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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

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Reference: 190746.04FB

Jacobs  
Level 7, 177 Pacific Highway  
North Sydney, NSW 2060  
Attention: Myall Stevens

### PEER REVIEW OF THE TRAFFIC AND PARKING ASSESSMENT OF THE PROPOSED MIXED USE DEVELOPMENT AT 187 - 203 PEATS FERRY ROAD

Dear Myall,

Reference is made to your request to provide an additional Peer Review for the Proposed Mixed Use Development at 187 - 203 Peats Ferry Road against the initial peer review undertaken by *M<sup>C</sup>Laren Traffic Engineering* (MTE) dated 21<sup>st</sup> of November 2019. This peer review should be read in conjunction with the Peer Review prepared by *M<sup>C</sup>Laren Traffic Engineering* (MTE) dated 21<sup>st</sup> of November 2019.

*M<sup>C</sup>Laren Traffic Engineering* (MTE) has previously undertaken three (3) peer reviews of the *Jacobs Traffic and Transport Impact Assessment* (referred to as JTP Report) in relation to the proposed development at 187 – 203 Peats Ferry Road. The amended JTP Report is in direct response to the comments made in the previous peer reviews dated 12<sup>th</sup> of December 2019 (Peer Review 2) and 21<sup>st</sup> of November 2019 (Peer Review 1). The documents provided to MTE as part of this further peer review are outlined below:

- Jacobs Traffic and Transport Impact Assessment dated 10<sup>th</sup> March 2020.
- Sidra files as provided by Jacobs (Version 8).
- Architectural Plans prepared by Turner Studio as depicted in **Annexure A** for reference.

The relevant plans are reproduced in **Annexure A** and the JTP Report in **Annexure B**.

It should be noted that since the *MTE Peer Review* dated 12<sup>th</sup> of December 2019, MTE has been working with Jacobs and Turner Architects to provide a basement car park layout that MTE would be happy to support. The result of this is reproduced in **Annexure A** for reference.

The amended scale of the proposed development based upon the current JTP Report is outlined below:

- 200 dwellings units with the following unit split:
  - 61 x one-bedroom apartments;
  - 118 x two-bedroom apartments; and
  - 21 x three-bedroom apartments.
- Childcare Centre as per the following:
  - 30 Children.
- Retail shops with a GLFA of 2,634m<sup>2</sup> split between the following uses:
  - 1,157m<sup>2</sup> GLFA (does not include BOH) supermarket (1,487m<sup>2</sup> GFA);
  - 1,477m<sup>2</sup> GLFA retail speciality shops (1,874m<sup>2</sup> GFA).
- Commercial office with a GLFA of 1,707m<sup>2</sup> (2,127m<sup>2</sup> GFA).

Provision of 316 car parking spaces (as stated in the JTP Report Section 3.1) within a basement car park as per the following:

- 28 residential visitor parking spaces;
- 134 resident parking spaces;
- 41 commercial parking spaces;
- 91 retail parking spaces;
- 8 child care centre parking spaces;
- 12 delivery vehicle spaces;
- 2 spaces for car sharing.

## **1 MTE Assessment Against Initial Peer Review**

As previously mentioned, an initial peer review has been undertaken by MTE, with the raised concerns by the initial MTE Peer review dated 21<sup>st</sup> of November 2019 outlined below (*shown italicised*), with MTE's response to the concern outlined below, based upon the most recent JTP Report and information provided.

*Table 2.2 The JTP states that the adopted traffic generating rates used were from the RTA Guide to Traffic Generating Developments (RMS Guide) for slow trade speciality shops, but does not provide the direct quote from the RMS Guide.*

*Based upon the RMS Guide, the restaurant is expected to generate 5 vehicle trips per 100m<sup>2</sup> GFA, which is adopted in the JTP Report (Table 2.2).*

*Based upon the RMS Guide, slow trade shops are expected to generate 2 vehicle trips per 100m<sup>2</sup> GLFA on Thursday and 1.1 vehicle trips per 100m<sup>2</sup> GLFA on Friday. This is contrary to the adopted rate of 2.2 trips per 100m<sup>2</sup> GLFA during the PM peak hour period in the JTP Report (Table 2.2).*

*The RMS Guide does not outline traffic generating rates during AM peak hour periods, as such it is not known how the AM peak hour rate has been derived (shown to be 1.1 per 100m<sup>2</sup> GLFA in the JTP Report).*

**MTE Response:** The adopted rates within the amended JTP Report that are relied upon are the traffic generation rates outlined in the RMS Guide to Traffic Generating Developments as shown below:

*Retail*

*PM: - 2 vehicle trips per 100m<sup>2</sup> GLFA*

*AM – 1 vehicle trip per 100m<sup>2</sup> GLFA (assumed to be half of PM peak)*

*Restaurant – 5 per 100m<sup>2</sup> GFA*

The report still does not provide the direct reference to these rates, making it hard for the reader to determine what rates were adopted. Considering that this only relates to exiting site context only, it does not impact the proposed development assessment.

*No assessment of the existing car parking requirements has been undertaken for the existing use of the site. Noting that it is highly likely that the parking demand of the site is not fully contained wholly on the existing site. This would mean that the existing development traffic impact is not fully occurring at the site driveway, but rather within the town centre.*

*No existing surveys of the site driveway have been undertaken to validate Jacobs adopted existing traffic generation of the site. This is required to be undertaken if any discount is to be given to the existing use within the surveyed road network.*

*The GLFA has been assumed to be 75% of the GFA. This should be validated and not just assumed. The architect should provide the GLFA.*

**MTE Response:** The JTP Report does not rely upon existing parking shortfalls, or discount any traffic flows as a result of the existing development, hence any forecasting impact assessment will provide for a conservative assessment.

*The JTP Report gathers data on Tuesday the 31<sup>st</sup> of October 2017. Considering that the proposal is for a supermarket and specialty retail shops, survey data should have been gathered on a Thursday. Typically shopping centre / supermarkets have higher traffic generation rates on Thursday nights due to extended operating hours (late night shopping).*

**Jacobs Response:** *Tuesday surveys are still appropriate given that we have assessed the AM and PM weekday peak period, when overall traffic volumes are highest. Although some shopping centres may generate more trips on Thursday nights due to extended hours, this would occur later in the evening outside of the assessed peak hours.*

**MTE Response:** Section 3.6.1 of the Guide to Traffic Generating Developments 2002 provides daily traffic flow fluctuations based upon the day of the week. The extract from the RMS Guide is shown below.

Day	Variation (compared with average)	Day	Variation % (compared with average)
Monday	0.88	Friday	1.00
Tuesday	0.85	Saturday	1.05
Wednesday	0.85	Sunday	0.18
Thursday	1.32		

The above table relates to daily vehicle flows and considering the extended operating hours on Thursday is likely the reason for increases in daily vehicular traffic on Thursday and does not necessarily mean that Thursday will have a larger peak hour. Reference is made to the *Trip Generation and Parking Demand Surveys of Shopping Centre Analysis Report September 2011 commissioned by the RTA*, the relevant results relating to peak hour trips per size of centre and based upon the day is shown below:

**Table 3.20 – Network Peak Hour Traffic Generation Rates (Average Rates)**

Range in Total Floor Area (GLFA - m <sup>2</sup> )	Network Peak Hour Generation Rates (vehicles per 100m <sup>2</sup> GLFA)			
	Thursday	Friday	Saturday	Sunday
0 - 20,000	5.8	6.4	6.9	5.6
20,000 - 40,000	5.2	4.0	6.9	5.6
40,000 - 60,000	5.2	5.6	6.7	4.7
60,000 - 80,000	3.7	3.2	4.6	4.3
Above 80,000	3.0	2.8	3.5	3.1

NOTE: Network peak hour for Thursday and Friday is for the PM peak hour.

Whilst there is no Tuesday provided in the table above, there is no consistent trend that the Thursday network peak will always generate more compared to the Friday peak based upon the size of the centre. Considering the above, it may be unnecessary to undertake additional surveys on a Thursday compared to the Tuesday.

*The JTP Report gives no consideration to existing traffic flows on weekends. Retail specialty shops generate almost double the vehicle trips on a weekend compared to weekdays based upon the Guide to Traffic Generating Developments 2002. Considering the site has a large portion of specialty retail shops floor space, consideration should be made to modelling the weekend traffic impact.*

**MTE Response:** The amended JTP undertakes a very high level assessment for the weekend, with consideration to SCATS data. The data suggests that the weekend peak hour period is higher than the AM weekday commuter peak hour period and less than the PM weekday commuter peak hour period (only slightly). The JTP report recommends the provision of a “Keep Clear” zone at the intersection of Peats Ferry Road / Dural Street to prevent blockage of in and out movements due to queues at the southern approach to the peats Ferry Road / Coronation Street intersection. It should be noted that the assumed PM peak hour period 2031 model that has been assessed as a Saturday shows a 95<sup>th</sup> percentile queue of 78m at the south approach to Coronation Street / Peats Ferry Road, resulting in blockage of the intersection of Dural Street / Peats Ferry Road, as such the provision of this facility will ensure that blockage of right turn movements into Dural Street will not occur. Although MTE does not agree with the use of the PM traffic volumes to inform Saturday results.

MTE does not agree with the methodology adopted by Jacobs to inform future conditions on the Saturday. Whilst Jacobs adopts the PM peak hour period which has a higher traffic flow compared to the weekend, turning movements may be significantly different. The correct method to inform future conditions during the Saturday period would be to collect survey data on a Saturday typical (which currently is not able to be undertaken considering the current public behaviour patterns due to the Coronavirus).

It is accepted that typically weekend traffic allows for a lower target Level of service compared to the weekday commuter peaks.

*It is not known if the results of the survey data take into consideration any residual queues.*



**Jacobs Response:** No queue length data collected.

**MTE Response:** Existing traffic volumes by be higher, resulting in further queue lengths for the actual operation of intersections

*No assessment has been carried out outside of peak commuter periods, when vehicles have the ability to turn right into Dural Road from Peats Ferry Road or when parking restrictions do not apply along Dural Street.*

**Jacobs Response:** Worst case scenario assessed – weekday AM and PM peak hour. Additional commentary provided detailing the number of right turn undertake outside of the banned period.

**MTE Response:** Commentary has been added to Section 2.8 of the JTP report in relation to the number of vehicles turning right into Dural Street from Peats Ferry Road outside of turn ban restriction. The JTP Report does not provide an assessment of the development when the right turn movement is allowable. Although considering 100 vehicles currently undertake this movement outside turn restrictions, it is expected that further delays due to additional right turn movements would occur to vehicles travelling southbound along Peats Ferry Road. It is relevant to note that the assessed assumed Saturday period shows 135 vehicles turning right into Dural Street with a 95th percentile queue of 27m, which does not queue back to the intersection of Coronation Street / Peats Ferry Road. Vehicles attempting to turn right into Dural Street from Peats Ferry Road may impact the capacity of the signalised intersection of Coronation Street / Peats Ferry Road, although based upon the provided SIDRA, the only capacity constraint at the intersection of Coronation Street / Peats Ferry Road is due to vehicles overflowing into the through lane for those vehicles turning right into Coronation Street from Peats Ferry Road (south). Whilst SIDRA reports no capacity reduction, it is likely to occur in practice.

*The JTP Report outlines that in the existing conditions there are turn restrictions at the intersection of Dural Street and Dural Lane with Peats Ferry Road, where vehicles are disobeying the signposted turn restrictions.*

*Considering the access arrangements of the site and the expected traffic generation of the site, the illegal right turns can be expected to increase if no design changes are implemented.*

*Peats Ferry Road is a single lane southbound, with no dedicated turning lanes provided to enter either Dural Street or Dural Lane. Any vehicle turning right into Dural Street or Dural Lane will block the through lane and result in queuing of the through movement if there are following vehicles. This can potentially queue back to the signalised intersection, affecting the operations of the signalised intersection of Coronation Street / Peats Ferry Road and therefore reducing the traffic flow efficiency of the entire corridor.*

**MTE Response:** No additional commentary has been provided for this as the scope of assessment was limited to within turn restricted periods. Based upon the previous response, if vehicles do turn right it does not appear it would result in a capacity reduction to the intersection of Coronation Street / Peats Ferry Road.

*The adopted car parking rates as shown in Table 3.1 of JTP Report are based upon the rates in Hornsby Shire Council DCP Part 1 - General which is the relevant planning control. It is also noted that the RMS Guide high residential density parking rates are the same as the Hornsby Shire Council's DCP requirements.*

*The loading parking rate outlined within Table 3.1 of JTP Report does not appear to relate to any Hornsby Shire Council DCP control. No justification has been provided for the variation to the stated required delivery parking spaces.*

*The development requires the provision of 10% of units to be adaptable as per the DCP requirement. This results in the requirement for 19.1 adaptable units (rounded to 19). Under the DCP each adaptable unit should be provided a disabled car parking space as per AS2890.6:2009 design requirements. Table 3.2 of JTP Report indicates that only 13 disabled car parking spaces have been provided which is a shortfall of six (6) disabled spaces for the residential component of the site.*

*The provision of 10 disabled car parking spaces for the supermarket component greatly exceeds the DCP car parking requirement.*

*The number of bicycle spaces that can be provided within the bicycle parking area should be shown on the plans, rather than stating how many bicycle spaces can be provided.*

**MTE Response:** The parking required under Council's DCP and the provided parking is hard to determine from the traffic report. A summary is provided below for ease of reference.

Land Use	Rate	Scale	Parking Required	Parking Provided as stated in JTP Report	Actual Parking Provided based upon Plans
<b>Residential</b>	0.4 space per 1 bedroom	61	24.4	134	133
	0.7 space per 2 bedroom	118	82.6		
	1.2 space per 3 bedroom	21	25.2		
	1 space per 7 units for visitors	200	28.6	28	28
<b>Sub-total</b>	-	-	160.8 (161)	162	161
<b>Commercial (office)</b>	1 space per 48m <sup>2</sup> GFA	2,127m <sup>2</sup> GFA	44.3 (45)	41	36
<b>Supermarket / Retail</b>	1 space per 29m <sup>2</sup> GLFA	2,634m <sup>2</sup> GLFA	90.8 (91)	91	93
<b>Child Care Centre</b>	1 space per 4 children	30	7.8 (8)	8	8
<b>Sub-total</b>	-	-	144	140	137
<b>Total</b>	-	-	305	302	298

As shown above the development provides a shortfall of seven (7) spaces, based upon Council's DCP, although is actually short nine (9) commercial spaces due to parking allocation.

In addition to the above the following are provided:

- Two (2) car share parking spaces;
- Ten (10) service bay parking spaces.

Considering the above, the development would be capable of providing complaint parking. Allocating nine (9) retail spaces on Basement 2 to commercial car parking and also allocating the service bay spaces on Basement 1 to retail parking would result in complaint car parking numbers. The use of service bays can shared between the retail car parking spaces, such that they can just be linemarked

as standard retail spaces. The use of loading facilities within the basement should be restricted to occur outside of peak operating periods, which is typical operation for retail developments.

The JTP references the RMS Guide for delivery vehicle requirements and as mentioned above these can be considered to be shared and is acceptable.

The development provides the following disabled car parking:

- 2 commercial car parking spaces;
- 1 child care centre car parking space;
- 2 residential visitor car parking spaces;
- 5 retail car parking spaces
- 19 residential car parking spaces.

Based upon the above, there is a requirement for 20 disabled spaces for residents (shortfall of one space). There is sufficient room within the basement to provide this car parking. In addition, the provision non-residential disable car parking spaces exceeds the typical 2% of disabled car parking spaces.

The proposed development greatly exceeds the bicycle requirements for the site, requiring only 70 spaces, whilst 120 are provided. Similarly, only six (6) motorcycle spaces are required and the site provides ten (10) motorcycle spaces.

## **MTE Peer Review 1 Design Comments**

*The JTP Report indicates that a maximum of a 12.5m length Heavy Rigid Vehicle will be used for deliveries, but Figure 3.2 clearly shows at least a 15.5m length Vehicle using the loading area.*

*The internal swept paths of the basement car parking areas are unsuccessful with the following relevant to note:*

*The entry and exit swept paths do have any vehicle clearance in accordance with AS2890.1:2004 requirements (Figure 3.6 of JTP Report);*

*The swept paths in Basement 1 are shown to travel over car parking spaces and have no vehicle clearances. This applies to all basement levels (Figure 3.7 to Figure 3.9);*

*The development is a Class 3 driveways under Table 3.1 of AS2890.1:2004 and as such shall have separate entry and exit driveways. This is a very important aspect for supermarkets due to the high number of vehicle trips generated from supermarkets and is required to ensure internal circulation efficiency, pedestrian safety and minimise internal two-way passing conflicts.*

*The basement car parking areas is not appropriate for a supermarket design due to the entire basement layout being two-way and within only one circulating aisle. Typically, supermarkets adopt multiple one-way circulating aisles, with separate entry and exits to provide for an efficient car park circulation. The inadequate design is likely to result in internal traffic congestion, resulting in queues. This is made worse when considering the high turn over of parking, pedestrian*

*movements to and from the supermarket, which in some cases are required to walk past the circulating ramps and share circulating aisles with two-way traffic flows.*

*There should not be any dead-end aisles within the supermarket car parking area.*

*The entry circulation requirements (undertaking a U-turn upon entry and exit) is not favourable and is a poor design for a supermarket.*

*The entry driveway into the basement car park does not comply with Figure 3.3 of AS2890.1:2004.*

*The swept paths in the report have been undertaken on different plans to the Architectural drawings provided. The design of the entry driveway into the basement is slightly different on the Architectural plans, compared to what has been assessed. It may appear that two-way passing into the site is not possible due to the modifications.*

*No swept paths have been undertaken for the entry or exit from the supermarket loading dock spaces.*

*There is no separation between the commercial parking and retail parking and as such there is no guarantee that the commercial parking will be reserved for the commercial use.*

**MTE Response:** As mentioned previously MTE has been providing design advice for the layout of the basement car parking areas and as such the concerns raised previously in relation to the driveway access, car park circulation areas are now resolved. The design achieves separate entry and exit driveways, separated by a small island for pedestrians.

The internal basement layout provides one-way circulation aisles and a one-way ramp system, typical for large shopping centres which will limit impacts to vehicular circulation when vehicles park. The design is superior to the previous design which provided two-way circulating aisles, and two-way ramps for the entire basement layout.

The entry ramp provides access to the Basement 1, while all vehicles must exit the site from Basement 2 which is supported.

Swept paths within the report show that the internal layout is successful for vehicular circulation along all ramps and circulation aisles.

The remaining concern in relation to the design is that the commercial car parking spaces are not separated from the retail spaces, but it is understood that Council have accepted this arrangement. It is also understood that the service vehicle will be restricted to a 12.5m length Heavy Rigid Vehicle, this should an operating condition of consent.

### **MTE Peer Review 1 Haulage Route Comments**

*The haulage route for the delivery vehicle is stated to be right in, right out. This promotes delivery vehicles going through residential areas which is typically not supported by Council's due to residential amenity considerations. It is recommended that the design of the delivery area be designed so to ensure that delivery vehicles do not travel through residential areas.*

*The swept paths undertaken for delivery vehicle movements into and out of the development have not been undertaken with any vehicle clearances shown. Swept path testing should be undertaken showing vehicle clearance (0.5m vehicle*

*clearance for heavy vehicles and 0.3m clearance for passenger vehicles). These clearances should be provided to parked vehicles. The following are relevant to note with respect to the swept paths undertaken:*

*The 12.5m length Heavy Rigid vehicle turning right into Dural Road encroaches into the parking lane along Peats Ferry Road;*

*The right turning 12.5m length Heavy Rigid from Peats Ferry Road travels over the centreline of Dural Street which is unacceptable;*

*The statement that the left turning HRV into Peats Ferry Road is legal is simply incorrect. The swept paths clearly show that it is impossible for a 12.5m length Heavy Rigid Vehicle to turn left onto Peats Ferry Road;*

*Clearance at intersection on public roads should comply with the requirements in Austroad Design Vehicle and Turning path Templates Guide 2013;*

*The left turn movement from William Street onto Peats Ferry Road is not successful. The swept path clearly cuts the corner of the road;*

*The 12.5m length HRV is unsuccessful turning left onto Frederick Street from Dural Street. The HRV is required to travel on the other side of the carriageway.*

**MTE Response:** The acceptance of the service vehicle delivery route is a matter for Council to consider, it is noted that the haulage route proposed is for a right in / right out from Dural Road, resulting in delivery vehicles travelling through residential areas. The following are relevant to note with respect to the proposed haulage route:

- Modifications are required to the kerb on the southern corner of Dural Street / Peats Ferry Road to allow a 12.5m length heavy rigid vehicle (HRV) to turn into Dural Street without travelling over the centreline of the road;
- A 12.5m HRV cannot turn left onto Peats Ferry Road from William Street without encroaching onto the other side of the road;
- A 12.5m HRV can turn right onto Peats Ferry Road from William Street;
- A 12.5m HRV cannot turn right onto William Street from Frederick Street without encroaching onto the other side of the road;
- A 12.5m HRV cannot turn left onto Frederick street from Dural Street without travelling on the wrong side of the road along Dural Street and in any event encroaches onto the other side of the road along Frederick Street.

Swept paths provided within the report show the vehicle clearances, but do not provide vehicle clearances to kerbs as required by *Austroad Design Vehicle and Turning Path Templates Guide 2013*.



*Considering the site is located within a town centre next to a train station the use of a discount of 20% for multi-purpose trips would be appropriate.*

*Commercial office trip distribution should be 90% in / 10 out in the AM peak hour period and 10% in, 90% out in the PM peak hour period.*

*The GFLA should not be assumed to be 75% of the GFA but derived from the architectural plans and provided by the architect.*

*The use of the traffic generation rate of 12.3 per 100m<sup>2</sup> GLFA should be justified. As this rate is typically applied in planning stages when it is not known what specific retail use will be provided in a proposed shopping centre development. This is not the case for this proposed development which will have a supermarket and specialty retail shops. As the uses of the retail shops are known the more specific traffic generation rates should be adopted as outlined in the RMS Guide to Traffic Generating Developments 2002 and as reproduced in **Annexure C**.*

**MTE Response:** The traffic report has correctly adopted a 90% in / 10% outbound trip rate during the AM peak hour and vice versa during the PM peak for commercial land uses and derived the GLFA based upon the actual plans and not just assumed a discounted rate. In addition, the JTP report adopts the correct traffic generation rates, with the shopping centre AM peak hour assumed to generate half of the PM.

The discount of 20% as a result of multi-purpose trips is no longer applicable to the proposed development due to the corrected use of the estimated traffic generation rates. The model already considers multi-purpose trips. Any discount to traffic generation would be attributed to passing trade (from exiting traffic volumes) or a reduction in the estimated traffic generation of the site as a result of the mixed-use nature of the site and location of the site.

Considering the site is located within a town centre and the site does not discount existing vehicle trips, the reduction in traffic generation is accepted.

#### **MTE Comments on Trip Distribution as Part of Peer Review 1.**

*The review of the Hornsby West Side Traffic Study (2013) is outside the scope of this document and as such M<sup>c</sup>Laren Traffic Engineering (MTE) cannot comment on the adopted traffic distribution. It is noted that there is no difference in the adopted traffic distribution between retail uses, commercial uses or residential uses.*

*Model assumes that vehicles cannot turn right from Dural Street into Peats Ferry Road and that most traffic would use signalised intersection at William Street. There is nothing within the report as to why this has been adopted for the model. There are no existing turn restrictions, and this is the most direct route to Peats Ferry Road from the site which the majority of vehicle would use.*

*The assumption that most vehicles would use the signalised intersection of William Street to turn right is not accepted unless justified.*

*Further, any restriction to the right turn onto Peats Ferry Road will result in the promotion of vehicles trips through residential areas, impacting upon residential amenity.*

**MTE Response:** The JTP Report still states that no vehicles will turn right onto Peats Ferry Road from Dural Street, but has completed SIDRA based upon the provision of right turns out of Dural Street onto Peats Ferry Road. This is the preferred route that needs to be assessed considering there are no current turn restrictions. Based upon Figure 4.5 of the JTP report approximately 31% of

all vehicle have the potential to travel along Peats Ferry Road, based upon the outbound volume of 136 vehicle trips during the PM peak hour period, this corresponds to 42 right turn movements (not including existing traffic flow). The existing traffic flow was some 7 vehicle movements resulting in a total of 49 right turn movements, the assessed vehicle flow based upon Figure 4.7 of the JTP Report is 32 in the PM peak hour period. Notwithstanding this, a sensitivity test was undertaken for the right turn out of Dural Street with 44 vehicle movements turning right with the resultant vehicle queue being 27m. This indicates that the vehicle driveway will not be blocked by right turning vehicles during the PM peak hour period and is supported.

It should be noted that whilst blocking of the site driveway does not occur during the PM peak hour period, it may occur on weekends, although it is not possible to determine if this will occur as there is no existing traffic flow data to inform results. It should be noted that during the weekend period, the right turn out of Dural Street will be opposed by right turns into Dural Street from Peats Ferry Road, resulting in longer delays to right turning vehicles from Dural Street.

*The JTP report has not included the site driveway within the SIDRA model. Considering its proximity to Peats Ferry Road and high generation analysis of the driveway should be included especially considering the rat-run nature of Dural Street for northbound vehicles.*

**MTE Response:** The main concern relating to the requirement to model the site driveway was a result of queuing back from the intersection of Peats Ferry Road as a result of right turning vehicles. As stated above, queuing does not occur during the PM peak hour period and as such does not block the site driveway. In view of this modelling of the site driveway during the PM peak hour period is not required considering the 83 vehicle trips anticipated to turn right into the site driveway within a one-hour period. Although this may be required for weekend modelling if vehicle queues are anticipated to block the site driveway. In any case, it would still be beneficial to model the site driveway considering the data is available.

### Additional Comments

- The traffic report addresses the concern previously raised in relation to Dural Street having a limited carriageway width, with parking on one side of the street. The proposal to restrict parking on the southern side of the road between the Frederick Street and the development is supported as this will allow for two-way passing within Dural Street which is required considering the assessed trip distribution.

### SIDRA COMMENTS

- SIDRA Model – Base Case
  - It is understood that the amended intersection modelling has been calibrated using intersection count survey, TCS plans and video footage of the signalised intersections on the day surveyed and have modified the previous comments in relation to intersection geometry.
  - The following comments made below are based upon any deviations from the TCS Plans. For MTE to provide detailed comments in relation to if the base case models are set up in accordance with the existing operations a site visit (or video footage of the signals) would need to be undertaken to review how the signalised intersections work which is outside the scope of this report.

- Jacobs has indicated that the SIDRA models have been set up with reference to video footage, which would provide an indication of the phasing and cycle times of each signalised intersection.
- It should be noted that the provided SIDRA 8 are generally providing a stable result and as such can be relied upon to inform the development. This is superior to the previous SIDRA 7 assessment whereby no result stabilised. All signalised intersections along the corridor have been coordinated.
- Coronation Street / Peats Ferry Road:
  - Phasing sequence appear to be incorrect with the phasing running ADC, this phase sequence should be ACD. This should be checked with on-site operations in the base case.
- The phase sequence of Peats Ferry Road / Station Street / William Street may be better to run with phases ACAC (i.e. two cycles in 120 seconds compared to only one cycle in the AM peak only, this also applies to the PM peak hour period). This should be checked with the actual operation of the site.
- George Street / Peats Ferry Road is operating with phases ACBD, this should be modified to be ABCD this should be checked with the on-site operation.
- The left turn slip lane should be operating in all phases including the crossing, with the priorities set up for vehicles to give way to pedestrian movements. This should allow for a better operation of the signalised intersection, but should be checked with the actual operation of the signalised intersections.

The modifications outlined above have been run through SIDRA and result in a worst result for the overall network and as such the input phases by Jacobs for Coronation Street / Peats Ferry Road, Peats Ferry Road / Station Street / William Street and George Street / Peats Ferry Road seems to provide the best result. It should also be noted that whilst TCS plans provide phases A, B, C, D, it is not mandatory that the actual signal operation run the phases in that order.

- **SIDRA Results / Comments**

- The results that are based upon the 2% background growth to year 2031 are highly unlikely to occur within the Hornsby Town Centre due to the existing capacity constraints of the corridor (i.e. Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue which are operating at capacity during the PM peak hour period). MTE agrees with Jacobs in that without significant capacity increases the results stipulated in Table 4.10 of the JTP Report are unlikely to occur within the town centre.
- The above is supported by the assessment undertaken in Section 4.1 of the JTP report which indicates that there has not been any growth.
- MTE would have expected the base case and do minimum without development traffic volumes should be consistent with the previous provided SIDRA models. This is not the case, whereby the current SIDRA files provided “future do minimum without development” traffic volumes at the intersection of Coronation Street / Peats Ferry

Road are different to the SIDRA previously provided. This is shown in **Annexure C** for reference. The traffic volumes within the “future do minimum without development” SIDRA results are all lower compared to the previous SIDRA’s provided. This requires an explanation / clarification.

