5. transport management and accessibility (TMAP)

5.1 introduction

The traffic impact assessment undertaken in this report, as discussed in this section below, is premised upon a 10% reduction in traffic generation from the RTA's "unconstrained" trip rates, which reflect relatively poor access to public transport for many of the land use components. To achieve this target, various initiatives are proposed. These are discussed below and include improved bus services, provision of pedestrian and bicycle linkages (including end-user facilities), taxi services, a constrained parking supply, car sharing arrangements and the formulation of a Transport Access Guide.

These should be seen in the context where the site is expected to accommodate about 1,000 employees and residents, which is comparable to the employee levels previously associated with the Sunbeam factory operations.

5.2 bus services

5.2.1 existing bus services

Numerous bus services operate in the vicinity of the site, including along Canterbury Road (280 metres from the site), Kingsgrove Road (600 metres), Bexley Road (760 metres) and William Street (580 metres). The various existing routes operating in the vicinity of the site are shown in **figure 4** and can also be found on the State Transit Authority (STA) website.

These services operate regularly and will provide an alternative travel mode choice for residents, employees and visitors associated with the proposed development. The use of these services should be encouraged by residential strata managers and employers where possible. This may include the provision of current service timetable and route information within reception, foyer and/or other communal areas within the site. Furthermore, routes 423 and L23 (pre-pay) provide access to

Railway Square (Central CBD) in approximately 30 minutes from William Street (itself approximately a 6.5 minute walk from the site).

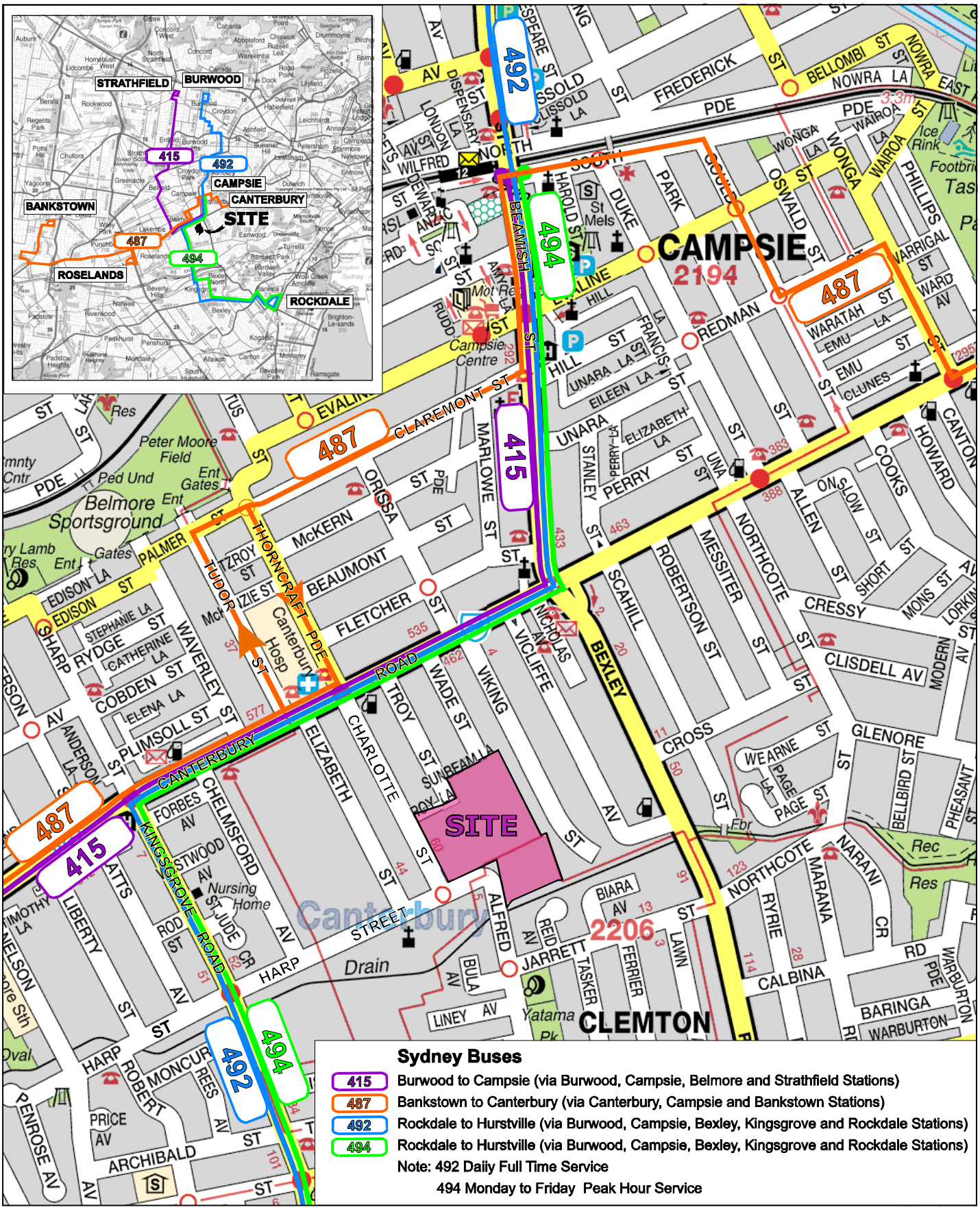
5.2.2 Proposed bus services

The potential to divert some existing services to serve the subject development exists due to the increased residential, commercial and retail yields. Accordingly, bus stops are intended on both sides of Charlotte Street immediately adjacent to the site. No buses are intended to use the internal road system. This is considered essential having regard for the very moderate walking distances to any part of the site from the perimeter road system, the improved pedestrian linkages as now proposed under the Preferred Plan, and the safety and amenity impacts that would arise from the use of these quiet local roads, which have been designed to provide a high standard of pedestrian convenience and amenity.

Discussions have been held with existing bus operators in the locality to assess the potential for route diversions to provide improved site accessibility. These have included Sydney Buses and Punchbowl Buses. The STA has agreed to investigate diversions of some services past the site along Harp Street and Charlotte Street, although it is likely given the moderate employee and resident numbers that these will be off-peak services intended to assist the general public. Punchbowl Buses has no current plans to alter existing bus services, although further discussions will be undertaken in consultation with the Ministry of Transport to identify possible diversions and frequencies.

The existing STA bus routes are shown in more detail in **figures 7** and 8, with candidate diversions shown in **figure 9.** These diversions will be subject to ongoing discussions with STA representatives with the intention of incorporating them into a TMAP agreement. These diversions will, if adopted, provide direct connections to Campsie Station, Bankstown Station, Rockdale Station and Hurstville Station.

The existing Punchbowl Bus services are shown in **figure 10**, with the a candidate diversion shown in **figure 11**. This would provide access to Belmore Station and Roselands shopping centre. These diversions will also be subject to ongoing discussions with Punchbowl Buses and the Ministry of Transport, with the intention of also incorporating them into a TMAP agreement. It is noted that if Alfred Street were to be closed at some time in the future, the possibility would still remain to keep it open to bus services.



inset

N

0 10km

0 500m

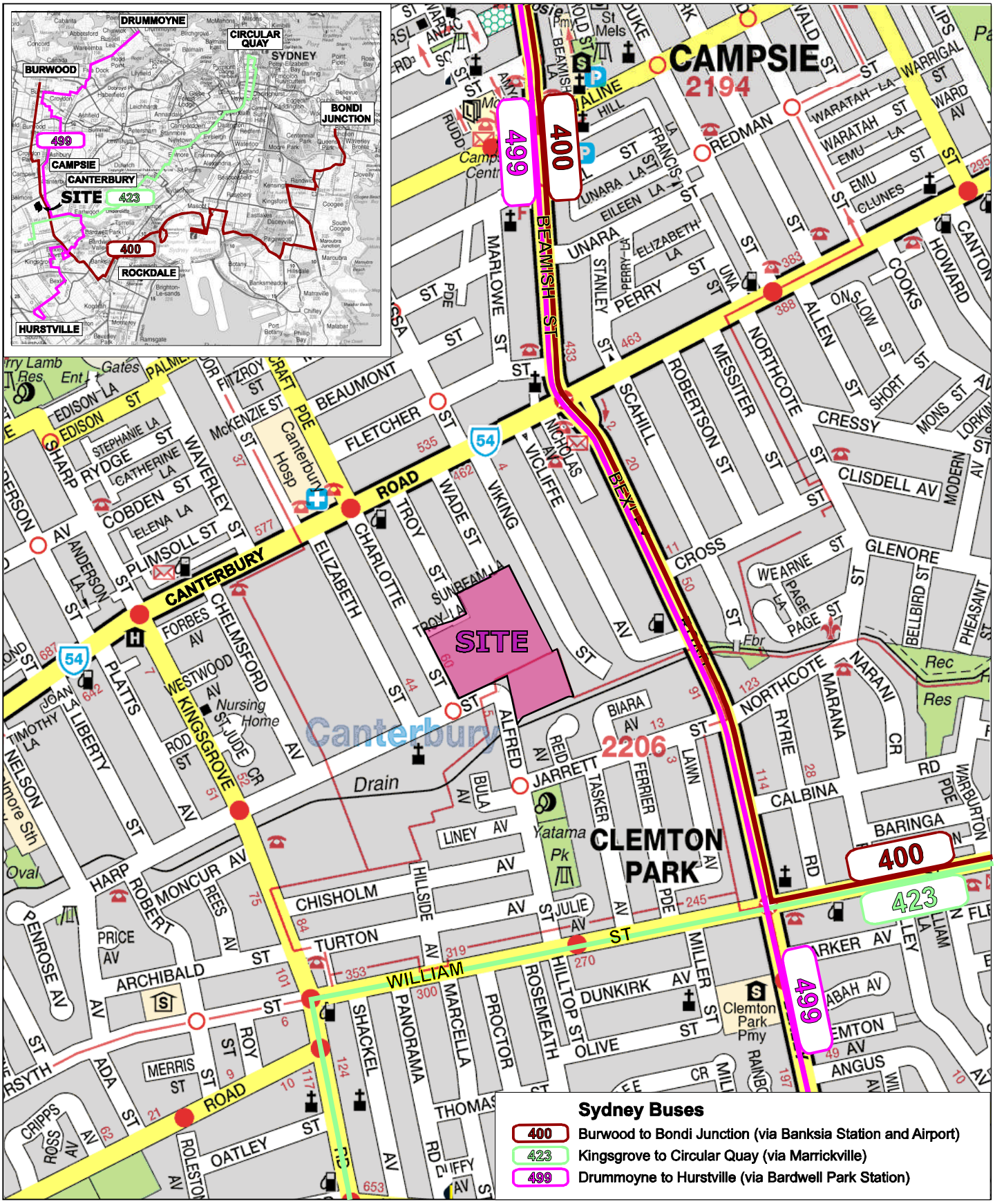
concept plan application: mixed use development

