



Northern Beaches Business Park

100 South Creek Road, Cromer Transport Impact Assessment

Client: EG

on 21/11/19

Reference: N135572

Issue #: A

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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1. INTRODUCTION





1.1. Background

It is understood that a development application is to be lodged with Northern Beaches Council (Council) for a proposed warehouse/ industrial and commercial development at 100 South Creek Road, Cromer. EG engaged GTA Consultants (GTA) to undertake a transport impact assessment for the proposed development.

The site is currently vacant, with existing light industrial/ warehouse facilities comprising approximately 13,450 square metres gross floor area (GFA) of warehouse use and 11,400 square metres GFA of office space (i.e. total GFA of approximately 24,850 square metres).

The proposed redevelopment of the site will include 11 warehouse units with mezzanine offices, a further five office tenancies, a self-storage facility and a café, totalling approximately 24,550 square metres GFA. The proposed office space will only account for 20 per cent of the total GFA compared to 45 per cent for the existing on-site facilities.

1.2. Purpose of this Report

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

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3. References

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

- an inspection of the site and its surrounds
- Warringah Development Control Plan (DCP) 2011
- Warringah Local Environmental Plan (LEP) 2011
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- traffic and car parking surveys undertaken by Matrix as referenced in the context of this report
- plans for the proposed development prepared by SBA Architects, Drawing Number 19110 DA202 Revision P12, dated 6 November 2019
- other documents and data as referenced in this report.



2. TRANSPORT CONTEXT





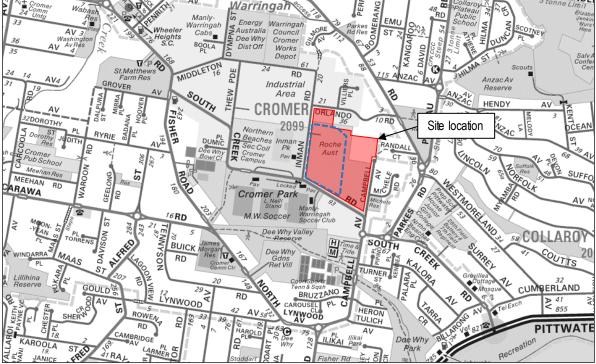
2.1. Location

The subject site is located at 100 South Creek Road, Cromer. The site of approximately 44,500 square metres has a frontage of 190 metres to South Creek Road and 210 metres to Inman Road. The site currently has a land use classification as IN1 General Industrial and is occupied by vacant industrial and commercial/ office facilities.

The surrounding properties predominantly include industrial developments to the north and south, Cromer Park sports fields to the southwest, Cromer High School to the west and residential uses to the east of the site.

The location of the subject site and its surrounding environs is shown in Figure 2.1, while the Warringah LEP 2011 land use map is shown in Figure 2.2.

Figure 2.1: Subject site and its environs



Base image source: Sydway



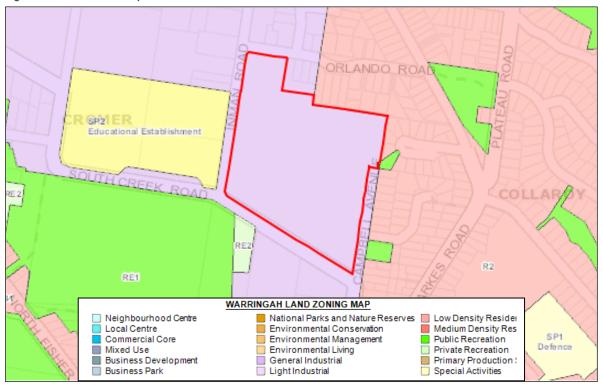


Figure 2.2: Land use map

Base image source: Warringah LEP 2011

2.2. Transport Network

2.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Roads and Maritime Services (Roads and Maritime) responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

Roads and Maritime defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or Roads and Maritime under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.



Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2. Surrounding Road Network

Along the frontages of the site, South Creek Road, Inman Road, Orlando Road and Campbell Avenue function as local roads. South Creek Road and Campbell Avenue become sub-arterial roads south and east of where they intersect.

These roads have a posted speed limit of 50km/h, with one traffic lane and kerbside parking or parking lane in each direction. There is a combination of unrestricted and eight-hour time restricted kerbside parking near the site. Inman Road and Orlando Road have dedicated on-road bicycle shoulder lanes between the kerbside parking and the traffic lanes.

Pittwater Road is a 20-kilometre arterial road that generally aligns north-south linking Mona Vale to the north with Manly to the south. It is a two-way road configured with three traffic lanes in each direction, including peak direction kerbside bus lanes (southbound in the morning peak periods and northbound in the afternoon peak periods) with kerbside parking at other times. It has a posted speed limit of 60km/h.

The key roads are shown in Figure 2.3 to Figure 2.8.

Figure 2.3: Inman Road (looking north)







Figure 2.5: South Creek Road (looking east)

Figure 2.6: South Creek Road (looking west)







Figure 2.7: Pittwater Road (looking east)



Figure 2.8: Pittwater Road (looking west)



2.3. Traffic Volumes

GTA commissioned vehicle turning movement counts at the South Creek Road intersections with Inman Road and Pittwater Road on Wednesday 16 October 2019, during the morning and afternoon peak periods:

The AM and PM peak hours were found to occur from 7.45am to 8.45am and 5:00pm to 6:00pm respectively, with full survey results contained in Appendix A.

2.4. Intersection Operation

The operation of the surveyed intersections has been assessed using SIDRA INTERSECTION¹, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the Roads and Maritime, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.1: SIDRA INTERSECTION level of service criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
А	Less than 14	Good operation	Good operation
В	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
С	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

¹ Program used under license from Akcelik & Associates Pty Ltd.



Table 2.2 presents a summary of the existing operation of the intersections, with full results presented in Appendix B. Signalised intersection results are based on the overall operation, whilst unsignalised intersection results are based on the worst movement.

