ACT Government
Transport Canberra and City Services

FREEDOM OF INFORMATION COVERSHEET

The following information is provided pursuant to section 28 of the *Freedom of Information Act 2016*.

FOI reference: 23-126

Information to be published	Status
1. Access application	Published
2. Decision notice	Published
3. Schedule	Published
4. Documents	Published
5. Additional information identified	Not Applicable
6. Fees	Not Applicable
7. Processing time (in working days)	68 days
8. Decision made by Ombudsman	Not applicable
9. Additional information identified by Ombudsman	Not applicable
10. Decision made by ACAT	Not applicable

11. Additional information identified by ACAT	Not applicable

Freedom of Information – Access Application Form

ACT Government
Transport Canberra and City Services

Privacy notice

The personal information you supply on this form will only be used for the purpose of processing your request. Your application must include an email or postal address to which the respondent can send notices under the *Freedom of Information Act 2016* (the Act). If all or some of this information is not collected, Transport Canberra and City Services may not be able to communicate with you, inhibiting their obligations under the Act. This could mean the request cannot be dealt with. Your personal information will not be disclosed to a third party without your consent unless statutory obligations require otherwise.

The Transport Canberra and City Services Privacy Policy contains information on how you can access or seek to correct any of your personal information that is held by the Transport Canberra and City Services, as well as the process for lodging a complaint about an alleged breach of the *Information Privacy Act 2014*. The Privacy Policy can be found at www.cityservices.act.gov.au.

Applicant details

I wish to make an access application to Transport Canberra and City Services under the *Freedom of Information Act 2016.*

Name	[redacted]
Address (where notices relating to this request can be sent – either postal or electronic)	[redacted]
Telephone (Business hours)	[redacted]
Telephone (Mobile)	
Email	[redacted]

What documents are you requesting under the Act?

I write to request under the Freedom of Information Act 2016 (FOI Act) documents generated or received by the ACT Government in relation to traffic studies conducted on roads within Strathnairn and Macnamara as well as Pro Hart Avenue and Drake Brockman Drive between 2017 – present.

Fee waver

If you wish to apply for a fee waiver, the Act sets out a number of provisions to do so:

- The information being requested was previously publicly available but no longer is.
- The information being requested is of special benefit to the public (Ombudsman guidelines see Section 66).
- The applicant is a concession card holder and demonstrates a material connection with the information requested (concession cards include a current health care or pensioner card issued under the Social Security Act 1991; a current pensioner concession card issued in relation to a pension under the Veterans' Entitlements Act 1986 or the Military Rehabilitation and Compensation Act 2004; a current gold card; or a card prescribed by regulation).
- The applicant is a not-for-profit organisation and the application relates to the activities or purposes of the organisation.
- The applicant is a member of the Legislative Assembly.

Transport Canberra and City Services must waive any fees for providing information if the information was not publicly available and the agency makes the information publicly available before or within 3 working days after giving it to the applicant.

To apply for a fee waver please complete the following.

I make this request pursuant to section 30 of the FOI Act. As a member of the [redacted] I note that any fees and charges associated with this request with be waived in pursuant to section 107 (2)(e) of the Act. Should you require any further information or clarification about my request, please contact my office on [redacted]	
I would like	a copy of these documents sent to the above address

Applicant's signature	Date of request
[redacted]	24 October 2023

ACT Government
Transport Canberra and City Services

[redacted]

Dear [redacted]

Freedom of Information Request - Reference 23-126

I refer to your access application under the *Freedom of Information Act 2016* (FOI Act) received by Transport Canberra and City Services (TCCS) on 25 October 2023. It is my understanding that you sought access to the following government information:

> *"Documents generated or received by the ACT Government in relation to traffic studies conducted on roads within Strathnairn and Macnamara as well as Pro Hart Avenue and Drake Brockman Drive between 2017 – present."*

I thank your office for providing further clarification on the scope of your application on 18 December 2023:

> *"We are only seeking records that capture traffic studies or proposed traffic studies."*

Timeframes
A decision was due on your application by 6 December 2023. I thank you for agreeing to an extension until 9 February 2024.

Authority
I am an Information Officer appointed by the Director-General under section 18 of the Act to deal with access applications made under Part 5 of the FOI Act.

Decision on access
In accordance with the FOI Act, a search of TCCS records has been completed.

In reviewing these records, it was identified some records are currently publicly available. In accordance with the FOI Act I have refused to deal with your application where it applies to these records. I have however included links to the online publications in the schedule at Attachment A for completeness.

Upon reviewing the information within the remaining 9 records, and applying the public interest test under section 17 of the FOI Act, I have decided to provide you with:

- Full access to two records; and
- Partial access to seven records.

The records identified as relevant to your application are listed in the schedule enclosed at Attachment A. A copy of the records with deletions applied to the information I have found to be contrary to the public interest is enclosed at Attachment B. The reasons for my decision are detailed further below in the statement of reasons.

Statement of Reasons
In making my decision on disclosing the relevant government information, I must identify all relevant factors in schedule 1. I must also identify any information relevant to the factors set out under schedule 2 of the FOI Act and determine, on balance, where the public interest lies. I have also taken the following into account:

- The FOI Act generally; and
- The *Human Rights Act 2016.*

Schedule 1:

- No relevant factors identified.

Schedule 2:
Factors favouring disclosure in the public interest (Section 2.1)

- Schedule 2.1(a)(i) - promote open discussion of public affairs and enhance the government's accountability;
- Schedule 2.1(a)(ii) - contribute to positive and informed debate on important issues or matters of public interest;
- Schedule 2.1(a)(iii) - inform the community of the government's operations, including the policies, guidelines and codes of conduct followed by the government in its dealings with members of the community;
- Schedule 2.1(a)(viii) - reveal the reason for a government decision and any background or contextual information that informed the decision.

Factors favouring non-disclosure (Section 2.2)

- Section 2.2(a)(ii) - prejudice the protection of an individual's right to privacy or any other right under the *Human Rights Act 2016*;
- Schedule 2.2(a)(xvi) - prejudice a deliberative process of government;
- Schedule 2.2(a)(xii) - prejudice the competitive commercial activities of an agency.

In reviewing the relevant records, personal information of third parties has been identified within the relevant records. I have considered that this information is not readily available to the public and the disclosure of this information is likely to prejudice the protection of an individual's right to privacy under the *Human Rights Act 2004* and carries significant weight. I find this information is, on balance, contrary to the public interest to disclose.

I have also identified information that has been prepared for or relates to ongoing or future government deliberative processes, including financial estimates. I have considered that the disclosure of this information at this time is likely to prejudice those processes and the competitive commercial activities of TCCS. I have placed significant weight on these factors and find this information is, on balance, contrary to the public interest to disclose.

I have found that the factors favouring disclosure can be satisfied with the deletion of information which is contrary to the public interest. A copy of the relevant information is enclosed at Attachment B. Deletions have also been applied to information which is outside of the scope of your application.

Charges
In accordance with *Freedom of Information (Fees) Determination 2018*, a fee of $0.35 per page of information disclosed, except for the first 50 pages, may be applied to an access application.

In accordance with section 170(e), no fee is applicable to your application as you are a member of the ACT Legislative Assembly.

Online publishing – disclosure log
Under section 28 of the Act, TCCS maintains an online record of access applications called a disclosure log. In accordance with section 28, your application, my decision and information disclosed to you will be published on the TCCS Disclosure Log within 3 – 10 business days. Your personal information, including information relating to your firm, will be removed from these documents prior to publication.

Ombudsman review
My decision on your access request is a reviewable decision as identified in Schedule 3 of the Act. You have the right to seek an Ombudsman review of this outcome under section 73 of the Act within 20 working days from the day that my decision is published in TCCS' disclosure log, or a longer period allowed by the Ombudsman. If you wish to request a review of my decision, you may write to the Ombudsman at:

The ACT Ombudsman
GPO Box 442
CANBERRA ACT 2601
Via email: actfoi@ombudsman.gov.au

ACT Civil and Administrative Tribunal (ACAT) review
Under section 84 of the Act, if a decision is made under section 82 on an Ombudsman review, you may apply to the ACAT for review of the Ombudsman decision. Further information may be obtained from ACAT at:

ACT Civil and Administrative Tribunal
15 Constitution Avenue
Canberra City ACT

GPO Box 370
CANBERRA CITY ACT 2601
Telephone: (02) 6207 1740
www.acat.act.gov.au

If you have any queries concerning the directorate's processing of your request, or would like further information, please contact the TCCS FOI team on (02) 6207 2987 or email to tccs.foi@act.gov.au.

Yours sincerely

Lisa Johnson
Information Officer

9 February 2024

ATTACHMENT A - ACCESS APPLICATION SCHEDULE, FREEDOM OF INFORMATION

Reference Number: 23-126
Please be aware that under the *Freedom of Information Act 2016*, some of the information provided to you will be released to the public through the ACT Government's Open Access Scheme. The Open Access release status column of the table below indicates what documents are intended for release online through open access. Personal information or business affairs information will not be made available under this policy. If you think the content of your request would contain such information, please inform the contact officer immediately. Information about what is published on open access is available online at: https://www.cityservices.act.gov.au/about-us/freedom_of_information/disclosure-log
Factors favouring non-disclosure:
Schedule 2.2(a)(ii) - prejudice the protection of an individual's right to privacy or any other right under the *Human Rights Act 2016.* Schedule 2.2(a)(xii) - prejudice the competitive commercial activities of an agency. Schedule 2.2(a)(xvi) - prejudice a deliberative process of government.

Reference number	Page number	Description	Date	Status	Reason for non-release or deferral	Open Access release status
1	**1- 65**	01. Strathnairn_Active_Travelway_St1_Route _Improvements_V3_w_Att_R201209	9 December 2020	Partial access	Schedule 2.2(a)(ii) Schedule 2.2(a)(xii) Schedule 2.2(a)(xvi)	Decision to be published on the TCCS Disclosure Log.
2	**66 – 120**	02. DBD Traffic - Stage 2 PSP combined	2021	Full access	Not applicable	
3	**121**	02a. 60501930-SHT-21-2000-CA-0105-A	12 July 2017	Partial access	Schedule 2.2(a)(ii)	
4	**122**	02a. 60501930-SHT-21-2000-CA-0107-A	12 July 2017	Partial access	Schedule 2.2(a)(ii)	
5	**123**	02a. 60501930-SHT-21-2000-CA-0110-A	12 July 2017	Partial access	Schedule 2.2(a)(ii)	

6	**124 - 210**	03. Traffic Impact Assessment (Quantum Traffic, 2022)	21 August 2023	Partial access	Schedule 2.2(a)(ii)	
7	**211 - 213**	04. Appendix I - Feasibility Study for West Belconnen Road Upgrade	Undated	Full access	Not applicable	
8	**214 - 313**	05. SUPP-202240118-RECONSIDERATION-TRAFFIC REPORT-01 (Green Waste Drop-off Facility–Traffic Impact Assessment)	21 August 2023	Partial access	Schedule 2.2(a)(ii)	
9	**314**	06. SUPP-202138585-APPENDIX C TRAFFIC ANALYSIS-01	16 December 2022	Partial access	Schedule 2.2(a)(ii)	
-	**-**	Traffic Impact Assessment, William Hovell Drive Duplication	21 April 2021	Available here	-	
-	**-**	DBD Intersection Memo for TCCS 091122 (Drake Brockman Dr / Pro Hart Dr Intersection)	9 November 2022	Available here	-	
-	**-**	DBD Transport Assessment Report (Transport Assessment Report William Hovell Drive Duplication)	18 March 2022	Available here	-	
-	**-**	PLAN-202037685-TRAFFIC-01 (Canberra Sand and Gravel–Traffic Impact Assessment)	7 April 2022	Available here	-	
-	**-**	SUPP-202240118-RECONSIDERATION-TRAFFIC REPORT-01 (Strathnairn School Site –Traffic Impact and Parking Assessment)	4 April 2022	Available here	-	

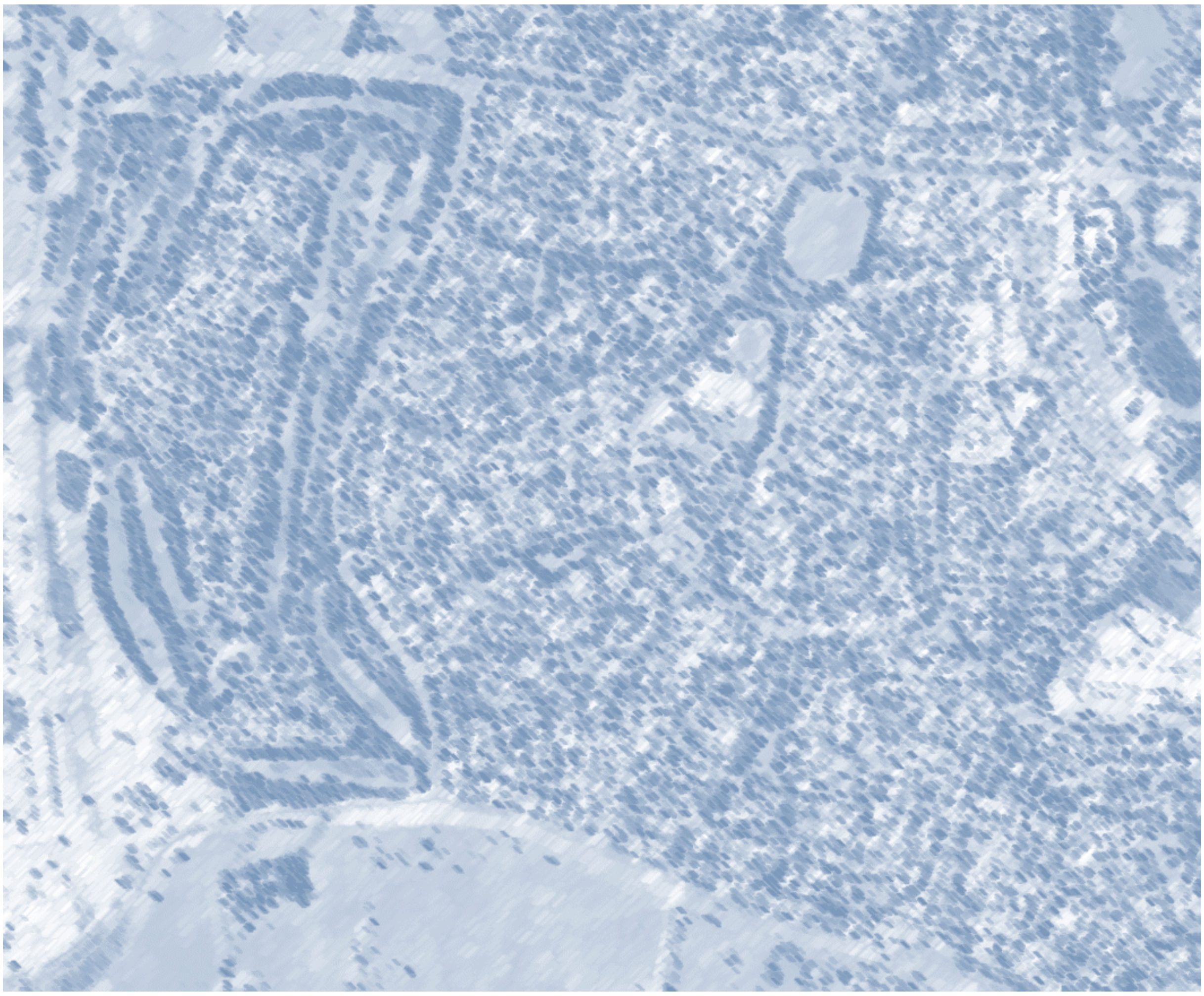
CIVILscope Consult Pty Ltd

ACN 128 068 217

Strathnairn Active Travelway - Stage 1

Route selection and recommended path infrastructure improvements

Version 3 – 9 December 2020



Document Information

Document Title:	Strathnairn Active Travelway Stage 1 – Route selection and recommended path infrastructure improvements		
Document number:	CC-2004-RPT-004		
Version Number:	Version 3		
Version Date:	9 December 2020		
Prepared by:	[redacted] Senior Civil Engineer	Signature	[redacted]
Reviewed by:	[redacted] Active Travel Consultant	Signature	[redacted]

Executive Summary

Strathnairn is a new suburb currently under development to the west of the Belconnen Golf Course and the suburb of Holt in Belconnen. The suburb of Holt was constructed in the 1970s under ACTCode planning regime and includes many streets without paths with much of the path infrastructure in poor condition and reaching the end of its service life.

There are destinations in Holt that would be attractive for the new residents of Strathnairn and vice-versa. Providing improvements to an identified active travel route to reach destinations such as Holt Shops and Kippax could be a key factor in encouraging active travel as a first choice for local trips, as residents move in and are possibly more open to changing their usual travel preferences.

A proposed route referred to as the **Strathnairn Active Travelway** was identified in Version 1 of the report following field investigations and desktop review with reference to the methodology developed as part of the Active Travel Route system now in operation in the ACT (Included as Appendix A). Three alternatives for the latter part of the route between Holt Shops to Kippax were investigated prior to recommending the Southern route option (refer **Figure 2**) as the initial preferred route. This was presented to TCCS on 3 September 2020 and Version 2 of the Report was issued on 9 September 2020 to address comments made at the meeting.

Following initial approval of the concept by TCCS, stakeholder consultation was undertaken on the Southern route option in late September through to late October 2020 and a summary of the comments and issues raised at the consultations is included at Appendix B.

As part of the consultation the entry point into Kippax was discussed with the architect / planner responsible for the redevelopment of the Kippax Fair shopping mall and an entry via Luke Street utilising the northern Starke Street underpass was noted as a strong preference. This required use of the Northern route option which had originally been discounted because of issues outlined in **Section 5** of this report. Consequent to the issues raised in the stakeholder engagement, a review of possible mitigations to the recognised issues associated with the alternative Northern route was undertaken and discussed with TCCS at the meeting of 12 November. The response from TCCS (Tim Wyatt) on 24 November is addressed in this version of the Report.

The revised preferred active travelway route links from the existing trunk path at the intersection of Spofforth St / Pro Hart Ave, which already provides for a good connection into Strathnairn, to Holt Shops and on to Kippax via the Northern route alignment. This remains a reasonably direct and well graded alignment that is **1.89km** to Hardwick Crescent at Kippax. The route provides an entrance to Kippax Fair via the existing Zebra crossing on Hardwick Crescent through the proposed "Peoples Park" to the relocated main shopping centre entrance.

The route improvements require the demolition of existing paths mostly reaching the end of their service life and construction of new wider paths generally through green corridor alignments. Some speed mitigation works and path improvements are required on Pickworth Street to calm the street to be appropriate for use as a "bicycle boulevard" and improve crossing safety. A strategic connection in one short section (Grout Place) requires the use of "streets without paths", where pedestrians and cyclists are required to use the roadway on quiet local streets, a legacy of the ACTCode planning principles used in the development of Holt in the 1970's.

The total cost estimate for the proposed improvements along the active travelway, via the Northern route, necessary to upgrade facilities to the current ACT Standard is [redacted] from the Southern route option provided in the previous version of the report. The cost estimate at Appendix G includes an allowance for contingency [redacted] and project management / design / approvals / Superintendence [redacted] Signage and pavement marking for an active travel route in accordance with ACT standards has been allowed for in the estimate.

Contents

Figures

Appendices

1. Introduction

The new suburb of Strathairn, located to the west of the existing suburb of Holt is currently in the development phase. There are already approximately 45 dwellings with circa 60 residents now living in the suburb and this is growing rapidly with further stages under construction. Continuing development will include the suburb of MacNamara to the north-west for an eventual West Belconnen population of approximately 30,000 people.

Holt was developed in the 1970’s and much of the existing path infrastructure is heavily aged and reaching the end of its service life. Like many of Canberra’s suburbs built under the prevailing planning regime of this era (ACTCode), there are many streets without paths. Consequently, walkers and cyclists are forced to travel within the roadway on this street type as most verge areas have been vegetated to the kerb. This is problematic as the most direct active travel routes to local destinations often traverse streets without paths.

Holt Shops provide for the nearest local centre to the current residents of Strathnairn and this will remain the case for some time until the commercial precinct proposed adjacent to Parkwood Road is completed in the medium term. Kippax Centre is only a further 900m from Holt shops and the most direct route to Kippax from Strathnairn Stage 1 is via Holt Shops.

Providing appropriate infrastructure to make it convenient and safe for people to choose active travel for local trips is so important when they move into a new area and reassess and possibly establish different travel habits. In this context, to make active travel an attractive choice the path infrastructure requires improvement for the link between Strathnairn and the destinations in Holt, The choice of facility improvements should be with due consideration of the needs of the majority of active travellers who are generally not comfortable in using the road environment (unless on roads other than collectors, that have been suitably calmed).

2. Objective

This report provides recommendations for a preferred active travel route and the infrastructure improvements required to meet the objective of making active travel an easy and attractive choice for trips from Strathnairn to Holt Shops and Kippax, and also from Holt to the shops and community facilities in Strathnairn.

The route alignment and associated infrastructure will require the following key attributes to meet the objective.

- be perceived as safe and convenient (priority at intersections with appropriate crossings where possible, minimise driveway crossings, smooth surfacing, kerb ramps and adequate lighting),
- as direct and well graded as possible,
- suitable environment for people not comfortable on the roadway (riding on paths wherever possible or calmed quiet streets),
- good public transport connectivity, and
- strategic use of existing infrastructure such as underpasses and any placemaking elements along the way wherever possible.

3. Connection point and route choice

There is currently a 2.5m wide trunk path that connects the intersection of Spofforth Street and Pro Hart Avenue to the west. This facility changes to a 2.0m wide one-way paired bicycle-only and 2.0m wide intermediate paths on each side of the road where Pro-Hart Avenue changes from a single carriageway with a wide verge at Lionel Rose Street, to a boulevard. These paths provide for a safe and convenient active travel connection between the southern section of Strathnairn to the edge of the suburb of Holt. This route will also provide a good connection to the proposed commercial precinct within Strathnairn via the boulevard cross-section for Holt residents in future.

To complete the active travel link to meet the objectives requires the selection of the most appropriate route from the intersection of Spofforth Street and Pro Hart Avenue to connect Strathnairn to Holt Shops and Kippax, through the existing urban fabric of Holt.

For simplicity in referencing in this report the link is referred to as the Strathnairn Active Travelway.

4. Challenges in route selection

The conditions and urban design of Holt present challenges and some opportunities in selecting a suitable route alignment.

Disadvantages

- Much of the infrastructure associated with active travel in Holt is reaching the end of its service life having been constructed in the 1970s. Many of the paths are observed to be in poor condition with multiple cracks, displaced slabs and a higher risk of trip hazards.
- Paths are generally 1.2m wide which is less than the current standard minimum width of 1.5m. The current minimum width allows for a person pushing a pram / walker or a person in a wheelchair to pass another pedestrian without having to exit the path.
- The urban design of the streetscape using ACTCode, in use when the suburb was developed has left a legacy of many local streets without paths. These are usually lower speed and volume streets that were considered safe for people walking and cycling to share with vehicles when the suburb was designed. Householders have colonised the verge space generally with vegetation or car parking pads meaning that people are generally forced to walk and ride within the roadway. These streets can also interconnect with green corridors to form part of planned active travel links through the suburb. **Figure 1** shows the path and local access street network in Holt that illustrates the ACTCode urban design principles for active travel including connected laneways, green corridors and streets without paths.
- Streets that include paths are generally classified as minor or major collectors with relatively higher traffic volumes and include bus routes. Paths are generally at the property boundary and, as a well-established suburb, constrained by vegetation. This is problematic as major and minor collectors include driveways, generally with poor sightlines due to the vegetation.

Advantages

- Green corridors and laneways that provide reasonable permeability through the suburban area.
- Some strategically placed underpasses on green corridor crossings of major and minor collectors.
- Multi-unit developments that include through paths with access streets of very low traffic volumes and speeds.

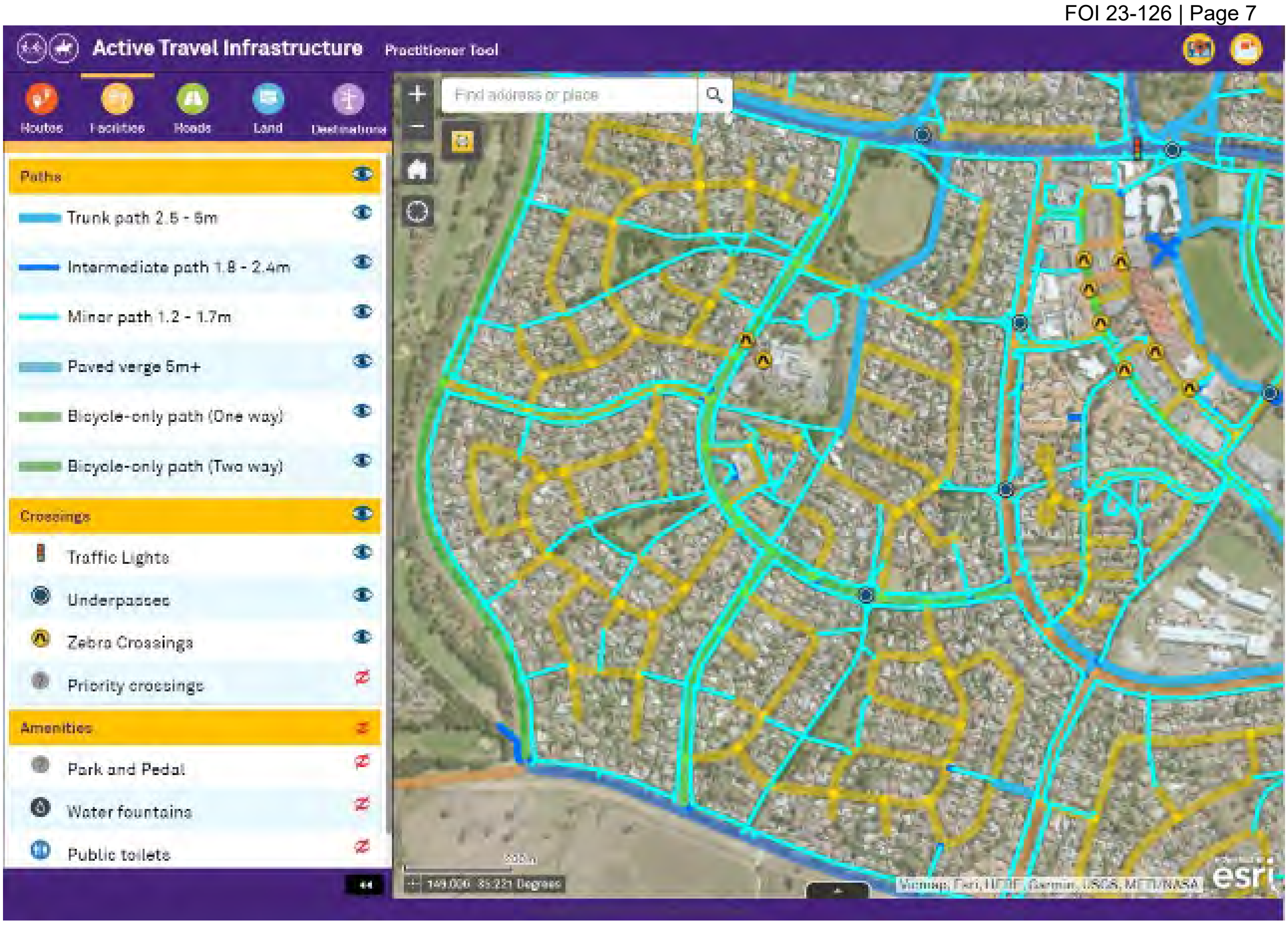


Figure 1 – Road hierarchy, existing path network and facilities in Holt illustrating the ACTCode urban design principles of connected laneways, green corridors and streets without paths (ATIPT extract – www.activeinfrastructure.net.au)

5. Route alignment investigations

Active Travel Routes system

The active travel network is planned in the ACT using the Active Travel Routes system which is available for viewing at activeinfrastrucutre.net.au (Active Travel Practitioners Tool – ATIPT). The system is explained in *Planning for Active Travel in the ACT* (PATACT) with the appropriate infrastructure for each route type to meet user needs detailed in the ACT *Municipal Infrastructure Standard 05 – Active Travel Facilities Design* (MIS05).

Community Routes are a type of active travel route for walkers and people not comfortable riding on roads that connect destinations for transportation, getting from A to B. These routes include a similar hierarchy to roads that guide the level of amenity / service required along a route to meet the needs of the targeted users and provide for the anticipated volume of traffic.

Community Route hierarchy level for the Strathnairn Active Travelway

The route from Strathnairn along Pro Hart Avenue to Holt Shops and Kippax has been identified as a Local Community Route as it was originally considered to connect a local centre to a group centre. However, with the possible upgrade of the Strathnairn commercial precinct to a group centre this route could be revised to a Main Community Route in the future. The active travel routes within and connecting to the Ginninderry development are included at Appendix E.

The design for facilities is similar for Main and Local Community Routes so this does not greatly influence the suggested infrastructure solutions. However, with the strong prospect that it may become a Main Community Route in future a greater importance may be justified on the inclusion of priority crossings along the route, improved lighting, path width provisions and realignments.

Strathnairn Active Travelway alignment

The connection of Strathnairn to destinations in Holt was the basis of an example to inform the development of Community Routes alignment design methodology through existing ACTCode suburbs in 2017. This work was undertaken to progress endorsement of the design methodology for inclusion in the new guidance and standard documents for planning and facilities design, *PATACT* and *MIS05*. The recommended methodology included in the paper was adopted by ACT Government and the documents were subsequently released for use in December 2018. The paper including the Holt example study is as Appendix A.

From the investigations and recommendations from the paper included as Appendix A, the route alignment from the Spofforth St / Pro Hart Av intersection, past Holt Shops to Trumper Street was initially considered to be the preferred route alignment without viable alternatives. From this point there were two alternatives that were investigated as shown in **Figure 2**.

