GTAconsultants

Precinct 16 West

Amendment C114 to the Hobsons Bay Planning Scheme

Transport Impact Assessment

Client //	Newport Townhomes Pty Ltd Alceon Group No. 67 as trustee for South Kingsville Trust Brymart Pty Ltd
Office //	VIC
Reference //	V138460
Date //	22/06/20

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Issue: H 22/06/20

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
F	05/09/19	Updated Final – minor edits	Tom Dwyer	Simon Davies	Simon Davies	Simon Davies
G	19/05/2020	Updated to include Council Comments and Changes	Tom Dwyer	Simon Davies	Simon Davies	Simon Davies
H	22/06/2020	Minor updates	Tom Dwyer	Simon Davies	Simon Davies	

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Table of Contents

Appendices

Figures

Tables

1. Introduction

1.1 Preamble

The following report includes updates that incorporate changes and comments in accordance with the specific direction provided by Hobsons Bay City Council in May 2020. GTA Consultants reserves the right to maintain the position as outlined in its earlier reports in the presentation of evidence at any future planning forum.

1.2 Overview

A Planning Scheme Amendment (PSA) is currently being sought to rezone land located at 41-59 Stephenson Street & 5-9A Sutton Street in South Kingsville (otherwise known as "Precinct 16 West"), from an Industrial 3 Zone to a Residential Growth Zone or other residential zone. It is proposed to apply Development Plan Overlay, Schedule 2 to the land, seeking development generally in accordance with the Framework Plan in the draft DPO2. This report has assumed a conservative upper limit of 650 lots in order to test surrounding infrastructure however ultimate number of dwellings is anticipated to be less. It is expected predominantly townhouse and apartment style dwellings will be proposed at the site.

Vehicle access is proposed via an unsignalised access point to/from Stephenson Street and it is understood that Council requires the signalisation of Blackshaws Road and Sutton Street to provide access to the development. A new east-west connector road between Stephenson Street and Sutton Street will complete the internal road network through the subject land.

On the above basis, GTA Consultants (GTA) was commissioned by the Applicant(s) in October 2017 to undertake a Transport Impact Assessment for the proposed rezoning.

1.3 Background

GTA has previously prepared a Traffic Impact Assessment (TIA) for the site, dated 2 March 2015, for the rezoning of land which is generally consistent with what is being sought under this application. The changes from the previous TIA that are pertinent to note include:

- Reduction of development yield from 670 to 650 dwellings[1]
- Removal of the internal road connection between sites 5 and 9a Sutton Street, South Kingsville.

It is noted that the previous TIA relied on a study undertaken for the Precinct 16 East site and incorporated a cumulative impact assessment of a number of surrounding developments (including the Precinct 16 West site). Notably, the cumulative impact assessment incorporated developments within the surrounding area and, as discussed, assessed both a higher yield of 670 dwellings for Precinct 16 West and also 600 dwellings for Precinct 16 East.

The assessment completed in this report only considers the intersections immediately adjacent the site noting the following improvement works to the road network:

- Improvements to the intersection of Blackshaws Road and Sutton Street to support Precinct 16 East development.

[1] it is anticipated that the total number of dwellings will be less than 650 dwellings.

- An auxiliary right turn lane into Schutt Street from Blackshaws Road.
- Potential works at the intersection of Melbourne Street/Ross Street.
- Detector loops at Melbourne Road and Ross Street to activate the pedestrian lights at Melbourne Road or a contribution toward a future alternative treatment at this intersection such as signalisation.
- Designated left and right turn lanes at Sutton Street.
- The auxiliary right turn lane into Schutt Street formalised on Blackshaws Road.
- Pedestrian refuges along Blackshaws Road.

1.4 Purpose of this Report

This report sets out an assessment of the anticipated broad level transport implications of the proposed development, including consideration of:

i the acceptability of the traffic impacts of the proposed development
ii the adequacy of the proposed pedestrian, bicycle and public transport access arrangements to the site
iii the adequacy of the proposed bike and car parking provision/general layout design (including waste and loading collection arrangements).

This report primarily focuses on the internal road network layout issues and direct access points to the external network abutting the site (specifically the interface with Stephenson Street and Sutton Street). Consideration of ultimate traffic impacts at external intersections further afield are assessed in the GTA Report prepared for Precinct 16 East (the remainder of Precinct 16).

Further, this report addresses the requirements of the Hobsons Bay City Council Industrial Land Redevelopment Planning Scheme Amendment Guidelines, which are reproduced as follows:

- Connections to existing roads and the means of vehicular ingress and egress from the site.
- The traffic generated from the proposed development.
- Traffic impacts of the development on the existing and broader road network, specifically, the key arterial road networks where applicable.
- The design of the footpaths and bicycle paths including connections and reservations linking existing local and regional networks.
- Road layout, road widths and reserves. This must include the provision for service vehicles access.
- Car parking rates and location of car parking for the use and development of land. Alternative modes of transportation should be catered for within the development and include end of trip facilities (i.e. bike parking, showers, etc.).
- Consideration has also been given to the Framework Plan in the draft DPO2 prepared for the site in consultation with Council that set the overall road network for Precinct 16 West. It is understood that this plan has now been incorporated into the Draft Development Plan Overlay Schedule 2 and renamed a 'Framework Plan'.

1.5 References

In preparing this report, reference has been made to the following:

- Framework Plan in the draft DPO2
- Hobsons Bay Planning Scheme
- GTA Report titled 'Residential Subdivision – 38-48 Blackshaws Road, South Kingsville Transport Impact Assessment' dated 14 August 2014

- VCAT Transport Evidence Statement '38-48 Blackshaws Road and 24 Sutton Street, South Kingsville' dated 13 July 2017
- GTA Report titled 'Newport Village Master Plan' dated 15 June 2017
- Traffic and car parking surveys as referenced in the context of this report
- VicRoads 'Guidelines for Transport Impact Assessment Reports – For Major Land Use and Development Proposals', May 2006 Version 1.02
- Hobsons Bay Industrial Land Management Strategy, dated June 2008
- Development Plan for 41-59 Stephenson Street, South Kingsville prepared by CHT Architects, dated 22 March 2019
- Development plan for 9-9A Sutton Street.

2. Existing Conditions

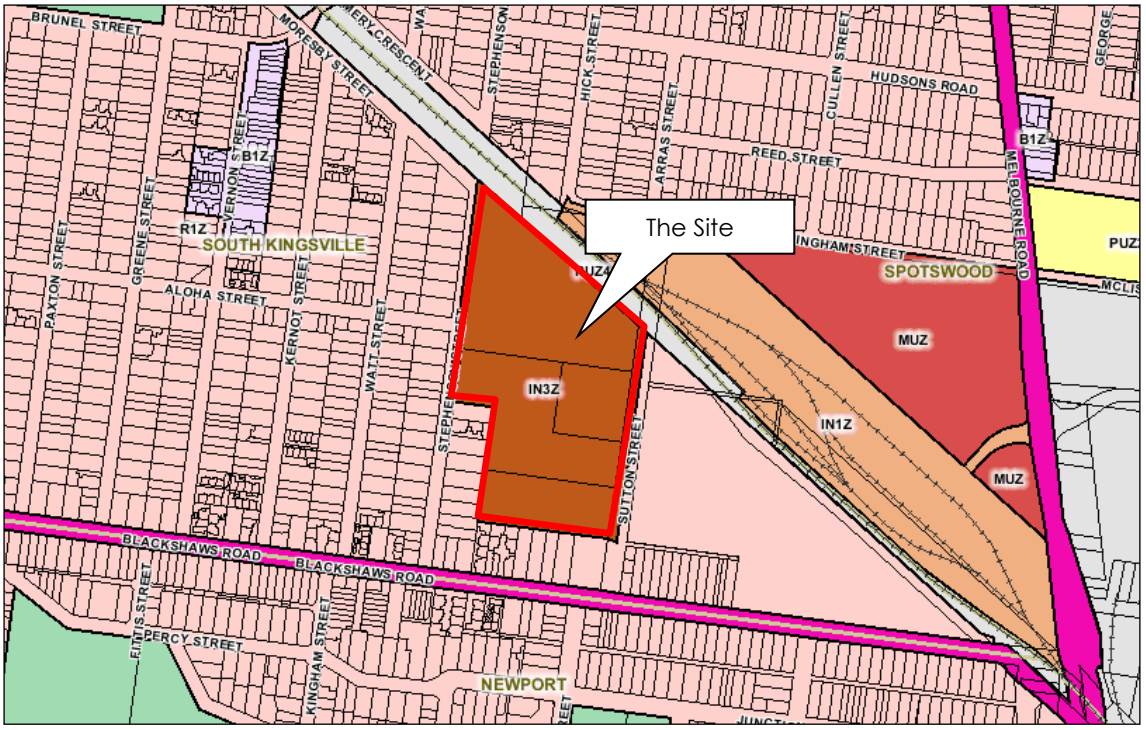
2.1 Subject Site

The Site is located at 41-59 Stephenson Street & 5-9A Sutton Street in South Kingsville and has frontages of approximately 240m to Stephenson Street to the west and 240m to Sutton Street to the east.

The site is located within an Industrial 3 Zone, is currently partly vacant and partly occupied by some industrial uses. The surrounding properties include a mix of residential and industrial land uses; the latter including most significantly the Pacific National Locomotive Maintenance Facility to the north-east of the site. A child care centre is also located on the corner of Blackshaws Road and Sutton Street.

The notable exceptions include Newport Lakes Primary School to the southeast and Newport Lakes Park to the southwest. A land zoning map identifying the site is shown in Figure 2.1.

Figure 2.1: Land Zoning Map



Source: Land Channel website

2.2 Transport Policy

Details of the relevant transport planning policy which surrounds the development of the subject site, including consideration of the Hobson Bay Industrial Land Management Strategy 2008 and VicRoads SmartRoads policy is provided in Appendix A.

2.3 Road Network

The road network in the vicinity of the site features a traditional hierarchy incorporating primary and secondary arterial roads, collector roads and local streets.

Descriptions of the key roads (and others within the vicinity of the site) are provided below.

Blackshaws Road

Blackshaws Road functions as a secondary arterial road and is aligned in the east-west direction.