60 charlotte street, clemton park

figure 7

existing STA bus routes 415, 487, 492 & 494

prepared on behalf of davids group
by **traffix** traffic & transport planners



Sydney Buses

- 400 Burwood to Bondi Junction (via Banksia Station and Airport)
- 423 Kingsgrove to Circular Quay (via Marrickville)
- 499 Drummoyne to Hurstville (via Bardwell Park Station)

inset

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0 10km

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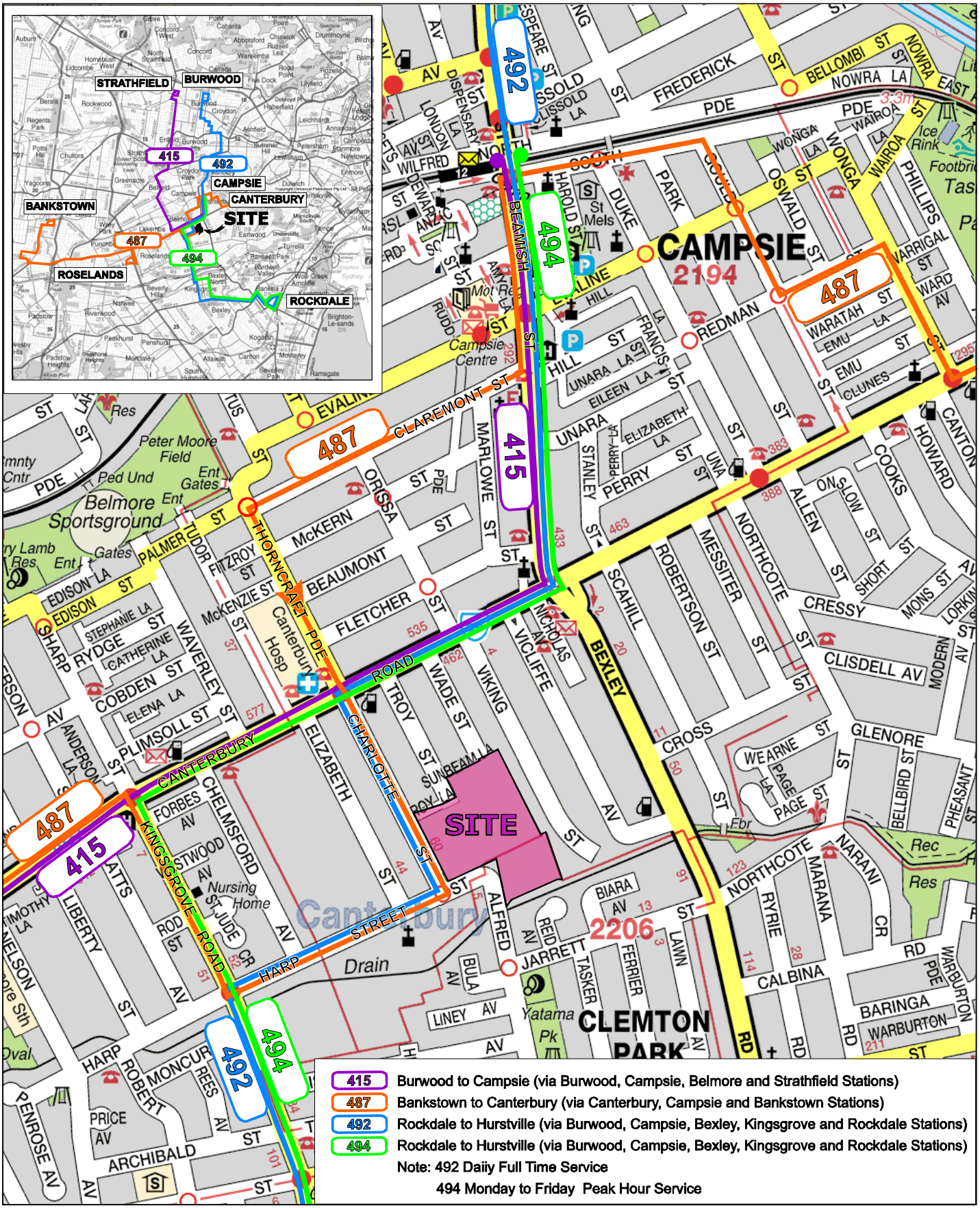
concept plan application: mixed use development

60 charlotte street, clemton park

figure 8

existing STA bus routes 400, 423 &499

prepared on behalf of davids group
by traffix traffic & transport planners



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0 500m

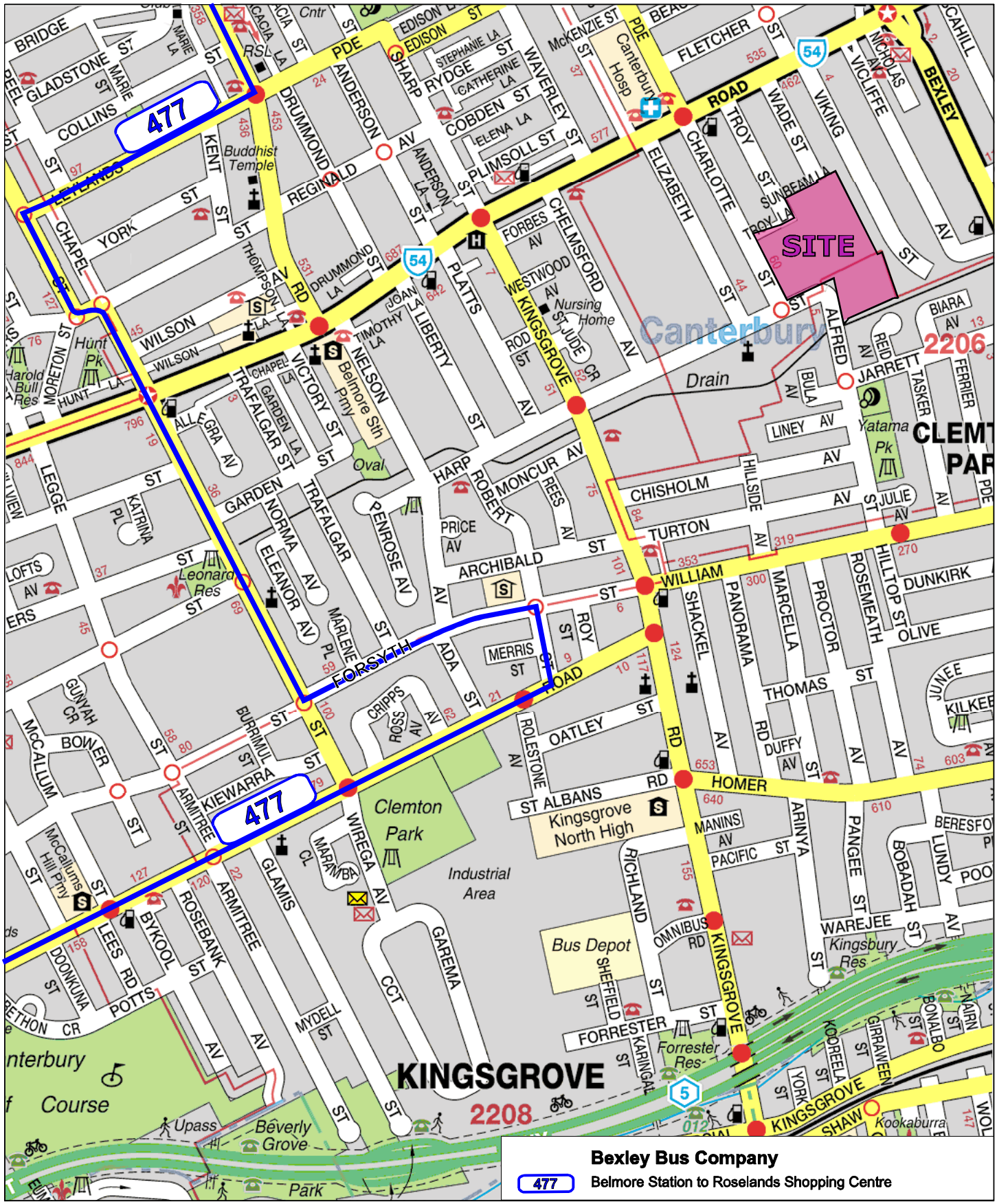
concept plan application: mixed use development

60 charlotte street, clemton park

figure 9

possible variation to STA bus routes 487 & 492

prepared on behalf of davids group
by **traffix** traffic & transport planners



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concept plan application: mixed use development

