For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

Appendix C: Traffic Impact Report

mecone

ratio:

Prepared for
NX Property Group

Our Reference: 12555T-REP02-F01

Proposed Residential Development

29 Browns Road, Clayton

27 September 2018

parking assessment

r:

ratio:consultants

8 Gwynne Street
Cremorne VIC 3121
ABN 93 983 380 225

Prepared for:

NX Property Group
Our reference: 12555T-REP02-F01

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jennyl
15/01/2020

Version	Date	Reason for Issue	Prepared By	Checked By
01	19/09/18	Draft	E Constable	R Fairlie
02	27/09/18	Final	E Constable	R Fairlie

Directory Path	Y:\12501 - 13000\12555 - 29 Browns Road, Clayton (Residential Development)\Reports\Car Parking Assessment\12555T-REP02-F01.docx

r:

ISO 9001 ISO 14001 AS NZS 4801

Table of contents:

1 Introduction:

Ratio Consultants was engaged by NX Property Group to assess the parking implications of the proposed residential development at 29 Browns Road, Clayton.

The proposal contemplates the construction of 74 townhouses and four buildings comprising a total of 147 apartments.

Access to the site is proposed from Browns Road (with the exception of two townhouses accessed directly from Monash Street), with an internal road network provided within the development.

A consolidated basement car park is proposed to service the four apartment buildings, with access from the internal road network. Parking for the townhouses is proposed in the form of individual garages accessed directly from the internal road network, with at-grade car spaces accessed directly from the internal road network proposed for visitors to the townhouses.

This report has been prepared to assess the adequacy of the car parking provision to service the proposed development and is based on surveys and observations in the vicinity of the site and on previous studies of other similar developments in Melbourne.

2.1 Location and Environment

The subject site is located on the east side of Browns Road between Francis Street and Monash Green Drive, as shown in Figure 2.1. An aerial view of the site and surrounds is provided in Figure 2.2.

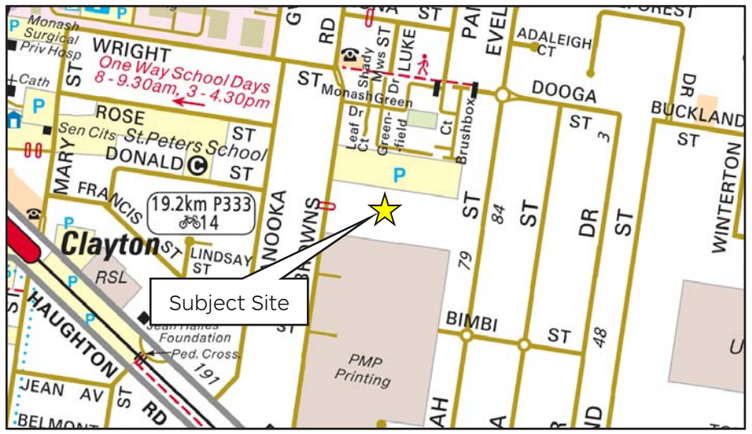
The site is generally rectangular in shape, with the exception of a rectangular offshoot which extends further east to Moriah Street. The site has frontages of 91 metres to Browns Road and 17 metres to Moriah Street and an overall site area of approximately 2 hectares.

The site is currently vacant and was previously occupied by the Clayton Primary School. There are two existing vehicle crossover to Browns Road and one existing crossover to Moriah Street.

Surrounding land use is mixed in nature. Directly to the south of the site is a warehouse associated with PMP Printing, with additional warehouse uses located further south. Directly to the north of the site is a car park servicing staff of the Monash Medical Centre which is located to the northwest. Fregon Reserve is located approximately 600 metres to the north of the site on the west side of Browns Road.

Clayton Activity Centre, which comprises a wide variety of commercial and retail uses, is located approximately 700 metres to the southwest of the site on Clayton Road and Monash University Clayton Campus is located approximately 800 metres to the north of the site. Beyond these uses, land use is primarily residential.

Figure 2.1: Site Location



Source: Melways Edition 39

Figure 2.2: Aerial View of the Site and Surrounds

Source: www.nearmap.com

2.2 Road Network

Browns Road is a Local Road and it essentially extends in a north-south alignment from Dandenong Road (Princes Highway) to Carinish Road.

In the vicinity of the site, Browns Road provides for a single lane of traffic in each direction, with kerbside parallel parking permitted along both kerbs clear of traffic. Constructed footpaths are provided on both sides of the road. Browns Road has been treated with a series of raised pavement devices along its length.

A view of Browns Road in the vicinity of the site is provided in Figure 2.3.

Figure 2.3: View of Browns Road, Facing North in the Vicinity of the Site

Moriah Street is a Local Road which extends in a north-south alignment from Dooga Street to Centre Road. North of Dooga Street, Moriah Street continues as Evelyn Street.

In the vicinity of the site, Moriah Street operates as a two-way road, with kerbside parking permitted along both kerbs. Constructed footpaths are provided on both sides of the road.

A view of Moriah Street in the vicinity of the site is provided in Figure 2.4.

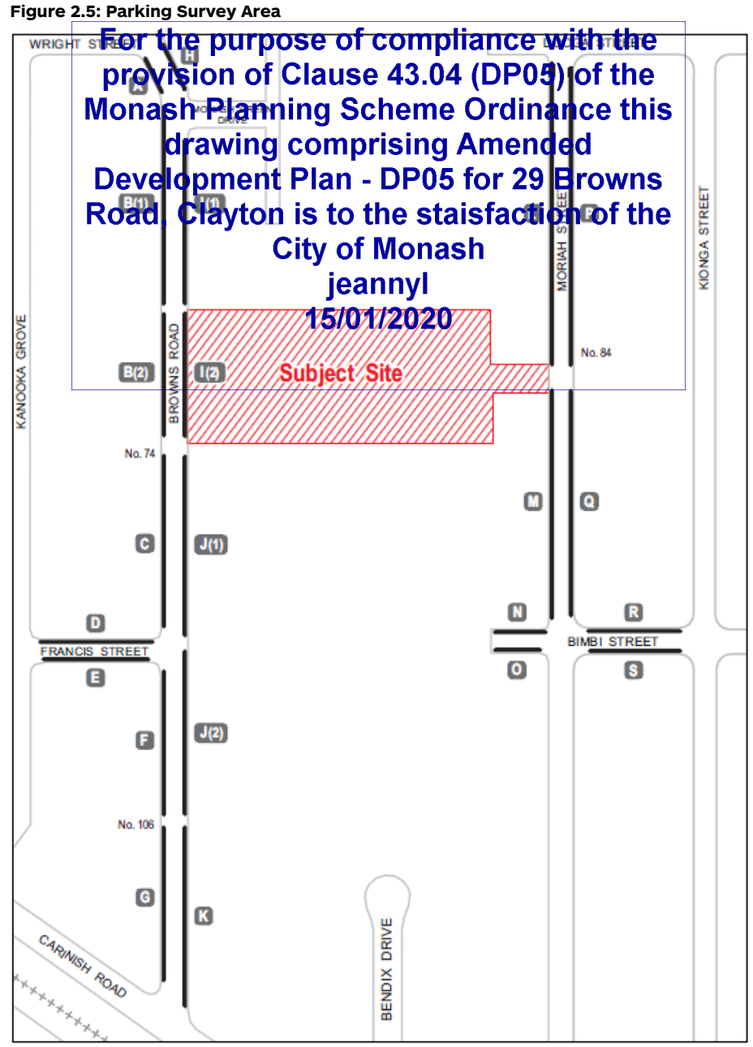
Figure 2.4: View of Moriah Street, Facing South in the Vicinity of the Site

2.3 Parking Conditions

Ratio Consultants commissioned car park occupancy surveys between 11:00am and 8:00pm on Friday 24 August 2018 and Saturday 25 August 2018. The surveys were undertaken in hourly intervals of on-street parking within an approximate 400 metre walking distance of the subject site. The extent of the survey area is shown in Figure 2.5 and detailed survey results are presented in Appendix A.

Parking in the survey area is a mixture of unrestricted and time restricted (1/2P, 1P and 2P) spaces between 7:30am and 6:00pm Monday to Friday.

Figure 2.5: Parking Survey Area



In summary, the survey results showed:

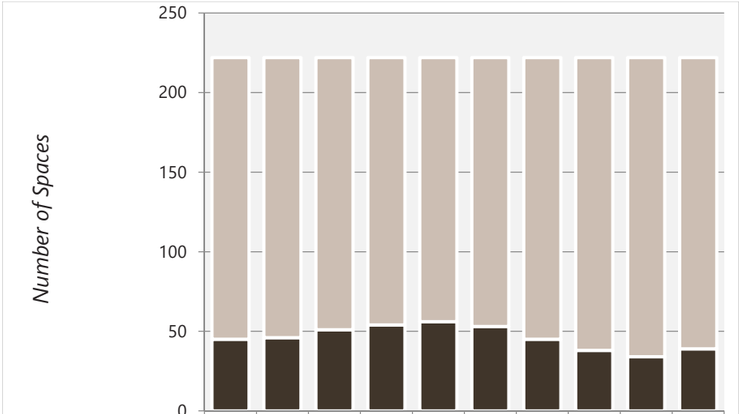
Friday 24 August 2018

- There was a total of 222 on-street public car parking spaces within the survey area.
- The peak period occurred at 3:00pm, when a total of 56 parking spaces were recorded occupied out of an available supply of 222 spaces, representing a parking occupancy of 25%. At this time, 166 spaces were vacant.
- During the late afternoon/evening period from 5:00pm to 8:00pm, there was a maximum parking occupancy of 20%. This occurred at 5:00pm.
- The demand for parking was low during the survey period, ranging between 15% and 25%.

— On Browns Road to the north of the site, there is a supply of 9 spaces on the eastern side of the road (Zone I (1)) and 12 spaces on the western side of the road (Zone B (1)), all of which were subject to 1/2P parking restrictions. The utilisation of these spaces was recorded to be a maximum of 33%. Therefore, there was a minimum of 14 available parking spaces in these zones during the survey period.
— On Browns Road, directly adjacent to the site, there is a supply of 17 parking spaces on the eastern side of the road (Zone I (2)) and 6 spaces on the western side of the road (Zone B (2)), comprising of 2P and 1/2P parking restrictions. The maximum recorded utilisation rate of these spaces was 17%. Therefore, there was a minimum of 19 available parking spaces in these zones during the survey period.
— On Browns Road to the south of the site, there is a supply of 14 spaces on the eastern side of the road (Zone J (1)) and 10 spaces on the western side of the road (Zone C) all of which were subject to 2P parking restrictions. The maximum recorded utilisation of these spaces was 21%. Therefore, there was a minimum of 19 available parking spaces in these zones during the survey period.

Figure 2.6 provides a graphical representation of the Friday parking demands.

Figure 2.6: Parking Demand Survey Results – Friday 24 August 2018



	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PUBLIC VACANCIES	177	176	171	168	166	169	177	184	188	183
PUBLIC OCCUPANCIES	45	46	51	54	56	53	45	38	34	39

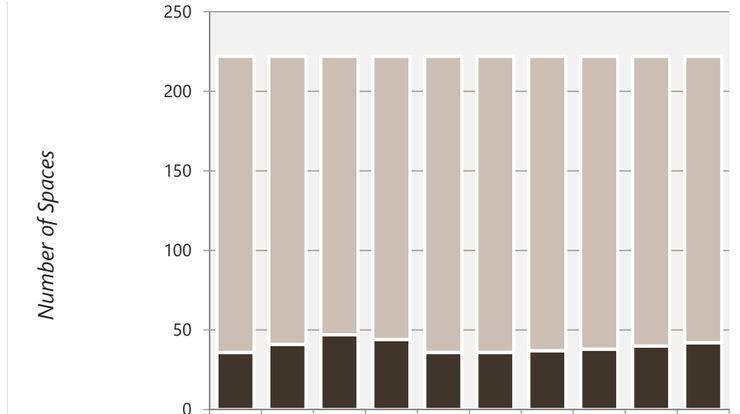
Saturday 25 August 2018

— There was a total of 222 on-street public car parking spaces within the survey area.
— The peak period occurred at 1:00pm, when a total of 47 parking spaces were recorded occupied out of an available supply of 222 spaces, representing a parking occupancy of 21%. At this time, 175 spaces remained vacant.
— During the late afternoon/evening period from 5:00pm to 8:00pm, there was a maximum parking occupancy of 19%. This occurred at 8:00pm.
— The demand for parking was low during the survey period, ranging between 16% and 21%.

— On Browns Road to the north of the site, there is a supply of 9 spaces on the eastern side of the road (Zone I (1)) and 12 spaces on the western side of the road (Zone B (1)). The utilisation of these spaces was recorded to be a maximum of 29%. Therefore, there was a minimum of 15 available parking spaces in these zones during the survey period.
— On Browns Road directly adjacent to the site, there is a supply of 17 parking spaces on the eastern side of the road (Zone I (2)) and 6 spaces on the western side of the road (Zone B (2)). The maximum recorded utilisation rate of these spaces was 9%. Therefore, there was a minimum of 21 available parking spaces in these zones during the survey period.
— On Browns Road to the south of the site, there is a supply of14 spaces on the eastern side of the road (Zone J (1)) and 10 spaces on the western side of the road (Zone C) all of which were subject to 2P parking restrictions. The maximum recorded utilisation of these spaces was 4%. Therefore, there was a minimum of 23 available parking spaces in these zones during the survey period.

Figure 2.7 provides a graphical representation of the Saturday parking demands.

Figure 2.7: Parking Demand Survey Results – Saturday 25 August 2018



	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PUBLIC VACANCIES	186	181	175	178	186	186	185	184	182	180
PUBLIC OCCUPANCIES	36	41	47	44	36	36	37	38	40	42

2.4 Sustainable Transport

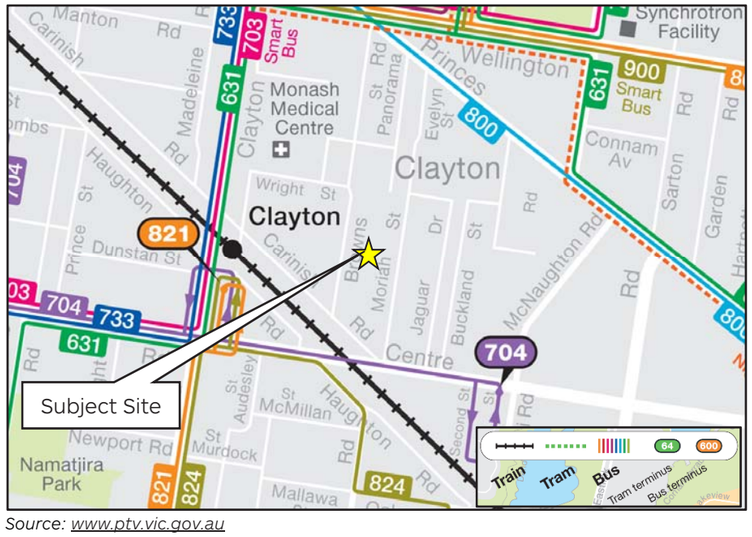
Public Transport

The site has both bus and train services operating in convenient proximity of the site, as detailed in Table 2.1 and Figure 2.8. Additional bus services are available slightly further afield at Monash University and within the Clayton Activity Centre.

