

TTM Consulting (Vic) Pty Ltd



PROPOSED MIXED USE DEVELOPMENT 602-630 DONCASTER ROAD, DONCASTER TRAFFIC IMPACT ASSESSMENT

Prepared By

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1. INTRODUCTION AND SCOPE

TTM Consulting (Vic) Pty. Ltd. has been engaged by ITN Architects Pty. Ltd. to provide a traffic impact assessment for a proposed mixed use development at 602-630 Doncaster Road, Doncaster.

This report addresses the traffic implications of the proposal, including the suitability of the on-site parking provision, the accessibility to and throughout the site, and the proposed connections to the street network and impacts on traffic conditions in the area.

The report concludes that the proposal provides an adequate design in the context of the surrounding environment, and that there are no traffic or parking grounds that should warrant refusal of the sought Planning Permit.

2. THE EXISTING SITE

2.1 Location and Land Use Context

The subject site is located at 602-630 Doncaster Road, on the south-eastern corner of the Doncaster Road - Tram Road intersection. The site is surrounded by a mix of commercial and residential land uses and is located within 'Precinct 2' of the Doncaster Hill Principal Activity Centre.

Figure 1 shows the location of the site and the surrounding street network.



FIGURE 1 : SITE LOCALITY PLAN

2.2 The Subject Site

The subject site has an area of 8,395 square metres. The site has approximately 82 metres frontage to Doncaster Road along its northern boundary and approximately 106 metres frontage to Tram Road along its western boundary. A left-turn slip lane forms the north-western corner of the site.

The following aerial photograph shows the subject site in respect of the surrounding environs and road network.



SUBJECT SITE AND SURROUNDING ENVIRONMENT

2.3 Current Use of the Site

The site currently accommodates a single-storey commercial building of approximately 3,030 square metres and provides 129 on-site parking spaces in an at-grade car park. The current tenants of the building are 'Officeworks' and 'Autobarn'

2.4 The Street Network

Doncaster Road is a VicRoads declared primary state arterial road.

At the location of the subject site, the eastbound side of the carriageway comprises three (3) thru lanes and a left turning lane for access to the Westfield Shopping Centre loading area.

The westbound side of the carriageway comprises three (3) thru lanes and two (2) right turn lanes. A left-turn slip lane is provided for vehicles turning south onto Tram Road.

A median of approximately 2 metres width separates the opposing traffic flows.

The following photographs show the typical configuration of Doncaster Road along the northern frontage of the subject site.



LOOKING WEST



LOOKING EAST

DONCASTER ROAD CONFIGURATION

Tram Road is a VicRoads declared secondary state arterial road.

At the location of the subject site, the southbound side of the carriageway comprises three (3) lanes which merge into two (2) lanes along the site frontage.

The northbound side of the carriageway comprises three (3) thru lanes, a bus lane, and two (2) right turn lanes. A left-turn slip lane is provided for vehicles turning west on to Doncaster Road.

The following photographs show the typical configuration of Tram Road along the western frontage of the subject site.



LOOKING NORTH



LOOKING SOUTH

TRAM ROAD CONFIGURATION

2.5 Site Access

2.5.1 Doncaster Road Access

Vehicle access from Doncaster Road is provided via an approximately 13 metres wide crossover located in front of the neighbouring property at 632-640 Doncaster Road. The crossover connects to an access roadway which enters the subject site via the eastern boundary. The crossover provides left-in 'entry only' access.

The following photographs show the existing Doncaster Road access arrangement.



AERIAL VIEW



VIEW FROM STREET

DONCASTER ROAD ACCESS

2.5.2 Tram Road Access

Vehicle access from Tram Road is provided via an approximately 13 metres wide crossover located at the southern site boundary. The crossover provides for 'left in, left out' vehicle movements only.

The following photograph shows the site access from Tram Road.



SITE ACCESS FROM TRAM ROAD

2.6 Existing Public Transport and Facilities Proximate to the Site

Buses provide the only form of public transport within close proximity of the site.

A bus stop is located along the Doncaster Road site frontage which services two (2) bus routes, providing connections between the City, Mitcham and Donvale.

The Westfield Bus Interchange is located approximately 500 metres from the subject site on Williamsons Road. The interchange services twenty (20) bus routes which provide links to the city and throughout the north eastern suburbs.

The Westfield Shopping Centre is located approximately 50 metres from the site. The Centre comprises supermarkets, chemists, specialty stores, banks, cinemas and a post office.

3. THE PROPOSAL

3.1 The Proposed Development

A development plan for the proposal has been prepared by ITN Architects Pty. Ltd, which indicates the following inventory of uses on the site : -

Use	Inventory
Restricted Retail Tenancies (4 no.)	8,809 sqm
Restaurants (6 no.)	567 sqm (approx 200 seats)
Dwellings	
-1 bedroom	110 no.
-2 bedroom	172 no.
-3 bedroom	8 no.
Function Rooms (4 no.)	1,469 sqm
On-Site Parking Spaces	568 no.
On-Site Bicycle Spaces	132 no.
On-Site Motorcycle Space	6 no.

The Applicant has proposed an on-site parking provision of 568 spaces, comprising :-

- A 558 space multi-level car park spread across the two basement levels and the lower ground level. Sixteen (16) of these spaces are in a tandem arrangement. Vehicle access between the car parking levels is proposed via the construction of several vehicle ramps.
- Seven (7) at-grade spaces located in the north-eastern corner of the site.
- Three (3) at-grade spaces located near the western pedestrian entrance to the building.

