

Traffic Engineering Assessment

**DHHS Public Housing Renewal Program
at
Walker Street, Northcote**

**Prepared for
Department of Health and Human Services**

**July, 2017
G22495R1C_TrancheA_Northcote**

Traffic Engineering Assessment

Walker Street, Northcote: DHHS Public Housing Renewal Program

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at

Walker Street, Northcote

Document Control

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1 Introduction

Traffix Group has been engaged by Department of Health and Human Services to prepare a traffic engineering assessment for the redevelopment of the site at Walker Street, Northcote for the purposes of a new residential development which will form part of the DHHS Public Housing Renewal Program.

The Department of Health and Human Services (DHHS) and Victorian State Government have identified a number of DHHS sites for rejuvenation and redevelopment of public and social housing. The redevelopment of these sites is intended to respond to existing undersupply issues, not only relating to the number, but also the types of dwellings available for public and social housing. The redevelopment of the sites will also include the provision of new private housing developments.

This site forms one of three sites known as Tranche A and includes sites at Brunswick West and Heidelberg West.

To facilitate the program, a Design Framework has been prepared by Hayball for this site, and a site specific Development Plan Overlay (DPO) and Parking Overlay (PO) have been prepared to inform the redevelopment.

This report provides a detailed traffic engineering assessment of the parking and traffic issues associated with the proposed development.

2 Existing Conditions

2.1 Location

The subject site is located at the south-western corner of the intersection of Walker Street and High Street in Northcote as shown in the locality map provided at Figure 1.

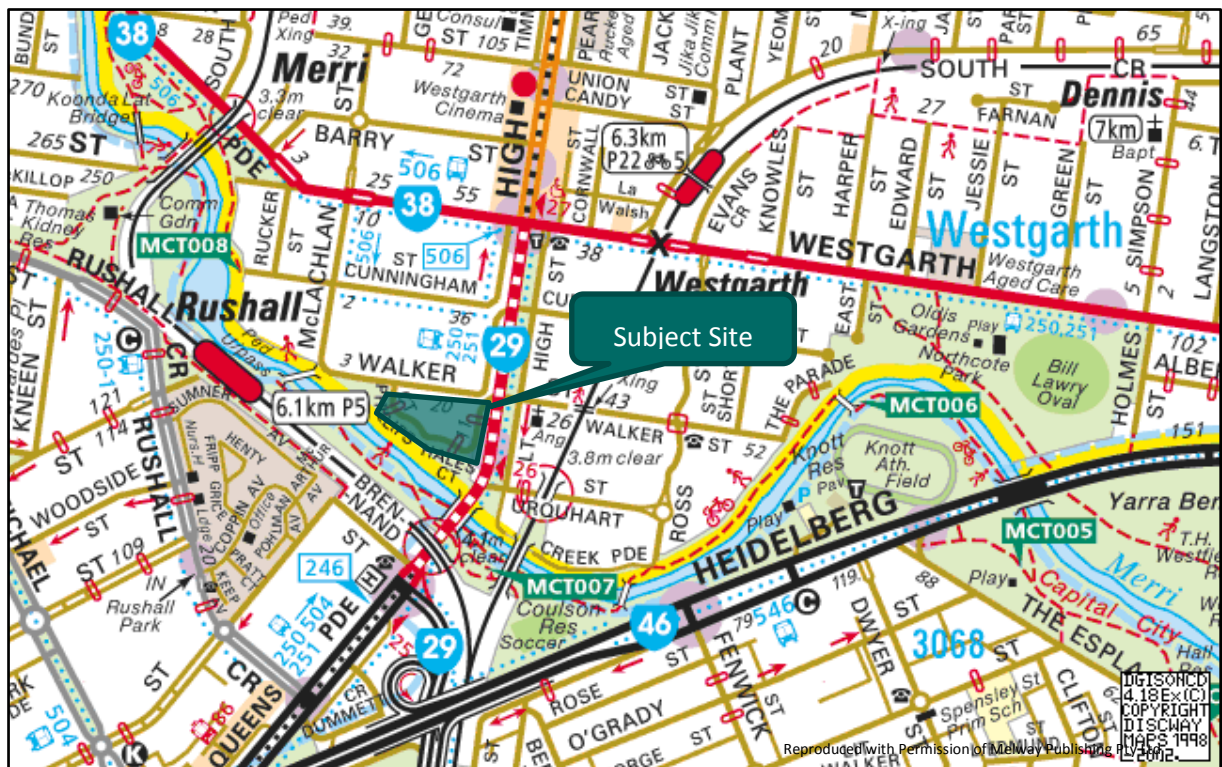


Figure 1: Locality Map

2.2 Subject Site and Use

The subject site is irregular in shape with abutments to Walker Street to the north and High Street to the east. It abuts Merri Creek to the south and west.

The site currently accommodates 87 residential dwellings. Phillips Court and Hales Court provide access through the site connecting with Walker Street at the north-west and High Street at the north-east. This road link accommodates indented angled parking for 42 car spaces, including 21 spaces located outside the site boundary (within a service road to High Street).

There is a fall across the site from Walker Street down to Hales Court toward Merri Creek.

An aerial photograph of the site is provided at Figure 2

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Figure 2: Northcote Site Aerial

2.3 Planning Scheme Zones & Surrounding Uses

The subject site is zoned as Neighbourhood Residential Zone – Schedule 1, under the Darebin Planning Scheme.

Significant nearby land uses include:

- Merri Creek and Capital City Trail which run along the southern and western boundaries of the site and provide shared path linkages to areas to the east, south and west of the site;
- Westgarth Neighbourhood Activity Centre approximately 300 metres to the north of the site, which is centred around the commercial and entertainment provisions provided along High Street north of Westgarth Street/Merri Parade;
- Clifton Hill Neighbourhood Activity Centre approximately 600 metres to the south which provides for retail, food and beverage, entertainment and other essential services; and
- Rushall Railway Station which is located less than 300 metres walk from the site boundary via a bridge overpass across Merri Creek accessed from the corner of McLachlan Street and Walker Street west of the site.

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2.4 Road Network

High Street is an arterial road under the control of VicRoads, running in a north-south direction continuing as Queens Parade to the south. In the vicinity of the subject site, High Street has a carriageway which provides for two northbound lanes of through traffic and a single southbound lane. A central tramway is provided. Pedestrian operated signals are located to the south of the intersection with Hales Court providing access to the accessible tram stop.

Walker Street is a local access street under the control of Council, running in an east-west direction along the site's northern abuttal. At its western end, Walker Street continues as McLachlan Street in a northerly direction connecting to Westgarth Street. Adjacent to Hales Court/High Street, it diverts to the north and operates two-way toward Cunningham Street. There is no through vehicle access between Hales Court and Walker Street. Along the site abuttal, Walker Street provides for two-way traffic with 30 degree angled parking along its southern side and indented parallel parking along its northern side. Where it runs parallel with High Street, Walker Street provides unrestricted indented parking on the eastern side.