Table 2.1: Public Transport Services

Service	Route No's	Route	Nearest Stop	Approximate Walking Distance
Bus	631	Southland – Waverley Gardens via Clayton, Monash University	Monash Medical Centre / Clayton Rd	800m
	703	Middle Bright – Blackburn via Bentleigh, Clayton, Monash University (SMARTBUS Service)		
	733	Oakleigh – Box Hill via Clayton, Monash University, Mt Waverley		
	824	Moorabbin – Keysborough via Clayton, Westall	Centre Rd / Haughton Rd	800m
	800	Dandenong – Chadstone via Princes Highway, Oakleigh	Browns Ct / Princes Hwy	900m
	704	East Clayton – Oakleigh via Clayton, Huntingdale	Audsley St / Centre Rd	950m
Train	Cranbourne and Pakenham Lines		Clayton Station	850m

Figure 2.8: Public Transport Map

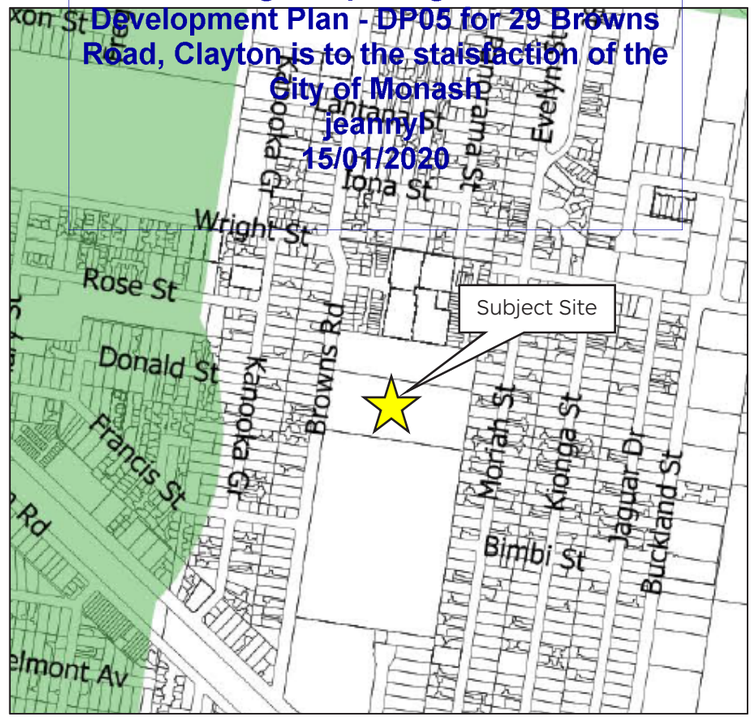


Source: www.ptv.vic.gov.au

Principal Public Transport Network

The subject site falls just outside the Monash Principal Public Transport Network (PPTN) Area (State Government of Victoria, 2018), as shown graphically in Figure 2.9.

Figure 2.9 Monash Principal Public Transport Network



3.1 Overview

It is proposed to develop the site for the purpose of a residential development. More specifically, the proposed development comprises the following:

— 74 townhouse style dwellings, comprising:
  - 34 x two-bedroom dwellings;
  - 5 x three-bedroom dwellings; and
  - 35 x four-bedroom dwellings.

— 147 apartment style dwellings across four buildings, comprising:
  - 40 x one-bedroom dwellings; and
  - 107 two-bedroom dwellings.

A basement car park is proposed to service the apartments, with access from the internal road network. Parking for the townhouses is proposed in the form of individual garages accessed directly from the internal road network, with at-grade car spaces accessed directly from the internal road network proposed for visitors to the townhouses.

In total, the development proposes 297 car spaces, comprised of the following:

— 169 car spaces within the basement car park, including:
  - 147 resident spaces; and
  - 22 visitor spaces.

— 114 garaged spaces, including:
  - 34 single space garages;
  - 32 double space garages (64 spaces); and
  - 8 tandem space garages (16 spaces).

— 14 at-grade spaces for visitors to the townhouses.

4.1 Clause 52.06 Car Parking Requirements

Parking requirements for developments are set out under Clause 52.06 of the Monash Planning Scheme. The purpose of the Clause, among other things, is:

— To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
— To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
— To support sustainable transport alternatives to the motor car.
— To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
— To ensure that car parking does not affect the amenity of the locality.
— To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

The number of car parking spaces required for a number of uses is listed under Table 1 of Clause 52.06-5. The application of the relevant rates is detailed in Table 4.1 below.

Table 4.1: Clause 52.06 Planning Scheme Assessment

Use	Rate	Number	Requirement*
Townhouses	1 space to each one or two bedroom dwelling	34 dwellings	34 spaces
	2 spaces to each three or more bedroom dwelling	40 dwellings	80 spaces
	1 space for visitors to every 5 dwellings for developments of 5 or more dwellings	74 dwellings	14 spaces
Apartments	1 space to each one or two bedroom dwelling	147 dwellings	147 spaces
	1 space for visitors to every 5 dwellings for developments of 5 or more dwellings	147 dwellings	29 spaces
Total			**304 spaces**

*Rounded down to the nearest whole number in accordance with Clause 52.06-5

Based on the foregoing, the proposal has a requirement to provide 304 car spaces.

The proposal includes:

— 114 garaged spaces for the townhouses, which satisfies the townhouse resident parking requirements. The two-bedroom townhouses are provided with one space and the three and four-bedroom townhouses are provided with two spaces, in accordance with the statutory requirements.
— 14 at grade visitor spaces for townhouse visitors, which satisfies the townhouse visitor parking requirements.
— 147 resident spaces within the basement car park for the apartments, which satisfies the apartment resident parking requirements.

— 22 visitor spaces within the basement car park for the apartments, which is a shortfall of 7 spaces from the apartment visitor parking requirement.

On the basis of the above, a reduction of 7 spaces is being sought in relation to visitors of the apartments.

4.2 Car Parking Demand Assessment

Overview

Clause 52.06-6 states that an application to reduce the number of car parking spaces required under Clause 52.06-5 must be accompanied by a Car Parking Demand Assessment which must address the following matters:

— The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.
— The variation of car parking demand likely to be generated by the proposed use over time.
— The short-stay and long-stay car parking demand likely to be generated by the proposed use.
— The availability of public transport in the locality of the land.
— The convenience of pedestrian and cyclist access to the land.
— The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.
— The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.
— Any empirical assessment or case study.

Expected Apartment Visitor Demands

Empirical surveys of visitor parking demands of residential developments in Melbourne indicate that visitor parking demand varies throughout the day, with peak demands generally occurring outside of business hours.

Surveys undertaken by Cardno Pty Ltd of visitor parking demands at residential developments in inner urban suburbs of the City on a Tuesday and Saturday indicate that visitor parking demand varies throughout the day, with peak demands occurring between 6.00pm and 9.00am.

The surveys showed the peak visitor parking demand during business hours (between 9.00am and 5.00pm) on a weekday was 0.07 spaces per apartment. Outside business hours on weekdays, the peak visitor parking demand was equivalent to 0.12 spaces per apartment.

It is considered that due to the location of the site, a rate of 0.10 spaces per apartment provides a suitable estimate of the visitor parking demand likely to be generated by the development during weekday business hours. Application of this rate to the 147 apartments results in an anticipated visitor parking demand up to 15 visitor spaces during weekday business hours. This could be expected to increase to up to 22 visitor spaces (0.15 spaces per apartment) during the evening and weekends when visitor demand is at its peak.

4.3 Parking Reduction Considerations

Overview

Before granting a permit to reduce the number of spaces, Clause 52.06-7 of the Planning Scheme sets out a number of factors to be considered by the Responsible Authority, with those considered most relevant in this instance reproduced as follows:

— The Car Parking Demand Assessment;
— On-street parking in residential zones in the locality of the land that is intended to be for residential use.
— Access to or provision of alternative transport modes to and from the land.

Car Parking Demand Assessment

In relation to apartment visitors, there is an expected peak demand for 22 spaces during evening and weekend periods. The proposed apartment visitor parking provision of 22 spaces satisfies this expected peak demand.

Availability of Alternative Car Parking

In order to determine the availability of alternative car parking in the vicinity of the site, car parking surveys were recently undertaken, as detailed in Section 2.3.

The surveys identified a relatively low level of utilisation of on-street parking in the vicinity of the site, with no less than 166 vacant spaces at all times surveyed, including a minimum of 15 available spaces in Zone I (2) on the east side of Browns Road at all times during the Friday and Saturday parking surveys. In the event that apartment visitor parking demands exceed the supply, the overflow demands could be comfortably accommodated along the east side of Browns Road directly adjacent to the site as well as other nearby sections of Browns Road, without the need to park directly in front of other existing residential properties.

Alternative Transport Modes

As discussed in Section 2.4, the site has bus and train services operating within convenient proximity of the site.

Discussion

The proposed apartment visitor parking provision of 22 spaces meets the expected peak parking demand of 22 spaces, which could occur during peak evening and weekend periods and is considered to be an ample provision. In addition, the site has the benefit of a generous street frontage to Browns Road, which can readily cater for any off-site visitor car parking demands.

5 Conclusions:

It is proposed to develop the site at 29 Browns Road, Clayton, for the purpose of a residential development comprising 74 townhouses and 147 apartments, serviced by an internal road network and a basement car park.

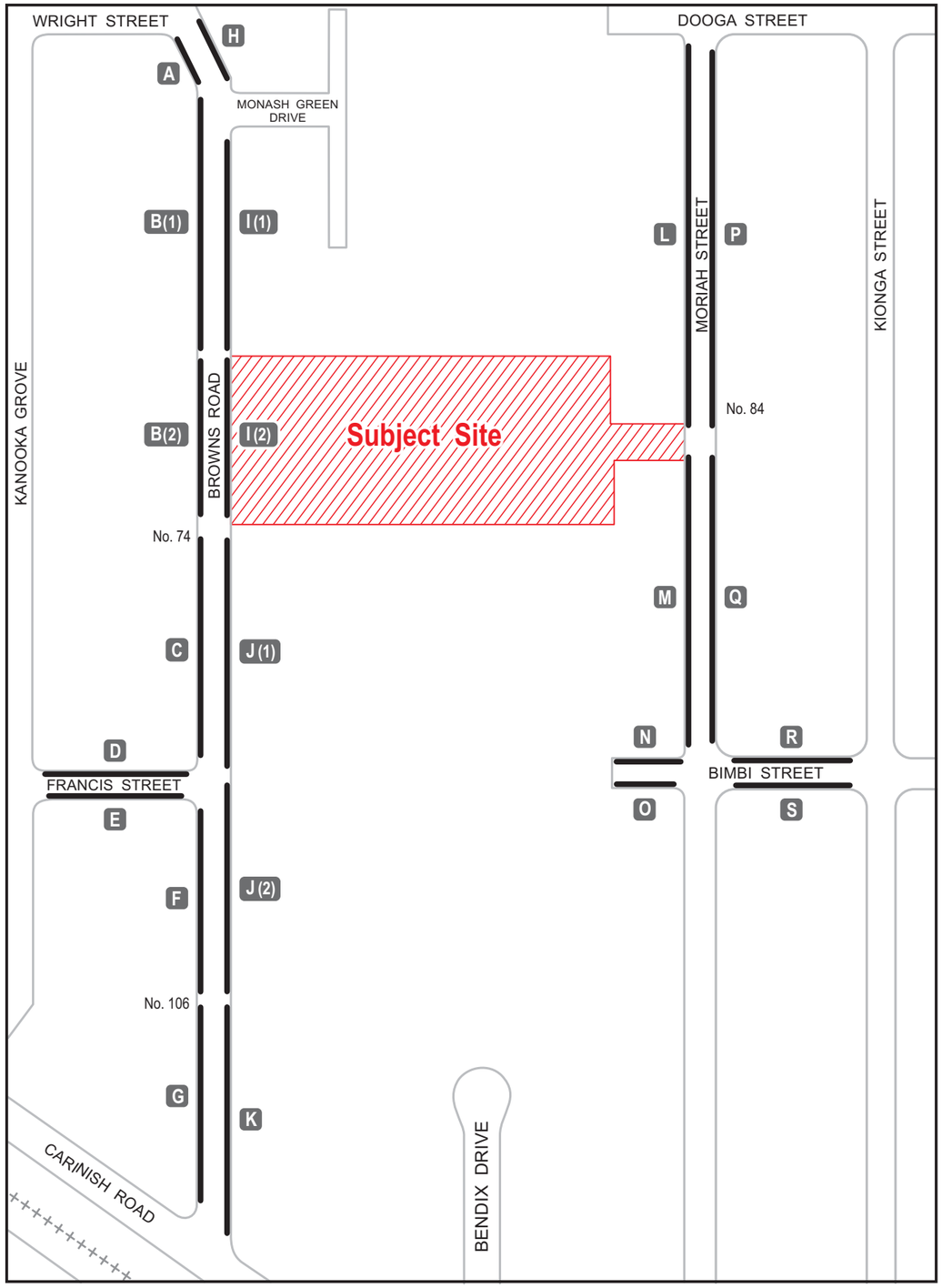
Based on the assessment undertaken above, it is concluded as follows:

- Parking for townhouse residents are proposed in the form of individual garages, with the provision in accordance with the statutory requirement.
- Parking for townhouse visitors are proposed within convenient at-grade spaces accessed directly from the internal road network, with the provision in accordance with the statutory requirement.
- Parking for apartment residents are proposed in the basement car park, with the provision in accordance with the statutory requirement;
- Parking for apartment visitors is proposed within the basement car park, with a generous provision of 22 spaces, which represents a shortfall of 7 spaces from the statutory requirement. Notwithstanding, the provision of 22 spaces meets the expected peak visitor parking demand of 22 spaces, with sufficient and convenient on-street parking available in the direct vicinity of the site, without the need to park in front of existing residential properties.

Overall, the proposed development is not expected to create adverse parking impacts in the precinct.

