: A deemed to comply report is prepared by a suitably qualified person for Council approval, including conceptual location and design drawings of each treatment measure in plan and section views, in accordance with the *Best Practice Erosion and Sediment Control: International Erosion Control Association, (IECA) 2008, Australasia Chapter 2008.* (b) greater than 10 or developments involving multiple stages of disturbance or more than 1.25 ha of land: (i) For material change of use or reconfiguring a lot, a conceptual erosion and sediment control plan (ESCP) is prepared by a	**AO2 – COMPLIES** Section 8 of the stormwater report prepared by Arcadis, '30265222-GA0002' discusses appropriate ESC techniques for the site. The erosion hazard assessment has been completed within the table of this code response, and has scored a total of 10.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
	suitably-qualified person for Council approval in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards**, and the *Best Practice Erosion and Sediment Control: International Erosion Control Association (IECA) 2008, Australasia Chapter 2008*. (ii) For operational work, a detailed ESCP is prepared by a suitably-qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards**, and *Best Practice Erosion and Sediment Control: International Erosion Control Association (IECA) 2008, Australasia Chapter 2008*. The ESCP is to detail appropriate treatment measures for the construction phase of development, demonstrating how the minimum design objectives in **Table 9.4.5-5: Stormwater design objectives** are achieved, including: (a) measures to ensure the release of sediment-laden stormwater for the nominated design storm are minimised when the design storm is exceeded; (b) detailed design, installation, construction, monitoring and maintenance requirements of all approved proprietary products in		

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
	accordance with local conditions and manufacturer's recommendations; and (c) details of how the ESCP aligns with the approved development staging plan.		
Stormwater quality			
PO3 Development appropriately manages stormwater quality to: (a) protect natural ecosystems; (b) protect water quality; (c) reduce runoff and peak flows; and (d) meet the water quality objectives and environmental values for Queensland waters. **Note: Water quality objectives and environmental values for Queensland waters are contained within *Schedule 1* of the *Environmental Protection (Water) Policy 2009*. Water quality objectives are locally specific and vary between and within river catchments.** **Note: A stormwater quality management plan prepared by a suitably qualified person in accordance with SC6.12 City Plan policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards, is Council's preferred method for addressing this performance outcome.**	**AO3.1** For post developed sites, the following minimum pollutant reduction targets are achieved: (a) Gross pollutants (>5mm) – 90%; (b) Total Suspended Solids (TSS) – 80%, (c) Total Phosphorus (TP) – 60%; and (d) Total Nitrogen (TN) – 45%.	**AO3.1 – COMPLIES** A stormwater management plan has been prepared which addresses the management of operational phase stormwater quality measures for the proposed development. Refer to Section 7 of the SBSMP, report reference 30265222-GA0002.	
	AO3.2 For development on land less than 1.25ha, a deemed to comply solution for stormwater quality is achieved in accordance with **Table 9.4.5-6: Stormwater quality deemed to comply solutions**.	**REFER ABOVE**	
	AO3.3 For development on land greater than 1.25ha, a stormwater quality management plan is to be prepared by a suitably qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**, is required.	**REFER ABOVE**	
Waterway stability			
PO4 In-stream erosion, downstream of urban	**AO4** Post-development peak 0.632 Annual	**AO4 – COMPLIES** Refer to Section 6 of the SBSMP, report reference	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
development is prevented by controlling the rate (or magnitude) and duration of sediment transporting flows.	Exceedance Probability (AEP) event discharge within receiving waterway is limited to pre-development peak 0.632 AEP event discharge and is in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards.**	30265222-GA0002 which addresses waterway stability requirements where applicable.	
Stormwater quantity control			
PO5 Stormwater quantity management outcomes demonstrate no adverse impact on stormwater flooding or the drainage of properties external to the subject site.	**AO5** The following is achieved external to the development site: (a) no increase in peak flood flow rate from the development site for all events up to and including the 1% AEP; (b) no increase in peak flood velocities from the development site for all events up to and including the 1% AEP; (c) no increase in peak flood level from the development site for all events up to and including the 1% AEP; and (d) stormwater outfalls or discharge is located to avoid conflict with existing usage of downstream land or impacts on existing watercourse or drainage.	**AO5 – COMPLIES** A stormwater management plan has been prepared which addresses the management of stormwater quantity for the proposed development. Refer to Section 6 of the SBSMP, report reference 30265222-GA0002.	
Lawful point of discharge			
PO6 Development ensures the stormwater systems are designed to not cause actionable nuisance that would adversely affect adjoining (upstream or downstream) properties.	**AO6** A lawful point of discharge must be identified and demonstrated that all discharge point/s from the development are in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and**	**AO6 – COMPLIES** Refer to Section 5 of the SBSMP, report reference 30265222-GA0002 which assesses the LPoD(s) relevant to the subject site.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets **either** the performance outcome or overall outcome	Internal use
	water sensitive urban design standards.		
Overland flow paths			
PO7 Development must not obstruct free open surface flow of stormwater through a site.	**AO7** Overland flowing stormwater is allowed free open surface flow between the street and any waterway at the rear or sides of a property, in accordance with the provisions of the *Building Code of Australia.*	**AO7 – COMPLIES** The development does not interfere with any known existing overland flow paths.	
Whole of life costs			
PO8 Stormwater infrastructure is designed and constructed to: (a) remain fit for purpose for the life of the development and maintains full functionality in the design flood event; (b) be cost effective to maintain; and (c) ensure no structural damage to existing stormwater infrastructure.	**AO8** No acceptable outcome provided.	**AO8 – COMPIES** Private infrastructure will remain the responsibility of the body corp. All other municipal connection works have been designed to relevant standards.	
Landscape integration			
PO9 Stormwater treatment devices and stormwater infrastructure are designed to: (a) integrate with the urban design and landscape outcomes of the development; (b) complement natural environments, wetlands and watercourses; (c) protect environmental values; (d) enhance visual amenity; and (e) incorporate CPTED principles in accordance with **SC6.12 City Plan**	**AO9.1** Where stormwater treatment devices and stormwater infrastructure are integrated into public open space, a Statement of Landscape Intent is to be prepared by a suitably qualified person, for approval by Council. The plan is to demonstrate that the operation of stormwater infrastructure does not compromise the function of any co-located uses and reflect the design principles within **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards.**	**AO9.1 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30265222-GA0002 which demonstrates the location of stormwater treatment devices. The architect and landscape architect have integrated this within the proposed design as appropriate.	

Performance outcomes	Acceptable outcomes	Does the proposal meet the acceptable outcome? If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome	Internal use
policy – Land development guidelines, Section 4 – Stormwater drainage and water sensitive urban design standards.	**Note: A Statement of landscape intent is to be prepared in accordance with SC6.13 City Plan policy – Landscape work.**		
	AO9.2 Stormwater treatment devices are located offline to any upstream catchment. **Note: This provision relates to the integration of stormwater treatment devices and stormwater infrastructure into the landscape. Development identified on the Environmental significance – wetlands and watercourse overlay map will still require assessment against the Environmental significance overlay code.**	**AO9.2 – COMPIES** Refer to Section 5 of the SBSMP, report reference 30265222-GA0002 which demonstrates flows which stormwater treatment devices receive.	
	AO9.3 All stormwater outlets that are located adjacent to watercourses, creeks and drainage paths are aligned at a maximum of 45 degrees to the downstream direction of flow, and energy dissipation measures installed to minimise scour.	**NOT APPLICABLE** No outlets to watercourses, creeks or drainage paths are proposed.	
Public safety			
PO10 Stormwater treatment devices and stormwater infrastructure minimise impacts on public health and safety.	**AO10** All stormwater quantity control measures are designed in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.	**AO10 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30265222-GA0002, which details the proposed treatment system including levels and location. The proposed treatment system is not in a location or position where it would pose an abnormal risk to health and safety.	
Maintenance access			

PO11 Maintenance access is provided for all stormwater management systems and considers: (a) the type of vehicle or machinery needed to service particular assets; and (b) the need to ensure a safe working environment for maintenance personnel and the public.	**AO11.1** All weather vehicle access is to be provided to inlet zones of the stormwater treatment systems in accordance with **Table 9.4.5-7: Maintenance access requirements (slope).**	**AO11.1 – COMPIES** Refer to Engineering Drawings within Appendix B of the SBSMP, report reference 30265222-GA0002, which illustrates appropriate maintenance access from the site frontage. It should be noted that the proposed asset is a small, private asset not transferred to Council.	
	AO11.2 Maintenance access is to be provided around the perimeter of all stormwater treatment systems in accordance with **Table 9.4.5-8: Maintenance access requirements (size).**	**REFER ABOVE**	
	AO11.3 A maintenance buffer is provided around the perimeter of all stormwater treatment devices and adjoining private property equal to: (a) 1m in width; or (b) the width of a perimeter maintenance access, as delivered in AO11.2, plus 0.5m. The maintenance buffer is measured from the adjacent allotment boundary to the top of batter around the treatment measure. The maximum slope on the maintenance buffer is 1 in 10.	**REFER ABOVE**	
Fauna movement			
PO12 Stormwater conveyance structures and channels are designed to ensure the safe movement of native fauna and provide for terrestrial and aquatic passage.	**AO12.1** Stormwater drainage structures and channels minimise impacts on aquatic fauna and associated habitats and provide opportunities for beneficial habitat uses of structures in accordance with the *Department of Primary Industries and Fisheries – Fisheries guidelines for Fish-friendly structures (2006).*	**NOT APPLICABLE** The proposed stormwater infrastructure is within an urbanised area which is not occupied by native fauna / does not currently provide aquatic passage.	

	AO12.2 Stormwater drainage structures allow for the safe movement of terrestrial fauna in accordance with: (a) the Queensland Government Fauna Sensitive Road Design Manual Volume 2: Preferred Practices; and (b) the Queensland Government Koala-Sensitive Design Guidelines.	**REFER ABOVE**	

Wastewater management			
PO13 Development does not discharge wastewater to receiving waters or areas external to the site unless demonstrated to be the best-practice environmental management for that site and takes into consideration: (a) the applicable water quality objectives for the receiving waters; and (b) the potential adverse impact on ecosystem health of receiving waters.	**AO13** Where the development involves the discharge of wastewater, a Wastewater Management Plan (WWMP) is prepared, demonstrating compliance with the performance outcome, by a suitably qualified person and submitted to the Council, detailing all of the following: (a) wastewater type; (b) climatic conditions; (c) water quality objectives; (d) best-practice environmental management; (e) waste management hierarchy; and (f) the WWMP provides for the management of wastewater in accordance with a wastewater management hierarchy that: (i) avoids wastewater discharge to watercourses; or (ii) if wastewater discharge to the environment cannot practicably be avoided wastewater discharge to watercourses is minimised through re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.	**NOT APPLICABLE** The site doesn't propose to discharge wastewater into receiving waters.	
Dewatering management			
PO14 Dewatering occurs in accordance with an approved Dewatering management plan.	**AO14** No acceptable outcome provided.	**AO14 – COMPLIES** If relevant requirements are triggered, the proposed development will be required to provide a dewatering plan to facilitate basement construction. Standard condition wording can be provided for the development approval.	
Woongoolba flood mitigation catchment area			

PO15 In the Woongoolba flood mitigation catchment area, shown on the **Water catchments and dual supply system area overlay map**, peak outflow and its timing for Q2, Q5 and Q10 for rainfall events up to 72 hours does not change as a result of development.	**AO15** No acceptable outcome provided.	**NOT APPLICABLE** The site is not within the flood mitigation scheme area.	

State Planning Policy July 2017

Policies	Demonstrate how the proposal meets the policy?	Internal use
State interest – water quality		
ASSESSMENT BENCHMARK 4 (POLICY 4): At the construction phase, development achieves the applicable stormwater management design objectives in table A (appendix 2) of the State Planning Policy.		
ASSESSMENT BENCHMARK 5 (POLICY 5): (5) At the post-construction phase, development: a) achieves the applicable stormwater management design objectives on-site, as identified in table B (appendix 2) of the State Planning Policy; or b) achieves an alternative locally appropriate solution off-site that achieves an equivalent or improved water quality outcome to the relevant stormwater management design objectives in table B (appendix 2) of the State Planning Policy.		

Table 9.4.5-3: Erosion hazard assessment

Controlling factor	Points	Score
Average slope of the whole site prior to operational works		
Slope less than 2%	0	0
More than or equal to 2% but less than 5%	1	
More than or equal to 5% but less than 10%	2	
More than or equal to 10% but less than 15%	4	
More than or equal to 15%	5	High risk
Soil type (to be disturbed)		
Gravels and sandy soils	1	1
Sandy loam	2	
Clays on flood plains	3	
Shallow soils on slopes	4	
Clays on slopes greater than 5%/imported fill or untested fill	5	High risk
Anticipated duration of site disturbance		
Duration less than 2 weeks	0	
More than 2 weeks but less than 3 months	2	
More than 3 months but less than 6 months	4	4
More than 6 months	5	High risk
Anticipated erosive rainfall risk during site disturbance		
Low (monthly average rainfall less than 45 mm)	0	
Moderate (monthly average rainfall 46 - 100 mm)	1	
High (monthly average rainfall 101 - 225 mm)	2	2
Very high (monthly average rainfall 226 - 1500 mm)	4	
Extreme (monthly average rainfall more than 1500 mm)	5	High risk

Controlling factor	Points	Score
Off-site sediment control (down-slope of the soil disturbance)		
Score 1 point if there is no purpose-built sediment trap (e.g. sediment basin, gross pollutant trap or purpose-built wetland).	1	1
Run-off entering the site		
Score 1 point if stormwater run-off is not diverted from entering the site or away from soil disturbance.	1	
Extent of site disturbance		
Score 2 points if the building works requires reshaping of the ground surface.	2	2
Total Score **Note: High erosion risk - if score 11 or greater, or five for any factor.**		

This Erosion Hazard Assessment form is adapted from the *Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia), IECA 2008 Appendix H - Building Sites, the Brisbane City Council Erosion Hazard Assessment Form* and *Attachment 2 to the QDC Draft Part 16 Erosion and Sediment Control*.

Table 9.4.5-5: Stormwater design objectives

Construction phase stormwater design objectives	Notes
Drainage control	
Design life and design storm of temporary drainage works: (1) Disturbed area open for less than 12 months - 1 in 2 ARI. (2) Disturbed area open for 12-24 months - 1 in 5 ARI. (3) Disturbed area open for more than 24 months - 1 in 10 ARI.	• ARI = Average Recurrence Interval (see Engineers Australia document Australian Rainfall and Runoff). • Design capacity excludes minimum 150mm freeboard. • A higher drainage design objective may be required for temporary drainage structures upslope of occupied properties. • A revised drainage design storm may be required if these design objectives are found to be impracticable.
Erosion control	
(1) Stage clearing and construction works to minimise the area of exposed soil at any one time. (2) Effectively cover or stabilise exposed soils prior to predicted rainfall. (3) Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation. (4) Avoid or minimise large construction activities in the 'wet season'. (5) Divert water run-off from undisturbed areas around disturbed areas. (6) Use erosion risk ratings to determine appropriate erosion control measures.	• 'Wet season' means the high rainfall months, e.g. the four highest rainfall months. • For point 6, determine the erosion risk rating using local rainfall erosivity, rainfall depth, or soil loss rate or other acceptable method. A rating scale such as very low, low, moderate, high, extreme should be applied. Such ratings should reflect the local area. Example ratings may be shown in local council guidelines or detailed in best-practice guidelines.
Sediment control	
(1) Use soil loss rates to determine appropriate sediment control measures. (2) Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. (3) All exposed areas greater than 2500 metres must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual	• For point 1, surrogate determinations may be used such as monthly erosion or average monthly rainfall. • A commonly used design storm for basin sizing is 80th percentile five-day event. Depending on the settling characteristics of local soils, a higher 'operational' design storm can be achieved with chemical dosing operated in flow-through mode in a large storm with rainfall-activated auto-flocculent dosing, and advanced hydraulic efficiency features such as floating off-takes,

runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).	and a sediment forebay. • TSS = Total Suspended Solids. Turbidity measurements (e.g. 60 Nephelometric Turbidity Units (NTU)) could be used; however, for accuracy, a site-specific relationship should be developed between turbidity and TSS.

Table 9.4.5-6: Stormwater quality deemed to comply solutions

The following deemed to comply solutions are to be documented within a Stormwater quality management plan prepared by a suitably-qualified person in accordance with **SC6.12 City Plan policy – Land development guidelines**, **Section 4 – Stormwater drainage and water sensitive urban design standards**.

Development type			**Stormwater treatment train**		**Land ownership[2]**
Land use	**Scenario**	**Scale**			
Residential	>2 lots up to 20 lots	N/A	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.3% of impervious catchment area.[1]	Public and/or Private
			No Tanks	Bio retention[3] @ 1.8% of impervious catchment area.[1]	Public and/or Private
			Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Wetland @ 5% of impervious catchment area.	Public and/or Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Public and/or Private
	> 2 dwellings (Townhouse style up to 2 storeys	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.3% of impervious catchment area.[1]	Private
			No Tanks	Bio retention[3] @ 1.8% of impervious catchment area. [1]	Private
			Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Wetland @ 5% of impervious catchment area.[1]	Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Private

	High density multiple dwelling apartments (flats, high-rise)*	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Bio retention[3] @ 1.8% of impervious catchment area.[1]	Private
			No Tanks	Wetland @ 7% of impervious catchment area.[1]	Private
Commercial, Industrial and Retail (including retail at the bottom floors of high rise)[4]	Commercial and/or Industrial uses	≤ 12,500m^2	Tank Volume per dwelling: • Detached 5 kl • Attached 3 kl	Gross pollutant management (GPT) + Bio retention[3] @ 1.8% of impervious catchment area.[1]	Public and/or Private
			No Tanks	Gross pollutant management (GPT) + Wetland @ 8% of impervious catchment area.[1]	Public and/or Private

[1] For developments that results in an increase in less than 15% imperviousness (i.e. roof and ground level impervious), then stormwater management to focus on the impervious areas only.

[2] Ultimate owner of the device and responsible for maintenance.

[3] For bioretention basins larger than 800m^2, an inlet pond will be required.

[4] The City requires gross pollutant management for these land uses. It is preferred that these are located on private property, but in larger scale Reconfiguring a lot applications it is logical to have a single gross pollutant trap for the site. The City will not accept proprietary devices for nutrient management on public/City land.

Table 9.4.5-7: Maintenance access requirements (slope)

Treatment type	Access track slope	Material and width
Stormwater inflows where pipe is 450mm or greater (where there is no forebay or inlet pond)	1 in 4 or flatter	2.5m wide minimum Gravel or reinforced turf from inlet
Coarse sediment forebay	1 in 4 or flatter	2.5m minimum Reinforced concrete in accordance with *IPWEAQ standard drawing RS-051* Concrete paver (subject to City approval), cement treated gravel

		250mm thick may be accepted by the City through negotiation.
Inlet pond (wet) for retention or wetland Sediment basins	1 in 4 or flatter	3m wide Reinforced concrete in accordance with Heavy Vehicle Crossing Industrial (*refer IPWEAQ standard drawing RS-051*). Where this access crosses perpendicular to pedestrian paths, the path must be 200mm thick, double reinforced and 42MPa.
Proprietary devices	1 in 4 or flatter	Reinforced concrete in accordance with Heavy Vehicle Crossing Industrial (refer *IPWEAQ standard drawing RS-051*).

Table 9.4.5-8: Maintenance access requirements (size)

Treatment type	Size	Maintenance access requirements (all paths 1 in 10 cross fall or less and maximum 1 in 4 longitudinal grade)
Bioretention	< 500m^2	Access path to > 40% of perimeter. ≥ 0.75m wide. Grass, mulch, gravel or concrete suitable for access on foot.[1]
	≥ 500m^2	Access path to > 40% of perimeter. ≥ 2.5m wide. Reinforced grass, gravel or concrete for light vehicles.[1] Remainder of perimeter as per < 500m^2 bioretention.
Wetland	<1000m^2	Access path to > 40% of perimeter. ≥ 0.75m wide. Grass, mulch, gravel or concrete

		suitable for access on foot.
	≥ 1000m^2 to < 5000m^2	Access path minimum 40% of perimeter. ≥ 2.5m wide. Reinforced grass, gravel or concrete for light vehicles.[1] Remainder of perimeter ≥ 0.75m wide.
	≥ 5000m^2	Access path 100% of perimeter. ≥ 2.5m wide. Cement treated gravel 200mm or concrete for large vehicles.

[1] Determine access path treatment based on slope, maintenance vehicle and the surrounding landscape. For example, turf is not appropriate where the treatment system is located against conservation open space, and where revegetation for the treatment system complements the surroundings, the use of gravel or concrete is preferred.

ATTACHMENT 8

Sewer Network Capacity Assessment prepared by Arcadis



UPS
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ARCADIS

SEWER NETWORK CAPACITY ASSESSMENT

19-21 ANNE AVENUE, BROADBEACH

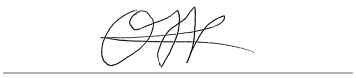
MARY ANNE DEVELOPMENTS



IMPROVING QUALITY OF **LIFE**

19-21 ANNE AVENUE, BROADBEACH

SEWER NETWORK CAPACITY ASSESSMENT

Author	Oliver Purton	
Checker	Ben Wieser	
Approver	Richard Mulligan RPEQ7850	

Project No	30265222
Report No	GA0003
Revision	01
Date	18/02/2025

This report has been prepared for Mary Anne Developments in accordance with the terms and conditions of appointment. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

Revision	Date	Description
01	18/02/2025	Issue for Approval

Should you require any further information, please contact our Gold Coast office and ask to speak to the report author denoted above.

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APPENDICES

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CoGC Correspondence
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Existing Scenario Results
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Developed Scenario Results

1 EXECUTIVE SUMMARY

Mary Anne Developments has commissioned Arcadis to prepare a Sewer Network Capacity Assessment (SNCA) for the proposed development located over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

With the use of the software InfoSWMM, a hydraulic assessment of the proposed development's impact on the surrounding wastewater network has been undertaken. One connection is proposed to Gold Coast Water and Waste (GCWW) wastewater network, the existing DN225 gravity sewer network south of the subject site. The manhole identified by Council for assessment purposes is:

- SEMH_A025_9000153177

The following SNCA compares the existing local sewer network performance under the 'existing' and 'developed' network demand for the relevant planning horizons against GCWW's Desired Standard of Service (DSS) as specified by the South-East Queensland Design and Construction Code for Water Supply and Sewerage (SEQ WS&S D&C Code). Under both scenarios, various other planned/approved but generally not built development is included in the model. The purpose of this assessment is to determine whether there is sufficient capacity in the local network to service the proposed development or whether the proposed development triggers the requirement for a wastewater infrastructure upgrade within the Sewer Pump Station (SPS) A25 sub-catchment.

Gravity Network

- This assessment has concluded that the existing gravity sewerage pipe and manhole network satisfies the minimum 1m manhole freeboard DSS for all of the assessed line in both the existing and developed loading scenarios up to SPS A25.

An assessment of SPS A25 was undertaken, with the following conclusions:

Pump Capacity

- There is inadequate pump capacity across the 2021, 2026 and 2066 assessed planning horizons for both scenarios. Therefore, it is recommended that Council bring forward the 2031 planning horizon upgrade to cater for the 2021 and 2026 planning horizons.

Operational Storage

- There is adequate operational storage in the 2021 to 2041 planning horizons for both scenarios. There is inadequate operational storage in the 2066 planning horizon for both scenarios. It is suggested that Council investigate an upgrade for the operational storage volume in the 2066 planning horizon.

Emergency Storage

- There is adequate emergency storage volume across all assessed planning horizons for both scenarios.

Rising Main Velocity Assessment

- No assessment was undertaken as the proposed development in isolation does not trigger an upgrade.

Based on the results from this report, no network upgrades are proposed as a direct result of this development. Network upgrades are required to mitigate impacts of loading resulting from the wider catchment.

2 SITE CHARACTERISTICS

2.1 Location Details

The subject site is located within Broadbeach, South-East Queensland, Australia over the following allotment(s):

- Lot 0 on BUP1114 (19 Anne Avenue, Broadbeach).

The site is bordered by apartment buildings to the north, east and west, and Anne Avenue to the south.

The total area of the site is approximately 1,032m^2.

The City of Gold Coast is the local government authority.

2.2 Land Usage

In its current state, the project site contains a residential apartment building with associated driveways. Figure 2-1 below provides a current locality plan of the site.



Figure 2-1 Site Locality Plan (Aerial Imagery Courtesy of Nearmap)

3 PROPOSED DEVELOPMENT

The proposed development involves the construction of a residential apartment building, including:

- Residential apartments.
- Residential amenities.
- Ground level parking.
- 2 levels of podium parking.
- 2 levels of basement parking.

A plan extract of the proposed development has been provided in Figure 3-1.

A full set of Architectural plans are provided within the development application package and should be referred to for further information.

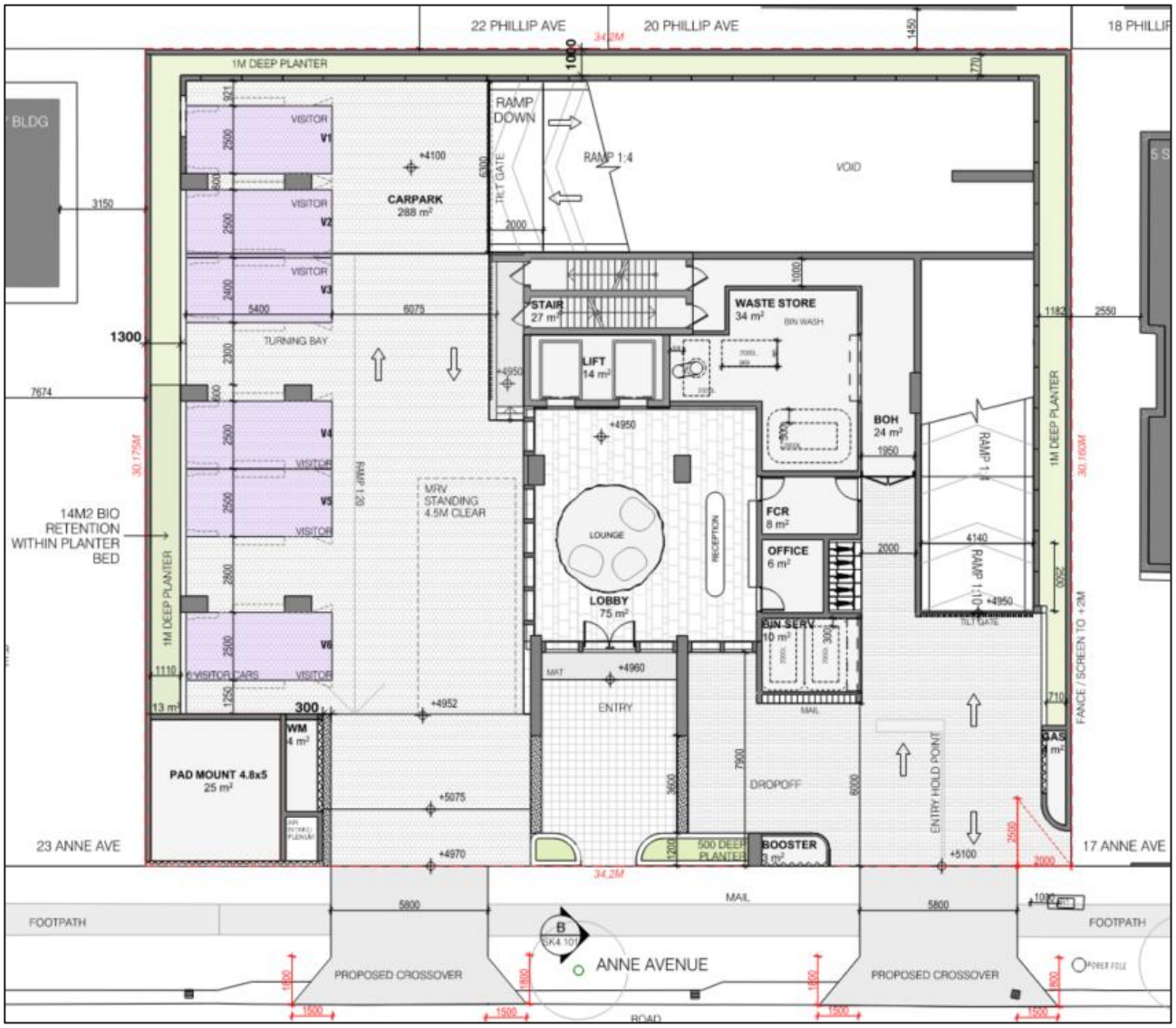


Figure 3-1 Proposed Development Ground Floor

3.1 Proposed Development Loading

For the purposes of this report, the development has been assessed under two loading cases to better determine the anticipated impact to be had on the surrounding network. These cases are as follows:

- **Existing Case with other Over-Planning-Scheme Density Sites** – A demand assigned to the site via the infrastructure Demand Model (IDM) 2018 provided by GCWW with additional loads included of other proposed developments (refer to section 4 & 5 for further details) as instructed by GCWW. All planning horizons were assessed; and
- **Developed Case with other Over-Planning-Scheme Density Sites** – The calculated demand for the property based on proposed architect plans and conversion rates from the Water Supply & Sewerage Infrastructure Plan Demand Table. Additional loads included of other proposed development's (refer to section 4 for further details) as instructed by GCWW.