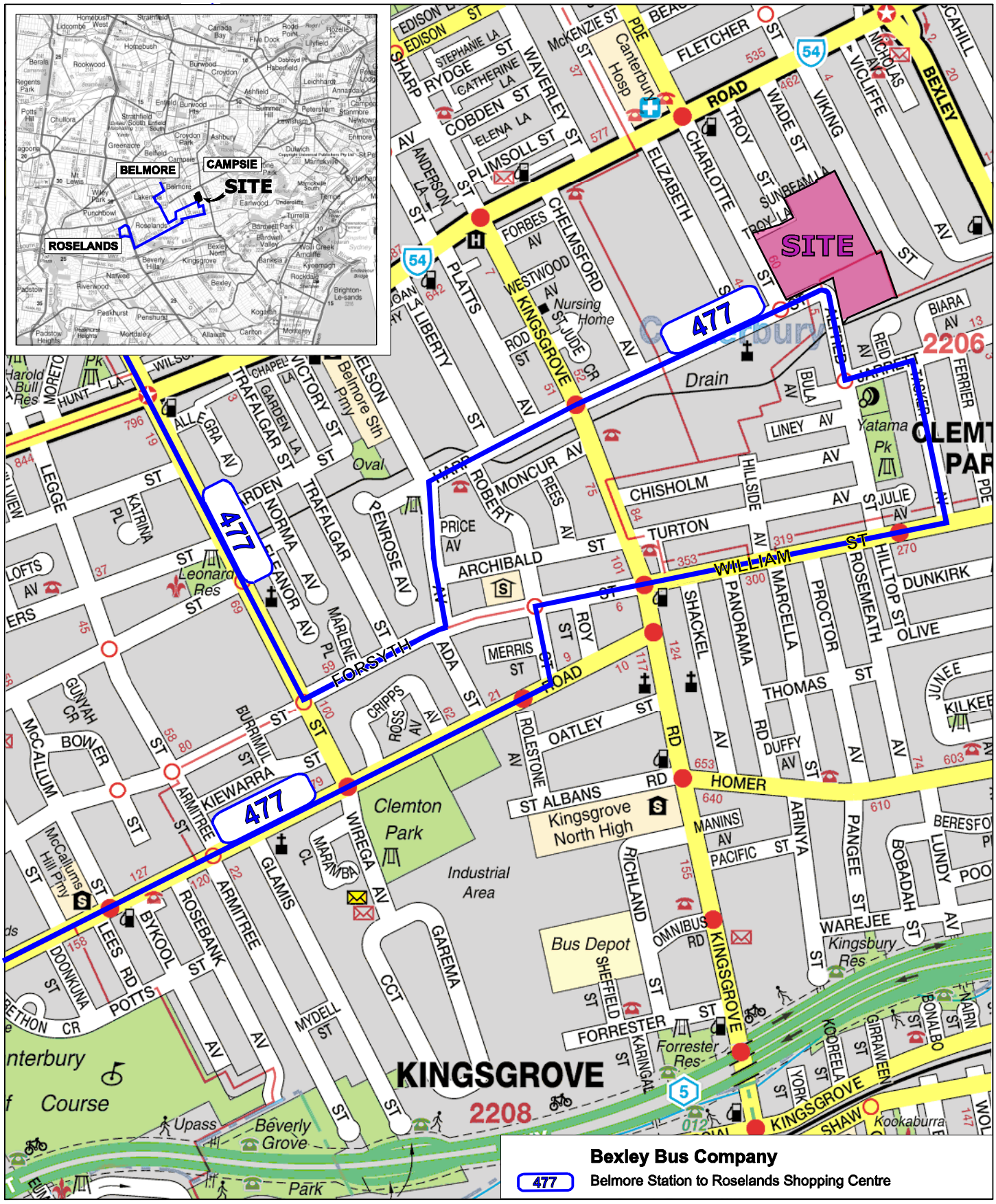
60 charlotte street, clemton park

figure 10

existing punchbowl bus company route 477

prepared on behalf of davids group

by **traffix** traffic & transport planners



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0 10km

0 500m

concept plan application: mixed use development

60 charlotte street, clemton park

figure 11

possible variation to punchbowl bus company routes 477

prepared on behalf of davids group
by **traffix** traffic & transport planners

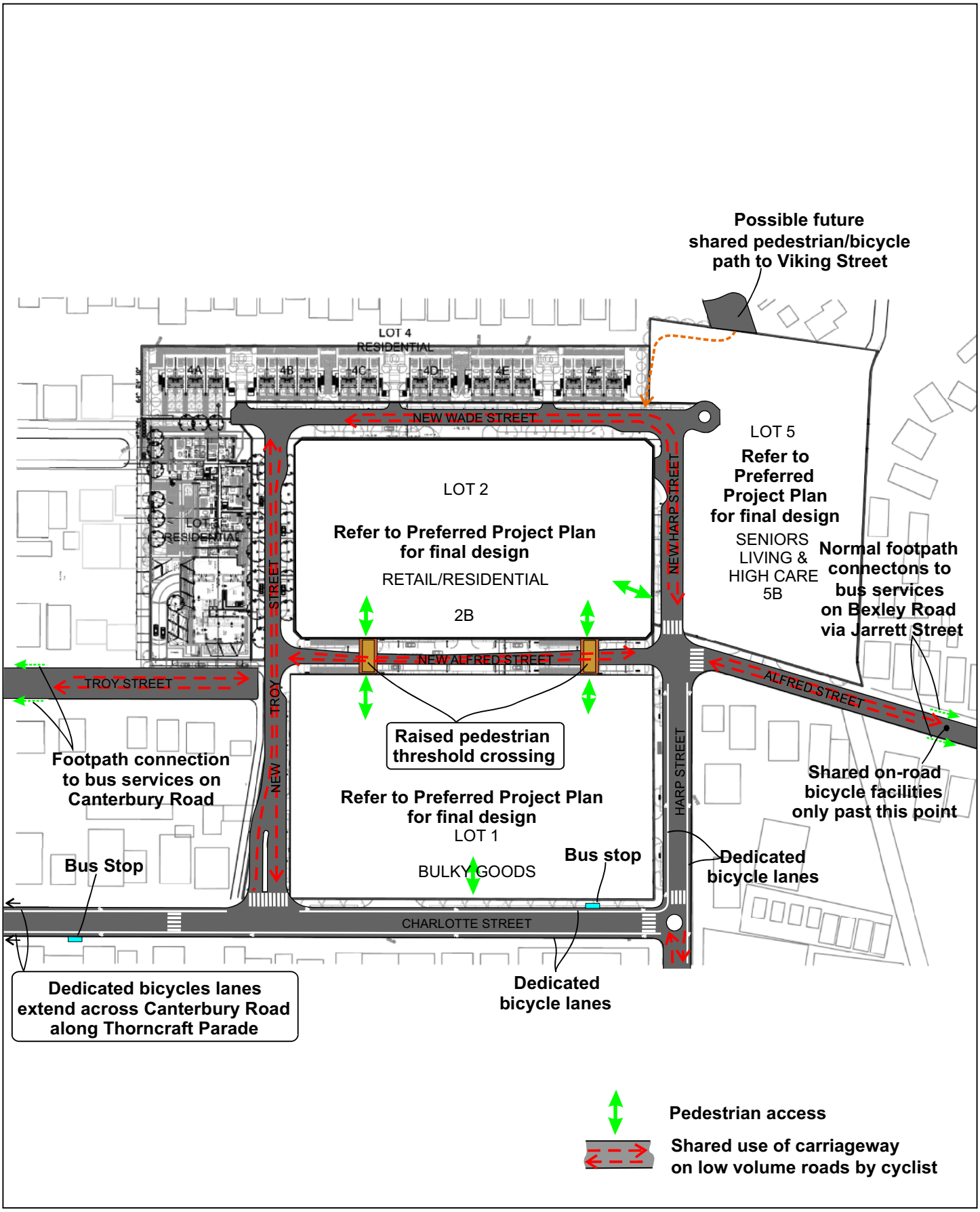
5.3 rail services

Rail services provide access to the wider transport network serving the greater metropolitan area. Numerous stations are located in the wider vicinity of the site including Campsie (approximately 1.6 kilometres from the site), Belmore and Kingsgrove. Residents and staff of the subject site are not anticipated to walk to these stations as the distance involved is considered slightly too far for the average person. However, diverted bus services as discussed above will provide a direct connection and this will provide access by employees, residents and visitors.

5.4 pedestrian and bicycle linkages

The pedestrian and bicycle linkages are shown in **figure 12**. It can be seen that the development proposes improved linkages (subject to the approval of Council's Traffic Committee) which include the following:

- Pedestrian crossings on Charlotte Street to provide improved crossing at Harp Street and in the vicinity of the proposed bus stop north of New Troy Street (northbound) and north of Harp Street (southbound);
- Pedestrian crossings at the intersection of Harp Street with Alfred Street;
- A pedestrian crossing of New Troy Street at its intersection with Charlotte Street;
- Two new internal crossings across New Alfred Street (within the site) which are located on expected desire-lines, which link Lots 1 and 2 at grade;
- Provision of a new pedestrian access onto Charlotte Street between Harp Street and New Troy Street;
- An extensive footpath system on both sides of all internal roads;
- Maintenance of the on-road cycle lanes in Charlotte Street and Harp Street;
- Future provision of a shared pedestrian/cycle path extending to Viking Street at the corner of Wade Street and New Harp Street, through Council's vacant site; and



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concept plan application: mixed use development

60 charlotte street, clemton park

figure 12

bicycle and pedestrian linkages

prepared on behalf of davids group
by **traffix** traffic & transport planners

- Connectivity to all footpath systems in the locality on all public roads, with the ability to access bus services on Bexley Road and Canterbury Road;

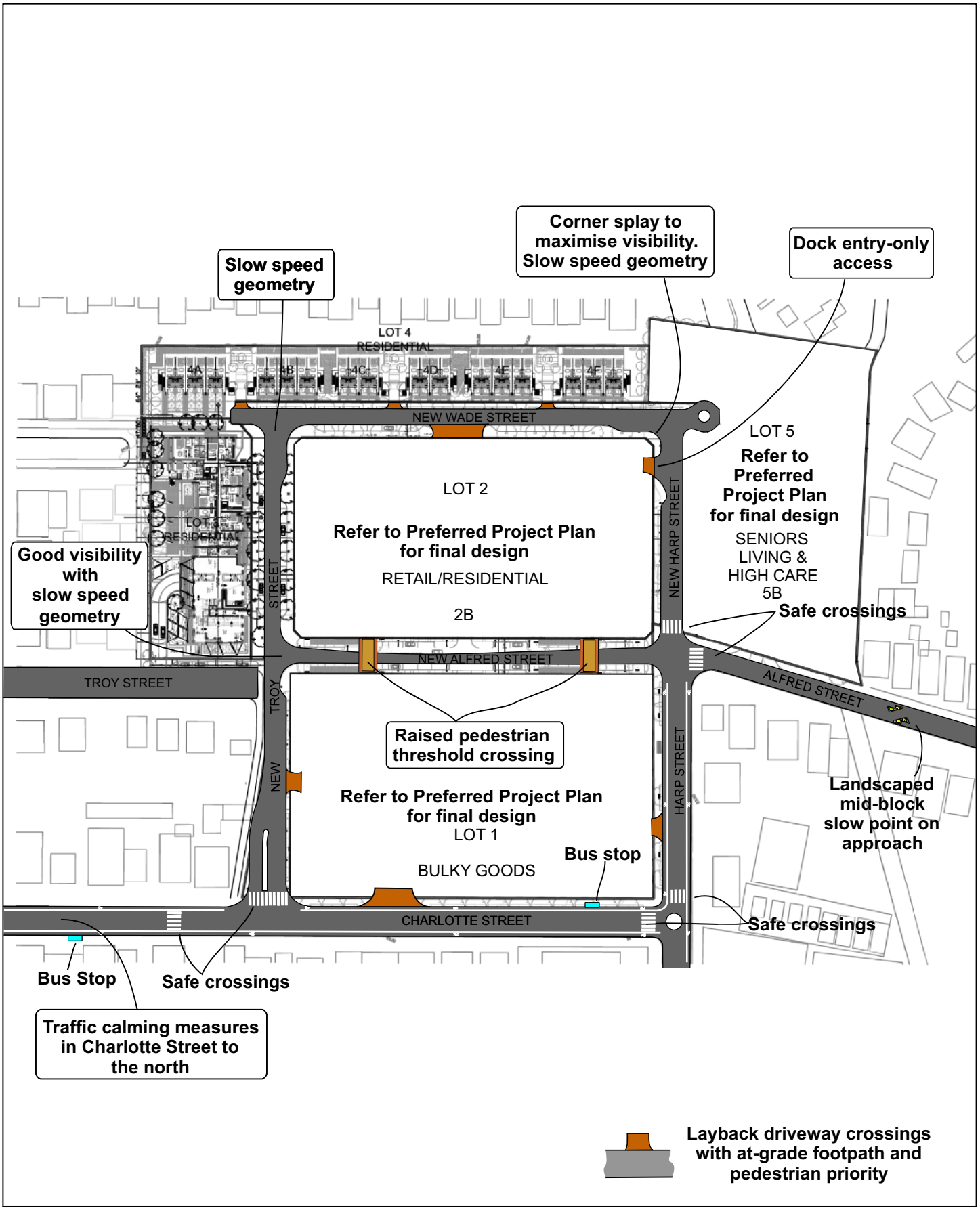
In summary, the development of the public road network within the site provides an internal system of footpaths that will allow pedestrians to move freely within and through the site. This system links with the existing pedestrian network external to the site. The entire road system incorporates kerb blisters and landscaping to provide an attractive streetscape; and to slow traffic. Safe crossing opportunities are available on all desire-lines, including connections to possible future bus services on Charlotte Street and Harp Street as discussed previously.