Appendix A **Car Park Occupancy Survey Results**

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020



Project : 12555 March 2017

FIGURE A1
PARKING SURVEY AREAS

TRANS TRAFFIC SURVEY trafficsurvey.com.au

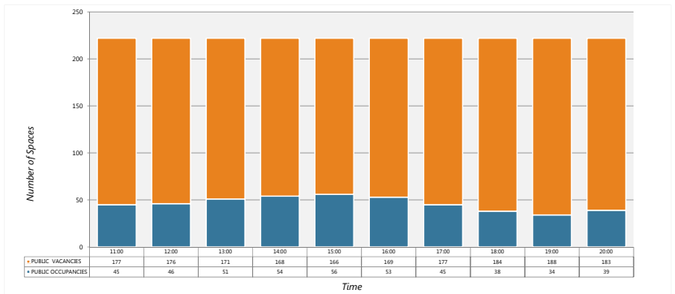
Parking Occupancy Survey

Date:	Friday, 24 August 2018
Location:	29 Browns Road, Clayton
Weather:	Fine
Customer:	Ratio

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

Public Parking (1/0)	Map Ref	Street	Section	Side	Restriction	Spaces	Parking Occupancy 11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
0	A	Browns Rd	Monash Green Drive To Wright St	W	No Stopping	0	0	0	0	0	0	0	0	0	0	0
1	B1	Browns Rd	No.62 To Monash Green Drive	W	1/2P 8a-6p Mon-Fri	3	1	1	2	2	2	3	3	2	2	4
1	B2	Browns Rd	No.74 To No.62	W	1/2P 8a-6p Mon-Fri	3	2	2	2	2	2	2	2	2	2	2
1	C	Browns Rd	Francis St To No.74	W	2P 7:30a-5:30p Mon-Fri	10	3	2	2	3	2	2	1	1	0	0
1	D	Browns Rd	Francis St To Kanooka Grove	N	1/2P 8a-6p Mon-Fri	1	1	1	0	0	0	0	0	0	0	0
1	E	Francis St	Browns Rd To Kanooka Grove	S	1/2P 8a-6p Mon-Fri	1	0	0	0	0	0	0	0	0	0	0
1	F	Browns Rd	No.106 To Francis St	W	2P 7:30a-5:30p Mon-Fri	10	1	1	1	2	2	1	1	0	0	0
1	G	Browns Rd	Carnish Rd To No.106	W	2P 7:30a-5:30p Mon-Fri	12	4	4	4	4	4	3	2	2	1	1
0	H	Browns Rd	Monash Green Drive To Wright St	E	No Stopping	0	0	0	0	0	0	0	0	0	0	0
1	I1	Browns Rd	No.62 To Monash Green Drive	E	1/2P 8a-6p Mon-Fri	9	0	0	1	1	2	2	3	3	4	3
1	I2	Browns Rd	No.74 To No.62	E	2P 7:30a-5:30p Mon-Fri	4	1	1	1	1	1	1	0	0	0	0
1	I2	Browns Rd	No.74 To No.62	E	1/2P 8a-6p Mon-Fri	13	0	0	0	0	1	0	0	0	0	0
1	J1	Browns Rd	Francis St To No.74	E	2P 7:30a-5:30p Mon-Fri	14	2	3	0	0	1	1	0	0	0	0
1	J2	Browns Rd	No.106 To Francis St	E	2P 7:30a-5:30p Mon-Fri	11	1	0	1	1	1	1	2	2	1	1
1	K	Browns Rd	Carnish Rd To No.106	E	2P 7:30a-5:30p Mon-Fri	14	2	2	3	3	2	2	1	1	1	0
1	L	Moriah Street	No.84 To Dooga St	W	1P 8a-6p Mon-Fri	19	3	3	6	6	6	5	5	4	4	6
1	M	Moriah Street	Bimbi St To No.84	W	Unrestricted	8	6	6	6	6	6	6	5	3	3	3
1	M	Moriah Street	Bimbi St To No.84	W	1P 8a-6p Mon-Fri	9	2	4	4	5	5	4	3	3	2	3
1	N	Bimbi St	Moriah Street To End (W)	N	Unrestricted	3	1	1	2	2	2	2	2	2	2	2
1	O	Bimbi St	Moriah Street To End (W)	S	Unrestricted	4	2	2	4	4	4	4	3	3	2	2
1	P	Moriah Street	No.84 To Dooga St	E	Unrestricted	2	2	2	2	2	2	2	1	1	1	2
1	P	Moriah Street	No.84 To Dooga St	E	1P 8a-6p Mon-Fri	18	2	2	2	2	2	2	2	2	3	3
1	Q	Moriah Street	Bimbi St To No.84	E	1P 8a-6p Mon-Fri	6	1	1	1	1	1	1	1	1	1	2
1	Q	Moriah Street	Bimbi St To No.84	E	Unrestricted	10	7	7	7	7	7	7	6	4	3	3
1	R	Bimbi St	Moriah Street To Kionga St	N	Unrestricted	6	1	1	1	1	1	2	2	2	2	2
1	S	Bimbi St	Moriah Street To Kionga St	S	Unrestricted	7	0	0	0	0	0	0	0	0	0	0
	PUBLIC CAPACITY						**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**
	PUBLIC OCCUPANCIES						**45**	**46**	**51**	**54**	**56**	**53**	**45**	**38**	**34**	**39**
	PUBLIC VACANCIES						**177**	**176**	**171**	**168**	**166**	**169**	**177**	**184**	**188**	**183**
	PUBLIC % OCCUPANCIES						**20%**	**21%**	**23%**	**24%**	**25%**	**24%**	**20%**	**17%**	**15%**	**18%**

not available for public parking



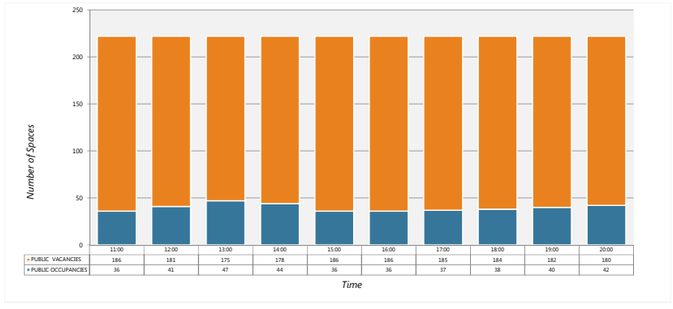
TRANS TRAFFIC SURVEY
trafficsurvey.com.au

Parking Occupancy Survey

Date:	Saturday, 25 August 2018
Location:	29 Browns Road, Clayton
Weather:	Fine
Customer:	Ratio

Public Parking (1/0)	Map Ref	Street	Section	Side	Restriction	Capacity	Parking Occupancy									
							11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
0	A	Browns Rd	Monash Green Drive To Wright St	W	No Stopping	0	0	0	0	0	0	0	0	0	0	0
1	B1	Browns Rd	No.62 To Monash Green Drive	W	1/2P 8a-6p Mon-Fri	12	4	4	5	5	4	4	4	4	3	3
1	B2	Browns Rd	No.74 To No.62	W	1/2P 8a-6p Mon-Fri	6	1	1	2	2	1	1	1	1	1	2
1	C	Browns Rd	Francis St To No.74	W	2P 7:30a-5:30p Mon-Fri	10	0	0	0	1	0	0	0	0	0	0
1	D	Francis St	Browns Rd To Kanooka Grove	N	1/2P 8a-6p Mon-Fri	7	0	0	0	0	0	0	0	0	0	0
1	E	Francis St	Browns Rd To Kanooka Grove	S	1/2P 8a-6p Mon-Fri	8	0	1	1	0	0	0	0	0	0	0
1	F	Browns Rd	No.106 To Francis St	W	2P 7:30a-5:30p Mon-Fri	10	1	1	1	0	0	0	0	0	0	0
1	G	Browns Rd	Carnish Rd To No.106	W	2P 7:30a-5:30p Mon-Fri	12	1	2	2	2	1	1	1	1	1	1
0	H	Browns Rd	Monash Green Drive To Wright St	E	No Stopping	0	0	0	0	0	0	0	0	0	0	0
1	I1	Browns Rd	No.62 To Monash Green Drive	E	1/2P 8a-6p Mon-Fri	9	1	1	1	0	0	0	0	1	2	2
1	I2	Browns Rd	No.74 To No.62	E	2P 7:30a-5:30p Mon-Fri	4	0	0	0	0	0	0	0	0	0	0
1	I2	Browns Rd	No.74 To No.62	E	1/2P 8a-6p Mon-Fri	13	0	0	0	0	1	1	0	0	0	0
1	J1	Browns Rd	Francis St To No.74	E	2P 7:30a-5:30p Mon-Fri	14	0	0	0	0	0	0	0	0	0	0
1	J2	Browns Rd	No.106 To Francis St	E	2P 7:30a-5:30p Mon-Fri	11	0	0	0	1	1	1	1	1	0	0
1	K	Browns Rd	Carnish Rd To No.106	E	2P 7:30a-5:30p Mon-Fri	14	2	2	2	1	1	0	0	0	0	0
1	L	Moriah Street	No.84 To Dooga St	W	1P 8a-6p Mon-Fri	19	5	6	6	7	5	6	6	6	7	7
1	M	Moriah Street	Bimbi St To No.84	W	Unrestricted	8	2	2	3	3	3	3	3	3	3	4
1	M	Moriah Street	Bimbi St To No.84	W	1P 8a-6p Mon-Fri	9	3	3	4	4	4	4	5	5	5	4
1	N	Bimbi St	Moriah Street To End (W)	N	Unrestricted	3	2	2	2	2	2	2	2	2	2	2
1	O	Bimbi St	Moriah Street To End (W)	S	Unrestricted	4	2	2	2	2	1	1	1	1	1	2
1	P	Moriah Street	No.84 To Dooga St	E	Unrestricted	2	1	1	2	2	1	1	2	2	2	2
1	P	Moriah Street	No.84 To Dooga St	E	1P 8a-6p Mon-Fri	18	4	5	5	4	3	3	2	2	4	5
1	Q	Moriah Street	Bimbi St To No.84	E	1P 8a-6p Mon-Fri	6	2	3	3	2	2	2	3	3	3	2
1	Q	Moriah Street	Bimbi St To No.84	E	Unrestricted	10	4	4	4	3	3	3	4	4	4	4
1	R	Bimbi St	Moriah Street To Kionga St	N	Unrestricted	6	1	1	1	2	3	3	2	2	2	2
1	S	Bimbi St	Moriah Street To Kionga St	S	Unrestricted	7	0	0	1	1	0	0	0	0	0	0
	PUBLIC CAPACITY						**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**	**222**
	PUBLIC OCCUPANCIES						**36**	**41**	**47**	**44**	**36**	**36**	**37**	**38**	**40**	**42**
	PUBLIC VACANCIES						**186**	**181**	**175**	**178**	**186**	**186**	**185**	**184**	**182**	**180**
	PUBLIC % OCCUPANCIES						**16%**	**18%**	**21%**	**20%**	**16%**	**16%**	**17%**	**17%**	**18%**	**19%**

not available for public parking



For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

ratio:

Report
Prepared for
Nan Xin Investments Pty Ltd

23 February 2017

Proposed Residential Development

Development Plan Traffic Impact Assessment

29 Browns Road
CLAYTON

traffic:report

r:

ratio:consultants

9 Clifton Street
Richmond VIC 3121
ABN 93 983 380 225

Prepared for: Nan Xin Investments Pty Ltd

Our reference 12555Rep07.docx

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

Version	Date	Reason for Issue	Prepared By	Checked By
01	31/08/15	Issued for approval	B Chan	R Symons
02	18/09/15	Issued for approval	B Chan	R Symons
03	18/09/15	Issued for approval	B Chan	R Symons
04	18/09/15	Issued for approval	B Chan	R Symons
05	06/06/16	Revised Scheme	B Chan	R Symons
06	20/02/17	Revised Scheme	B Chan	R Symons
07	23/02/17	Updated based on comments received on 23/02/17	B Chan	R Symons

Directory Path	Y:\12501 - 13000\12555 - 29 Browns Road, Clayton (Residential Development)\Reports\12555Rep07.docx

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Table of contents:

Appendices:

1 Introduction:

Ratio Consultants has been engaged by Nan Xin Investment Pty Ltd to assess the traffic and parking implications of a Development Plan for a residential development at 29 Browns Road, Clayton.

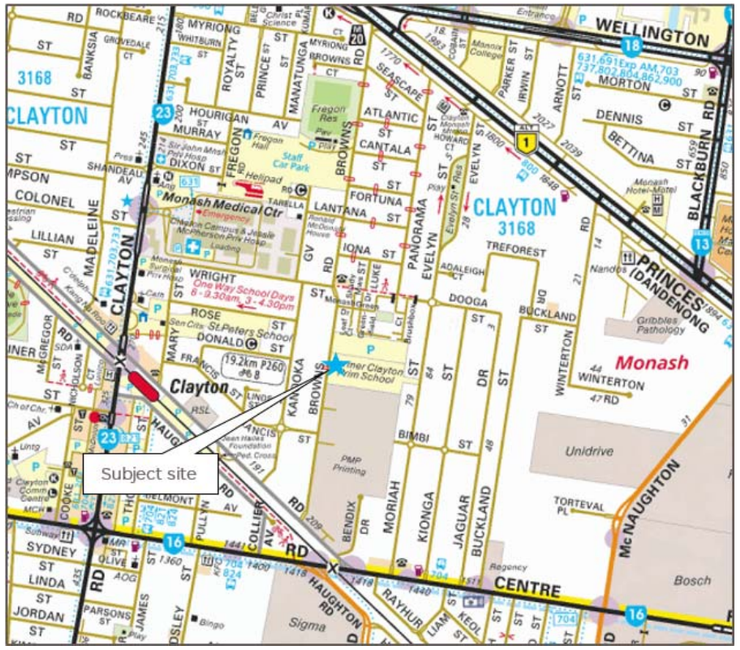
This report has been prepared to address the parking and traffic matters to form part of the Development Plan and will be submitted to the Monash City Council.

The report is based on recent surveys and observations in the vicinity of the site, and of previous studies of similar developments elsewhere in Melbourne.

2.1 Location and Environment

The subject site is located at 29 Browns Road and is located south of Princes Highway, between Browns Road and Moriah Street in Clayton. The site and surrounding road network is shown below in Figure 2.1.

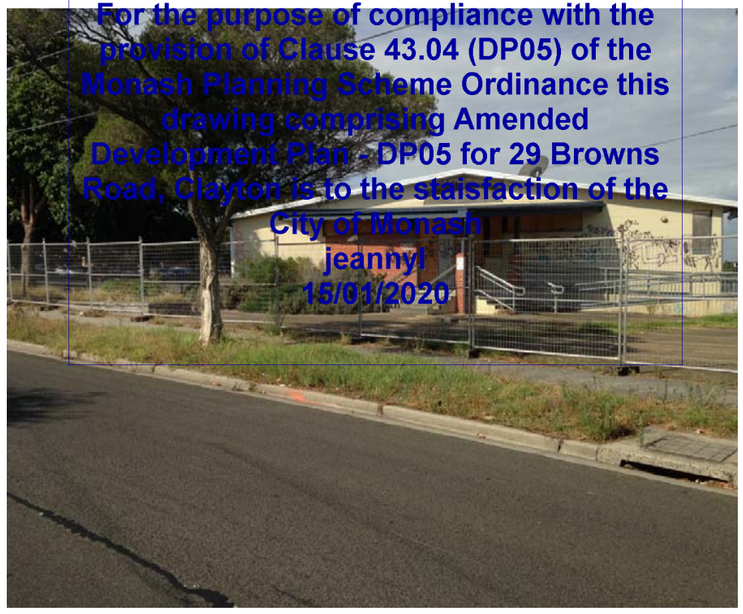
Figure 2.1: Site Location and the surrounding road network



Source: http://www.melway.com.au/

The site is rectangular in shape with a frontage to Browns Road of approximately 90.86 metres, a frontage to Moriah Street of 16.36 metres and an approximate depth of 212.9 metres for an overall site area of approximately 2 hectares. There is currently an unoccupied single storey school (Clayton Primary School) and car park on-site. There is one existing vehicular crossover to/from Browns Road located along the northern boundary and one existing crossover to/from Moriah Street. There is also a pedestrian wombat crossing provided across Browns Road at the frontage of the site.