We note that our site visit identified that works are currently being undertaken to the Merri Creek embankment and have temporarily closed the vehicle connection between Walker Street and McLachlan Street. It is understood that post works, this vehicle connection will be reinstated.

Phillips Court is located within the site and appears to operate as a private access road for the existing estate. It currently provides access to indented parking which is typically provided for residents.

Hales Court (High Street Close) is a local road, in effect operating as a service road for High Street. However, existing signage at its northern extent restricts access for vehicles which are not public housing associated. Its intersection with High Street is sign controlled and fully directional forming a x-intersection with the eastern extension of Walker Street.

Figure 3 to Figure 10 provide views of the road network in the vicinity.



Figure 3: High Street – View North

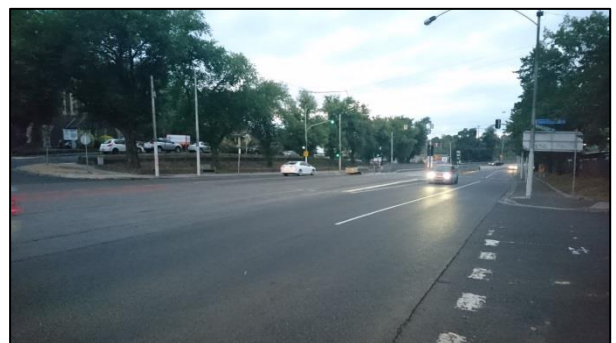


Figure 4: High Street – View South from Hales Court

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Figure 5: Walker Street– View East



Figure 6: Walker Street – View West

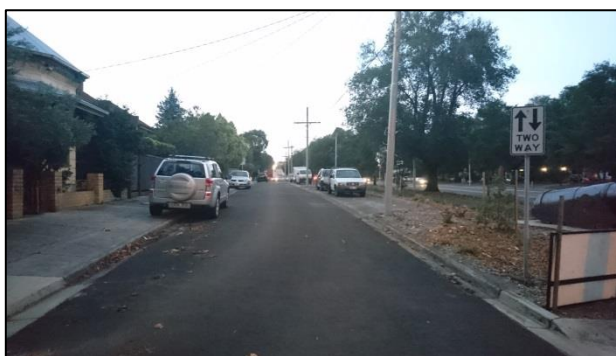


Figure 7: Walker Street – Looking north from Hales Court

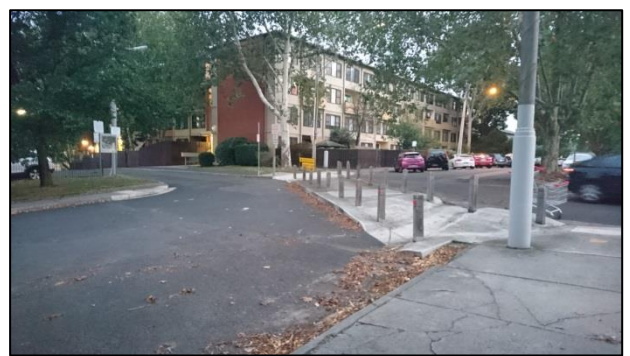


Figure 8: Walker Street/Hales Court – Road Closure near High Street Access



Figure 9: Phillips Court/Hales Court – looking west (from High Street footpath)



Figure 10: Hales Court – View South

3 Proposal

3.1 Design Framework Plan

The Design Framework prepared by Hayball contemplates the redevelopment of the site for the purposes of a mixed public and private residential development through the provision of three new residential buildings with ground and podium parking.

The existing social housing on the site will be demolished and new social/public housing will be provided at a minimum 10% increase of the existing supply. The remaining development on the site will be provided as private dwellings.

The framework generally retains the existing through connection between Hales Court (High Street Close) and Walker Street, albeit with a realignment of the road, particularly at the Walker Street end. The internal road connection will provide for indented parking to supplement ground and podium parking provisions.

Access to ground level and podium parking is intended to be provided via the internal road connection. The intention is to supply all resident parking on-site within the podium parking areas. Additional parking along the internal road is intended for residential visitors.

An excerpt of the Design Framework Plan is provided at Figure 11.



Figure 11: Design Framework Plan - Walker Street, Northcote

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3.2 Pedestrian and Bicycle Accessibility

The Design Framework contemplates pedestrian accessibility provided along the internal road, connecting between Hales Court (High Street Close) and Walker Street. Individual access points will also be provided along the external road abutments as shown in Figure 12.

These pedestrian and vehicle links are likely to also be suitable for resident cyclists.