Table 2.2: Existing operating conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
		East	0.83	13	312	A
	4.84	North	0.80	57	115	Е
	AM	West	0.53	20	138	В
Pittwater Road/		Overall	0.83	21	312	В
South Creek Road	PM	East	0.70	11	74	А
		North	0.60	54	75	D
		West	0.71	9	144	А
		Overall	0.71	14	144	A
		East	0.14	6	4	А
	AM	North	0.11	7	3	А
South Creek Road/		West	0.11	5	0	А
Inman Road		East	0.17	6	5	А
	PM	North	0.16	8	4	А
		West	0.14	6	0	А

Table 2.2 indicates that the study intersections currently operate satisfactorily during the peak periods. There is some queuing along Pittwater Road in the peak direction, which is expected along an arterial road. South Creek Road experiences some delays during the peak periods as the green time priority is given to Pittwater Road.

2.5. Car Parking

A review of publicly available car parking near site indicates that eight-hour restricted parking is available on both sides of Inman Road and South Creek Road, with unrestricted parking on Orlando Road.

Observations of on-street car parking suggest there is low demand during the afternoon peak period. There were less than 30 vehicles parked in the afternoon along Inman Road (19 spaces both sides) and South Creek Road (nine spaces both sides), which have kerbside supply of approximately 80 spaces and 75 spaces respectively on both sides. This suggests there are at least 120 spaces available.

Along the site frontages there are currently 45 spaces between Inman Road and South Creek Road.

2.6. Public Transport

Bus route 158 services link Cromer with Manly via Dee Why and Brookvale. Bus stops are located on South Creek Road adjacent to the site. Buses are infrequent with one service running in the morning and one in the evening.

There are further bus services (bus routes 151, 185, 188, 199, E60, E83, E85) on Pittwater Road, with the nearest bus stops a 12-minute walking distance from site. These services have 15-minute frequency during peak periods, providing access to Palm Beach, Mona Vale, Warriewood Valley, Elanor Heights and Manly.



The surrounding bus network is shown in Figure 2.9.

Figure 2.9: Surrounding public transport network



Base image source: https://transportnsw.info, accessed October 2019

2.7. Walking and Cycling Infrastructure

Footpaths are available on the south side of South Creek Road near the site and on the east side of Inman Road. The existing South Creek Road footpath ends at the bus stop adjacent to the site, with opportunity to extend the footpath to the South Creek Road/ Campbell Avenue roundabout.

On-road cycle shoulder lanes are located on both sides of Inman Road and Orlando Road, with off-road shared paths provided adjacent to Cromer Park and Cromer High School. The draft Northern Beaches Bike Plan proposes new and extended shared paths along Inman Road and South Creek Road towards Pittwater Road, illustrated in Figure 2.10.



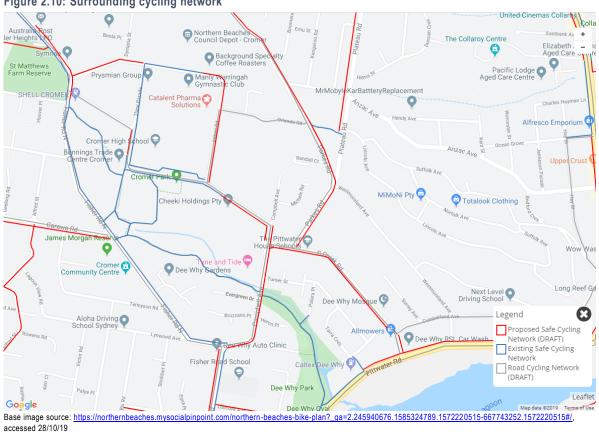


Figure 2.10: Surrounding cycling network



GTAconsultants

3. DEVELOPMENT PROPOSAL





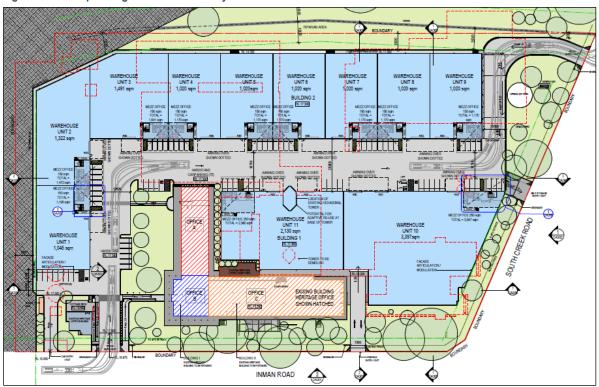
3.1. Land Uses

The proposed development incorporates light industrial, commercial and retail land uses fronting Inman Road. It intends to retain a heritage commercial building for five office tenancies, construct 11 warehouse units with mezzanine offices, a self-storage facility and a café also in a heritage building. The land use breakdown is summarised in Table 3.1, with the ground level site layout shown in Figure 3.1.

Table 3.1: Development schedule

Use	Description	Size (GFA)
Light Industrial/	Warehouse	15,505sq.m
Warehouse	Mezzanine Office	1,850sq.m
	Commercial	3,179sq.m
	Self-storage facility	3,902sq.m
	Café	124sq.m
Total		24,560sq.m

Figure 3.1: Proposed ground level site layout



Source: Drawing Number 19110 DA202 Revision P12, prepared by SBA Architects, dated 6 November 2019



3.2. Vehicle Access and Parking

The proposal provides a total of 231 car parking spaces, with the breakdown of car parking spaces as follows:

- At-grade car parking 72 spaces including nine visitor parking spaces
- Basement car parking 159 spaces.

There are three separate site accesses proposed along Inman Road, as follows:

- a two-way visitor car park access (new driveway)
- a two-way at-grade car and truck to the light industrial/ warehouse units (existing driveway location)
- a two-way basement car park access (existing driveway location).

A further two separate site accesses are proposed along South Creek Road, as follows:

- a two-way access to the self-storage facility (new driveway)
- an exit only access from the light industrial/ warehouse units (existing driveway location).



4. PARKING ASSESSMENT





4.1. Bicycle Parking

The bicycle parking requirements for different development types are set out in Warringah DCP 2011. The DCP bicycle parking requirement for the proposal is summarised in Table 4.1, which indicates 39 bicycle spaces are required.

Table 4.1: Warringah DCP 2011 bicycle parking requirements

Use	Size	Bicycle parking rate	Bicycle parking requirement		
Warehouse	15,505sq.m	1 per 600sq.m	26		
Self-storage	3,902sq.m	1 per 600sq.m	7		
Mezzanine	1,850sq.m	1 per 750sq.m	2		
Office	3,179sq.m	1 per 750sq.m	4		
Cafe	124sq.m	1 per 600sq.m	0		
	Total				

While bicycle parking is not currently shown on the plans, the above 39 spaces can be readily accommodated on site.

