

**TRAFFIC AND PARKING IMPACTS REPORT  
FOR A DEVELOPMENT APPLICATION  
FOR A PROPOSED INDUSTRIAL DEVELOPMENT  
5-7 KESTREL AVENUE, THORNTON NSW 2322**

<b>Property address</b>	5-7 Kestrel Avenue, Thornton NSW 2322
<b>Client</b>	Levant Investments Pty Ltd
<b>Prepared by</b>	O. Sannikov, MEngSc (Traffic Engineering), MIEAust, PEng, FAITPM
<b>Date</b>	06/01/22
<b>Job No.</b>	21133
<b>Report No.</b>	21133 Rep 01

<b>Item</b>	<b>Report</b>
<b>Site location</b>	<ul style="list-style-type: none"> <li>• Refer to <b>Figure 1</b>.</li> </ul>
<b>Existing land use</b>	<ul style="list-style-type: none"> <li>• Lot 602 (DP 1005289) – vacant land</li> <li>• Lot 603 (DP 1005289) – vacant land</li> </ul>
<b>Proposed development</b>	<ul style="list-style-type: none"> <li>• Industrial development comprising:           <ul style="list-style-type: none"> <li>◦ 19 light industrial/warehouse units (each with GFA between 123 m<sup>2</sup> and 255 m<sup>2</sup>)               <ul style="list-style-type: none"> <li>▪ Car parking area on the ground level                   <ul style="list-style-type: none"> <li>• A total of 66 car parking spaces, including                       <ul style="list-style-type: none"> <li>◦ 19 internal parking spaces (one space per unit, 10 spaces in tandem arrangement and 9 spaces independently accessible)</li> <li>◦ 47 spaces in the common parking area                           <ul style="list-style-type: none"> <li>▪ Including one (1) space for people with disabilities</li> </ul> </li> </ul> </li> </ul> </li> <li>▪ 10 bicycle spaces</li> </ul> </li> </ul> </li> </ul>



Figure 1. Site location.

Item	Report
Road characteristics	<p><b>Existing traffic and parking situation</b></p>
	<ul style="list-style-type: none"> <li>• Refer to <b>Figure 2</b>.</li> <li>• The key roads surrounding the proposed development are described below.               <ul style="list-style-type: none"> <li>◦ Kestrel Avenue                   <ul style="list-style-type: none"> <li>▪ Local road</li> <li>▪ 2 traffic lanes and parking opportunities on both sides</li> </ul> </li> <li>◦ Glenwood Drive                   <ul style="list-style-type: none"> <li>▪ Local road</li> <li>▪ 2 traffic lanes and parking opportunities on both sides</li> </ul> </li> <li>◦ Sandringham Avenue                   <ul style="list-style-type: none"> <li>▪ Local road</li> <li>▪ 2 traffic lanes and parking opportunities on both sides</li> </ul> </li> <li>◦ Thornton Road                   <ul style="list-style-type: none"> <li>▪ Local road</li> <li>▪ 2-4 traffic lanes and no parking opportunities</li> </ul> </li> <li>◦ Other streets in the surrounding area are local/local collector roads. Street conditions are typical for a residential area, with low to moderate traffic volumes.                   <ul style="list-style-type: none"> <li>▪ General speed limit is 50 km/h on local streets around the site.</li> </ul> </li> </ul> </li> </ul>
<p><b>Public Transport</b></p>	
Bus	<ul style="list-style-type: none"> <li>• Refer to <b>Figure 3</b>.</li> <li>• There closest bus stop is located outside the convenient walking distance from the site on Thornton Road (approximately 1.5 km).</li> <li>• Bus route 182               <ul style="list-style-type: none"> <li>◦ Thornton to Rutherford via Ashtonfield, Stockland Green Hills &amp; Maitland                   <ul style="list-style-type: none"> <li>▪ 3 services operate during the morning peak hours.</li> <li>▪ 3 services operates during the afternoon peak hours.</li> </ul> </li> <li>◦ Rutherford to Thornton via Maitland, Stockland Green Hills &amp; Ashtonfield                   <ul style="list-style-type: none"> <li>▪ 3 service operates during the morning peak hours.</li> <li>▪ 3 services operate during the afternoon peak hours.</li> <li>▪ The morning peak hours are between 6:30 a.m. and 9:30 a.m. and the afternoon peak hours are between 3:30 p.m. and 6:30 p.m.</li> </ul> </li> </ul> </li> </ul>
Train	<ul style="list-style-type: none"> <li>• The site is also located approximately 1.8 km from the Thornton Train station.</li> <li>• Refer to <b>Figure 3</b>.               <ul style="list-style-type: none"> <li>◦ The Hunter Line Train Services through this station</li> </ul> </li> <li>• The location of the site in relation to public transport stops does not discourage the reliance on private vehicle as a mode of travel.</li> </ul>



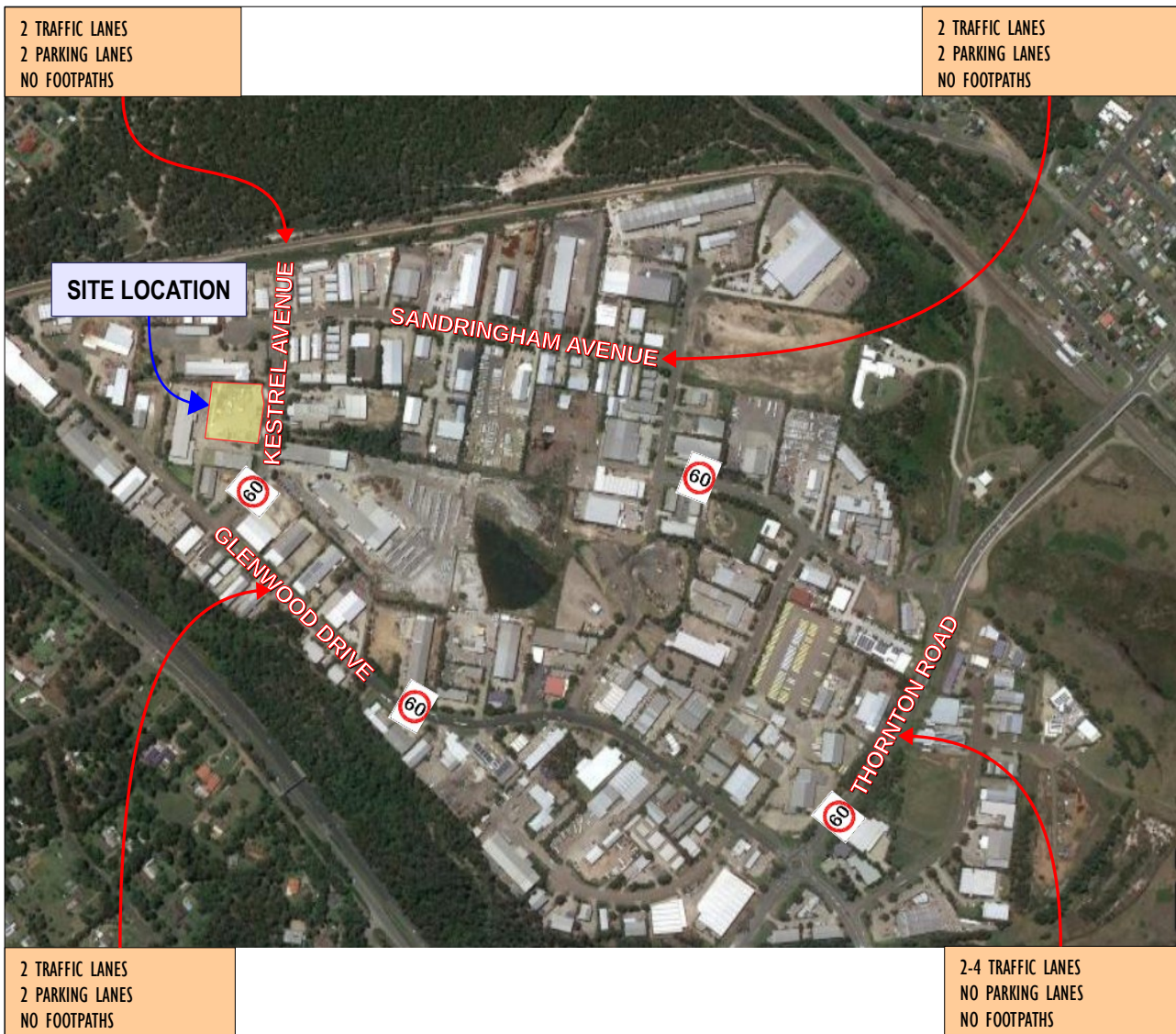


Figure 2. Road characteristics.



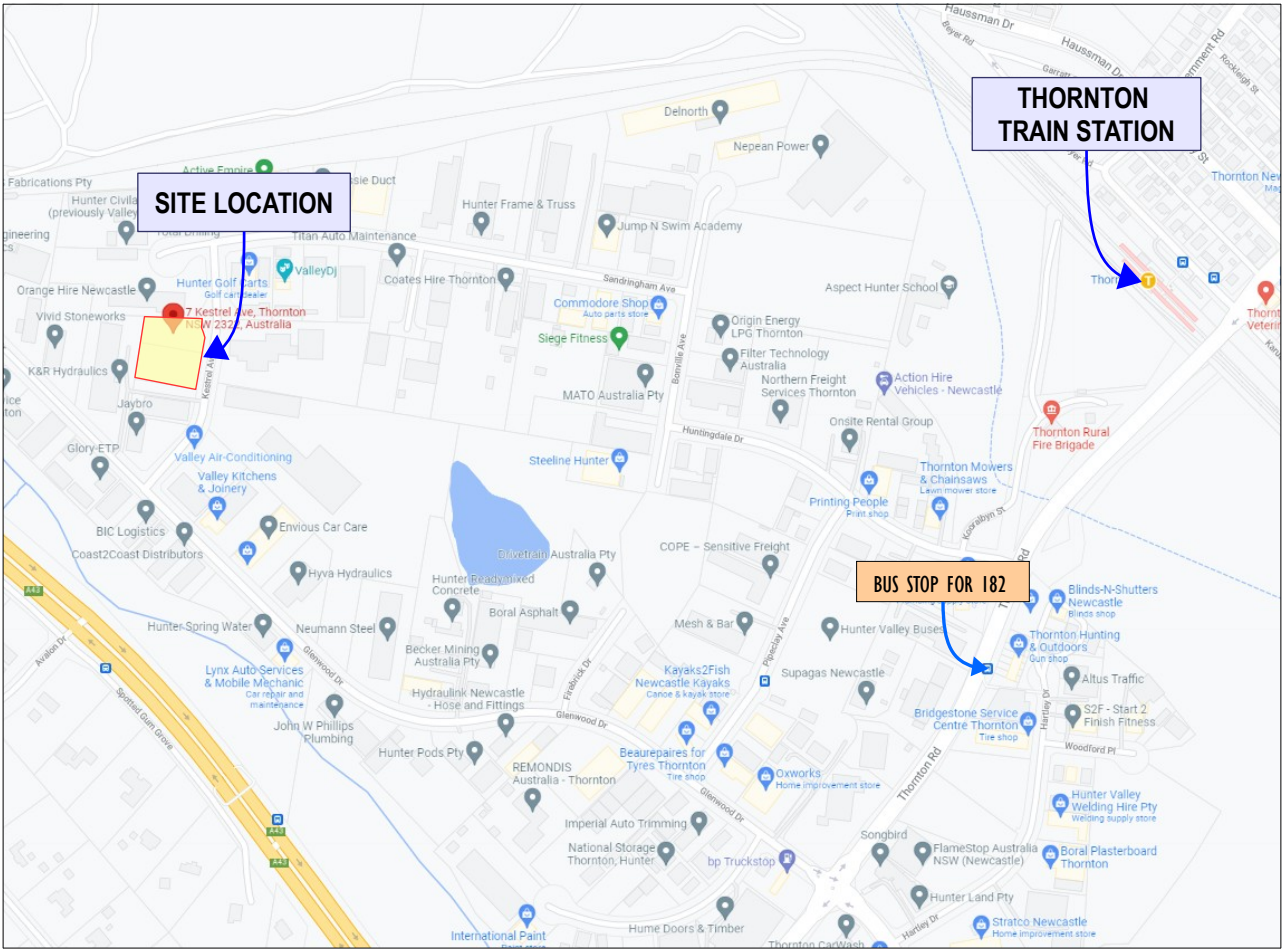


Figure 3. Public transport.

Item	Report
	<p><b>Surveys and survey results</b></p>
<p><b>Parking survey</b></p>	<ul style="list-style-type: none"> <li>• A parking demand survey was conducted on Tuesday 07/12/21 (morning) and Monday 06/12/21 (afternoon). <ul style="list-style-type: none"> <li>◦ The morning survey was between 6:00 a.m. and 10:00 a.m.</li> <li>◦ The afternoon survey was between 2:30 p.m. and 7:00 p.m.</li> </ul> </li> <li>• Refer to <b>Figure 4</b> for survey locations <ul style="list-style-type: none"> <li>◦ Areas in red represent a convenient walking distance of up to 150 metres from the site.</li> <li>◦ Areas in blue represent a close walking distance within 250 metres from the site.</li> </ul> </li> </ul>
<p><b>Survey results</b></p>	<ul style="list-style-type: none"> <li>• Refer to <b>Table 1</b> for survey results.</li> <li>• Areas 1a-3b (within 150 m walking distance). <ul style="list-style-type: none"> <li>◦ The morning peak occurred between 9:00 a.m. and 10:00 a.m.</li> <li>◦ The afternoon peak occurred between 3:00 p.m. and 4:00 p.m.</li> <li>◦ The survey results indicated that there were at least 37 spaces vacant throughout the day (to a maximum of 64) in the survey area.</li> </ul> </li> <li>• Areas 4-8 (between 150 to 250 m walking distance). <ul style="list-style-type: none"> <li>◦ The morning peak occurred at 10:00 a.m.</li> <li>◦ The afternoon peak occurred between 3:00 p.m. and 4:00 p.m.</li> <li>◦ The survey results indicated that there were at least 24 spaces vacant throughout the day (to a maximum of 82) in the survey area.</li> </ul> </li> </ul>

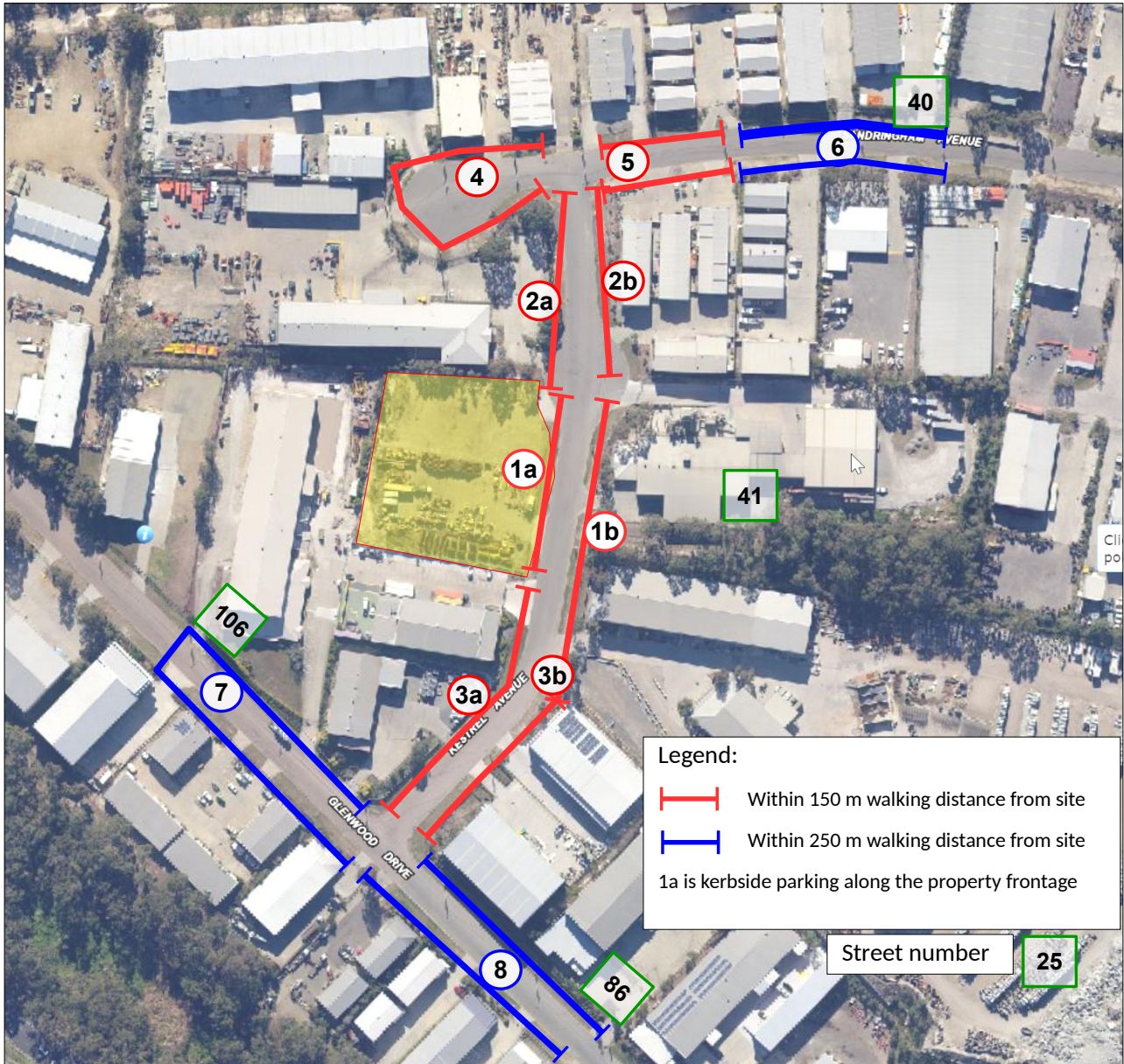


Figure 4. Parking demand survey locations.