It is expected that cyclists will use the internal road carriageways that are provided as a shared on road facility. This is considered appropriate as these roads do not form part of a through -cycle route, rather they are at a destination. In addition, shower facilities will be available within buildings and bicycle storage provision is to be made in accordance with Council's requirements. Reference should be made to individual Project Application reports for details regarding the specific provision of the various components of the site. The predominant bulky goods use is nevertheless expected to generate only moderate demand for bicycles.

The majority of the external cycle routes are via the shared road carriageways, with exclusive cycle lanes provided only along Charlotte Street to the north and along Harp Street between Alfred Street and Charlotte Street. As such, the provision for shared on-road facilities within the site is consistent with the overall cycle plan of the surrounding area. The subject site does not specifically form part of the existing or proposed cycle network and it is considered sufficient to provide access to these established routes only. Therefore, dedicated cycle lanes within the site are not considered necessary.

5.5 pedestrian safety

The internal design and particularly vehicle access locations has taken due account of pedestrian safety. The overall pedestrian linkages are shown in **figure 13** and these also show the proposed treatment at all vehicular crossings. In summary, all driveways are designed as standard laybacks so that pedestrians have priority. All driveways also are in accordance with AS 2890.1 and AS 2890.2, which includes the provision of appropriate sight lines.



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0 100m

concept plan application: mixed use development

60 charlotte street, clemton park

figure 13

pedestrian safety

prepared on behalf of davids group
by **traffix** traffic & transport planners

5.6 taxi services

Taxi services will be able to access the site directly via the internal road system. It is recommended that a taxi bay be provided within New Alfred Street and this is accommodated by the design and simply requires existing parallel parking spaces to be allocated and signposted. This is a matter that will also be finalised in consultation with Council's traffic committee.

5.7 car share and car pool arrangements

It is considered that car share arrangements will form an integral part of future Project Applications and this can be conditioned. This will be prepared having regard for relevant guidelines when available and a copy of any such guideline has been requested from the RTA. In general, a parking system such as "GoGet" is contemplated which has potential application to all non-resident land uses and this will be effective in reducing retail/commercial tenant parking demands. In this regard, as a general proposition, one "GoGet" car is able to meet the needs of many users, substantially reducing the need for a 'designated' car and thereby reducing parking demands. Based on the experience of "GoGet", one shared space is equivalent to 5 'normal' spaces. It is expected that adoption of a car share and ride share policy will also support a 10% to 20% reduction to be achieved in employee parking levels. The implementation of a car share policy is a matter that can be conditioned having regard for relevant guidelines in association with individual applications.

In addition, it is recommended that two on-street spaces in New Alfred Street be allocated as car share spaces, ensuring a high level of visibility to the principle commercial/retail frontage.

5.8 servicing

The road system has been developed to ensure safe and convenient access to all parts of the site, based on the required Design Vehicle. The largest commercial vehicle is an articulated truck in the case of Lot 1, with a 12.5m rigid truck for other service areas. This is similarly a matter for assessment during later Project Application/s and compliance with relevant standards is proposed.

Servicing of the residential component of the development will be accommodated on-street by Councils garbage services, which will be assessed for all relevant Project Applications. Refer to Project Application reports for details on Lots 1 and 3.

5.9 perimeter road frontages

The design of the perimeter road frontages of Charlotte Street and Harp Street needs to have regard for the new public road linkages that are created as well as the need for improved pedestrian and bicycle connections and site access requirements. The road layout will also need to be the subject of further discussions with Council and approval will need to be obtained from the Traffic Committee. Nevertheless, a concept layout is provided in **figure 14** which shows how these various design parameters have been resolved external to the site. This should also be seen in the context of the traffic calming measures that are available as discussed further below.

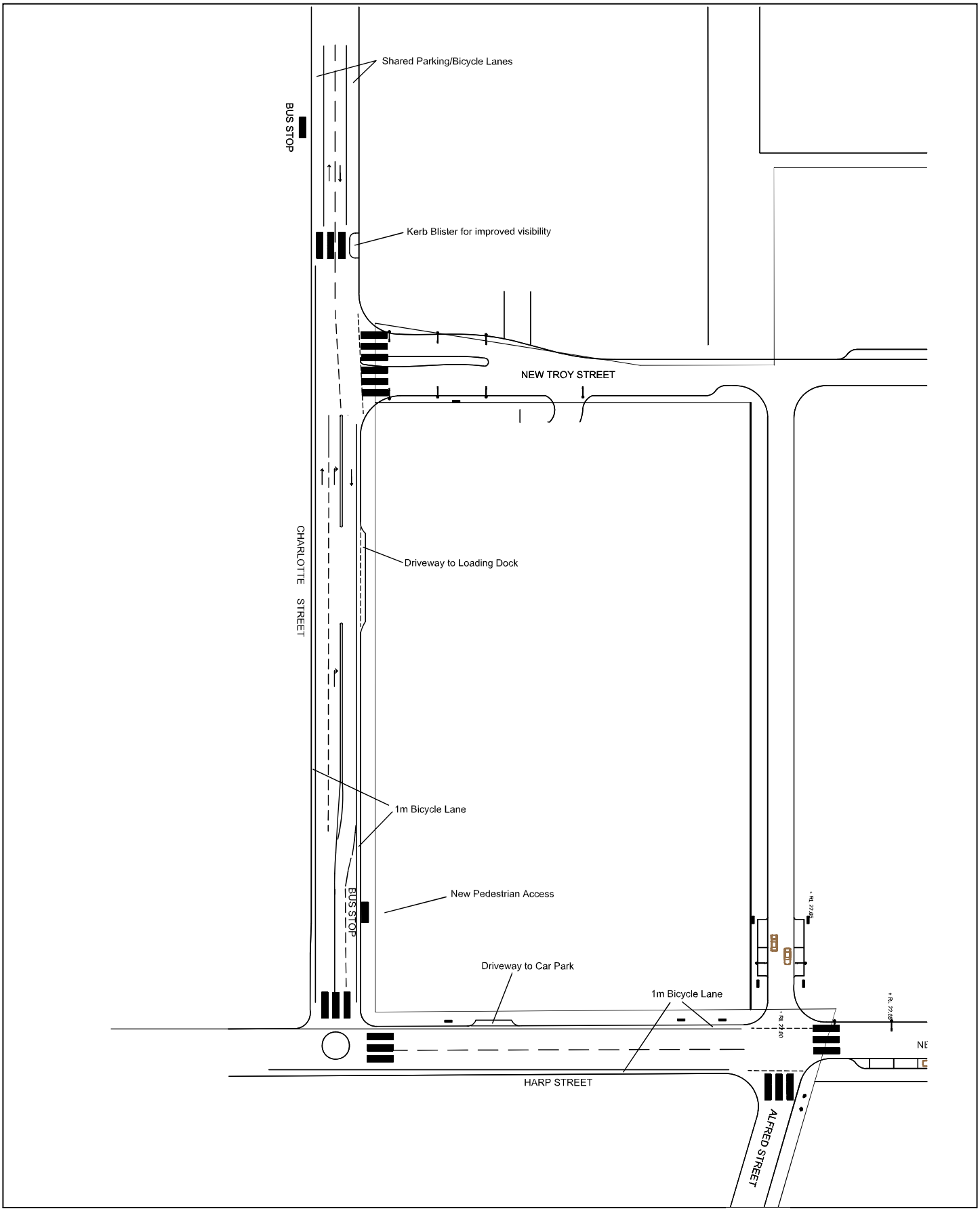
5.10 parking requirements

5.10.1 parking rates and provision

The site is subject to the controls of Canterbury Council's Parking DCP No. 20 (Car Parking), although regard needs also to be given to the requirements of the RTA's Guideline as well as other survey-based assessments where these are of assistance. Specifically, the Director General's requirements seek to reduce parking as far as possible while promoting other (non-car) travel modes. This however needs to be balanced against the practical reality that some car-dependent uses (notably bulky goods uses) are car-dependent and need to provide sufficient parking to ensure that on-street demands do not occur, which would have amenity impacts. The required parking levels for each land use component are considered separately below.

- Bulky Goods

There is a total of 17,995m2 of bulky foods retail lettable floor area within the site, which includes 3,165m2 of trade retail area. Council's DCP does not provide a rate for this use but rather requires an assessment based approach. It is therefore instructive to review the RTA's Guidelines which has an average rate of 1.9 spaces/100m2 GLFA, but with a significant range of 0.3 to 5.1 spaces/100m2



N 0 50m

concept plan application: mixed use development
60 charlotte street, clemton park

figure 14
lane configurations on frontage roads

prepared on behalf of davids group
by **traffix** traffic & transport planners

GLFA. It is considered that reliance on the average rate of 2.4 spaces/100m2 will suppress car usage to a reasonable degree and is in line with surveys of similar developments. Accordingly, adoption of 2.4 spaces/100m2 is recommended for this (car dependent) use, resulting in a need for 430 spaces.

- Specialty Retail and Other Shops

Council's DCP requires 1 space/22m2 of floor area which when applied to the overall 4,005m2 of floor area results in a need for 182 parking spaces. This does not take account of the fact that the retail will serve the residents and employees in the locality to a significant extent, with these people walking to the shops. In these circumstance, adoption of a rate of 1 space/34m2 is recommended, which is a reduction of about 35%. This approach is in accordance with the objectives of the DCP as well as the Director General's requirements and results in a need for a total of about 115 spaces. These will be shared between Lots 1 and 2.