Photo 2-1: Subject Site



The subject site is located within a General Residential Zone – Schedule 1 (GRZ1), subject to a Development Plan Overlay – Schedule 5 (DPO5). The subject site is surrounded by a General Residential Zone – Schedule 2, to the east and west, and Industry 1 Zone (INZ1) to the north and south. Accordingly, the land use in the immediate vicinity of the site comprises a mixture of residential and industry uses.

Notable non-residential land uses in the vicinity of the site include:

- Secured car parking to the north of the site.
- PMP Limited print and distribution warehouse to the south of the site.
- Various warehouse developments along the east side of Browns Road between the site and Carinish Road.
- Sir John Monash Private Hospital approximately 750 metres north-west of the site.
- Monash Institute of Medical Research located approximately 350 metres north-west of the site.
- Clayton Railway Station approximately 700 metres south-west of the site.
- Clayton Activity Centre approximately 700 metres south-west of the site.
- Monash University located approximately 1.2 kilometres north of the site.
- Springvale Homemaker Centre located approximately 1.4 kilometres east of the site.

2.2 Road Network

Browns Road is a municipal Local Road that runs in a north-south alignment between Princes Highway (Dandenong Road) and Carinish Road, in Clayton. In the immediate vicinity of the site, Browns Road has an approximate carriageway width of 9.0 metres accommodating one traffic lane in each direction and kerbside parking on both sides of the road.

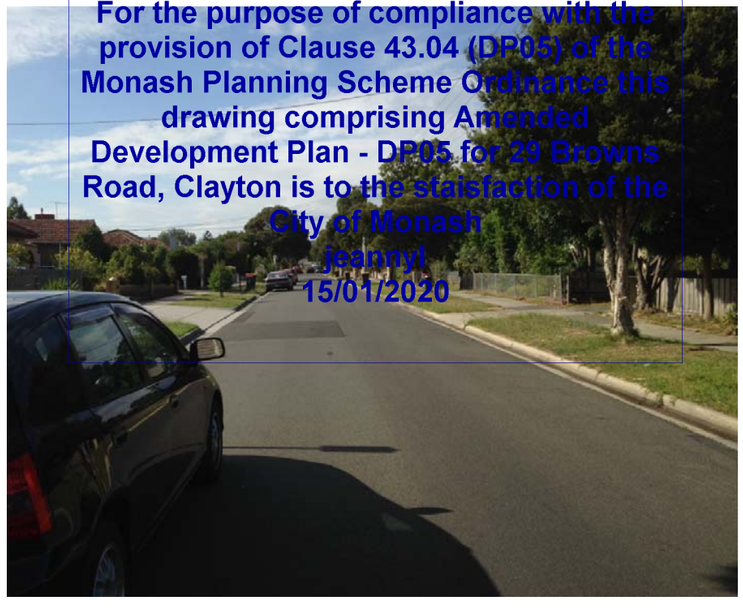
Footpaths are provided on both sides of the road. Browns Road has a default speed limit of 50km/hr.

Photo 2-2: Browns Road looking north

Photo 2-3: Browns Road looking south

Moriah Street is a Local Road that runs in a north-south alignment between Centre Road and Dooga Street, in Clayton. In the immediate vicinity of the site, Moriah Street has an approximate carriageway width of 7.0 metres accommodating one trafficable lane in each direction and kerbside parking on both sides of the road. Footpaths are provided on both sides of the road. Moriah Street has a posted speed limit of 50km/hr.

Photo 2-4: Moriah Street looking south



2.3 Traffic Conditions

Ratio Consultants Pty Ltd commissioned a 7-day traffic volume and speed count on Browns Road from Tuesday 18 August 2015 to Monday 24 August 2015. The detailed survey results are presented in Figure 2.2 and Table 2.1 of Appendix A.

In summary, the survey results showed:

- A 7-day average of 3,249 vehicles per day, of which 2.8% were classified as Heavy Vehicles. Of this, 1418 vehicles were recorded travelling northbound and 1831 vehicles travelling southbound.
- The morning peak occurred between 8:00am and 9:00am when an average total of 245 vehicles movements were recorded over this section of Browns Road. This consisted of an average of 129 vehicles travelling northbound and an average of 116 vehicles travelling southbound.
- The evening peak occurred between 5:00pm and 6:00pm when an average total of 317 vehicles movements were recorded over this section of Browns Road. This consisted of an average of 95 vehicles travelling northbound and an average of 222 vehicles travelling southbound.
- The 85th percentile speed over the 7 days was 37.9km/h.

2.4 Parking Conditions

Ratio Consultants conducted surveys of parking supply and demand on Thursday 5 March 2015 between 12:00pm to 8:00pm. The extent of the survey area and detailed survey results are presented in Figure 2.3 and Table 2.1, attached in Appendix A.

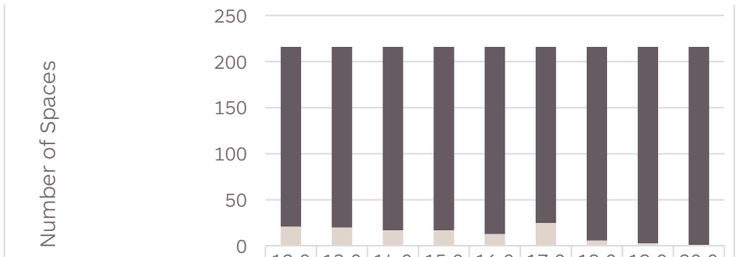
A summary of the results are as follows:

Thursday 5 March 2015

- There were a total of 216 publicly available car parking spaces available during the survey period, subject to a range of parking restrictions.
- The peak period occurred between 12:00pm and 1:00pm, when a total of 21 parking spaces were recorded occupied out of an available supply of 216 spaces, representing a parking occupancy of 10%.
- The demand for parking was low during the survey period, ranging between 0% and 10%.
- On Browns Road immediately in front of the site, there is a supply of 26 parking spaces on the eastern side of the road (Zone I) and 15 spaces on the western side of the road (Zone B), with a mixture of 2P and 1/2P parking restrictions. These were observed to be very minimally used during the survey period.
- On Browns Road to the south of the site, there is a supply of 25 spaces on the eastern side of the road (Zone J) and 10 spaces on the western side of the road (Zone C), with 2P parking restrictions. Similarly, these were observed to be very little used.

Graph 2.1 provides a graphical representation of the Thursday parking demands.

Graph 2.1: Thursday 5 March 2015 Temporal Profile of Parking Demand



	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PUBLIC VACANCIES	195	196	199	199	203	191	210	213	215
PUBLIC OCCUPANCIES	21	20	17	17	13	25	6	3	1

The survey results indicate that the overall parking demand is low during the survey period, indicating that there is ample parking capacity within close vicinity of the subject site to accommodate any additional visitor parking demand generated by the site.

2.5 Sustainable Transport

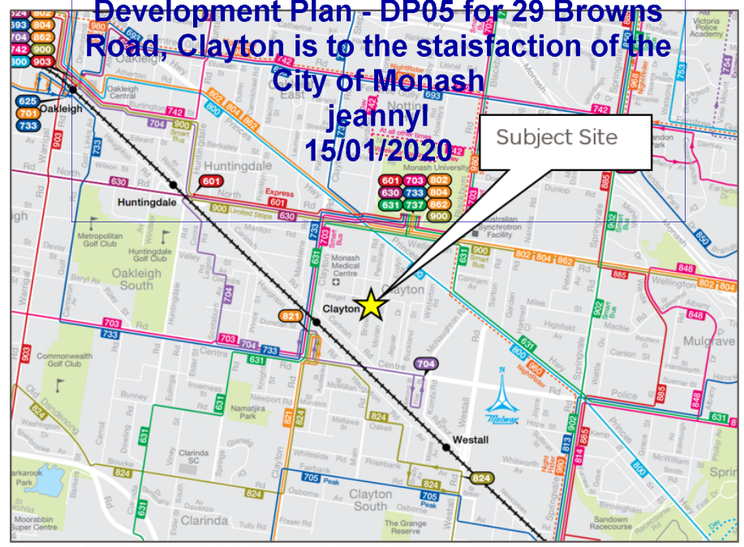
The site has access to the following public transport facilities:

- Clayton Railway Station located 700 metres south-west of the site.
- Bus Route 703 SMARTBUS (Middle Brighton – Blackburn via Bentleigh, Clayton, Monash University) operates along Clayton Road, with the closest stop located 620 metres west of the subject site.
- Bus Route 631 (Southland – Waverley Gardens via Clayton, Monash University) operates along Clayton Road, with the closest stop located 620 metres west of the subject site.
- Bus Route 733 (Oakleigh – Box Hill via Clayton, Monash University, Mt Waverley) operates along Clayton Road, with the closest stop located 620 metres west of the subject site.

- Bus Route 800 (Dandenong – Chadstone via Princes Highway, Oakleigh) operates along Browns Road with the closest stop located 950 metres north of the site.

Refer to Figure 2.3 for a graphical representation of the available public transport services in the vicinity of the site.

Figure 2.3: Monash Public Transport Map



Source: Public Transport Victoria http://ptv.vic.gov.au/

2.6 Crash Analysis

A review has been conducted of VicRoads 'Crashstats' data base for the most recent five year period of available data from 1 July 2008 to 30 June 2013 for any reported casualty crashes along Browns Road (between Francis Street and Wright Street inclusive of the intersections), and along Moriah Street (between Dooga Street and Bimbi Street inclusive of the intersections).

The analysis revealed one casualty crash at the intersection of Browns Road and Wright Street, involving a vehicle running off the road into a parked vehicle, resulting in a serious injury. Given the low number of crashes in the area, it is considered that the road network surrounding the subject site is operating in a relatively safe manner.

3 The Development Plan:

The Development Plan envisages 4 four-storey apartment buildings and 74 townhouses, plus associated on-site basement car parking on land at 29 Browns Road, Clayton.

Initial plans indicate:

- 172 apartments across 4x four-story apartment buildings, accessed from Browns Road, comprising:
  - 78 x one-bedroom apartments; and
  - 94 x two-bedroom apartments.
- 72 townhouses accessed from Browns Road, comprising:
  - 34 x two-bedroom townhouses;
  - 20 x three-bedroom + study townhouses[1];
  - 18 x four-bedroom townhouses.
- 2 x three-bedroom + study townhouses accessed from Moriah Street
- A total of 340 car parking spaces is proposed to be provided on-site, comprising:
  - 212 at-grade car parking spaces provided within a basement car park for residents and visitors of the apartments, accessed via a ramp to/from the internal road;
  - 14 visitor spaces provided on ground level within the internal streets; and
  - 114 car parking spaces provided for the 74 townhouses, with each of the two-bedroom townhouses provided with a single garage, and each of the three and four-bedroom townhouses provided with either a double garage or a single garage plus a tandem space.

Access to the site will be via Browns Road. Access to the townhouses within the site will be via a network of internal roads.

Vehicular access to the basement car park for the apartments will be via an access ramp located centrally on the site, accessed from the northern internal street.

In addition to the above, there are 2 three-bedroom + study townhouses proposed at the eastern end of the site, accessed from Moriah Street. Each of these two townhouses will be provided with a double garage (ie. four spaces). No through vehicular access is proposed between Moriah Street and Browns Road.

A network of 1.4 metre wide footpaths throughout the site have been provided to accommodate access to each of the townhouses and the apartment buildings.

Refer to Appendix B for the Development Plans prepared by Mushan Architects.

[1] The dimensions of the studies are not considered to be of sufficient size to allow them to function as a bedroom. Therefore, for the purpose of this assessment, these apartments have been considered as three-bed apartments.

4 Parking Assessment:

4.1 Clause 52.06 Assessment

Parking requirements for a range of uses are set out under Clause 52.06 of the Victoria Planning Provisions. The purpose of the Clause, amongst other things, is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

In accordance with the Car Parking Table to Clause 52.06-5, Table 4.1 below sets out the statutory parking requirements for the initial development plans.

Table 4.1: Clause 52.06 Planning Scheme Assessment

Use	Type	Number	Statutory Parking Rate	Statutory Requirement
Residential (apartments)	One Bedroom	78 x 1-bed apartment	1 space per dwelling	78 spaces
	Two Bedrooms	94 x 2-bed apartments	1 space per dwelling	94 spaces
Residential (townhouses)	Two bedrooms	34 x 2-bed townhouses	1 space per dwelling	34 spaces
	Three Bedrooms	20 x 3-bed townhouses	2 spaces per dwelling	40 spaces
	Four Bedrooms	18 x 4-bed townhouses	2 spaces per dwelling	36 spaces
Residential (townhouses accessed from Moriah Street)	Three Bedrooms	2 x 3-bed townhouses	2 spaces per dwelling	4 spaces
Visitor		244 dwellings total (172 apartments + 72 townhouses – excluding 2 units on Moriah Street)	1 visitor space per 5 dwellings	49 spaces
TOTAL				335 spaces

On the basis of the above, the initial plans would have a statutory requirement to provide 335 spaces (286 resident and 49 visitor spaces). Given that 340 on-site spaces are proposed, including 50 visitor spaces, the development exceeds the requirements of the Planning Scheme.

5.1 Access Arrangements

Access to the development will be via the Browns Road 7.3 metre wide driveway crossing. The location of the access is considered satisfactory and appropriate as it provides good sightlines to both directions of traffic on Browns Road, and at a good distance away from any existing intersection to avoid any conflict with turning vehicles.

Internal Streets

The site access road will have a road reserve width of 9.81 metres, between Browns Road and the first intersecting street to provide for landscaping and footpath on the south side of the road.

The proposed internal private street network is configured to provide a main circulating road between the site entry point on the north-western corner of the site and the basement car park entry. This section is anticipated to carry the largest volume of traffic. Lower order access streets extending from the main road are also provided, providing access to the remaining townhouses.

The main access road between the site access and the basement entry has been provided with a minimum kerb to kerb road width of 6.0 metres. The lower order side access streets extending out from the main section has been provided with a kerb to kerb road width of 5.5 metres.

Vehicle priority will be established for the main access road through the use of give way signage and linemarking. Refer to Appendix C for a linemarking plan showing details of the vehicle priorities which will be established for the main circulating road.

Footpaths are proposed to be provided at a width of 1.4 metres.

A one-way road is proposed through the apartment buildings, which is envisaged to be bollarded on both ends and closed to vehicular traffic, and only to be used for emergency vehicles and waste removal vehicles. The road is proposed to be 3.5 metres wide, and has been designed to accommodate the movements of an 8.8 metre long truck.