- The following are relevant to note with respect to the “Do Minimum” scenario SIDRA results:
  - The intersection of William Street / Peats Ferry Road is operating at LoS F in both the AM and PM peak hour period during the without development scenario. This indicates that the right turn movement on Peats Ferry Road at William Street is already at capacity and it is highly unlikely that anyone from the site who wants to travel south will choose to use the signalised intersection of William Street / Peats Ferry Road. It is likely that almost all vehicles wanting to travel south along Peats Ferry Road will use the intersection of Dural Street / Peats Ferry Road.
  - The intersection of Coronation Street / Peats Ferry Road will queue back past Dural Street in both the AM and PM peak hour periods (with and without development).
  - The William Street / Peats Ferry Road intersection fails in the future as the right turn movement out of the minor road (William Street) is at capacity during existing periods, which is made worse due to the assumption that everyone from the development will use this intersection. As suggested previously, this is unlikely to occur as all vehicles will likely use the intersection of Dural Street / Peats Ferry Road to travel south along Peats Ferry Road. The assumptions that vehicles will use the intersection of William Street / Peats Ferry Road skews the overall intersection performance as a whole resulting in a LoS E condition,. It is relevant to note that the major road through movements still operate at LoS A or B.
  - Table 4.8 of Jacobs JTP Report appears to incorrectly summarise the results of the intersection. For example the existing LoS reported by SIDRA in the PM peak hour period for the intersection of George Street / Peats Ferry Road / Pacific Highway is shown to be LoS E in the provided SIDRA files, but is reported as LoS F in Table 4.8. Table 4.6 of the Jacob Reports also reports the intersection performing at LoS E.
  - Overall the critical intersections are George Street / Peats Ferry Road / Pacific Highway and Edgeworth David Avenue / Pacific Highway. The summary of the before development and after development are shown below.

**TABLE 1: PM PEAK HOUR SUMMARY COMPARISON**

Leg	Degree of Saturation	Average Delay	LoS	Degree of Saturation	Average Delay	LoS
Existing				Future		
George Street / Peats Ferry Road / Pacific Highway						
South (Pacific Highway)	0.804	27.8	B	0.931	41.5	C
East (Westfield)	1.09	129.2	F	1.034	105.5	F
North (George Street)	0.907	70.6	F	0.907	70.5	F
West (Peats Ferry Road)	0.927	63.8	E	0.929	64.5	E
Edgeworth David Avenue / Pacific Highway						
South (Pacific Highway)	1.036	116.7	F	1.029	112.1	F
East (Edgeworth David Avenue)	1.032	99.9	F	1.046	105.4	F
North (Pacific Highway)	0.725	28.3	B	0.707	27.5	B

As shown above as a result of the development, the only significant change is the southern leg (Pacific Highway) and the eastern leg (Westfield) of the intersection of George Street / Peats Ferry Road / Pacific Highway. The southern leg changes from a LoS B to a LoS C, whilst the eastern leg experiences an additional 24 seconds of average delays. All other legs have minor increases to average delays and degree of saturation. Although it is evident that in both the existing and future conditions the intersection of George Street / Peats Ferry Road / Pacific Highway and Edgeworth David Avenue / Pacific Highway are operating over capacity and without capacity upgrades both intersections will continue to deteriorate, resulting in large delays and queues.



## 2 Summary of Findings

McLaren Traffic Engineering has undertaken a peer review of the Amended Traffic and Parking Assessment Report of the Proposed Mixed Use Development completed by Jacobs.

The findings of the peer review are detailed in **Sections 1** and **2** and summarised below:

- The amended SIDRA modelling is acceptable to inform the development impact. Whilst MTE does **not** agree with the adopted distribution, specifically the distribution of all right turns onto Peats Ferry Road to the signalised intersection of William Street / Peats Ferry Road. A sensitivity assessment has been provided indicating that the driveway will not be blocked as a result of vehicles waiting to turn right onto Peats Ferry Road during the AM and PM peak hour period.
- Whilst a very high level assessment has been undertaken for the Saturday period by adopting the PM traffic flows, MTE is not satisfied that appropriate consideration / assessment has been given to weekend traffic modelling. The primary concern with this, is the change in base case traffic flow movements, whereby critical turn movements may result in delays and queues that may block the site driveway and therefore impede through traffic movements along both Dural Street and Peats Ferry Road. Without base case data it is not possible to determine the impact that the development will have on weekend periods.
- The site driveway has not been modelled within the amended JTP Report. Based upon the SIDRAs provided queuing does not occur during the PM peak hour period along Dural Street. In view of this modelling of the site driveway during the PM peak hour period is not required considering the 83 vehicle trips anticipated to turn right into the site driveway within a one-hour period. Although this may be required for weekend modelling if vehicle queues are anticipated to block the site driveway. In any case, it would still be beneficial to model the site driveway considering the data is available.
- MTE would have expected the base case and do minimum without development traffic volumes should be consistent with the previous provided SIDRA models. This is not the case, whereby the current SIDRA files provided “future do minimum without development” traffic volumes at the intersection of Coronation Street / Peats Ferry Road are different to the SIDRA previously provided. This is shown in **Annexure C** for reference. The traffic volumes within the “future do minimum without development” SIDRA results are all lower compared to the previous SIDRA's provided. This requires an explanation as if additional traffic has been added to inform future SIDRA model, the SIDRA would be reporting a better overall result.
- MTE has been providing design advice for the layout of the basement car parking areas and as such the concerns raised previously in relation to the driveway access, car park circulation areas are now resolved. The design achieves separate entry and exit driveways, separated by a small island for pedestrians.
- The remaining concern in relation to the design is that the commercial car parking spaces are not separated from the retail spaces, but it is understood that Council have accepted this arrangement. It is also understood that the service vehicle will be restricted to a 12.5m length Heavy Rigid Vehicle, this should be an operating condition of consent.
- The development provides a shortfall of nine (9) commercial car parking spaces, the shortfall can be removed through allocating an additional nine (9) retail spaces on Basement 2 to commercial, and allocating the ten (1) service bay spaces to retail, whilst allowing a shared car parking arrangement for any deliveries, which will have to occur outside of peak operating periods.

- The acceptance of the service vehicle delivery route is a matter for Council to consider, it is noted that the haulage route proposed is for a right in / right out from Dural Road, resulting in delivery vehicles travelling through residential areas.
  - Swept paths provided within the report show the vehicle clearances, but do not provide vehicle clearances to kerbs as required by *Austroad Design Vehicle and Turning Path Templates Guide 2013*.
- The JTP Report correctly adopts the correct traffic generation rates and uses the correct scale in their assessment.
- MTE supports the following recommendations within the report:
  - Restriction of kerbside parking on the southern side of Dural Street during the proposed hours of operation. This will allow for two-way passing of vehicles between Frederick Street and the site driveway.
  - “Keep Clear” linemarking at the intersection of Dural Street / Peats Ferry Road as a result of queued vehicles at the intersection of Coronation Street / Peats Ferry Road. Although MTE does not agree with the use of the PM traffic volumes to inform Saturday results

Overall, there is enough information to determine the application, with the exception of the impact of the development on weekend periods or the change in volume of previous SIDRAs provided. It is ultimately up to Council to accept the proposed haulage route noting the concerns raised within this peer review. The intersection of George Street / Peats Ferry Road / Pacific Highway and Edgeworth David Avenue / Pacific Highway are operating over capacity in both the existing and future conditions (under do minimum scenario) and without capacity upgrades both intersections will continue to deteriorate, resulting in large delays and queues.

Please contact the undersigned on 8355 2440 should you require further information or assistance.

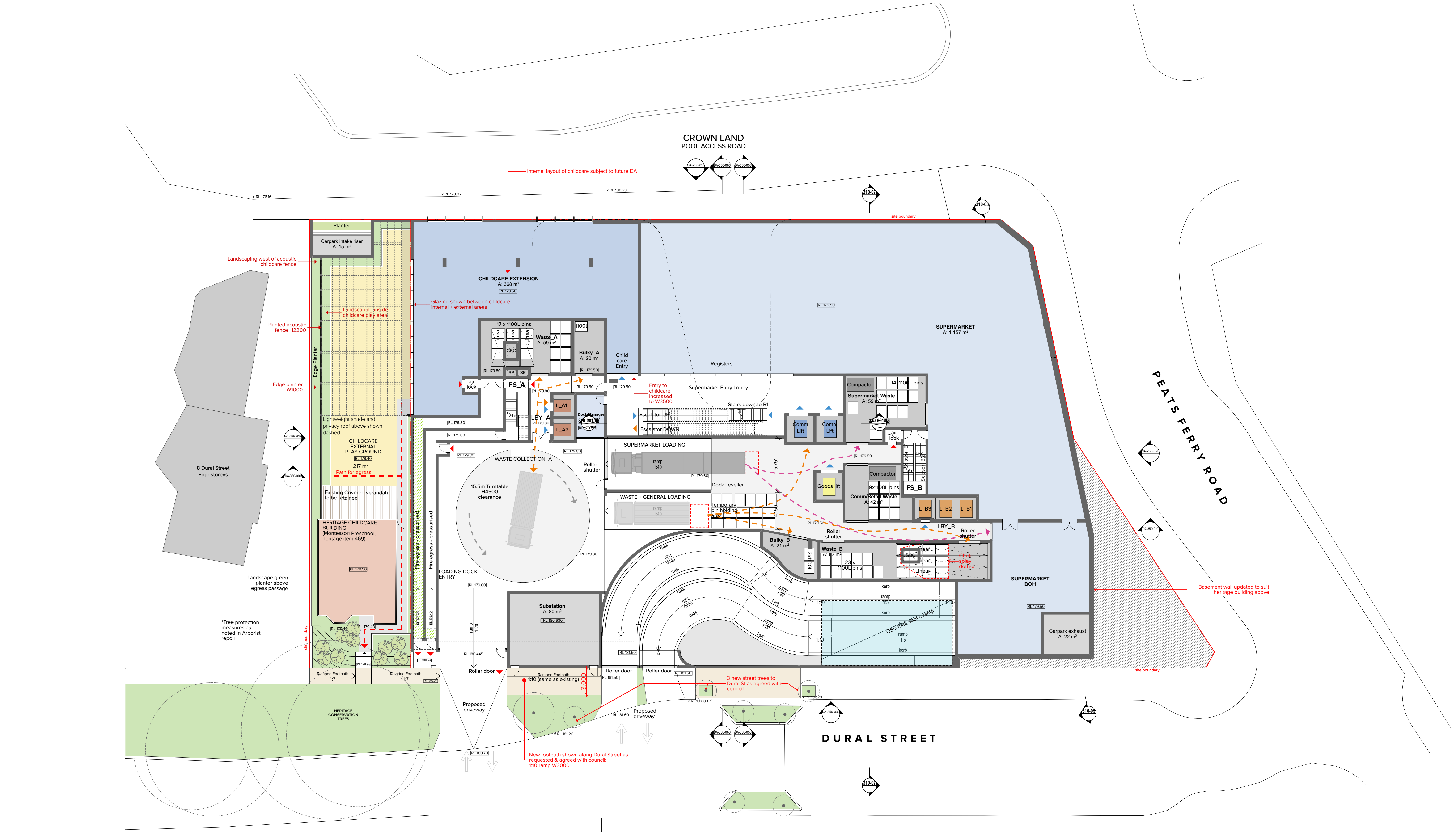
Yours faithfully  
**McLaren Traffic Engineering**



**Matthew McCarthy**  
Senior Traffic Engineer  
BE Civil Engineering  
Masters of Engineering Science  
RMS Accredited Level 1 Road Safety Auditor  
RMS Accredited Work Zone Traffic Management Plan Designer and Inspector



**ANNEXURE A: REDUCED PLANS**



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DLCS Quality Endorsment Company ISO 9001:2015, Registration Number 20476  
Turner and Trenchard Architects Pty Ltd ABN 96 594 394 811

Project Title  
**187-203 Peats Ferry Rd, Hornsby**  
Peats Ferry Road Hornsby NSW 2077 Australia  
Drawing Title  
**GA Plans**  
**Lower Ground - Loading/Supermarket/Childcare**

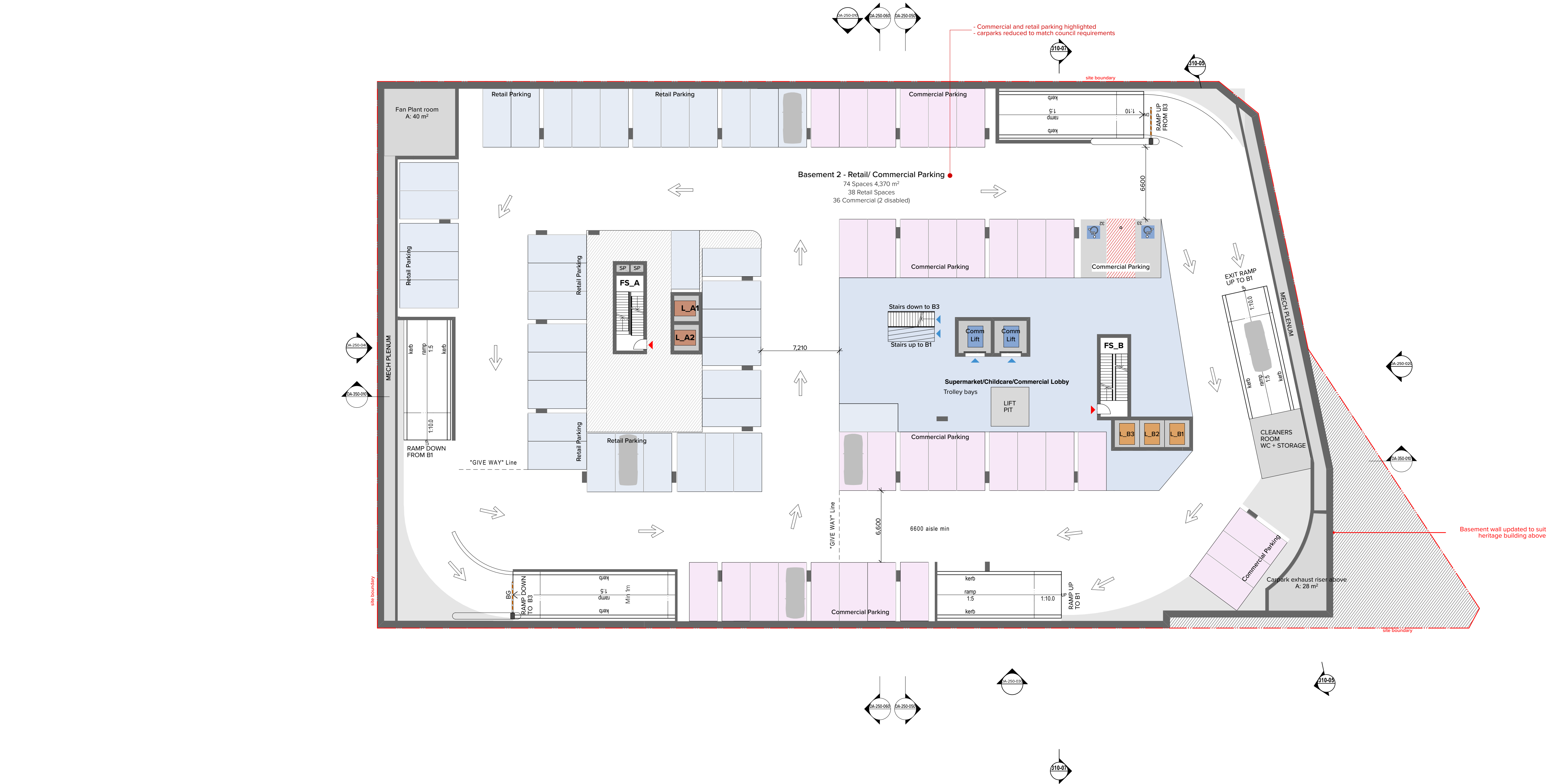
Rev.	Date	Approved by	Revision Notes	Project No.	16104	Drawn by	North
1:200	@A1, 50% @A3					YO, CC, AM	
Status				Dwg No.	DA-110-007	Rev	N
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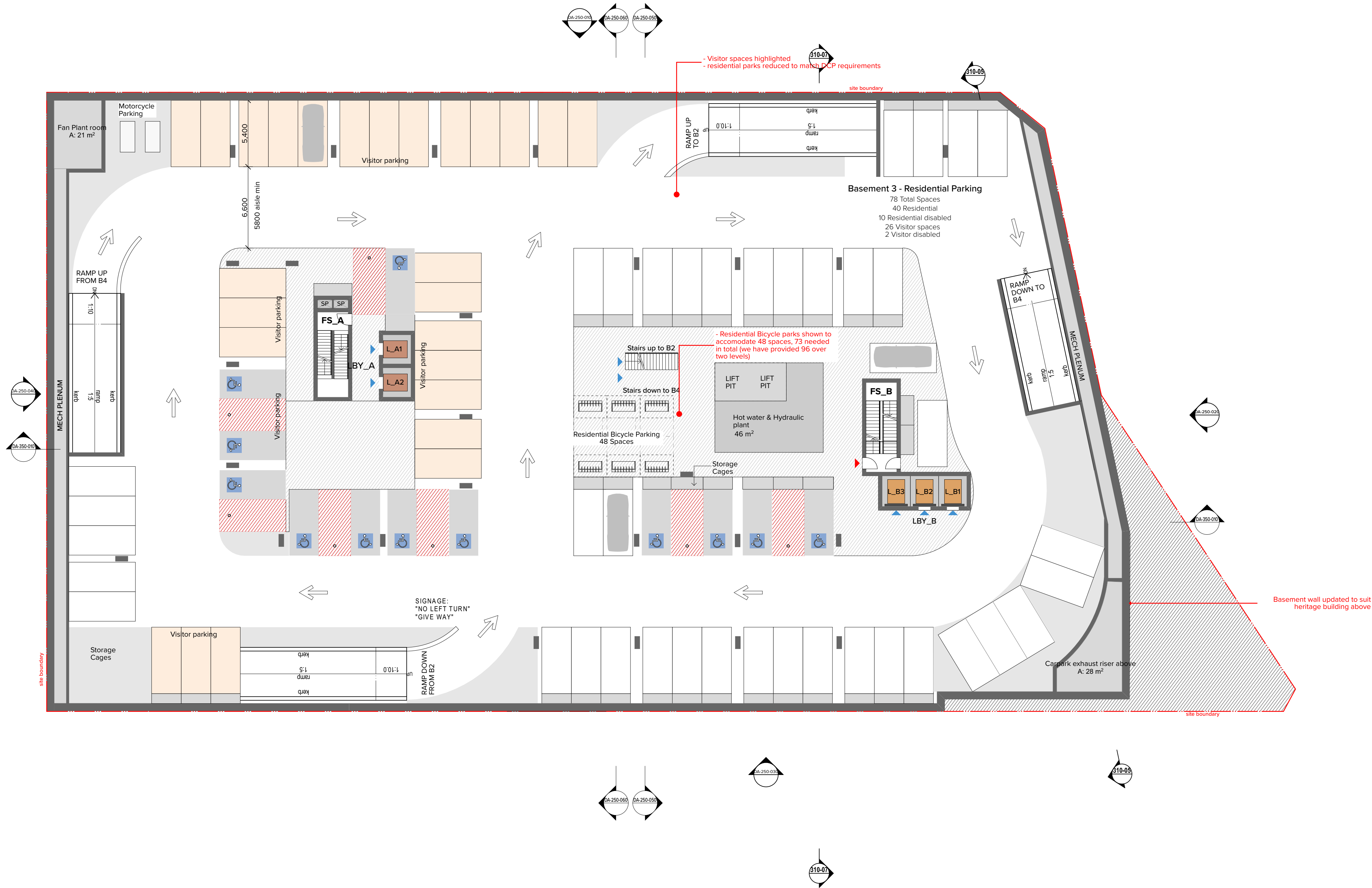
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Notified Architect Nicholas Turner 6055, APR 99 594 394 811

Project Title  
**187-203 Peats Ferry Rd, Hornsby**  
Peats Ferry Road Hornsby NSW 2077 Australia  
Drawing Title  
**GA Plans**  
**Basement 2 - Retail Carpark**

Rev.	Date	Approved by	Revision Notes	Project No.	16104	Drawn by	YO,CC,AM	North
Scale	1:200 @A1, 50% @A3			Dwg No.	DA-110-005	Rev	N	
Status	Development Application							

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Project Title  
**187-203 Peats Ferry Rd, Hornsby**  
Peats Ferry Road Hornsby NSW 2077 Australia  
Drawing Title  
**GA Plans**  
**Basement 3 - Residential Carpark**

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Development Application							

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**Project Title**  
**187-203 Peats Ferry Rd, Hornsby**  
Peats Ferry Road Hornsby NSW 2077 Australia  
**Drawing Title**  
**GA Plans**  
**Basement 4 - Residential Carpark**

N 19.02.20 YO FOR DA UPDATES

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**ANNEXURE B: JTP REPORT**



## **187-203 Peats Ferry Road**

Lyon Group Australia

### **Traffic and Transport Impact Assessment**

| Final

March 2020





## 187-203 Peats Ferry Road

Project No: IA133100  
 Document Title: Traffic and Transport Impact Assessment  
 Document No.:  
 Revision: Final  
 Date: March 2020  
 Client Name: Lyon Tanner Hornsby Pty Ltd  
 Client No:  
 Project Manager: Myall Stevens  
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 File Name: C:\Users\stevnm3\Desktop\IA133100 203 Peats Ferry Road TIA\_v9.docx

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### Document history and status

Revision	Date	Description	By	Review	Approved
0	15/12/2017	Draft Report for Comments	J. Huang	S. Read	
1	10/01/2018	Draft Report for Comments	J. Huang	S. Read	
2	15/02/2018	Draft Report for Comments	J. Huang	S. Read	
3	06/03/2018	Final	J. Huang	S. Read	M. Stevens
4	21/09/2018	Updated report for modified design	J. Huang	S. Read	
5	04/7/2019	Revised report	S. Read		
6	14/11/2019	Updated report with revised yields	R. Banzon	M. Stevens	
7	27/11/2019	Response to peer review comments (excluding chapter 4)	R. Banzon	M. Stevens	
8	09/12/2019	Response to peer review comments (including chapter 4)	R. Banzon	M. Stevens	
9	21/02/2020	Basement amendments	J. Bryce	M. De Marco	M. Stevens
10	2/03/2020	Response to peer review comments	J. Bryce	M. De Marco	M. Stevens
11	10/03/20	Response to peer review comments	J. Bryce	M. De Marco	M. Stevens

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Appendix A. Sidra Intersection Analysis

## 1. Introduction

Jacobs has been commissioned by Lyon tanner Hornsby Pty Ltd to assess the traffic and transport impacts of the proposed mixed-use development at 187 to 203 Peats Ferry Road. This report assesses the existing traffic and transport conditions, describes the proposed development and assesses the impact of the development on the transport network.

### 1.1 Background

The proposed development is located at 187 to 203 Peats Ferry Road Hornsby. The development will comprise a 10 storey and an 18 storey mixed use building including residential units, a supermarket, smaller speciality retail and commercial offices.

The subject site is bound by Peats Ferry Road to the East, Dural Street to the South and the access driveway to the Hornsby Aquatic Centre, an extension to Coronation Street, to the North. The site is identified as the Gateway Site for the Hornsby West Side Town Centre, in the Hornsby DCP 2013.

In preparing this document a Pre-Lodgement application was submitted to Council based on a proposal for only partial development of the site. Hornsby Shire Council's Traffic Branch provided comments and these comments have been addressed as part of this study.

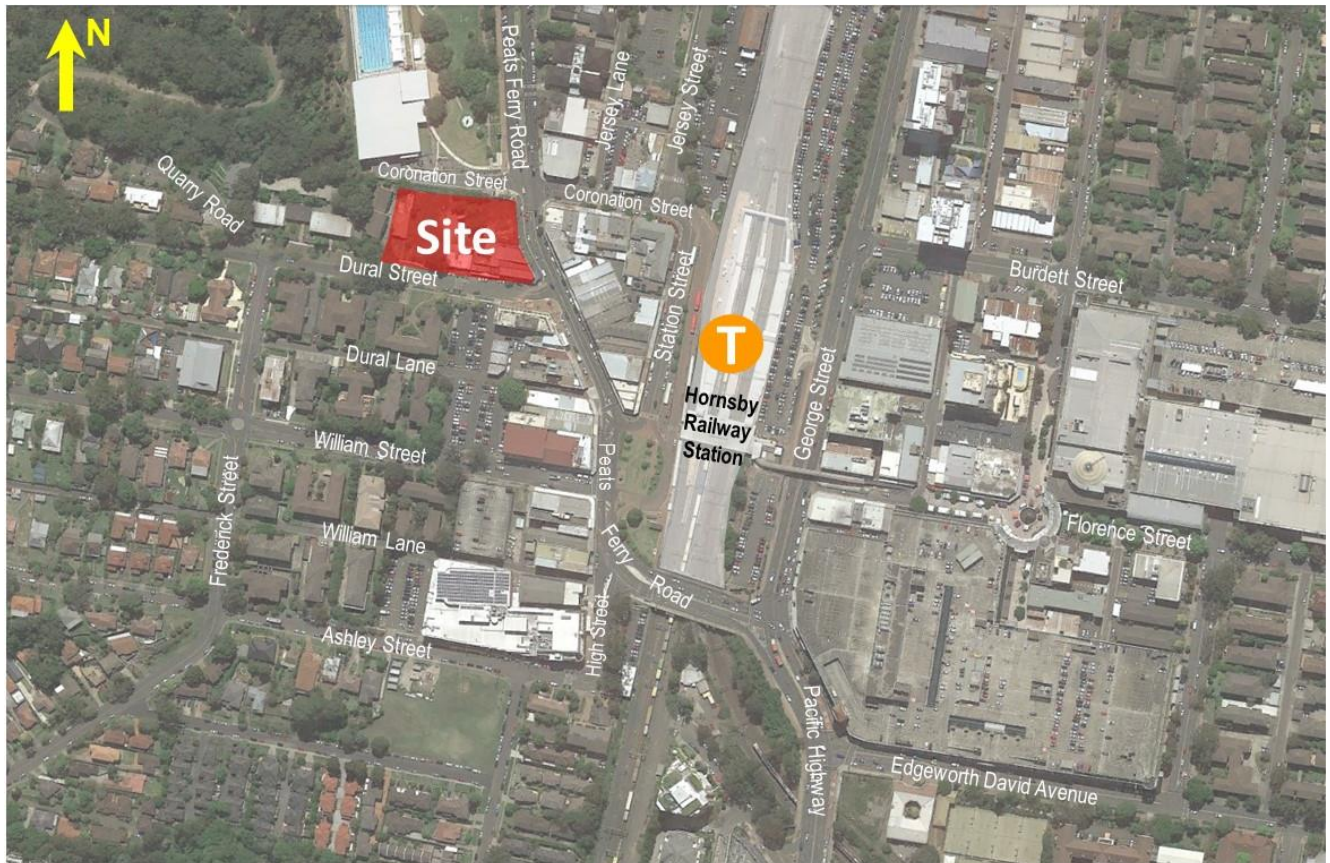
This report provides our analysis of the existing conditions, review of the proposed development and the internal car park layout, identifies the impacts on traffic associated with the proposed development and identifies potential mitigation measures. This report also addresses key issues raised in the comments from the Hornsby Shire Council's Traffic Branch. These issues include:

- The need for a network model (morning and evening peak periods) to include the following 10 intersections:
  - a. Peats Ferry Road and Coronation Street
  - b. Peats Ferry Road and Dural Street
  - c. Peats Ferry Road and Dural Lane
  - d. Peats Ferry Road and Station Street
  - e. Peats Ferry Road and William Street
  - f. Peats Ferry Road and High Street
  - g. Peats Ferry Road and George Street
  - h. Peats Ferry Road and Edgeworth David Avenue
  - i. Dural Street and Frederick Street
  - j. Frederick Street and William Street
- Turning path analysis for the largest vehicle to enter/exit from the site
- Consideration of the difficulty of right turn movement from Dural Street into Peats Ferry Road during peak traffic periods.
- Vehicular access to the site from the north and the south

## 1.2 Site Location

The site is located at 187 to 203 Peats Ferry Road, Hornsby, near the intersection of Peats Ferry Road and Coronation Street, and Peats Ferry Road and Dural Street. The site fronts onto Peats Ferry Road and Dural Street. It is located within close proximity of the Hornsby Railway Station and shopping areas.