Vehicular access to the site is proposed via three (3) connections to the road network as follows :-

- The existing Tram Road crossover at the southern boundary of the site will be widened to 14.2 metres. The crossover will provide 'left in, left out' access to the multi-level car park and serve as the point of egress for larger delivery/collection vehicles.
- The existing Doncaster Road access arrangement will be relocated west from the frontage of 632-640 Doncaster Road to be better aligned with the subject land. The access will provide 'left in, left out' vehicular access for cars and smaller delivery / collection vehicles to the loading areas. The access will also serve as the point of entry for larger delivery vehicles which will make their way around the site and exit onto Tram Road.
- A 3.5 metres wide single lane connection to Tram Road to be constructed approximately 48 metres north of the southern site boundary. The crossover will be fully managed and serve as an after hours 'exit only' when the Function Centre is in use.

Two (2) loading bays are proposed at the eastern boundary of the site. One loading bay will be for the exclusive use of 'Retail Tenancy C', whilst the other bay will service the remainder of the uses on the site.

A copy of the development plans for the ground and basement levels is attached in Appendix A.

3.2 Proposed Allocation of On-Site Parking Spaces

The on-site parking supply is proposed to be allocated as follows :-

Use	No. of Parking Spaces
Restricted Retail Tenancies, Restaurants & Resident Visitors	380
Dwellings	
-1 bedroom	0
-2 bedroom (1 space per dwelling)	172
-3 bedroom (2 spaces per dwelling)	16
Total	568

The proposed allocation of parking spaces will result in 110 one-bedroom apartments not having access to an on-site parking space.

4. PARKING DEMANDS, REQUIREMENTS AND LIKELY IMPACT

4.1 Doncaster Hill Parking Precinct Plan

The subject site is located within 'Precinct 2' of the Doncaster Hill Principal Activity Centre and is therefore subject to the parking provisions of the 'Doncaster Hill Parking Precinct Plan'.

The Doncaster Parking Precinct Plan proposes on-site parking at the following rates :-

USE	CAR SPACE MEASURE	RATE
Office	Car spaces to each 100 sq m of gross leasable floor area	2.5
Dwelling	Car spaces to each 1 bedroom dwelling	1.1
	Car spaces to each 2 bedroom dwelling	1.1
	Car spaces to each 3 or more bedroom dwelling	2.1
Restaurant	Car spaces to each seat available to the public	0.36
Shop, other than Supermarket, Department Store and Restricted Retail Premises	Car spaces to each 100 sq m of gross leasable floor area	4
Restricted Retail Premises	Car spaces to each 100 sq m of gross leasable floor area	1.5

(iii) Car parking requirements for developments with a land use of "dwelling" have been provided at rates similar to ResCode parking rates adjusted to include visitor car parking requirements which were adopted in the Doncaster Hill Parking Study. These rates are detailed in Table 3.

The following requirements for the breakdown of resident and visitor parking should be met when providing car parking for a "dwelling" land use:

- One long term resident space for each 1 and 2 bedroom dwelling;
- Two long term resident spaces for each 3 or more bedroom dwelling;
- 0.1 spaces per dwelling should be provided for visitor parking; and
- Visitor parking should be clearly marked and accessible at all times

FIGURE 2 : DONCASTER HILL PARKING RATES

4.2 On-Site Parking Requirement

4.2.1 Residential Parking Requirement

The residential parking requirement as per the Doncaster Hill Precinct Plan is as follows :-

Dwelling	No.	Rate	Parking Spaces
1 Bedroom	110	1.0 space per dwelling	110
2 Bedroom	172	1.0 space per dwelling	172
3 Bedroom	8	2.0 spaces per dwelling	16
Visitor		1.0 space per 10 dwellings	29
Total	290		327

The residential parking requirement is 327 spaces.

4.2.2 Commercial Parking Requirement

The commercial parking requirement as per the Doncaster Hill Precinct Plan is as follows :

Use	No.	Rate	Parking Spaces
Restricted Retail	8,809 sqm	1.5 spaces to each 100 sqm of gross leasable floor area	133
Restaurants	567 sqm (approx 200 seats)	0.36 car spaces to each seat available to the public	72
Total			205

The commercial parking requirement is 205 spaces.

4.2.3 Function Rooms

The parking requirement for the function rooms is based upon the Clause 52.06 provision for a 'Place of Assembly'.

Use	No.	Rate	Parking Spaces
Place of Assembly	1,502 sqm	0.3 spaces to each seat or to each sqm of net floor area, whichever is greater	451
Total			451

The function room parking requirement is 451 spaces.

4.2.4 Combined Parking Requirement

The combined Planning Scheme parking requirement for the development is 983 spaces. The Applicant has allowed provision of 568 parking spaces and therefore seeks a reduction against the requirements of the Manningham Planning Scheme.

The Planning Scheme allows the following 'decision guidelines' to be taken into account when determining an appropriate car parking rate.

- Any relevant parking precinct plan.
- The availability of car parking in the locality.
- The availability of public transport in the locality.
- Any reduction in car parking demand due to the sharing of car spaces by multiple uses, either because of variation of car parking demand over time or because of efficiencies gained from the consolidation of shared car parking spaces.
- Any car parking deficiency or surplus associated with the existing use of the land.
- Any credit, which should be allowed for a car parking demand deemed to have been provided in association with a use which existed before the change of parking requirement.
- Local traffic management.

- Local amenity including pedestrian amenity.
- An empirical assessment of car parking demand.
- Any other relevant consideration.