Provision has been made at the ends of the side streets to allow for a turnaround area for cars. The ends of the side streets will be designed to enable vehicles to perform three-point turn manoeuvres and exit in a forwards direction. ‘No Stopping’ restrictions will be installed at the dead end sections to ensure vehicles are not parked in the area.

Basement Car Park Access

— The initial plans show a 6.0 metre wide basement car park access ramp to the north of the site, accessed from the internal street and leading down into the basement car park. This provides sufficient width to accommodate two-way traffic and a central intercom island, if required.
— Ramp gradients will be determined during the conceptual design stage, and designed within the gradient transition requirements set out in Clause 52.06-8 of the Planning Scheme.
— It is recommended that an exit sight splay measuring 2.0 metres by 2.5 metres is provided at the top of the basement car park ramp, to provide adequate sight distance to pedestrians on the footpath

5.2 Car Park Layout

The development accommodates a total of 341 parking spaces, comprising of:

— 212 parking spaces within a basement level car park, comprising:
  - 176 resident parking; and
  - 36 visitor parking spaces;
— 114 parking spaces for the townhouses; and
— 14 visitor parking spaces on the ground level, accessed from the internal streets.

Each car space will be designed consistent with the dimensions and standards outlined in Clause 52.06-8 of the Monash Planning Scheme and/or AN/NZS 2890.1:2004.

Basement Parking Spaces

The basement car parking spaces will comply with the dimensional requirements of Clause 52.06 of the Planning Scheme and/or AS/NZS 2890.1:2004, with the following minimum requirements:

— Minimum width of 2.6 metres and a length of 4.9 metres, accessed via a minimum 6.4 metre wide access aisle
— In accordance with Design Standard 2: Diagram 1 of Clause 52.06, a minimum of 300mm clearance will be provided to parking spaces located adjacent to structures or objects that impact upon the parking envelope;
— No columns are currently shown in the basement level, and will be detailed at a later stage. All columns adjacent to parking bays will need to be set back 250mm and extending no further than 1.25m back from the front of the parking space, in compliance with Diagram 1 of Clause 52.06-8 Design Standard 2;
— End bay islands to be provided to protect cars that are parked in the end bays;
— Parking aisles to be extended by 1 metre beyond the last parking spaces at blind aisles to allow for vehicles to turn around at the end and drive out forwards in accordance to Section 2.4.2 of AS/NZS 2890.1:2004.

Townhouse Garage Spaces

Parking for the townhouses are provided within a combination of single garages, double garages and single garages plus a tandem space. More specifically:

— 32 townhouses will be provided with a double garage (including the two townhouses accessed from Moriah Street)
— 34 townhouses will be provided with a single garage
— 8 townhouses will be provided with a single garage with a tandem space

The townhouse parking arrangement will be designed in accordance with Clause 52.06 of the Planning Scheme and/or AS/NZS 2890.1:2004, with the following minimum requirements:

— The single garages to have an internal width of 3.5 metres by 6.0 metres in dimension, accessed via a minimum 5.8 metre aisle in accordance with Clause 52.06-8 of the Monash Planning Scheme.
— The double garages to have a minimum internal width of 5.5 metres by 6.0 metres, accessed by a minimum aisle width of 6.4 metres.
— The tandem garages to have a minimum internal length of 11.4 metres and an internal width of 3.5 metres.

Townhouse Visitor Parking Spaces

14 visitor parking spaces have been provided on the ground level for the townhouses. The townhouse visitor parking spaces will be in a 90 degree format and will be designed in accordance with the dimensional requirements of Clause 52.06 of the Planning Scheme, with the following minimum requirements:

— Minimum width of 2.6 metres and a length of 4.9 metres, accessed via a minimum 6.4 metre wide access aisle, in accordance with AS/NZS 2890.1:2004.

Swept Path Assessment

A swept path assessment (Refer to Appendix D) has been conducted using the "Autodesk Vehicle Tracking' software. The assessment demonstrates that:

— Cars are able to enter and exit the basement car park simultaneously (the B99 vehicle has been used for this assessment).
— Cars are able to adequately turn around at the end of each of the side streets (the B99 vehicle has been used for this assessment)

6 Bicycle Parking:

6.1 Bicycle Parking

The provisions set out under Clause 52.34-3 of the Monash Planning Scheme require that bicycle parking be provided at the following rates, as shown in Table 4.3:

Table 6.1: Bicycle Parking Statutory Requirements

Use	Type	Number of Apartments	Statutory Parking Rate	Statutory Requirement
Residential (apartments)	Resident	172 apartments	1.0 space per five residential apartments	35 spaces
	Visitor	172 apartments	1.0 space per 10 residential apartments	18 spaces
Total				53 spaces

Accordingly, the proposal has a statutory requirement to provide 53 bicycle spaces. It is recommended that a minimum of 53 on-site bicycle spaces are provided for apartment residents and visitors. It is noted that there is ample space to provide the required level of bicycle parking.

Bicycle storage for the townhouses may be within the garage.

7 Waste Management:

7.1 Waste Management

Waste storage areas for the apartments could be provided on the ground level between the two apartment buildings.

For the townhouses, bins may be accommodated within the garages.

Waste collection will be undertaken by private contractor within the internal streets. Townhouse residents will transfer bins to bin collection points located at various points around the site, and a building manager/caretaker will be responsible for transferring apartment garbage and recycling bins for collection from the bin storage areas to the kerbside collection points.

Prior to collection, residents within the eastern row of townhouses will shift their bins to western side of the street, adjacent to the apartment block, with waste collection to be undertaken at the intersection. A 1.3 metre wide nature strip has been provided at this location to accommodate the placement of bins in a single line without obstructing the footpath. Waste collection vehicles will utilise the intersection as a turning area, and prop within the street to undertake the waste collection.

It is recommended that a Waste Management Plan be prepared at a later stage by a qualified consultant detailing the waste collection arrangements.

Swept Path Assessment

A swept path assessment (Refer to Appendix D) has been conducted using the "Autodesk Vehicle Tracking' software. The assessment demonstrates that:

- Waste collection vehicles are able to circulate through the one-way street (8.8m long Medium Rigid Vehicle has been used for this assessment)
- Waste collection vehicles are able to utilise the intersection on the north-eastern corner of the site to turn around and exit in a forward direction (8.8m long Medium Rigid Vehicle has been used for this assessment).

8.1 Traffic Generation

Residential apartments of the type and location proposed generate approximately four vehicle trips per day for one and two bedroom dwellings with one car space, and up to eight trips a day for three or four bedroom dwellings with two car spaces. Therefore, the 172 apartments and 72 townhouses that will be accessed via Browns Road (consisting of 38 three or four-bedroom dwellings and 206 one and two bedroom dwellings) would be expected to generate in the order of 1,128 vehicle trips per day. Generally, 10 percent of the trips, which equates to about 112 peak hour trips, will occur in each of the morning and evening peak hours.

The majority of the traffic generated by the residential development during the morning peak period will be residents departing the site (80 percent out and 20 percent in) and the majority of the traffic during the evening peak period will be residents returning to the site (30 percent out and 70 percent in).

Accordingly the expected trip generation for a typical weekday AM and PM peak hours is estimated as shown in Table 8.1

Table 8.1: Traffic Generation for the Development

	AM Peak	PM Peak
Arriving trips:	19	81
Departing trips:	93	31
Total trips:	112	112

8.2 SIDRA Analysis

The Australian Research Board (ARRB) developed a computer program called SIDRA, as an aid in the design and analysis of both signalised and unsignalised intersections. The relevant major performance measures calculated by SIDRA are the 95th percentile queue length, the average delay, and the Level of Service (LOS).

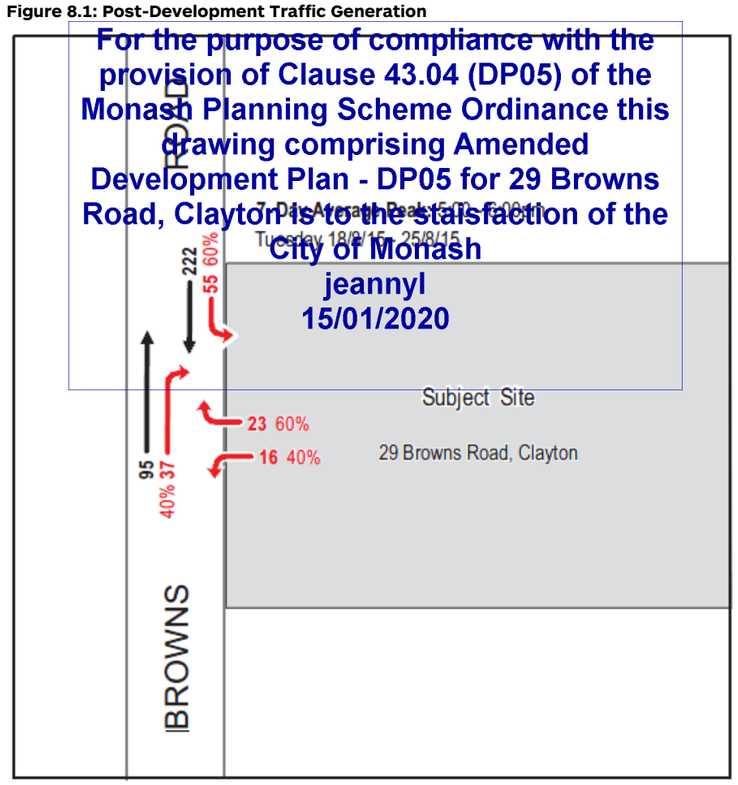
The location of the site access for the proposed development is on Browns Road, midblock between Francis Street and Monash Green Drive.

Traffic volume data was obtained as described previously in Section 2.3 of this report, and a SIDRA analysis was undertaken, including both the existing AM and PM peak periods.

A model with the current road geometry and the existing peak hour volumes along Browns Road was conducted for the afternoon / evening critical period, based on the 7-day average volumes obtained from the tube counts. A 5% heavy vehicle percentage was applied to both the eastbound and westbound traffic volumes. A further model of the proposed intersection was then conducted, incorporating the estimated additional volumes.

For the purposes of the study, the distribution of traffic is assumed to be 60% arrival/departure from the north, and 40% arrival/departure from the south. Using the traffic generation estimates outlined in Table 5.1 above, the expected generated traffic volumes are shown graphically in Figure 8.1 below:

Figure 8.1: Post-Development Traffic Generation



The results of the SIDRA analysis for the proposed conditions are summarised in Table 8.2 below, and the full set of results have been included for reference in Appendix E.

Table 8.2: SIDRA Analysis – Browns Road Future Conditions

Approach	Movement	PM Peak Hour (5:00pm-6:00pm)		
		Average Delay (sec)	Level of Service	95% Back of Queue (metres)
Browns Road (South Approach)	Through	0.5	A	1.9
	Right	5.6	A	1.9
Site	Left	2.7	A	0.9
	Right	3.8	A	0.9
Browns Road (North Approach)	Through	0	A	0
	Left	4.6	A	0

The results indicate that in the critical PM peak hour (5:00pm-6:00pm),

the traffic generated by the site would have a very minor impact on the existing operation of Browns Road. The through traffic would be largely unaffected by the additional 114 vehicles during the PM peak hour, and there would be a negligible queue in both directions of Browns Road as well as within the site.

8.3 Traffic Distribution and Impact

The majority of the additional traffic generated by the proposed development will flow onto Browns Road and the surrounding road network, with a low level of traffic generated onto Moriah Street. It is considered that the traffic generated by the proposed development (in the order of 114 vehicle movements in the morning and afternoon peak hours) can be managed in a safe and effective manner without creating adverse safety or capacity impacts to the wider road network.

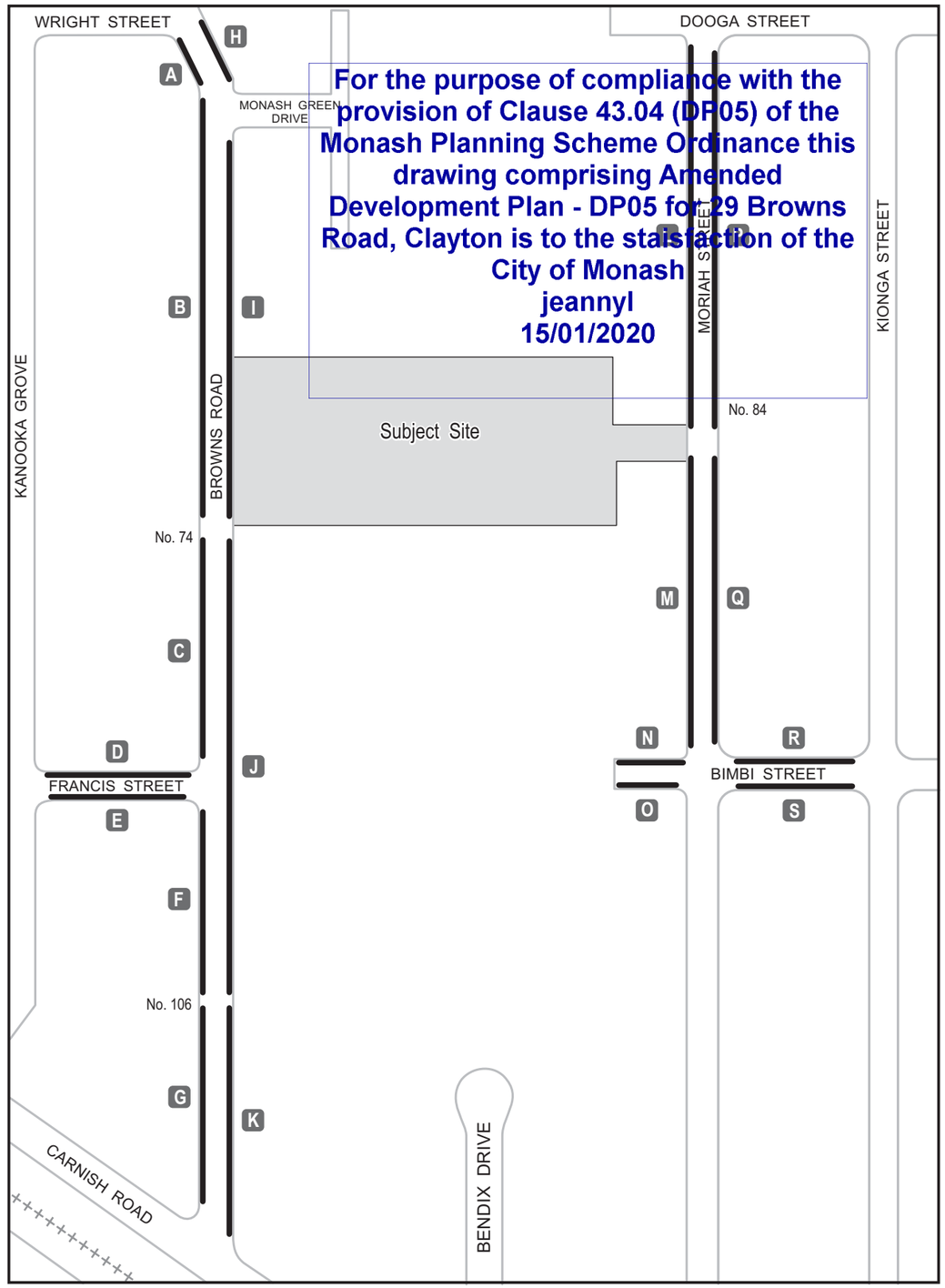
9 Conclusion:

The initial development plans for residential development at 29 Browns Road, Clayton comprises 172 apartments within four storey buildings, 34 two-bedroom townhouses, 22 three-bedroom townhouses and 18 four-bedroom townhouses. The proposed development would also include basement car parking spaces.