**Table 1. Parking demand survey results.**

7/12/2021		Number of parked cars																	
Tuesday		Parking Location														Total			
Time	1a	1b		2a	2b	3a	3b	4		5		6	7	8		1a to 3b	4 to 8	All	
		A	B					A	B	A	B			A	B				
6:00	0	2	2	0	2	0	1	2	1	2	1	4	3	3	2	7	18	25	
6:30	0	3	2	0	2	3	5	3	1	3	1	4	5	7	2	15	26	41	
7:00	0	4	2	1	4	4	5	7	1	4	1	2	5	7	3	20	30	50	
7:30	0	4	2	1	4	4	5	7	1	4	1	2	6	11	3	20	35	55	
8:00	0	4	2	2	5	6	6	11	2	4	1	2	9	12	4	25	45	70	
8:30	0	3	1	2	5	6	6	13	2	4	1	2	8	12	4	23	46	69	
9:00	0	5	1	1	5	9	8	15	3	5	2	2	10	14	4	29	55	84	
9:30	0	4	1	2	5	9	8	15	3	3	3	4	10	15	4	29	57	86	
10:00	0	5	0	3	7	9	8	15	3	2	3	4	11	18	4	32	60	92	
No of spaces	8	10	0	10	11	15	12	16	0	10	0	20	24	30	0	66	100	166	
		A = On-road parking						B = Grass verge parking											

6/12/2021		Number of parked cars																	
Monday		Parking Location														Total			
Time	1a	1b		2a	2b	3a	3b	4		5		6	7	8		1a to 3b	4 to 8	All	
		A	B					A	B	A	B			A	B				
14:30	0	2	1	4	4	5	4	9	0	4	1	4	8	7	6	20	39	59	
15:00	0	3	1	5	4	6	6	10	0	4	1	4	8	7	6	25	40	65	
15:30	0	2	2	5	4	6	4	8	0	5	1	4	7	8	6	23	39	62	
16:00	0	2	2	4	4	3	2	8	2	5	1	4	8	8	6	17	42	59	
16:30	0	1	1	2	4	2	1	6	2	4	1	3	8	8	6	11	38	49	
17:00	0	1	1	0	1	1	0	2	1	3	1	4	4	4	5	4	24	28	
17:30	0	1	1	0	0	1	0	1	0	3	1	4	3	4	4	3	20	23	
18:00	0	1	1	0	0	1	0	1	0	2	1	3	3	4	4	3	18	21	
18:30	0	1	1	0	0	1	0	2	0	2	1	2	3	5	4	3	19	22	
19:00	0	1	1	0	0	0	0	1	0	1	1	2	3	4	2	2	14	16	
No of spaces	8	10	0	10	11	15	12	16	0	10	0	20	24	30	0	66	100	166	
		A = On-road parking						B = Grass verge parking											

7/12/2021		Number of vacant parking spaces																	
Tuesday		Parking Location														Total			
Time	1a	1b		2a	2b	3a	3b	4		5		6	7	8		1a to 3b	4 to 8	Total	
		A	B					A	B	A	B			A	B				
6:00	8	8	-2	10	9	15	11	14	-1	8	-1	16	21	27	-2	59	82	141	
6:30	8	7	-2	10	2	12	7	13	-1	7	-1	4	5	7	-2	44	32	76	
7:00	8	6	-2	9	4	11	7	9	-1	6	-1	2	5	7	-3	43	24	67	
7:30	8	6	-2	9	4	11	7	9	-1	6	-1	2	6	11	-3	43	29	72	
8:00	8	6	-2	8	5	9	6	5	-2	6	-1	2	9	12	-4	40	27	67	
8:30	8	7	-1	8	5	9	6	3	-2	6	-1	2	8	12	-4	42	24	66	
9:00	8	5	-1	9	5	6	4	1	-3	5	-2	2	10	14	-4	36	23	59	
9:30	8	6	-1	8	5	6	4	1	-3	7	-3	4	10	15	-4	36	27	63	
10:00	8	5	0	7	7	6	4	1	-3	8	-3	4	11	18	-4	37	32	69	
		A = On-road parking						B = Grass verge parking											

6/12/2021		Number of vacant parking spaces																	
Monday		Parking Location														Total			
Time	1a	1b		2a	2b	3a	3b	4		5		6	7	8		1a to 3b	4 to 8	Total	
		A	B					A	B	A	B			A	B				
14:30	8	8	-1	6	7	10	8	7	0	6	-1	16	16	23	-6	46	61	107	
15:00	8	7	-1	5	7	9	6	6	0	6	-1	16	16	23	-6	41	60	101	
15:30	8	8	-2	5	7	9	8	8	0	5	-1	16	17	22	-6	43	61	104	
16:00	8	8	-2	6	7	12	10	8	-2	5	-1	16	16	22	-6	49	58	107	
16:30	8	9	-1	8	7	13	11	10	-2	6	-1	17	16	22	-6	55	62	117	
17:00	8	9	-1	10	10	14	12	14	-1	7	-1	16	20	26	-5	62	76	138	
17:30	8	9	-1	10	11	14	12	15	0	7	-1	16	21	26	-4	63	80	143	
18:00	8	9	-1	10	11	14	12	15	0	8	-1	17	21	26	-4	63	82	145	
18:30	8	9	-1	10	11	14	12	14	0	8	-1	18	21	25	-4	63	81	144	
19:00	8	9	-1	10	11	15	12	15	0	9	-1	18	21	26	-2	64	86	150	
		A = On-road parking						B = Grass verge parking											



item	Report	
Intersection traffic volume counts	<b>Traffic counts</b>	
	Location / type of control	Huntingdale Road / Thornton Road (T-intersection, Give Way control) Glenwood Drive / Thornton Road (four-way roundabout)
	Date / Day of the week	Tuesday 07/12/2021 (morning) and Monday 06/12/2021 (afternoon).
	Time period (AM)	05:00 to 11:00; the morning peak hour occurred between 07:30 and 08:30
	Time period (PM)	14:00 to 19:30; the afternoon peak hour occurred between 15:45 and 16:45
		<ul style="list-style-type: none"> <li>Refer to <b>Figures 5</b> and <b>6</b> demonstrate existing traffic counts for morning and afternoon commuter peak hours.</li> </ul>

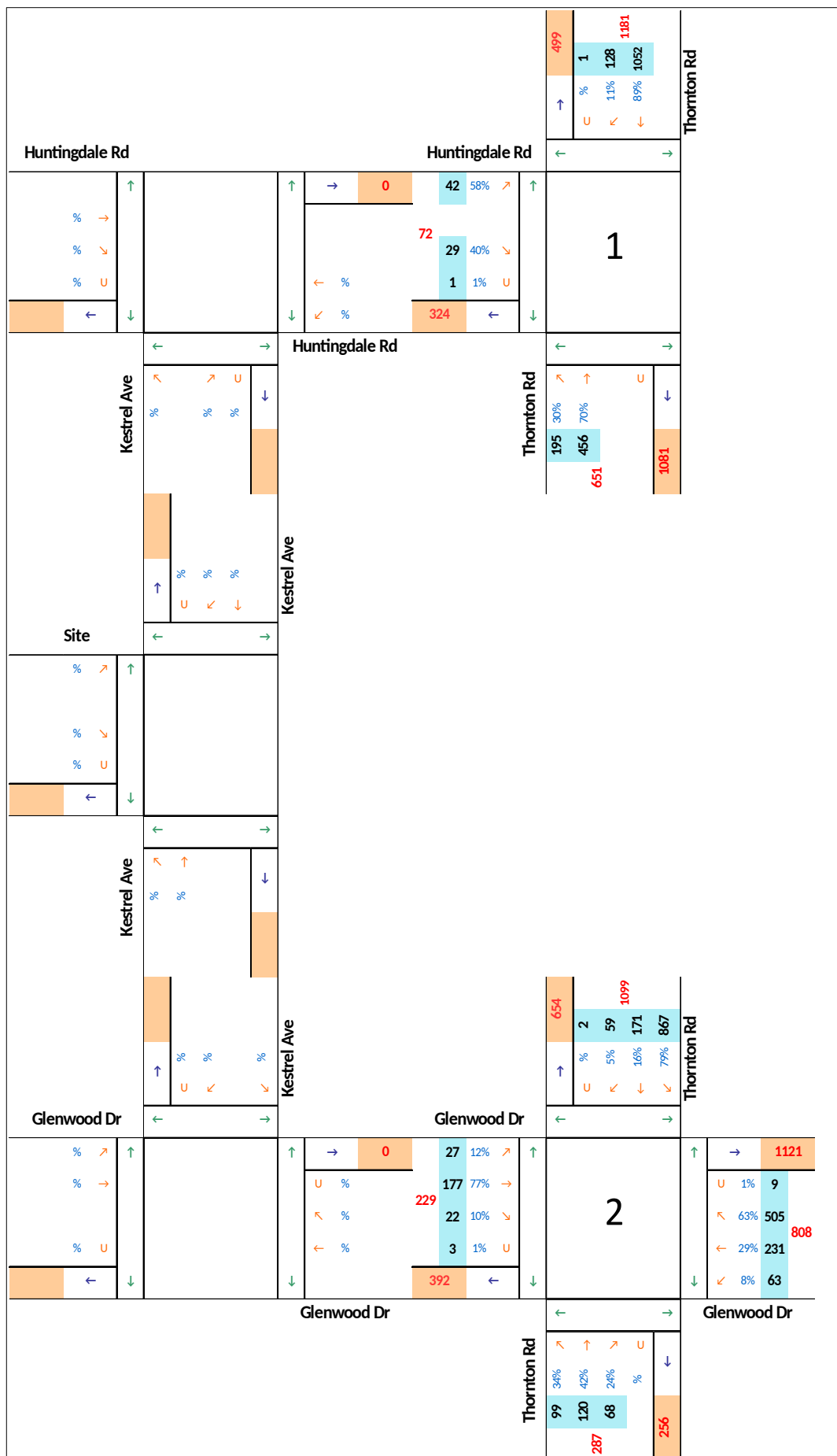


Figure 5. Existing traffic volumes - morning peak hour.



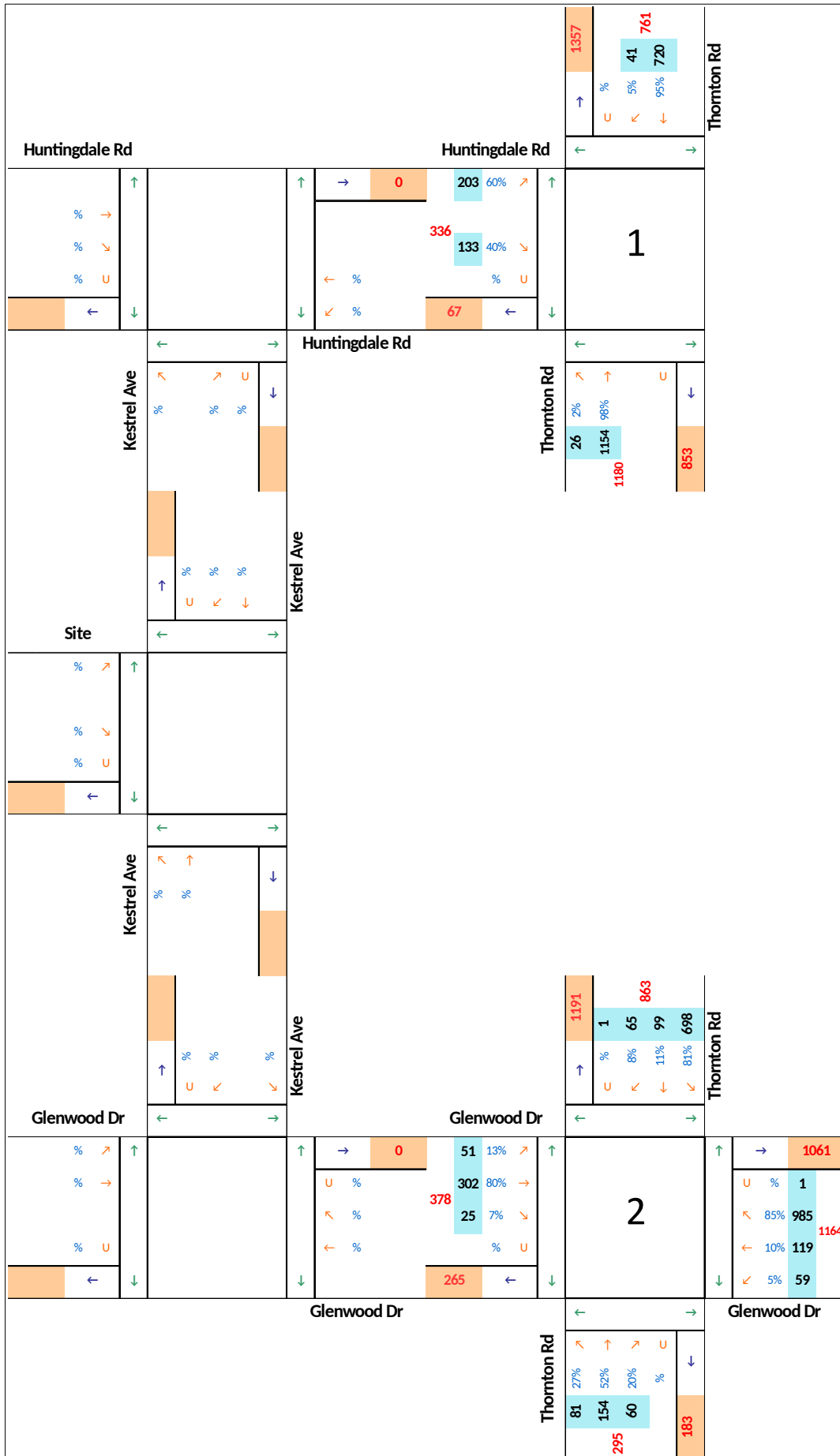


Figure 6. Existing traffic volumes - afternoon peak hour.

Item	Report
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- Planning control document**
- Maitland City Council
    - Maitland Development Control Plan 2011
      - Part C – Design Guidelines
        - Chapter C.5 – Industrial Land
        - Chapter C.11 – Vehicular Access & Car Parking

Requirement	Compliance
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**Chapter C.5 – Industrial Land**

**3. DEVELOPMENT GUIDELINES**

**Vehicular Access**

11. Access drives shall have a minimum width of 6 metres (Note: Major traffic generating developments may require a greater access width, divided at the property line). Complies and exceeds (separate entry and exit driveways 11.6 m wide are provided)

12. Access drives shall not be located in close proximity to an intersection. Complies

13. Loading and unloading facilities appropriate to the particular development are to be provided on site such that service vehicles are located wholly within the site, and do not create conflicts with parking areas. Complies

**Parking**

14. See C.1: Vehicular Access and Parking for number of parking spaces required. Refer to a separate assessment under C.11 (the DCP contains an error in referencing C.1)

15. All car parking facilities shall be located behind the front 5 metre landscaped area; Complies

16. Where it is proposed to locate parking facilities behind an industrial building or to the rear of an industrial site, separate provision for visitor parking shall be made in front of the building and behind the front 5 metre landscaped area. Complies

**Chapter C.11 – Vehicular Access & Car Parking**

2.2 Calculation of Parking Requirements

a) Development Generally

The minimum number of parking spaces to be provided for a particular development is to be calculated in accordance with Appendix A of this policy.

Appendix A

Car Parking Requirements for Specific Land Uses

LAND USE	PARKING	COMMENTS
Industry	1 space per 75m <sup>2</sup> GFA or 1 space per 2 employees <i>WHICHEVER IS THE GREATER</i>	This requirement may increase if retailing is permitted on the site, or the office space component is in excess of 20% of the floor area.