As shown in Figure 2.2 and Figure 2.3, Blackshaws Road is a two-way road configured with a two-lane, 12.5 metre wide carriageway set within a 20 metre wide road reserve (approx.). Kerbside parking is permitted on both sides of the carriageway although parking on the southern side of Blackshaws Road is restricted to vehicles less than 10 tonne. Blackshaws Road is subject to a speed limit of 60km/hr in the vicinity of the site.

Blackshaws Road carries approximately 6,850 vehicles per day (vpd) immediately west of Elizabeth Street[2].

Figure 2.2: Blackshaws Road at Elizabeth Street – looking East

Figure 2.3: Blackshaws Road at Elizabeth Street – looking West

Sutton Street

Sutton Street functions as a local street and is aligned in the north-south direction. It is predominately unconstructed, with the exception of a short sealed section adjacent to its intersection with Blackshaws Road.

As shown in Figure 2.4 and Figure 2.5, Sutton Street is a two-way road configured with a two-lane, 9.2 metre wide carriageway set within a 20 metre wide road reserve (approx.). Kerbside parallel parking is permitted on both sides of the carriageway although it is noted that kerbs are only constructed along the southern section of the street (after which kerbing is not provided and an unsealed carriageway is provided). Sutton Street is subject to a speed limit of 50km/hr.

Sutton Street carries approximately 650 vpd to the immediate north of Blackshaws Road.[2]

[2] Based on peak hour traffic movement counts commissioned by GTA Consultants on Tuesday 30 August 2016 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for other roads.

Figure 2.4: Sutton Street at Blackshaws Road – looking North

Figure 2.5: Sutton Street at Blackshaws Road – looking South

Stephenson Street

Stephenson Street functions as a local street and is aligned in the north-south direction. It is constructed with a two-way, 7m wide carriageway set within a 15.5m road reserve (approx.). Bus route 432 operates along Stephenson Street between Aloha Street and Blackshaws Road, along the western frontage of the subject site. Kerbside parallel parking is permitted on both sides of the carriageway.

Stephenson Street carries approximately 900 vpd to the immediate north of Blackshaws Road[3].

2.3.1 Surrounding Intersections

Key intersections in the vicinity of the site include:

- Blackshaws Road/Stephenson Street ('stop sign' controlled)
- Blackshaws Road/Sutton Street/Johnston Street ('stop sign' controlled).

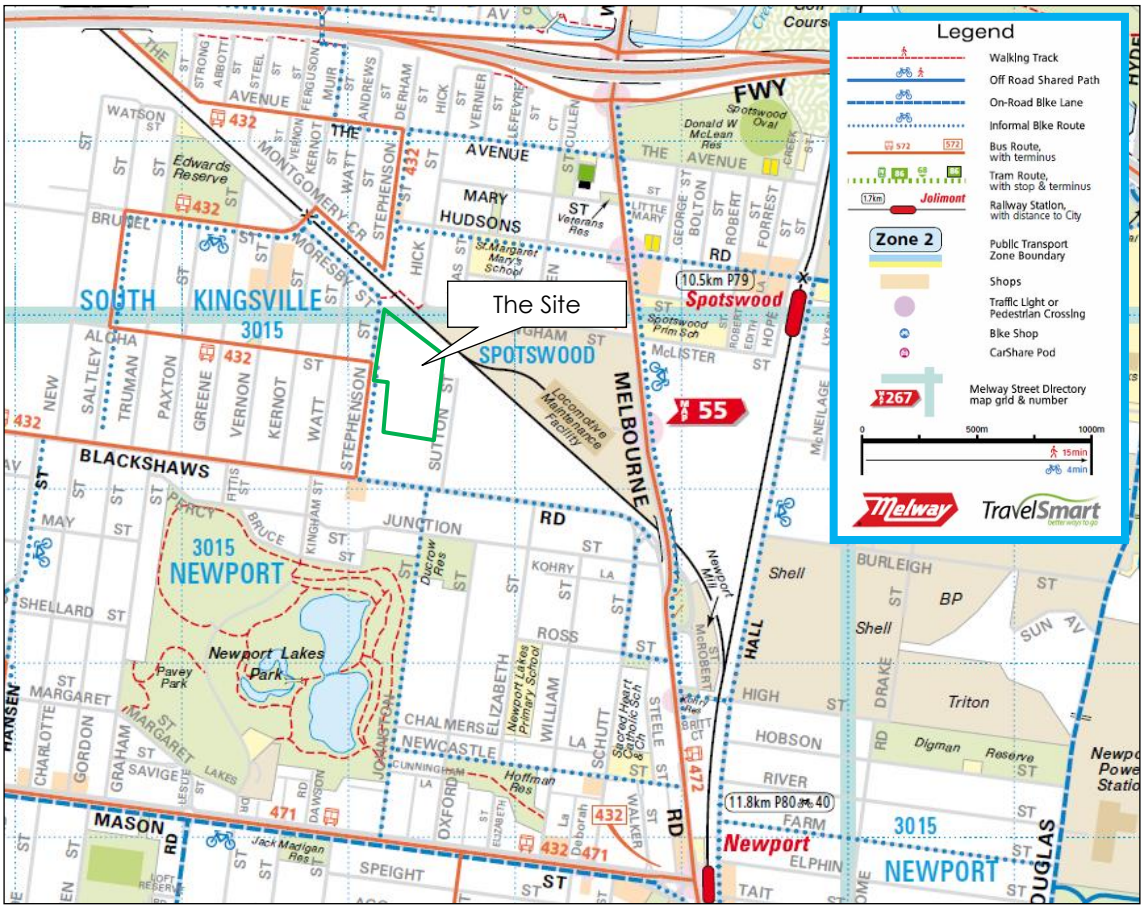
2.4 Sustainable Transport Infrastructure

The subject site in relation to existing sustainable transport infrastructure, public transport, bicycle and pedestrian facilities are most clearly shown in the Hobson Bay "TravelSmart" map, a relevant portion of which is reproduced in Figure 2.6

The sustainable transport infrastructure surrounding the subject site is described in further detail within the following sections of this report.

[3] Based on peak hour traffic movement counts commissioned by GTA Consultants on Tuesday 20 March 2012 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for other roads.

Figure 2.6: Nearby Sustainable Transport (TravelSmart)



Hobsons Bay TravelSmart Map

2.4.1 Public Transport

Figure 2.7 shows the subject site in relation to existing public transport routes within its vicinity whilst Table 2.1 summarises the road-based routes and major destinations that can be reached using these services.

Figure 2.7: Public Transport Map

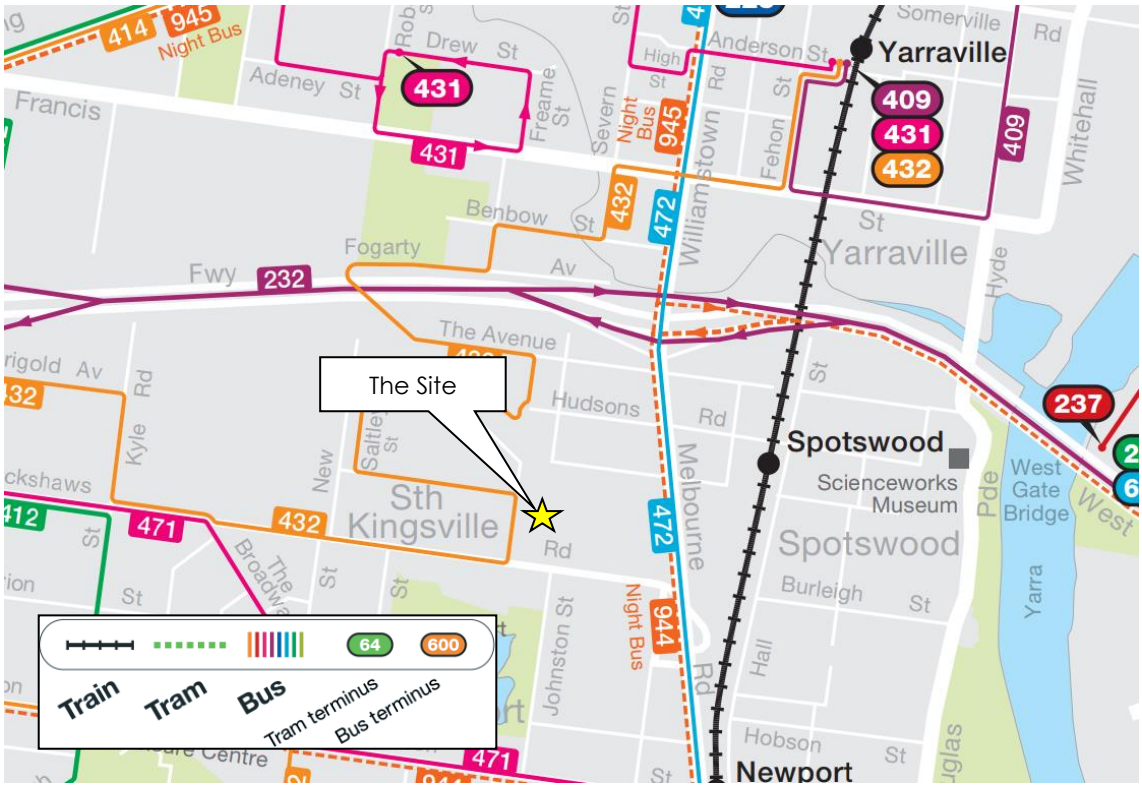


Table 2.1: Road Based Public Transport Provision

Service	Route Nos	Route Description	Approx. Distance to Nearest Stop (m)	Significant Destinations On Route	Frequency On/Off Peak
Bus	432	Newport - Yarraville via Altona Gate Shopping Centre	<300m	Newport Bus Interchange, Altona Shopping Centre, South Kingsville and Yarraville	10min/20min
	472	Williamstown - Moonee Ponds via Footscray	1km	West Footscray Station, Footscray Station, Flemington Show Grounds, Ascot Vale Station and Moonee Ponds Bus Interchange	15min/15min

In addition to road based public transport, Spotswood Railway Station, on the Williamstown line, is located approximately 1-kilometre walking distance to the north-east and south-east of the subject site.

It should also be noted as part of a rezoning process associated with Hobsons Bay Planning Scheme Amendment C88 for Precinct 15 (large development site approx. 1km west of Precinct 16), provisions will be made to enable future capability for buses and improvements to existing services along the key east-west collector road within the site and along Blackshaws Road, respectively.