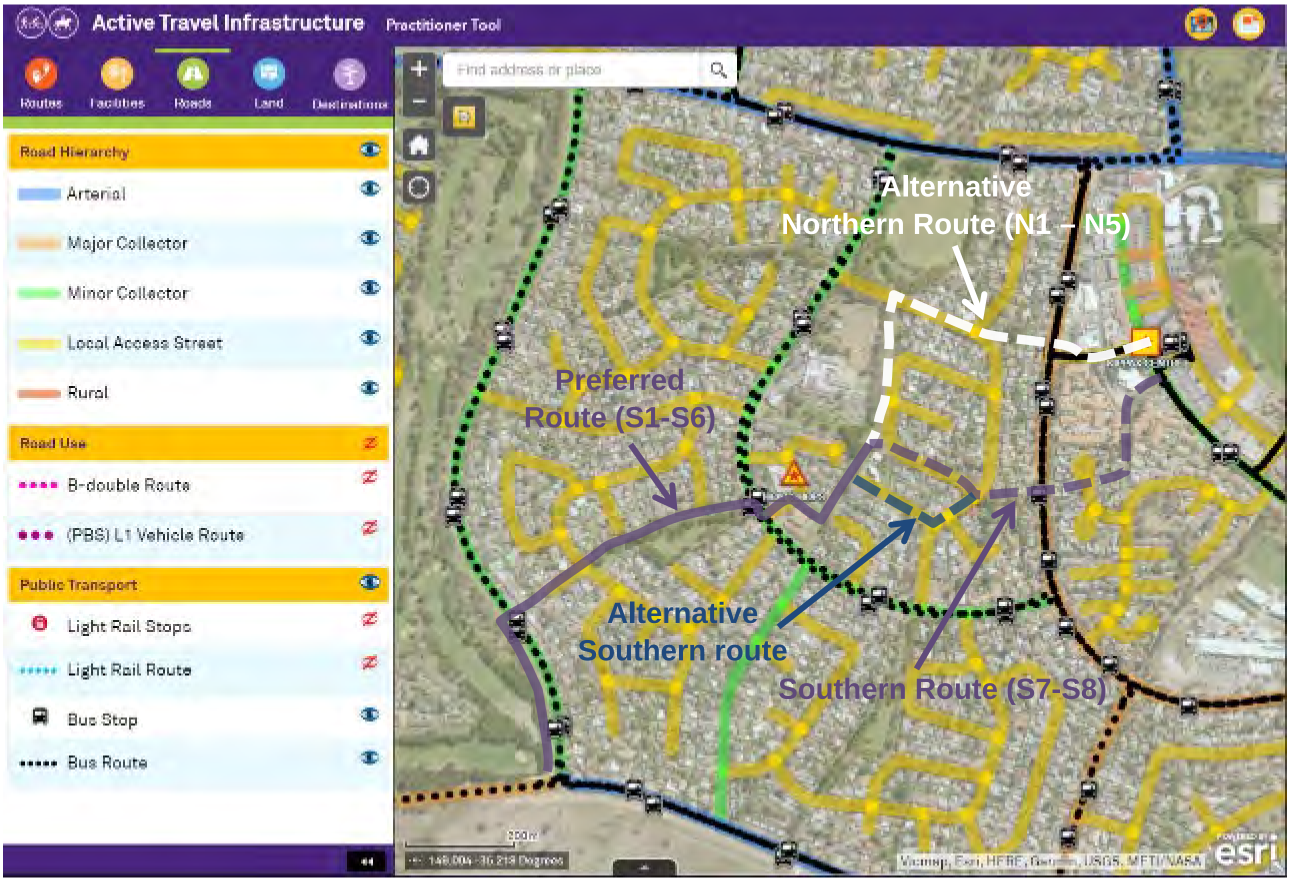


Figure 2 – Strathnairn Active Travelway Route options including road hierarchy, bus routes and stops (ATIPT extract)

The Southern route alignment option was initially considered as the best linkage from Holt shops to Kippax Group Centre and demonstrated the achievement of the objective requirements as follows:

- Avoidance of narrow paths in road reserves with driveways on major and minor collectors (refer to **Figure 2** that includes the road hierarchy in the Holt area).
- Use of quiet, slow speed environment local access streets (Cul-de-sac or loop streets with no other road accesses) where possible.

- Use of connected green corridor spaces Refer to **Figure 1** that shows the existing paths, streets and other important infrastructure such as underpasses and Zebra crossings that demonstrate how urban design utilising ACTCode allowed for connectivity through the suburb. Note that nearly all local access streets shown do not include paths.
- Use of existing infrastructure that improves safety wherever possible such as underpasses and laneways with consideration of public surveillance and CPTED principles.
- Use of a well graded and direct route linking both Holt Shops and Kippax.
- Improvements in connectivity with public transport stops where possible (refer to **Figure 2** for bus routes and bus stop locations).
- Incorporation of placemaking elements where possible.

Alternatives to the initially proposed Southern route option, investigated prior to consultation and not selected

Further to the initially preferred route alignment that included the Southern route option, and those discussed in Appendix A, the latter part of the route between Holt Shops and Kippax included two other possible options. The two other options considered were not selected for the reasons below: (Numbers in brackets defining each section of the routes for reference are as shown on **Figure 7**.)

Northern route (A1-A4) – Green space and Pickworth Street alignment via the northern Starke Street underpass and on to Luke Street

- This alternative, initially passed over, is slightly longer (105m or 6%) and along 1.2m wide paths through green space then on to Pickworth Street at the back of the northern kerb, across Laycock Place into a laneway and underpass (Starke St) to connect to the Zebra crossing across Hardwick Cr north of the Luke St intersection.
- Pickworth Street (A2) is a local access street that connects to Beaurepaire Crescent (minor collector) at each end. It serves a number of cul-de-sacs and loop streets and there are a number of issues that require address including:
  - ➢ poor sight distance at the path exit from the green corridor linking to Trumper Street. Sight distance is blocked to the east by a large significant tree (**Photo 1**).
  - ➢ Pickworth Street between Beaurepaire Crescent and Laycock Place is a straight section of road of approximately 280m in length which is conducive to higher speeds as observed on site inspection. (**Photo 2**).
  - ➢ the path located behind the kerb is blocked by wheelie bins on rubbish collection days (refer **Photo 3**).

Photo 1 – Pickworth St, large tree obscures sight distance

Photo 2 – Pickworth St, long straight allows higher speeds

- The grade up from the eastern exit to Luke Street from the underpass (A4) is steep (>10%) and more difficult to traverse than the underpass on the Southern route (Refer **Photo 4**).

Photo 3 – Pickworth Street – bins out

Photo 4 – Starke St northern underpass eastern exit to Luke Street

- There are two driveway entrances to carparks along Luke Street, opposite the Kippax Uniting Church to Blocks 4 and 10, Section 52. (Refer **Photo 5**). Sight distance is restricted for the eastern driveway (Block 4, furthest from view) but is reasonably low volume for delivery access and tenant parking only and for the western driveway (Block 10, closest to view) is one of two accesses for the West Belconnen Child & Family Centre carpark with the other from Starke Street. This was a Covid-19 testing facility on issue of Version 3 of the report.
- The paved area outside the commercial frontage on Luke Street approaching Hardwick Crescent has adjacent parking and could be cluttered in the future with the potential to seriously decrease active travel amenity and safety along this section (refer **Photo 6**). This has been the experience at Kingston Foreshore, where in 2010, the upper harbourside paved area was planned to be a 5m clear zone to allow for active travel / recreation around the Lake. This area has subsequently become colonised resulting in a narrow trafficable area and bicycles have subsequently been prohibited from using the space. There is a reasonable risk of this scenario developing over time in this space and with the proximity to Luke Street (also the main bus access to Kippax) options for realignment may be limited.

Photo 5 – Driveways across verge on Luke Street

Photo 6 – Luke Street frontages near Hardwick Crescent

Alternative Southern route (B1) – Davison Place / Pickworth Street alignment

- This alternative is slightly more direct (30m) and would involve less path improvements (70m) and new path construction (35m).
- The alignment involves two right turn arrangements on streets without paths (pedestrians and cyclists may have to wait within the roadway to turn and be exposed to rear collisions

from through vehicles) and travel along Pickworth Street (a road with slightly more traffic) on a section where it does not have a path.

- The initially proposed Southern route used Trumper Street, a quiet local access loop street without a path and the crossing of Pickworth Street is directly into the laneway path.

6. Stakeholder Consultation

Stakeholder consultation on the initially proposed route alignment was undertaken between late September through to late October 2020. There were four separate consultation meetings and an information session during this time and a summary of the comments and issues raised by stakeholders is included at Appendix B. The key issues raised by stakeholders with the initially proposed alignment were as follows:

- Stakeholders were generally positive about the initiative and supportive of the proposed improvements to infrastructure.
- The proposed redevelopment of the Kippax Group Centre includes plans to move the library south to the area now occupied by the bus stops and turning loop. The area between the Luke Street tee intersection with Hardwick Crescent and Kippax Fair is planned to become a "People's Park" and the architect / planner of the proposed redevelopment has expressed a strong preference for the active travelway to arrive via Luke Street. The proposed masterplan and the future layout of the shopping centre are illustrated on **Figure 3** including the repositioning of the main entry to alignment with Luke Street, the "Peoples Park" and the library relocation.

Figure 3 – Proposed future development of Kippax Group Centre

- The proposed Southern route alignment traversed the Kellermann Close public housing area for which stakeholders expressed safety concerns due to issues associated with socially disadvantaged families that live in this area. This issue was raised at two consultations and the laneways through this area have become unkempt that may add to this perception of an "unsafe" place.

7. Reconsideration of the route alignment after consultation

Following stakeholder consultation, further site investigations were undertaken on 30 October 2020 to further consider if the challenges documented in Section 5 for the previously rejected alternative Northern route alignment option could be addressed satisfactorily and allow for a change from the initially proposed Southern route alignment taken to stakeholder consultation.

Photos taken of the challenges associated with the alternative **Northern route (N1-N4)** option were documented using the Bluewren Photo Record Tool App and are available through the link:

https://bluewren.photos/?l=150113116210&group=9228

Reconsideration of the alternative Northern route (N1 – N4)

The issues associated with the alternative Northern route have been reviewed in more detail as follows including suggested mitigation measures to address concerns. Refer to **Figure 7.** for a plan showing the key to the referred route sections for the locations of the identified issues.

1. **Poor sight distance at the Pickworth Street entry from the green space link to Holt shops (Northern end of Section N1)**

   A large and significant tree is located to the east of where the current 1.2m wide path joins a 1.2m wide path at the back of the southern kerb (refer to **Photos 1 & 2** on page 5). The geometry of the path intersection is difficult for cyclists to negotiate and the current informal crossing flagged by the termination of the 1.2m wide path on the south side of Pickworth Street would also be difficult for cyclists to complete.

Figure 4 – Possible Pickworth Street crossing blister concept

The road intersection is to a carpark servicing a park area and does not connect to any dwellings. The park area includes a concrete cricket pitch located in the middle of the space but appears to currently be for informal use only.

The poor crossing sight distance may be remediated by installing a kerb blister that intrudes into the tee intersection with the park entry road. **Figure 4** provides a possible concept.

2. Pickworth Street speed environment (Section N2)

For Pickworth Street to be an acceptable environment to enable use as an active travelway would require the street to be calmed to bring the speed environment down to 30km/h. The straight section between Beaurepaire Crescent and Laycock Place of approximately 280m allows the speed environment to be greater than 50km/h (refer to **Photos 1 & 2** on page 5).

The kerb blister to facilitate the crossing as shown in concept in **Figure 4** could also act as a speed mitigation device and threshold marker for the commencement of the Bicycle Boulevard / Active Travel Street section of Pickworth Street if designed accordingly.

3. Path blocked by wheelie bins on bin day / Active Travel Street (Section N2)

The section of street that would be part of the Strathnairn Active Travelway could be marked as a Bicycle Boulevard / Active Travel Street (refer <u>Appendix D</u>) with appropriate calming measures and suitable threshold treatments to define the area and allow people to safely walk on the roadway to avoid bins if an ongoing problem (refer **Photo 3**, page 6). Pickworth Street becomes a "street without a path" after Laycock Place and all pedestrians and cyclists are required to negotiate colonised and vegetated verges or use the roadway beyond this point.

4. Steep grade up to Luke Street from the northern Starke Street underpass

The grade up from the underpass is steep (>10%) and could be remediated by extending the path straight up to the fence and then along the fence to Luke Street. This would reduce the grade of the path through regrading over a longer distance and allow for a better graded connection between Luke Street and the eastern verge path on Starke Street.

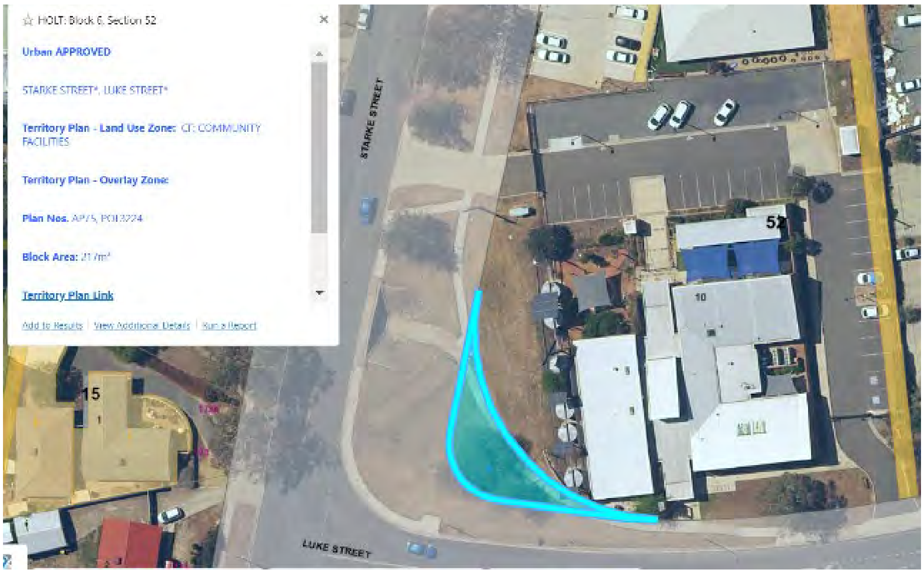


Figure 5 – Northern Starke Street underpass path realignment required through B10 S2

The issue with this concept is that the path would need to go through an area of Block 10 Section 52. This is not evident on site as the existing security fence for the West Belconnen Child & Family Centre has been constructed in a straight line along a favourable grade rather than following the property boundary. Refer **Figure 5** above for an overview that shows the separate block (Block 6) that appears to have been sub-divided from the larger block to accommodate the path that may have been constructed under similar circumstance to that now proposed.

Following information provided by TCCS at the meeting of 12 November the subdivision of Block 10 to accommodate a new path alignment may not be possible to affect. This should be revisited prior to detail design as an alignment along the new fence within Block 10 provides for a much more favourably graded link for the eastern verge path connection from Starke Street (refer **Photo 7**, below) to Luke Street. This path connection currently goes down and then back up and out of the underpass (refer **Photo 4** on page 6). This undulation can only be rectified through using the higher ground connection route offered by following the fence alignment

Alternatively the existing steeper grade on the exit from the underpass towards Luke Street can be regraded by lowering the path to lengthen the level change and provide a wall on the Starke Street side so as to minimise encroachment on the significant tree root system. Regrading could then be undertaken outside the Block 10 area subject to existing services and impact on the existing tree. Existing services and the root system of the tree would need to be checked prior to detail design of any path works in this area.

This alternative path regrading option has been assumed to be possible at this stage and allowed for in the cost estimate.

Photo 7 – Block 10 S2 fence alignment, a favourable grade to Luke St for users of Starke St eastern verge path

Photo 8 – Entry to eastern carpark is for delivery access and tenant parking only

5. Driveway accesses on Luke Street

The two driveways on Luke Street (refer previous discussion and **Photo 5** on page 6) are both reasonably low volume accesses but remain a potential hazard to path users. The eastern entry is for deliveries and tenant parking only (approximately 33 spaces) and there is a sightline impediment due to the building line (refer **Photo 8** above) on the westbound approach to the driveway. The impediment is of lower order due to path users being on the roadside of the path on this approach. The western driveway serves the West Belconnen Child & Family Centre that also has another access from Starke Street and has approximately 40 parking spaces.

With consideration of the above a treatment across both driveways as illustrated on ACTSD-0527 included in Appendix D could be installed. The marked pavement shown on this drawing should be included to highlight the area of potential hazard and interaction to both path users and drivers. The treatment for path crossing at the driveway to Block 4 should be aligned close to the roadway to maximise sightlines for vehicles exiting the driveways.

6. Active frontages adjacent to the paved verge on Luke Street

The fully paved frontage on the north side of Luke Street on the eastbound approach to Hardwick Crescent (refer previous discussion and **Photo 6** on page 6) is currently reasonably clear of obstructions however may be at risk of future colonisation and clutter which could seriously impact on the amenity of an active travelway.

The *Kippax Group Centre Masterplan March 2019, Map 15 – Proposed pedestrian and cyclist routes* recognises both the northern and southern route connections (extract included as **Figure 6**).

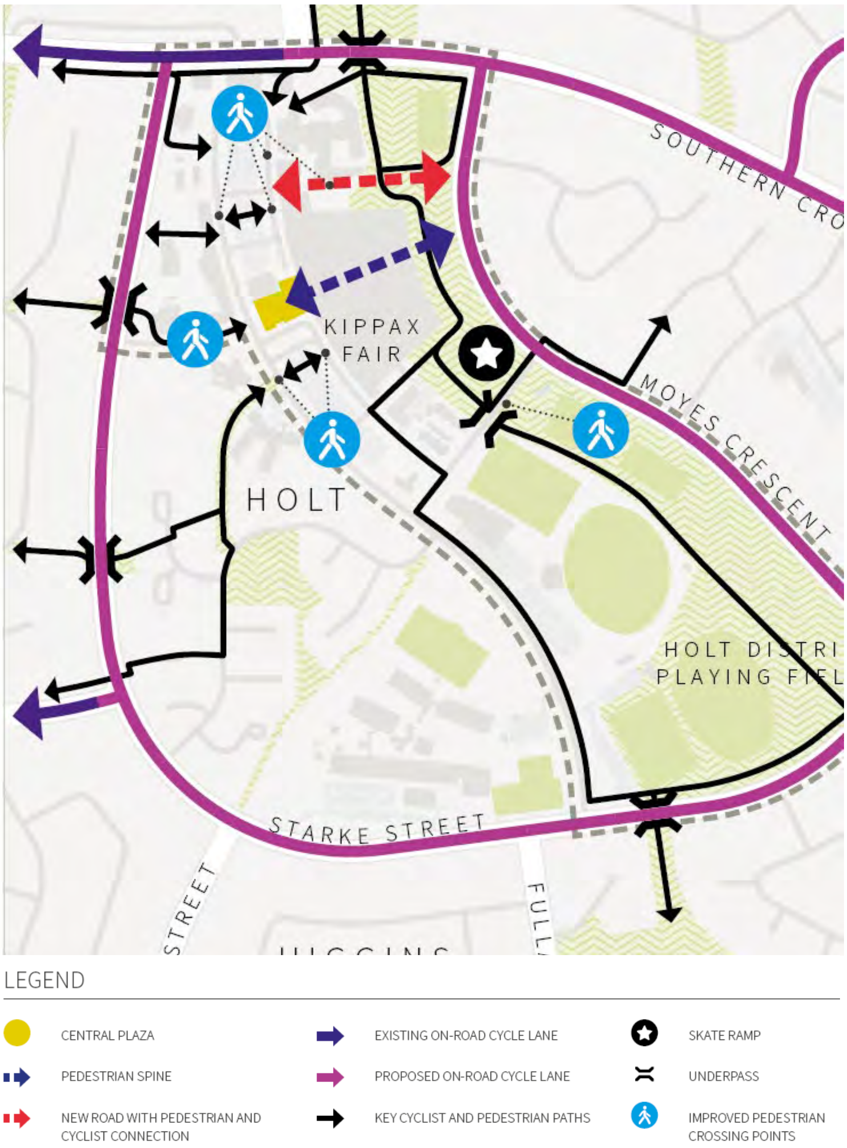


Figure 6 – Kippax Group Centre Masterplan, March 2019, (Map 15 extract)

To be acceptable for cyclist use the active travelway should have at least 3m of clearway to allow for passing and appropriate path sharing. This would need to be included in the Masterplan to ensure future adjacent leases have uses that recognise the purpose of the verge and inform licences, so they are not granted for use of the verge inconsistent with an active travelway.

The suggested measure to flag that there is a 3m clearway through the paved verge area would be by linemarking or revamp of the paving for a strong visual marker and introduction of planter boxes or other physical measures as cues to mark the space.

8. Preferred Strathnairn Active Travelway route

The preferred alignment is illustrated in more detail in **Figure 7** below and is represented by the Sections (S1-S6, N1-N4). Sections of the route have been identified based on the existing facilities and have been used as the basis to breakdown the preliminary cost estimate into homogenous areas for the anticipated infrastructure improvements included in **Section 9**.

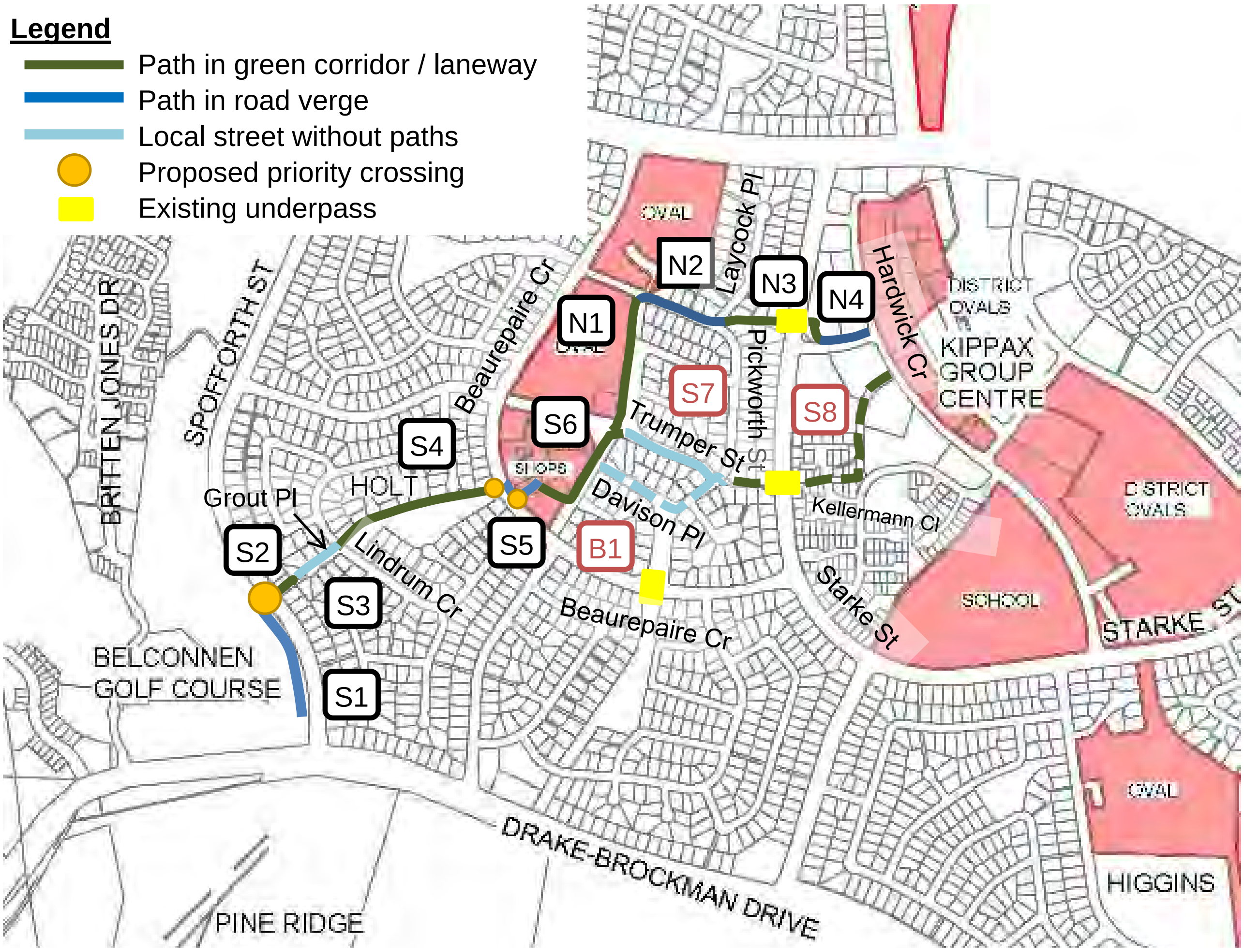


Figure 7 – Preferred Strathnairn Active Travelway alignment details with alternative alignment options

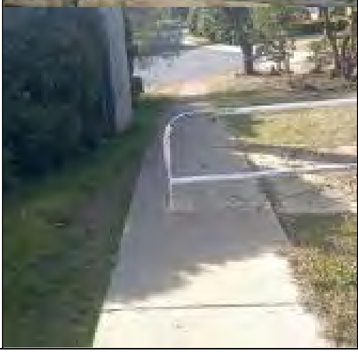
Table 1 over describes the route and includes photos of the existing facilities and conditions along the route that will require consideration in the development of infrastructure improvements. This version of the report also includes the proposed improvements to each section.

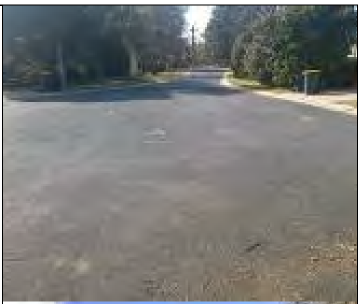
Photos of the facilities and conditions along the route in the Holt and Strathnairn area have been taken using the *Bluewren Photo Record Tool App*. There are current photos taken for this project and photos from previous surveys taken back to 2017 available for viewing through the *Photo Viewer*. The photos showing existing conditions on and around paths and laneways not accessible using *Google streetview* are available for viewing at any time via the following link:

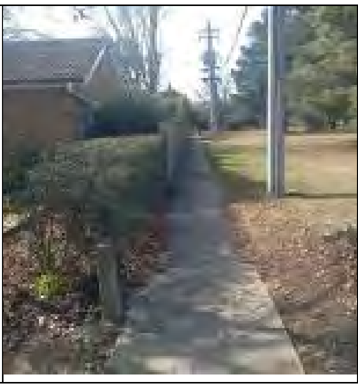
https://bluewren.photos/150113116210

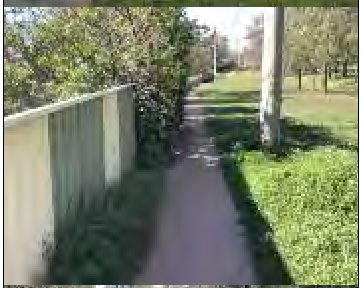
Table 1 - Preferred route alignment details

<table>
<tr><th>Identifier</th><th>Photo</th><th>Existing facilities / conditions / issues</th></tr>
<tr><td colspan="3">S1 - Spofforth St - From Drake Brockman Dr & crossing
Proposed Improvements:
• Widen existing concrete path by 1m (35m)
• Construct new 3m wide asphalt path in western verge (260m)
• Lighting improvements
• Priority crossing (Zebra on raised platform) across Spofforth Street (Minor Collector)</td></tr>
<tr><td rowspan="4">Section length 295m</td><td></td><td>Spofforth Street (looking north from Pro Hart Ave)
- A 1.8m wide path to the Golf course estate runs along the western verge of Spofforth Street for 35m before turning into the Golf Course.
- A 2.5m wide path runs to the west from here to Strathnairn via Pro Hart Ave.</td></tr>
<tr><td></td><td>Spofforth St (looking south-east)
- Western verge has well defined wear path line showing a strong desire line in this verge
- A bus stop pad has been constructed on the west side of Spofforth Street approximately 95m north of Pro Hart Ave, serviced by an uncontrolled crossing from the eastern side bus stop.</td></tr>
<tr><td></td><td>Spofforth St crossing point (looking north-east)
- Existing uncontrolled crossing with median island
- The opposite bus stop in the western verge is located approximately 20m south of the crossing and has no access path from the crossing point.
- Spofforth St is a minor collector bus route so a raised platform would need to cater for bus movements.</td></tr>
<tr><td></td><td>No. 14 Spofforth Street (looking south along path)
- Examples of issues with the 1.2m wide path on the eastern side of Spofforth Street:
➢ Narrow path constrained by walls in verge and property
➢ Driveway crossings
➢ Vegetation obscuring sightlines</td></tr>
</table>

Identifier	***Photo***	***Existing facilities / conditions / issues***
S2 - Spofforth St bus stop (east side) to Grout Place ***Proposed Improvements:*** • ***Improve pavement around bus stop*** • ***Demolish existing 1.2m wide path and construct 3.0m wide concrete path in laneway (75m)*** • ***Adjust manholes*** • ***Lighting improvements***		
Section length 75m	   	*Bus stop arrangement (looking south-east)* - A shelter is positioned adjacent the crossing path linking to the laneway. - The paved area adjacent the bus stop is uneven and heavily cracked. - There is no access path from the crossing point to the opposite stop. *Laneway connection to Grout Place (looking south-west to Spofforth St)* - The shelter should be able to remain in its current location with a widened path and priority crossing installation. - The current barriers present a difficult passage for wheelchairs, people with prams and bike trailers. *Laneway at Spofforth St (looking north-east to Grout Pl)* - 1.2m wide path is generally in poor condition through the laneway. - Electricity / light poles on each side of the laneway would require path demolition and a new curved path alignment constructed. - The laneway has good sightlines with no vegetation. *Laneway from Spofforth St (looking south -west to Grout Place)* - The barrier presents a difficult passage for bikes towing trailers and wheelchairs and people pushing prams. - The grade down to Grout Place may benefit from constructing a new curved path.

<table>
<tr><th>Identifier</th><th>Photo</th><th>Existing facilities / conditions / issues</th></tr>
<tr><td colspan="3">S3 – Grout Place to green corridor, crossing of Lindrum Crescent
Proposed Improvements:
• “Street without paths” pavement marking and signage (refer ACTSD-0513 and -0514)
• Lighting improvements</td></tr>
<tr><td>Section length 80m</td><td>

</td><td>Grout Place at path entry to roadway (looking north-east)
- Broad cul-de-sac head with driveway entry from No.9 to the south close of the current path entry point.
- The roadway is currently used for walking and cycling.
- A new path curved to the north-west would allow better clearance to the driveway from no.9.
Grout Place at Lindrum Cres crossing (looking south-west)
- Grout Place is 6m wide with approximately 3m of verge space on the NW side and vegetated on the SE side but clear at the intersection.
- Current path crossing point is to the north-west side of Grout Place.
- Sightlines are good to the south-east on the path.
Lindrum Cres crossing (looking north-west)
- Sightlines to the north-west are partially blocked by an existing large tree.
- Location of crossing may benefit from moving path to the south-east to cross in the middle of the cul-de-sac entry.</td></tr>
<tr><td colspan="3">S4 - Green corridor to Holt Shops & Beaurepaire Cres crossing
Proposed Improvements:
• Demolish existing 1.2m wide path adjacent property boundaries and construct 3.0m wide asphalt path meandering adjacent trees in green corridor (325m)
• Lighting improvements using existing poles
• Priority crossing (Zebra on raised platform) across Beaurepaire Crescent (Minor Collector)</td></tr>
<tr><td>Section length 345m</td><td></td><td>Path on green corridor at Lindrum Cres (looking north-east)
- 1.2m wide path through the corridor is adjacent fence lines and in generally poor condition.
- Electricity poles are in close proximity and would not allow for adequate path widening and appropriate clearances to be maintained.
- A new path to the south of the current alignment would allow for use of the existing poles for lighting</td></tr>
</table>

Identifier	***Photo***	***Existing facilities / conditions / issues***
S4 - Green corridor to Holt Shops & B'paire Cres crossing (Cont)		*Garden bed at Lindrum Cres (looking south-east)* - Garden bed on the NE side of Lindrum Place would need to be modified to allow the path crossing to move SE to improve sight distance and align the path away from the property boundaries closer to the shade of trees.
		*Path connection to Trott Place (looking east)* - 1.2m wide path connects to the green corridor path from Trott Place (no path). - A new path alignment further south through the open space would allow a wider path without the need to relocate electricity / light poles.
		*Path alignment east of Trott Place (looking east)* - Vegetation and electricity / light poles are in close proximity to the path. - Path condition is heavily cracked in this area.
		*Path alignment at Florey Place (looking west)* - A 1.2m path connects from the path to Florey Place cul-de-sac (no path) but does not link to the path on the southern side of the green corridor. - A new path alignment to the south of the existing 1.2m wide path in poor condition would allow a wider path without the need to relocate electricity poles.
		*Path alignment towards Beaurepaire Cr (looking east)* - A new path alignment further south through the open space would allow a wider path without the need to relocate electricity / light poles and could curve back to line up with the existing crossing. - Path alignment serves both bus stops (both shelters in view).
		*Beaurepaire Cr crossing (looking south-west towards the green corridor)* - The crossing aligns with the main entry path to the shops (behind). - Beaurepaire Cr is a minor collector bus route so a priority crossing platform would need to cater for bus movements.