Item	Report												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Requirement</th> <th style="text-align: left;">Compliance</th> </tr> </thead> <tbody> <tr> <td><b>Car parking required</b></td> <td><b>Car parking proposed</b></td> </tr> <tr> <td>The proposed development is a set of industrial units.</td> <td>66 spaces are proposed (including 19 internal spaces, one (1) space in each unit).</td> </tr> <tr> <td>The total GFA is 2801 m<sup>2</sup>.</td> <td>Complies and exceeds by 28 spaces</td> </tr> <tr> <td>2801 / 75 = 37.3, say <b>38 spaces</b></td> <td></td> </tr> <tr> <td>The exact use of each unit and hence the number of employees are not yet known, therefore the alternative parking requirement based on the number of employees cannot be calculated.</td> <td>However, the proposed car parking provision of 66 spaces would allow for 132 employees. This equates to 7 employees per unit on average, which is considered to be unrealistically high for the proposed type of the development and the proposed unit sizes.</td> </tr> </tbody> </table>	Requirement	Compliance	<b>Car parking required</b>	<b>Car parking proposed</b>	The proposed development is a set of industrial units.	66 spaces are proposed (including 19 internal spaces, one (1) space in each unit).	The total GFA is 2801 m <sup>2</sup> .	Complies and exceeds by 28 spaces	2801 / 75 = 37.3, say <b>38 spaces</b>		The exact use of each unit and hence the number of employees are not yet known, therefore the alternative parking requirement based on the number of employees cannot be calculated.	However, the proposed car parking provision of 66 spaces would allow for 132 employees. This equates to 7 employees per unit on average, which is considered to be unrealistically high for the proposed type of the development and the proposed unit sizes.
Requirement	Compliance												
<b>Car parking required</b>	<b>Car parking proposed</b>												
The proposed development is a set of industrial units.	66 spaces are proposed (including 19 internal spaces, one (1) space in each unit).												
The total GFA is 2801 m <sup>2</sup> .	Complies and exceeds by 28 spaces												
2801 / 75 = 37.3, say <b>38 spaces</b>													
The exact use of each unit and hence the number of employees are not yet known, therefore the alternative parking requirement based on the number of employees cannot be calculated.	However, the proposed car parking provision of 66 spaces would allow for 132 employees. This equates to 7 employees per unit on average, which is considered to be unrealistically high for the proposed type of the development and the proposed unit sizes.												
b) Mixed Uses	<p>The proposed design does not show internal offices. The dimensions of offices will be defined by internal fit-out for the owners/lessees of each unit. It is assumed that the offices will occupy less than 20% of each unit.</p> <p>However, even if they occupied, say, 50% of each unit, the required parking provision would be 54 spaces (calculated at 1 space per 40 m<sup>2</sup> for office space). The proposed car parking provision is still greater than the DCP requirement for such a scenario.</p>												
c) Calculation of Numbers	Refer to the calculations above												
Where the calculation results in a fraction of a space, the total number of parking spaces required will be the next highest whole number.													
d) Change of Use	Not applicable												
e) Renovation of Existing Buildings	Not applicable												
f) Extensions/Additions to Existing Development	Not applicable												
g) Small Scale Additions	Not applicable												
h) Complementary Parking Facilities	Not applicable However, parking accumulation surveys showed substantial on street parking availability near the site.												
<b>3. GUIDELINES FOR THE DESIGN, LAYOUT AND CONSTRUCTION OF ACCESS AND PARKING AREAS</b>													
The dimensional requirements for on-site car parking spaces and driveways giving access to parking spaces shall generally be as set out in accordance with the Australian Standard AS2890.1-1993 Parking Facilities – Off-Street Car Parking, and summarised below.	The proposed design complies with the current Standards AS/NZS 2890.1:2004, AS 2890.2:2018 and AS/NZS 2890.6:2009												
<b>3.1 Access To The Site</b>	<b>Complies</b>												
A development should be designed to provide adequate on-site manoeuvring and circulating areas to ensure that all vehicles can enter and leave the site in a forward direction.	The design utilises the exiting previously approved access locations.												
<b>3.2 Sight Distances</b>	<b>Complies</b>												
Consideration must be given to maintaining adequate sight distances for all access driveways. Any vehicle entering or leaving the													



Item	Report	
	Requirement	Compliance
	<p>driveway must be visible to approaching vehicles and pedestrians. AS 2890.1 Off Street Car Parking gives minimal and desirable sight distances for a range of road frontage speeds.</p>	
	<p>3.3 Entrance / Exit to the Site</p>	
	<ul style="list-style-type: none"> <li>• separate entrance and exit driveways should be provided for developments requiring more than 50 car parking spaces or where the development generates a high turnover of traffic such as a service station or other drive- in retail facilities;</li> </ul>	Complies
	<ul style="list-style-type: none"> <li>• entry and exit driveways shall be clearly signposted;</li> </ul>	Capable of compliance at the Construction Certificate Stage
	<ul style="list-style-type: none"> <li>• the number of access points from a development site to any one street frontage should be limited to one ingress and one egress; and</li> </ul>	Complies
	<ul style="list-style-type: none"> <li>• the potential for on-street queuing should be minimised by ensuring that adequate standing areas are available for vehicles entering the car park and loading areas.</li> </ul>	Complies
	<p>3.4 Location of Parking Areas</p> <p>Parking facilities for visitors and customers shall be provided where clearly visible from the street so their use is encouraged.</p>	A common employee/visitor car parking area is proposed. If required, allocation of parking spaces can be detailed at the Construction Certificate Stage
	<p>3.5 Parking Space and Aisle Dimensions</p>	The proposed design complies with the current Standards AS/NZS 2890.1:2004, AS 2890.2:2018 and AS/NZS 2890.6:2009
<p>4. LOADING/UNLOADING REQUIREMENTS</p>		
	<p>4.2 Number and Size of Loading Bays</p> <p>The number and dimensions of the on-site loading bays must be designed having regard to the nature and scale of the proposed development, the estimated frequency of deliveries, the type of delivery vehicle likely to be involved and the types of goods being loaded/unloaded. Accordingly, these details are required to be submitted with the Development Application for Council's consideration.</p> <p>As a guide, for small and medium-sized shops or commercial premises, restaurants or small-scale industrial development likely to involve the use of vans, utilities or small trucks only, one loading bay will usually be sufficient.</p>	<p>The proposed units are small (each with GFA between 123 m<sup>2</sup> and 255 m<sup>2</sup>). It is expected that they will be serviced by vans, utilities or small trucks only. Each unit is provided with a roller door access and the internal area suitable for parking of vans, utilities or small trucks.</p> <p>Also, the excess car parking spaces can be used by vans and utilities.</p> <p>An area in front of units 12 and 13 can be used for loading/unloading of vehicles up to the size of a Heavy Rigid Vehicle (12.5 m long as per AS 2890.2:2018). Such deliveries are expected to be rare and can be managed between the unit operators.</p>
<p>5. CAR PARKING FOR PERSONS WITH A DISABILITY</p>		
	<p>Special parking spaces for persons with a disability are to be made available in the provision of car parking facilities, in accordance with Australian Standard AS2890.1 – 1993. In general, where 10 or more vehicle spaces are required, one designated parking space for people with disabilities is required per 100 (or part thereof) car spaces provided.</p>	<p>The proposed design incorporates one (1) space, compliant with AS/NZS 2890.6:2009.</p> <p>Complies</p>
<p>6. BICYCLE PARKING</p> <p>Provision is to be made for cyclists via the</p>		
		<p>10 bicycle spaces are proposed, compliant with the current Standard (AS/NZS 2890.3:2015).</p>

Item	Report	
	Requirement	Compliance
	installation of bicycle parking facilities in accordance with Australian Standard AS 2890.3-1993 – Bicycle Parking Facilities and Austroads Guide to Traffic Engineering, Part 14.	Complies
	7. MAJOR TRAFFIC GENERATING DEVELOPMENT	Not applicable

Item	Report
	<p><b>Traffic impacts of the facility operation</b></p>
<p><b>Traffic generation</b></p>	<ul style="list-style-type: none"> <li>• <b>Base traffic generation rates</b> <ul style="list-style-type: none"> <li>◦ Based on RMS (2002) Guide to Traffic Generating Developments (as amended in TD 2013/04a)</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Traffic generated by the proposed development</b> <ul style="list-style-type: none"> <li>◦ Industrial development           <ul style="list-style-type: none"> <li>▪ Total GFA is 2801 m<sup>2</sup></li> <li>▪ Morning weekday peak hour vehicle trip rate: 0.7 per 100 m<sup>2</sup> GFA  <math>0.7 \times 2801 / 100 = 19.6</math> say <b>20 trips per hour</b></li> <li>▪ Afternoon weekday peak hour vehicle trip rate: 0.78 per 100 m<sup>2</sup> GFA  <math>0.78 \times 2801 / 100 = 21.84</math> say <b>22 trips per hour</b></li> </ul> </li> </ul> </li> </ul>
<p><b>Traffic distribution</b></p>	<ul style="list-style-type: none"> <li>◦ Trip distribution is based on the analysis of the existing traffic distribution at the entry/exit intersections for the area where the site located.           <ul style="list-style-type: none"> <li>▪ Morning peak hour vehicle trips               <ul style="list-style-type: none"> <li>• <b>20 trips per hour</b> <ul style="list-style-type: none"> <li>◦ <math>19.6 \times 0.7 = 13.7 = 14</math> trips in</li> <li>◦ <math>19.6 \times 0.3 = 5.9 = 6</math> trips out</li> </ul> </li> </ul> </li> <li>▪ Afternoon peak hour vehicle trips               <ul style="list-style-type: none"> <li>• <b>22 trips per hour</b> <ul style="list-style-type: none"> <li>◦ <math>21.84 \times 0.32 = 6.98 = 7</math> trips in</li> <li>◦ <math>21.84 \times 0.68 = 14.9 = 15</math> trips out</li> </ul> </li> </ul> </li> </ul> </li> <li>• The results are shown in <b>Figures 7 and 8.</b></li> </ul>



Figure 7. Distribution of additional traffic volumes during the morning peak hour.



Figure 8. Distribution of additional traffic volumes during the afternoon peak hour.



**Impacts on intersection operation**

- **SIDRA modelling**
  - The operation of the street network under additional traffic loading was modelled using the SIDRA network software.
    - **Table 2** contains a summary of the SIDRA modelling results
  - The modelling results show comparison of the existing situation with that after the proposed development. The results indicate the following:
    - The existing LoS at the Thornton Rd / Huntingdale Dr intersection (LoS B in the morning and LoS D in the afternoon commuter peak hours) will remain the same, with insignificant changes to the average delays and queuing.
    - The existing LoS at the Thornton Rd / Glenwood Dr intersection (LoS B in the morning and in the afternoon commuter peak hours) will remain the same, with insignificant or no changes to the average delays and queuing.

**Conclusion**

- Additional traffic generation will have no detrimental impacts on the existing road network operation nor on road safety.

**Table 2. SIDRA modelling results.**

Intersection	Existing									
	AM Peak					PM Peak				
	AVD	LOS	DS	Queue, m	Movement	AVD	LOS	DS	Queue, m	Movement
Thornton Rd/Huntingdale Dr	15.4	B	0.09	2.6	HDr WB R	43.4	D	0.83	27.7	HDr WB R
Thornton Rd/Glenwood Dr	16.3	B	0.34	18.4	GDr WB U	16.3	B	0.34	18.4	GDr WB U

Intersection	After development									
	AM Peak					PM Peak				
	AVD	LOS	DS	Queue, m	Movement	AVD	LOS	DS	Queue, m	Movement
Thornton Rd/Huntingdale Dr	15.5	B	0.10	2.6	HDr WB R	43.5	D	0.85	29.8	HDr WB R
Thornton Rd/Glenwood Dr	16.3	B	0.35	18.9	GDr WB U	16.3	B	0.35	18.9	GDr WB U

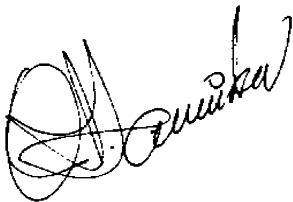
TRd	Thornton Rd	EB	Eastbound
HDr	Huntingdale Dr	WB	Westbound
GDr	Glenwood Dr	NB	Northbound
ND	New development	SB	Southbound
		T	Through movement
		U	U turn
		R	Right hand turn
		I	Left hand turn

Level of service criteria for intersections			
Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays; Roundabouts require other control mode	At capacity, requires other control mode

Source: RTA (2002) Guide to Traffic Generating Developments

**Conclusions**

- Proposed parking provision
  - Complies with and exceeds Council's Development Control Plan requirements.
- Traffic impacts
  - The additional traffic from the proposed development will have no negative impacts on the road network operation.
- Design of access, car parking and servicing facilities
  - Complies with the relevant Standards
- The proposed development is supportable on traffic and parking grounds.



Director  
MEngSc (Traffic Engineering)  
MIEAust, PEng  
FAITPM



**References:**

Maitland Development Control Plan 2011

RMS (2002) Guide to Traffic Generating Developments

AS/NZS 2890.1:2004: Parking Facilities – Off-street car parking

AS 2890.2-2002: Parking Facilities – Off-street commercial vehicle facilities

AS 2890.3:2015: Parking Facilities – Bicycle parking

AS/NZS 2890.6:2009: Parking Facilities – Off-street parking for people with disabilities

## **Appendix**

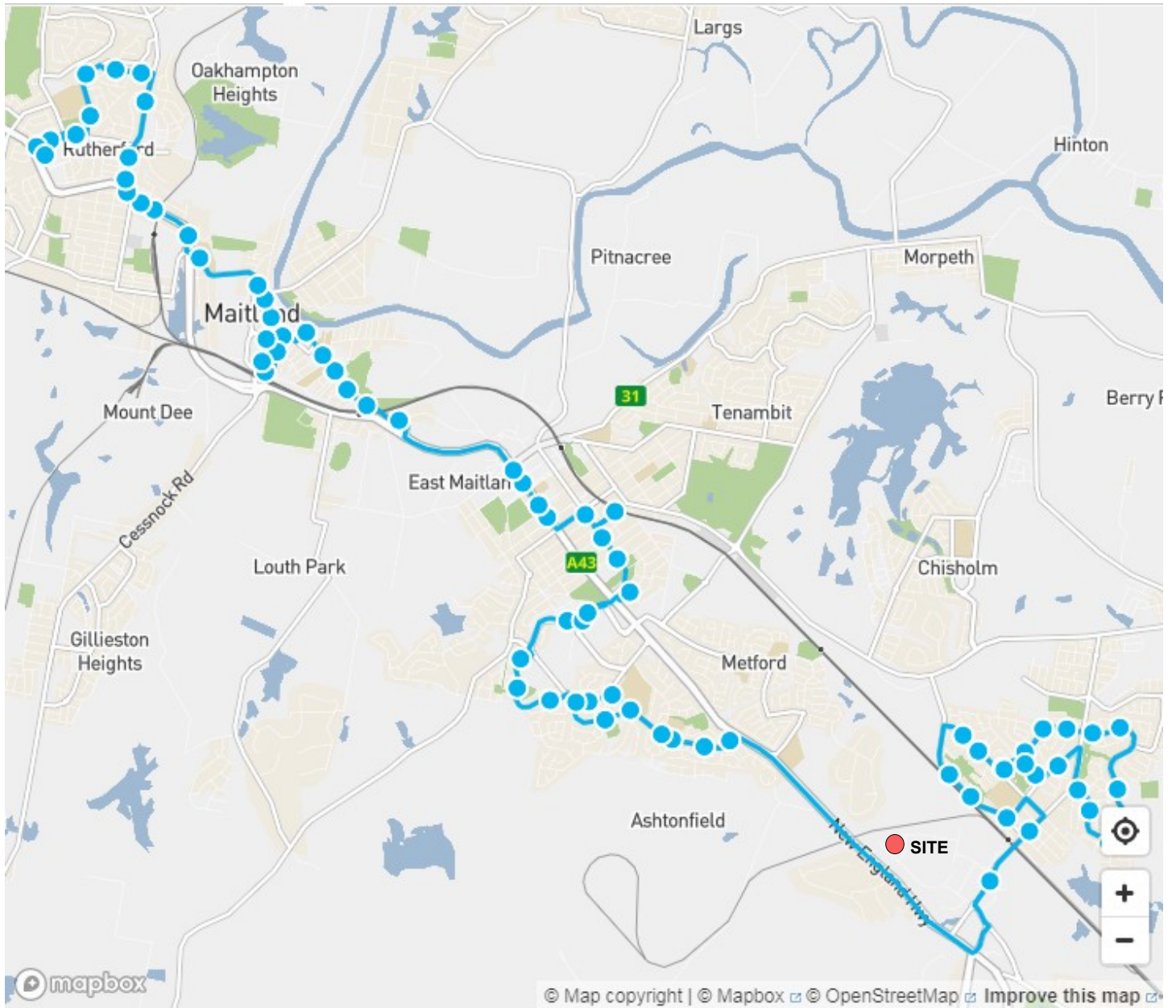
**Public transport routes**

**Results of SIDRA modelling**

**Reduced copy of the architect's drawings**

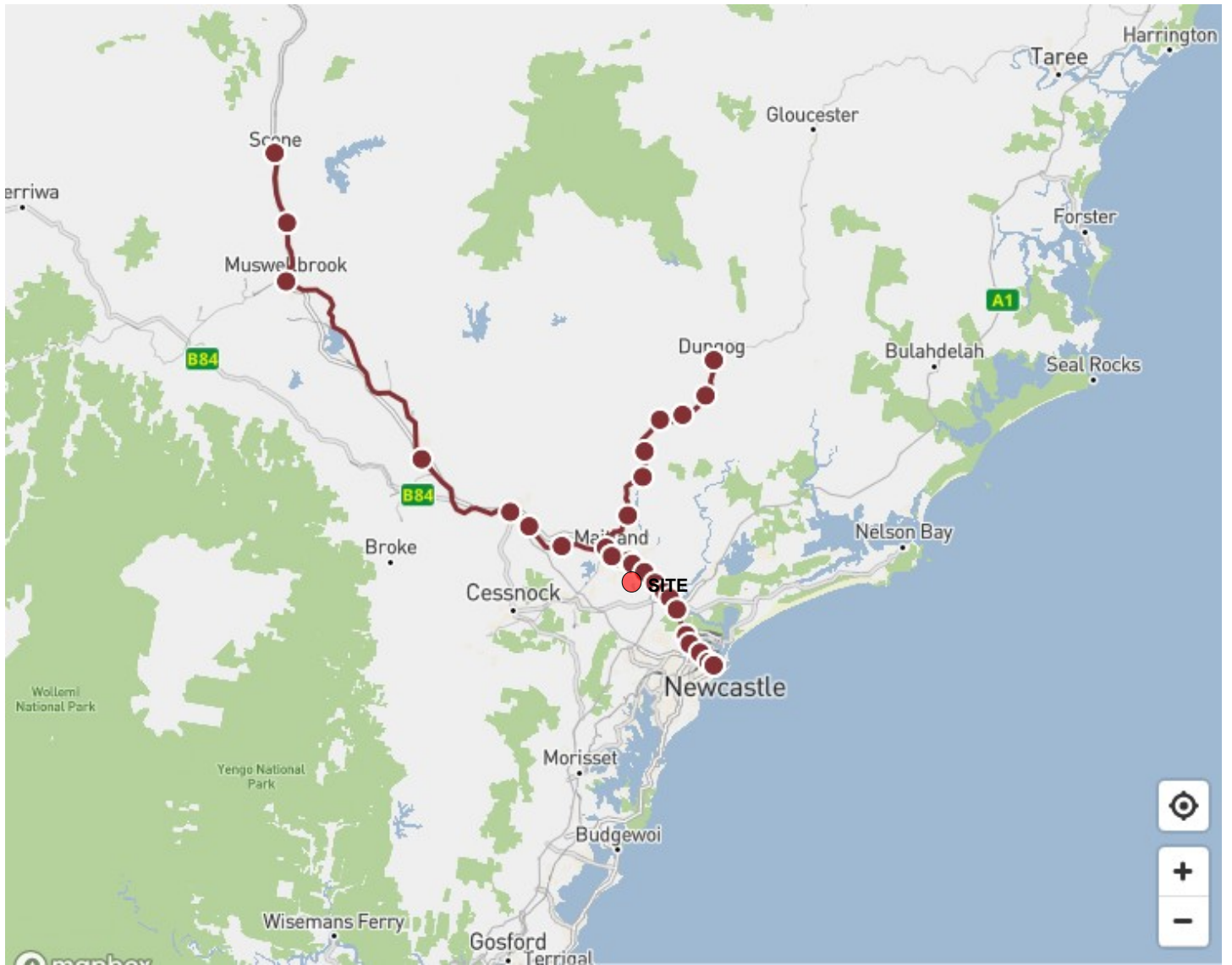
**Design checks and proposed vehicle turning diagrams**