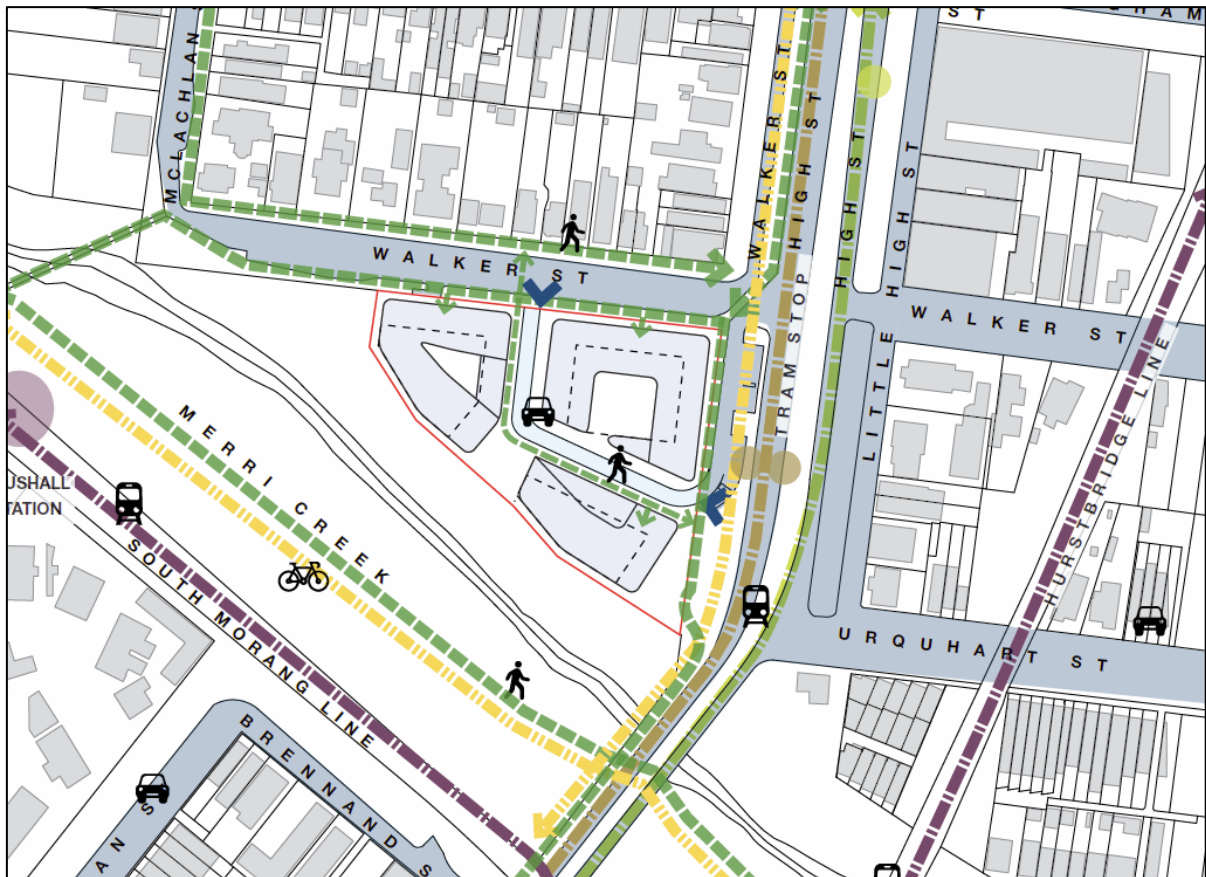


Figure 12: Design Framework Pedestrian & Bicycle Links

3.3 Contemplated Yield

The Design Framework estimates that the redevelopment of the site could accommodate approximately 222 dwellings across the three new buildings as summarised in Table 1.

Table 1: Northcote Estate Proposed Apartment Mix

No. of Bedrooms	1-Bedroom	2-Bedroom	3-Bedroom	Total
Public Dwellings	57	33	5	95
Private Dwellings	70	57	0	127
Total	127	90	5	222

4 Car Parking Considerations

4.1 Proposed Parking Overlay

It is proposed to introduce a site-specific parking overlay to inform the redevelopment of the site. The objective of the parking overlay is to identify appropriate car parking rates for residential uses within the Northcote Estate.

The proposed car parking rates are detailed in Table 2.

Table 2: Proposed Parking Overlay Rates

Use	Rate
Dwelling (Social Housing)	0.6 spaces to each dwelling for residents
Dwelling (Private Housing)	0.7 spaces to each 1-bedroom dwelling for residents
	1 space to each 2-bedroom dwelling for residents
	1.6 spaces to each 3-bedroom dwelling for residents
Dwelling (All)	0.1 spaces to each dwelling for visitors

The proposed parking overlay specifies a permit is required to reduce the minimum number of car parking spaces specified in the schedule.

4.2 Adequacy of Proposed Car Parking Rates

An assessment of the adequacy of the proposed car parking rates follows.

4.2.1 Sustainable Modes of Transport

TravelSmart Map

Figure 13 provides an excerpt of the TravelSmart map for the cities of Darebin and Yarra in the vicinity of the site. It illustrates the numerous alternative transport modes accessible to the site, including multiple public transport modes and bicycle and walking trails.

Pedestrian Accessibility

The site is very well located to promote walking to everyday services.

The subject site scores 93 out of a possible 100 using the 'Walk Score', which is a measure of how easy it is to access everyday services by walking. This score classifies the site as 'Walker's Paradise' and that daily errands do not require a car.

Pedestrian linkages to nearby retail and commercial uses (Clifton Hill and Westgarth), as well as walking tracks along and across Merri Creek provide very convenient links to support walking as a mode of transport for the site.

Bicycle Accessibility

The site is also well serviced by the Principal Bicycle Network (PBN), with on-road and off-road bicycle paths directly linking the site with surrounding areas as shown in Figure 13.

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The subject site is well serviced by bicycle infrastructure with formal and informal bicycle routes on many roads in the immediate vicinity of the subject site, including along the Merri Creek Trail, McLachlan Street, Cunningham Street, Heidelberg Road and Westgarth Street.