Identifier	***Photo***	***Existing facilities / conditions / issues***
S5 - Holt Shops & crossing of Holt Place ***Proposed Improvements:*** • ***Widen existing paths on Beaurepaire Crescent and Holt Place to 3.0m wide (76m)*** • ***Relocate 2 x streetlights*** • ***Priority crossing (Zebra on raised platform) across Holt Place (Shop access street)***		
Section length 98m		*Beaurepaire Cr at Holt Shops (looking south)* - A bus shelter is positioned adjacent the crossing and the route turns in front of the shelter. - The path is 3m wide in this section. - Coloured treatment could be used to highlight the area of path user interaction.
	 	*Place marker near Holt Place (looking north)* - The place marker for Holt Shops is positioned close to the path and provides a clear locator.
		*Beaurepaire Cr at Holt Place (looking north-west)* - The path becomes 1.2m on the approach to Holt Place. - Installing a raised platform or kerb extensions in conjunction with a priority crossing across Holt Place to narrow the entry would assist with entry speeds and place making.
S6 – Holt Place to Trumper Street ***Proposed Improvements:*** • ***Demolish existing 1.2m wide path in laneway and through green corridor and construct 3.0m wide asphalt path to link to Trumper St (325m)*** • ***Lighting improvements at existing pole locations (7 No.)***		
Section length 258m		*Holt Place (looking south-west from laneway)* - Holt Place is approximately 7.2m wide with a 1.2m wide path at the back of kerb. - Two driveway entrances service the gravel carpark for St James Church and hall. - Two light poles are within the path and would require relocation to widen the path within the verge.
		*Holt Place laneway (looking north-west towards Holt Shops)* - A 1.2m wide path runs along the northern side of the 3m wide laneway easement. - Widening should be possible within the southern side of the laneway.

Identifier	*Photo*	*Existing facilities / conditions / issues*
S6 – Holt Place to Trumper Street (cont)		*Rice Place connection path to Holt Place laneway (looking west towards Holt Shops)* - A 1.2m wide path generally in poor condition connects from Holt Shops to the 1.2m wide path along the green corridor and also to Rice Place cul-de-sac (no path). - The green corridor path connects to Beaurepaire Cr at Trickett St.
		*Green corridor path between Rice and Davison Places (looking north-east)* - A 1.2m wide path runs along the eastern property boundary. - A wider path in this area could be aligned to avoid removal of light poles.
		*Green corridor path between Davison Place and Trumper Street (looking north-east)* - A 1.2m wide path runs along the eastern property boundary. - A wider path in this area could be aligned to avoid removal of light poles.
N1 - Trumper Street green space to Pickworth St ***Proposed Improvements:*** • ***Demolish existing 1.2m wide path through green corridor and construct 3.0m wide asphalt path to link from Trumper St to Pickworth St (285m)*** • ***Remove log barriers and replace with open space protection bollards (140m)*** • ***Lighting improvements at existing pole locations (7 No.)*** • ***Manhole adjustments***		
Section length 255m		*Green corridor path from Trumper St (view from Trumper St southern loop corner looking north)* - A 1.2m wide path runs from the eastern property boundary to the kerbline on Trumper St. - A wider path in this area could be aligned to avoid removal of light poles.
		*Green corridor path along Trumper St kerb (St (view from Trumper St southern loop corner looking north)* - 1.2m wide path runs along the back of kerbline on Trumper St. - A wider path could be aligned outside of the log barriers and the existing path and barriers left in place if desired. (removal included in estimate).

<table>
<tr><th>Identifier</th><th>Photo</th><th>Existing facilities / conditions / issues</th></tr>
<tr><td rowspan="2">N1 - Trumper Street green space to Pickworth St (cont)</td><td></td><td>Green corridor path from Trumper St to Pickworth St (from Trumper St nrthern loop corner looking north)
- A 1.2m wide path runs from the kerbline on Trumper St to follow the eastern property boundary.
- A wider path in this area could be aligned to avoid removal of light poles.</td></tr>
<tr><td></td><td>Green corridor path termination at Pickworth St (looking north across Pickworth St to the park carpark access road)
- A 1.2m wide path runs along the eastern property boundary and connects to a 1.2m wide path at the back of kerb on Pickworth St.
- Path turn to the east is difficult and will require a blister to allow turning movement without a road encroachment.</td></tr>
<tr><td colspan="3">N2 - Pickworth St island blister crossing and bicycle boulevard, Laycock St crossing
Proposed Improvements:
• Priority crossing (Zebra on raised platform) across Pickworth Street (local access street) with a blister island for speed mitigation and calming to a 30km/h speed environment
• “Bicycle Boulevard / Active Travel Street” pavement marking and signage (refer ACTSD-0511 and -0512)
• Priority crossing (Zebra on raised platform) at Laycock Pl (Local access street)
• Threshold treatment on Pickworth St east of Laycock Pl (to flag entry into the “Bicycle Boulevard / Active Travel Street”
• Stormwater adjustments at island blister location
• Linemarking and signage
• Lighting improvements</td></tr>
<tr><td rowspan="2">Section length 160m</td><td></td><td>Green corridor connection to Pickworth Street (looking east from intersection with the road to the park)
- A large tree obscures the sightlines from the 1.2m wide path emerging from the green corridor.
- Pickworth Street has a 280m long straight from Beaurepaire St to Laycock St.</td></tr>
<tr><td></td><td>Pickworth Street (looking east along northern kerbline at intersection with the road to the park)
- A 1.2m wide path runs along the northern kerbline of Pickworth Street to Laycock St.
- Electricity poles are in close proximity to the existing path and a widened path may need to be curved to achieve acceptable clearance.</td></tr>
</table>

Identifier	***Photo***	***Existing facilities / conditions / issues***
N2 - Pickworth St island blister crossing and bicycle boulevard, Laycock St crossing (cont)		*Pickworth St at Laycock St (looking west)* - The 1.2m wide path runs into Laycock St to connect to the path to Kippax. - There is no path on Pickworth St beyond Laycock St and walkers and cyclists use the roadway. - Pickworth St has an approximately 50m radius curve that turns through 60 degrees south from Laycock St.
		*Laycock St crossing into the laneway path to Kippax (looking south-west across Laycock St)* - The 1.2m wide path from Pickworth St follows the kerb return around to cross Laycock St at the TP. - A threshold treatment to flag entry into the "Bicycle Boulevard" speed environment should be installed west of Laycock St.
N3 - Laycock St to Luke St via laneway, underpass and vertical alignment improvements ***Proposed Improvements:*** • ***Demolish existing 1.2m wide path and construct 3.0m wide concrete path in laneway (120m)*** • ***Demolition of 1.2m wide path on east side of underpass and regrade 3m wide concrete path with wall on west side (40m) to protect tree*** • ***Clear vegetation in laneway*** • ***Adjust manholes***		
Section length 200m		*Laneway connection from Laycock Pl to Starke St northern underpass (looking east from Laycock St)* - A 1.2m wide path runs along the middle of a 6m wide laneway. - The laneway has good sightlines if vegetation were trimmed and cleared where necessary.
		*Laneway connection from Laycock Pl to Starke St northern underpass (looking east from western Starke St property boundary)* - Manhole will require adjustment with path improvements. - Vegetation requires trimming and removal where necessary.
		*Starke St northern underpass (looking east from west side)* - A 1.2m wide path runs to the underpass that includes a 2.5m wide path bounded by low walls. - 1.2m wide paths connect to Starke St on the west side. - Sightlines are good through the underpass.

<table>
<tr><th>Identifier</th><th>Photo</th><th>Existing facilities / conditions / issues</th></tr>
<tr><td>N3 - Laycock St to Luke St via underpass (cont)</td><td></td><td>Starke St northern underpass (looking north-westt from east side at Luke St)
- A 1.2m wide path runs from the underpass up to Luke St with a grade exceeding 10%.
- The 1.2m wide path to the north on the east side of Starke St connects to Luke St by going down into and up out of the underpass. There is no connection to the south.
- The path may be regraded with care for the tree to the west of the path</td></tr>
<tr><td colspan="3">N4 – Luke Street road reserve
Proposed Improvements:
• Widen the concrete path on Luke St to 3.0m wide path to the fully paved verge (40m)
• Include driveway crossing marking in accordance with ACTSD-0527 (2 no.)
• Mark paved verge and include planter boxes to delineate the 3.0m wide pathway area (50m)
• Lighting improvements
• Service pit adjustments</td></tr>
<tr><td rowspan="3">Section length 50m</td><td></td><td>Luke St outside the West Belconnen Child & Family Centre B10, S52 (looking east)
- A 1.2m wide path runs along the back of kerb in the road reserve (approximately 4.8m wide).
- Luke St is the main bus route (two way) into Kippax Centre.</td></tr>
<tr><td></td><td>Luke Street in front of the shops at B4, S52 (looking west)
- The fully paved verge is approximately 4.8m wide and includes some clutter.
- Parking may need to be reviewed to allow for more space for the active travelway.</td></tr>
<tr><td></td><td>Hardwick Crescent Zebra crossing north of Luke St (looking west from the eastern verge)
- This crossing will link into the access through the proposed “People’s Park” to the relocated main entrance to the shopping centre.</td></tr>
</table>

9. Recommended infrastructure improvements cost estimate

The recommended infrastructure improvements to provide a level of service that meets the requirements for a Main / Local Community Route in accordance with MIS05 are estimated to total approximately [redacted] summated from **Table 2** below. The Northern route total length is **1.86km** to the Hardwick Crescent Zebra crossing north of Luke Street.

Table 2 - Preferred Northern route estimated costs

Sect	Route Section	Works estimate description	Length (m)	Estimate $ Ex GST
S1	Spofforth St - From Drake Brockman Dr & crossing	• Path widening to 3m (35m) • New path - 3m (260m) • Priority crossing of Spofforth St • Path lighting along Spofforth St	305	[redacted]
S2	Spofforth St bus stop to Grout Place	• Demolish existing and construct new path - 3m (75m) • Bus stop area improvements • Install bollards at end of laneway • Lighting improvements and manhole adjustments	75	
S3	Grout Place	• “Street without paths” signage and linemarking including crossing of Lindrum Cr • Install bollards at end of laneway • Lighting improvements	80	
S4	Green corridor to Holt Shops & crossing	• Demolish existing and construct new path – 3m (325m) • Priority crossing of Beaurepaire Cr • Install bollards at each end • Lighting improvements	345	
S5	Holt Shops & Holt Pl including Holt Pl crossing	• Widen paths to 3m (76m) • Bus stop path improvements • Priority crossing of Holt Pl • Relocate 2 x streetlights	98	
S6	Holt Shops to Trumper Street	• Demolish existing and construct new path (3m) • Install bollards at each end • Lighting improvements	153	

Sect	Route Section	Works estimate description	Length (m)	Estimate $ Ex GST
N1	Trumper Street to Pickworth Street	• Demolish existing 1.2m wide path through green corridor and construct 3.0m wide asphalt path to link from Trumper St to Pickworth St (285m) • Remove log barriers and replace with open space protection bollards (140m) • Lighting improvements at existing pole locations (7 No.) • Manhole adjustments	285	[redacted]
N2	Pickworth Street island blister and raised platform crossing and bicycle boulevard treatment	• Priority crossing (Zebra on raised platform) across Pickworth Street with an island blister for speed calming • “Bicycle Boulevard – Active Travel Street” pavement marking and signage • Priority crossing (raised platform) at Laycock St • Threshold treatment east of Laycock Pl • Stormwater adjustments at blister location • Lighting improvements	160	
N3	Laycock Pl to Luke St via underpass and vertical alignment improvements	• Demolish existing 1,2m wide path and construct new 3.0m wide path (120m) from Laycock Pl to Starke St underpass • Demolition of 1.2m wide path on east side of underpass and regrade new 3m wide path (50m) with wall on west side (20m) • Clear vegetation in laneway • Adjust manholes	200	
N4	Luke St road reserve improvements	• Widen the path on Luke St to 3.0m wide to the fully paved verge (40m) • Driveway crossing marking (2 no.) • Delineate the 3.0m wide pathway • Lighting improvements • Service pit adjustments	120	

The estimate for the work includes an allowance for contingency [redacted] and project management / design / approvals / Superintendence [redacted]

Signage and pavement marking for an active travel route and vehicle restriction devices (bollards) as per the requirements of MIS05 have also been allowed in the estimate.

The full preliminary cost estimate for the Northern route is included at Appendix G. The preliminary cost estimate for the Southern route alternative (S1 - S8) along with details for this route alignment not included in Table 1 (S7 - S8) is included at Appendix F.

10. Streets without paths and Active Travel Streets

As discussed in previous sections, the ACTCode legacy in the design of Holt is the prevalence of “streets without paths” throughout the suburb. There are many suburbs designed in the 1960s through to the 90s with this type of street that can form strategic links in the active travel network.

These streets are common in Canberra and most remain without paths requiring people to walk and cycle on streets with traffic volumes of generally up to 1,000 vehicles per day and default speed limits of 50km/h. Notwithstanding this, and because of the generally low speed environment, there have been very few traffic incidents on these streets.

Although considered safe for shared use when the suburbs were designed, the current safe systems approach to road design would suggest otherwise. Subsequently, as part of the development of the Active Travel Routes system launched in December 2018 the new standard for active infrastructure facilities design (Municipal Infrastructure Standard 05 – MIS05 4.8.6) includes guidance on treatments for this type of street that allows for use when forming part of Main and Local Community Routes and there is no other practical alignment suitable for this purpose.

ACT Standard Drawings 0513 and 0514 provide guidance on the signage and pavement markings for streets without a verge path when part of a Local Community Route, as is the case for Grout Place and Trumper Street. Both of these streets are very lowly trafficked and low speed streets. Trumper Street is very similar to Wakool Circuit in Kaleen that forms part of the Main Community Route between the North Canberra area and destinations in Kaleen.

The ACT Standard Drawings are included for reference at Appendix C.

Appendix A

Active Travel Infrastructure Integrated Planning and Design
Infrastructure Design - Amendments Summary
Local Community Route Facilities in Established Areas.
Acceptable level of Facility to allow Installation of Local Community Route Directional Signage

ACTive Travel Infrastructure Integrated Planning and Design

ACT Government

Infrastructure Design - Amendments Summary

Local Community Route Facilities in Established Areas. Acceptable level of Facility to allow Installation of Local Community Route Directional Signage

Relevant section / Tables: MIS05.4.10.10. / Table 5-13
(included at document end)

Background.

Local Community Routes (LCRs) are being developed to provide connections between the network of Main Community Routes (MCRs) and important local destinations such as local centres, colleges, high schools, and district parks and playing fields. The network of MCRs was developed in 2003 and included on Standard Drawing DS13-11 following a review of the walking and cycling standards held in 2007. Nearly all MCRs have had directional signage installed in a process that commenced in 2008.

Initial mapping which plotted the alignment of LCRs through established areas was undertaken via desktop as a proof of concept exercise in 2013. LCRs mapping also determines where directional signage will be placed in a systematic way to provide wayfinding to the identified local destinations.

The LCR mapping in established areas did not look at the detail of the route alignments and the choice of initial alignments was based primarily on the shortest distance linking to destinations through existing street and parkland corridors. The rationale was that it was important at this early stage in the development of the Active Travel Route Alignments to understand the density of LCRs required across the urban fabric and provide an initial view of the network for further consideration.

For many LCRs through established areas, the route purpose of connecting MCRs to local destinations may be served by a number of different alignment options. Currently all LCRs in established areas are shown on http://activeinfrastructure.net.au as solid lines because during the proof of concept phase of the network design it was considered necessary to keep the representation of the network as simple as possible. LCR alignments in new areas are known as Planned Future Routes and are shown as dashed lines. These indicate where a connection between identified destinations is required with a notional alignment to be solidified generally through the approval of an Estate Development Plan.

Initial consultation

Pedal Power was commissioned in 2013 to provide comments on the initial LCR alignments The LCR network developed since 2015 and available for viewing access through http://activeinfrastructure.net.au incorporates Pedal Power feedback. Feedback was limited due to lack of understanding of the active travel route alignment concept at the time. This was mainly due to the early development of the concept and the ready availability of information on the route system,

Challenges

LCRs in new areas are to be constructed essentially to the same standard as MCRs with the same path widths, priority at road and any driveway crossings, lighting and similar directional signage. MCRs in established areas mostly already include trunk paths and directional signage with other infrastructure improved through the prioritisation of MCRs in capital works and maintenance programs since 2008.

The finalisation of LCR alignments in established areas is required primarily to allow for the commencement of the installation of directional signage. Before this could proceed a number of issues in the design and route selection for LCRs is required as follows:

- **LCR alignment status :** Many of the LCR alignments currently shown on http://activeinfrastructure.net.au may have a number of alternative alignments with similar or lesser risk profiles and similar link distances. As part of the ATRA validation exercise it is proposed that LCRs undergo further desktop review to identify LCR**s** that may change alignment. MCR and LCRs have four status options including,
  - **future**, Main or Local Community Routes where the alignment is to be confirmed and it is important to show that a link is required between destinations to ensure planned infrastructure is of the level of facility required. Usually in Future Urban Areas but may be in existing areas where there may be a number of options, for example the link between Crace and Girralang and the Airport and Fyshwick.
  - **endorsed**, in new areas an endorsed route comes through an approved Estate Development Plan. In established areas the alignment should have been ground proofed to ensure the alignment represents the most direct, flattest route with consideration of inherent safety issues. There is also the possibility that there is no other viable option due to existing topography, urban layout or existing facilities to link the destinations appropriate to the route level
  - **intended.** Status of routes in established areas only where multiple alignment options may exist and ground proofing is required to confirm and update the status to 'endorsed'.
  - **temporary**, routes that have been realigned due to adjacent development works and that are to be in place for a period of not less than three months.

  LCRs that could be changed through ground-proofing are to be marked with a status of "intended" and shown as a dash. Alignments that may be fixed by topography or existing facilities will remain as endorsed and shown as a solid line.

- **LCR alignment selection :** Canberra's urban design has evolved over many years through times when the amenity and hazards of the constructed infrastructure for walkers and cyclists were assessed differently to current practice. In selecting the "endorsed" LCR alignments in established areas to connect to the required destinations a higher level of safety and amenity expectation is to be overlaid on the existing infrastructure and alignment options tested against each other, The comparison of route options should include consideration of hazards and amenity along each possible route as follows:
  - Directness – Shortest distance to destination, detour factor (actual distance compared to as the crow flies distance)
  - Comfort – Route with flattest topography, minimal steep climbs, presence of shade trees and use of green corridors.
  - Safety – Risk profile of route, least number of hazardous conditions such as:
    - status and width of existing paths;
    - traffic volumes and speed environment of the roadways;
    - at- grade intersection crossings;

  - sightlines to driveway accesses across paths;
  - likelihood of vehicles blocking paths at driveways / verge parking;
  - close proximity of walls and letterboxes when immediately adjacent paths;
  - intrusion of adjacent landscaping including shrubs and edging on to paths
  - presence of busses on streets where it is desirable for cyclists to ride on the roadway due to driveways and narrow and often degraded paths;
  - streets without paths;
  - cyclists required to share narrow paths with walkers; and
  - right turns for cyclists using roadways.
- ➢ Attractiveness – Passive surveillance opportunities, existing lighting, existing places the route may pass and away from vehicle noise and fumes.
- ➢ Coherence – Continuity and consistent quality of facilities. For existing paths this would be the likelihood of the provision of consistent facilities along the route alignment. Also the use of existing infrastructure investment including underpasses should favour a route option.

- **Streets without paths along LCRs** :Streets designed to previous planning requirements from the 1960s- 1990s generally do not include paths on local access streets. Often these streets form part of the most direct route to local destinations including sections that link between green corridors and shortcut connections via laneways. These routes often utilise cul-de-sacs and parts of loop streets in established suburban residential areas.

Suggested LCR alignment selection methodology and treatments

- **LCR alignment selection –** Guidance on the selection of the most appropriate “endorsed” Community Route alignment is to be included in the planning guidance document *Planning for Active Travel in the ACT* as an interim measure prior to development of an *Active Travel Planning* Code. It is proposed that guidance on route selection would not include a multi criteria analysis but instead provide for the assessment of the various existing hazards and amenity along a route with a simple ranking of route options based on directness, topography, hazards and amenity. The final decision is proposed to be based on professional judgement and a stated “value” system rather than a numerical scoring regime. This is because subjective scoring regimes utilised for similar purposes in the past have demonstrated the likelihood of becoming overly complex and providing outcomes skewed from the desired objectives.

  An example of a route choice exercise is included as Attachment 1. This example is proposed as the bases to inform the values and assessment methodology to be included in *Planning for Active Travel in the ACT.*

- **Values to be considered in selecting LCR alignments –** The example included in Attachment 1 involved ground proofing the residential area in the south-west of Holt which is similar in urban design to many established residential areas in Canberra. The existing urban layout resulting from the planning policies in place at the time of development (from the 1960s to the 1990s under ACTCODE and its predecessor) often presents two distinct options for route alignments to connect local destinations that are generally of similar distance.
  - ➢ Use of green corridors generally requiring connections using local access streets without paths. These may often include grade separation using underpasses at collector and arterial roads.

- Use of collector streets with paths in verges on both sides and bicycle lanes within the roadway.

The following table presents the hazards / issues and opportunities presented by the two environments above as well as the other route environments typically encountered in established residential areas. Discussion on the preferred environments when selecting route alignments for LCRs is also provided.

Facility type in established area	*Hazards / Issues*	*Opportunities*	*Discussion*
Green corridor paths and links on local access streets without paths	- Generally poor lighting - Narrow paths (generally 1.2m wide) difficult for users to pass - Passive surveillance may be lacking in connecting laneways and open spaces - Streets without paths require all pedestrians and cyclists to use the roadway. Speed environments may be higher than the desired 30km/h on higher use routes (LCRs).	- Shade from trees along green corridors - Pleasant environment generally away from vehicles - Use of underpasses for road crossings - Placemaking opportunities along the route through open spaces - Generally no driveway crossings of paths.	- This type of route has the potential to provide the most pleasant and safe route if identified for targeted future capital investment. - Safe increased use of local streets without paths for walking and cycling can be facilitated through linemarking and signage as paths have never been a part of this environment. Paths should hover be installed wherever possible to allow pedestrians space to walk away from the roadway.
Minor collectors	- Right turns require at grade crossings that may be difficult to provide pedestrian and cyclist priority. - Right turns require cyclists on roadway to wait in exposed position - Narrow paths (generally 1.2m wide) difficult for users to pass - Driveway crossings, verge landscaping and parking all may present significant hazards. - Number of road crossings with feeder street (mainly local access) - Often used as bus routes.	- Lower traffic volumes may be calmed with speed cushions to make the roadway attractive to a larger cross-section of cyclists. - Bicycle lanes may be installed for use by cyclists comfortable riding within the roadway. - Bus routes / stops provide good connectivity between transport modes	- This environment provides choice for cyclists but also significant hazards for all path users and cyclists using the roadway at intersections. - The number of road crossings is usually greater than the green corridor alternative
Major collectors without driveways	- Generally poor lighting in wider verge where path is located. - Narrow paths (generally 1.2m wide) difficult for users to pass - Number of at grade road crossings with feeder street (local access and collectors) - Often used as bus routes - Traffic volumes and speed environment (60km/h) would preclude most community route cyclists using the roadway even with bicycle lanes	- Verges are generally wider and may allow for appropriate path width to be constructed. - Bus routes / stops provide good connectivity between transport modes.	- May be attractive if appropriately vegetated and adequate separation can be achieved from the traffic lane.

Facility type in established area	*Hazards / Issues*	*Opportunities*	*Discussion*
Major collectors and arterials with driveways	- Generally poor lighting in wider verge where path is located. - Narrow paths (generally 1.2m wide) difficult for users to pass - Number of at grade road crossings with feeder street (local access and collectors) - Driveway crossings, verge landscaping and parking all may present significant hazards. - Traffic volumes and speed environment (60km/h) would preclude most community route cyclists using the roadway even with bicycle lanes.	- Generally very wide verges that may allow for appropriate path width to be constructed - Bus routes / stops provide good connectivity between transport modes.	- May be attractive if separation can be achieved from traffic. - If the location of vegetation allows a wider path may be constructed away from the property boundary to improve driveway sightlines. - If the road pavement width permits a bicycle only path could be constructed within the roadway area with a kerb separation and remove cyclists from the verge path. - A policy to allow parking on wider verges would assist in allowing this option.

From the review the following values to assist in selecting LCR alignments through established areas can be stated:

- For similar distances to connect destinations a green corridor route should generally be preferred especially ii it provides grade separation and minimal road crossings.
- Use of local access streets without paths if connecting green corridors are favoured with the installation of appropriate awareness pavement marking and signage. Physical measures may also be required if the speed environment is significantly higher than 30km/h.
- Use of paths in verges of higher order roads may be appropriate when the green corridor alternative is longer and the detour factor is greater than 30% or the topography is more sympathetic ie. a hill is avoided by an alignment that follows a higher order road than a green corridor.
- Use of higher order roads with driveways should always consider the reallocation of road space to provide a bicycle only path (physical separation) within the roadway to allow cyclists to travel away from the verge path wherever possible.
- Allow vehicles to park on the verge to facilitate use of the roadway (removal of parking) on higher order roads with driveway access.

MIS05 Guidance to allow directional signage installation on an MCR / LCR

The table below lists the issues that should be considered prior to installing directional signage on Main or Local Community Routes. Directional signage should not be installed until the route is assessed as suitable for the additional use and user expectation levels with regard to amenity and safety.

Table 5-1 Risk assessment guidance prior to insttallation of directional signage on Main and Local Community Routes

Issue	*Description*	*Short-term remedial actions*	*Longer-term remedial actions*
Path adequacy	Is the path adequate to accommodate estimated user traffic? Are good sight lines maintained, and blind driveways and building entrances minimised?	Signing and marking. Repair path imperfections and serious hazards. Sign or mark blind entrances or driveways. If cycling is required on-street, mark the pavement for cycling awareness. Refer to *ACTSD-0511 and install measures to promote a lower speed environment*	Rebuild path to required width and alignment. Relocate obstructions such as power poles, trees, signage. Install measures to provide an Active Travel Street along the route
Physical hazards in the street or path environment	Are there physical deficiencies or hazards on the street or path (drainage grates, large cracks, blind driveways or hidden entrances, bollards and poles on paths etc)?	Sign and mark hazards within 1m of the path edge with reflective tape. Provide contrasting pavement and / or pavement markings on driveway crossings to the requirements of *ACTSD-*	Complete removal of hazard.
Sight lines and clearances	Are sight lines obscured by obstacles such as signs, trees, fences or parked cars?	Signing and marking to improve sightlines.	Complete removal of hazard.
Intersections, general	Is there adequate operating space in the intersection to accommodate user needs?	Signing and marking. Repair road imperfections and hazards. Refer to *ACTSD-0511 and 0592x*	Develop paths as a parallel system.
Signalised intersections	Can users comfortably negotiate the intersection? Is there sufficient storage space on any islands for anticipated user volumes?	Signing and marking. Repair road and path imperfections and serious hazards. Investigate installation of priority path crossing on slip lanes on Main and Local Community Routes at crossings. Refer to *ACTSD-0521*.	Include user needs in signal phasing and priority crossings for Main and Local Community Routes.
Path crossings of roadways	Is the crossing point adequately marked and signed?	Cycle rest rails at crossings and crossing warning signs on Main and Local Community Routes, install path priority crossing if warranted. Refer to *ACTSD-0522*.	Installation of path priority, refuge crossing or other engineering treatment.
Transitions	Can cyclists comfortably negotiate transitions between paths and the roadway? Are sight lines preserved at transitions by signed parking restrictions?	Signing and marking. Refer to *ACTSD-0510*. Repair imperfections and serious hazards.	Install protected transition.

Suggested additional provisions for inclusion in MIS05 Draft6

Destinations	Do destinations currently exist?	If destinations do not currently exist or are not planned to exist within a six month timeframe the route should not be signed,	Do not install directional signage on the route until within six months of destinations being opened.

Example LCR alignment selection exercise
LCR Alignments selection to connect Ginninderry to Holt

The new development of Ginninderry to the west of Belconnen requires connection into the adjacent established area for active travel. The Ginninderry development includes a local centre and an LCR has been identified to connect from south-west Holt into Ginninderry from the intersection of Spofforth Street and Drake Brockman Drive (labelled as “1” in **Figure 1** below). A path conforming with LCR requirements has been constructed along the north side of Stockdill Drive to serve as the connection to the estate with one-way paired bicycle only paths proposed to connect into this trunk path and on to the Local Centre.