4.3 Likely Residential Parking Demand

4.3.1 An Empirical Assessment of Resident Parking Demand

Car ownership data has been obtained from the Australian Bureau of Statistics for the Doncaster postcode, 3108. The data is from the 2006 Census and car ownership is as follows :-

**Australian Bureau of Statistics
2006 Census of Population and Housing
Postal Area (POA) - 3108
Dwelling Structure (STRD) - Apartment**

Number of Bedrooms in Private Dwelling (BEDD)	Number of Motor Vehicles (VEHD)							Car Ownership
	0	1	2	3	4	5	Total	
1 bedroom	20	27	0	0	0	0	47	0.57
2 bedrooms	54	225	69	9	4	0	361	1.12
3 bedrooms	21	118	113	15	3	0	270	1.49
4 bedrooms	0	10	23	3	3	0	39	1.97

Based on the car ownership census data for Doncaster this development can be expected to generate the following resident parking demand :-

	1 bedroom	2 bedroom	3 bedroom	Total
No. of Apartments	110	172	8	290
ABS Car Ownership	0.57	1.12	1.49	
Parking Demand	62.7	192.64	11.92	268

The ABS Data suggests that there is a reduced level of car ownership in the Doncaster postcode than is outlined by the Planning Scheme and the Doncaster Hill Precinct Plan.

If the development has a similar parking ratio to apartments within the Doncaster postcode, the residential parking demand can be expected to be in the order of 268 parking spaces, or 0.92 spaces per apartment.

The Applicant has proposed allocation of 188 on-site parking spaces to residents, or 0.65 spaces per apartment.

4.3.2 Impact of Residential Parking Reduction

For this proposal, the on-site resident parking provision will likely set the upper limit of demand as the existing parking controls in the area limit opportunities to park near to the site on a long term basis.

Furthermore, the on-site parking spaces assigned for resident visitor and commercial use will have a parking control / pricing system in place, which will prevent the use of these spaces for long-term resident parking demands.

Other issues that support a reduction in on-site resident parking include :-

- A purchaser/tenant will be buying/leasing a property aware that they have no access to an on-site parking space, and that the surrounding parking controls make it impractical to own a vehicle and live in the area without a parking space.
- The location of the site within the Doncaster Hill Activity Centre will place residents within walking distance of supermarkets, shops, chemists, grocers, a post office and recreational facilities such as cinemas. Such facilities generate household vehicle trips on a regular basis and can support residents living in the area without a motor vehicle.
- A key land use objective of the Doncaster Hill Activity Zone is to provide for high density residential development on individual sites, in conjunction with a diversity of other (mixed) uses. In the subject case, providing on-site parking for residents as set out in the Planning Scheme would reduce the provision of mixed uses or associated parking on the site.

4.4 Likely Commercial Parking Demand

4.4.1 Likely Retail Parking Demand

The 'Doncaster Hill Parking Precinct Plan' outlines a restricted retail parking requirement of 1.5 spaces per 100 square metres, for which the subject proposal generates a parking requirement of 133 spaces.

TTM Consulting (Vic) Pty. Ltd. considers the precinct plan an accurate assessment of parking demands generated by restricted retail use, which is typically lower on a floor area basis than traditional retail parking demands.

4.4.2 Likely Restaurant Parking Demand – Empirical Assessment

La Luna Restaurant – Carlton North

TTM Consulting (Vic) Pty. Ltd. undertook mode of travel surveys at La Luna restaurant in Rathdowne Street Carlton North, on Friday 18th August and Saturday 19th August 2006, to determine the parking demand generated by a restaurant. The mode of travel survey included the parking demand generated by both staff and customers. The following table summarises the mode of travel survey :-

Mode of Travel	No. of Records		
	Friday 18 th August Lunchtime	Friday 18 th August Evening	Saturday 19 th August Evening
Car as Driver	17	11	19
Car as Passenger	10	12	30
Dropped Off	0	2	37
Walk	7	7	11
Tram/Bus	0	0	1
Other	0	0	0
Parking spaces per person	0.50	0.34	0.19
Parking spaces per seat	0.15	0.10	0.17

At the time of the survey, La Luna was operating with 115 internal seats that comprised 70 seats in the main restaurant and 45 seats upstairs in small function rooms. The parking demand generated by the existing restaurant was around 0.2 spaces per person when the restaurant is close to full occupancy on Saturday evening. Whilst Friday lunchtime and evening generate a higher parking demand per person in attendance, the restaurant had occupancy of only 50% at these times and thus parking demand per seat was very similar to a Saturday evening.

Based upon the above mode of travel survey, it is expected that the proposed restaurants, when fully occupied, will generate a parking demand at a rate of around 0.17 parking spaces per seat.

On the basis that 200 proposed restaurant seats are fully occupied, peak parking demand generated by the restaurants is estimated at around 34 spaces.

This is considered a fairly conservative estimation as a large proportion of restaurant custom is likely to come from employees and customers of the nearby commercial outlets and residents of the adjoining residential areas.

4.5 Likely Resident Visitor Parking Demand and Impact of Reduction

The Doncaster Hill Precinct Plan outlines a resident visitor parking requirement of one (1) space to every ten dwellings, which for the subject proposal generates a requirement of twenty-nine (29) spaces.

Demand for resident visitor parking is expected to peak in the evenings and on weekends. During these times, the adjoining businesses in the development may be closed or operating on extended trading hours and therefore generating little parking demand.

It is envisaged that resident visitors will be able to utilise the shared on-site parking facilities during these times without causing any loss of convenience to the surrounding land uses.

The use of spaces to accommodate the shared demands of resident visitors and retail customers is appropriate.

4.6 Function Rooms

The Planning Scheme parking requirement rate of 0.3 spaces per seat/sqm generates a requirement of 451 parking spaces when based upon floor area.

However, the more appropriate method is based upon the number of people present rather than the floor area of the facility, as it is the number of people present that generate the demand for parking. Therefore, the actual parking demand generated will likely be reduced once further information is provided regarding the capacity of the function rooms.

Furthermore, it is unlikely that all four (4) function rooms will be occupied at the same time, thus the typical parking demands generated by the function rooms will typically be lower.