Figure 1.1 : Site Location



## 1.3 Report Structure

The report is structured as follows:

- Section 2 – Details the existing conditions including the site location, road network, public transport, active transport, traffic demand, and existing planning;
- Section 3 – Description of the proposed development including the development plan, vehicular access, car parking provision, parking layout and turning swept paths;
- Section 4 – Traffic and transport impacts including the assessment methodology, traffic generation and distribution, existing intersection performance assessment, future year intersection performance, impacts on parking, active transport and public transport, as well as mitigation measures.
- Section 5 – A summary of key findings from this study.



## 1.4 Assumptions

Based on the comments from Hornsby Shire Council and the understanding of the traffic operation of the local road network, the following assumptions have been made for this study:

- The vehicle traffic impact on the road network would be identified by an assessment of the intersection performance assessment for 10 intersections as identified by Hornsby Shire Council.
- Background growth in traffic volumes of 2% per annum up to 2031.
- No vehicle or pedestrian access to the pool access road along the northern boundary.
- Specific Hornsby Shire Council comments include;
  - All the turn bans at existing intersections in Hornsby Town Centre would be maintained.
  - No changes to existing roadway and footpath improvements on Dural Street and Peats Ferry Road.
  - No further signage at Dural Street and Peats Ferry Road intersection.
  - Preferred traffic route to return to Peats Ferry Road via William Street.
- The traffic modelling assessment included the following:
  - Closure of Dural Lane at Peats Ferry Road and removal of the intersection from the network model for the future years.
  - Closure of Station Street at Peats Ferry Road and replaced with a mid-block crossing and redirection of traffic to Coronation Street.
  - Major routes for the network model that included northbound and southbound movements have not been changed.
  - Addition of a leading right turn phase for vehicles on William Street in the eastbound direction
  - The cycle time for all signalised intersections has been set to 120 seconds during the morning peak and 140 seconds during the evening peak, which is the same as the previous models.
  - For outbound development traffic travelling intending to travel southbound on Peats Ferry Road, half these vehicles were assumed to use the Peats Ferry Road / Dural Street intersection and the other half were assumed to use the Peats Ferry Road / William Street intersection.

## 2. Existing Conditions

This section provides a description of the existing conditions and the transport network.

### 2.1 Site Description

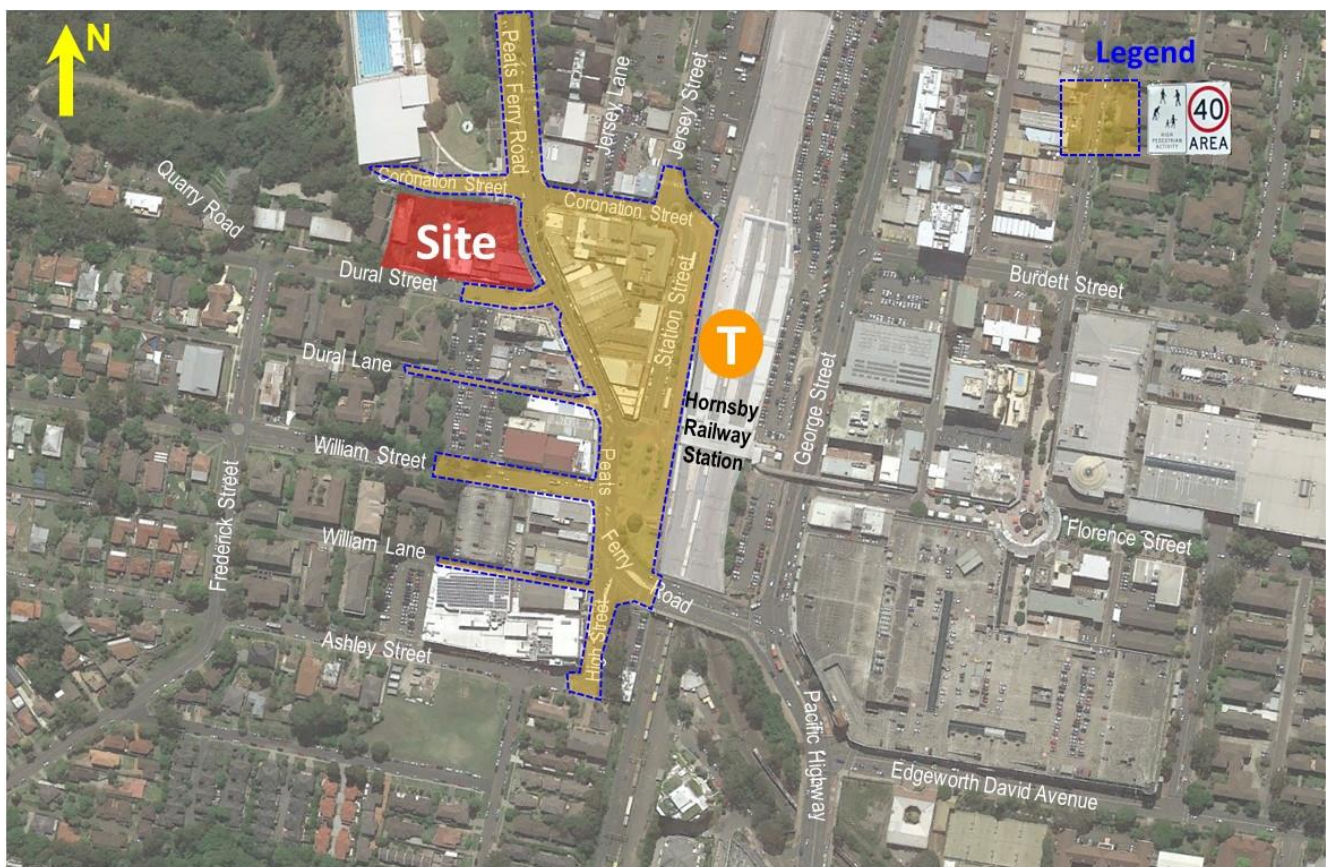
The site is currently used by a range of commercial and retail uses as well as vacant land that is currently used for informal parking. The land uses include real estate agents, solicitor's office, a small grocery shop and a Chinese Restaurant.

The site which includes small shops and vacant land on the corner of Coronation Street and Peats Ferry Road has multiple owners who have agreed to develop the land as one package.

### 2.2 Road Network

The site is situated within Hornsby town centre area. The area is zoned as a High Pedestrian Activity Area (HPAA) with a speed limit of 40 km/h (as shown in Figure 2.1).

Figure 2.1 : Hornsby Town Centre High Pedestrian Activity Area



The **Pacific Highway** is an arterial road with a sign posted speed limit of 60 km/h to the south of George Street. It has two or three lanes in each direction on a divided carriageway. Historically, Peats Ferry Road was part of the Pacific Highway, however changes to Peats Ferry Road and upgrades to George Street have been implemented to encourage most of the through traffic to bypass the town centre. The section of road in the study area had an AADT of 34,445 vehicles per day in 2009 (Traffic Volume Viewer website, Roads and Maritime Services).

**Peats Ferry Road** is a section of the Pacific Highway running south-north from George Street to Jersey Street. The road has a posted speed limit of 60 km/h to the north of Bridge Road, 50 km/h between Bridge Road and Jersey Lane, and 40 km/h south of Jersey Lane. It has generally been reduced to one through lane in each direction near the subject site.

**Dural Street** is a local road that runs from east to west between Peats Ferry Road and Rosemead Road. A short eastern section of the road forms the southern boundary of the proposed development site and has a posted speed limit of 40 km/h as shown in Figure 2.1. The remaining sections of the road has a posted speed limit of 50 km/h. The road is undivided with one lane in each direction with the exception of a short section between Lisgar Road and Quarry Road which is one-way westbound. The road width from kerb to kerb narrows to some 5m but widens to 13 metres at the eastern end. Kerbside parking is permitted on most sections of the road with a no parking restriction along most of the southern side during weekdays. The right turn into Dural Street from Peats Ferry Road is banned during the peak traffic periods.

**Williams Street** is a local road that runs from east to west between Peats Ferry Road and Rosemead Road. It has a posted speed limit of 50 km/h for most sections and a 40 km/h speed limit as it enters the HPAA. The road is undivided with a lane in each direction and kerbside parking permitted for both sides. The road width from kerb to kerb is 12m and has a role of collecting traffic from the local road network.

**Frederick Street** is a local road and runs from north to south between Dural Street and Pretoria Parade. It has a posted speed limit of 50 km/h. The road has a single lane in each direction separated by a double barrier line. The road width from kerb to kerb in northern part is around 12 m and the southern part is narrower, and functions as a local collector. Kerbside parking on both sides in northern section is permitted but banned in southern sections.

**Coronation Street** is a local road and runs from east to west between Jersey Street and Hornsby Aquatic and Leisure Centre. It is located within the 40 km/h HPAA. The road has one lane in each direction. The eastern part of the road provides kerbside parking.

## 2.3 Public Transport

The proposed development has excellent access to public transport services at Hornsby Station and the bus interchange. The site is located:

- 160m from Hornsby Railway Station, which has frequent service to Sydney CBD via Chatswood or Strathfield, as well as services to Newcastle.
- Within 160m of the bus interchange at Hornsby Station, that services 14 bus routes.
- Five bus routes to and from the north stop at the intersection of Peats Ferry Road and Coronation Road which is adjacent to the development site.

Hornsby Station is the focus of many of the feeder services from the surrounding suburbs. A summary of the local bus routes is provided in Table 2.1 and the location of bus stops in Figure 2.2. All the services have a frequency of less than three per hour during the commuter peak periods with the exception for the M60 bus route which operates 6-8 times per hour during commuting peak periods.

Table 2.1 : Bus frequencies

Bus Route No.	Morning Peak Period (8-9am)	Evening Peak Period (4.45-5.45pm)
100	No service in AM peak and only 1 per day from Port Stephens to Sydney and vice versa	No service in PM peak and only 1 per day from Port Stephens to Sydney and vice versa
575	3 per hour from Hornsby to Macquarie University 2 per hour from Macquarie University to Hornsby	2 per hour from Hornsby to Macquarie University 3 per hour from Macquarie University to Hornsby
587	Loop route, 1 per hour	2 per hour
588	Loop route: 1 per hour	2 per hour
589	1 per hour both directions	1 per hour both directions
592	Loop route: no service during peak period	no service during peak period
594H	Hornsby to QVB: no service in AM peak period 2 per hour from QVB to Hornsby	2 per hour from Hornsby to QVB 3 per hour from QVB to Hornsby
595	Loop route: 2 per hour	2 per hour
596	Loop route: 3 per hour	3 per hour
597	1 per hour for each of directions	No service during this time period
598	Loop route: 1 per hour	2 per hour
M60	6 per hour from Hornsby to Parramatta; 7 per hour from Parramatta to Hornsby;	7 per hour from Hornsby to Parramatta; 8 per hour from Parramatta to Hornsby
N80	Night bus, not operate during AM/PM peak	Night bus, not operate during AM/PM peak
N90	Night bus, not operate during AM/PM peak	Night bus, not operate during AM/PM peak



Figure 2.2 : Bus routes and stops close to project site

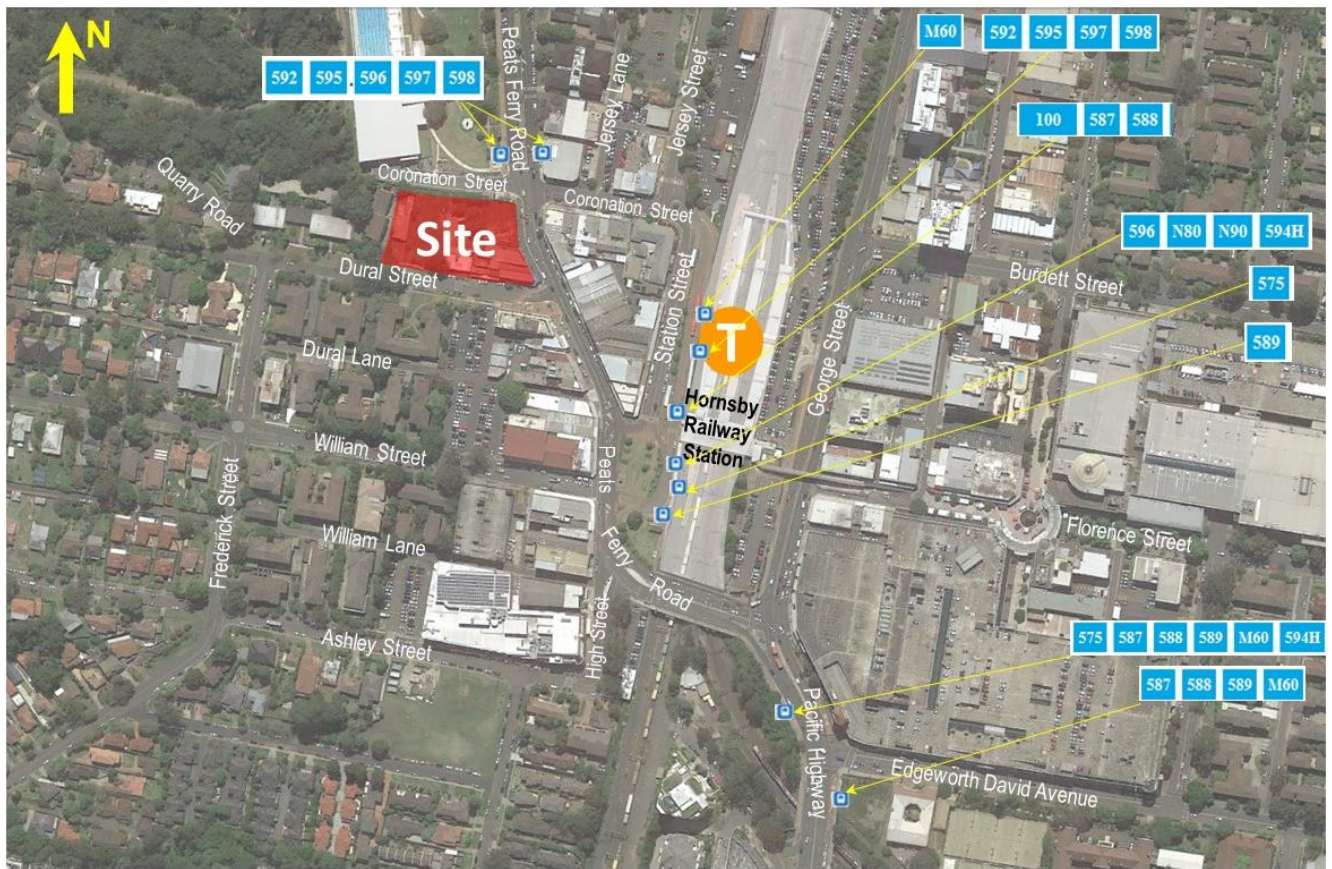
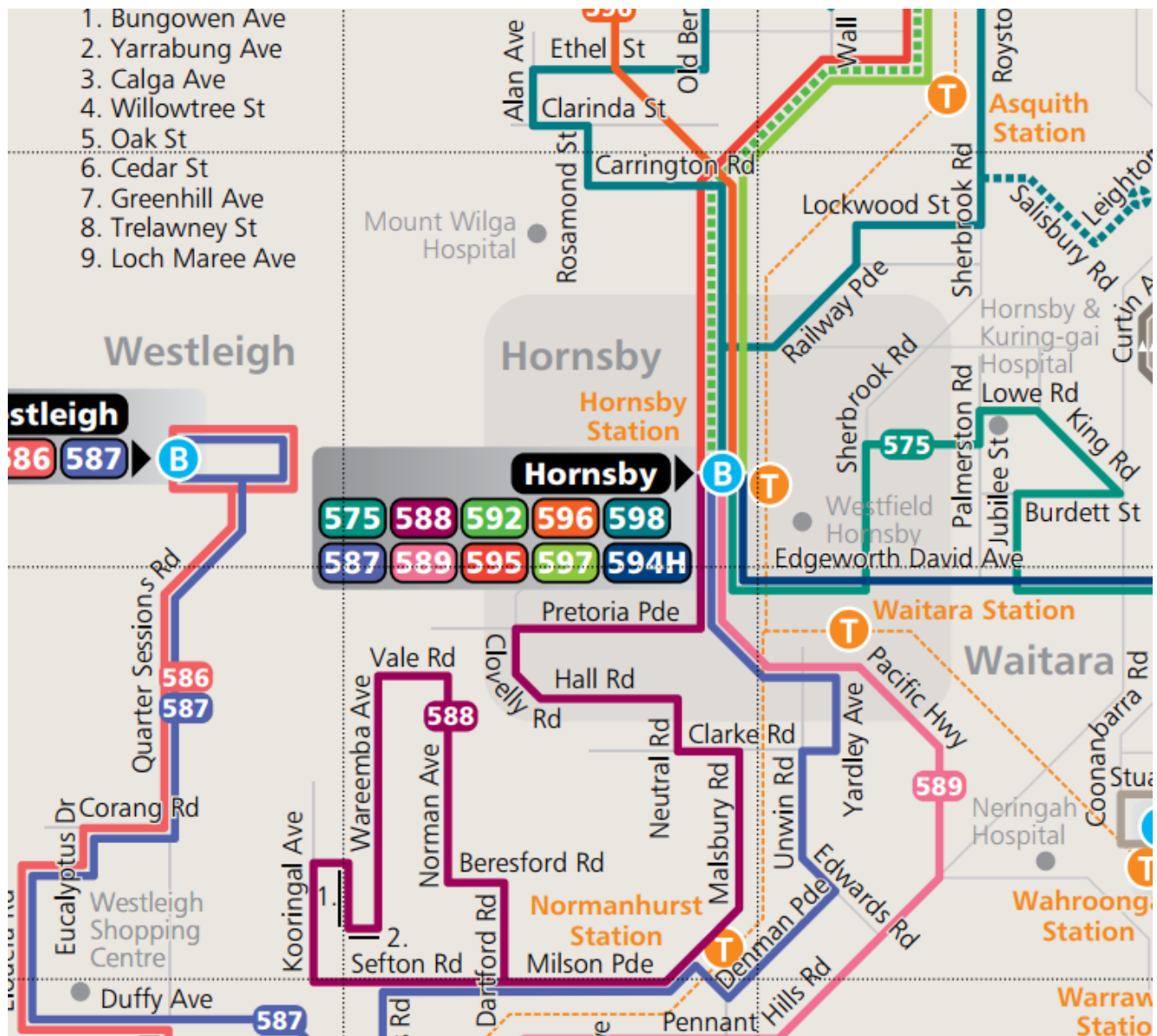




Figure 2.3 : Bus Routes Near Hornsby



Source: TransDev

## 2.4 Active Transport

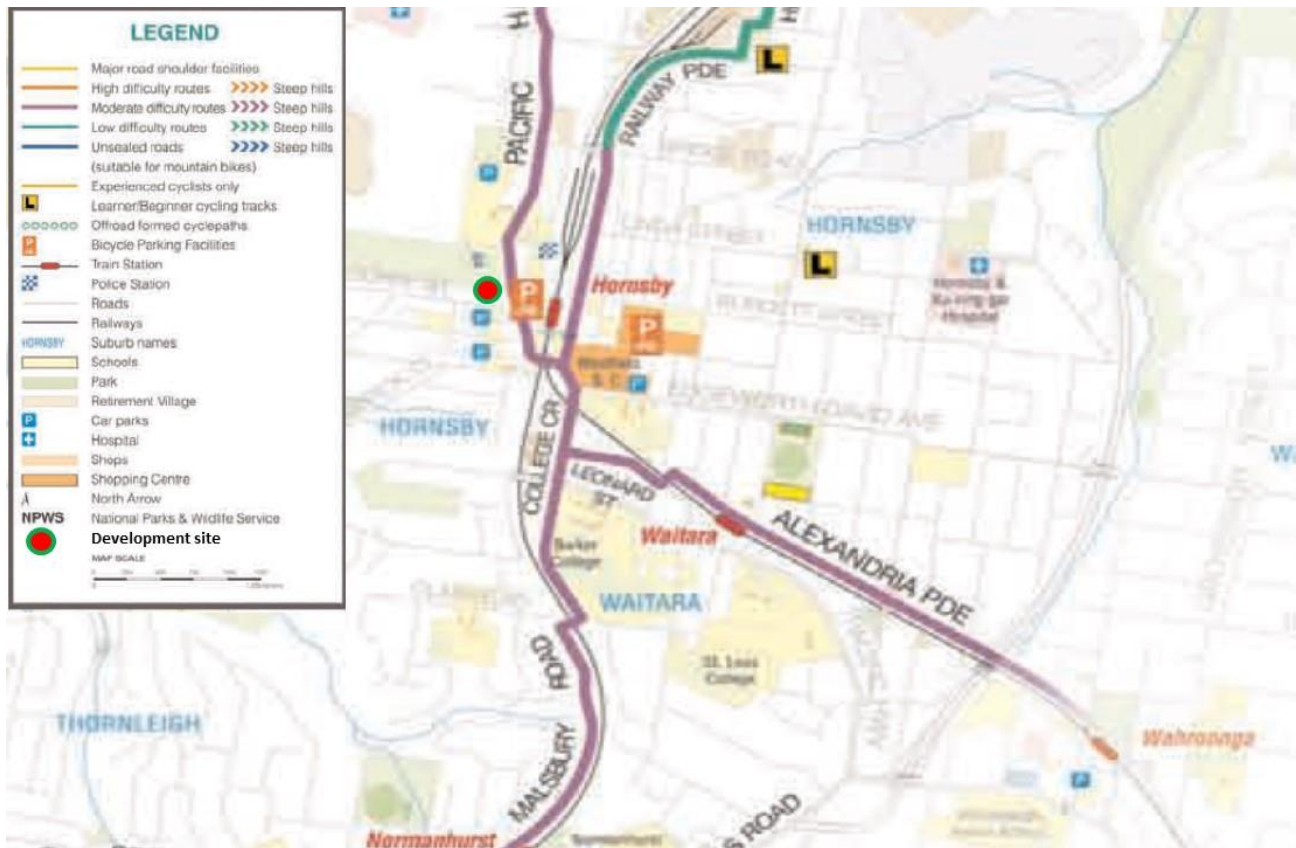
The Hornsby Town Centre is a High Pedestrian Activity Area (HPAA) which generally combines a lower speed limit of 40km/h and traffic calming measures to improve road safety. This encourages pedestrian trips in the area. The traffic calming measures include:

- On the roads that intersect with Peats Ferry Road, speed humps are provided including Dural Street, William Street and Ashley Street at the boundary location of the HPAA.
- The carriageway on Peats Ferry Road has been reduced to one through traffic lane, which assists pedestrian crossings.

Within the study area footpaths are provided on both sides of the streets and signalised pedestrian crossings that allow for crossing Peats Ferry Road to access the station.

There are no dedicated off-road bicycle paths within the town centre. Peats Ferry Road is identified as a bicycle route of moderate difficulty (as shown in Figure 2.4). High traffic volumes would make this route accessible only to confident and experienced cyclists.

Figure 2.4 : Bicycle routes in the surrounding road network of the proposed development site



Source: Hornsby Bike Plan

## 2.5 Pedestrian Environment

The HPAAs encapsulates most of Hornsby Town Centre west of Hornsby Station as shown in Figure 2.1. The town centre has evolved over the last 6 years with road and pedestrian upgrades undertaken by Council to improve pedestrian safety. Upgrades in close proximity to the site include:

- Blistering of the footpath at the intersection of Peats Ferry Road (western side) and Dural Street;
- Blistering of footpath for a crossing on the eastern side of Peats Ferry Road opposite Dural Street;
- Installation of planters along the eastern and western side of Peats Ferry Road;
- Signalisation of the intersection of Coronation Street and Peats Ferry Road; and
- Painting of Dural Lane blank walls with commercial murals.

Hornsby Shire Council have advised during the assessment process that changes to any of the above upgrades to facilitate traffic movements is not preferred.

## 2.6 Existing Land Use and Traffic Generation

Most parts of the site are currently vacant, but the site has some existing retail shops, real estate agents and a restaurant with following features:

- The restaurant occupies around 180m<sup>2</sup> land with only one level and opens during 12pm-2.30pm and 5pm-9.30pm;
- The buildings for retail have a floor area of 1,500m<sup>2</sup> on two floors. The buildings provide service such as grocery, convenience shop, hair dresser, travel agency, solicitors office, property agent offices etc.

Using rates from the RTA Guide to Traffic Generating Development for slow trade speciality shops, the existing land use is expected to generate around 12 vehicles trips during morning peak and 32 vehicles trips during evening peak as shown in Table 2.2.

No onsite customer parking is provided as the existing land behind the shops is used as employee parking only. Any traffic impacts from the existing development occur within the Hornsby Town Centre.

Table 2.2 : Site existing land use and traffic generation

Land use category	Gross floor leasable area (GFLA) (sqm)*	Vehicle trips per 100 sqm GFLA		Vehicle trips per hour	
		AM	PM	AM	PM
Restaurant	135	0	5	0	7
Retail**	1,125	1	2	12	23
Total				12	30

\*According to RTA Guide to Traffic Generating Developments, GFLA is around 75% of gross floor area.

\*\*It is noted that the RTA Guide to Traffic Generating Developments does not provide trip generation rates for the AM peak hour for retail. Given store opening hours, the number of trips generated for retail would be minimal during the morning peak hour. To provide a conservative estimate, half the trip generation rate for the PM peak hour has been applied to the AM peak hour.

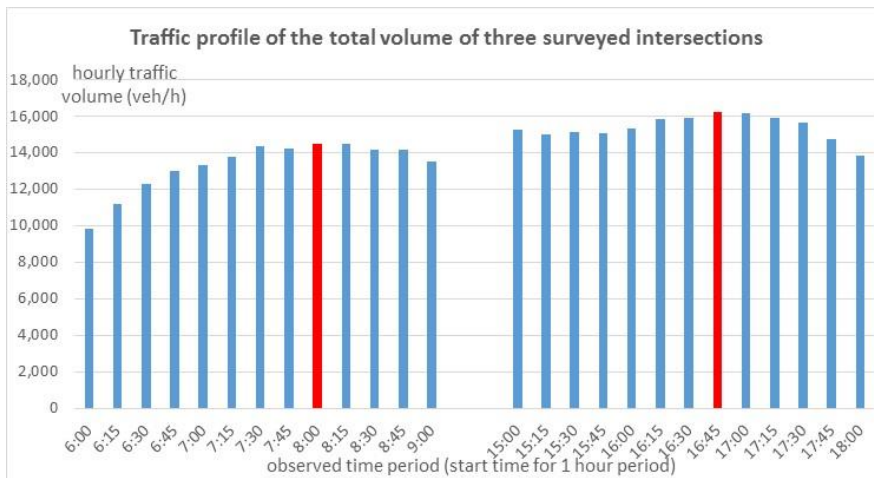
## 2.7 Existing Traffic Volumes

Intersection traffic counts were undertaken as part of the traffic study. The data was collected on Tuesday 31 October 2017 at the following sites:

- Peats Ferry Road and Coronation Street
- Peats Ferry Road and Dural Street
- Peats Ferry Road and Dural Lane
- Peats Ferry Road and Station Street
- Peats Ferry Road and William Street
- Peats Ferry Road and High Street
- Peats Ferry Road and George Street
- Peats Ferry Road and Edgeworth David Avenue
- Dural Street and Frederick Street
- Frederick Street and William Street

The counts covered the time period from 6:00am – 10:00am and 3:00pm – 7:00pm on a weekday. We have identified that the peak traffic hours occur from 8.00am - 9.00am in the morning and 16.45pm -17.45pm in the evening peak period. The assessment of intersection performance has been based on these peak periods.

Figure 2.5 : Peak period identification for local traffic volume



Figures 2.6 and 2.7 show the traffic volumes of 10 observed intersections during 8:00am - 9:00am and 4.45pm - 5.45pm peak periods.

