



TRAFFIC • PARKING • ACOUSTICS

**Central Village Master Plan
+ Phase 2 Development Approval
332-342 Water Street, Fortitude Valley
Traffic Engineering Report**

PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

26 JUN 2015

MEDQ

Metro Property Developments Pty Ltd

Reference: 13BRT0407

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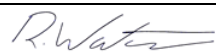
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1. Introduction

1.1. Background

TTM Consulting Pty Ltd (TTM) has been engaged by Metro Property Development Pty Ltd to prepare a traffic engineering report investigating the proposed Master Plan of the Central Village development, and specific details of Phase 2 of the wider site.

The original Revision 1 version of this report (dated 25th November 2014) was submitted to Department of State Development, Infrastructure & Planning (Economic Development Queensland (EDQ)) in support of the development application for 'Phase 2' of the Master Plan (EDQ Ref. Dev2014/630). Following this application submission, a number of subsequent discussions with representatives of EDQ have taken place.

The contents of this revised report reflect subsequent changes to the development scheme in response to ongoing design development and in response to the further issues noted by EDQ in correspondence dated 27th April 2015.

For ease of reference, the following further issues have been identified by EDQ.

- ***Manoeuvrability to/from end parking spaces.***
Refer to TTM Drawing 13BRT0407-SK13 included in Appendix C, and Section 4.4.4 of this report, which details the car park design aspects. The car park design has made provisions for manoeuvrability to/from end car parking spaces whereby a 1.0m aisle extension has been provided beyond the last bay or alternatively a "Reversing Zone" has been provided behind last bay.
- ***The position of the PWD spaces.***
Refer to the revised car park plans included in Appendix A. The PWD spaces have been located as close as possible to the various lift cores taking cognisance of the desire to maximise car park efficiency.
- ***Connectivity for cyclists and the position of the bicycle racks.***
Refer to the revised car park plans included in Appendix A. As shown on the car park plans bicycle racks have been removed from corners.
- ***Height clearance over car parking spaces.***
Refer to the revised car park plans included in Appendix A, and Section 4.4.4 of this report, which details the vertical height clearance achieved over car parking spaces.
- ***Operation of the laneway.***
Refer to TTM Drawing 13BRT0407-SK12 included in Appendix D, and Section 5.3 of this report, which details the operation of the laneway.
- ***Queuing provision at the Water Street driveway.***
Refer to Section 5.3.1 of this report. It should be noted that the queuing provision on the driveway has since been accepted by EDQ.

1.2. Scope

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

- Parking supply
- Parking layout
- Surrounding road layout and site accessibility
- Access locations and designs
- Traffic generation and distribution
- Development impacts on surrounding road network
- Service vehicle operation
- Public transport accessibility
- Bicycle provisions

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

- ULDA Planning Scheme, specifically;
 - 3.0 Land Use Plan for Precinct 4: Water Street Precinct
- Australian Standard for Parking Facilities (AS2890)
- Queensland Complete Streets
- Austroads Guide to Traffic Management

In addition, guidance on particular design issues has been taken from sections of the Brisbane City Council (BCC) *Brisbane City Plan 2014*.

1.3. Site Location

The Central Village site is located at 62-68 Brunswick Street and 332-342 Water Street, Fortitude Valley, as shown in Figure 1.1. The site has road frontages onto Brunswick Street and Water Street. The site forms part of Precinct 4 (Water Street Precinct) of the Bowen Hills Urban Development Area (UDA), formerly under the development jurisdiction of the Urban Land Development Authority (ULDA). This area has now been renamed as the Bowen Hills Priority Development Area (PDA).



Figure 1.1: Site Location

Map Source: Google Maps 2015

Phase 2 of the development relates to the portion of the development located on western side of the wider site. It has road frontages onto both Water Street on the south and Brunswick Street on the west.

It is proposed that a new internal one-way laneway running will be constructed as part of the wider development, connecting Diggles Close in the north-east corner of the site to Water Street north to south, which will connect with Water Street, will be constructed as part of this development. This laneway will connect to the proposed laneway being constructed as part of Stage 3 and will provide a new private road frontage for Phase 2, with associated pedestrian paths.

2. The Proposed Development

2.1. Development Profile

The Central Village Master Plan divides the site into two phases; Phases 1 and 2. Phase 1 consists of construction of the three residential buildings, car parking area and community space on the eastern side of the site (right of the black dashed line shown in Figure 2.1). Phase 1 is broken up into Stages 1-3. Phase 2 consists of a separate car parking area, two residential buildings and community space on the western side of the site (left of the black dashed line shown in Figure 2.1). Phase 2 is broken up into Stages 4, 5 and 6.

Phase 2 relates to the construction of two residential towers (plus podium edge buildings at 5/6 storeys) on the western side of the site. It is also proposed that the laneway being constructed as part of Stage 3 will also be extended into Phase 2 to run along the east boundary of Phase 2 and connect through to Water Street

Figure 2.1 shows the extent of Phase 2, and the specific footprints of Stages 4, 5 and 6, within the wider site.

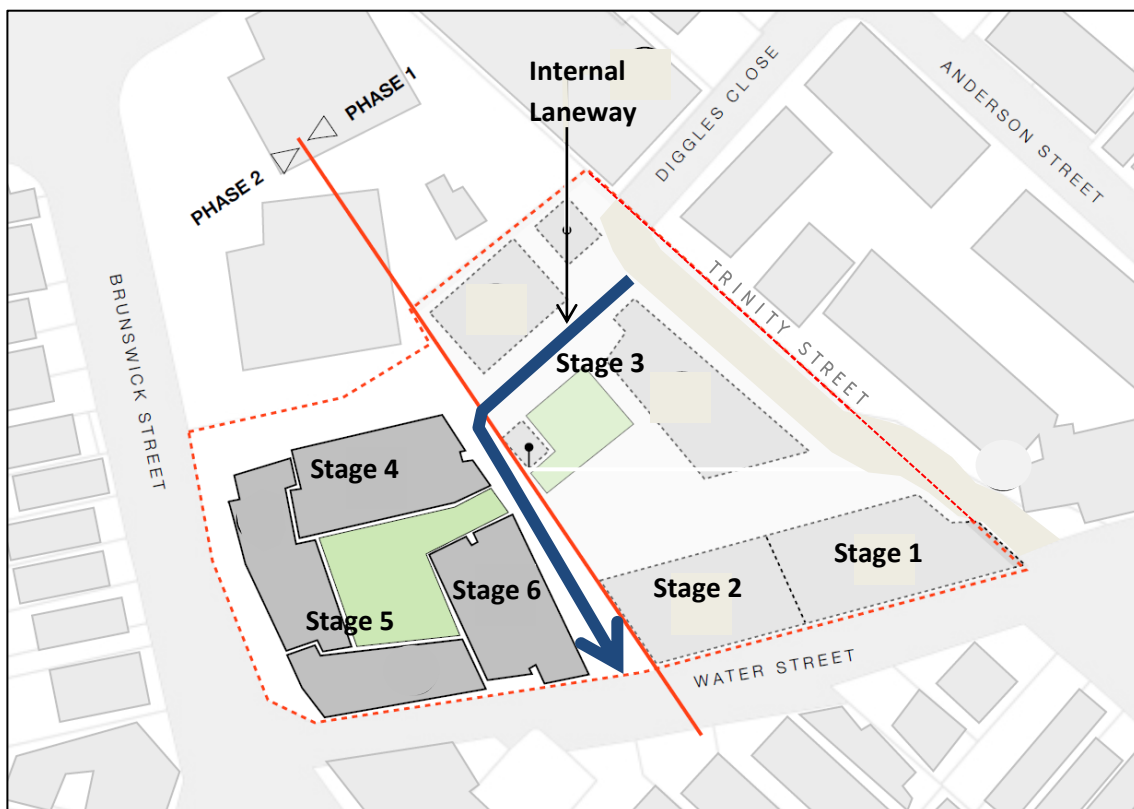


Figure 2.1: Central Village Master Plan - Stages 4, 5 & 6

The proposed land uses and parking supply for each phase and stage of this development are summarised in Table 2.1. For the purposes of this assessment, it is noted that Stages 4 & 5 have been grouped together as it is understood that these two stages will be delivered concurrently.

Table 2.1 : Central Village Master Plan Proposed Land Uses

Development Component	Area/Quantity	Parking Supply
Phase 1	520 units	371 spaces
Stage 1	1 Bedroom: 115 units 2 Bedroom: 46 units SOHO1*: 4 units TOTAL: 165 units	105 spaces, as approved
Stage 2	1 Bedroom: 113 units 2 Bedroom: 45 units SOHO1*: 2 units TOTAL: 160 units	101 spaces (99 spaces approved)
Stage 3 Residential Dwellings:	1 Bedroom: 85 units 2 Bedroom: 108 units 3 Bedroom: 2 units TOTAL: 195 units	164 spaces, as approved
Retail Use:	57m ² GFA	
Commercial/Office Use:	71m ² GFA (Cottage)	
Indoor Sport and Recreation	420m ² GFA (Drill Hall)	
Development Component	Area/Quantity	Parking Supply
Phase 2	565 units	517 spaces
Stage 4 & 5 Residential Dwellings:	1 Bedroom: 201 units 2 Bedroom: 165 units SOHO2^: 3 units TOTAL: 369 units	321 spaces plus 16 motorcycle spaces
Retail Use:	233m ² GFA	4 spaces
Stage 6 Residential Dwellings:	1 Bedroom: 82 units 2 Bedroom: 114 units TOTAL: 196 units	192 car parking spaces plus 10 motorcycle spaces
Total Development	1,085 units 781m² GFA (non-residential)	888 spaces

*SOHO1 = Single Occupancy / Home Office (1 bedroom unit equivalent).

^SOHO2= Single Occupancy / Home Office (2 bedroom unit equivalent).

Detailed design plans relating to the Phase 2 parking area, inclusive of the specific parking provisions for Stages 4, 5 and 6 assessed as part of this report, is included in Appendix A.

The unit numbers and parking supply for Stages 1-3 in Table 2.1 are based on the previous approvals issued by the former ULDA for Stage 1 (Decision Notice dated 31st January 2013, DEV2012/289) and EDQ for Stages 2 (Decision Notice dated 8th August 2013, DEV2012/392) and Stage 3 (Decision Notice dated 27th July 2014, DEV2012/387).

2.2. Access

The Central Village development contains four access points onto the external road network; two for the Phase 1 precinct and two for the Phase 2 precinct. Phase 1 provides a main car park access onto the “Baxter Street Extension” (recently renamed Trinity Street) on the southern side of the road near the intersection with Water Street. This will facilitate entry/exit movements in all directions. A second access onto Trinity Street is provided for the new one-way internal laneway (which extends west towards the Phase 2 site) near the intersection with Diggles Close, which will be designed to allow left and right entry movements.

The Phase 2 accesses will consist of a car park access onto Water Street and then an egress crossover of the internal private road also onto Water Street. Assuming that Water Street remains a one-way road, the car park access provided for Phase 2 onto Water Street will be a left-in/left-out only, while the private laneway egress onto Water Street will be left-out only. Internally, the Phase 2 car park will also provide an entry point onto the internal private road at the 90-degree bend at the interface between Phase 1 and Phase 2.

Further details on the proposed access arrangements are provided in Section 5.

2.3. Parking

The development plan includes a total of 888 car parking spaces and 1,302 bicycle spaces.

The total proposed on-site parking supply for the development is 888 parking spaces, inclusive of 371 parking spaces as part of Phase 1 and 517 parking spaces as part of Phase 2.

Phase 1 of the master plan provides 371 parking spaces, inclusive of 338 resident spaces (incl. 6 PWD spaces), 29 visitor spaces and 4 non-resident spaces.

Phase 2 of the master plan provides 517 parking spaces, inclusive of 484 resident spaces (incl. 6 PWD spaces), 29 visitor spaces (incl. 1 PWD spaces) and 4 non-resident spaces.

The breakdown between different stages within Phase 2 is as follows:

- The Stage 4 & 5 proposes a total parking supply of 325 spaces; inclusive of 302 resident spaces (incl. 4 PWD spaces), 19 visitor spaces (incl. 1 PWD space) and 4 non-resident spaces. An additional 16 motorcycle spaces for resident use are also provided.
- The Stage 6 proposes a total parking supply of 192 spaces; inclusive of 182 resident spaces (incl. 2 PWD spaces) and 10 visitor spaces. An additional 10 motorcycle spaces for resident use are also provided.

Inclusive in this total resident parking supply are 6 Go Get car parking spaces which will be provided for usage by residents of Phase 2. These are located in designated spaces provided in conjunction with the visitor parking supply.

Further details of the car parking provisions are provided in Section 4 and bicycle parking provisions in Section 8.2.

2.4. Servicing

The Phase 2 service area provides 2 VAN bays, 1 MRV bay and 1 RCV bay for the shared use by Phase 2.

Further details of the servicing provisions are provided in Section 7.

3. Existing Transport Infrastructure

3.1. The Road Network

All roads in the immediate vicinity of the site are administered by Brisbane City Council. The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 3.1.

Table 3.1: Local Road Hierarchy

Road	Speed Limit	Carriageway		Road Reserve Width	Classification	Road Authority
		Width	Lanes			
Water Street	50 km/h	6m	1 (one-way)	13m	Neighbourhood access	BCC
Brunswick Street	60 km/h	15m	5(2 northbound, 3 southbound)	22m	Arterial route	BCC
Diggles Close	50 km/h	5m	1 (plus parking on 1 side)	11m	Local access	BCC
Anderson Street	50 km/h	7m	2 (plus parking on 1 side)	14m	Neighbourhood access	BCC
Baxter Street	50 km/h	13m	2 (plus parking on both sides)	20m	Neighbourhood access	BCC

Water Street is a one-way street allowing only eastbound traffic. It is 6m wide where the main building of Stages 1 and 2 fronts onto it, but widens to 10m just west of it to provide a small number of parking spaces on both sides of the road. The intersection of Water Street / Baxter Street is priority controlled, while the intersection of Brunswick Street / Water Street is signalised.

3.2. Road Planning

The concept development plans provided in Appendix A incorporate the following resumptions/land dedications to facilitate planned road network improvements:

- A minimum 5.25-5.6m road dedication on the western property boundary of the Central Village site, on the Phase 2 Brunswick Street frontage, to allow for future widening of Brunswick Street and upgrading of the Brunswick Street / Water Street signalised intersection. This allowance is consistent with road dedication/land requirements proposed to be imposed on the subject site, as outlined in the road works concept design prepared by Brisbane City Council (Drawing RPN677). A copy of this drawing is provided in Appendix B.

- A 168m² road dedication on the southern property boundary of the Central Village site, on the Water Street frontage primarily along the Phase 2 section, to allow for footpath widening on the north side of Water Street.
- A 1337m² road dedication on the eastern property boundary of the Central Village site to allow for Trinity Street from Water Street through to Diggles Close.
- A 34m² road dedication on the eastern most corner of the site (by tapering the existing pointed end of the property) to facilitate footpath widening on the corner of Water Street.

The former Bowen Hills UDA Land Use Plan for Precinct 4 (Water Street Precinct) indicates that a road was to be constructed connecting Baxter Street with Diggles Close. The former ULDA also undertook the 'Bowen Hills Traffic Study' with the objective of identifying ultimate road requirements and intersection configurations to accommodate the total development in accordance with the former Bowen Hills UDA development Scheme.

Also, the RNA redevelopment (renamed the "Showground Hill" project) to the east of the subject site will include a new internal local road that will influence the operation of the wider road network in the vicinity of the subject site.

Figure 3.1 indicates the proposed road network upgrades in the immediate area.

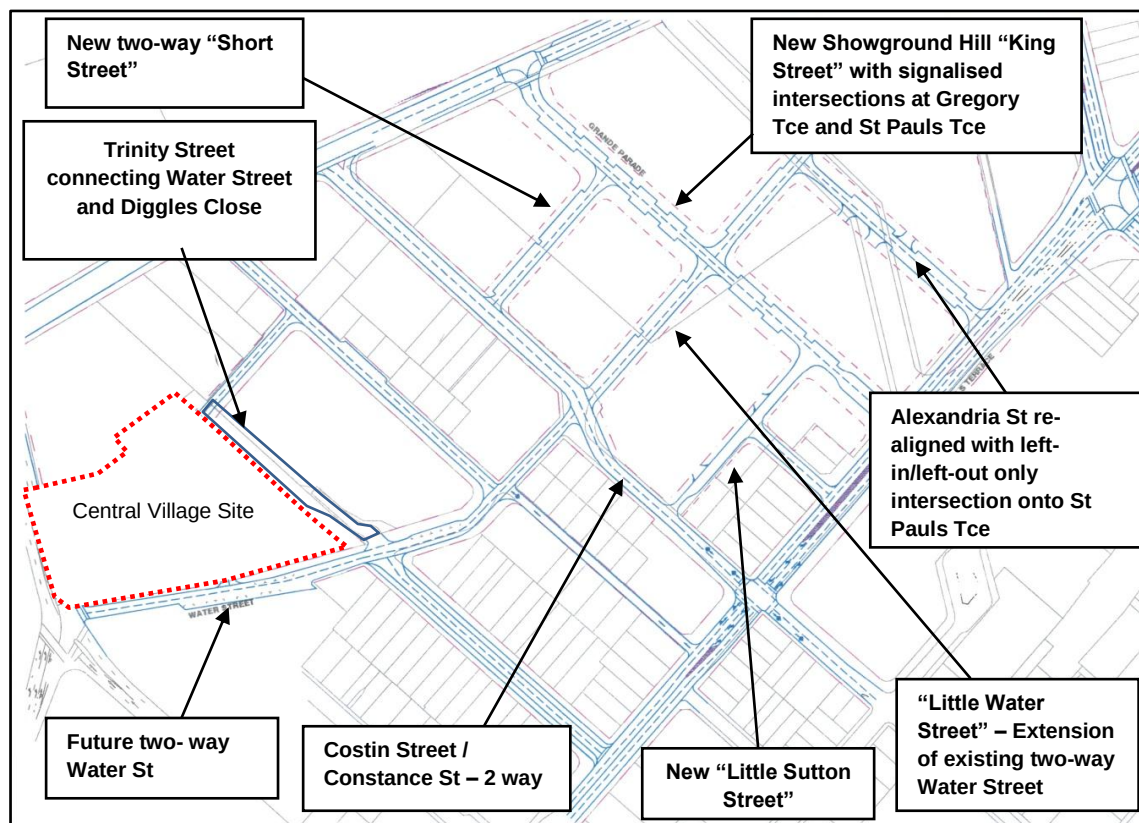


Figure 3.1: Future Road Network Configuration

3.3. Public Transport and Pedestrian Facilities

Fortitude Valley train station is located approximately 550m to the south of the site, and provides access to all train lines going through the central city.

On-street bus stops are located on Brunswick Street adjacent to the site, as well as on Gregory Terrace some 250m walk from the site.

The Riverside CityCat stop is located approximately 1.5km to the south of the site.

Most of the streets in the area provide footpaths on both sides of the road, with the exception of Diggles Close which provides a footpath on the south side only. The signalised intersection of Brunswick Street / Bowen Bridge Road / Gregory Terrace provides pedestrian crossings on all approaches, while the signalised intersection of Brunswick Street / Water Street provides crossings on three of the four approaches.

No dedicated cycle lanes are provided in the immediate vicinity of the site, the nearest being provided on Gregory Terrace beginning some 300m west of the intersection with Brunswick Street. The nearest CityCycle station is 360m walk from the site at the intersection of Constance Street and St Pauls Terrace.

4. Car Parking Arrangements

4.1. EDQ Requirements for Car Parking

The 'Bowen Hills Urban Development Area Development Scheme' stipulates that a **maximum** rate of 1 car parking space (inclusive of visitor car parking) be provided per unit. Based on this requirement, the overall development can have at most 1022 car parking spaces for the residential components of the site.

With respect to the additional office/retail space provided within the new residential buildings (excluding SOHO uses), a **maximum** provision of 1 car parking space per 100m² floor area applies.

4.2. Resident Car Parking Supply Rationale

The proposed resident parking supply rate is based on constraining the commuter traffic generated by the development, which is consistent with Transport-Orientated-Development (TOD) principles. The UDA Development Criteria states:

"In support of TOD principles priority should be given to pedestrian, cycle and public transport modes, over private vehicle use".

As mentioned previously the site enjoys a high level of connectivity to the public transport network and therefore it is considered appropriate, in terms of travel demand management strategies, to reduce the overall parking supply and encourage residents to use alternative modes of transport. The site is also located within walking distance of the key centres of Fortitude Valley, Royal Brisbane Hospital and Brisbane CBD.

In contrast to the parking supply for Phase 1, the supply for Phase 2 has been adjusted slightly to better suit current market expectations. The parking supply for Phase 2 has been generally derived based on applying the rates of 0.75 spaces per one bedroom unit (so only 75% of the 1 bedroom units will have a dedicated parking space), 1 space per two bedroom unit and an additional 1 visitor space per 20 units. These rates, aside from the rate for one bedroom units, are consistent with the BCC recommended rates for CBD residential developments. For information purposes, the BCC rate is 0.5 spaces for one bedroom units, as opposed to the 0.75 spaces adopted for Phase 2 of this development. Given the site is located in comparable proximity to surrounding activity centres and public transport provisions to the CBD area, TTM consider that adopting car parking provisions consistent with (if not slightly more conservative) is acceptable for the proposed development.

4.3. Proposed Parking Provisions

4.3.1. Introduction

The total proposed on-site parking supply for the development is 888 parking spaces, inclusive of 371 parking spaces as part of Phase 1 and 517 parking spaces as part of Phase 2.