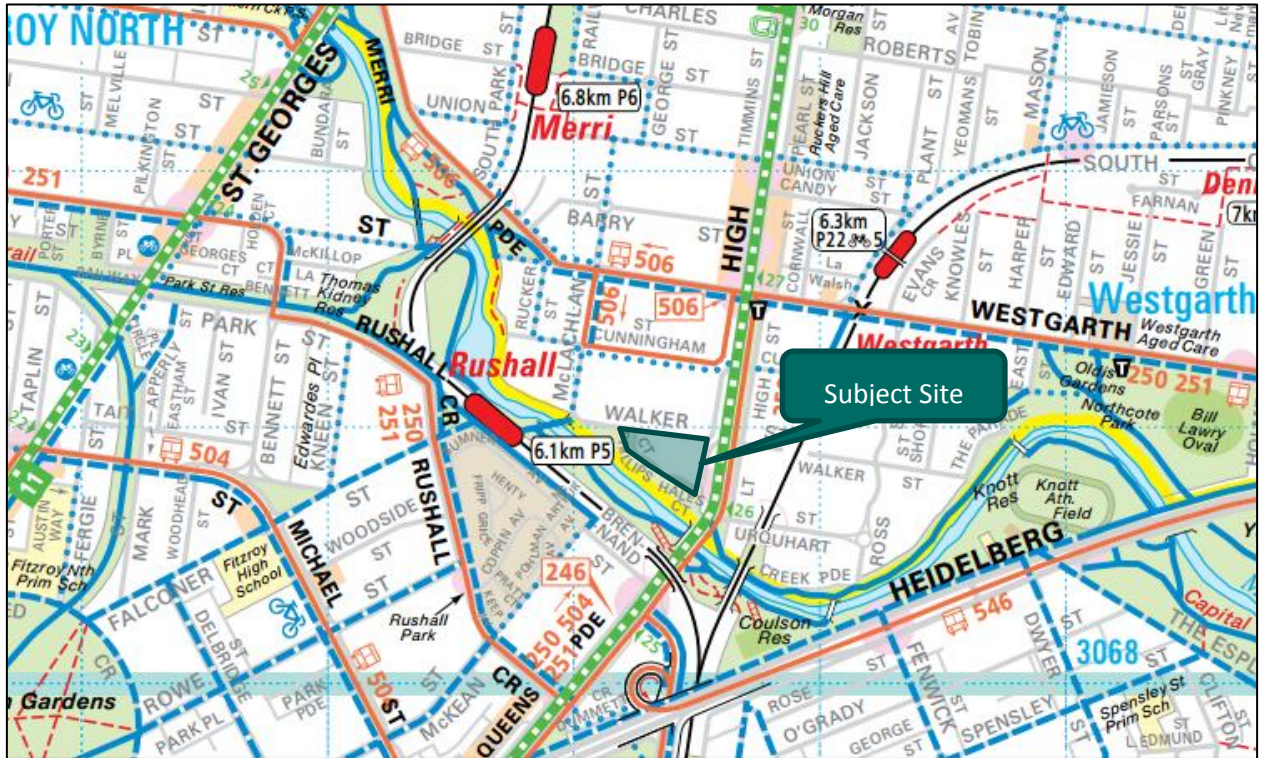


Figure 13: Darebin TravelSmart Map

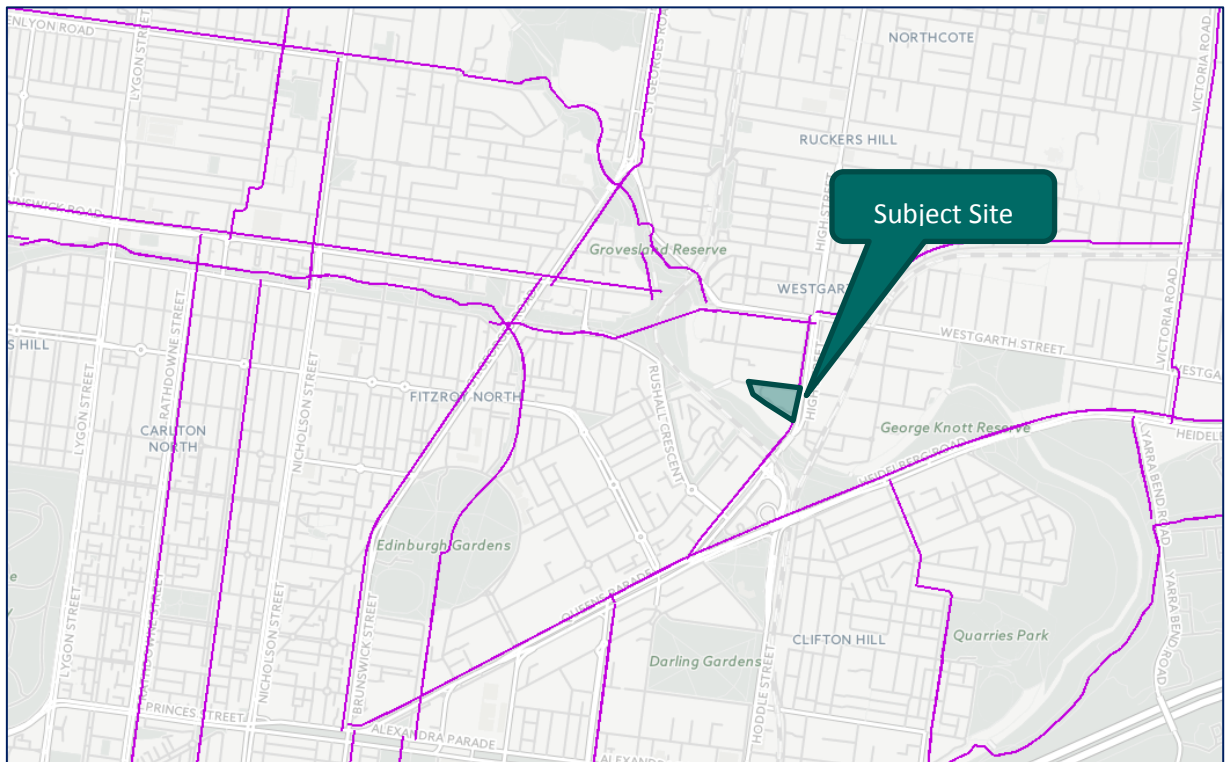


Figure 14: VicRoads Principle Bicycle Network Map

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Public Transport

The site has excellent accessibility to existing public transport modes.

Rushall Railway Station is accessible to the west (by crossing Merri Creek) less than 300 metres walk from the site, and Westgarth Railway Station is accessible approximately 500 metres to the north-east.

Tram Route 86 operates along the site's eastern abuttal and an accessible tram stop is served by pedestrian operated signals adjacent to the site boundary.

Additional bus services are accessible to the site via the Clifton Hill bus/tram interchange to the south as shown in Figure 15.

Table 3 summarises the available services.

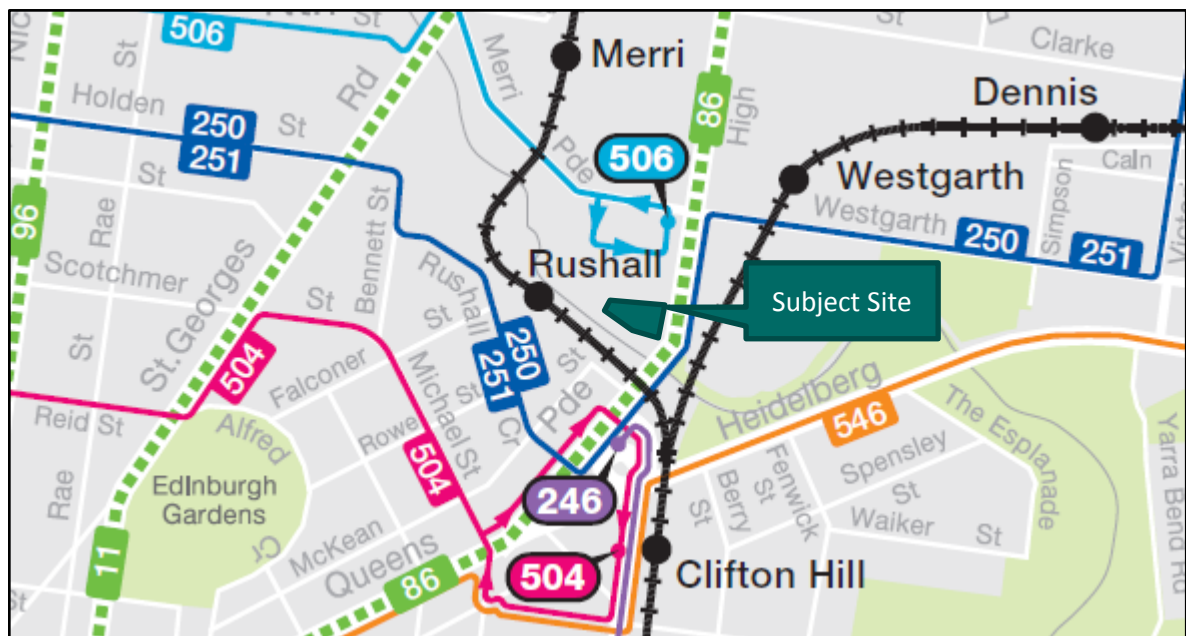


Figure 15: PTV Public Transport Map – Darebin

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Table 3: Public Transport Services in the Vicinity of the Subject Site

Service	Route	Distance to Node
Metropolitan Train Services		
Rushall Station	City – South Morang	Approximately 200m west of the site
Westgarth Station	City - Hurstbridge	Approximately 400m north-east of the site
Metropolitan Tram Services		
Route 86	Bundoora RMIT – Waterfront City Docklands via City	Approximately 30m east of the site
Metropolitan Bus Services		
250	City (Queen Street) – La Trobe University	Approximately 260m south west of the site
251	City (Queen Street) – Northland SC	Approximately 260m south west of the site
246	Elsternwick – Clifton Hill via St Kilda	Approximately 260m south west of the site
504	Moonee Ponds – Clifton Hill via East Brunswick	Approximately 500m south of the site
546	Heidelberg – Melbourne University – Queen Victoria Market via Clifton Hill and Carlton	Approximately 400m east of the site

Car Share Facilities

Car share schemes have been operating within the cities of Darebin and Yarra for some years and a number of inner metropolitan Councils actively supporting their use by allocating on-street spaces throughout their municipalities for the purpose of accommodating car share pods.