4.2. Car Parking

In establishing the appropriate parking supply for the proposal, reference is made to both the Warringah Development Control Plan (DCP) 2011 and the Roads and Maritime Services *Guide to Traffic Generating Developments* 2002 (RMS Guide).

4.2.1. DCP Parking Requirements

The car parking requirements for different development types are set out in Warringah DCP 2011.

The Warringah DCP 2011 parking rates for warehouse and industry uses allows for up to 20 per cent office floor area within individual tenancies. A review of the area schedule suggests that the mezzanine office space for the 11 units will account for less than 15 per cent of the floor area, therefore no separate consideration of office floor area is required.

There are no specific rates for self-storage facilities, as such the warehouse rates have been applied.

The DCP car parking requirement for the proposal as summarised in Table 4.2.

Table 4.2: Warringah DCP 2011 car parking requirements

Use	Size	Car parking rate	Car parking requirement
Warehouse/ Factory	15,505sq.m	1.3 per 100sq.m	202
Self-storage	3,902sq.m	1.3 per 100sq.m	51
Mezzanine	1,850sq.m	1.3 per 100sq.m	24
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	12 per 100sq.m	15
	371 spaces		

Table 4.2 suggests that the proposal requires 371 car parking spaces.

DCP 2011 also requires the proposal provides eight accessible spaces in accordance with the AS/NZ 2890.6.2009 – Parking facilities – Off-street parking for people with disabilities.



4.2.2. RMS Parking Requirements

The RMS Guide provides separate rates for factory and warehouse uses under the grouping of industry. The 20 per cent office floor area allowance also applies to the factory rate, however the warehouse rate does not specifically include this allowance and GTA typically considers ancillary office space separately for warehouses.

There are no specific rates for self-storage facilities, as such the warehouse rates have been applied.

The on-site café is ancillary to the overall development and surrounding area, and is not expected to be a destination in its own right. As such, any parking demand for the café (i.e. visitors not associated with other tenancies or immediate local area) would be minimal.

If the proposed warehouse component was considered to be all warehouse, the resulting car parking requirement is summarised in Table 4.3.

Table 4.3: RMS Guide 2002 - All Warehouse Rate

Use	Size	Car parking rate	Car parking requirement
Warehouse	15,505sq.m	1 per 300sq.m	52
Self-storage	3,902sq.m	1 per 300sq.m	13
Warehouse Mezzanine	1,850sq.m	1 per 40sq.m	46
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	-	-
	190 spaces		

If the proposed warehouse component was considered to be all factory/ light industrial, the resulting car parking requirement is summarised in Table 4.4.

Table 4.4: RMS Guide 2002 – All Factory Rate

Use	Size	Car parking rate	Car parking requirement
Factory/ Light Industrial	15,489sq.m	1.3 per 100sq.m	202
Self-storage	3,902sq.m	1 per 300sq.m	13
Factory/ Light Industrial Mezzanine	1,850sq.m	1.3 per 100sq.m	24
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	-	-
	318 spaces		

Table 4.3 and Table 4.4 suggests that the proposal requires between 205 and 333 car parking spaces with the proportion of factory and warehouse use to determine the requirement.

4.2.3. Empirical Assessment of Car Parking Demand

Warehouse/ Industry

There are no confirmed tenants for the individual units, however EG has advised that it is likely to include both warehouse and light industrial (e.g. medical equipment assembly) tenants. While the balance will vary over the life of the facility, it is unlikely that parking requirements will be skewed to either end of the range at a given point in time.

The rates adopted in RMS Guide for factory and warehouse uses better reflect the intended site occupancy/ operation compared with the single rate adopted in the Warringah DCP 2011.



For the purposes of this assessment, a likely split of 70 per cent warehouse tenants to 30 per cent light industrial tenants has been assumed for the units based on advice from EG that it will be more skewed towards warehouse.

Self-storage Facility

Self-storage facilities typically require less staff than traditional warehouse facilities, whilst users have access to the facility 24 hour/ seven days a week. These facilities do not have defined peak parking demand, with user arrivals dispersed across the day. In addition, such facilities are not a high traffic and parking generator as users typically leave their goods stored for extended periods of time without accessing. All of the above suggests that a more suitable car parking provision would be aligned with the RMS Guide rate for warehouse uses.

Summary

A summary of the anticipated car parking demand is provided in Table 4.5 and suggests that the proposal could generate a demand for 228 spaces.

Table 4.5: Anticipated Parking Demand

Land Use	Warringah DCP Parking Rate	Parking Requirement	Proposed Provision
Self-Storage	1 space per 300 sqm (RMS warehouse rate)	13	
Warehouse (70% of units)	Warehouse - 1 space per 300 sqm (RMS Rate) Mezzanine Office - 1 space per 40 sqm	68 spaces (36 + 32 spaces)	
Industry (30% of units)	1.3 spaces per 100 sqm (incl. mezzanine office)	68	231 spaces
Office	1 space per 40 sqm	79	-
Café Ancillary to overall development (infrequent external tri		nal trips expected)	
Total		228 spaces	-

Note: total parking requirement subject to rounding of requirements for each land use

4.2.4. Adequacy of Car Parking Supply

The expected parking demand generated by the proposal (228 spaces) is approximately equal to the proposed provision (231 spaces). The balance of warehouse and light industrial/ factory uses will influence the demand, which could range between 205 spaces and 333 spaces when considering the relevant rates in the RMS Guide. However, as noted above, it is unlikely that parking requirements will be skewed to either end of the range at a given point in time.

As previously mentioned, the café is expected to be ancillary to the site and surrounding area (i.e. school, sports fields and other industrial uses), with a predominant walk-up catchment. As such, it is not expected to be a vehicle trip destination in itself.

The site has some 400 metres of frontages along South Creek Road and Inman Road. Discounting locations of proposed vehicle accesses, there is opportunity to park up to 40 vehicles directly adjacent to these site frontages. Site observations suggests that 21 spaces were occupied along the site frontages.