The three destinations applicable for connection by Local Community Route with distances shown from the intersection of Spofforth Street and Drake Brockman Drive include:

- Holt Shops (Local Centre) – 660m
- Kippax (Group Centre) – 1.4km
- Kingsford Smith School (K-10 School) – 1.3km

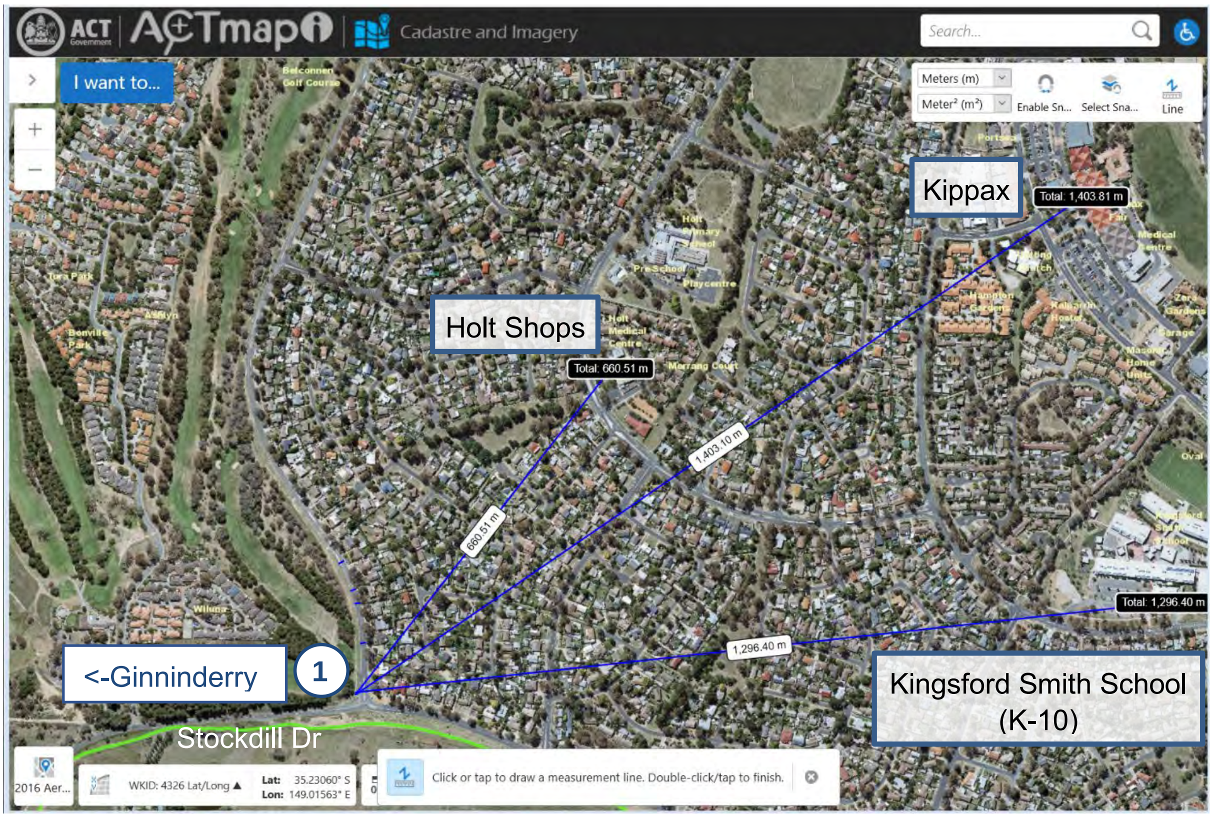


Figure 1 – Distances to destinations “as the crow flies”

Initial work on identifying the LCR network was undertaken in 2013/14 and involved Pedal Power providing consulting advice on the proposed network layout. The resulting network is available for viewing at http://activeinfrastructure.net.au.and and is shown in **Figure 2** over. Ginninderry was not a consideration at this time and hence no LCRs are shown through the south-west of Holt.

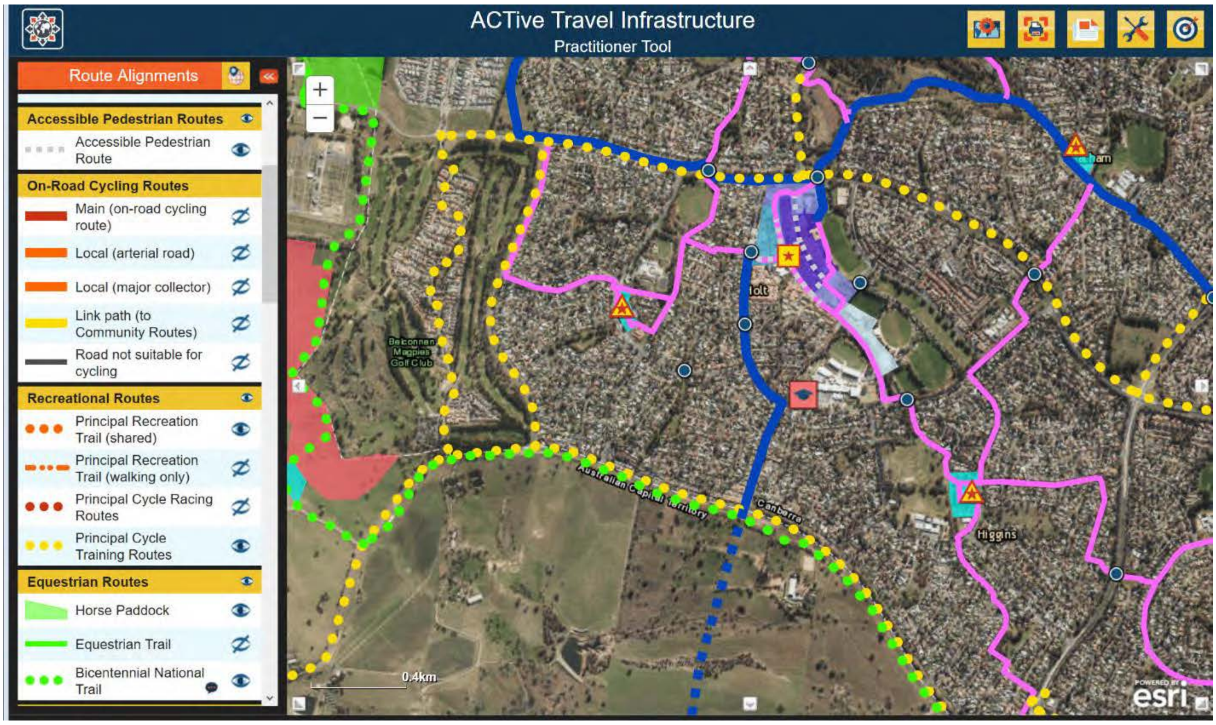


Figure 2 – Existing identified Active Travel Route Alignments

Ground proofing of available alignment options

Local Community Routes are for active transportation and the selection of a suitable alignment through established areas should primarily consider distance (shortest possible) and grades (minimise ups and downs and avoid steep grades wherever possible)

LCRs are targeted for use by walkers and cyclists, 8-80, people who are generally not comfortable riding on roads and prefer to ride in lower stress environments such as along paths or streets with slow speed / low traffic environments. The preferred alignment should also be chosen with consideration of the needs of this user group.

Figure 3 over shows the possible alignments through Holt that could provide appropriate alignments for an LCR. The preferred routes should be the ones that best meet user needs.

The existing infrastructure along the possible alignments is shown in **Figure 3** and pictures that include GPS positioning taken along the alignments that show the existing conditions are available for viewing at https://bwpmap.link?l=158875442110

Each alignment includes opportunities as well as hazards in the existing layout of paths, intersections, driveways, underpasses and the condition of the existing infrastructure.

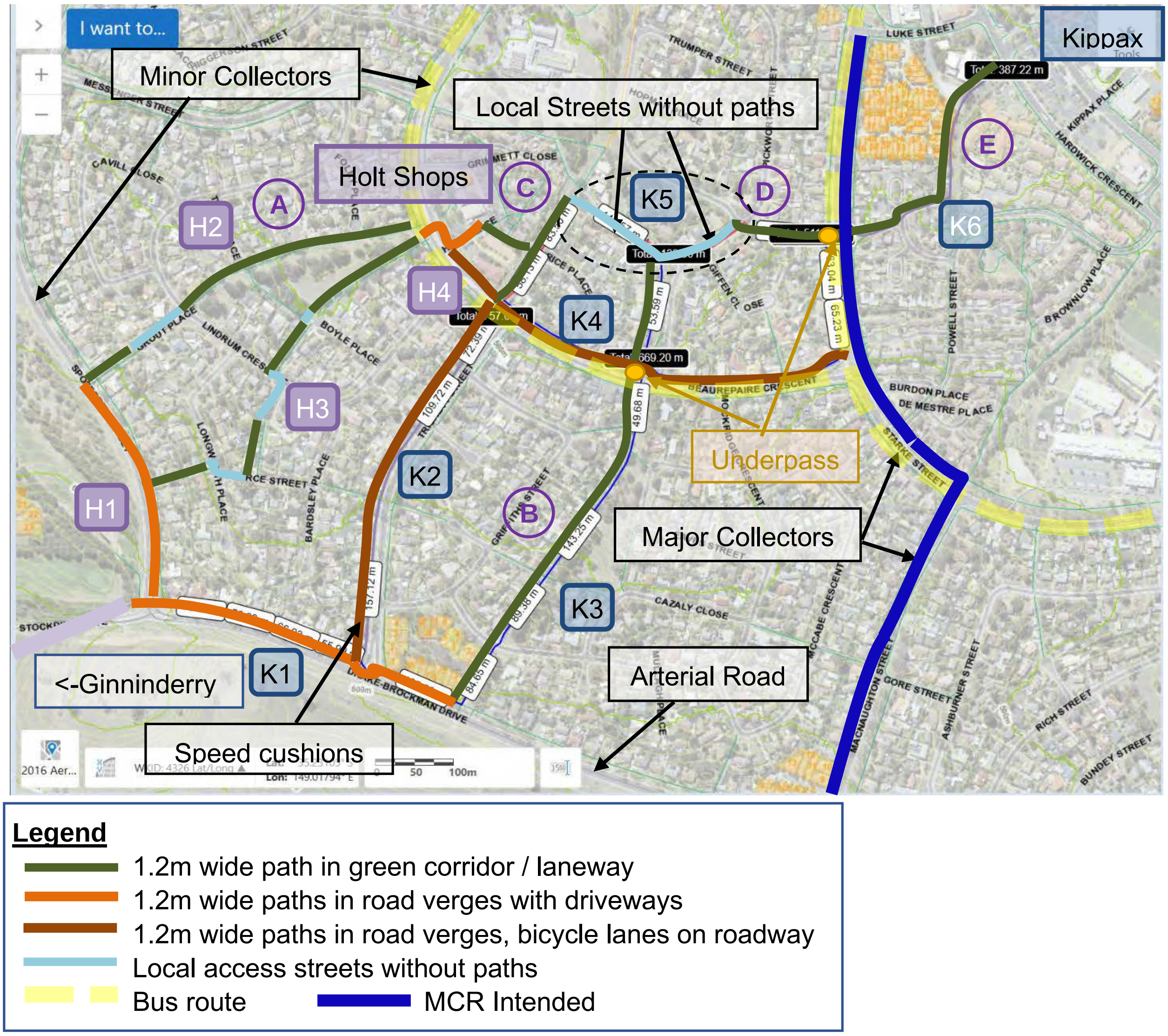


Figure 3 – Possible LCR alignments to link Ginninderry to local destinations in Holt

LCR alignment selection for Ginninderry connection

The choice of LCR alignment should be considered following field proofing and accumulation of route characteristics in a form as follows:

Possible Routes for analysis:

Route	*Distance*	Route discription	Topography
H1A – H3	790 (20%)	Minor collector with 1.2m wide path and driveways, green corridor with streets with no paths	Generally descending no sharp rises or descents
H1 – H2	845 (28%)	Minor collector with 1.2m wide path and driveways, green corridor with streets with no paths	Generally descending no sharp rises or descents
K1 – K2 – H4	910 (37%)	Arterial road with driveways, minor collector with paths both sides and bicycle lanes and minor collector bus route with paths both sides and bicycle lanes,	Generally descending no sharp rises or descents

The third route was not considered further due to the extra distance to the destination with similar terrain to the two green corridor routes. A further route that could provide a connection to K2 from the H3 route was also discounted for further review due to the extra distance.

The preferred route to Holt Shops from the analysis is as presented in the table below. The possible connection on to Kippax is as shown in **Figure 3**. Proofing of this route would require further investigation similar to the exercise above.

Link	*Distance*	*Description*	*Hazards*	*Opportunities*	*Rating*
Route: Ginninderry to Holt Shops					
H1	345m (via H2) 190m (via H3)	1.2m wide path on east side of minor collector (10.0m wide pavement)	- Driveway crossings with restricted sightlines due to vegetation - Walls immediately adjacent path	- Trunk path could be extended on west side of Spofforth Street to remove hazards. - Island crossing	
H2	500m	1.2m wide path through green corridor and local street without paths 80m (Grout Place – 6m wide pavement)	- 1.2m wide paths in green corridors in poor repair. - Street without paths requires walking and cycling within the roadway	- Green corridor is pleasant with some lighting and passive surveillance. -	
H3	600m	1.2m wide path through green corridor and local street without paths 80m (Grout Place – 6m wide pavement)	- 1.2m wide paths in green corridors in poor repair. - Street without paths requires walking and cycling within the roadway	- Green corridor is pleasant with some lighting and passive surveillance.	

Appendix B

Stakeholder Engagement Summary

Strathnairn Active Travelway
Stakeholder Engagement Summary

Ginninderry has engaged with stakeholders to discuss the proposed Strathnairn Active Travelway alignment from Strathnairn to Kippax via Holt Shops. This summary captures the considerations and recommendations which have been provided by stakeholder group through consultations that were held between late September and late October 2020.

Consultation meetings and sessions were held as listed below:

- Ginninderry Transport and Travel Advisory Group, 24 September 2020
- Stakeholder Information Session, 27 September 2020
- Magpies Belconnen Golf Club, 1 October 2020
- Kippax Fair, 7 October 2020
- Cox Architects, Kippax Fair upgrade designers, 27 October 2020

Overall, the stakeholder engagement on the Strathnairn Active Travelway received a positive response. Notes on the stakeholder engagement have been captured for the consideration of Transport Canberra City Services.

Meeting with Ginninderry Transport and Travel Advisory Group (GTTAG)
24 September 2020

Four members of GTTAG attended the Link Building, Strathnairn.

GTTAG were supportive of the active travel network from Strathnairn to Kippax. In this meeting the following comments/ suggestions were made –

- Consideration be given to extend the active travel network to Kingsford Smith School and Cranleigh School
- TCCS should include a safe school initiative for this active travel upgrade
- The opportunity to connect a section of path on Southern Cross Drive and Parkwood Road between Spofforth Street and west of the Transgrid substation. It was identified in the meeting that the intent is to provide active travel linkage between Ginninderry and West Belconnen as the urban development progresses.
- The cycle quality of Drake-Brockman Drive was considered to be less than desirable as the painted line sections on the road push cars to the outside, making the road unsafe for on road cyclist.
- GTTAG expressed a desire for two routes to Kippax, a need to further link people into the Belconnen Town Centre and a commendation on the high-quality paths within the Ginninderry development.
- GTTAG suggested that the Active Travel Report be presented to the Belconnen Community Council.

GTTAG were made aware that the delivery of the improvements for the Strathnairn Active Travelway proposed are required to be undertaken with Transport Canberra City Services and other potential stakeholders. In the meeting GTTAG were advised that their suggestions would be provided onto TCCS through the Strathnairn Active Travelway Report for further consideration.

Meeting with Magpies Belconnen Golf Club
1 October 2020

The Magpies Club were supportive of the active travel route proposed. The Magpie Club members raised concern about the active travel route and its proximity to Kellermann Close units and safety concerns about undesirable activities reported to be an issue in the area.

Meeting with Kippax Fair
7 October 2020

Kippax Fair are supportive of the West Belconnen Active Travel Strategy. Kippax Fair suggested that the Strathnairn Active Travelway consider the connection to Starke Street onto Luke Street directly to Kippax Fair. This suggestion is in-line with the Kippax Group Centre Masterplan. While further detail is being considered by the Kippax Fair team, the intent is that Luke Street will provide a green link through to the shopping complex. Page 57 of the Kippax Group Centre identifies the proposed active travel connections.

It was noted that there could be safety concerns with the route traversing through the Kellermann Close housing area.

Stakeholder Information Session
27 September 2020

On Sunday 27 September 2020 at 10am-11am - Ginninderry held an information session at the Link to about summer awareness and initiatives which included engagement on active travel.

This even was advertised on the Ginninderry facebook group and the electronic digital mail system.

- In this hour 10 people approached to discuss active travel
- The 10 people that engaged with active travel were overall supportive of the initiative
- A resident raised a concern with the current road alignment with the current works on the existing path network on Pro Hart. It was identified that this is a temporary safety measure, fencing will be removed at the top of Pro Hart before the end of the year, 2020.

Cox Architects, Kinston (Kippax Fair redevelopment designers)
27 October 2020

[redacted] explained the desire to have the main entry to Kippax Fair via the park on the south side of the library. The proposed redevelopment plans show a main active travel axis that runs from Luke Street through the map to the active travel route on the playing field side of the mall. [redacted] expressed a strong preference for use of the Starke Street northern underpass due to the proposal to relocate the library to an area to the south where the bus stop and bus circulation loop is currently located.

Figure 15 of The Kippax Group Centre Masterplan released in 2019 showing the proposed pedestrian and cyclist routes was discussed and use of the route through the southern Starke Street underpass explored. It was agreed that this would be satisfactory in the interim until the redevelopment occurred but that it would be preferred to have arrival through the proposed "People's Park" where the library is currently located. The difficulty to achieve this objective with entry through the southern Starke Street underpass because of the revised bus circulation and church entry location was acknowledged.

Appendix C

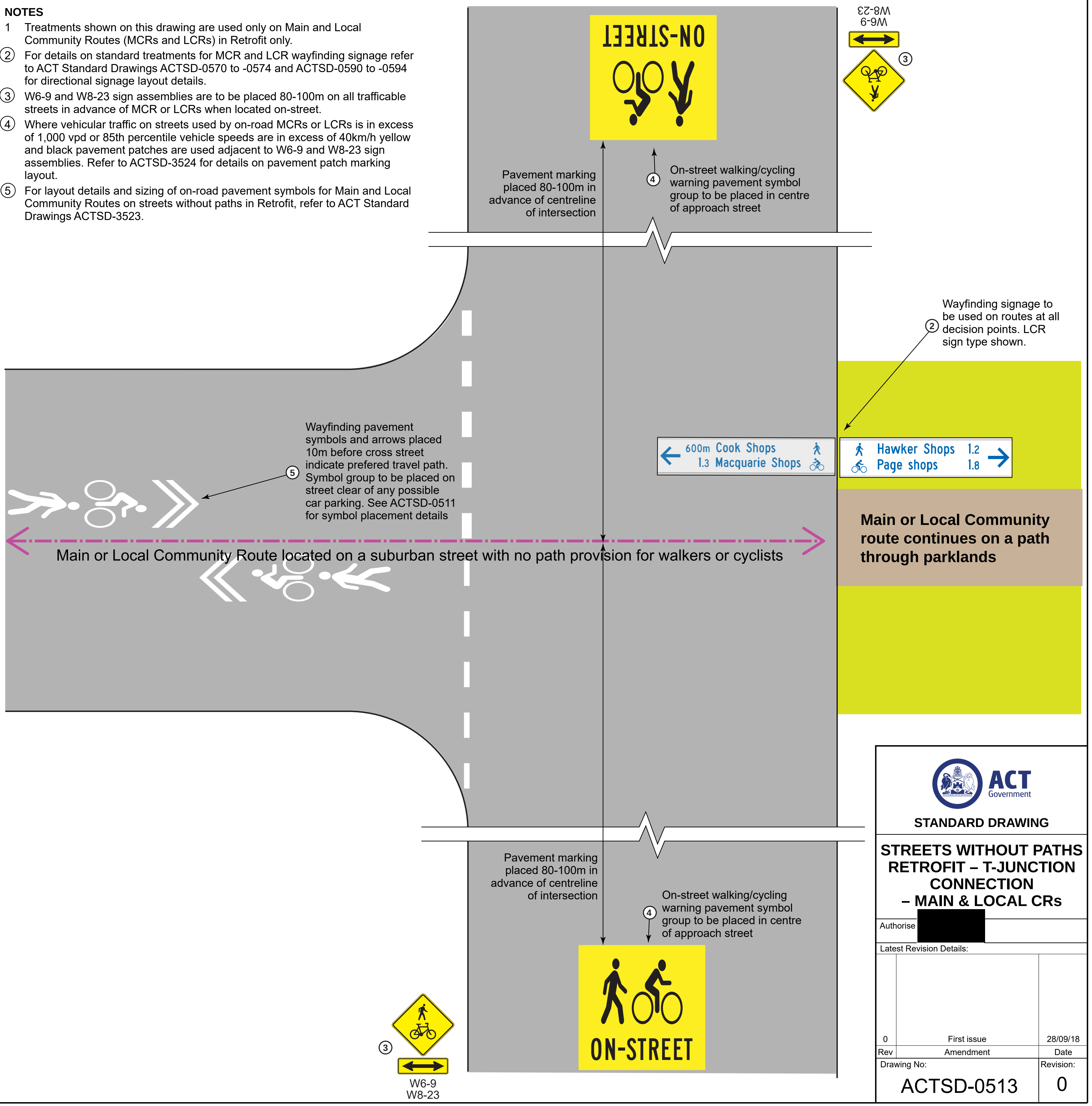
Pavement marking and signage guidance for Main and Local Community Routes located on suburban streets with no path provision.

ACTSD-0513	Streets without paths Retrofit - T junction connection - Main and Local Community Routes
ACTSD-0514	Streets without paths Retrofit - Offset junction connection - Main and Local Community Routes

Area layout example: Local community route along a short section of existing suburban street with no path provision for walkers or cyclists

NOTES

1. Treatments shown on this drawing are used only on Main and Local Community Routes (MCRs and LCRs) in Retrofit only.
2. For details on standard treatments for MCR and LCR wayfinding signage refer to ACT Standard Drawings ACTSD-0570 to -0574 and ACTSD-0590 to -0594 for directional signage layout details.
3. W6-9 and W8-23 sign assemblies are to be placed 80-100m on all trafficable streets in advance of MCR or LCRs when located on-street.
4. Where vehicular traffic on streets used by on-road MCRs or LCRs is in excess of 1,000 vpd or 85th percentile vehicle speeds are in excess of 40km/h yellow and black pavement patches are used adjacent to W6-9 and W8-23 sign assemblies. Refer to ACTSD-3524 for details on pavement patch marking layout.
5. For layout details and sizing of on-road pavement symbols for Main and Local Community Routes on streets without paths in Retrofit, refer to ACT Standard Drawings ACTSD-3523.



ACT Government

STANDARD DRAWING

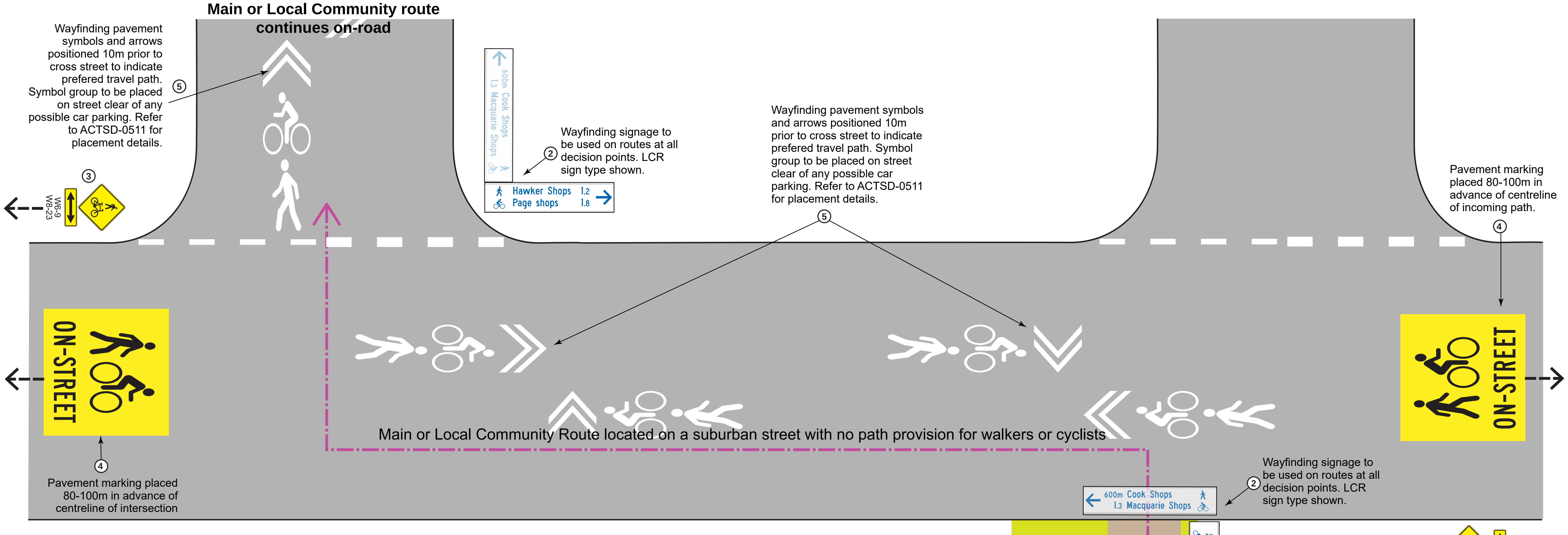
STREETS WITHOUT PATHS RETROFIT – T-JUNCTION CONNECTION – MAIN & LOCAL CRs

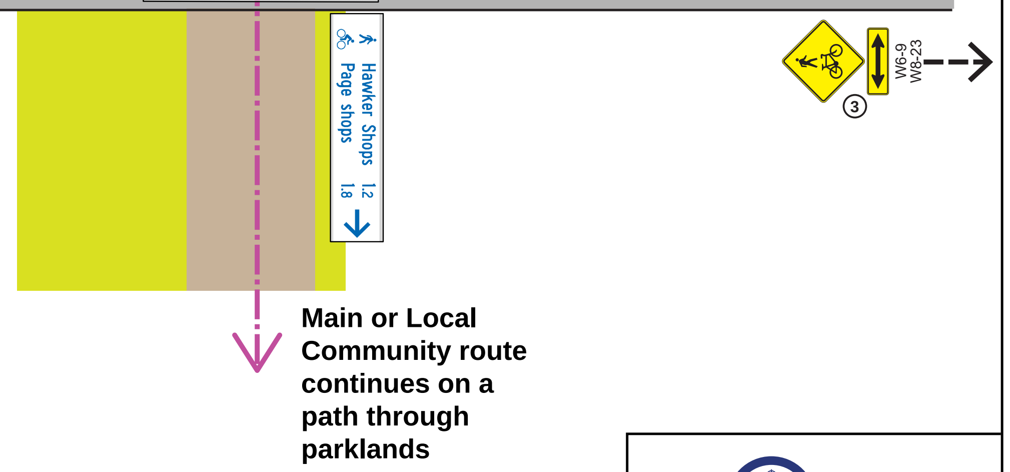
Authorise [redacted]

Latest Revision Details:

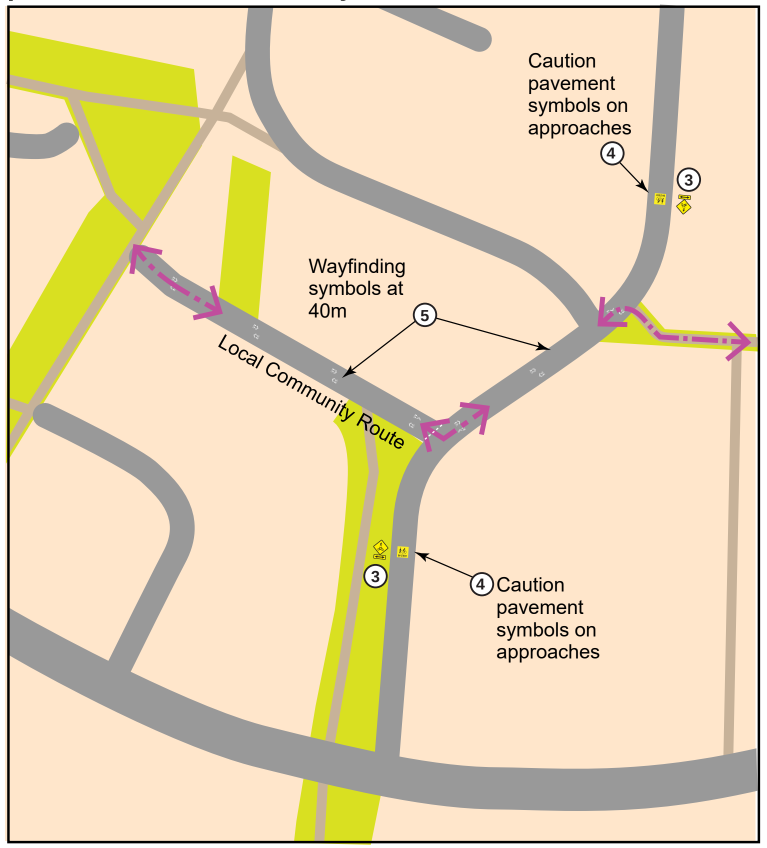
Rev	Amendment	Date
0	First issue	28/09/18

Drawing No:	Revision:
ACTSD-0513	0





Area layout example: Local community route along two short sections of existing suburban streets with no path provision for walkers or cyclists



NOTES

1. Treatments shown on this drawing are used only on Main and Local Community Routes (MCRs and LCRs) in Retrofit only.
2. For details on standard treatments for MCR and LCR wayfinding signage refer to ACT Standard Drawings ACTSD-0570 to -0574 and ACTSD-0590 to -0594 for directional signage layout details
3. W6-9 and W8-23 sign assemblies are to be placed 80-100m on all trafficable streets in advance of MCR or LCRs when located on-street.
4. Where vehicular traffic on streets used by on-road MCRs or LCRs is in excess of 1,000 vpd or 85th percentile vehicle speeds are in excess of 40km/h yellow and black pavement patches are used adjacent to W6-9 and W8-23 sign assemblies. See ACTSD-3524 for layout details of pavement marking patch.
5. For layout details and sizing of on-road pavement symbols for Main and Local Community Routes on streets without paths in Retrofit, refer to ACT Standard Drawings ACTSD-3523.