Phase 2 of the master plan provides 517 parking spaces, inclusive of 484 resident spaces (incl. 6 PWD spaces), 29 visitor spaces (incl. 1 PWD spaces) and 4 non-resident spaces.

The breakdown between different stages within Phase 2 is as follows:

- The Stage 4 & 5 proposes a total parking supply of 325 spaces; inclusive of 302 resident spaces (incl. 4 PWD spaces), 19 visitor spaces (incl. 1 PWD space) and 4 non-resident spaces. An additional 16 motorcycle spaces for resident use are also provided.
- The Stage 6 proposes a total parking supply of 192 spaces; inclusive of 182 resident spaces (incl. 2 PWD spaces) and 10 visitor spaces. An additional 10 motorcycle spaces for resident use are also provided.

Further details in relation to the proposed parking provisions for Phase 2 is detailed in Sections 4.3.2 to 4.3.6.

In addition to the car parking supply, it is proposed that 26 motorcycle spaces will be provided in Phase 2 including 16 spaces as part of Stage 4 & 5 and 10 spaces as part of Stage 6.

4.3.2. Stage 4, 5 and 6 Residential Car Parking Supply

Based on the parking rates outlined in Section 4.2, the proposed parking supply for each of Stages 4, 5 and 6 (when considered in isolation) is shown in Table 4.1 and Table 4.2.

Table 4.1: Stage 4 & 5 Residential Parking Supply Summary

Parking Component	Extent	Parking Supply Rate	Parking Supply	Actual Provision
Residential Units:	369 units	-	319 spaces	302 spaces
– 1 Bedroom	201 units	0.75 spaces/unit	151 spaces	(incl. 4 PWD spaces, 4 tandem spaces & 4 GoGet spaces)
– 2 Bedroom	168 units	1.0 space/unit	168 spaces	
Residential Visitors	369 units	0.05 spaces/unit	19 spaces	19 spaces (incl. 1 PWD space)
Total			338 spaces	321 spaces

As outlined in Table 4.1 above, the proposed resident parking supply of 321 spaces for Stage 4 & 5 is generally consistent with the parking supply rates previously outlined. The parking supply for Stage 4 & 5 is therefore considered acceptable.

Table 4.2: Stage 6 Residential Parking Supply Summary

Parking Component	Extent	Parking Supply Rate	Parking Supply	Actual Provision
Residential Units:	196 units	-	176 spaces	182 spaces
– 1 Bedroom	82 units	0.75 spaces/unit	62 spaces	(incl. 2 PWD spaces, 14 tandem spaces and 2 GoGet spaces)
– 2 Bedroom	114 units	1.0 space/unit	114 spaces	
Residential Visitors	196 units	0.05 spaces/unit	10 spaces	10 spaces
Total			186 spaces	192 spaces

As outlined in Table 4.2, the proposed resident parking supply of 192 spaces for Stage 6 is generally consistent with the parking supply rates previously outlined. The parking supply for Stage 6 is therefore considered acceptable.

It is also considered prudent to review the parking provisions in the context of the wider Phase 2 site, which is detailed in Table 4.3.

Table 4.3: Overall Phase 2 Residential Parking Supply Summary

Parking Component	Extent	Parking Supply Rate	Parking Supply	Actual Provision
Residential Units:	565 units	-	495 spaces	488 spaces
– 1 Bedroom	283 units	0.75 spaces/unit	213 spaces	(incl. 6 PWD spaces, 17 tandem spaces & 5 GoGet spaces)
– 2 Bedroom	282 units	1.0 space/unit	282 spaces	
Residential Visitors	565 units	0.05 spaces/unit	29 spaces	29 spaces (incl. 1 PWD space)
Total			524 spaces	517 spaces

Overall, the proposed resident parking supply of 517 spaces for Phase 2 is generally consistent with the parking supply rates previously outlined. As such, TTM considers the proposed parking supply for Phase 2 is acceptable in the wider context of the site.

The plan included in Appendix A show the proposed allocation of resident, tandem, visitor and GoGet spaces parking for each stage. All visitor parking spaces are located directly inside the security line at Podium 1 level.

4.3.3. Commercial/Retail/SOHO Parking Supply

Stage 4 & 5 provides a total of 3 retail tenancies, with GFA's of 54m², 134m² and 45m² respectively. It is proposed that 1 car parking space will be provided for staff/customer parking for each of the two smaller retail tenancies whilst 2 spaces will be provided for the larger retail tenancy. This provision is generally consistent with EDQ maximum requirements.

With respect to the SOHO units, which could also be classed as 'office' use, the resident parking provision for each of these units will satisfy any demands for on-site parking attributed to these uses (i.e. the residents are also the staff of the SOHO).

4.3.4. Drop-Off Parking Provisions

The approved layout for the internal laneway as part of Stage 3 provides one dedicated drop-off space compliant with the requirements of a parallel PWD space as set out in *Australian Standard for Parking Facilities – Part 6: Off-Street Car Parking for People with Disabilities* (AS2890.6:2009). It is anticipated that this drop-off space will service any anticipated demands for visitors to the wider site, inclusive of Phase 2, given the limited ability for vehicles to temporarily stand on the external road frontages of the site.

4.3.5. Service/Loading Bay Provisions

It is noted that there is no specific loading bay requirements for residential developments indicated in either the EDQ Land Use Plan for Precinct 4, PDA wide development criteria, Australian Standard for Parking Facilities or the BCC Brisbane City Plan 2000.

Phase 2 provides a total of 2 VAN bays, 1 MRV bay and 1 RCV bay for the shared use of Phase 2. In the absence on prescribed requirements, TTM consider that the proposed provision is satisfactory to cater for the development needs, as is discussed in further detail in Section 7.

4.3.6. PWD Parking Supply

The approved parking provisions for Phase 1 provide a total of 6 PWD spaces, including 4 resident spaces (of the total 342 resident spaces) and 2 visitor spaces (of the total 29 visitor spaces). As discussed previously, the drop-off space provided on the internal access road has been designed to facilitate PWD parking, ensuring equitable access to these facilities for PWD equipped vehicles/taxi.

With respect to required provisions for Phase 2, it is noted that neither the EDQ Land Use Plan for Precinct 4 nor PDA wide development criteria specify minimum provisions for PWD parking. In addition, the Building Code of Australia (BCA) has no specific requirements for PWD parking for residential (Class 2) buildings. Regardless, the development proposal provides a total of 6 PWD spaces for the resident uses of Phase 2. For the total parking supply of 488 resident spaces this equates to a provision of 1 space per 81 standard spaces. This exceeds the requirements for other comparable BCA Class buildings (i.e. for example Class 3 which incorporates other kinds of residential type uses), which requires a provision of 1 space per 100 standard spaces. It is also noted that Phase 2 provides a number of PWD accessible units, which will allow for PWD spaces to be allocated should a purchaser of one of these units require a dedicated PWD space.

The 6 resident PWD spaces have been split up within the Phase 2 car park, providing 4 spaces in close proximity to the Stage 4 elevators, 1 space in close proximity to the Stage 5 elevators and 1 space in close proximity to the Stage 6 elevators.

An additional 1 PWD space is also provided for the 29 dedicated residential visitor parking spaces as part of Phase 2. Once again this exceeds the most generous requirement for PWD parking for any building class as detailed in the BCA (i.e. 1 space per 50 standard spaces), and is therefore considered acceptable.

Overall, Phase 2 provides a total of 7 PWD parking spaces. All PWD parking is provided in close proximity to the lifts of the building the respective spaces are assigned to.

4.4. Proposed Car Park Design

4.4.1. Introduction

Australian Standard for Parking Facilities – Part 1: Off-Street Car Parking (AS2890.1:2004) is adopted as the design standard for car parks in developments under the assessment of EDQ.

Vehicular access to the car parking areas associated with Phase 2 will be achieved via Water Street and the new internal one-way laneway from Trinity Street.

The design of the Phase 1 (Stages 1-3) parking areas was resolved in the previous development applications for these respective stages. The design of the components of the car park to be constructed as part of Phase 2 has been specifically assessed in this report.

The detailed car park plans for Phase 2 are included in Appendix A.

4.4.2. Internal Circulation

As shown on the car park plans included in Appendix A, the circulation/parking aisles are a minimum of 6.2m wide and as such exceed the minimum width requirements under AS2890.1.

The overall layout of the Phase 2 car parking area, and circulation routes for travel between basement/podium levels has been revised from that in the previous scheme submitted as part of the original application in November 2014. Notably, the circulation routing is now more generous and allows greater space for vehicular passing. The revised internal circulation for a B99 vehicle on the inside versus a B85 vehicle on the outside is shown in TTM Drawing 13BRT0407-SK11 included in Appendix C. These swept paths show that at all locations a minimum of 600m clearance is achieved on the inside/outside of vehicles to all vertical obstructions and a minimum 300m clearance in between vehicle bodies around the primary circulation paths within the car park.

Although it is recognised that AS2890.1 details a minimum 600mm clearance 600mm clearance is necessary between passing vehicles, this is still considered an acceptable solution given the car park is comprised of residential uses which will operate on a largely tidal basis (i.e. generally departures in the AM peak and mostly departures in the PM peak) and so the probability of vehicular conflict on the various ramps and circulating aisles is low. In addition, it is noted that the swept paths tested represent the 'worst case' scenario of a B9g on the inside and B85 on the outside, when in reality most vehicles operating within the car park will be B85 and smaller, which will have increased vehicular clearance. Finally, it is also recognised that the car park will be a low speed environment and there are adequate sight lines around corners to allow for approaching vehicles to recognise each other and if necessary give way.

4.4.3. Visitor Car Parking Location

As previously discussed in 4.3.2, the visitor parking is located on Podium 1 level initially behind the security doors. It is proposed that all residential visitors will drive into the site and call the respective resident they are visiting (via the intercom provided outside the security door) to gain access to the visitor car park. Such systems are routinely implemented at residential car parks within the inner city area to reduce the potential for parking misuse by other non-development related vehicles and provide increased security for wider car park. Given the parking spaces are accessible through an intercom for legitimate visitors, TTM see no reason why the proposed arrangements not be accepted. It is also noted that the arrangement was previous accepted, and is currently in use for the Phase 1 car park of the Central Village site. For visitor vehicles exiting the site, it is recommended that loop detectors are installed on the exit lane of the driveway which will automatically open the exit gates.

In the instance that a visitor cannot contact the respective resident they are visiting, they can reverse back out from the intercom, perform a turnaround movement (using the open space provided in the loading area) and exit the site. This is demonstrated in TTM Drawing 13BRT0407-SK11 included in Appendix C.

4.4.4. Phase 2 Car Park Design

The general design parameters of the Phase 2 car park layout are set out in Table 4.4. The last column of the table indicates compliance with the respective requirements.

Table 4.4: Stage 3 Car Park Design Criteria

Design Aspect	AS2890.1 Requirement	Proposed Provision	Compliance
Parking space length: - Standard Bay (Class 1A) - Small Car Bay - PWD Bay (Class 5)	5.4m (min) 5.0m (min) 5.4m (min)	5.4m 5.0m (min) 5.4m	Australian Standards Compliant
Parking space width: - Standard bay (Class 1A) - Small Car Bay - PWD Bay (Class 5)	2.4m (min) 2.3m (min) 2.4m (min) + 2.4m (min) 'Shared Area' next to space	2.4m 2.3m (min) 2.4m + 2.4m 'Shared Area' next to space	Australian Standards Compliant
Parking Aisle Width:	5.8m (min)	6.2m	Australian Standards Compliant
Parking envelope clearance - Column adjacent to bay	Located between 0.75m and 1.75m off aisle	All columns located between 0.75m and 1.75m off aisle	Australian Standards Compliant
Parking envelope clearance – space adjacent to wall	Space 0.3m clear of wall	Spaces 0.3m clear of wall *	Australian Standards Compliant
Maximum Gradient: - PWD parking - Parking bay - Parking aisle	1:40 (2.5%) 1:20 (5.0%) 1:16 (6.25%)	Flat Flat 1:19 (5.3%)	Australian Standards Compliant
Height Clearance: - General Min. - Over PWD bay	2.2m (2.3m for access to PWD space) 2.5m	2.2m (min) ** over all parking spaces, 2.3m (min) over all aisles providing access to PWD spaces, and 2.5m (min) over PWD bays.	Australian Standards Compliant
Parking Aisle Extension	1m beyond last bay	1.0m beyond last bay, or provide "Reversing Zone" behind last bay.***	Australian Standards Compliant

** Inspection of the development plans included in Appendix A confirms that whilst in the vast majority of instances adequate clearance is provided to adjacent columns and structure there are some cases where encroachment is evident. It should be noted that the car parking layout will be further refined at the detailed design stage.*

*** With respect to the height clearance above car parking spaces, the design generally complies with the minimum requirement of 2.2m as set out in AS2890.1; however, services will be typically designed to intrude into standard/small parking spaces at various locations throughout the car park. The intrusion zones generally permitted over standard/small parking spaces are shown in Figure 4.1*

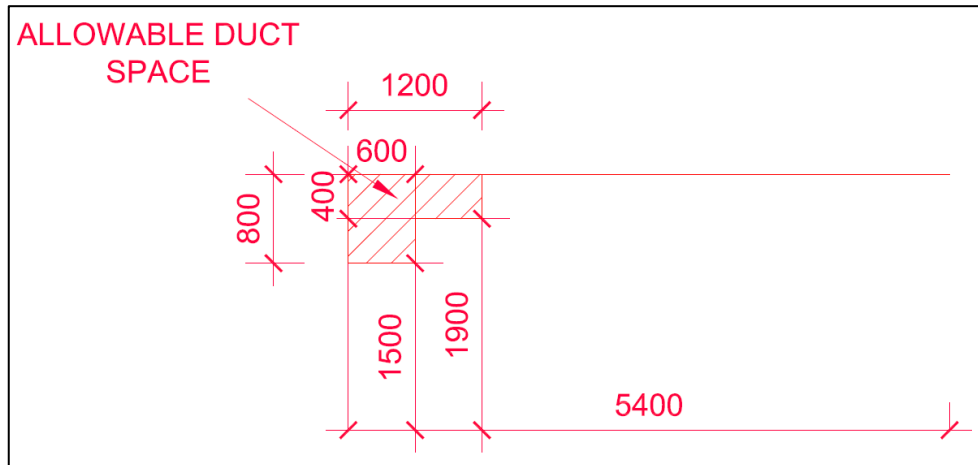


Figure 4.1: Acceptable Intrusion Zones for Services

It should be noted that the intrusion zones for services over standard/small parking spaces as shown in Figure 4.1 above have been developed over many years by local authorities and have been adopted at numerous other multi-level car parking facilities within the SEQ region including the car parking areas serving the residential developments at Madison Heights and the Chelsea within Bowen Hills. It should be noted that there is no reference within AS2890.1 in respect to the acceptable intrusion zones over standard/small parking spaces.

**** Typical manoeuvrability to/from end car parking spaces where "Reversing Zones" have been provided is illustrated in TTM Drawing 13BRT0407-13 included in Appendix C.*

Overall, the proposed car park layout generally complies with the requirements set out in AS2890.1.

5. Site Access Arrangements

5.1. Introduction

Given the size of the wider Central Village Master Plan, it was considered necessary that there be multiple accesses fronting onto different roads surrounding the site. Not only would this provide maximum flexibility to assist in the staging of the development, but it would also help cater for the travel movement desires of the development related traffic and would avoid congestion by efficiently distributing the development traffic on the surrounding roads. It was considered that direct access onto Brunswick Street would be unachievable given the current traffic volumes using the road and topography of the site.

Therefore, an alternative to construct a new road fronting the site was considered suitable as multiple access points could then be incorporated on both this new road and the existing Water Street. This new road, which is currently under construction, is Trinity Street. The design of Trinity Street was resolved in the previous development applications for Phase 1.

A summary of the proposed access arrangements is shown in Figure 5.1.

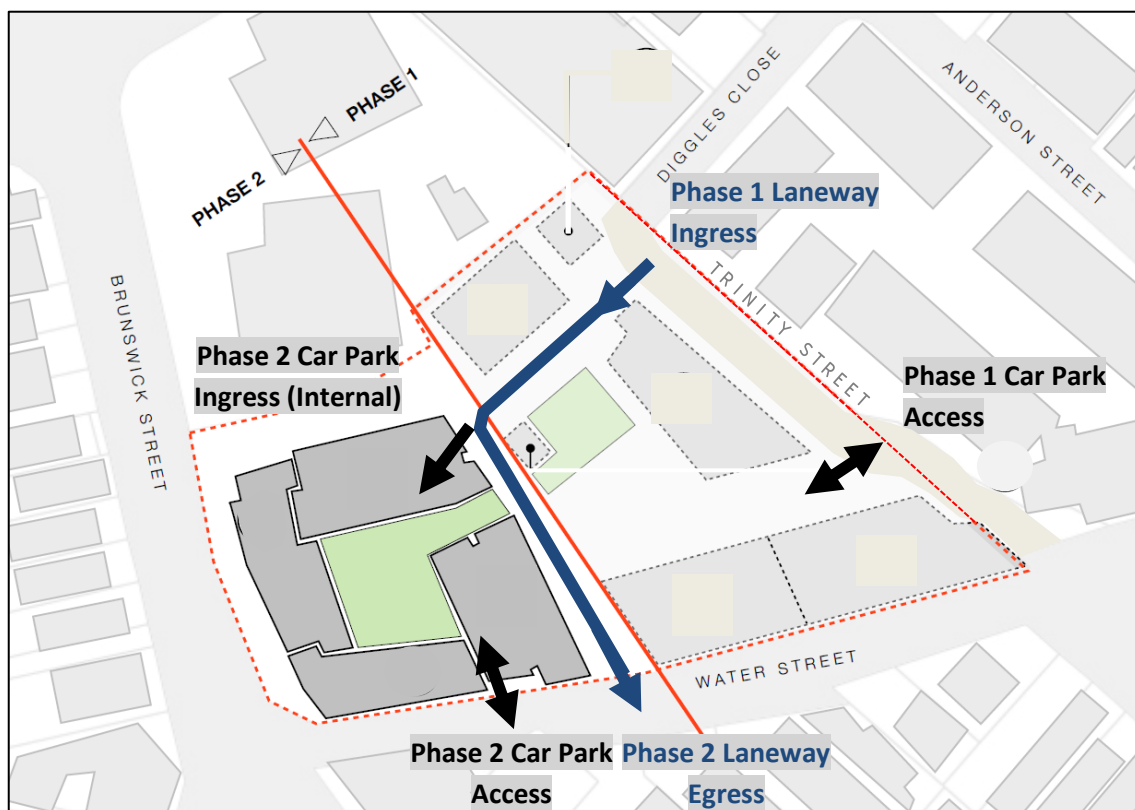


Figure 5.1: Site Access Arrangements Summary Map

Details of the characteristics of the various site accesses for Phases 1 and 2 are detailed in the following sections.

5.2. Access to Phase 1 of Development

Vehicular access to the Phase 1 car park is gained through an all-movement site access onto the new Trinity Street located approximately 35m north of Water Street.

In addition, the Phase 1 scheme provides a vehicular access near the connection of Trinity Street to the existing Diggles Close. This vehicle access is the ingress for the internal one-way laneway running through the site (to be initiated as part of the Stage 3 works), which was resolved in the previous development applications for these respective stages. Contrary to previous proposals it is now intended that the new internal road will operate one-way (westbound) beyond the access to the on-grade car parking area serving the Drill Hall. It is understood the change of the internal laneway to one-way was previously discussed and agreed with EDQ.

5.3. Access to Phase 2 of Development

Vehicular access to the parking and servicing areas of Phase 2 will be via a primary vehicular access onto Water Street, with an additional ingress to the car parking area also provided off the new one-way internal laneway near the go-degree bend at the interface between Phase 1 and Phase 2. This internal laneway will then also extend down and provide an egress onto Water Street.

A summary of the proposed accesses onto the external road network, and design provisions, is detailed further in the following sections.

5.3.1. Water Street Car Park Access

The Water Street Car Park access will be located approximately 40m east of Brunswick Street. This will facilitate left-in/left-out traffic movements given the existing one-way nature of Water Street. TTM understands, however, there are future plans to potentially convert Water Street into a two-way road (east of Brunswick Street). Should this occur, there is the ability for this access to be converted to an all-movements access.

The key design parameters of this access in accordance with AS2890.1 are set out in Table 5.1.

Table 5.1: Phase 2 Water Street Access Characteristics

Design Aspect	AS 2890.1 Requirement	Proposed Provision	Compliance
Crossover width	11.0-13.0m Category 3 Access	9.0m Category 3 Access *	Alternative solution proposed. Refer to further details below.
Minimum distance intersection	6m from tangent point on kerb	36m from Brunswick Street	Australian Standards Compliant
Sight distance	Ideally 69m, minimum of 45m	50m to the west to the Brunswick Street / Water Street intersection, +100m to the east	Australian Standards Compliant
Entry queue capacity	7 vehicles (42m)	4 vehicles (24m)	Alternative Solution Proposed. Refer to further details below.
Gradient of first 6m	1:20 (5%)	1:20 (5%)	Australian Standards Compliant

*Access will provide a BCC standard Type C1 crossover.

Driveway Crossover Width

Whilst the width of the driveway crossover does not fully satisfy the requirements set out in AS2890.1 it is considered 'fit for purpose' given the negligible levels of background traffic on Water Street. Furthermore the driveway width proposed is consistent with that provided at crossovers facilitating vehicular access to developments of a similar scale at other locations around the fringe area. The primary objective of reducing the crossover width at CBD/fringe area locations is to maintain the integrity, quality and primacy of the adjacent footpath links.