Where applicable, the proposed development may be assessed against the existing network, in isolation of any other planned sites to better ascertain responsibility and network augmentations.

Table 3-1 shows the calculated Equivalent Persons (EP) for the existing site based upon CoGC's 'Water and sewage demand table'. Note that this value does not impact this capacity assessment and is purely provided for reference. Table 3-2 shows the calculated EP for the proposed development as per CoGC's 'Water and sewage demand table'.

Table 3-1 Planned Demand

Category	Area (ha)	Conversion Rate	Planned Demand (EP)
RD8	0.1032	792EP/ha	81.73

Table 3-2 Projected Development Loading

Category	Quantity	Conversion Rate	Proposed Demand (EP)
Multi-Unit Dwelling 3+ bedroom	56	2.51	140.56
		Total	**140.56**

The proposed demand presents an increase of 58.83 EP compared to the planned demand.

When notified about this demand increase, GCWW requested that an SNCA is to be completed to support the development application. Refer to Appendix A for correspondence.

4 MODELLING ASSUMPTIONS

The sewer network surrounding the proposed development site was modelled using the wastewater model 'CO_WSSIP_2019' for the Coombabah catchment using the software "InfoSWMM". The required modelling files were supplied by CoGC in February 2020. The demand due to the proposed development has been applied in the relevant planning horizons. This analysis was undertaken adopting the following assumptions and design criteria (Note: All design criteria are in accordance with Table 10 – Sewerage Network Design Criteria (Gold Coast) of the SEQ D & C Code and GCWW DSS) and advice by CoGC W&W:

- The extent of the network studied is to the downstream pump station SPS A25.
- Average Dry Weather Flow (ADWF) = 200 L/EP/d
- Average Dry Weather Flow for 2066 Horizon (ADWF) = 180 L/EP/d
- Peak Dry Weather Flow (PDWF) = C2 x ADWF.
- C2 = 4.7 x EP-0.105.
- Peak Wet Weather Flow (PWWF) = 5 × ADWF.
- EP/ET Conversion = 2.79.
- Manning's flow equation is used to calculate flows.
- Manning's roughness coefficient is taken as 0.013.
- Depth of flow @ PWWF – Existing system = Up to 1.0m below MH cover level and no spillage through overflow structures (as confirmed by Council Officers).
- Depth of flow @ PWWF – Proposed new sewers = Max flow depth shall not exceed ¾ pipe internal diameter.
- Pump Station Parameters.
- Emergency Storage: 4 Hours @ ADWF.
- The development is serviced from connection point 'SEMH_A025_9000153177' located on Figure 6-1.
- GCWW advised that there was seventeen (17) other above planning-scheme-density site to be included as part of the assessment for both the existing and developed scenarios. Refer Appendix A.
- GCWW advised that there is one node currently servicing the site. Refer Appendix A.
- GCWW advised via email correspondence the existing pump capacity, emergency storage values and operating storage volume for SPS A25. Refer Appendix A.

5 MODELLING METHODOLOGY

The InfoSWMM model 'CO_WSSIP_2019' was first run by applying the existing loads of the CoGC Infrastructure Demand Model (IDM) at the specified junction points to provide a baseline to compare the impacts of the proposed development. The impact on the existing network was assessed by verifying and comparing the flow velocities and depth of flow of the developed network against the existing network. One reach of pipe was assessed, from the proposed connection point to the respective downstream pump station. The reach of pipe assessed is shown in Figure 6-1.

5.1 Depth of Flow

The depth of flow was assessed for all manholes included in the assessment for the 2036, 2041 and 2066 horizons in the existing scenario, and the 2036, 2041 and 2066 horizons in the developed scenario. In the developed scenario, the additional loads were applied to the specified connection point and the models were then compared to the results obtained in the existing scenario and GCWW DSS. The maximum depth of flow was assessed over a 24-hour period against the maximum depths for pipes in the existing and developed scenarios.

5.2 Pump Capacity

The pump capacity was assessed for all assessed planning horizons in the existing and developed scenarios. The pump capacity is obtained from the relevant LGIP catchment report. The pump capacity is then assessed against the PWWF generated by the assessed pump station's local catchment (Local EP) and all upstream catchments (Cumulative EP) feeding into the assessed local catchment.

5.3 Operational Wet Well Volume

The operational wet well volume was assessed for all relevant planning horizons in the existing and developed scenarios. Existing operational wet well volume is determined through the relevant LGIP catchment report. The required operational well volume is calculated by obtaining the ADWF (L/s) and multiplying it by Variable C1 then dividing it by average pump starts per hours (N = 12 has been adopted for this assessment given motors <100kW) and multiplying it by 0.9. This is then compared to the calculated existing operational wet well volume.

5.4 Emergency Storage

The emergency storage was assessed for all planning horizons in the existing and developed scenarios. Emergency storage is calculated by assessing the volume of wastewater generated over four hours at ADWF. This volume is calculated from local catchment EP load for both existing and developed scenarios.

5.5 Rising Main Assessment

A rising main assessment is to be undertaken from the pump station to the next gravity outlet should the proposed development in isolation necessitate an upgrade to the pump capacity. However, in this instance, the proposed development in isolation does not necessitate an upgrade to the pump capacity, therefore a rising main assessment has not been undertaken.

6 RESULTS AND DISCUSSION

6.1 Gravity Line Assessment

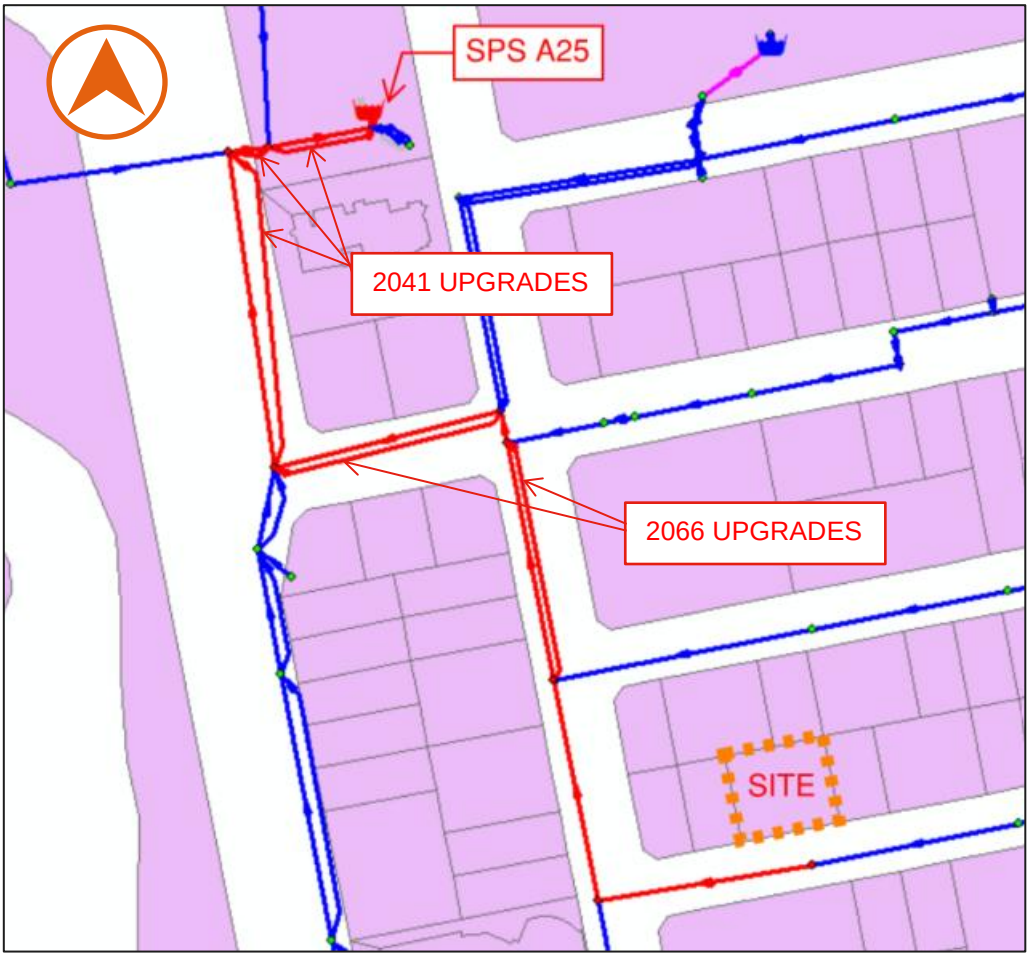


Figure 6-1 Assessed Gravity Line

6.1.1 Existing System Performance

One reach of pipe has been assessed, being the existing sewer line from 'SEMH_A025_9000153177' to SPS A25. This line terminates at SPS A25 located approximately 300m northwest of the proposed development along Gold Coast Highway within Victoria Park. The demands have been assigned as per IDM 2018. The reach is described as:

- From the existing sewer manhole 'SEMH_A025_9000153177', west along Anne Avenue within a DN225 gravity main, north along the western verge of Surf Parade in a DN300 gravity main, west along the northern verge of Elizabeth Avenue in a DN375 gravity main, north along the eastern verge of Gold Coast Highway in a DN525 and then east into Victoria Park and into SPS A25.

The alignment can also be seen in Figure 6-1 above. The results attached in Appendix B show the detailed outputs of each manhole assessed, including longitudinal sections showing the depth of flow and hydraulic grade line.

It should be further noted that Council have upgrades proposed in the 2041 and 2066 planning horizons for this length of gravity sewer (hence additional assessment of 2036). These Council planned upgrades were already applied within Council's model, and were left unchanged in both the existing and developed scenarios.

The existing 2036, 2041 & 2066 planning horizon results show that the existing system performance is compliant with SEQ's DSS requirements. Therefore, horizons prior to 2036 were not assessed.

The existing results are noted as a baseline reference for comparison once the developed loadings are applied to the network.

6.1.2 Developed System Performance

For the developed scenario, the same existing reach of pipe has been assessed for the 2036, 2041 and 2066 planning horizons. Loads have been assigned as per the proposed loads of the development (Table 3-2). The tabulated results attached in Appendix C show the detailed outputs of each pipe and manhole assessed, including longitudinal sections showing the depth of flow and hydraulic grade line.

The developed 2036, 2041 & 2066 planning horizon results show that the proposed development does not cause any non-compliances within the network. Therefore, horizons prior to 2036 were not assessed.

6.2 Pump Station Assessment

6.2.1 Pump Station A25

In addition to assessing the adequacy of downstream pipe infrastructure, the required operating wet well volume, pump capacity, rising main and emergency storage volume of SPS A25 has also been assessed. The local EPs have been determined from the sewerage catchment which is serviced by the pump station. These loads have been determined from the IDM 2018 and surrounding approved developments supplied.

6.2.1.1 Pump Capacity Assessment

Table 6-1 below encompasses all the information relevant to the pump capacity of SPS A25. Council advised that there are two proposed upgrades for the pump capacity for the 2031 and 2066 planning horizons. However, Council did not specify the 2066 upgrade capacity.

Table 6-1 Pump Capacity Assessment

SPS A25	Cumulative EP	PWWF (L/s)	Pump Capacity (L/s)
2066 Existing	46756	487.04 (+21.35)	465.69
2066 Developed	46745	486.92 (+21.23)	
2041 Existing	23417	271.03 (-194.66)	
2041 Developed	23544	272.50 (-193.19)	
2036 Existing	21241	245.85 (-219.84)	
2036 Developed	21369	247.32 (-218.37)	
2031 Existing	19057	220.56 (-245.13)	
2031 Developed	19184	222.04 (-243.65)	
2026 Existing	17908	207.26 (+41.86)	165.40

SPS A25	Cumulative EP	PWWF (L/s)	Pump Capacity (L/s)
2026 Developed	18035	208.74 (+43.34)	
2021 Existing	16768	194.08 (+28.68)	
2021 Developed	16896	195.56 (+30.16)	

As shown above in Table 6-1, there is inadequate pump capacity in both the existing and developed scenarios for the 2021, 2026 and 2066 planning horizons.

Although council did not provide information on the proposed 2066 planning horizon upgrade, it is likely that it may be sufficient given the relatively minor L/s difference between the above results.

It is recommended that Council bring forward the 2031 planning horizon upgrade to cater for the 2021 and 2026 planning horizons.

The proposed development is not the trigger for this upgrade. The development in isolation presents +~1.48L/s in the 2021 to 2041 planning horizons and -0.11L/s in the 2066 planning horizon due to the planned demand in the model being greater than the proposed development.

Refer to Appendix A for Council correspondence that includes pump information.

6.2.1.2 Operational Wet Well Assessment

Table 6-2 below encompasses all the information relevant to the operational wet well volume of SPS A25. Council's infrastructure plan shows that there are no proposed upgrades. Council provided advice that there are no proposed upgrades to the operational wet well volume for pump station SPS A25 for the assessed planning horizons.

No upgrade is deemed necessary for pump capacity for the proposed development in isolation, therefore N = 12 was maintained (<100kW).

Table 6-2 Operational Wet Well Volume

SPS A25	Existing Op. Storage Volume (m^3)	Required Volume (m^3)
2066 Existing	14.7	25.57 (+10.87)
2066 Developed		25.56 (+10.86)
2041 Existing		14.23 (-0.47)
2041 Developed		14.31 (-0.39)
2036 Existing		12.91 (-1.79)
2036 Developed		12.98 (-1.72)
2031 Existing		11.58 (-3.12)

SPS A25	Existing Op. Storage Volume (m^3)	Required Volume (m^3)
2031 Developed		11.66 (-3.04)
2026 Existing		10.88 (-3.82)
2026 Developed		10.96 (-3.74)
2021 Existing		10.19 (-4.51)
2021 Developed		10.27 (-4.43)

As shown above in Table 6-2, there is adequate operational storage in the 2021 to 2041 planning horizons for both scenarios. There is inadequate operational storage in the 2066 planning horizon for both scenarios. It is suggested that Council investigate an upgrade for the operational storage volume in the 2066 planning horizon.

The proposed development is not the trigger for this upgrade. It is noted that the development in isolation presents +0.08m^3 of operational storage in the 2021 to 2041 planning horizons and a -0.01m^3 of operational storage in the 2066 horizon. This reduction is due to the planned demand in the model being greater than the proposed development.

Refer to Appendix A for Council correspondence that includes operational storage information.

6.2.1.3 Emergency Storage Volume Assessment

Table 6-3 below encompasses all the information relevant to the Emergency Storage Volume of the local SPS A25 catchment advised by Council (refer Appendix A for correspondence). Council advised that there is a 1092.4kL emergency storage upgrade planned for the 2021 planning horizon. This has been added to the provided values.

Table 6-3 Emergency Storage Volume

SPS A25	Local EP	Existing System Volume (m^3)	Required System Volume (m^3)	Compliant (YES/NO)
2066 Existing	32765	1378.8	982.94	YES
2066 Developed	32754		982.61	YES
2041 Existing	15856	1288.4	528.53	YES
2041 Developed	15983		532.77	YES
2036 Existing	14088	1291.6	469.61	YES
2036 Developed	14216		473.85	YES
2031 Existing	12740	1293.3	424.66	YES

SPS A25	Local EP	Existing System Volume (m^3)	Required System Volume (m^3)	Compliant (YES/NO)
2031 Developed	12867		428.92	YES
2026 Existing	12183	1322	406.09	YES
2026 Developed	12310		410.35	YES
2021 Existing	11221	1325.7	374.02	YES
2021 Developed	11349		378.28	YES

As shown above in Table 6-3, all assessed planning horizons have sufficient emergency storage volume in both scenarios. It is noted that the development in isolation presents +~4.25m^3 of emergency storage in the 2021 to 2041 planning horizons, and -0.33m^3 of emergency storage in the 2066 horizon. This reduction is due to the planned demand in the model being greater than the proposed development.

Refer to Appendix A for Council correspondence that includes emergency storage volume information.

6.2.1.4 Rising Main Velocity Assessment

No assessment was undertaken on the rising mains as the proposed development in isolation does not trigger an upgrade to the pump capacity.

7 CONCLUSION

This report provides the summary of a Sewer Network Capacity Assessment (SNCA) undertaken to assess potential impacts of the proposed development upon the existing sewer network.

Gravity Network

- This assessment has concluded that the existing gravity sewerage pipe and manhole network satisfies the minimum 1m manhole freeboard DSS for all of the assessed line in both the existing and developed loading scenarios up to SPS A25.

An assessment of SPS A25 was undertaken, with the following conclusions:

Pump Capacity

- There is inadequate pump capacity across the 2021, 2026 and 2066 assessed planning horizons for both scenarios. Therefore, it is recommended that Council bring forward the 2031 planning horizon upgrade to cater for the 2021 and 2026 planning horizons.

Operational Storage

- There is adequate operational storage in the 2021 to 2041 planning horizons for both scenarios. There is inadequate operational storage in the 2066 planning horizon for both scenarios. It is suggested that Council investigate an upgrade for the operational storage volume in the 2066 planning horizon.

Emergency Storage

- There is adequate emergency storage volume across all assessed planning horizons for both scenarios.

Rising Main Velocity Assessment

- No assessment was undertaken as the proposed development in isolation does not trigger an upgrade.

Based on the results from this report, no network upgrades are proposed as a direct result of this development.

APPENDIX A
CoGC Correspondence

Wieser, Ben

From: SIKDER Swapan <SSIKDER@goldcoast.qld.gov.au>
Sent: Thursday, 16 January 2025 11:28 AM
To: Wieser, Ben
Cc: Stockwell, James; ADINA Anton
Subject: RE: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

Follow Up Flag: Follow up
Flag Status: Completed

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Hi Ben,

Please find below the information needed for your modelling assessment.

Water Supply and Sewerage Infrastructure Plan 2019 report is available under:

https://www.goldcoast.qld.gov.au/water-supply-sewerage-infrastructure-plan-24413.html

Note: Assessment is required from 2021 to 2066 planning horizons only (i.e, 2021, 2026, 2031, 2036, 2041, 2066).

Scenarios from WSSIP2019 model to be used: L2_2021_PWWF_AUG, L2_2026_PWWF_AUG, L2_2031_PWWF_AUG, L2_2036_PWWF_AUG, L2_2041_PWWF_AUG, L2_2066_PWWF_AUG.

ADWF Loading = 200 L/EP/day up to 2041 planning horizons, thereafter 180 L/EP/day.

1 ET = 2.79 EP.

Development Site: 19-21 Anne Avenue, Broadbeach

- **Scope of analysis**

Gravity mains capacity assessment from proposed development connection manhole in the existing gravity sewer network to SPS A25.

SPS A25 pump capacity, operational storage, emergency storage & rising main capacity assessments are required.

Pumps capacity for SPS A25 should be verified by running whole model with proposed development and surrounding developments and to be provided in the report.

The following sewer network model to be used for the analysis:

The **Coombabah sewer model** (CO_WSSIP_2019)

- **LGIP sewer demands to be removed from the model**

The following demand is required to remove from the model for existing loads.

LotPlan	Address	Allocation Code	Manhole (on Model)
0BUP1114	19 Anne Avenue, Broadbeach	1328	SEMH_A025_9000153177

Then you can add total development load at the connecting manhole.

- **Overflow**

Pump Station	PS RL	Overflow Location	Overflow Asset Description	Overflow Point RL	Depth from PS Lid to Overflow
A25	5.259	Overflow pipe from S044-00227M	Overflow pipe to stormwater	2.177	3.082

- **Pumps Information**

SPS A25: 2 Pumps, 18.5 kW each, wet well dia. = 5.55 m. Take other levels from the model.

For existing operational volume calculation, take pump start/stop level from model Pump 1. In SEQ Code, Q is duty (single) pump capacity (L/s)

Existing operating storage volume at A25 is 14.7 m^3.

Existing A25 dual pumps capacity is 165.4 L/s from WSSIP2019 Coombabah modelling report. Pumps upgrade is proposed in 2031 and 2066.

See below table for available emergency storage at A25 for each planning horizon.

Pump Station	Available emergency storage 9kL) in 2021	Available emergency storage (0) in 2026	Available emergency storage (kL) in 2031	Available emergency storage (kL) in 2036	Available emergency storage (kL) in 2041	Available emergency storage (kL) in 2066
A25	233.3	229.6	200.9	199.2	196.0	286.4

LGIP (WSSIP 2019 report) has proposed to construct additional emergency storage of 1092.4 kL in 2021.

- **Any other considerations that need to be accounted for (e.g. demands from recently approved developments)**

There are several approved surrounding developments within SPS A25 in our database, as shown in below table.

Additional EP (Proposed development EP – IDM 2016 EP) for each development is provided below in the table. Consultant should add these demands in the model before analysis is undertaken.

Address	LotPlan	Connection Manhole	Pump Station Catchment	2021 Additional EP	2026 Additional EP	2031 Additional EP	2036 Additional EP	2041 Additional EP	2066 Additional EP
2605 Gold Coast Hwy, 16 Mermaid Avenue, Mermaid Beach	6RP203973, 10RP90652	SEMH_A025_9000232677	A25	899	104	30	14	0	0
5 - 9 Anne Avenue, Broadbeach	0BUP699, 17B83824, 0, 1, 2, 3, 4, 5 BUP43	SEMH_A025_9000232744	A25	335	104	0	0	0	0
12 to 14 Elizabeth Avenue, Broadbeach	45SP291104	SEMH_A025_9000233012	A25	198	198	71	15	11	11
4 - 6 Alexandra Avenue, Mermaid Beach	10B83838, 0, 2BUP1341	SEMH_A025_9000153109	A25	88	87	22	7	5	5
12 - 18 Philip Avenue, Broadbeach	8B83824, 7SP287568, 0BUP6625	SEMH_A025_9000232734	A25	417	416	62	1	0	0

26 - 28 Alexandra Ave, Mermaid Beach	0, 2BUP365, 25B83838	SEMH_A025_9000153085	A25	166	166	45	16	13	13
272 - 274 Hedges Ave, Mermaid Beach	0BUP665, 4BUP665, 5BUP665, 0BUP1182, 6BUP1182	SEMH_A025_9000099518	A25	200	200	200	199	0	0
33 Surf Parade, 22 George Avenue, Broadbeach	0, 2BUP439, 0, 1, 2GTP104932	SEMH_A025_9000153189	A25	144	144	143	143	143	1
2 Charles Avenue, Broadbeach	0BUP992, 6BUP992	SEMH_A025_9000153136	A25	107	40	39	38	37	37
2709 – 2723 Main Place, Broadbeach	Lots 1 & 2 on RP119599, Lots 1, 21, 23, 24, 25, 27 & 28 on B83818	SEMH_A025_9000099467	A25	1492	1491	1490	1488	1487	930
14- 20 Mary Avenue, Broadbeach	0BUP797, 1BUP797	SEMH_A025_9000153095	A25	253.8	253.5	253.1	252.7	0.0	0.0
26-28 Alexandra Avenue, Mermaid Beach	0BUP365, 2BUP365, 25B83838	SEMH_A025_9000232663	A25	161.41	161.05	151.01	151.01	151.01	151.01
2669 Gold Coast Highway, Broadbeach	41SP217726	SEMH_A025_9000232989	A25	807.5	793.5	772.6	751.6	730.7	438.7
11 Anne Ave, Broadbeach	0BUP1948,	SEMH_A025_9000232740	A25	34.8	34.7	34.6	34.4	34.3	0.0
12-22 Albert Avenue, Broadbeach		SEMH_A025_9000153018	A25	933.9	930.3	466.6	455.6	444.7	441.0
22 Mary Avenue, Broadbeach	0BUP402	SEMH_A025_9000153095	A25	142.1	142.0	141.7	141.5	141.2	5.8
167 Old Burleigh Road	0BUP6459	SEMH_A025_9000232727	A25	248.3	242.8	236.6	230.4	224.2	15.8

Please let me know should you need any further information.

Kind regards,
Swapan

From: Wieser, Ben <Ben.Wieser@arcadis.com>
Sent: Wednesday, 15 January 2025 9:30 AM
To: SIKDER Swapan <SSIKDER@goldcoast.qld.gov.au>
Cc: Stockwell, James <James.Stockwell@arcadis.com>
Subject: FW: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

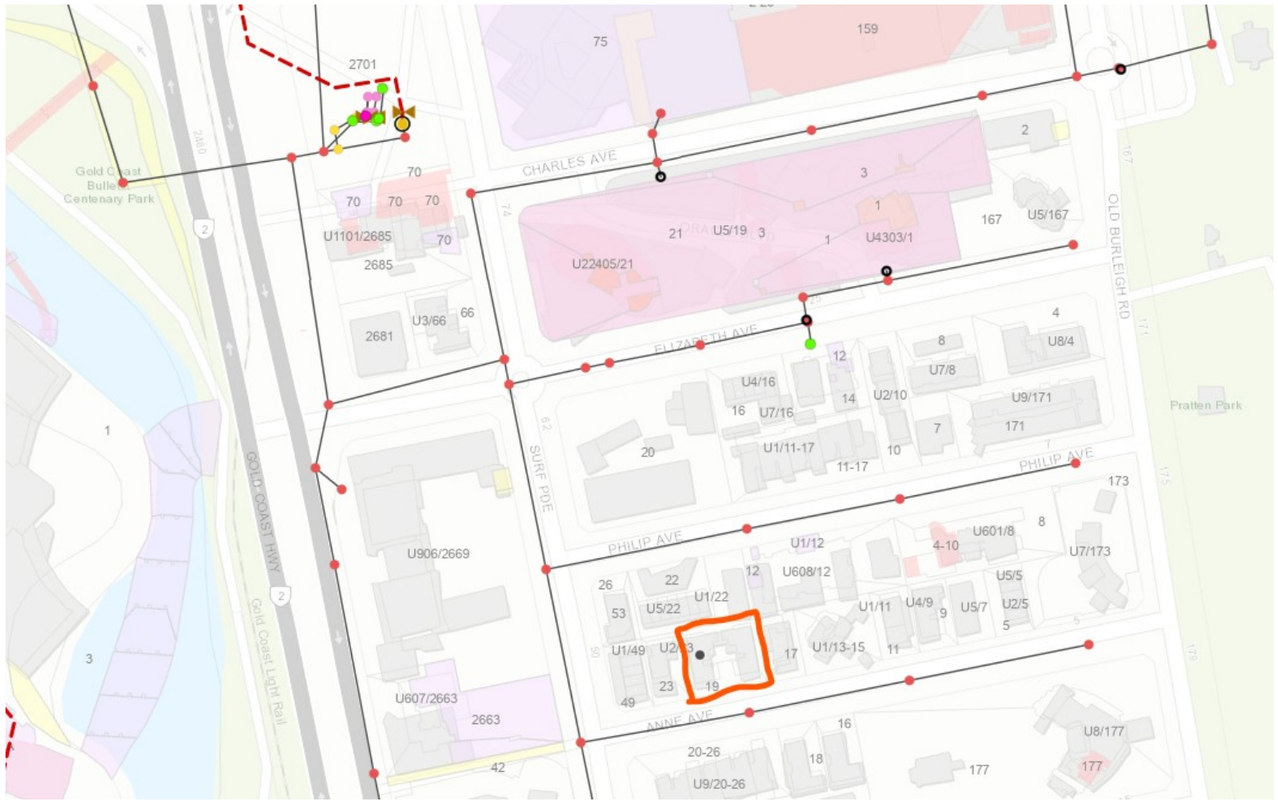
Hi Swapan,

Hope you are well.

Brioni has advised that the proposed development loading triggers the requirement for a sewer network capacity assessment. Please refer to the email below.

We have a client who is interested in a site in Broadbeach for Development Approval. May I please request the following information pertaining to the site mentioned below:

- 19-21 Anne Avenue, Broadbeach (BUP1114)



The proposed development will see the construction of a residential apartment building.

Information Requested:

- Relevant LGIP Report (We are still in possession of the Coombabah 2019 report / model – can you please confirm if this is still current?)
- Scope of Analysis.
- LGIP loads to be removed.
- Other Approved Loads to be added.
- Pump Station Assessment.
- Existing Pump information; Power, Start Stop levels, Wet well diameter, Invert and Surface level, overflow level.
- Any other considerations for the Site?

Please feel free to contact me if you require any further information.

Kind regards,

Ben Wieser
Civil Engineer – Urban Development & Regeneration
BEng (Civil) Hons
Arcadis Australia Pacific
Level 7 Seabank Building, 12-14 Marine Parade, Southport, QLD | 4215 | Australia
T +61 (0) 7 5503 4852
Postal address – PO Box 1653, Southport QLD | 4215 | Australia
www.arcadis.com

Be green, leave it on the screen.

I acknowledge and pay my respects to the Traditional Owners, Custodians and Elders past, present and emerging of the Indigenous Nations of Australia on whose lands I work

---

From: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Sent: Wednesday, 15 January 2025 8:59 AM
To: Wieser, Ben <Ben.Wieser@arcadis.com>
Cc: Stockwell, James <James.Stockwell@arcadis.com>
Subject: RE: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Hi Ben,

Based on the information provided below, the network teams have advised that;

Water network capacity assessment WOULD NOT BE required.
Sewer network capacity assessment WOULD BE required.

Kind regards,

Brioni Gallo
Business Administration Officer – Water and Waste Assessment
City Development

P: 07 5582 8340
cityofgoldcoast.com.au

CITY OF
GOLDCOAST.