ACT Government

STANDARD DRAWING

STREETS WITHOUT PATHS RETROFIT – OFFSET JUNCTION CONNECTION – MAIN & LOCAL CRs

Authorised: [redacted]

Latest Revision Details:

Rev	Amendment	Date
0	First issue	28/09/18

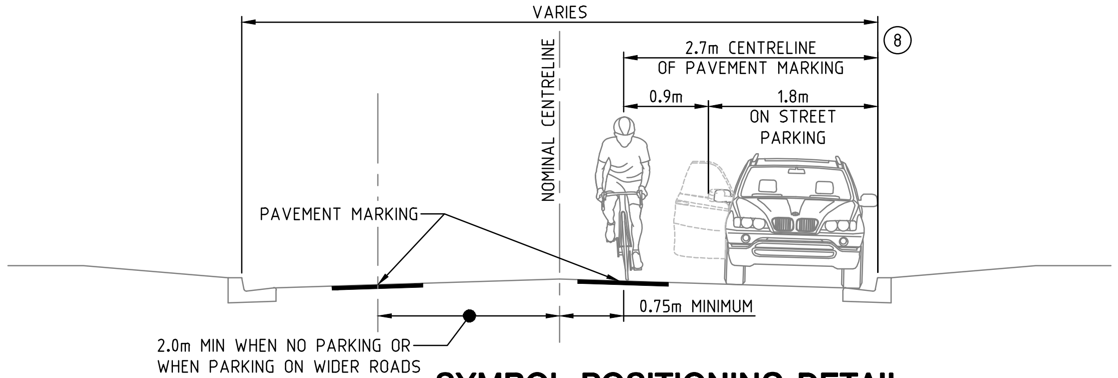
Drawing No: ACTSD-0514

Revision: 0

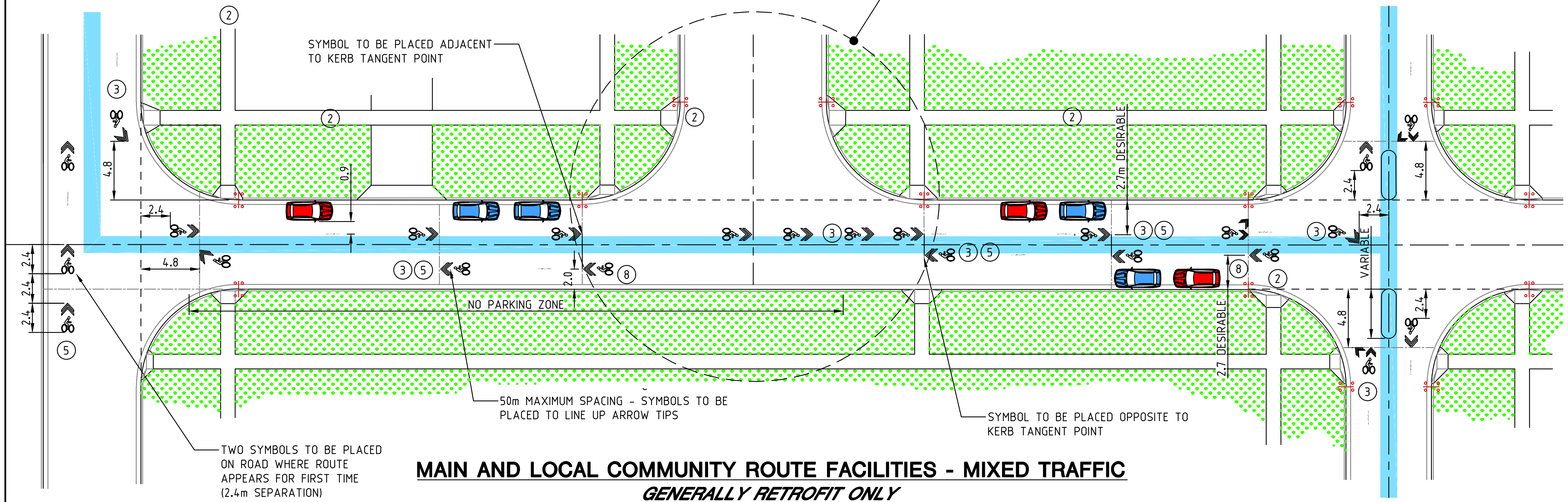
Appendix D

ACT guidance on provision of Active Travel Street treatments and treatments across driveway accesses on Main and Local Community Routes

ACTSD-0511	Mixed Traffic Linemarking Main and Local Community Routes
ACTSD-0512	Active Travel Streets and Bicycle Boulevards Design Guidance
ACTSD-0527	Mid-block Treatments – Driveway Crossings of Paths (Shared) on Main and Local Community Routes

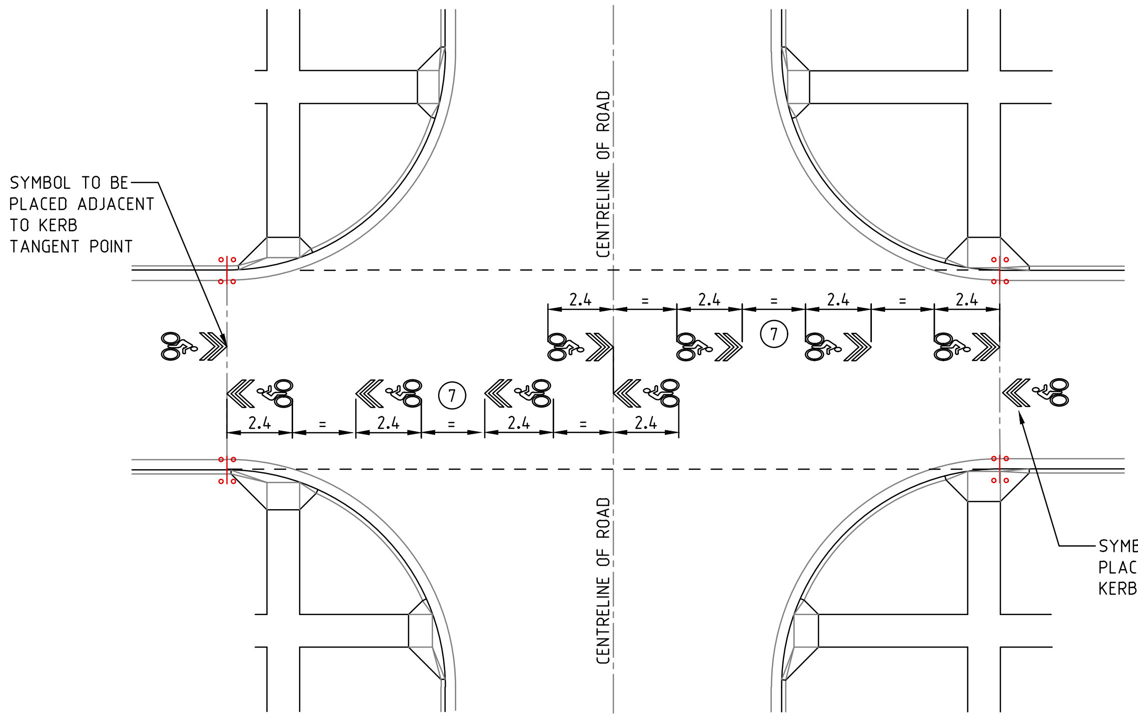


SYMBOL POSITIONING DETAIL

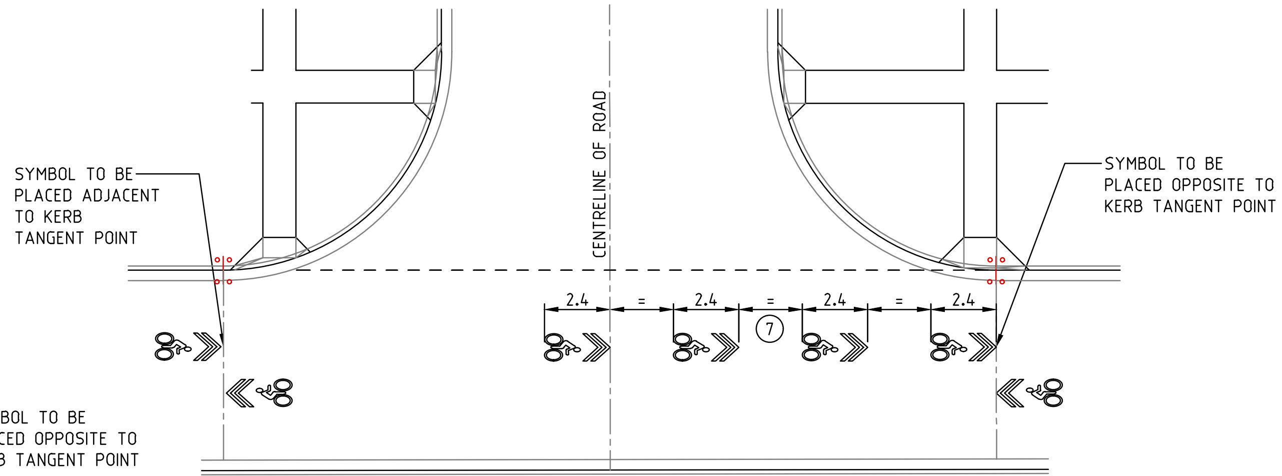


MAIN AND LOCAL COMMUNITY ROUTE FACILITIES - MIXED TRAFFIC

GENERALLY RETROFIT ONLY



SYMBOL ARRAY AT 4 WAY (THROUGH) INTERSECTION



SYMBOL ARRAY AT T (THROUGH) INTERSECTION

NOTES

1 DETAILS FOR USE ON MAIN AND LOCAL COMMUNITY ROUTES IN RETROFIT. PAVEMENT SYMBOLS AS DETAILED ARE ALSO FOR WAYFINDING ON ACTIVE TRAVEL STREETS IN ESTATE DEVELOPMENT. ACTIVE TRAVEL STREET TREATMENTS ARE ALSO TYPICAL FOR INSTALLATION IN RETROFIT. REFER TO ACTSD-0512 FOR DETAILS

2 PATHS PROVIDE FOR PEDESTRIANS AND USE BY CYCLISTS NOT COMFORTABLE ON THE ROADWAY SUCH AS SCHOOL CHILDREN. PATHS INCLUDING KERB RAMPS SHOULD BE UPGRADED TO MEET THE COMMUNITY ROUTE HIERARCHY LEVEL REFER TO MIS05 4.8.2 AND ACTSD-0512 FOR MEASURES THAT MAY BE UNDERTAKEN TO CONVERT THE ROUTE INTO AN ACTIVE TRAVEL STREET.

3 FOR DETAILS OF PAVEMENT SYMBOL FOR USE ON ROADWAYS REFER TO ACTSD-3523

4 REFER TO MIS05 4.10.8 AND ACTSD-0592 TO 0595 FOR DIRECTIONAL SIGNAGE TO BE INSTALLED IN CONJUNCTION WITH THE PAVEMENT MARKINGS ON MAIN AND LOCAL COMMUNITY ROUTES

5 FOR POSITIONING OF SYMBOL REFER TO THE SYMBOL POSITIONING DETAIL

6 ALL DIMENSIONS ARE IN METRES UNLESS SHOWN OTHERWISE

7 THE FIRST SYMBOL IS ALWAYS SETOUT WITH THE TIP OF THE SHARROW ON THE CENTRELINE OF THE SIDE ROAD. WHERE THE DISTANCE FROM CENTRELINE OF THE SIDE ROAD TO TANGENT POINT IS:-
- < 13.2m PLACE 3 SYMBOLS EVENLY SPACED
- ≥ 13.2m AND ≤ 19.8m PLACE 4 SYMBOLS EVENLY SPACED AS SHOWN
- > 19.8m PLACE 3 SYMBOLS SETOUT FROM CENTRELINE SPACED 4.2m APART AND AN ADDITIONAL SYMBOL ADJACENT TO THE TANGENT POINT

8 WHERE PARKING IS PERMITTED AN OFFSET OF 2.7m FROM NOMINAL KERB TO SYMBOL CENTRELINE IS DESIRABLE. SYMBOLS SHALL BE 0.3m MINIMUM CLEAR OF LANE MARKING. WHERE PARKING IS NOT PERMITTED SYMBOL CENTRELINE IS TO BE 2.0m FROM NOMINAL KERB LINE.

LEGEND

MAIN OR LOCAL COMMUNITY ROUTE

ACT Government

STANDARD DRAWING

MIXED TRAFFIC LINEMARKING MAIN AND LOCAL COMMUNITY ROUTES

Authorised: [redacted]

Latest Revision Details

Rev	Amendment	Date
0	FIRST ISSUE	28/09/18

Drawing No.	Revision
ACTSD-0511	0

Active Travel Streets - design requirements and implementation in Estate Development and Retrofit. Example shown between points A and B on the diagram below

This Active Travel Street example uses path improvements for pedestrians and a Bicycle Boulevard treatment for on-road cycling in a low-speed, low-traffic volume street environment.

4 Arterial road crossings
Crossings of arterial roads are provided in accordance with MIS05. In this example a signalised crossing has been provided on one side of the major collector road which takes the Main Community Route to a town or group centre. An Active Travel Street on Main or Local Community Routes connects with similar or improved continuing facilities, preferably a trunk path or separated paths.

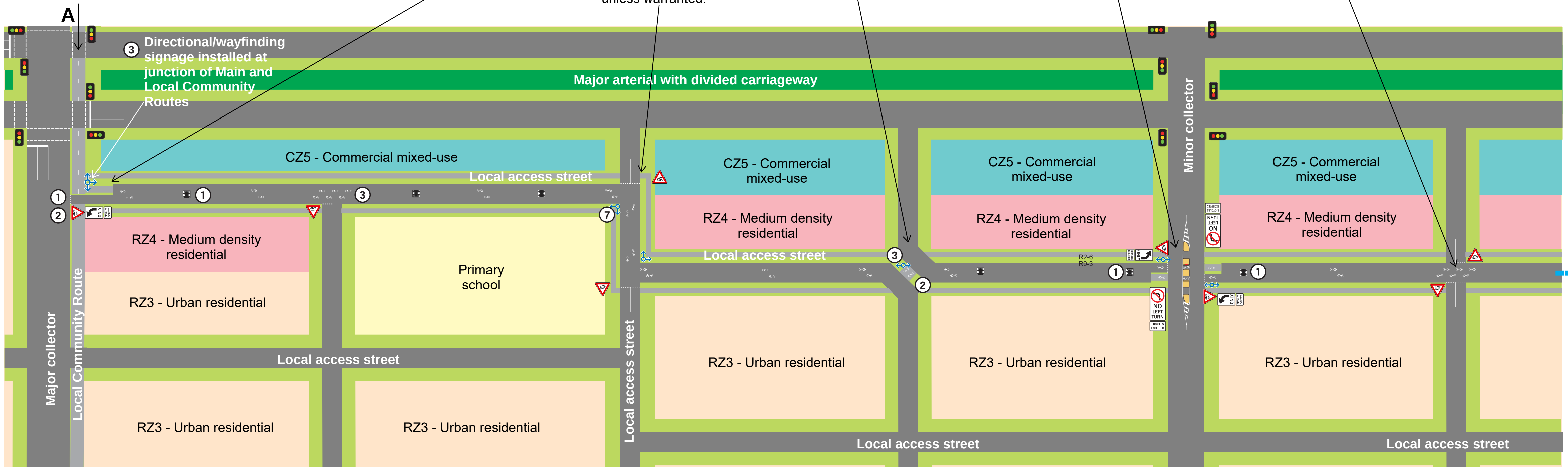
1 Speed reduction measures
Measures such as speed cushions and street narrowings at entry points to the bicycle boulevard, reinforces the low-speed, low traffic volume design intent of the street environment.

6 Accessibility for pedestrians
At all cross street intersections kerb ramps are installed to assist crossing accessibility for pedestrians. Zebra crossings are not used unless warranted.

2 Volume reduction measures
When providing additional through-priority for a bicycle boulevard, it is important to install vehicle volume reduction treatments to ensure the route does not become a traffic 'rat run'. This example breaks the street continuity for local vehicle traffic but provides through travel for cyclists.

5 2 Minor collector street crossing
This example shows a refuge crossing provided for pedestrians and cyclists across a minor collector street. Vehicle through-movements are restricted as a volume reduction measure along the route.

3 Route signing and marking
Bicycle boulevard pavement markings (see Standard Drawing ACTSD-3523 and ACTSD-0511) are used to indicate the use of the roadway by Community Route cyclists (8 to 80). These markings are applied at all intersecting streets to indicate the lower-speed, shared street environment.



5 Minor collector street crossing
This example shows a priority crossing of the Active Travel Street with a minor collector. The intersection is on a raised pavement platform to improve safety and amenity for both pedestrians and cyclists using the Active Travel Route.

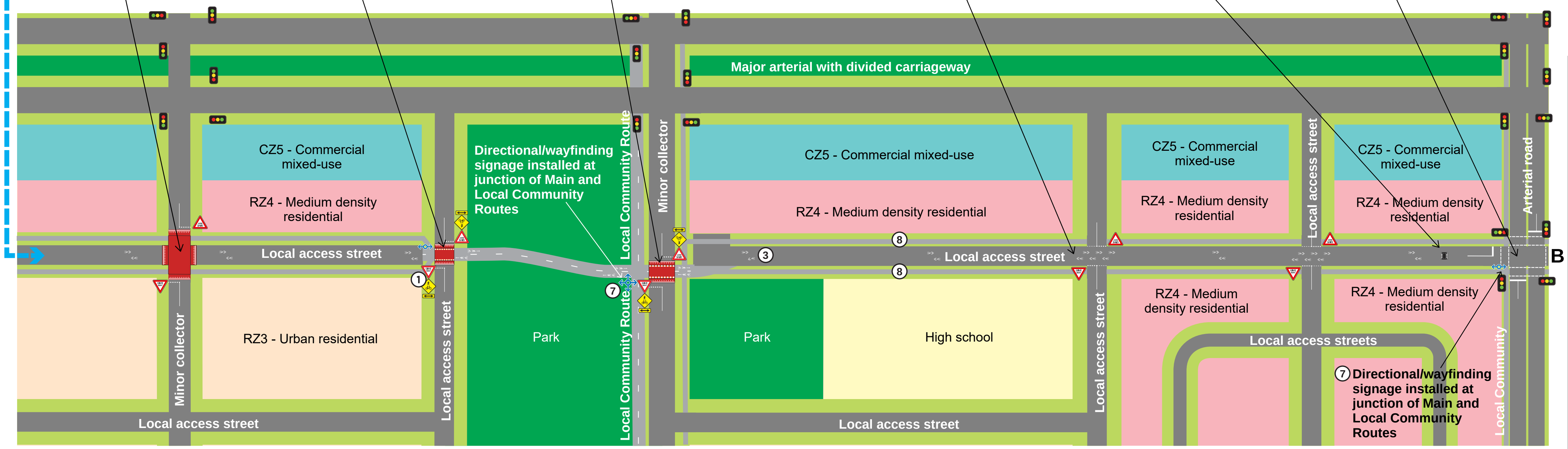
2 5 Minor road crossing and volume reduction measures
Crossings of local access streets are provided in accordance with MIS05. In this example a Path Priority crossing has been provided across a local access street where path traffic volumes exceed street volumes. Traffic volumes along the Active Travel Street have been reduced by the street closure.

5 Minor road crossing
Crossings of minor collector roads are provided in accordance with MIS05. In this example a Path Priority crossing is provided across the minor collector road as path volumes exceed street volumes.

3 Route wayfinding pavement marking
Bicycle Boulevard pavement markings for cyclists (see Standard Drawing ACTSD-3523 and ACTSD-0511) are used to indicate the on-road route in mixed traffic conditions. These markings are applied at all intersecting streets to the layout as shown on ACTSD-0511 to indicate the low-speed shared road environment.

1 Speed reduction measures
Measures such as speed cushions and traffic entry thresholds are designed to support the low-speed, low traffic volume environment.

4 Arterial road crossings
Crossings of arterial roads are provided in accordance with MIS05. In this example a signalised crossing has been provided across an inner urban arterial providing access to the town centre. Typically an Active Travel Street would connect to similar or improved pedestrian/cycling facilities such as a trunk path or separated facilities for cyclists and pedestrians.



PRIMARY DESIGN MEASURES

1. **Speed reduction measures** to reduce 85th percentile speed to 30km/h or below. Speed reduction measures can consist of street narrowings, speed cushions and other LATM treatments.
2. **Volume reduction measures** to reduce motor vehicle volumes to 1,500 - 3,000vpd or below depending on the street characteristics.
3. **Wayfinding linemarking** to identify the bicycle boulevard and to assist cyclist navigation along the route.
4. **Major road crossings** are installed to maximise pedestrian and cyclist safety, comfort, amenity and priority at arterial and major collector road crossings.
5. **Minor road crossings** are installed to maximise pedestrian and cyclist safety, comfort, amenity and priority at minor collector and access streets.
6. **Equal accessibility for pedestrians** and cyclists to meet their operational needs and route safety.

The Active Travel Street continues on the diagram below as indicated by this arrow

ADDITIONAL DESIGN MEASURES

7. **Wayfinding and directional signage** is used at route junctions for Main and Local Community Routes which use Active Travel Streets.
8. **High standard pavement** is provided for Active Travel Streets including footpath upgrades, kerb ramps, and street pavement remedial works.
9. **Green infrastructure** such as rain gardens, bio-swales and stormwater management are provided where opportunities present.
10. **Public awareness measures** such as local and ACT-wide promotional campaigns may be undertaken to improve user acceptance and knowledge of newly installed facilities.
11. **Additional risk minimisation measures.** Where incidents of excessive speed persist, consider the further application of measures recommended in MIS05 Table 5-12. See also ACTSD-0523 for examples.

ACT Government

STANDARD DRAWING

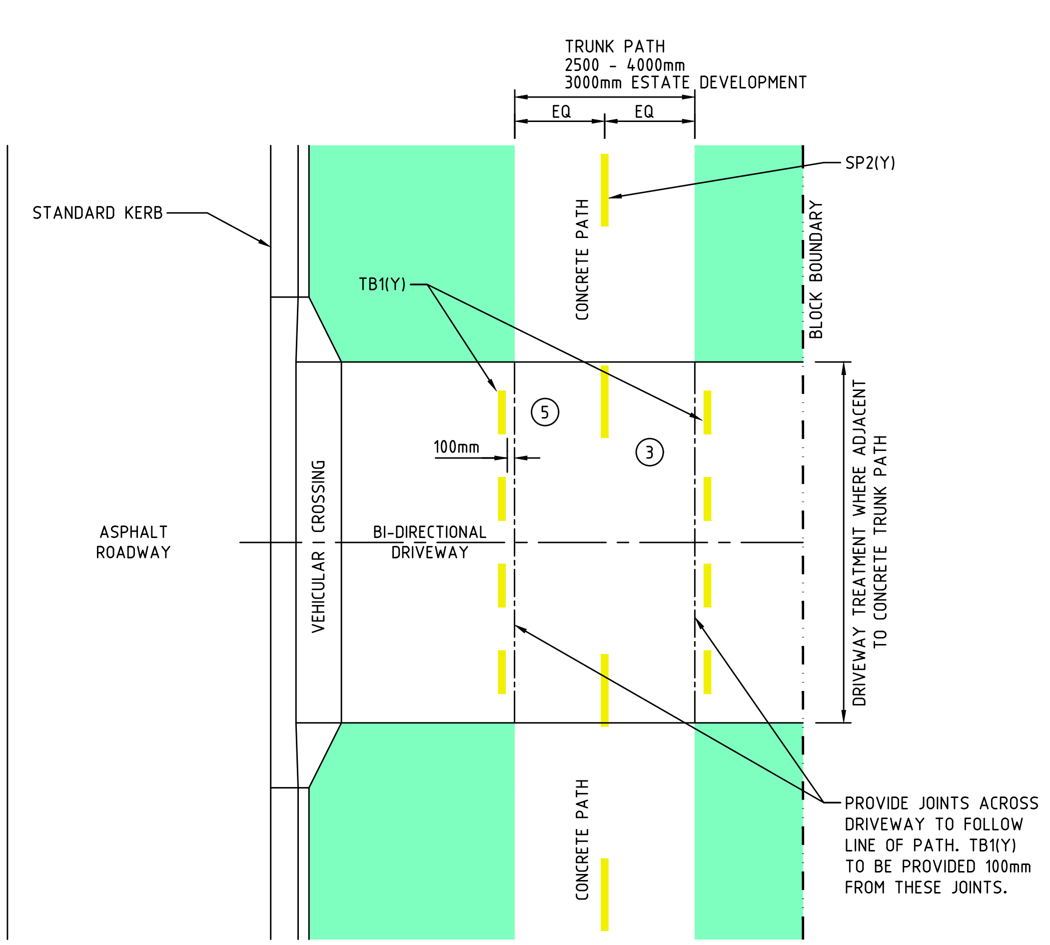
ACTIVE TRAVEL STREETS & BICYCLE BOULEVARDS DESIGN GUIDANCE

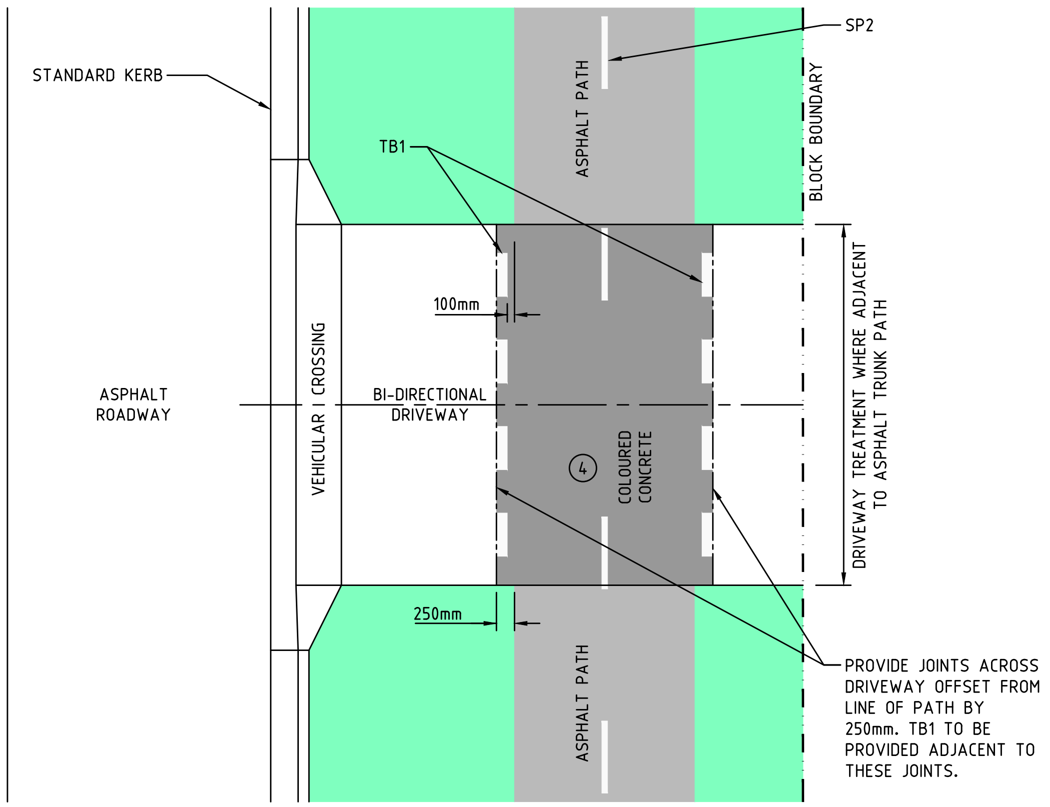
Authorised: [redacted]

Latest Revis

Rev	Amendment	Date
1	MIS05 Table references updated	09/11/20
0	First issue	28/09/18

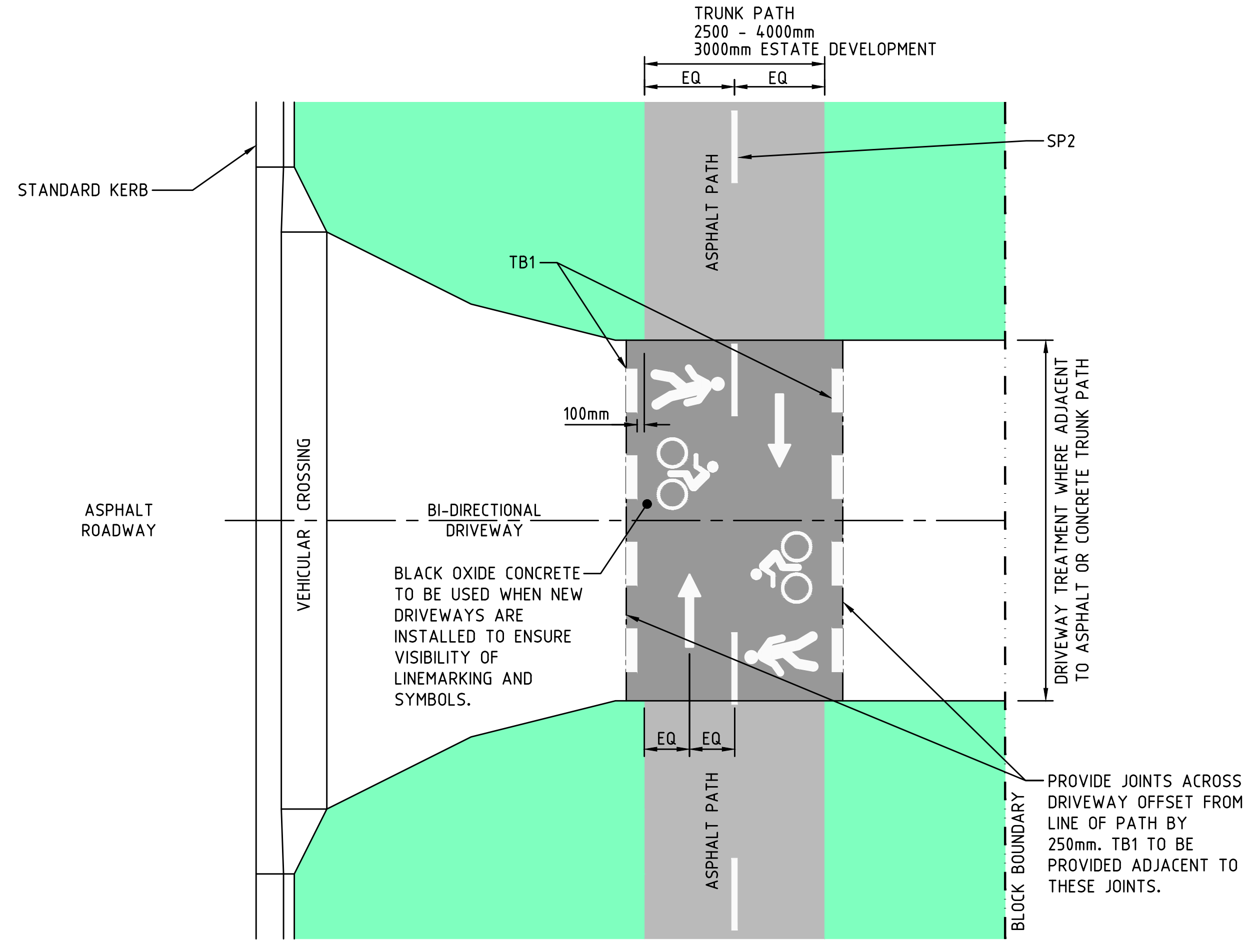
Drawing No: ACTSD-0512
Revision: 0



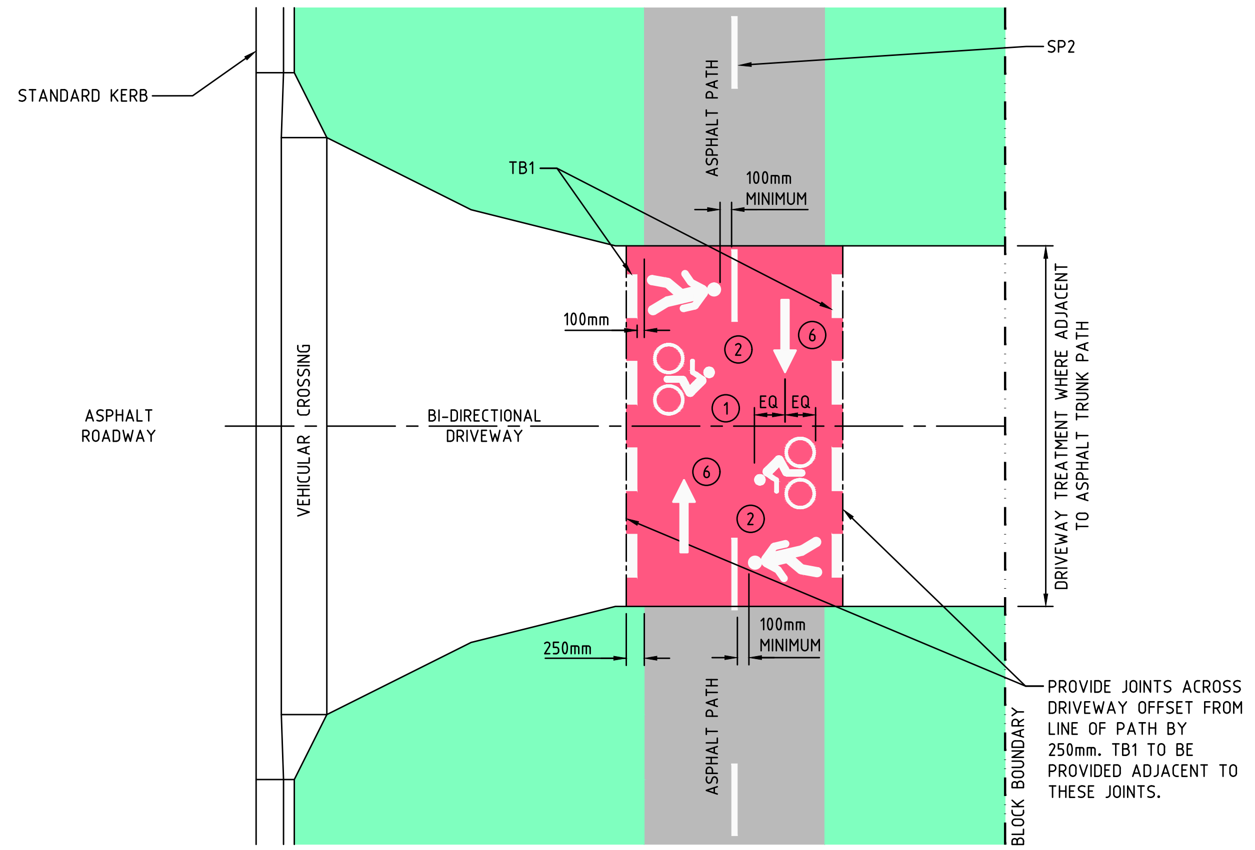


MAIN OR LOCAL COMMUNITY ROUTE CROSSING RESIDENTIAL DRIVEWAYS WITH 5 OR LESS CAR PARKING SPACES

RETROFIT ONLY 8



DRIVEWAYS TO MORE THAN 5 AND LESS THAN 15 CAR PARKING SPACES



DRIVEWAYS TO MORE THAN 15 CAR PARKING SPACES
MAIN OR LOCAL COMMUNITY ROUTE CROSSING OF DRIVEWAYS TO COMMERCIAL OR MULTI-RESIDENTIAL DWELLING SITES