As shown in TTM Drawing 13BRT0407-SK01 included in Appendix H, the width and alignment of the proposed driveway crossover is adequate to permit a BCC refuse collection vehicle (RCV) to enter/exit the site. It is intended that the central median will be "trafficable" to assist access by larger vehicles.

Internal Queuing Capacity

With respect to entry queue capacity, it is noted that the car parking areas accessed from this driveway will be low-turnover residential parking spaces. As detailed further in Section 6, it is expected that the peak inflow into the site will be at most 55vph when Phase 2 is fully operational.

The probability of more than 4 vehicles entering the site at the same time (or say within a 30 second period) and all requiring to queue within the site, extending back onto Water Street, is less than 1%. The proposed internal queuing capacity is sufficient to cater for the 99th percentile entry queue of the site, and is therefore considered acceptable.

It should be noted that the queuing requirements specified in Table 3.3 of 'AS2890.1' primarily relate to the requirements at short-stay car parking facilities (e.g. city centre parking, parking stations, hospital and medical centres) and its application in this instance is not considered appropriate. Notwithstanding this and for comparison purposes, for short-stay car parking facilities with over 100 spaces and a peak-hour in-flow of traffic of up to 75% of capacity (the driveway will have a peak-hour in-flow of traffic of 55vph or 10% of capacity), for the first 100 cars the queuing provision is 3% of capacity (55vph in this instance), which equates 2 vehicles, or a minimum of 3 vehicles per lane. Based on these queuing requirements for short-stay car parking facilities it is considered that the queuing provision on the entry lane, (which facilitates access to a low-turnover car parking area), is more than adequate.

In order to provide EDQ with a certain degree of certainty that the queuing provision on the entry lane is more than adequate boom gates will be introduced on the entry and exit lanes. The boom gates will control entry/exit to the car parking area during AM and PM peak-hour periods with the roller shutters used outside these periods. Please note that this arrangement is consistent with what has been introduced at other significant residential developments around the CBD and inner city fringe areas (e.g. M & A development on Ann Street, Fortitude Valley). The provision of the boom gates during the peak-hour periods will ensure that any queuing on the entry lane is minimised.

5.3.2. Car Park Ingress from Internal Road

It is proposed that ingress to the basement and podium parking areas will also be achieved via the new internal road branching from Trinity Street. For information purposes the internal road will be constructed as part of the works associated with Stage 3. It is intended that this second access will facilitate entry only.

The key design parameters in accordance with AS2890.1 are set out in Table 5.2.

Table 5.2: Phase 2 Internal Road Access Characteristics

Design Aspect	AS 2890.1 Requirement	Proposed Provision	Compliance
Crossover width	11.0-13.0m Category 3 Access	3.5m entry lane	Alternative solution proposed. Refer to further details below.
Minimum distance intersection	6m from tangent point on kerb	60m from Trinity Street	Australian Standards Compliant
Sight distance	N/A	N/A	N/A
Entry queue capacity	7 vehicles (42m)	2 vehicles (12m)	Alternative Solution Proposed. Refer to further details below.
Gradient of first 6m	1:20 (5%)	1:20 (5%)	Australian Standards Compliant

Entry Lane Width

The width of the entry lane is considered adequate based on the negligible levels of traffic anticipated to utilise this entry point to access the car parking area (as detailed in Section 6) and the fact that this access will facilitate entry only.

In order to resolve priorities within the car park it is intended that a stop line (supplemented by signage) will be provided beyond the security line.

Internal Queuing Capacity

With respect to queue capacity, it is noted that the car parking areas accessed from this entry lane will also be low-turnover residential parking spaces and so a similar rationale behind queuing reductions as for the Water Street access is proposed. As detailed further in Section 6, it is expected that the peak inflow via this access will be at most 61vph when Phase 2 is fully operational. The probability of more than 2 vehicles entering the site at the same time (or say within a 30 second period) and all required to queue within the site is less than 2%. The proposed internal queuing capacity is sufficient to cater for the 98th percentile entry queue of the site, and is therefore considered acceptable.

5.3.3. Water Street Internal Laneway Egress

It is proposed that a new laneway will be constructed as part of Phase 2, extending from the internal road (Cardiff Court) to be constructed as part of Stage 3, to Water Street. Similar to the treatment proposed for the internal road branching from Trinity Street, the laneway will

be designated as a 10kph 'shared zone' and treated to appear as a private road with flush kerbs, etc. Through the use of contrasting paving materials, planting, street furniture and outdoor seating an environment will be achieved where drivers understand intuitively to maintain low speeds and be aware that other people will be using the space.

As noted in the UK's Department for Transport's (DFT's) *Manual for Streets* the underlying philosophy of shared zones, is that streets can function better where users negotiate priority and movement with one another, rather than obeying fixed rules set by the local authority. These shared zones work because the need to negotiate causes drivers to travel slowly, and others to watch out and make eye contact before proceeding. In order to achieve this, shared zones typically involve the removal (or absence) of road markings, signage and physical limitations on movement such as kerbs, etc.

The DFT observe that shared area techniques were first developed in the Netherlands. "The Kaden-Torenstraat junction in Drachten accommodates flows up to 17,000 vehicles and 2,000 cyclists and pedestrians per day, with no priority other than two pedestrian crossings. Initial data suggests that this scheme has reduced collisions compared to the seven years prior to installation (when the junction was controlled by conventional traffic signals)".

Figure 5.2 shows the Kaden- Torenstraat intersection in Drachten.

Figure 5.2: Kaden-Torenstraat Intersection in Drachten



Signage will be introduced at the entry point to the internal road at Trinity Street in order to limit the size and weight of the vehicles utilising the laneway. It is anticipated that the laneway will be very lightly trafficked with realistically only the traffic availing of the drop-off zone opposite the Drill Hall using the laneway in order to connect with Water Street.

The signage and line marking for the internal road branching from Trinity Street and the laneway, which has been prepared taking cognisance of the requirements set out in the *Manual of Uniform Traffic Control Devices (MUTCD)*, is shown in TTM Drawing 13BRT0407-

SK12 included in Appendix D. Left-turn only signage will be introduced at the bottom of laneway to reinforce priorities at this location given the current one-way operation of Water Street. It is proposed that a stop sign will be introduced at the bottom of the laneway to inhibit vehicular speed on approach to Water Street.

Given the grades along the laneway there is little or no scope to introduce typical traffic calming measures in the form of either vertical or horizontal devices to effectively control vehicular speed. Furthermore the length of the laneway, which is approximately 60m long, does not strictly justify the provision of speed control measures, i.e. the MUTCD specifies that speed control devices are typically only required at intervals of between 80 and 120m. Notwithstanding this, it is considered that the designation of the laneway as a 10kph 'shared zone' and the grade transitions at the bottom of the laneway will be a suitable deterrent to speeding. It is proposed that bands treated with cobble stones, etc. will be introduced along the laneway (including at the ramp transition directly to the north of the Stage 6 retail tenancy). It is considered that this treatment will have a similar effect as rumble strips acting as both a visual and acoustic indicator for vehicles to slow down.

Sculptural walls acting as seating opportunities will be introduced along the laneway to provide rest stops. It is considered that these measures will reinforce the shared nature of the laneway. Similar treatment has been successfully introduced at both the Antiques Precinct in Woolloongabba (as shown in Figure 5.3) and on Main Drive at QUT Gardens Point (as shown in Figure 5.4).



Figure 5.3: Shared Zone – Antiques Precinct at Woolloongabba



Figure 5.4: Shared Zone – Main Drive at QUT Gardens Point

The design of the laneway (including long and cross-section details) is provided in Appendix E. For ease of reference, a typical cross-section is shown below in Figure 5.5.

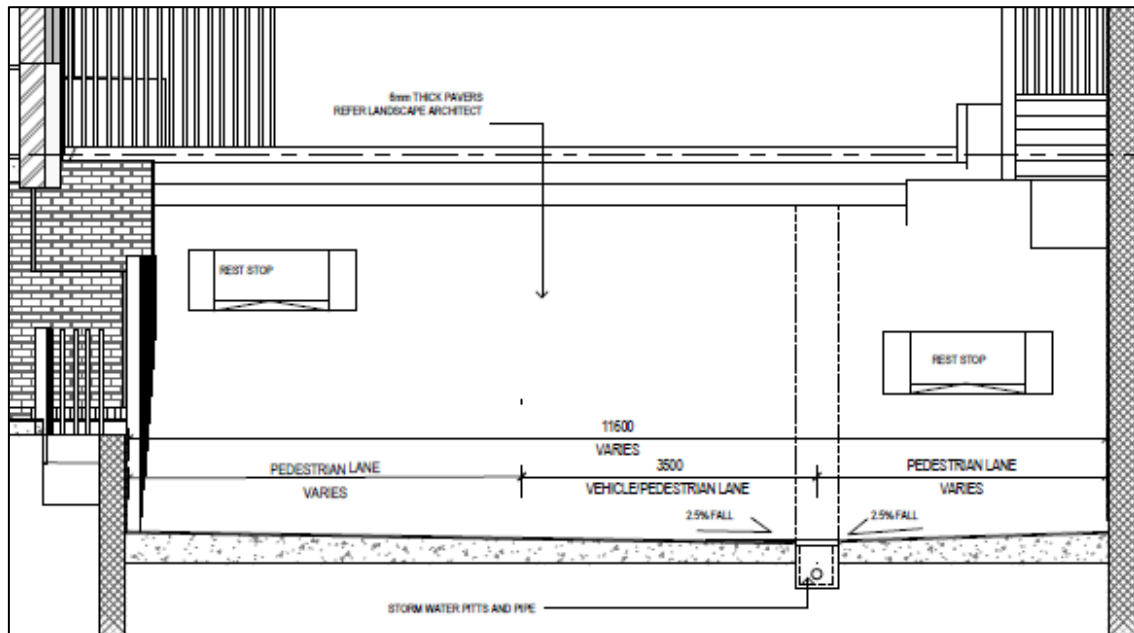


Figure 5.5: Typical Cross-Section along Laneway

As shown in Figure 5.5 the width of the trafficable portion of the laneway is 3.5m wide, which satisfies the requirements set out in *Australian Standard for Parking Facilities – Part 2: Off-Street Commercial Vehicle Facilities (AS2890.2:2002)* for use by service vehicles. Banding will be introduced along the edge of 3.5m wide trafficable section of the lane to ensure that

vehicles maintain the desired path of travel. The laneway will be adequately lit to ensure safe operation during night time hours.

The main grade of the laneway is 1:5.4 (18.5%), which is not really conducive to use by vehicles larger than a van (i.e. AS2890.2:2002 specifies a maximum grade of 1:6.5 for small rigid vehicles (SRVs) and above). Notwithstanding this, the transitions along the laneway have been designed to ensure that vehicles up to size of an Australian Standard medium rigid vehicle (MRV) do not 'bottom-out' in the event that they ignore the signage or get lost. Ground clearance analysis for a MRV is demonstrated in TTM Drawing 13BRT0407-SK09 included in Appendix F.

The key design parameters in accordance with AS2890.1 are set out in Table 5.3.

Table 5.3: Laneway Access Characteristics

Design Aspect	AS 2890.1 Requirement	Proposed Provision	Compliance
Crossover width	3.5m	3.5m	Australian Standards Compliant
Minimum distance intersection	6m from tangent point on kerb	36m from Brunswick Street	Australian Standards Compliant
Sight distance	Ideally 69m, minimum of 45m	80m to the west to the Brunswick Street / Water Street intersection, +100m to the east	Australian Standards Compliant
Gradient of first 6m	1:20 (5%)	1:20 (5%)	Australian Standards Compliant

5.4. Conclusion

Overall, the proposed access arrangements for the Central Village Master Plan site generally comply with Australian Standards requirements and are therefore considered acceptable.

6. Road Network Performance

6.1. Traffic Generation & Distribution

The Transport Roads & Maritime Service (TMRS) *Guide to Traffic Generating Developments* indicates that the peak hour trip generation characteristics of high density residential developments at metropolitan centres is between 0.07 - 0.32 trips/unit in the weekday AM peak-hour and between 0.06 - 0.41 trips/unit in the weekday PM peak-hour. The guide also provides traffic generation as a function of parking spaces, which equates to 0.09-0.29 trips/space in the weekday AM peak hour and 0.05-0.28 trips/space in the weekday PM peak hour. Considering that in this proposed development not all units have a car parking space, it is considered more appropriate to adopt the per parking space rate rather than the per unit rate for the purposes of estimating traffic generation.

Based on this, the estimated development traffic generation is shown in Table 6.1 and Table 6.2 below.

Table 6.1: Central Village Peak Hour Traffic Generation – AM Peak-Hour

Development Component	Number of Spaces	Traffic Generation Rate	Peak Hour Trips
Phase 1	371 spaces	0.09-0.29 vph/space	34 - 108 vph
Phase 2	517 spaces		47 - 150 vph
Total Development	888 spaces		81 – 258 vph

Table 6.2: Central Village Peak Hour Traffic Generation – PM Peak-Hour

Development Component	Number of Units	Traffic Generation Rate	Peak Hour Trips
Phase 1	371 spaces	0.05-0.28 vph/space	19 - 104 vph
Phase 2	517 spaces		26 - 145 vph
Total Development	818 spaces		45 - 249vph

The development peak hour traffic distribution on the surrounding road network was determined for each of the Phases 1 and 2, using the following generic assumptions:

- The higher end of the traffic generation ranges (i.e. 0.29 trips/space in the AM Peak and 0.28 trips/space in the PM Peak) have been adopted as a worst case scenario when calculating the intersection movement volumes shown.
- The in/out split development traffic is 25%/75% in the AM Peak and 75%/25% in the PM Peak.

With respect to the more specific characteristics of the distributions, the following assumptions were made for the Phase 1 development generated traffic:

- All vehicles entering the Phase 1 access on the new Trinity Street come from Water Street and Baxter Street. No traffic enters from the north (i.e. via Diggles Close). Assumed 40% will come from Baxter Street and 60% from Water Street.
- 70% of vehicles exit to the south from Trinity Street access, and 30% to the north. Out of all the vehicles exiting to the south, 50% head south along Baxter Street, 10% turn left into Anderson Street and 40% turn right into Constance Street.
- Out of all the vehicles exiting to the north from the Phase 1 access, 70% turn right onto Gregory Terrace to head east, and 30% turn left to head west.

Figure 6.1 shows the assumed distribution of inbound and outbound traffic for Phase 1.

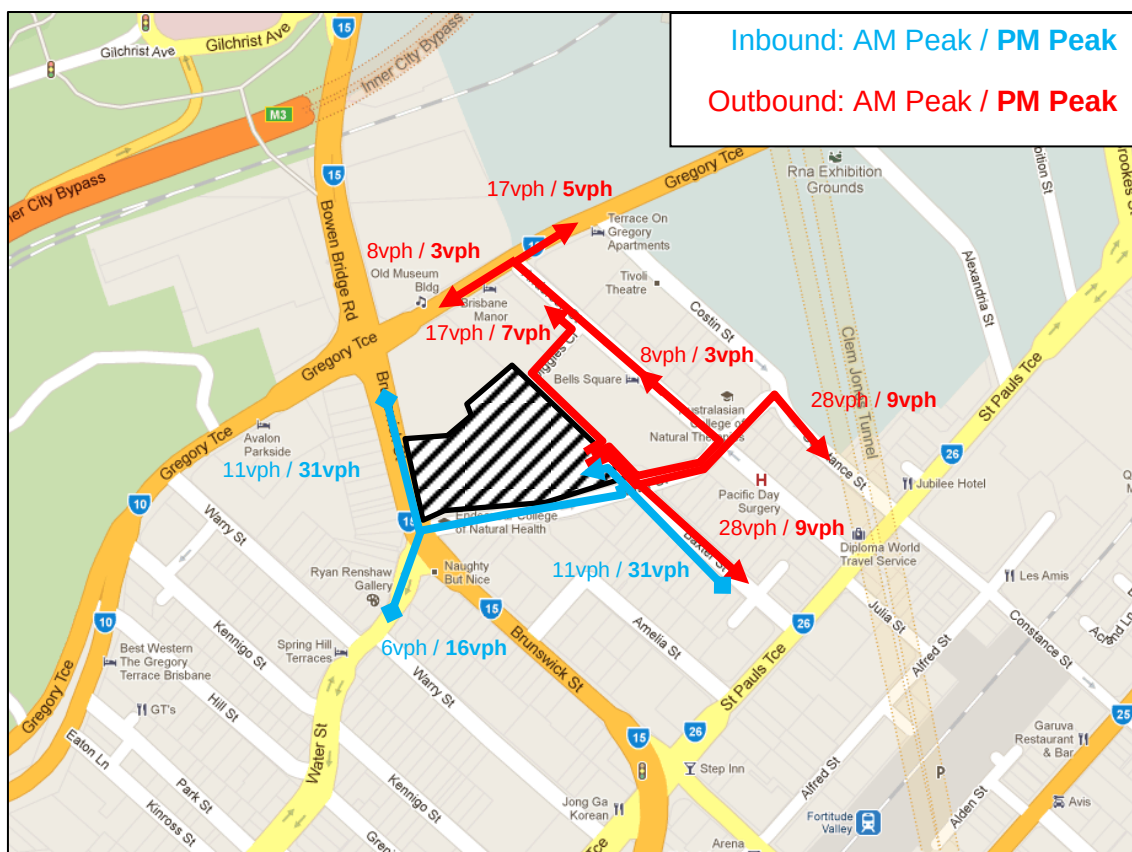


Figure 6.1: AM/PM Movements Peak Hour Traffic Volumes to/from Phase 1 Access

With respect to the more specific characteristics of the distributions, the following assumptions were made for the Phase 2 development generated traffic:

- 50% of vehicles entering Phase 2 will do so via that Water Street access; with 50% coming from the north (via Bowen Bridge Road) and 50% from the east (from the east side of Water Street).

- The remaining 50% of vehicles entering Phase 2 will do so via the access onto the new Trinity Street; with 70% of the traffic coming from the south (via Baxter Street) and 30% from the north (via Gregory Terrace).
- All the vehicles exiting Phase 2 will do so via the Water Street access.

Figure 6.2 shows the assumed distribution of inbound and outbound traffic for Phase 2.

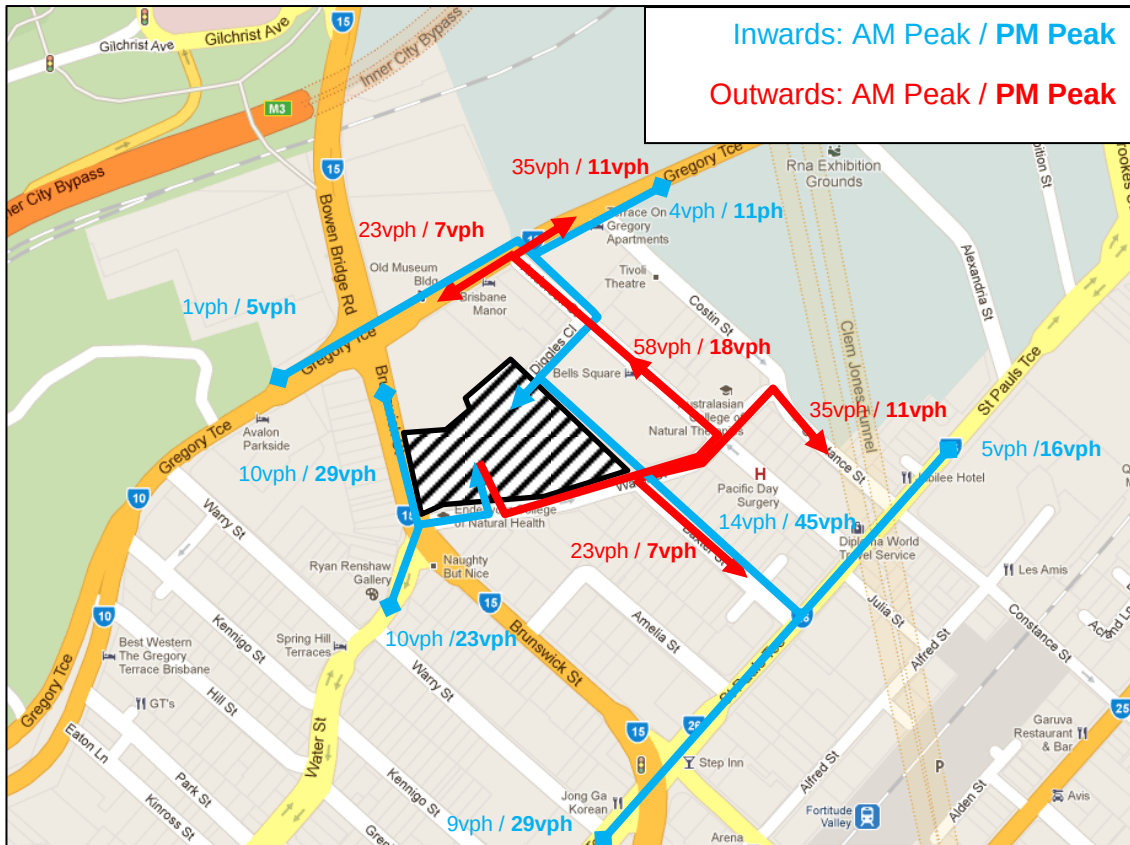


Figure 6.2: AM/PM Movements Peak Hour Traffic Volumes to/from Phase 2 Access

6.2. Development Impacts

It should be noted the 'Bowen Hills Traffic Model' – which was developed by TTM for the former ULDA to assess the area wide road network performance and impacts of the various development projects within the Bowen Hills UDA – previously used generic traffic generation rates for the site of the proposed Central Village development.