From: Wieser, Ben <Ben.Wieser@arcadis.com>
Sent: Friday, 10 January 2025 10:04 AM
To: Water and Waste Assessment <GCWDA@goldcoast.qld.gov.au>
Cc: Stockwell, James <James.Stockwell@arcadis.com>
Subject: 19-21 Anne Avenue, Broadbeach - Network Capacity Assessments

This email originates outside of the City of Gold Coast's email system. If suspicious, report it using the 'Report Email' button.

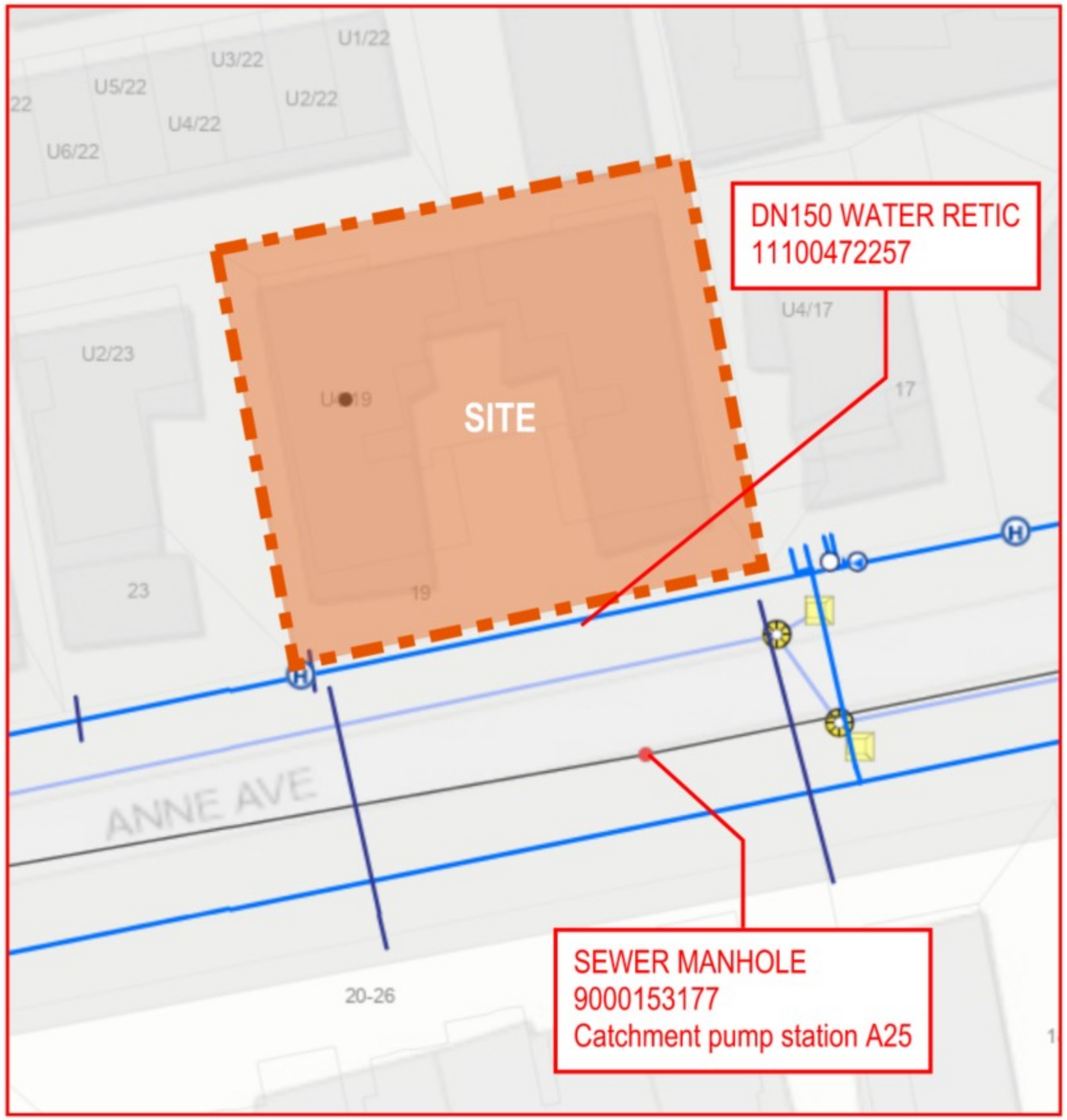
Hi GCWDA,

Our client is investigating the site "**19-21 Anne Avenue, Broadbeach**".

Accordingly, we are hoping to seek early input from GCWW on whether network assessment(s) would be required to support a future DA.

- From concept plans, the proposed demand is currently calculated to be **140.56 EP, comprising of 100% residential**.
- Can GCWW please confirm whether any network assessments are required?

Should you require any further information, please let us know.



Kind regards,

Ben Wieser
Civil Engineer – Urban Development & Regeneration
BEng (Civil) Hons
Arcadis Australia Pacific
Level 7 Seabank Building, 12-14 Marine Parade, Southport, QLD | 4215 | Australia

APPENDIX B
Existing Scenario Results

Long Section 1 Results - Existing Scenario

Year Model **2036**
Time Setting Base
Domain Map

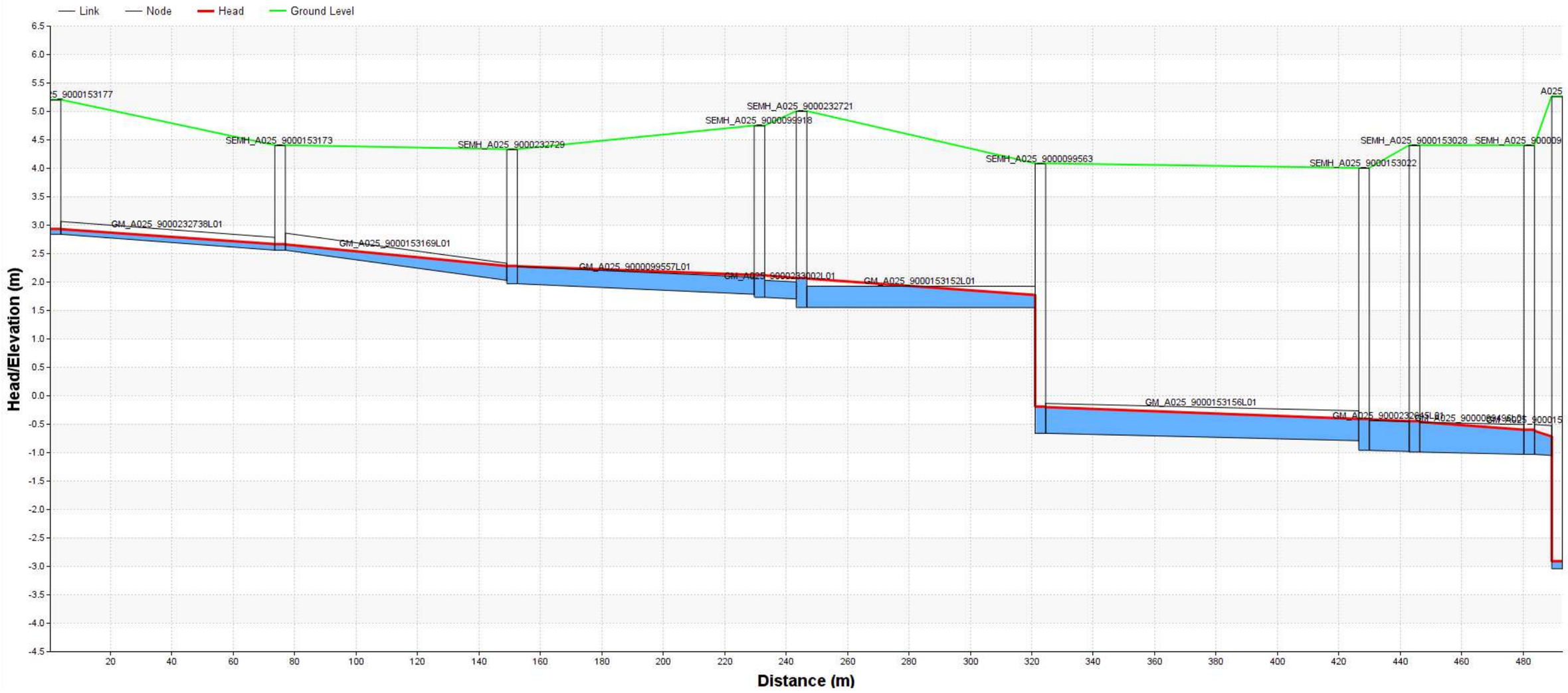
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.0945	2.26551	2.90396	1.37498	10.11051	
SEMH_A025_9000153173	2.56	4.4	1.84	0.10749	1.73251	2.58651	0.09549	21.96907	
SEMH_A025_9000232729	1.97	4.33	2.36	0.31301	2.04699	2.0053	0.03819	41.24	
SEMH_A025_9000099918	1.73	4.745	3.015	0.39518	2.61982	1.80568	0	58.00	
SEMH_A025_9000232721	1.55238	5	3.44762	0.51931	2.92831	1.59736	0.2707	92.19	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.46931	4.27069	-0.60217	0.33833	173.89	
SEMH_A025_9000153022	-0.96	4	4.96	0.55268	4.40732	-0.92815	0	180.18	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.54403	4.84597	-0.97324	0	245.85	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.43307	4.99693	-1.02925	0	245.85	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



Long Section 1 Results - Existing Scenario

Year Model **2041**
Time Setting Base
Domain Map

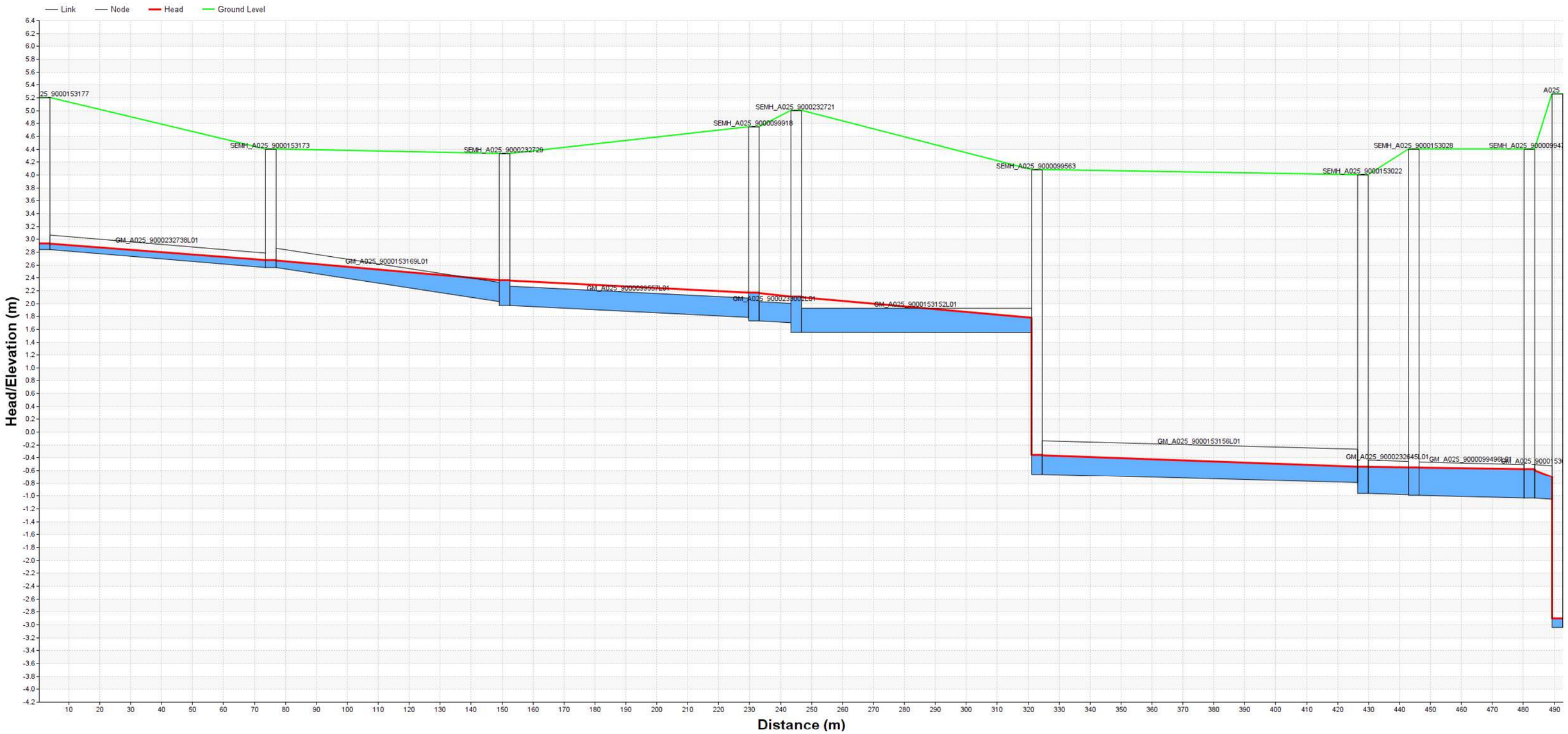
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.09559	2.26441	2.90486	1.39998	10.31951	
SEMH_A025_9000153173	2.56	4.4	1.84	0.11626	1.72374	2.58731	0.09722	25.41217	
SEMH_A025_9000232729	1.97	4.33	2.36	0.39277	1.96723	2.00628	0.03889	45.58	
SEMH_A025_9000099918	1.73	4.745	3.015	0.44	2.575	1.80673	0	62.51	
SEMH_A025_9000232721	1.55238	5	3.44762	0.55548	2.89214	1.59911	0.29853	98.07	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.30616	4.43385	-0.62711	0.33833	193.59	
SEMH_A025_9000153022	-0.96	4	4.96	0.42285	4.53715	-0.9474	0	200.42	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.44221	4.94779	-0.98046	0	266.31	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.45462	4.97538	-1.02919	0	266.29	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



Long Section 1 Results - Existing Scenario

Year Model	**2066**
Time Setting	Base
Domain Map	

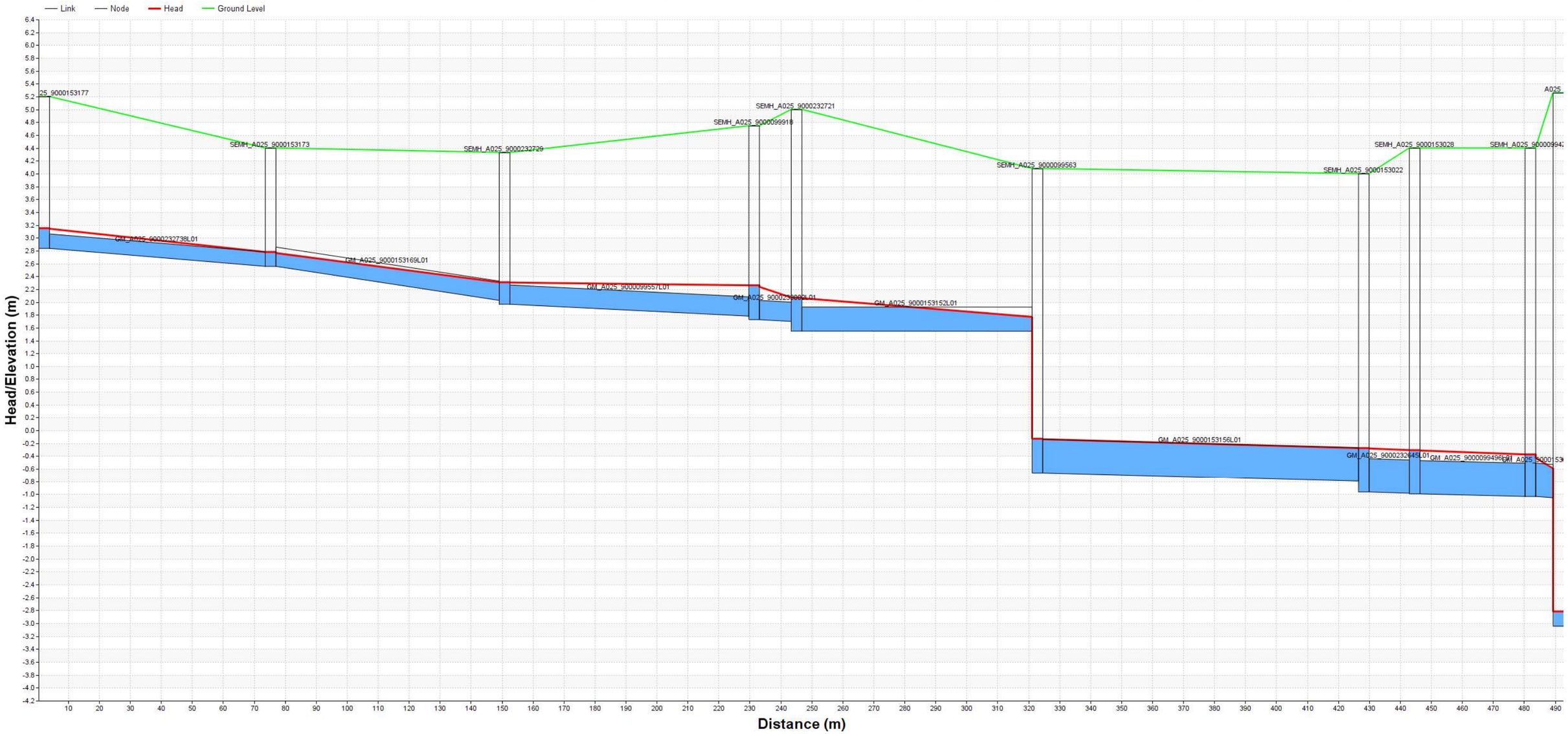
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.68396	1.67604	2.99895	9.46363	32.71477	
SEMH_A025_9000153173	2.56	4.4	1.84	0.22397	1.61603	2.64361	0.77728	69.89587	
SEMH_A025_9000232729	1.97	4.33	2.36	0.34226	2.01774	2.01132	0.77727	94.14056	
SEMH_A025_9000099918	1.73	4.745	3.015	0.53502	2.47998	1.80964	0	109.36699	
SEMH_A025_9000232721	1.55238	5	3.44762	0.52245	2.92517	1.59873	1.72169	185.42116	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.53525	4.20475	-0.62628	1.96677	375.83643	
SEMH_A025_9000153022	-0.96	4	4.96	0.68938	4.27062	-0.94208	0	384.40941	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.6883	4.7017	-0.96887	0	487.19178	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.66137	4.76863	-1.02738	0	487.19178	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



APPENDIX C
Developed Scenario Results

Long Section 1 Results - Developed Scenario

Year Model	**2036**
Time Setting	Base
Domain Map	

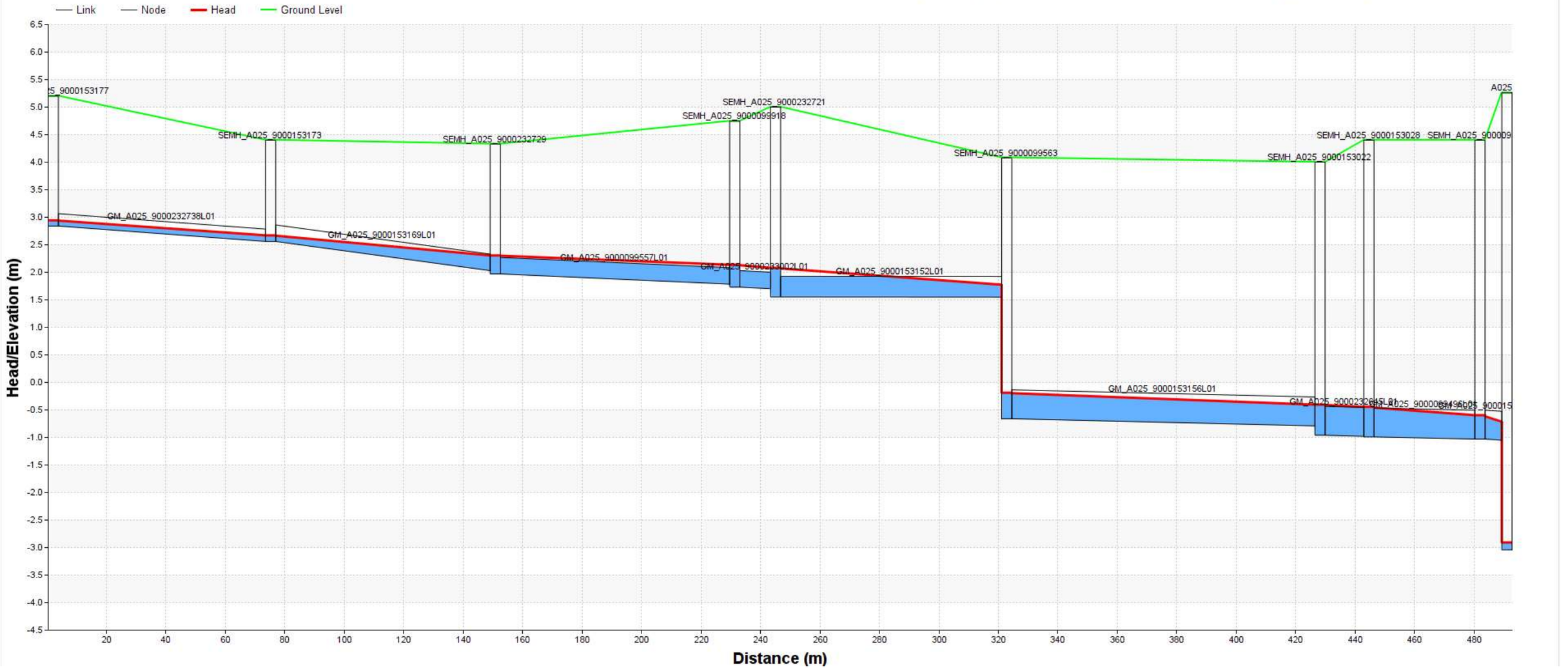
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.10463	2.25537	2.91577	2.84904	11.58457	
SEMH_A025_9000153173	2.56	4.4	1.84	0.1113	1.7287	2.59161	0.09549	23.44312	
SEMH_A025_9000232729	1.97	4.33	2.36	0.33611	2.02389	2.0061	0.03819	42.71553	
SEMH_A025_9000099918	1.73	4.745	3.015	0.4068	2.6082	1.80664	0	59.46983	
SEMH_A025_9000232721	1.55238	5	3.44762	0.52818	2.91944	1.59747	0.2707	93.66297	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.47276	4.26724	-0.60217	0.33833	175.36245	
SEMH_A025_9000153022	-0.96	4	4.96	0.55601	4.40399	-0.92815	0	181.65553	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.54672	4.84328	-0.97324	0	247.32107	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.43464	4.99536	-1.02925	0	247.32107	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



Long Section 1 Results - Developed Scenario

Year Model **2041**
Time Setting Base
Domain Map

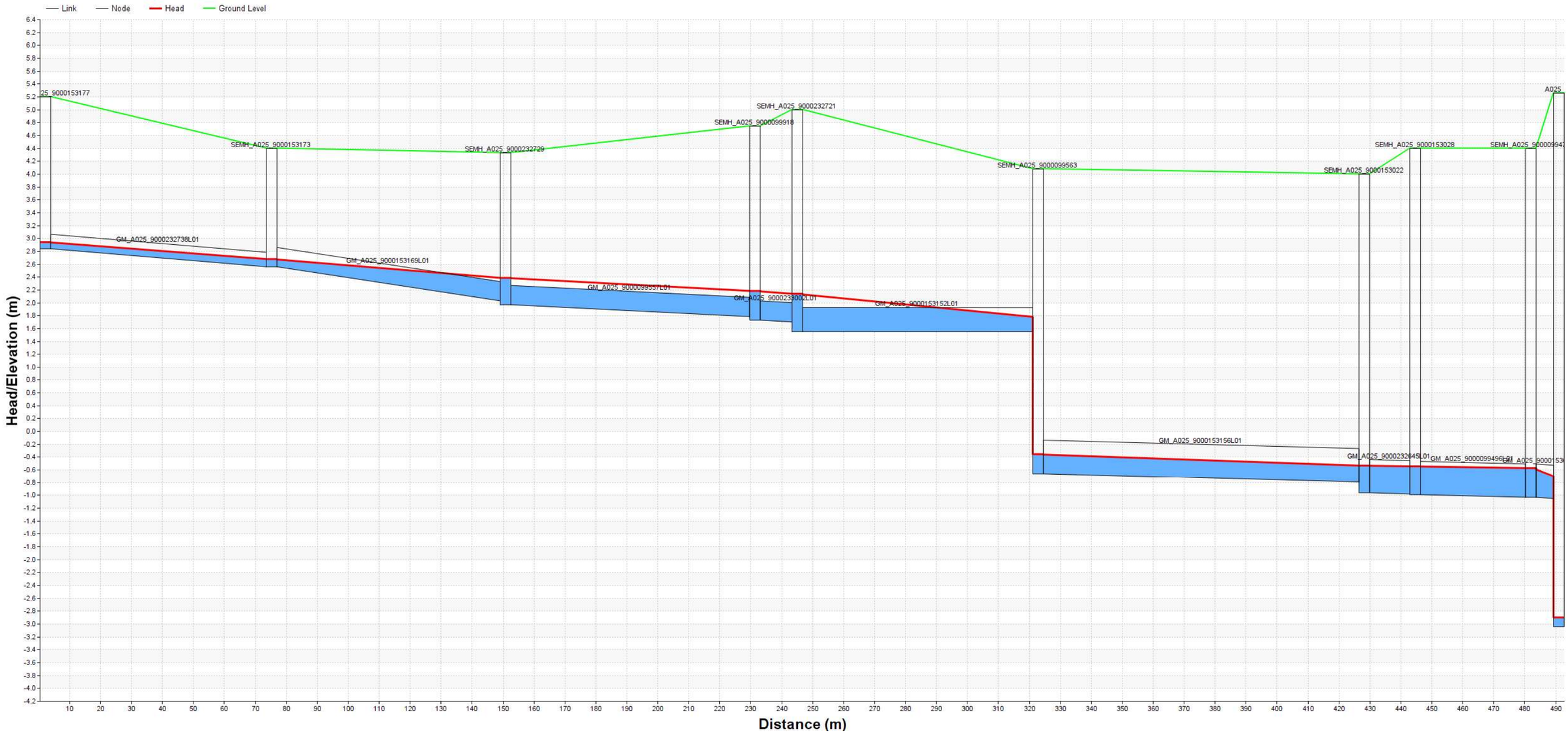
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.1046	2.2554	2.91649	2.87126	11.79078	
SEMH_A025_9000153173	2.56	4.4	1.84	0.11987	1.72013	2.59235	0.09722	26.88345	
SEMH_A025_9000232729	1.97	4.33	2.36	0.42012	1.93989	2.00698	0.03889	47.13074	
SEMH_A025_9000099918	1.73	4.745	3.015	0.46977	2.54523	1.80778	0	64.26685	
SEMH_A025_9000232721	1.55238	5	3.44762	0.59684	2.85078	1.59924	0.29853	99.81774	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.30736	4.43264	-0.62711	0.33833	195.17083	
SEMH_A025_9000153022	-0.96	4	4.96	0.4296	4.5304	-0.9474	0	202.0427	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.44914	4.94086	-0.98046	0	272.49614	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.4611	4.96891	-1.02919	0	272.49614	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