- Supermarket

Council's DCP requires 1 space/22m2 floor area which when applied to the overall 2,585m2 of floor area results in a need for 118 parking spaces. This compares with a rate of 1 space/24m2 based on the RTA's Guidelines which would result in a comparable level of provision. In the circumstances, having regard for the Director General's requirements to reduce parking, the fact that the supermarket will to a significant extent serve the local residents and employees, but having regard also for the car-dependent nature of supermarkets, a slightly reduced rate of 1 space/28m2 is recommended, resulting in a need for about 90 spaces.

- Commercial

Council's DCP requires 1 space/40m2 of floor area which is the same as the RTA's requirement. Adoption of this rate is considered appropriate to ensure that on-street parking does not occur, which would impact on the amenity of the locality, notably existing residents. With 5,960m2 of commercial floor area, a need for 149 spaces results and 146 are provided.

- Gymnasium

Council's DCP recommends a rate of 7.5 spaces/100m2 of floor area as a guide. With an area of 1,248m2, this would result in a need for 94 spaces. This does not take account of the fact that the

gym will serve the residents and employees in the locality to a significant extent, with these people walking to the gym. In these circumstances, adoption of a lower rate is recommended, particularly as the RTA's Guidelines minimum rate is 4.5 spaces/100m2. It is therefore proposed to provide 60 spaces, which equates to a rate of 4.8 spaces/100m2. This approach is also in accordance with the objectives of the DCP as well as the Director General's requirements.

- Childcare Centre

The childcare centre accommodates 75 children. Council's DCP requires 1 space per 2 staff, with a minimum of 2 spaces. It is assumed that the centre will employ up to 15 staff (on site at any one time) so that a need for 8 spaces results. It is relevant that this level of provision makes no allowance for parents/carers and based on the RTA's Guideline, a 75 place centre would require 19 spaces, including 8 staff spaces and 11 parent/carer spaces (note that the RTA's Guideline does not provide a split between staff spaces and parent/carer spaces). It is therefore proposed to provide 8 staff spaces, with 5 on-street spaces for set-down and pick-up. The demand for parent set-down and pick up is reduced from the RTA's requirement due to the fact that many parents will live or work within the site and will walk to the childcare centre

- Medical Centre

Council's DCP requires 2 spaces per health consulting room. This level of detail is not available at Concept Plan application stage and it is therefore considered that reliance on the RTA's Guideline is a more appropriate basis for assessment. The Guideline recommends a minimum provision of 4 spaces/100m2 of GFA. Based on the proposed 3,719m2 of GFA, a need for 149 spaces results. However, this does not take account of the fact that many visitors will be residents and employees who will walk to the centre. In addition, the peak retail parking demands will typically occur on a Thursday evening or Saturday morning so that peak medical centre demands, which occur throughout the day, will be able to share this parking. With some 670 retail parking spaces available within the site, provision of 90 medical centre spaces is proposed which equates to a theoretical discount of 40%, but with effective full provision subject to the sharing of only 9% of the retail parking

- Residential Units

Council's DCP requires one space per 1 bedroom unit or studio unit; 1.2 spaces per unit for a 2 bedroom unit; and 2 spaces per unit for a 3 (or more) bedroom unit. Additional visitor parking is required at a rate of 1/5 units. The overall site accommodates 336 units, including 65 one bedroom

units, 245 two bedroom units and 26 three bedroom units. Hence, the parking requirement will be for 478 spaces as follows:

- 65 units @ 1.0/unit 65 spaces; plus;
- 245 units @ 1.2/unit 294 spaces; plus;
- 26 units @ 2.0/unit 52 spaces; plus
- 336 units @ 1/5 units 67 spaces

- High Care Seniors Living Units

Council's DCP does not provide a parking rate for this use category. The RTA's Guideline 1 space/10 units for residents, plus 1 space/10 units for visitors, if it is assumed that the development is a self-contained, subsidised development. With 50 high care units, a need for 10 spaces results. It is considered that this would be appropriate whether the development was self-funded or subsidised, as defined by the RTA.

The requirements of the SEPP (Housing for Seniors) 2004 also need to be considered. This requires 1/10 beds plus 1/2 employees. The 50 beds therefore require 5 spaces. Preliminary estimates indicate that there will be a total of 80 staff associated with the high care accommodation and it is assumed that this would include up to 50 staff during the main day shift. This would result in a need for 25 staff spaces. Hence, a need for a total of 35 spaces is required for the high care facility

- Independent Seniors Living Units

Council's DCP does not provide a parking rate for this use category. The RTA's Guideline recommends 2 spaces/3 units for residents, plus 1 space/5 units for visitors, if it is assumed that the development is a self-contained, resident funded development. With 59 ILU's, a need for 52 spaces results, comprising 34 resident spaces and 12 visitor spaces.

The requirements of the SEPP (Housing for Seniors) 2004 also need to be considered. This requires 0.5 spaces/bedroom; with no specific requirement for visitor parking. With 51 two bed and 8 one bed units (110 beds) this results in a need for 55 resident spaces. Some visitor parking is recommended

having regard for the location of these uses (Lot 5, south of New Harp Street), whereby reliance on other parking on site will be relatively remote so that sharing will not be practicable. Overall, provision of 55 resident spaces and 10 visitor spaces is considered satisfactory for this component, particularly as reliance on on-street parking will be possible

Summary of Parking Requirements

The above assessment results in the need for parking as shown in table 2. The table also includes the level of provision shown on the Concept Plan application drawings and associated schedules.

table 2: parking allocations to individual lots

Lot	Use	Yield (GFA unless stated otherwise)	Spaces Required (as assessed above)	Spaces Proposed
Lot 1	Bulky Goods	17,995m^2 GLFA	430	448
	Gym	1,248m^2	93	93
	Specialty Retail	1,254m^2	42	60
	Commercial	5,960m^2	146	146
			711	747
Lot 2	Residential	214 units	294	294
	Shops	2,751m^2	92	55
	Supermarket	2,585m^2	92	90
	Medical Centre	3,719m^2	151	90
			629	529
Lot 3	Residential	58 units	85	85
	Childcare	75 places	8	8
			93	93
Lot 4	Residential	64 units	90	96
Lot 5	High Care Seniors	50 units	35	35
	Independent Living	59 units	65	65
			100	100
TOTAL			1,533	1,469

Note 1: Includes discounts for local trips and sharing as discussed

The above allocations provide satisfactory parking for each lot which will ensure that each stage of development (lot combinations) is self sufficient, so that on-street parking demands will not occur. It is noted that based on the RTA's Guidelines, the above uses would require significantly more parking based on the 'unrestrained' demand for parking. The proposed parking provision is about 4% below Council's requirements (even with the reduced rates and with sharing), which is considered an appropriate outcome for the development, which responds to the Director General's requirements to minimise parking provision. This is achieved even though this is limited in scope due to the car-dependent nature of several uses on the site

5.10.2 disabled parking

This is a matter for assessment during later Project Application/s and compliance with relevant Australian standards is proposed. Refer to Project Application reports for details on Lots 1 and 3.

5.11 transport access guide

The NSW Government State Plan (November 2006) includes the following transport targets:

- Increase the mode share of public transport trips to the Sydney CBD to 75%;
- Increase journeys to work within the Sydney metropolitan region by public transport to 25% by 2016;
- Consistently meet public transport reliability targets for all forms of public transport;
- Road fatalities continue to fall relative to distance travelled;
- Increase the number of people who live within 30 minutes of a city or major centre by public transport in metropolitan Sydney;
- Maintain current travel speeds along Sydney's major road corridors despite increase in travel volumes;

Generally the primary objective of Government behind establishing a Transport Access Guide for a major development is to reduce the reliance on private vehicle usage associated with the proposed development. Increasing the number of journey to work trips by public transport is considered the most relevant State target, identified above, with regard to the subject development. A reduced target of say 10-15% is arguably more realistic and appropriate when considering that the overall metropolitan target will be significantly influenced by mode shares associated with major centres including the Sydney CBD. In the subject case and having regard form the proposed uses, a target of 10% is considered achievable in relation to the journey to work trips, as discussed above. Part of reducing the mode share of private vehicle use will involve promoting the use of other travel modes including public transport, cycling and walking. These are also discussed above.

It is expected that the preparation of a Transport Access Guide will be included as a condition of consent and will form part of the TMAP Agreement.

5.12 traffic impacts

5.12.1 trip generation

It is usual practice to adopt trip rates published by the Roads and Traffic Authority for individual land use components, as set out in the document entitled “Guide to Traffic Generating Developments”. While this is appropriate for some land uses, it is not appropriate for the proposed trade centre bulky goods component. In this regard, this use is a relatively new concept which has unique attributes that do not reflect any of the land use categories in the Guideline. In these circumstances the Guideline recommends that comparisons be made with similar developments. In recognition of this methodology TRAFFIX has previously undertaken extensive surveys of trade centres that are similar to that proposed. The sites surveyed were as follows:

- The Chatswood Business Centre
- Your Home Centre, Castle Hill
- The Enterprise Centre, Artarmon
- The business Centre, Artarmon

These surveys were undertaken on Thursday evenings and Saturday mornings and the aggregated results are result in the following trip rates for the trade component:

- Weekday AM Peak 0.58 trips/100m2 GFA
- Weekday PM Peak 1.04 trips/100m2 GFA
- Saturday AM Peak 1.09 trips/100m2 GFA

In addition, the development concept incorporates a normal 'public' bulky goods area and the trip rates for this have been assessed on the basis of averaging over several sources, including the RTA's Guideline, other surveys held by TRAFFIX in relation to the Moore Park SuperCenta, Caringbah SupaCenta; and recent surveys of the existing Mitre 10 hardware store at Narellan. This latter development is very similar to this component of the proposed concept as there is a likelihood that this could be a hardware store with a shared trade and public use, as occurs at Narellan. Having regard for this, the adoption of average rates below potentially overstates the level of traffic generation. The aggregation of these sources has resulted in the adoption of the following trip rates for the public bulky goods component:

- Weekday AM Peak 0.70 trips/100m2 GFA
- Weekday PM Peak 2.5 trips/100m2 GFA
- Saturday AM Peak 4.0 trips/100m2 GFA

The trip rates adopted for the other uses have been based on the RTA's Guideline rates. In addition to the above, it is expected that an extensive public transport management plan is capable of reducing private car use to a significant extent. This would include policies aimed at maximising ride sharing, providing public transport incentives, and increasing services to key centres. These policies target significant reductions in private car use and by way of example, the Optus development at Ryde has a 40% public transport target, which compares with about 15% under current travel patterns. On this basis, it is considered reasonable to allow a moderate 10% reduction in the above rates across all uses. Finally, the following adjustments have been made for individual land uses:

- 50% of places within the childcare centre are assumed to be associated with on-site employees or residents; or will occur as linked trips and will generate no additional traffic movements;
- The convenience retailing serves the needs of passing traffic (linked trips), as well as multi-purpose trips. These are not additional trips on the road network and the RTA's Guideline permits a discount of 25% in trip rates for these factors. This use also has reduced parking;

- 50% of traffic generated by the gymnasium is assumed to be associated with on-site employees and residents; or will occur as multi-purpose or linked trips. These people will generate no additional traffic movements and will walk to the gym;

- 50% of traffic generated by the medical centre is assumed to be associated with on-site employees, apartment residents or retirees; or will occur as multi-purpose or linked trips. These people will generate no additional traffic movements, and

- The commercial offices will generate trips at a rate of 1.5 trips/space (compared with 2.0 under the RTA's Guidelines) as it is intended to allocate 20% of all commercial parking as visitor parking to reduce employee car use and in addition, improvements are expected in the medium to long term in response to a Transport Access Guide. This will include measures to promote high car occupancies, to promote public transport and other travel modes and would be prepared in response to a suitable condition on any consent. The resultant traffic generation for the overall development concept is shown in table 3, based on lettable area only for the retail uses. This includes rates for the critical weekday peak period, as well as for Saturday morning.

table 3: adopted trip rates and traffic generation for concept plan

Use	GFA or NFA (m^2)	Weekday AM Peak		Weekday PM Peak		Saturday AM Peak	
		Rate	Trips	Rate	Trips	Rate	Trips
Lot 1							
Bulky Retail	14,830	0.57	84	2.0	296	3.3	488
Gym	1,248	4.05	50	4.05	50	4.05	50
Trade Retail	3,165	0.52	16	0.94	30	0.94	30
Specialty Retail	1,254	0.63	8	2.25	28	3.60	46
Commercial	5,960	1.5	87	1.5	87	nil	nil
TOTAL			**245**		**491**		**614**
Lot 3							
Childcare	75 places	0.36/child	26	0.32/child	24	nil	Nil
Units	58 units	0.36/unit	22	0.36/unit	22	0.2/unit	12
TOTAL			**48**		**46**		**12**
Lot 2							
Units	214	0.36/unit	77	0.36/unit	77	0.2/unit	42
Shops	2,751	2.0	54	4.5	120	4.5	120
Supermarket	2,500	2.0	50	6.8	170	6.8	170
Medical Centre	3,719	3.96	148	3.96	148	2.0	74
TOTAL			**329**		**515**		**406**

Lot 5							
High care	50 units	0.1/unit	5	0.1/unit	5	0.1/unit	5
Normal Care	59 units	0.2/unit	12	0.2/unit	12	0.2/unit	12
TOTAL			**17**		**17**		**17**

Lot 4							
Units	64 units	0.36/unit	24	0.36/unit	24	0.2/unit	12
TOTAL			**24**		**24**		**12**

TOTAL ALL LOTS			**663**		**1,093**		**1,059**

Note: The areas and yields shown have altered

It can be seen from table 3 that the development will result in moderate traffic volumes during the AM peak period, with peak demands occurring on a Thursday evening or Saturday morning. These trips are also very similar to those established in the 2006 traffic report and the Preliminary Environmental Assessment and have been previously accepted in principle.

5.12.2 traffic distributions

The impact of the above traffic generation and distribution onto the surrounding intersections is indicated by the future performance of the surrounding critical intersection. These intersections have been previously assessed under existing traffic conditions in Section 3.

In can be seen that predicted flows on a weekday AM Peak would be similar to those that have historically occurred. Flows during the weekday PM peak and on weekends would be higher, although the latter occur at a time when 'background' traffic volumes on the road system are lower

than on a weekday peak period. The critical period for assessment is therefore the weekday PM peak period, although Saturday morning conditions have also been assessed. The above trips have been assigned to the road network on the basis of the following distributions:

Arrivals

- 25% in from the east via Canterbury Road and Charlotte Street;
- 5% in from the north via Thorncraft Parade;
- 30% in from the west via Harp Street and Kingsgrove Road;
- 15% in from the south via Kingsgrove Road;
- 15% in from the south via William Street and Alfred Street; and
- 10% in from the east via Bexley Road and Jarrett Street

Departures

- 25% out to the east via Charlotte Street and Canterbury Road;
- 5% out to the north via Thorncraft Parade;
- 5% out to the west via Charlotte and Canterbury Road;
- 25% out to the west via Kingsgrove Road and Canterbury Road;
- 15% out to the south via Kingsgrove Road;
- 15% out to the south via Alfred Street and William Street; and
- 10% out to the east via Alfred Street and Jarrett Street

These distributions are the same as those provided in the preliminary traffic report, which were previously accepted. The distributions are based on the expected catchment (and expenditure patterns) for the predominant retail use (in terms of traffic generation) and are considered reasonable, having regard for the surrounding road system. The distributions are based on a 5km radius catchment (including primary, secondary and tertiary catchment areas), with the vast majority of trade drawn from within 2kms. In a more local context, the trip distributions “to and from the development sites” has had regard for the location of driveways and the relative attraction of each access to parking. It is acknowledged that access distributions may vary. However, any variations are not

expected to alter any of the conclusions that have been made. Notwithstanding, this has been assessed in more detail below.

5.12.3 Weekday peak period traffic impacts

- Existing development at full capacity

A general context for the application is to review the impacts that the existing development operating at full capacity would have. The generation of the existing site has been discussed in section 3 above and indicates that the existing development generated in the order of 600 veh per hour during peak periods, compared to the 1,093 vehicles under the current application during the more critical PM peak period. Importantly, the analysis of the key intersections in the vicinity of the site has assumed a net increase over surveyed volumes, at which time the site generates minimal traffic activity. To the extent that traffic activity currently occurs on the site, this has not been taken into account so that future intersection performances as assessed are considered conservative.

- Future development at full capacity

The trips shown in table 3 (1,093 veh/hr) have been distributed onto the road system based on the above distributions. The additional traffic on available access routes is shown in **figures 7 and 8**. The resulting performance of all intersections assessed in Section 3 is provided in table 4. This also shows the performance of the intersections of Charlotte Street with New Troy Street; and New Harp Street with New Alfred Street, which are both newly-created intersections arising from the developed public road system.

table 4: future intersection performances during AM & PM peak periods

Intersection Description	Control	Time Period	Degree of Saturation	Intersection Delay (secs)	Level of Service
Charlotte/Canterbury	Signals	AM	0.83	36.5	C
		PM	0.83	41.1	C
Bexley/Canterbury	Signals	AM	0.97	33.0	C
		PM	1.00	37.6	C
Kingsgrove/Harp	Signals	AM	0.83	26.1	B
		PM	1.00	37.7	C
Charlotte/Harp	Roundabout	AM	0.33	10.8	A
		PM	0.50	12.0	A
Alfred/Jarrett	Roundabout	AM	0.10	11.6	A
		PM	0.21	11.2	A
Kingsgrove/Canterbury	Signals	AM	0.85	42.1	C
		PM	0.80	40.3	C
Jarrett/Bexley	Signals	AM	0.21	7.6	A
		PM	0.48	16.9	B
Charlotte/New Troy	Priority	AM	0.49	32.8	C
		PM	0.44	23.8	B
New Harp/New Alfred	Priority	AM	0.04	10.4	A
		PM	0.19	14.9	B

The above results are based upon the following improvements, following further consideration of issues raised by Council and the RTA:

- At the intersection of Charlotte Street and Canterbury Road, the “No Stopping” restriction on the northern approach along Charlotte Street has been increased an additional 30 metres (from 30m to 60m) to the south;

- At the intersection of Kingsgrove Road and Harp Street, a leading right turn phase has been introduced for westbound traffic in Harp Street. Furthermore, Council's request to lengthen the right turn bay for northbound vehicles on Kingsgrove Road is accepted. It is proposed to lengthen this bay to 70 metres (greater than the 95% queue length) although we note that this is not essential based on modelling undertaken.

- At the intersection of New Harp and New Alfred Street, a four-way priority-controlled intersection is proposed; and;

- At the intersection of Charlotte Street with New Troy Street, a passing bay is proposed to provide a safe right turn entry into the site and to overcome on street queuing effects;

Based on the above improvements, traffic conditions remain only moderately affected, with only slight increases in delays at all intersections examined and with no change in levels of service. The RTA has also agreed that no allowance needs to be made for growth in background traffic along Canterbury Road, based on its own strategic modelling.

5.12.4 sensitivity testing

The RTA has raised the issue of the need to consider a separate distribution for employees, based on journey to work data. The 2006 JTW data has been reviewed and the 1,093 veh/hr shown in Table 3 has been disaggregated and residents and employees account for a total of 269 veh/hr. This represents only 25% of the total traffic generated by the site, with the vast majority of the remaining trips (786 veh/hr) being retail shopping trips.

A separate distribution and trip assignment for the 269 resident and employee tips was undertaken which related to 157 employee trips (32 in, 125 out); and 112 resident trips (93 in, 19 out). Of these 269 trips, 30% were previously assumed to travel to/from the south. These were assigned slightly differently for the arrivals and departures to take account of the available access routes. Based on a review of the JTW data it is evident that travel to/from the south is likely to increase from 30% to a maximum of 40%. Accordingly, JTW travel to/from the south (i.e. non-retail trips) will increase from 80 veh/hr (30% of 269veh/hr) to 108 veh/hr (40% of 269veh/hr). To provide an additional safety factor, an additional 40 veh/hr were assumed to make use of the Harp Street-Kingsgove Road route which provides full interchange with the M5 Motorway. This is essentially a 100% increase in JTW trips on this route, which was assessed as 40 veh/hr in the above assessment. The implications of this additional traffic are discussed below.

Kingsgrove Road Parking Restrictions

The impacts of this additional traffic have been assessed for the critical PM peak period at this intersection and the results indicate that the right turn lane in Kingsgrove Road (southern approach) requires a length of 70 metres. This will require a commensurate permanent increase in the kerbside parking restrictions. Subject to this, the performance of this intersection will be satisfactory. These results have been provided separately to the RTA.

Charlotte Street Parking Restrictions

This intersection has been remodelled to overcome the lane overflow effects in Charlotte Street and the results show that the introduction of a 110 metre long kerbside lane in Charlotte Street on approach to Canterbury Road is required to overcome this concern and parking restrictions will need to be increased commensurately during the PM peak period.

5.12.5 saturday AM traffic impacts

The development is predicted to generate a peak flow of 1,059 veh/hr on a Saturday morning as shown in table 3, which is less than the levels generated on a busy weekday evening. Sample surveys undertaken on a Saturday morning indicate that existing flows on the road system are about 25% less than occur during the weekday peak period, due to spreading. This is a consequence of the predominant industrial nature of the locality. Hence, these flows can be accommodated

5.12.6 sunday traffic impacts

Traffic generation on a Sunday will only relate to the public bulky goods use. This is expected to generate about 500 veh/hr which is moderate and occurs at a time when background volumes are lower. This is also evidenced by the available AADT data which shows that Sunday volumes on Canterbury Road are 19% lower than occur on a weekday. It is therefore concluded that these volumes can also be readily accommodated with no significant road capacity impacts and with good intersection levels of service.