This was based on assumed land redevelopment yields and maximum plot ratios specified in the former Bowen Hills UDA Development Scheme.

The outputs of the model show the traffic generation estimated from this site was 174vph in the AM Peak and 173vph in the PM Peak. These peak hour volumes are generally consistent with the development traffic generation range shown in Table 6.1.

In light of this fact, TTM previously prepared a letter in June 2012 comparing the proposed development generated traffic on roads surrounding the site for both the original 'Bowen Hills Traffic model' and revised model with development yield of 1,038 units (and peak hour generation of 244vph). Whilst it is understood that EDQ are in the process of updating the 'Bowen Hills Traffic Model' given that the proposed revised scheme provides an anticipated traffic generation of between 81-258vph in the AM Peak and 45-249vph in the PM Peak, TTM considers the results are still valid for comparison purposes. The results of the comparisons documented in June 2012 showed that the effects of the revised yield (compared to the original model) would be negligible. TTM considers this will still be the case for the new development size of 1,085 units and that overall impacts of this development have already been considered in the planning of future road infrastructure for Bowen Hills UDA, as per the "Bowen Hills Network Analysis Report" submitted to the former ULDA.

A copy of the Road Modelling and Impacts Analysis Letter prepared by TTM (TTM Ref. '27703let_traffic model update', Dated 20th June 2012) is included for reference in Appendix G.

6.3. Two-Way Conversion of Water Street

The future road planning activities summarised in Figure 3.1 show a conversion of Water Street to two-way flow is proposed between Brunswick Street and Anderson Street/ Misterton Street. Road widening and two-way conversion works along the full section of roadway between Brunswick Street and Baxter Street is unable to be performed until the property on the south corner of the Brunswick Street / Water Street intersection is redeveloped, and rededication of land for road reserve (to facilitate two lanes at the intersection approach).

With respect to the remaining section between Baxter Street and Anderson Street / Misterton Street, it is understood that the approval conditions of Stage 2 of the development required the upgrade and conversion of Water Street to two-way flow between these roads prior to completion of Stage 2 works (as per Condition 25b of the EDQ approval for DEV2012/392).

7. Service Vehicle Arrangements

The service vehicle facility needs to accommodate the demands generated by the residential components of the development. Although the development also incorporates a small amount of retail space and a number of Sole Occupancy/Home Office (SOHO) uses, the service vehicle size and general demand generated by these uses is not likely to be larger than the residential component.

It is noted that all of the residential apartments within the development are one or two bedroom units and are targeted at the investor market, which relates to a high proportion of rental units. Whilst this may relate to a higher turn-over of tenants, most tenants typically have less furniture to move in/out of the unit and so utes or vans will more typically be expected for furniture removals, with the occasional larger furniture trucks. With respect to furniture trucks, it is expected that smaller MRV sized trucks would service the small units for this site as opposed to traditional LRVs used for larger units and houses where the volume of furniture being relocated is greater.

Given the size of each Phase of this project, it is expected that there will be frequent furniture vehicle access to the site. To accommodate this expected vehicle demand, it is proposed that a management strategy will be implemented to control the timing of furniture/removals vehicles accessing the site. This will involve the building manager allocating a specific time period for residents to move in/out, by providing access to the service area and priority over an elevator/lift to transport goods to the respective units. On this basis, it is TTM's view that the ability to schedule the timing of the trucks will allow for appropriate sharing of the service vehicle area and as such a single MRV bay and a number of dedicated VAN bays for smaller delivery vehicles is considered acceptable. Given the number of units in each of the Phases, regular refuse collection is likely to be needed and so TTM feels a dedicated RCV bay is warranted. The design RCV considered acceptable for the proposed developments is the 10.3m rear-loading trucks currently being rolled-out by BCC Waste Services. Given the refuse collection times/periods is usually scheduled, the RCV bay can also be used as an additional loading bay for residential deliveries/furniture removals outside of collection times.

The proposal provides two separate service areas; one area each for both Phase 1 and 2 of the development. Each service area will consist of 2 dedicated VAN bays, 1 MRV bay and 1 RCV bay.

Service vehicle swept path analysis of the Phase 2 service area is illustrated in Drawing No. 13BRT0407-SK01 in Appendix H.

To provide further details on how the loading area and internal driveway will be delineated, TTM has also provided a concept signs and line marking plan which is detailed in TTM Drawing 13BRT0407-SK10 in Appendix C.

8. Public Transport, Pedestrian and Bicycle Facilities

8.1. Public Transport

As indicated previously the subject site enjoys a high level of connectivity to the public transport network. The master plan allows for the inclusion of an indented bus bay which is consistent with BCC planning outcomes.

It has been demonstrated that the proposed development accords with Translink's requirements whereby public transport can be accessed within a 5 minute (400m) walk of the site. The fact that there is an indented bus bay also being constructed on the Brunswick Street frontage of the site is likely to allow for increased frequency and an expanded range of services to be added in the future, improving the overall public transport serviceability and connectivity of the site.

8.2. Pedestrians and Cyclists

Trinity Street and the one-way laneway branching from Water Street have both been designed as spaces to be shared by pedestrians and vehicles. Through the use of contrasting paving materials, planting, street furniture and outdoor seating an environment will be achieved where drivers understand intuitively to maintain low speeds and be aware that other people will be using the space.

EDQ requires 1 resident's bicycle space per apartment plus 1 visitor's space per 400m² GFA. In terms of the non-residential uses, employees are to have 1 bicycle space per 200m² NLA with 1 visitor space per 1000m² NLA.

Based on the approved bicycle parking provisions for Stages 1 -3, the wider Phase 1 of the development will provide a total of 634 bicycle parking spaces.

With respect to Stage 4 & 5, the total development yield of 369 units (and approximately 23,904m² GFA equates) to an EDQ parking requirement of 369 resident bicycle parking spaces and 60 visitor bicycle parking spaces. The non-residential uses of Stage 4 & 5 (totalling approximately 233m²) also require bicycle parking provisions of 3 spaces for employee use, and 1 space for visitor use. The proposed design of Stages 4 & 5 will incorporate a total supply of 438 bicycle parking spaces; including 369 resident bicycle parking spaces, 2 employee spaces and 67 spaces for visitors. The total parking supply therefore satisfies EDQ requirements.

In relation to Stage 6, the total development yield of 196 units (and approximately 12,584m² GFA equates) to an EDQ parking requirement of 196 resident bicycle parking spaces and 32 visitor bicycle parking spaces.

The proposed design of Stages 6 will incorporate a total supply of 230 bicycle parking spaces; including 196 resident bicycle parking spaces, 2 employee spaces and 33 spaces for visitors. The total parking supply therefore satisfies EDQ requirements.

Direct access from the car park to Water Street is available via a dedicated two-way cycle lane along the edge of the loading area (through to the lift core). It is also proposed that all areas throughout the car park will be signed as a 10kph 'shared area' and as such all users will enjoy equal priority. The gradients of the ramps within the various car parking levels align with the requirements set out in the *National Construction Code (NCC)* and *Austroads Part 14 – Cyclists* and permit access by both pedestrians and cyclists. As shown in the modified car park plans included in Appendix A, a link designed in accordance with *Australian Standard for Parking Facilities – Part 3: Bicycle Parking Facilities (AS2890.3:1993)* has been introduced adjacent to the fire tank room at podium level 1 in order to improve connectivity for both pedestrians and cyclists to the Stage 4 elevators.

It is proposed that all bicycle parking spaces will be located within the secured basement/podium footprints of Phase 2. The visitor spaces in particular will be located within the designated visitor car parking areas of Podium 1 level, easily accessible via the dedicated cycle path from Water Street and in close proximity to residential building elevators.

Overall, Phase 2 will provide a total of 668 bicycle parking spaces, which when added to the approved 634 spaces provided for Phase 1 equates to a total bicycle parking provision of 1,302 spaces

9. Recommendations

9.1. Impact on Surrounding Road Network

The impact of the whole Central Village development has effectively been accounted for in the original Bowen Hills Traffic Model established for the wider Bowen Hills UDA. Any road network impacts and proposed improvements are detailed in the original Bowen Hills Network Analysis Report provided to the former ULDA.

9.2. Car Parking Arrangements

The proposal includes 818 parking spaces distributed over the two car parking areas; including 371 spaces as part of the Phase 1 car park and 517 spaces as part of the Phase 2 car park.

The 517 spaces as part of Phase 2 include 325 spaces for Stage 4 & 5 and 192 spaces for Stage 6. Included in the Phase 2 parking supply is 4 spaces for retail use, which is generally consistent with EDQ allowances. The wider resident parking supply for Phase 2 also include provision for 7 PWD parking spaces, consistent with BCA requirements. Overall, the proposed parking provisions for Phase 2 of the Central Village Master Plan are considered acceptable.

Detailed design of the basement car park for Phase 2 has been undertaken in accordance with the requirements of AS2890.1; albeit with some minor performance solutions which have been demonstrated by TTM to be acceptable.

9.3. Development Access

The Central Village development contains four access points onto the external road network; two for the Phase 1 precinct and two for the Phase 2 precinct. These arrangements are considered satisfactory in providing a high level of accessibility to the site and cater for the anticipated travel demands associated with the development. The accesses are designed generally in accordance with the requirements of AS2890; however, some alternative solutions are proposed with respect to queuing capacity and internal laneway gradient, which have been deemed acceptable.

9.4. Service Vehicle Arrangements

The proposal provides 2 VAN bays, 1 MRV bay and 1 RCV bay for each of the service areas for Phases 1 and 2. These service vehicle facilities are considered to be sufficient to service the demands of the development.

9.5. Public Transport and Bicycle / Pedestrian Facilities

The site is well located in terms of providing a high level of accessibility to public transport, with the Fortitude Valley train station within easy walking distance of the site. This reinforces the proposal to constrain resident car parking and encourage residents to use public transport.

1,303 bicycle spaces are provided in the proposal, comprising primarily secure spaces located in the basement parking area and a small number of public spaces in communal areas of the site.

Based on the approved bicycle parking provisions for Stages 1 -3, the wider Phase 1 of the development will provide a total of 634 bicycle parking spaces.

The proposed design of Phase 2 will incorporate a total supply of 668 bicycle parking spaces, split between resident, employee and visitor use, which largely satisfies the respective EDQ requirements.

Appendix A Central Village Master Plan Phase 2 Car Park Plans

Central Village Phase 2, Stages 4, 5 and 6:

Parking Staging & Summary

20/05/15



14037 Water Street - PHASE 2 (Stages 4 , 5 & 6)

Carpark Summary

20.05.15

bureau^proberts

CARPARKING SUMMARY - CARS / MOTORCYCLES / BICYCLES

PHASE 2	APARTMENT MIX		
	1 BED	2 BED	TOTAL
STAGE 4	162	149	311
STAGE 5	39	19	58
STAGE 6	82	114	196
TOTAL	283	282	565

CARS PROVIDED							MOTORCYCLES
RESIDENTIAL		VISITORS (5%)	GO GET VEHICLES	TOTAL	TANDEM (RESIDENTS)	RETAIL (STAFF / VISITORS)	RESIDENTS (5%)
1 BED	2 BED						
102	149	16	3	270	2	2	14
25	19	3	1	48	1	1	2
52	114	10	2	178	14	1	10
461		29	6	496	17	4	26

BICYCLES PROVIDED			
RESIDENTS	VISITORS (1 PER 400m2 G.F.A.)	RETAIL STAFF (1 PER 200m2 RETAIL G.F.A.)	RETAIL VISITORS (1 PER 1000m2 RETAIL G.F.A.)
311	56	1	1
58	10	1	
196	33	1	
565	99	3	1

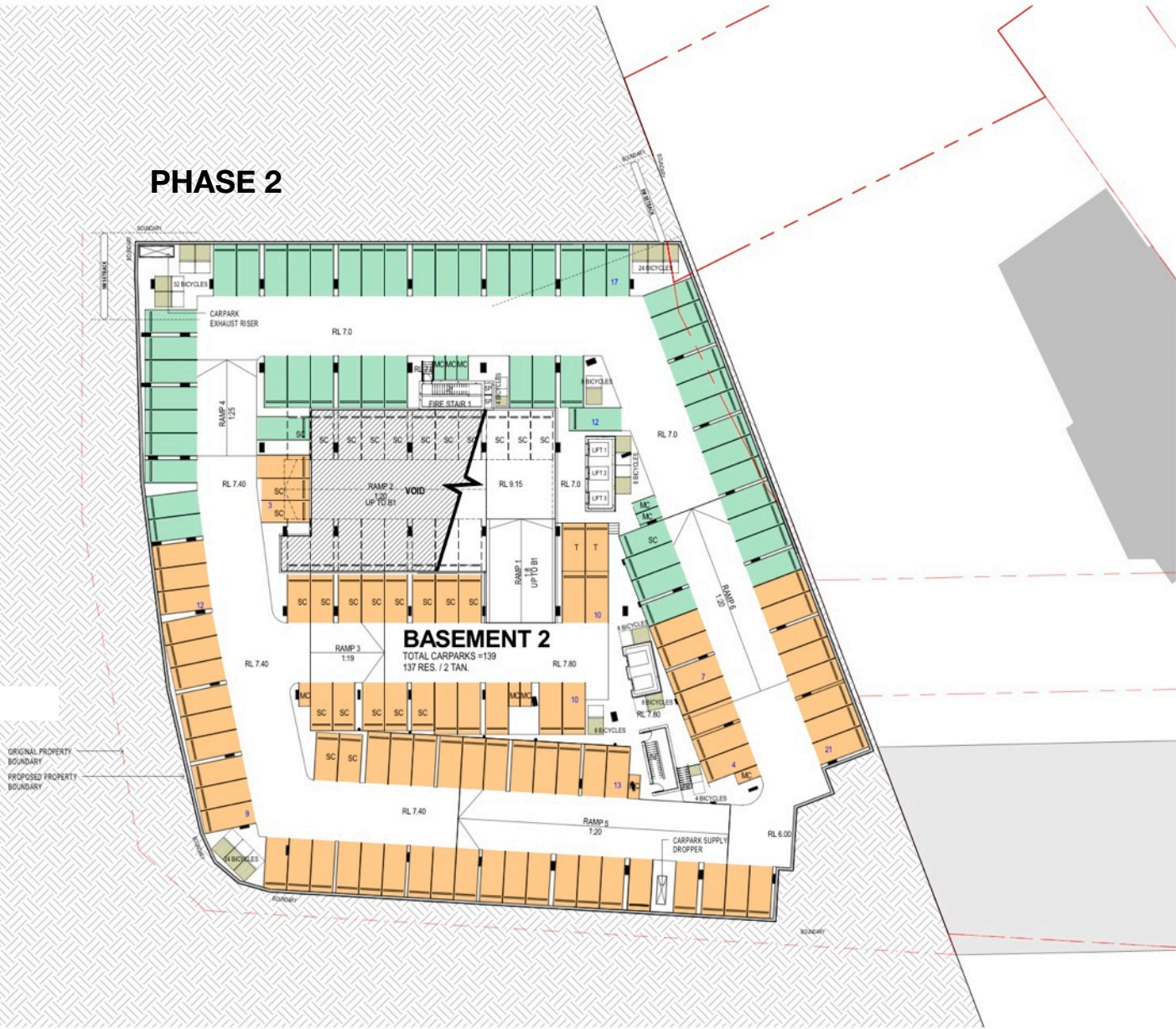
STAGES 4-6 SHARED LOADING BAYS			
VAN	MRV	RCV	TOTAL
2	1	1	4
2	1	1	4

LEGEND - CAR PARK STAGING

- STAGE 4 CAR PARKS
- STAGE 4 VISITOR CAR PARKS
- STAGE 5 CAR PARKS
- STAGE 5 VISITOR CAR PARKS
- STAGE 6 CAR PARKS
- STAGE 6 VISITOR CAR PARKS
- SERVICE LOADING BAYS
- RETAIL CAR PARKS