Figure 2.6 : Traffic Volumes 8:00am - 9:00am

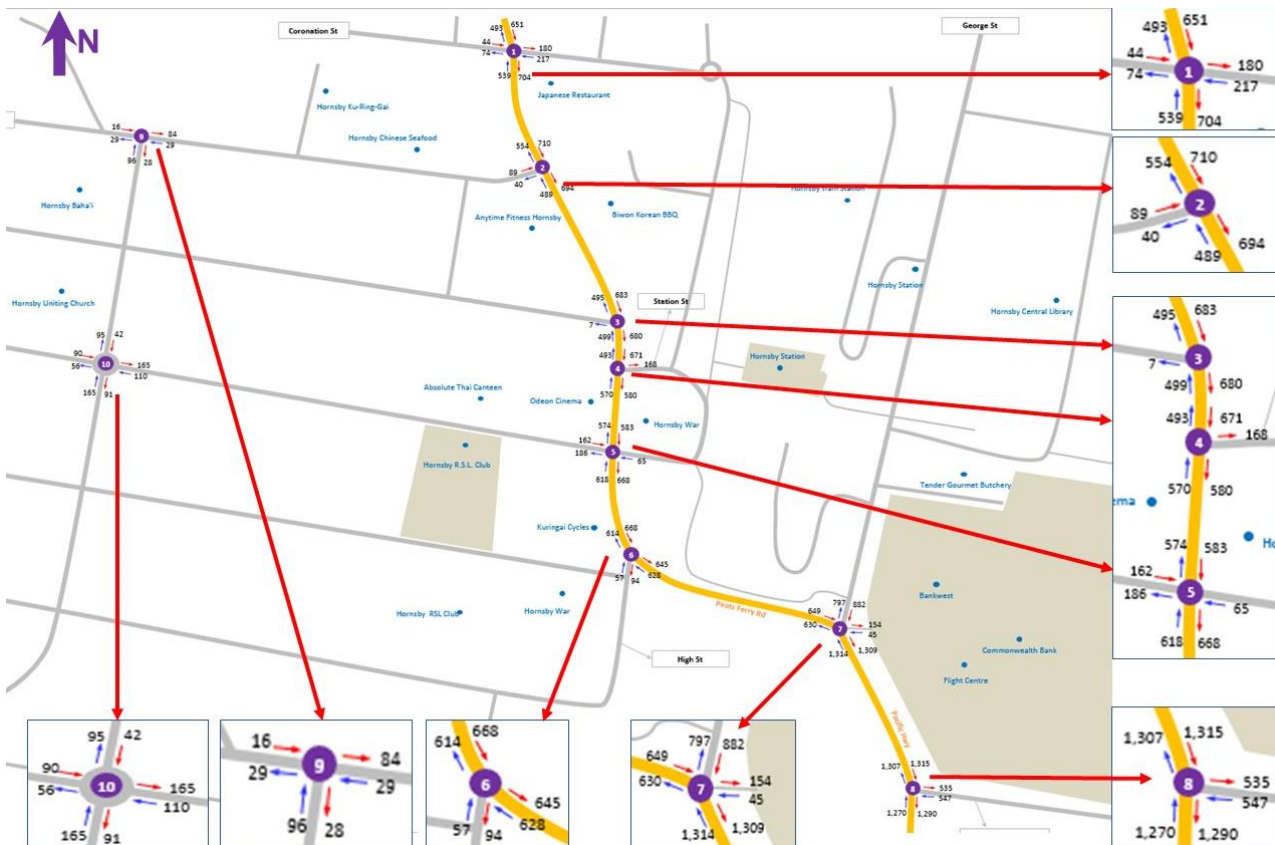
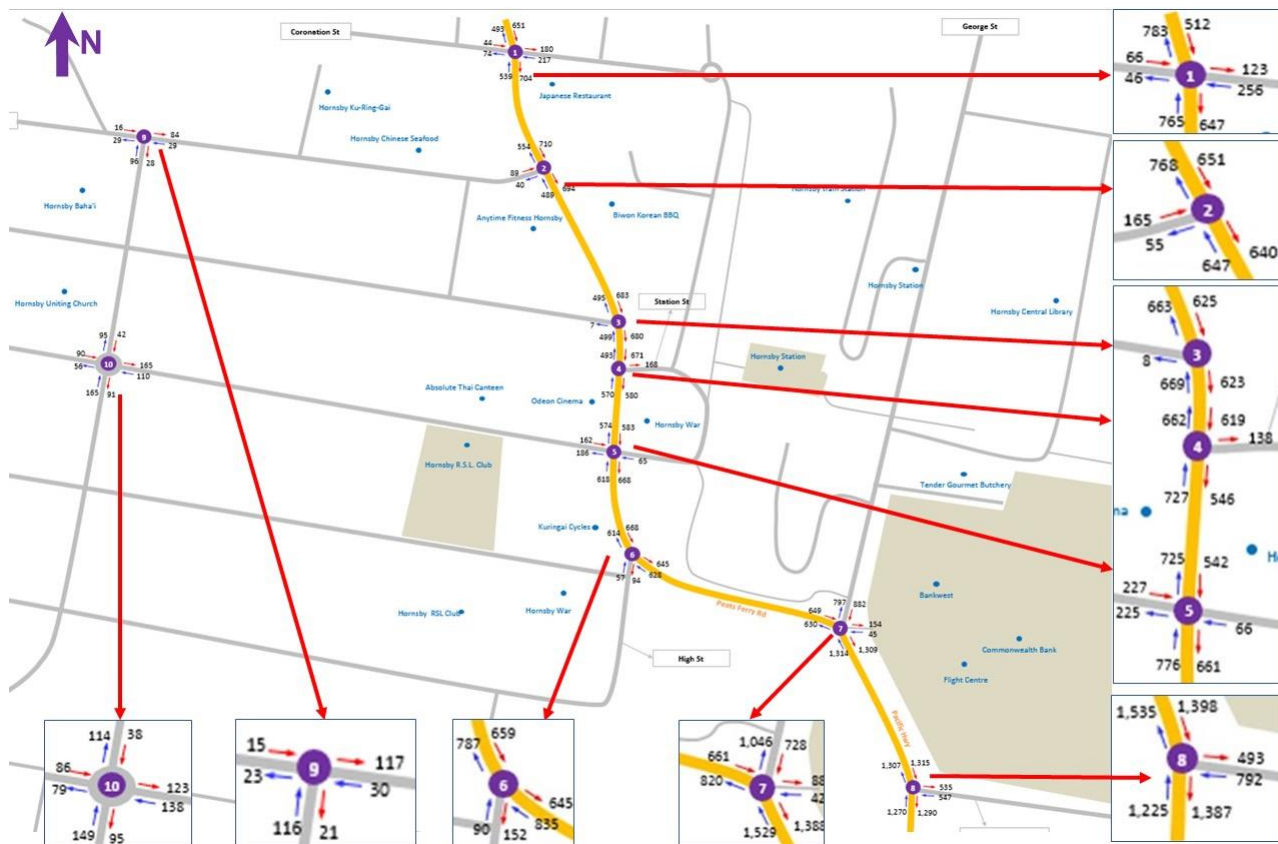




Figure 2.7 : Traffic Volumes 4:45pm - 5:45pm



## 2.8 Turn Restrictions

There are right-turn bans for southbound traffic on Peats Ferry Road at the intersections with Dural Street and Dural Lane during the weekday morning (7:00am – 9:00am) and evening (3:00pm – 6:00pm) peak traffic periods. We have noted that the traffic surveys have counted:

- 18 and 19 cars turning right into Dural Street during morning and evening periods respectively (see Figure 2.8).
- 3 and 2 cars turning right into Dural Lane during morning and evening periods respectively (see Figure 2.9).

This indicates that a small number of vehicles are illegally turning right. For our assessment we have assumed no cars turn right and that enforcement of the right turn bans would reduce this number.

During the hours surveyed when the right turn ban does not operate, up to 100 vehicles performed a right turn into Dural Street between 9:00am to 10:00am and 6:00pm to 7:00pm, while up to 10 vehicles performed a right turn into Dural lane during the same hours.



Figure 2.8 : Vehicle right-turning violation at intersection of Peats Ferry Road and Dural Street

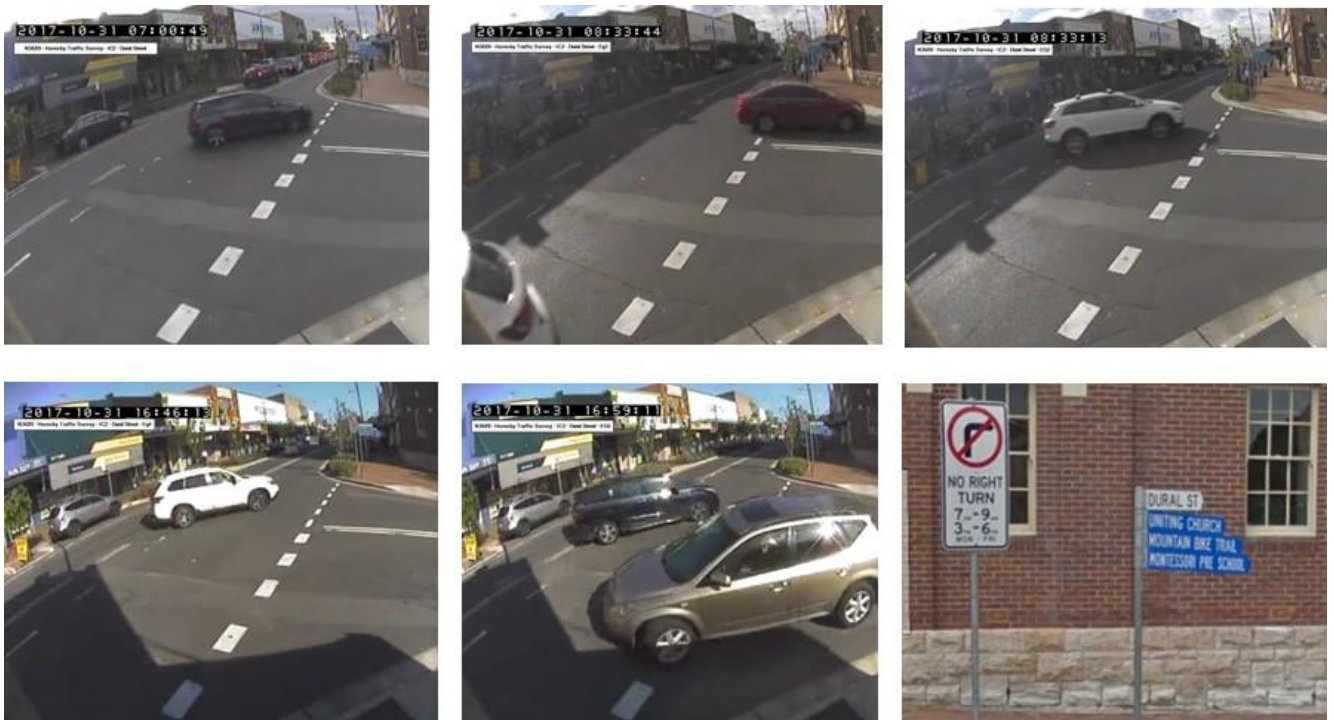
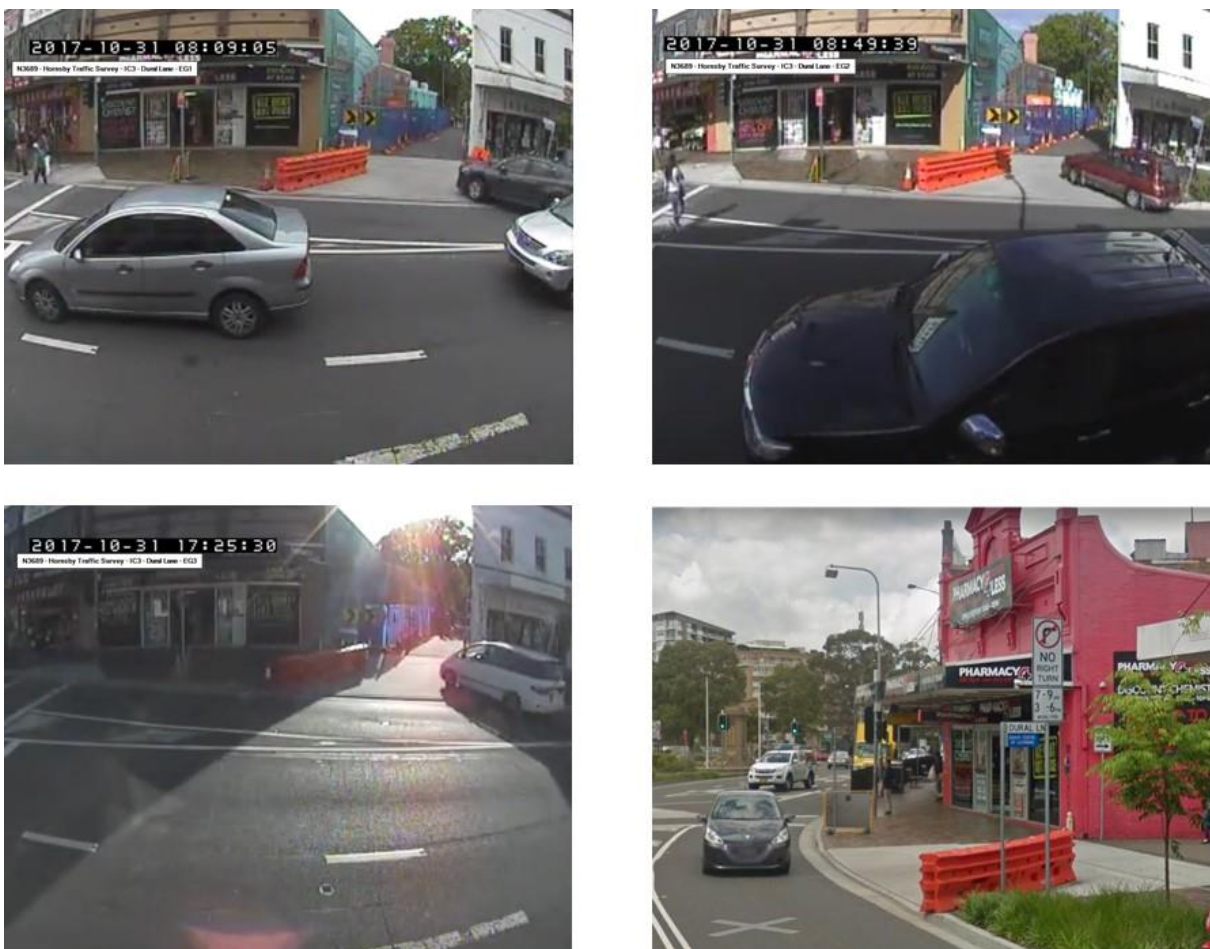


Figure 2.9 : Vehicle right-turning violation at intersection of Peats Ferry Road and Dural Lane



## **2.9      Hornsby Westside Master Plan**

The site is within an area that was the subject of Council's master plan for the West Side Precinct and is part of the overall concept to redevelop the Hornsby town centre. The Hornsby West Side Precinct is shown in Figure 2.10.

Advice from Council has indicated that the planned extension of Station Street through the Cenotaph Park to opposite High Street would not be constructed. Therefore, the traffic models have assumed maintaining the existing road network alignment.

The Hornsby West Side Precinct was predicted to have a yield of 1,000 dwellings and 18,000m<sup>2</sup> of non-residential floor space for retail and commercial uses, according to the Hornsby West Side Traffic Study report (2013). It is within this context that the proposal is for 200 dwellings and 5,158m<sup>2</sup> of retail and commercial uses.

Figure 2.10 : West Side Precinct Plan of Council's Development Control Plan

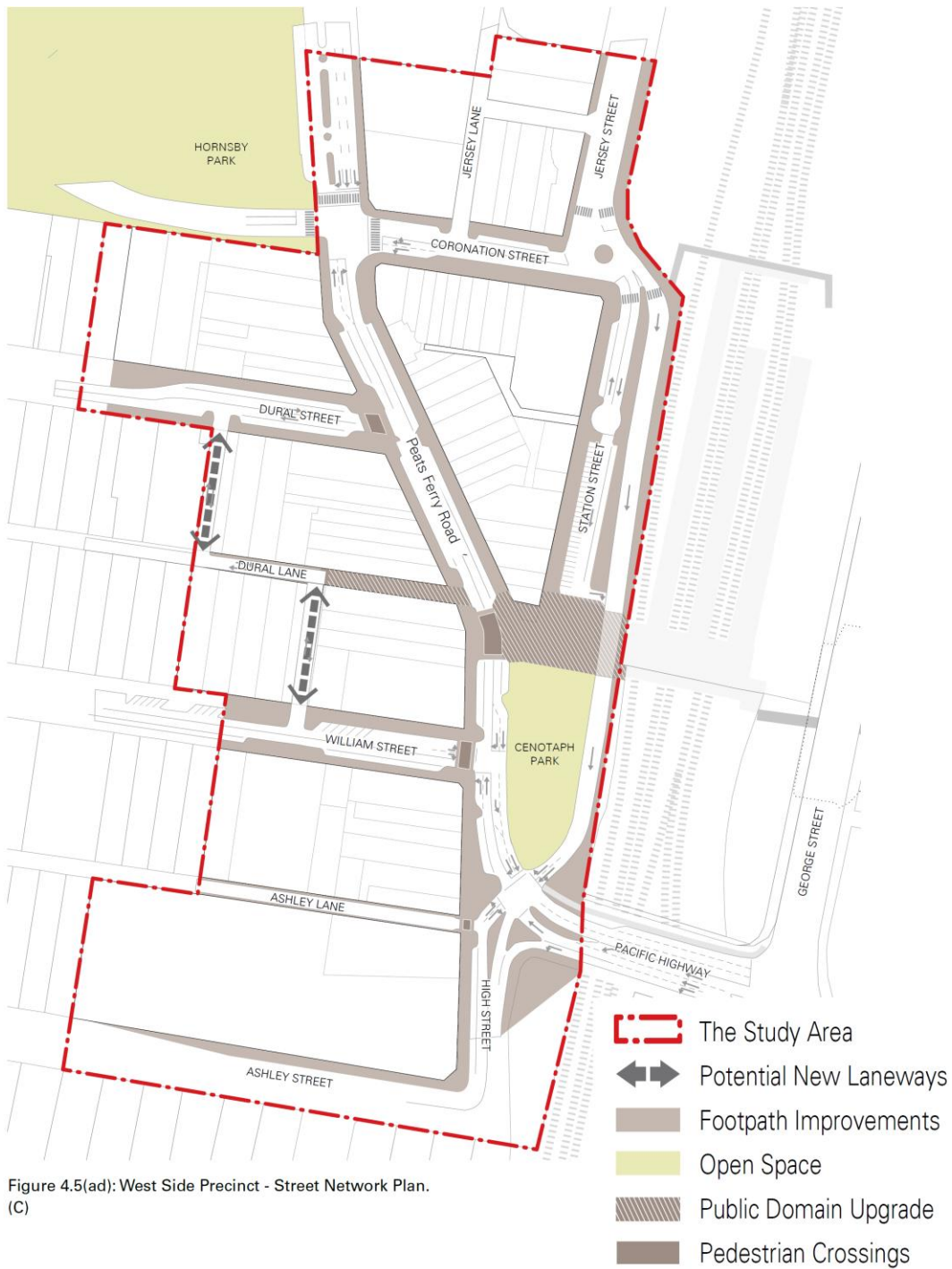


Figure 4.5(ad): West Side Precinct - Street Network Plan.  
(C)





### 3.2 Parking Provision

The Hornsby Development Control Plan (DCP) provides detailed requirements on the parking provision for each land use category. Parking rates in the Hornsby DCP were compared the parking rates documented in RTA's Guide to Traffic Generating Developments. Most parking rates used for this assessment are consistent between the documents, except for residential parking provision, where the Hornsby DCP considers the parking rate to be a maximum while the RTA guide considers the parking rate to be a minimum. In addition, the Hornsby DCP does not include any parking rates for delivery vehicles.

This section reviews the compliance of the proposed parking with the DCP. The relevant controls are for sites that are within 800m of a train station and requires a minimum amount of car parking.

The proposed development is comprised of residential, supermarket and other speciality shops, commercial office and a childcare centre. The DCP parking rates for each land use category, except for delivery vehicles which uses the RTA parking rate, are described in Table 3.1.

**Table 3.1 : Car parking rates of each land use category required by Hornsby Council DCP**

Category	Car parking rate	Car parking rate for visitors	Parking rate for delivery*	Car share	Car parking for disability	Bicycle parking rate	Motorcycle parking rate
Residential: 1-bedroom unit	0.4 space per unit	1 space per 7 units	1 space per 50 units if number of units is less than 200	A minimum of 1 space is to be allocated to car share for developments with 50 or more units.	10% of all units to be adaptable with 1 minimum disability parking space per adaptable unit	1 space per 5 units for residents and 1 space per 10 units for visitors	1 space per 50 car parking spaces.
Residential: 2-bedroom unit	0.7 space per unit						
Residential: 3-bedroom unit	1.2 space per unit						
Commercial (office)	1 space per 48m <sup>2</sup> GFA	-	1 space per 4,000m <sup>2</sup> GFA if total GFA is less than 20,000m <sup>2</sup> GFA	-	1-2% of spaces for commercial premises	1 space per 600m <sup>2</sup> GFA for staff	1 space per 50 car parking spaces.
Supermarket / retail (shops/cafes)	1 space per 29m <sup>2</sup> GLFA	-	5 plus 1 space per 1,000m <sup>2</sup> GFA over 2,000m <sup>2</sup> GFA	-	1-2% of spaces for commercial premises	1 space per 600m <sup>2</sup> GFA for staff	1 space per 50 car parking spaces.
Education: childcare centre	1 space per 4 children	-	-	-	2-3% of spaces for educational premises	1 rack per up to 20 employees	1 space per 50 car parking spaces.

\* Parking for delivery vehicles is based on rates outlined in RMS Guide to Traffic Generating Developments



Based on the parking rates in Table 3.1, the minimum parking provision for each of the land use categories is shown on Table 3.2.

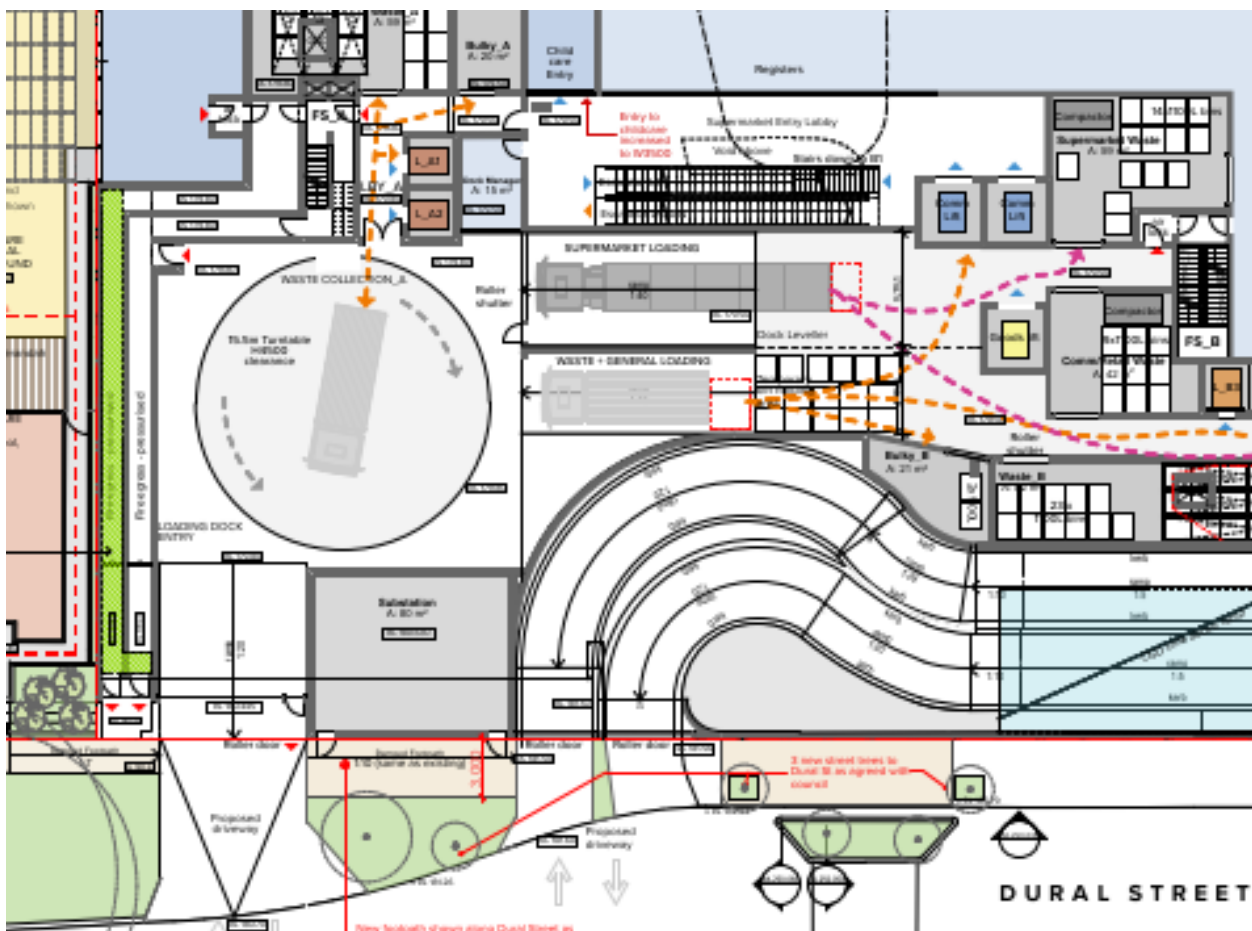
**Table 3.2 : Car parking provision complying with Hornsby Council DCP**

Unit for parking rate	Car parking spaces	Car parking spaces for visitors	Parking spaces for deliveries*	Car share spaces	Disabled car parking spaces	Bicycle parking spaces	Motorcycle parking spaces
Residential (1-bedroom): 61 units	25	28	4	2	22	96	4
Residential (2-bedroom): 118 units	83						
Residential (3-bedroom): 21 units	26						
Commercial office: 2,127m <sup>2</sup> GFA	41	-	1	-	1	24	1
Supermarket and other retail: 2634m <sup>2</sup> GFLA	91	-	7	-	5		2
Childcare centre: 30 children	8	-	-	-	1		1
<b>Total</b>	<b>274</b>	<b>28</b>	<b>12</b>	<b>2</b>	<b>29</b>	<b>120</b>	<b>8</b>

\* Parking for delivery vehicles is based on rates outlined in RMS Guide to Traffic Generating Developments

The DCP requires:

- A total minimum of 316 car parking spaces including 91 spaces for retail and the supermarket, 44 spaces for commercial offices, 8 spaces for the child care centre, 2 car share spaces (located on the retail levels), 12 service vehicles and the remaining 156 spaces for residents.
- Of the 162 car parking spaces for residents, 28 spaces will be for visitor parking, 22 designated for people with a disability for adaptable units and the remaining 112 spaces for the tenants of other units (non-adaptable units).
- A total of 41 car spaces are provided for the commercial office, this is less than the required 44. However, 5 service spaces are supplied that will only operate as service spaces out of peak hours, thus these can be used to support parking for other land uses during peak times. In addition, an extra car share space as a mitigation measure.
- Of the 91 retail car parking spaces, 4 spaces are for people with a disability.
- Of the 41 commercial office car spaces, 1 space is for people with a disability.
- Of the 8 childcare centre car parking spaces, 1 space will be for people with a disability.
- A total of 12 parking spaces will be provided for service and delivery vehicles.
- A total of 70 secure bicycle spaces are required including 60 for residents and visitors, 10 parking spaces for retail and commercial, and a rack for employees of the child care centre. 120 are provided.



### 3.3 Vehicular Access and Car Park Circulation

#### 3.3.1 Vehicle Access to Loading Area

As shown in Figure 3.1, the proposed car park driveway and driveway to the loading area are both located in Dural Street. This is due to the Hornsby DCP only allowing two vehicular entries to the site, with no access permitted along Peats Ferry Road or the pool access road (Coronation Street west of Peats Ferry Road). Separate entries for the loading dock and the basement have been proposed to reduce conflicts between these vehicles.

While it is preferable to have a separated entry and exit driveway for vehicles, The provision of more than two access points would result in decreased activated frontage along Dural Street. The proposed development has been subject to a design excellence process whereby an urban Design Panel reviewed the proposal. Activation of Dural Street is a high priority for this site, and would require pedestrians to navigate across three driveways, reducing pedestrian safety. The car park entry and exit has been designed so as to facilitate a perpendicular exit to the footpath on a relatively flat grade to maximise pedestrian safety. Furthermore, the car park exit and entry are separated by an pedestrian refuge island.

Signage instructing vehicles to give-way to pedestrians and flashing lights should also be installed to reduce potential conflicts between these user groups and improve overall safety. The fin wall between the car park exit ramp and Dural Street will be at least 40% permeable for an area that is 2m high and 4m from the driveway exit to allow pedestrians to see cars exiting the car park.

The proposed driveways are located on the northern side of Dural Street, where a “No Parking” sign is currently located as shown in Figure 3.3. The opposite side of the street to the proposed driveways has “No Parking” restrictions for 8:00am-5:30pm weekdays, 8:00am-12:30pm on Saturdays. Given the narrow width of Dural Street between the development and Frederick Street, it is recommended that “No Stopping” signs be installed on the southern side of Dural Street during the proposed hours of operation of the shopping centre. This would result in the loss of up to 10 on-street parking spaces outside of the hours identified above. These lost parking spaces could be accommodated on other local roads nearby.