Long Section 1 Results - Developed Scenario

Year Model	**2066**
Time Setting	Base
Domain Map	

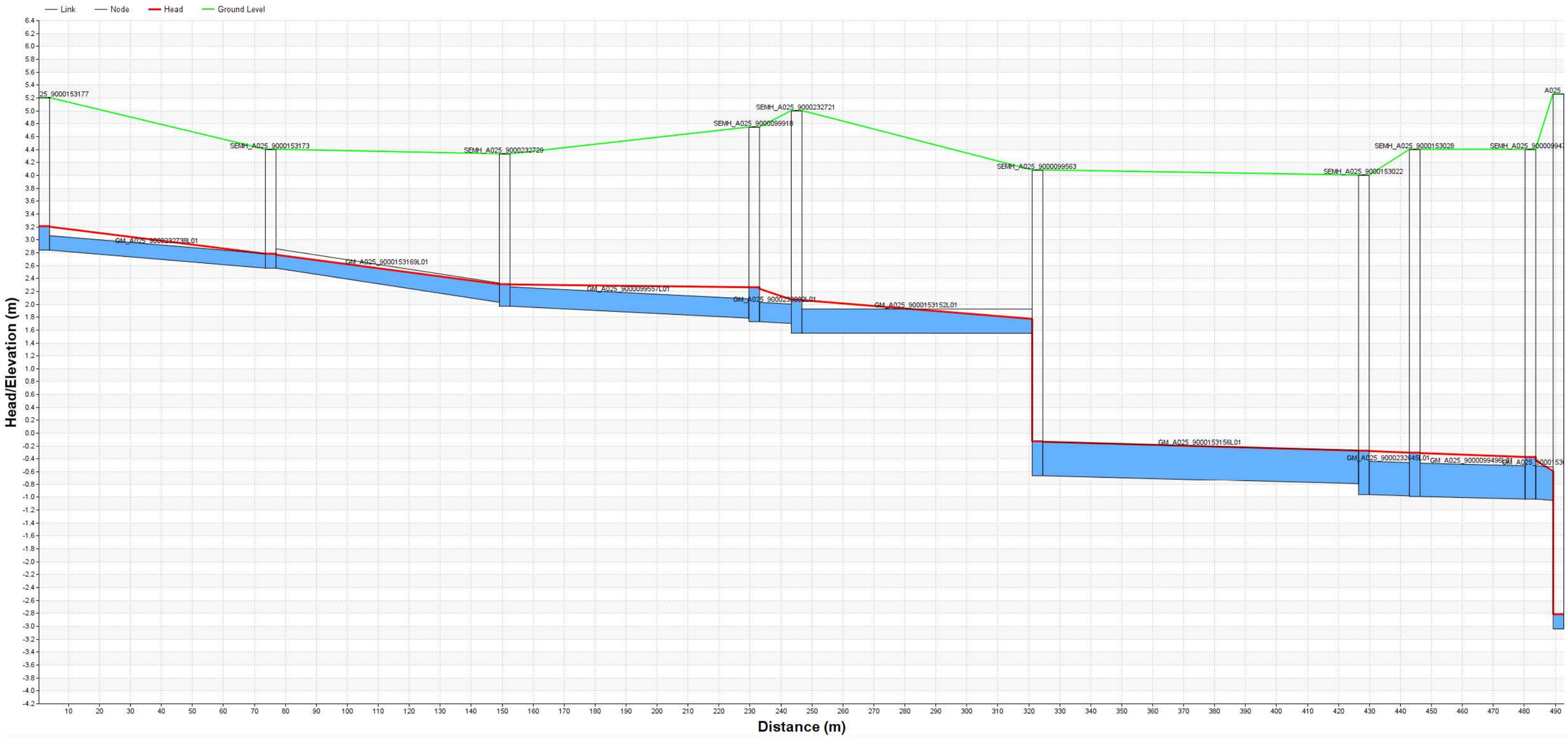
Standard Run - Node Results

Allowable Depths in Accordance with GCCC Guidelines

Depth Below MH 1

Junction ID	Invert Elevation (m)	Rim Elevation (m)	Full Depth (m)	Max. Depth (m)	Freeboard (m)	Head (m)	Max. Lateral Inflow (L/s)	Max. Total Inflow (L/s)	MH Depth Comment
SEMH_A025_9000153177	2.84	5.2	2.36	0.93813	1.42188	2.99854	9.3489	33.36586	
SEMH_A025_9000153173	2.56	4.4	1.84	0.22381	1.61619	2.64357	0.77728	69.64303	
SEMH_A025_9000232729	1.97	4.33	2.36	0.34141	2.01859	2.01131	0.77727	94.01	
SEMH_A025_9000099918	1.73	4.745	3.015	0.53427	2.48073	1.80963	0	109.25	
SEMH_A025_9000232721	1.55238	5	3.44762	0.5221	2.92552	1.59873	1.72169	185.31	
SEMH_A025_9000099563	-0.66	4.08	4.74	0.53499	4.20501	-0.62628	1.96677	375.72	
SEMH_A025_9000153022	-0.96	4	4.96	0.68921	4.27079	-0.94208	0	384.29	
SEMH_A025_9000153028	-0.99	4.4	5.39	0.68816	4.70184	-0.96887	0	487.08	
SEMH_A025_9000099470	-1.03	4.4	5.43	0.66127	4.76873	-1.02738	0	487.08	

HGL Profile with Maximum Data of Links GM_A025_9000232738L01,GM_A025_9000153169L01,...,GM_A025_9000153000L01



ATTACHMENT 9

Acoustic Works
prepared by Acoustic Works



UPS
URBAN PLANNING SERVICES

acousticworks

Proposed Residential Development
19-21 Anne Avenue
Broadbeach

ACOUSTIC REPORT






Client:
Mary Anne Development Pty Ltd

Reference:
2025001 R01B 19-21 Anne Avenue, Broadbeach ENV.docx

Date Issued:
21 February 2025

Document Information

Contact Details

Acoustic Works
Suite 17/10 Benson Street
Toowong QLD 4066
(07) 3393 2222
ABN: 56 157 965 056

PO Box 69
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Greg Pearce
Email: gpearce@acousticworks.com.au

Mark Enersen
Email: menersen@acousticworks.com.au

Report Register

Date	Revision	Author	Reviewer	Manager
10/02/25	R01A (DRAFT)	Khoi Phan	Kayleigh Duce	ME
21/02/25	R01B	Khoi Phan	Kayleigh Duce	ME

Disclaimer

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1. Introduction

This report is in response to a request by Mary Anne Development Pty Ltd for an environmental noise assessment of a proposed residential apartment building development located at 19-21 Anne Avenue, Broadbeach. To facilitate the assessment, unattended noise monitoring was conducted to establish the criteria for onsite activities. Based on the outcomes of the assessment recommendations for acoustic treatments are specified.

2. Site Description

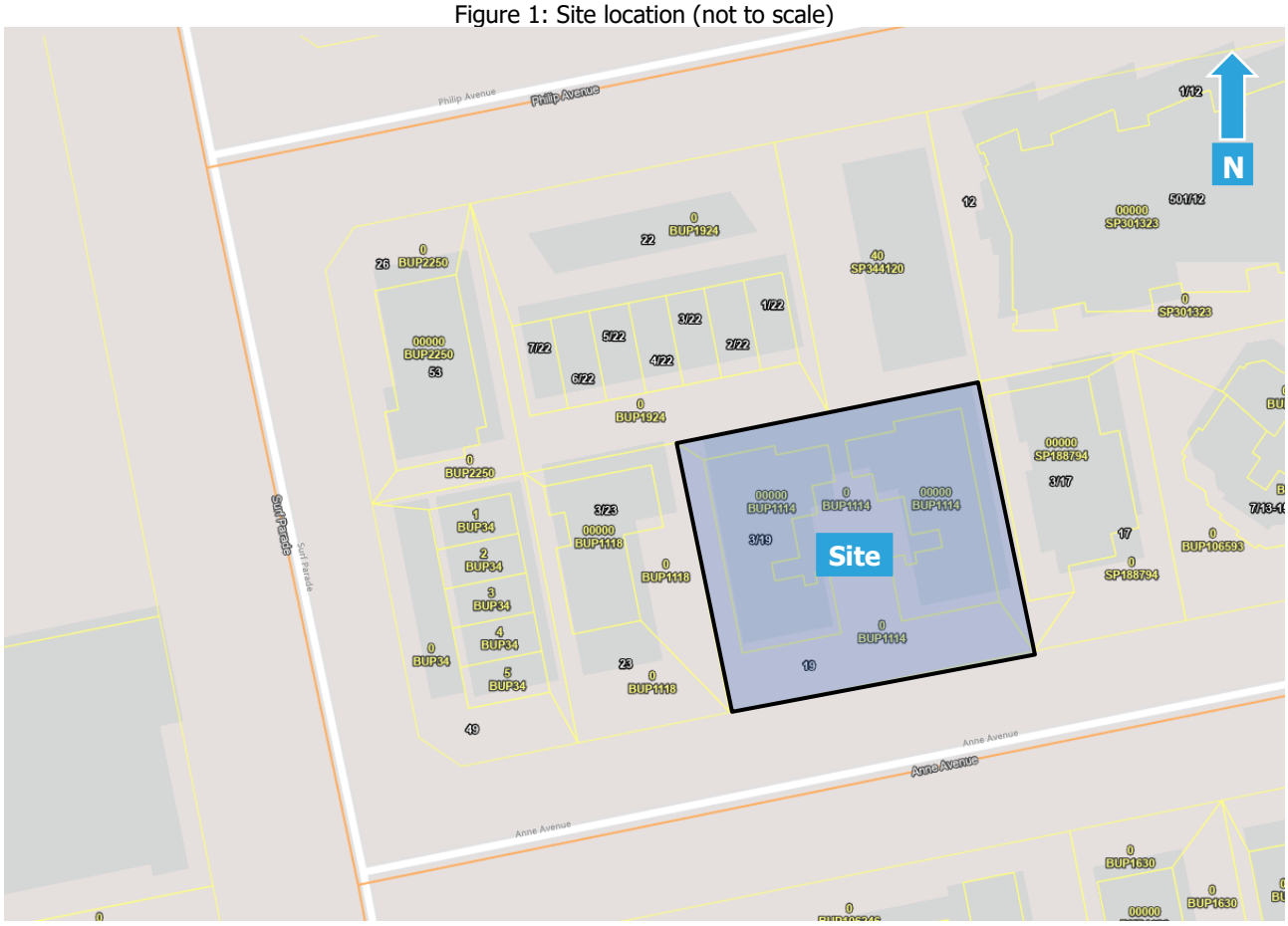
2.1 Site Location

The site is described by the following:

19-21 Anne Avenue, Broadbeach
Lot 0 on BUP1114

Refer to Figure 1 for site location.

Figure 1: Site location (not to scale)



A site survey was conducted on 16 January 2025 and identified the following;

a) The site is currently occupied by a two-storey residential building and will be demolished to make way for the proposed development.
b) Residential land uses bound the site to the east, north and west.
c) Anne Avenue bounds the site to the south and separates the site from residential land uses.

2.2 Proposal

The proposal is for a multi-storey residential apartment building consisting of the following;

- Site area of 1,032m^2.
- Car parking to be provided with total 107 car spaces, located between ground and 4 basement levels:
  - 26 residential car spaces on basement 2.
  - 24 residential car spaces on basement 1.
  - 6 visitor car spaces on ground level.
  - 24 residential car spaces on level 2 podium.
  - 26 residential car spaces on level 3 podium.
- The ground floor consists of reception and entry lobby.
- The level 4 Recreational Floor consists of: gym, spa, sauna, outdoor recreational areas including a pool, a terrace and cold & hot plunges.
- 56 residential units from level 5 to level 32.
- Site access via Anne Avenue.

Refer to the Appendices for development plans.

2.3 Acoustic Environment

The acoustic environment in the surrounding area is primarily affected by surf and local traffic noise.

3. Equipment

The following equipment was used to record noise levels:

- Rion NL42 Environmental Noise Monitor
- Pulsar Model 105 Sound Calibrator

The Rion NL42 Environmental Noise Monitor hold current NATA Laboratory Certification and was field calibrated before and after the monitoring periods, with no significant drift from the reference signals recorded.

4. Receivers and Noise Measurements

4.1 Receiver Locations

The nearest noise sensitive receiver locations were identified as follows;

1. A two-storey residential building bounds the site to the west at 23 Anne Avenue.
2. A five-storey residential building is located adjacent to the eastern site boundary at 17 Anne Avenue.
3. Two-storey residential buildings bound the site to the north at 20-22 Philip Avenue.
4. A four-storey short-term accommodation building is located to the south of the site at 20-26 Anne Avenue.

The locations were chosen as being representative of the nearest noise sensitive receivers to the proposed development. Refer to Figure 2 for these locations.

Figure 2: Receivers and noise monitoring locations



4.2 Unattended Noise Monitoring

Construction noise from 8 George Avenue (The Sterling Broadbeach) was found to be audible at all the nearby receivers to the site. To minimise potential construction noise affecting the monitoring data previous ambient noise monitoring that was not affected by construction noise and has been utilised. The location of the monitor is detailed in the following sections.

4.2.1 Ambient Noise Levels

The Rion NL42 environmental noise monitor was previously placed at 25 George Avenue to measure the ambient noise levels. The monitor was placed in this location as it was considered representative of the nearest residential receivers. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between 16 and 23 May 2018.

The environmental noise monitor was set to record noise levels in "A" Weighting, Fast response using 15-minute statistical intervals. Ambient noise monitoring was conducted generally in accordance with Australian Standard AS1055:2018 *Acoustics – Description and measurement of environmental noise*.

For the unattended noise monitoring location refer to Figure 2.

5. Measured Noise Levels

The following tables present the measured noise levels from the unattended noise survey and weather conditions during the monitoring period. Any periods of inclement weather or extraneous noise were omitted from the measured data prior to determining the results.

5.1 Background Noise Levels

The background noise levels measured at the monitoring location are as follows;

Table 1: Measured background noise levels - all time periods

Day	Date	L90 dB(A)		
		Day	Evening	Night
Wednesday	16/05/18	50	47	44
Thursday	17/05/18	50	47	44
Friday	18/05/18	50	50	46
Saturday	19/05/18	50	51	45
Sunday	20/05/18	47	45	42
Monday	21/05/18	48	44	43
Tuesday	22/05/18	47	45	43
Wednesday	23/05/18	48	-	43
Overall value		49	47	44

Refer to the appendix for graphical representation of the noise monitoring.

6. Noise Criteria

6.1 Environmental Noise Criteria

The noise criteria as applied by City of Gold Coast under the City Plan Version 11 (commenced 6 February 2024) are as follows;

6.1.1 Acoustic Quality Objectives

Table 2 below presents the acoustic quality objectives at noise sensitive receptors as detailed in Schedule 1 of the EPP (Noise) 2008.

Table 2: Acoustic Quality Objectives at Noise Sensitive Properties

Sensitive Receptor	Time of Day	Acoustic Quality Objectives, dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Dwelling (outdoors)	Day and Evening (7am – 10pm)	50	55	65
Dwelling (Indoors)	Day and Evening (7am – 10pm)	35	40	45
	Night (10pm – 7am)	30	35	40

6.1.2 Background Creep

The Background Creep criteria are as follows;

Time-varying noise:

$$L_{Aeq,adj,T,} \leq \text{Ambient } L_{A90,T} + 5\text{dB(A)}$$

Steady-state noise:

$$L_{A90,T} \leq \text{Ambient } L_{A90,T}$$

The time period (T) is a time interval of at least 15 minutes, or if the noise continues for less than 15 minutes, the duration of the noise source.

Based on the results of ambient noise monitoring, the project specific background creep noise limits are shown in Table 3.

Table 3: Background creep noise limits

Time Period	Noise Level Limits SPL dB(A)	
	$L_{Aeq,T}$	$L_{A90,T}$
Day 7am – 6pm	54	49
Evening 6pm – 10pm	52	47
Night 10pm – 7am	49	44

6.1.3 Sleep Disturbance Criteria

Criteria for sleep disturbance under the WHO Guideline is addressed is as follows:

> *"As a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) $L_{A,(Max)}$ more than 10 or 15 times per night'.*
>
> *'Where noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided'."*

7. Environmental Assessment

7.1 Onsite Activities

Noise associated with the development was assessed based on previous measurements of similar activities. The calculations assume that the activities are located at the closest point within the development site to each receiver location in each case. Any relevant shielding or building transmission loss is taken into account for these activities.

7.1.1 Acoustic Quality Objectives

The average maximum noise source levels and predicted levels at the receiver locations are shown in Table 2 as follows. Note: L_{A10} and L_{A1} results are not shown in cases where the total duration of the events is less than the minimum time required e.g. $L_{A10(1hr)}$ requires noise events to occur for at least 360 seconds of an hour-long period. L_{Aeq} results are not shown where the calculated total is less than 0dBA.

Table 4: Acoustic Quality Objective Noise Assessment, 1 hour, Residential receivers

Receiver	Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	No. of events per 1hr Day	No. of events per 1hr Eve	No. of events per 1hr Night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Topo screening dB	Dist atten. @ -6dB/dd	LAeq adj.1hr ext. dB(A) Day	LAeq adj.1hr int. dB(A) Day	LAeq adj.1hr ext. dB(A) Eve	LAeq adj.1hr int. dB(A) Eve	LAeq adj.1hr ext. dB(A) Night	LAeq adj.1hr int. dB(A) Night	LA10 adj.1hr ext. dB(A) Day	LA10 adj.1hr int. dB(A) Day	LA10 adj.1hr ext. dB(A) Eve	LA10 adj.1hr int. dB(A) Eve	LA10 adj.1hr ext. dB(A) Night	LA10 adj.1hr int. dB(A) Night	LA1 adj.1hr ext. dB(A) Day	LA1 adj.1hr int. dB(A) Day	LA1 adj.1hr ext. dB(A) Eve	LA1 adj.1hr int. dB(A) Eve	LA1 adj.1hr ext. dB(A) Night	LA1 adj.1hr int. dB(A) Night	Amenity LAeq Compliance Day / eve	Amenity LAeq Compliance Day / eve indoor	Amenity LAeq Compliance Night indoor	LA10 Compliance Day / eve	LA10 Compliance Day / eve indoor	LA10 Compliance Night	LA1 Compliance Day / eve	LA1 Compliance Day / eve indoor	LA1 Compliance Night indoor
	Criteria																																	50	35	30	55	40	35	65	45	40
	Car passby (Visitor)	69		69	12	8	4	15	13					-23	33	23	31	21	28	18							38	28	38	28	38	28	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1	Car door closure (Visitor)	75	2	77	12	8	4	2	9					-19	36	26	34	24	31	21													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	12	8	4	2	9					-19	34	24	32	22	29	19													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	200	100	40	10	18					-25	45	35	42	32	38	28	48	38	48	38	48	38	51	41	51	41	51	41	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
	Car passby (Residents)	69		69	200	100	40	15	13					-22	45	35	42	32	38	28	48	38	48	38	48	38	50	40	50	40	50	40	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	200	100	40	2	7			-30		-17	20	10	17	7	13	3	23	13					25	15	25	15	25	15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Residents)	74	2	76	200	100	40	2	7			-30		-17	19	9	16	6	12	2	23	13					25	15	25	15	25	15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym (L4)	79	2	81	4	4	4	900	35			-22		-31	28	18	28	18	28	18	32	22	32	22	32	22	39	29	39	29	39	29	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	4	4	0	900	13				-15	-22	42	32	42	32			47	37	47	37			54	44	54	44			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Voice conversation (BBQ area - L4)	70		70	4	4	4	900	22				-23	-27	20	10	20	10	20	10	23	13	23	13	23	13	27	17	27	17	27	17	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	28	16	8	10	18	1.5	-14			-25	23	13	20	10	17	7							29	19	29	19	29	19	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Podium)	69		69	28	16	8	15	13	1.5	-14			-22	23	13	20	10	17	7	26	16					30	20	30	20	30	20	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	28	16	8	2	7	1.5	-11			-17	31	21	28	18	25	15							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Podium)	74	2	76	28	16	8	2	7	1.5	-11			-17	30	20	27	17	24	14							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														50	40	48	38	43	33	53	43	53	43	51	41	57	47	57	47	54	44	**Yes**	**No**	**No**	**Yes**	**No**	**No**	**Yes**	**No**	**No**
	Criteria																																	50	35	30	55	40	35	65	45	40
	Car passby (Visitor)	69		69	12	8	4	15	26					-29	27	17	25	15	22	12							32	22	32	22	32	22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Car door closure (Visitor)	75	2	77	12	8	4	2	32			-24		-30	1																	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	12	8	4	2	32			-24		-30																		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	200	100	40	10	7			-24		-17	31	21	28	18	24	14	34	24	34	24	34	24	37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Residents)	69		69	200	100	40	15	13			-24		-22	22	12	19	9	15	5	25	15	25	15	25	15	27	17	27	17	27	17	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	200	100	40	2	7			-30		-17	21	11	18	8	14	4	24	14					26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Residents)	74	2	76	200	100	40	2	7			-30		-17	20	10	17	7	13	3	24	14					26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym (L4)	79	2	81	4	4	4	900	15			-22		-24	35	25	35	25	35	25	39	29	39	29	39	29	46	36	46	36	46	36	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	4	4		900	39					-32	48	38	48	38			53	43	53	43			60	50	60	50			Yes	No	n/a	Yes	No	n/a	Yes	No	n/a
	Voice conversation (BBQ area - L4)	70		70	4	4	4	900	38					-32	38	28	38	28	38	28	41	31	41	31	41	31	45	35	45	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	28	16	8	10	7	1.5	-15			-17	31	21	29	19	26	16							37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Podium)	69		69	28	16	8	15	13	1.5	-15			-22	22	12	20	10	17	7	25	15					29	19	29	19	29	19	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	28	16	8	2	7	1.5	-16			-17	26	16	24	14	21	11							31	21					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Podium)	74	2	76	28	16	8	2	7	1.5	-16			-17	25	15	23	13	20	10							31	21					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														49	39	49	39	41	31	54	44	54	44	44	34	61	51	61	51	50	40	**Yes**	**No**	**No**	**Yes**	**No**	**Yes**	**Yes**	**No**	**Yes**
	Criteria																																	50	35	30	55	40	35	65	45	40
	Car passby (Visitor)	69		69	12	8	4	15	14			-10		-23	23	13	21	11	18	8							28	18	28	18	28	18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Car door closure (Visitor)	75	2	77	12	8	4	2	8			-10		-18	27	17	25	15	22	12													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	12	8	4	2	8			-10		-18	26	16	24	14	21	11													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	200	100	40	10	7			-24		-17	31	21	28	18	24	14	34	24	34	24	34	24	37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Residents)	69		69	200	100	40	15	7			-30		-17	21	11	18	8	14	4	24	14	24	14	24	14	26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	200	100	40	2	7			-30		-17	21	11	18	8	14	4	24	14					26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Residents)	74	2	76	200	100	40	2	7			-30		-17	20	10	17	7	13	3	24	14					26	16	26	16	26	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym (L4)	79	2	81	4	4	4	900	22			-22		-27	32	22	32	22	32	22	36	26	36	26	36	26	43	33	43	33	43	33	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	4	4		900	14			-17		-23	40	30	40	30			45	35	45	35			52	42	52	42			Yes	Yes	n/a	Yes	Yes	n/a	Yes	Yes	n/a
	Voice conversation (BBQ area - L4)	70		70	4	4	4	900	31				-22	-30	18	8	18	8	18	8	21	11	21	11	21	11	25	15	25	15	25	15	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	28	16	8	10	7	1.5	-13			-17	33	23	31	21	28	18							39	29	39	29	39	29	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Podium)	69		69	28	16	8	15	7	1.5	-13			-17	30	20	27	17	24	14	33	23					37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	28	16	8	2	7	1.5	-11			-17	31	21	29	19	26	16							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Podium)	74	2	76	28	16	8	2	7	1.5	-11			-17	30	20	28	18	25	15							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														43	33	42	32	36	26	46	36	46	36	38	28	53	43	53	43	46	36	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																																	50	35	30	55	40	35	65	45	40
	Car passby (Visitor)	69		69	12	8	4	15	29					-30	26	16	24	14	21	11							31	21	31	21	31	21	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Car door closure (Visitor)	75	2	77	12	8	4	2	35					-31	24	14	23	13	20	10													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	12	8	4	2	35					-31	23	13	22	12	19	9													Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	200	100	40	10	51			-6		-34	31	21	28	18	24	14	34	24	34	24	34	24	37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Residents)	69		69	200	100	40	15	31			-30		-30	8		5		1		11	1	11	1	11	1	13	3	13	3	13	3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	200	100	40	2	27			-30		-29	9		6		2		12	2					14	4	14	4	14	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Residents)	74	2	76	200	100	40	2	27			-30		-29	8		5				12	2					14	4	14	4	14	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Gym (L4)	79	2	81	4	4	4	900	34			-22		-31	28	18	28	18	28	18	32	22	32	22	32	22	39	29	39	29	39	29	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	4	4		900	46					-33	47	37	47	37			52	42	52	42			59	49	59	49			Yes	No	n/a	Yes	No	n/a	Yes	No	n/a
	Voice conversation (BBQ area - L4)	70		70	4	4	4	900	31					-30	40	30	40	30	40	30	43	33	43	33	43	33	47	37	47	37	47	37	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	28	16	8	10	39					-32	31	21	29	19	26	16							37	27	37	27	37	27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car passby (Podium)	69		69	28	16	8	15	28					-29	31	21	28	18	25	15	34	24					38	28	38	28	38	28	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	28	16	8	2	25					-28	31	21	29	19	26	16							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start (Podium)	74	2	76	28	16	8	2	25					-28	30	20	28	18	25	15							36	26					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														48	38	48	38	41	31	52	42	52	42	44	34	59	49	59	49	49	39	**Yes**	**No**	**No**	**Yes**	**No**	**Yes**	**Yes**	**No**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Some exceedances of the acoustic quality objective criteria are predicted at receivers 1, 3 and 4. However, as these criteria are already exceeded by the background noise levels, the impacts do not necessarily affect the acoustic amenity. Therefore, assessment to the background creep criteria only is recommended.

7.1.2 Background Creep

Based on assessment of all time periods, the noise source levels and predicted impacts at the receiver locations are shown as follows;

Table 5: Background Creep Noise Assessment, 15min

Receiver	Receivers / Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	No. of events per 15min Day	No. of events per 15min Eve	No. of events per 15min Night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building TL or shield dB	Building screening dB	Dist atten. @-6dB/dd	LAeq adj,T ext. dB(A) Day	LAeq adj,T int. dB(A) Day	LAeq adj,T ext. dB(A) Eve	LAeq adj,T int. dB(A) Eve	LAeq adj,T ext. dB(A) Night	LAeq adj,T int. dB(A) Night	LAeq 15 min Compliance Day	Eve	Night
	1. 23 Anne Avenue (W) 2. 17 Anne Avenue (E) 3. 20-22 Phillip Avenue (N) 4. 20-26 Anne Avenue (S)																						
	Criteria																				54	52	49
	Car passby (Visitor)	69		69	3	2	1	15	13					-23	33	23	31	21	28	18	Yes	Yes	Yes
1	Car door closure (Visitor)	75	2	77	3	2	1	2	9					-19	36	26	34	24	31	21	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	3	2	1	2	9					-20	34	24	32	22	29	19	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	50	25	10	10	18					-26	45	35	42	32	38	28	Yes	Yes	Yes
	Car passby (Residents)	69		69	50	25	10	15	13					-23	45	35	42	32	38	28	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	50	25	10	2	7			-30		-17	20	10	17	7	13	3	Yes	Yes	Yes
	Car start (Residents)	74	2	76	50	25	10	2	7			-30		-17	19	9	16	6	12	2	Yes	Yes	Yes
	Gym (L4)	79	2	81	1	1	1	900	35			-22		-31	28	18	28	18	28	18	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	1	1		900	13				-15	-23	42	32	42	32			Yes	Yes	n/a
	Voice conversation (BBQ area - L4)	70		70	1	1	1	900	22				-23	-27	20	10	20	10	20	10	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	7	4	2	10	18	1.5	-14			-26	23	13	20	10	17	7	Yes	Yes	Yes
	Car passby (Podium)	69		69	7	4	2	15	13	1.5	-14			-23	23	13	20	10	17	7	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	7	4	2	2	7	1.5	-11			-17	31	21	28	18	25	15	Yes	Yes	Yes
	Car start (Podium)	74	2	76	7	4	2	2	7	1.5	-11			-17	30	20	27	17	24	14	Yes	Yes	Yes
	Total														50	40	48	38	43	33	**Yes**	**Yes**	**Yes**
	Criteria																				54	52	49
	Car passby (Visitor)	69		69	3	2	1	15	26					-29	27	17	25	15	22	12	Yes	Yes	Yes
2	Car door closure (Visitor)	75	2	77	3	2	1	2	32			-24		-30	1						Yes	Yes	Yes
	Car start (Visitor)	74	2	76	3	2	1	2	32			-24		-30							Yes	Yes	Yes
	Car on ramp (Residents)	74		74	50	25	10	10	7			-24		-17	31	21	28	18	24	14	Yes	Yes	Yes
	Car passby (Residents)	69		69	50	25	10	15	13			-24		-22	22	12	19	9	15	5	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	50	25	10	2	7			-30		-17	21	11	18	8	14	4	Yes	Yes	Yes
	Car start (Residents)	74	2	76	50	25	10	2	7			-30		-17	20	10	17	7	13	3	Yes	Yes	Yes
	Gym (L4)	79	2	81	1	1	1	900	15			-22		-24	35	25	35	25	35	25	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	1	1		900	39					-32	48	38	48	38			Yes	Yes	n/a
	Voice conversation (BBQ area - L4)	70		70	1	1	1	900	38					-32	38	28	38	28	38	28	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	7	4	2	10	7	1.5	-15			-17	31	21	29	19	26	16	Yes	Yes	Yes
	Car passby (Podium)	69		69	7	4	2	15	13	1.5	-15			-22	22	12	20	10	17	7	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	7	4	2	2	7	1.5	-16			-17	26	16	24	14	21	11	Yes	Yes	Yes
	Car start (Podium)	74	2	76	7	4	2	2	7	1.5	-16			-17	25	15	23	13	20	10	Yes	Yes	Yes
	Total														49	39	49	39	41	31	**Yes**	**Yes**	**Yes**
	Criteria																				54	52	49
	Car passby (Visitor)	69		69	3	2	1	15	14			-10		-23	23	13	21	11	18	8	Yes	Yes	Yes
3	Car door closure (Visitor)	75	2	77	3	2	1	2	8			-10		-18	27	17	25	15	22	12	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	3	2	1	2	8			-10		-18	26	16	24	14	21	11	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	50	25	10	10	7			-24		-17	31	21	28	18	24	14	Yes	Yes	Yes
	Car passby (Residents)	69		69	50	25	10	15	7			-30		-17	21	11	18	8	14	4	Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	50	25	10	2	7			-30		-17	21	11	18	8	14	4	Yes	Yes	Yes
	Car start (Residents)	74	2	76	50	25	10	2	7			-30		-17	20	10	17	7	13	3	Yes	Yes	Yes
	Gym (L4)	79	2	81	1	1	1	900	22			-22		-27	32	22	32	22	32	22	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	1	1		900	14			-17		-23	40	30	40	30			Yes	Yes	n/a
	Voice conversation (BBQ area - L4)	70		70	1	1	1	900	31				-22	-30	18	8	18	8	18	8	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	7	4	2	10	7	1.5	-13			-17	33	23	31	21	28	18	Yes	Yes	Yes
	Car passby (Podium)	69		69	7	4	2	15	7	1.5	-13			-17	30	20	27	17	24	14	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	7	4	2	2	7	1.5	-11			-17	31	21	29	19	26	16	Yes	Yes	Yes
	Car start (Podium)	74	2	76	7	4	2	2	7	1.5	-11			-17	30	20	28	18	25	15	Yes	Yes	Yes
	Total														42	32	42	32	36	26	**Yes**	**Yes**	**Yes**
	Criteria																				54	52	49
	Car passby (Visitor)	69		69	3	2	1	15	29					-30	26	16	24	14	21	11	Yes	Yes	Yes
4	Car door closure (Visitor)	75	2	77	3	2	1	2	35					-31	24	14	23	13	20	10	Yes	Yes	Yes
	Car start (Visitor)	74	2	76	3	2	1	2	35					-31	23	13	22	12	19	9	Yes	Yes	Yes
	Car on ramp (Residents)	74		74	50	25	10	10	51			-6		-34	31	21	28	18	24	14	Yes	Yes	Yes
	Car passby (Residents)	69		69	50	25	10	15	31			-30		-30	8		5		1		Yes	Yes	Yes
	Car door closure (Residents)	75	2	77	50	25	10	2	27			-30		-29	9		6		2		Yes	Yes	Yes
	Car start (Residents)	74	2	76	50	25	10	2	27			-30		-29	8		5				Yes	Yes	Yes
	Gym (L4)	79	2	81	1	1	1	900	34			-22		-31	28	18	28	18	28	18	Yes	Yes	Yes
	Rec area inc pool (L4)	78	2	80	1	1		900	46					-33	47	37	47	37			Yes	Yes	n/a
	Voice conversation (BBQ area - L4)	70		70	1	1	1	900	31					-30	40	30	40	30	40	30	Yes	Yes	Yes
	Car on ramp (Podium)	74		74	7	4	2	10	39					-32	31	21	29	19	26	16	Yes	Yes	Yes
	Car passby (Podium)	69		69	7	4	2	15	28					-29	31	21	28	18	25	15	Yes	Yes	Yes
	Car door closure (Podium)	75	2	77	7	4	2	2	25					-28	31	21	29	19	26	16	Yes	Yes	Yes
	Car start (Podium)	74	2	76	7	4	2	2	25					-28	30	20	28	18	25	15	Yes	Yes	Yes
	Total														48	38	48	38	41	31	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance is predicted with the background creep criteria for all activities associated with the development on the condition the recommendations in Section 8 are implemented.