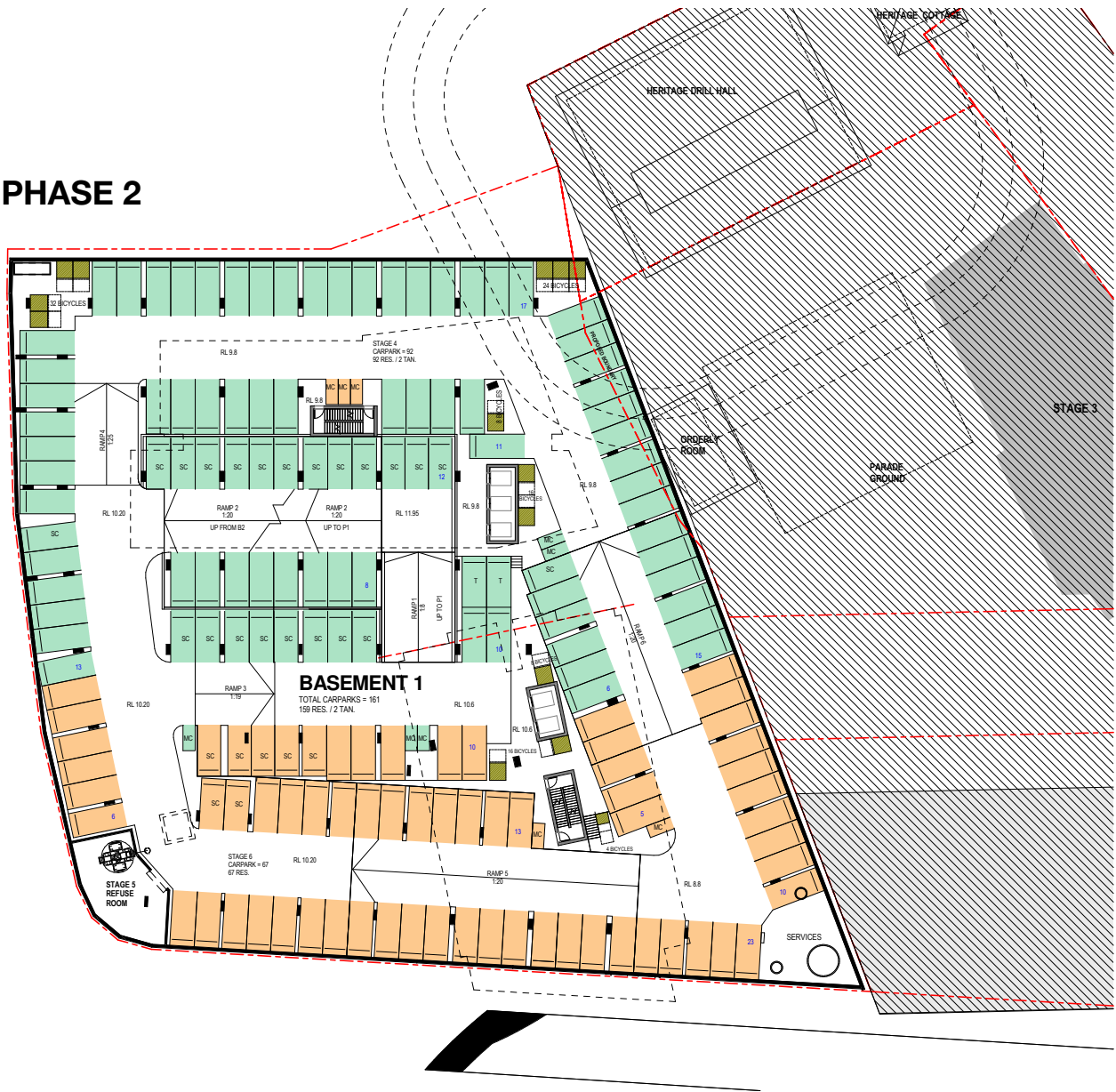


PHASE 2



BASEMENT 2

PHASE 2

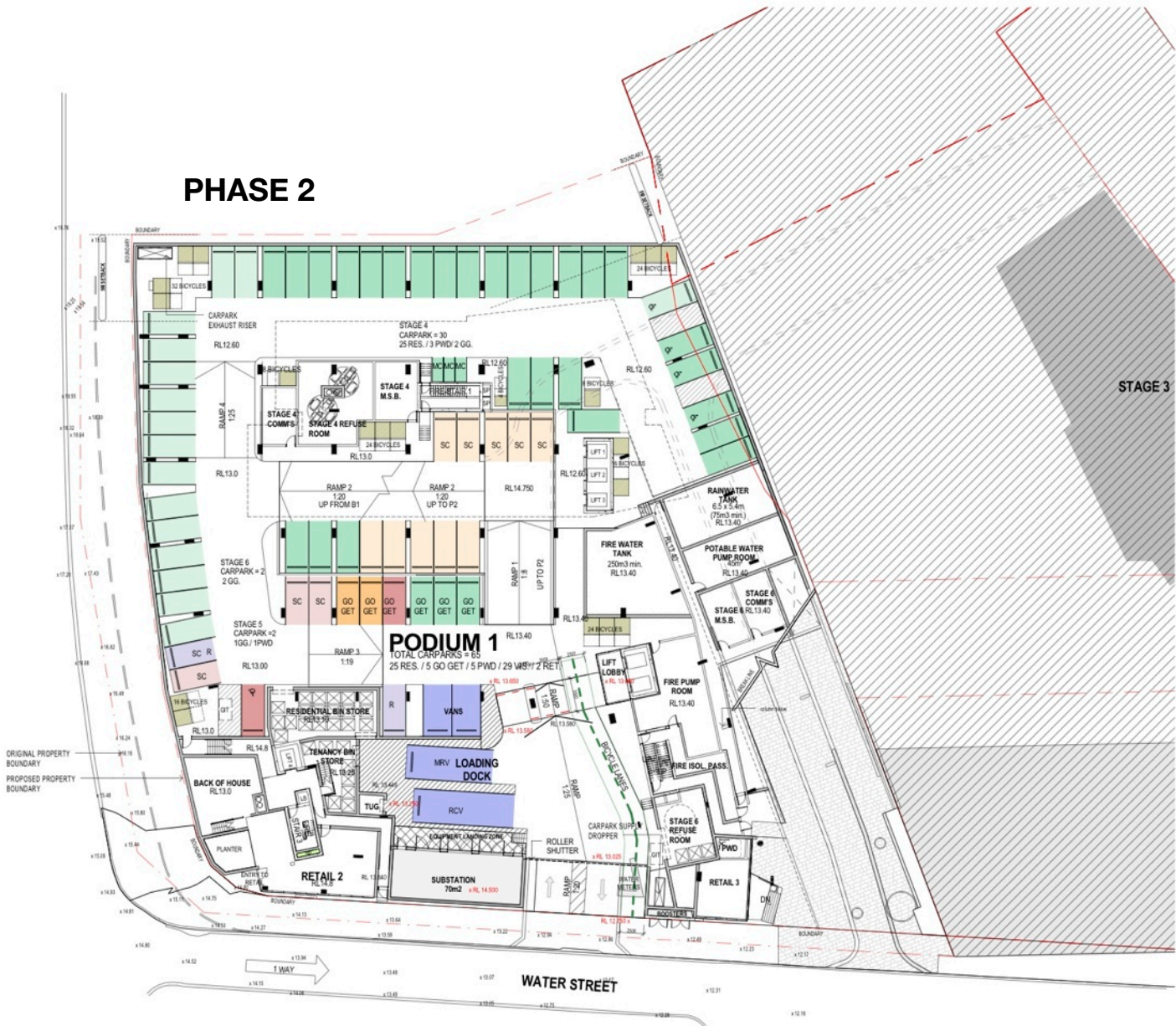


BASEMENT 1

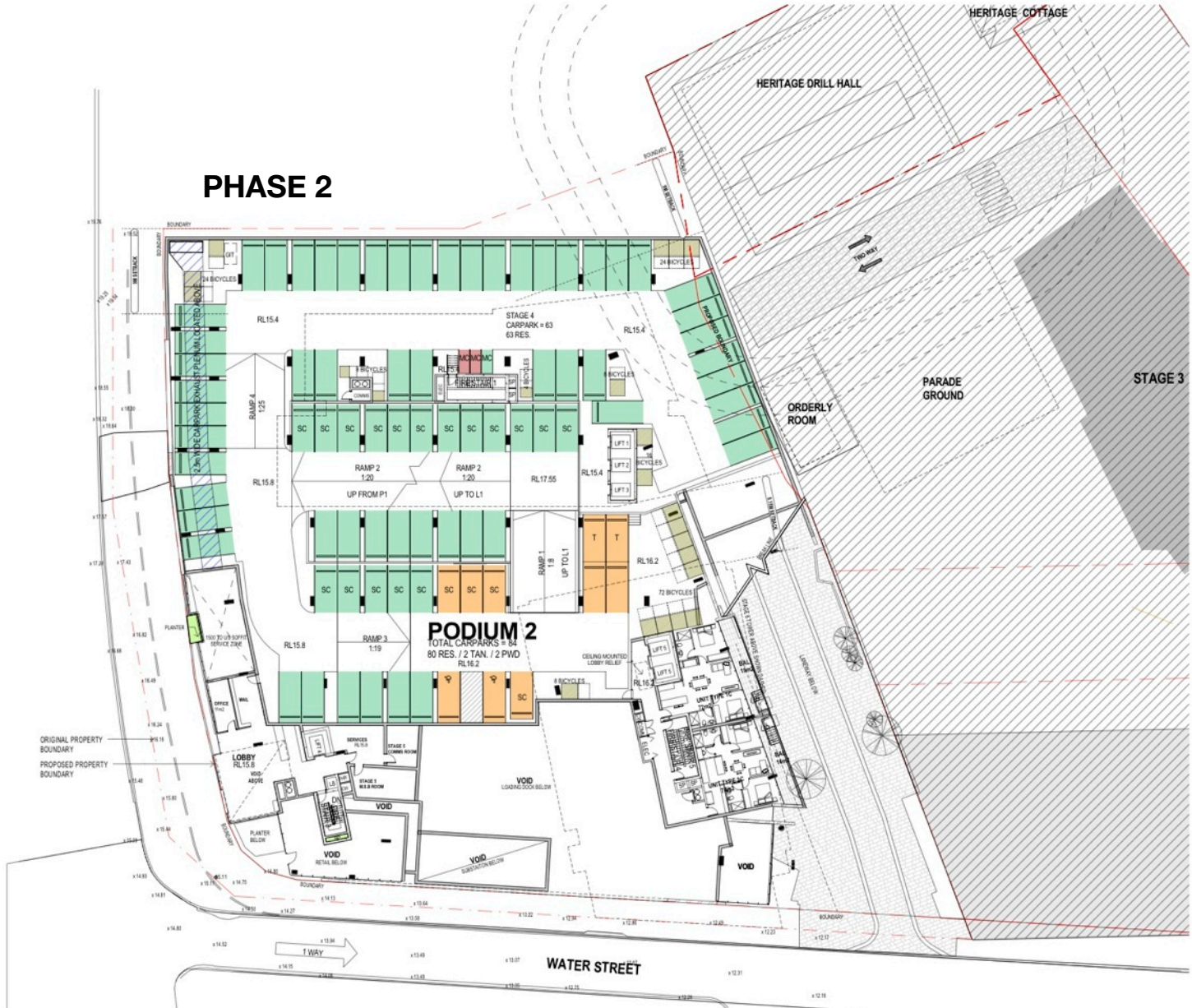
LEGEND - CAR PARK STAGING

- STAGE 4 CAR PARKS
- STAGE 4 VISITOR CAR PARKS
- STAGE 5 CAR PARKS
- STAGE 5 VISITOR CAR PARKS
- STAGE 6 CAR PARKS
- STAGE 6 VISITOR CAR PARKS
- SERVICE LOADING BAYS
- RETAIL CAR PARKS





PODIUM 1

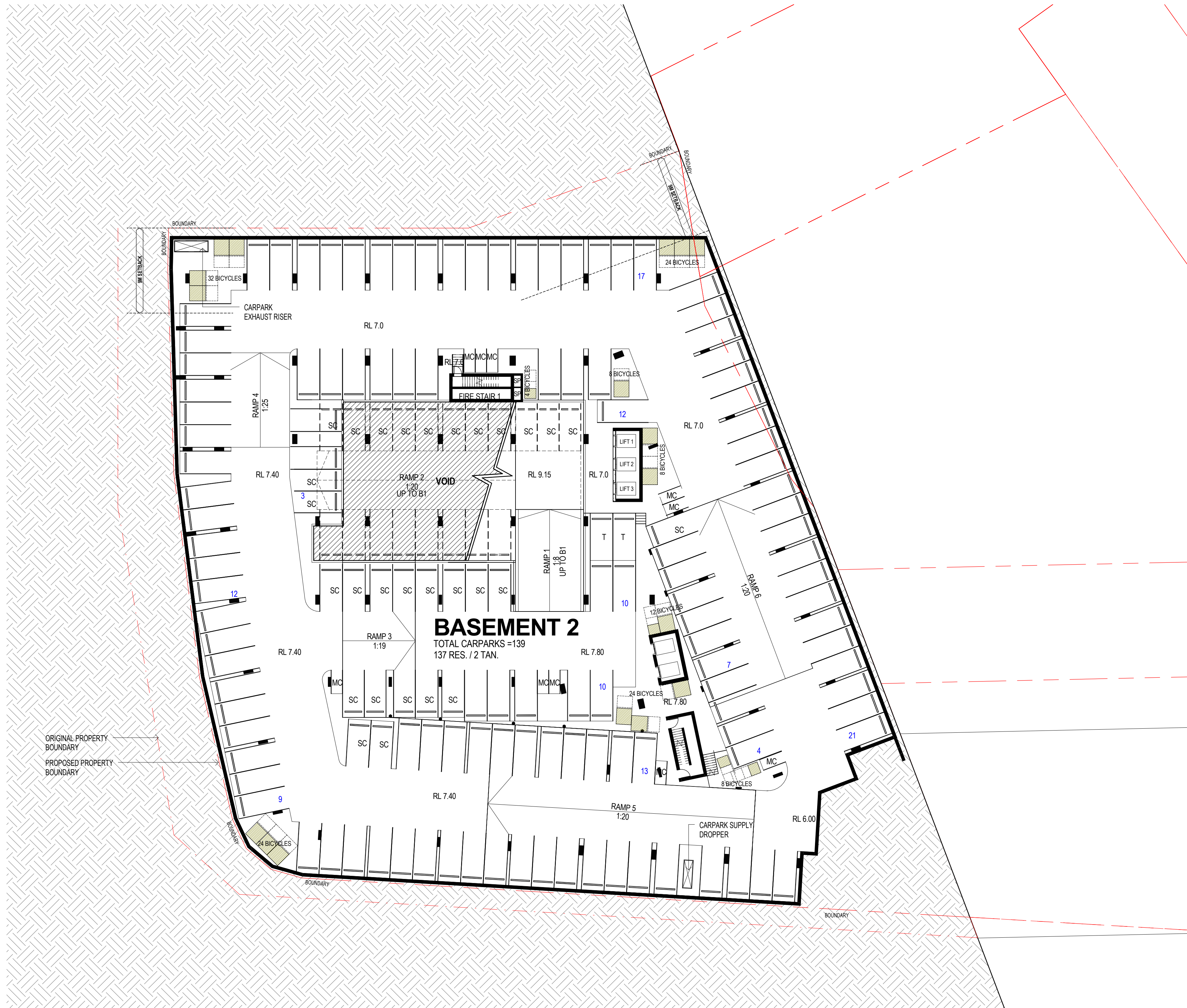


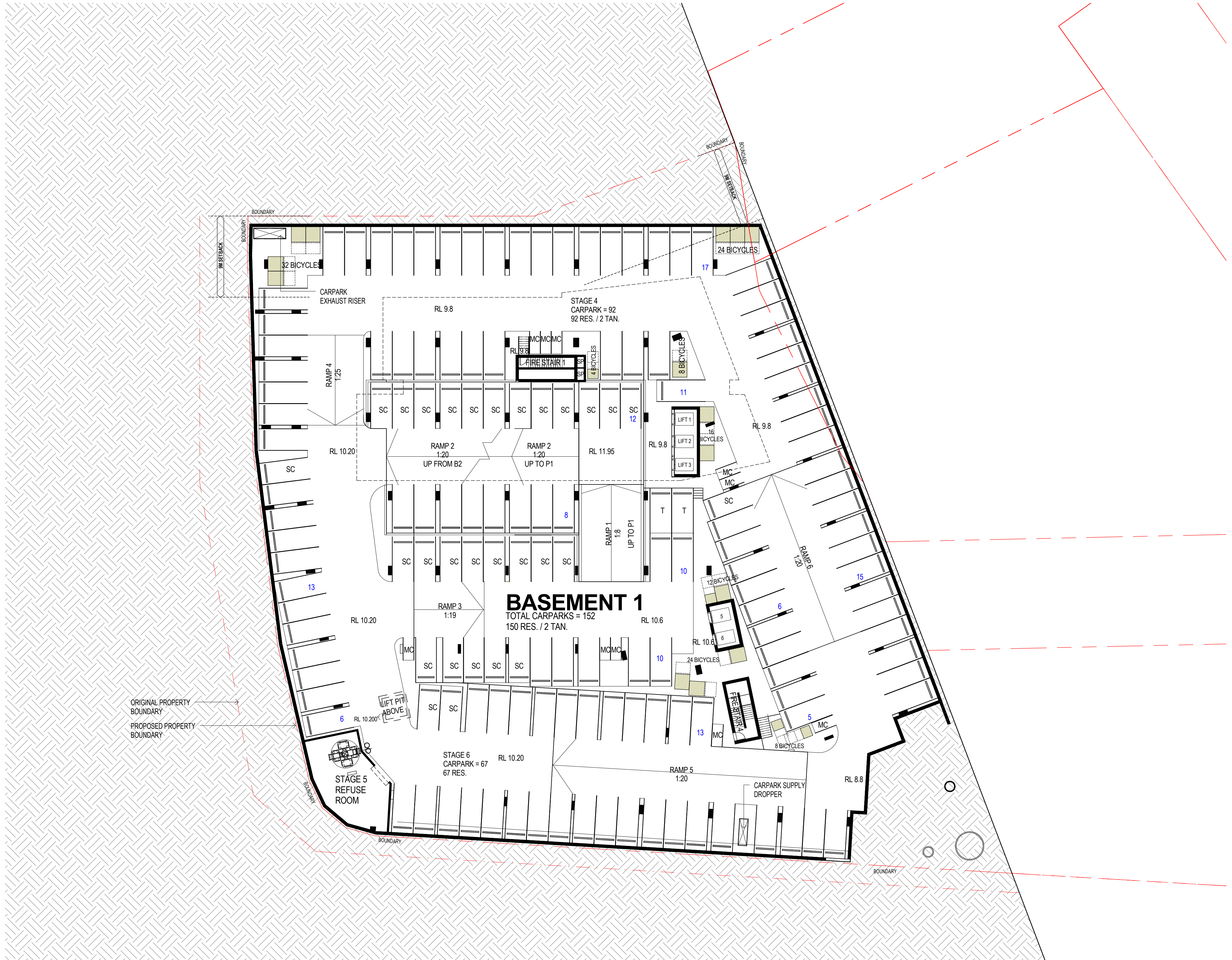
PODIUM 2

LEGEND - CAR PARK STAGING

- STAGE 4 CAR PARKS
- STAGE 4 VISITOR CAR PARKS
- STAGE 5 CAR PARKS
- STAGE 5 VISITOR CAR PARKS
- STAGE 6 CAR PARKS
- STAGE 6 VISITOR CAR PARKS
- SERVICE LOADING BAYS
- RETAIL CAR PARKS





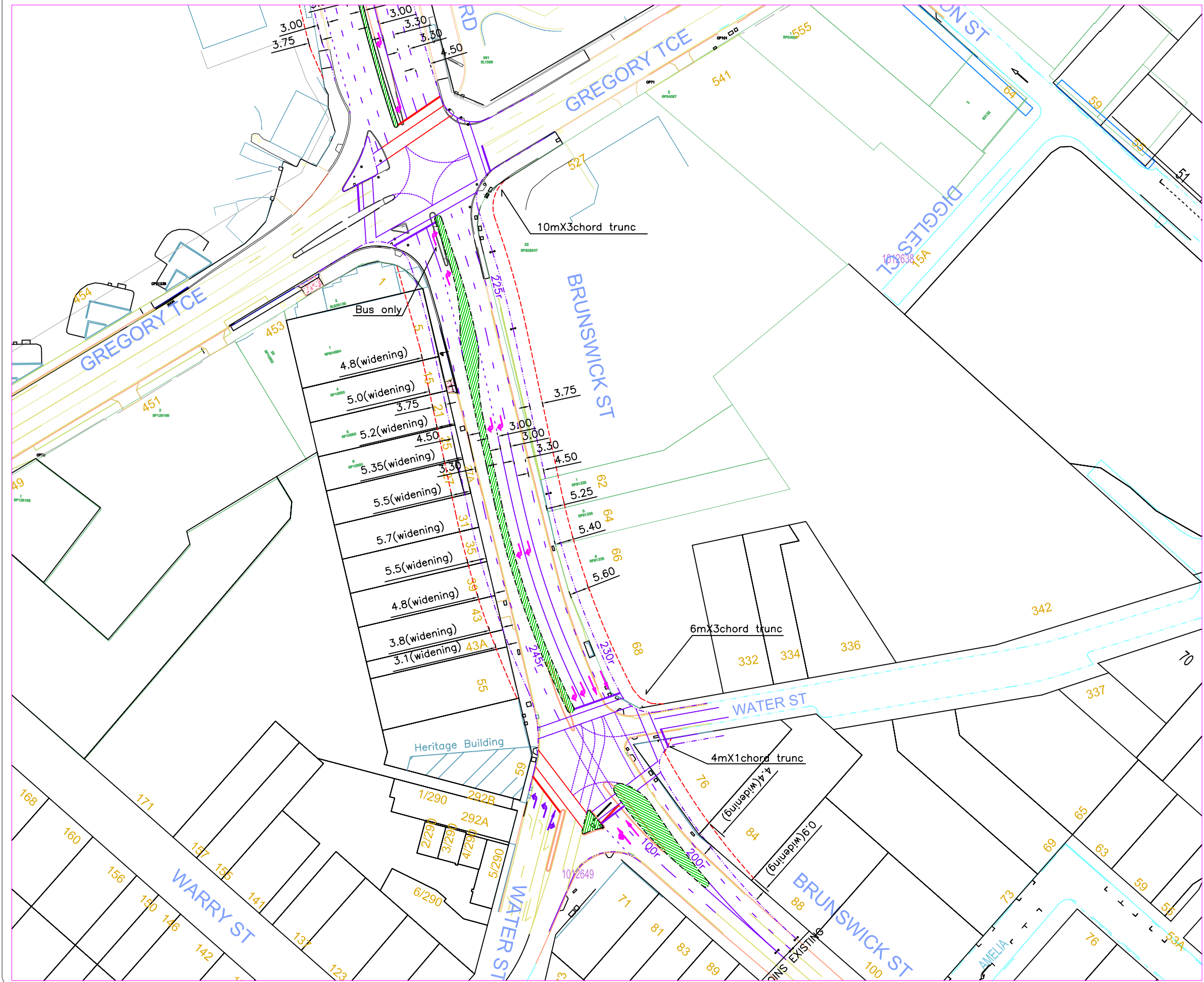






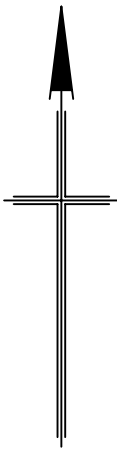


Appendix B BCC Concept Roadworks Design - Brunswick Street (DWG. RPN677)



CONCEPT PLAN
FOR COMMENTS ONLY

REDUCED COPY
HALF SIZE



NOTE
THE REAL PROPERTY BOUNDARIES SHOWN ON THIS CONCEPT PLAN ARE INDICATIVE ONLY. EXTREME CARE SHOULD BE EXERCISED IN THE USE OF THIS INFORMATION.
VARIATIONS IN CONCEPT TO BE APPROVED BY BCC TRANSPORT & TRAFFIC BRANCH (NETWORK INFORMATION).
FINAL DESIGN PLANS MUST INDICATE THE LOCATION OF THE ACTUAL BOUNDARIES ON BOTH SIDES OF THE ROAD RESERVE, AFTER THEY HAVE BEEN IDENTIFIED BY A LICENSED SURVEYOR.