# Bus Route 182





# Train Route Hunter line



# SITE LAYOUT

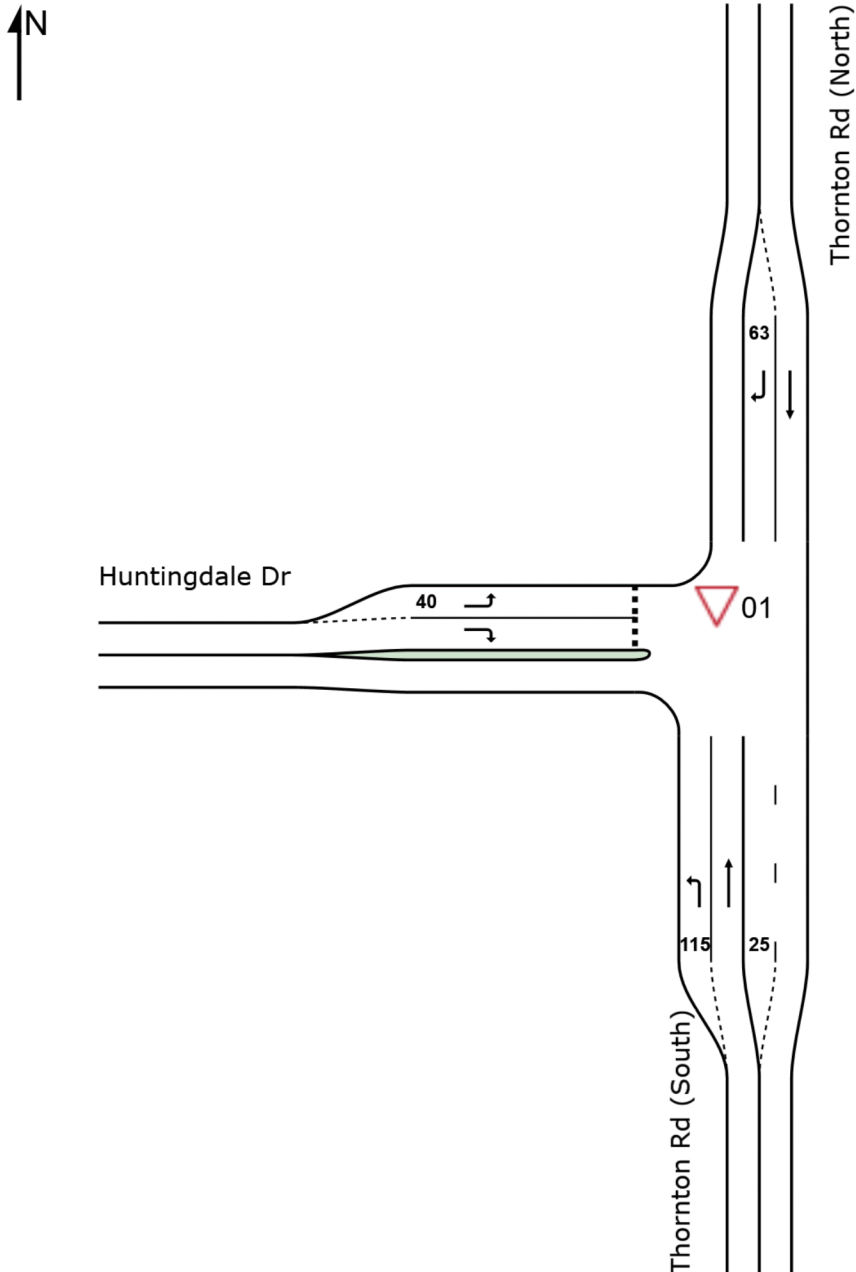
▽ Site: 01 [01 Thornton Rd/Huntingdale Dr AM Ex]

21133

01 Thornton Rd/Huntingdale Dr AM Ex

Site Category: (None)

Giveaway / Yield (Two-Way)



# MOVEMENT SUMMARY

Site: 01 [01 Thornton Rd/Huntingdale Dr AM Ex]

21133

01 Thornton Rd/Huntingdale Dr AM Ex

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
South: Thornton Rd (South)												
1	L2	205	4.1	0.114	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.6
2	T1	480	10.5	0.263	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		685	8.6	0.263	1.7	NA	0.0	0.0	0.00	0.17	0.00	57.6
North: Thornton Rd (North)												
8	T1	1107	4.7	0.590	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	135	3.9	0.218	10.4	LOS A	0.9	6.2	0.62	0.85	0.63	49.2
Approach		1242	4.6	0.590	1.2	NA	0.9	6.2	0.07	0.09	0.07	58.4
West: Huntingdale Dr												
10	L2	44	33.3	0.074	9.7	LOS A	0.3	2.3	0.52	0.75	0.52	49.0
12	R2	31	13.8	0.094	15.4	LOS B	0.3	2.6	0.70	0.88	0.70	44.7
Approach		75	25.4	0.094	12.0	LOS A	0.3	2.6	0.60	0.80	0.60	47.3
All Vehicles		2002	6.7	0.590	1.8	NA	0.9	6.2	0.06	0.15	0.06	57.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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# MOVEMENT SUMMARY

Site: 01 [01 Thornton Rd/Huntingdale Dr AM Fu]

21133

01 Thornton Rd/Huntingdale Dr AM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	205	4.1	0.114	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.6
2	T1	480	10.5	0.263	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		685	8.6	0.263	1.7	NA	0.0	0.0	0.00	0.17	0.00	57.6
North: Thornton Rd (North)												
8	T1	1107	4.7	0.590	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
9	R2	140	3.8	0.226	10.5	LOS A	0.9	6.5	0.62	0.85	0.64	49.2
Approach		1247	4.6	0.590	1.3	NA	0.9	6.5	0.07	0.10	0.07	58.3
West: Huntingdale Dr												
10	L2	45	32.6	0.076	9.7	LOS A	0.3	2.3	0.52	0.75	0.52	49.1
12	R2	31	13.8	0.095	15.5	LOS B	0.3	2.6	0.71	0.88	0.71	44.7
Approach		76	25.0	0.095	12.0	LOS A	0.3	2.6	0.60	0.80	0.60	47.3
All Vehicles		2008	6.7	0.590	1.8	NA	0.9	6.5	0.07	0.15	0.07	57.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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# MOVEMENT SUMMARY

Site: 01 [01 Thornton Rd/Huntingdale Dr PM Ex]

21133

01 Thornton Rd/Huntingdale Dr PM Ex

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	27	3.8	0.015	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.6
2	T1	1215	1.8	0.630	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1242	1.9	0.630	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Thornton Rd (North)												
8	T1	740	7.0	0.400	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	48	10.9	0.316	33.0	LOS C	1.0	7.9	0.92	1.00	1.06	37.1
Approach		788	7.2	0.400	2.1	NA	1.0	7.9	0.06	0.06	0.06	57.7
West: Huntingdale Dr												
10	L2	214	2.0	0.825	32.2	LOS C	3.9	27.7	0.96	1.28	2.25	37.7
12	R2	140	2.3	0.701	43.4	LOS D	3.4	24.6	0.96	1.17	1.71	32.2
Approach		354	2.1	0.825	36.6	LOS C	3.9	27.7	0.96	1.24	2.04	35.5
All Vehicles		2384	3.7	0.825	6.2	NA	3.9	27.7	0.16	0.21	0.32	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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# MOVEMENT SUMMARY

Site: 01 [01 Thornton Rd/Huntingdale Dr PM Fu]

21133

01 Thornton Rd/Huntingdale Dr PM Fu

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	27	3.8	0.015	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.6
2	T1	1215	1.8	0.630	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1242	1.9	0.630	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Thornton Rd (North)												
8	T1	740	7.0	0.400	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	49	10.6	0.322	33.1	LOS C	1.0	8.0	0.92	1.00	1.06	37.1
Approach		789	7.2	0.400	2.1	NA	1.0	8.0	0.06	0.06	0.07	57.6
West: Huntingdale Dr												
10	L2	219	1.9	0.845	33.9	LOS C	4.2	29.8	0.96	1.32	2.41	37.1
12	R2	140	2.3	0.702	43.5	LOS D	3.5	24.6	0.96	1.17	1.71	32.2
Approach		359	2.1	0.845	37.6	LOS C	4.2	29.8	0.96	1.26	2.13	35.1
All Vehicles		2391	3.7	0.845	6.5	NA	4.2	29.8	0.16	0.22	0.34	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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# SITE LAYOUT

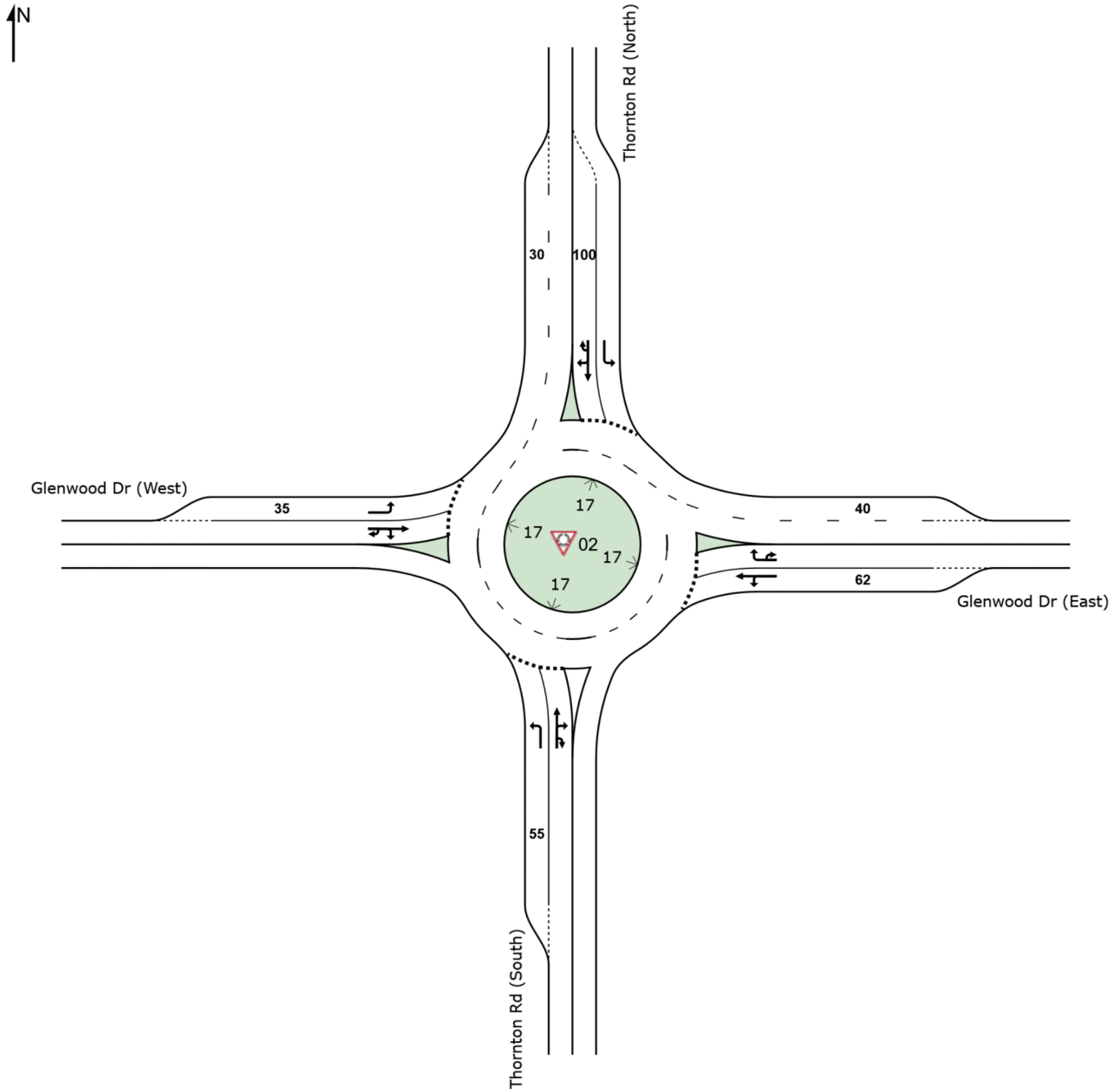
 Site: 02 [02 Thornton Rd / Glenwood Dr AM Ex]

21133

02 Thornton Rd / Glenwood Dr AM Ex

Site Category: (None)

Roundabout



# MOVEMENT SUMMARY

 Site: 02 [02 Thornton Rd / Glenwood Dr AM Ex]

21133  
02 Thornton Rd / Glenwood Dr AM Ex  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	104	12.1	0.171	8.2	LOS A	0.7	5.5	0.64	0.82	0.64	50.7
2	T1	126	9.2	0.245	7.2	LOS A	1.2	8.7	0.65	0.77	0.65	51.6
3	R2	72	10.3	0.245	11.6	LOS B	1.2	8.7	0.65	0.77	0.65	47.5
3u	U	1	0.0	0.245	13.2	LOS B	1.2	8.7	0.65	0.77	0.65	51.6
Approach		303	10.4	0.245	8.6	LOS A	1.2	8.7	0.64	0.79	0.64	50.5
East: Glenwood Dr (East)												
4	L2	66	4.8	0.340	6.0	LOS A	1.9	14.6	0.50	0.61	0.50	49.2
5	T1	243	14.7	0.340	6.3	LOS A	1.9	14.6	0.50	0.61	0.50	52.2
6	R2	532	7.7	0.475	10.2	LOS B	3.2	23.9	0.55	0.71	0.55	48.8
6u	U	9	22.2	0.475	12.6	LOS B	3.2	23.9	0.55	0.71	0.55	43.1
Approach		851	9.7	0.475	8.8	LOS A	3.2	23.9	0.53	0.67	0.53	49.7
North: Thornton Rd (North)												
7	L2	913	5.8	0.821	10.7	LOS B	12.6	92.2	0.91	0.93	1.17	47.0
8	T1	180	0.0	0.357	7.3	LOS A	1.9	13.5	0.59	0.72	0.59	52.3
9	R2	62	5.1	0.357	11.8	LOS B	1.9	13.5	0.59	0.72	0.59	52.8
9u	U	2	0.0	0.357	13.6	LOS B	1.9	13.5	0.59	0.72	0.59	53.9
Approach		1157	4.8	0.821	10.2	LOS B	12.6	92.2	0.84	0.88	1.05	48.2
West: Glenwood Dr (West)												
10	L2	28	22.2	0.070	11.5	LOS B	0.3	2.6	0.68	0.79	0.68	49.2
11	T1	186	42.4	0.337	10.2	LOS B	2.0	18.4	0.76	0.85	0.76	45.1
12	R2	23	9.1	0.337	13.3	LOS B	2.0	18.4	0.76	0.85	0.76	50.3
12u	U	3	33.3	0.337	16.3	LOS B	2.0	18.4	0.76	0.85	0.76	51.3
Approach		241	36.7	0.337	10.7	LOS B	2.0	18.4	0.75	0.85	0.75	46.3
All Vehicles		2552	10.1	0.821	9.6	LOS A	12.6	92.2	0.71	0.80	0.80	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

# MOVEMENT SUMMARY

 Site: 01 [02 Thornton Rd / Glenwood Dr AM Fu]