Figure 3.3: The traffic management at the kerbside close to heavy vehicle driveway of the proposed development



The arrival of some trucks is likely to occur outside the ‘No Parking’ restriction time period. Therefore, the swept paths of vehicles arriving and leaving the site has been assessed for the proposed truck driveway with removal

of parking spaces on the southern side of Dural Street as shown in Figure 3.4 and Figure 3.5. It is recommended that the parking be restricted from 6am (to facilitate waste removal vehicles) or no parking at all times be installed in this section of Dural Street.

A right-in, right-out access arrangement is proposed for trucks only, and was determined in consultation with Hornsby Shire Council. Hornsby Shire Council have indicated this preference due to potential turn path implications for trucks exiting onto Peats Ferry Road and removing, where possible, truck movements from HPAA. Implementing a right-out access arrangement would require egressing trucks to travel on the local road network such as Dural Street, Frederick Street and William Street. This route has been identified by Hornsby Shire Council as the preferred route and would reduce conflicts at the Dural Street / Peats Ferry Road intersection and enable trucks to utilise the traffic signals at the Peats Ferry Road / William Street intersection to access the arterial road network. Furthermore, a truck performing a left-out from the development would encroach on opposing traffic lanes as shown Figure 3.4. While truck movements through residential streets are not typically recommended, the proposed development will result in approximately 10-12 trucks per day plus moving vehicles if all movements happen on any given day. The truck movements will include the following:

- Commercial waste
- Commercial recycling
- Retail waste
- Retail recycling
- Bulky waste
- Residential waste
- Residential recycling (paper)
- Residential recycling (plastic and glass)
- Supermarket delivery x 2
- Other retail delivery

It is unlikely that all movements will occur on the same day and a building management plan will be developed that will control service and delivery movements for the loading dock.

As indicated by the truck turn path analysis an additional splay area of the driveway would be required to allow a HRV truck to turn out of the driveway and comply with AS 2890.2 Parking Facilities Part 2: Off-street commercial vehicle facilities.



Figure 3.4: The entering and exit path of heavy vehicle eastbound

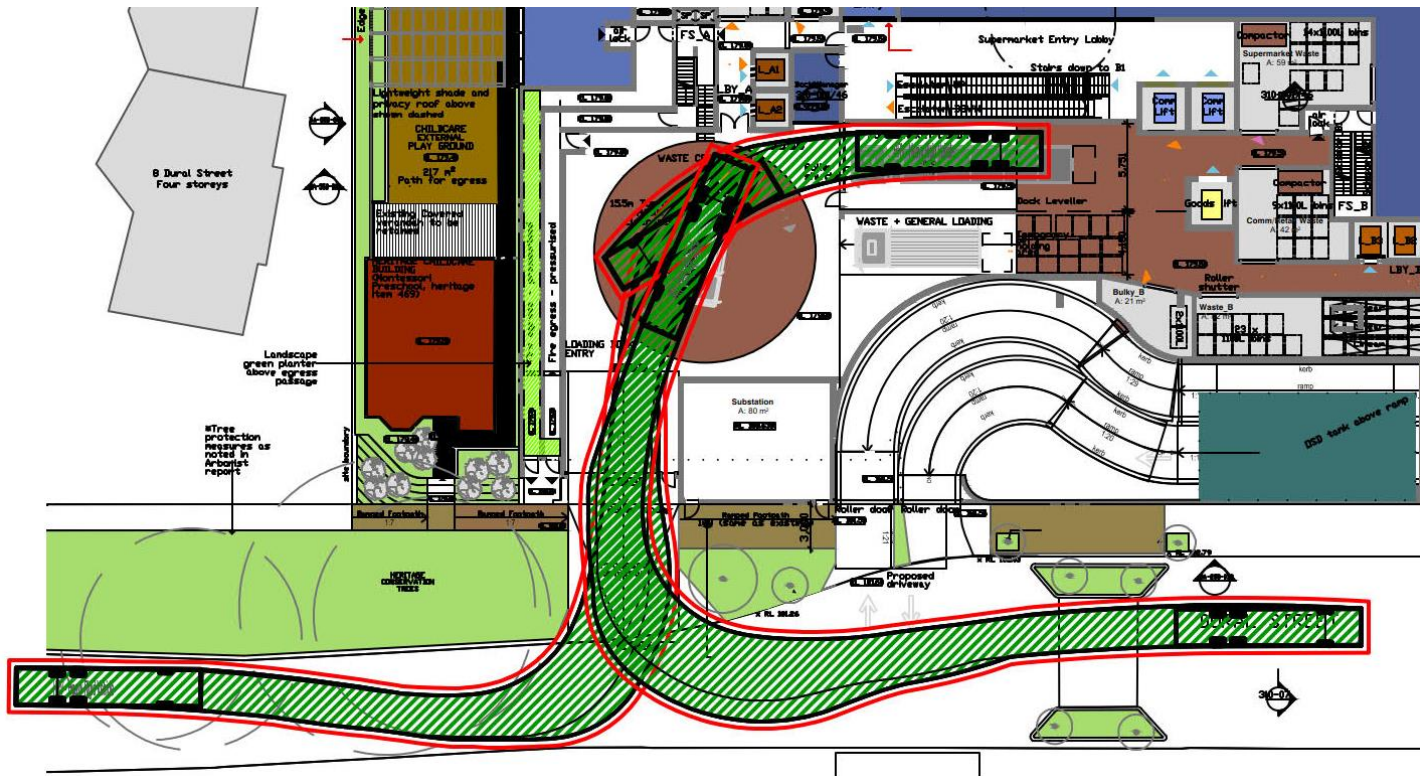
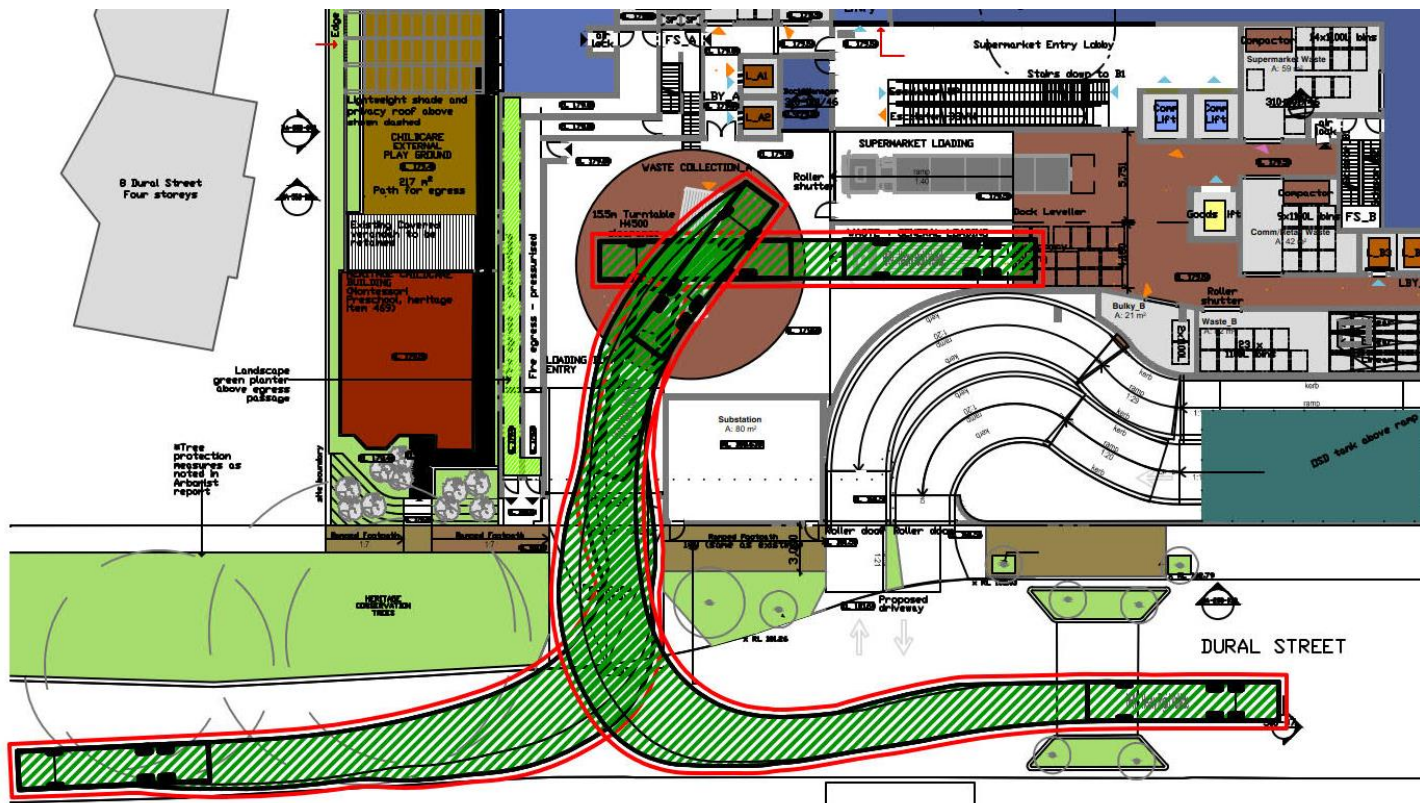


Figure 3.5: The entering and exit path of heavy vehicle westbound







As a result of a peer review undertaken in November 2019, basement plans have been updated with provision of a one-way circulating aisle. Turn paths for the revised basement plan are capable of being compliant.

Figure 3.7: Swept Paths for B1 (B99 and B85 vehicles)

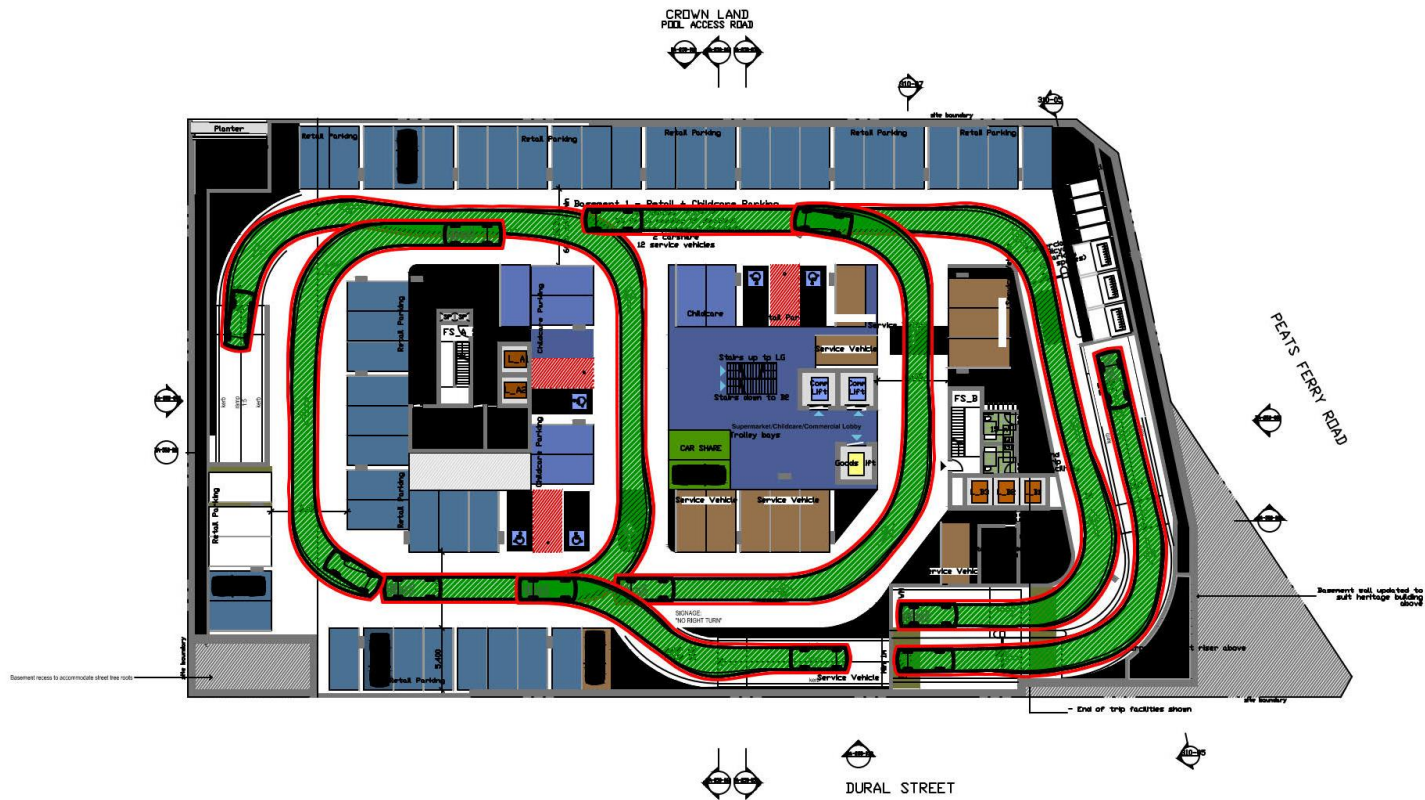


Figure 3.8: Swept Paths for B2 (B99 and B85 vehicles)

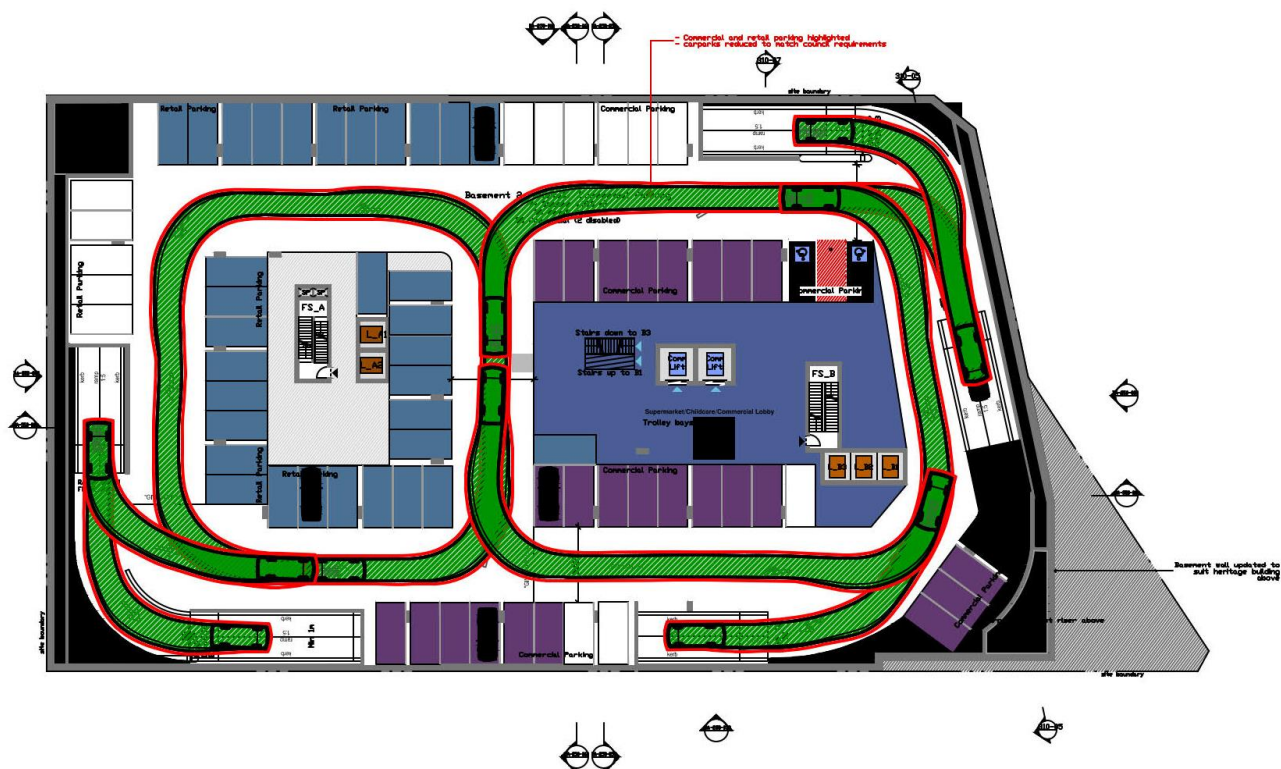




Figure 3.9: Two-way car parking circulation for levels B3

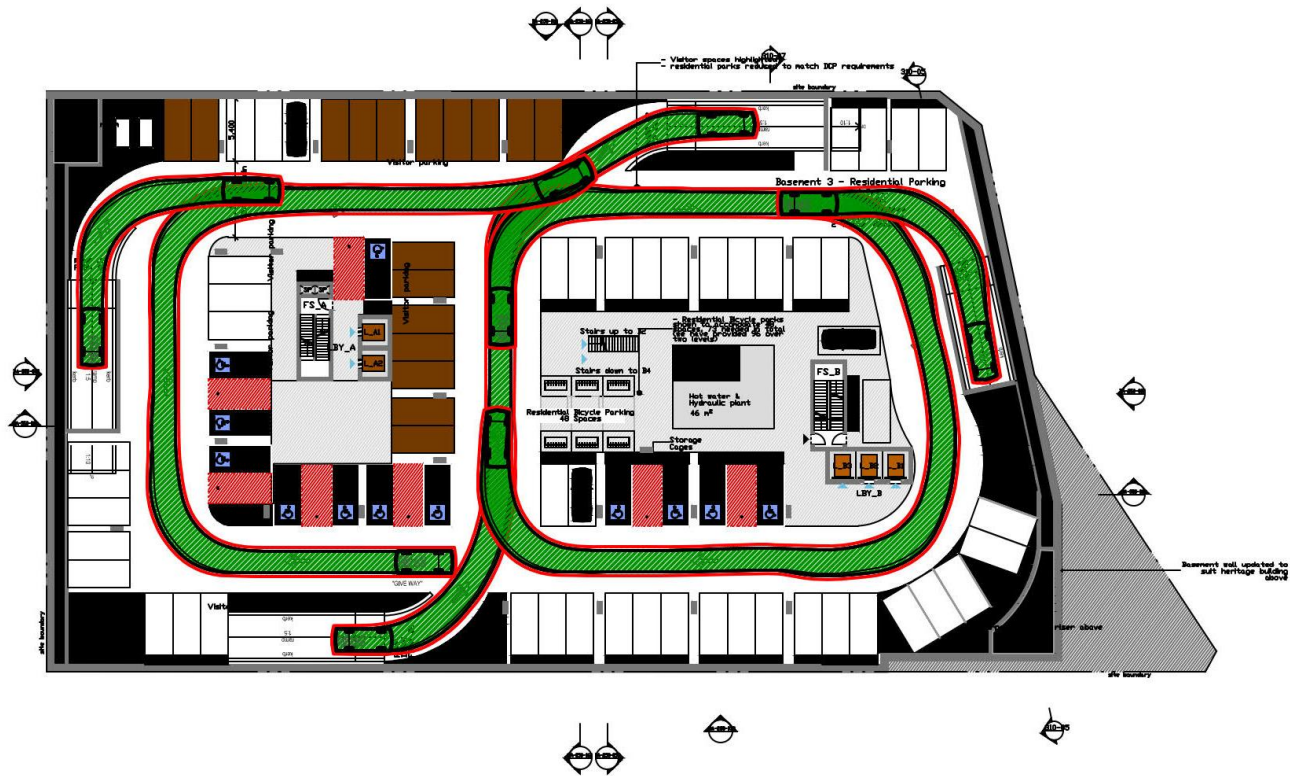
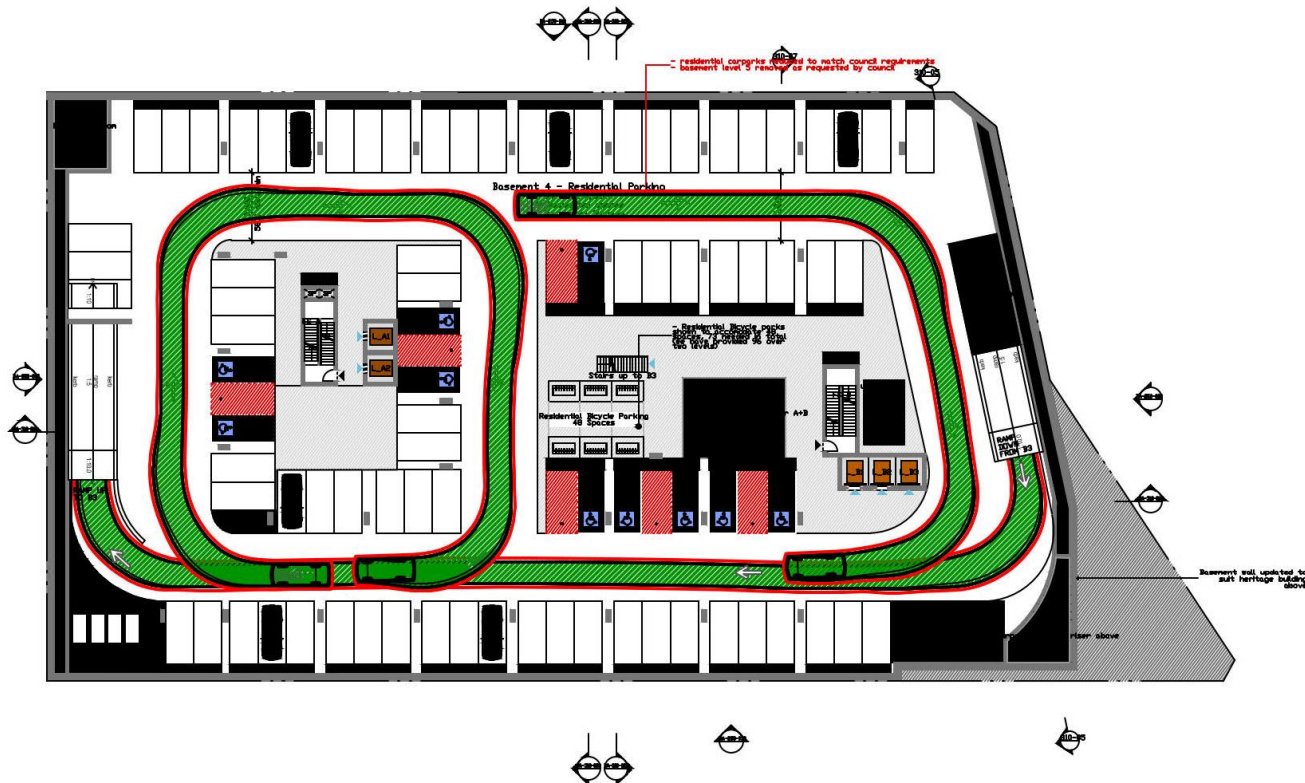


Figure 3.10 : Two-way car parking circulation for levels B4





### 3.3.4 Ramp Gradients

The proposed ramps will have a maximum gradient of 1 in 5 and provide 1 in 8 transition to avoid scraping. This would comply with AS2890.1.

### 3.3.5 Turn path analysis

#### Peats Ferry Road / Dural Street intersection

The turn path of a 12.5m Heavy Rigid Vehicle has been tested for paths between Dural Street and Peats Ferry Road. Given that a right-in, right-out access arrangement is proposed for the loading dock at Council's request, turn paths for heavy vehicles turning into Dural Street from Peats Ferry Road has been assessed as illustrated in Figure 3.11 to Figure 3.14.

The turn path analysis shows that a 12.5m truck can turn right or left from Peats Ferry Road into Dural Street with an encroachment either on the oncoming land of Dural Street or the southern curb. A manoeuvre that avoided encroachment on the oncoming land of Dural Street would require some minor adjustments (1.5m reduction) to the curb on the southern corner of Dural Street and Peats Ferry Road.

Based on the turn path analyses, it is recommended that the curb on the southern corner be adjusted to accommodate truck movements given the increased safety risk without any curb adjustments where trucks may encroach into an adjacent traffic lane.

Figure 3.11 : Right turn path from Peats Ferry Road to Dural Street (with curb adjustment)

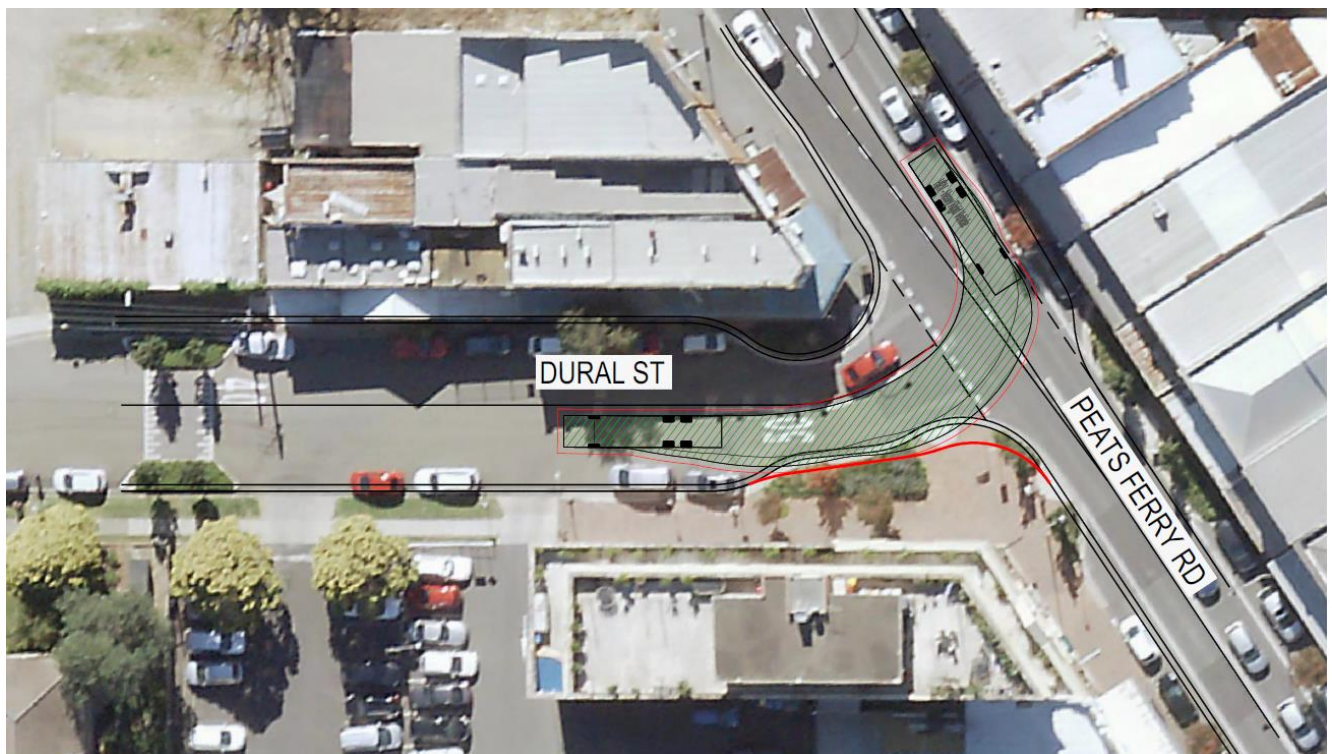




Figure 3.12 : Right turn path from Peats Ferry Road to Dural Street (without curb adjustment)