The availability of a car share scheme provides a suitable alternative to the private motor vehicle as it allows residents to make smarter travel choices and actively encourages them to seek alternate transport modes for the majority of trips.

Car share schemes provide access to a motor vehicle for the limited number of trips a car may be required. This opportunity to access a car is both convenient and cost-effective as motor vehicles can be hired on an hourly or daily basis.

A number of commercially operated car share pods are available proximate to the site including a GoGet pod located on Walker Street, to the east of High Street.

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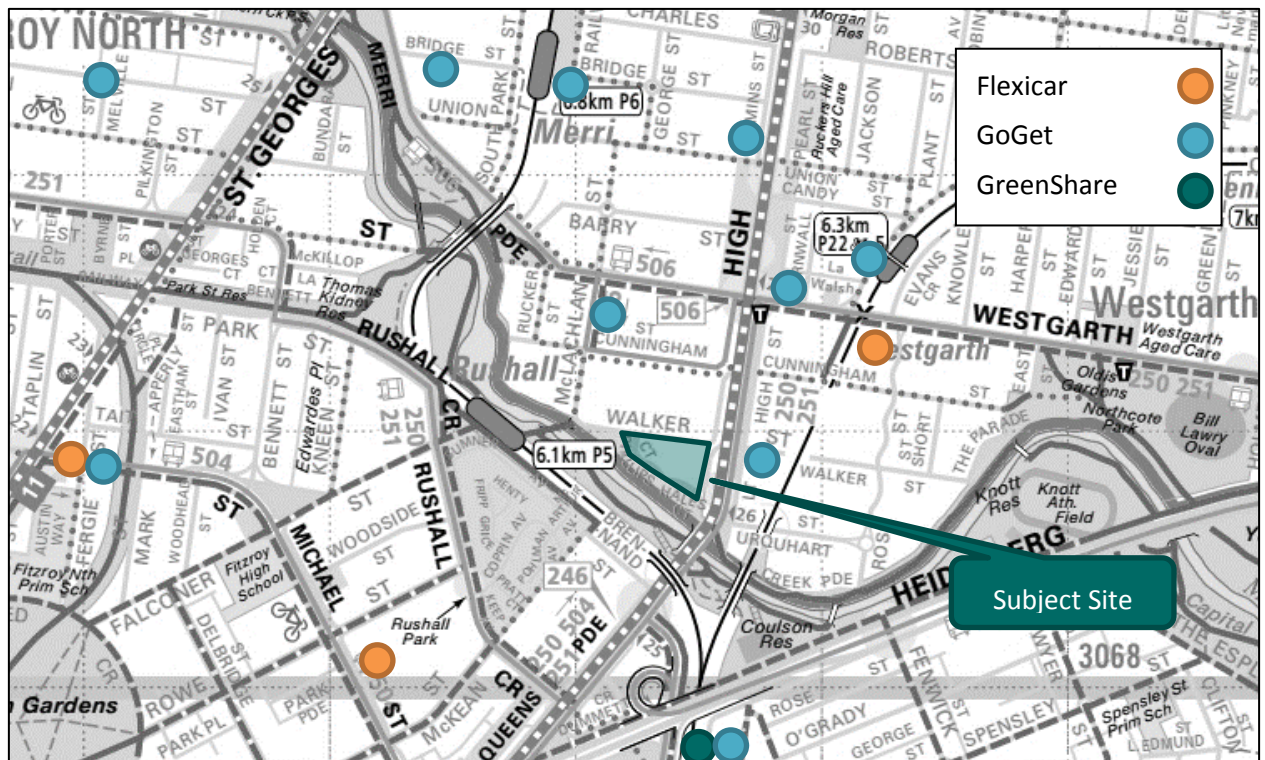


Figure 16: Car Share Pods in the surrounding area

Having regard to the alternative transport modes available to the site, we are of the view that this would support reduced parking demands, particularly for smaller dwellings.

4.2.2 ABS Car Ownership - Resident Demands

Public Housing

ABS Car Ownership Data from 2011 was sourced for public housing and private housing in order to achieve an understanding of suitable parking rates for future residents. Public housing car ownership data was separated from the remainder of car ownership data to establish the average rates relating to the public housing dwellings.

We note that the existing dwellings on the site are typically larger dwellings, and the intention is that the redevelopment will provide for a change in the mix of apartments, being predominantly one and two bedroom apartments.

The following data relates to 'apartments, units or flats' in the suburb of Northcote and also for the wider Darebin municipality. A summary of the data is provided in Table 4.

Table 4: 2011 ABS Car Ownership Data – Public Housing Northcote & Darebin

Type	Northcote		Darebin	
	Av. rate	% ownership	Av. rate	% ownership
1-bedroom dwellings	0.3	72% w no veh	0.4	72 % w no veh
2-bedroom dwellings	0.4	61% w no veh	0.5	48 % w no veh
3- bedroom dwellings	0.6	29% w 1 veh	0.7	39 % w 1 veh

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These statistics indicate that the parking requirements for dwellings set out under the Planning Scheme are greater than the ABS car ownership statistics in this locality.

Public housing demands for 1-bedroom, 2-bedroom and 3-bedroom dwellings are typically less than one vehicle per dwelling, and car parking is not required by a proportion of residents.

Private Housing

Private housing car ownership data was derived by subtracting the public housing data from the overall ABS Car Ownership Data from 2011.

The following data relates to 'apartments, units or flats' in the suburb of Northcote and also for the wider Darebin municipality. A summary of the data is provided in Table 5.

Table 5: 2011 ABS Car Ownership Data – Private Housing Northcote & Darebin

Type	Northcote		Darebin	
	Av. rate	% ownership	Av. rate	% ownership
1-bedroom dwellings	0.7	36% w no veh	0.8	33% w no veh
2-bedroom dwellings	1.0	24% w no veh	1.1	19% w no veh
3- bedroom dwellings	1.6	36 % w 1 veh	1.5	44 % w 1 veh

This data demonstrates that for private housing, whilst car ownership is typically higher than for public and social housing, the rates for one and three bedroom apartments are less than the rates listed in Clause 52.06 of the Planning Scheme.