21133

02 Thornton Rd / Glenwood Dr AM Fu

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	113	11.2	0.179	8.1	LOS A	0.8	5.9	0.64	0.82	0.64	50.9
2	T1	126	9.2	0.245	7.2	LOS A	1.2	8.7	0.65	0.77	0.65	51.6
3	R2	72	10.3	0.245	11.6	LOS B	1.2	8.7	0.65	0.77	0.65	47.5
3u	U	1	0.0	0.245	13.2	LOS B	1.2	8.7	0.65	0.77	0.65	51.6
Approach		312	10.1	0.245	8.5	LOS A	1.2	8.7	0.64	0.79	0.64	50.5
East: Glenwood Dr (East)												
4	L2	66	4.8	0.341	6.1	LOS A	1.9	14.7	0.51	0.61	0.51	49.2
5	T1	244	14.7	0.341	6.3	LOS A	1.9	14.7	0.51	0.61	0.51	52.2
6	R2	532	7.7	0.476	10.2	LOS B	3.2	23.9	0.55	0.71	0.55	48.7
6u	U	9	22.2	0.476	12.6	LOS B	3.2	23.9	0.55	0.71	0.55	43.0
Approach		852	9.6	0.476	8.8	LOS A	3.2	23.9	0.53	0.67	0.53	49.7
North: Thornton Rd (North)												
7	L2	913	5.8	0.827	11.0	LOS B	12.9	94.8	0.92	0.95	1.20	46.7
8	T1	180	0.0	0.359	7.4	LOS A	1.9	13.6	0.59	0.73	0.59	52.2
9	R2	62	5.1	0.359	11.8	LOS B	1.9	13.6	0.59	0.73	0.59	52.7
9u	U	2	0.0	0.359	13.7	LOS B	1.9	13.6	0.59	0.73	0.59	53.8
Approach		1157	4.8	0.827	10.5	LOS B	12.9	94.8	0.85	0.90	1.07	48.0
West: Glenwood Dr (West)												
10	L2	28	22.2	0.070	11.5	LOS B	0.3	2.6	0.68	0.79	0.68	49.2
11	T1	193	41.0	0.346	10.2	LOS B	2.0	18.9	0.77	0.86	0.77	45.3
12	R2	24	8.7	0.346	13.3	LOS B	2.0	18.9	0.77	0.86	0.77	50.4
12u	U	3	33.3	0.346	16.3	LOS B	2.0	18.9	0.77	0.86	0.77	51.3
Approach		248	35.6	0.346	10.7	LOS B	2.0	18.9	0.76	0.85	0.76	46.4
All Vehicles		2568	10.0	0.827	9.7	LOS A	12.9	94.8	0.71	0.81	0.81	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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Organisation: TEF Consulting | Processed: Tuesday, 28 December 2021 10:50:29 AM

Project: D:\Dropbox\\_\_\_DB current TEF projects\_NR\21133 - 7 Kestrel Avenue, Thornton - Zreicon\21133\_modelling\21133 sidra\21133 - 7 Kestrel Avenue.sip8

# MOVEMENT SUMMARY

 Site: 01 [02 Thornton Rd / Glenwood Dr PM Ex]

21133

02 Thornton Rd / Glenwood Dr PM Ex

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	104	12.1	0.171	8.2	LOS A	0.7	5.5	0.64	0.82	0.64	50.7
2	T1	126	9.2	0.245	7.2	LOS A	1.2	8.7	0.65	0.77	0.65	51.6
3	R2	72	10.3	0.245	11.6	LOS B	1.2	8.7	0.65	0.77	0.65	47.5
3u	U	1	0.0	0.245	13.2	LOS B	1.2	8.7	0.65	0.77	0.65	51.6
Approach		303	10.4	0.245	8.6	LOS A	1.2	8.7	0.64	0.79	0.64	50.5
East: Glenwood Dr (East)												
4	L2	66	4.8	0.340	6.0	LOS A	1.9	14.6	0.50	0.61	0.50	49.2
5	T1	243	14.7	0.340	6.3	LOS A	1.9	14.6	0.50	0.61	0.50	52.2
6	R2	532	7.7	0.475	10.2	LOS B	3.2	23.9	0.55	0.71	0.55	48.8
6u	U	9	22.2	0.475	12.6	LOS B	3.2	23.9	0.55	0.71	0.55	43.1
Approach		851	9.7	0.475	8.8	LOS A	3.2	23.9	0.53	0.67	0.53	49.7
North: Thornton Rd (North)												
7	L2	913	5.8	0.821	10.7	LOS B	12.6	92.2	0.91	0.93	1.17	47.0
8	T1	180	0.0	0.357	7.3	LOS A	1.9	13.5	0.59	0.72	0.59	52.3
9	R2	62	5.1	0.357	11.8	LOS B	1.9	13.5	0.59	0.72	0.59	52.8
9u	U	2	0.0	0.357	13.6	LOS B	1.9	13.5	0.59	0.72	0.59	53.9
Approach		1157	4.8	0.821	10.2	LOS B	12.6	92.2	0.84	0.88	1.05	48.2
West: Glenwood Dr (West)												
10	L2	28	22.2	0.070	11.5	LOS B	0.3	2.6	0.68	0.79	0.68	49.2
11	T1	186	42.4	0.337	10.2	LOS B	2.0	18.4	0.76	0.85	0.76	45.1
12	R2	23	9.1	0.337	13.3	LOS B	2.0	18.4	0.76	0.85	0.76	50.3
12u	U	3	33.3	0.337	16.3	LOS B	2.0	18.4	0.76	0.85	0.76	51.3
Approach		241	36.7	0.337	10.7	LOS B	2.0	18.4	0.75	0.85	0.75	46.3
All Vehicles		2552	10.1	0.821	9.6	LOS A	12.6	92.2	0.71	0.80	0.80	48.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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# MOVEMENT SUMMARY

 Site: 01 [02 Thornton Rd / Glenwood Dr PM Fu]

21133

02 Thornton Rd / Glenwood Dr PM Fu

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Thornton Rd (South)												
1	L2	107	11.8	0.174	8.1	LOS A	0.7	5.7	0.64	0.82	0.64	50.8
2	T1	126	9.2	0.245	7.2	LOS A	1.2	8.7	0.65	0.77	0.65	51.6
3	R2	72	10.3	0.245	11.6	LOS B	1.2	8.7	0.65	0.77	0.65	47.5
3u	U	1	0.0	0.245	13.2	LOS B	1.2	8.7	0.65	0.77	0.65	51.6
Approach		306	10.3	0.245	8.6	LOS A	1.2	8.7	0.64	0.79	0.64	50.5
East: Glenwood Dr (East)												
4	L2	66	4.8	0.341	6.1	LOS A	1.9	14.7	0.51	0.61	0.51	49.2
5	T1	244	14.7	0.341	6.3	LOS A	1.9	14.7	0.51	0.61	0.51	52.2
6	R2	532	7.7	0.476	10.3	LOS B	3.2	23.9	0.55	0.71	0.55	48.7
6u	U	9	22.2	0.476	12.6	LOS B	3.2	23.9	0.55	0.71	0.55	43.0
Approach		852	9.6	0.476	8.8	LOS A	3.2	23.9	0.53	0.67	0.53	49.7
North: Thornton Rd (North)												
7	L2	913	5.8	0.826	11.0	LOS B	12.9	94.4	0.92	0.94	1.20	46.8
8	T1	180	0.0	0.359	7.4	LOS A	1.9	13.6	0.59	0.73	0.59	52.2
9	R2	62	5.1	0.359	11.8	LOS B	1.9	13.6	0.59	0.73	0.59	52.7
9u	U	2	0.0	0.359	13.7	LOS B	1.9	13.6	0.59	0.73	0.59	53.8
Approach		1157	4.8	0.826	10.5	LOS B	12.9	94.4	0.85	0.90	1.07	48.1
West: Glenwood Dr (West)												
10	L2	28	22.2	0.070	11.5	LOS B	0.3	2.6	0.68	0.79	0.68	49.2
11	T1	191	41.4	0.345	10.2	LOS B	2.0	18.9	0.77	0.86	0.77	45.2
12	R2	25	8.3	0.345	13.3	LOS B	2.0	18.9	0.77	0.86	0.77	50.4
12u	U	3	33.3	0.345	16.3	LOS B	2.0	18.9	0.77	0.86	0.77	51.3
Approach		247	35.7	0.345	10.7	LOS B	2.0	18.9	0.76	0.85	0.76	46.4
All Vehicles		2562	10.1	0.826	9.7	LOS A	12.9	94.4	0.71	0.80	0.81	48.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

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

Roundabout Capacity Model: SIDRA Standard.

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

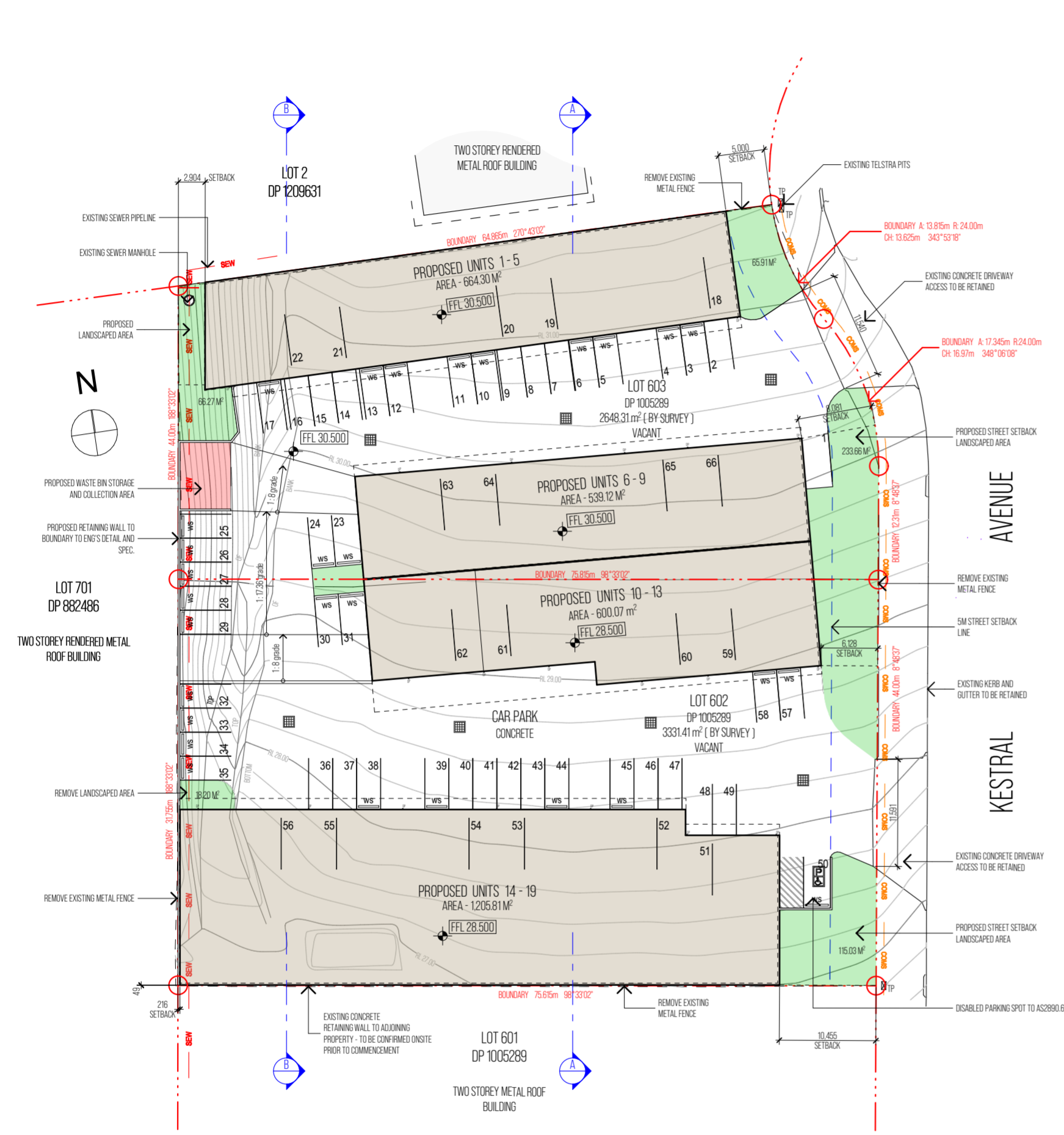
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

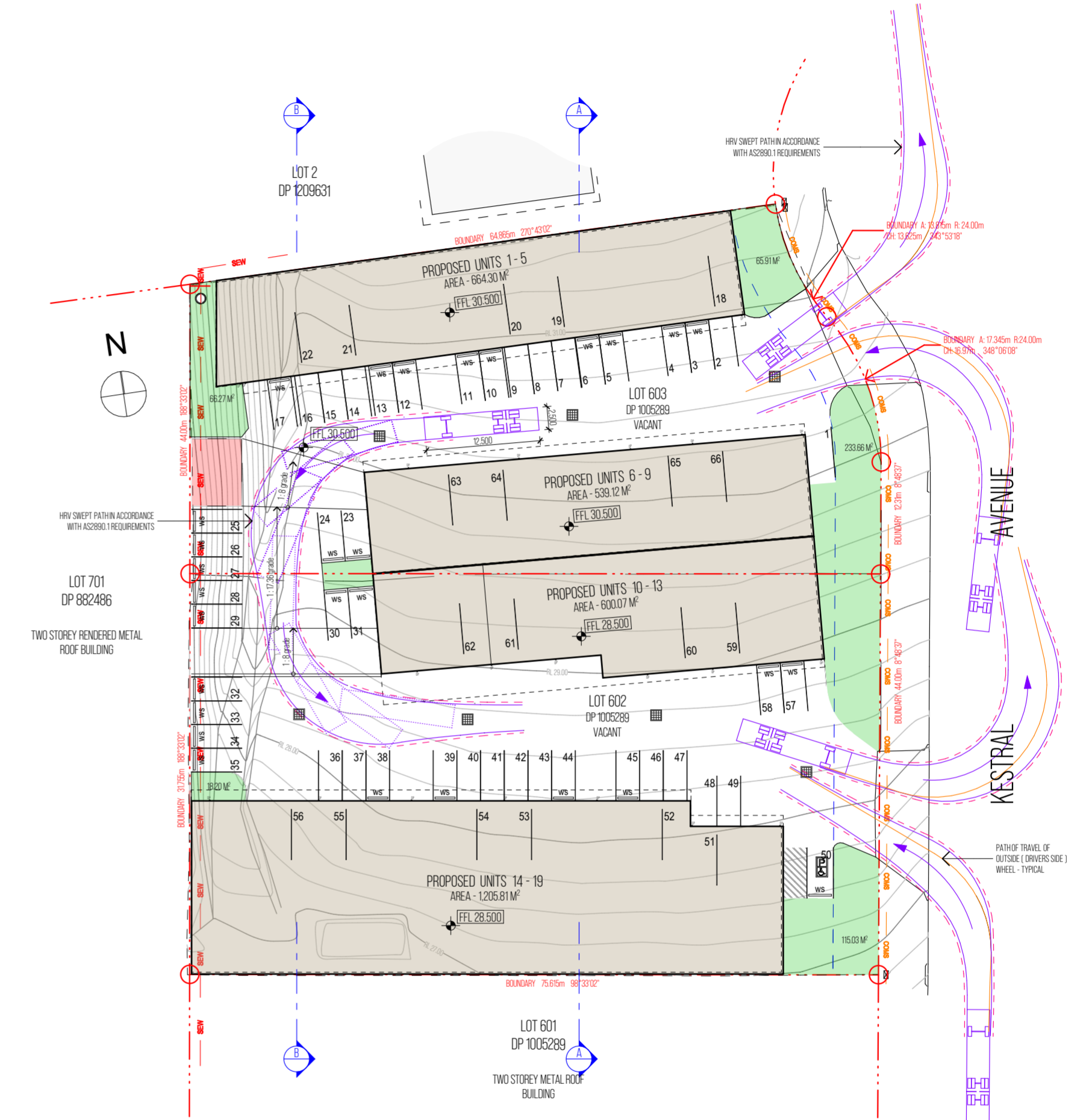
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1 SITE PLAN 1:500



2 CARPARK + HRV VEHICLE PLAN 1:500



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 NOM. ARCHITECT LAURAN TREVENA 10054

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 01 05/09/2021 SCHEMATIC DESIGN - ISSUE A  
 02 11/10/2021 SCHEMATIC DESIGN - ISSUE B

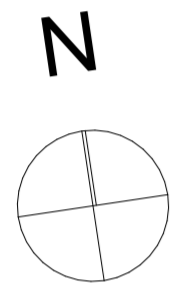
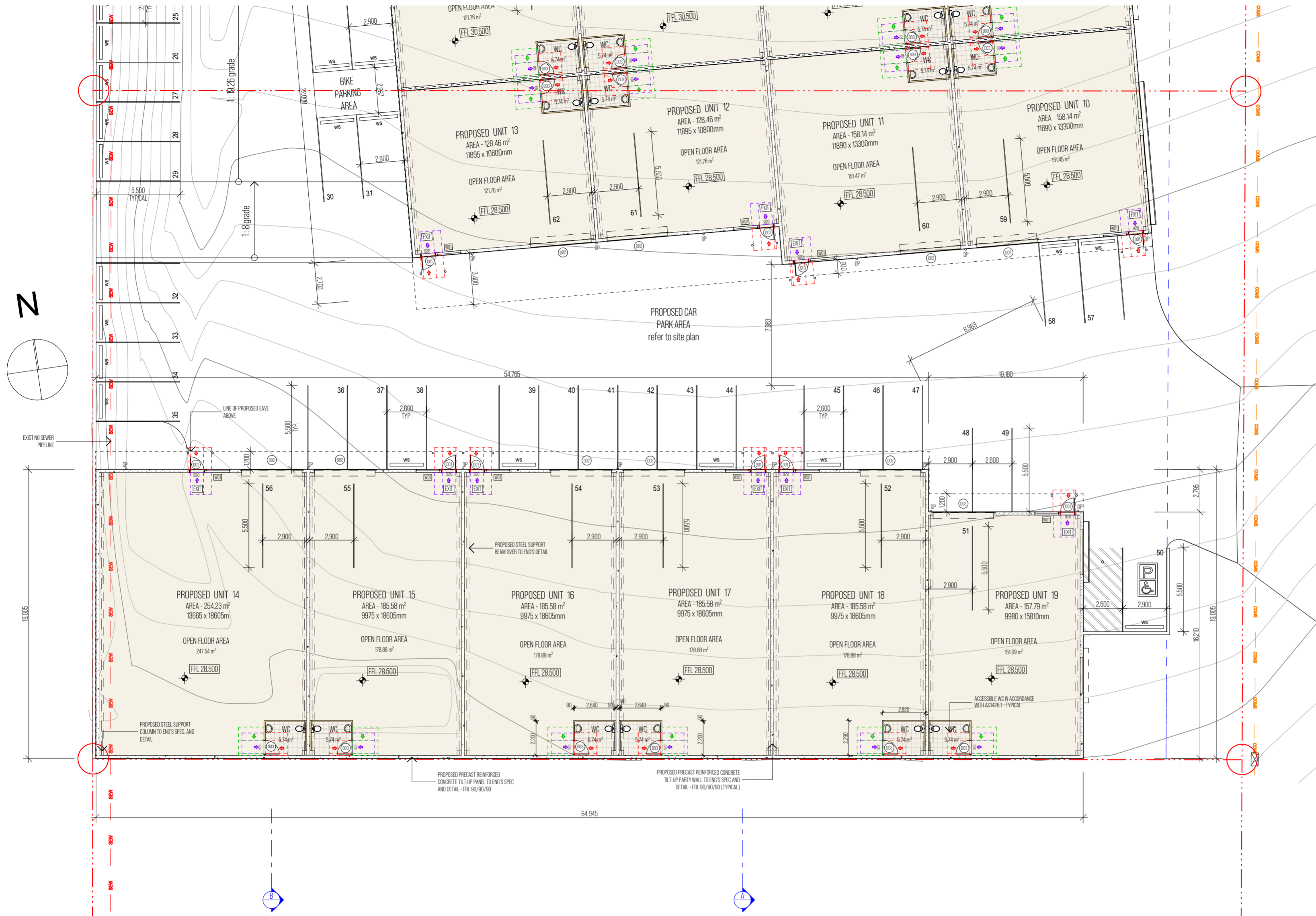
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 LEVANT INVESTMENTS PTY. LTD.  
 LOT 602 & 603 KESTRAL AVE. THORNTON, NSW  
 PROJECT  
 PROPOSED INDUSTRIAL COMPLEX