LEGEND
EXISTING PROPERTY BOUNDARY
KERB AND CHANNEL
KERB ONLY
PROPOSED PROPERTY REQUIREMENT

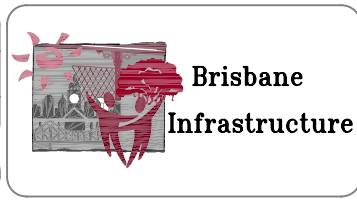
A	Original Issue				
ISSUE	AMENDMENT	DRAWN DATE	CHK'D DATE	APPR'D DATE	

CAD REF: G:\PROJECTS\DRAWINGS\brunswick-aerial.DWG
FULL SIZE A1

DIVISIONAL MANAGER
BRISBANE INFRASTRUCTURE

MANAGER
TRANSPORT AND TRAFFIC

DESIGNED	CVF 6-7-12	FILE NO.	
TRACED		SURVEY NO.	
CHECKED		ASSOCIATED PLANS	

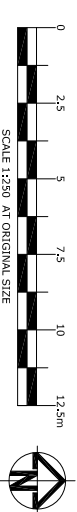


BRISBANE CITY COUNCIL – BRISBANE INFRASTRUCTURE

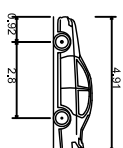
CONCEPT DESIGN
PROPOSED ROADWORKS
BRUNSWICK ST– FORTITUDE VALLEY

NO. 1 IN SET OF 1
RPN677
A

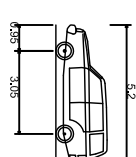
Appendix C TTM Internal Vehicle Circulation and Car Park Detail Drawings



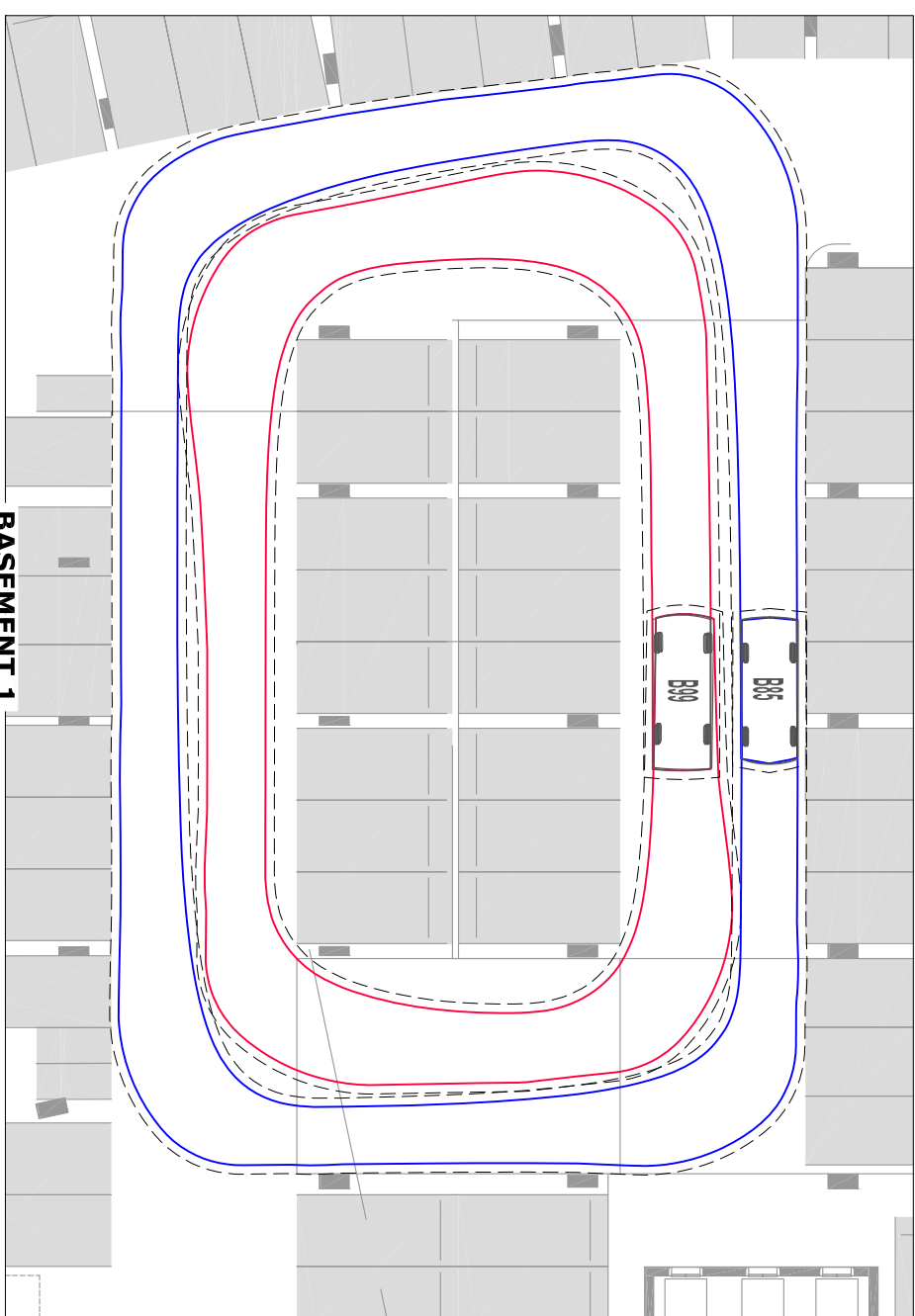
NOTE:
LEVEL 1 SWEEP PATHS ARE
INDICATIVE TO INTERNAL AISLES
THROUGHOUT OTHER LEVELS



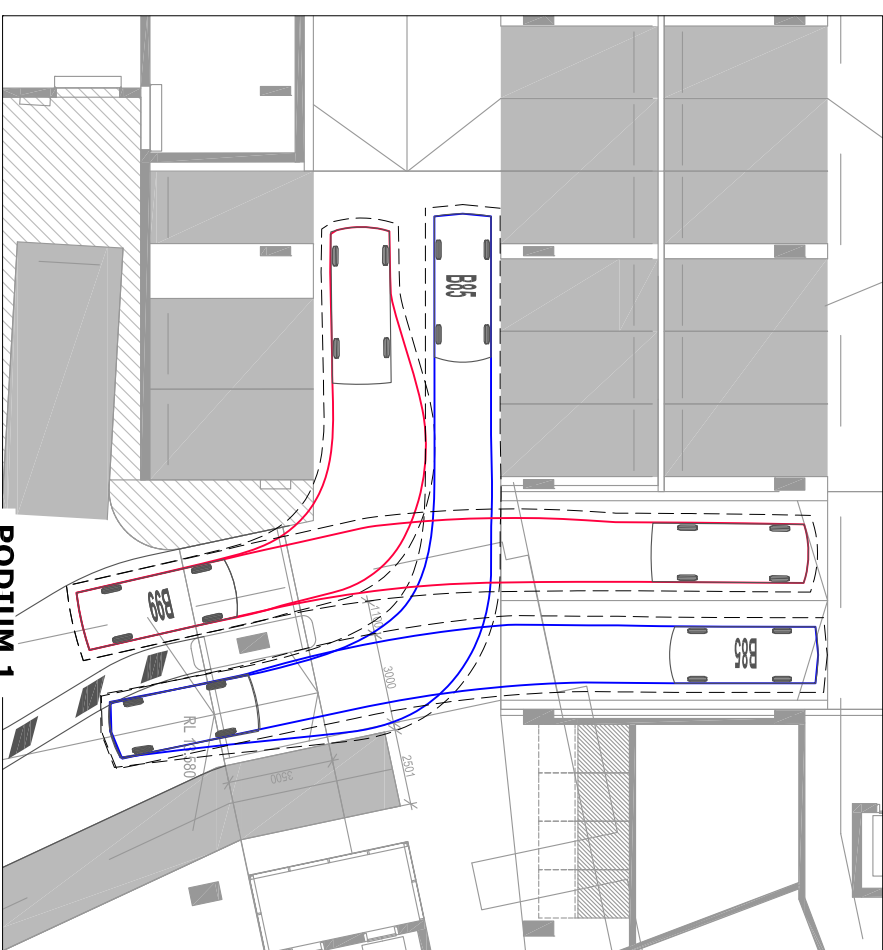
B85 Vehicle (Realistic min radius) (2004)	
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m



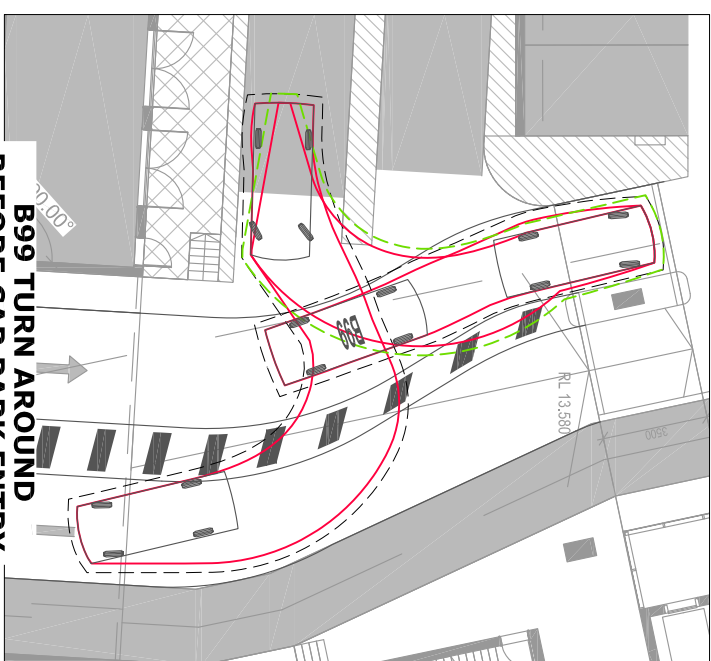
B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m



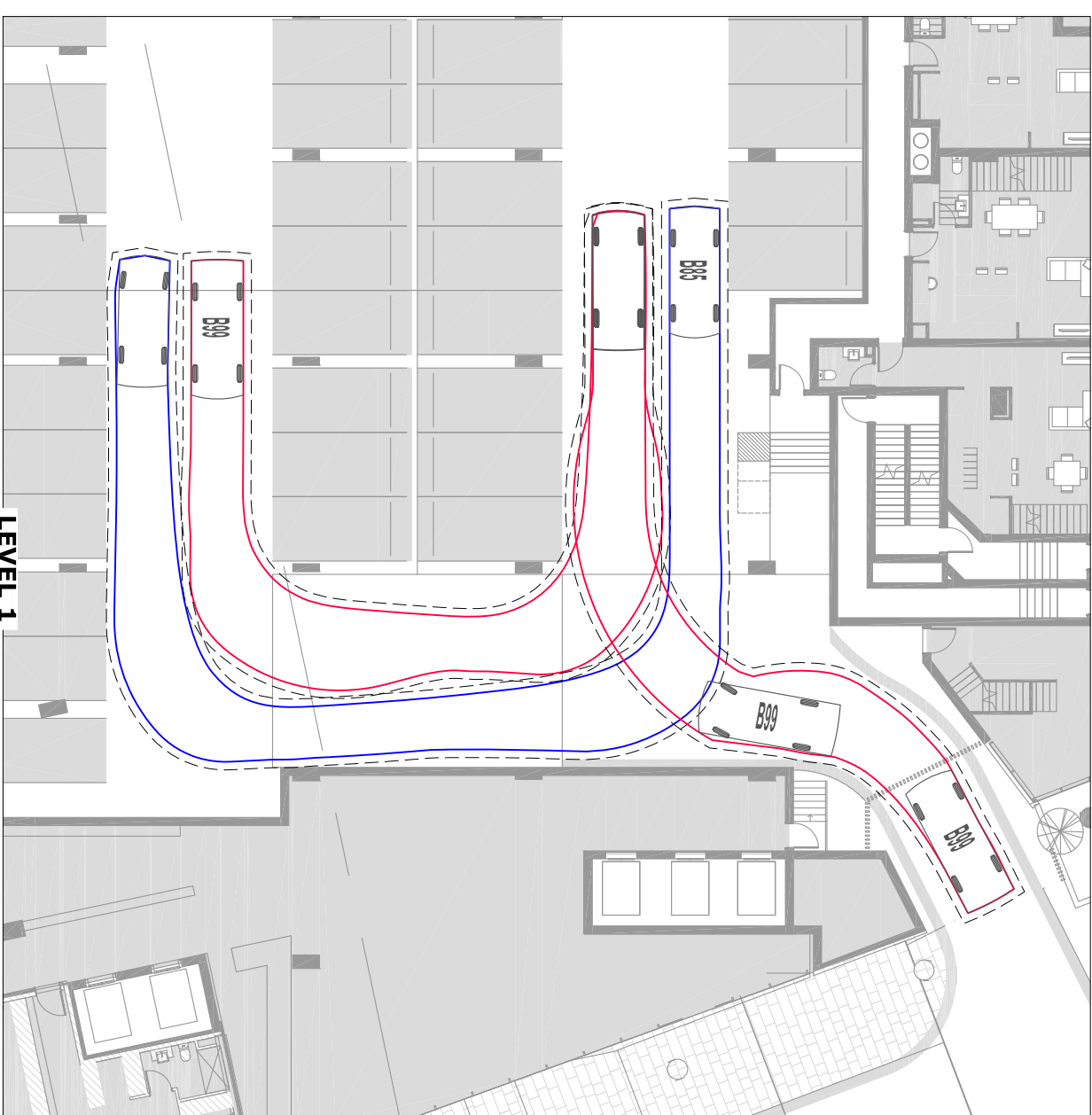
BASEMENT 1



PODIUM 1



B99 TURN AROUND
BEFORE CAR PARK ENTRY



LEVEL 1

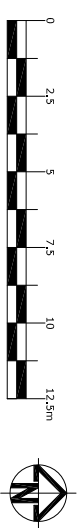


TTM CONSULTING PTY LTD
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T: (07) 3327 9500 F: (07) 3327 9501
E: ttm@ttmgroup.com.au W: www.ttmgroup.com.au

CENTRAL VILLAGE PHASE 2 DA

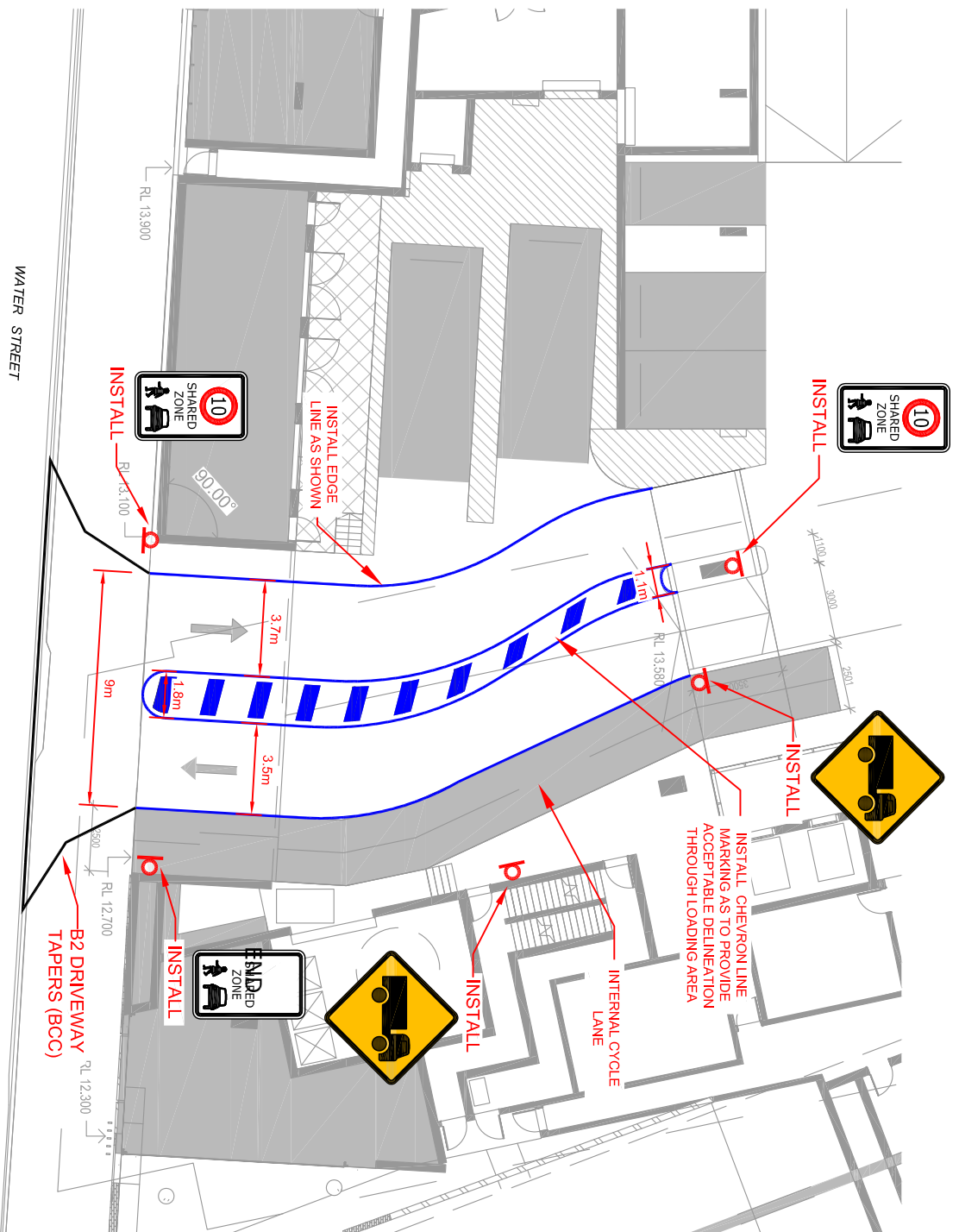
INTERNAL CIRCULATION
SWEEP PATH ANALYSIS

TTM REFERENCE	REVISION
13BRT0407-SK11	A
DRAWN BW	CHECKED AR
DATE 31 MARCH 2015	



NOTES

1. DESIGN FINALISTION ISSUED FOR EDO - DSDIP APPROVAL.
2. TRAFFIC SIGNS AND LINE MARKINGS ARE TO BE INSTALLED IN ACCORDANCE WITH MUTCD GUIDELINES (PART 2).
3. LOCATION OF TRAFFIC SIGNS TO BE DETERMINED ON SITE BASED ON EXISTING STRUCTURES AND VISIBILITY.



TTM CONSULTING PTY LTD

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E: ttmbrts@ttmgroup.com.au W: www.ttmgroup.com.au

CENTRAL VILLAGE PHASE 2 DA

TRAFFIC SIGNS AND LINE MARKING PLAN PODIUM LEVEL 2 [LOADING AREA ENTRY]

TTM REFERENCE

13BRT0407-SK10 D

DRAWN

BW

CHECKED

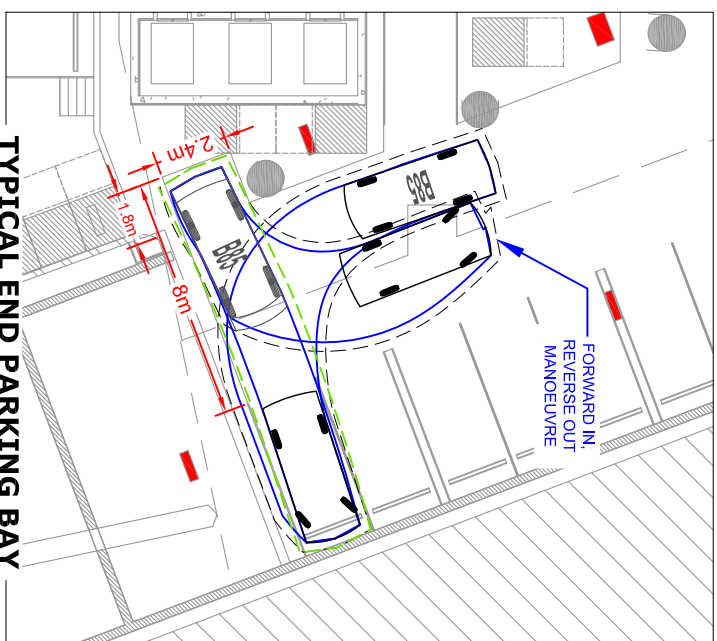
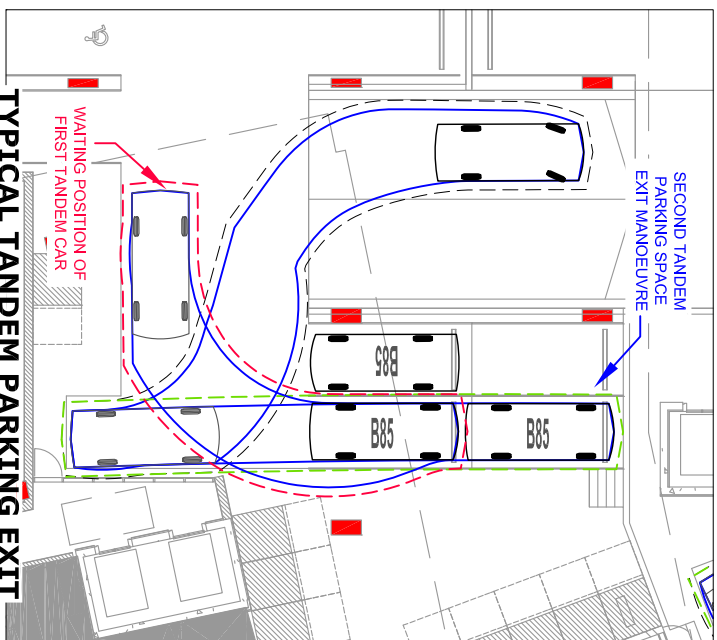
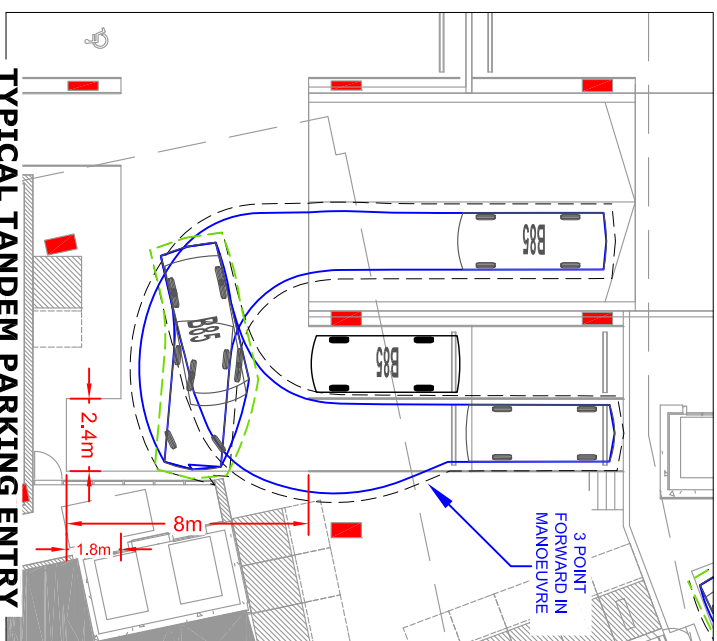
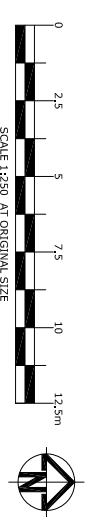
AR

DATE

31 MARCH 2015



TRAFFIC • PARKING • ACOUSTICS



TTM CONSULTING PTY LTD



ABN 65 010 868 621
LEVEL 1, 129 LOGAN ROAD, WOOLLOONGABAH, QLD, 4102
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E: ttmbtfs@ttmgroup.com.au W: www.ttmgroup.com.au

CENTRAL VILLAGE PHASE 2 DA

INTERNAL PARKING (BASEMENT & PODIUM LEVELS)
SWEEP PATH ANALYSIS

TTM REFERENCE

13BRT0407-SK13 A

DRAWN

BW

CHECKED

DATE

AR

20 MAY 2015

Appendix D TTM Drawing 13BRT0407-SK12 (Signs & Line Marking Plan)