2.4.2 Pedestrian Infrastructure

Sealed pedestrian pathways are generally provided on both sides of the majority of roads within the vicinity of the site, with the noted exception of along Blackshaws Road where the northern pedestrian footpath terminates approximately 200m east of Sutton Street. It is expected that the pedestrian footpath will be extended along Blackshaws Road across the frontage of the Precinct 16 East site as part of the works associated with that site.

Pedestrian connectivity across the rail line is provided at the northern extent of Stephenson Street providing the shortest route to Spotswood train station (approximately 1km walking distance).

The existing pedestrian infrastructure in the vicinity of the site provides safe pedestrian access from the site to surrounding public transport services discussed above, as well as neighbouring land uses located in the vicinity of the site.

2.4.3 Cycle Infrastructure

The Principal Bicycle Network (PBN) is a network of existing and proposed on-road and off-road bicycle routes and a bicycle infrastructure planning tool used to guide the funding and construction of bicycle routes.

VicRoads has primary responsibility for managing the development of the PBN and its bicycle facilities are generally implemented by VicRoads and local Councils.

The following map shows the existing and proposed on and off road bicycle facilities making up the PBN in the vicinity of the subject site.

Figure 2.8: VicRoads Principal Bicycle Network (Existing and Proposed)

(Reproduced from VicRoads Website)

Figure 2.8 shows that Blackshaws Road, Melbourne Road, and the Westgate Freeway alignment are proposed as bicycle routes on the Principal Bicycle Network.

Notwithstanding the above, reference to the TravelSmart map and a review of the sites surrounds indicated the following existing bicycle facilities are currently available:

- Blackshaws Road: Informal cycling route (wide traffic lane/shared bicycle and parking lane)
- Stephenson Street: Informal cycling route (shared motorist/cyclist traffic environment)
- Hudsons Road: Informal cycling route (shared motorist/cyclist traffic environment).

3. Development Site

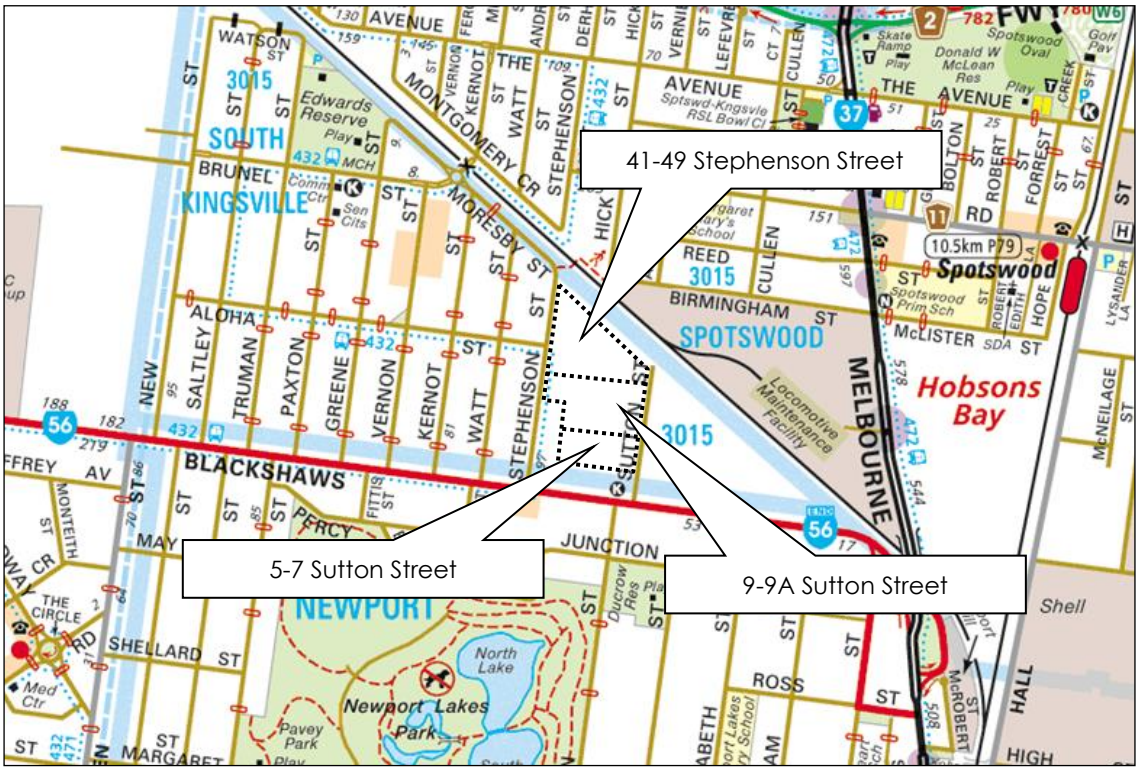
3.1 Background and Development Summary

The PSA seeks to rezone three parcels of land located at 41-59 Stephenson Street, 5-7 Sutton Street & 9-9A Sutton Street in South Kingsville, from an Industrial 3 Zone to a Residential Growth Zone or other residential zone. In addition, the PSA is also seeking the application of a Development Plan Overlay for the site.

The Site (referred to as Precinct 16 West) is identified in the Hobsons Bay City Council's Industrial Land Management Strategy (2008) (ILMS). It is bound by a rail line to the north, Sutton Street to the east, residential properties to the south, and Stephenson Street to the west.

The location of the Site (including its land parcels) and its surrounding environs is shown in Figure 3.1.

Figure 3.1: The Site and its Environs



Source: Melway Publishing Pty Ltd

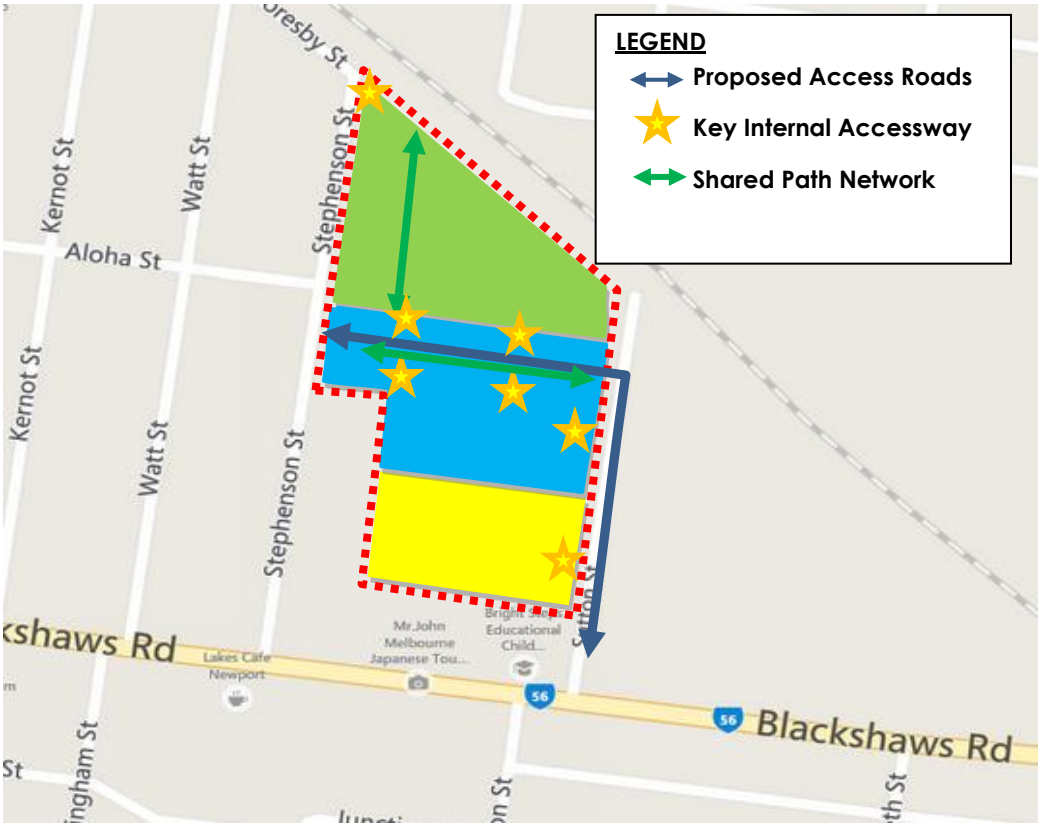
The proposed rezoning across the three land parcels, as per the DPO2 Framework Plan. While this report has conservatively assumed an upper limit of 650 residential lots (apartments and townhouses) for this analysis, the total number of lots is expected to be less.

Vehicle access is proposed via Stephen Street and Sutton Street onto Blackshaws Road.

Access to Stephenson Street will also be provided via a new east-west access road between Sutton Street and Stephenson Street. Additional internal access lanes or internal driveways are proposed within each of the lots, which are subject to further design consideration.

Direct lot access is proposed via the east-west access road through the site. A shared path will be provided on the southern side of the east-west access road as well as on the western side of the access road connecting through to the north of the site. The proposed access arrangements are illustrated indicatively in Figure 3.2.

Figure 3.2: Proposed Access Arrangements



Source: Bing Maps website

The anticipated yields for each development land parcel at the Site are summarised in Table 3.1.

