# APPENDIX E

## Traffic Engineering Report

Prepared by:

**TTM Consulting**

# Traffic Engineering Report

15 Anderson Street, Fortitude Valley

Proposed Build to Rent Scheme

# About TTM

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

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

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## Revision Record

| No. | Author | Reviewed/Approved | Description | Date |
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| 4. | | | | |

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# 1. Introduction

## 1.1. Background

TTM Consulting has been engaged to prepare a traffic engineering report investigating a proposed mixed use development at 15 Anderson Street, Fortitude Valley. It is understood that a Development Application (DA) will be lodged with Economic Development Queensland (EDQ).

The site is located within the Bowen Hills Priority Development Area (Bowen Hills PDA). As such, the application has been assessed against the requirements of the Bowen Hills PDA Development Scheme, with reference to BCC's TAPS Policy as required.

## 1.2. Scope

The scope of the transport aspects investigated includes:

- Reviewing the prevailing traffic and transport conditions surrounding the site.
- Identifying parking supply required to cater for development demands.
- Assessing the parking layout to provide efficient and safe internal circulation and manoeuvring.
- Assessing the access configuration to provide efficient and safe manoeuvring between the site and the public road network for cars, service vehicles, cyclists and pedestrians.
- Identifying the service vehicle needs for the site and assessing the internal layouts to provide efficiency and safety for on-site service vehicle operation
- Reviewing access to a suitable level of public and active transport provisions.
- Identification of likely traffic volumes and traffic distribution from the development and the expected traffic impacts of development on the surrounding road network.

The development plans have been assessed against the following guidelines and planning documents:

- Bowen Hills PDA Development Scheme (June 2019)
  - Schedule 3 – Transport, access, parking and servicing
- Brisbane City Plan (2014) Planning Scheme, specifically:
  - Transport, Access, Parking and Servicing Planning Scheme Policy (TAPS Policy)
  - Transport, Access, Parking and Servicing Code (TAPS Code)
  - Refuse Planning Scheme Policy
- Australian Standards for Parking Facilities (AS2890 series)

- Road Traffic Authority (RTA) Guide to Traffic Generating Developments

## 1.3. Site Location

The site is located at 15 Anderson Street, Fortitude Valley, as shown in Figure 1.1. The property description is Lot 10 on SP208752. The site has road frontages to Anderson Street, Costin Street and Water Street. The site is currently occupied by assorted commercial properties.

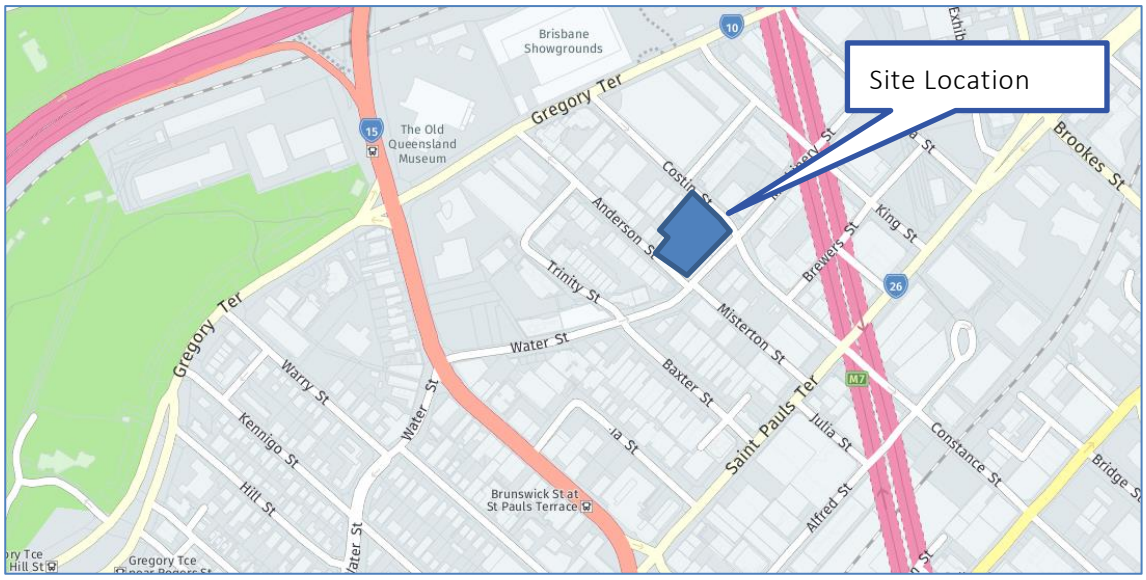



Figure 1.1: Site Location

# 2. The Proposed Development

## 2.1. Development Profile

The development scheme includes a total of 400 built to rent (BTR) dwellings and ground floor retail. A breakdown of the unit mix is provided in Table 2.1. For reference, a copy of the development plans, is included in Appendix A.

Table 2.1: Proposed Development Scheme

| Land Use | Qty / GFA |
|---|---|
| BTR Dwelling:<br>• 1 bedroom<br>• 2 bedroom<br>• 3 bedroom<br>Total – dwellings | <br>249<br>140<br>20<br>400 dwellings |
| Retail | 342m² GFA |

## 2.2. Parking

The development proposal includes the following car parking supply:

- 60 visitor spaces (including 1 PWD space), which are located across Podium levels 1 and 2
- 203 resident spaces (including 3 PWD spaces), which are located across the basement and podium parking levels

Further details regarding the proposed car and bicycle parking provisions are included in Section 4.

## 2.3. Access

Access to the subject site is provided via both Costin Street and Anderson Street. Service vehicles will enter the site via Costin Street and exit to Anderson Street. Basement car access is provided via Costin Street. Podium car access is provided via Anderson Street. A summary of the proposed access arrangements is as follows:

- Anderson Street - the characteristics of this access include:
  - 7m wide, modified Type B2 crossover
  - Movements limited to podium car entry and exit, and service vehicle exit
  - Priority controlled, limited to left out only
- Costin Street (north) - the characteristics of this access include:
  - 7.3m wide, modified Type B2 crossover
  - Priority controlled, movements limited to basement car entry and exit only

- Costin Street (south) access, - the characteristics of this access include:
  - 5.5m wide, Type B1 crossover
  - Priority controlled, service vehicle entry only
- Pedestrian access provided via all street frontages.

Further details regarding the proposed access arrangements is included in Section 5.

## 2.4. Servicing

Service vehicles will enter the site via Costin Street and exit to Anderson Street. In terms of service vehicle bays, the development is to provide:

- 1 x RCV / MRV bay
- 1 x SRV / Van bay
- Loading on-site for an LRV

All bays are located across the ground floor.

Further details regarding the proposed servicing arrangements is included in Section 7

# 3. Site Travel Environment

## 3.1. The Road Network

All roads in the immediate vicinity of the site are administered by Brisbane City Council (BCC). 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 | Lanes | Classification |
|---|---|---|---|
| Costin Street | 50kph | One lane, one way, with on-street loading and parking bays on both sides. | Neighbourbood Road |
| Anderson Street | 50kph | One lane, one way. Parking provided on western side. Loading zone at site frontage. | Neighbourhood Road |
| Water Street | 50kph | Two way. No standing on both sides along length of site frontage | Neighbourhood Road |
| Machinery Street | 50kph | Two way. Indented on-street parking (2P) on southern side of carriageway. Loading zone on northern side of carriageway. | Neighbourhood Road |
| Constance Street | 50kph | One way. Parking on eastern side of carriageway. | Neighbourhood Road |
| Gregory Terrace | 60kph | Two way, two traffic lanes, divided. On street parking (4P) available on both sides. | Suburban Road |
| St Pauls Terrace | 60kph | Two way, four traffic lanes plus turning lanes separated by a median. | Arterial Road |

The characteristics of the frontage roads is detailed in Table 3.2.

Table 3.2: Road Characteristics

| Road | Road Characteristics |
|---|---|
| Costin Street | 15.5m road reserve<br>9.5m carriageway<br>2.3m verge width |
| Anderson Street | 13m road reserve<br>7.5m carriageway<br>3.75 verge (southern side)<br>1.75m verge (northern side) |
| Water Street | 10.5m road reserve<br>6.5m carriageway<br>2m verge on both sides |

All intersections are priority control with the exception of Constance Street / St Pauls Terrace, which is signalised.

## 3.2. Road Planning

It is understood that there are no road upgrades planned within the vicinity of the site. During pre-lodgement discussion it is understood that road resumptions are required along all frontages to ensure that compliant verge widths are provided.

Within the Bowen Hills PDA (Map 2 – Structure Plan), Costin Street is identified as an 'active transport route'. Cross block links are also identified between Anderson Street and Costin Street, near the Carriageway Street intersection.

Map 9 – Precinct 2 Plan – identifies that bicycle infrastructure is to be provided along Costin Street.

## 3.3. Active Transport Facilities and Services

### Train Services

The Fortitude Valley train station is located approximately 350m south of the site. Services to all Brisbane train lines operate from this station, with service every 2 to 3 minutes (approximately) in peak periods and every 10 minutes in the off-peak.

### Bus Services

Bus stops are located north and south of the site at the Gregory Terrace / Costin Street and Constance Street / St Pauls Terrace intersections. Additional bus stops are located along the length of Brunswick Street. All stops are located within a 400m walking distance of the site.

A summary of the Translink bus routes that utilise these stops are found below in Table 3.3.

### Pedestrians

Formal pedestrian footpaths are located on both sides of all roads in the vicinity of the site. No formal crossings are provided at key intersections surrounding the site.

### Bicycles

No dedicated on-street or off-street cycle lanes are provided within the vicinity of the site. Saint Pauls Terrace and Brunswick Street are identified as secondary cycle routes. Gregory Terrace is identified as a local cycle route.

Table 3.3 Surrounding Bus Service Summary

| Bus Routes | Servicing | Operating Times | Frequency (Approx) |
|---|---|---|---|
| 301 | Toombul, Clayfield, Hendra, Ascot, Bowen Hills, Fortitude Valley, Brisbane City, Spring Hill, South Brisbane. | 6am – 11:30pm (weekday)<br>7am – 11:30pm (weekend) | Half hourly (peak)<br>Hourly (off peak, weekend) |
| 320 | Chermside, Wavell Heights, Kalinga, Clayfield, Bowen Hills, Fortitude Valley, Spring Hill, Brisbane City | 5:15am – 10:15pm (weekday)<br>7am – 7pm (Saturday)<br>10am – 6pm (Sunday) | 15 mins (peak)<br>Half hourly (off-peak)<br>1 - 2 hours (weekends) |
| 393 (loop) | Teneiffe, Newstead, Fortitude Valley, Bowen Hills, | 6:30am – 6:30pm (weekdays) | 15 mins (peak)<br>Hourly (off peak) |
| 379 | Stafford, Grange, Lutwyche, RBWH, Valley, City | 6am – 10:30pm (weekday)<br>7:30am – 11pm (Saturday)<br>8:30am – 8:30pm (Sunday) | Half hourly (peaks)<br>Hourly (off peak, weekend) |
| 364 | Herston, Kelvin Grove, Valley, City | 7pm – 9pm (weekday)<br>8:30am – 10pm (Saturday)<br>8:30am – 7pm (Sunday) | Hourly – all times |
| 360 | Everton Park, Enoggera, Alderley, Herson, Valley, City | 6:30am – 7pm (weekday)<br>8am – 6pm (Saturday) | Half hourly (peaks)<br>Hourly (off peak, Saturday) |
| 375 | Stafford, Lytwyche, RBWH, Valley, City, Paddington, Bardon | 5:45am – 11:30pm (weekday)<br>7am – 11:30pm (Saturday)<br>8:30am – 9:30pm (Sunday) | 10 – 15 mins (weekday)<br>Half hourly (weekend) |
| 346 | Aspley, Stafford, Grange, Windosr, RBWH, Valley, City | 6am – 6:30pm (weekdays) | Half hourly (peak)<br>Hourly (off peak) |
| 370 | Chermside, Kedron, Lutwyce, Windsor, RBWH, Valley, City | 5:30am – 11pm (weekday)<br>5:30am – 11pm (Saturday)<br>8am – 9pm (Sunday) | 5 - 10 mins (peak)<br>15 means (off peak)<br>Half hourly (Saturday, Sunday) |
| 334 | Chermside, Prince Charles, Windsor, RBWH, Valley, City | 7:00am – 5pm (weekdays)<br>9:00am – 5pm (Saturday) | Half hourly (peaks)<br>Hourly (off peak, saturday) |
| 361 | Mitchelton, Enoggera, Newmarket, Herston, Valley, City | 10am – 3pm (weekday) | Hourly |
| 353 | Chermside, McDowall, Stafford, Wilston, RBWH, Valley, City | 6:00am – 7:00pm (weekdays)<br>8:00am – 4:30pm (Saturday)<br>8:00am – 4pm (Sunday) | Half hourly (peaks)<br>Hourly (peaks, Saturday)<br>2 hours (Sunday) |

# 4. Car Parking Arrangements

## 4.1. Parking Supply Requirement

Schedule 3 of the Bowen Hills PDA Development Scheme specifies parking rates for multiple dwelling developments. All other parking rates are to be provided in accordance with BCC's TAPS Policy. The development is located within the City Frame, and therefore a maximum parking rate applies to all non-residential uses.