4.7 Likely Combined Parking Demand

The following table summarises the parking demands generated by each of the proposed uses on the site at various stages throughout a typical week. Resident parking demand is limited by the on-site parking provision and has been omitted from the table :-

Component	Likely Peak Parking Demand			
	Weekday Daytime	Weekday Evening	Saturday Daytime	Saturday Evening
Restricted Retail	133	67	133	0
Restaurants	17	34	25	34
Resident Visitors	15	29	15	15
Function Rooms	181	226	181	271
Total	346	356	354	320

The above table suggests the typical parking demands generated by the site will be accommodated within the shared on-site parking provision of 380 spaces.

A considerable amount of custom for the commercial uses on the site is expected to come from residents of the proposal and the adjoining development under construction. This will provide a large customer base within a walkable catchment and may reduce the demand for on-site parking.

4.8 Justification for a Reduction of On-Site Parking

Considering the “decision guidelines” a reduction of on site parking as required by the Planning Scheme is justified on the basis of the following :-

An empirical assessment of car parking demand

The ABS Census Data indicates that the proposed residential use will generate a parking demand in the order of 0.92 spaces per apartment, which is lower than the rates provided in the Planning Scheme and Doncaster Hill Precinct Plan.

A Mode of Travel survey undertaken at a suburban Melbourne restaurant revealed a parking demand of 0.17 spaces per seat when near to full capacity.

Availability of public transport in the locality

The site is well served by public transport with twenty (20) bus routes stopping within close proximity of the subject site, including two (2) routes that stop along the site frontage.

Any reduction in car parking demand due to the sharing of car spaces by multiple uses, either because of variation of car parking demand over time or because of efficiencies gained from the consolidation of shared car parking spaces

The temporal displacement of parking demands generated by resident visitors, restricted retail and restaurant customers will spread the peak parking demands throughout the day/week, resulting in the increased utilisation of the shared on-site parking spaces.

Local amenity including pedestrian amenity

A typical household will generate vehicle trips on a weekly basis to work, shopping facilities, recreation facilities and other destinations. All of these demand generators are within walking distance of the subject site.

Any other relevant consideration

Prospective Tenants/Owners

A prospective owner or tenant will be buying/renting an apartment aware that they do not have access to an on-site parking space and that the surrounding area will make it impractical/uneconomical to park within the shared parking provision on a long term basis.

Melbourne 2030

“Other relevant considerations” include objectives relating to intensification of use of Activity Centres designated in Melbourne 2030, and the public transport utilisation objectives of Melbourne 2030.

Given that an overall 10% increase in public transport use as against private vehicle use is a strong objective of Melbourne 2030, it would be reasonably expected that the percentage increase in locations well favoured by transport services and facilities would enjoy a significantly greater increase than 10%, if the strategy is successful. Forcing developments to provide parking at unconstrained demand rates, as set out in the Planning Scheme for the proposed use, will not provide any encouragement towards achievement of the Melbourne 2030 objectives.

5. PARKING AND ACCESS AREA DESIGN

5.1 Parking Area Design

The Applicant has proposed an on-site parking provision of 568 spaces.

558 spaces are located within the multi-deck car park. Each bay is 5.4 metres long by 2.63 metres wide and placed at 90 degrees to an aisle of minimum 6 metres width. These parking bay dimensions and aisle widths satisfy the criteria outlined in AS2890.1:2004 - Table 1.1 for user class 3, short term city parking, town centre parking and parking stations.

Sixteen (16) of these spaces are in a tandem arrangement. These spaces will be assigned to the three-bedroom dwellings thus the management of these spaces will be up to the individual household. It is also noted that several spaces within the multi-deck car park are located within blind aisles. These spaces will be allocated to residents of the development so short-term parkers will not need to enter these areas.

The remaining seven (7) spaces at the north-eastern corner of the site and three (3) spaces at the west of the site are each 5.4 metres long by 2.4 metres wide and accessed from an aisle of minimum 6.6 metres width. These parking bay dimensions and aisle widths exceed the criteria outlined in AS2890.1:2004 - Table 1.1 for user class 1A - residential, domestic and employee parking.

A further four (4) 'No Standing' spaces are proposed in a parallel arrangement around the roundabout at the western pedestrian entrance to the site. These spaces are 5.4 metres long by a minimum 2.1 metres wide, which satisfies the dimension criteria for 'end' parallel bays in AS2890.1:2004, Figure 2.5.

Several spaces have been checked using the turning template software AutoTrack v9.00, to confirm that adequate maneuvering space is available for a 'B85 vehicle' from AS2890.1:2004 to gain convenient access to each of the parking arrangements.

The swept path diagrams area attached in Appendix B and confirm that adequate maneuvering space is available.

5.2 Access Ramps

The multi-level car park is interconnected by vehicle ramps.

Longitudinal sections have been prepared for each of the vehicle ramps using AutoTrack v9.10. The sections are based upon the levels and ramp lengths indicated on the development plan and are attached in Appendix C.

The sections confirm that the ramps can be designed to provide adequate grade transitions and maintain 2.2 metres height clearance as per AS2890.1:2004, Section 5.3.

5.3 Proposed Site Access

5.3.1 Doncaster Road Access

The Applicant proposes to modify the existing access arrangement at the 632-640 Doncaster Road frontage and relocate it west so that it better aligned with the subject land.

The crossover will provide 'left in, left out' access to the site and will include a splitter island that separates traffic flows and assists pedestrians in crossing.

The access will service the following vehicle movements :-

- Entry and exit for vehicles accessing the multi-deck car park and at-grade parking spaces,
- Entry to the loading areas for all delivery / collection vehicles,
- Exit from the loading area for smaller delivery / collection vehicles.