Table 3.1: Proposed Development Schedule

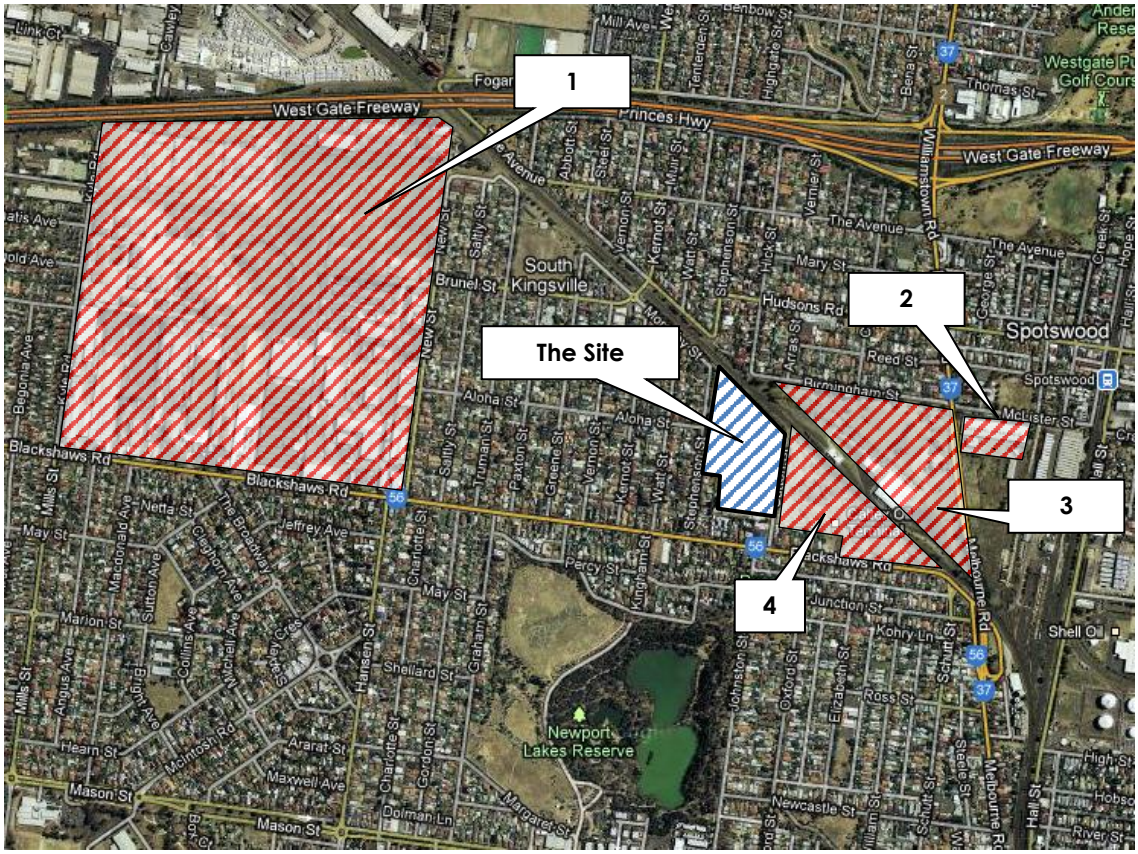
Site Location	Yield
41-59 Stephenson Street, South Kingsville	250 dwellings
9-9A Sutton Street, South Kingsville	250 dwellings
5-7 Sutton Street, South Kingsville	150 dwellings
TOTAL	**650 dwellings**

While it is understood that the above figures are subject to further resolution, a total yield of 650 lots has been adopted to provide a conservative assessment.

3.2 Surrounding Land Use Developments

It is understood that a number of developments, at various stages of design and approval, are being contemplated within the vicinity of the Site. These developments are referenced in Figure 3.3 and discussed in detail below.

Figure 3.3: Nearby Development Sites



Source: Google Maps website

Site 1. **Precinct 15 – Blackshaws Road, South Kingsville**

Approval for up to 3,000 residential dwellings, plus retail and commercial floor space (in place of existing industrial uses) as per the Development Contributions Plan report for the site (dated August 2018)[4].

Site 2. **31-69 – McLister Street, South Kingsville**

Potential to cater for approximately 350 residential dwellings[5].

Site 3. **Precinct 17 – Birmingham Street and Melbourne Road, Spotswood**

Potential to cater for approximately 200 residential dwellings[6].

Site 4. **Precinct 16 "East" - 38-48 Blackshaws Road, South Kingsville**

Has a masterplan approved for 420 dwellings[7].

The additional traffic generated by nearby development sites (as generally indicated above) has been used to represent future traffic growth along Blackshaws Road. The increase in traffic volumes on the road network has also been used to assess the anticipated operation of the Site access points to ensure that these will continue to operate satisfactorily following full development (Ultimate Post-Development).

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4 The DCP is referenced in Schedule 2 to the Comprehensive Development Zone (CDZ2) of the Hobsons Bay Planning Scheme.

5 Previously 240 dwellings were proposed on this site – in the context of the reduction in yields at other nearby sites this change is not considered significant.

6 A reduction from 285 dwellings proposed previously on this site.

7 It is noted that a previous development scheme presented for this site contemplated the construction of 600 dwellings and a child care centre (120 children).

4. Traffic Impact Assessment

4.1 Preamble

Land use planning policy in Victoria indicates that where a development site abuts (or does not abut but may impact on any part of the declared main road network), the development should be assessed against the benchmarks and guidelines set out under VicRoads' "*Traffic Impact Assessment Report Guidelines*" (TIAR Guidelines – May 2006).

In this regard, it is noted that GTA has previously undertaken extensive traffic modelling in relation to rezoning and Master Plan approval associated with the parcel of land located at 38-48 Blackshaws Road in South Kingsville (or Precinct 16 "East").

The assessment completed by GTA, included a Network Fit Assessment and Transport Impact Assessment Report comprising a comprehensive 'Ultimate Post-Development' assessment including all of Precinct 16 (including the Site and 38-48 Blackshaws Road) as well as cumulative traffic generated by other developments in the area as shown in Figure 3.3.

Furthermore, GTA was engaged to prepare a revised Master Plan report for the Precinct 16 East site (dated 10 November 2017). As part of this report, an assessment was undertaken to demonstrate that the Ultimate Post Development scenarios of the previous assessment and an updated assessment (including 2016 existing traffic volumes) represents a comparable outcome. It has been demonstrated below that the similarity in total traffic volumes between the previous and updated traffic assessments represents a good comparison and therefore indicates that similar impacts of the proposed development will occur.

A summary of GTA's road network assessment is detailed in Section 4.2 and 4.3 of this report, noting that it has been conservatively assessed that there are a proposed 670 dwellings for the proposed development of Precinct 16 West (in keeping with the previous assessment).

4.2 Previous Cumulative Traffic Impact Assessment

GTA has previously undertaken a TIA for the Precinct 16 East site (dated 14 August 2014) to accompany the development application for the rezoning of land. The report referenced the cumulative impact assessment undertaken as part of that application and included the impacts of a number of sites forecast to be developed within the surrounding area.

GTA subsequently presented the cumulative impact assessment at the VCAT hearing in July 2015, as part of the Precinct 16 East development application[8].

Of note, The Site (Precinct 16 West) was incorporated as part of the developments within the surrounding area and at the time constituted a development yield of 670 dwellings. For further reference, the land uses assessed as part of the cumulative impact assessment are outlined in Table 4.1.

[8] Note that the Precinct 16 West development is included in the overall assessment.

Table 4.1: Ultimate Post Development Land Uses

Site	Land Uses Assessed (GTA Report 14 August 2014)
Precinct 16 East	600 dwellings & Child Care Centre (120 children)
Precinct 16 West (West of Sutton Street)	**670 dwellings [1]**
Precinct 15 (Approved)	3000 dwellings & Retail Floor Space (4,000sqm)
Precinct 17 (Birmingham Street, Spotswood)	285 dwellings
31-69 McLister Street, South Kingsville	240 dwellings
TOTAL [2]	**4,795 dwellings** **4,000sqm Retail Floor Space &** **Child Care Centre (120 children)**

[1] An upper limit of 650 dwellings is now considered to be conservative, noting the expected number of developed lots is expected to be lower.

[2] A further land use development at Nelson Place in Williamstown (Precinct 20), containing 800 dwellings, was also reviewed by GTA as part of the Transport Evidence prepared in 2015. Sensitivity testing of the impacts on Melbourne Road as a result of the development indicated that the key intersection of Melbourne Road/Ross Street would operate satisfactorily under all scenarios.

The assessment concluded that the traffic generated by the proposed development of Precinct 16 can be accommodated by the surrounding road network and that the proposed site access points can be expected to operate satisfactorily under ultimate post-development conditions (including traffic generated by surrounding developments). In comparison with anticipated yields for these sites as per Section 3.2 of this report, it is noted that the above overall is considered conservative on the high side with respect to completing an assessment of traffic impacts.

4.3 Current Traffic Impact Assessment

4.3.1 Traffic Volumes

It is noted that the cumulative traffic impact assessment prepared by GTA is based on vehicle movement data captured in 2012. Given the data was captured approximately five years ago, it is considered necessary to investigate the potential changes to the traffic conditions within the road network that may have occurred over this time period.

GTA was able to source publicly available traffic volume data which was captured as part of the '*Precinct 15, Altona North Integrated Transport Study*'. The Precinct 15 study sought the approval of a Comprehensive Development Plan to rezone the land from an industrial use to a predominately residential use. The traffic impact assessment undertaken as part of the Precinct 15 study assessed the surrounding road network with the salient considerations of the study identified below:

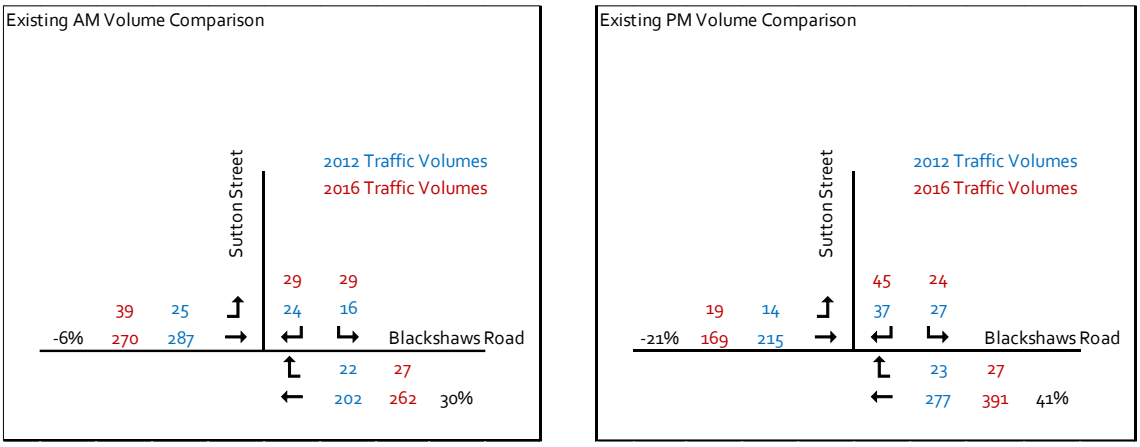
- The major roads included as part of the traffic assessment were Millers Road, Blackshaws Road and Melbourne Road. The study area captured the study area all the way up to the West Gate Freeway.