7.1.3 Sleep Disturbance

The noise source levels and predicted levels of noise at the receiver locations are shown in Table Table 6.

Table 6: Sleep Disturbance from onsite activities – Night-time

Receiver	Receivers 1. 23 Anne Avenue (W) 2. 17 Anne Avenue (E) 3. 20-22 Phillip Avenue (N) 4. 20-26 Anne Avenue (S) Description	Source LAmax @ 1m dB(A)	Correction dB(A)*	Corrected dB(A)	Distance (m)	Barrier (height (m) No	Barrier screening dB	Building TL or shield dB	Building screening dB	Dist atten. @-6dB/dd	LAmax adj, T int. dB(A)	Complies Night dB(A)
1	Criteria											45
	Car passby (Visitor)	74		74	13					-22	42	Yes
	Car door closure (Visitor)	79	2	81	9					-19	52	No
	Car start (Visitor)	78	2	80	9					-19	51	No
	Car on ramp (Residents)	77		77	18					-25	42	Yes
	Car passby (Residents)	74		74	13					-22	42	Yes
	Car door closure (Residents)	79	2	81	7			-30		-17	24	Yes
	Car start (Residents)	78	2	80	7			-30		-17	23	Yes
	Gym (L4)	89		89	35			-22		-31	26	Yes
	Voice conversation (BBQ area - L4)	78		78	22				-23	-27	18	Yes
	Car on ramp (Podium)	77		77	18	1.5	-14			-25	28	Yes
	Car passby (Podium)	74		74	13	1.5	-14			-22	28	Yes
	Car door closure (Podium)	79	2	81	7	1.5	-11			-17	43	Yes
	Car start (Podium)	78	2	80	7	1.5	-11			-17	42	Yes
2	Criteria											45
	Car passby (Visitor)	74		74	26					-28	36	Yes
	Car door closure (Visitor)	79		79	32			-24		-30	15	Yes
	Car start (Visitor)	78	2	80	32			-24		-30	16	Yes
	Car on ramp (Residents)	77	2	79	7			-24		-17	28	Yes
	Car passby (Residents)	74	2	76	13			-24		-22	20	Yes
	Car door closure (Residents)	79	2	81	7			-30		-17	24	Yes
	Car start (Residents)	78		78	7			-30		-17	21	Yes
	Gym (L4)	89		89	15			-22		-24	33	Yes
	Voice conversation (BBQ area - L4)	78		78	38					-32	36	Yes
	Car on ramp (Podium)	77		77	7	1.5	-15			-17	35	Yes
	Car passby (Podium)	74		74	13	1.5	-15			-22	27	Yes
	Car door closure (Podium)	79	2	81	7	1.5	-16			-17	38	Yes
	Car start (Podium)	78	2	80	7	1.5	-16			-17	37	Yes
3	Criteria											45
	Car passby (Visitor)	74		74	14			-10		-23	31	Yes
	Car door closure (Visitor)	79		79	8			-10		-18	41	Yes
	Car start (Visitor)	78	2	80	8			-10		-18	42	Yes
	Car on ramp (Residents)	77	2	79	7			-24		-17	28	Yes
	Car passby (Residents)	74	2	76	7			-30		-17	19	Yes
	Car door closure (Residents)	79	2	81	7			-30		-17	24	Yes
	Car start (Residents)	78		78	7			-30		-17	21	Yes
	Gym (L4)	89		89	22			-22		-27	30	Yes
	Voice conversation (BBQ area - L4)	78		78	31				-22	-30	16	Yes
	Car on ramp (Podium)	77		77	7	1.5	-13			-17	37	Yes
	Car passby (Podium)	74		74	7	1.5	-13			-17	34	Yes
	Car door closure (Podium)	79	2	81	7	1.5	-11			-17	43	Yes
	Car start (Podium)	78	2	80	7	1.5	-11			-17	42	Yes
4	Criteria											45
	Car passby (Visitor)	74		74	29					-29	35	Yes
	Car door closure (Visitor)	79		79	35					-31	38	Yes
	Car start (Visitor)	78	2	80	35					-31	39	Yes
	Car on ramp (Residents)	77	2	79	51			-6		-34	29	Yes
	Car passby (Residents)	74	2	76	31			-30		-30	6	Yes
	Car door closure (Residents)	79	2	81	27			-30		-29	12	Yes
	Car start (Residents)	78		78	27			-30		-29	9	Yes
	Gym (L4)	89		89	34			-22		-31	26	Yes
	Voice conversation (BBQ area - L4)	78		78	31					-30	38	Yes
	Car on ramp (Podium)	77		77	39					-32	35	Yes
	Car passby (Podium)	74		74	28					-29	35	Yes
	Car door closure (Podium)	79	2	81	25					-28	43	Yes
	Car start (Podium)	78	2	80	25					-28	42	Yes

*Correction due to tonality and impulsiveness as per AS1055:2018.

Exceedances of the sleep disturbance criteria are predicted for the night-time period for receiver 1. WHO states that the maximum instantaneous value should not exceed 45dB(A) more the 10 to 15 times per night. As the development only has 12 visitor car parking spaces, the traffic movements are predicted to be infrequent and are not expected to occur more than a few times during the night-time period (10pm-7am).

8. Recommendations

8.1 Acoustic Barrier

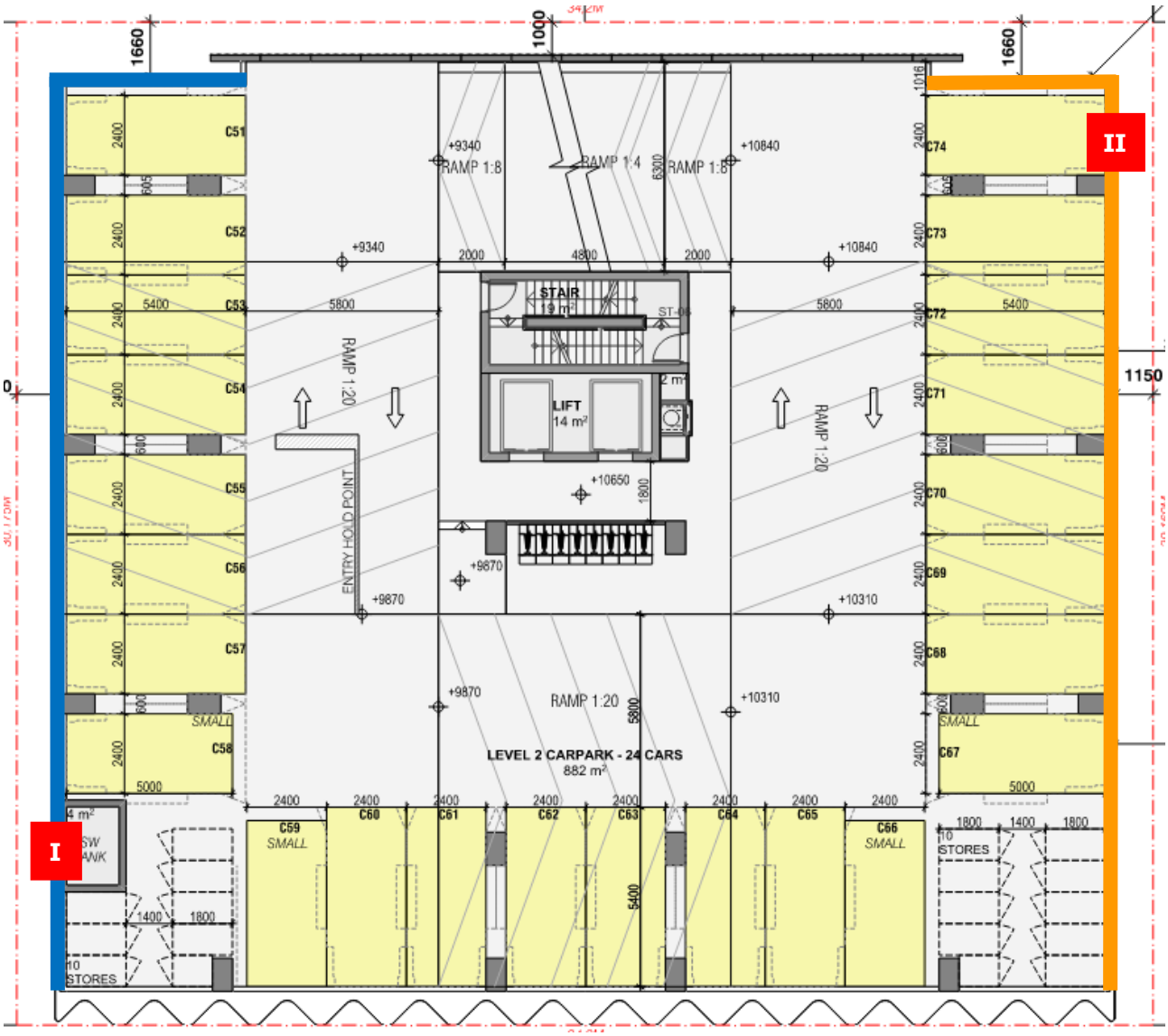
Podium Level 2

Acoustic barriers shall be constructed along the western and southern boundaries on podium level 2. The barriers are shown in Figure 3.

The acoustic barriers should be constructed using either 16mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 11kg/m^2 and shall be free of gaps and holes.

Refer to Figure 3 for visual a visual representation of the acoustic barrier location requirements and Table 7 for the height requirements.

Figure 3: Recommended Acoustic Treatments (Level 2)



8.1.1 Podium Level 3

Acoustic barriers shall be constructed along the western and southern boundaries on podium level 2. The barriers are shown in Figure 4.

The acoustic barriers should be constructed using either 16mm thick lapped timber (minimum 40% overlap), masonry, 9mm fibre cement sheet, Hebel, Perspex, plywood, or other materials with a minimum surface density of 11kg/m^2 and shall be free of gaps and holes.

Refer to Figure 4 for a visual representation of the acoustic barrier location requirements and Table 7 for the height requirements.

Figure 4: Recommended Acoustic Treatments (Level 3)

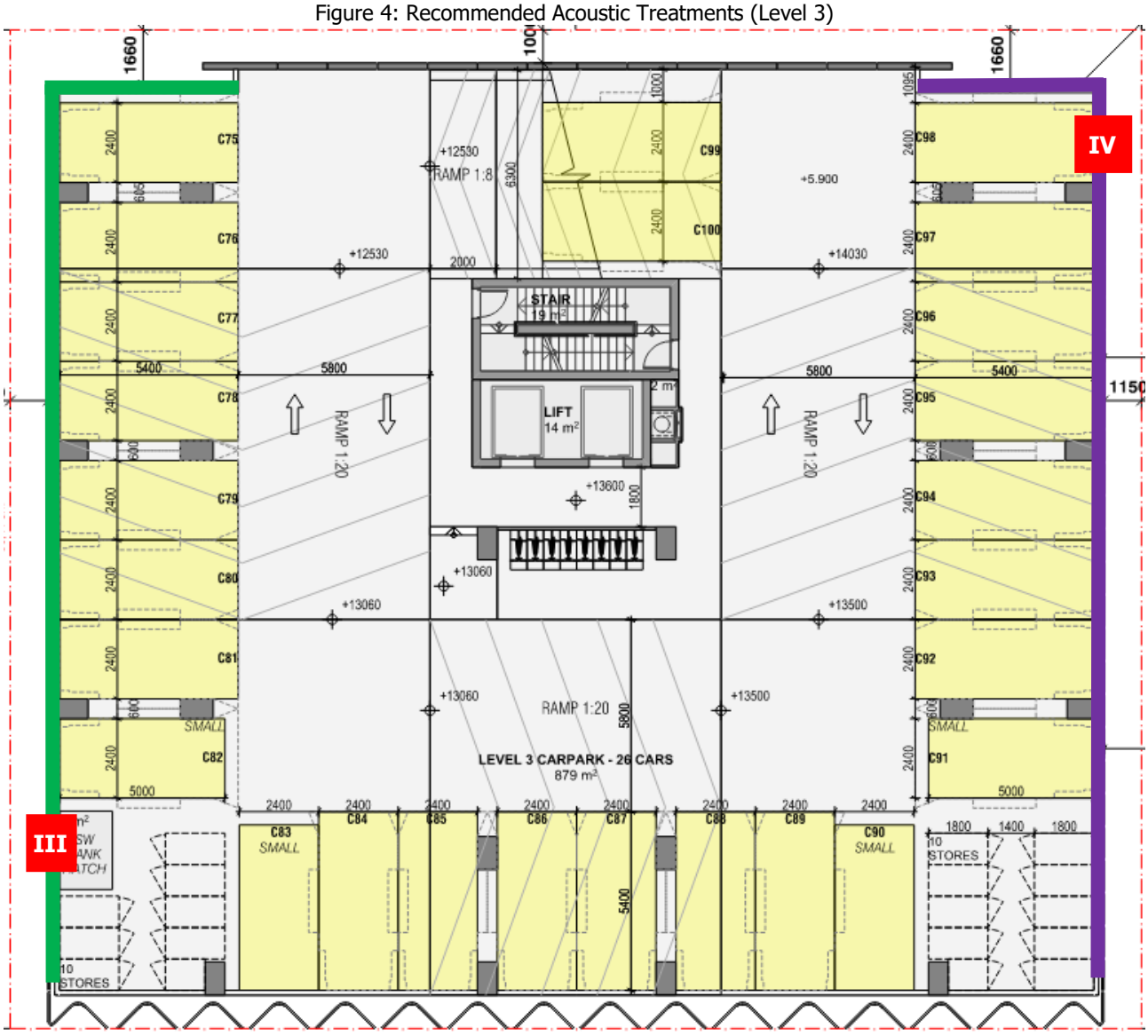


Table 7: Recommended Acoustic Barrier Height

Reference Point	Approximate Finished Level (m)	Approximate Barrier Height (m)	Approximate Finished Barrier Level (m)
I	9.8	1.5	11.3
II	10.8	1.5	12.3
III	13.0	1.5	14.5
IV	14.0	1.5	15.5

8.2 Gym and Pool Recommendations

We recommend that the following acoustic treatments be incorporated into the development to mitigate onsite gym and pool noise:

- The exact nature of the type of exercise use for the gym is not known at this stage. Once the use characteristics have been determined a detailed acoustic investigation will be completed. Depending on the use it is likely that an acoustic floor material would be necessary to reduce vibration into the building structure. Such a system may include Regupol sonosfit4080 or other similar materials Exercise machines where possible should be installed incorporating resilient mounts and/or be installed on resilient flooring.

- The gym has provision of air-conditioning to allow windows and doors to be kept closed when necessary.

- Gym to be installed with 4mm float glazing with acoustic seals.

- The level 4 pool will require acoustic isolation to reduce unwanted vibration and noise through the building structure. Detailed design should be undertaken at the detailed design phase of the building by an engineer(s) with suitable experience.

8.3 Onsite Activities

Based on the predicted noise levels of the site and surrounds for all time periods, noise impacts at the residential receiver locations are predicted to comply on the condition the following acoustic treatments are implemented:

- We recommend waste collection be conducted in accordance with existing residential collections in the area to reduce the potential for disturbance.
- Carpark finished surfaces should consist of materials which provides low tyre squeal characteristics. Any traversable drainage grates must be securely fastened.
- Pool hours of operation are to be limited between 7am to 10pm (day and evening periods).

8.4 Onsite Mechanical Plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the steady-state noise criteria stated in Section 6.1.2 with an assessment by a qualified acoustic consultant is recommended to be conducted prior to installation.

9. Conclusion

An environmental noise assessment was conducted for the proposed development located at 19-21 Anne Avenue, Broadbeach. Based on the predicted noise levels and subjective assessment of the site and surrounds for all time periods, compliance is predicted with City of Gold Coast assessment criteria.

If you should have any queries please do not hesitate to contact us.

Report prepared by:



Khoi Phan
Acoustic Consultant
acousticworks)))

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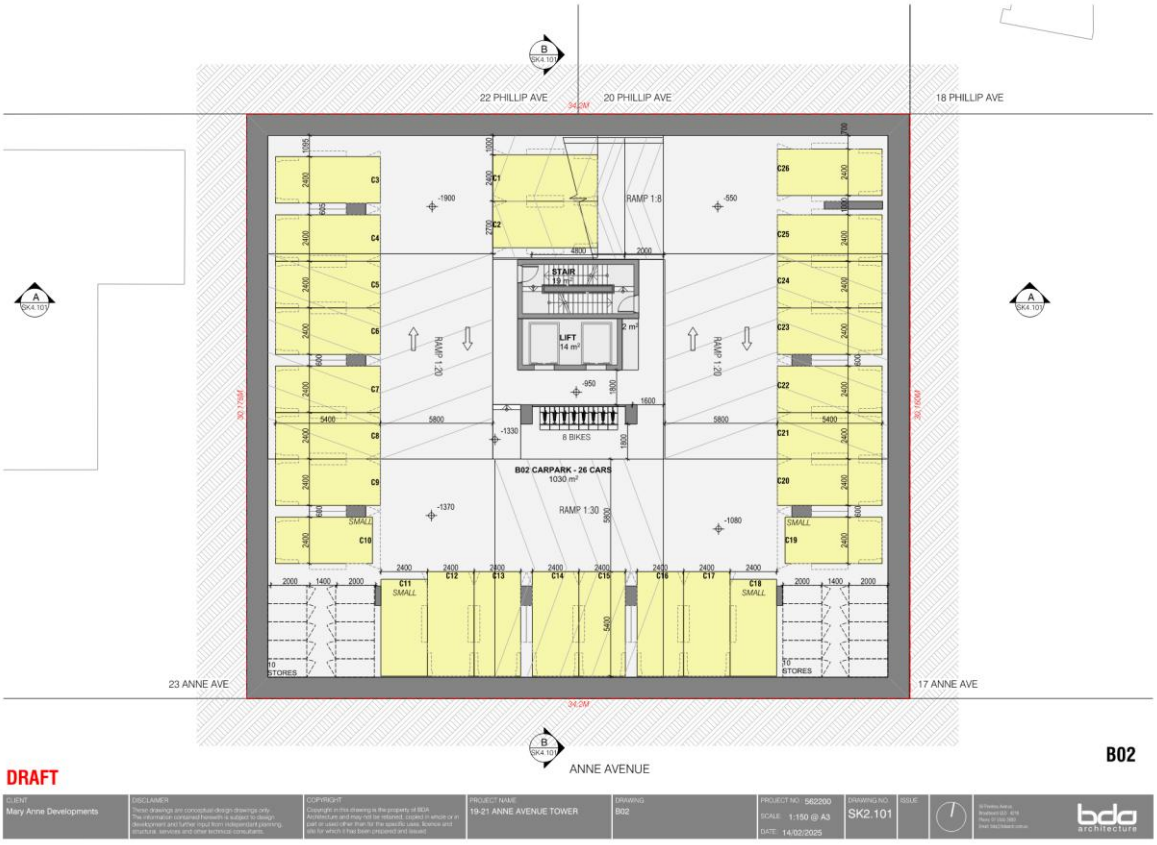
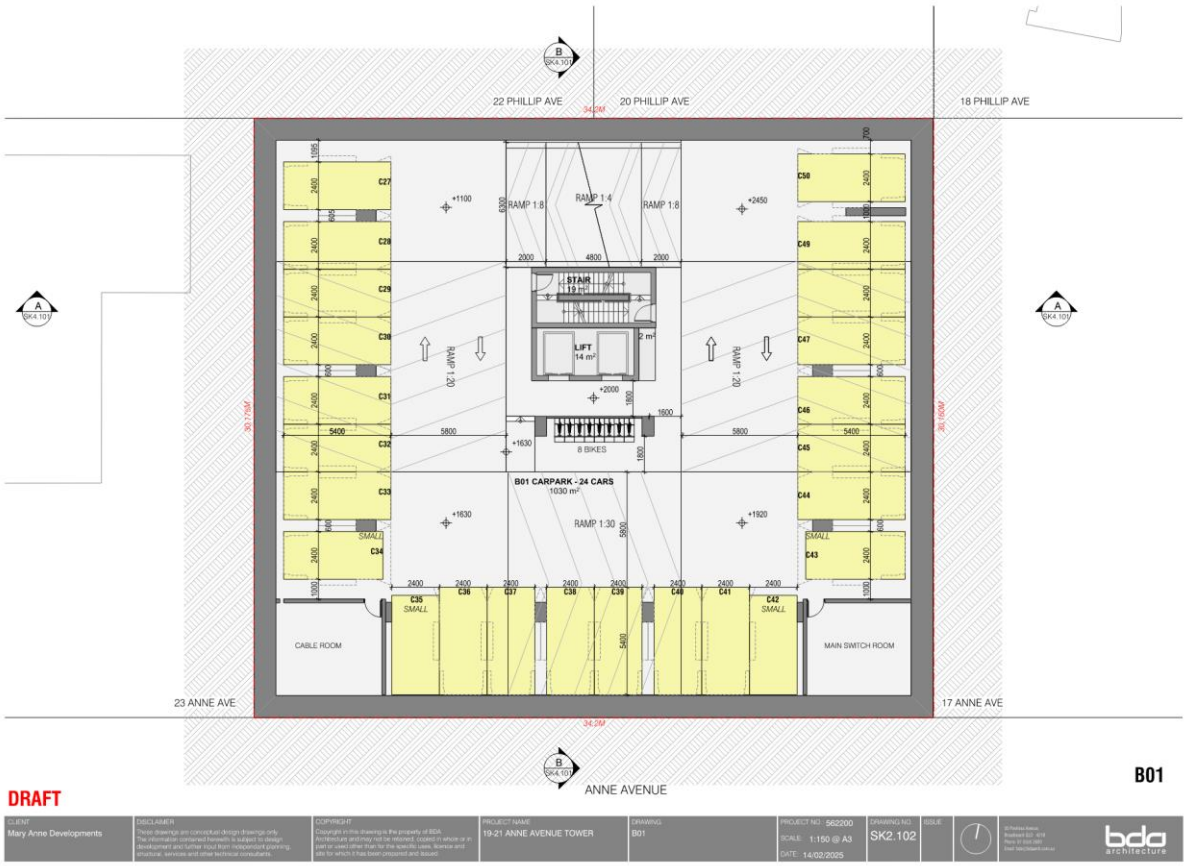
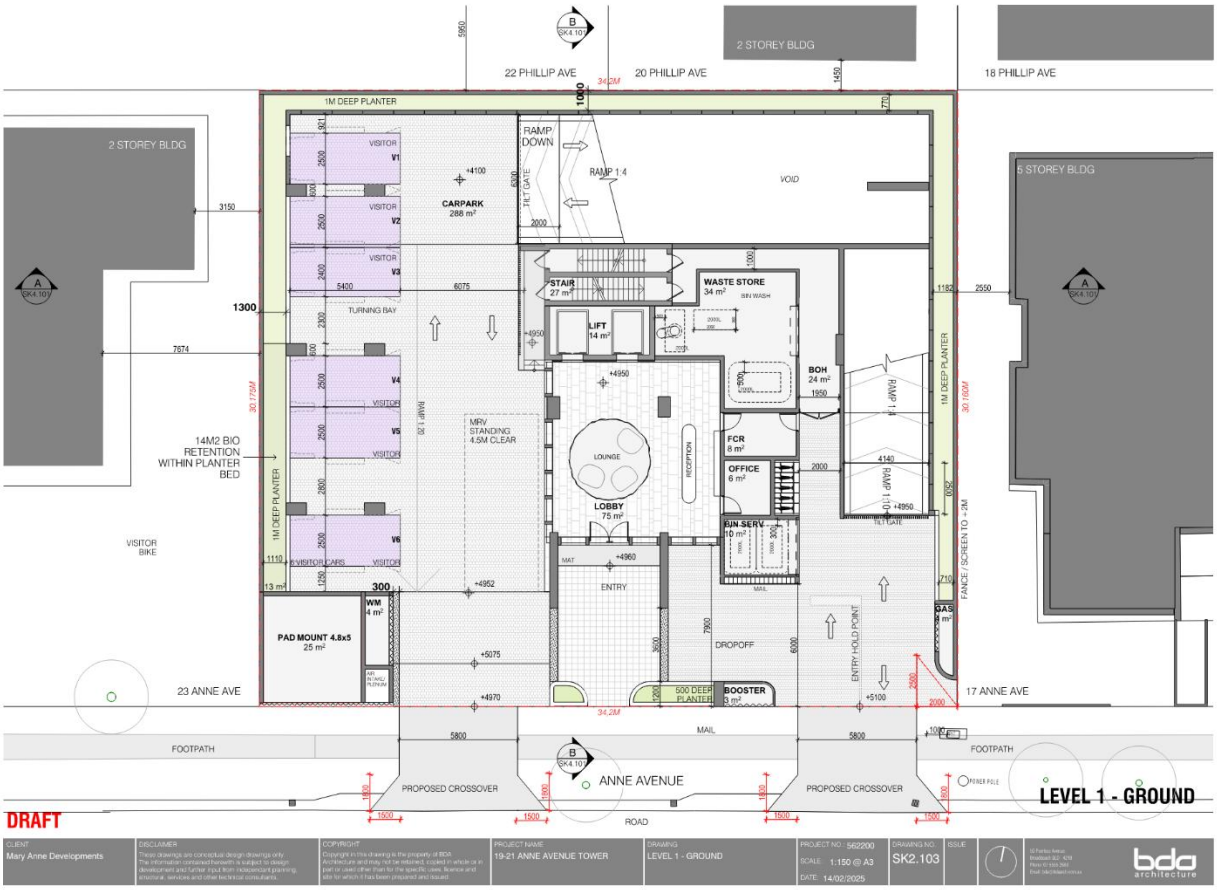
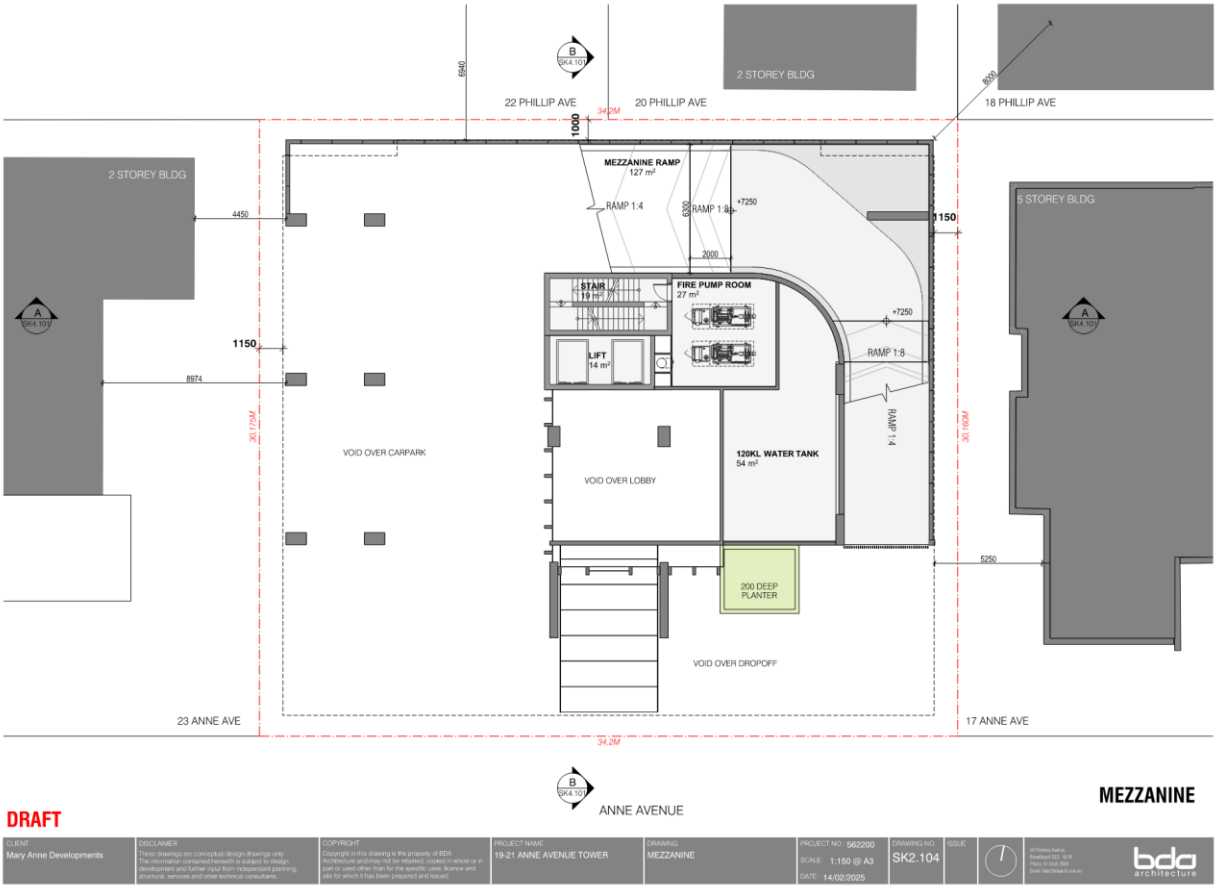
10. Appendices