The TAPS Policy is silent with regard to 'Built to Rent' (BTR) development. As such, the parking supply is to be based on a first principles assessment of resident demands. The visitor parking supply with comply with Table 13 of the TAPS Policy.

The first principles assessment of the parking aligns with PO12 of the TAPS Code, which note:

PO12

*Development in the City core and City frame provides car parking spaces at rates to discourage private car use and encourage walking, cycling and the use of public transport.*

The proposed car parking rate for the BTR component is detailed in Table 4.1. Further justification regarding the proposed rates is provided in Section 4.2 – 4.3 of this report.

Table 4.1: Proposed Parking Supply Rate

| Land Use | | Proposed Parking Supply Rate |
|---|---|---|
| Build to Rent | Resident<br>Visitor | 0.5 spaces per dwelling<br>0.15 spaces per dwelling |
| Retail | | 1 space per 100m² GFA (max) |

## 4.2. First Principles Assessment – BTR

To assess the practical parking requirements for BTR development, the following needs to be considered:

- Operation of a BTR scheme
- How the development aligns with the currently defined uses within the City Plan
- Proximity to public and active transport

The following sections detail the above considerations.

### 4.2.1. Operation of BTR Developments

BTR developments typically have the physical build characteristics of multiple dwellings and the use and demand characteristics of rooming accommodation. The household size of a BTR dwelling is generally less than a standard MUD. Survey data indicates that the average occupancy for a MUD is 2.6 persons per dwelling as compared to a BTR dwelling which is 1.45 persons per dwelling. This indicates a lower population associated with this style of residential development.

As at 2020-2021, 33% of the population is housed within the rental market. This statistic is significantly higher within Brisbane city, and among younger Australians. Approximately 70% of persons aged 25 – 34 rent their home. Of this, 40% of all renters are considered 'long term' renter – i.e. renting for at least 10 years (PwC).

The demand for affordable permanent rental accommodation is growing significantly in the Brisbane market. In this current climate, there is a shortage of suitable supply for people such as essential workers, young professionals and the like (typically aged less than 35yrs old). As such, this results in inadequate and unsuitable accommodation with respect to quality, cost, living arrangement, location, tenure and maintenance.

The market for the BTR project is specifically targeted at a demographic that are sensitive to affordability and sustainability. That is, residents that generally do not want to pay for a parking space and / or are attracted to using alternative modes of transport from either a cost saving or sustainability perspective.

Residents also have limitations imposed on their living arrangements under an agreed operational management plan, typically annexed to the resident's lease, in relation to number of occupants, number of visitors, use of a car space being optional only.

#### 4.2.1.1. Management

The applicant will have ongoing control over both the leasing of the apartments and the allocation of parking spaces. This provides opportunity to more effectively manage parking demands, particularly given the target market.

A key aspect of this holistic management of the apartments and the car park, is that parking spaces will be de-coupled from the apartments and leased to tenants on an as needs basis. Applicants will be advised that a maximum number of spaces are provided and will be required to apply for a space at an additional cost. It is noted that some applicants may also be offered a unit with no option for a car park.

De-coupling the spaces from the apartment ensures that all spaces are effectively utilised, unlike traditional residential developments with allocated parking. It is not uncommon in residential developments with allocated parking that a proportion of the residents do not own cars yet have an allocated parking space, which sit vacant.

This arrangement aligns with the intended target market which is aimed primarily at students and essential workers aged between 20-40. Students generally cannot afford the costs to buy a car and additional expenses such as insurance, fuel and parking (ie at university), and are more inclined to utilise car share such as uber, if public transport is not available.

#### 4.2.1.2. Practical Parking Demands

Surveys of like uses at Kelvin Grove / Newmarket and Red Hill indicate that the practical parking demand based on car ownership is **0.33 spaces per unit** for residents.

Comparatively, a BTR scheme at 19 Campbell Street, Bowen Hills has an approved rate of:

- Resident – 0.63 spaces per dwelling
- Visitor – 0.1 spaces per dwelling

Like the proposed site, the development is located within the Bowen Hills PDA with similar access to public and active transport facilities.

It is also relevant to note that the above rates are consistent with BTR rates within New South Wales and Victoria. The key elements for the New South Wales BTR scheme are based on single ownership, single operator and located in existing low-medium density zones (importantly not limited to high rise) with a car park ratio of 0.5 spaces per unit.

Victoria has a car ratio for BTR of between 0.2-0.5 spaces per unit and found that even despite the lower car park rates, developments operate with a third of spaces actually being used by residents.

### 4.2.2. Comparison of Defined Uses

The City Plan does not currently define a BTR development, and as such, does not have a specific use code. In terms of operation, BTR developments typically have the design characteristics of a multiple dwelling use, with the operation of a rooming accommodation use.

The key differences with a BTR development compared with a multiple dwelling is:

- De-coupled parking arrangements
- Tailored management approach
- Sites are typically in close proximity to public / active transport and activity nodes
- Smaller household size (2.6 occupants / dwelling and 75m2 GFA for multiple dwellings, compared to 1.45 occupants / dwelling and <40m2 for BTR developments)

Based on the above, the parking demands for a BTR development vary significantly from a multiple dwelling development. As such, application of the standard multiple dwelling rate is not considered suitable. In this instance, the parking demand characteristics align with a rooming accommodation use.

Whilst not strictly applicable, TTM have undertaken a comparison of the BCC multiple dwelling and rooming accommodation rates. As the site is located within the City Frame, the rates noted within Table 13 of the TAPS Policy have been applied.

Table 4.2: Parking Supply Requirement – Multiple Dwelling Rate

| Land Use | BCC Requirement | Extent | Requirement |
|---|---|---|---|
| • Resident | | | |
| – 1 Bedroom | 0.9 spaces per dwelling | 249 dwellings | 225 |
| – 2 Bedroom | 1.1 spaces per dwelling | 140 dwellings | 154 |
| – 3 bedroom | 1.3 space per dwelling | 20 dwellings | 26 |
| • Visitor | 0.15 spaces per dwelling | 409 dwellings | 62 |
| Total | | | 466 spaces |

Table 4.3: Parking Supply Requirement – Rooming Accommodation

| Land Use | BCC Requirement | Extent | Requirement |
|---|---|---|---|
| Rooming Accommodation | 0.4 spaces per room | 409 dwellings | 164 |
| Total | | | 164 spaces |

As noted in Section 4.1, the development is to provide parking at a rate of 0.5 spaces per dwelling for residents and 0.15 spaces per dwelling for visitors. The visitor parking supply complies with the MUD requirements, and is considered suitable for the development.

The provision of 0.5 spaces per dwelling for residents exceeds the rooming accommodation rate, and is considered a suitable compromise between the MUD and rooming accommodation rates.

### 4.2.3. Proximity to Public and Active Transport

The site is located within the City Frame, and is situated in close proximity to several public transport facilities. Costin Street is defined as a 'active transport route' within the Bowen Hills PDA.

Further, as the site is within City Frame, there is acknowledgement that a high level of alternate modes of travel are available to residents and visitors. This is reflected in the reduced rates noted in Table 13 of the TAPS Policy as compared to the standard rates provided within Table 14. Whilst a BTR scheme is not a nominated use, the reduced rates within the City Frame acknowledge that the location of the site warrants a reduced parking rate.

In terms of on-site operation, the ongoing management and control of on-site parking allows for the encouragement of public transport use. By providing reduced on-site parking, private vehicle usage is discouraged, aligning with the outcomes of PO13.

The site is located within 400m walk of the pedestrian entrance to the Fortitude Valley train station and several on-street bus stops. The bus stops along Brunswick Street provide access to several bus routes, allowing connections to Brisbane northern suburbs. The Fortitude Valley train station provides connections to all train lines within the Brisbane region, allowing connections north, south, east and west of Brisbane.

## 4.3. Proposed Parking Supply

With respect to the BTR component, the proposed parking supply rates are:

- Resident – 0.5 spaces per dwelling
- Visitor – 0.15 spaces per dwelling
- Retail – 1 space per 100m$^2$ GFA (max)

In terms of parking supply, the visitor and retail parking supply complies with BCC's TAPS Policy. The proposed resident parking supply is consistent with the outcomes of the first principles assessment provided in Section 4.2.

The proposed parking supply is summarised in Table 4.4.

Table 4.4: Proposed Parking Supply

| Land Use | Proposed Rate | Extent | Required | Proposed |
|---|---|---|---|---|
| • Resident<br>– 1 Bedroom<br>– 2 Bedroom<br>– 3 bedroom<br>• Visitor | <br>0.5 spaces per dwelling<br>0.5 spaces per dwelling<br>0.5 spaces per dwelling<br>0.15 spaces per dwelling | <br>249 dwellings<br>140 dwellings<br>20 dwellings<br>409 dwellings | <br>124<br>70<br>10<br>62 | <br>123<br>70<br>10<br>60 |
| Retail | 1 space per 100m$^2$ GFA (Max) | 342m$^2$ GFA | 4 (max) | 0 |
| Total | | | 270 (max) | 263 spaces |

Based on the provision of 60 visitor spaces, a total of two PWD spaces are required. The development provides currently provides one PWD visitor space. Minor changes to the plans will allow for a second space to be provided. This can be included within the detailed design phase.

With respect to the proposed parking supply, the total number of spaces is slightly less than the proposed rates. However, the development provides a total of 20 motorcycle spaces. Inclusion of the motorcycle spaces within the total parking allocation results in a parking supply that is consistent with the outcomes of PO12 of the TAPS Policy.

Overall, the proposed rates are expected to suitably cater for the practical demands of the development and are consistent with approved rates within Brisbane.

## 4.4. Car Parking Layout

The development provides car parking across both basement and podium parking levels.

Table 4.5 identifies the characteristics of the proposed parking area with respect to the BCC requirements. The last column identifies the compliance of each design aspect. Where compliance is not achieved, further information is provided below

Table 4.5: Parking Design Requirements

| Design Aspect | BCC Requirement | Proposed Provision | Compliance |
|---|---|---|---|
| Parking space length:<br>– Resident space<br>– Visitor space<br>– PWD space<br>– Tandem space | <br>5.4m<br>5.4m<br>5.4m<br>10.8m | <br>5.4m (min)<br>5.4m<br>5.4m<br>10.8m | <br>Compliant<br>Compliant<br>Compliant<br>Compliant |
| Parking space width:<br>• Resident space<br>• Visitor space<br>• PWD space (Class 5) | <br>2.6m (min)<br>2.6m (min)<br>2.4m + 2.4m Shared Area | <br>2.4m – 2.6m<br>2.6m<br>2.4m + 2.4m shared area | <br>Performance Outcome<br>Compliant<br>Compliant |
| Aisle Width:<br>– Parking aisle<br>– Circulation ramp<br>– Circulation road (one way – service vehicles) | <br>6.2m (min)<br>6.2m (min) + clearance to walls<br>4.5m (min) + clearance to walls | <br>6m (min)<br>6.2m (min) + clearances<br>4.5m + clearances | <br>Compliant – see below.<br>Compliant<br>Compliant |
| Parking envelope clearance | Located as per Figure f of TAPS PSP | Located as per Figure f of TAPS PSP* | To be confirmed as part of detailed design. |
| Maximum Gradient:<br>– PWD parking<br>– Parking aisle<br>– Ramp | <br>1:40 (2.5%)<br>1:20 (5.0%)<br>1:6 (16.7%) | <br>Flat<br>Flat<br>1:5 | <br>Compliant<br>Compliant<br>Performance Outcome |
| Maximum Gradient Transitions | 1:8 (12.5%) summit | 1:8 | Compliant |
| Blind Aisle Extension | 2m or 8m extension to aisle width beyond final space | 1m end aisle extension | Compliant |
| Height Clearance:<br>– General Minimum<br>– Over PWD space | <br>2.3m<br>2.5m | <br>2.3m<br>2.5m | <br>Compliant<br>Compliant |
| **Motorcycle Parking** | | | |
| Motorcycle space length | 2.5m (min) | 2.5m | Compliant |
| Motorcycle space width | 1.35m (min) | 1.35m | Compliant |

* Structure is not shown on the plans. it is understood that columns will be located per Figure F of the TAPs Policy.