4.2.3 Case Study Data - Residential Visitor Demands

To establish the visitor demands likely to be generated by the development, car parking surveys undertaken by Cardno at apartment complexes in Beacon Cove (127 and 147 Beach Street) have been sourced.

The surveys were conducted over a 42 hour period from 6am Friday 19 November to midnight Saturday 20 November 2010, and recorded a peak visitor demand of 0.1 spaces per apartment during evenings and on weekends, and a demand of 0.06 spaces per apartment during business hours.

4.2.4 Local Policy

Darebin City Council supports sustainable transport and design in new and existing developments through a number of policies and initiatives. Excerpts from some of the relevant Clauses within the Darebin Planning Scheme are provided as follows:

Clause 21.02 Environment

21.02-3 Built Environment

Objective 3 – Environmentally Sustainable Design

To promote and facilitate development that incorporates best practice environmentally sustainable design and promotes sustainable living and business practices.

Strategies

- *Encourage the adaptive reuse of buildings to reduce the amount of waste going to landfill.*

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- *Encourage the design of new and retrofitted buildings and public spaces to incorporate high standards of energy efficient design, water sensitive urban design, sustainable transportation, waste reduction and protection of biodiversity.*
- *Promote the integration of land use and sustainable transport (walking, cycling and public transport) in accordance with the strategies in Clause 21.05-1.*
- *Encourage best practice industrial and commercial development to minimise amenity impacts and achieve long term environmental sustainability.*
- *Encourage the preparation of Sustainable Design Assessments and Sustainability Management Plans for residential, mixed use, industrial and commercial developments as part of the planning permit approval process.*

Clause 21.05 Transport and Infrastructure

Objective 3 – Car Parking

To manage the provision of car parking and congestion of car parking in Darebin and encourage use of sustainable transport modes to reduce car parking demand.

Strategies

- *Consider existing public transport opportunities when assessing applications to waive or reduce car parking.*
- *Take into consideration existing car parking demand levels when considering applications to waive car parking and ensure there is demonstrated on-street capacity before waiving an on-site car parking requirement, particularly in locations outside of activity centres.*
- *Consider requiring Travel Plans as a condition of approval for new uses and developments where there is a substantial reduction in car parking from Clause 52.06 requirements.*
- *Investigate specific parking requirements at a precinct level leading to more localised and area specific provisions.*
- *Ensure the design of new developments address interfaces with the public realm and support walking, cycling and public transport access, in accordance with the Objectives and Strategies in Clause 21.02-3.*

Integrated Transport Strategy

Darebin City Council's Transport Strategy 2007-27 (Going Places) establishes Council's strategic direction for transport planning until 2027.

The Darebin Transport Strategy (DTS) aims to promote sustainable transport options and reduce dependence on private car transport. The Plan identifies a range of actions including advocacy, infrastructure development and programs that will be implemented over a twenty-year timeframe. The DTS aims to double the share of walking, cycling and public transport for all trips and for journeys to work by 2027.

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Eight key objectives have been developed. They are:

- *To improve local and metropolitan accessibility*
- *To increase the role of sustainable transport modes*
- *To build new developments that reduce transport demands*
- *To increase social inclusion for residents*
- *To improve health and environmental outcomes*
- *To improve community safety*
- *To integrate quality urban design, economic development and access*
- *To engage stakeholders through effective communication*

The relevant objectives to this development include:

To increase the role of sustainable transport modes

Cars and trucks are the least energy efficient form of travel (on land) and the greatest contributor to environmental pollution. Therefore, the DTS seeks to promote alternative, more sustainable ways of moving people and good-walking, cycling, public transport and rail-freight.

This is achieved by increasing the attractiveness of those modes through improved services and facilities, priority over other modes, and reducing the attractiveness of the car through reduced priority and other travel demand management techniques.

To build new developments that reduce transport demands

The need to travel and the lengths of journeys can be influenced by the way land is developed. Building housing and key destinations such as jobs, services and shops closer to each other reduces the distances people need to travel, in turn increasing the chance of them utilising more sustainable modes. Concentrating housing closer to public transport increases the chance of residents using it to access more distant destinations.

To integrate quality urban design, economic development and access

Darebin reflects Melbourne's very car-based society. As a result, the economic prosperity of some of its businesses relies on vehicular access, parking for customers and freight deliveries. However, many people choose to or have no choice but to use other means of travel to access activity centres. In addition, traffic and car parks can adversely affect the pedestrian amenity of activity centres.

Therefore, the DTS seeks to provide good access to its centres and other employment areas by all modes of travel to balance their needs in the design of streets while accommodating freight vehicles.

The site is well located to encourage the use of sustainable transport modes and nearby services and reduced parking provisions would contribute to reducing future resident's reliance on motor vehicles.

4.2.5 Existing Parking Deficiency

We note that the site is currently occupied by 87 dwellings and provides a total of 42 parking spaces on-site. This includes some 21 spaces on-street along Hales Court (High Street Close). Observations of the site also indicate a reliance on some on-street parking along Walker Street.

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Having regard to the rates at Clause 52.06, the existing site is therefore expected to have an associated statutory parking deficiency.

The redevelopment of the site intends to provide all parking for residents on-site.

The remaining on-street parking in the area would be subject to Council management, but would be suitable for use by future residential visitors of the site and surrounding catchment.

4.3 Proposed Parking Provisions

Based on the preceding, and having particular regard to the proximity of the site to alternative transport modes, historic reliance on on-street parking, and local council policy, it is considered that the provision of parking at reduced rates from those specified within Clause 52.06 would be appropriate for this site.

The rates outlined within the proposed Schedule to the Parking Overlay and adopted within the Design Framework are considered appropriate for the site as they are generally consistent with the ABS Data for the area and dwelling types.

Application of the above rates would suggest that the Design Framework would have an associated parking requirement for 57 spaces for public housing residents, 106 spaces for private housing residents and 22 spaces for residential visitors as noted in Table 6.

Table 6: Proposed Parking Rates and Demands

Description	Type	No.	Suggested Parking Rate	Suggested Parking Provision
Public	1-bedroom	57 no.	0.6 spaces per apartment	34 spaces
	2- bedroom	33 no.	0.6 spaces per apartment	20 spaces
	3- bedroom	5 no.	0.6 spaces per apartment	3 spaces
	Total	95 no.		57 spaces
Private	1- bedroom	70 no.	0.7 spaces per apartment	49 spaces
	2- bedroom	57 no.	1 spaces per apartment	57 spaces
	3- bedroom	0 no.	1.6 spaces per apartment	0 spaces
	Total	127 no.		106 spaces
Visitors		222 no.	0.1 spaces per apartment	22 spaces

Whilst the intention is to provide visitor parking on-site, it is noted that there has been a historical reliance on on-street parking by the existing social housing estate residents. The relocation of these demands onto the site would make those on-street parking spaces available for visitors of the redevelopment.