DRAWING TITLE  
 PROPOSED SITE PLAN + CARPARK PLAN  
 DRAWING STATUS  
 DEVELOPMENT APPLICATION

JOB NUMBER  
 20.21.16  
 LAYOUT NO.  
 A / DA03

SCALE  
 1:500 @ A2  
 DRAWN BY  
 CS  
 REVISED BY  
 LT  
 PRINT DATE  
 12/11/2021





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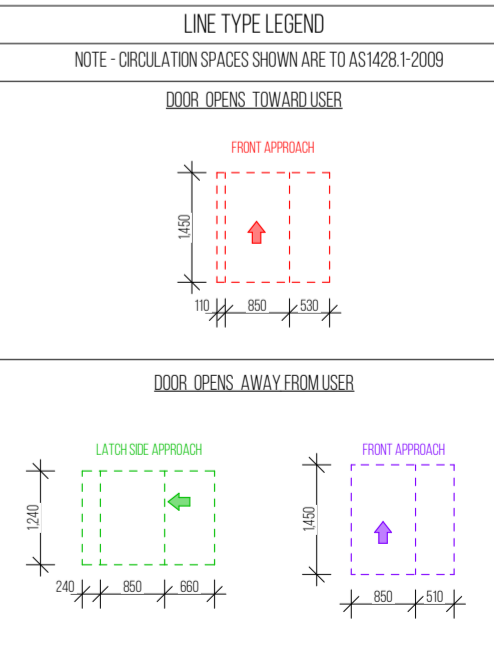
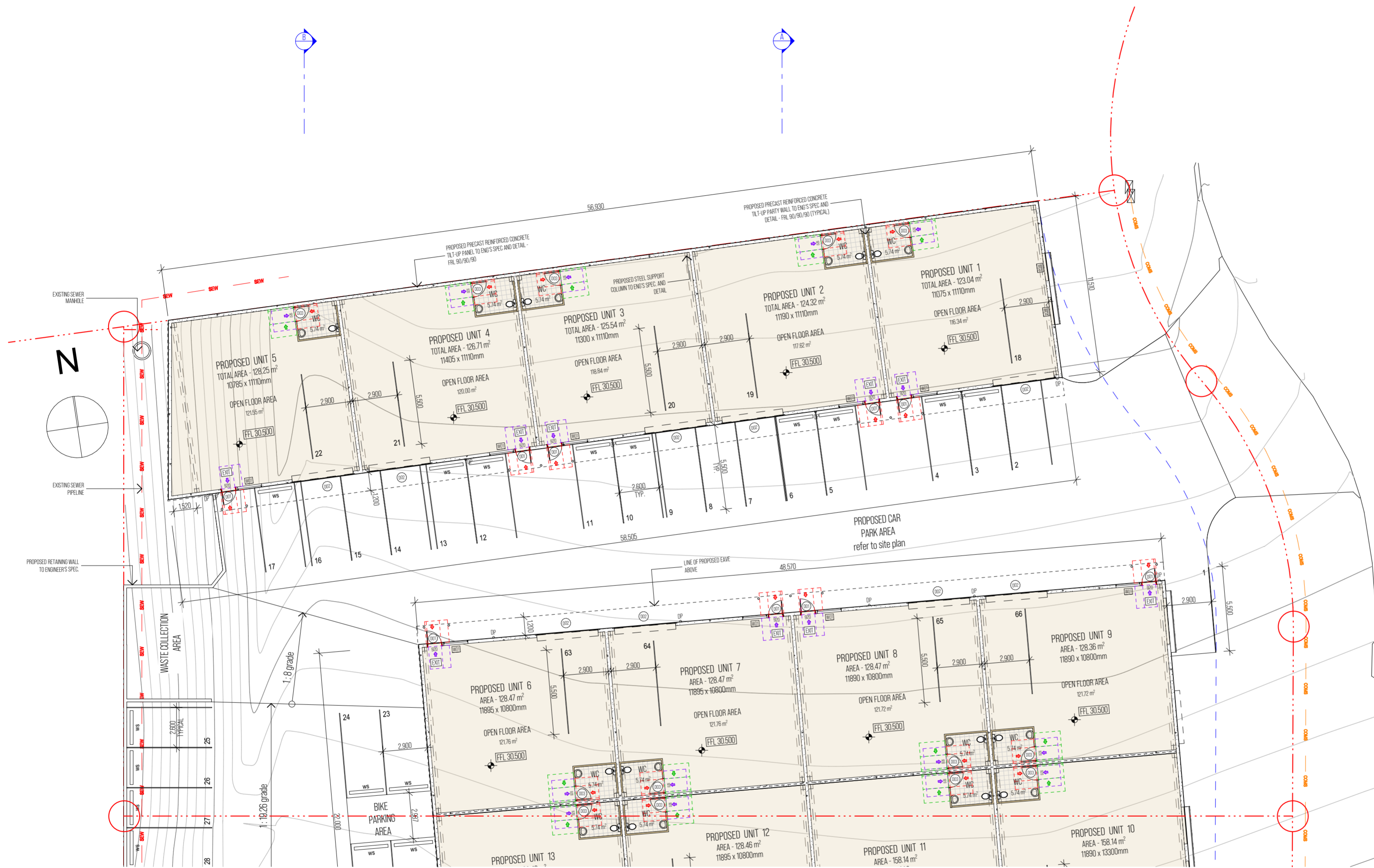
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REV DATE NOTES  
01 05/09/2021 SCHEMATIC DESIGN - ISSUE A  
02 11/10/2021 SCHEMATIC DESIGN - ISSUE B

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LEVANT INVESTMENTS PTY. LTD.  
LOT 602 & 603 KESTRAL AVE. THORNTON, NSW  
PROJECT  
PROPOSED INDUSTRIAL COMPLEX

DRAWING TITLE  
FLOOR PLAN - LOT 602  
DRAWING STATUS  
DEVELOPMENT APPLICATION

JOB NUMBER 20.21.16	DRAWN BY CS	SCALE 1:1, 1:200, 1:100 @ A
LAYOUT NO. A / DA04	REVISED BY LT	PRINT DATE 12/11/2021



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 01 MAY 2021 MOORE ARCHITECTS 2020 - 2021 20/21 01 - 5 KESTRAL AVE THORNTON CADRELS 04 - DEVELOPMENT APPLICATION 2021 01 05 KESTRAL AVENUE, THORNTON NSW

REV DATE NOTES  
 01 06/09/2021 SCHEMATIC DESIGN - ISSUE A  
 02 11/10/2021 SCHEMATIC DESIGN - ISSUE B

CLIENT  
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 LOT 602 & 603 KESTRAL AVE. THORNTON, NSW

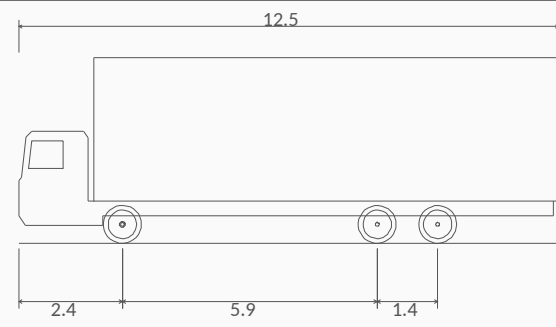
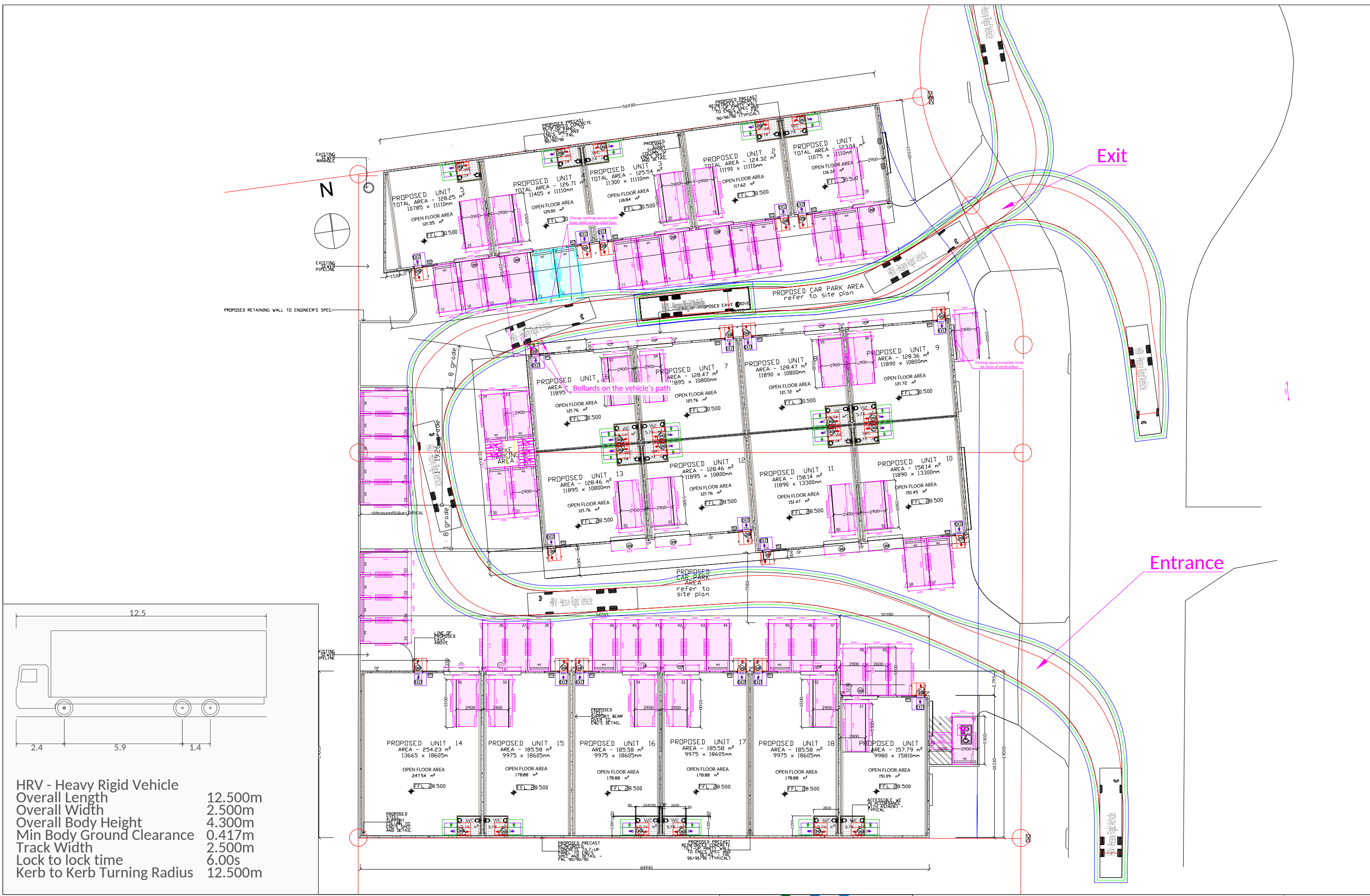
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 PROPOSED INDUSTRIAL COMPLEX

DRAWING TITLE  
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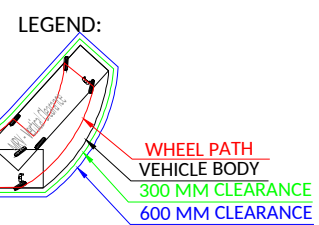
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 DEVELOPMENT APPLICATION

JOB NUMBER 20.21.16	DRAWN BY CS	SCALE 1:200, 1:100 @ A2
LAYOUT NO. A / DA05	REVISED BY LT	PRINT DATE 12/11/2021





HRV - Heavy Rigid Vehicle  
 Overall Length 12.500m  
 Overall Width 2.500m  
 Overall Body Height 4.300m  
 Min Body Ground Clearance 0.417m  
 Track Width 2.500m  
 Lock to lock time 6.00s  
 Kerb to Kerb Turning Radius 12.500m

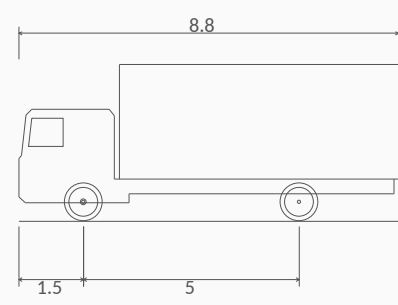
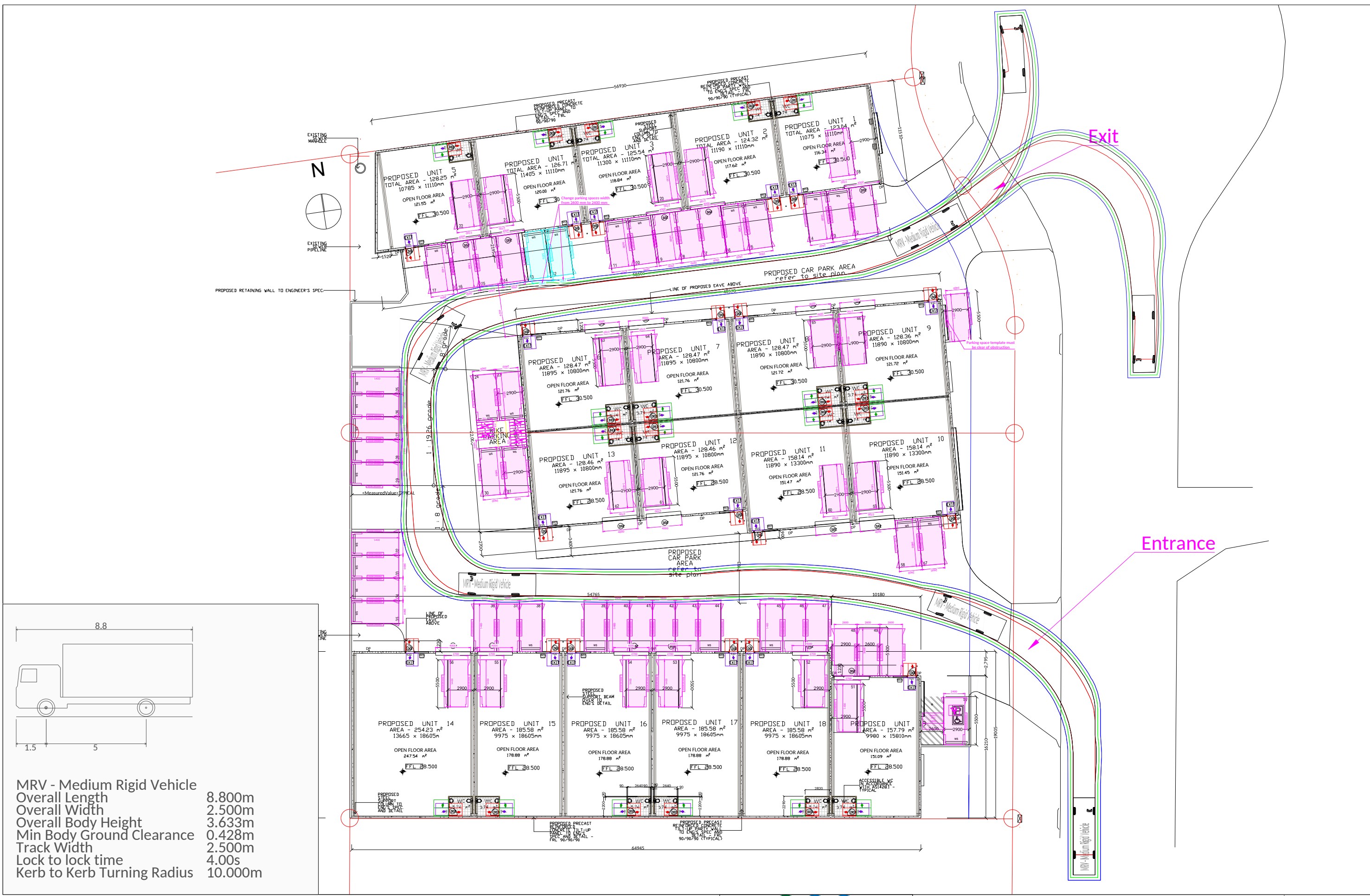