It is generally considered acceptable for a development to rely on 50 to 60 per cent of the available site frontage(s) to accommodate parking demand, which promotes on-street activation and traffic calming. With the proposal anticipated to generate car parking demand for 12 spaces more than provided on-site, it would be reasonable for this demand to use on-street parking noting the high parking availability along the site frontages since the closure of the previous on-site use and limited parking demand from other nearby uses (school and sports fields having different peaks).



4.3. Site Layout Review

The site layout has been reviewed against the requirements of the Australian Standard for Off Street Parking Facilities (AS/NZS2890.1:2004, AS2890.2:2002 and AS/NZS2890.6:2009). This assessment included a review of the following:

- bay and aisle width
- adjacent structures
- circulation roads and ramps
- ramp grades
- height clearances
- internal queuing
- parking for persons with disabilities.

Details of this review are provided below. This review indicates that the proposed site layout is expected to operate satisfactorily, subject to the adoption of recommendations discussed below and shown graphically at Appendix C.

The proposed car parking spaces will be designed as a User Class 2 facility with each space to be a minimum 2.5m wide and 5.4m long, with adjacent 5.8m wide aisles. Car parking spaces for people with disabilities will be designed as a User Class 4 facility with each a minimum 2.4m wide and 5.4m long, with a shared area 2.4m wide and 5.4m long on one side of the dedicated space. A centrally located bollard will also be required in the shared area.

The site access driveways will be designed to accommodate entry/ exit movements for the largest design vehicle requiring access. Swept paths have been completed and show that vehicles up to and including Australian Standard 20-metre-long articulated vehicles can enter and exit the site in a forward direction.



5. TRAFFIC ASSESSMENT





5.1. Traffic Generation

Traffic generation estimates for the proposed development have been sourced from the Roads and Maritime Guide to Traffic Generating Developments 2002 (the Guide) and Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a).

5.1.1. Existing Development

The existing site is currently unoccupied and therefore, not generating any traffic. The peak hour traffic volume estimates for the previous uses are set out in Table 5.1.

Table 5.1: Existing Use - Traffic generation estimates

Hee	Use Size Traffic generation rate (trips / hour)		Traffic generation es	timates (trips / hour)	
Use	Size	AM	PM	АМ	PM
Warehouse	13,444sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	70	75
Office	11,407sq.m	2 trips per 100sq.m	2 trips per 100sq.m	228	228
		Total	298	303	

Table 5.1 indicates that the previous use on the site could have generated approximately 300 vehicle trips in any peak hour.

5.1.2. Proposed Development

The peak hour traffic volume estimates of the proposed use are set out in Table 5.2.

Table 5.2: Proposed Use - Traffic generation estimates

Use	Size	Traffic generation	rate (trips / hour)	Traffic generation estimates (trips / hour)			
		AM	PM	AM	PM		
Warehouse	15,505sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	81	87		
Self-Storage	3,902sq.m	0.1 trip per 100sq.m		4	8		
Mezz	1,850sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	10	10		
Office	3,179sq.m	2 trips per 100sq.m	2 trips per 100sq.m	64	64		
Café	124sq.m 5 trips per 10sq.m		5 trips per 100sq.m	6	6		
	•	Total	164	175			

Table 5.2 indicates that the site could potentially generate 164 and 175 vehicle trips in the AM and PM peak hours respectively.

5.1.3. Summary

Whilst the previous use had similar overall GFA to the proposal, there was a higher proportion of office space. As a result, the proposal is expected to generate approximately 130 vehicles less during the peak hours, or at least 40 per cent less traffic compared with previous site operations.

Notwithstanding, the impact of the proposal on the surrounding road network has been reviewed in subsequent sections.



5.2. Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposal have been estimated based on a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- likely distribution of employee's residences in relation to the site
- configuration of access points to the site.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) for the proposal has been assessed as 80 percent entering and 20 per cent exiting during the AM with 30 per cent entering and 70 per cent exiting in the PM.

5.3. Traffic Impact

The study intersections have been reassessed to include traffic associated with the proposed development, with the SIDRA modelling results summarised in Table 5.3, with full results presented in Appendix B.

Table 5.3: Existing and development operating conditions

Intersection	Peak	Leg	Existing Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
		East	Α	0.85	16	340	В
	АМ	North	E	0.80	57	123	Е
		West	В	0.60	23	161	В
Pittwater Road/		Overall	В	0.85	24	340	В
South Creek Road		East	Α	0.71	13	81	A
	PM	North	D	0.70	57	103	Е
	PIVI	West	Α	0.75	13	194	А
		Overall	Α	0.75	18	194	В
		East	Α	0.23	6	9	А
	AM	North	Α	0.13	8	4	А
South Creek		West	Α	0.11	5	0	А
Road/ Inman Road		East	А	0.18	6	5	А
	PM	North	А	0.22	9	7	А
		West	А	0.14	6	0	A

Table 5.3 indicates that the study intersections will continue to operate satisfactorily during road network peak periods. On this basis, the anticipated traffic volumes associated with the proposal could not be expected to compromise the safety or function of the surrounding road network.



6. CONCLUSION





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

- The proposal incorporates 11 warehouse units with mezzanine offices, a further five office tenancies, a selfstorage facility and a café. The overall gross floor area is similar to the existing on-site facilities, however with a lower proportion of office space.
- Whilst the proposal generates a Warringah DCP 2011 car parking requirement of 371 spaces (as the DCP has a single rate for industrial and warehouse uses), an assessment based on Roads and Maritime Services Guide to Traffic Generating Developments 2002 suggests that proposal would generate an expected parking demand of 228 spaces.
- The proposed supply of 231 spaces is considered appropriate and is approximately equal to the expected parking demand for 228 spaces.
- 4. Notwithstanding this, some use of available on-street parking along the site frontages is reasonable, to promote on-street activation and traffic calming, noting the high parking availability since the closure of the previous on-site use and limited parking demand from other nearby uses (school and sports fields having different peaks).
- 5. The proposed site layout is generally consistent with the dimensional requirements as set out Australian Standard for Off Street Parking Facilities (AS/NZS2890.1:2004, AS2890.2:2002 and AS/NZS2890.6:2009).
- 6. The proposed hardstand area has been designed to accommodate vehicles up to Australian Standard 20-metre-long articulated vehicles.
- 7. It is recommended that the proposal provides at least 39 bicycle spaces for use by staff and/ or visitors across the tenancies with end of trip facilities in accordance with DCP 2011.
- 8. The proposal is expected to generate up to 164 and 175 vehicle movements in the AM and PM peak hours respectively, which is at least 40 per cent less vehicles than estimated for the previous site uses.
- Intersection analysis suggests that the surrounding intersections would continue to operate satisfactorily during
 the road network peak periods post development and the anticipated traffic volumes associated with the proposal
 could not be expected to compromise the safety or function of the surrounding road network.