5 Bicycle Considerations

Clause 52.34 of the Darebin Planning Scheme specifies the bicycle parking requirement for new developments. The relevant requirements are summarised in Table 7.

Table 7: Statutory Bicycle Parking Requirements

Use	Statutory Requirement
Dwelling	1 space per 5 dwellings for residents 1 space per 10 dwellings for visitors

As a minimum, parking should be provided at the above rates to satisfy the requirements of Clause 52.34 of the Planning Scheme.

Parking for residents should be provided within secure areas and at dimensions that accord with Clause 52.34 and/or the requirements of AS2890.3:2015.

Consideration could be given to providing additional bicycle parking for future residents of the development to further encourage the use of alternative transport modes and reduce the reliance on cars as daily modes of transport.

Visitor parking should be provided in appropriately accessible locations and proximate to the site entries.

6 Traffic Considerations

6.1 Traffic Surveys

Traffix Group commissioned traffic surveys of the site access points on Thursday 4th May 2017 to understand existing traffic conditions in the area and the traffic generated by the existing site.

Surveys were undertaken at the intersection of Walker Street and Phillips Court (the site access) and at the intersection of High Street/Hales Court (High Street Close)/ Walker Street (east).

This data was supplemented by VicRoads SCATS data along High Street, which identified that the peak periods for the network occurred between 7:15am-8:15am in the morning period and 4:30pm-5:30pm in the afternoon period.

A summary of the peak hour vehicle movements at the subject intersections is provided in Figure 17 and Figure 18.

It is noted that at the time of the surveys, works were being undertaken to the west of the site at the corner of Walker Street and McLachlan Street. These works severed the vehicle connection to the west and hence the volumes recorded on Walker Street are not likely to be representative of volumes on Walker Street during normal conditions. Having said that, our observations of this area suggest local area traffic management restricts movements throughout the existing residential network and, in any case, Walker Street is likely to currently take relatively low levels of through traffic.

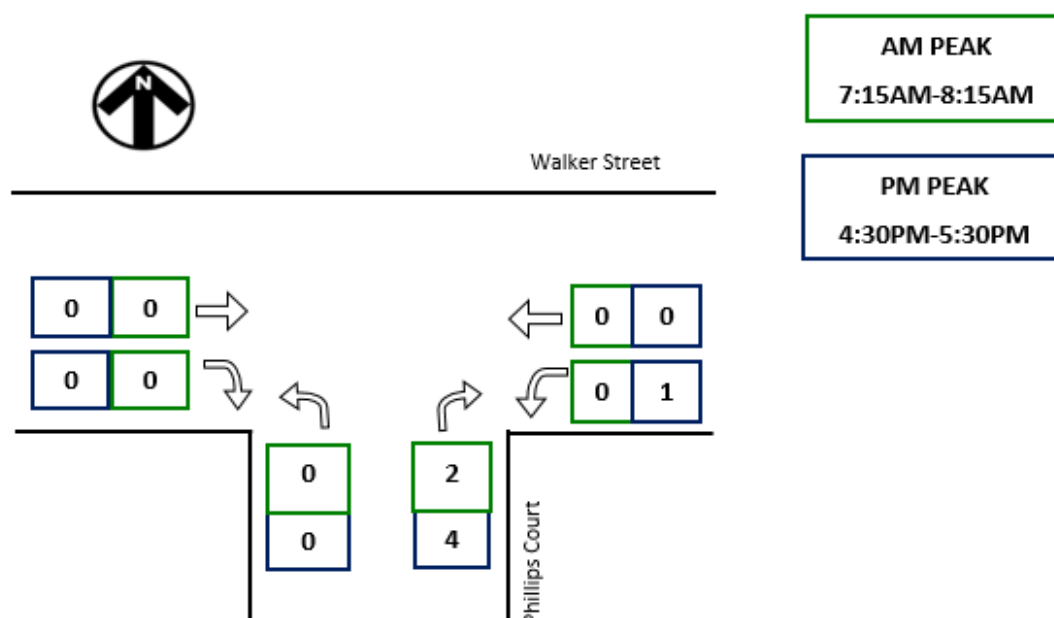


Figure 17: Peak Hour Turning Movements Walker Street/Phillips Court (Site Access)

Traffic Engineering Assessment

Walker Street, Northcote: DHHS Public Housing Renewal Program

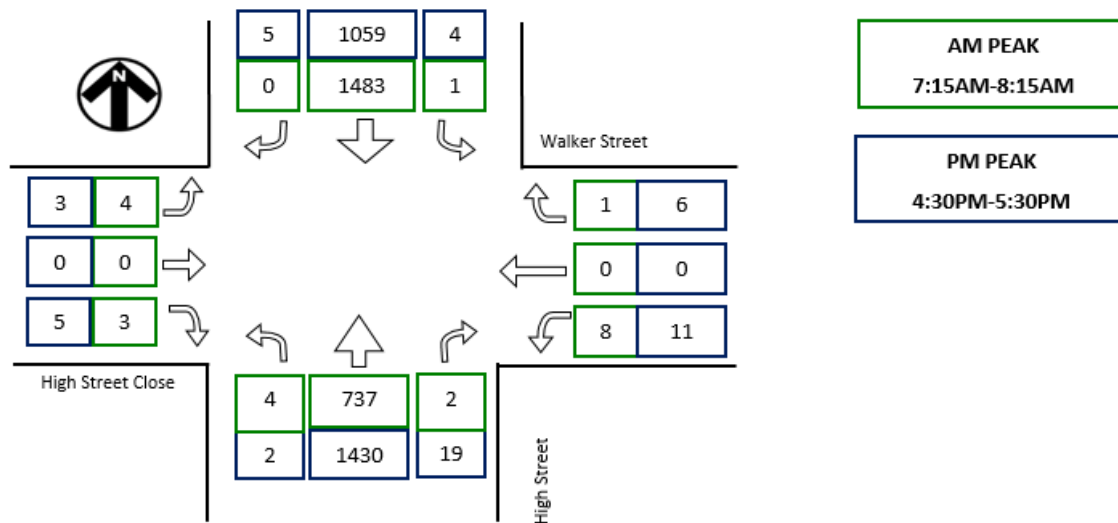


Figure 18: Peak Hour Turning Movements High St/Hales Ct (High St Cl)/Walker St (East)

Our observations of traffic conditions showed that the whilst the two-way volume along High Street in the peak hours is in the order of 2,200-2,500 vehicles per hour, some gaps are afforded to motorists exiting Walker Street and Hales Court (High Street Close) and the adjacent side streets along High Street.

The pedestrian signals at the site abuttal and the signals to the north of the site (at Merri Parade and Westgarth Street) assist with platooning traffic flows along High Street, particularly during morning and afternoon peak periods when tram users alight at the tram stop and utilise the crossing to cross High Street Road.