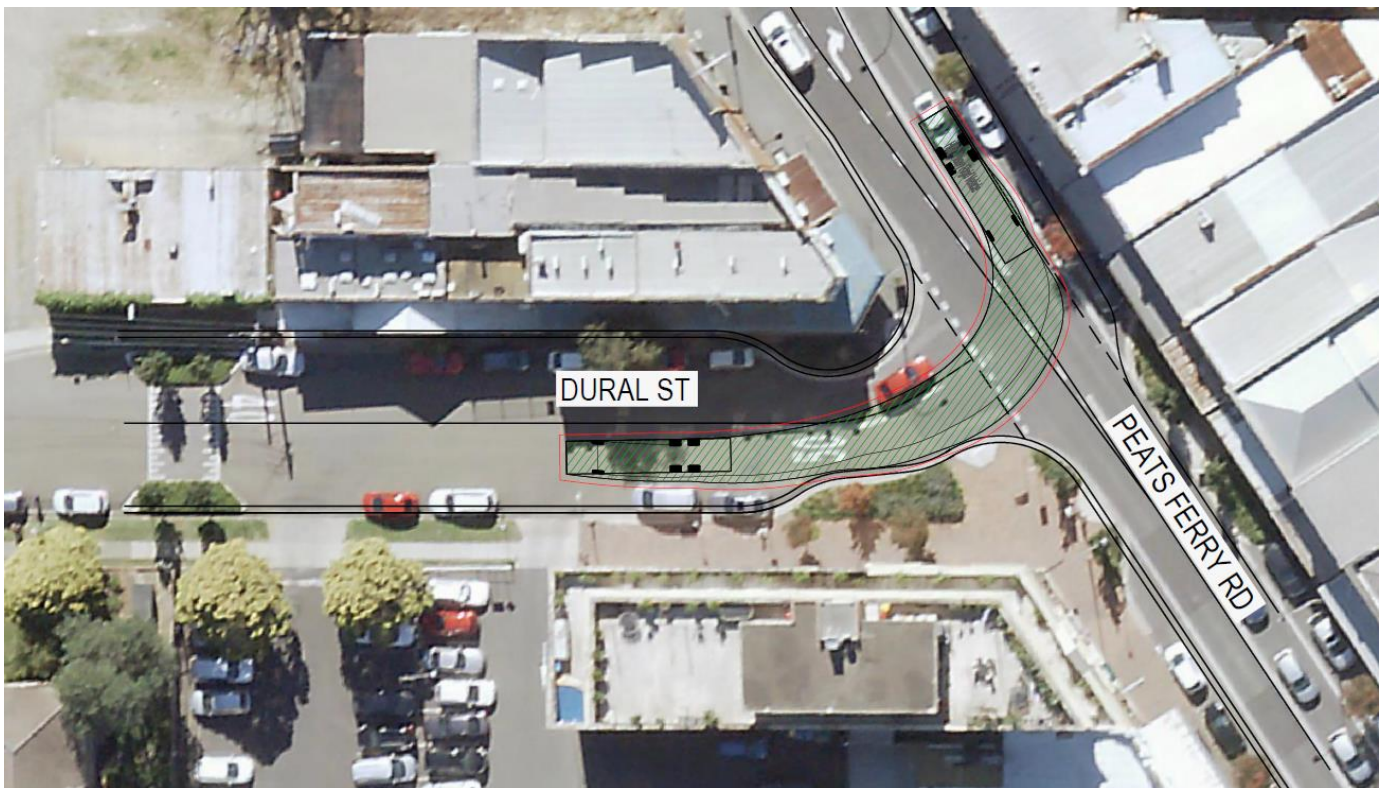


Figure 3.13 : Left turn path from Peats Ferry Road to Dural Street (with curb adjustment)

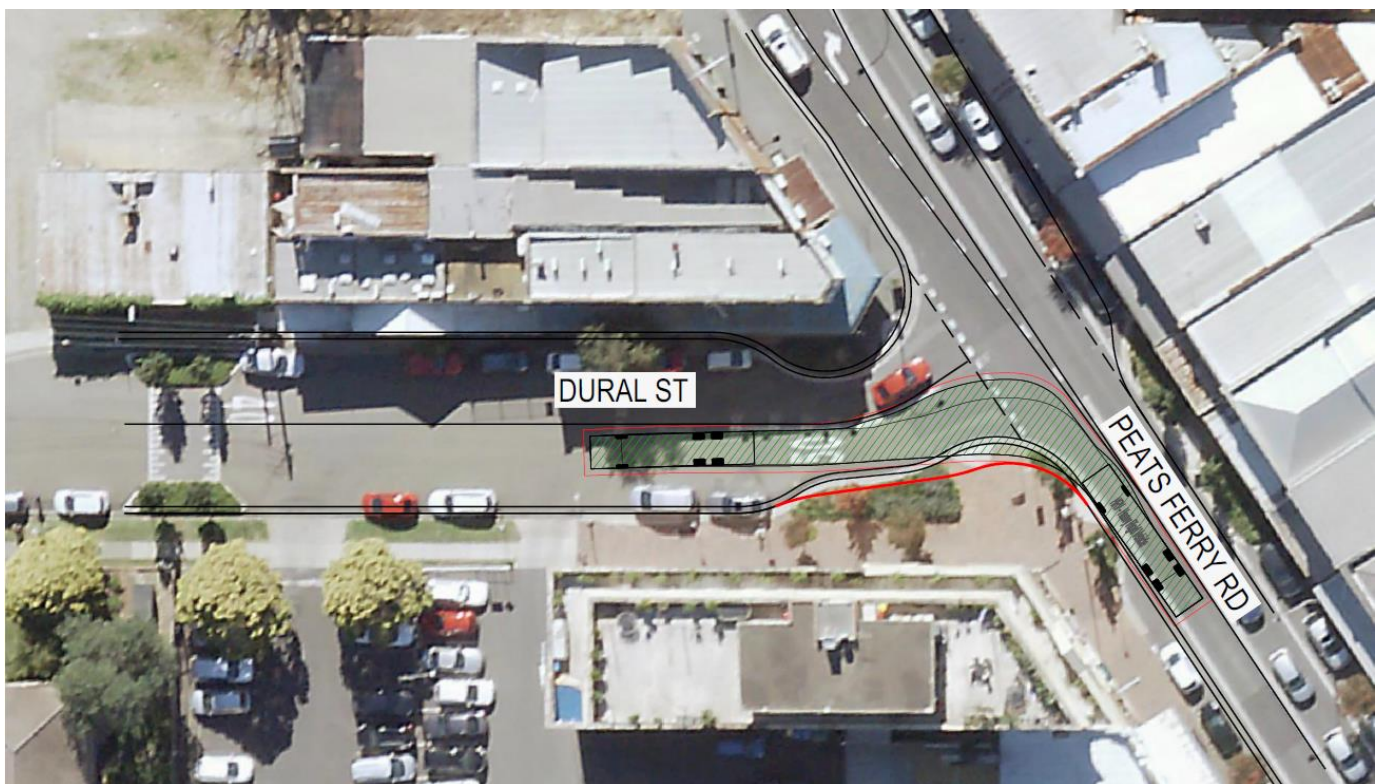
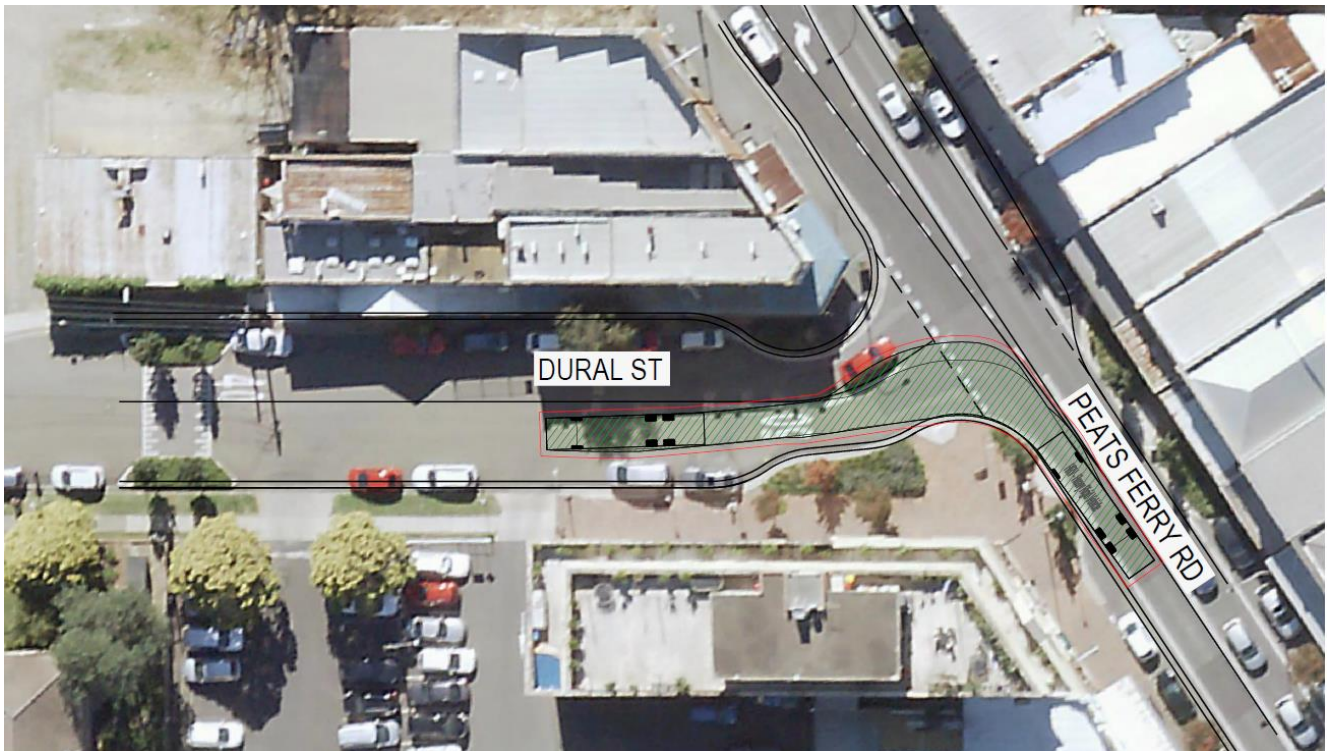




Figure 3.14 : Left turn path from Peats Ferry Road to Dural Street (without curb adjustment)



The turn path analysis as shown in Figure 3.15 and Figure 3.16 shows that a 12.5m truck can turn right or left from Dural Street into Peats Ferry Road however, due to the encroachment of the HRV into the southbound traffic for a left turn, vehicles exiting the loading dock will be directed with a right turn only sign when entering Dural Street.

The intersection of Peats Ferry Road and Dural Street is cluttered with signage. Hornsby Shire Council have indicated that any further signage at this intersection would not be supported.

Right turn only signage will be placed at the exit to the loading dock to avoid HRV movement from Dural Street to Peats Ferry Road, directing HRV traffic to Hornsby Shire Council's preferred route. The right turn only condition is proposed to be included in the building management plan and form a condition of any contract agreement with contractors and tenants.

Figure 3.15 : Right turn path from Dural Street to Peats Ferry Road without encroaching opposing traffic lane

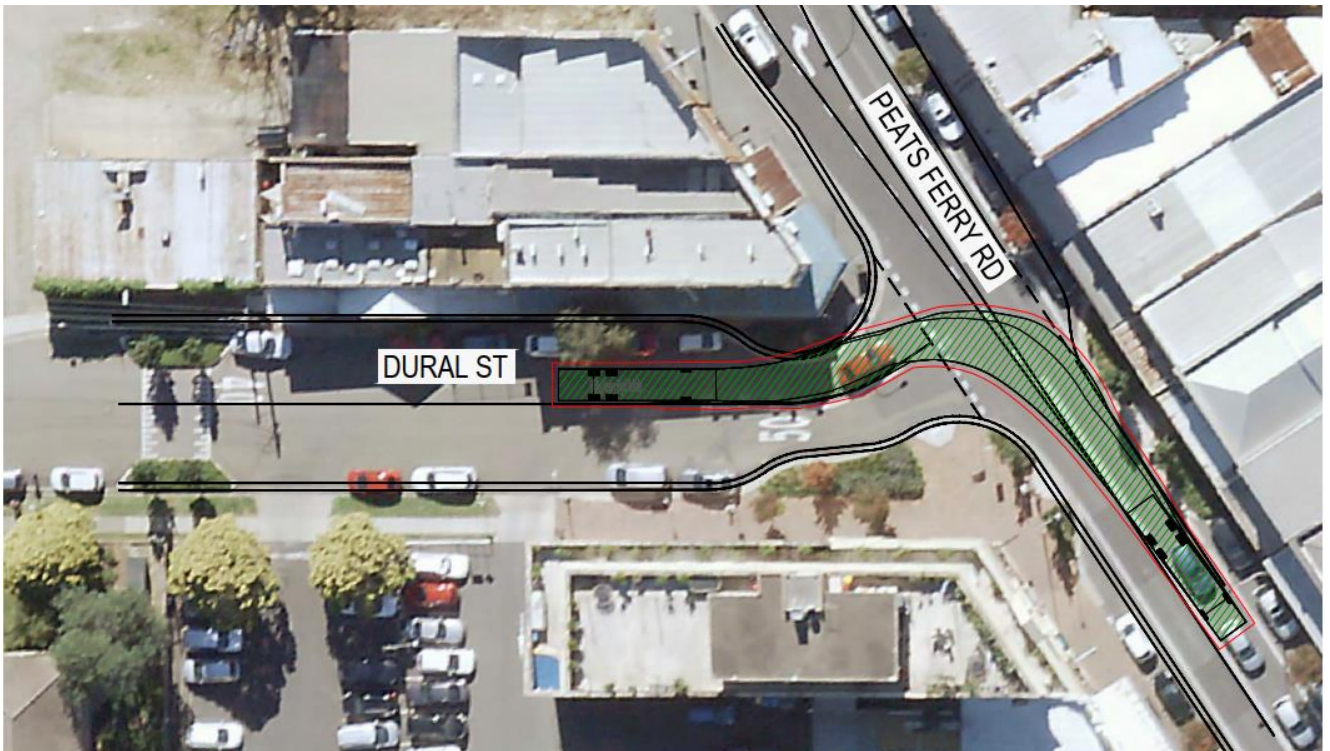


Figure 3.16 : Left turn path from Dural Street to Peats Ferry Road





### Other intersections

The turn path of a 12.5m Heavy Rigid Vehicle has been tested at other intersections (Figure 3.17 to Figure 3.23) which may be used by heavy vehicles intending to access the development. These intersections are:

- Peats Ferry Road / William Street
- William Street / Frederick Street
- Dural Street / Frederick Street

The turn path analysis shows that a 12.5m HRV can perform the required turning movements at these intersections without any adjustments to existing curbs. There are minor encroachments for the turn manoeuvres in both directions at the intersection of Dural Street and Frederick Street. HRV's turning from Frederick Street to Dural Street are required to give way and therefore any encroachment to oncoming lanes is unlikely to result in conflict with other vehicles. HRV's turning from Dural Street to Frederick Street have right of way however may be required to wait for cars to manoeuvre out of Frederick Street prior to making the turn. Turn manoeuvres have been reviewed based on the assumption that the recommended parking restrictions are installed on Dural Street. HRV's will be required to manoeuvre around parked cars along the southern side of Dural Street. Cars currently are required to make this same avoidance and need to travel partially on the oncoming lane to avoid parked cars. There is high visibility along Dural Street when travelling westbound and vehicles can, with the occasional small wait, make this manoeuvre safely. Both manoeuvres can be made safely.

HRV's turning from Frederick Street to William Street encroach on the westbound lane of William Street. HRV's will need to wait for any vehicle on William Street travelling westbound to enter the roundabout prior to making the turn. This manoeuvre can be made safely.

Figure 3.17 : Left turn path between Peats Ferry Road and William Street

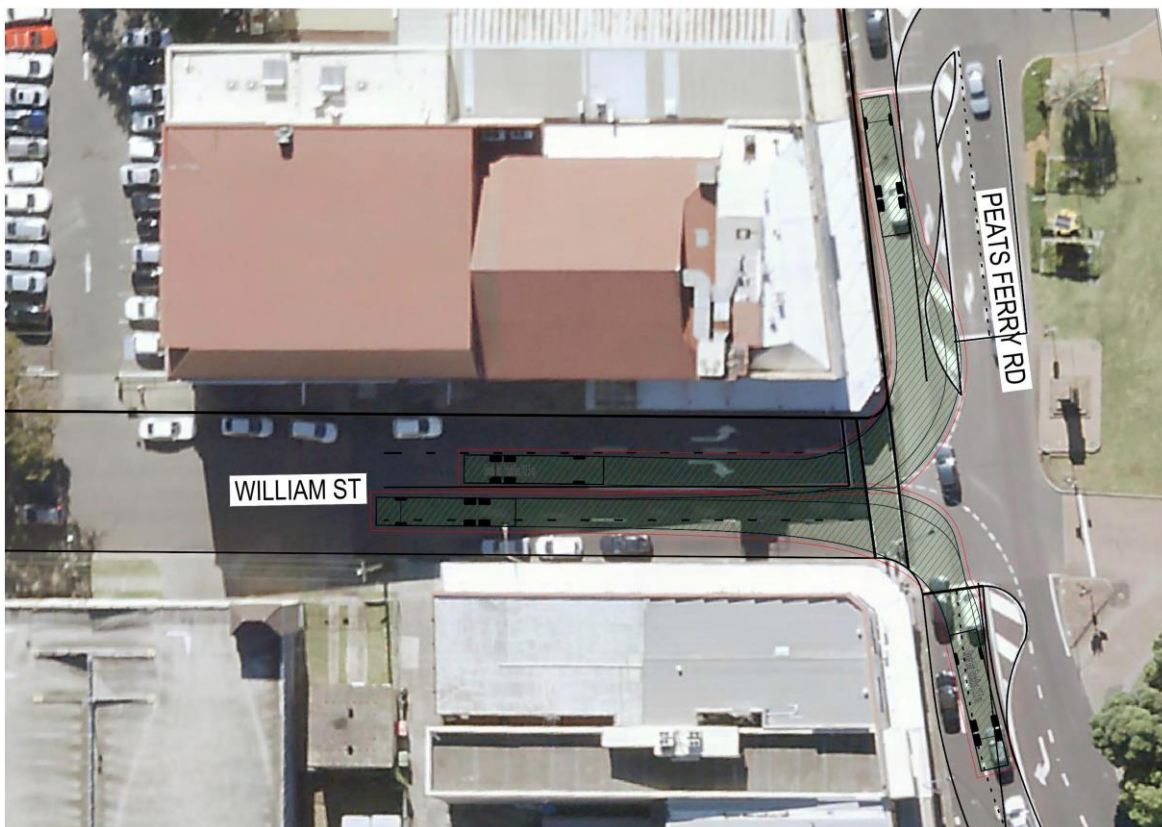




Figure 3.18 : Right turn path from William Street to Peats Ferry Road



Figure 3.19 : Right turn path from Peats Ferry Road to William Street





Figure 3.20 : Right turn path from William Street to Frederick Street



Figure 3.21 : Left turn path from Frederick Street to William Street





Figure 3.22 : Right turn path from Frederick Street to Dural Street



Figure 3.23 : Left turn path from Dural Street to Frederick Street



## 4. Traffic and Transport Impacts

The following section provides an assessment of the impacts on traffic and transport. This includes an assessment of growth in background traffic, forecast traffic generation and assignment, traffic modelling and an assessment of the impacts on public transport and active transport.

The traffic modelling was undertaken in Sidra version 8 using a network model to model the corridor along Peats Ferry Road.

### 4.1 Background Traffic Growth

Background traffic growth of 2% per annum has been assumed as part of this assessment in accordance comments received from Council. However, the growth in background traffic, that is trips through the study area, is constrained by the regional road network and is unlikely to be this high. Evidence suggests that background traffic will not grow at this rate as evidenced by:

- Hornsby Shire Council acknowledge in their pre-DA advice that the road network has limited capacity.
- The Hornsby West Side traffic study (Bitzios Consulting, 2013) assumed no background traffic growth.
- Historical traffic data from Roads and Maritime permanent count stations show no appreciable growth in traffic over the last 10 years.

The memo provided by the Hornsby Shire Council on 14 March 2017, stated “Peats Ferry Road currently operating at capacity or very near capacity during peak periods and has limited capacity to absorb additional traffic, particularly the section between William Street and Coronation Street”.

In addition, the three Roads and Maritime traffic counts stations closest to the proposed development site show that the background traffic volumes have not increased in years. These three traffic counts stations are located at:

- 70m North of Pennant Hills Road, Wahroonga
- 80m South of Clarinda Street, Hornsby
- 70m South of Mills Avenue, Asquith

The traffic counts data for weekday morning and evening peaks at these three intersections are shown in Figures 4.1-4.3. This demonstrates traffic volumes have not increased significantly.

Figure 4.1: Past average weekday traffic volume at three closest RMS traffic counts stations

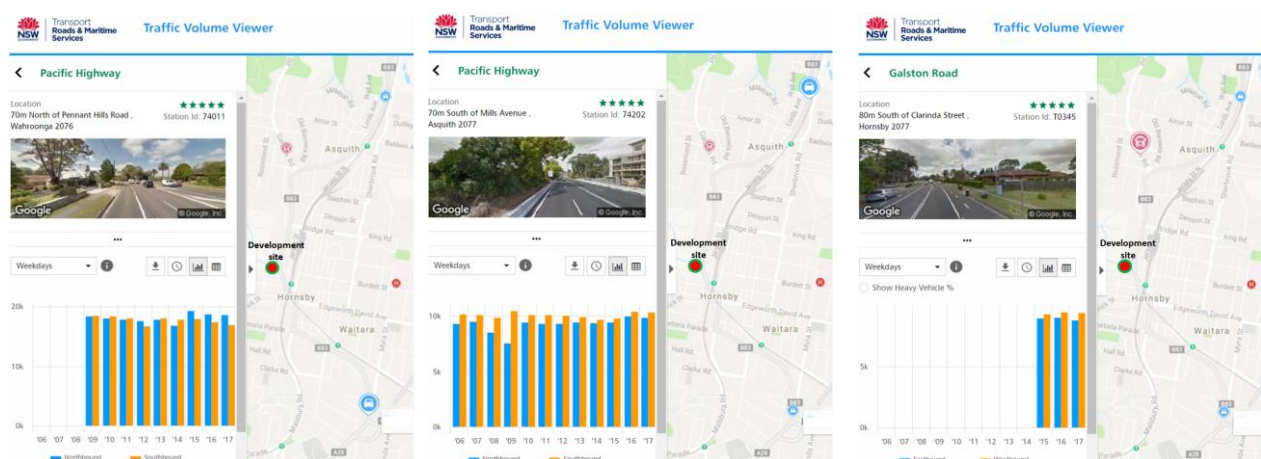




Figure 4.2: Past average AM peak traffic volume at three closest RMS traffic counts stations

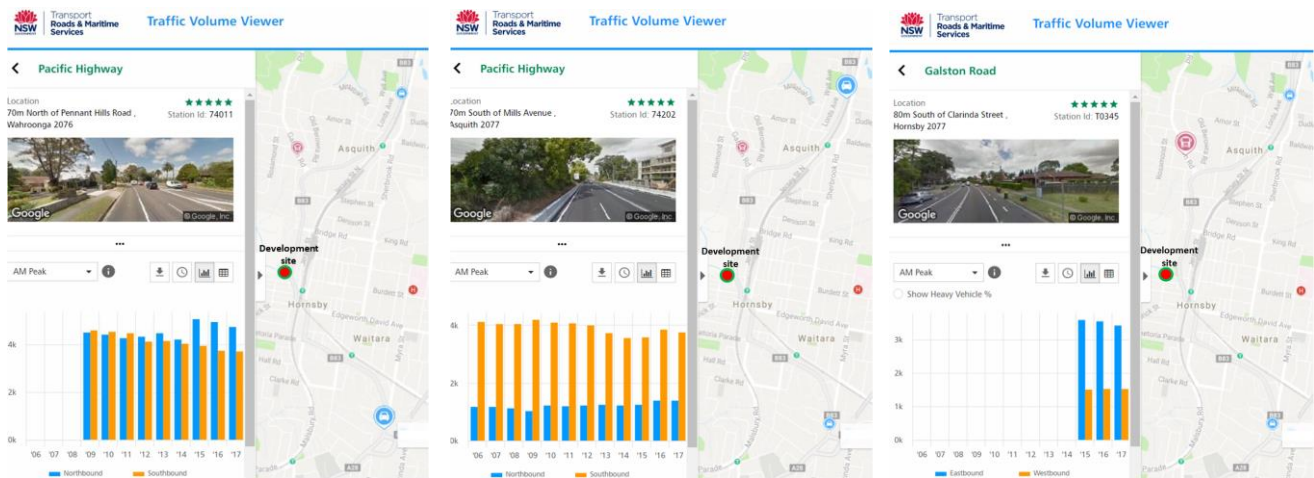
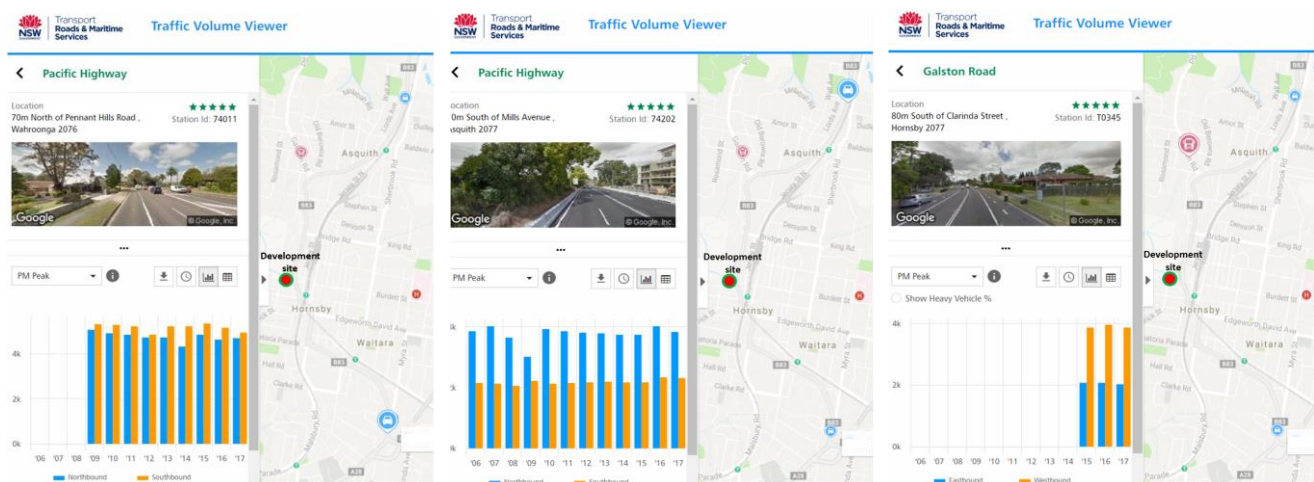


Figure 4.3: Past average PM peak traffic volume at three closes RMS traffic counts stations



Notwithstanding this assessment has included a 2031 scenario in which a 2% per annum growth factor has been applied.

## 4.1.1 Road Network Assessment Criteria

This study has used the Sidra intersection software package and RTA level of service method to assess intersection performance. The following indicators have been used to measure the intersection operation:

- Level of service (LOS)
- Degree of saturation
- Average of vehicle delay
- 95% percentile queue length

Level of Service (LoS) is a basic performance parameter used to describe the operation of an intersection. Levels of Service range from A (indicating good intersection operation) to F (indicating over-saturated conditions with long delays and queues). At signalised intersections, the LoS criteria are related to average intersection delay (seconds per vehicle). At priority controlled (give-way and stop controlled) and roundabout intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement (refer to Table 4.1).

Table 4.1 : Level of Service Criteria for Intersections

Level of Service	Average delay (seconds per vehicle)	Traffic signals, roundabout	Give Way and stop signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode.	At capacity; requires other control mode
F	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Source: Roads and Maritime Services Guide to Traffic Generating Developments, 2002

Degree of Saturation (DoS) is the ratio of demand flow to capacity, and therefore has no unit. As it approaches 1.0, extensive queues and delays could be expected. For a satisfactory operation, DoS should be less than the nominated practical degree of saturation, usually 0.9. The intersection DoS is based on the movement with the highest value.

Average delay is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At signalised intersections, the average intersection delay for the whole intersection is reported. At roundabouts and priority-controlled intersections, the average delay for the most delayed movement is reported.

Queue length is measured in metres reflecting the number of vehicles waiting at the stop line and is usually quoted as the 95th percentile back of queue, which is the value below which 95% of all observed queue lengths fall. It reflects the number of vehicles per traffic lane at the start of the green period, when traffic starts moving again after a red signal. The intersection queue length is usually taken from the movement with the longest queue length.

Typically, acceptable intersection performance in peak periods for urban environments is defined as follows:

- LoS D or better (the worst-case scenario of vehicle delay was less than or equal to 56 seconds)
- Degree of saturation (DoS) less than or equal to 0.8 at priority-controlled intersection, and 0.90 at a signalised controlled intersection
- 95<sup>th</sup> percentile worst back of queue length not interfering with adjacent intersections.

## 4.2 Traffic Forecast

Traffic generation estimates for the proposed development has been based on the published traffic generation data in the Roads and Maritime, Guide to Traffic Generating Developments technical direction (2013) for the land use types including residential, supermarket, retail and child care.

The forecast trip generation is shown in Table 4.2 for the morning peak period and Table 4.3 for the afternoon peak period. The proposed development has mixed of land uses including residential, supermarket, retail and child care, which would induce linked and multi-purpose trips to the proposed development. The RTA Guide to Traffic Generating Developments suggests a discount of 20% to account for multi-purpose trips linked to the supermarket and retail land use. The column "Adjusted volumes" shows the traffic generation after the discount factor has been applied.