Dwg No 21133/01 | Rev. A | 06/01/2022  
 Client: Zreicon

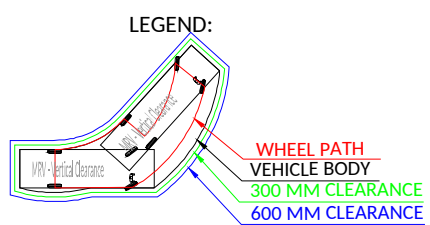
7 Kestrel Avenue, Thornton NSW 2322

Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 HRV - Heavy rigid vehicle

SCALE 1:400@A3



MRV - Medium Rigid Vehicle  
 Overall Length 8.800m  
 Overall Width 2.500m  
 Overall Body Height 3.633m  
 Min Body Ground Clearance 0.428m  
 Track Width 2.500m  
 Lock to lock time 4.00s  
 Kerb to Kerb Turning Radius 10.000m



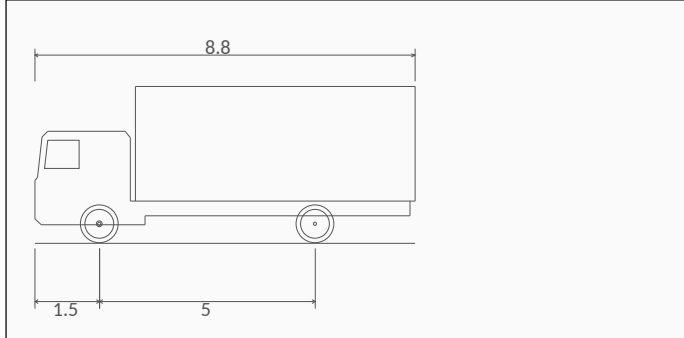
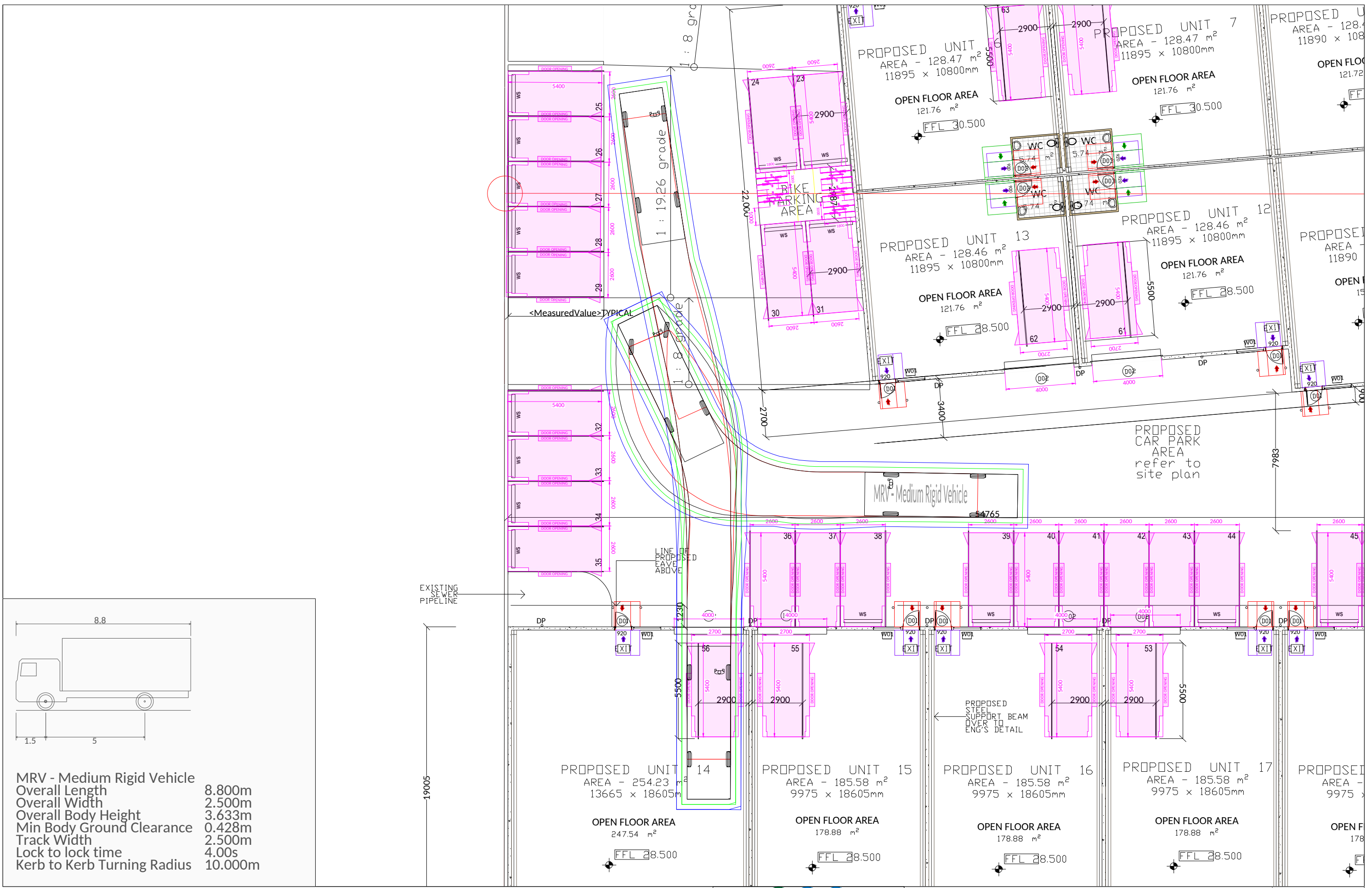
Dwg No 21133/02 | Rev. A | 06/01/2022  
 Client: Zreicon

7 Kestrel Avenue, Thornton NSW 2322

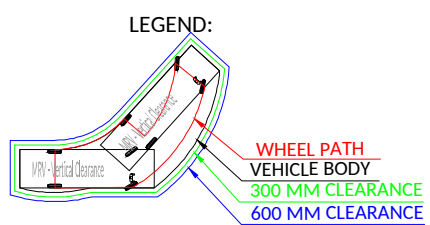
Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 MRV - Medium rigid vehicle

SCALE 1:400@A3

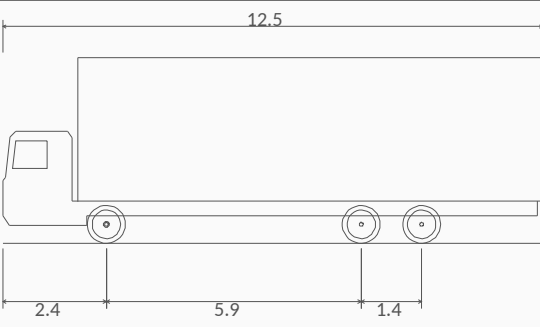
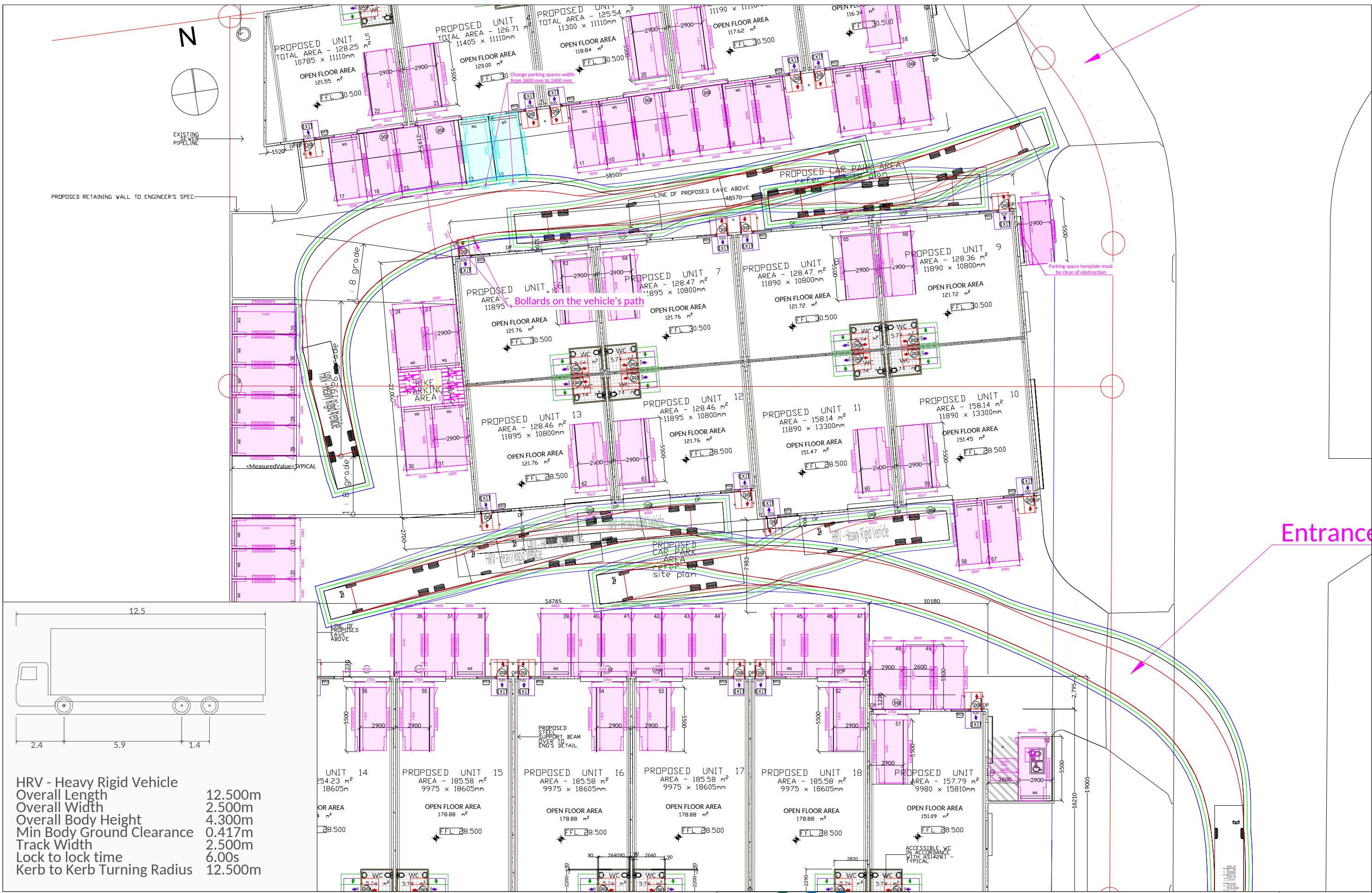




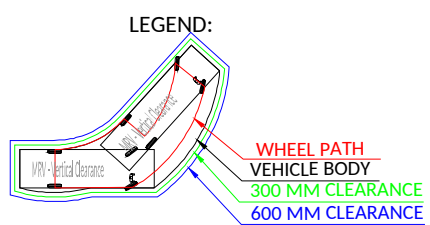
**MRV - Medium Rigid Vehicle**  
 Overall Length 8.800m  
 Overall Width 2.500m  
 Overall Body Height 3.633m  
 Min Body Ground Clearance 0.428m  
 Track Width 2.500m  
 Lock to lock time 4.00s  
 Kerb to Kerb Turning Radius 10.000m



		7 Kestrel Avenue, Thornton NSW 2322	SCALE 1:200@A3
Dwg No 21133/03	Rev. A	06/01/2022	
Client: Zreicon Proposed car park layout Design checks as per AS/NZS 2890 series MRV - Medium rigid vehicle			
PO Box 215 Bondi NSW 2026   ph:+61 (0)2 9332 2024   fax:+61 (0)2 9332 2022   mob:+61 (0)414 978 067   email: o.s@tefconsult.com.au   www.tefconsult.com.au			



HRV - Heavy Rigid Vehicle  
 Overall Length 12.500m  
 Overall Width 2.500m  
 Overall Body Height 4.300m  
 Min Body Ground Clearance 0.417m  
 Track Width 2.500m  
 Lock to lock time 6.00s  
 Kerb to Kerb Turning Radius 12.500m



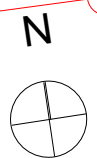
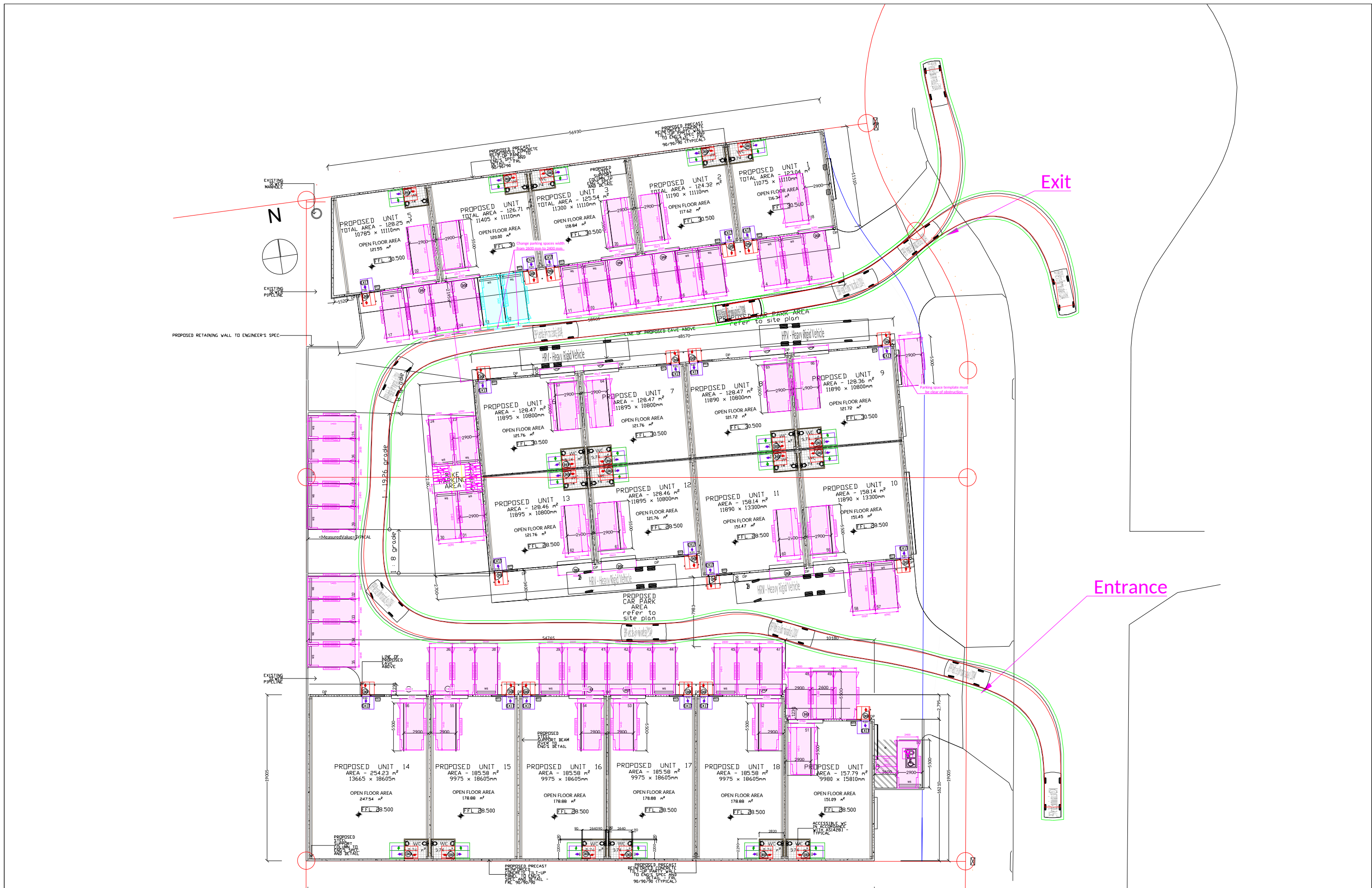
7 Kestrel Avenue, Thornton NSW 2322

SCALE 1:300@A3

Dwg No 21133/04 Rev. A 06/01/2022  
 Client: Zreicon

Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 MRV - Medium rigid vehicle

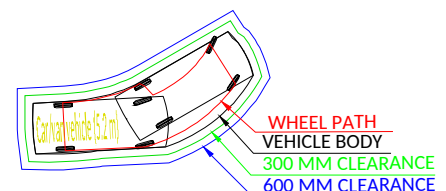




Exit

Entrance

LEGEND:



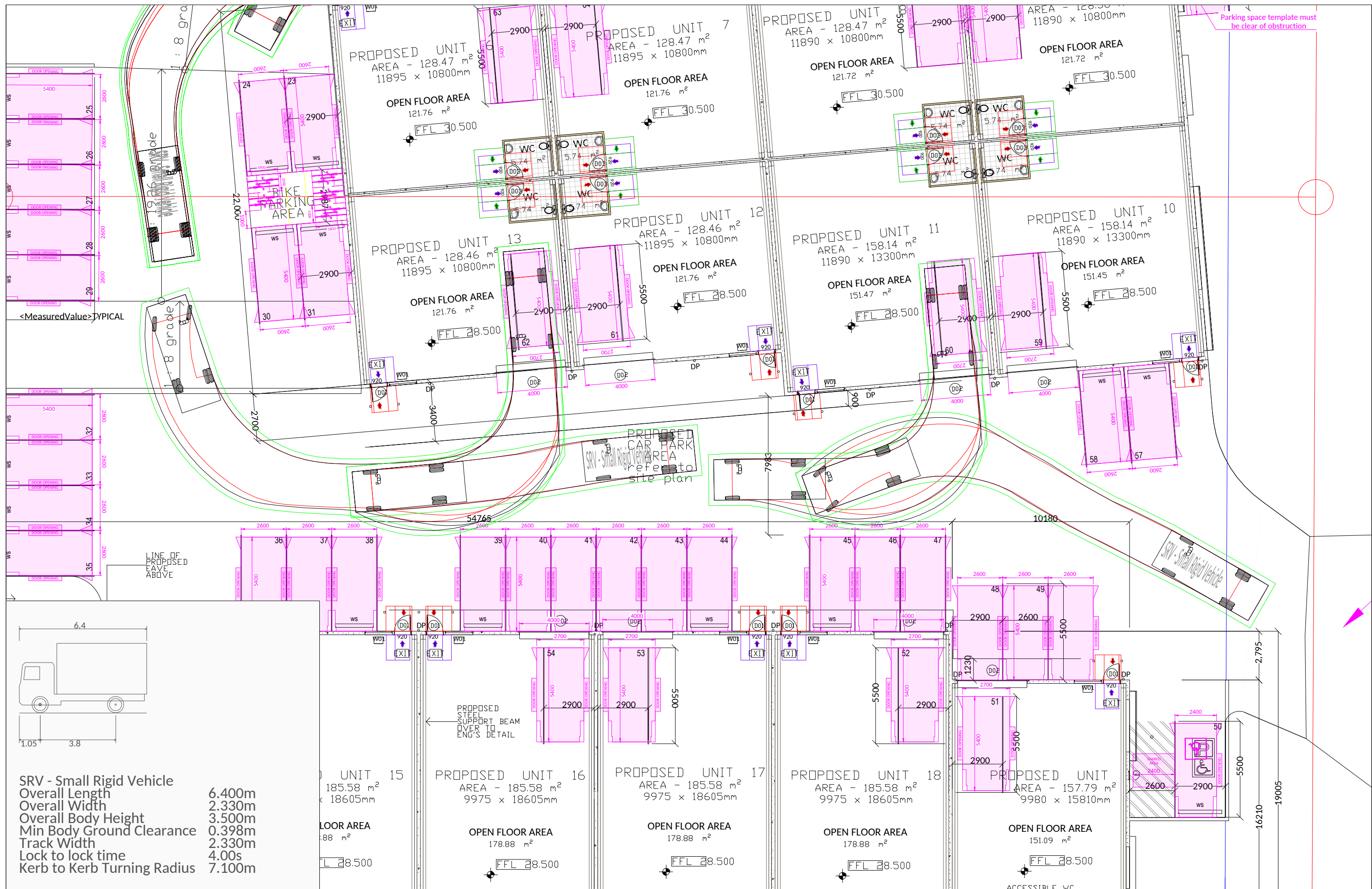
7 Kestrel Avenue, Thornton NSW 2322

SCALE 1:400@A3

Dwg No 21133/05 | Rev. A | 06/01/2022  
 Client: Zreicon

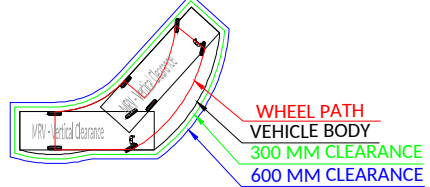
Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 B99 Vehicle





SRV - Small Rigid Vehicle  
 Overall Length 6.400m  
 Overall Width 2.330m  
 Overall Body Height 3.500m  
 Min Body Ground Clearance 0.398m  
 Track Width 2.330m  
 Lock to lock time 4.00s  
 Kerb to Kerb Turning Radius 7.100m

LEGEND:

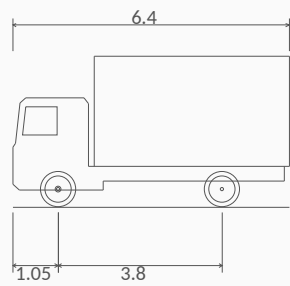
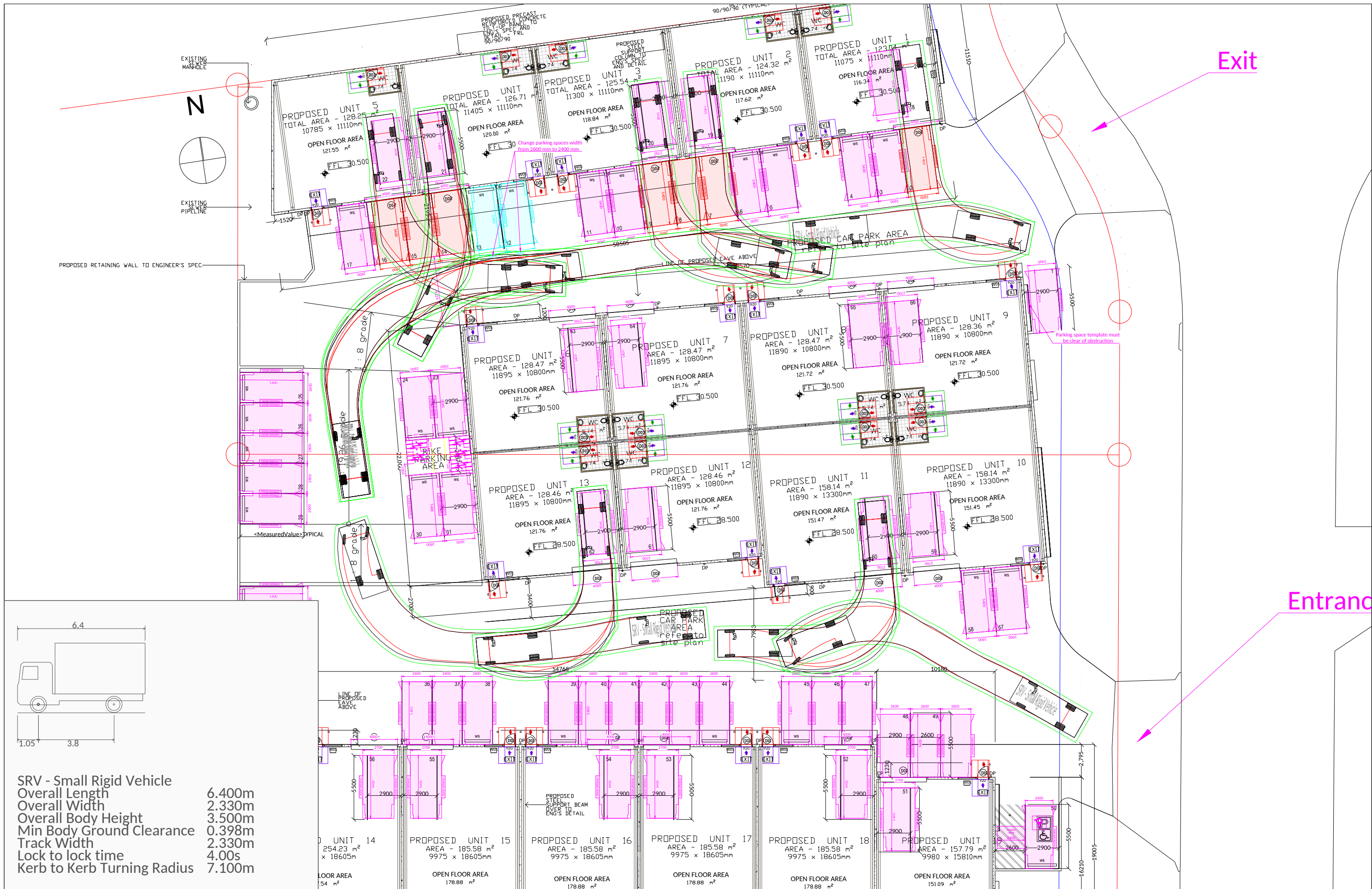


Dwg No 21133/06 | Rev. A | 06/01/2022  
 Client: Zreicon

7 Kestrel Avenue, Thornton NSW 2322

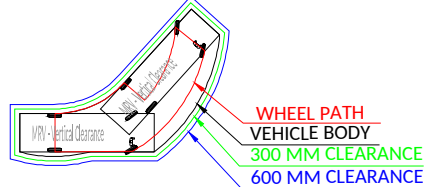
Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 MRV - Medium rigid vehicle

SCALE 1:200@A3



SRV - Small Rigid Vehicle  
 Overall Length 6.400m  
 Overall Width 2.330m  
 Overall Body Height 3.500m  
 Min Body Ground Clearance 0.398m  
 Track Width 2.330m  
 Lock to lock time 4.00s  
 Kerb to Kerb Turning Radius 7.100m

LEGEND:



7 Kestrel Avenue, Thornton NSW 2322

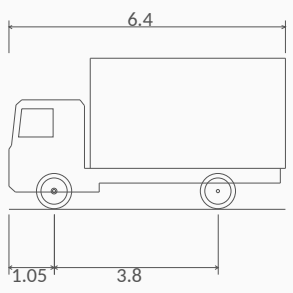
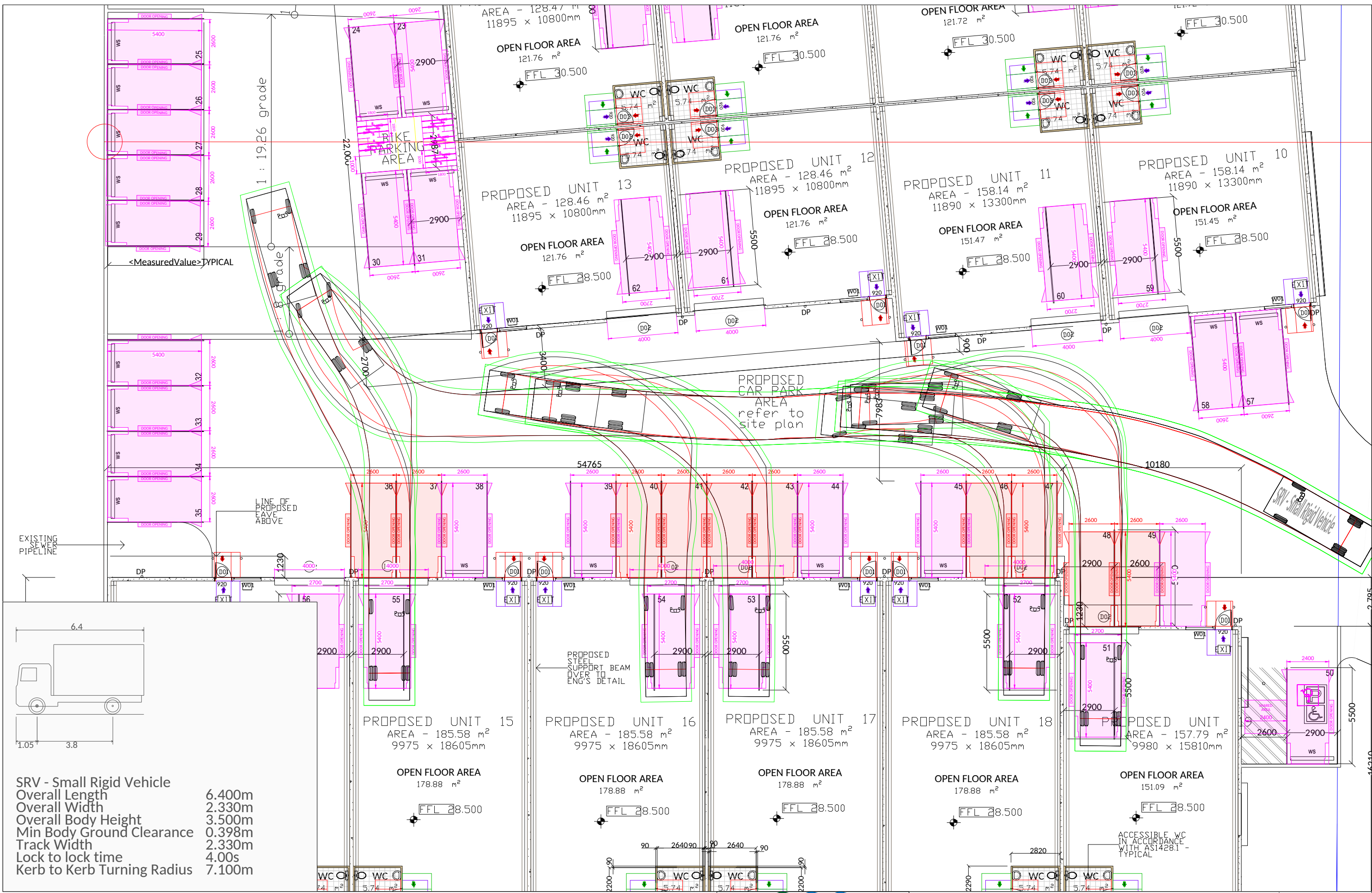
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Dwg No 21133/07 Rev. A 06/01/2022  
 Client: Zreicon

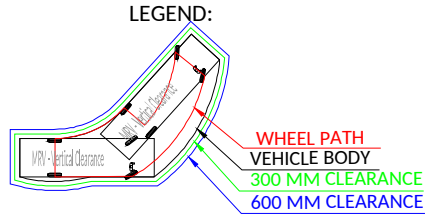
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 MRV - Medium rigid vehicle







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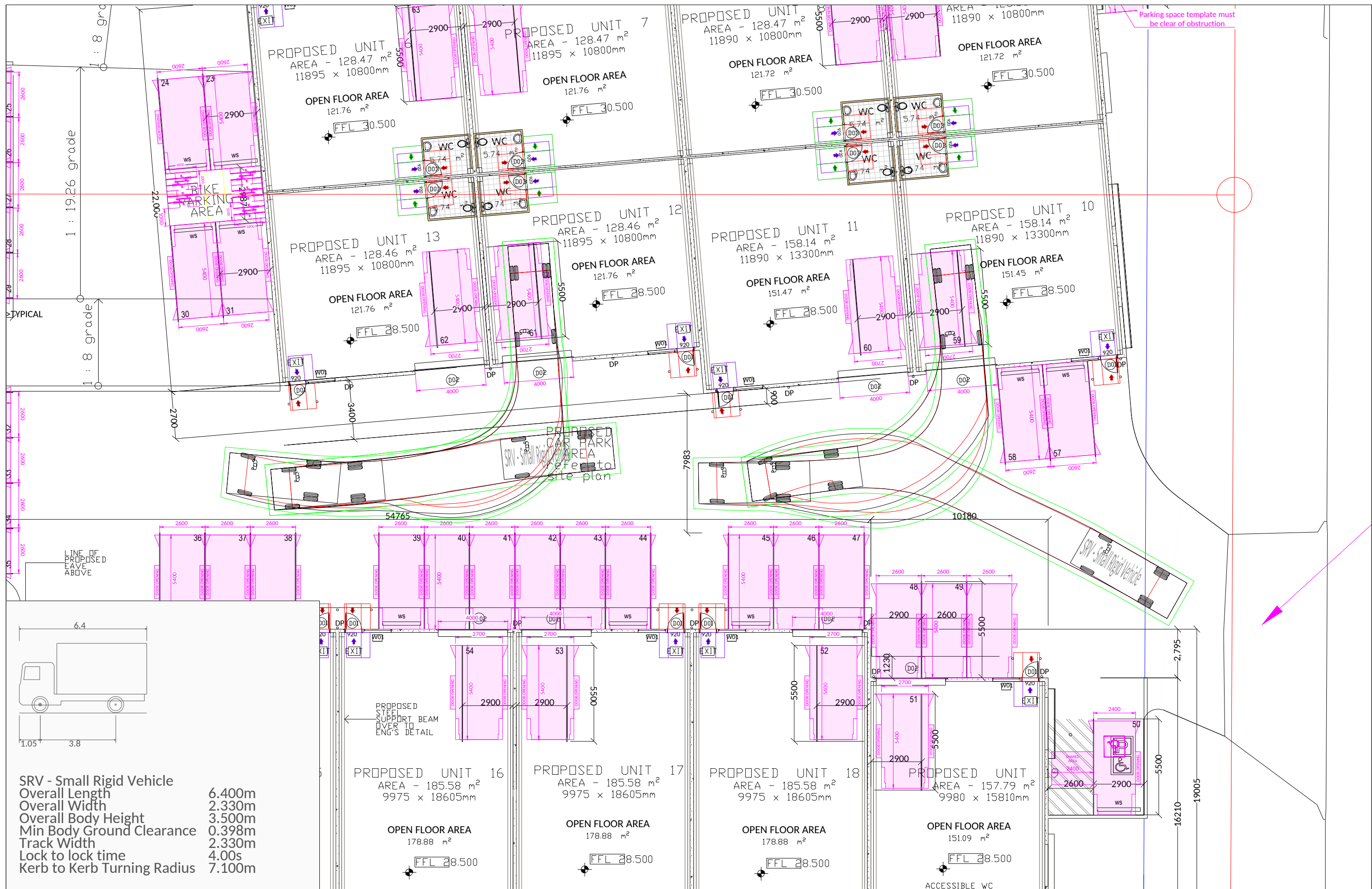
7 Kestrel Avenue, Thornton NSW 2322

SCALE 1:200@A3

Dwg No 21133/09 | Rev. A | 06/01/2022  
Client: Zreicon

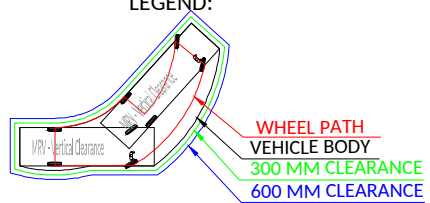
Proposed car park layout  
Design checks as per AS/NZS 2890 series  
SRV - Small rigid vehicle





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 Kerb to Kerb Turning Radius 7.100m

LEGEND:



7 Kestrel Avenue, Thornton NSW 2322

SCALE 1:200@A3

Dwg No 21133/10 | Rev. A | 06/01/2022  
 Client: Zreicon

Proposed car park layout  
 Design checks as per AS/NZS 2890 series  
 SRV - Small rigid vehicle