Whilst we observed that some motorists exiting the side roads were subject to delays and queues in the peak hours, motorists were able to enter the High Street traffic stream due to queues from the Merri Creek intersection and slow moving traffic providing courtesy gaps to allow vehicles to enter the road.

6.2 Traffic Generation

6.2.1 Public Housing

The traffic surveys undertaken above include traffic movements associated with the existing public housing which takes access to Walker Street and High Street via Phillips Court and Hales Court (High Street Close).

It is assumed that the movements to/from Hales Court (High Street Close) and Phillips Court are solely associated with the existing public housing development and the 42 spaces which are currently provided from these accesses.

A summary of the peak traffic generation at these intersections is summarised in Table 8.

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Table 8: Existing Public Housing Traffic Generation to Phillips Court/Hales Court

Peak	Hales Court		Phillips Court		Total	
	In	Out	In	Out	In	Out
AM Peak	4	7	0	2	4	9
PM Peak	7	8	1	4	8	12

The surveys indicate that the existing public housing generates some 13 vehicle movements two-way in the AM peak hour and 20 vehicle movements two-way in the PM peak hour via these accesses.

Based on the existing provision of 42 spaces accessed via this location, this equates to a traffic generation rate of 0.31 vehicle movements per space during the AM peak hour and 0.48 vehicle movements per space during the PM peak hour.

The application seeks to increase the number of dwellings on the site by approximately 10 percent and provide in the order of 57 resident spaces on-site. Application of the above rates suggests a peak traffic generation of some 18 vehicle movements during the AM peak hour and 27 vehicle movements during the PM peak hour.

It is noted that the majority of this traffic generation will already be on the road network and associated with the existing estate.

In this regard, it is expected that the 10% increase in total social housing dwelling numbers is likely to in fact generate only a very small number of additional vehicle movements during the AM and PM peak hours (2-3 additional vehicle movements in a peak hour).

6.2.2 Private Housing

The proposed private housing will have higher parking provisions and car ownership than the public housing component of the development.

In consideration of the location of the site, size of the dwellings and traffic generation rates adopted for other developments in the area, it is expected that the private residential component will generate traffic at a rate of 3 vehicle movements per dwelling per day, inclusive of 0.3 movements per dwelling in peak hours.

Application of this rate to the proposed 127 dwellings equates to a projected daily traffic generation of 381 movements, inclusive of 38 movements in peak hours.

We note that the reduced parking provisions for private residents is likely to contribute to even further reduced traffic generation for the proposal. However for the purposes of a robust and conservative analysis (and potential for higher private parking provisions on the site), the above rate has been applied to all dwellings regardless of parking allocation.

Assuming a typical AM peak traffic split of 20% arrivals and 80% departures and PM peak traffic split of 60% arrivals and 40% departures, it is projected the development will generate:

AM PEAK:	8 arrivals and 30 departures
PM PEAK:	23 arrivals and 15 departures.

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6.3 Traffic Impact

Based on the preceding, we expect that the redevelopment of the site could generate some 40-41 additional movements during the network peak hours associated with 38 private residential vehicle movements and only an additional 2-3 public housing residential vehicle movements.

This level of additional traffic generation is relatively low in traffic engineering terms, equivalent to an average of less than one additional vehicle movement being generated every minute during the peak periods.

The access arrangements for the site will provide future residents with opportunities to access Walker Street and depart or arrive via Merri Parade (to the north-west) or High Street either via Walker Street or Hales Court (High Street Close).

Whilst the existing traffic surveys demonstrate that there is a concentration of site traffic to/from High Street (and not to Walker Street) this is likely to be associated with the works at the corner of Walker Street and McLachlan Street. Once those works have ceased, and the connection has been re-established, it is likely that resident movements will be more evenly distributed across both access points to arrive or depart via the external road network.

In this regard, traffic volumes generated by the proposal will be distributed to multiple access routes and once at each intersection, the movements will also be distributed to left and right turning vehicles. The associated impact of the relatively low increase to any one turning movement is therefore expected to be minimal.

Furthermore, the nearby signalised intersections meter traffic on High Street and Merri Parade to create gaps in traffic to accommodate side road entering and exiting traffic.

The existing road network is therefore expected to have sufficient capacity to accommodate the additional traffic generated by the proposed redevelopment.

7 Additional Considerations

With regard to access points, internal design and pedestrian and bicycle connections through and around the site, the Design Framework includes consideration of these items.

The internal roadway is intended to be retained as a private road, managed by the future Owners Corporation, and contemplates two-way traffic with some indented parking for visitors.

This will accommodate service vehicle access and appropriate two-way circulation within the private accessways.

Waste collection and emergency vehicle access should also be considered when incorporating at-grade vehicle accessways into the design of the site.

Reference is made to the MFB Planning Guidelines for Emergency Vehicle Access and Minimum Water Supplies within the Metropolitan Fire District which has minimum requirements to allow an emergency vehicle to turnaround on site and exit in a forward direction.

8 Conclusions

Having undertaken a detailed traffic engineering assessment of the DHHS Public Housing Renewal Program at Walker Street, Northcote, we are of the opinion that:

- a) The car parking requirements of Clause 52.06 are currently applicable to the site, however the proposal to include a Schedule to the Parking Overlay with reduced parking rates for this site is considered appropriate based on the following grounds:
 - i) The site is located within close proximity to a number of neighbourhood activity centres and is very well served by public transport (trains, trams and buses) and other alternative transport modes (walking, cycling and car share),
 - ii) There is a high demand for smaller dwellings without resident parking in this locality,
 - iii) Local Policy for City of Darebin supports reduced parking provisions to encourage the use of sustainable transport modes and reduction in traffic congestion caused by private motor vehicle ownership
 - iv) There has been a historical reliance on on-street parking by residents of the existing estate.
- b) Appropriate rates for parking are set for public housing and private housing and suggest the Design Framework and expected yield would require the provision of in the order of 57 spaces for public housing residents, 106 spaces for private housing residents and 22 spaces for residential visitors.
- c) Bicycle parking should be provided in accordance the requirements set out at Clause 52.34 of the Planning Scheme,
- d) The level of traffic generated by the proposal is expected to be able to be accommodated by the existing road network and surrounding intersections, particularly when considering that:
 - i) The public housing component is expected to generate in the order of only 2-3 additional vehicle movements in the peak hours;
 - ii) The private housing component is expected to generate up to 38 additional vehicle movements in the peak hours,
 - iii) Collectively, this equates to an average of an average of less than one additional vehicle movement each minute during the peak hours,
 - iv) Once split to the multiple access routes, this will have no discernible impact on the operation of the intersections.

Subject to the preceding, there are no traffic engineering reasons why the redevelopment of the Walker Street Estate, generally in accordance with the Design Framework Plan, should not be permitted.

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