- The future 2031 scenario tested incorporates all forecasted developments within the area (as identified in Table 4.1), following the construction of the West Gate Tunnel and widening of the West Gate Freeway.

The traffic volume data was captured on Tuesday 30 August 2016, with subsequent analysis in the associated report outlining this day as a typical survey day (i.e. 85th percentile traffic event).

A comparison between the 2012 and 2016 survey data at the Blackshaws Road/Sutton Street intersection is presented in Figure 4.1 for the AM and PM peak periods.

Figure 4.1: Blackshaws Road/Sutton Street Intersection - 2012 vs 2016 Traffic Volume Data



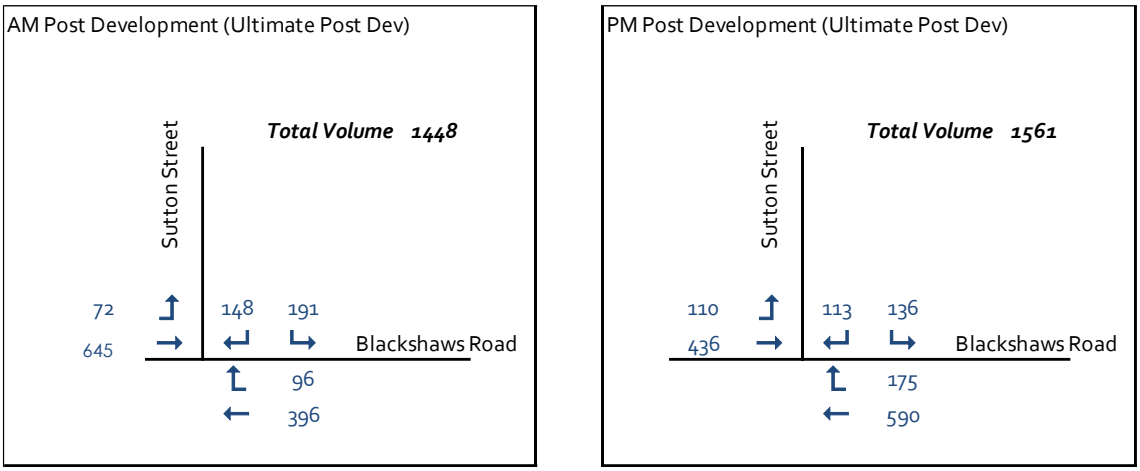
The comparison between the two data sets indicates the following:

- The 2016 traffic volumes are approximately 14% greater than the 2012 volumes.
- The through volumes along Blackshaws Rd heading west at the Sutton Street intersection have increased by 30% and 41% in the AM and PM peaks respectively.
- The eastbound through traffic volumes have decreased by approximately 6% and 21% in the AM and PM peaks respectively.

4.3.2 Development Traffic

The ultimate post development scenario assessed as part of the previous cumulative impact assessment has been reproduced in Figure 4.2 for the Blackshaws Road/Sutton Street intersection. Figure 4.2 identifies the 2012 traffic volumes overlayed with the growth of the surrounding developments and the proposed development yields as identified in Table 4.1.

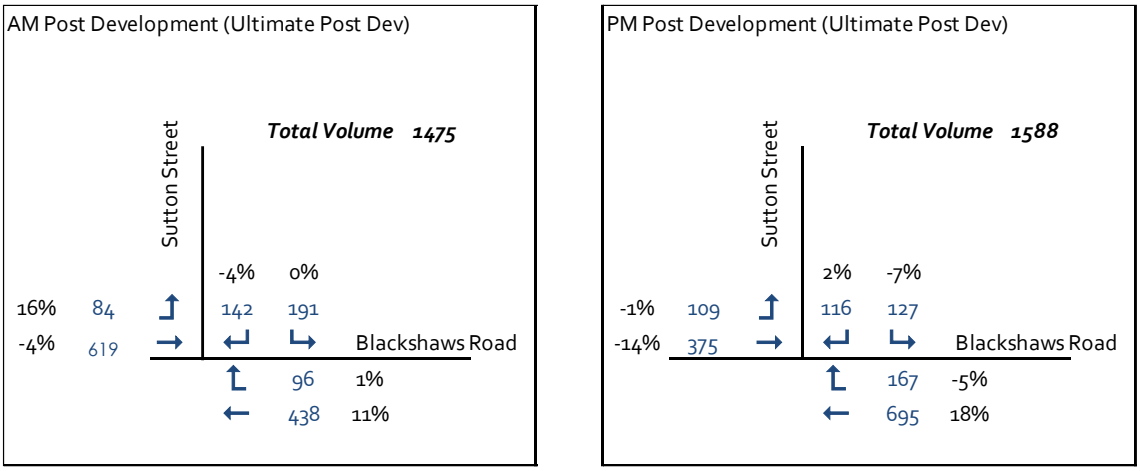
Figure 4.2: Previous Master Plan Volumes (2012 Existing Volumes + Precinct 16 East (600 dwellings) + Surrounding Developments)[9]



It is noted that the most recent master plan submission for the Precinct 16 East site now contemplates a reduced yield of 420 dwellings and also omits the previously assessed child care centre. This represents a reduction of approximately 90 vehicle movements in each peak hour to those volumes presented in 2014.

With respect to the Precinct 16 West subject site, the same development yield was adopted as part of this assessment. Figure 4.3 outlines the ultimate post development conditions for the updated assessment and includes the 2016 traffic volumes overlayed with the growth of the surrounding developments[10].

Figure 4.3: Updated Traffic Volumes (2016 Existing Volumes + Precinct 16 East (420 dwellings) + Surrounding Developments) [11]



The comparison between the ultimate development scenarios indicates the following:

- An increase of around 11% and 18% along Blackshaws Rd heading westbound in the AM and PM peaks respectively.
- A reduction in traffic volumes of around 4% and 14% along Blackshaws Road heading eastbound in the AM and PM peak respectively.
- Overall traffic volumes through the intersection are very comparable with around 27 vehicles the difference between the two scenarios.

[9] Including minor correction to through volume on eastern leg, September 2019
[10] Incorporates the reduced development yield (420 dwellings) of Precinct 16 East
[11] Including minor correction to through volume on eastern leg, September 2019

Specifically, for the purpose of understanding the operation of the Blackshaws Road/Sutton Street intersection following the development of the subject site, the following analysis has been prepared on the basis of the previous cumulative impact assessment. Additionally, this analysis presents a comparison between the signalised and unsignalised arrangements at the Blackshaws Road/Sutton Street intersection.

4.3.3 Blackshaws Road/Sutton Street Intersection

The operation of the Blackshaws Road/Sutton Road intersection has been assessed using *SIDRA INTERSECTION* and are summarised below:

- Similar to other intersections along Blackshaws Road, the Blackshaws Road/Sutton Street intersection has been modelled to reflect through traffic on the east-west road being able to manoeuvre around a vehicle turning right into the north-south road based on existing conditions.
- In this regard, the Blackshaws Road/Sutton Street intersection currently operates with an 'excellent' level of service during the AM and PM peak hour periods, with minimal queues and delays on all approaches.
- Unsignalised Intersection Arrangement:
    - GTA has modelled an unsignalised Blackshaws Road/Sutton Street intersection, with results summarised in Table 4.2. Under ultimate post-development conditions, the unsignalised intersection, whilst approaching capacity for the right turn departures from Sutton Street in both peak periods, is shown to operate in a satisfactory manner. GTA consider this arrangement to deliver an operationally efficient outcome in terms of road network performance overall as Blackshaws Road would still be expected to operate with minimal delays. Under this scenario, pedestrian refuges or signals could be provided to improve the permeability of Blackshaws Road to pedestrian traffic.
- Signalised Intersection Arrangement:
    - GTA has also modelled the Blackshaws Road/Sutton Street intersection under a signalised arrangement. GTA understand this to be Council's preferred access strategy for Precinct 16 incorporating a signalised pedestrian crossing at this location. Under ultimate post-development conditions, the signalised intersection arrangement would be expected to operate with an 'acceptable' level of service. It is understood that DoT and Hobsons Bay City Council prefer a signalised intersection arrangement due to traffic volumes on Blackshaws Road that may lead to risk taking behaviour by motorists when selecting gaps suitable to enter Blackshaws Road from Sutton Street.

A summary of the unsignalised and signalised intersection operation is provided in the following table.

Table 4.2: Blackshaws Road/Sutton Street Ultimate Intersection Operation Comparison[12][13]

Scenario	Approach	DOS	Average Delay (sec)	95th Percentile Queue (m)
Unsignalised AM Peak	Blackshaws Road (East)	0.25	2 sec	5 m
	Sutton Street (North)	0.84	33 sec	37 m
	Blackshaws Road (West)	0.40	1 sec	0 m
Signalised AM Peak	Blackshaws Road (East)	0.64	10 sec	47 m
	Sutton Street (North)	0.63	25 sec	32 m
	Blackshaws Road (West)	0.67	8 sec	68 m
Unsignalised PM Peak	Blackshaws Road (East)	0.39	2 sec	7 m
	Sutton Street (North)	0.77	30 sec	27 m
	Blackshaws Road (West)	0.27	1 sec	0 m
Signalised PM Peak	Blackshaws Road (East)	0.78	10 sec	96 m
	Sutton Street (North)	0.63	39 sec	33 m
	Blackshaws Road (West)	0.31	5 sec	33 m

The analysis presented above indicates that either an unsignalized intersection or signalised intersection would be expected to operate satisfactorily in terms of anticipated queues and delays during the AM and PM peak hours.

It is understood that Council consider that a signalised intersection will still significantly improve traffic operation and safety of trips into and out of Sutton Street. We note that Council have requested that gap selection surveys and queuing surveys be undertaken and more recent traffic volumes utilised for this SIDRA analysis. Any data gathered during the Covid 19 environment and West Gate Tunnel works at the time of this report however was not considered by GTA to be reliable data so this work was not completed.

[12] Output in table updated to reflect results in updated SIDRA (8) Assessment and two run up lanes on the north approach for the signalised case, September 2019.

[13] Verified 2012 (Previous Cumulative Assessment, not 2016) volumes used in this traffic assessment. No gap acceptance surveys were undertaken which Council are understood to have requested. Given the current situation surveys are currently not feasible.