The proposed carpark layout generally complies with BCC requirements; however, the following items are resolved with performance outcomes

## Aisle Width

Within the car parking area, the aisle widths vary between 6m and 6.4m. The provision of 6m (min) aisles aligns with Section 7.4.3 (1) of the TAPS Policy, which allows for 6m aisles in car parking areas with less than 50 spaces.

Generally, the main circulation paths within the car park are 6.4m, except for the south-east aisle, which reduces to 6m. Reducing to 6m at this location allows for standard parking bays to be provided along the south-east boundary.

### Ramp Gradients and Transitions

BCC requires maximum ramp grades of 1:6 and that transitions at any change in grade do not exceed 1:12 8.3%. The grades and transitions provided on the circulation ramps between the parking propose a maximum grade of 1:5 and maximum transition of 1:8.

These maximum grades and transitions, which are compliant with the requirements set out in AS2890.1, have been empirically tested using Autotrack software as being adequate to prevent ground clearance issues (i.e. scraping/bottoming out) for both Australian Standard B99 and B85 sized vehicles.

Note: the parking gradients for the podium car park have been measured along the inside edge of the ramp.

### Parking Aisle Extension

The BCC TAPS Policy details that end aisle extensions of 2m are required. The proposed development provides a minimum 1m wide aisle extension. The proposed 1m end aisle extension is consistent with the alternative requirements detailed in AS2890.1. Based on previous experience, TTM has found that typical vehicles are able to reverse out of a standard space in a single manoeuvre with the reduced 1m aisle extension provision of AS2890.1.

On level 1, the security line is shown directly adjacent the visitor bays. To comply with BCC's TAPS Policy, it is recommended that the storage cage be removed and the visitor bay set back from the aisle. This will allow for an 8m end aisle extension to be provided, thereby complying with BCC's TAPS requirements.

## 4.5. Shared Laneway

On the ground floor, a shared lane is proposed. To access the laneway, vehicles will enter via Costin Street. Vehicles dropping off will stop within the lane, north of the refuse room. Service vehicles will continue through to the loading dock, reversing from the lane into the bay. All vehicles will then exit to Anderson Street.

Given the infrequent serving demands, the shared use of the lane is considered suitable.

# 5. Access Arrangements

Schedule 3 of the Bowen Hills PDA specifies that all access crossovers are to be designed in accordance with the BCC TAPS Policy.

Access to the site is provided via both Costin Street and Anderson Street. A total of three crossovers are provided across the two frontages.

Access to the basement car park is provided via Costin Street. The entry to the service laneway is also provided via Costin Street. Access to the podium parking levels is provided via Anderson Street. The crossover will also facilitate service vehicle exit movements.

The provision of three crossovers considers the site levels, and distribution of traffic across the surrounding network. By separating the basement and drop off crossover, a pedestrian refuge can be provided, improving safety at the access.

The proposed access arrangement is considered an improvement on the existing operation, whereby vehicles can reverse from the site directly to Costin Street.

Further information regarding each of the access crossovers is provided under the respective heading below.

## 5.1. Costin Street (North) Access

The Costin Street north access facilitates car movement to and from the basement. No service vehicles utilise this crossover. As Costin Street is one way (southbound), the access will be limited to right in / left out movements.

The proposed driveway arrangements are summarised in Table 5.1.

Table 5.1: Costin Street (North) Access Arrangements

| Design Aspect | BCC Requirement | Proposed Provision | Compliance |
|---|---|---|---|
| Design Type / Width<br>• Cars | 6m – 9m, Type B2 | 7.3m wide, Modified Type B1 | Performance Outcome |
| Distance from:<br>• minor intersection<br>• adjacent driveway | 10m (min)<br>3m (min) | 30m<br>1.2m (min) | Complaint<br>Performance Outcome |
| Sight Distance (50kph) | 90m (desirable)<br>70m (minimum) | 150m | Compliant |
| Minimum Queuing Provisions | 3 vehicles /18m | 30m (min) | Compliant |
| Maximum Driveway grade | 1:20 (5%) maximum within first 6m | 6m at 1:20 (max) | Compliant |

The proposed access arrangements generally comply with BCC requirements and are considered suitable. Further information regarding internal queueing is provided below.

### Driveway Type

Council requires that a Type B2 crossover be provided. The development scheme provides for a modified Type B1.

The provision of a modified Type B1 crossover allows for the crossover to be provided adjacent the northern boundary, improving the separation between the basement and laneway crossover. Further, all movements are limited to right in / right out, and therefore, a splay at the northern side of the crossover is redundant.

Overall, the proposed splays are considered suitable for the operation of the site.

### Driveway Separation

BCC requires that a 3m separation be provided between crossovers. The development achieves 1.2m (min) between crossovers. The proposed separation allows for a pedestrian to stand within between the crossovers should a vehicle be entering both the basement ramp and service vehicle aisle at the same time. Overall, the proposed arrangement is considered suitable.

## 5.2. Costin Street (South) Access

The Costin Street south access facilitates service vehicle entry movements to the site. As Costin Street is one way (southbound), the access will be limited to right in movements only.

The proposed driveway arrangements are summarised in Table 5.2.

Table 5.2: Costin Street (South) Access Arrangements

| Design Aspect | BCC Requirement | Proposed Provision | Compliance |
|---|---|---|---|
| Design Type / Width<br>• Service Vehicle | 7m wide, Type B2 | 5.5m wide, Modified Type B1 | Performance Outcome |
| Distance from:<br>• minor intersection<br>• adjacent driveway | 10m (min)<br>3m (min) | 20m (min)<br>1.2m (min) | Compliant<br>Refer to Section 5.1 |
| Sight Distance (50kph) | 90m (desirable)<br>70m (minimum) | 150m | Compliant |
| Maximum Driveway grade | 1:20 (5%) maximum within first 6m | 6m at 1:20 (max) | Compliant |

The proposed access arrangements generally comply with BCC requirements and are considered suitable. Further information regarding internal queueing is provided below.

### Design Type / Width

To allow for service vehicle access to a site, BCC requires that a 7m wide, Type B2 crossover be provided. Note that this typically allows for two-way movement to/from the site.

The proposed access provides for service vehicle entry movements only. As such, a reduced crossover width of 5.5m is provided. The splay of the crossover has been designed such that an LRV can enter the site. Swept paths showing the

## 5.3. Anderson Street Access

The Anderson Street crossover facilitates car access to the podium parking level, and service vehicle exit movements. As Anderson Street is one way (northbound), the access will be limited to left in / right out movements.

The proposed driveway arrangements are summarised in Table 5.3.

Table 5.3: Anderson Street Access Arrangements

| Design Aspect | BCC Requirement | Proposed Provision | Compliance |
|---|---|---|---|
| Design Type / Width<br>• Car<br>• Service Vehicle | <br>6m – 9m, Type B2<br>7m, Type B2 | 7m, Type B2 | <br>Compliant<br>Compliant |
| Distance from:<br>• minor intersection<br>• adjacent driveway | <br>10m (min)<br>3m (min) | <br>25m (min)<br>15m (min) | <br>Compliant<br>Compliant |
| Sight Distance (50kph) | 90m (desirable)<br>70m (minimum) | Clear sight lines in all direction | Compliant |
| Minimum Queuing Provisions | 6 vehicles / 36m | 6 cars, 36m | Compliant – further information provided below. |
| Maximum Driveway grade | 1:20 (5%) maximum within first 6m | 1:20 max for fist 6m | Compliant |

The proposed access arrangements generally comply with BCC requirements and are considered suitable. Further information regarding internal queueing is provided below.

### Queueing Provisions

The proposed queueing arrangements include the ramp to the podium. Whilst a conflict point occurs at the loading bay, vehicles exiting the loading bay will be required to give way to all vehicles entering. As such, inbound vehicles have priority along the length of the ground floor / podium ramps.

# 6. Development Transport Demands

## 6.1. Existing Development Traffic

The site is currently occupied by approximately 3200m$^2$ GFA of office / commercial space.

For commercial developments, the RPDM recommends adopting a generation rate of 2vph per 100m$^2$ GFA. Application of this rate to the existing site equates to an approximate peak hour generation of 64vph.

Once the existing use is removed these trips will no longer occur and have therefore been deducted from future development generation.

## 6.2. Proposed Development Traffic Demands

### 6.2.1. Generation Rates

The proposed traffic generation for both the retail and residential land uses is based on historical survey data. Further information regarding the traffic generation rates is provided below under the respective headings.

#### Residential

The DTMR RPDM and RTA GTGD recommends, for planning purposes, adopting a peak hour traffic generation rate of between 0.2 to 0.3 trips per unit dwelling for high density residential developments.

Surveys undertaken of residential developments within the City Frame identified a traffic generation rate between 0.21 – 0.225vph per dwelling.

Based on the above, a generation rate of 0.2vph per dwelling has been applied to the site. Application of the MUD rate to the BTR scheme is considered conservative given the difference in car ownership and parking supply rate.

Application of the above rate to the scheme results in a peak hour generation of 82 vehicles (in+ out).

#### Retail

As no parking is provided for the retail component, no trip generation has been allowed for within this assessment.

### 6.2.2. Generation – Proposed Scheme

Any estimate of the traffic impacts of the proposed development should consider the net increase in traffic as a result of the development. A summary of the expected peak hour traffic generation of the site is given in Table 6.2.

Table 6.1: Existing Site Traffic Generation (Estimated)

| Generation | AM Peak Hour (vph) | | | PM Peak Hour (vph) | | |
|---|---|---|---|---|---|---|
| | In | Out | Total | In | Out | Total |
| Existing Land Uses | 32 | 32 | 64 | 32 | 32 | 64 |
| Proposed Development | 25 | 57 | 82 | 57 | 25 | 82 |
| **Net Change** | **-7** | **+25** | **+18** | **+25** | **-7** | **+18** |

## 6.3. Warrants for Further Assessment

Acceptable Solution A02 of the Road Hierarchy Overlay Code details that that the development traffic impacts be quantified and mitigated for an 'assessable development for material change of use' which meets any of the following triggers:

- is classified as a major development; or
- involves an access driveway to a major road; or
- involves an access driveway within 100m of a signalised intersection.

Note: The BCC TAPS Policy defines a 'major development' as one with a total peak hour vehicle generation rate greater than 25vph.

The net increase in traffic as a result of the proposed scheme is in the order of 20vph. As such, no detailed TIA is warranted as part of this application.

# 7. Service Vehicle Arrangements

To assess the required service provisions for the development, TTM has deferred to the requirements as set out in the BCC's TAPS Policy.

## 7.1. BCC Requirements

As noted in Section 4, the proposed use is not a defined use within the BCC Planning Scheme. As such, TTM have deferred to the requirements for a MUD as indicative requirements for the BTR component of the scheme.

The retail requirements are as per Table 1 and 3 of BCC's TAPS Policy.

### BTR Dwellings (Multiple Dwelling)

- Regular access for an RCV
- Occasional access for a LRV

### Retail (0 - 599m$^2$ GFA)

- Occasional access for van
- Loading bay for Van and MRV

## 7.2. Practical Demands

For the residential component of the scheme, the primary demand for service vehicles is furniture deliveries. Given that the development comprises mostly one and two bedroom dwellings, it is expected that the majority of deliveries will occur by MRV.

For the retail tenancies, it is expected that serving demands for the retail portion of the site will typically occur by van. Larger, more infrequent stock deliveries may occur by SRV.