A. SURVEY RESULTS



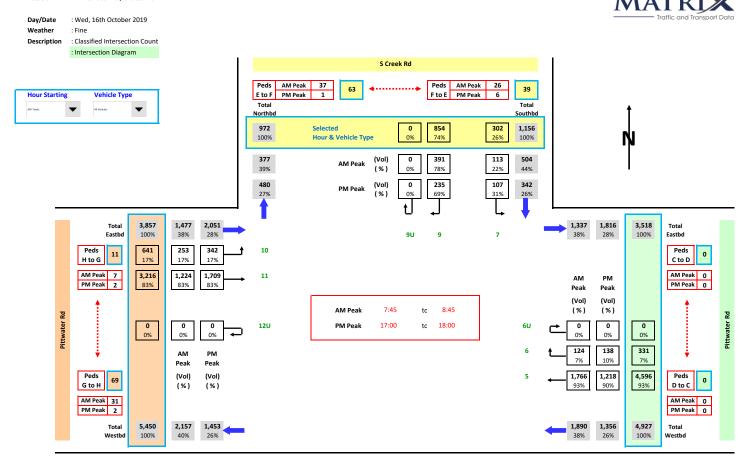


 Job No.
 : N5364

 Client
 : GTA

 Suburb
 : Cromer

Location : 1. Pittwater Rd / S Creek Rd

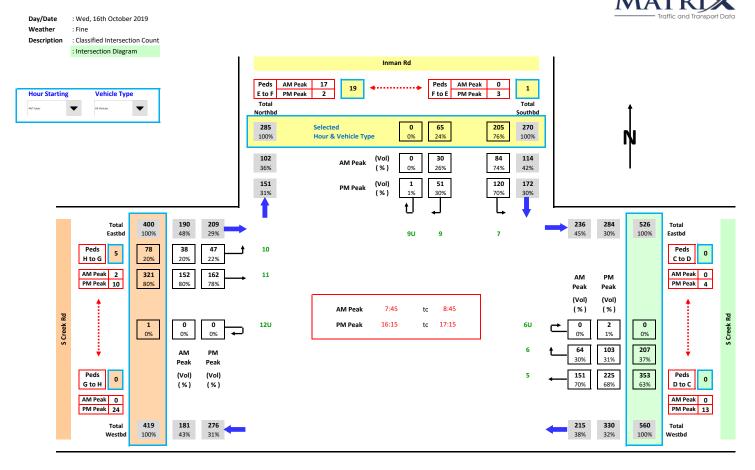


 Job No.
 : N5364

 Client
 : GTA

 Suburb
 : Cromer

Location : 2. S Creek Rd / Inman Rd



B. SIDRA RESULTS





USER REPORT FOR SITE



Project: 191021sip-N135572 100 South Creek Road, Cromer

Template: Default Site User Report

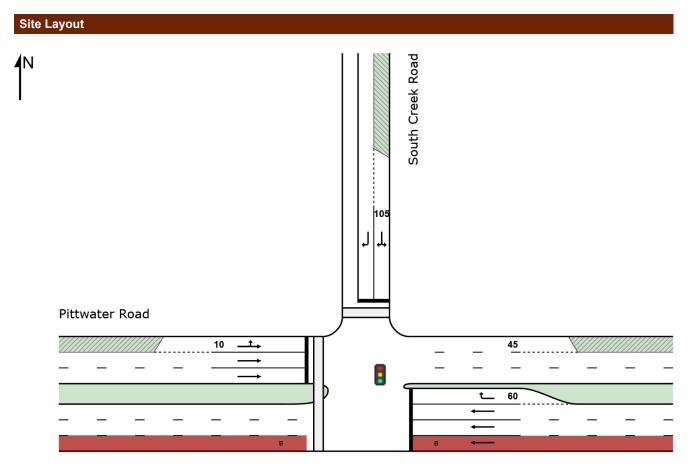
Site: [1 Pittwater Road/ South Creek Road - Ex AM]

Site Category: -

Signals - Fixed Time Coordinated Cycle Time = 115 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog Phase Times determined by the program Phase Sequence: Variable Phasing

Reference Phase: Phase A Input Phase Sequence: A, B, C Output Phase Sequence: A, B, C



Pittwater Road

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	
East:	Pittwater	Road										
5	T1	1859	4.2	0.816	11.2	LOS A	42.3	301.0	0.63	0.60	0.64	50.2
6	R2	131	9.7	0.460	38.0	LOS C	5.9	44.9	0.83	0.83	0.88	34.7
Appro	ach	1989	4.6	0.816	12.9	LOS A	42.3	301.0	0.64	0.61	0.66	48.6
North	North: South Creek Road											
7	L2	119	18.6	0.801	57.8	LOS E	15.2	115.1	1.00	1.00	1.49	28.7
9	R2	412	3.1	0.801	58.4	LOS E	15.2	115.1	1.00	0.94	1.28	27.8
Appro	ach	531	6.5	0.801	58.3	LOS E	15.2	115.1	1.00	0.96	1.33	28.0
West:	Pittwate	r Road										
10	L2	266	8.7	0.666	18.5	LOS B	8.3	65.5	0.56	0.68	0.56	41.7
11	T1	1288	5.1	0.720	17.9	LOS B	31.5	227.4	0.73	0.66	0.73	45.6
Appro	ach	1555	5.7	0.720	17.9	LOS B	31.5	227.4	0.70	0.66	0.70	44.9
All Ve	hicles	4075	5.2	0.816	20.8	LOS B	42.3	301.0	0.71	0.68	0.76	43.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