Swept path diagrams have been prepared for the above turning movements using AutoTrack v9.10 and are attached in Appendix D. The kerb return radius on the western side of the access has been increased to 3 metres to assist vehicles in exiting the site.

Restricting movements at this access to left in and left out only will ensure that the modifications will have minimal impact on traffic conditions in the area.

5.3.2 Southern Tram Road Access

The Applicant proposes to widen the existing Tram Road crossover at the southern site boundary to 14.2 metres. The crossover will provide 'left in, left out' access to the site and will also include a splitter island that separates traffic flows and assists pedestrians in crossing.

The access will service the following movements :-

- Entry and exit for vehicles accessing the multi-level car park,
- Exit from the loading area for larger delivery / collection vehicles.

Swept path diagrams have been prepared for each of the above movements using the AutoTrack v9.00 software and are attached in Appendix E. Feature survey is required to confirm the layout of Tram Road, which has been shown on the diagrams in an approximate location. The diagrams indicate that subject to minor modification to the kerb on the south side of the crossover, all the above movements should be achievable.

The southern Tram Road access will provide a similar access arrangement as the existing arrangement, which is downstream of traffic signals and will have minimal impact on traffic conditions.

5.3.3 Northern Tram Road Access

The Applicant proposes a 3.5 metre wide single lane connection to Tram Road located approximately 48 metres north of the southern site boundary. The crossover will serve as an after hours 'exit only' for the multi-level car park when the Function Centre is in use.

The access will therefore service the following vehicle movements :-

- Exit for vehicles from the multi-level car park.

Attached in Appendix F is a swept path diagram which shows a vehicle pass around the roundabout at the access and exit on to Tram Road, confirming the layout is appropriate.

5.3.4 Tram Road Turning Treatment

A deceleration lane has been provided along the Tram Road frontage of the site to assist vehicles in exiting the traffic stream to access the multi-deck car park. The length of the deceleration lane is limited by the proximity of the Doncaster Road intersection, however still provides enough length to function effectively.

Formation of the left turn deceleration proposes to use some of the excessive pavement width at the throat of the intersection. Our observations on-site confirm that buses are given the jump on other traffic when passing thru the intersection making the departure side bus lane of little use.

The proposed deceleration lane is appropriate.

6. LOADING BAY ACCESS AND AREA DESIGN

6.1 Loading Bay Design

6.1.1 Loading Bay 1

'Loading bay 1' is 6.3 metres wide by 20.8 metres long and is proposed for the use of all tenancies on the site except for 'Retail Tenancy C'.

Articulated and larger rigid vehicles will access the loading bay from Doncaster Road and exit towards Tram Road. Smaller delivery vehicles will access and exit the loading bay via Doncaster Road. The length of the loading bay is such that a 19-metre articulated vehicle can park to load or unload whilst maintaining a clear width for two-way traffic flow along the ramp.

Swept path diagrams have been prepared using AutoTrack v9.10 which show both a 19 metres articulated vehicle and a 12.5 metres rigid vehicle access the loading bay from Doncaster Road, then exit towards Tram Road.

The diagrams are attached in Appendix G and confirm that the layout of the loading bay is at least adequate.

6.1.2 Loading Bay 2

'Loading Bay 2' is located in the south-eastern corner of the site and is for the exclusive use of 'Retail Tenancy C'. The layout of Loading Bay 2 will require larger vehicles to drive in forwards so loading and unloading can take place at the rear of the vehicle. All vehicles that access Loading Bay 2 from Doncaster Road will exit towards Tram Road.

The length of Loading Bay 2 is such that a 19-metre articulated vehicle can park to load or unload whilst maintaining adequate passage for a second articulated vehicle to pass around the rear of the vehicle.

Swept path diagrams have been prepared using AutoTrack v9.10 to confirm that both 19m Articulated and 12.5m rigid vehicles can access the loading bay.

The diagrams are attached in Appendix H and confirm that the loading bay design is appropriate.

6.1.3 Management of Loading Vehicles

- All loading vehicles will enter the site via the Doncaster Road site access.

Loading Bay 1

When a loading vehicle wishes to access loading bay 1, a boom gate system to the south and north of the loading bay will restrict vehicles from entering the area so that adequate maneuvering space is provided for a loading vehicle to reverse into the dock.

Once the vehicle is in dock, the boom gates will be raised so that vehicles can again pass along the accessway

Loading Bay 2

No special access arrangements are necessary for vehicles accessing Loading Bay 2.

Egress from Tram Road

Larger delivery vehicles from Loading Bay 1 and all delivery vehicles from Loading Bay 2 will egress via the shared exit at Tram Road.

To avoid vehicle conflict with vehicles exiting the multi-deck car park, an inductive loop will be placed on the accessway approximately 20 metres from Tram Road. When a vehicle passes over the loop, the boom gate at the multi-deck car park will stay in the closed position preventing vehicles from exiting.

Once the loading vehicle has passed the multi-deck access the gate will be raised so that vehicles can again exit the car parking area.

6.2 Loading Bay Access Ramp

The fall of the land from the north-east corner of the site to the south-west corner will require that adequate grade transitions are in place along the external accessway to ensure vehicles do not scrape.

Providing a ramp which links the loading bay levels nominated on the development plan is possible, however it requires that quite steep ramp grades (up to 1:4.65) be provided.