5.12.7 sunday traffic impacts

The assessment of environmental impacts within residential areas is an important consideration. In this regard, traffic volumes on key roads will alter as shown in table 5, based on the flow increases shown in figures 7 and 8.

5.12.8 environmental amenity impacts

The assessment of environmental impacts within residential areas is an important consideration. In this regard, traffic volumes on key roads will alter as shown in table 5, based on the flow increases shown in figures 7 and 8.

table 5: existing and future mid block traffic volumes (veh/hr two way-combined)

Street	Status	Period	Existing	Additional	Total	% Increase
Canterbury Rd (west of site)	state	AM	2320	201	2521	8%
		PM	2297	307	2604	13%
Kingsgrove Road (north of site)	Regional	AM	1263	153	1416	12%
		PM	1156	261	1417	23%
Thorncraft Pde (north of site)	Collector	AM	980	30	1010	3%
		PM	1082	41	1123	4%
Charlotte Street (north of site)	Collector	AM	642	199	841	30%
		PM	579	339	918	58%
Harp Street (west of site)	Collector	AM	690	244	934	35%
		PM	513	443	956	86%
Arthur Street (south of site)	Collector	AM	337	153	490	45%
		PM	376	261	637	69%
Jarrett Street (east of Alfred)	Local		226	61	287	27%
			272	105	377	38%

The above increases on collector roads, while significant in relative terms, are not unacceptable for collector roads they are considered to remain within acceptable limits in absolute terms. In this regard, these streets are not exclusively residential streets by virtue of the presence of non-residential uses in the locality, including the subject site with its industrial zoning. Accordingly, the 6,000 veh/day environmental threshold that typically applies to residential collector streets (refer AMCORD 1990) is not relevant for adoption, other than for reference purposes. This is particularly the case for Harp Street, which is predominantly within an established industrial precinct. Hence, flows significantly in excess of 6,000 vpd (or 600 veh/hr) would reasonably be expected for comparable streets.

It is considered that the impacts on Charlotte Street and Harp Street are a direct consequence of the intensification of this underutilised site and that the previous use of the site, which generated some 480 veh/hr during peak periods, would have had similar impacts, particularly during the AM peak period. The provision of efficient site accesses, via the permeable public road system that is proposed, will also mitigate against any adverse local traffic impacts.

Traffic volume increases will be more noticeable on Saturdays and Sundays due principally to the bulky goods uses. However, these will below the current traffic levels that occur on weekdays, with the most notable impacts occurring at the proposed site accesses. However, these operate efficiently, so that queuing effects will be moderate.

Traffic volume impacts on Troy Street relate only to Lot 3 which incorporates 58 residential units and the child care centre. These will generate minimal traffic activity, which will have a significantly lower impact than the historic and current industrial uses on the site that rely on this route.

5.12.9 alfred street and residential amenity

The development proposes to allocate about 25% of all traffic onto Alfred Street, which accesses the southern catchment area. The additional volumes are therefore significant and this does raise a potential concern in relation to amenity impacts.

In the case of Alfred Street itself, traffic volumes are expected to increase by up to 69% in the PM peak although this will only occur in the section between Jarrett Street and Harp Street. This should be seen in the context of the previous use of the site by Sunbeam, which also generated significant

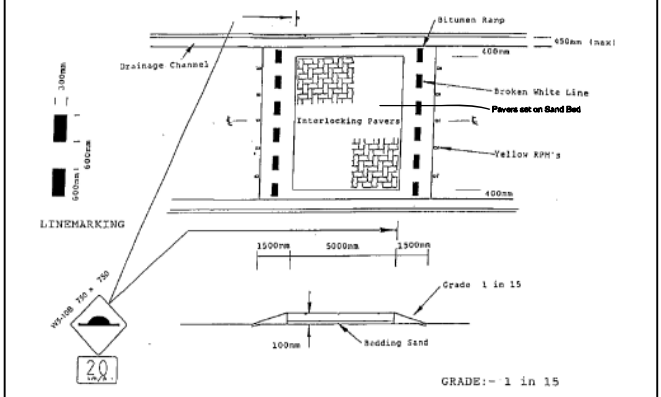
volumes on Alfred Street which have now been removed and are not reflected in the above analysis. It is noted that this route is currently used as a rat-run and that there is an opportunity to reduce through traffic volumes slightly by implementing moderately aggressive local area traffic management measures. This would also have the effect of increasing the environmental capacity of this route as acknowledged in Section 4.3.5 of the RTA's "Guide to Traffic Generating Developments", to the extent that resultant volumes should not be a concern even with the development.

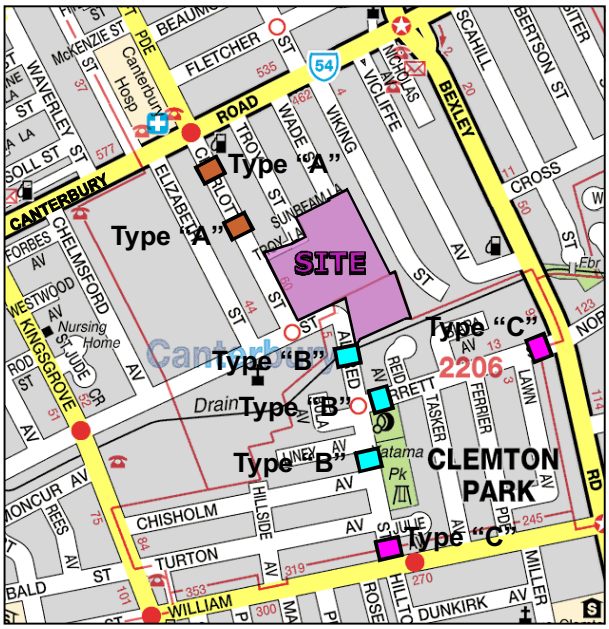
The section of Alfred Street south of Jarrett Street presently carries 356 veh/hr in the PM peak and this is predicted to increase by 156 veh/hr (with reduced flows in the AM peak). The majority of this traffic increase will be local trips accessing the development. It is considered that a moderate reduction in these resultant volumes would occur with a regime of appropriate traffic devices. One option for the precinct is presented in **figure 15**. This incorporates threshold devices to identify the precinct as a 'special' residential area, together with one-way slow points to slow traffic and discourage unnecessary rat-running. Based on this option, it is anticipated that traffic volumes will only increase slightly above existing levels, with reduced speeds providing a compensatory effect. These devices can be included as a suitable condition of consent, requiring the approval of Council's Traffic Committee.

Conversely, the full closure of Alfred Street as has been suggested by Council is considered unnecessary and will have unacceptable impacts. These include the severance of the local community, severely reduced local accessibility and the dislocation and redistribution of 347 veh/hr in the AM peak and 362 veh/hr during the PM peak. The latter will also involve the re-routing of this traffic onto other local residential streets that are not presently affected by through traffic infiltration.

Conversely, the proposed LATM solution provides an opportunity to manage these impacts while retaining a high level of local accessibility (including to the subject development) with no impacts in terms of community severance.

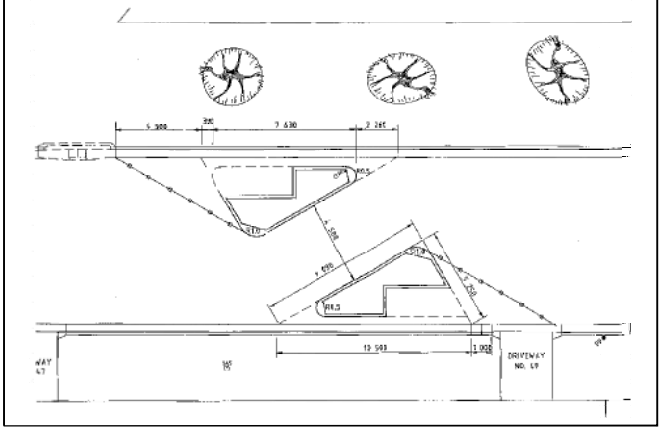
Type “A” Device - Platform



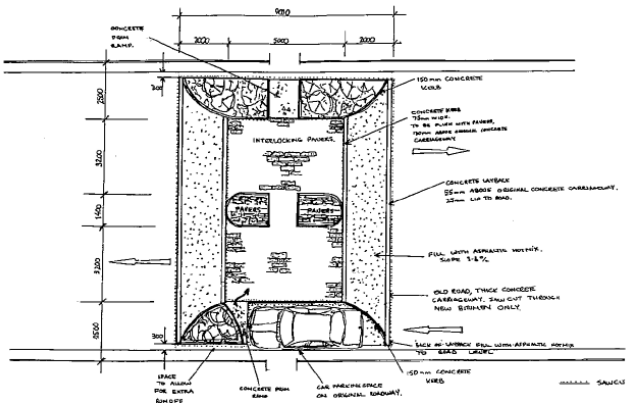


Location of devices

Type “B” Device - Single Lane Angled Slowpoint



Type “C” Device - Entry Threshold



location of devices plan

N

0 500m

concept plan application: mixed use development

60 charlotte street, clemton park

figure 15

local area traffic management option

prepared on behalf of davids group

by **traffix** traffic & transport planners

5.12.10 alfred street/harp street intersection

The overall traffic situation will be assisted by the new four-way junction with Harp Street and Alfred Street. This arrangement does not give priority to the current through movement, so that travel times on this route will be impacted and through traffic discouraged. The development itself will also create side-friction and hence also contribute to delays to existing through traffic or "rat-runners". Finally, the introduction of speed control measures in Alfred Street and Jarrett Street will also discourage through traffic, eliminating some of the existing rat-running" and will also increase the environmental capacity along these local routes.

The above factors overcome any need to consider a closure of Alfred Street, which would create extensive traffic diversions associated with the existing 4,200 veh/day; create unnecessary traffic concentrations on other routes; and create a dislocation of the local community. The preferred approach is to manage traffic intrusion into residential areas as indicated above. It is noted that in the event that Alfred Street remains open, the RTA considers that a roundabout should be installed at this intersection. This is not favoured for the following reasons:

- Roundabouts will give priority to the 'through' traffic movement along the Alfred Street-Harp Street route, with relatively 'free flow' conditions. This is considered counter-productive to the objective of limiting or indeed reducing through traffic from the residential areas to the south of the site. Conversely, the 'priority' movement as shown in appendix c requires the through traffic movement to give way to site-related traffic, with consequent benefits.
- Roundabouts do not provide the same level of safety or convenience for pedestrians compared with the crossings shown in appendix c; and
- A roundabout would result in additional road widening to facilitate safe turns.