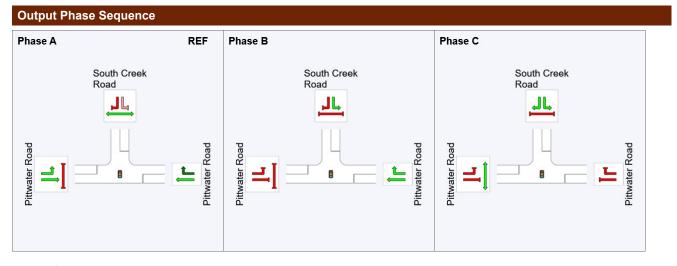
Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase VAR: Variable Phase



Phase Timing Summary

Phase	Α	В	С
Phase Change Time (sec)	0	71	89
Green Time (sec)	65	12	20
Phase Time (sec)	71	18	26
Phase Split	62%	16%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Dev AM]

Site Category: -

Signals - Fixed Time Coordinated Cycle Time = 115 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog Phase Times determined by the program

Phase Times determined by the pro Phase Sequence: Variable Phasing Reference Phase: Phase A Input Phase Sequence: A, B, C Output Phase Sequence: A, B, C

Pittwater Road

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	· ·
East: Pittwater Road												
5	T1	1859	4.2	0.841	13.4	LOS A	45.6	324.4	0.66	0.64	0.69	48.6
6	R2	171	8.6	0.566	47.9	LOS D	8.1	61.1	0.88	0.92	1.19	31.8
Appro	ach	2029	4.6	0.841	16.3	LOS B	45.6	324.4	0.68	0.66	0.73	46.4
North:	North: South Creek Road											
7	L2	129	17.9	0.810	58.9	LOS E	16.2	122.9	1.00	1.01	1.54	28.5
9	R2	433	3.4	0.810	58.7	LOS E	16.2	122.9	1.00	0.95	1.30	27.7
Appro	ach	562	6.7	0.810	58.8	LOS E	16.2	122.9	1.00	0.97	1.36	27.9
West:	Pittwate	r Road										
10	L2	352	9.3	0.786	27.2	LOS B	14.0	110.3	0.63	0.77	0.73	37.6
11	T1	1288	5.1	0.796	22.5	LOS B	36.6	264.2	0.79	0.74	0.82	42.9
Appro	ach	1640	6.0	0.796	23.5	LOS B	36.6	264.2	0.76	0.75	0.80	41.6
All Ve	hicles	4232	5.4	0.841	24.7	LOS B	45.6	324.4	0.75	0.74	0.84	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

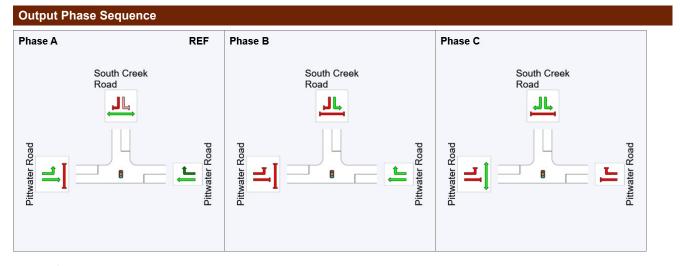
Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

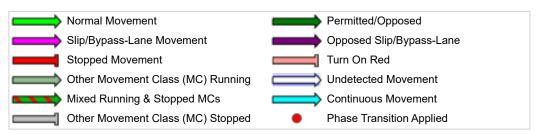
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase VAR: Variable Phase



Phase Timing Summary

Phase	Α	В	С
Phase Change Time (sec)	0	68	88
Green Time (sec)	62	14	21
Phase Time (sec)	68	20	27
Phase Split	59%	17%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Ex PM]

Site Category: -

Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog Phase Times determined by the program

10

Phase Sequence: Variable Phasing Reference Phase: Phase A Input Phase Sequence: A, B, C Output Phase Sequence: A, B, C

Pittwater Road Pittwater Road

Pittwater Road

10

Move	ement P	erformance	- Vehi	cles								
Mov ID	Turn	Demand I Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	
East:	Pittwater	Road										
5	T1	1282	3.4	0.484	5.9	LOS A	13.4	95.0	0.37	0.33	0.37	54.4
6	R2	145	2.2	0.704	56.2	LOS D	10.4	74.0	1.00	1.02	1.41	29.6
Appro	ach	1427	3.3	0.704	11.0	LOS A	13.4	95.0	0.43	0.40	0.47	49.9
North	: South C	reek Road										
7	L2	113	0.9	0.592	46.0	LOS D	9.3	66.0	0.97	0.86	1.09	33.6
9	R2	247	2.1	0.592	58.1	LOS E	10.5	74.9	0.98	0.83	1.02	29.3
Appro	ach	360	1.8	0.592	54.3	LOS D	10.5	74.9	0.98	0.84	1.04	30.6
West:	Pittwater	Road										
10	L2	360	1.5	0.355	16.6	LOS B	11.2	85.9	0.47	0.67	0.47	45.8
11	T1	1799	3.3	0.705	7.6	LOS A	20.3	143.5	0.39	0.37	0.39	52.9
Appro	ach	2159	3.0	0.705	9.0	LOS A	20.3	143.5	0.40	0.42	0.40	51.5
All Ve	hicles	3946	3.0	0.705	13.9	LOSA	20.3	143.5	0.47	0.45	0.49	47.9

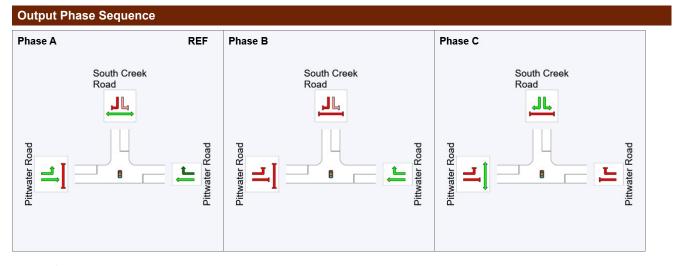
Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

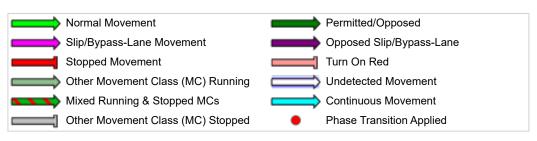
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase VAR: Variable Phase