5. Other Considerations

5.1 Vehicle Network

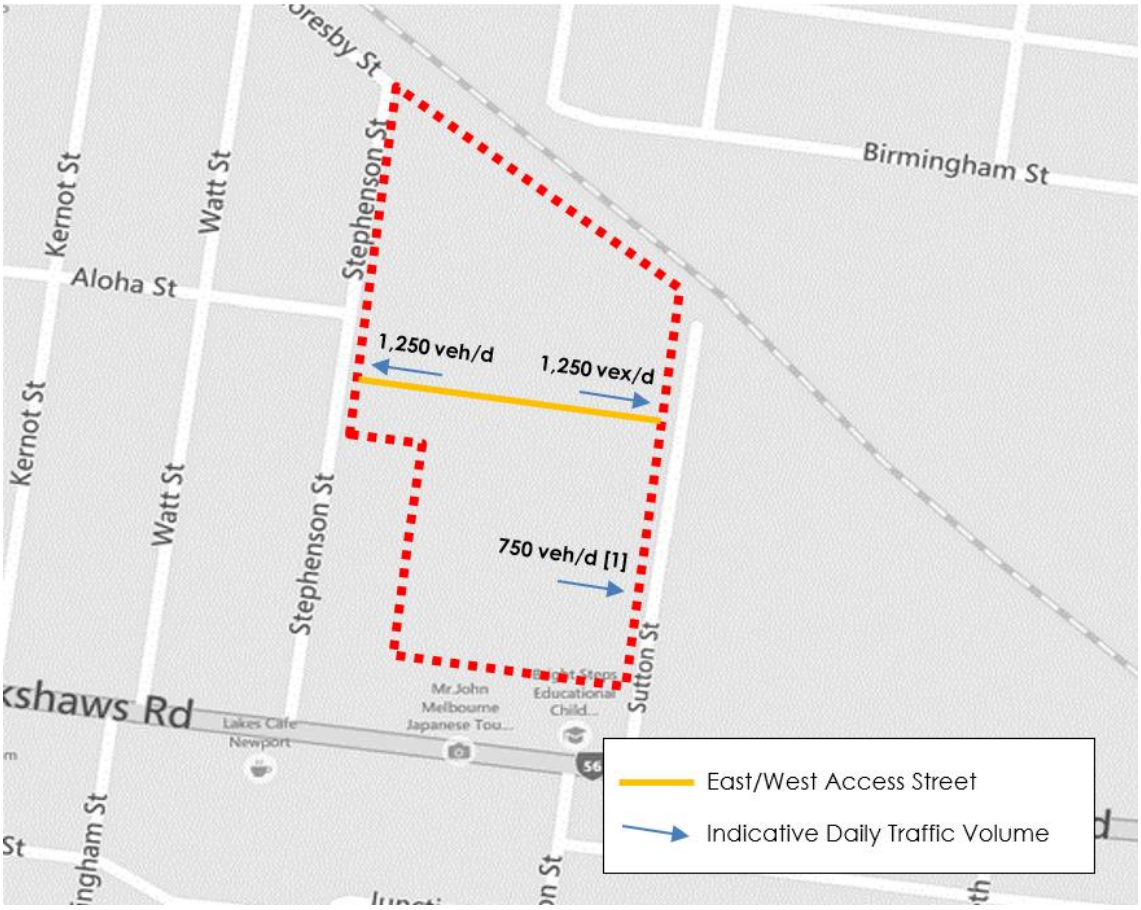
5.1.1 Internal Road Hierarchy

The internal road network has the ability to be designed in accordance with the requirements of Clause 56 of the Hobsons Bay Planning Scheme and it is expected that this will be examined in further detail within a future Development Plan.

The Precinct 16 "West" site can be expected to generate up to approximately 3,250 vehicle movements per day[14], which is anticipated to be spread between the vehicle access points to the surrounding road network (noting that some access points will be provided directly to Sutton Street).

To determine the internal road classification within the precinct, Figure 5.1 has been prepared which identifies the indicative daily traffic volumes.

Figure 5.1: Indicative Daily Traffic Volumes



[1] Note that these 750 vehicles generated by the site are associated with the 5-7 Sutton St lot which does not connect into the main East/West access street.

[14] Based on the application of a daily traffic generation rate of 5 vehicle movements per dwelling to the assumed upper limit of 650 dwellings.

The recommended dimension requirements for internal road types are presented in Table 5.1, as per Clause 56.06-8 of the Planning Scheme.

Table 5.1: Road Hierarchy Characteristics (Minimums)

Road	Road Type	Indicative Daily Traffic Volume	Carriageway Width [1]	Verge Width	Road Reserve Width	Parking	Footpath Provision
East-West Access Road	Access Street – Level 1	1000-2000 vehicles per day	5.5m wide (minimum)	4m each side	13.5m	1 verge parking space per 2 lots	1.5m (both sides)
	Access Street – Level 2	2000-3000 vehicles per day	7-7.5m wide	4.5m each side	16m	Both sides of carriageway	1.5m (both sides)
Other Lower Order Roads	Access Lane	300 vpd	5.5m wide (minimum)	Not required	5.5m	None	Carriageway designed as a shared zone
	Access Place	300 – 1000 vpd	5.5m wide (minimum)	7.5m total	13m	1 verge parking space per 2 lots **OR** On one side only	1.5m wide **OR** Not required if serving 5 dwellings or less

Based on the development plan and cross-sections, details of the Primary Access Road (East-West Access Road) and Secondary Access Roads are summarised in Table 5.2, with other lower order roads in accordance with the dimensional requirements of Clause 56.06-8 of the Planning Scheme.

Table 5.2: Road Characteristics (Proposed)

Road	Road Type	Indicative Daily Traffic Volume	Carriageway Width	Verge Width	Road Reserve Width	Parking	Footpath Provision
East-West Access Road	Primary Access Road	1000-2500 vehicles per day	11.1m comprising 6.5m trafficable lanes and 2.3m wide indented parking bays both sides	800mm adjacent to indented parking, additional landscaping where possible	17m	Indented parking both sides of carriageway, where available between landscaping	2.5m shared path on one side, 1.8m footpath on one side
Other Roads	Secondary Access Roads	1000-2000 vehicles per day	10.6m comprising 6.0m trafficable lanes and 2.3m wide indented parking bays both sides	900mm adjacent to indented parking, additional landscaping where possible	16m	Indented parking both sides of carriageway, where available between landscaping	1.8m footpaths both sides

As shown in the Table 5.2, the proposed road reserves of the primary and secondary access roads exceed the road reserve dimensions listed in Clause 56.06-8 of the Planning Scheme based on their anticipated volumes.

It is understood that Council has requested that all on-street (visitor) parking be provided by way of indented parking bays. Compared to the equivalent road without indented parking (i.e.

straight kerbing alignment), there is a reduced supply of on-street parking and reduced opportunity to provide meaningful landscaping, including street trees, and an overall reduction of permeable area. Nevertheless, it is understood that this is the road configuration preference of Council, and as a result the design of the internal road has been updated to incorporate indented parking.

5.1.2 Car Parking Requirements

Residents

It is recommended that all resident parking be provided off-street such that the on-street parking is available for the use of residential visitors. Resident car parking is anticipated to be provided at the following rates consistent with Clause 52.06 of the Hobsons Bay Planning Scheme unless otherwise supported by empirical evidence:

- one and two-bedrooms: 1 resident space per dwelling
- three-or more bedroom: 2 resident spaces per dwelling.

Visitors

Clause 52.06 is the only part of the Hobsons Bay Planning Scheme that has specific visitor parking requirements, noting that Clause 56.06 outlines dimensional requirements of roads based on their function. Only two street types require visitor parking based on number of the number of lots being Access Place and Access Street – Level 1.

Clause 52.06 of the Planning Scheme requires parking at a rate of one space per five dwellings (0.2 spaces per dwelling) but does not apply to construction and use of one dwelling on a lot.

5.1.3 Sutton Street Modifications

Should Sutton Street be upgraded while the 'Brymart Site' (5-7 Sutton Street) is continuing to operate as an industrial facility, the safe and functional movement of permitted trucks to the site should be maintained in accordance with relevant standard requirements.

Any modifications required to the design of Sutton Street to facilitate the above should be negotiated between adjacent land-owners and agreed with the Responsible Authority.

5.2 Walking & Cycling Network

5.2.1 Internal Network

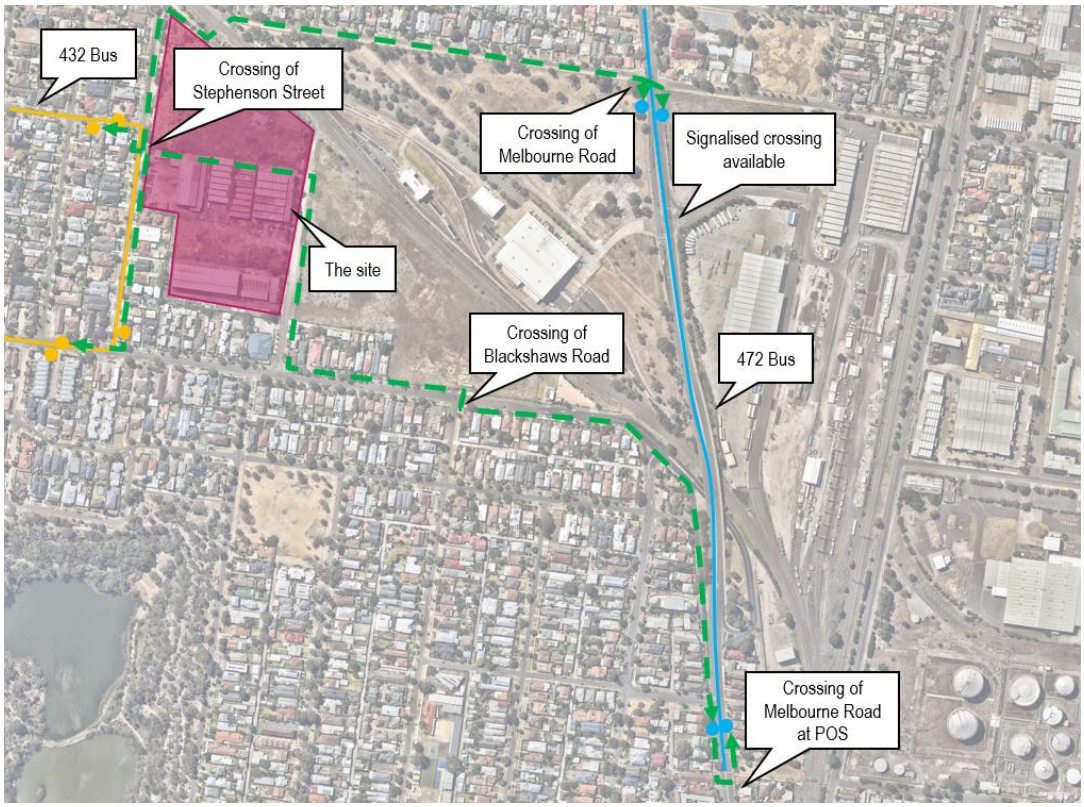
GTA understand that Council's transport and planning units have agreed that pedestrian pathways will be provided along both sides of all internal access roads including the east-west road. Further no separate bicycle lanes will be provided consistent with Planning Scheme requirements.