Based on the above considerations, it is considered that:

- The proposed on site parking provision fully meets the requirements of Clause 52.06 of the Monash Planning Scheme and is expected to accommodate the resident and visitor parking demand. Parking surveys indicate that there is ample parking along Browns Road in the immediate vicinity of the site that can accommodate for additional visitor parking if and when required.
- The proposed car park and access arrangements are suitably designed and will be designed in accordance with the requirements of the Monash Planning Scheme and/or AS/NZS2890.1:2004.
- Up to 112 vehicular trips will be generated during the morning and afternoon peak hours by the proposed development. Traffic generated by the proposed development will be dispersed onto the surrounding road network, which has the capacity to accommodate the additional traffic volumes in a safe and satisfactory manner.
- Bicycle parking is currently not shown in the plans. However, it is noted that there is ample space to provide for the required number of bicycle parking under Clause 52.34 of the Monash Planning Scheme.
- Waste collection will be undertaken within the site on ground level, with waste collected kerbside at certain locations throughout the site. A Waste Management Plan is recommended to be prepared.

Overall, the proposed development is not expected to create adverse traffic or parking impacts in the precinct. Accordingly, it would be appropriate to approve a Development Plan incorporating a proposal of the indicated type and scale.



Project : 12555 March 2015

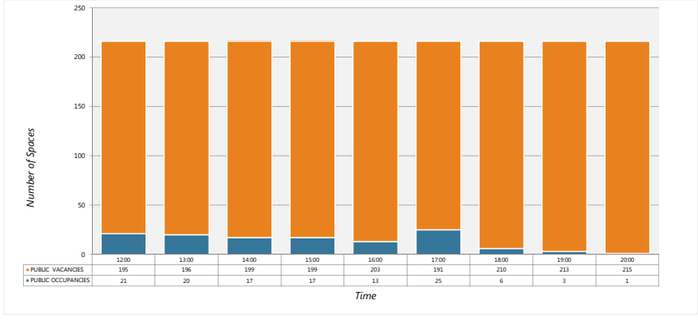
FIGURE 2.3
PARKING SURVEY AREAS

Parking Occupancy Survey

Location 29 Browns Road, Clayton
Date Thursday, 5 March 2015
Weather Mild And Overcast

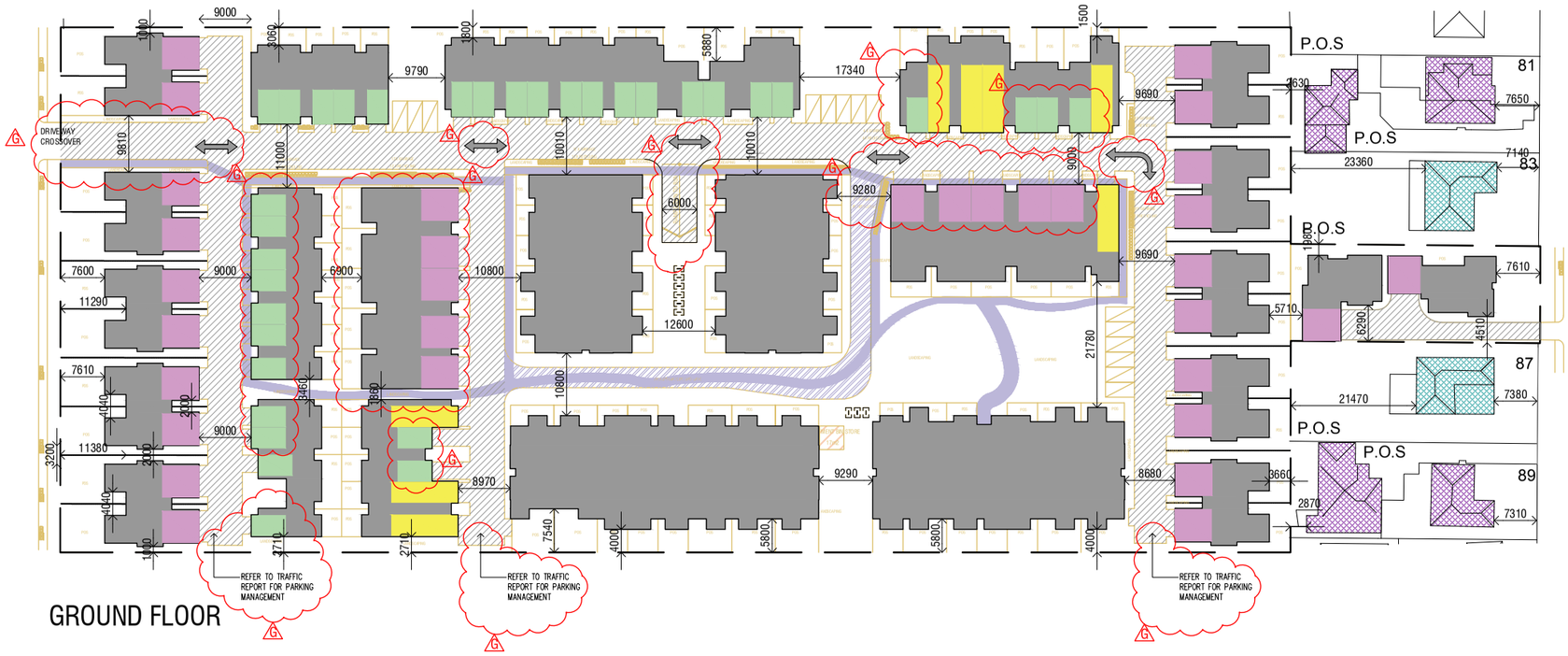
Public Parking (1/0)	Ratio Map Ref	Street	Section	Side	Restriction	Capacity	Parking Occupancy								
							12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
0	A	Browns Rd	From Monash Green Drive To Wright St	W	No Standing	0	0	0	0	0	0	0	0	0	0
1	B		From No.74 To Monash Green Drive	W	2P 7:30a-5:30p Mon-Fri	1	0	0	0	0	0	0	0	0	0
1					1/2P 8a-6p Mon-Fri	14	1	0	0	0	0	1	0	0	0
1	C		From Francis St To No.74	W	2P 7:30a-5:30p Mon-Fri	10	0	0	0	0	0	1	0	0	0
1	D	Francis St	From Browns Rd To Kanooka Grove	N	1/2P 8a-6p Mon-Fri	7	0	0	0	0	0	0	0	0	0
1	E		From Browns Rd To Kanooka Grove	S	1/2P 8a-6p Mon-Fri	8	0	0	0	0	0	0	0	0	0
1	F	Browns Rd	From No.106 To Francis St	W	2P 7:30a-5:30p Mon-Fri	10	0	0	0	0	1	1	0	0	0
1	G		From Carnish Rd To No.106	W	2P 7:30a-5:30p Mon-Fri	12	0	1	0	0	0	1	0	0	0
0	H		From Monash Green Drive To Wright St	E	No Standing	0	0	0	0	0	0	0	0	0	0
1	I		From No.74 To Monash Green Drive	E	2P 7:30a-5:30p Mon-Fri	4	0	0	0	0	0	0	0	0	0
1					1/2P 8a-6p Mon-Fri	22	0	0	0	0	1	1	0	0	0
1	J		From No.106 To Francis St	E	2P 7:30a-5:30p Mon-Fri	11	3	2	2	2	1	1	0	0	0
1			From Francis St To No.74	E	2P 7:30a-5:30p Mon-Fri	14	0	0	0	0	0	1	0	0	0
1	K		From Carnish Rd To No.106	E	2P 7:30a-5:30p Mon-Fri	14	1	0	0	1	0	0	0	0	0
1	L	Moriah Street	From No.84 To Dooga St	W	Unrestricted	2	2	2	2	2	1	1	0	0	0
1					1P 8a-6p Mon-Fri	17	4	4	3	3	2	4	3	2	1
1	M		From Bimbi St To No.84	W	Unrestricted	15	2	2	2	2	2	3	1	0	0
1	N	Bimbi St	From Moriah Street To End (W)	N	Unrestricted	3	0	0	0	0	0	1	0	0	0
1	O		From Moriah Street To End (W)	S	Unrestricted	4	2	2	2	1	1	1	0	0	0
1	P	Moriah Street	From No.84 To Dooga St	E	Unrestricted	2	1	1	1	1	1	1	0	0	0
1					1P 8a-6p Mon-Fri	18	1	2	2	2	1	3	0	0	0
1	Q		From Bimbi St To No.84	E	Unrestricted	15	3	3	2	2	2	3	2	1	0
1	R	Bimbi St	From Moriah Street To Kionga St	N	Unrestricted	6	0	0	0	0	0	1	0	0	0
1	S		From Moriah Street To Kionga St	S	Unrestricted	7	1	1	1	1	0	0	0	0	0
	PUBLIC CAPACITY						**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**	**216**
	PUBLIC OCCUPANCIES						**21**	**20**	**17**	**17**	**13**	**25**	**6**	**3**	**1**
	PUBLIC VACANCIES						**195**	**196**	**199**	**199**	**203**	**191**	**210**	**213**	**215**
	PUBLIC % OCCUPANCIES						**10%**	**9%**	**8%**	**8%**	**6%**	**12%**	**3%**	**1%**	**0%**

not available for public parking



Appendix B **Development Plans**

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020



GROUND FLOOR

TANDEM GARAGES

SINGLE GARAGES

DOUBLE GARAGES

NOTE
ALL ROADS TO BE PRIVATE INTERAL ROADS

SITE BOUNDARY

DRIVE WAY

FOOTPATH MIN 1.4m WIDE

WASTE COLLECTION / EMERGENCY ONLY

2-STOREY NEIGHBOR

1-STOREY NEIGHBOR

GROUND LEVEL

2 STOREY

3 STOREY

4 STOREY

REFER TO TRAFFIC REPORT FOR DETAIL OF VEHICLE PRIORITY ESTABLISHMENT

FINAL

MUSHAN DESIGN STUDIO PTY LTD
LEVEL 15, 333 COLLINS STREET
MELBOURNE VIC 3000
ABN: 44 162 772 714

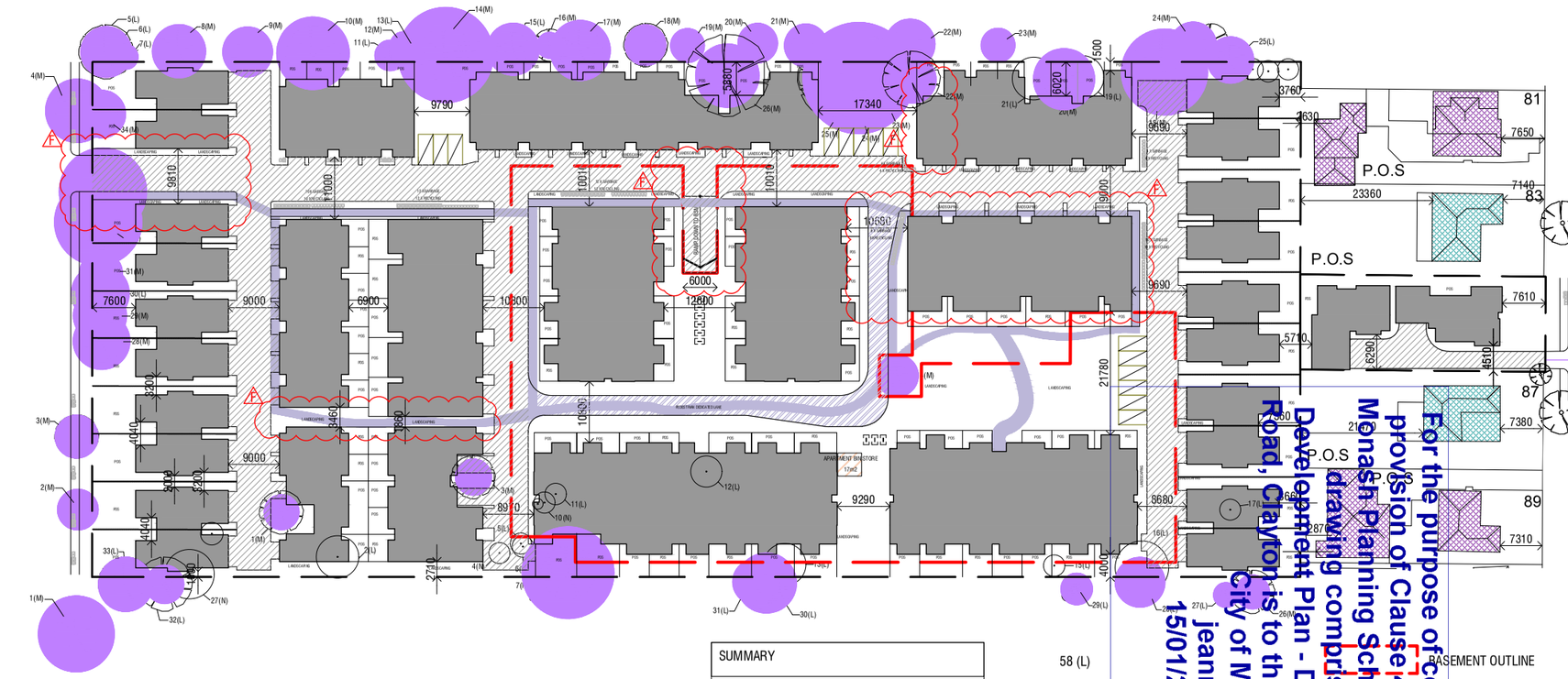
PH: 03 8611 7605
EMAIL: INFO@MUSHAN.COM.AU

NORTH

PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT
29 BROWNS ROAD, CLAYTON
VIC 3168

TITLE
PROPOSED BUILT FORM AND CIRCULATION

DATE	FEBRUARY 2017
SCALE	1:700 @ A3
PROJECT NO.	M023
DRAWING NO.	G DP08



GROUND FLOOR

SUMMARY	
TOTAL EXIST STREET TREES 04	
TREES TO BE REMOVED	04
TOTAL EXIST SITE TREES 66	
TREES TO BE REMOVED	18
TREES TO BE RETAINED	34
HIGH RETENTION TOTAL	00
HIGH RETENTION TO BE REMOVED	00
MODERATE RETENTION TOTAL	16
MODERATE RETENTION TO BE REMOVED	00
LOW RETENTION TOTAL	08
LOW RETENTION TO BE REMOVED	08

58 (L)