RETROFIT ONLY 8

NOTES

1. USE RED OXIDE CONCRETE COLOUR MIX FOR CONTRAST WHERE TRUNK PATHS CROSS HEAVY DUTY CONCRETE DRIVEWAYS TO SITES WITH GREATER THAN 15 CAR PARKING SPACES. THE RED OXIDE COLOUR IS TO BE ADJUSTED TO PROVIDE CONTRAST TO BOTH THE PATH AND THE DRIVEWAY. THE DRIVEWAY COLOUR IS TO BE SELECTED TO PROVIDE APPROPRIATE CONTRAST TO THE RED OXIDE COLOUR AS ADJUSTED.
2. REFER TO ACTSD-3522 FOR PAVEMENT SYMBOL DETAILS. SYMBOLS MAY BE SCALED PROPORTIONALLY TO FIT WITHIN THE PATH WITH 100mm MINIMUM CLEARANCE FROM EDGE LINES AND CENTRELINE. SYMBOLS AND ARROWS TO BE SETOUT EQUALLY ON EACH SIDE OF DRIVEWAY AND EQUALLY WITHIN EITHER SIDE OF TRUNK PATH.
3. CONCRETE PATH ACROSS DRIVEWAY CROSSING MAY BE THE SAME COLOUR AS THE DRIVEWAY. THE PATH PRIORITY IS TO BE MADE APPARENT THROUGH THE SURFACE FINISH AND USE OF JOINTING TO HIGHLIGHT THE PATH CROSSING. THE PATH BROOMED FINISH IS TO BE CONTINUOUS ALONG THE PATH AT 90 DEGREES TO THE PATH DIRECTION AND THE DRIVEWAY FINISH EACH SIDE OF THE PATH IS TO BE 90 DEGREES TO THE DRIVEWAY DIRECTION.
4. USE BLACK OXIDE CONCRETE COLOUR MIX WHERE ASPHALT TRUNK PATHS CROSS CONCRETE DRIVEWAYS.
5. TO PROVIDE CONTRAST, YELLOW PATH LINES SHALL BE USED ON LIGHT COLOURED SURFACES. THE YELLOW COLOUR SHALL BE AS2700 : Y14 GOLDEN YELLOW AND THE YELLOW LINE COLOUR INDICATED WITH "(Y)" SHOWN AFTER THE LINETYPE, EG A YELLOW SP2 LINE WOULD BE ANNOTATED SP2(Y).
6. PAVEMENT MARKING ARROW TO BE IN ACCORDANCE WITH AS1742.9 FIGURE 3.1. REFER ALSO ACTSD-3522.
7. DRIVEWAYS SHOWN ARE DIAGRAMMATIC ONLY, FOR CONSTRUCTION AND LAYOUT DETAILS REFER TO ACTSD-0701 FOR RESIDENTIAL DRIVEWAYS AND ACTSD-0702 FOR HEAVY DUTY DRIVEWAYS.
8. DRIVEWAY CROSSINGS ARE NOT ACCEPTABLE IN ESTATE DEVELOPMENT EXCEPT WITH APPROVAL OF THE ROAD AUTHORITY.

ACT Government

STANDARD DRAWING

MID-BLOCK TREATMENTS - DRIVEWAY CROSSINGS OF PATHS (SHARED) ON MAIN OR LOCAL COMMUNITY ROUTES

Authorised: Ken Marshall [redacted]

Latest Revision Details

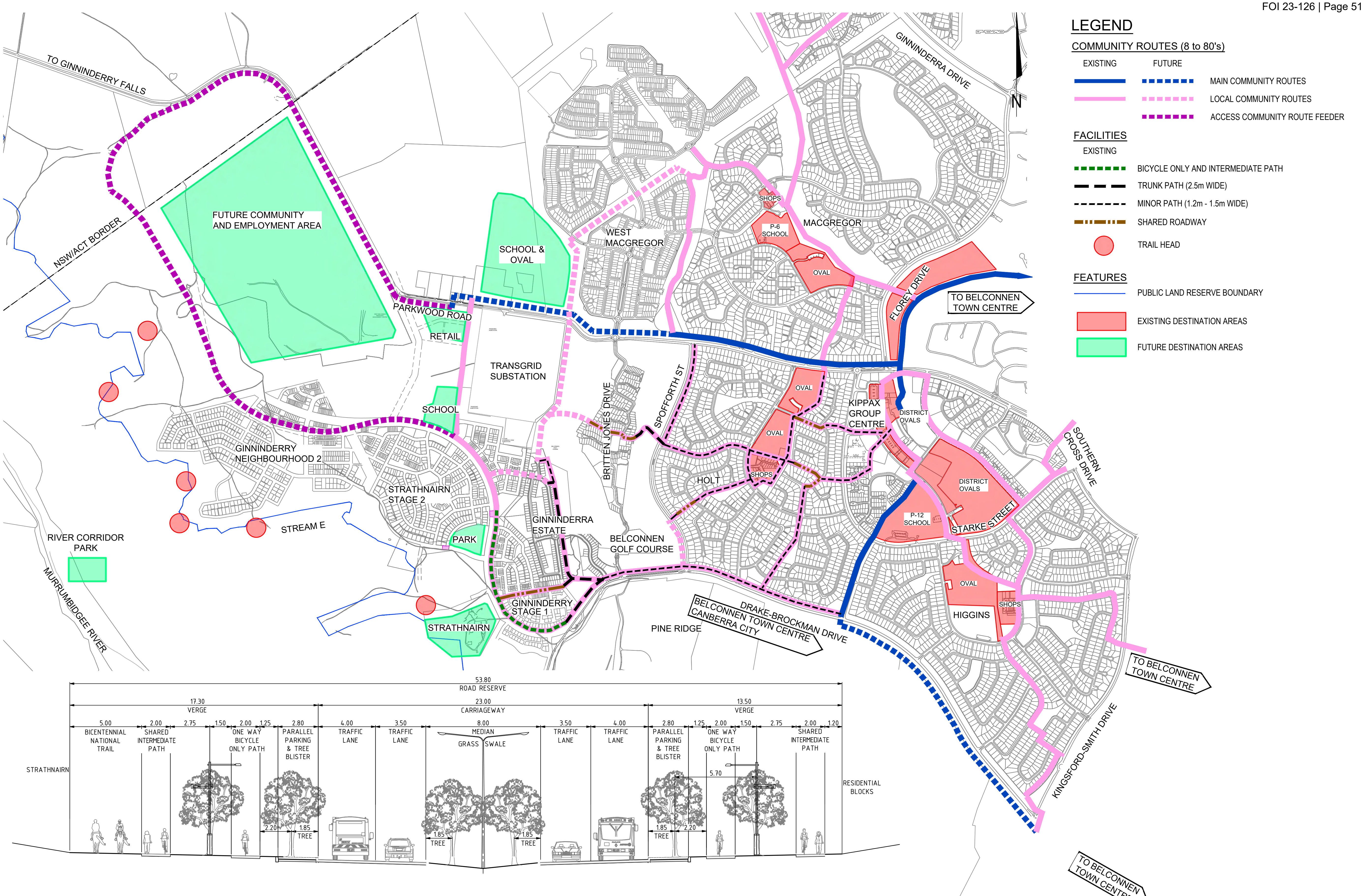
Rev	Amendment	Date
1	NOTE 3 AMENDED	09/11/20
0	FIRST ISSUE	28/09/18

Drawing No.	Revision
ACTSD-0527	1

Appendix E

Active Travel Routes – Strathnairn / Holt network connections context plan.

1906-01 Ginnderry Active Travel Routes Review
Active Travel Network Community Routes
(Rev 1 - 26 June 2020)



BOULEVARD - ULTIMATE CONFIGURATION
FOR USE BY COMMUNITY AND ON-ROAD CYCLING ROUTES USERS
NOT TO SCALE

AMENDMENTS			Scale		Project	Drawing Title
AMENDMENT	APPROVAL	DATE	1:10000 A1 — 100 50 0 100 200 300 400 500 — 1:20000 A3	Ginninderry; CIVILscope Consult Pty Ltd ACN 128 068 217; R.D. Gossip Pty Ltd Consulting Engineers	GINNINDERRY ACTIVE TRAVEL ROUTES REVIEW	ACTIVE TRAVEL NETWORK COMMUNITY ROUTES
0 FIRST ISSUE	[redacted]	30/04/20			Date 26/06/20	Drg. No. 1906 - 01 Revision 1
1 GINNINDERRY NEIGHBOURHOOD 2 AND STRATHNAIRN STAGE 2 PROPERTY BOUNDARIES UPDATED		26/06/20				

Appendix F

Southern route alternative (S1 – S8).

Route details and cost estimate

Southern route infrastructure improvements cost estimate

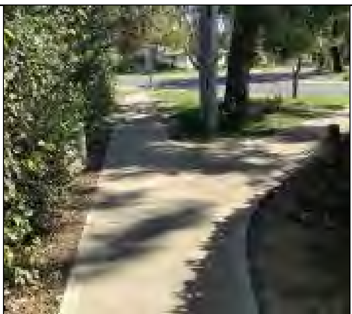
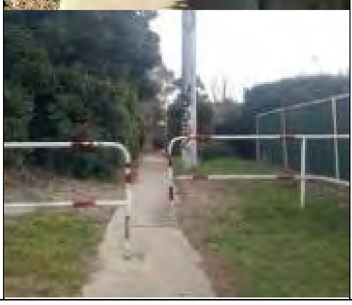
The recommended infrastructure improvements on the southern route to provide a level of service that meets the requirements for a Main / Local Community Route as per MIS05 are estimated to total approximately [redacted], summated from the table below. The southern route total length is **1.79km** to the southern Hardwick Street Zebra crossing south of Luke Street.

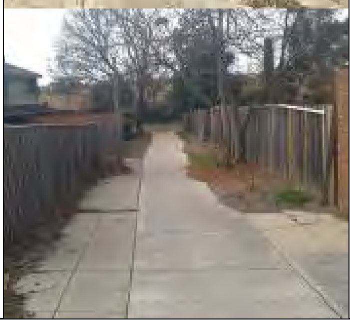
Sect	Route Section	Works estimate description	Length (m)	Estimate $ Ex GST
S1 – S6	Spofforth St - From Drake Brockman Dr & crossing to Trumper Street	• Refer Table 2 in the Report for details • S6 includes Trumper St connection (35m of new 3m wide path)	1126	[redacted]
S7	Trumper Street to Pickworth Street including crossing Pickworth Street	• "Street without paths" signage and linemarking including crossing of Pickworth St • Lighting improvements	177	
S8	Pickworth Street - Hardwick Crescent	• Demolish existing and construct new path (3m) • Improvements to Kellerman close seating plaza • Install bollards at ends of laneways • Adjust services including SW pits • Lighting improvements / relocation	448	

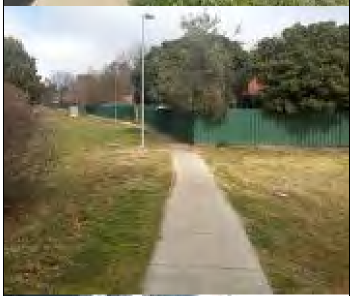
Southern route alignment details

The southern route alignment details are as shown in **Table 1** for S1 – S6 and the remainder of the route to the Hardwick Crescent Zebra crossing south of Luke Street (S7 – S8) are included in the Table below.

Identifier	***Photo***	***Existing facilities / conditions / issues***
Part S6 not included in the northern route Length 35m		*Trumper Street connection to the green corridor path (looking west)* - A strong wear path shows a possible alignment for the required new path to connect both to the green corridor path alignment and the path that connects to Messenger Street and the golf course to the west. - Sight distances should be adequate at the entry with appropriate pavement markings warning of the entry area and use of Trumper Street for active travel.

<table>
<tr><th>Identifier</th><th>Photo</th><th>Existing facilities / conditions / issues</th></tr>
<tr><td colspan="3">S7 - Trumper Street to Pickworth Street
Proposed Improvements:
• “Street without paths” pavement marking and signage (refer ACTSD-0513 and -0514)
• Lighting improvements</td></tr>
<tr><td rowspan="2">Section length 177m</td><td></td><td>Trumper Street (looking south-east)
- Trumper Street is a 7.2m wide local access loop street with no paths and currently used for both walking and cycling.
- The verges are colonised with vegetation sometimes to the kerb.</td></tr>
<tr><td></td><td>Intersection of Trumper and Pickworth Streets (from Trumper St looking south-east)
- The 1.2m wide laneway connection path is to the north of the intersection.
- Sight distances should be adequate for the crossing with appropriate pavement markings warning of the crossing point.</td></tr>
<tr><td colspan="3">S8 - Pickworth Street - Hardwick Crescent (via Starke St underpass and Kellerman Cl)
Proposed Improvements:
• Demolish existing 1.2m wide path in laneways and through green corridor (except through Starke Street underpass) and construct 3.0m wide concrete path to link to Hardwick Crescent (390m)
• Paving and placemaking improvements at Kellerman Place
• Manhole adjustments
• Lighting improvements</td></tr>
<tr><td rowspan="2">Section length 448m</td><td></td><td>Laneway connection from Pickworth Street (looking west)
- The 1.2m wide path bifurcates to two 1.2m wide paths to join on to Pickworth St laneway.
- The path shown on the left joins Pickworth St at the north side of the Trumper St tee intersection.</td></tr>
<tr><td></td><td>Laneway connection from Pickworth Street (looking west)
- A 1.2m wide path runs along the middle of a 6m wide laneway.
- Electricity poles are in close proximity to the existing path and a widened path may need to be curved to achieve acceptable clearance.</td></tr>
</table>

Identifier	***Photo***	***Existing facilities / conditions / issues***
S8 - Pickworth Street - Hardwick Crescent (cont)		*Starke Street underpass (from west looking east)* - A 1.2m wide path widens to approximately 2.4m through the underpass. - Plantation sumps each side of the path present hazards that may be addressed by realigning the opening orientations. - 1.2m wide paths connect to Starke St both sides.
		*Starke Street underpass (from east looking west)* - A 1.2m wide path widens to approximately 2.4m through the underpass. - 1.2m wide paths connect to Starke St on the south side only.
		*Laneway connection from Pickworth Street (looking north-east)* - A 2.5-3m wide segmentally paved path runs along the south side of a 4.5m wide laneway. - The path is in poor condition with trip hazards.
		*Laneway connection to Kellerman Close (looking north-east)* - A 3m wide path segmentally paved crosses Kellerman Close to a public seating / paved plaza. - Kellerman Close is a 6.5m wide local access street with flush brick kerbing internally servicing a multi-unit development with access from Powell St.
		*Kellerman Place seating plaza (looking south from laneway path to seating plaza area)* - The route traverses the paved area associated with the seating plaza that includes a pergola type covering of three bench seats and a further three bench seats shaded by a tree. - Signage may be required to assist with wayfinding.
		*Laneway connection from Kellerman Cl to green corridor (looking north-east)* - A generally 2.0m wide path in good condition runs along the middle of a 4.5m wide laneway. - The first section of the path includes segmental paving on the edges across the laneway width.

Identifier	***Photo***	***Existing facilities / conditions / issues***
S8 - Pickworth Street - Hardwick Crescent (cont)		*Green corridor connection to Hardwick St (looking north from south of the laneway connection to Kellerman Cl)* - A 1.2m wide path in generally poor condition runs adjacent property fences along the edge of a grassed drainage easement. - Light pole is located away from the required path widening.
		*Green corridor connection to Hardwick St (looking north-east)* - A 1.2m wide path in generally poor condition runs along the edge of a grassed drainage easement. - Light poles are too close to allow widening and would require relocation.
		*Green corridor connection to Hardwick St (looking south-west)* - A 1.2m wide path in generally poor condition (to the end of the fencing heading north) continues along the edge of a grassed drainage easement. - Light poles are too close to allow widening and would require relocation.
		*Green corridor to Hardwick St (looking north-east)* - A 1.2m wide path runs between a grassed drainage easement and Kippax Uniting Church. - Light poles are too close to allow widening and would require relocation. - The path is generally in good condition north from the commencement of open space associated with the Church carpark on the western side.
		*Zebra crossing on Hardwick Crescent (looking north-east to Kippax Centre)* - A 1.2m wide path runs along the middle of a 6m wide laneway.

Appendix G

Strathnairn Active Travelway Stage 1
Connection to Holt Shops / Kippax

Preliminary Cost Estimate.

Strathnairn Active Travelway - Stage 1
Ginninderry Stage 1 active travel connection to Holt Shops / Kippax
Preliminary Cost Estimate Version 3

Summary

	Section	Type	Length	
S1	Spofforth St - From Drake Brokman Dr & crossing	Path - New / widen	304.5	[redacted]
S2	Spofforth St bus stop to Grout Place	Path - Replace	75	
S3	Grout Place	Active Travel Street	80	
S4	Green corridor to Holt Shops & crossing	Path - New	344.5	
S5	Holt Shops & crossing	Path - Upgrade	97.5	
S6	Holt Shops to Trumper Street (Removed Trumper St conn)	Path - Replace	223	
	Northern Route Option			
N1	Trumper St green space to Pickworth St	Path - Replace	285	
N2	Pickworth St island blister crossing and bicycle boulevard	Active Travel Street	160	
N3	Laycock Pl to Luke St via underpass and alignment impr	Path - Replace	200	
N4	Luke Street road reserve	Path - Upgrade	120	
			1889.5	
	Total Estimate Northern route			

	Southern Route Option	Type	Length	
S6	Connection to Trumper St		35	[redacted]
S7	Trumper Street - Pickworth Street	Active Travel Street	177	
S8	Pickwoth Street - Hardwick Crescent	Path - Replace	448	
	Total Estimate Southern route		**1784.5**	

Cost Estimate R[redacted]

Path /m2
Priority crossing with platform / each
Bollards / each
Demolish path /m2
Relocate streetlights /each

Contingency
Superintendence Design and PM

Section Details

	Section	Facility Type	Length (m)	Width (m)	Comment
S1	Spofforth St - From Drake Brokman Dr & crossing	Path - Road Reserve	35	1.0	Wear path only
			260	3.0	Existing 2m path
			9.5	9.5	Priority crossing of Spofforth
S2	Spofforth St bus stop to Grout Place	Path - Laneway	75	3.0	Demolish and replace
S3	Grout Place	Active Travel Street	80		Includes crossing of Lindrum
S4	Green corridor to Holt Shops & crossing	Path - Parkland	325	3.0	New alignment through parkl
			19.5		Priority crossing of Beaurepa
S5	Holt Shops & crossing	Paths Road Reserve	12		Beaurepaire Crescent bus st
			23	3.0	Beaurepaire Crescent - wide
			9.5		Holt Place - threshold
			53	3.0	Holt Place
S6	Holt Shops to Trumper Street (Removed Trumper St conn)	Path - Laneway / park	73	3.0	Laneway (Boundary 3.0m)
			150	3.0	Green corridor
	Northern Route option	**765 m**			
N1	Trumper St green space to Pickworth St	Path - Parkland	285	3.0	
N2	Pickworth St island blister crossing and bicycle boulevard	Active Travel Street	20		Blister and crossing
			140		Active Travel Street and Layc
N3	Laycock Pl to Luke St via underpass and alignment impr	Laneway - Underpass	200	3.0	Laneway and underpass with
N4	Luke Street road reserve	Path - Road Reserve	55		Path widening
			65	3.0	Existing fully paved verge
			1889.5		

	Section	Facility Type	Length (m)	Width (m)	Comment
	Southern Route option	**660 m**			
S6	Connection to Trumper St		35	3.0	Path - new to follow desire lir
S7	Trumper Street - Pickworth Street	Active Travel Street	177		Trumper Street
S8	Pickwoth Street - Hardwick Crescent	Path - Laneways	165	3.0	Pickworth St - Kellerman Clc
			45		Kellerman Close gathering s|
		Path - Laneway	38	3.0	Laneway to green corridor 2r
		Path - Open space	200	3.0	Green corridor to Hardwick C
	Total length		**1784.5**	**105.0**	**m Difference**
				5.9%	Difference

Section Cost Estimates

Common Sections

S1 Spofforth St - From Drake Brokman Dr & crossing

	Cost / m2	Length	Width	Estimate
Path	[redacted]	35	1	[redacted]
Path		260	3	
Signage				
Cycle facility Linemarking				
Priority crossing (Minor Collector - Spofforth St)		9.5		
Lighting improvements				
Sub-total				
Contingency				
Design and PM				
Total				

S2 Spofforth St bus stop to Grout Place

		Length	Width	Estimate
Path		75	3	[redacted]
Demolish		75	3	
Signage				
Cycle facility Linemarking				
Bollards		2		

	Section	Facility Type	Length (m)	Width	Comment
	Bus stop area improvements			[redacted]	
	Manhole adjustments				
	Lighting improvements	[redacted]			
	Sub-total				
	Contingency				
	Design and PM				
	Total				

S3 Grout Place

	Cost / m2	Length	Width	Estimate
Path	[redacted]			[redacted]
Signage				
Cycle facility Linemarking				
Bollards		2		
Lighting improvements				
Sub-total				
Contingency				
Design and PM				
Total				

S4 Green corridor to Holt Shops & crossing

	Cost / m2	Length	Width	Estimate
Path	[redacted]	325	3	[redacted]
Demolish		325	3	
Signage				
Cycle facility Linemarking				
Bollards			6	
Priority crossing (Minor Collector - Beaurepaire Cr)		19.5		
Lighting improvements				
Sub-total				
Contingency				
Design and PM				
Total				

	Section	Facility Type		Length (m)	Width (m)	Comment
S5	**Holt Shops & crossing**					
		Cost / m2	**Length**	**Width**	**Estimate**	
	Path through bus stop area	[redacted]			[redacted]	
	Path widen on Beaurepaire Cr		23	1.5		
	Priority crossing (Local Access - Holt Place)		45			
	Path widen on Holt Place		53	1.5		
	Signage					
	Cycle facility Linemarking					
	Bollards		2			
	Relocate streetlights		2			
	Sub-total					
	Contingency					
	Design and PM					
	Total					
S6	**Holt Shops to Trumper Street (Removed Trumper St conn)**					
		Cost / m2	**Length**	**Width**	**Estimate**	
	Path (Laneway to Shops assume full replacement)	[redacted]	73	3	[redacted]	
	Demolish (Laneway boundaries is 3m wide)		73	1.8		
	Path (Green corridor)		150	3		
	Path (Green corridor to Trumper St - Removed)			3		
	Demolish		150	1.2		
	Signage					
	Cycle facility Linemarking					
	Bollards		2			
	Lighting improvements		5			
	Sub-total					
	Contingency					
	Design and PM					
	Total					

	Section	Facility Type	Length (m)	Width (m)	Comment
	Northern Route				
		Cost / m2	**Length**	**Width**	**Estimate**
N1	**Trumper St green space to Pickworth St**	[redacted]			
	Path (Green corridor to Pickworth St)		255	3	[redacted]
	Demolish		255	1.2	
	Signage				
	Cycle facility Linemarking				
	Bollards - open space (140m @ 1.4m spacing)		100		
	Manhole adjustments				
	Lighting improvements (7 poles upgraded)				
	Sub-total				
	Contingency				
	Design and PM				
	Total				
N2	**Pickworth St island blister crossing and bicycle boulevard**				
		Cost / m2	**Length**	**Width**	**Estimate**
	Pickworth St Island blister and Zebra crossing (raised platform)				[redacted]
	Laycock Pl Zebra crossing (raised platform)				
	Threshold treatment (include speed cushions)				
	Signage				
	Cycle facility - active travel street linemarking	[redacted]			
	Bollards	$	4		
	Lighting improvements 5 poles and crossing lighting x 2				
	Sub-total				
	Contingency				
	Design and PM				
	Total				

	Section	Facility Type	Length (m)	Width (m)	Comment

N3 Laycock Pl to Luke St via underpass and alignment impr

	Cost / m2	Length	Width	Estimate
Path (Laycock St to Underpass)	[redacted]	120	3	[redacted]
Demolish (Laycock St to Underpass)		120	1.2	
Path (Underpass to Luke St)		50	3	
Demolish (Underpass to Luke S)		50	1.2	
Wall construction and cut earthworks		20	1	
Signage				
Cycle facility Linemarking				
Bollards		4		
Lighting improvements 5 poles and crossing lighting x 2				
Sub-total				
Contingency				
Design and PM				
Total				

N4 Luke Street road reserve

	Cost / m2	Length	Width	Estimate
Path	[redacted]	40	3	[redacted]
Demolish		40	3	
Signage				
Cycle facility Linemarking				
Driveway crossing coloured treatment		2		
Paved verge deliniation and planter boxes				
Services adjustments				
Lighting improvements		4		
Sub-total				
Contingency				
Design and PM				
Total				

	Section	Facility Type	Length (m)	Width (m)	Comment
	Southern Option				
S7	**Trumper Street - Pickworth Street**				

	Cost / m2	Length	Width	Estimate
Path	[redacted]			[redacted]
Signage				
Cycle facility Linemarking				
Bollards		2		
Lighting improvements				
Sub-total				
Contingency				
Design and PM				
Total				

S8 Pickwoth Street - Hardwick Crescent

	Cost / m2	Length	Width	Estimate	Improvement %
Path (Pickworth St - Kellerman Cl - 90%)	[redacted]	148.5	3	[redacted]	90%
Demolish (Except through underpass - 90%)		148.5	1.2		90%
Paving and placemaking improvements - Kellerman Pl					
Path (Kellerman Cl to Open space)		38	3		100%
Demolish (100%)		38	1.8		100%
Path (Open space)		200	3		100%
Demolish (100%)		200	1.2		100%
Signage					
Cycle facility Linemarking					
Bollards		2			
Adjust SW pits and 2x MHs					
Lighting improvements (except open space)					
Sub-total					
Contingency					
Design and PM					
Total					

1.0 Traffic Analysis

1.1 Background

1.1.1 Data Sources

Intersection traffic counts were undertaken by BVY Traffic Survey in May 2016 for each of the seven intersections along Drake Brockman Drive (from Britten-Jones Drive to Kingsford Smith Drive inclusive). Classified traffic counts were also undertaken at three locations along the length of Drake Brockman Drive (east of Trickett Street, west of Cussens Street and east of Cussens Street) and also on William Hovell Drive (south of Drake Brockman Drive).

Traffic modelling was undertaken by AECOM in 2015 using the microsimulation modelling tool Commuter as part of the development works for Ginninderry. The projected future volumes for Drake Brockman Drive and the connecting minor streets for 2021 and 2031 were determined using this model. The 2026 projected volumes were extrapolated from these models.

1.1.2 Roads

The key roads are outlined below and detailed in terms of their road hierarchy, purpose and design. A road hierarchy summary is provided in Table 1.

Table 1 Road Hierarchy

Name	Road Hierarchy
Drake Brockman Drive	Arterial Road
Stockdill Drive	Arterial Road
William Hovell Drive	Arterial Road
Kingsford Smith Drive	Arterial Road
Kinsella Street	Access Street
Cussens Street	Access Street
Macnaughton Street	Major Collector
Trickett Street	Minor Collector
Spofforth Street	Major Collector
Britten-Jones Drive	Access Street

Drake Brockman Drive is an arterial road located between William Hovell Drive and Spofforth Street. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally between 3.5 and 6 m, with a total pavement width of around 12 m. Daily traffic volumes are currently up to about 9,100 vpd. There are four minor roads to the north of Drake Brockman Drive and approximately four rural property access locations to the south of the road.

Stockdill Drive is an arterial road located between the western extent of Drake Brockman Drive and the Lower Molonglo Water Quality Control Centre. It is a two-lane single-carriageway with a single lane in each direction. Lane widths are generally around 3.5 m, with a total pavement width of around 7 m. Daily traffic volumes are currently up to 700 vpd. There is an access road to the Magpies Golf Club (Britten-Jones Drive) to the north of the road and approximately nine rural property access locations on the road.

William Hovell Drive is an arterial road which connects the Glenloch Interchange in the south to Kingsford Smith Drive in the north. In close proximity to Drake Brockman Drive, it is generally a three-lane carriageway with two lanes northbound and a single southbound lane. The carriageway separates on approach to the Drake Brockman Drive roundabout. Lane widths are generally around 4 m, with a varying total pavement width for the length of the road. Daily traffic volumes are currently up to 17,800 vpd in proximity to Drake Brockman Drive.

Kingsford Smith Drive is an arterial road which connects William Hovell Drive in the south to Kuringa Drive in the north. In close proximity to Drake Brockman Drive, it is generally a four-lane dual-carriageway with two lanes in each direction. Lane widths are generally around 3.5 m, with an 11 m median island. Daily traffic volumes are currently about 17,400 vpd in proximity to Drake Brockman Drive.

Kinsella Street is an access street which connects to the north of Drake Brockman Drive. It provides access to the Higgins residential area. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 5 m. Daily traffic volumes are currently up to 800 vpd in proximity to Drake Brockman Drive.

Cussens Street is an access street which connects to the north of Drake Brockman Drive. It provides access to the Higgins residential area. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 5 m. Daily traffic volumes are currently up to 1,600 vpd in proximity to Drake Brockman Drive.