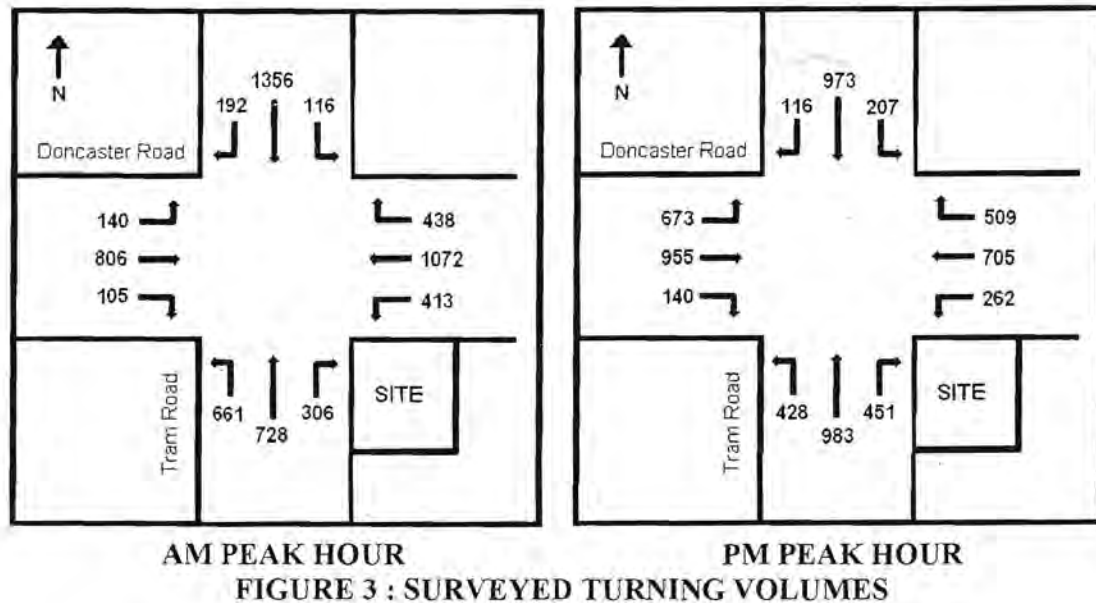
TTM Consulting (Vic) Pty. Ltd. has prepared an alternative ramp design which allows for flatter ramp grades to be used. The ramp requires both loading bays to be lowered by 1 metre, but maintains the 3.6 metres level difference between the two loading bays. Ramps between parking levels would also have to be modified. A copy of the ramp design is attached in Appendix I.

A minimum 4.5 metres height clearance should be provided along the length of the ramp as per AS2890.2:2004.

7. TRAFFIC GENERATION AND IMPACTS

7.1 Existing Traffic Conditions

TTM Consulting (Vic) Pty. Ltd. undertook a turning movement count at the intersection of Doncaster Road and Tram Road from 7:00am to 9:00am and 4:30pm to 6:30pm on Tuesday 13th April 2010. The following diagram shows the direction of the AM and PM peak hour turning movements :-



Intersection analysis has been performed using SIDRA v5 to assess the current performance of the Doncaster Road / Tram Road intersection.

The results are attached in Appendix J.

7.2 Likely Traffic Generated by the Development

7.2.1 Residential Component

Traffic generation rates for the proposal are taken from the RTA publication "Guide to Traffic Generating Developments, October, 2002", and are summarised in the following table :-

		Vehicles Trips Per Day		AM				PM			
				Out		In		Out		In	
Apartments	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.
2 Bedroom	172	5	860	0.35	61	0.12	21	0.15	26	0.35	61
3 Bedroom	8	6	48	0.35	3	0.12	1	0.15	2	0.35	3
Total	180		908		64		22		28		64

The residential component of the development is expected to generate in the order of 908 vehicle movements a day with up to 92 vehicle movements during the PM peak hour.

7.2.2 Likely Traffic Generated by On-Site Commercial Uses

Restricted Retail

TTM Consulting (Vic) Pty. Ltd. undertook a survey of trip generation at the location of the subject site from 7:00am to 7:00pm on Thursday 25th November, 2011. An Autobarn retail outlet and an Officeworks retail outlet were operating from the site with a combined floor area of 3,030 square metres.

Over the course of our 12 hour survey, the site generated the following number of vehicle movements :-

- Inbound: Tram Road : 441 vehicle movements
 Doncaster Road : 449 vehicle movements
- Outbound: Tram Road : 890 vehicle movements

Based on a GFA of 3,030 square metres, the observed trip generation rate over the 12 hour period was 58.75 vehicle movements / 100 square metres. The various businesses on the site operate between 7:00am and 7:00pm, thus the 12 hour volume equals the daily volume.

Peak hour trip generation occurred between 3:45pm and 4:45pm, with a total of 248 vehicle trip ends observed. That is equivalent to a trip generation rate of 8.2 vehicle movements / 100 square metres / hour.

Trip generation rates during the AM and PM peak commuter periods were as follows :-

- 8:00am – 9:00am : 58 trip ends – 1.92 vehicle movements/100sqm/hour
- 4:00pm – 5:00pm : 180 trip ends – 5.94 vehicle movements/100sqm/hour

The development has a proposed restricted retail floor area of 8,809 square metres. Based on the above trip generation rates the proposal can be expected to generate 170 vehicle movements during the AM peak commuter period and 524 vehicle movements during the PM peak commuter period.

These figures are likely to be overestimates as the retail uses on the site will attract customers on multi-purpose trips, who will not generate additional trips on the road network but redirect their existing trip. For the ensuing analysis, we will assume that 50% of the retail vehicle movements are additional trips on to the road network. The analysis volumes for the retail development are therefore :-

- AM Peak Period : 85 vehicle movements
- PM Peak Period : 262 vehicle movements

Restaurants

The RTA publication 'Guide to Traffic Generating Developments, October, 2002' suggests an evening trip generation rate of 5 vehicle trips per 100 square metres floor area.

Therefore, 567 square metres of restaurant floor is estimated to generate in the order of 29 vehicle movements during the evening peak period.

Vehicle movements generated by the restaurants during the AM peak period will be minimal.