TREES TO BE REMOVED

TREE PROTECTION ZONE

TREES TO BE RETAINED

BASEMENT OUTLINE

SITE BOUNDARY

CIRCULATION

WASTE / EMERGENCY VEHICLES ONLY

FOOTPATH MIN 1.4m WIDE

GROUND LEVEL MASS

FINAL

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash.
jeanny
15/01/2020

MUSHAN DESIGN STUDIO PTY LTD
LEVEL 15, 333 COLLINS STREET
MELBOURNE VIC 3000
ABN: 44 162 772 714

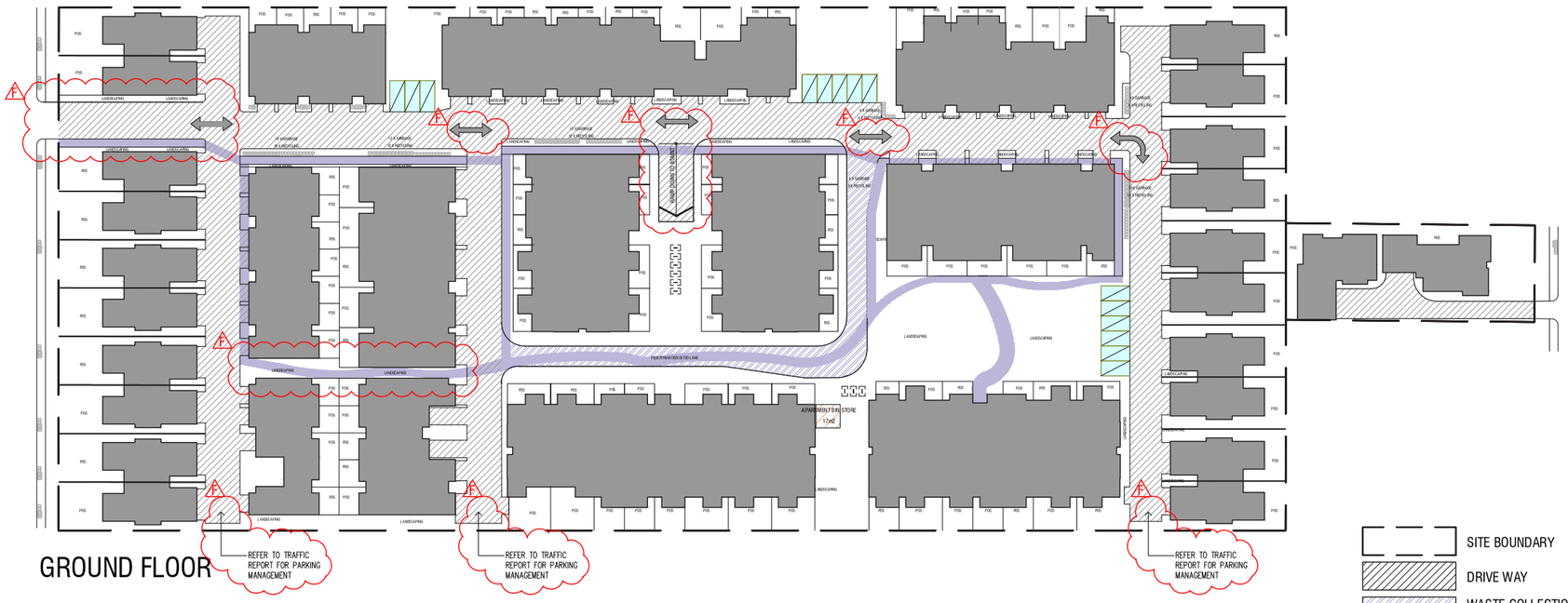
PH: 03 8611 7605
EMAIL: INFO@MUSHAN.COM.AU

NORTH

PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT
29 BROWNS ROAD, CLAYTON
VIC 3168

TITLE
TREE RETENSION DIAGRAM

DATE	FEBRUARY 2017
SCALE	1:700 @ A3
PROJECT NO.	M023
DRAWING NO.	F DP08A



GROUND FLOOR

FINAL

MUSHAN DESIGN STUDIO PTY LTD
LEVEL 15, 333 COLLINS STREET
MELBOURNE VIC 3000
ABN: 44 162 772 714

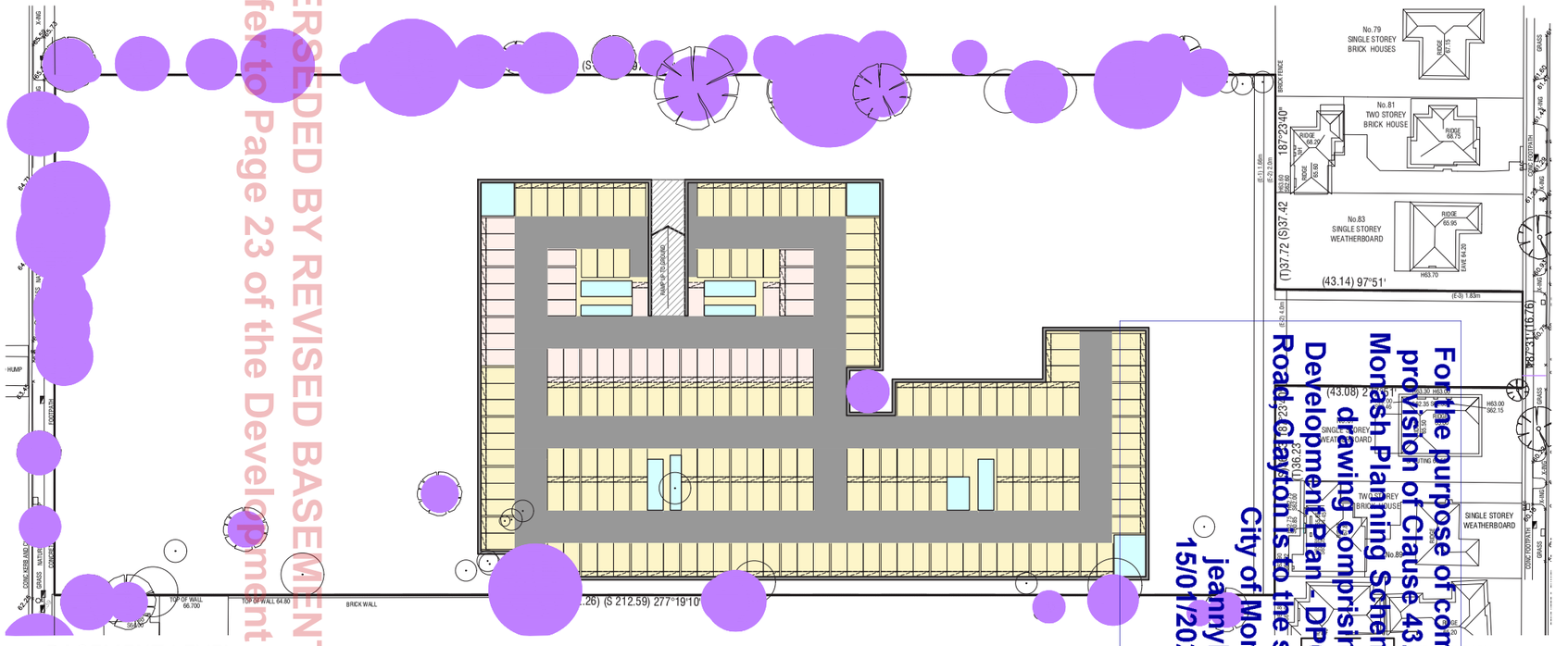
PH: 03 8611 7605
EMAIL: INFO@MUSHAN.COM.AU

NORTH

PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT
29 BROWNS ROAD, CLAYTON
VIC 3168

TITLE
VEHICLE CIRCULATION & PARKING (GL)

DATE	FEBURARY 2017
SCALE	1:700 @ A3
PROJECT NO.	M023
DRAWING NO.	F DP12



BASEMENT LEVEL

FINAL

MUSHAN DESIGN STUDIO PTY LTD
LEVEL 15, 333 COLLINS STREET
MELBOURNE VIC 3000
ABN: 44 162 772 714

PH: 03 8611 7605
EMAIL: INFO@MUSHAN.COM.AU

NORTH

PROJECT
PROPOSED RESIDENTIAL DEVELOPMENT
29 BROWNS ROAD, CLAYTON
VIC 3168

TITLE
VEHICLE CIRCULATION & PARKING (BL)

DATE	APRIL 2016
SCALE	1:700 @ A3
PROJECT NO.	M023
DRAWING NO.	B DP13

Appendix C **Signs and Linemarking Plan**

SIGN SCHEDULE

#1 GIVE WAY R1–2

INSTALL GIVEWAY SIGNAGE AND LINEMARKING TO ESTABLISH PRIORITY TO MAIN CIRCULATION ROAD

ISSUE	APP'D	DATE	AMENDMENT
A			

GENERAL NOTES
1. BASE INFORMATION OBTAINED FROM MUSHAN ARCHITECTS ON 17/02/17
2. DIMENSIONS IN MILLIMETRES
3. PRELIMINARY PLAN FOR DISCUSSION ONLY

DESIGNED	B CHAN
CHECKED	R SYMONS
AUTHORISED	R SYMONS
SCALE	0 5 10

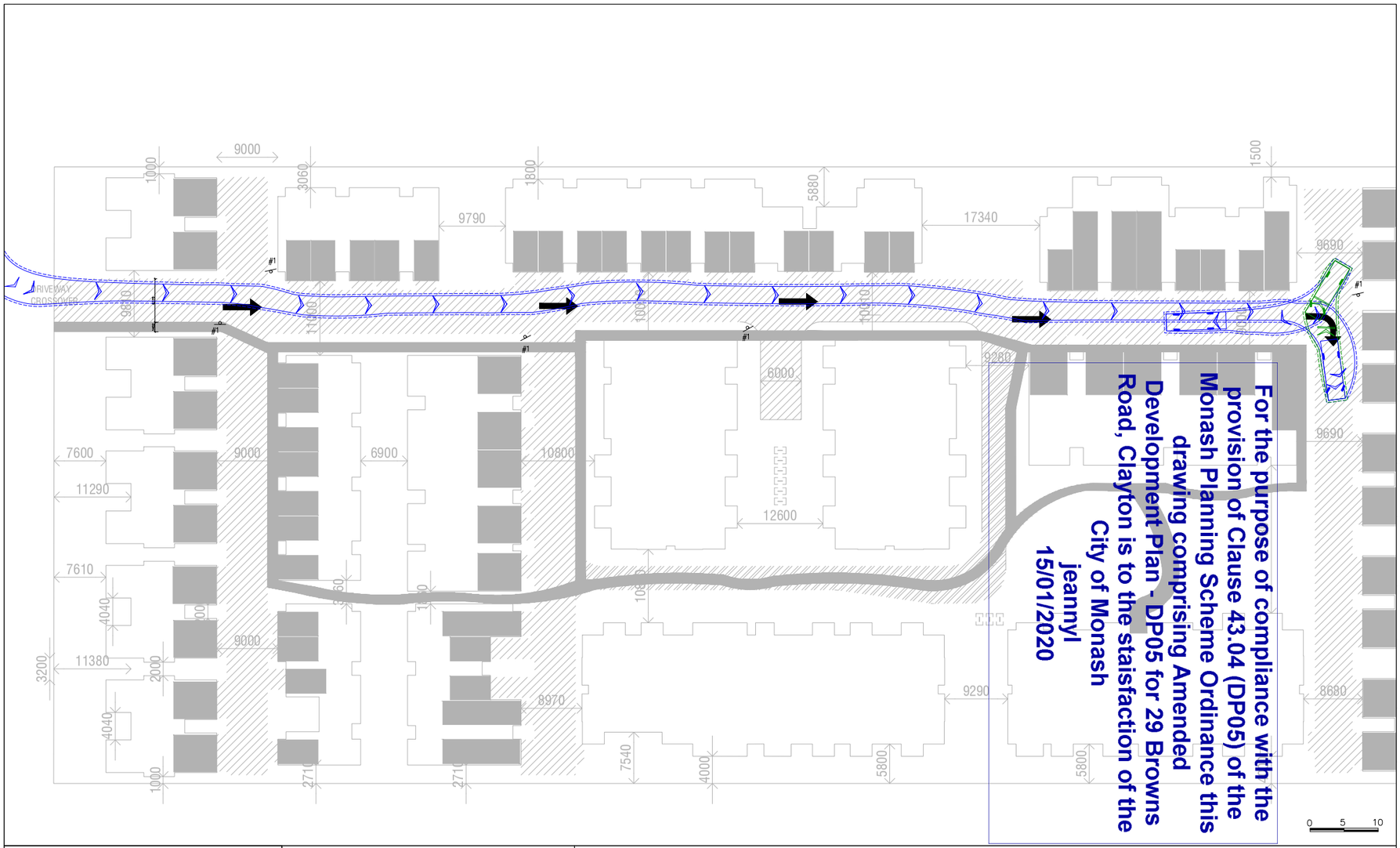
ratio:
RATIO CONSULTANTS PTY LTD
ACN 005 422 104
9 CLIFTON STREET
RICHMOND, VICTORIA 3121
TELEPHONE (03) 9429 3111
FACSIMILE (03) 9429 3011

PROPOSED RESIDENTIAL DEVELOPMENT
CITY OF MONASH
29 BROWNS ROAD, CLAYTON
SIGNS AND LINEMARKING PLAN

DATE	SHEET NO.	DRAWING NO.	ISSUE
18/02/2017	1 OF 1	12555–1	A

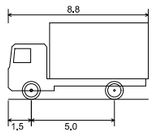
CAD FILE: v:\12555\1 - 1300\01\2555 - 29 browns road, clayton (residential development) \swept paths\2017.02.16\12555-sk06.dwg

Appendix D **Swept Path Assessment**



ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
9 CLIFTON STREET
RICHMOND, VICTORIA 3121
TELEPHONE (03) 9429 3111
FACSIMILE (03) 9429 3011

MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002)