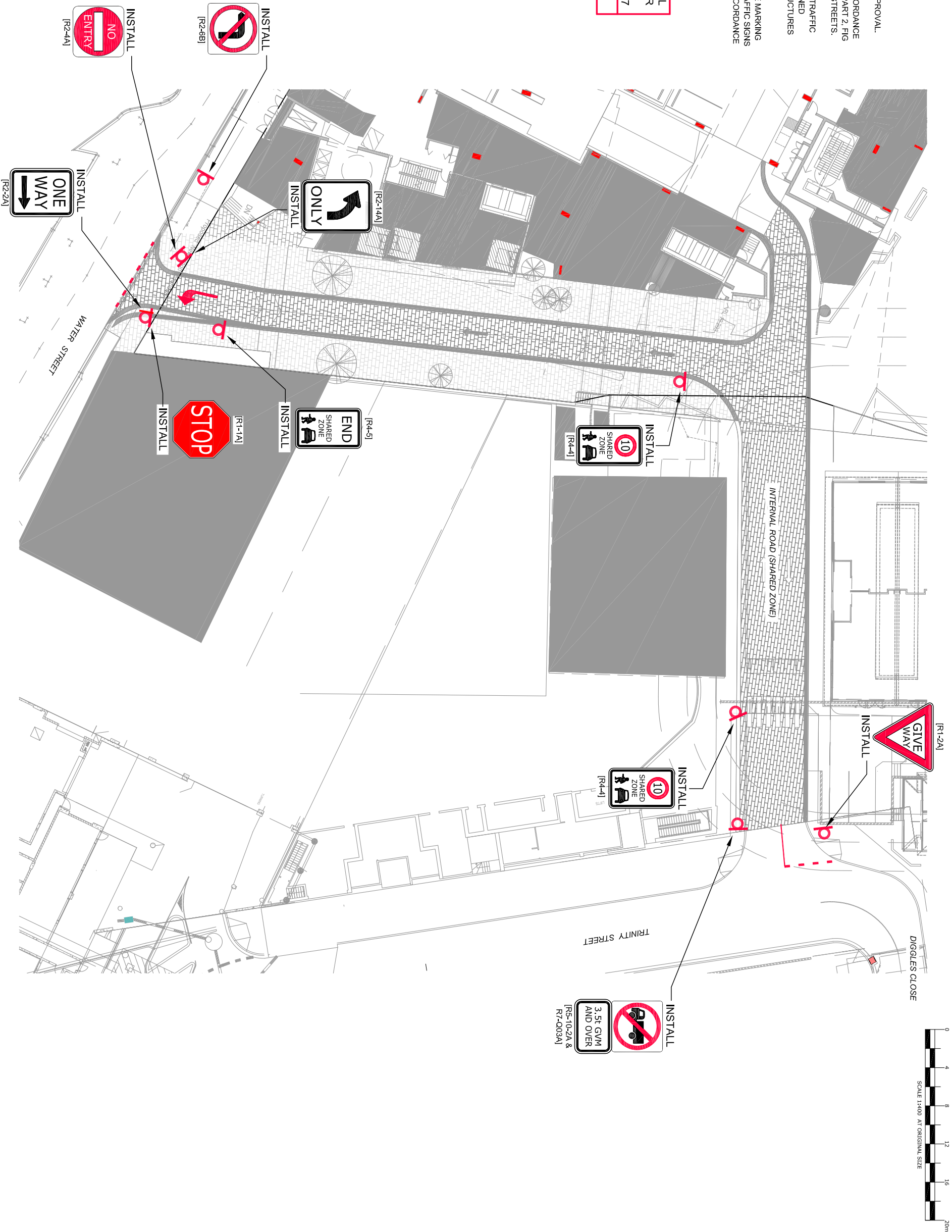
NOTES

- 1. DESIGN FINALISATION ISSUED FOR EDO - DSDP APPROVAL.
- 2. ALL TRAFFIC SIGNS ARE TO BE INSTALLED IN ACCORDANCE WITH M.U.T.C.D GUIDELINES (PART 2). REFER TO PART 2, FIG 3.12 FOR ENTRY AND EXIT DETAILS AT ONE-WAY STREETS.
- 3. CONFIRMATION OF THE INDICATED LOCATION OF TRAFFIC SIGNS SHOWN ON THIS PLAN, ARE TO BE DETERMINED DURING INSTALLATION, BASED ON EXISTING STRUCTURES AND VISIBILITY.
- 4. LINE MARKINGS ARE TO BE CONFIRMED. ANY LINE MARKING TO BE INSTALLED WITH ASSOCIATION TO THE TRAFFIC SIGNS SHOWN ON THIS PLAN ARE TO BE DONE SO IN ACCORDANCE WITH M.U.T.C.D STANDARDS, [PART 2, SECTION 5]

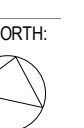
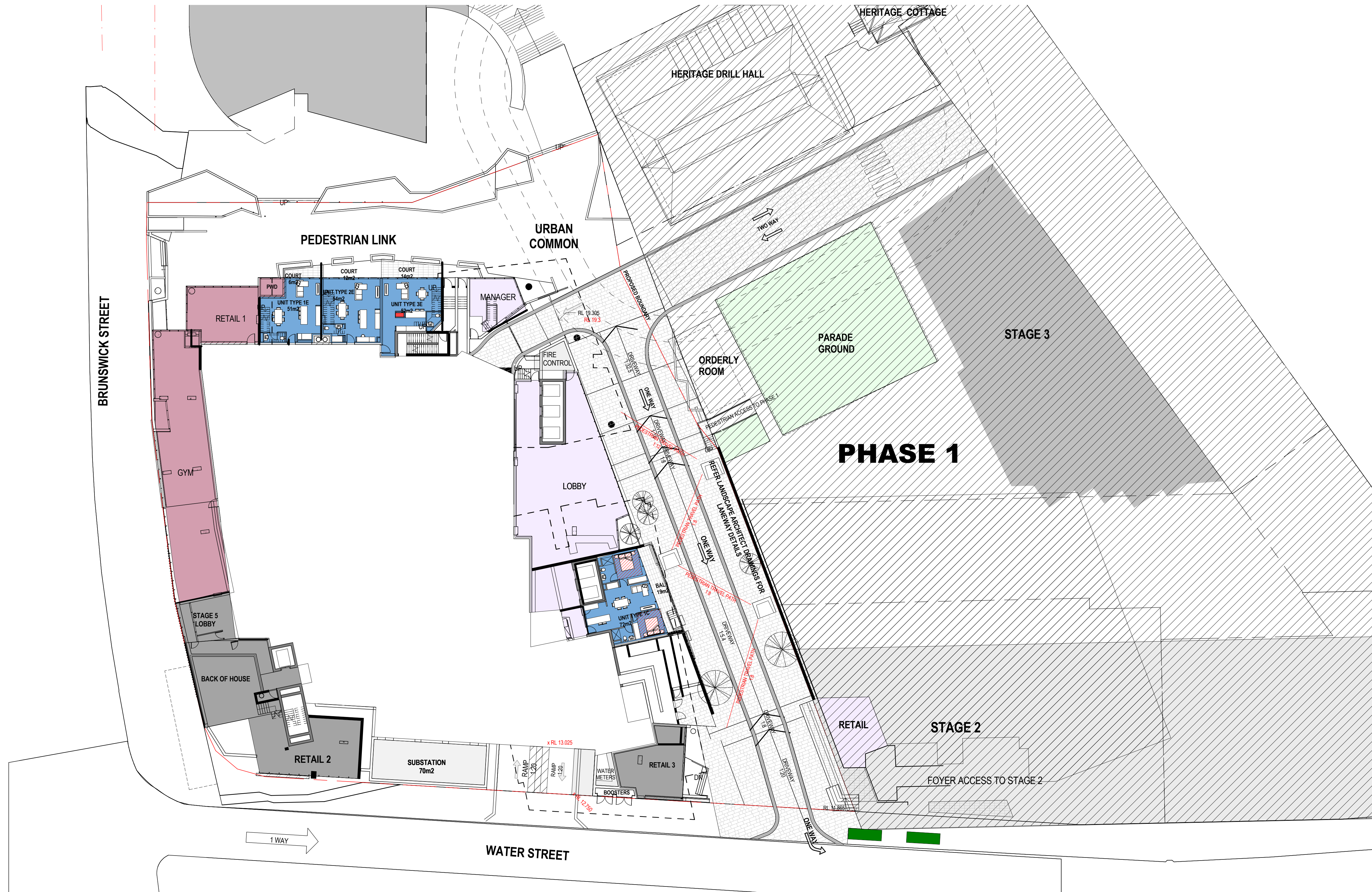

BRIAN CAMILLERI

PRINCIPAL
DIRECTOR
RPEQ 7577

APPROVED 04 JUNE 2015

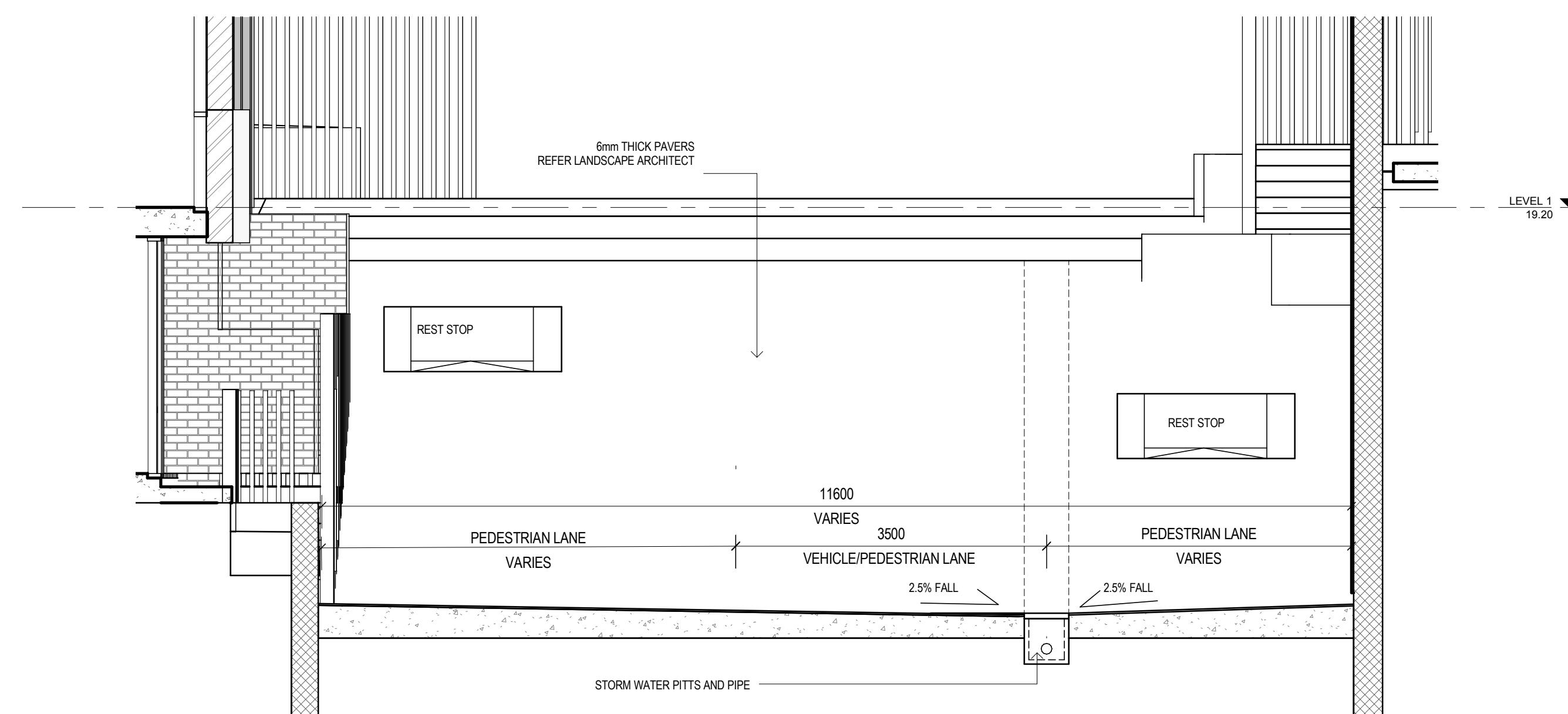


Appendix E Laneway Design



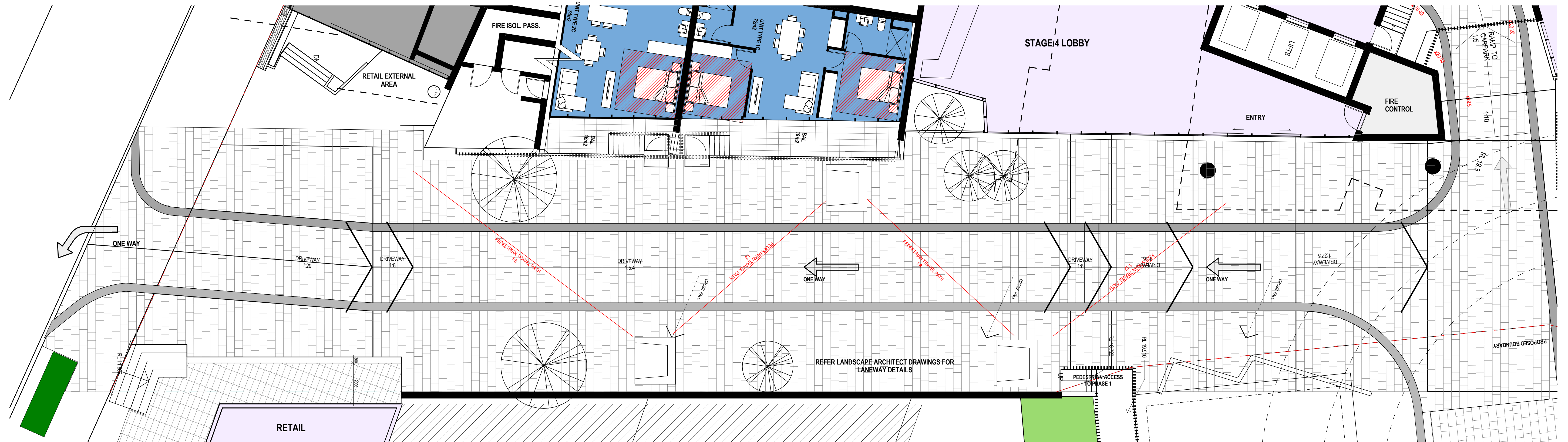


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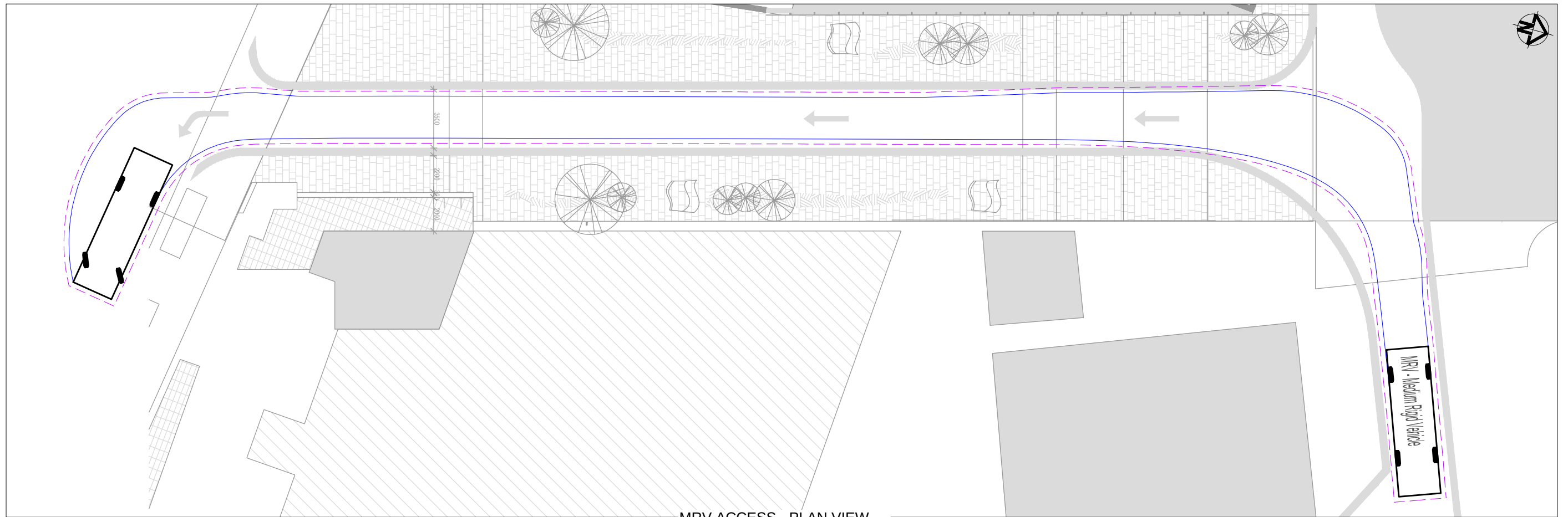


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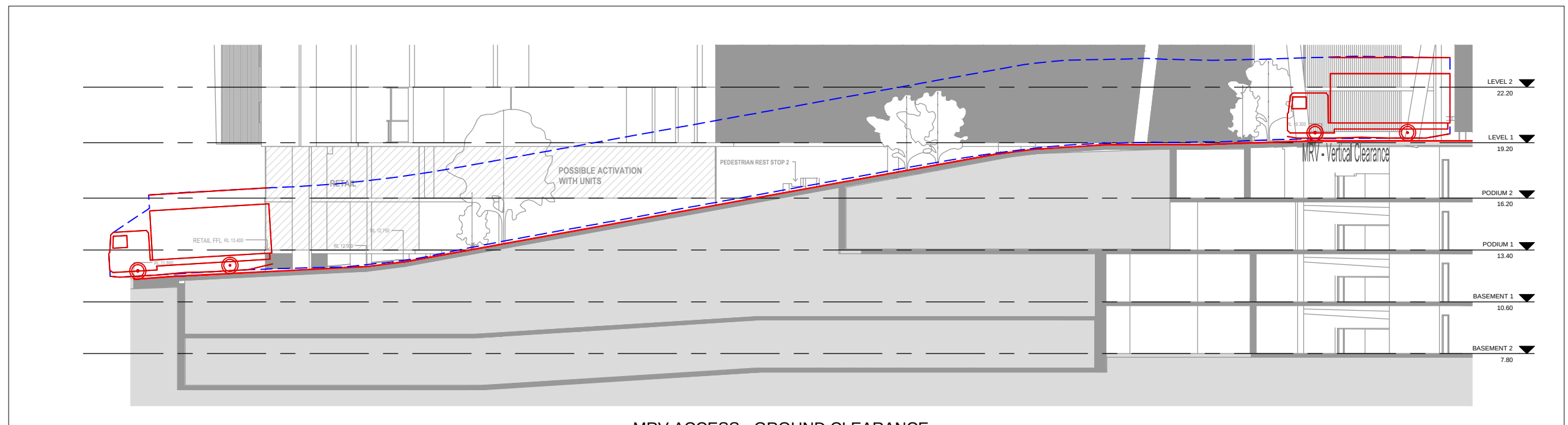
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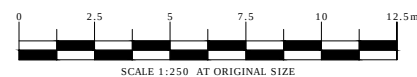
Appendix F TTM Drawing 13BRT0407-SK09 (Laneway Review)



MRV ACCESS - PLAN VIEW



MRV ACCESS - GROUND CLEARANCE



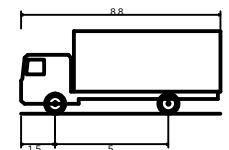
**CONCEPT
DESIGN**
ISSUED FOR COMMENT ONLY



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CENTRAL VILLAGE
LANE WAY DESIGN CHECK
MRV SWEEP PATH ANALYSIS
& GROUND CLEARANCE

TTM REFERENCE	REV
13BRT0407-SK09	A
DRAWN	CHECKED
BW	AR
DATE	
24 NOV 2014	



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

Appendix G Road Modelling & Impacts

Letter - TTM Ref:
'27703let_traffic model update'

20 June 2012

Our Ref: 27703

Your Ref:

Attention: Stephen Buhmann

**Metro Property Developments Pty Ltd
C/- Brannock and Associates
Level 16, Matisse Tower
110 Mary Street
Brisbane QLD 4001**

Dear Stephen,

**RE: Project Waters, 332-342 Water Street, Fortitude Valley
Updated Road Network Traffic Volumes**

TTM Consulting has been engaged by Metro Property Development Pty Ltd to undertake traffic assessments for the proposed Project Waters development at 332-342 Water Street, Fortitude Valley. This letter outlines the expected changes in traffic volumes on the local roads surrounding the development site as a result of the updated development scheme and alterations to the internal road/access layouts. These proposed alterations were detailed in the revised Project Waters Master Plan + Stage 1 & 2 Preliminary Development Approval Traffic Engineering report prepared by TTM on 24th May 2012 (TTM Report: 27703Trep3).

Prior to undertaking this development application, TTM was engaged by the Urban Land Development Authority (ULDA) to prepare a traffic model of the wider Bowen Hills Urban Development Area (UDA) to estimate future traffic volumes and road upgrades required. The traffic generated by the Project Waters site (Precinct 4: Water Street Precinct of the Bowen Hills UDA) was originally determined in the Bowen Hills Model by applying generation rates to the site based on the assumed land use and maximum plot ratios. The original generation rate adopted for the Project Waters site in the original Bowen Hills Model was derived as being 174vph in the AM/PM weekday peak hours. As outlined in the TTM report, the revised Project Waters development is expected to generate between 154 – 244 vph during the weekday AM/PM peak hour periods. It can therefore be seen that there is only a slight difference in the traffic generation assumptions made for the original Bowen Hills model compared to what is actually expected from the Project Waters site.