10.1 Plans of development






22 PHILLIP AVE
20 PHILLIP AVE
18 PHILLIP AVE
2 STOREY BLDG
5 STOREY BLDG
1M DEEP PLANTER
RAMP DOWN
RAMP 1:4
VOID
CARPARK
288 m²
VISITOR
V1
V2
V3
V4
V5
V6
TURNING BAY
STAIR
27 m²
LIFT
14 m²
WASTE STORE
34 m²
BIN WASH
BOH
24 m²
FCR
8 m²
OFFICE
6 m²
LOUNGE
RECEPTION
LOBBY
75 m²
MRV
STANDING
4.5M CLEAR
ENTRY
MAT
MAIL
FIRE SERV
10 m²
DROPOFF
ENTRY HOLD POINT
BOOSTER
9 m²
500 DEEP PLANTER
PAD MOUNT 4.8x5
25 m²
WM
4 m²
14M2 BIO
RETENTION
WITHIN PLANTER
BED
VISITOR
BIKE
6 VISITOR CARS
FENCE / SCREEN TO ~1M
23 ANNE AVE
17 ANNE AVE
FOOTPATH
PROPOSED CROSSOVER
ANNE AVENUE
ROAD
LEVEL 1 - GROUND
DRAFT
Mary Anne Developments
19-21 ANNE AVENUE TOWER
SK2.103
14/02/2025
1:150 @ A3


22 PHILLIP AVE
20 PHILLIP AVE
18 PHILLIP AVE
2 STOREY BLDG
5 STOREY BLDG
MEZZANINE RAMP
127 m²
RAMP 1:4
RAMP 1:8
STAIR
19 m²
FIRE PUMP ROOM
27 m²
LIFT
14 m²
120KL WATER TANK
54 m²
VOID OVER CARPARK
VOID OVER LOBBY
VOID OVER DROPOFF
200 DEEP PLANTER
23 ANNE AVE
17 ANNE AVE
ANNE AVENUE
MEZZANINE
DRAFT
Mary Anne Developments
19-21 ANNE AVENUE TOWER
SK2.104
14/02/2025
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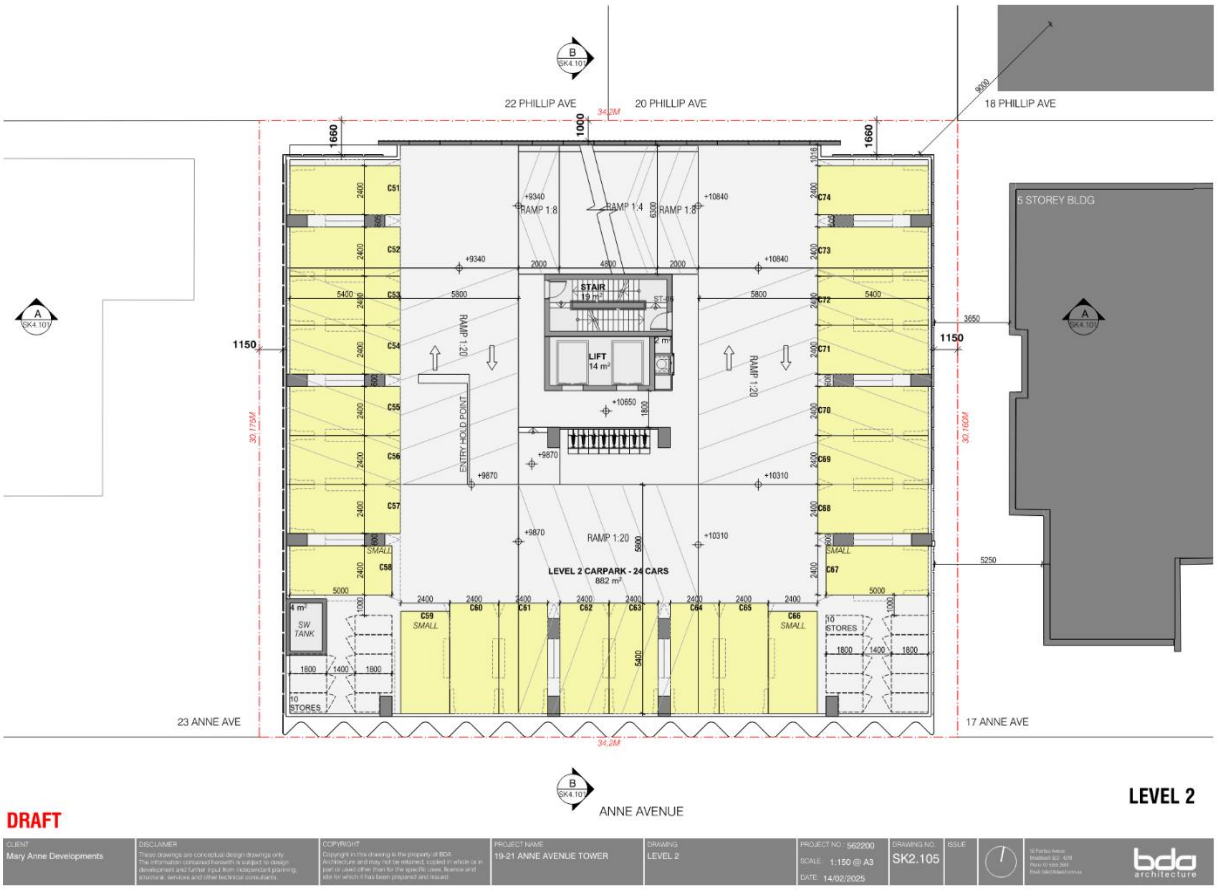
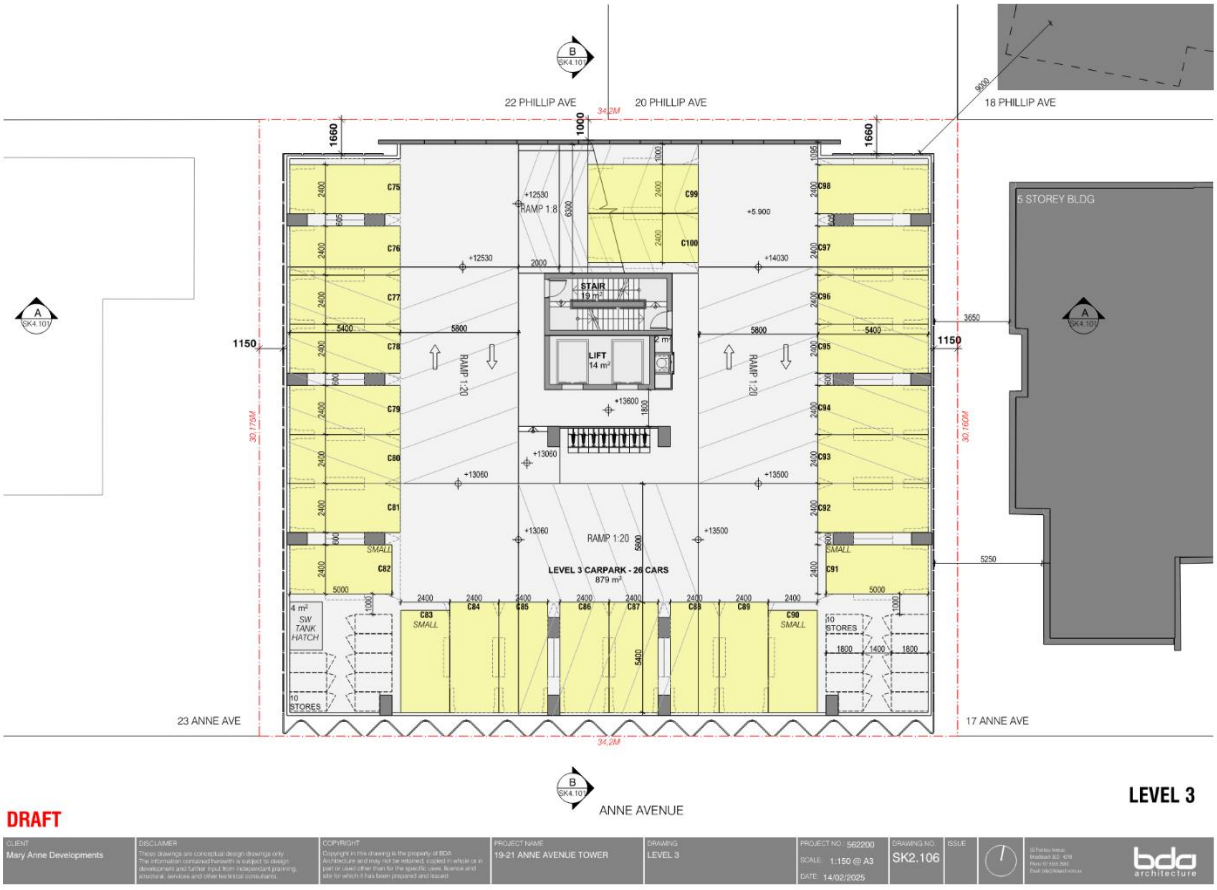
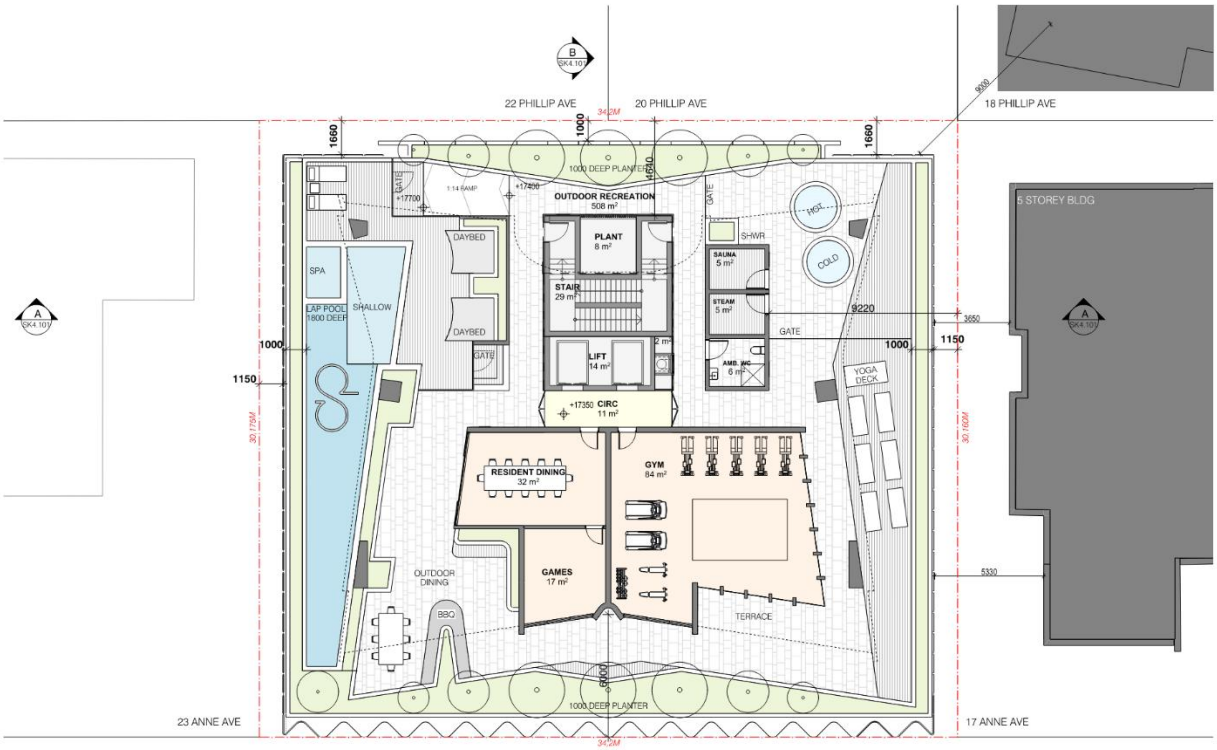

22 PHILLIP AVE
20 PHILLIP AVE
18 PHILLIP AVE
5 STOREY BLDG
RAMP 1:8
RAMP 1:4
RAMP 1:20
STAIR
LIFT
ENTRY HOLD POINT
LEVEL 2 CARPARK - 24 CARS
882 m²
SW TANK
10 STORES
23 ANNE AVE
17 ANNE AVE
ANNE AVENUE
DRAFT
LEVEL 2
Mary Anne Developments
19-21 ANNE AVENUE TOWER
LEVEL 2
1:150 @ A3
14/02/2025
SK2.105


22 PHILLIP AVE
20 PHILLIP AVE
18 PHILLIP AVE
5 STOREY BLDG
RAMP 1:8
RAMP 1:20
STAIR
LIFT
LEVEL 3 CARPARK - 26 CARS
879 m²
SW TANK HATCH
10 STORES
23 ANNE AVE
17 ANNE AVE
ANNE AVENUE
DRAFT
LEVEL 3
Mary Anne Developments
19-21 ANNE AVENUE TOWER
LEVEL 3
1:150 @ A3
14/02/2025
SK2.106



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LEVEL 4 - RECREATION

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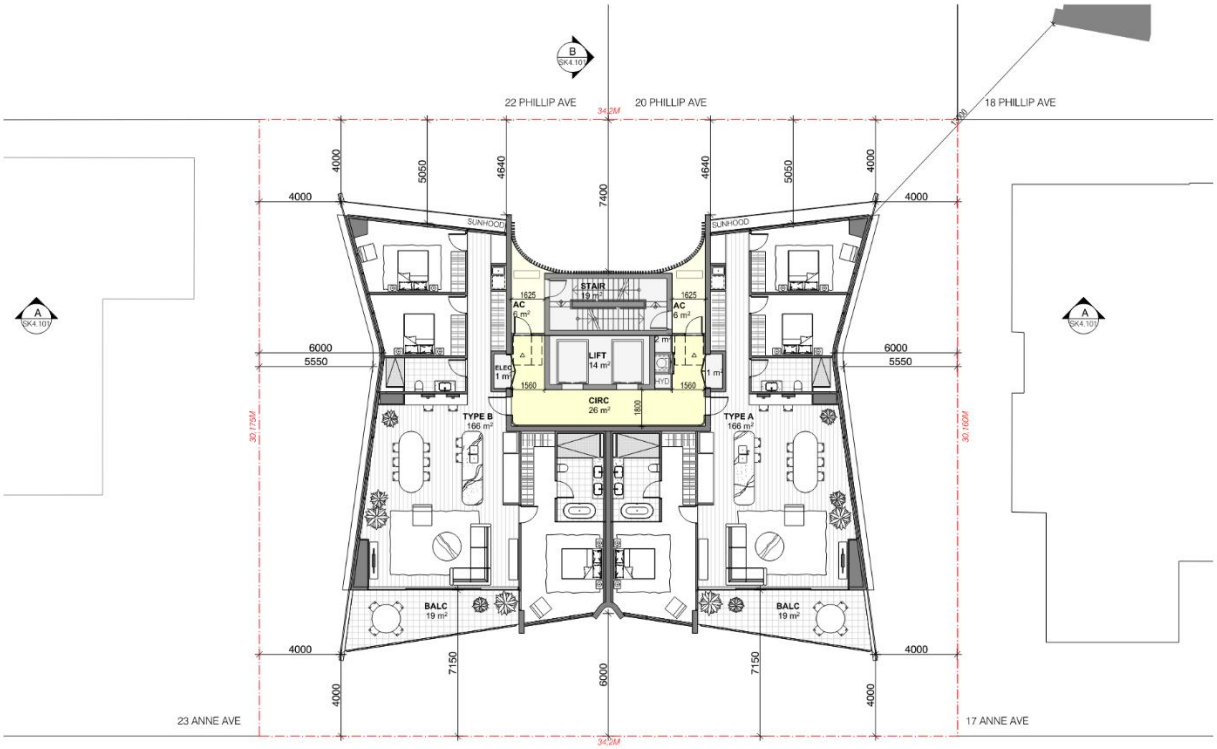

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TOWER TYPICAL LEVEL 5 - 31

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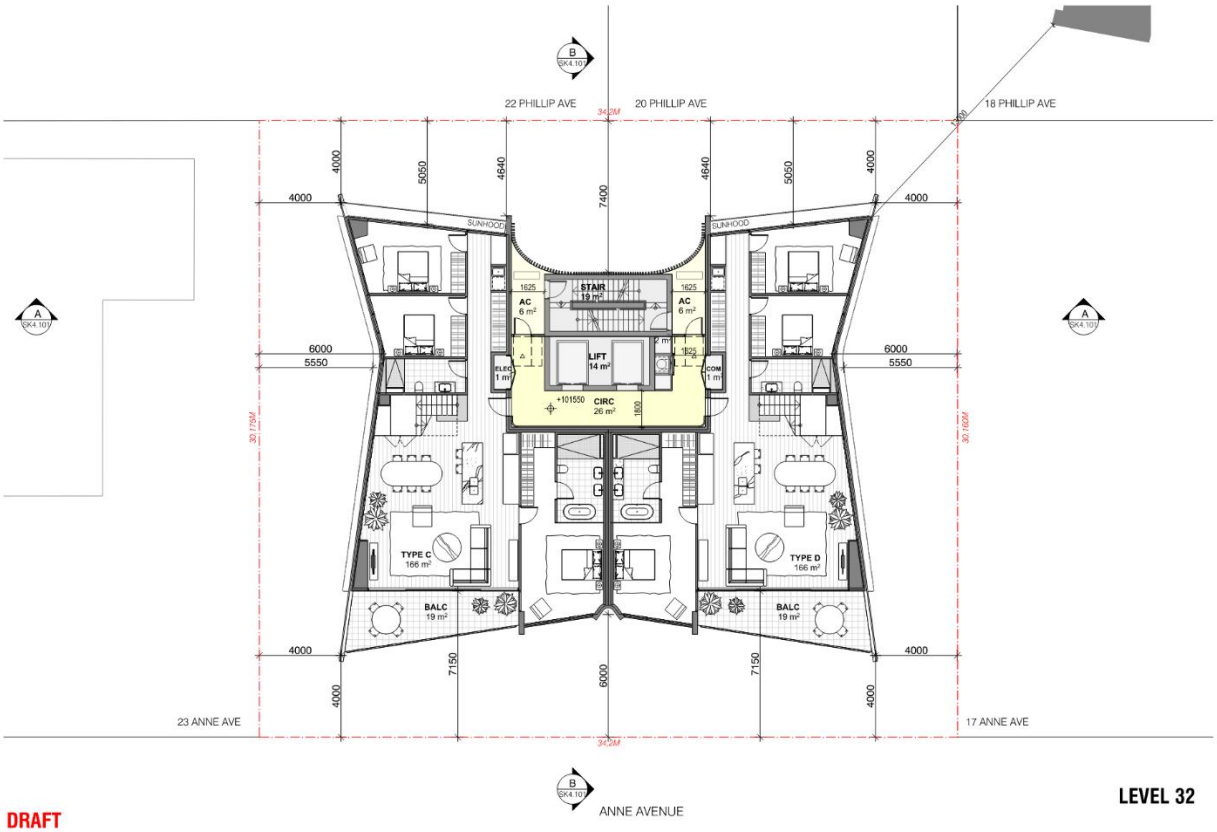

LEVEL 32

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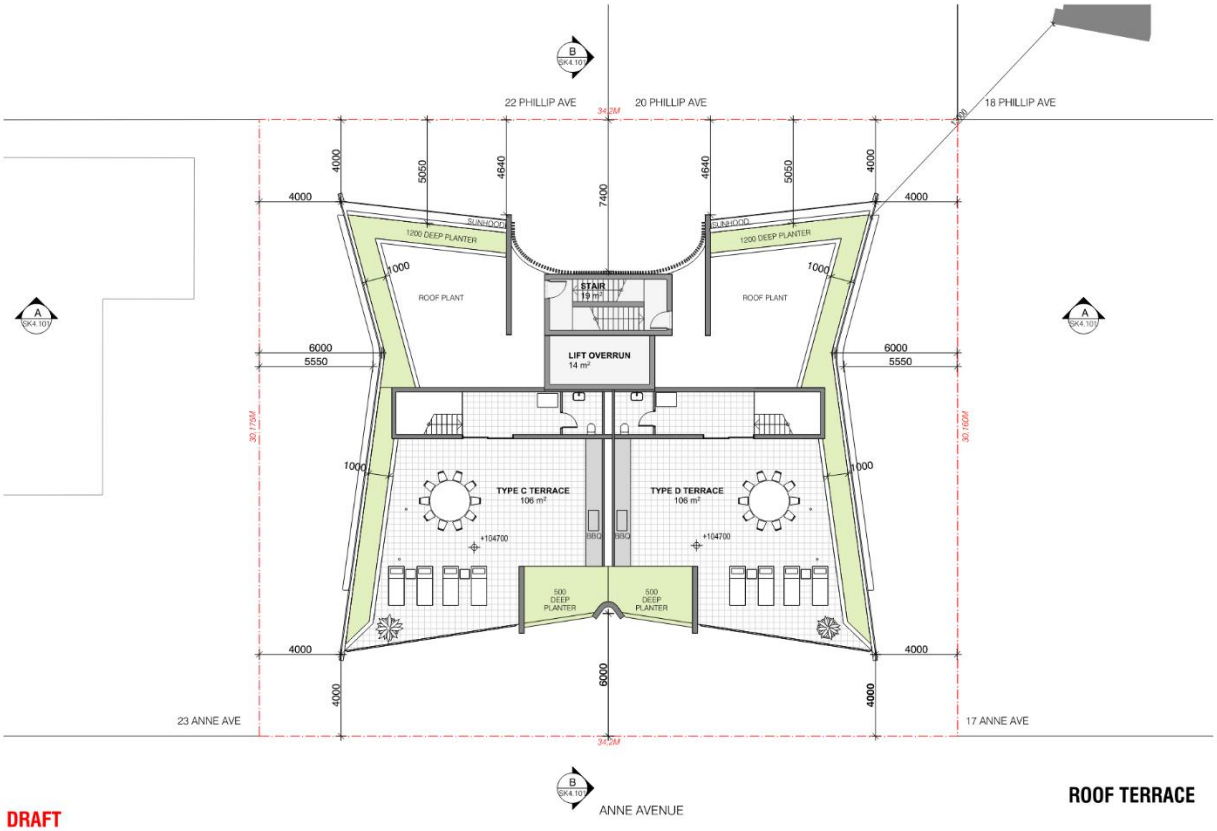

ROOF TERRACE

DRAFT

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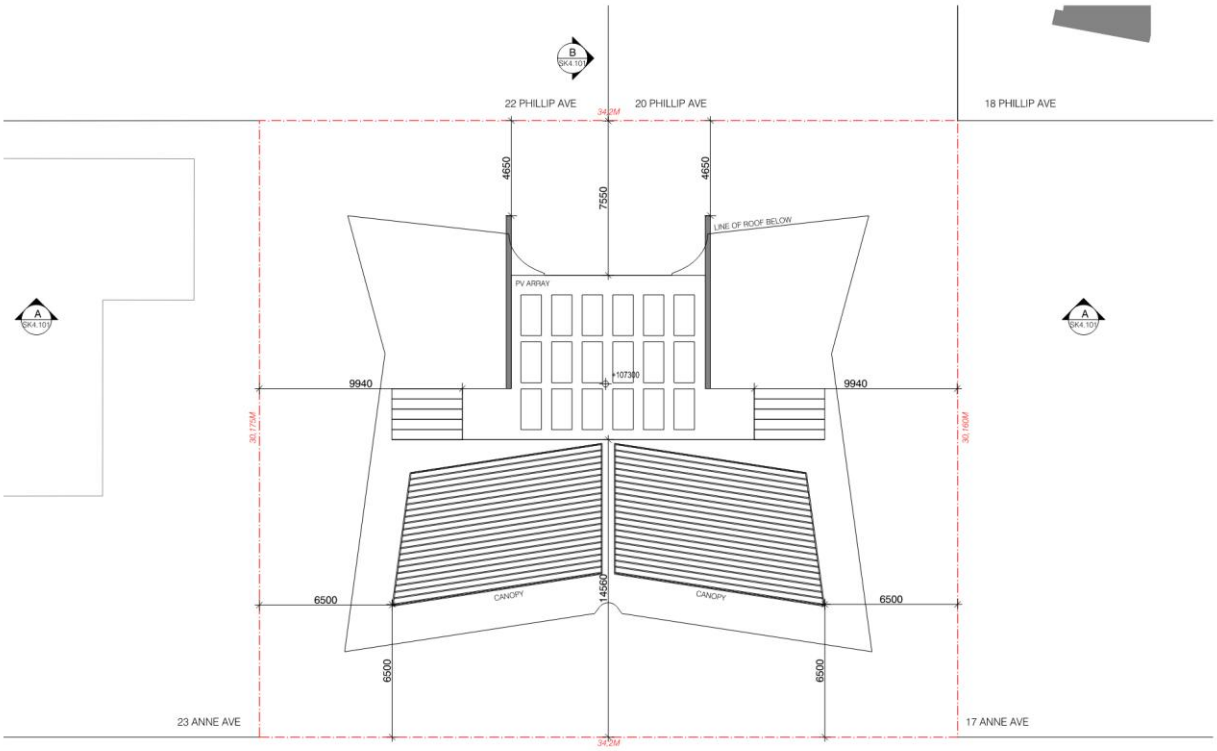

ROOF PLAN

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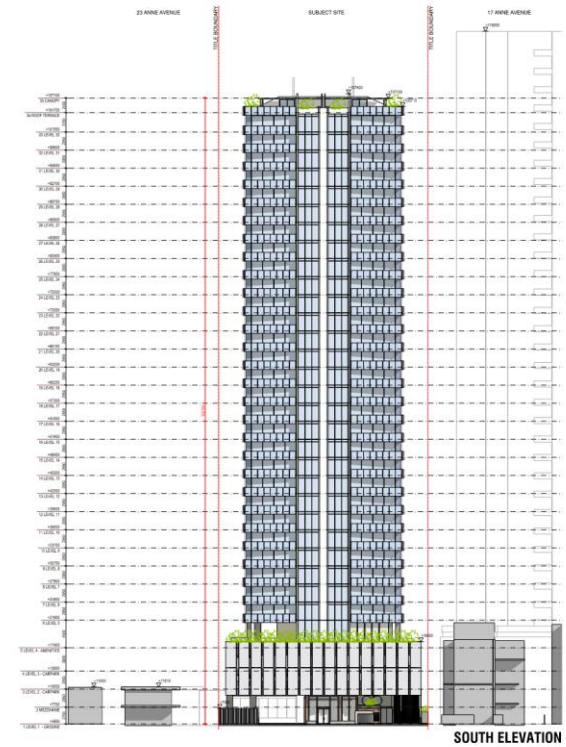