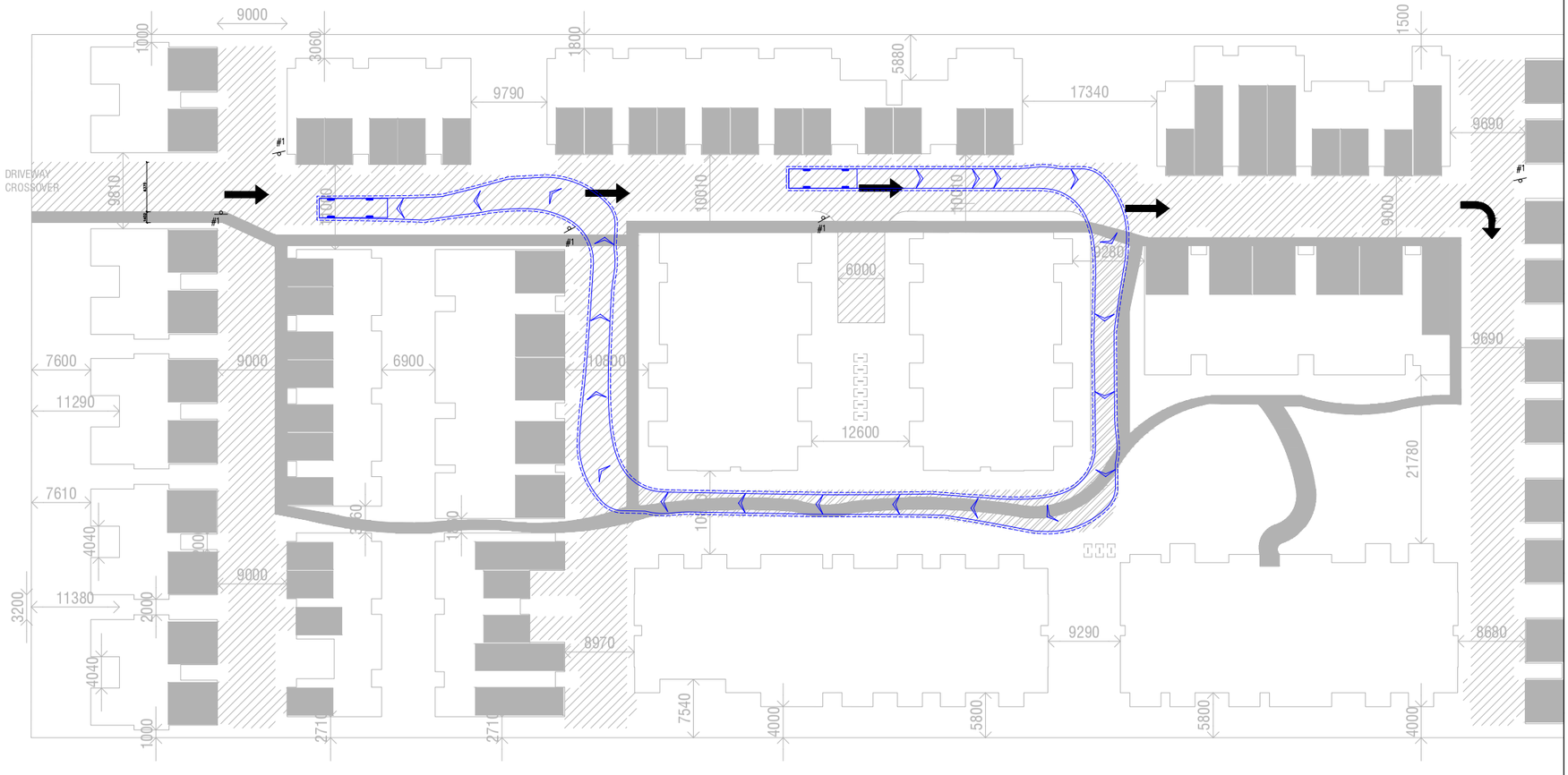
VEHICLE ENVELOPE (FORWARD)
500mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
500mm CLEARANCE (REVERSE)

Overall Length	8,800m
Overall Width	2,500m
Track Width	2,500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10,000m

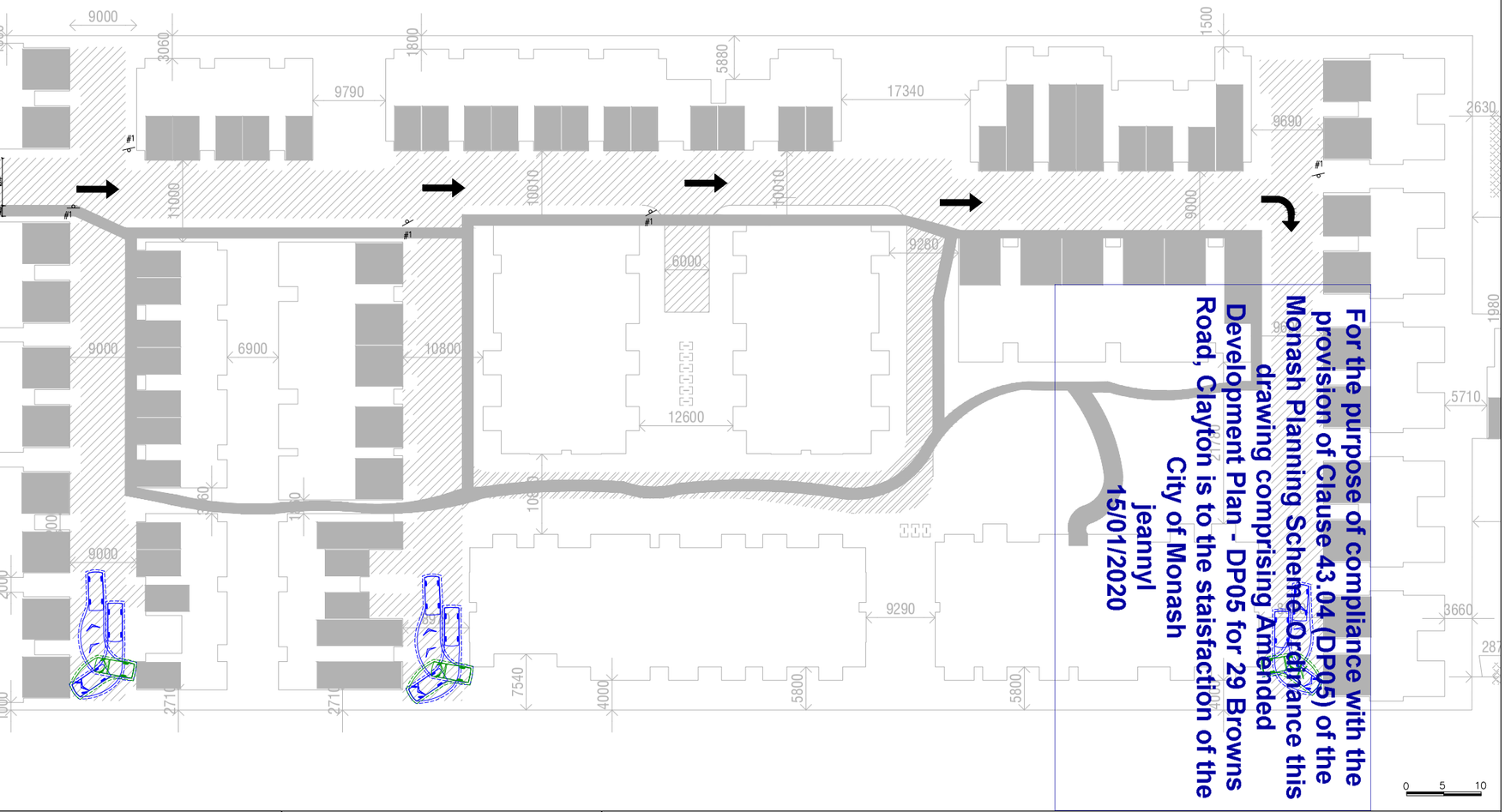
Proposed Residential Development
29 Browns Road, Clayton
Swept Path Assessment

NOTE:
1) Base Plan Supplied by Mushan Architects on 17/02/17
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	SCALE	DATE
12555-AT06/BC	A3 AT(1)	1:500@A3	18/02/2017

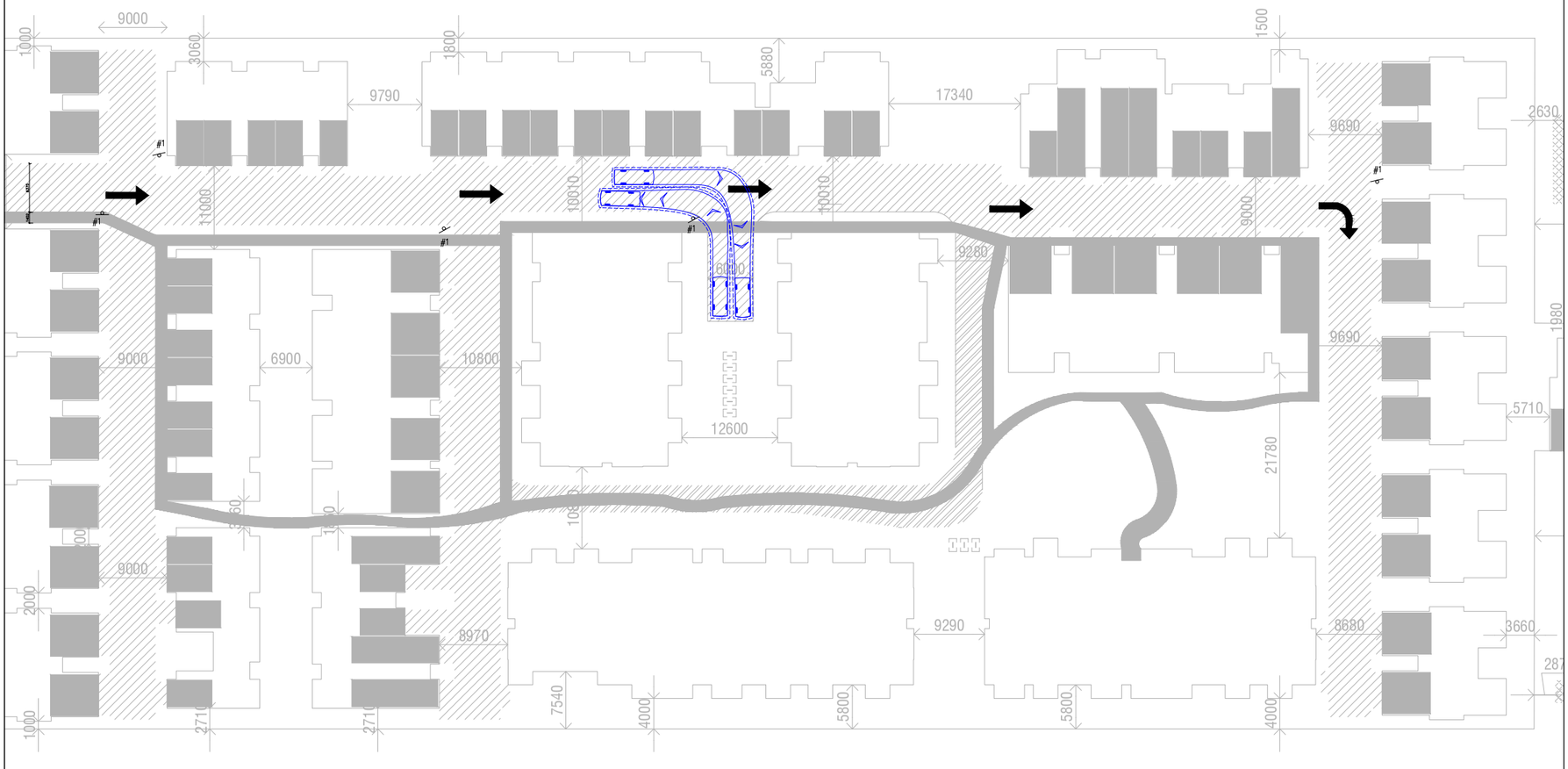


ratio: RATIO CONSULTANTS PTY LTD ABN 005 422 104 9 CLIFTON STREET RICHMOND, VICTORIA 3121 TELEPHONE (03) 9429 3111 FACSIMILE (03) 9429 3011	MRV - Medium Rigid Vehicle (AS/NZS2890.2:2002) 8.8 1.5 5.0 VEHICLE ENVELOPE (FORWARD) 500mm CLEARANCE (FORWARD) VEHICLE ENVELOPE (REVERSE) 500mm CLEARANCE (REVERSE) Overall Length 8,800m Overall Width 2,500m Track Width 2,500m Lock to Lock Time 4.00 sec Curb to Curb Turning Radius 16,000m	Proposed Residential Development 29 Browns Road, Clayton Swept Path Assessment			
		NOTE: 1) Base Plan Supplied by Mushan Architects on 17/02/17 2) Maximum Design Speed 10km/h	RATIO REFERENCE 12555-AT06/BC	SHEET No. A3 AT(2)	SCALE 1:500@A3	DATE 18/02/2017



For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

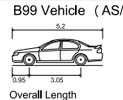
ratio: RATIO CONSULTANTS PTY LTD ABN 005 422 104 9 CLIFTON STREET RICHMOND, VICTORIA 3121 TELEPHONE (03) 9429 3111 FACSIMILE (03) 9429 3011	B99 Vehicle (AS/NZS2890.1:2004) 5.2 0.95 3.05 VEHICLE ENVELOPE (FORWARD) 300mm CLEARANCE (FORWARD) VEHICLE ENVELOPE (REVERSE) 300mm CLEARANCE (REVERSE) Overall Length 5.200m Overall Width 1.940m Overall Body Height 2.200m Min Body Ground Clearance 0.312m Track Width 1.840m Lock to Lock Time 4.00 sec Curb to Curb Turning Radius 6.30m	Proposed Residential Development 29 Browns Road, Clayton Swept Path Assessment			
		NOTE: 1) Base Plan Supplied by Mushan Architects on 17/02/17 2) Maximum Design Speed 10km/h	RATIO REFERENCE 12555-AT06/BC	SHEET No. A3 AT(3)	SCALE 1:500@A3	DATE 18/02/2017



0 5 10

ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
9 CLIFTON STREET
RICHMOND, VICTORIA 3121
TELEPHONE (03) 9429 3111
FACSIMILE (03) 9429 3011

B99 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.30m

Proposed Residential Development
29 Browns Road, Clayton
Swept Path Assessment

NOTE:
1) Base Plan Supplied by Mushan Architects on 17/02/17
2) Maximum Design Speed 10km/h

RATIO REFERENCE	SHEET No.	SCALE	DATE
12555-AT06/BC	A3 AT(4)	1:500@A3	18/02/2017

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

Appendix E **SIDRA Results**

For the purpose of compliance with the provision of Clause 43.04 (DP05) of the Monash Planning Scheme Ordinance this drawing comprising Amended Development Plan - DP05 for 29 Browns Road, Clayton is to the staisfaction of the City of Monash
jeannyl
15/01/2020

MOVEMENT SUMMARY

▽ Site: Browns Road Site Access

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Browns Road South Approach											
2	T1	100	0.0	0.077	0.5	LOS A	0.3	1.9	0.24	0.16	48.5
3	R2	39	0.0	0.077	5.6	LOS A	0.3	1.9	0.24	0.16	47.7
Approach		139	0.0	0.077	1.9	NA	0.3	1.9	0.24	0.16	48.3
East: Site Access											
4	L2	24	0.0	0.037	2.7	LOS A	0.1	0.9	0.33	0.43	29.6
6	R2	17	0.0	0.037	3.8	LOS A	0.1	0.9	0.33	0.43	29.4
Approach		41	0.0	0.037	3.1	LOS A	0.1	0.9	0.33	0.43	29.5
North: Browns Road North Approach											
7	L2	58	0.0	0.142	4.6	LOS A	0.0	0.0	0.00	0.11	48.9
8	T1	234	0.0	0.142	0.0	LOS A	0.0	0.0	0.00	0.11	49.4
Approach		292	0.0	0.142	0.9	NA	0.0	0.0	0.00	0.11	49.3
All Vehicles		472	0.0	0.142	1.4	NA	0.3	1.9	0.10	0.15	46.3

Level of Service (LOS) Method: Delay (HCM 2000).
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.