It is further recommended that a series of internal pathways be provided to link the dwellings and internal open spaces to pathways external to the site. In particular, a pedestrian and cycling connection is recommended to connect the site to the railway crossing located to the north-west corner of the site.

5.2.2 Access to Public Transport

Access to and from the most proximate bus stops to the Site (via the key east-west road – through the 9-9A Sutton Street parcel) is shown in Figure 5.2. The Figure indicates that crossing of Blackshaws Road is not required to access the Route No. 432 bus service. Access however to the Route No. 472 bus service may require crossing of Blackshaws Road, however an alternate option is available which requires the crossing of Melbourne Road (signalised crossing option available) and these routes are equidistant.

Figure 5.2: Pedestrian Desire Lines to Bus Stops from the Subject Site



A package of transport improvement works was agreed as part of the VCAT hearing for Precinct 16 East that included pedestrian refuges along Blackshaws Road.

It is understood that Council position is that signalised intersection at Blackshaws road and Sutton Street is required to assist in pedestrian movements north-south across Blackshaws Road.

5.3 Public Transport

The notable public transport services operating within the vicinity of the site include Bus Route 432 which operates along Stephenson Street, with the nearest stops on Aloha Street between Stephenson Street and Watt Street, and on Blackshaws Road directly east of Watt Street. Additionally, the Williamstown Rail line is accessible via Spotswood Station approximately 1km from the site. Further details of the sites connectivity to existing public transport infrastructure is documented earlier in this report.

Having regard to the existing bus routes in the area, the development plan indicates that the internal road network will not be designed to accommodate potential future bus routes. It is considered more appropriate that any future services utilise Blackshaws Road, with appropriate pedestrian connectivity provided along Sutton Street and Stephenson Street.

This is supported by the SmartRoads Network Operating Plan (included at Appendix A of this report) which designates Blackshaws Road a Bus Priority Route.

6. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

i The traffic generated by the Precinct 16 West site has been included as part of a cumulative impact assessment undertaken as part of the assessment for Precinct 16 overall.

ii There is adequate capacity in the surrounding road network to cater for the traffic generated by the proposed development, noting the conservatism of the completed assessments.

iii SIDRA analysis indicates that the Sutton Street / Blackshaws Road intersection will continue to operate satisfactorily either in an unsignalized or signalised configuration.

iv It is understood that DoT and Hobsons Bay City Council prefer a signalised intersection arrangement as the traffic volumes on Blackshaws Road are considered to provide for poor gap selection. DoT and Hobsons Bay City Council consider that increasing the number of traffic trips entering Blackshaws Road may lead to risk taking behaviour by motorists when selecting gaps suitable to enter Blackshaws Road from Sutton Street.

v The internal road network has the ability to be developed in accordance with the principles embodied in Clause 56 of the Hobsons Bay Planning Scheme.

vi Adequate pedestrian and cyclist facilities can be provided on the site and connecting with surrounding areas.

vii Other key transport elements of the proposal are generally consistent with, or have the potential to meet, the relevant Planning Scheme guidelines.

Appendix A

Transport Planning Policy

SmartRoads Policy

SmartRoads is a VicRoads policy which sets 'modal' priorities on the road network and underpins many of the strategies significant to the Victorian Transport Plan surrounding the issue of public transport prioritisation.

"SmartRoads is an approach that manages competing interests for limited road space by giving priority use of the road to different transport modes at particular times of the day."

All road users will continue to have access to all roads. However, certain routes will be managed to work better for cars while others will be managed for public transport, cyclists and pedestrians."

The VicRoads SmartRoads Network Operating Plan for the area surrounding the subject site has been reproduced in Figure A.1.

Figure A.1: VicRoads SmartRoads Network Operating Plan – Hobsons Bay

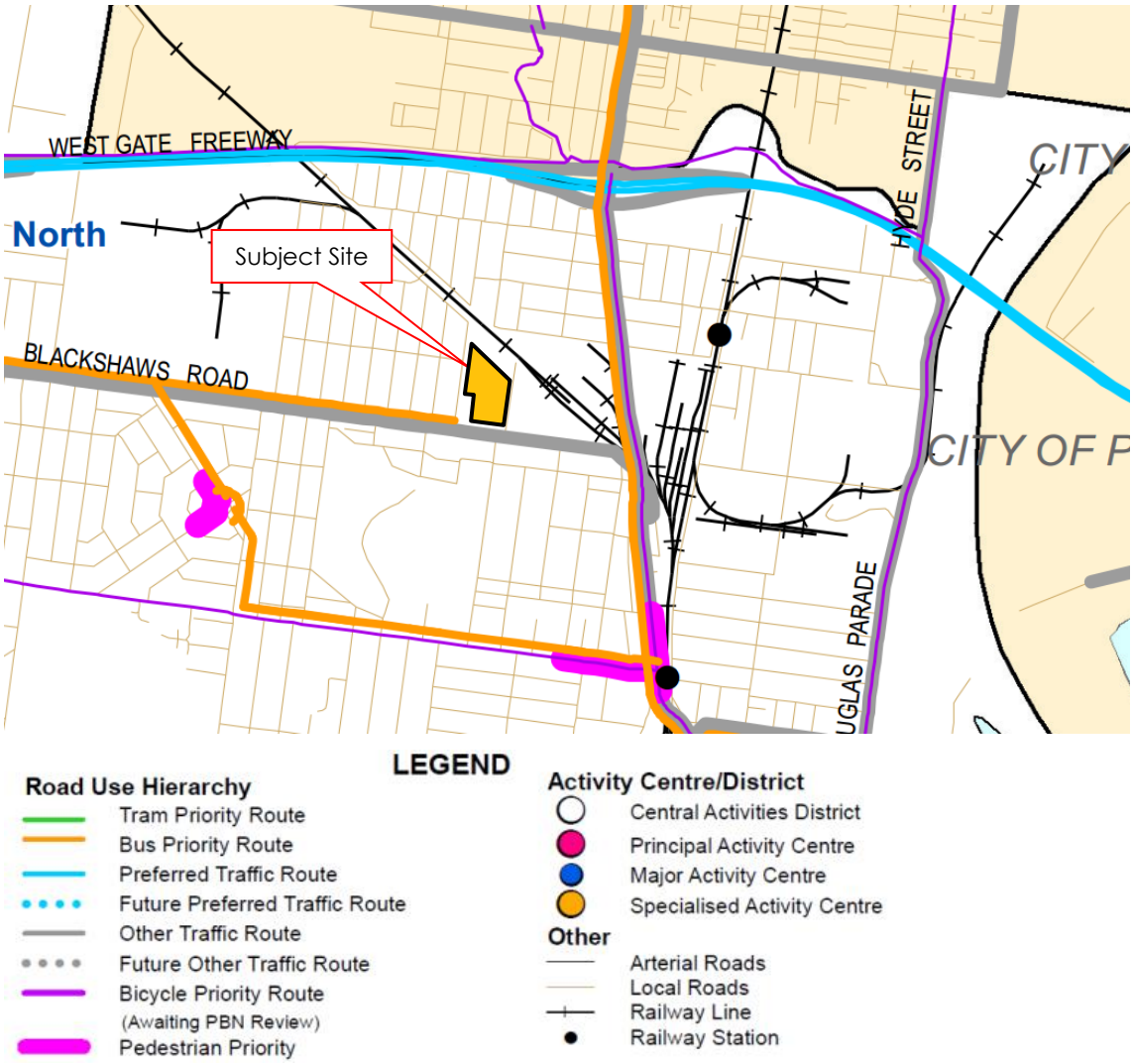


Figure A.1 illustrates that Blackshaws Road and Melbourne Road (Williamstown Road) in the vicinity of the subject site are nominated as other traffic/bus priority routes, while the West Gate Freeway is nominated as a preferred traffic route.

Council Policy

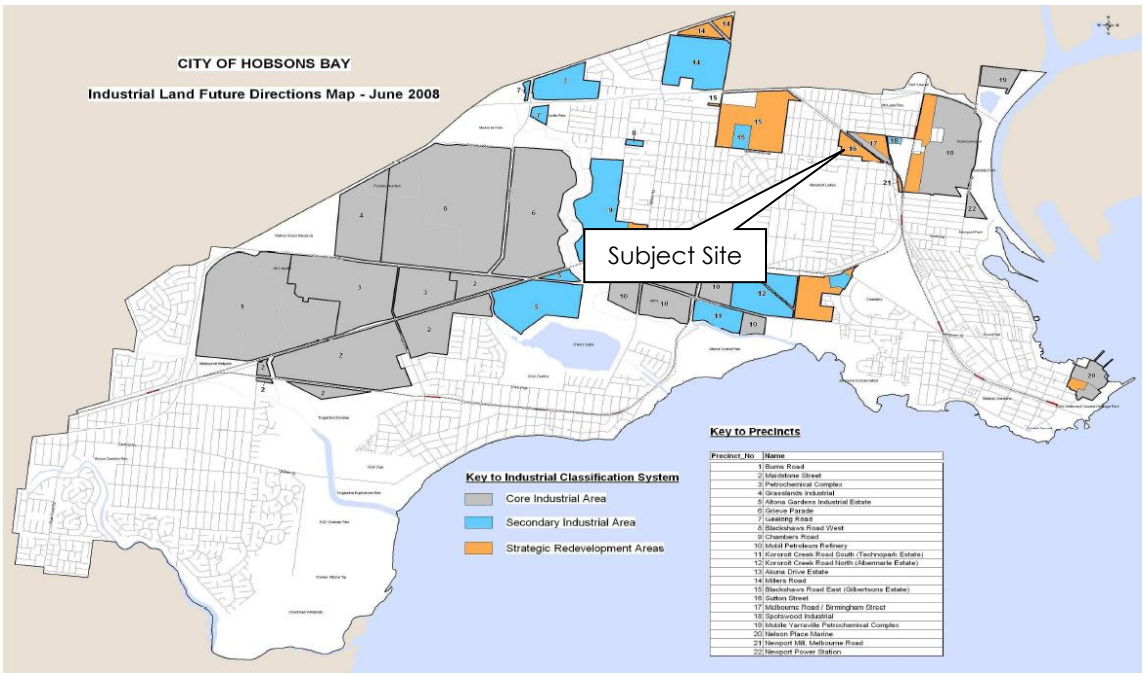
The subject site is located within a larger area known as Precinct 16 (industrial land bounded by Blackshaws Road, Stephenson Street and the railway line in South Kingsville) of the Hobson Bay Industrial Land Management Strategy 2008 document.