## 7.3. Proposed Service Vehicle Arrangements

The development is to provide 1 x MRV/ RCV bay and 1 x SRV / Van bay within the loading area. Each of the bays can be used simultaneously. If required, an LRV can stand within the service aisle.

The proposed service vehicle provisions are expected to suitably cater for the shared demands of the proposed land uses.

The provision of shared bays is considered suitable based on Section 3.3 of the TAPS Policy, which states that "large multi-use developments with centralised service vehicles areas may require fewer service bays than the sum of the individual component requirements". Furthermore, it is stated that "if fewer service vehicle bays are proposed, satisfactory operation of the service vehicle area is to be demonstrated and supported by a Registered Professional Engineer Queensland". As this report has been certified by an RPEQ, the proposed service vehicle arrangements are considered suitable for the expected demands of the site.

The dimensions of the service vehicle bays satisfy the minimum requirements set out in the TAPS Policy. It is recommended that bollards be installed at the rear of the bay to reduce the risk of conflict between pedestrians and trucks.

The grades within the service vehicle area does not exceed 1:20. The height clearance within the laneway and loading dock is a minimum 4.5m.

Detailed swept path analysis demonstrating on-site manoeuvring is included in Appendix B.

Overall, TTM considers that the proposed on-site servicing provisions are sufficient to cater for the expected demands generated by the development.

# 8. Active Transport

## 8.1. Public Transport

The proposed development is located suitably with a high level of accessibility to the established public transport infrastructure within the area. No additional service or facilities are necessary to accommodate the development.

## 8.2. Pedestrian Access

Pedestrian access to the site is suitable with several pedestrian access points available along the site frontages. The development also supports the classification of Costin Street as an active transport link.

## 8.3. Cyclist Requirements

BCC policy requires that bicycle parking be provided at a rate of one per unit for residents, and 1 per 4 units for visitors. Due to the proposed nature of the site, and proximity to key destinations and public transport infrastructure, the bicycle requirements are considered to be excessive.

As such, TTM have referred to the bicycle parking provisions outlined in Appendix I of the Cycling Aspects of Austroads Guides. This indicates that a rate of multiple dwelling rate of 1 bicycle space per 4 units for residents and 1 space per 16 units for visitors.

The bicycle parking requirement and proposed supply are summarised in Table 8.1.

Table 8.1: Proposed Bicycle Parking Rates

| Land Use | Proposed Rate | Extent | Requirement | Proposed |
|---|---|---|---|---|
| Resident<br>Visitor | 1 space per 4 dwellings<br>1 space per 16 dwellings | 409 dwellings | 103<br>26 | 252<br>31 |
| **Total** | | | | **283 spaces** |

# 9. Summary and Conclusions

## 9.1. Parking Arrangements

The development is to provide a total of 263 parking spaces will be provided across the site. The spaces will be distributed across one basement level and three podium parking levels. In terms of car parking allocation, it is intended that 260 spaces will be allocated to resident and 60 spaces allocated to visitors.

The proposed parking supply is considered suitable given:

- The intended operation of the site, including on-site management and de-coupling of spaces.
- Target market of the site
- Location of the site in proximity to public transport infrastructure,
- Parking rates approved/currently provided for BTR schemes in Brisbane, New South Wales and Victoria.

The proposed car park layout generally complies with BCC's requirements, however, a small number of Australian Standard compliant solutions (including the provision of blind aisle extensions, ramp grades/transitions) have been proposed.

The development provides a service aisle through the site. This facilitates both temporary servicing for larger vehicles, and service vehicle movement through the site.

## 9.2. Access Arrangements

Access to the site is provided via both Costin Street and Anderson Street. A total of three crossovers are provided across the two frontages.

Access to the basement car park and service laneway are provided via Costin Street. Access to the podium parking levels is provided via Anderson Street. The crossover will also facilitate service vehicle exit movements.

The design of the crossovers generally complies with the requirements of the BCC TAPS Policy. Performance outcomes are sought regarding:

- Design type / width (Costin Street South)
- Driveway separation (Costin Street North and South)

## 9.3. Service Vehicle Arrangements

The development is to provide a central loading area located within on the ground floor. The loading area accommodates 1 x MRV/ RCV bay and 1 x SRV / van bay. On-site loading for an LRV can be accommodated within the service laneway.

The development is to provide five loading bays – a shared MRV / RCV, SRV and three van spaces. To access the loading dock, all vehicles will enter and exit the site via Exhibition Street.

A minimum height clearance of 4.5m is to be provided within the service area.

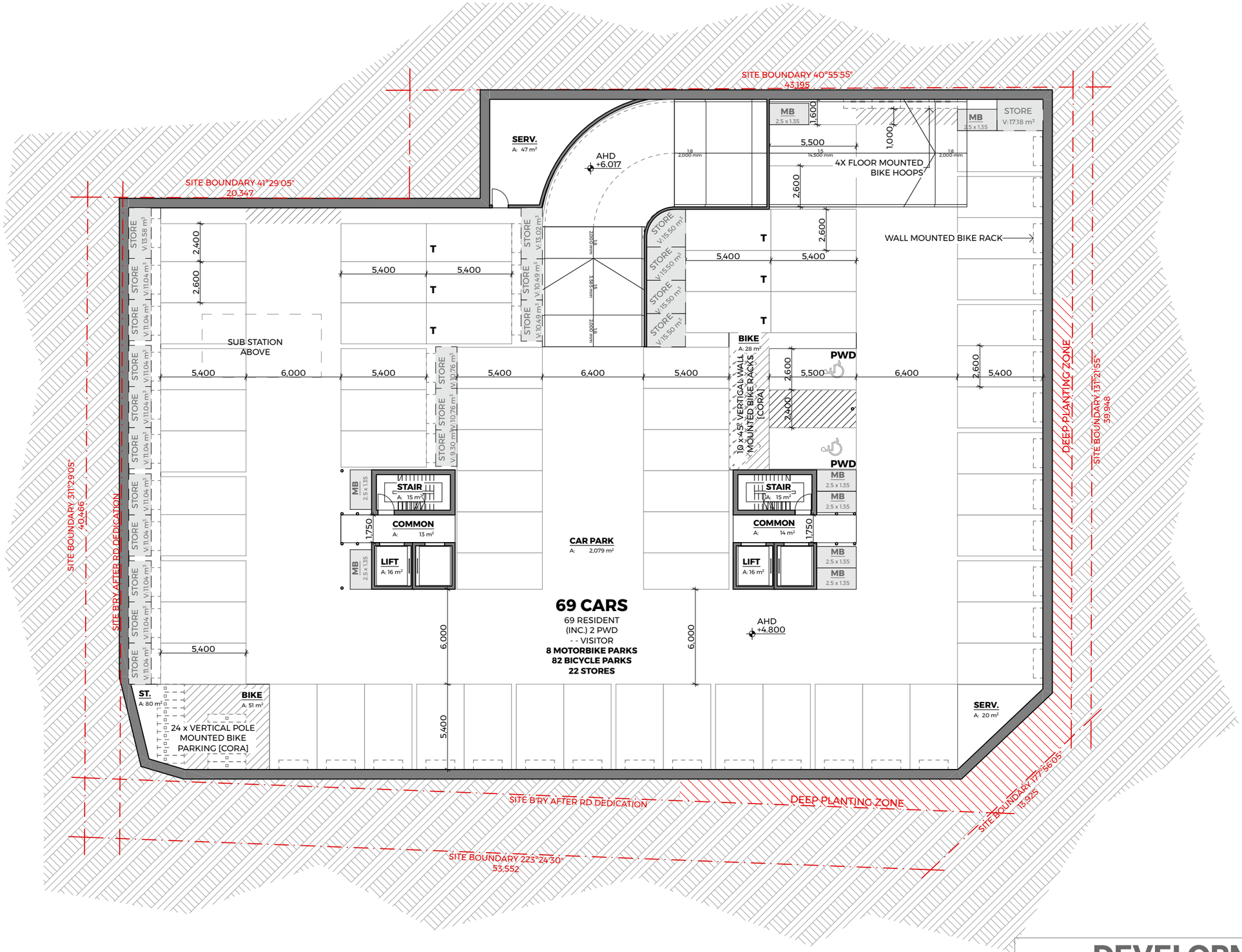
## 9.4. Active Transport Facilities

The current public transport infrastructure and site provisions for pedestrian/bicycle facilities is considered adequate for the development.

## 9.5. Conclusion

Based on the assessment contained within this report, TTM see no traffic engineering reason why the relevant approvals should not be granted.

# Appendix A Development Plans




# DEVELOPMENT APPLICATION

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|---|---|---|---|---|
| DA.01 | 4/8/2022 | DEVELOPMENT APPLICATION | CB | TC |
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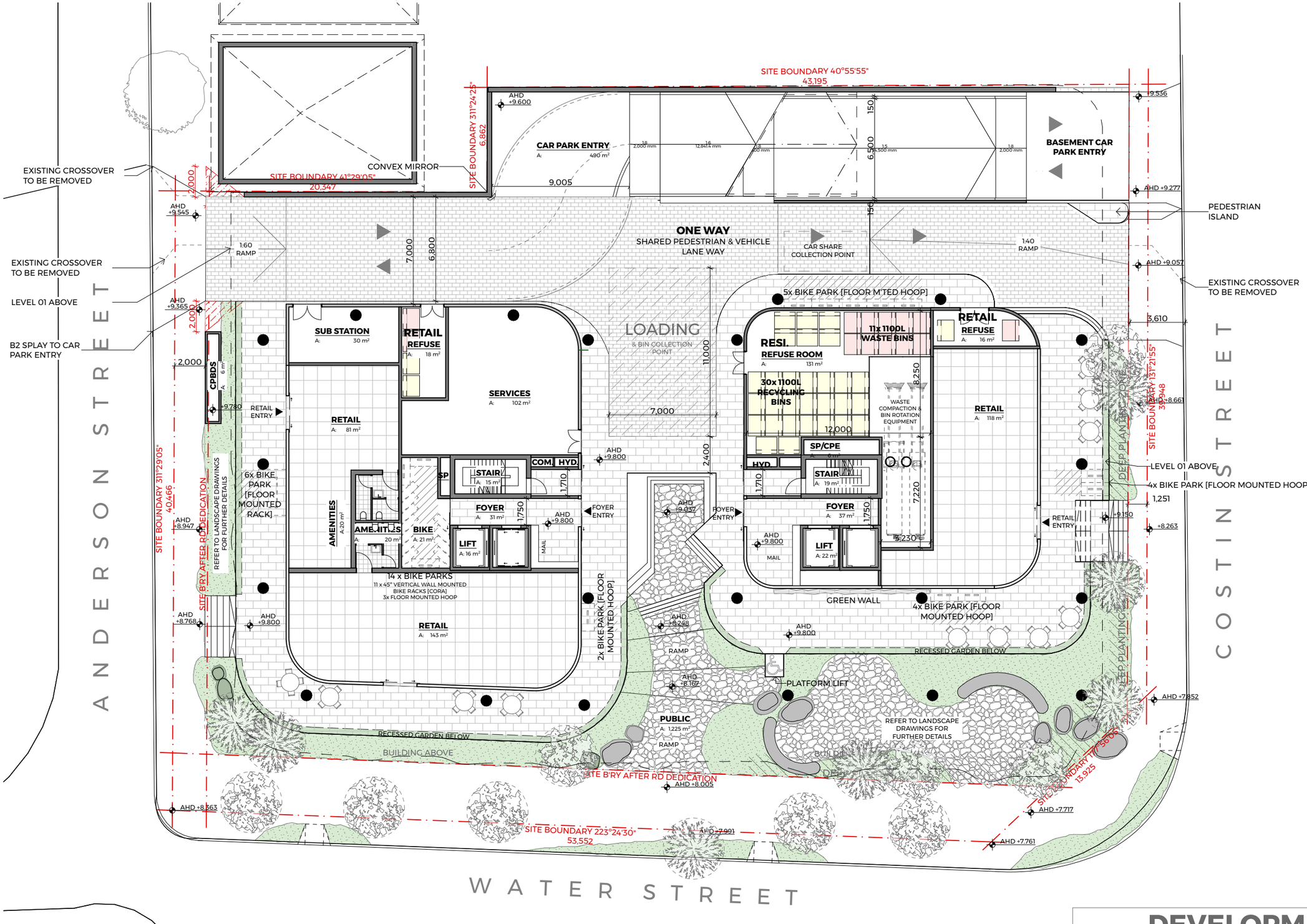
| | | | | |