The assumed directional split for the residential component is 80% out to 20% in during morning peak period, vice versus during afternoon peak period, and 50% out to 50% in for other land uses both in morning and afternoon peak periods.

**Table 4.2 : Forecast Trip Generation for the Morning Peak Hour**

Land use	Quantity	Measurement Unit	Trip Rate	Traffic generation (veh/hr)	Adjusted volumes (veh/hr)	Directional Split (out / in)	Outbound vehicle trips	Inbound vehicle trips
Residential	200	Dwellings	0.19	38	38	90% / 10%	34	4
Commercial office	2,127	GFA (m <sup>2</sup> )	1.6 per 100m <sup>2</sup>	34	34	10% / 90%	4	30
Supermarket	1,157	GLFA (m <sup>2</sup> )	6 per 100m <sup>2</sup>	69	56	50% / 50%	28	28
Retail	1,477	GLFA (m <sup>2</sup> )	6 per 100m <sup>2</sup>	89	71	50% / 50%	36	35
Child Care	30	No. of Children	0.8	24	24	50% / 50%	12	12
<b>Total</b>					<b>223</b>		<b>114</b>	<b>109</b>

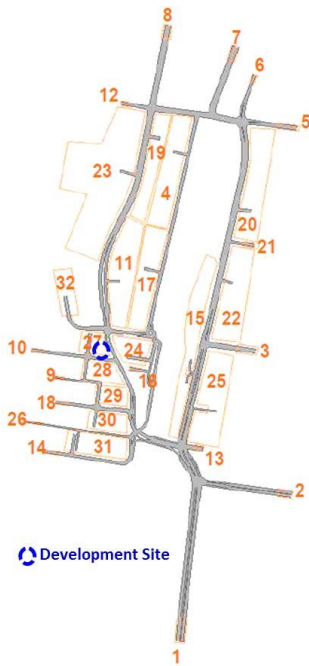
**Table 4.3 : Forecast Trip Generation for the Evening Peak Hour**

Land use	Quantity	Measurement Unit	Trip Rate	Traffic generation (veh/hr)	Adjusted volumes (veh/hr)	Directional Split (out / in)	Outbound vehicle trips	Inbound vehicle trips
Residential	200	Dwellings	0.15	30	30	10% / 90%	3	27
Commercial office	2,127	GFA (m <sup>2</sup> )	1.2 per 100m <sup>2</sup>	26	26	90% / 10%	23	3
Supermarket	1,157	GLFA (m <sup>2</sup> )	15.5 per 100m <sup>2</sup>	179	144	50% / 50%	72	72
Retail	1,477	GLFA (m <sup>2</sup> )	4.6 per 100m <sup>2</sup>	68	54	50% / 50%	27	27
Child Care	30	No. of Children	0.7	21	21	50% / 50%	11	10
<b>Total</b>					<b>275</b>		<b>136</b>	<b>139</b>

### 4.3 Traffic Distribution

The traffic distribution for this study has been based on the Origin / Destination matrices provided in the Hornsby West Side Traffic Study (2013) report provided by Hornsby Shire Council. The origin to destination (OD) was based on 32 traffic zones for the entire Hornsby town centre area as shown in Figure 4.4. Based on recommendations in the Hornsby DCP and in consultation with Council, it has been assumed that traffic would not be able to turn right from Dural Street into Peats Ferry Road and that most traffic would use the signalised intersection at William Street.

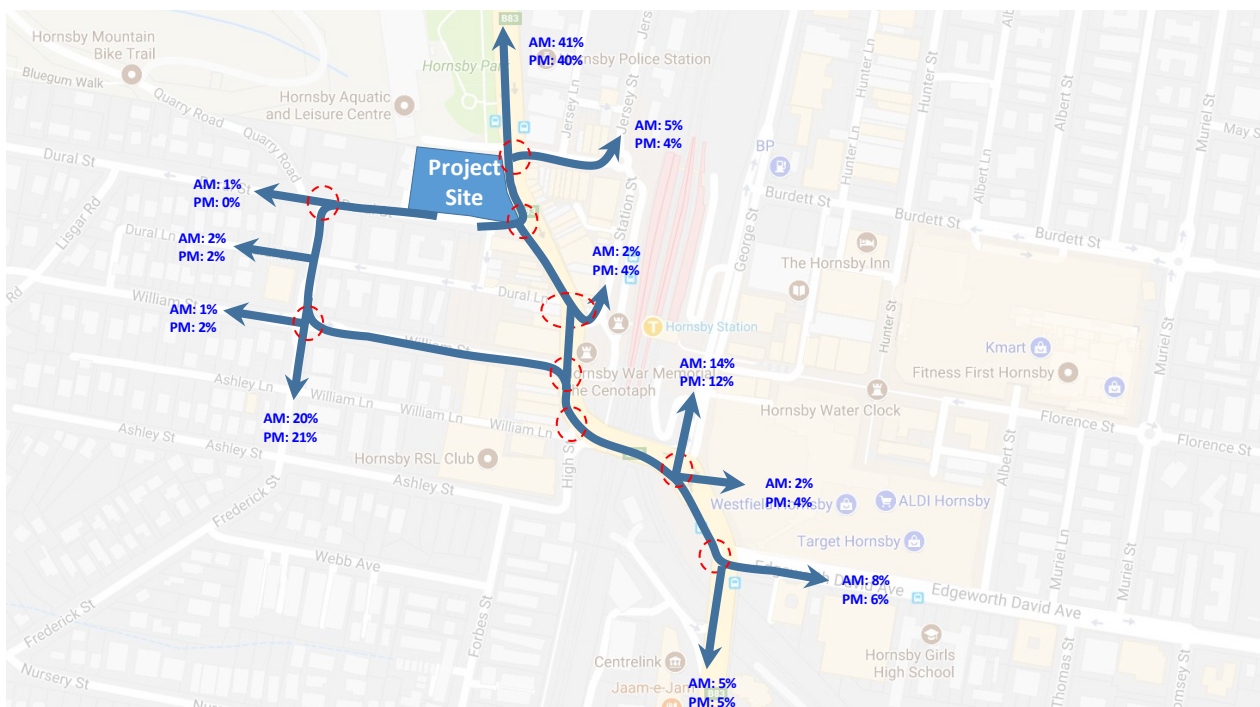
Figure 4.4: Hornsby Westside Traffic Zones



Source: Bitzios Consulting (2013)

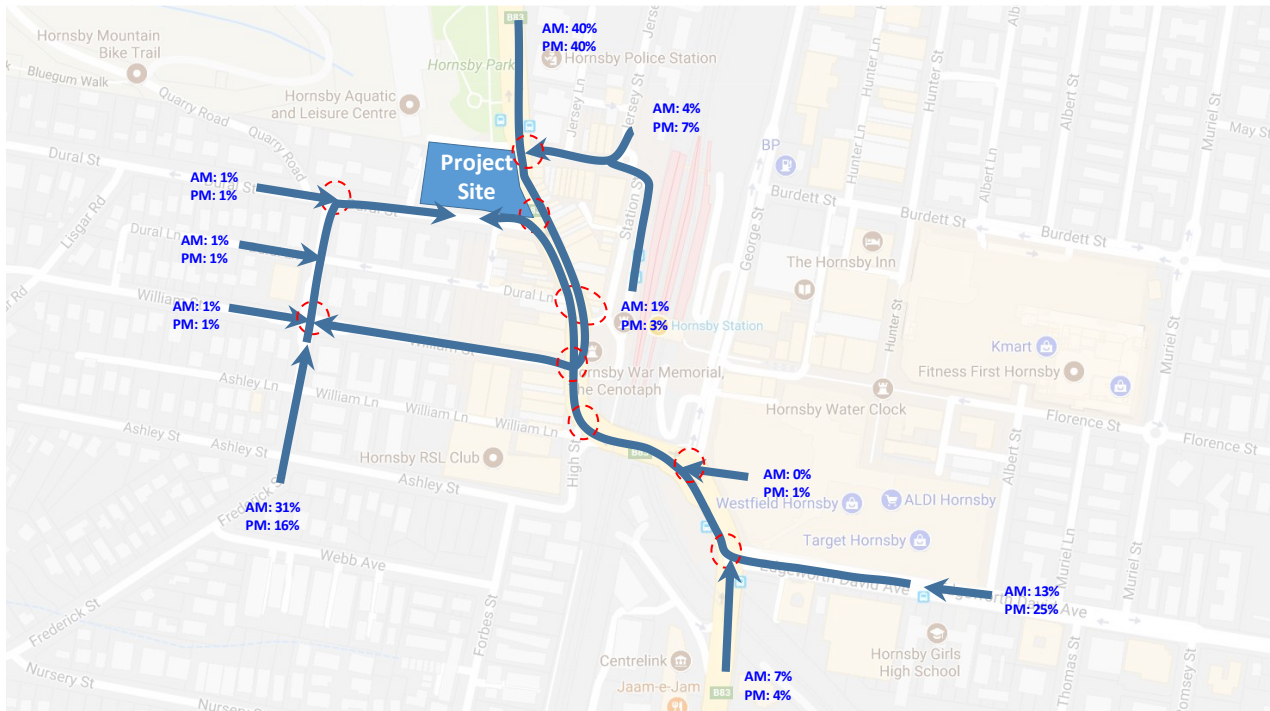
The traffic zone 27 in the Hornsby West Side Traffic Study represents the proposed development site. The traffic generated from zone 27 to all other traffic zones and from other traffic zones to zone 27 were adopted from the study. By merging some traffic zones, the distribution factors for inbound and outbound generated traffic of the proposed development site during morning and afternoon peak periods are shown in Figure 4.5 and Figure 4.6.

Figure 4.5: Outbound Trip Distribution





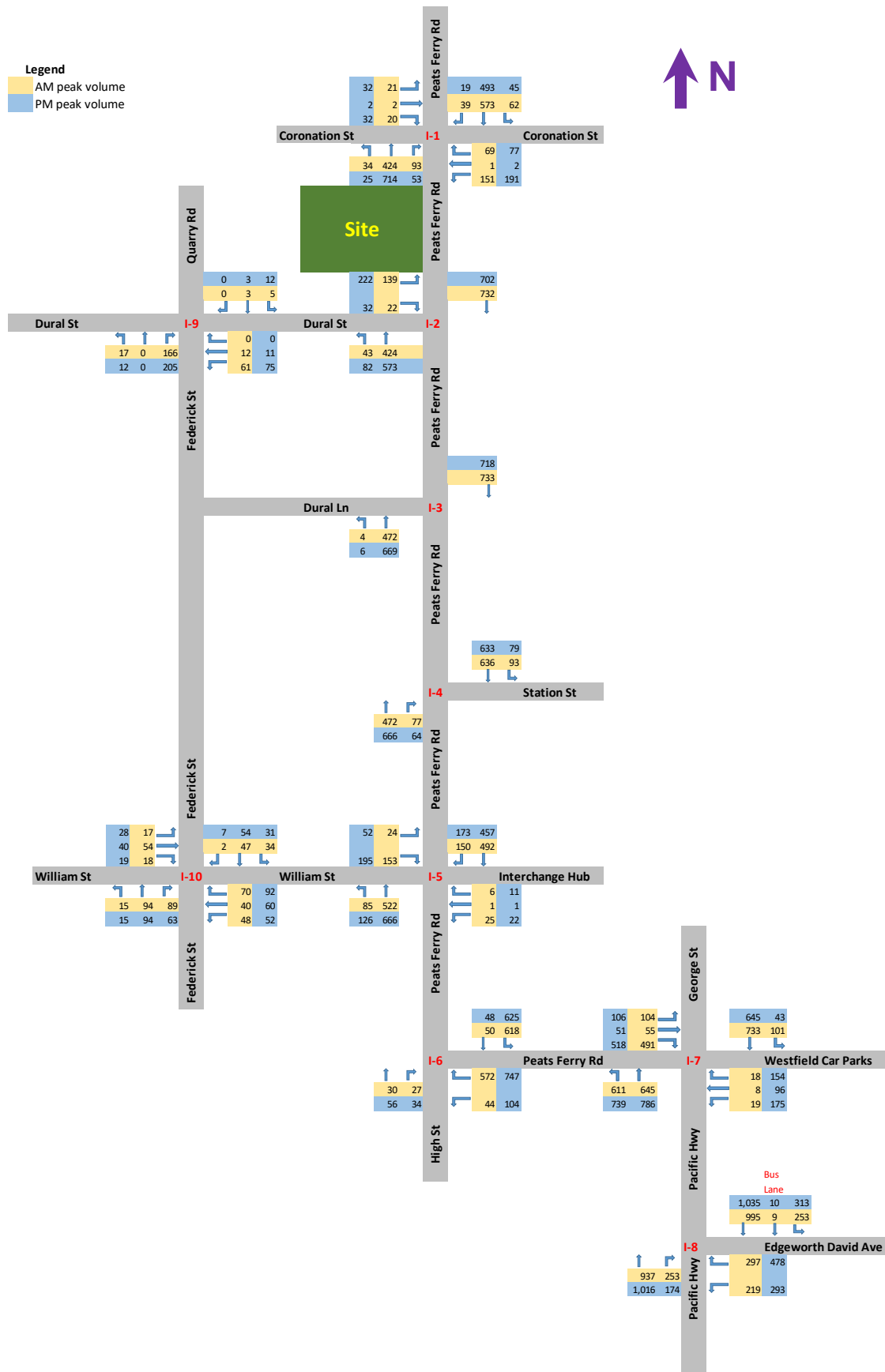
**Figure 4.6: Inbound Trip Distribution**



Figures 4.5 and 4.6 show the light vehicle traffic volumes at all assessed intersections during the morning peak period and afternoon peak period. Based on advice from Council 80% of traffic travelling to and from the south was assumed to use Frederick Street. This is due to congestion near Edgeworth David Avenue and lack of capacity out of side streets into Peats Ferry Road making this alternative route quicker than using the Pacific Highway.

The forecast traffic volumes with the proposed development are shown in Figure 4.7.

Figure 4.7: Forecast Traffic Volumes



#### 4.4 Model Description

The network model was developed in Sidra version 8 and included the Pacific Highway from Edgeworth David Avenue to Coronation Street. Traffic signal timing and phasing was coded according to the traffic signal plans and observations of signal timing taken from the observations and videos of the intersection performance. The model network layout is shown in Figure 4.8.

The intersections of William Street and Frederick Street and Dural Street and Frederick Street have been modelled as standalone intersections.

Figure 4.8 : Peats Ferry Road Sidra Model (Base Year)



For the future year modelling analysis, four scenarios have been tested to identify the traffic impacts of the proposed development under the different conditions of the road network and traffic demand, as summarised in Table 4.4.

**Table 4.4 : Future year scenarios summary**

Scenario	Traffic demand		Road network
	Proposed development	Background traffic growth	Do Minimum
Future No Development Do Minimum	N	N	Y
Future with Development Do Minimum	Y	N	Y
2031 No Development Do Minimum	N	Y	Y
2031 with Development Do Minimum	Y	Y	Y

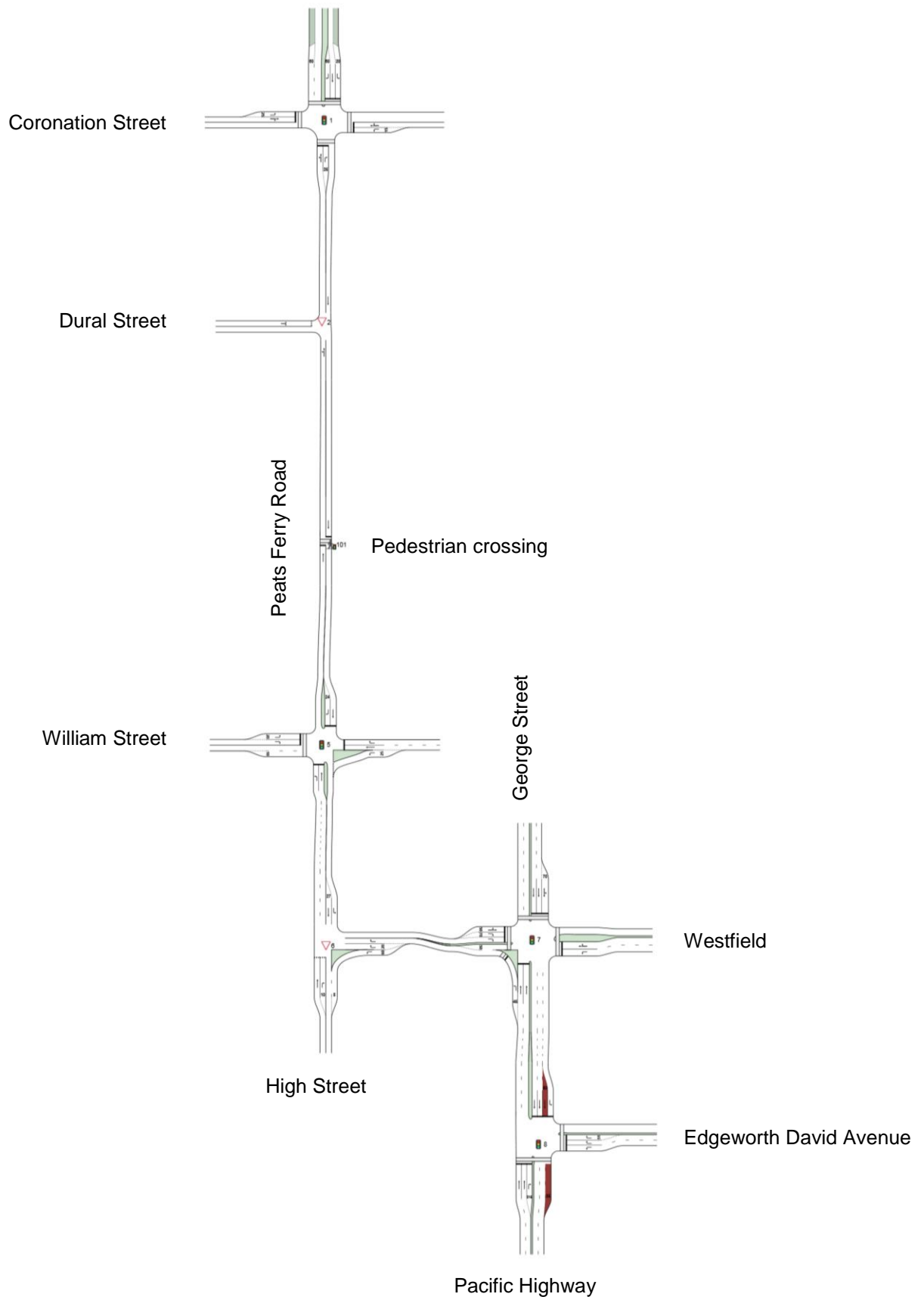
The background traffic growth scenarios assumed a 2% per annum growth in traffic as suggested by Hornsby Shire Council.

For the 'do minimum' modelling with development traffic, changes were made to the signal timing to reflect the adaptive signals of SCATS control, as well as the road network improvements including:

- Closure of Dural Lane at Peats Ferry Road and removal of the intersection from the network model for the future years.
- Closure of Station Street at Peats Ferry Road and replaced with a mid-block crossing and redirection of traffic to Coronation Street.
- Major routes for the network model that include northbound and southbound movements have not been changed.
- Addition of a leading right turn phase for vehicles on William Street in the eastbound direction
- The cycle time for all signalised intersections has been set to 120 seconds during the morning peak and 140 seconds during the evening peak, which is the same as the previous models.
- For outbound development traffic travelling intending to travel southbound on Peats Ferry Road, half these vehicles were assumed to use the Peats Ferry Road / Dural Street intersection and the other half were assumed to use the Peats Ferry Road / William Street intersection.



Figure 4.9 : Peats Ferry Road Sidra Model (Do Minimum in future year)



## 4.5 Intersection Performance Assessment

The existing intersection performance is shown in Table 4.5. The results show that the following intersections perform poorly at LoS F:

- Peats Ferry Road / George Street during the evening peak period
- Pacific Highway / Edgeworth David Avenue during the evening peak period.

**Table 4.5 : Sidra Results Base Model**

Intersection	Peak period	Degree of Saturation	Average delay(s)	95% percentile Queue length (m)	Level of service
Peats Ferry Road / Coronation Street	Morning	0.56	17	110	B
	Evening	0.55	21	105	B
Peats Ferry Road / Dural Street	Morning	0.39	14	<5	A
	Evening	0.40	15	45	B
Peats Ferry Road / Dural Lane	Morning	0.29	7	65	A
	Evening	0.32	7	100	A
Peats Ferry Road / Station Street	Morning	0.44	<5	45	A
	Evening	0.52	7	45	A
Peats Ferry Road / William Street	Morning	0.91	13	70	A
	Evening	0.90	23	100	B
Peats Ferry Road / High Street	Morning	0.69	27	55	B
	Evening	0.39	30	120	C
Peats Ferry Road / George Street	Morning	0.90	44	185	D
	Evening	>1	>100	215	F
Pacific Highway / Edgeworth David Avenue	Morning	>1	42	285	C
	Evening	>1	77	465	F
Frederick Street / Dural Street	Morning	0.08	5	<5	A
	Evening	0.10	5	<5	A
Frederick Street / William Street	Morning	0.13	7	5	A
	Evening	0.13	7	5	A

The intersection performance for future Do Minimum without proposed development scenario is shown in Table 4.6. The results show that the following intersections perform poorly at Los F or DoS >1:

- Peats Ferry Road / George Street during the evening peak period
- Pacific Highway / Edgeworth David Avenue during the morning and evening peak period.

**Table 4.6 : Intersection performance without proposed development but with Do Minimum road network improvements**

Intersection	Peak period	Degree of Saturation	Average delay(s)	95% percentile Queue length (m)	Level of service
Peats Ferry Road / Coronation Street	Morning	0.57	18	110	B
	Evening	0.91	19	100	B
Peats Ferry Road / Dural Street	Morning	0.43	12	<5	A
	Evening	0.44	16	30	B
Pedestrian Crossing at Station Street	Morning	0.56	<5	65	A
	Evening	0.55	<5	65	A
Peats Ferry Road / William Street	Morning	0.91	11	70	A
	Evening	>1	28	140	B
Peats Ferry Road / High Street	Morning	0.58	<5	<5	A
	Evening	0.69	36	20	C
Peats Ferry Road / George Street	Morning	0.90	43	185	D
	Evening	>1	58	215	E
Pacific Highway / Edgeworth David Avenue	Morning	>1	42	285	C
	Evening	>1	77	465	F
Frederick Street / Dural Street	Morning	0.08	<5	<5	A
	Evening	0.10	<5	<5	A
Frederick Street / William Street	Morning	0.13	6	5	A
	Evening	0.13	6	5	A

The intersection performance with the changes described above for the 'do-minimum' and development scenario is shown in Table 4.7. The results show that the following intersections perform poorly at LoS E or F or DoS >1:

- Peats Ferry Road / William Street during the evening peak period
- Peats Ferry Road / George Street during the evening peak period
- Pacific Highway / Edgeworth David Avenue during the morning and evening peak period.



Table 4.7 : Sidra Results with Development Traffic ('Do Minimum')

Intersection	Peak period	Degree of Saturation	Average delay(s)	95% percentile Queue length (m)	Level of service
Peats Ferry Road / Coronation Street	Morning	0.62	18	125	B
	Evening	0.84	20	120	B
Peats Ferry Road / Dural Street	Morning	0.52	<5	5	A
	Evening	0.74	24	50	B
Pedestrian Crossing at Station Street	Morning	0.70	<5	65	A
	Evening	0.58	<5	65	A
Peats Ferry Road / William Street	Morning	0.90	17	60	B
	Evening	>1	75	295	F
Peats Ferry Road / High Street	Morning	0.59	<5	35	A
	Evening	0.44	35	90	C
Peats Ferry Road / George Street	Morning	0.92	45	185	D
	Evening	>1	74	185	F
Pacific Highway / Edgeworth David Avenue	Morning	>1	50	330	D
	Evening	>1	76	460	F
Frederick Street / Dural Street	Morning	0.16	<5	<5	A
	Evening	0.19	<5	<5	A
Frederick Street / William Street	Morning	0.17	<5	7	A
	Evening	0.17	<5	6	A

A comparison between the existing and future intersection performance is shown in Table 4.8. This shows that:

- The majority of intersections would perform at a similar or improved LoS and DoS
- The Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue intersections during the evening peak period would continue to perform at a poor LoS with the do minimum upgrades and development traffic
- Some intersections are approaching or at capacity and include Peats Ferry Road / William Street, Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue. The Peats Ferry Road / William Street intersection is forecast to operate at capacity without development traffic. Therefore, this intersection is sensitive to small changes in traffic volumes, and the addition of development traffic would result in the intersection deteriorating from LoS B to LoS F.

Table 4.8 : The comparison between existing and with development intersection performance

Intersection	Peak period	Existing LoS	With Development LoS	Change from existing to future
Peats Ferry Road / Coronation Street	Morning	B	B	Minimal impact
	Evening	B	B	Minimal impact
Peats Ferry Road / Dural Street	Morning	A	A	Minimal impact
	Evening	B	B	Moderate increase in average delay
Peats Ferry Road / Dural Lane	Morning	A	Dural lane closed	No impact
	Evening	A		
Peats Ferry Road / Station Street	Morning	A	Station Street closed	No impact
	Evening	A		
Peats Ferry Road / William Street	Morning	A	B	Minor increase in average delay
	Evening	B	F	Major increase in average delay
Peats Ferry Road / High Street	Morning	A	A	Minimal impact
	Evening	C	C	Minor increase in average delay
Peats Ferry Road / George Street	Morning	D	D	Minimal impact
	Evening	F	F	Major decrease in average delay
Pacific Highway / Edgeworth David Avenue	Morning	C	D	Moderate increase in average delays
	Evening	F	F	Minimal impact
Frederick Street / Dural Street	Morning	A	A	Minimal impact
	Evening	A	A	Minimal impact
Frederick Street / William Street	Morning	A	A	Minimal impact
	Evening	A	A	Minimal impact

#### 4.5.1 Mitigation Measures

The modelling has identified capacity constraints on the road network given that the Peats Ferry Road / William Street, Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue intersections would operate at LoS F. A range of mitigation measures were previously proposed in the Hornsby West Side Traffic Study report. Advice from Council has been that these options are unlikely to be supported by TfNSW as they require using land located between Peats Ferry Road and the Railway. These options include widening between William Street and George Street.

#### 4.5.2 Future traffic growth 2031

Sidra a model outputs for the scenarios of 2% annual background traffic growth to 2031 with/without the proposed development are shown in Table 4.9 and Table 4.10.