Phase Timing Summary

Phase	Α	В	С
Phase Change Time (sec)	0	93	108
Green Time (sec)	87	9	21
Phase Time (sec)	93	15	27
Phase Split	69%	11%	20%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Dev PM]

10

Site Category: -

Signals - Fixed Time Coordinated Cycle Time = 135 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog Phase Times determined by the program

Phase Sequence: Variable Phasing Reference Phase: Phase A Input Phase Sequence: A, B, C Output Phase Sequence: A, B, C

Pittwater Road Pittwater Road Pittwater Road

Pittwater Road

10

Move	ement P	erformance	e - Vehi	icles								
Mov ID	Turn	Demand I Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East:	Pittwater	Road										
5	T1	1282	3.4	0.508	7.1	LOS A	15.6	110.2	0.40	0.36	0.40	53.4
6	R2	161	2.6	0.712	62.5	LOS E	11.3	80.8	1.00	1.04	1.49	28.2
Appro	ach	1443	3.4	0.712	13.2	LOS A	15.6	110.2	0.47	0.44	0.52	48.3
North	: South C	reek Road										
7	L2	151	2.1	0.699	51.5	LOS D	13.3	95.5	0.99	0.91	1.21	32.0
9	R2	326	4.2	0.699	59.6	LOS E	14.2	103.1	0.99	0.86	1.08	28.9
Appro	ach	477	3.5	0.699	57.0	LOS E	14.2	103.1	0.99	0.88	1.12	29.9
West:	Pittwater	Road										
10	L2	395	2.4	0.410	19.6	LOS B	14.0	107.7	0.54	0.70	0.54	44.0
11	T1	1799	3.3	0.748	11.3	LOS A	27.5	194.1	0.53	0.49	0.53	50.0
Appro	ach	2194	3.1	0.748	12.7	LOS A	27.5	194.1	0.53	0.53	0.53	48.8
All Ve	hicles	4114	3.2	0.748	18.1	LOS B	27.5	194.1	0.56	0.54	0.60	45.2

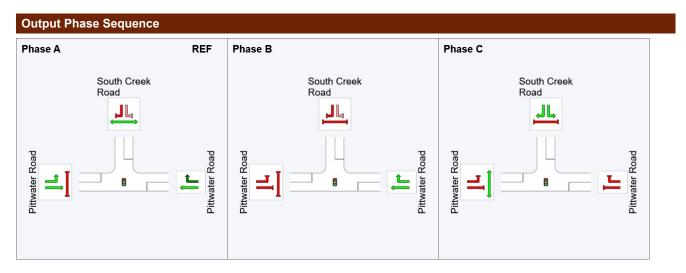
Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

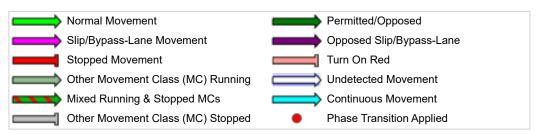
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase VAR: Variable Phase



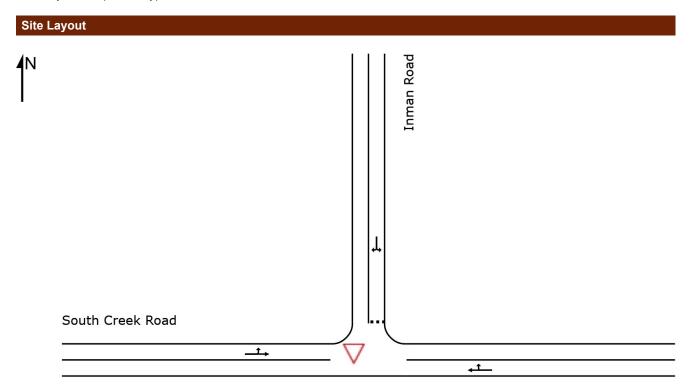
Phase Timing Summary

Phase	Α	В	С
Phase Change Time (sec)	0	88	105
Green Time (sec)	82	11	24
Phase Time (sec)	88	17	30
Phase Split	65%	13%	22%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

\overline{V} Site: [2 Inman Road/ South Creek Road - Ex AM]

Site Category: -Giveway / Yield (Two-Way)



Move	ment P	erformanc	e - Veh	icles								
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	<u> </u>
East:	East: South Creek Road											
5	T1	159	6.6	0.135	0.4	LOS A	0.5	3.6	0.22	0.17	0.22	48.2
6	R2	67	10.9	0.135	5.5	LOS A	0.5	3.6	0.22	0.17	0.22	46.2
Appro	ach	226	7.9	0.135	1.9	NA	0.5	3.6	0.22	0.17	0.22	47.7
North:	: Inman F	Road										
7	L2	88	15.5	0.107	5.3	LOS A	0.4	3.2	0.29	0.56	0.29	43.7
9	R2	32	10.0	0.107	6.7	LOS A	0.4	3.2	0.29	0.56	0.29	43.9
Appro	ach	120	14.0	0.107	5.7	LOS A	0.4	3.2	0.29	0.56	0.29	43.7
West:	South C	reek Road										
10	L2	40	5.3	0.110	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	48.4
11	T1	160	10.5	0.110	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	49.2
Appro	ach	200	9.5	0.110	0.9	NA	0.0	0.0	0.00	0.11	0.00	49.0
All Ve	hicles	546	9.8	0.135	2.4	NA	0.5	3.6	0.15	0.23	0.15	47.4

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.