TELHA CLARKE
59 GARDEN STREET
SOUTH YARRA
PH: 03 8672 5999
E: contact@telhaclarke.com.au

PROJECT
**15 ANDERSON STREET**
15 ANDERSON ST FORTITUDE VALLEY QLD 4006

DRAWING TITLE
**BASEMENT 01**

| | |
|---|---|
| SCALE **1:250 @A3** | |
| DATE **17/02/16** | PLOT DATE **4/8/2022** |
| DRAWN **CB** | CHECKED **TC** |
| JOB NO. **21026** | DRAWING NO. **TP099** |
| REVISION **DA.01** | |

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| DA.01 | 4/8/2022 | DEVELOPMENT APPLICATION | CB | TC |
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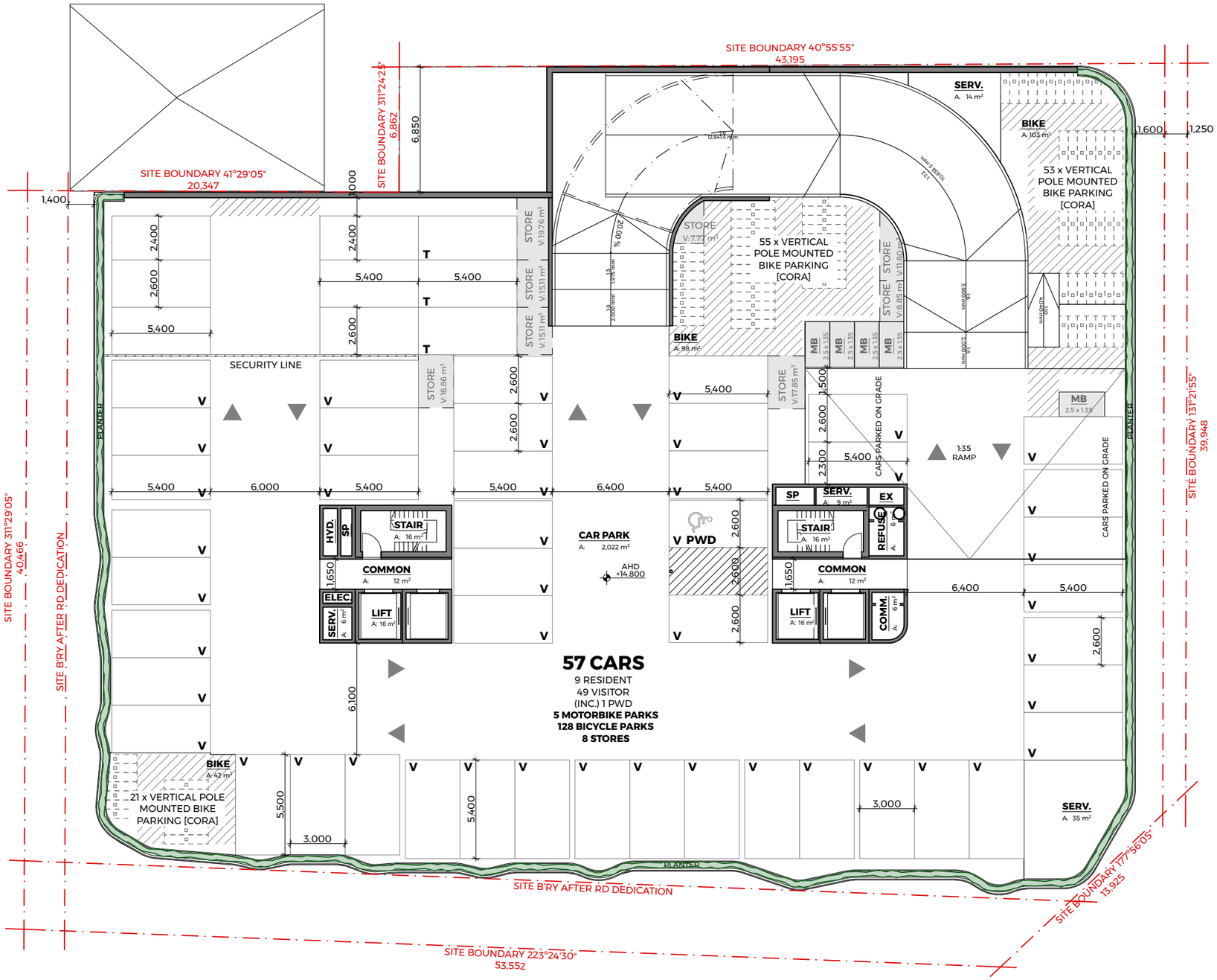
# DEVELOPMENT APPLICATION

PROJECT
**15 ANDERSON STREET**
15 ANDERSON ST FORTITUDE VALLEY QLD 4006

DRAWING TITLE
**GROUND FLOOR**

| | | |
|---|---|---|
| SCALE **1:250 @A3** | | |
| DATE **17/02/16** | PLOT DATE **4/8/2022** | |
| DRAWN **CB** | CHECKED **TC** | |
| JOB NO. **21026** | DRAWING NO. **TP100** | REVISION **DA.01** |

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|---|---|---|---|---|
| DA.01 | 4/8/2022 | DEVELOPMENT APPLICATION | CB | TC |


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# DEVELOPMENT APPLICATION

PROJECT
**15 ANDERSON STREET**
15 ANDERSON ST FORTITUDE VALLEY QLD 4006

DRAWING TITLE
**LEVEL 01**

| | |
|---|---|
| SCALE **1:250 @A3** | |
| DATE **17/02/16** | PLOT DATE **4/8/2022** |
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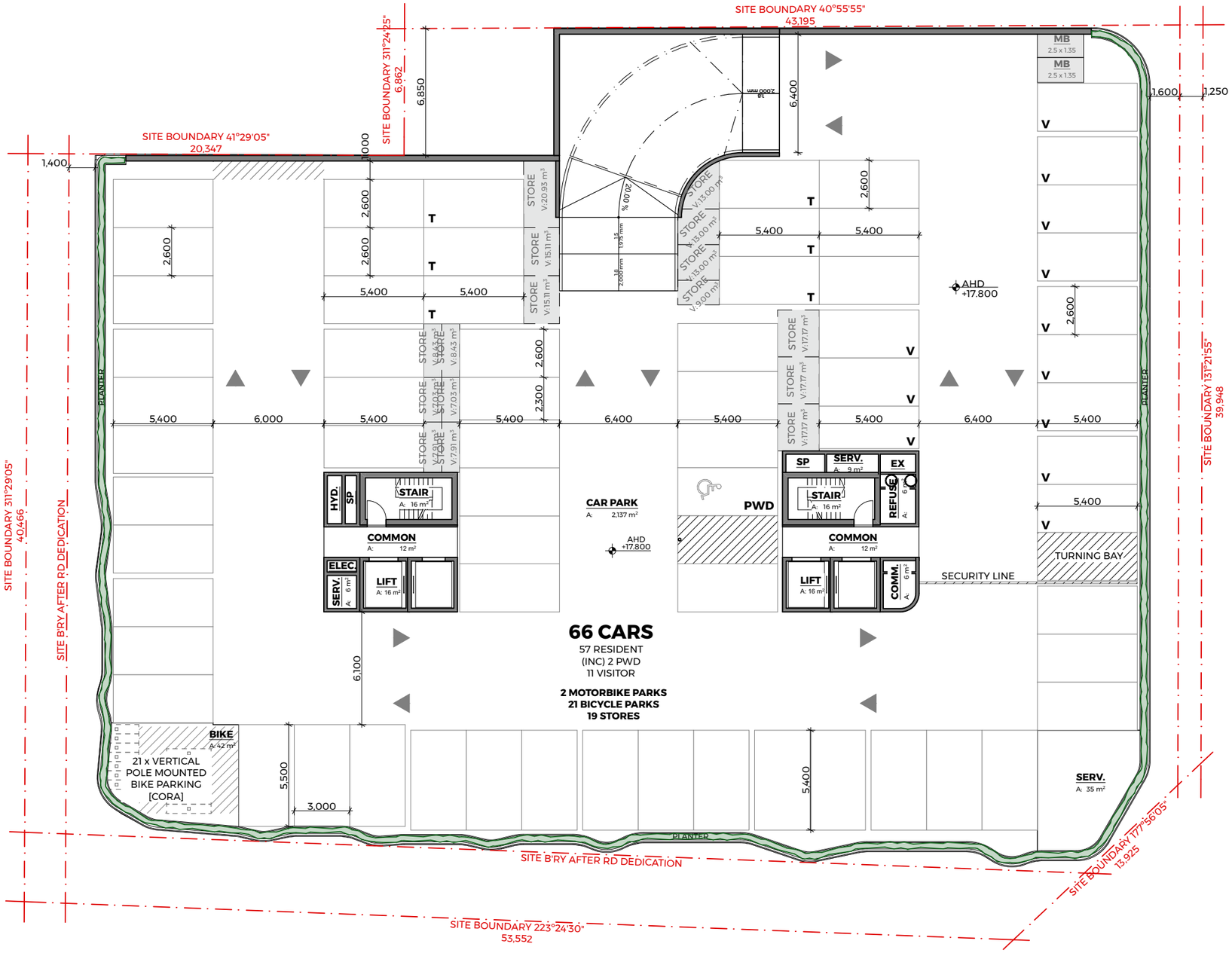
| REVISION **DA.01** | |

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# DEVELOPMENT APPLICATION

PROJECT
**15 ANDERSON STREET**
15 ANDERSON ST FORTITUDE VALLEY QLD 4006

DRAWING TITLE
**LEVEL 02**

| | | |
|---|---|---|
| SCALE 1:250 @A3 | | |
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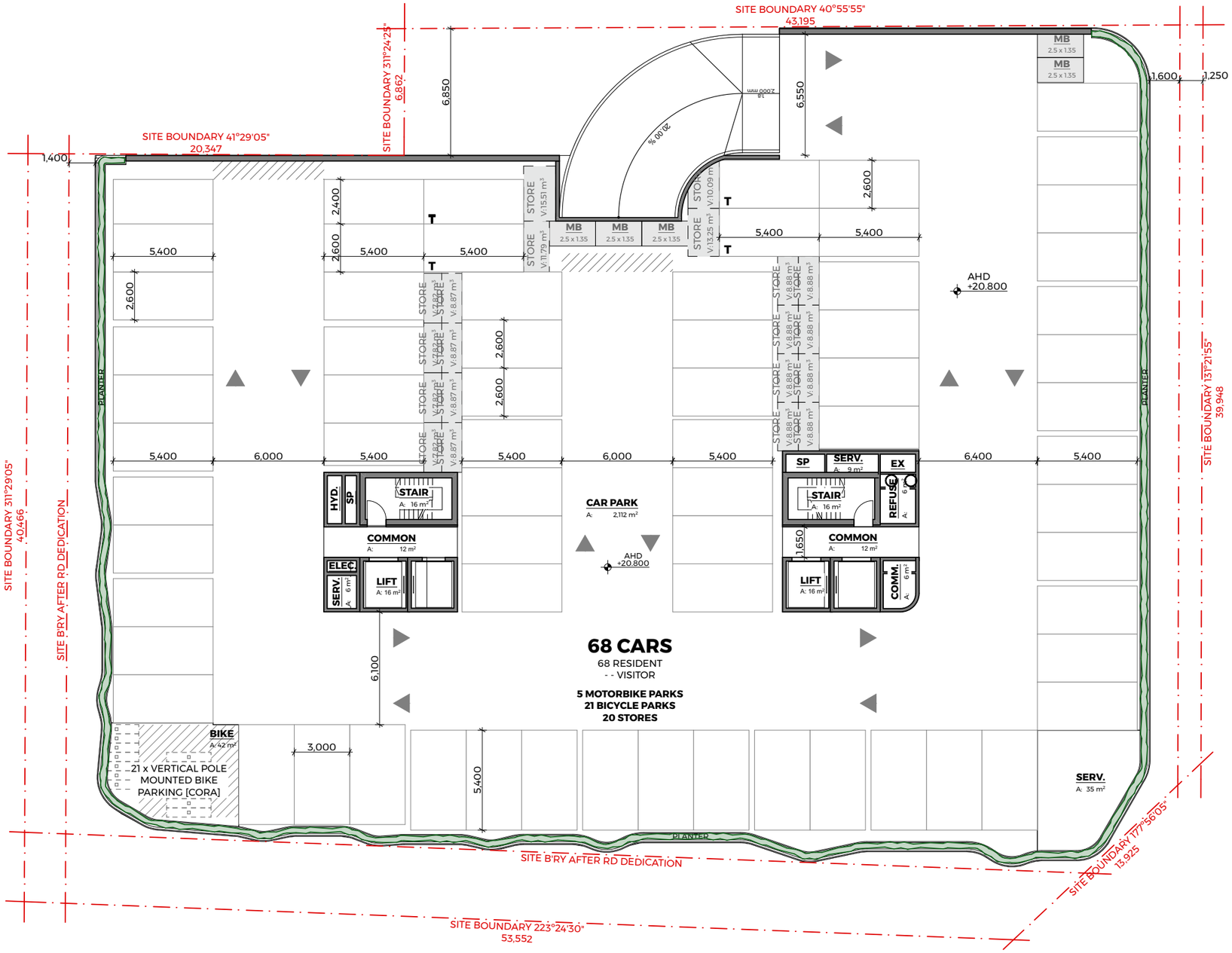