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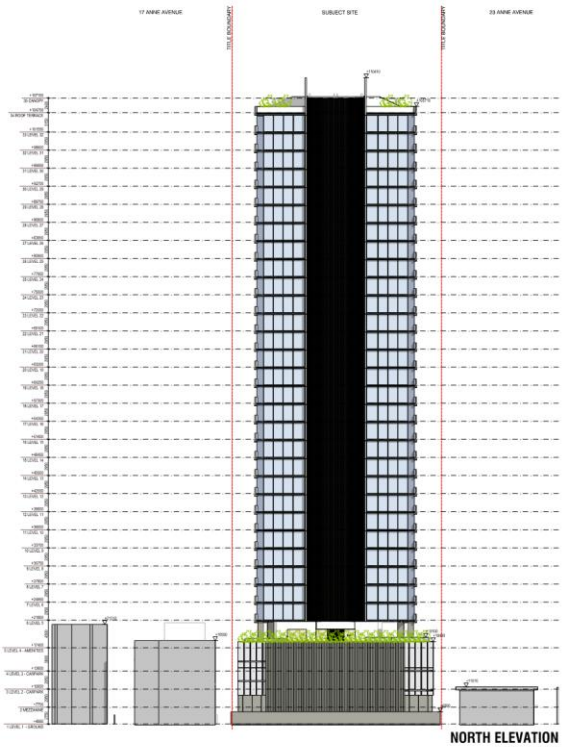

NORTH ELEVATION
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ELEVATIONS SHEET 1

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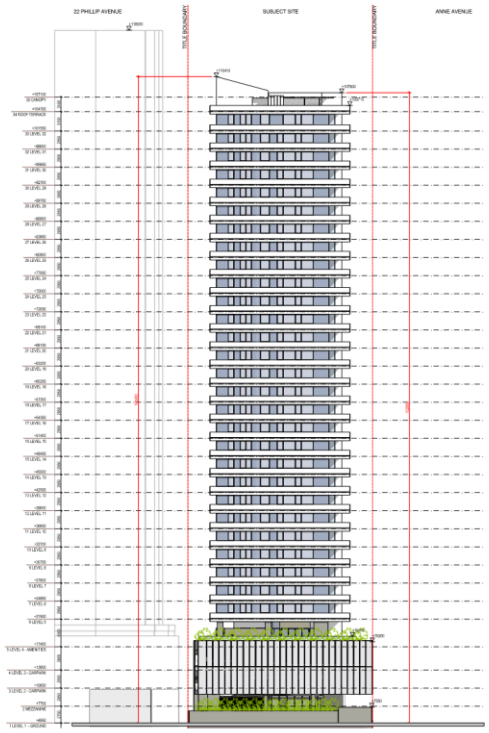

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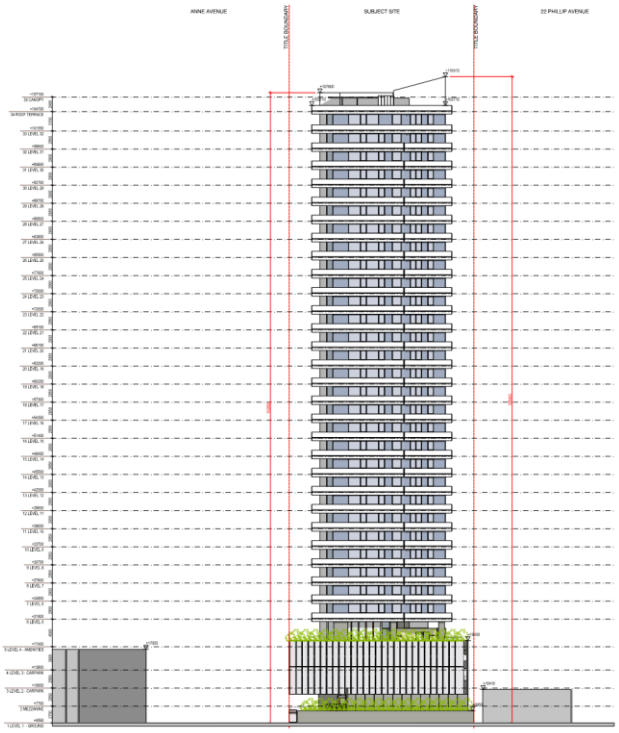

WEST ELEVATION
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ELEVATIONS SHEET 2

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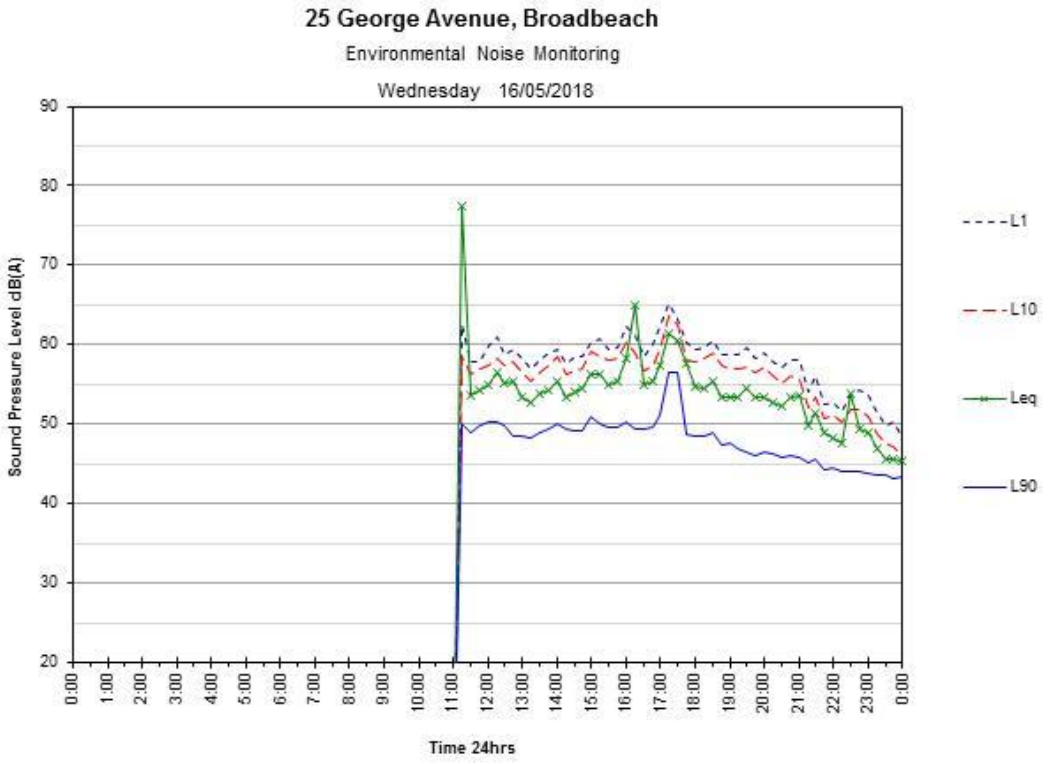
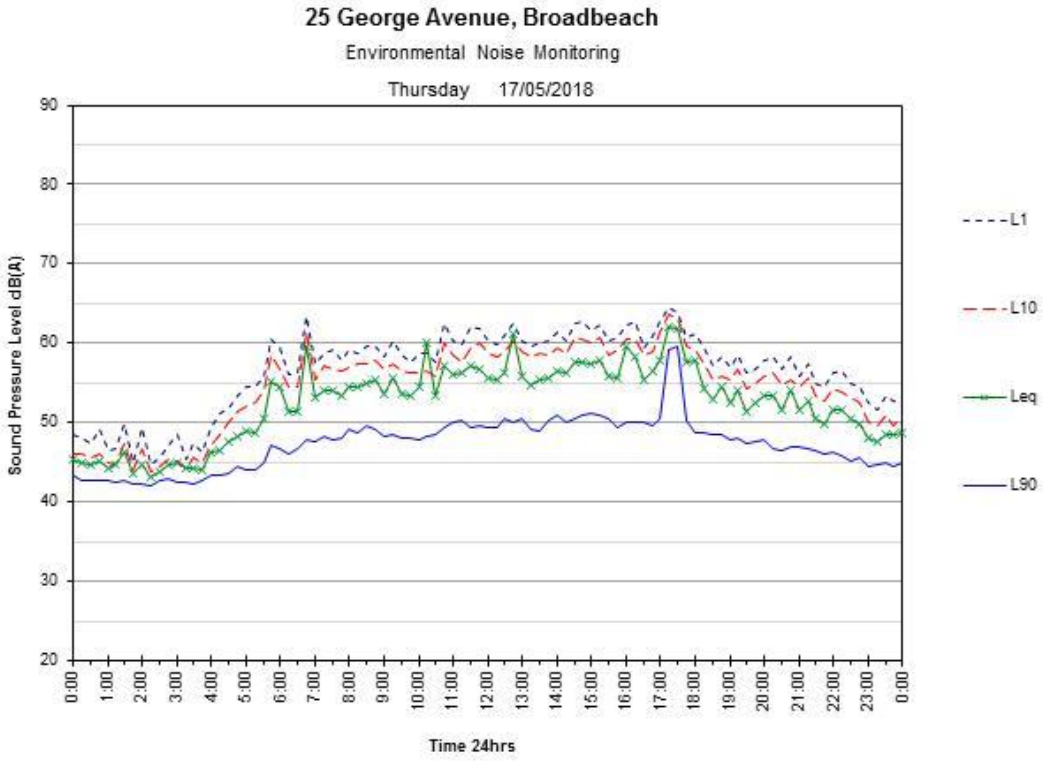
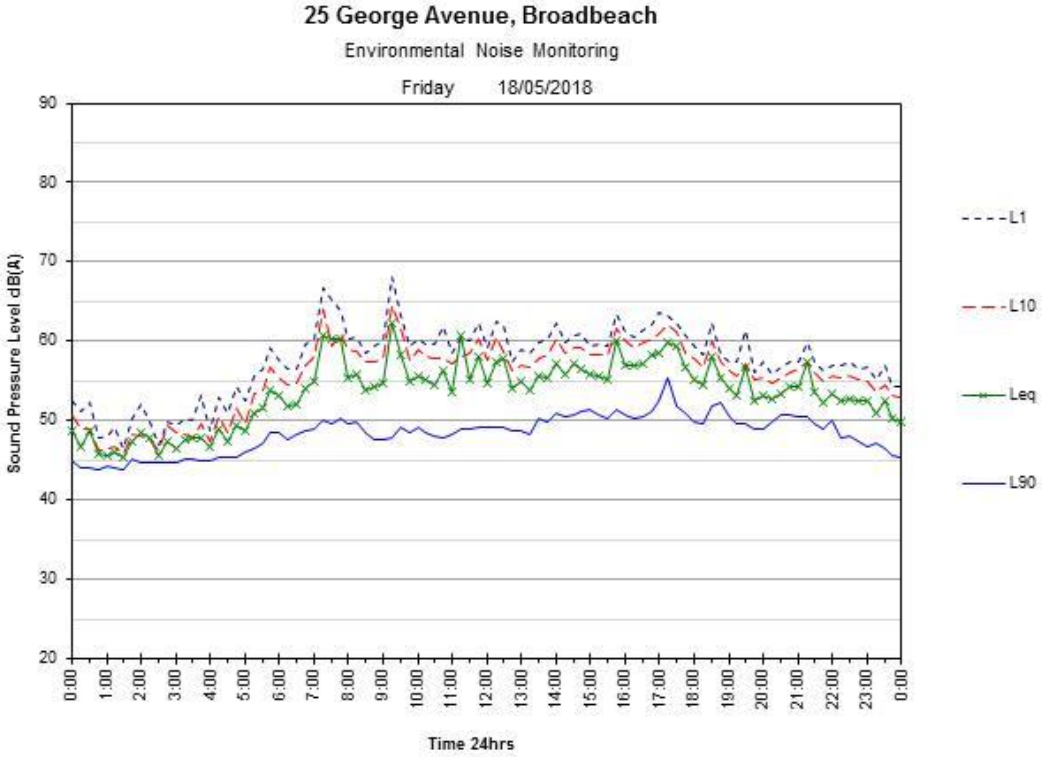
10.2 Noise Monitoring Charts



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20
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2:00
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4:00
5:00
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7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
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L1
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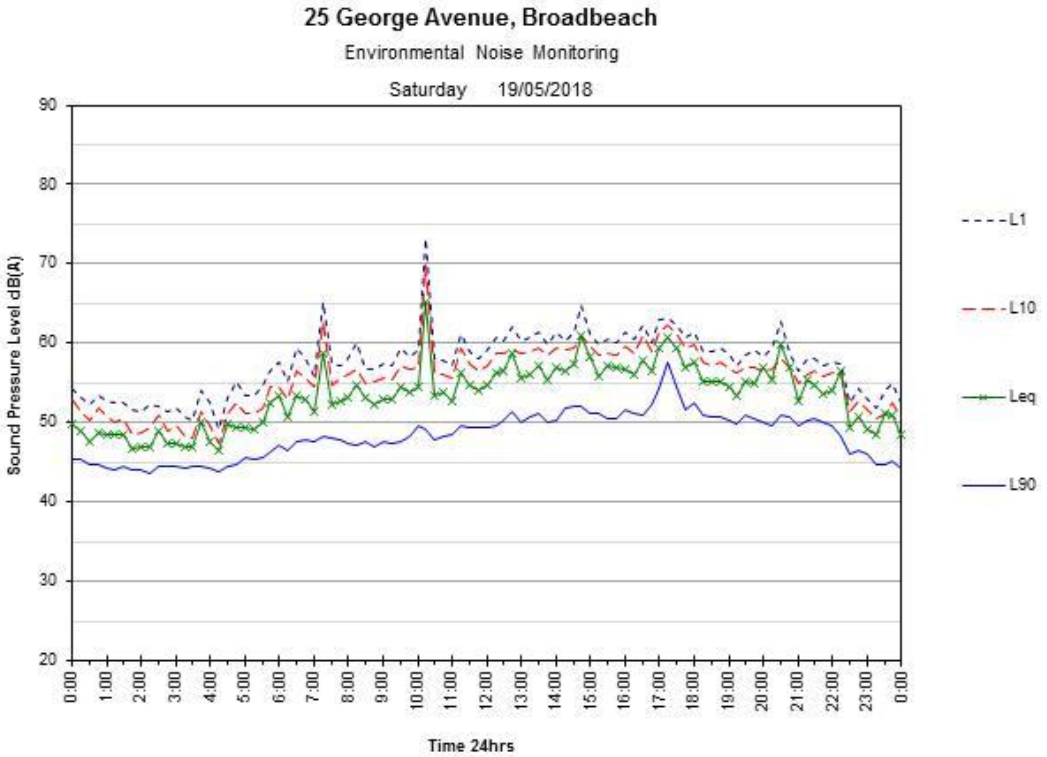
Leq
L90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16:00
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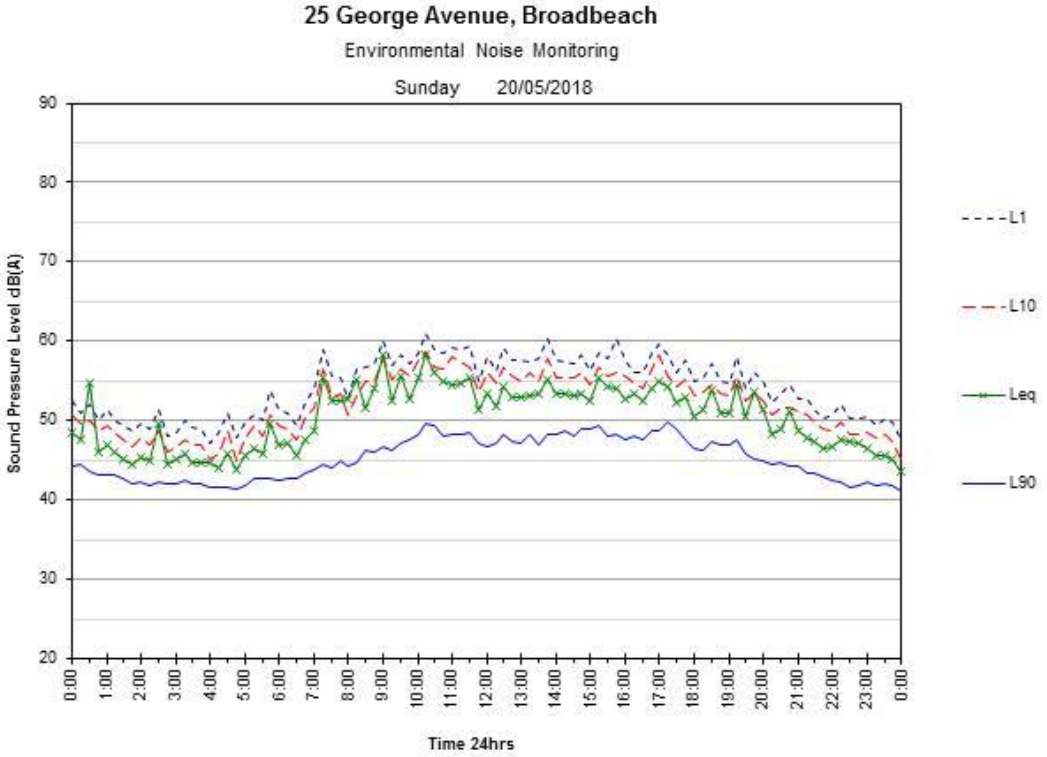
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Environmental Noise Monitoring
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Sound Pressure Level dB(A)
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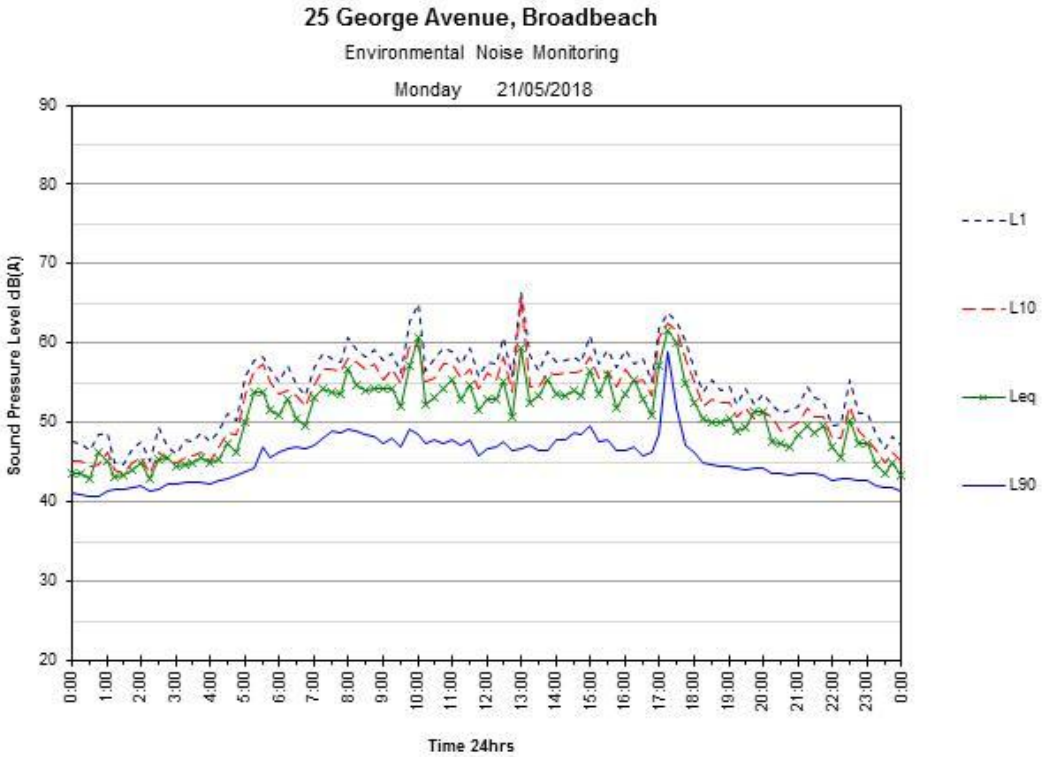
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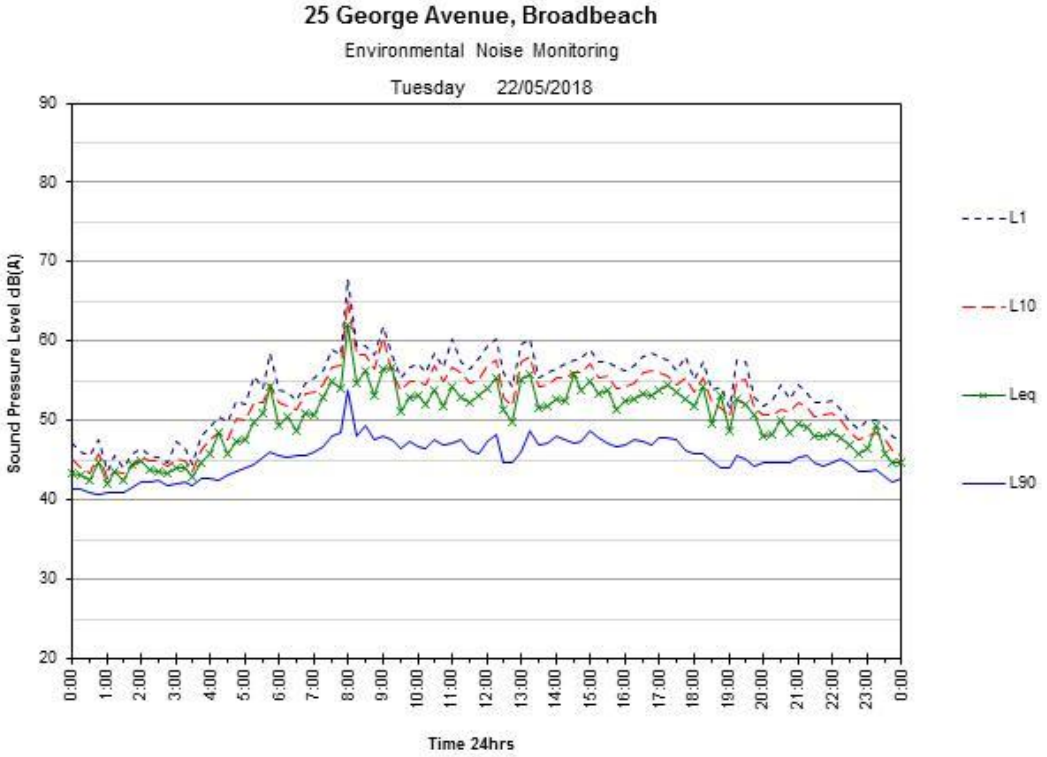
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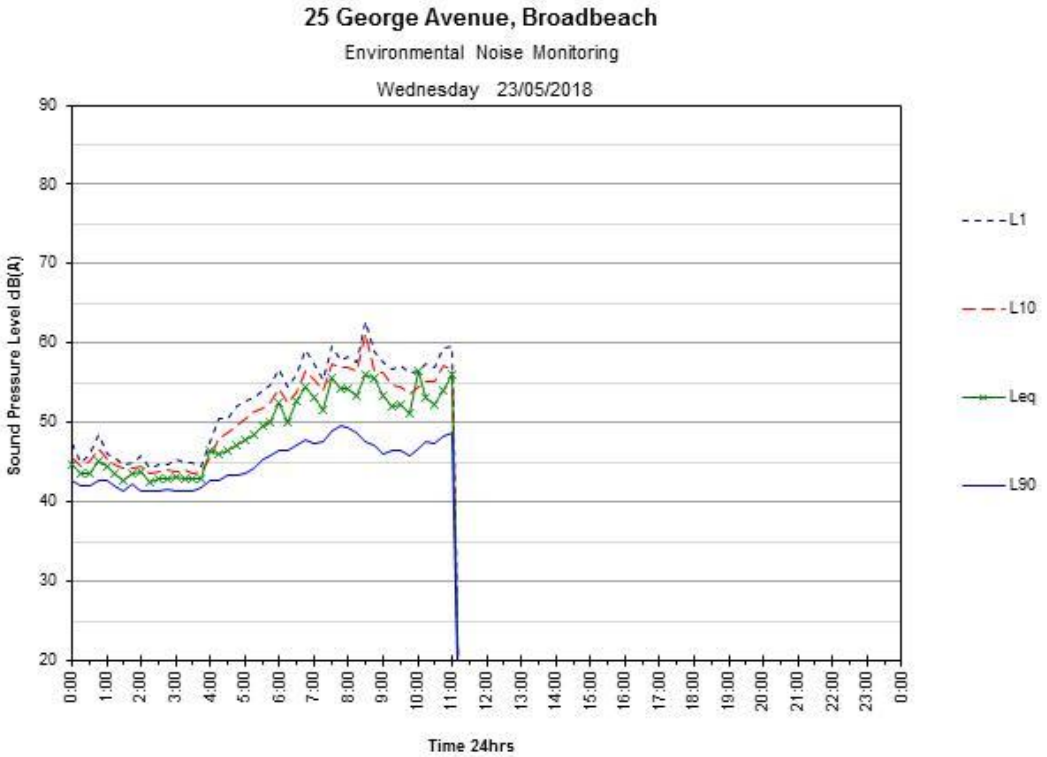
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Environmental Noise Monitoring
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11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time 24hrs
L1
L10
Leq
L90

ATTACHMENT 10

Waste Management Plan
prepared by MRA Environmental



UPS
URBAN PLANNING SERVICES

MRA ENVIRONMENTAL

YOUR TRUSTED ENVIRONMENTAL PARTNER

WASTE MANAGEMENT PLAN

19-21 ANNE AVE
BROADBEACH QLD 4218



CLIENT

Mary Anne Developments Pty Ltd

February 2025

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Document Details:

Title:	Waste Management Plan 19-21 Anne Avenue Broadbeach QLD 4218
Project Number:	MRA24-249

Revision	Date	Author	Reviewed By	Issued By
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V.2	21 February 2025	A Reiser	M Rigby	A Reiser

Destination	Draft	Final	Rev
Mary Anne Developments Pty Ltd	V.1	V.2	
Urban Planning Services	V.1	V.2	
MRA Environmental	V.1	V.2	

LIMITATIONS

Mark Rigby & Associates Pty Ltd (MRA Environmental) has prepared this Waste Management Plan for the sole use of Mary Anne Development Pty Ltd to support a Development Application for the proposed development located at 19-21 Anne Ave, Broadbeach QLD 4218.

Specifically, this report supports the Development Application and relates to the waste storage and collection activities for the operational phase of the planned development in accordance with the City of Gold Coast *City Plan - SC6.16 City Plan Policy v.11 - Solid Waste Management*. This WMP will be submitted to Council as a component of the Development Application.

This report is for the sole use of Mary Anne Development Pty Ltd and in relation to the Development Application to be submitted to City of Gold Coast. It may not contain sufficient information for the purposes of other parties, for other uses or at other locations.

We have performed our services for this project in accordance with our current professional standards. No other warranty, expressed or implied, is made as to the professional advice included in this submission.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions. The report also contains comments and information provided by others. MRA Environmental cannot take responsibility for advice provided by any third party.

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ATTACHMENTS

Attachment A: Solid Waste Management Code

1.0 GLOSSARY OF TERMS

Bin carting route – the proposed route to move bins between the storage point and the servicing point.

Bulk bins – bins fitted with lids and side pockets to allow them to be serviced by a front-lift truck.

Clinical or related waste – waste that has the potential to cause disease, including, for example, animal waste, discarded sharps, human tissue waste or laboratory waste.

Commercial accommodation – for the purposes of this report means commercial development that includes a domestic or residential component, such as Retirement facility, Community care centre, Rooming accommodation, Short term accommodation or Resort complex.

Commercial premises – for the purpose of this report means any of the following types of premises:

- a Hotel, Short term accommodation, Tourist park, Food and drink outlet;
- an assembly building, institutional building, Child care centre, Educational establishment;
- premises where a sport or game is ordinarily played in public;
- an exhibition ground, show ground or racecourse; or
- an Office, Shop or other premises where business or work other than a manufacturing process is carried out.

Commercial waste – means waste, other than green waste, recyclable waste, and interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of commercial developments.

Common servicing point – a common area where more than two dwellings/tenancies stand their wheelie bins for servicing.

Common storage point – a common area where more than two dwellings/tenancies store their wheelie bins.

Constructed hardstand area – a hardstand area, for example a concrete pad which has been constructed for bin storage.

Digesters and dehydrators - machines specifically designed to reduce food waste volumes to allow for efficient disposal. Digesters typically process the material into sludge while dehydrators remove liquid from food waste generating a fertiliser as the end product. Disposal of end product can be used on either internal gardens or on external gardens/farms.

Drive-on service – where the waste collection vehicle services bulk bins on site, bins are to be positioned for direct access/servicing without the need for manual handling by the waste vehicle driver or other person.

General waste – waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic or commercial premises.

Glass crushers - machines that can reduce the volume of glass waste by up to 75%, saving valuable space.

Hazardous waste - solid waste that is toxic or contains toxic material, for example, light bulbs, fluorescence lights, batteries.

Internal servicing roadway – is a driveway, private roadway or other path intended for use by vehicles, in which the waste collection vehicle is required to use to service a bin.

Mixed-use development – for the purpose of this report, any building or development complex used, or intended to be used, for residential purposes in combination with other commercial uses (e.g. Offices, Food and drink outlets etc).