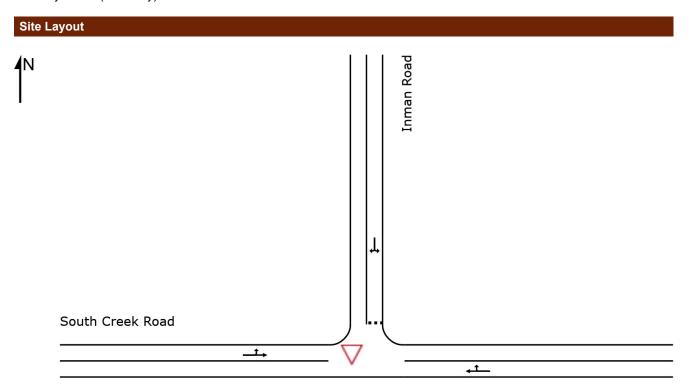
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\overline{V} Site: [2 Inman Road/ South Creek Road - Dev AM]

Site Category: -Giveway / Yield (Two-Way)



Move	ment P	erformanc	e - Veh	icles								
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	
East:	East: South Creek Road											
5	T1	159	6.6	0.229	8.0	LOS A	1.2	9.1	0.35	0.32	0.35	47.0
6	R2	196	10.2	0.229	5.6	LOS A	1.2	9.1	0.35	0.32	0.35	44.7
Appro	ach	355	8.6	0.229	3.4	NA	1.2	9.1	0.35	0.32	0.35	45.8
North:	Inman F	Road										
7	L2	109	12.5	0.130	5.3	LOS A	0.5	3.9	0.29	0.57	0.29	43.7
9	R2	33	9.7	0.130	7.8	LOS A	0.5	3.9	0.29	0.57	0.29	43.9
Appro	ach	142	11.9	0.130	5.9	LOS A	0.5	3.9	0.29	0.57	0.29	43.7
West:	South C	reek Road										
10	L2	46	4.5	0.113	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.3
11	T1	160	10.5	0.113	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.1
Appro	ach	206	9.2	0.113	1.0	NA	0.0	0.0	0.00	0.12	0.00	48.9
All Ve	hicles	703	9.4	0.229	3.2	NA	1.2	9.1	0.23	0.31	0.23	46.4

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.

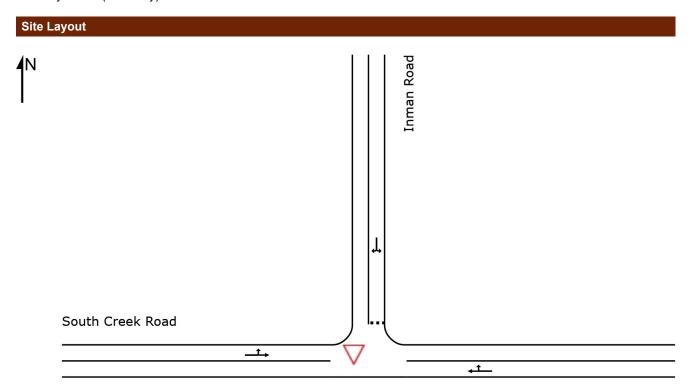
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\overline{V} Site: [2 Inman Road/ South Creek Road - Ex PM]

Site Category: -Giveway / Yield (Two-Way)



Move	ement P	erformanc	e - Veh	icles								
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	
East: South Creek Road												
5	T1	213	2.0	0.171	0.5	LOS A	0.6	4.5	0.24	0.15	0.24	48.4
6	R2	73	14.5	0.171	5.9	LOS A	0.6	4.5	0.24	0.15	0.24	46.3
Appro	ach	285	5.2	0.171	1.9	NA	0.6	4.5	0.24	0.15	0.24	47.9
North:	: Inman F	Road										
7	L2	101	2.1	0.157	6.3	LOS A	0.6	4.3	0.35	0.64	0.35	49.0
9	R2	62	3.4	0.157	8.2	LOS A	0.6	4.3	0.35	0.64	0.35	49.4
Appro	ach	163	2.6	0.157	7.0	LOS A	0.6	4.3	0.35	0.64	0.35	49.2
West:	South C	reek Road										
10	L2	58	0.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	56.3
11	T1	211	1.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	58.5
Appro	ach	268	1.2	0.140	1.2	NA	0.0	0.0	0.00	0.13	0.00	58.1
All Ve	hicles	717	3.1	0.171	2.8	NA	0.6	4.5	0.17	0.25	0.17	51.7

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.

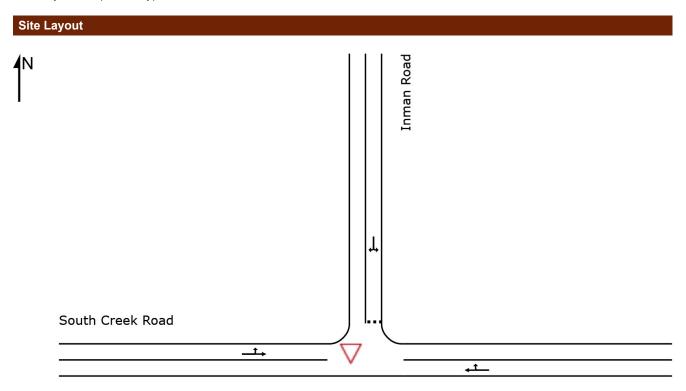
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\overline{V} Site: [2 Inman Road/ South Creek Road - Dev PM]

Site Category: -Giveway / Yield (Two-Way)



		erformanc										
Mov	Turn	Demand		Deg.	Average	Level of	95% Back		Prop.	Effective	Aver. No.	
ID		Total veh/h	HV %	Satn v/c	Delay sec	Service	Vehicles veh	Distance m	Queued	Stop Rate	Cycles	Speed km/h
East:	South Cre	eek Road	70	V/C	300		VCII					IXIII/II
5	T1	215	2.0	0.180	0.6	LOS A	0.7	5.1	0.25	0.15	0.25	48.3
6	R2	79	18.7	0.180	6.0	LOS A	0.7	5.1	0.25	0.15	0.25	46.1
Appro	ach	294	6.5	0.180	2.0	NA	0.7	5.1	0.25	0.15	0.25	47.8
North:	: Inman R	load										
7	L2	177	1.2	0.220	6.3	LOS A	0.9	6.4	0.35	0.63	0.35	49.1
9	R2	66	3.2	0.220	8.5	LOS A	0.9	6.4	0.35	0.63	0.35	49.5
Appro	ach	243	1.7	0.220	6.9	LOS A	0.9	6.4	0.35	0.63	0.35	49.2
West:	South Cr	eek Road										
10	L2	60	0.0	0.141	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	56.3
11	T1	211	1.5	0.141	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	58.5
Appro	ach	271	1.2	0.141	1.2	NA	0.0	0.0	0.00	0.13	0.00	58.0
All Ve	hicles	807	3.3	0.220	3.2	NA	0.9	6.4	0.20	0.29	0.20	51.4

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.

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C. COMPLIANCE REVIEW AND SWEPT PATH ASSESSMENT