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|---|---|---|---|---|
| DA.01 | 4/8/2022 | DEVELOPMENT APPLICATION | CB | TC |
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# DEVELOPMENT APPLICATION

PROJECT
**15 ANDERSON STREET**
15 ANDERSON ST FORTITUDE VALLEY QLD 4006

DRAWING TITLE
**LEVEL 03**

| | |
|---|---|
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| DATE | 17/02/16 |
| PLOT DATE | 4/8/2022 |
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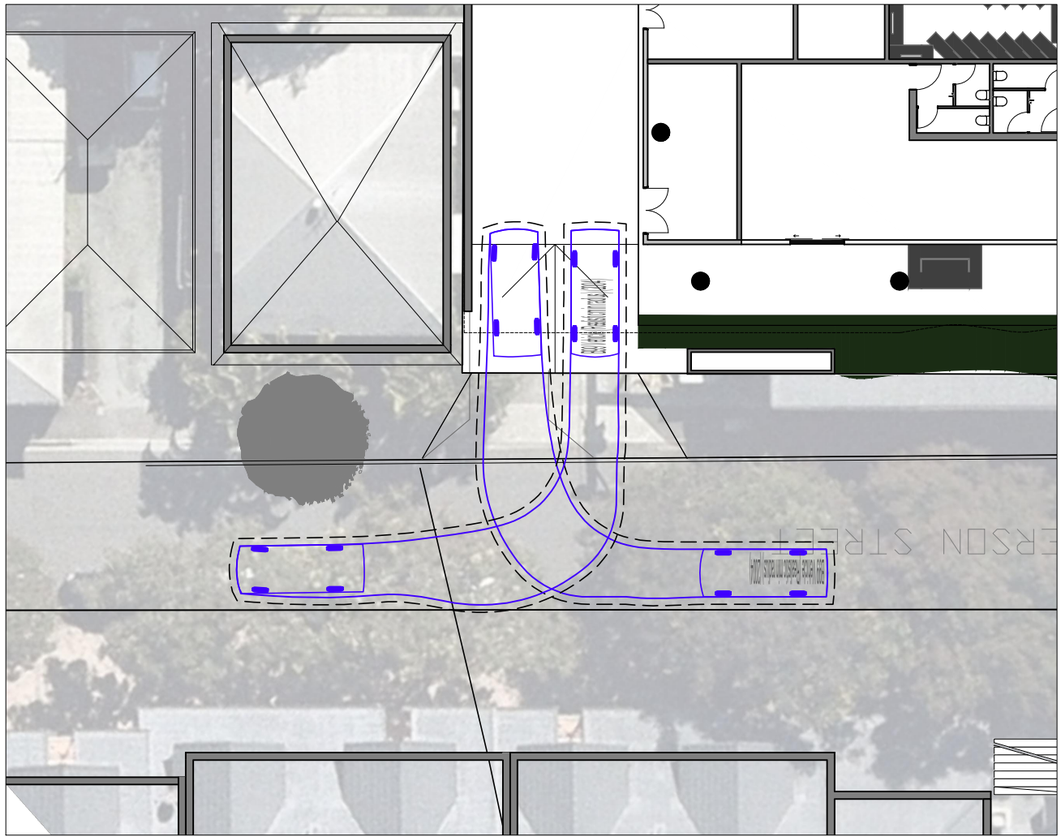
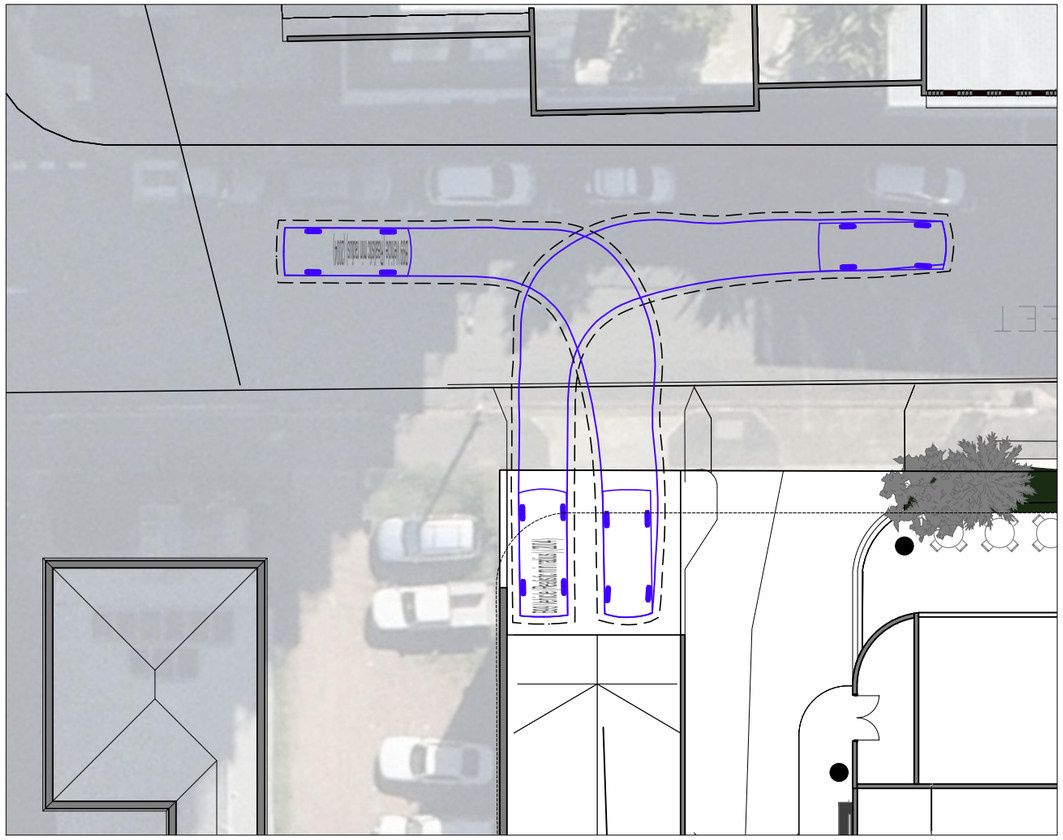
| CHECKED | TC |
| JOB NO. | 21026 |
| DRAWING NO. | TP103 |
| REVISION | DA.01 |

# Appendix B TTM Drawings



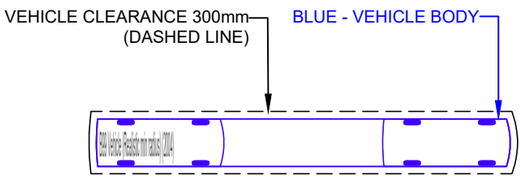
ANDERSON STREET ACCESS MANOEUVRES

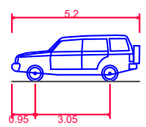


COUSIN STREET ACCESS MANOEUVRES

**PRELIMINARY ADVICE ONLY**

9 September 2022




B99 Vehicle (Realistic min radius) (2004)

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

| REV. | DATE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| A | 09-09-22 | ORIGINAL ISSUE | NG | NG | JB |

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

NORTH

CLIENT
PROPERTY PROJECTS AUSTRALIA


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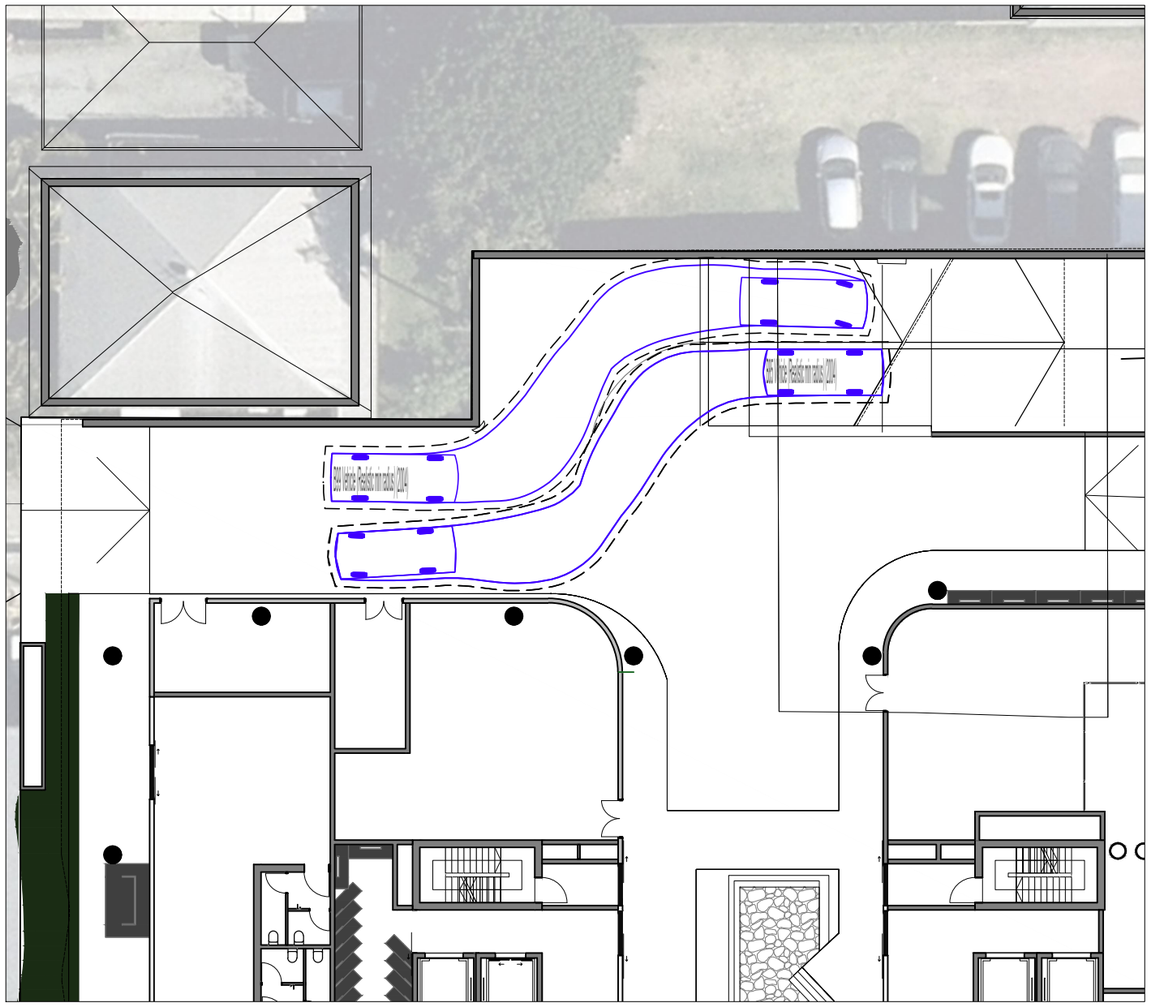
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