5.12.11 demolition traffic impacts

It is anticipated that a detailed demolition and construction traffic management plan will be prepared as part of individual Project Applications, taking due account of proposed development stages. Refer to Project Application reports for details on Lots 1 and 3.

5.12.12 site access arrangements

The development will make reliance on the developed road system as shown on the submitted Concept Plan documentation (refer to appendix 2). All accesses comply with relevant standards and will operate safely and efficiently.

The newly-created intersection of Harp Street with Alfred Street/New Alfred Street is proposed as a four way junction, with priority to the east-west movement along Harp Street under stop sign control. This will have the effect of discouraging through traffic movement along Alfred Street to the south of the site, which is considered desirable. Nevertheless its performance has been assessed assuming no reduction of existing traffic volumes and is acceptable.

Troy Street is proposed to be closed at its intersection with New Troy Street. This will protect the amenity of residents in Troy Street and reduce conflicts at its intersection with New Alfred Street.

The following accesses are proposed:

- Car access to Lot 1 is available via a combined entry-exit driveway onto Harp Street, serving the proposed public bulky goods use. A separate exit is provided onto New Troy Street. Servicing of Lot 1 is via a single access onto Charlotte Street, south of New Troy Street;
- Car access to Lot 2 is available via a combined entry-exit driveway onto both New Alfred Street and New Wade Street. Service vehicle access is available via a separate one-way driveway system, with entry via New Harp Street and exit onto New Wade Street;
- Car access to Lot 3 is available via Troy Street. Servicing demands for the development on this lot (58 units and a child care centre) will be negligible and can occur on-street;
- Car access to Lot 4 is available via three separate driveways onto New Wade Street. Servicing demands for the development on this lot (64 units) will be negligible and can occur on-street; and;
- Car access to Lot 5 is available via two separate driveways, with one via New Harp Street and one via Alfred Street. Servicing demands for the development on this lot (seniors living units) will be moderate and can occur on-street using the drive-through area proposed.

Sight distances to/from the proposed driveways exceed the requirements of AS2890.1 and AS 2890.2 and the driveways will operate safely.

5.12.13 internal design & carriageway widths

The internal road network and road cross-sections are shown in the plans provided in appendix 2. The available geometry has been reviewed using the AutoTurn computer program form the appropriate design vehicle and operates satisfactorily (refer to **appendix 4**). On street parking is also designed to comply with Austroads requirements. The detailed design of individual Project Applications will be subject to separate assessment and compliance with AS 2890.1.

Troy Street will terminate in a cul-de sac west of New Troy Street. This will require the creation of a turning facility for general traffic, with No Stopping restrictions for a short distance. This will require consideration by Council's Traffic Committee in due course, presumably in response to an appropriate condition of consent.

5.12.14 troy street accident data

Accident data has been obtained at the intersection of Troy Street with Canterbury Road for the 5 year period from 1 Jan 2003 to 21 December 2007. This data includes all reported accidents, which includes all tow-away and/or casualty accidents. A total of only 3 accidents occurred over this 5 year period. These included one pedestrian accident and two involving vehicles colliding with the rear of right turning vehicles into Troy Street. This is not an adverse crash history and there is no need to implement any changes at this intersection, particularly in view of its proposed closure at Troy Lane and the fact that traffic volumes are unlikely to change under the Concept Plan.

6. conclusions

The following matters are noteworthy:

- The proposed Concept Plan follows the principles and level of intensity foreshadowed in the Preliminary Environmental Assessment report;
- Traffic impacts have been assessed on the basis of the land use scenario outlined in this report and can be accommodated, subject to the public road system being developed as proposed and the improvements outlined in the report. This TMAP report will be the subject of ongoing discussions and development with a view to reaching a TMAP Agreement that underpins the Concept Plan and can provide the framework for individual Project Applications. This would include measures to achieve the 10% travel reduction target indicated, covering bus services, car share arrangements, bicycle linkages and end-user facilities, pedestrian linkages and preparation of a Transport Access Guide;
- Traffic conditions have been assessed on weekdays, Saturdays and Sundays and can be accommodated by the road system in terms of its capacity;
- The traffic impacts create no unacceptable environmental amenity concerns having regard for then predominant industrial character of the area. The volume increases in the locality are significant when compared with existing flows (with the site essentially dormant) but as all road frontages are collector roads they remain within acceptable limits;
- Speed control measures (slow points) are recommended for implementation in Alfred Street and Jarrett Street to discourage current “rat running” and to increase the environmental capacity of these routes. This is largely intended to respond to existing traffic conditions, as most the development traffic using these routes is local traffic making local trips. This approach overcomes the need to close Alfred Street at Harp Street, which would sever the local community. These measures can be conditioned and will require the approval of Council’s Traffic Committee;
- The proposed access driveways comply fully with the requirements of AS2890. The one-way flow-through system is considered very satisfactory and will minimise conflicts;
- The overall parking provision (1,469 spaces) is 4% less than Council’s DCP requirement as assessed (1,533 spaces, even assuming a reduced rate and with discounts for staring) and this accounts for the synergy between the uses and the ability to share parking where peak demands

do not overlap. The level of provision is also intended to promote alternate travel modes and is responsive to the Director General's requirements;

- The access and internal design arrangements will be able to comply with the requirements of AS 2890.1 and AS 2890.2, subject to further assessment in the Stage 2 and 3 development applications.

It is therefore concluded that based on this TMAP report and having regard for the matters raised by Council, the RTA and the DoP, the proposed Concept Plan is supportable on traffic and transport planning grounds. The Plan establishes a comprehensive framework to facilitate subsequent staged Project Application/s.

appendix 1

photographic record

View looking west in Harp Street adjacent to the site with the Charlotte Street roundabout in the distance.

Reverse view looking east in Harp Street on approach to the sharp bend (which will be eliminated and replaced with a cross junction).

View looking north along Alfred Street towards the bend adjacent to the site.

View looking south along Bexley Road at its intersection with Jarrett Street.

View looking south along Kingsgrove Road on approach to Harp Street.

View looking east along Jarrett Street on approach to Bexley Road.

appendix 2

concept plan (extracts)

REFER TO PLANS
SUBMITTED SEPARATELY

appendix 3a

SIDRA outputs (existing am peak)

PROVIDED ELECTRONICALLY TO THE RTA

appendix 3b

SIDRA outputs (existing pm peak)

PROVIDED ELECTRONICALLY TO THE RTA

appendix 3c

SIDRA outputs (future am peak)

PROVIDED ELECTRONICALLY TO THE RTA

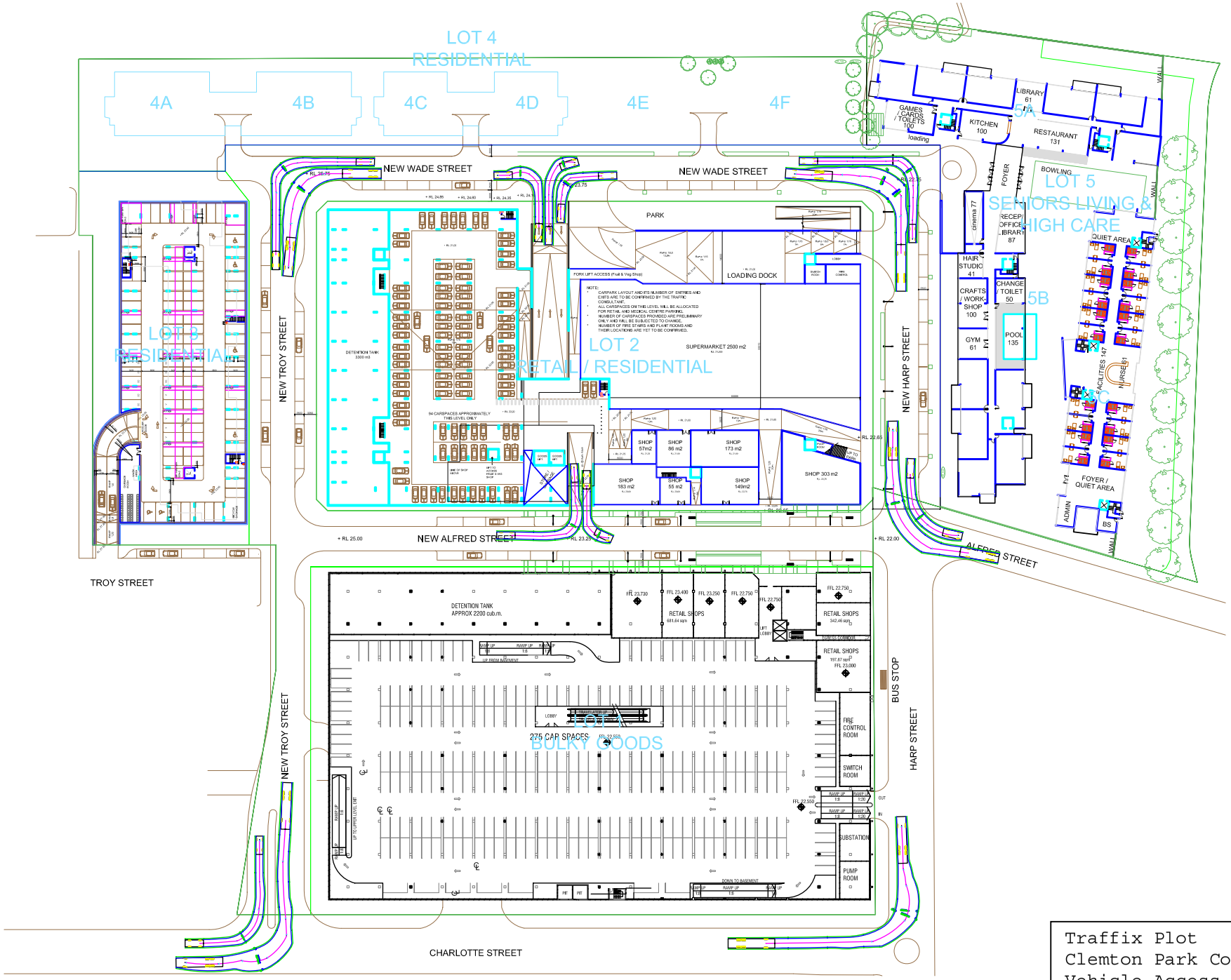
appendix 3d

SIDRA outputs (future pm peak)

PROVIDED ELECTRONICALLY TO THE RTA

appendix 4

swept path analysis



Traffix Plot
Clemton Park Concept Plan
Vehicle Access