Non-serviced area – an area within the boundaries of City of Gold Coast which is not serviced by Council's waste collection contractor.

Organic waste - is waste that comes from plants or animal that is biodegradable for example green waste and food waste.

Recycling chute - a duct in which recycling descends from one point to another.

Recyclable waste – for a local government's area, means clean and inoffensive waste that is declared by the local government to be recyclable waste for the area. In the City of Gold Coast the following wastes are deemed recyclable:

- all household plastics, bottles and containers;
- aluminium and steel cans and aerosols;
- bottles and jars made only of glass;
- clean cardboard, newspaper, loose paper, junk mail, magazines and cartons.

Related waste – means waste that constitutes, or is contaminated with, chemicals, cytotoxic drugs, human body parts, pharmaceutical products or radioactive substances.

Roll-on roll-off bin (Ro-Ro bin) – large steel open top skip bins or enclosed bins. Bins are collected by a hook-lift truck.

Solid waste – any general or recyclable waste, be it commercial or domestic. Solid waste does not include waste discharges to sewer/water or the atmosphere.

Servicing point – the designated area allocated to the temporary storage of waste bins for the period of servicing only. The point may be within or external to a development.

Storage point – the area allocated to the permanent storage of waste bins. This is the normal location of the waste bins and excludes the period where the bin is serviced. A storage point may be a common storage point or an individual bin storage point.

Waste – includes anything, other than a resource that is:

- left over, or an unwanted by-product from an industrial, commercial, domestic or other activity; or
- surplus to the industrial, commercial, domestic or other activity generating the waste.

Waste carting distance – the distance required for a person to transport their waste from the nearest point of exit of their dwelling/tenancy to a storage point (or in the case of a multi-level building, to the nearest waste disposal point).

Waste chute – a duct in which waste descends from one point/level to a collection bin.

Waste disposal point – the point where waste is disposed of into the chute, also known as waste hopper. It consists of a fixed frame and hood unit, covered with a hinged or pivoted door.

Waste storage room – the room at the base of the chute used for the storage of waste bins.

Wheelie bin – two wheeled mobile garbage bins, made from high density polyethylene (HDPE). Wheelie bins are collected by a side-lift truck.

2.0 INTRODUCTION

2.1 BACKGROUND

MRA Environmental (MRA) has been commissioned by Mary Anne Development Pty Ltd to prepare a Waste Management Plan (WMP) for the proposed residential development located at 19-21 Anne Ave, Broadbeach QLD 4218.

This WMP is to be submitted to the City of Gold Coast (Council) as part of the Development Application for the site and ensures that the waste storage and collection activities for the operational phase of the development are in accordance with *SC6.16 City Plan Policy v.11 - Solid Waste Management*.

2.2 SITE DETAILS

The subject site is located at 19-21 Anne Ave, Broadbeach QLD 4218 on a 1,032m^2 parcel of land known as Lot 0 on BUP1114. The site is largely surrounded by high-density residential units immediately to the north, east, south, and west (Refer to **Figure 1**).

The proposed 32-level residential development will consist of a total of 56 x three-bedroom apartments with communal recreational facilities on Level 4 and two (2) private recreation spaces on the rooftop for the penthouse apartments. Carparking is provided across four (4) levels; on two (2) basement levels and two (2) podiums.

2.3 PURPOSE & SCOPE OF REPORT

This report represents a Waste Management Plan for the operational phase of the development, which includes:

- Details on the anticipated type and quantity of waste (**Section 3.0**);
- Details of the waste storage point requirements and waste storage bins (**Section 4.0**); and
- Details of the proposed waste collection arrangements (**Section 5.0**).

2.4 WMP OBJECTIVES & STRUCTURE

The main objectives of this report are to provide details for optimal waste management in the operational phase of the development. The structure of this report will be as follows:

- An introduction including the site details, summary, purpose and scope of the report along with the objectives and structure;
- Development figures including the site location and outlining the waste storage and servicing infrastructure and locations;
- Waste quantities including the type of waste, quantities of waste and the proposed development uses;
- Proposed waste storage and servicing areas including waste storage infrastructure and locations within the development; and
- Details of the waste collection including servicing frequencies, the waste servicing area and collection vehicle access.



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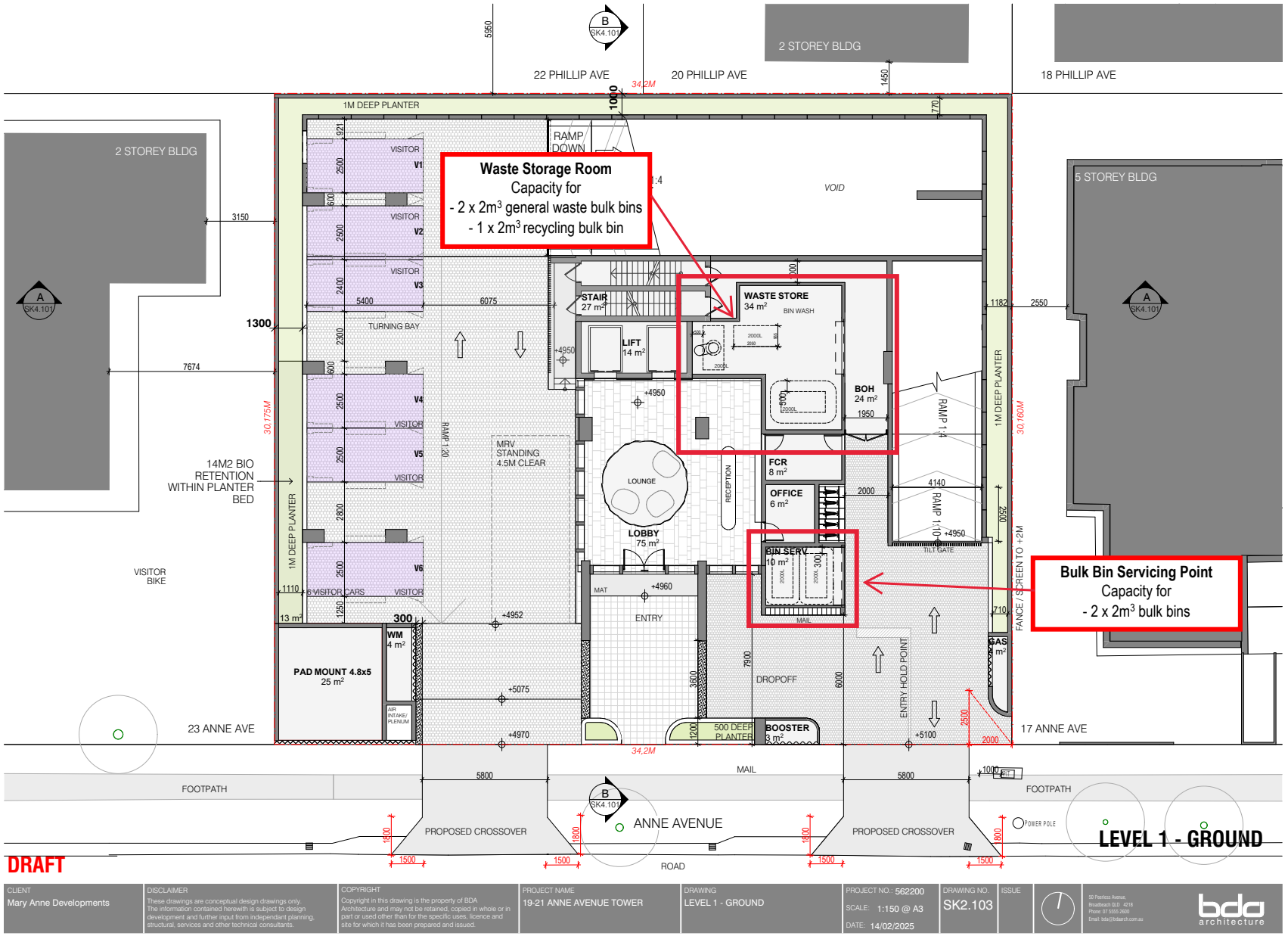
DESIGNED	RP	SCALE	NTS	CLIENT	MARY ANNE DEVELOPMENTS
DRAWN	RP	LEVEL DATUM	-	PROJECT	WASTE MANAGEMENT PLAN 19-21 ANNE AVE, BROADBEACH
CHECKED	AR	SHEET SIZE	A4		
APPROVED	AR	CAD FILE		TITLE	SITE LOCATION
DATE	FEBRUARY 2025	ISSUE	FINAL		

JOB NUMBER	MRA24-249
DRAWING	Figure 1
REV	FINAL



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SCALE: 1:150 @ A3
DATE: 14/02/2025

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bda architecture

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DESIGNED: RP	SCALE: NTS	CLIENT: MARY ANNE DEVELOPMENTS	JOB NUMBER: MRA24-249
DRAWN: RP	LEVEL DATUM: -	PROJECT: WASTE MANAGEMENT PLAN 19-21 ANNE AVE, BROADBEACH	DRAWING: Figure 2
CHECKED: AR	SHEET SIZE: A4		
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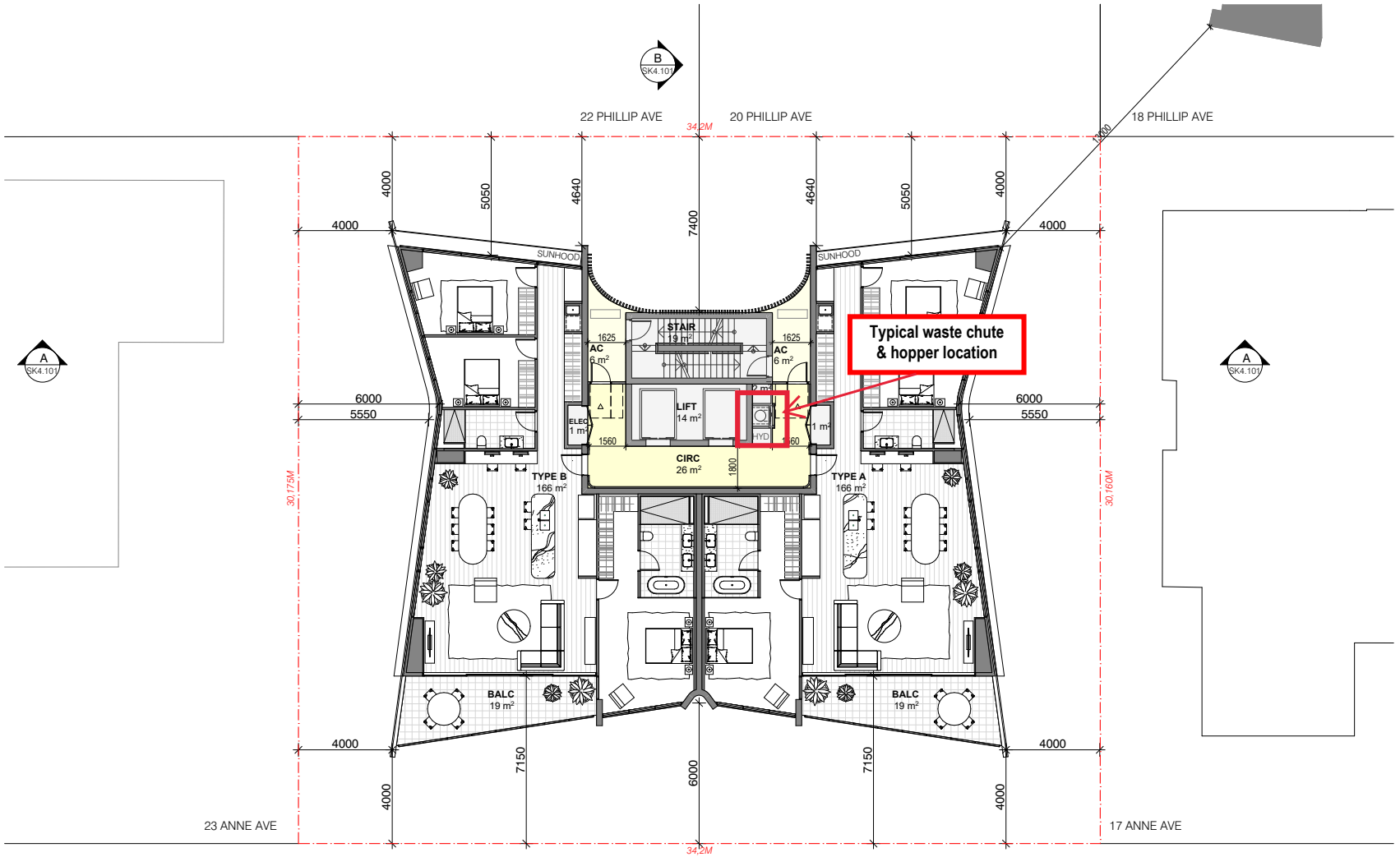
DATE: FEBRUARY 2025	ISSUE: FINAL		



TOWER TYPICAL LEVEL 5 - 31

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DESIGNED: RP	SCALE: NTS	CLIENT: MARY ANNE DEVELOPMENTS	JOB NUMBER: MRA24-249
DRAWN: RP	LEVEL DATUM: -	PROJECT: WASTE MANAGEMENT PLAN 19-21 ANNE AVE, BROADBEACH	DRAWING: Figure 3
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DATE: FEBRUARY 2025	ISSUE: FINAL		REV: A

3.0 WASTE QUANTITIES

3.1 TYPE OF WASTE

Table 1 outlines the predicted types of waste that are expected to be generated from the proposed development.

Table 1: Predicted waste types to be generated

Tenancy Type	Predicted Waste Types
Residential accommodation	General waste & recycling

3.2 WASTE QUANTITIES

Calculations of the anticipated waste quantities have been separated into the general waste and recycling components. The waste calculations were performed using typical waste generation rates as provided in Appendix A of Council's *SC6.16 City Plan Policy v.11 - Solid Waste Management.*

3.3 RESIDENTIAL APARTMENTS

Table 2 displays the general waste quantities and **Table 3** displays the recycling quantities that are anticipated for the residential apartments of the development.

Table 2: Anticipated general waste quantities

Room Type	No.	Total Required Waste Capacity (L/week)	Estimated Waste Generation (m^3/week)	Estimated Daily Waste Generation (m^3/day)
3 Bedrooms	56	6,720	6.72	0.96
TOTAL	**56**	**6,720**	**6.72**	**0.96**

Table 3: Anticipated recycling quantities

Room Type	No.	Total Required Waste Capacity (L/week)	Estimated Recycling Generation (m^3/week)	Estimated Daily Recycling Generation (m^3/day)
3 Bedrooms	56	4,480	4.48	0.64
TOTAL	**56**	**4,480**	**4.48**	**0.64**

3.4 TOTAL WASTE CAPACITY

The residential apartments are expected to generate approximately **0.96m^3/day** of general waste and **0.64m^3/day** of recycling waste.

4.0 WASTE & RECYCLING STORAGE

This section outlines the general design criteria of the waste storage room, waste chute and waste hoppers as required by *SC6.16 City Plan Policy v.11 – Solid Waste Management* along with a description of the proposed bins to be used.

4.1 WASTE STORAGE ROOM

General waste and recycling from the residential apartments will be disposed of via a single waste chute fitted with a diverter for recyclables terminating in the waste storage room. The residential waste storage room is located on the level 1 (ground) floor of the development adjacent to the lift core (Refer to **Figure 2**).

The waste storage room containing the waste chute will be for authorised personnel only (body corporate/site management) to ensure that the safety of residents is maintained.

The waste storage room will be constructed to meet the requirements listed below:

1. Designed to allow the bins to be easily transported to a separate servicing point (no steps or lips on bin carting route);
2. Waste-carting distance should generally not exceed 60 metres and in any be reasonable to ensure ease of use;
3. Located at least five (5) metres from any door, window or fresh air intake within the development or any adjoining site;
4. Screened to ensure bins are not visible from a public place or sensitive land use;
5. Designed with safe access to the disposal area;
6. Of sufficient size to accommodate the required number of bins, allowing for sufficient clearance surrounding each container;
7. Constructed hardstand area with a solid concrete base or acceptable equivalent;
8. Roofed and designed to prevent entry to rainwater and graded to fall to a drainage point that is connected to sewer in accordance with trade waste requirements and provided with a hose cock for cleaning;
9. Located in a purpose-built air-locked storage area used solely for the storage of waste;
10. Insect and vermin proof;
11. Fire rated and ventilated in accordance with the *National Construction Code – Building Code of Australia*;
12. Doors must be wide enough to allow for the easy removal of the largest container to be stored;
13. The walls, ceiling, floor and equipment of the waste storage room are to be designed and constructed of impervious material with a smooth finish to allow for easy cleaning;
14. Permit unobstructed access for removal of the containers to the service point and for positioning of the containers correctly in relation to the waste chute; and
15. Provided with adequate artificial lighting.

4.2 WASTE CHUTE

As outlined above, general waste and recycling will be delivered to the waste storage room at ground level via a single waste chute fitted with a diverter for recyclables terminating in the level 1 (ground) floor waste storage room.

The waste chute will be constructed to meet the requirements listed below:

1. Adequate in strength for its purpose, including additional reinforcing where necessary at joins, bends and hopper intersections;
2. Insect and vermin proof;
3. Constructed and installed to prevent the following during use and operation of the system:
    - transmission of vibration to the structure of the premises;
    - excessive odour – there must not be a noticeable odour beyond the waste disposal and storage points;
    - excessive noise to the occupants of the building.;
4. Installed in a 'fire rated' duct and ventilated in compliance with building requirements of the *National Construction Code – Building Code of Australia;*
5. Comply with the waste chute manufacturer's technical specifications and/or operational limitations, including installation design features and ancillary equipment required to prevent blockages and noise disturbances, to achieve compliance with the section; and
6. Fitted with a shutter at the base of the chute, for closing off the chute manually during bin exchange and automatically in the case of fire. The manual closing mechanism must be in a safe location to protect the operator from waste discharging from the chute when activating the closure.

4.3 WASTE HOPPER CONSTRUCTION

Waste hoppers will be available on each residential level of the development in a dedicated compartment in the lift lobby (Refer to **Figure 3**).

The waste hoppers will be constructed to meet the requirements listed below:

1. Located on each residential floor in a position which is:
    - in a dedicated room or compartment;
    - easily accessible by the occupants of each apartment;
    - separated from any habitable portion of a building or place used in connection with food preparation or storage;
2. Located to ensure the handle of the hopper is at least 1,200 millimetres above finished floor level;
3. Hopper door automatically returns to the closed position after use;
4. Designed to permit free flow of waste into the chute;
5. Constructed so that the diameter or largest dimension of the service opening (the diagonal of a rectangular opening) does not exceed three-quarters (3/4) of the diameter of the chute with which the hopper is connected; and
6. The floor adjacent to the hopper is paved with a durable impervious material with a smooth finished surface.

4.4 PROPOSED WASTE BINS

To ensure that the design of the waste storage room is sufficient, the details of the type and quantity of waste and number of bins to be stored are outlined on **Table 4**. Dimensions of the proposed containers are detailed in **Section 4.5**.

Table 4: Details of proposed bins & servicing frequency

Waste Type	Waste Quantity (m^3/week)	Bins Proposed in Area	Collection Frequency
General Waste	6.72	2 x 2.0m^3 bulk bins	Two times per week
Recycling	4.48	1 x 2.0m^3 bulk bins	Three times per week

4.5 DIMENSIONS OF WASTE CONTAINERS

Table 5 below provides dimensions of the bins to be used on-site. The 2.0m^3 bulk bins will be composed of galvanised or rust-free metal with lightweight plastic lids.

Table 5: Dimensions of waste storage bins

Bin Type	Volume	Length (mm)	Width/ Diameter (mm)	Height (mm)	Collection Vehicle Type
Bulk Bin	2.0m^3	2,050	965	1,553	Front Lift Truck

4.6 DRAINAGE AND BIN WASH

A bin wash facility (including hose cock) will be provided in the waste storage room, which will be graded to a drainage point that is connected to sewer in accordance with trade waste requirements. This area will be utilised as the bin washing facility for both the general waste and recycling bulk bins. It will be the responsibility of site management to wash bins and to maintain the cleanliness of the waste storage room.

5.0 DETAILS OF COLLECTION

5.1 FREQUENCY

Waste servicing frequencies for general waste and recycling bulk bins for the development have been outlined in **Table 4.** The general waste bulk bins are anticipated to be serviced twice per week, and the recycling bulk bins are anticipated to be serviced three times a week.

5.2 BULK BIN SERVICING POINT

Servicing from Anne Avenue is proposed for the development. The bulk bin servicing point is located adjacent to the eastern driveway and is a designated hardstand area, on a level pad positioned approximately 6m to 9m from the property boundary (Refer to **Figure 2**). Please note that due to the location of infrastructure services (gas & booster zone), this is as close to the property boundary as possible for the servicing point and is not expected to impact upon the ability of the collection personnel to service the development.

Site management will transfer the bulk bins to / from the servicing point when scheduled. The bulk bins will be transferred by the engaged waste contractor to/from the bulk bin servicing point to the waste collection vehicle on Anne Ave for servicing.

General waste and recycling servicing will be arranged to occur on different days; therefore, the servicing point is sized to accommodate two (2) x 2.0m^3 bulk bins.

The bulk bin servicing point will be designed and constructed to meet the following requirements:

1. Provided with sufficient access and clearance for the waste and recycling collection vehicles to service the bins, including adequate unobstructed overhead space for the swinging arm action of the waste collection vehicle;
2. Bins serviced safely while minimising the impediment of traffic flow during servicing;
3. Clearly separated from car parking bays, loading bays, footpaths and pedestrian access, and any other similar areas;
4. Clear of speed control devices or similar provisions which inhibit direct access to the bins for servicing;
5. Bin-carting route must allow bins to be easily manoeuvred and be devoid of steps or steep rises;
6. Bin carting route must not extend through habitable parts of a building, or a food premises, and only occur through common property or publicly accessible locations;
7. Over five metres from any door, window or fresh air intake within the development or any adjoining site;
8. Bins to be removed from and returned to the storage point;
9. Constructed hardstand with a solid concrete base or acceptable equivalent;
10. Positioned on a level pad within the site approx. 6m to 9m from the property boundary, level with the kerbside and adjacent to a driveway;

11. Allow for sufficient clearance surrounding the bulk bin container and any barrier around the location to allow for ease of movement;
12. Screened to minimise the view of bins from neighbouring properties, or passing vehicles and pedestrian traffic external to the site;
13. Bin carting is to be via hard stand pathways and can be easily moved to the temporary storage area either side of the property entry point and is not stored on a section of the driveway that falls away.; and
14. Positioned away from entrances to shops or residential premises.

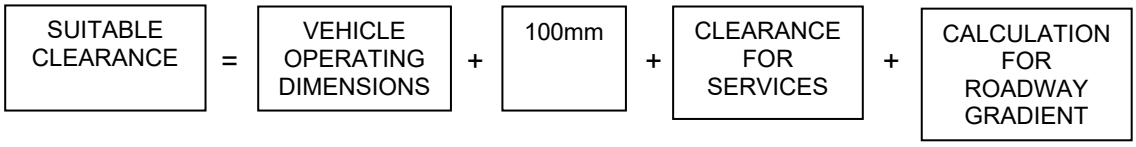
5.3 COLLECTION VEHICLE ACCESS

Table 6 details the dimensions of the Front Lift truck waste collection vehicle that will be used to service the development on Anne Avenue.

Table 6: Front lift truck dimensions

Parameter	Front lift truck
Height	4.3m
Width	2.5m
Length	10.2m
Working Height	6.5m*
Total Tonnage	27.5 tonne maximum
Min Turning Circle	13.2m (wall-wall)
Min Turning Circle	12.3m (kerb-kerb)

*Note that the waste collection vehicle clearance height (working height) is to be calculated according to the following formula as a minimum:



6.0 SUMMARY

Details of this Waste Management Plan are summarised below:

- The subject site is located at 19-21 Anne Ave, Broadbeach QLD 4218 on a 1,032m^2 parcel of land known as Lot 0 on BUP1114. The site is largely surrounded by high-density residential units immediately to the north, east, south, and west (Refer to **Figure 1**);
- The proposed 32-level residential development will consist of a total of 56 x three-bedroom apartments with communal recreational facilities on Level 4 and two (2) private recreation spaces on the rooftop for the penthouse apartments. Carparking is provided across four (4) levels; on two (2) basement levels and two (2) podiums;
- The residential apartments are expected to generate approximately **0.96m^3/day** of general waste and **0.64m^3/day** of recycling waste;
- General waste and recycling from the residential apartments will be disposed of via a single waste chute fitted with a diverter for recyclables terminating in the waste storage room. The residential waste storage room is located on the level 1 (ground) floor of the development adjacent to the lift core (Refer to **Figure 2**);
- There will be a total of three (3) x 2.0m^3 bulk bins stored within the waste storage room; comprised of two (2) x general waste bulk bins and one (1) x recycling bulk bins for residential waste;
- Servicing from Anne Avenue is proposed for the development. The bulk bin servicing point is located adjacent to the eastern driveway and is a designated hardstand area, on a level pad positioned approximately 6m to 9m from the property boundary (Refer to **Figure 2**). Please note that due to the location of infrastructure services (gas & booster zone), this is as close to the property boundary as possible for the servicing point and is not expected to impact upon the ability of the collection personnel to service the development; and
- A bin wash facility (including hose cock) will be provided in the waste storage room, which will be graded to a drainage point that is connected to sewer in accordance with trade waste requirements. This area will be utilised as the bin washing facility for both the general waste and recycling bulk bins. It will be the responsibility of site management to wash bins and to maintain the cleanliness of the waste storage room.

ATTACHMENT A

Solid Waste Management Code (9.4.12 v.11)

ASSESSABLE DEVELOPMENT CRITERIA
9.4.12 SOLID WASTE MANAGEMENT CODE (v.11)

Performance Outcomes	Acceptable Outcomes	Compliance Achieved	Comments
Waste and recycling storage and bin wash-down facilities			
PO1 Development provides waste and recycling storage facilities that are safe, convenient, efficient, appropriately sized for the type and volume of waste generated.	**AO1.1** Development includes waste storage points of sufficient size to accommodate the required number of waste and recyclable bins consistent with **SC6.16 City Plan policy – Solid waste management**.	✓	The Waste Management Plan confirms that the development includes waste storage points of sufficient size to accommodate the required number of waste and recyclable bins generally in accordance with **SC6.16 City Plan policy – Solid waste management**.
	AO1.2 Waste and recycling storage points are located, designed and sized consistent with **SC6.16 City Plan policy – Solid waste management**.	✓	The Waste Management Plan confirms that the development includes waste and recycling storage points that are located, designed and sized generally in accordance with **SC6.16 City Plan policy – Solid waste management**.
	AO1.3 Development with a dwelling above the third storey include appropriate waste removal systems which incorporate: (a) waste chutes; (b) hoppers; and (c) separate waste storage rooms. **Note: Waste removal system design is to be consistent with SC6.16 City Plan policy – Solid waste management.**	✓	The Waste Management Plan confirms that the development includes waste chutes, hoppers and separate waste storage rooms consistent with **SC6.16 City Plan policy – Solid waste management**.
	AO1.4 Developments that include a commercial kitchen or generate clinical or related waste incorporate additional waste facilities consistent with **SC6.16 City Plan policy – Solid waste management**.	**N/A**	The development does not contain a commercial kitchen.
PO2 Development provides a bin wash-down facility that maintains appropriate environmental health and amenity standards.	**AO2** Development includes appropriately sized and located bin wash-down facilities consistent with **SC6.16 City Plan policy –Solid waste management**.	✓	The Waste Management Plan confirms that the development includes appropriately sized and located bin wash-down facilities consistent with **SC6.16 City Plan policy –Solid waste management**.

Amenity			
PO3 Waste and recycling storage and servicing points are appropriately located and designed for convenient and safe access by all users and to minimise the potential for nuisance to occupants of the development or adjoining properties.	**AO3.1** Direct unobstructed paths exist between waste and recycling storage and servicing points and road frontages.	✓	The Waste Management Plan confirms that direct unobstructed paths exist between waste and recycling storage and servicing points and road frontages.
	AO3.2 Waste and recycle storage points are screened by solid fencing or vegetation to ensure they are not visible from a public place or sensitive land use.	✓	The Waste Management Plan confirms that waste and recycling storage points are screened by solid fencing or vegetation to ensure they are not visible from a public place or sensitive land use.
Waste servicing			
PO4 Waste and recycling servicing points are appropriately located and designed to facilitate safe, unobstructed and efficient servicing of waste containers.	**AO4** Waste and recycling servicing points are located, designed and sufficiently sized consistent with **SC6.16 City Plan policy –Solid waste management**. **Note: Regulation of the access, stopping and manoeuvring of refuse collection vehicles are subject to meeting, Part 9.4.13 Transport code and associated City Plan guidelines.**	✓	The Waste Management Plan confirms that the waste and recycling servicing points are designed and sufficiently sized generally in accordance with **SC6.16 City Plan policy –Solid waste management.**
Non-serviced areas			
PO5 Developments in non-serviced areas have appropriate solid waste management measures to adequately service the development. **Note: For Commercial developments a Waste management plan, prepared in accordance with SC6.16 City Plan policy – Solid waste management, is Council's preferred method of addressing the above outcome.**	**AO5** No acceptable outcome provided.	**N/A**	The development is located in a serviced area.

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