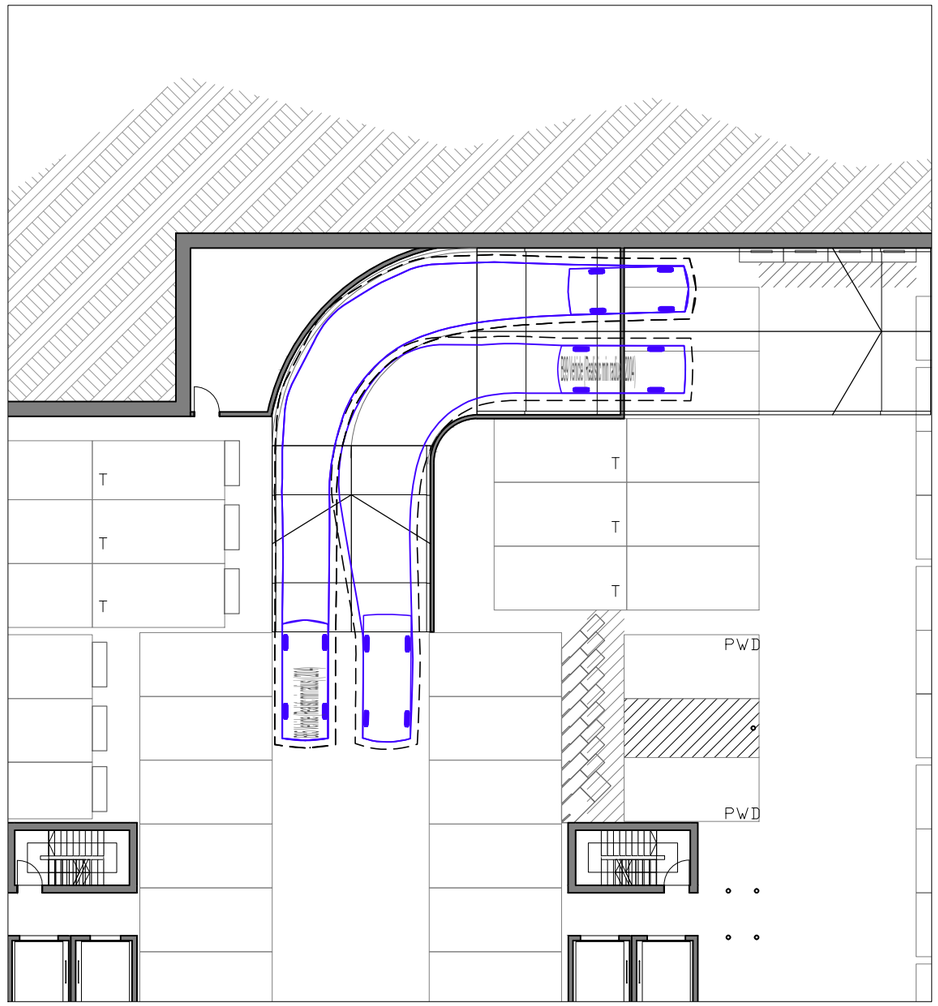

PROJECT
**15 ANDERSON STREET, FORTITUDE VALLEY**

DRAWING TITLE
**SWEPT PATH MOVEMENTS**
BIDIRECTIONAL CIRCULATION - SITE ACCESS
DESIGN VEHICLE - B99

| PROJECT NUMBER | ORIGINAL SIZE |
|---|---|
| 21BRT0794 | A3 |
| DRAWING NUMBER | REVISION |
| 21BRT0794-01 | A |
| DATE | SHEET |
| 9 Sep 2022 | 1 OF 1 |

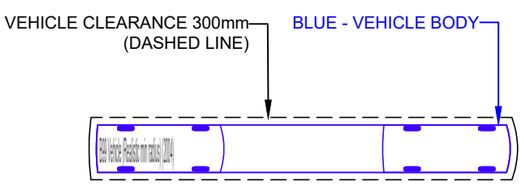


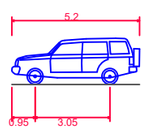
GROUND LEVEL RAMP MANOEUVRES




BASEMENT 01 RAMP MANOEUVRES

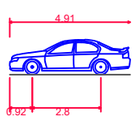
**PRELIMINARY ADVICE ONLY**
9 September 2022




B99 Vehicle (Realistic min radius) (2004)

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




B85 Vehicle (Realistic min radius) (2004)

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

| REV. | DATE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| A | 09-09-22 | ORIGINAL ISSUE | NG | NG | JB |

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

NORTH

CLIENT
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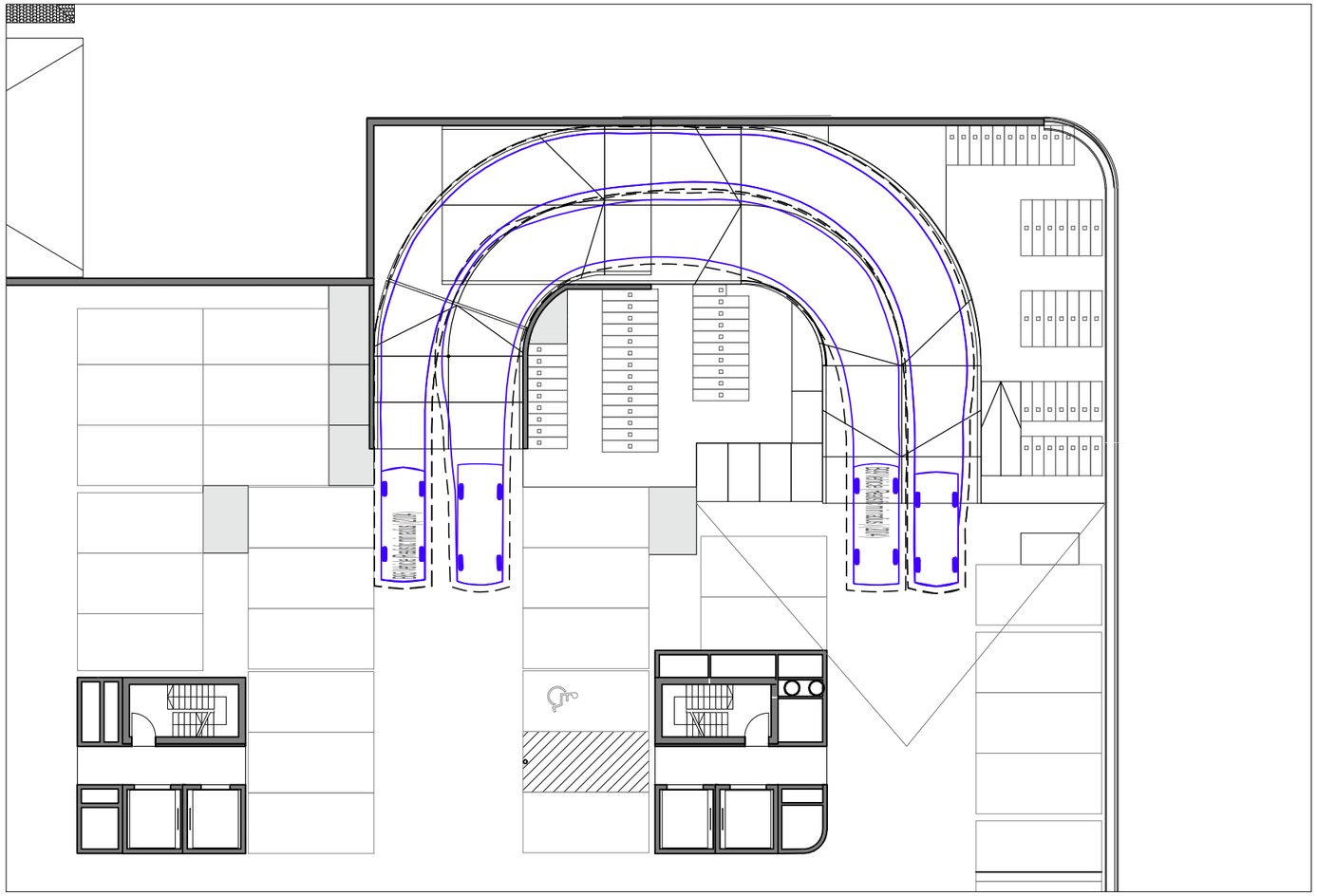
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au


PROJECT
**15 ANDERSON STREET, FORTITUDE VALLEY**

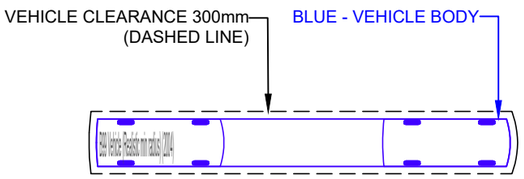
DRAWING TITLE
**SWEPT PATH MOVEMENTS**
BIDIRECTIONAL CIRCULATION - GROUND & BASEMENT 01
DESIGN VEHICLES - B85 & B99

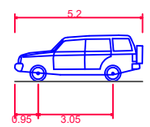
| | |
|---|---|
| PROJECT NUMBER | 21BRT0794 |
| ORIGINAL SIZE | A3 |
| DRAWING NUMBER | 21BRT0794-02 |
| REVISION | A |
| DATE | 9 Sep 2022 |
| SHEET | 1 OF 1 |



**PRELIMINARY ADVICE ONLY**

9 September 2022

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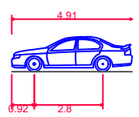
| Curb to Curb Turning Radius | 6.250m |
| Design Speed Forward | 5.0km/h |
| Clearance Envelope | 0.300m |




**B85 Vehicle (Realistic min radius) (2004)**

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

| REV. | DATE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| A | 09-09-22 | ORIGINAL ISSUE | NG | NG | JB |

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

NORTH

CLIENT
PROPERTY PROJECTS AUSTRALIA


TTM CONSULTING PTY LTD
ABN 65 010 868 621
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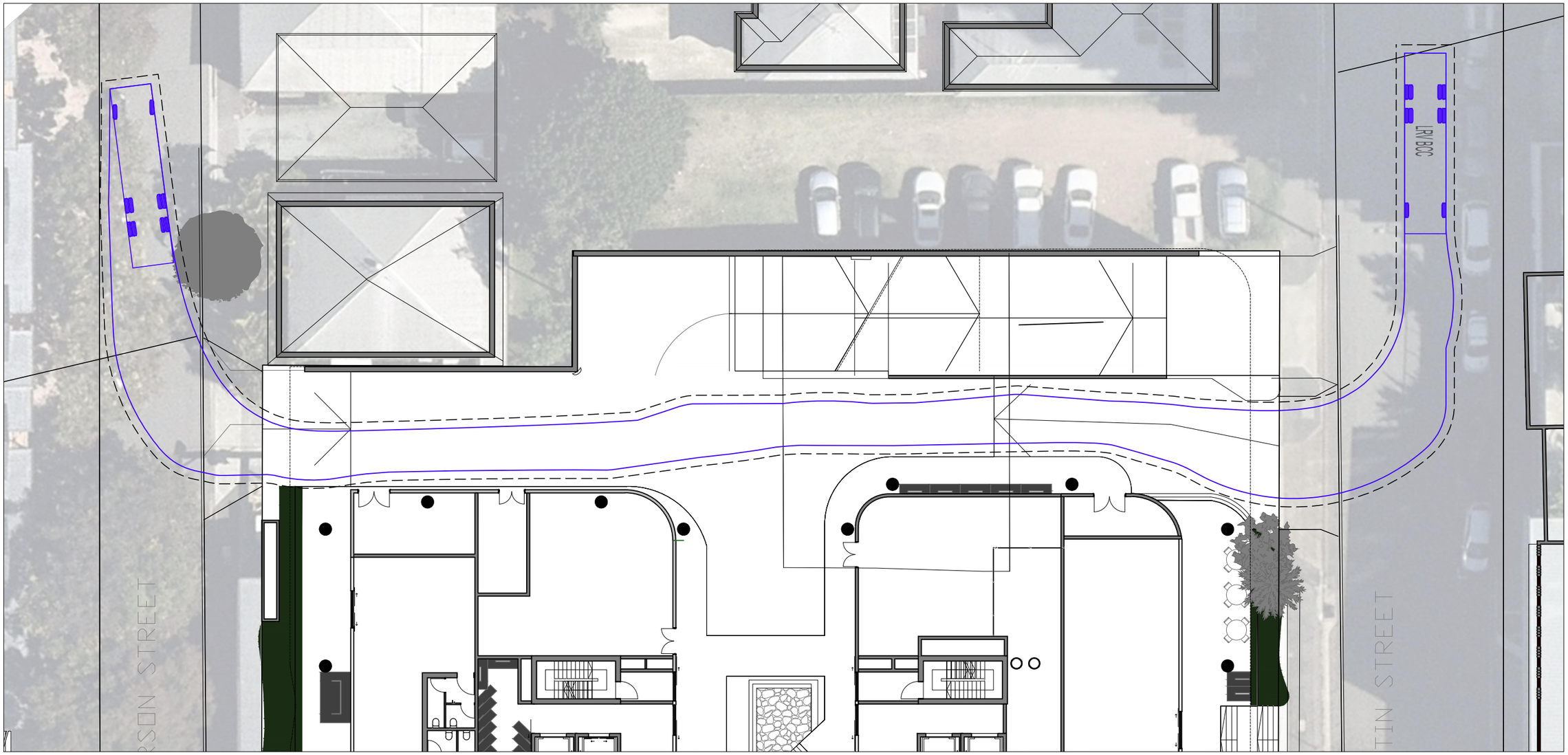
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