**Table 4.9 : Sidra Results with do minimum without proposed development in 2031**

Intersection	Peak period	Degree of Saturation	Average delay(s)	95% percentile Queue length (m)	Level of service
Peats Ferry Road / Coronation Street	Morning	>1	>100	>500	F
	Evening	>1	97	340	F
Peats Ferry Road / Dural Street	Morning	0.39	14	80	A
	Evening	0.51	16	80	B
Pedestrian Crossing at Station Street	Morning	>1	55	125	D
	Evening	>1	86	125	F
Peats Ferry Road / William Street	Morning	0.91	13	90	A
	Evening	>1	84	125	F
Peats Ferry Road / High Street	Morning	0.48	39	20	C
	Evening	0.39	21	90	B
Peats Ferry Road / George Street	Morning	>1	>100	>500	F
	Evening	>1	>100	>500	F
Pacific Highway / Edgeworth David Avenue	Morning	>1	>100	>500	F
	Evening	>1	>100	>500	F
Frederick Street / Dural Street	Morning	0.10	<5	<5	A
	Evening	0.13	<5	<5	A
Frederick Street / William Street	Morning	0.17	7	5	A
	Evening	0.17	7	5	A

Table 4.10 : Sidra Results with Do minimum with proposed development in 2031

Intersection	Peak period	Degree of Saturation	Average delay(s)	95% percentile Queue length (m)	Level of service
Peats Ferry Road / Coronation Street	AM	>1	>100	>500	F
	PM	>1	>100	460	F
Peats Ferry Road / Dural Street	AM	0.47	<5	80	A
	PM	0.78	<5	80	A
Pedestrian Crossing at Station Street	AM	>1	80	125	F
	PM	>1	72	125	F
Peats Ferry Road / William Street	AM	0.73	15	80	B
	PM	>1	>100	190	F
Peats Ferry Road / High Street	AM	0.72	<5	55	A
	PM	0.38	<5	115	A
Peats Ferry Road / George Street	AM	>1	>100	>500	F
	PM	>1	>100	>500	F
Pacific Highway / Edgeworth David Avenue	AM	>1	>100	>500	F
	PM	>1	>100	>500	F
Frederick Street / Dural Street	AM	0.18	<5	<5	A
	PM	0.22	<5	5	A
Frederick Street / William Street	AM	0.21	<5	10	A
	PM	0.20	<5	10	A

The 2031 modelled scenario with 2% annual background traffic growth shows that:

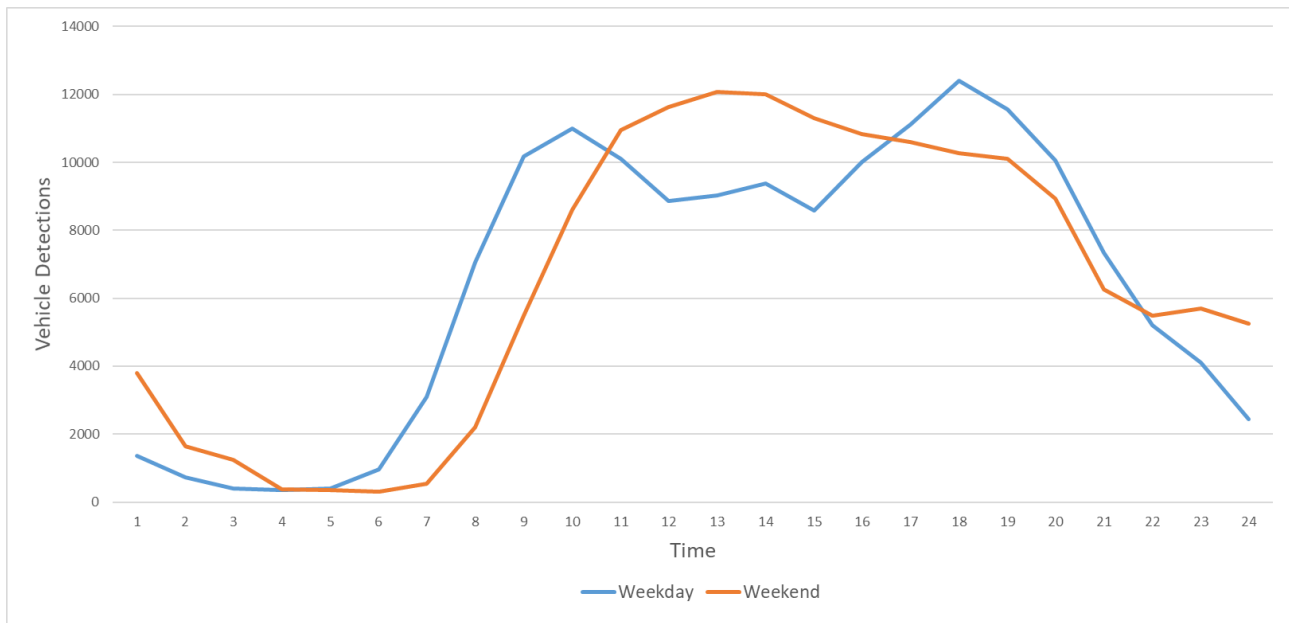
- Without the proposed development, the intersections of Peats Ferry Road at Coronation Street, William Street, George Street and Edgeworth David Avenue and the new pedestrians crossing at Station Street all operate with high delays and Level of Service F.
- With the proposed development, the above intersections continue to operate at a poor level of service and with high delays.

The additional traffic from the development does not significantly increase the delays on the road network compared to the delays caused by the growth in background traffic, except at the pedestrian crossing at Station Street. However, given that the assumed 2% increase in background traffic is higher than the capacity of the road network, this is unlikely to occur unless significant regional increases in road capacity are created.

#### 4.6 Weekend Peak Analysis

SCATS data was used to compare the traffic profiles and the intensity of peaks on weekdays and the weekend. Data from Tuesday 22 November 2019 was used to represent weekday traffic profiles and Saturday 26 November for the weekend traffic profiles as all detectors were fully functional on these days. Vehicle detections from the Peats Ferry Road / Coronation Street (SCATS site 4322), Peats Ferry Road / William Street (SCATS site 2968) and Peats Ferry Road / George Street (SCATS site 736) intersections were collated to produce Figure 4.10, which shows the total vehicle detections per hour in the vicinity of the proposed development site. Additionally, Table 4.11 displays the peak weekend trips generated from the development.



**Figure 4.10 : Morning Peak Passenger Loading**

**Table 4.11 : Forecast Trip Generation for the Saturday Peak**

Land use	Quantity	Measurement Unit	Trip Rate	Traffic Generation (veh/hr)	Adjusted Volumes (veh/hr)	Morning Peak Trips Generated	Evening Peak Trips Generated
Residential	200	Dwellings	0.15 <sup>1</sup>	30	30	38	30
Commercial office	2,127	GFA (m <sup>2</sup> )	N/A	-	-	34	26
Supermarket	1,157	GLFA (m <sup>2</sup> )	14.7 per 100m2	170	136	56	144
Retail	1,477	GLFA (m <sup>2</sup> )	10.7 per 100m2	158	126	71	54
Child Care	30	No. of Children	N/A	-	-	24	21
<b>Total</b>					<b>292</b>	<b>223</b>	<b>275</b>

The data shows weekday traffic has clearly defined AM and PM peaks, whereas the weekend peak is more spread throughout the day. The peak weekend traffic occurs between 1:00 PM and 2:00 PM and is marginally smaller in magnitude than the evening peak weekday traffic. In addition to the lower existing volumes, the commercial offices and child care will generate minimal traffic during the weekend. The retail land use will, however, generate over double the number of trips. Overall trip generation for the weekend forecasts an additional 17 trips to be generated in the Saturday peak when compared against the mid-week evening peak period. Even with slightly greater generation rates, it is still anticipated that fewer vehicles will be on the surrounding road network during the Saturday peak than the midweek evening peak.

High-level SIDRA modelling was undertaken to test the impact of not implanting right turn ban at the Peats Ferry Road/Dural Street intersection during the weekend peak. In-leu of data, the 2031 PM model was used as a proxy for Saturday. As the entrance to the development is located on Dural Street, traffic from the north has been distributed from the Peats Ferry Road/William Street intersection to the Peats Ferry Road/Dural Street intersection. As a result, there is a slight increase in the delays experienced by southbound traffic on Dural

<sup>1</sup> No weekend residential trip generation rates are listed in RTA Guide to Traffic Generating Developments, thus residential trip generation rates have been calculated by applying a conversion factor calculated from a Technical Direction (TDT 13/04a) publish to support the 'Guide to Traffic Generating Developments' to the evening generation rates.

Street, however, it continues to operate at the same LoS. In general, there is no great impedance for the right movement into Dural Street as heavy congestion at the downstream Peats Ferry Road/William Street intersection reduces the arrival flow of northbound traffic. Furthermore, the redistribution of traffic away from the Peats Ferry Road/William Street intersection results in an improvement to the performance of the intersection with a decrease in DoS, queues and delays. To ensure efficiency at the Peats Ferry Road/Dural Street intersection, it is recommended a 'keep clear' zone be implemented to prevent blockage of in and out movements due to queues at the southern approach to the Peats Ferry Road/Coronation Street intersection.

The RMS guide to generating traffic developments stipulates a lower target LoS for weekend traffic as it "occurs less frequently and therefore a lower level of service can be tolerated". Thus, the impact due to additional traffic from the development will not cause significant distribution to the road network during the Saturday peak period.

#### 4.7 Dural Street and Peats Ferry Road Intersection

The Hornsby DCP and consultation with Council has led to consideration of the capacity for vehicles to turn right from Dural Street into Peats Ferry Road with council forecasting that most southbound traffic would redistribute to use the signalised intersection at William Street. The traffic distribution for this study is based on the origin/destination matrices provided in the Hornsby West Side Traffic Study (2013) report provided by Hornsby Shire Council. This has approximately 50% of southbound traffic from the development turning right at Dural Street and 50% of traffic turning right from William Street to Peats Ferry Road.

Sensitivity testing was undertaken on the Dural Street/Peats Ferry Road intersection to test its capacity, this assumed no vehicles will redistribute to the Williams Street/Peats Ferry Road intersection and that 100% of southbound vehicles will turn right out of Dural Street. The results are displayed in Table 4.12.

**Table 4.12 : Dural Street Sensitivity Testing**

Peak Period	Turning Direction	Future Do Minimum with Development		Sensitivity Test	
		95th Percentile Queue (M)	Average Delay (Sec)	95th Percentile Queue	Average Delay (Sec)
AM Peak	Left	7	7	9	7
	Right	7	14	9	15
PM Peak	Left	20	13	27	17
	Right	20	22	27	26

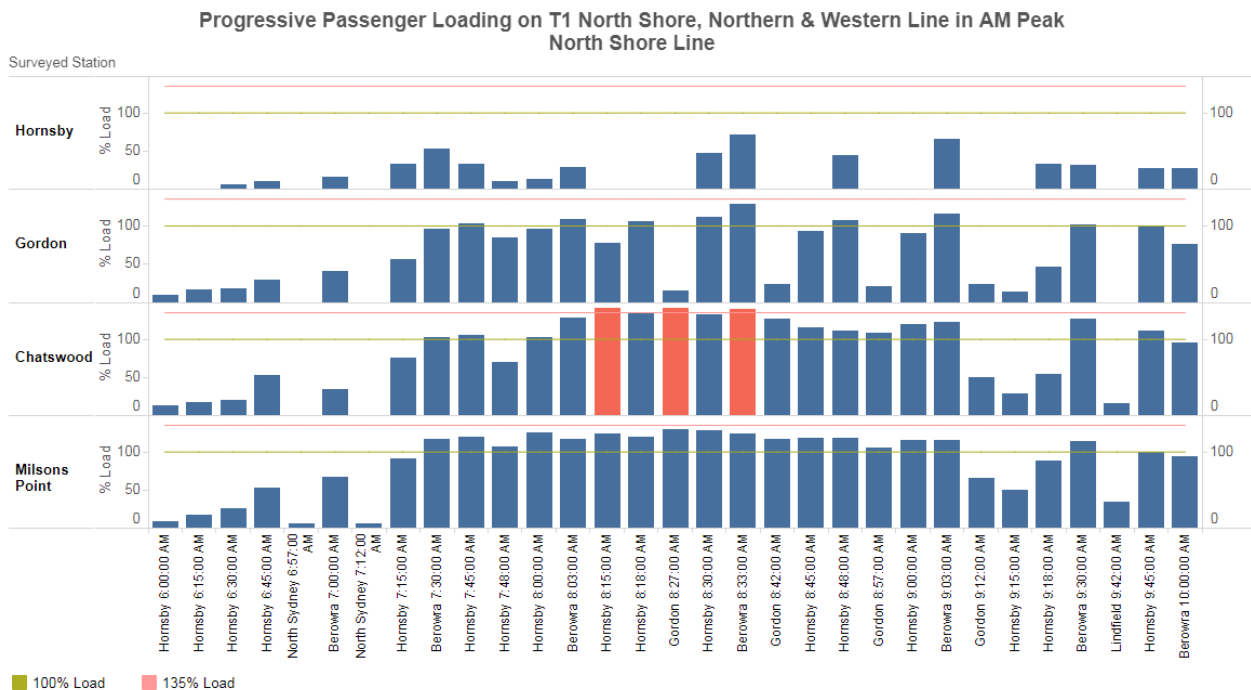
These results indicate the performance of Dural Street is adequate with the assumed distribution, as there is not significant queueing or delays. Furthermore, under sensitivity analysis, the intersection still performs with a LoS B and does not display any significant queues.

#### 4.8 Public Transport Impact

The proposed development has excellent access to public transport as it is within 200m walking distance from Hornsby Station and bus interchange. Hornsby Station has services that use the T1 north shoreline both via Epping and Gordon.

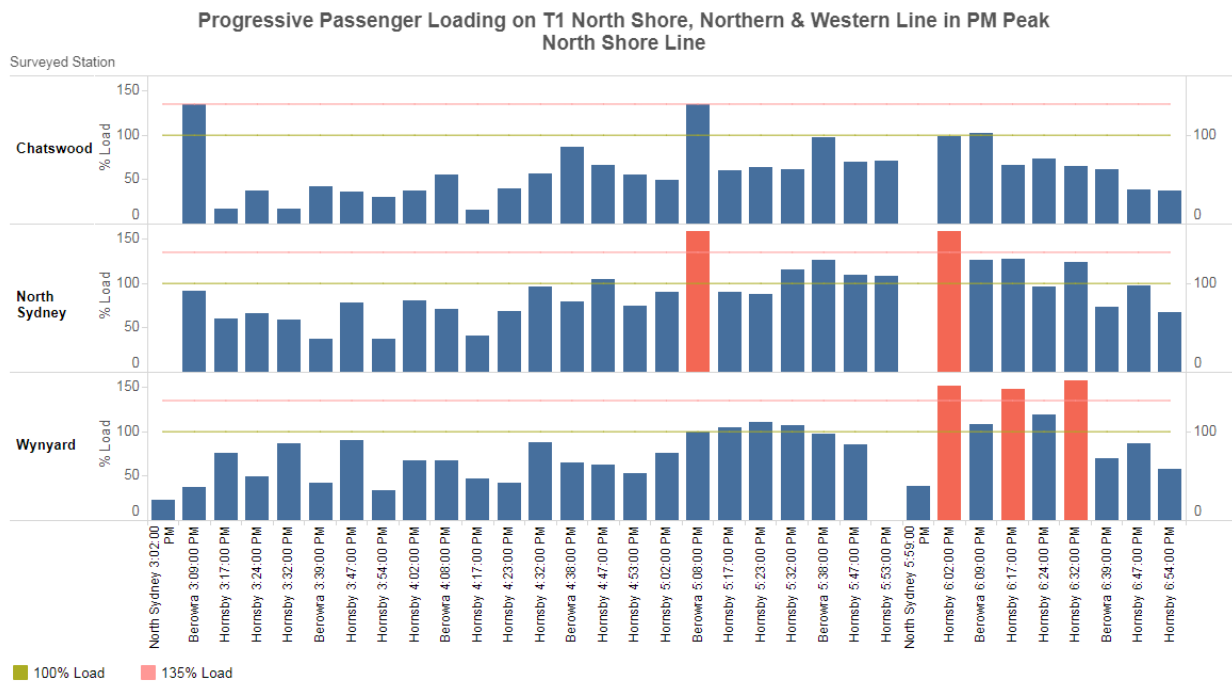
Surveys of passenger loading published by Sydney Trains is provided in Figure 4.11 and Figure 4.12.

Figure 4.11 : Morning Peak Passenger Loading



Source: Sydney Trains Passenger Loading Surveys 2016

Figure 4.12 : Evening Peak Passenger Loading



Source: Sydney Trains Passenger Loading Surveys 2016

The data shows that most trains leaving Hornsby in the morning peak toward the Sydney CBD have plenty of capacity. Some trains that leave Hornsby in the period from 8:00am – 8:30am are at capacity by the time they reach Chatswood. Trains returning in the afternoon are generally under capacity with peaks occurring after 6:00pm.

## **4.9 Active Transport Impact**

The proposed development would generate pedestrian trips between the site and public transport. The existing pedestrian paths and signalised crossings provide connections. This increase in pedestrian traffic would also provide a benefit for local businesses.

The proposed development would also generate some bicycle trips, which could be served by the existing bicycle route along Peats Ferry Road, as well as other local roads to access the subject site.

In particular, the existing 40 km/h speed limit HPAA (as shown in Figure 2.1) centred with Peats Ferry Road and Hornsby Railway Station offers an excellent environment for active transport. Within this speed-regulated area, Peats Ferry Road and other roads provide active transport users with sufficient facilities such as cycle routes, continuous footpaths and crossings, which would accommodate the new demand of the proposed development.



## **4.10 Travel demand management**

Travel demand management seeks to identify strategies and policies to manage vehicle trips generated by the development. The transport assessment has identified that road network is currently close to capacity, but the site has excellent access to public transport which makes public transport very an attractive mode choice over private vehicles for many trips including for commuting.

The subject site is within 200m of a major train station and a bus interchange and therefore has a higher mode share to public transport. The journey to work mode share for Hornsby (suburb) is 37.5% car driver compared to the Sydney average of 53% based on the 2016 census data. Closer to the station and the town centre, the public transport model share would invariably be significantly higher as residents would be able to undertake many of their daily activities by walking, bus or rail. It is, therefore, reasonable to expect that the proposed development will have a low car mode share even without intervention.

Travel demand management measures typically include a number of tools some of which may be suitable for implementation at this development. These measures are discussed below and include initiatives from the provision of infrastructure to providing public transport information to employees and residents.

### **4.10.1 Trip containment**

Trip containment is the reduction of trips through providing services within the development reducing the need for people to travel. The mixed-use development is conducive to trip containment as the supermarket allows residents to do their shopping within the same building. The supermarket is expected to service mostly local residents as Westfield shopping centre would cater for people intending to do their major shopping.

The major Westfield shopping centre is within 300m walk of the site reducing the need to drive to a shopping centre.

### **4.10.2 Active transport**

The site will provide more bicycle storage than required by the DCP and shower facilities for employees to use as end of trip facilities.

### **4.10.3 Travel behaviour change and public transport**

Travel behaviour of residents is often developed in the first weeks of moving into a development. Therefore, building management can take steps to encourage public transport use within the first week of people moving into the building. This may include:

- Display of map in a prominent location with information on the location of train stations, bus stops and walking routes to key destination.
- Providing \$100 opal cards to new residents to encourage them to try public transport within the first weeks of moving in.

### **4.10.4 Provision of car share**

The aim is to reduce the reliance on owning a vehicle by providing car share in the car park of the development. This can be accomplished by providing two car-share spaces within the basement car park and making it available to the public. This offers residents the flexibility of not needing to own a car.

### **4.10.5 Green travel plans**

It is recommended that building management develop and adopt a Green Travel Plan. The Green Travel Plan should identify key performance measures, targets and initiatives to meet those targets.

## 5. Conclusion

Jacobs has been commissioned to undertake a traffic and transport impact assessment for the proposed mixed land use development at 187 to 203 Peats Ferry Road, Hornsby. The proposed development features:

- Two buildings with a total of 200 dwelling units with 61 one-bedroom units, 118 two-bedroom units and 21 three-bedroom units.
- Retail land use: 1,157m<sup>2</sup> for a supermarket and 1,477m<sup>2</sup> ground-level retail space,
- Commercial office land use: 2,127 m<sup>2</sup>.
- Childcare: 368m<sup>2</sup> for a child care centre with a maximum of 30 children;
- A total of 316 car parking spaces provided on four levels, with levels B1 and B2 for retail parking and the remaining levels B3-B4 for residential parking. Of the 326 parking spaces, 162 car parking spaces are for residents including 22 for people with a disability, and 150 spaces for retail, childcare centre and commercial including 12 spaces for people with a disability and 2 car shared spaces
- 12 service vehicle parking spaces are also provided. In addition, 120 bicycle parking spaces and 20 motorcycle parking spaces are also provided.
- A loading area for two trucks including a 12.5m medium rigid and an 8.8m medium rigid garbage truck will be provided that features a turntable.

The key findings of the study were:

- The proposed car parking provision complies with the Hornsby Shire Council Development Control Plan. The internal one-way car parking circulation would provide for good traffic flow. The proposed heavy vehicle entrance provides an additional splay and meets the requirements of Australian Standard 2890.2.
- A right-in, right-out access arrangement is proposed for trucks entering and exiting the development and requires the removal of some parking spaces on the southern side of Dural Street.
- Due to the narrow width of Dural Street between the development and Frederick Street, installation of “No Stopping” signs to accommodate vehicle movements to and from the development would result in the loss of up to 10 on-street parking spaces outside of the existing hours when parking is available. These lost parking spaces could be accommodated on other local roads nearby.
- Mirrors, signage and flashing lights should be installed at the access driveways to reduce potential conflicts between pedestrians and vehicles and improve overall safety.
- A northbound left turn and southbound right turn from Peats Ferry Road to Dural Street can be undertaken by HRV's with a minor encroachment on the adjoining lane of traffic on Dural Street. A minor adjustment to the curb on the southern corner of Dural Street and Peats Ferry Road will facilitate no encroachment of the HRV on other traffic lanes.
- The estimated vehicle trips generated would be 222 during the morning peak period with 114 outbound trips and 109 inbound trips, and 275 during the afternoon peak period with 136 outbound trips and 139 inbound trips.
- The background traffic forecast is assumed not to increase in the future due to the constrained nature of the surrounding road network and an analysis of historical trends. Despite this, two scenarios with an additional 2% increase rate per annum to 2031 has been assessed as required by Hornsby Shire Council.
- The distribution of the generated traffic of the proposed development has been based on the origin and destination forecast provided by the Hornsby West Side Traffic Study (Bitzios Consulting, 2013).
- Traffic modelling a Sidra network model was undertaken at 10 key intersections including:
  - Peats Ferry Road and Coronation Street
  - Peats Ferry Road and Dural Street
  - Peats Ferry Road and Dural Lane
  - Peats Ferry Road and Station Street

- Peats Ferry Road and William Street
- Peats Ferry Road and High Street
- Peats Ferry Road and George Street
- Peats Ferry Road and Edgeworth David Avenue
- Dural Street and Frederick Street
- Frederick Street and William Street
- Currently, two intersections operate at LoS F and/ or DoS >1. These are:
  - Peats Ferry Road / George Street during the evening peak period
  - Pacific Highway / Edgeworth David Avenue during the evening peak period
- For the 'do minimum' modelling, Dural Lane and Station Street are closed, an additional leading right turn phase has been implemented on the eastbound approach of the Peats Ferry Road / William Street intersection, and the cycle time for all signalised intersections has been set to 120 seconds during the morning peak and 140 seconds during the evening peak.
- Based on the comparison between existing and scenarios with development with 'do minimum', the traffic generated by the proposed development would impact the local road network as follows:
  - The majority of intersections would perform at a similar or improved LoS
  - The Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue intersections during the evening peak period would continue to perform at a poor LoS with the do minimum upgrades and development traffic
  - Some intersections are approaching or at capacity and include Peats Ferry Road / William Street, Peats Ferry Road / George Street and Pacific Highway / Edgeworth David Avenue. The Peats Ferry Road / William Street intersection is forecast to operate at capacity without development traffic. Therefore, this intersection is sensitive to small changes in traffic volumes, and the addition of development traffic would result in the intersection deteriorating from LoS B to LoS F.
- The peak weekend traffic occurs between 1:00 PM and 2:00 PM and is marginally smaller in magnitude than the peak weekday traffic. High level modelling indicates the road network during the weekend is expected to perform equal to, or slightly better than weekday peak periods.
- The proposed development is located within the Hornsby West Side HPAA which has a 40 km/h speed limits, sufficient kerbside parking, dense intersections and high demand of pedestrians due to adjoining the public transport hub. All of these make it hard to completely remove the LoS F for the intersections of Peats Ferry Road and William Street, and Pacific Highway and Edgeworth David Avenue at present and in the future.
- The proposed development would produce negligible impacts on public transport and active transport system, that currently provides excellent service for the site. The assumed 2% increase in background traffic is higher than the capacity of the road network and is unlikely to occur unless significant regional increases in road capacity are created.

## **Appendix A. Sidra Intersection Analysis**



## ANNEXURE C: COMPARISON OF SIDRA VOLUMES EXAMPLE (Sheet 1 of 2)

### MOVEMENT SUMMARY

 **Site: 1 [Future - Coronation St / Peats Ferry Road  
PM\_without\_Dev\_DoMin]**

 **Network: N101  
[PM]**

Coronation St / Peats Ferry Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: Peats Ferry Road														
1	L2	26	0.0	26	0.0	0.571	8.4	LOS A	11.0	78.3	0.36	0.34	0.36	36.5
2	T1	708	2.5	691	2.5	0.571	5.0	LOS A	11.0	78.3	0.36	0.34	0.36	36.3
3	R2	139	15.9	135	15.9	0.205	9.1	LOS A	2.1	16.9	0.43	0.62	0.43	34.0
Approach		874	4.6	852 <sup>N1</sup>	4.6	0.571	5.8	LOS A	11.0	78.3	0.37	0.39	0.37	35.9
East: Coronation St														
4	L2	186	0.6	186	0.6	0.421	41.8	LOS C	9.5	67.1	0.80	0.76	0.80	21.1
5	T1	1	0.0	1	0.0	0.912	86.3	LOS F	5.8	40.4	1.00	1.07	1.59	20.2
6	R2	73	0.0	73	0.0	0.912	89.6	LOS F	5.8	40.4	1.00	1.07	1.59	20.3
Approach		260	0.4	260	0.4	0.912	55.3	LOS D	9.5	67.1	0.86	0.85	1.03	20.7
North: Peats Ferry Road														
7	L2	134	7.1	134	7.1	0.145	20.6	LOS B	4.5	33.3	0.53	0.65	0.53	32.7
8	T1	384	1.4	384	1.4	0.454	17.6	LOS B	14.1	99.5	0.59	0.52	0.59	29.0
9	R2	20	0.0	20	0.0	0.055	18.2	LOS B	0.6	4.3	0.47	0.60	0.47	33.5
Approach		538	2.7	538	2.7	0.454	18.4	LOS B	14.1	99.5	0.57	0.55	0.57	30.6
West: Aquatic Centre														
10	L2	34	0.0	34	0.0	0.184	67.0	LOS E	2.2	15.1	0.95	0.72	0.95	23.1
11	T1	2	0.0	2	0.0	0.389	72.8	LOS F	2.5	17.5	1.00	0.73	1.00	21.8
12	R2	34	0.0	34	0.0	0.389	76.3	LOS F	2.5	17.5	1.00	0.73	1.00	15.1
Approach		69	0.0	69	0.0	0.389	71.7	LOS F	2.5	17.5	0.98	0.73	0.98	19.7
All Vehicles		1741	3.2	1719 <sup>N1</sup>	3.2	0.912	19.9	LOS B	14.1	99.5	0.53	0.52	0.56	29.5

Current SIDRA Result for JTP Report Dated March 2020

## ANNEXURE C: COMPARISON OF SIDRA VOLUMES EXAMPLE

(Sheet 2 of 2)

### MOVEMENT SUMMARY

 **Site: 1 [Future - Coronation St / Peats Ferry Road  
PM\_without\_Dev\_DoMin]**

 **Network: N101  
[PM]**

Coronation St / Peats Ferry Road

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Peats Ferry Road														
1	L2	26	0.0	22	0.0	0.582	16.1	LOS B	11.0	78.3	0.65	0.60	0.65	32.1
2	T1	769	2.3	651	2.2	0.582	12.7	LOS A	11.0	78.3	0.65	0.60	0.65	31.9
3	R2	145	15.2	122	14.2	0.249	13.9	LOS A	3.2	24.8	0.63	0.68	0.63	31.5
Approach		941	4.3	794 <sup>N1</sup>	3.9	0.582	13.0	LOS A	11.0	78.3	0.64	0.61	0.64	31.9
East: Coronation St														
4	L2	202	0.5	202	0.5	0.903	72.3	LOS F	14.4	101.6	0.84	0.99	1.24	15.6
5	T1	2	0.0	2	0.0	0.931	90.6	LOS F	6.7	46.8	0.94	1.12	1.61	19.8
6	R2	81	0.0	81	0.0	0.931	93.9	LOS F	6.7	46.8	0.94	1.12	1.61	19.9
Approach		285	0.4	285	0.4	0.931	78.6	LOS F	14.4	101.6	0.87	1.03	1.35	17.3
North: Peats Ferry Road														
7	L2	140	6.8	140	6.8	0.144	18.6	LOS B	4.4	32.8	0.50	0.64	0.50	33.3
8	T1	441	1.2	441	1.2	0.900	43.1	LOS D	24.2	171.2	0.57	0.69	0.81	20.7
9	R2	20	0.0	20	0.0	0.057	21.7	LOS B	0.7	4.8	0.52	0.62	0.52	32.4
Approach		601	2.5	601	2.5	0.900	36.7	LOS C	24.2	171.2	0.55	0.68	0.73	24.6
West: Aquatic Centre														
10	L2	34	0.0	34	0.0	0.112	57.1	LOS E	2.0	13.7	0.89	0.71	0.89	24.7
11	T1	2	0.0	2	0.0	0.414	62.4	LOS E	2.3	16.0	0.94	0.72	0.94	23.3
12	R2	34	0.0	34	0.0	0.414	65.8	LOS E	2.3	16.0	0.94	0.72	0.94	16.5
Approach		69	0.0	69	0.0	0.414	61.5	LOS E	2.3	16.0	0.92	0.72	0.92	21.2
All Vehicles		1897	2.9	1750 <sup>N1</sup>	3.2	0.931	33.7	LOS C	24.2	171.2	0.66	0.71	0.80	24.9

SIDRA Results as provided within the JTP Report Dated December 2019

There is a difference of 156 vehicle trips that are not accounted in the current model from the previous model. It is expected that the volumes would not have changed considering no development traffic has been added.