Macnaughton Street is a major collector road which connects to the north of Drake Brockman Drive. It provides access to the Holt residential area. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 5m. Daily traffic volumes are currently up to 3,300 vpd in proximity to Drake Brockman Drive.

Trickett Street is a minor collector road which connects to the north of Drake Brockman Drive. It provides access to the Holt residential area. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 5 m. Daily traffic volumes are currently up to 3,000 vpd in proximity to Drake Brockman Drive.

Spofforth Street is a minor collector road which connects to the north of Drake Brockman Drive. It provides access to the Holt residential area and connectivity to Southern Cross Drive. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 5 m. Daily traffic volumes are currently up to 1,800 vpd in proximity to Drake Brockman Drive.

Britten-Jones Drive is an access street which connects to the north of Drake Brockman Drive. It provides access to the Magpies Golf Club and residential areas. It is a two-lane single-carriageway road with a single lane in each direction. Lane widths are generally around 3.5 m. Daily traffic volumes are currently up to 1,000 vpd in proximity to Drake Brockman Drive.

1.2 Intersection Analysis

AECOM undertook traffic analysis in August 2017 to using SIDRA 6.1 intersection analysis software of the Drake Brockman Drive (DBD) corridor. The analysis looked at the proposed layout of the Stage 2 DBD development and the impact of the future 2021, 2026 and 2031 traffic volumes.

Concerns were raised regarding the required future duplication of DBD and the likely lifespan of the Stage 2 construction works in relation to the future DBD traffic volumes. Duplication of DBD will be required in the future, however this is dependent on the rate of development of Ginninderry.

The SIDRA analysis undertaken primarily focused on the operation and capacity of DBD to accommodate the future volumes as a result of the development of Ginninderry. The linked model analysed the impacts on the DBD intersections and the flow on effects to each other.

The image below (Figure 1) indicates the extent of the SIDRA modelling for DBD and the form of control at each of the modelled intersections.

The results of the SIDRA modelling are summarised in Table 2, for 2021, 2026 and 2031, AM and PM peaks. The SIDRA layouts and detailed results are included in Appendix A.

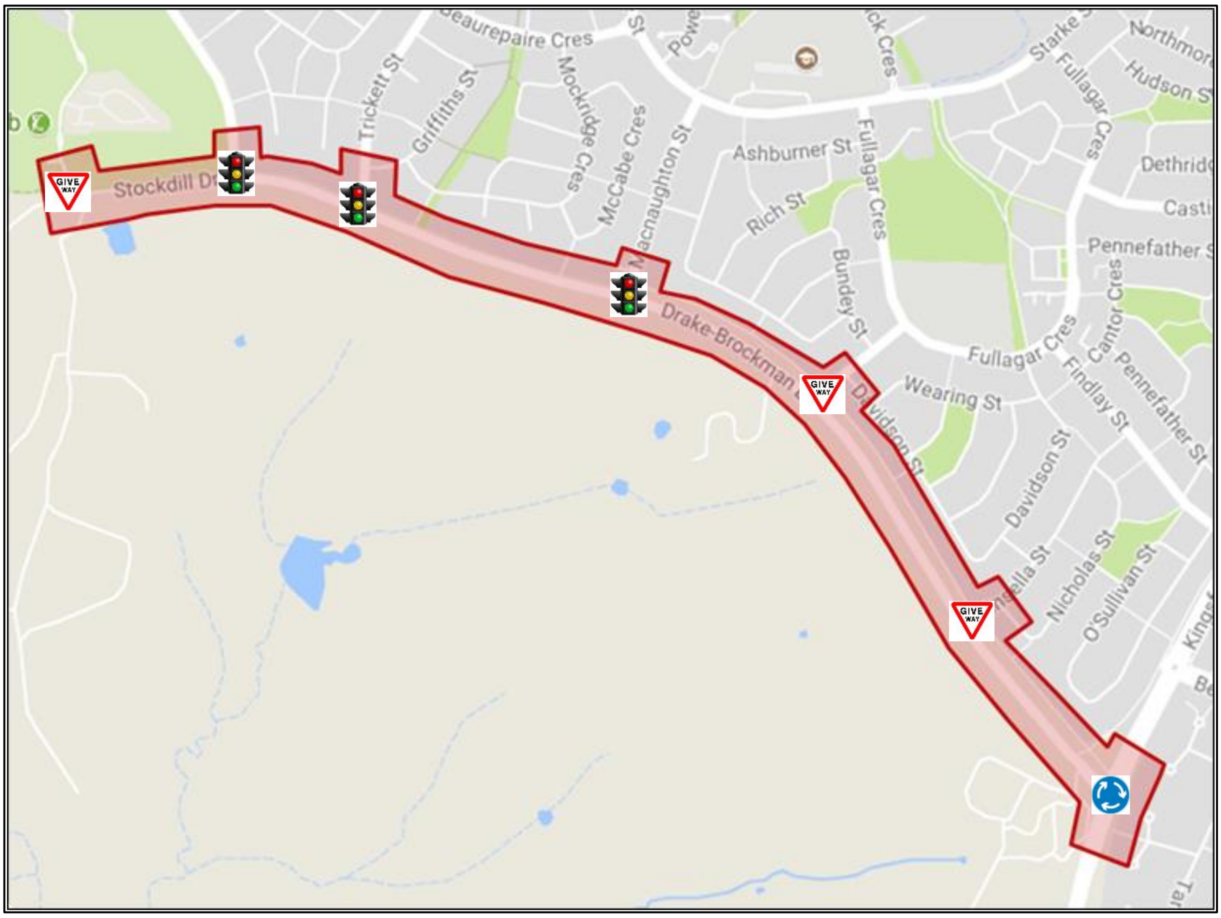


Figure 1 SIDRA Model Extents

Table 2 SIDRA Results Summary

Intersection	Year	Peak	Overall Intersection Results		
			Average LOS	Average Delay (s)	DOS
Stockdill / Britten-Jones	2021	AM	-	2	0.27
		PM	-	4	0.39
	2026	AM	-	2	0.43
		PM	-	3	0.30
	2031	AM	-	54	1.16
		PM	-	2	0.44
Spofforth / Stockdill / DBD	2021	AM	A	9	0.40
		PM	A	9	0.35
	2026	AM	B	12	0.77
		PM	B	13	0.97
	2031	AM	F	156	1.18
		PM	B	13	0.87

Intersection	Year	Peak	Overall Intersection Results		
			Average LOS	Average Delay (s)	DOS
Trickett / DBD	2021	AM	C	27	0.89
		PM	C	30	0.88
	2026	AM	C	25	0.91
		PM	B	19	0.65
	2031	AM	D	36	1.00
		PM	B	17	0.84
Macnaughton / DBD	2021	AM	B	20	0.89
		PM	C	21	0.90
	2026	AM	C	23	0.90
		PM	B	16	0.68
	2031	AM	C	27	0.93
		PM	B	15	0.89
Cussen / DBD	2021	AM	-	3	0.58
		PM	-	2	0.56
	2026	AM	-	3	0.70
		PM	-	1	0.65
	2031	AM	-	2	0.77
		PM	-	1	0.72
Kinsella / DBD	2021	AM	-	2	0.58
		PM	-	1	0.68
	2026	AM	-	6	0.90
		PM	-	2	0.79
	2031	AM	-	120	2.46
		PM	-	4	1.00
DBD / WHD / KSD	2021	AM	A	7	0.55
		PM	A	9	0.66
	2026	AM	B	15	1.00
		PM	B	14	0.84
	2031	AM	C	26	1.04
		PM	D	45	1.06

The results, as shown in Table 2 above, indicate that the intersection designs proposed for DBD Stage 2 will generally operate in an acceptable manner in 2026, with some congestion likely to appear before 2031.

Congestion issues that are likely to appear between 2026 and 2031 are:

- Generally, there will be inadequate through capacity on Stockdill Drive and Drake Brockman Drive, resulting in the likely need to duplicate these roads prior to 2031.
- Significant delays and queueing is expected at the Spofforth Street and Trickett Street intersections by 2031, with a need for additional through capacity before 2031. The approaches to these intersections and the link between them will need to be duplicated. The duplication of the remainder of the road could be delayed.
- The design proposed at the Macnaughton Street intersection (including two through lanes) will provide sufficient capacity to post 2031.
- Significant delays and queues at the Kinsella Street intersection by 2031 indicate that this intersection will need to signalised, with two through lanes, prior to 2031. The early installation of signals here will assist pedestrian movements for the proposed nearby bus stop.
- Significant delays and queues at the William Hovell Drive roundabout by 2031 indicates that part-time signals will need to be installed there prior to 2031. Additional capacity may also be needed.

1.3 Conclusion

The intersection analyses have shown that the planned Stage 2 design will operate satisfactorily until at least 2026, possibly through to about 2028/29. At this time, the through capacity would need to be increased at the signalised intersections of Spofforth Street and Trickett Street, including duplication of the link between these intersections.

The Kinsella Street intersection would also need to be signalised with two through lanes, possibly earlier to enable safer access to the proposed nearby bus stops. Furthermore, part-time signals would need to be introduced at the William Hovell Drive roundabout. Consideration could be given to bringing this latter work forward also to coincide with the likely extension of the southbound merge on William Hovell Drive, south of the roundabout.

Improvements to the capacity of intersections should delay the need for full duplication of the road until post-2031.

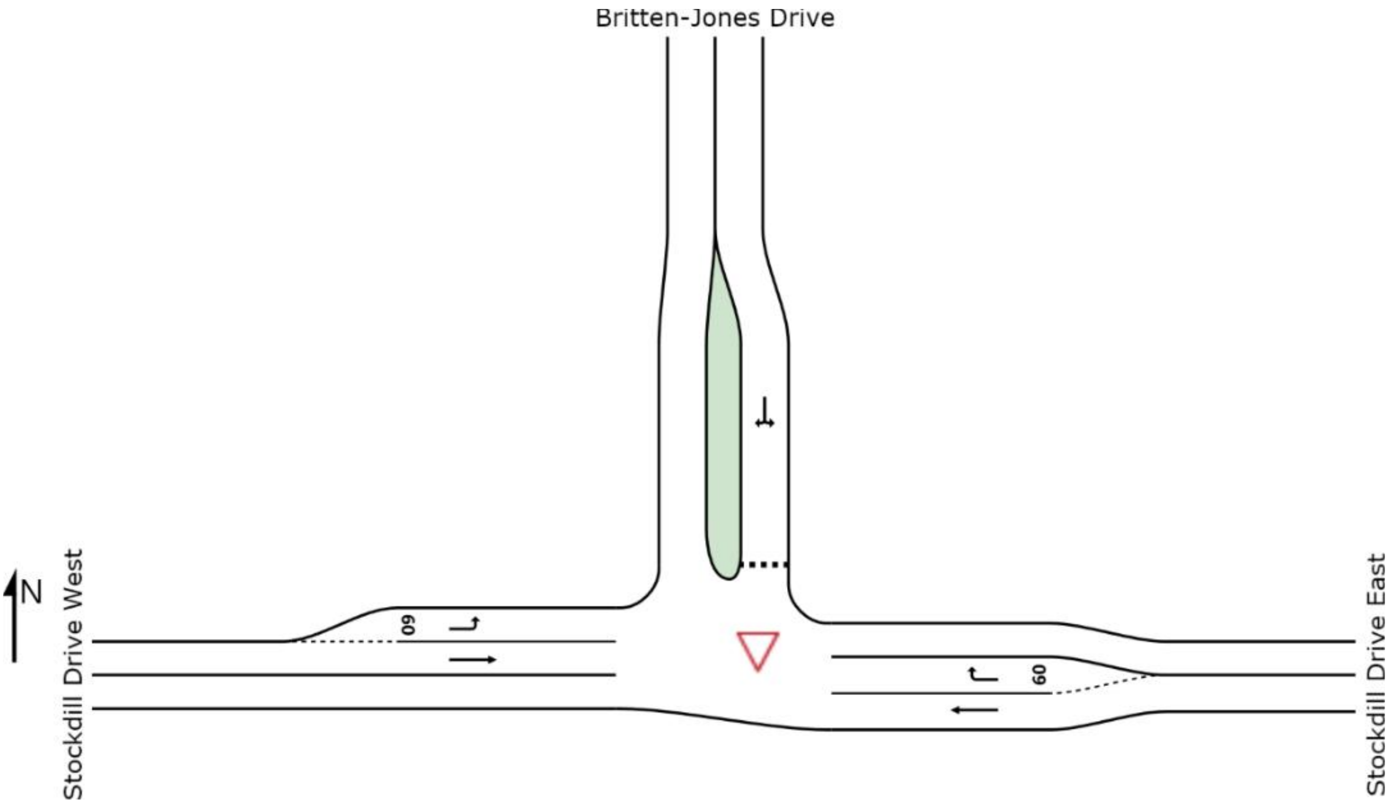
Appendix A

SIDRA Outputs

SITE LAYOUT

▽ Site: 2021 AM Stockdill Drive / Britten-Jones Drive

Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 2021 AM Stockdill Drive / Britten-Jones Drive

Network: 2021 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	232	2.5	232	2.5	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	38	2.5	38	2.5	0.049	8.4	LOS A	0.2	1.3	0.52	0.71	50.0
Approach		270	2.5	270	2.5	0.118	1.2	NA	0.2	1.3	0.07	0.10	58.4
North: Britten-Jones Drive													
7	L2	67	2.5	67	2.5	0.094	8.5	LOS A	0.3	2.3	0.51	0.74	47.0
9	R2	1	2.5	1	2.5	0.094	11.4	LOS B	0.3	2.3	0.51	0.74	51.4
Approach		68	2.5	68	2.5	0.094	8.6	LOS A	0.3	2.3	0.51	0.74	47.1
West: Stockdill Drive West													
10	L2	5	2.5	5	2.5	0.003	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	523	2.5	523	2.5	0.270	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		528	2.5	528	2.5	0.270	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehicles		866	2.5	866	2.5	0.270	1.1	NA	0.3	2.3	0.06	0.09	58.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2021 PM Stockdill Drive / Britten-Jones Drive

Network: 2021 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	207	2.5	207	2.5	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	412	2.5	412	2.5	0.391	7.6	LOS A	2.2	16.0	0.48	0.71	50.7
Approach		619	2.5	619	2.5	0.391	5.1	NA	2.2	16.0	0.32	0.47	53.5
North: Britten-Jones Drive													
7	L2	31	2.5	31	2.5	0.034	6.7	LOS A	0.1	0.8	0.35	0.60	48.9
9	R2	1	2.5	1	2.5	0.034	12.9	LOS B	0.1	0.8	0.35	0.60	52.5
Approach		32	2.5	32	2.5	0.034	6.9	LOS A	0.1	0.8	0.35	0.60	49.1
West: Stockdill Drive West													
10	L2	15	2.5	15	2.5	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	275	2.5	275	2.5	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		290	2.5	290	2.5	0.142	0.3	NA	0.0	0.0	0.00	0.03	59.3
All Vehicles		941	2.5	941	2.5	0.391	3.7	NA	2.2	16.0	0.22	0.34	54.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 AM Stockdill Drive / Britten-Jones Drive

Network: 2026 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	354	2.5	354	2.5	0.180	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	39	2.5	39	2.5	0.084	12.1	LOS B	0.3	2.1	0.69	0.87	47.2
Approach		393	2.5	393	2.5	0.180	1.2	NA	0.3	2.1	0.07	0.09	58.4
North: Britten-Jones Drive													
7	L2	65	2.5	65	2.5	0.157	12.5	LOS B	0.5	3.7	0.71	0.88	42.4
9	R2	1	2.5	1	2.5	0.157	34.9	LOS D	0.5	3.7	0.71	0.88	48.5
Approach		66	2.5	66	2.5	0.157	12.9	LOS B	0.5	3.7	0.71	0.88	42.6
West: Stockdill Drive West													
10	L2	8	2.5	8	2.5	0.004	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	824	2.5	824	2.5	0.425	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		832	2.5	832	2.5	0.425	0.1	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		1291	2.5	1291	2.5	0.425	1.1	NA	0.5	3.7	0.06	0.07	58.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 PM Stockdill Drive / Britten-Jones Drive

Network: 2026 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	545	2.5	545	2.5	0.277	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	284	2.5	284	2.5	0.304	8.0	LOS A	1.4	10.0	0.51	0.74	50.4
Approach		829	2.5	829	2.5	0.304	2.7	NA	1.4	10.0	0.17	0.25	56.3
North: Britten-Jones Drive													
7	L2	46	2.5	46	2.5	0.057	7.4	LOS A	0.2	1.4	0.43	0.66	48.2
9	R2	2	2.5	2	2.5	0.057	12.5	LOS B	0.2	1.4	0.43	0.66	52.1
Approach		48	2.5	48	2.5	0.057	7.6	LOS A	0.2	1.4	0.43	0.66	48.5
West: Stockdill Drive West													
10	L2	15	2.5	15	2.5	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	375	2.5	375	2.5	0.193	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		390	2.5	390	2.5	0.193	0.2	NA	0.0	0.0	0.00	0.02	59.4
All Vehicles		1267	2.5	1267	2.5	0.304	2.2	NA	1.4	10.0	0.13	0.20	56.7

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

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

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

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:06:24 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2031 AM Stockdill Drive / Britten-Jones Drive

Network: 2031 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	476	2.5	476	2.5	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	39	2.5	39	2.5	0.171	21.2	LOS C	0.5	3.8	0.86	0.95	41.6
Approach		515	2.5	515	2.5	0.242	1.6	NA	0.5	3.8	0.07	0.07	58.0
North: Britten-Jones Drive													
7	L2	63	2.5	63	2.5	0.630	73.8	LOS F	2.5	18.2	0.97	1.10	17.6
9	R2	1	2.5	1	2.5	0.630	111.6	LOS F	2.5	18.2	0.97	1.10	26.8
Approach		64	2.5	64	2.5	0.630	74.4	LOS F	2.5	18.2	0.97	1.10	17.8
West: Stockdill Drive West													
10	L2	11	2.5	11	2.5	0.006	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	1126	2.5	1126	2.5	1.162	77.3	LOS F	72.3	517.2	0.00	0.00	17.3
Approach		1137	2.5	1137	2.5	1.162	76.6	NA	72.3	517.2	0.00	0.01	17.6
All Vehicles		1716	2.5	1716	2.5	1.162	54.0	NA	72.3	517.2	0.06	0.07	24.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2031 PM Stockdill Drive / Britten-Jones Drive

Network: 2031 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Stockdill Drive East													
5	T1	884	2.5	863	2.5	0.438	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	156	2.5	152	2.5	0.186	8.4	LOS A	0.7	5.0	0.50	0.75	50.0
Approach		1040	2.5	1015 N1	2.5	0.438	1.3	NA	0.7	5.0	0.07	0.11	58.2
North: Britten-Jones Drive													
7	L2	60	2.5	60	2.5	0.084	8.1	LOS A	0.3	2.1	0.49	0.72	47.3
9	R2	3	2.5	3	2.5	0.084	12.3	LOS B	0.3	2.1	0.49	0.72	51.6
Approach		63	2.5	63	2.5	0.084	8.3	LOS A	0.3	2.1	0.49	0.72	47.7
West: Stockdill Drive West													
10	L2	15	2.5	15	2.5	0.008	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
11	T1	476	2.5	476	2.5	0.246	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		491	2.5	491	2.5	0.246	0.2	NA	0.0	0.0	0.00	0.02	59.5
All Vehicles		1594	2.5	1569 N1	2.5	0.438	1.2	NA	0.7	5.0	0.07	0.11	58.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

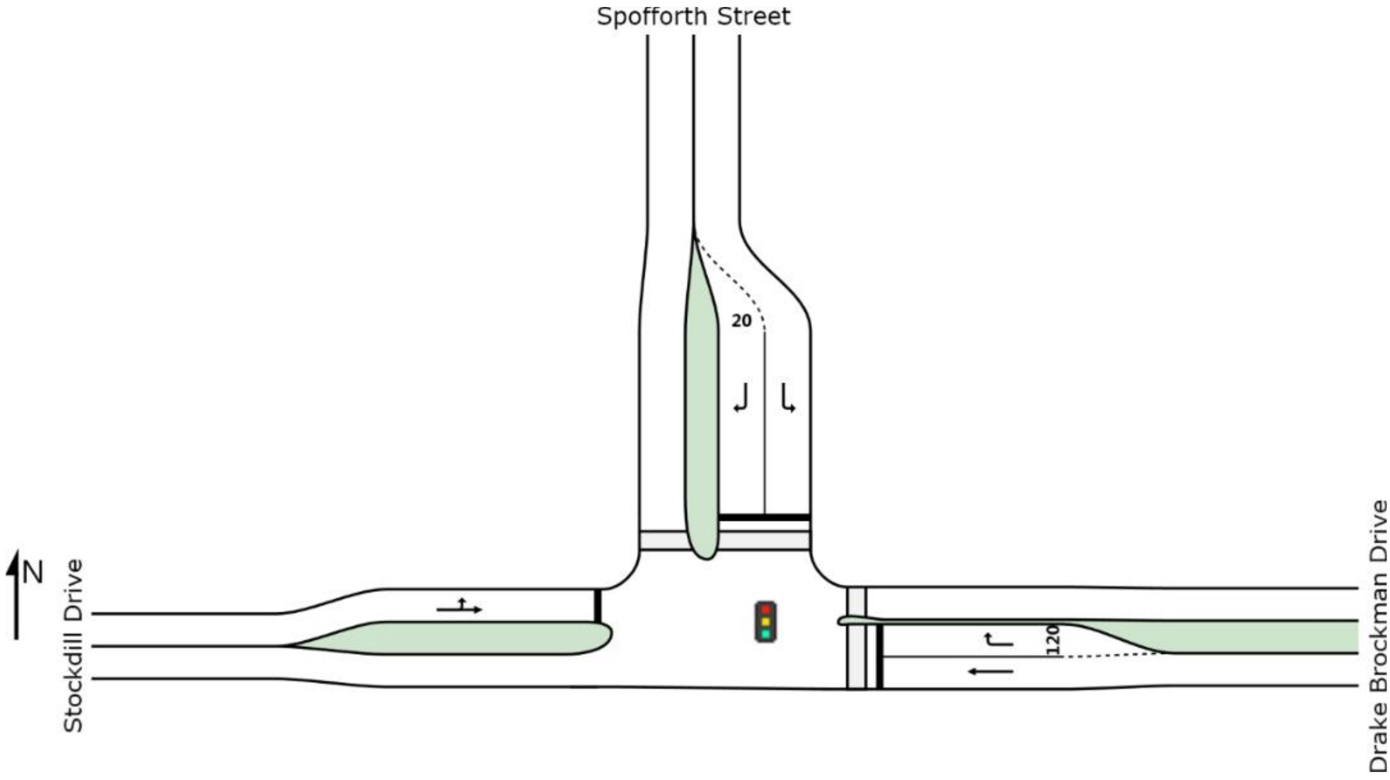
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:08:12 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

SITE LAYOUT

Site: 2021 AM DBD / Spofforth Street / Stockdill Drive

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 2021 AM DBD / Spofforth Street / Stockdill Drive

Network: 2021 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	234	2.5	234	2.5	0.147	1.8	LOS A	2.2	15.4	0.21	0.18	54.5
6	R2	8	2.5	8	2.5	0.072	55.9	LOS E	0.4	2.8	0.97	0.66	31.5
Approach		242	2.5	242	2.5	0.147	3.6	LOS A	2.2	15.4	0.23	0.19	50.6
North: Spofforth Street													
7	L2	29	2.5	29	2.5	0.243	56.9	LOS E	1.4	10.3	0.99	0.71	26.8
9	R2	1	2.5	1	2.5	0.008	54.3	LOS D	0.0	0.3	0.96	0.58	27.5
Approach		30	2.5	30	2.5	0.243	56.8	LOS E	1.4	10.3	0.99	0.71	26.8
West: Stockdill Drive													
10	L2	161	2.5	161	2.5	0.396	12.2	LOS B	10.5	75.3	0.45	0.50	52.2
11	T1	368	2.5	368	2.5	0.396	6.6	LOS A	10.5	75.3	0.45	0.50	44.0
Approach		529	2.5	529	2.5	0.396	8.3	LOS A	10.5	75.3	0.45	0.50	48.3
All Vehicles		801	2.5	801	2.5	0.396	8.7	LOS A	10.5	75.3	0.40	0.42	46.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	10.1	LOS B	0.0	0.0	0.45	0.45
All Pedestrians		42	27.2	LOS C			0.70	0.70

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

MOVEMENT SUMMARY

Site: 2021 PM DBD / Spofforth Street / Stockdill Drive

Network: 2021 PM

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	548	2.5	548	2.5	0.345	1.6	LOS A	3.9	27.9	0.16	0.14	55.2
6	R2	40	2.5	40	2.5	0.241	53.3	LOS D	1.9	13.6	0.97	0.73	32.1
Approach		588	2.5	588	2.5	0.345	5.1	LOS A	3.9	27.9	0.22	0.18	48.2
North: Spofforth Street													
7	L2	29	2.5	29	2.5	0.243	56.9	LOS E	1.4	10.3	0.99	0.71	26.8
9	R2	6	2.5	6	2.5	0.050	55.3	LOS E	0.3	2.1	0.97	0.65	27.2
Approach		35	2.5	35	2.5	0.243	56.6	LOS E	1.4	10.3	0.98	0.70	26.9
West: Stockdill Drive													
10	L2	81	2.5	81	2.5	0.230	12.4	LOS B	5.5	39.2	0.42	0.46	52.2
11	T1	213	2.5	213	2.5	0.230	6.8	LOS A	5.5	39.2	0.42	0.46	43.9
Approach		294	2.5	294	2.5	0.230	8.3	LOS A	5.5	39.2	0.42	0.46	47.9
All Vehicles		917	2.5	917	2.5	0.345	8.1	LOS A	5.5	39.2	0.31	0.29	45.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	11.5	LOS B	0.0	0.0	0.48	0.48
All Pedestrians		42	27.9	LOS C			0.71	0.71

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:05:25 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2026 AM DBD / Spofforth Street / Stockdill Drive

Network: 2026 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	354	2.5	354	2.5	0.223	2.0	LOS A	3.6	25.9	0.23	0.20	54.0
6	R2	9	2.5	9	2.5	0.081	55.9	LOS E	0.4	3.1	0.97	0.67	31.4
Approach		363	2.5	363	2.5	0.223	3.4	LOS A	3.6	25.9	0.25	0.21	51.0
North: Spofforth Street													
7	L2	91	2.5	91	2.5	0.764	61.4	LOS E	4.8	34.7	1.00	0.87	25.7
9	R2	1	2.5	1	2.5	0.008	54.3	LOS D	0.0	0.3	0.96	0.58	27.5
Approach		92	2.5	92	2.5	0.764	61.3	LOS E	4.8	34.7	1.00	0.86	25.7
West: Stockdill Drive													
10	L2	170	2.5	170	2.5	0.621	14.0	LOS B	21.3	152.1	0.58	0.58	51.3
11	T1	664	2.5	664	2.5	0.621	8.4	LOS A	21.3	152.1	0.58	0.58	42.2
Approach		834	2.5	834	2.5	0.621	9.6	LOS A	21.3	152.1	0.58	0.58	45.7
All Vehicles		1289	2.5	1289	2.5	0.764	11.5	LOS B	21.3	152.1	0.51	0.50	42.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	10.1	LOS B	0.0	0.0	0.45	0.45
All Pedestrians		42	27.2	LOS C			0.70	0.70

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

MOVEMENT SUMMARY

Site: 2026 PM DBD / Spofforth Street / Stockdill Drive

Network: 2026 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	755	2.5	755	2.5	0.475	1.8	LOS A	6.3	44.8	0.19	0.17	54.7
6	R2	40	2.5	40	2.5	0.310	56.2	LOS E	2.0	14.1	0.99	0.73	31.4
Approach		795	2.5	795	2.5	0.475	4.5	LOS A	6.3	44.8	0.23	0.20	49.0
North: Spofforth Street													
7	L2	115	2.5	115	2.5	0.973	82.1	LOS F	7.4	52.8	1.00	1.10	21.5
9	R2	8	2.5	8	2.5	0.067	55.5	LOS E	0.4	2.8	0.97	0.66	27.1
Approach		123	2.5	123	2.5	0.973	80.3	LOS F	7.4	52.8	1.00	1.08	21.8
West: Stockdill Drive													
10	L2	76	2.5	76	2.5	0.297	12.0	LOS B	7.3	52.4	0.42	0.43	52.8
11	T1	317	2.5	317	2.5	0.297	6.4	LOS A	7.3	52.4	0.42	0.43	45.2
Approach		393	2.5	393	2.5	0.297	7.5	LOS A	7.3	52.4	0.42	0.43	48.0
All Vehicles		1311	2.5	1311	2.5	0.973	12.5	LOS B	7.4	52.8	0.36	0.35	40.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	10.6	LOS B	0.0	0.0	0.46	0.46
All Pedestrians		42	27.4	LOS C			0.70	0.70

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

MOVEMENT SUMMARY

Site: 2031 AM DBD / Spofforth Street / Stockdill Drive

Network: 2031 AM

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	474	2.5	474	2.5	0.298	2.3	LOS A	5.4	38.5	0.26	0.23	53.4
6	R2	11	2.5	11	2.5	0.099	56.1	LOS E	0.5	3.8	0.97	0.67	31.4
Approach		485	2.5	485	2.5	0.298	3.5	LOS A	5.4	38.5	0.27	0.24	50.7
North: Spofforth Street													
7	L2	89	2.5	89	2.5	1.100	168.1	LOS F	8.8	62.9	1.00	1.29	12.9
9	R2	1	2.5	1	2.5	0.008	54.3	LOS D	0.0	0.3	0.96	0.58	27.5
Approach		90	2.5	90	2.5	1.100	166.8	LOS F	8.8	62.9	1.00	1.28	13.0
West: Stockdill Drive													
10	L2	180	2.5	180	2.5	1.184	224.2	LOS F	82.2	587.5	1.00	2.17	14.1
11	T1	960	2.5	960	2.5	1.184	218.6	LOS F	82.2	587.5	1.00	2.17	5.6
Approach		1140	2.5	1140	2.5	1.184	219.5	LOS F	82.2	587.5	1.00	2.17	7.2
All Vehicles		1715	2.5	1715	2.5	1.184	155.6	LOS F	82.2	587.5	0.79	1.57	9.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	10.1	LOS B	0.0	0.0	0.45	0.45
All Pedestrians		42	27.2	LOS C			0.70	0.70

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

MOVEMENT SUMMARY

Site: 2031 PM DBD / Spofforth Street / Stockdill Drive

Network: 2031 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive													
5	T1	963	2.5	938	2.5	0.612	4.5	LOS A	18.3	130.7	0.44	0.41	48.1
6	R2	39	2.5	38	2.5	0.343	57.7	LOS E	1.9	13.5	0.98	0.73	31.0
Approach		1002	2.5	976 N1	2.5	0.612	6.6	LOS A	18.3	130.7	0.46	0.42	45.0
North: Spofforth Street													
7	L2	151	2.5	151	2.5	0.865	63.0	LOS E	8.3	59.4	1.00	0.96	25.3
9	R2	11	2.5	11	2.5	0.062	51.6	LOS D	0.5	3.6	0.94	0.67	28.2
Approach		162	2.5	162	2.5	0.865	62.2	LOS E	8.3	59.4	1.00	0.94	25.5
West: Stockdill Drive													
10	L2	70	2.5	70	2.5	0.381	13.3	LOS B	10.4	74.6	0.48	0.47	52.0
11	T1	421	2.5	421	2.5	0.381	7.7	LOS A	10.4	74.6	0.48	0.47	43.6
Approach		491	2.5	491	2.5	0.381	8.5	LOS A	10.4	74.6	0.48	0.47	46.1
All Vehicles		1655	2.5	1629 N1	2.5	0.865	12.7	LOS B	18.3	130.7	0.52	0.49	39.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