This document aims to provide a clear direction in relation to the future use and development of industrial land in Hobson Bay over the next 15 years and to set the foundation for continued development beyond that point.

The Industrial Land Management Strategy 2008 states that *"Hobson Bay currently has 1,782 hectares of land zoned for the purpose of industry, which accounts for approximately one third of all of the land in Hobson Bay."*

Figure A.2 shows the location of the subject site within the Industrial Land Future Directions Map (June 2008), relative to the Hobson Bay Growth Area. This figure highlights that the sites identified in of this report indeed represent the key redevelopment sites in the vicinity of the subject site.

Figure A.2: Industrial Land Future Directions Map (June 2008) – City of Hobsons Bay



Appendix B

SIDRA Output – September 2019

MOVEMENT SUMMARY

Site: 0 [Existing AM]

Blackshaws Rd / Sutton St / Johnston St
Existing AM
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	213	5.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	23	5.0	0.024	7.0	LOS A	0.1	0.6	0.40	0.62	0.40	51.8
Approach		236	5.0	0.113	0.7	NA	0.1	0.6	0.04	0.06	0.04	59.1
North: Sutton St (n)												
7	L2	17	5.0	0.062	7.4	LOS A	0.2	1.6	0.47	0.70	0.47	51.2
9	R2	25	5.0	0.062	9.3	LOS A	0.2	1.6	0.47	0.70	0.47	50.7
Approach		42	5.0	0.062	8.5	LOS A	0.2	1.6	0.47	0.70	0.47	50.9
West: Blackshaws Rd (w)												
10	L2	26	5.0	0.175	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.7
11	T1	302	5.0	0.175	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach		328	5.0	0.175	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.4
All Vehicles		606	5.0	0.175	1.1	NA	0.2	1.6	0.05	0.10	0.05	58.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 0 [Existing PM]

Blackshaws Rd / Sutton St / Johnston St
Existing PM
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	292	5.0	0.155	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	24	5.0	0.022	6.5	LOS A	0.1	0.6	0.34	0.59	0.34	52.0
Approach		316	5.0	0.155	0.5	NA	0.1	0.6	0.03	0.05	0.03	59.3
North: Sutton St (n)												
7	L2	28	5.0	0.095	6.9	LOS A	0.3	2.5	0.43	0.69	0.43	51.3
9	R2	39	5.0	0.095	9.4	LOS A	0.3	2.5	0.43	0.69	0.43	50.8
Approach		67	5.0	0.095	8.3	LOS A	0.3	2.5	0.43	0.69	0.43	51.1
West: Blackshaws Rd (w)												
10	L2	15	5.0	0.128	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.8
11	T1	226	5.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		241	5.0	0.128	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles		624	5.0	0.155	1.3	NA	0.3	2.5	0.06	0.11	0.06	58.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 0 [Ultimate Post Development AM Peak - with RT lane]

Blackshaws Rd / Sutton St / Johnston St
Ultimate Post Development AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	461	5.0	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	101	5.0	0.200	11.9	LOS B	0.7	5.3	0.69	0.88	0.70	48.7
Approach		562	5.0	0.246	2.2	NA	0.7	5.3	0.12	0.16	0.13	57.6
North: Sutton St (n)												
7	L2	201	5.0	0.457	15.4	LOS C	2.2	15.9	0.75	0.99	1.09	46.7
9	R2	157	5.0	0.848	56.3	LOS F	5.1	37.1	0.97	1.36	2.44	30.4
Approach		358	5.0	0.848	33.3	LOS D	5.1	37.1	0.85	1.15	1.68	37.9
West: Blackshaws Rd (w)												
10	L2	88	5.0	0.400	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	57.4
11	T1	663	5.0	0.400	0.1	LOS A	0.0	0.0	0.00	0.07	0.00	59.3
Approach		752	5.0	0.400	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles		1672	5.0	0.848	8.2	NA	5.1	37.1	0.22	0.33	0.40	52.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 0 [Ultimate Post Development AM Peak - Signals - Two Stand Up Lanes]

Blackshaws Rd / Sutton St / Johnston St
Ultimate Post Development AM Peak (Signalised)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	461	5.0	0.640	8.7	LOS A	6.5	47.3	0.68	0.61	0.71	51.9
6	R2	101	5.0	0.640	16.7	LOS B	6.5	47.3	0.80	0.75	0.84	48.4
Approach		562	5.0	0.640	10.1	LOS B	6.5	47.3	0.70	0.64	0.73	51.2
North: Sutton St (n)												
7	L2	201	5.0	0.631	26.0	LOS C	4.5	32.9	0.97	0.85	1.07	41.1
9	R2	149	5.0	0.469	24.8	LOS C	3.2	23.1	0.94	0.78	0.94	41.6
Approach		351	5.0	0.631	25.5	LOS C	4.5	32.9	0.96	0.82	1.02	41.3
West: Blackshaws Rd (w)												
10	L2	88	5.0	0.134	10.8	LOS B	1.4	10.6	0.51	0.60	0.51	51.0
11	T1	663	5.0	0.670	7.4	LOS A	9.3	67.7	0.69	0.63	0.71	53.3
Approach		752	5.0	0.670	7.8	LOS A	9.3	67.7	0.67	0.63	0.68	53.0
All Vehicles		1664	5.0	0.670	12.3	LOS B	9.3	67.7	0.74	0.67	0.77	49.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	16.9	LOS B	0.1	0.1	0.87	0.87
P3	North Full Crossing	53	8.1	LOS A	0.0	0.0	0.60	0.60
All Pedestrians		105	12.5	LOS B			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 0 [Ultimate Post Development PM Peak - with RT lane]

Blackshaws Rd / Sutton St / Johnston St
Ultimate Post Development PM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	732	5.0	0.391	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	176	5.0	0.230	8.9	LOS A	0.9	6.7	0.56	0.80	0.56	50.7
Approach		907	5.0	0.391	1.8	NA	0.9	6.7	0.11	0.16	0.11	57.9
North: Sutton St (n)												
7	L2	134	5.0	0.198	9.0	LOS A	0.7	5.4	0.52	0.77	0.52	50.9
9	R2	122	5.0	0.773	53.7	LOS F	3.7	27.1	0.97	1.22	1.92	31.1
Approach		256	5.0	0.773	30.3	LOS D	3.7	27.1	0.73	0.98	1.19	39.1
West: Blackshaws Rd (w)												
10	L2	115	5.0	0.273	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	56.9
11	T1	395	5.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	58.7
Approach		509	5.0	0.273	1.3	NA	0.0	0.0	0.00	0.13	0.00	58.3
All Vehicles		1673	5.0	0.773	6.0	NA	3.7	27.1	0.17	0.28	0.24	54.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 0 [Ultimate Post Development PM Peak - Signals - Two Stand Up Lanes]

Blackshaws Rd / Sutton St / Johnston St
Ultimate Post Development AM Peak (Signalised)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 65 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackshaws Rd (e)												
5	T1	732	5.0	0.780	7.8	LOS A	13.1	96.0	0.51	0.53	0.57	52.4
6	R2	176	5.0	0.780	16.5	LOS B	13.1	96.0	0.61	0.69	0.71	48.5
Approach		907	5.0	0.780	9.5	LOS A	13.1	96.0	0.53	0.56	0.60	51.6
North: Sutton St (n)												
7	L2	134	5.0	0.692	39.3	LOS D	4.5	33.2	1.00	0.86	1.18	35.8
9	R2	122	5.0	0.632	38.5	LOS D	4.1	29.7	1.00	0.83	1.11	35.9
Approach		256	5.0	0.692	38.9	LOS D	4.5	33.2	1.00	0.84	1.14	35.9
West: Blackshaws Rd (w)												
10	L2	115	5.0	0.090	8.8	LOS A	1.1	8.2	0.33	0.65	0.33	51.1
11	T1	395	5.0	0.317	3.8	LOS A	4.6	33.6	0.40	0.34	0.40	56.5
Approach		509	5.0	0.317	4.9	LOS A	4.6	33.6	0.38	0.41	0.38	55.2
All Vehicles		1673	5.0	0.780	12.6	LOS B	13.1	96.0	0.56	0.56	0.62	49.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	26.8	LOS C	0.1	0.1	0.91	0.91
P3	North Full Crossing	53	5.2	LOS A	0.0	0.0	0.40	0.40
All Pedestrians		105	16.0	LOS B			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Melbourne

A Level 25, 55 Collins Street
PO Box 24055
MELBOURNE VIC 3000
P +613 9851 9600
E melbourne@gta.com.au

Brisbane

A Ground Floor, 283 Elizabeth Street
BRISBANE QLD 4000
GPO Box 115
BRISBANE QLD 4001
P +617 3113 5000
E brisbane@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
E adelaide@gta.com.au

Sydney

A Level 6, 15 Help Street
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
E sydney@gta.com.au

Perth

A Level 2, 5 Mill Street
PERTH WA 6000
PO Box 7025, Cloisters Square
PERTH WA 6850
P +618 6169 1000
E perth@gta.com.au