The effects that this slight traffic generation increase will have with respect to the peak hour volumes on the roads surrounding the Project Waters site was therefore determined by comparing the outputs of the original Bowen Hills UDA model with the outputs of an updated model assuming a traffic generation rate of 244vph from Precinct 4. This traffic generation value represents the upper limit of the expected range for the Project Waters site to give a conservative estimate of traffic volume increases on the surrounding roads.

It should be noted that the original Bowen Hills Model assumed there was a "New Road" linking from Diggles Close through to Water Street (midblock between Brunswick Street and Baxter Street). The revised development master plan, however, shows this link is planned to connect to the existing Baxter Street / Water Street "T" intersection (named the "Baxter Street Extension"). As such, it is expected that there will be slight changes to traffic volumes on the surround roads as a result of the changed network and redistribution of trips. This fact should be considered when comparing the outputs of the old and new Bowen Hills Models.

Figures 1 to 4 show the outputs of the Bowen Hills Model for the 2026 AM/PM scenarios, for the old and new model iterations.

Figure 1: 2026 AM Peak – Original Bowen Hills Model Outputs

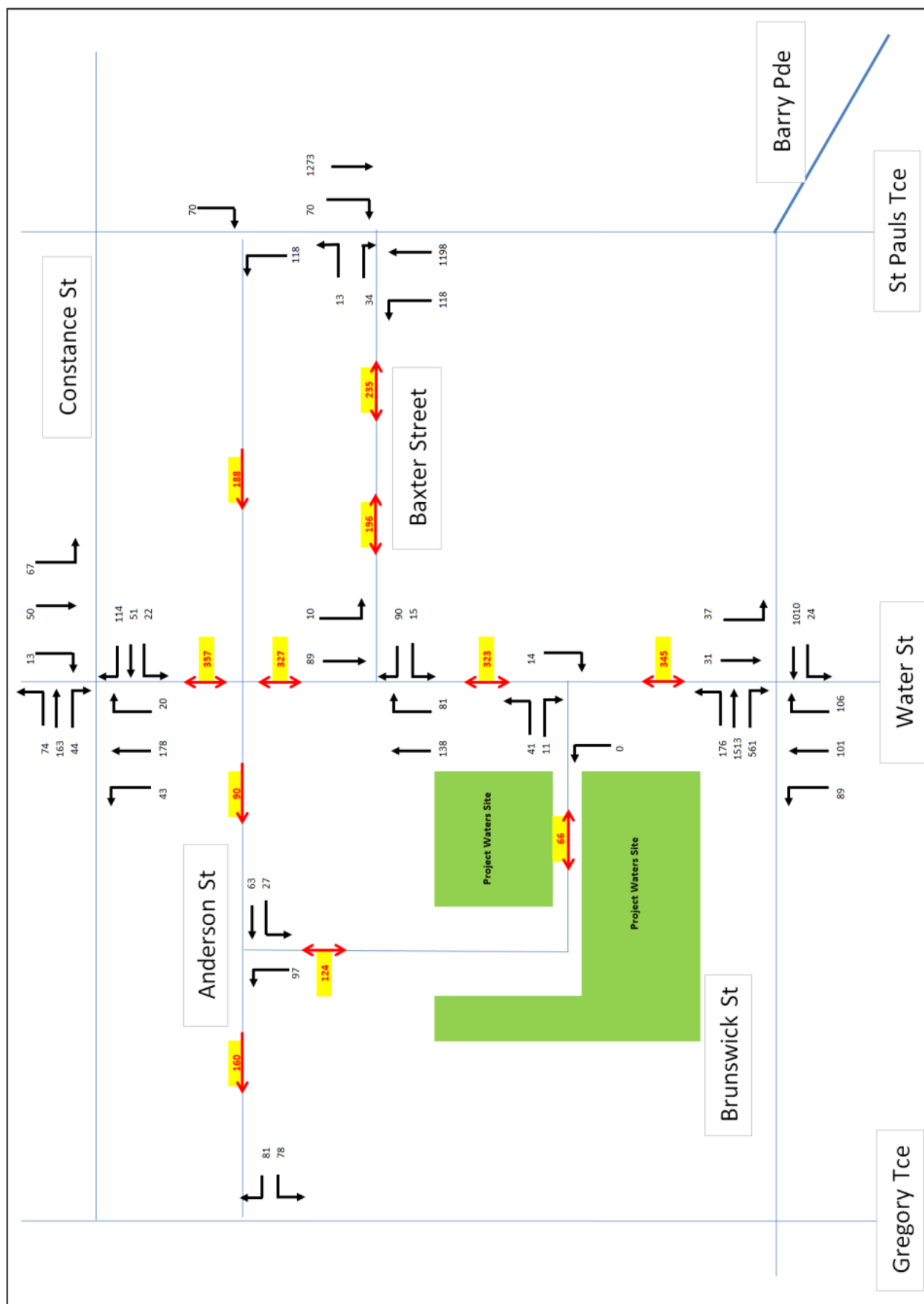


Figure 2: 2026 AM Peak – New Bowen Hills Model Outputs (Updated Project Waters Scheme)

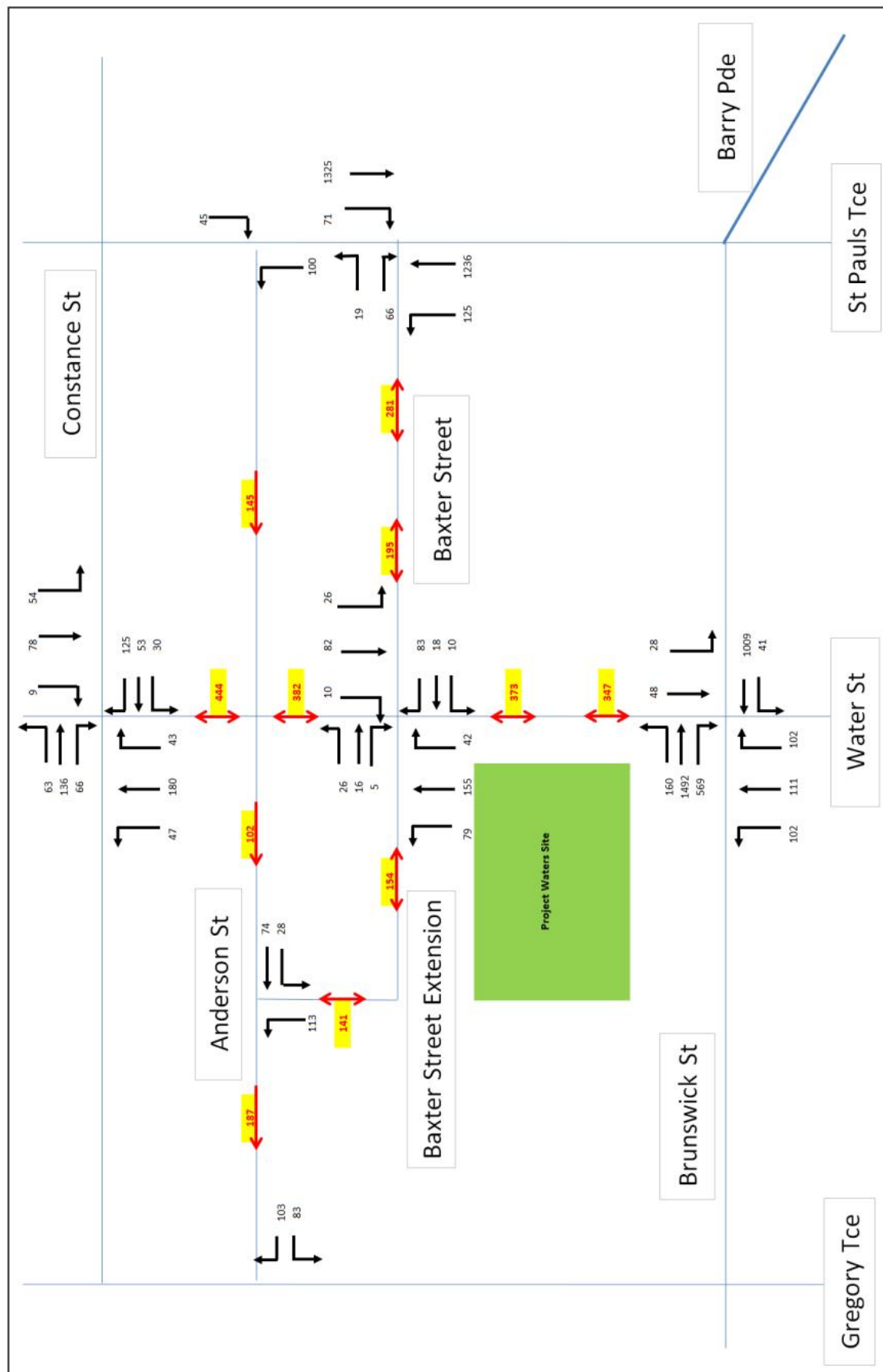


Figure 3: 2026 PM Peak – Original Bowen Hills Model Outputs

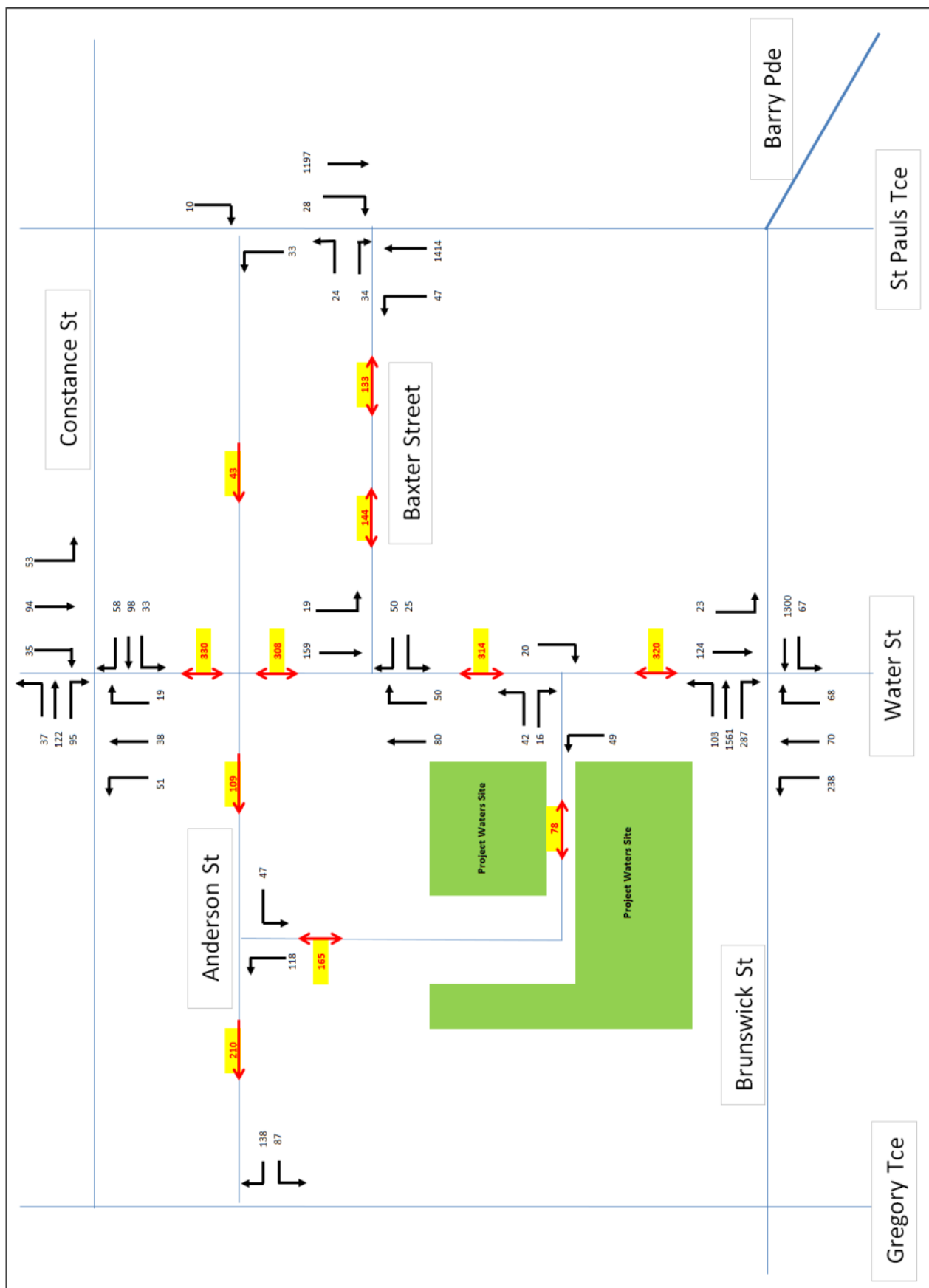
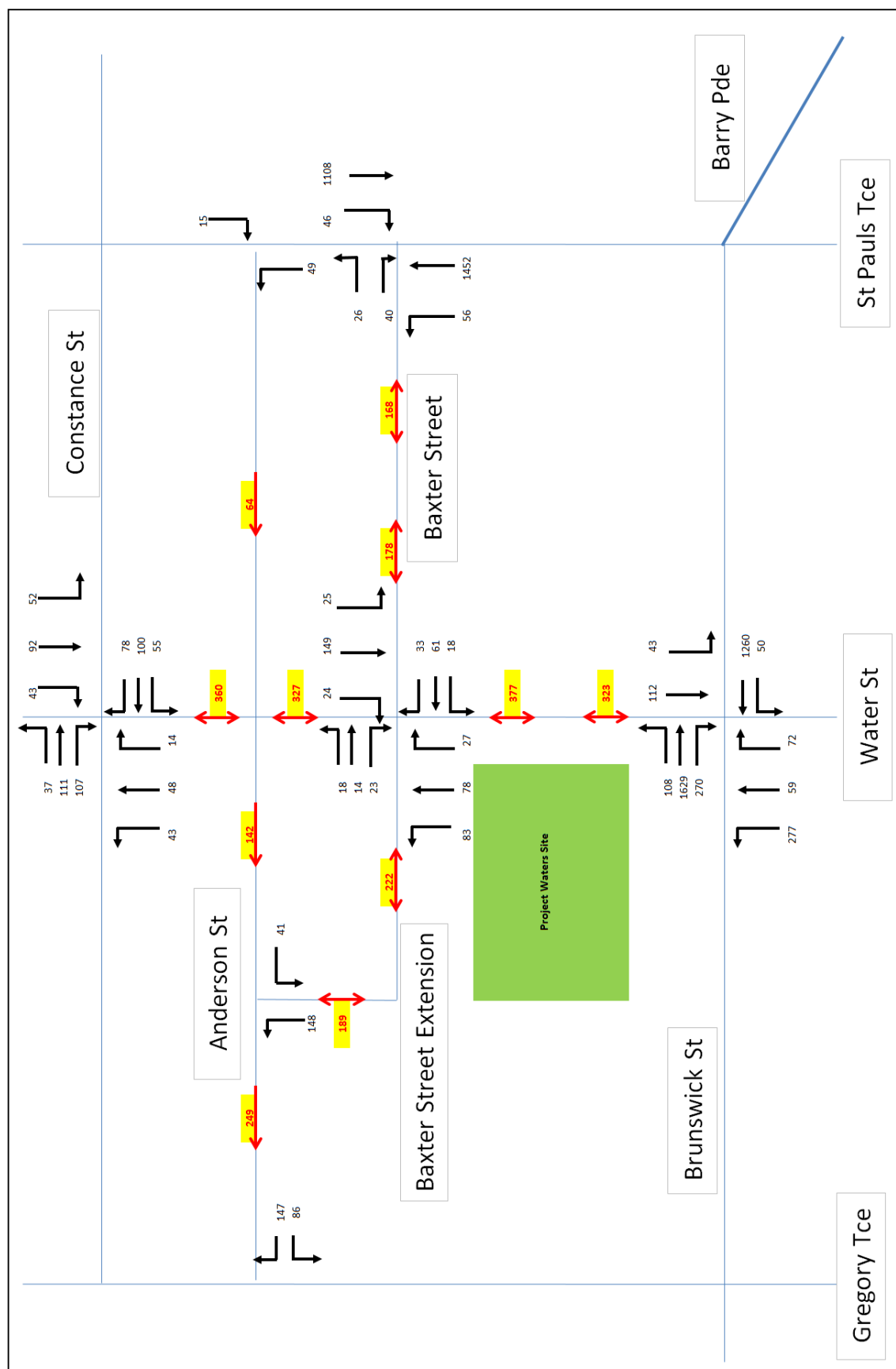


Figure 4: 2026 PM Peak – New Bowen Hills Model Outputs (Updated Project Waters Scheme)



Although the relocation of the “New Road” servicing the Project Waters development causes some redistribution of trips around the site (notably on Baxter and Andersons Street), it can be seen from the above figures that the expected link volumes for the AM/PM scenarios are quite similar between the old and new model.

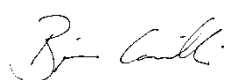
During the AM Peak hour, the greatest change in through volume traffic is apparent on Water Street (to the east of the site), where the through volumes between Anderson Street and Constance Street are expected to increase from 357vph to 444vph (87vph or 25% increase). The other roads, however, are expected to have minimal traffic volume increases, generally up to 20vph. It should be noted that although the values on Baxter Street and Anderson Street (south of the Project Waters site) are quite different between the new and old model, this is more due to the redistribution of trips as a result of the relocated “New Road” servicing the Project waters development. The combined traffic using both Baxter Street and Anderson Street is 592vph (two way) in the old model, and this has only slightly increased to 621vph in the new model.

During the PM peak hour, the greatest change in through volumes is 63vph which occurs on Water Street (outside the Project Waters site just west of Baxter Street). This is also, however, an effect of the relocation of the “New Road” to the eastern boundary of the site as all vehicles accessing Project Waters from the “New Road” were not originally included in the through volumes on Water Street. Apart from this, the traffic volume increases on the other roads surrounding in the surrounding area is at most 39vph.

Based on the outputs of the Bowen Hills Model, it is apparent that the changes to Project Waters site proposed in the revised masterplan development approval will have negligible effects on the traffic volumes using the surrounding road up to the 2026 design horizon. As such, no additional road upgrades – or changes to the road planning layouts developed by TTM as part of the original Bowen Hills modelling exercise - are warranted.

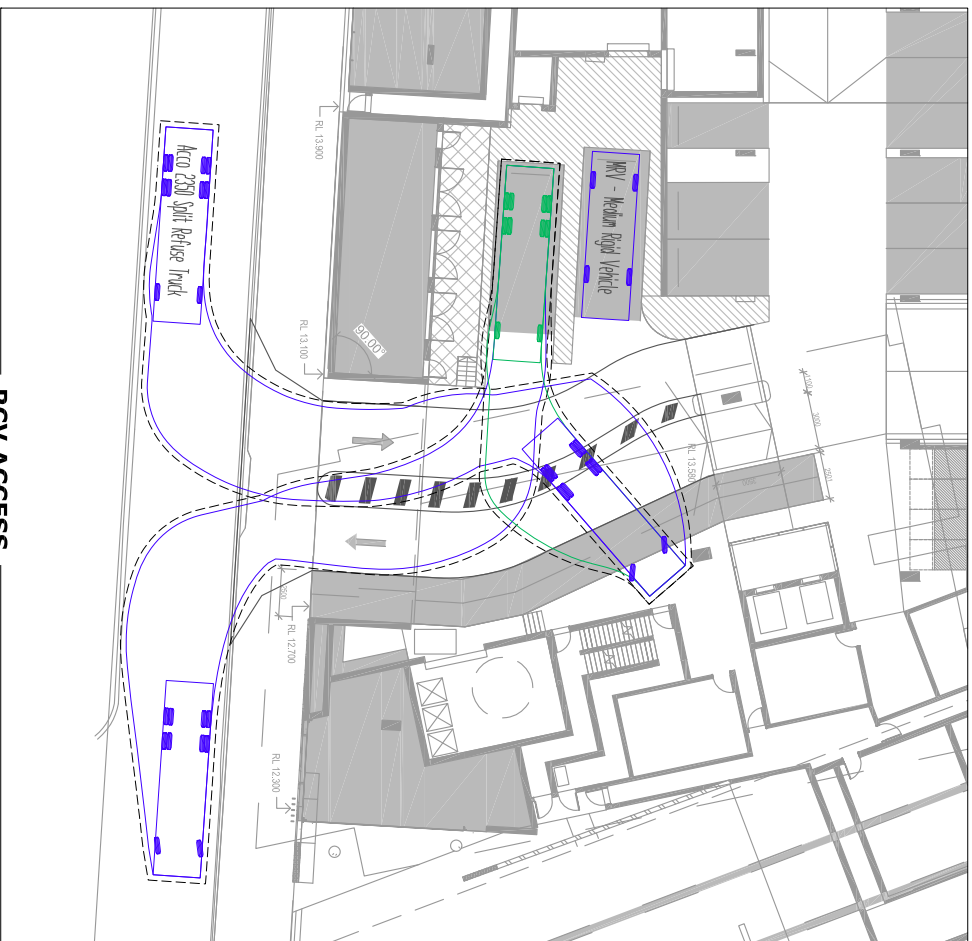
If you have any queries in relation to the information provided in this letter, contact Brian Camilleri on 3327 9500.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Brian Camilleri', is written in a cursive style.

Brian Camilleri
Principal Director

Appendix H TTM Drawing 13BRT0407-SK01 (Loading Area Swept Path Analysis)

[illegible]

31 MARCH 2015