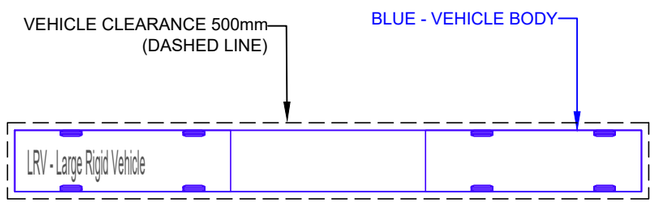

PROJECT
**15 ANDERSON STREET, FORTITUDE VALLEY**

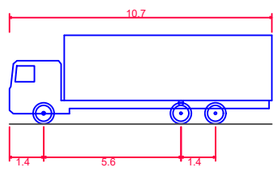
DRAWING TITLE
**SWEPT PATH MOVEMENTS**
BIDIRECTIONAL CIRCULATION - LEVEL 01
DESIGN VEHICLES - B85 & B99

| PROJECT NUMBER | ORIGINAL SIZE |
|---|---|
| 21BRT0794 | A3 |
| DRAWING NUMBER | REVISION |
| 21BRT0794-03 | A |
| DATE | SHEET |
| 9 Sep 2022 | 1 OF 1 |




**PRELIMINARY ADVICE ONLY**
9 September 2022




LRV BCC

| | |
|---|---|
| Overall Length | 10.700m |
| Overall Width | 2.450m |
| Overall Body Height | 3.623m |
| Min Body Ground Clearance | 0.419m |
| Track Width | 2.450m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 11.000m |
| Design Speed Forward | 5.0km/h |
| Clearance Envelope | 0.5m |

| REV. | DATE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| A | 09-09-22 | ORIGINAL ISSUE | NG | NG | JB |

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

NORTH

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PROPERTY PROJECTS AUSTRALIA

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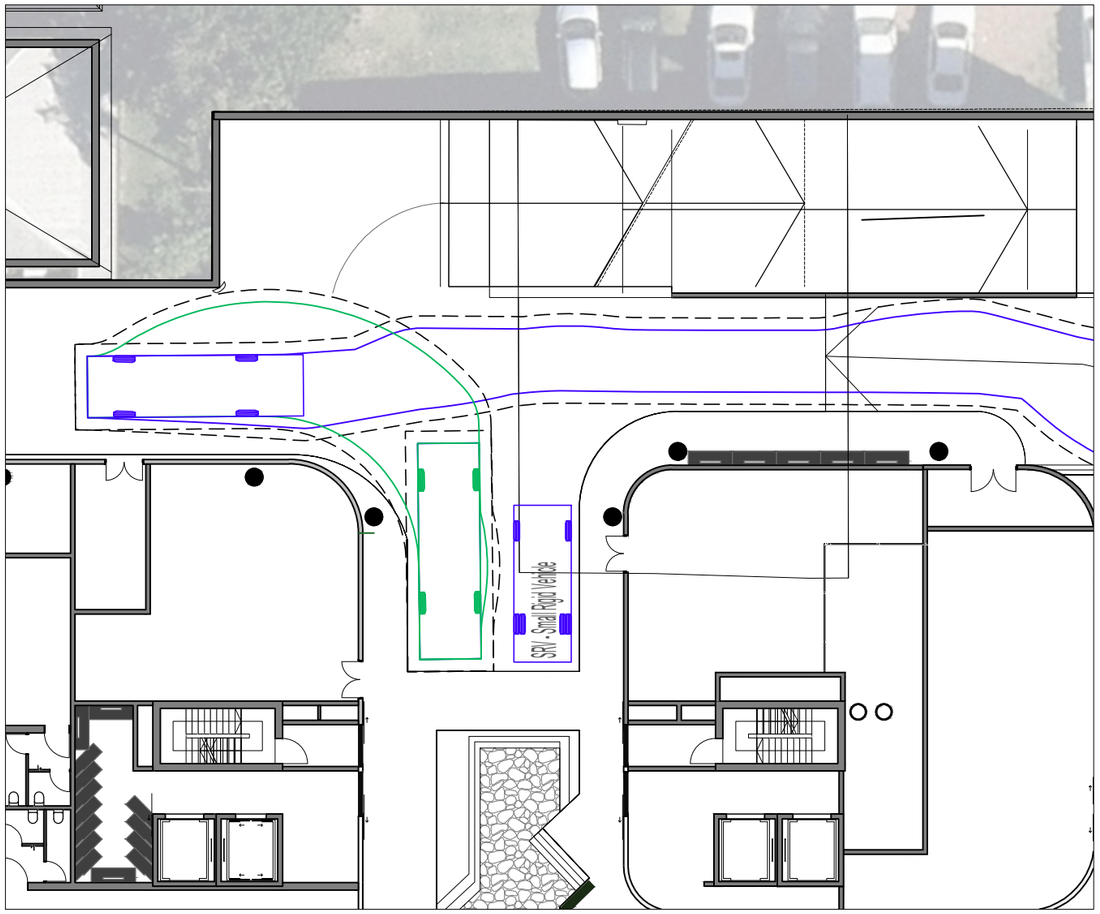
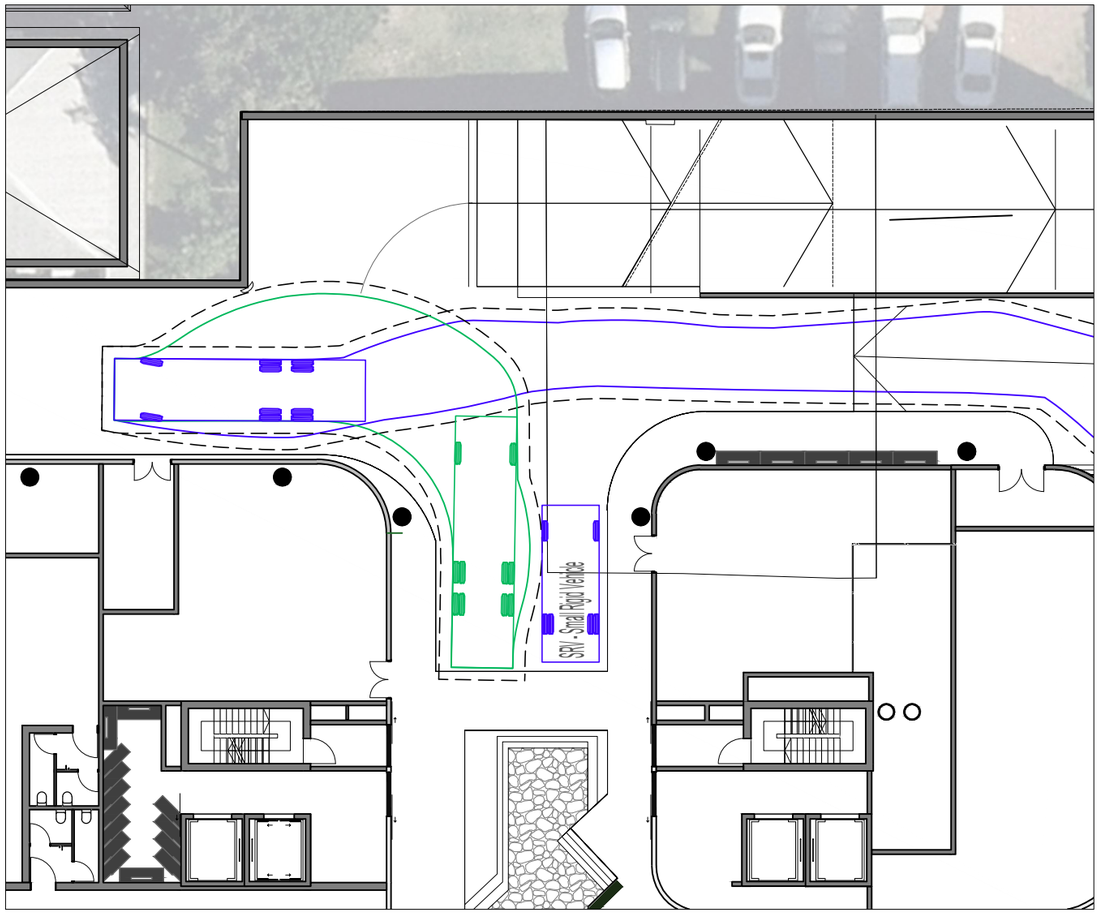
PROJECT
**15 ANDERSON STREET, FORTITUDE VALLEY**

DRAWING TITLE
**SWEPT PATH MOVEMENTS**
SITE ACCESS MANOEUVRES
DESIGN VEHICLES - LRV

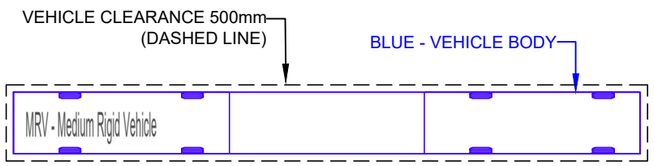
| PROJECT NUMBER | ORIGINAL SIZE |
|---|---|
| 21BRT0794 | A3 |
| DRAWING NUMBER | REVISION |
| 21BRT0794-04 | A |
| DATE | SHEET |
| 9 Sep 2022 | 1 OF 1 |




MRV MANOEUVRE

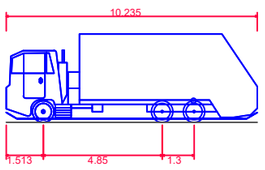



RCV MANOEUVRE



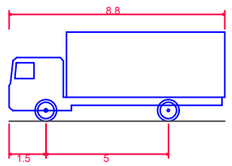

**PRELIMINARY ADVICE ONLY**

9 September 2022



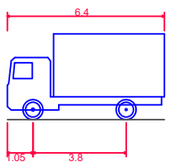

BCC Fleet 2020 (Rear Loader)

| | |
|---|---|
| Overall Length | 10.235m |
| Overall Width | 2.500m |
| Overall Body Height | 3.600m |
| Min Body Ground Clearance | 0.150m |
| Track Width | 2.500m |
| Lock-to-lock time | 6.00s |
| Curb to Curb Turning Radius | 9.500m |
| Design Speed Forward | 5.0km/h |
| Clearance Envelope | 0.500m |




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 |
| Curb to Curb Turning Radius | 10.000m |
| Design Speed Forward | 5.0km/h |
| Clearance Envelope | 0.500m |




SRV - Small Rigid Vehicle

| | |
|---|---|
| Overall Length | 6.400m |
| Overall Width | 2.330m |
| Overall Body Height | 3.500m |
| Min Body Ground Clearance | 0.398m |
| Track Width | 2.330m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 7.100m |

| REV. | DATE | AMENDMENT DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| A | 09-09-22 | ORIGINAL ISSUE | NG | NG | JB |

SCALE 0 2 4 6 8 10m

SCALE 1:200 AT ORIGINAL SIZE

NORTH

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PROJECT: **15 ANDERSON STREET, FORTITUDE VALLEY**

DRAWING TITLE: **SWEPT PATH MOVEMENTS**
LOADING BAY MANOEUVRES
DESIGN VEHICLES - RCV, MRV & SRV

| | |
|---|---|
| PROJECT NUMBER | 21BRT0794 |
| ORIGINAL SIZE | A3 |
| DRAWING NUMBER | 21BRT0794-05 |
| REVISION | A |
| DATE | 9 Sep 2022 |
| SHEET | 1 OF 1 |