7.2.3 Function Rooms

The function rooms will typically be utilised for events in the evenings or during lunchtimes. These are outside of the AM and PM peak commuter periods and therefore will not contribute to the daily peak hour traffic flows.

7.2.4 Likely Combined Traffic Generated by the Development

The combined estimation of peak hour vehicle movements is as follows :-

- AM Peak Period : 171 vehicle movements
- PM Peak Period : 383 vehicle movements

7.3 Directional Split of Site Generated Traffic to the Road Network

We will assume that the commercial vehicle movements are split 50/50 inbound and outbound. Residential vehicle movements will be split as presented in Section 7.2.1.

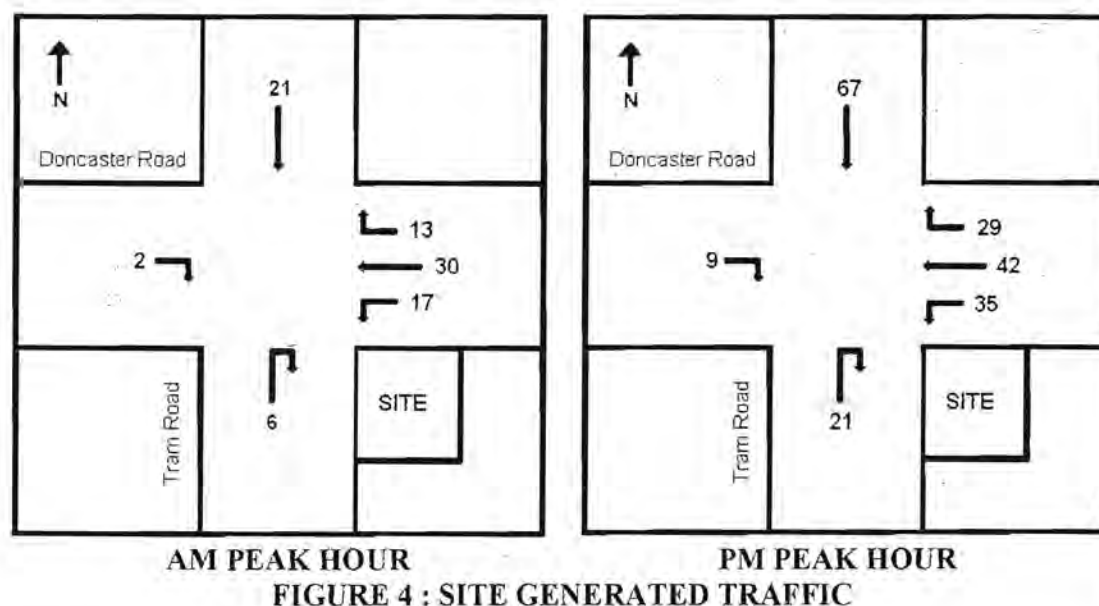
The inbound/outbound split for each peak period is as follows :-

- AM Peak Period : 64 inbound vehicle movements
107 outbound vehicle movements
- PM Peak Period : 210 inbound vehicle movements
173 outbound vehicle movements

Both the Tram Road and Doncaster Road access points service the multi-deck car park, thus we will assume an even number of vehicles will enter and exit at each access point. As both access points are restricted to 'left in, left out' vehicle movements only, the ensuing intersection analysis is concerned only with outbound vehicle movements on Doncaster Road and inbound vehicle movements on Tram Road. The remaining site-generated vehicle movements do not pass through the intersection.

Site-generated vehicle movements have been distributed through the intersection legs in accordance with the existing conditions. An allowance has been made for 10% of all inbound traffic to perform a u-turn from Tram Road

Figure 4 shows the site-generated vehicle movements for both the AM and PM peak periods :-



7.4 Impact of Site Generated Traffic on Intersection Performance

The additional vehicle movements have been combined with the existing traffic volumes from Section 7.1. for intersection performance analysis with Sidra v5.0. The full analysis is attached in Appendix K.

The analysis indicates the additional traffic will have minimal impact on existing traffic conditions at the intersection. Some marginal increases in queue lengths may result but will not affect the operation of the intersection during the peak periods.

7.5 Gaps in Traffic Flow for Exiting Vehicles

TTM Consulting (Vic) Pty. Ltd. undertook vehicle movement surveys at the existing site access points on 28th June, 2011 from 7:00am to 9:00am and 4:00pm to 6:00pm. At each access point, every passing vehicle was recorded with a time stamp, so that the number of gaps in the traffic flow for vehicles to exit the site could be determined.

The following tables show the results of our surveys :-

AM Gap Analysis

Doncaster Road AM - Left Turn Analysis			Tram Road AM - Left Turn Analysis		
Critical Acceptance Gap		5 sec	Critical Acceptance Gap		5 sec
Follow Up Headway		2 sec	Follow Up Headway		2 sec
Gap	Count	Vehicles Per Gap	Gap	Count	Vehicles Per Gap
0	200	0	0	2	0
1	1870	0	1	2304	0
2	464	0	2	178	0
3	158	0	3	56	0
4	86	0	4	19	0
5	30	30	5	16	16
6	35	35	6	13	13
7	21	42	7	14	28
8	22	44	8	13	26
9	12	36	9	24	72
10	5	15	10	14	42
11	9	36	11	13	52
12	4	16	12	14	56
13	10	50	13	3	15
14	5	25	14	13	65
15	6	36	15	5	30
16	6	36	16	4	24
17	5	35	17	9	63
18	7	49	18	6	42
19	2	16	19	7	56
20	4	32	20	1	8
21	3	27	21	7	63
22	1	9	22	8	72
23	3	30	23	0	0
24	0	0	24	9	90
25	4	44	25	10	110
26	2	22	26	0	0
27	3	36	27	2	24
28	3	36	28	2	24
29	1	13	29	4	52
30	2	26	30	2	26
31	4	56	31	1	14
32	1	14	32	2	28
33	0	0	33	2	30
34	1	15	34	1	15
35	4	64	35	4	64
36	4	64	36	3	48
37	1	17	37	2	34
38	3	51	38	0	0
39	3	54	39	0	0
40	1	18	40	3	54
41	3	57	41	1	19
42	3	57	42	0	0
43	4	80	43	4	80
44	2	40	44	2	40
45	0	0	45	1	21
46	0	0	46	1	21
47	1	22	47	1	22
48	1	22	48	1	22
49	3	69	49	3	69
50	1	23	50	0	0
51	0	0	51	1	24
52	1	24	52	4	96
53	1	25	53	0	0
54	1	25	54	1	25
55	2	52			
Gaps During Survey		1625	Gaps During Survey		1795
Gaps per Hour		812	Gaps Per Hour		897

PM Gap Analysis

Doncaster Road PM - Left Turn Analysis		
Critical Acceptance Gap		5 sec
Follow Up Headway		2 sec
Gap	Count	Vehicles Per Gap
0	80	0
1	2015	0
2	385	0
3	169	0
4	88	0
5	54	54
6	31	31
7	24	48
8	15	30
9	15	45
10	17	51
11	17	68
12	7	28
13	10	50
14	6	30
15	5	30
16	3	18
17	10	70
18	5	35
19	2	16
20	3	24
21	9	81
22	6	54
23	2	20
24	7	70
25	3	33
26	1	11
27	3	36
28	3	36
29	1	13
30	1	13
31	1	14
32	1	14
33	2	30
34	0	0
35	2	32
36	2	32
37	0	0
38	1	17
39	6	108
40	3	54
41	2	38
42	2	38
43	1	20
44	1	20
45	0	0
46	0	0
47	1	22
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	1	25
54	2	50
55	1	26
Gaps During Survey		1535
Gaps Per Hour		767

Tram Road PM - Left Turn Analysis		
Critical Acceptance Gap		5 sec
Follow Up Headway		2 sec
Gap	Count	Vehicles Per Gap
0	58	0
1	2017	0
2	244	0
3	73	0
4	39	0
5	18	18
6	19	19
7	12	24
8	19	38
9	12	36
10	18	54
11	12	48
12	7	28
13	6	30
14	15	75
15	10	60
16	6	36
17	7	49
18	7	49
19	7	56
20	6	48
21	6	54
22	7	63
23	5	50
24	5	50
25	2	22
26	3	33
27	2	24
28	2	24
29	3	39
30	1	13
31	3	42
32	3	42
33	2	30
34	0	0
35	1	16
36	2	32
37	4	68
38	5	85
39	2	36
40	2	36
41	3	57
42	2	38
43	1	20
44	2	40
45	1	21
46	2	42
47	2	44
48	1	22
49	0	0
50	0	0
51	1	24
52	0	0
53	1	25
54	1	25
55	0	0
56	1	26
Gaps During Survey		1811
Gaps Per Hour		905

The surveys indicate that there are more than ample gaps in the traffic streams on both Doncaster Road and Tram Road for vehicles to exit from the site.

8. BICYCLE FACILITIES

Table 1 to Clause 52.34-3 of the Planning Scheme specifies the bicycle space requirements for many different uses.

The Planning Scheme bicycle parking requirement for the proposal is summarised in the following table :-

Use	Planning Scheme Requirement	Area / No.	Parking Spaces
Retail - Employees	1 to each 300 sqm of leasable floor area.	8,069 sqm	27
Retail - Visitors	1 to each 500 sqm of leasable floor area.	8,069 sqm	17
Restaurant - Employees	1 to each 100 sqm of floor area available to the public.	567 sqm	6
Restaurant - Customers	2 + 1 to each 200 sqm of floor area available to the public if the floor area available to the public exceeds 400 sqm.	567 sqm	5
Dwelling - Resident	In developments of four or more storeys, 1 to each 5 dwellings.	290 no.	58
Dwelling - Visitor	In developments of four or more storeys, 1 to each 10 dwellings.	290 no.	29
Total			142

The combined Planning Scheme bicycle requirement for the development is 142 spaces.

The Applicant has allowed for provision of 132 bicycle spaces and 6 motorcycle parking spaces, which would seem more than sufficient for the proposal at hand.

It is recommended that bicycle racks be placed externally for the use of customers and resident visitors.

9. WASTE COLLECTION

The development plans indicate bin storage areas within the basement car parking levels.

Waste collection will be required to occur from the loading areas with assistance from a body corporate or similar.

Swept path diagrams have been prepared for a range of vehicles accessing the loading area in Appendices G and H.

The use of this area for refuse collection is appropriate.

10. SUMMARY AND CONCLUSIONS

The analysis of the development is summarised as follows :-

- The Applicant proposes an on-site parking provision of 568 spaces.
 - The provision of 380 spaces for the shared use of the restricted retail, restaurant and visitor uses is appropriate given that each use will likely generate peak demands at different times of day.
 - The provision of 188 spaces to residents of the development is an appropriate provision given the location of recreational, commercial and public transport facilities to the site.
- The reconfiguration of the Doncaster Road site access to provide 'left in, left out' vehicular flow is appropriate given that it will allow better access to the site and will have cause no adverse impacts on traffic conditions in the area.
- Traffic generated by the proposal will have minimal impact on the existing traffic conditions at the Doncaster Road/Tram Road intersection during the AM and PM peak commuter periods.

Approval of the development in respect of issues relating to traffic, parking and access is recommended.

TTM Consulting (Vic) Pty. Ltd.



Matthew Duffy