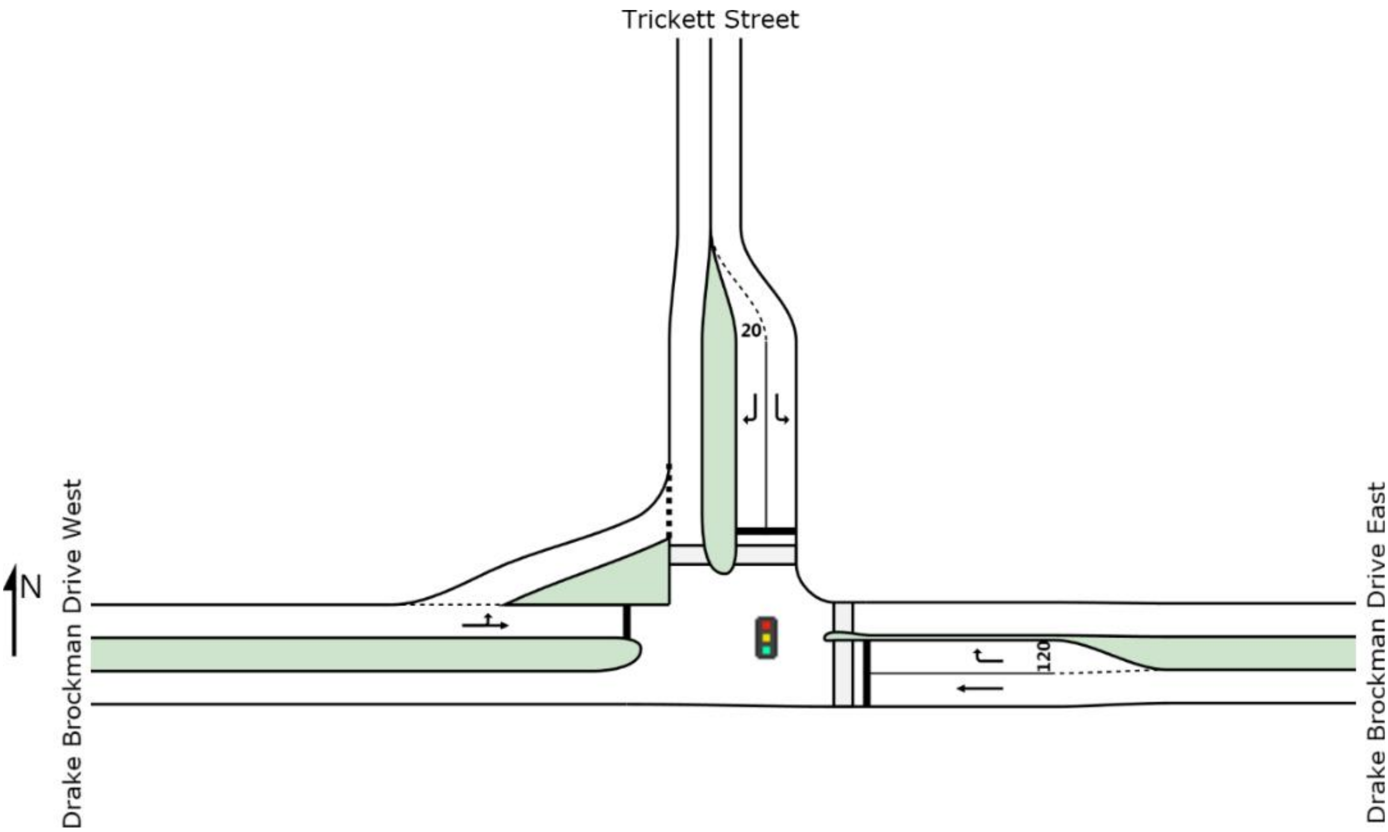
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	11.5	LOS B	0.0	0.0	0.48	0.48
All Pedestrians		42	27.9	LOS C			0.71	0.71

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

SITE LAYOUT

Site: 2021 AM DBD / Trickett Street

Signals - Fixed Time Isolated



Organisation: AECOM AUSTRALIA PTY LTD | Created: Thursday, 27 July 2017 9:26:15 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2021 AM DBD / Trickett Street

Network: 2021 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	224	2.5	224	2.5	0.165	5.3	LOS A	3.6	25.6	0.36	0.30	52.7
6	R2	102	2.5	102	2.5	0.553	54.1	LOS D	5.0	35.7	1.00	0.78	33.0
Approach		326	2.5	326	2.5	0.553	20.6	LOS C	5.0	35.7	0.56	0.45	41.5
North: Trickett Street													
7	L2	283	2.5	283	2.5	0.886	60.5	LOS E	15.9	113.9	1.00	0.98	20.6
9	R2	10	2.5	10	2.5	0.031	42.0	LOS D	0.4	2.9	0.85	0.67	25.6
Approach		293	2.5	293	2.5	0.886	59.9	LOS E	15.9	113.9	0.99	0.97	20.7
West: Drake Brockman Drive West													
10	L2	18	2.5	18	2.5	0.534	18.2	LOS B	13.1	93.7	0.52	0.48	46.8
11	T1	541	2.5	541	2.5	0.534	12.5	LOS B	13.1	93.7	0.52	0.48	35.1
Approach		559	2.5	559	2.5	0.534	12.7	LOS B	13.1	93.7	0.52	0.48	35.8
All Vehicles		1178	2.5	1178	2.5	0.886	26.6	LOS C	15.9	113.9	0.65	0.60	31.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	40.5	LOS E	0.1	0.1	0.90	0.90
P3	North Full Crossing	21	15.7	LOS B	0.0	0.0	0.56	0.56
All Pedestrians		42	28.1	LOS C			0.73	0.73

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

MOVEMENT SUMMARY

Site: 2021 PM DBD / Trickett Street

Network: 2021 PM

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	414	2.5	414	2.5	0.305	6.0	LOS A	7.5	53.6	0.41	0.36	51.8
6	R2	347	2.5	347	2.5	0.483	30.2	LOS C	11.9	85.0	0.75	0.79	40.8
Approach		761	2.5	761	2.5	0.483	17.0	LOS B	11.9	85.0	0.56	0.56	44.6
North: Trickett Street													
7	L2	283	2.5	283	2.5	0.882	60.0	LOS E	15.8	113.3	1.00	0.98	20.7
9	R2	8	2.5	8	2.5	0.024	41.9	LOS D	0.3	2.3	0.85	0.67	25.7
Approach		291	2.5	291	2.5	0.882	59.5	LOS E	15.8	113.3	1.00	0.97	20.8
West: Drake Brockman Drive West													
10	L2	21	2.5	21	2.5	0.469	40.7	LOS D	9.7	69.1	0.93	0.79	34.2
11	T1	207	2.5	207	2.5	0.469	35.1	LOS D	9.7	69.1	0.93	0.79	20.1
Approach		228	2.5	228	2.5	0.469	35.6	LOS D	9.7	69.1	0.93	0.79	22.1
All Vehicles		1280	2.5	1280	2.5	0.882	30.0	LOS C	15.8	113.3	0.73	0.69	34.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	40.5	LOS E	0.1	0.1	0.90	0.90
P3	North Full Crossing	21	36.2	LOS D	0.1	0.1	0.85	0.85
All Pedestrians		42	38.3	LOS D			0.88	0.88

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

MOVEMENT SUMMARY

Site: 2026 AM DBD / Trickett Street

Network: 2026 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	355	2.5	355	2.5	0.262	5.7	LOS A	6.2	44.1	0.39	0.34	52.1
6	R2	98	2.5	98	2.5	0.759	60.5	LOS E	5.2	37.2	1.00	0.87	31.4
Approach		453	2.5	453	2.5	0.759	17.6	LOS B	6.2	44.1	0.52	0.45	42.7
North: Trickett Street													
7	L2	291	2.5	291	2.5	0.910	64.5	LOS E	17.1	122.0	1.00	1.01	19.7
9	R2	10	2.5	10	2.5	0.031	42.0	LOS D	0.4	2.9	0.85	0.67	25.6
Approach		301	2.5	301	2.5	0.910	63.7	LOS E	17.1	122.0	1.00	1.00	19.9
West: Drake Brockman Drive West													
10	L2	21	2.5	21	2.5	0.776	20.4	LOS C	27.2	194.6	0.71	0.66	45.2
11	T1	836	2.5	836	2.5	0.776	14.7	LOS B	27.2	194.6	0.71	0.66	32.8
Approach		857	2.5	857	2.5	0.776	14.9	LOS B	27.2	194.6	0.71	0.66	33.4
All Vehicles		1611	2.5	1611	2.5	0.910	24.8	LOS C	27.2	194.6	0.71	0.67	31.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	40.5	LOS E	0.1	0.1	0.90	0.90
P3	North Full Crossing	21	14.1	LOS B	0.0	0.0	0.53	0.53
All Pedestrians		42	27.3	LOS C			0.72	0.72

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:49:34 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2026 PM DBD / Trickett Street

Network: 2026 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	659	2.5	659	2.5	0.415	2.6	LOS A	8.5	60.7	0.29	0.27	56.2
6	R2	310	2.5	310	2.5	0.442	30.4	LOS C	11.3	80.6	0.79	0.80	40.7
Approach		969	2.5	969	2.5	0.442	11.5	LOS B	11.3	80.6	0.45	0.44	47.9
North: Trickett Street													
7	L2	70	2.5	70	2.5	0.643	59.8	LOS E	3.7	26.1	1.00	0.80	20.7
9	R2	12	2.5	12	2.5	0.110	56.2	LOS E	0.6	4.2	0.97	0.68	21.5
Approach		82	2.5	82	2.5	0.643	59.3	LOS E	3.7	26.1	1.00	0.78	20.8
West: Drake Brockman Drive West													
10	L2	21	2.5	21	2.5	0.452	33.9	LOS C	13.3	95.0	0.88	0.78	37.3
11	T1	312	2.5	312	2.5	0.452	28.3	LOS C	13.3	95.0	0.88	0.78	23.1
Approach		333	2.5	333	2.5	0.452	28.6	LOS C	13.3	95.0	0.88	0.78	24.5
All Vehicles		1384	2.5	1384	2.5	0.643	18.4	LOS B	13.3	95.0	0.59	0.54	40.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	25.9	LOS C	0.0	0.0	0.72	0.72
All Pedestrians		42	35.1	LOS D			0.83	0.83

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

MOVEMENT SUMMARY

Site: 2031 AM DBD / Trickett Street

Network: 2031 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	487	2.5	487	2.5	0.349	5.5	LOS A	8.7	61.9	0.40	0.36	52.4
6	R2	94	2.5	94	2.5	0.850	64.7	LOS E	5.2	37.3	1.00	0.94	30.4
Approach		581	2.5	581	2.5	0.850	15.1	LOS B	8.7	61.9	0.50	0.45	44.2
North: Trickett Street													
7	L2	284	2.5	284	2.5	0.998	94.4	LOS F	20.7	147.9	1.00	1.16	15.0
9	R2	9	2.5	9	2.5	0.031	43.9	LOS D	0.4	2.7	0.87	0.67	25.0
Approach		293	2.5	293	2.5	0.998	92.8	LOS F	20.7	147.9	1.00	1.15	15.2
West: Drake Brockman Drive West													
10	L2	24	2.5	22	2.5	0.902	36.2	LOS D	53.7	383.8	0.95	0.99	36.3
11	T1	1131	2.5	1027	2.5	0.902	30.6	LOS C	53.7	383.8	0.95	0.99	22.1
Approach		1155	2.5	1049[N1]	2.5	0.902	30.7	LOS C	53.7	383.8	0.95	0.99	22.6
All Vehicles		2029	2.5	1923[N1]	2.6	0.998	35.5	LOS D	53.7	383.8	0.82	0.85	26.4

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	42.4	LOS E	0.1	0.1	0.92	0.92
P3	North Full Crossing	21	12.5	LOS B	0.0	0.0	0.50	0.50
All Pedestrians		42	27.4	LOS C			0.71	0.71

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

MOVEMENT SUMMARY

Site: 2031 PM DBD / Trickett Street

Network: 2031 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	903	2.5	877	2.5	0.552	3.1	LOS A	13.6	97.2	0.35	0.33	55.5
6	R2	274	2.5	266	2.5	0.481	36.6	LOS D	10.9	77.9	0.89	0.82	38.4
Approach		1177	2.5	1143 N1	2.5	0.552	10.9	LOS B	13.6	97.2	0.48	0.44	47.9
North: Trickett Street													
7	L2	91	2.5	91	2.5	0.836	64.2	LOS E	5.0	35.9	1.00	0.92	19.8
9	R2	15	2.5	15	2.5	0.138	56.4	LOS E	0.7	5.3	0.98	0.69	21.4
Approach		106	2.5	106	2.5	0.836	63.1	LOS E	5.0	35.9	1.00	0.89	20.0
West: Drake Brockman Drive West													
10	L2	22	2.5	22	2.5	0.491	27.0	LOS C	14.0	100.0	0.71	0.64	40.9
11	T1	416	2.5	416	2.5	0.491	21.4	LOS C	14.0	100.0	0.71	0.64	27.2
Approach		438	2.5	438	2.5	0.491	21.7	LOS C	14.0	100.0	0.71	0.64	28.3
All Vehicles		1721	2.5	1687 N1	2.6	0.836	17.0	LOS B	14.0	100.0	0.57	0.52	41.1

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	20.5	LOS C	0.0	0.0	0.64	0.64
All Pedestrians		42	32.4	LOS D			0.79	0.79

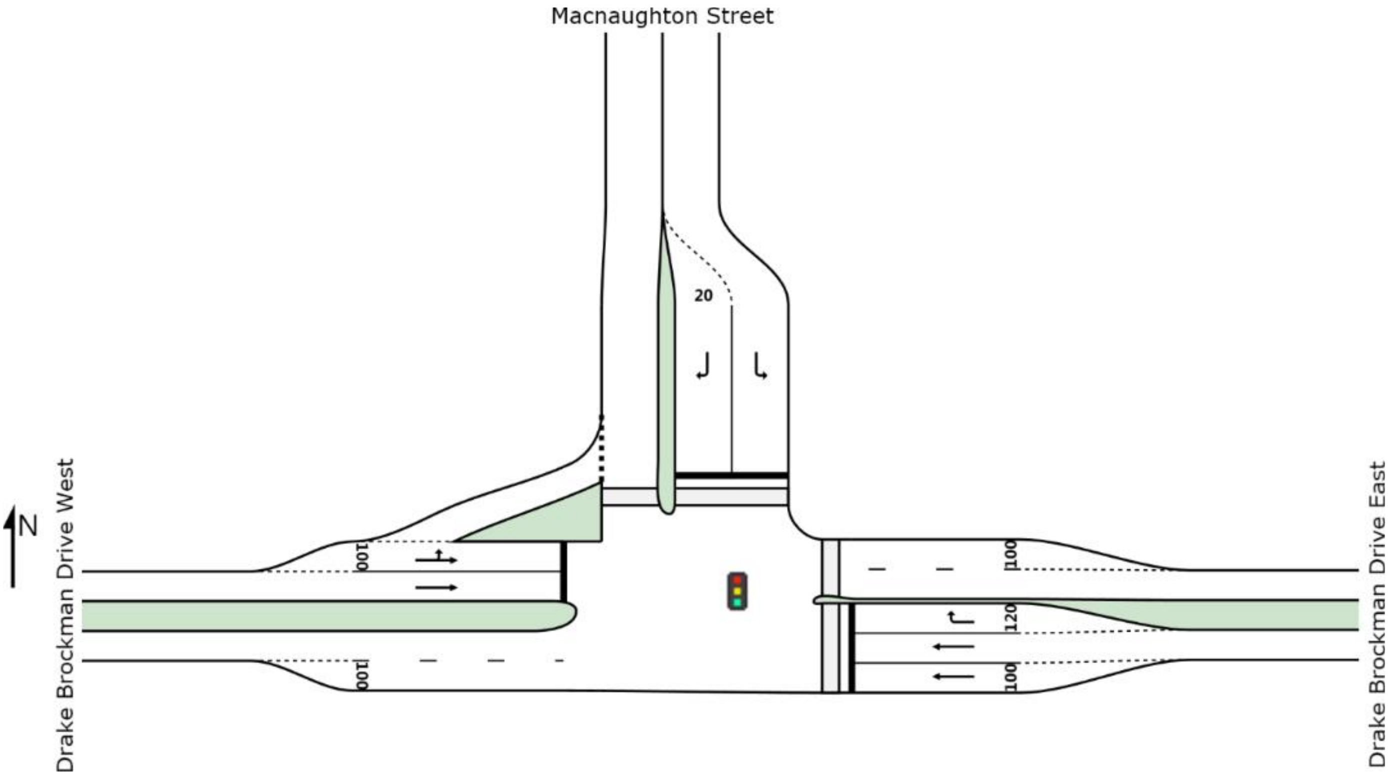
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:08:12 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

SITE LAYOUT

Site: 2021 AM DBD / Macnaughton Street

Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 2021 AM DBD / Macnaughton Street

Network: 2021 AM

Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	209	2.5	209	2.5	0.087	2.7	LOS A	1.5	10.5	0.25	0.20	55.1
6	R2	112	2.5	112	2.5	0.506	51.9	LOS D	5.3	38.2	0.98	0.78	31.5
Approach		321	2.5	321	2.5	0.506	19.9	LOS B	5.3	38.2	0.50	0.40	39.8
North: Macnaughton Street													
7	L2	175	2.5	175	2.5	0.890	64.7	LOS E	9.9	70.5	1.00	0.99	18.6
9	R2	4	2.5	4	2.5	0.020	49.9	LOS D	0.2	1.3	0.92	0.64	22.2
Approach		179	2.5	179	2.5	0.890	64.3	LOS E	9.9	70.5	1.00	0.98	18.7
West: Drake Brockman Drive West													
10	L2	14	2.5	14	2.5	0.287	15.0	LOS B	6.1	43.4	0.41	0.38	51.8
11	T1	887	2.5	887	2.5	0.487	10.1	LOS B	12.6	90.2	0.47	0.42	47.4
Approach		901	2.5	901	2.5	0.487	10.2	LOS B	12.6	90.2	0.46	0.42	47.5
All Vehicles		1401	2.5	1401	2.5	0.890	19.3	LOS B	12.6	90.2	0.54	0.49	39.7

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	16.8	LOS B	0.0	0.0	0.58	0.58
All Pedestrians		42	30.5	LOS D			0.76	0.76

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

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:05:03 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2021 PM DBD / Macnaughton Street

Network: 2021 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	718	2.5	718	2.5	0.396	3.5	LOS A	9.1	65.1	0.33	0.29	53.7
6	R2	353	2.5	353	2.5	0.467	28.8	LOS C	12.5	89.7	0.78	0.80	39.7
Approach		1071	2.5	1071	2.5	0.467	11.8	LOS B	12.5	89.7	0.48	0.46	45.8
North: Macnaughton Street													
7	L2	175	2.5	175	2.5	0.896	65.4	LOS E	9.9	71.0	1.00	1.00	18.5
9	R2	7	2.5	7	2.5	0.035	50.2	LOS D	0.3	2.2	0.93	0.66	22.1
Approach		182	2.5	182	2.5	0.896	64.8	LOS E	9.9	71.0	1.00	0.98	18.6
West: Drake Brockman Drive West													
10	L2	16	2.5	16	2.5	0.095	19.5	LOS B	1.1	7.7	0.57	0.51	48.2
11	T1	327	2.5	327	2.5	0.475	26.7	LOS C	10.0	71.5	0.74	0.63	35.3
Approach		343	2.5	343	2.5	0.475	26.4	LOS C	10.0	71.5	0.73	0.62	36.1
All Vehicles		1596	2.5	1596	2.5	0.896	21.0	LOS C	12.5	89.7	0.59	0.55	38.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	37.9	LOS D	0.1	0.1	0.87	0.87
All Pedestrians		42	41.0	LOS E			0.91	0.91

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

MOVEMENT SUMMARY

Site: 2026 AM DBD / Macnaughton Street

Network: 2026 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	347	2.5	347	2.5	0.156	4.6	LOS A	3.3	23.5	0.33	0.28	52.1
6	R2	110	2.5	110	2.5	0.663	56.7	LOS E	5.6	39.9	1.00	0.83	30.2
Approach		457	2.5	457	2.5	0.663	17.1	LOS B	5.6	39.9	0.49	0.41	40.8
North: Macnaughton Street													
7	L2	280	2.5	280	2.5	0.891	61.6	LOS E	15.8	112.8	1.00	0.98	19.3
9	R2	5	2.5	5	2.5	0.016	43.6	LOS D	0.2	1.5	0.86	0.64	24.1
Approach		285	2.5	285	2.5	0.891	61.3	LOS E	15.8	112.8	1.00	0.98	19.3
West: Drake Brockman Drive West													
10	L2	16	2.5	16	2.5	0.395	18.3	LOS B	11.2	80.2	0.58	0.52	49.7
11	T1	1159	2.5	1159	2.5	0.670	14.4	LOS B	24.4	174.4	0.68	0.62	43.6
Approach		1175	2.5	1175	2.5	0.670	14.5	LOS B	24.4	174.4	0.68	0.62	43.7
All Vehicles		1917	2.5	1917	2.5	0.891	22.1	LOS C	24.4	174.4	0.68	0.62	37.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	18.6	LOS B	0.0	0.0	0.61	0.61
All Pedestrians		42	31.4	LOS D			0.78	0.78

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

MOVEMENT SUMMARY

Site: 2026 PM DBD / Macnaughton Street

Network: 2026 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	936	2.5	936	2.5	0.491	2.7	LOS A	11.2	80.3	0.31	0.28	55.0
6	R2	294	2.5	294	2.5	0.456	32.7	LOS C	11.1	79.5	0.82	0.80	38.0
Approach		1230	2.5	1230	2.5	0.491	9.9	LOS A	11.2	80.3	0.43	0.40	47.0
North: Macnaughton Street													
7	L2	80	2.5	80	2.5	0.671	59.8	LOS E	4.2	29.8	1.00	0.81	19.7
9	R2	13	2.5	13	2.5	0.109	56.0	LOS E	0.6	4.5	0.97	0.68	20.6
Approach		93	2.5	93	2.5	0.671	59.2	LOS E	4.2	29.8	1.00	0.80	19.8
West: Drake Brockman Drive West													
10	L2	15	2.5	15	2.5	0.091	19.9	LOS B	1.7	12.0	0.64	0.55	48.2
11	T1	420	2.5	420	2.5	0.456	21.8	LOS C	12.8	91.4	0.76	0.65	38.3
Approach		435	2.5	435	2.5	0.456	21.7	LOS C	12.8	91.4	0.75	0.65	38.7
All Vehicles		1758	2.5	1758	2.5	0.671	15.4	LOS B	12.8	91.4	0.54	0.49	42.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	29.7	LOS C	0.0	0.0	0.77	0.77
All Pedestrians		42	36.9	LOS D			0.86	0.86

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

MOVEMENT SUMMARY

Site: 2031 AM DBD / Macnaughton Street

Network: 2031 AM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	485	2.5	485	2.5	0.216	4.4	LOS A	4.7	33.4	0.33	0.29	52.3
6	R2	107	2.5	107	2.5	0.829	63.0	LOS E	5.8	41.8	1.00	0.93	28.6
Approach		592	2.5	592	2.5	0.829	15.0	LOS B	5.8	41.8	0.45	0.40	41.9
North: Macnaughton Street													
7	L2	272	2.5	272	2.5	0.924	67.4	LOS E	16.2	115.6	1.00	1.03	18.1
9	R2	5	2.5	5	2.5	0.017	44.6	LOS D	0.2	1.5	0.87	0.64	23.8
Approach		277	2.5	277	2.5	0.924	67.0	LOS E	16.2	115.6	1.00	1.02	18.2
West: Drake Brockman Drive West													
10	L2	19	2.5	17	2.5	0.532	18.8	LOS B	18.5	132.0	0.67	0.62	49.4
11	T1	1431	2.5	1317	2.5	0.901	23.4	LOS C	32.8	234.8	0.70	0.73	37.3
Approach		1450	2.5	1335 N1	2.5	0.901	23.4	LOS C	32.8	234.8	0.70	0.73	37.5
All Vehicles		2319	2.5	2204 N1	2.6	0.924	26.6	LOS C	32.8	234.8	0.67	0.68	34.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	16.8	LOS B	0.0	0.0	0.58	0.58
All Pedestrians		42	30.5	LOS D			0.76	0.76

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

MOVEMENT SUMMARY

Site: 2031 PM DBD / Macnaughton Street

Network: 2031 PM

Signals - Fixed Time Coordinated   Cycle Time = 100 seconds (Network Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Drake Brockman Drive East													
5	T1	1153	2.5	1119	2.5	0.586	3.1	LOS A	15.5	110.7	0.35	0.32	54.4
6	R2	236	2.5	229	2.5	0.460	38.7	LOS D	9.4	67.3	0.88	0.80	35.7
Approach		1389	2.5	1348 N1	2.5	0.586	9.1	LOS A	15.5	110.7	0.44	0.40	47.3
North: Macnaughton Street													
7	L2	105	2.5	105	2.5	0.887	66.7	LOS E	5.9	42.4	1.00	0.98	18.3
9	R2	19	2.5	19	2.5	0.159	56.4	LOS E	0.9	6.7	0.98	0.69	20.5
Approach		124	2.5	124	2.5	0.887	65.1	LOS E	5.9	42.4	1.00	0.93	18.6
West: Drake Brockman Drive West													
10	L2	15	2.5	15	2.5	0.093	17.3	LOS B	1.6	11.4	0.47	0.44	49.9
11	T1	513	2.5	513	2.5	0.463	16.5	LOS B	12.4	88.3	0.60	0.53	42.0
Approach		528	2.5	528	2.5	0.463	16.5	LOS B	12.4	88.3	0.60	0.53	42.3
All Vehicles		2041	2.5	2000 N1	2.6	0.887	14.5	LOS B	15.5	110.7	0.52	0.47	42.5

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

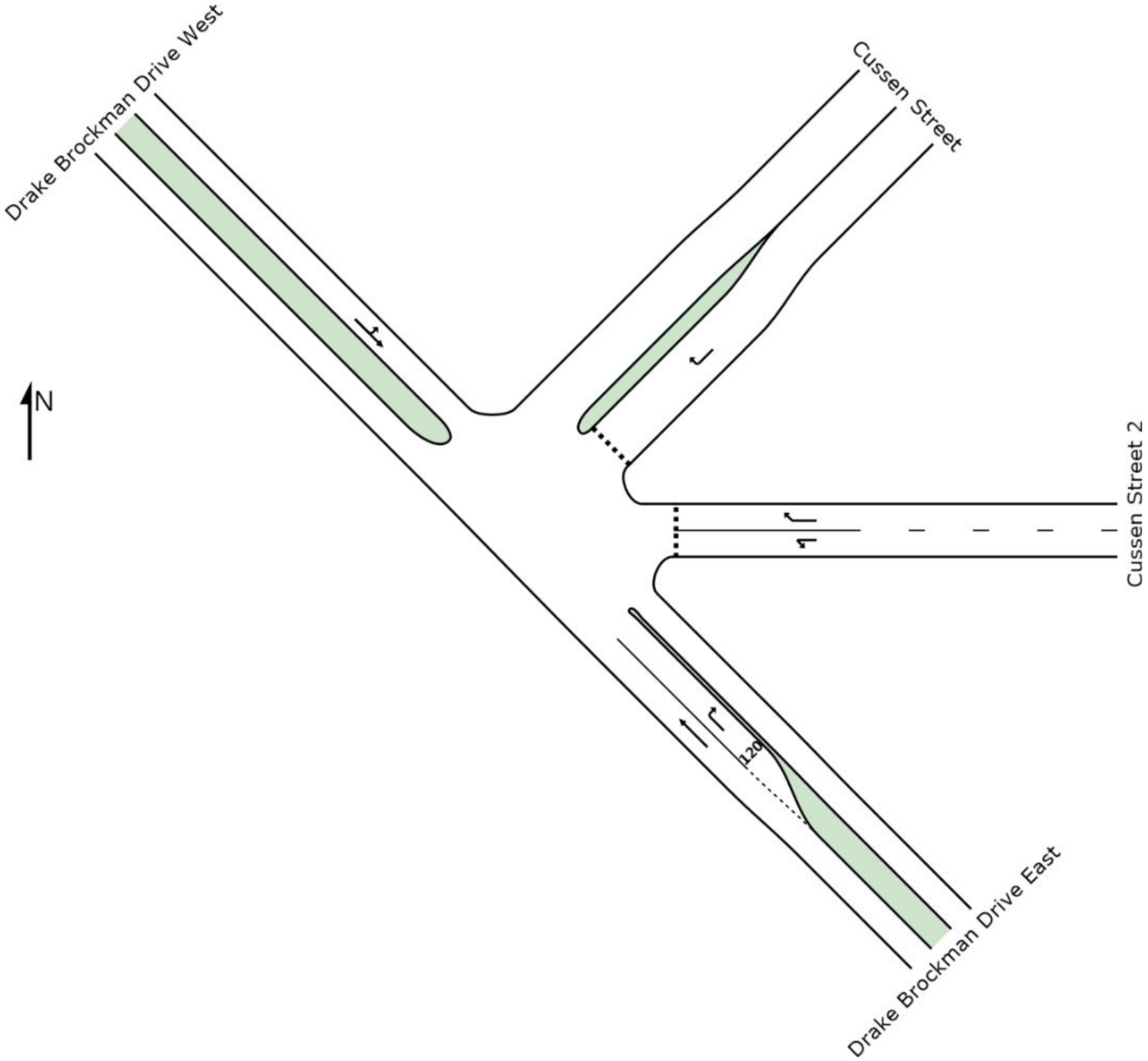
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	21	44.2	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	21	23.8	LOS C	0.0	0.0	0.69	0.69
All Pedestrians		42	34.0	LOS D			0.82	0.82

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

SITE LAYOUT

▽ Site: 2021 AM DBD / Cussen Street

Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 2021 AM DBD / Cussen Street

Network: 2021 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	277	2.5	277	2.5	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	45	2.5	45	2.5	0.124	15.7	LOS C	0.4	3.1	0.82	0.92	44.9
Approach		322	2.5	322	2.5	0.143	2.2	NA	0.4	3.1	0.11	0.13	56.4
East: Cussen Street 2													
4b	L3	146	2.5	146	2.5	0.418	19.8	LOS C	1.7	12.2	0.86	1.02	27.7
6a	R1	2	2.5	2	2.5	0.003	6.5	LOS A	0.0	0.1	0.41	0.52	43.1
Approach		148	2.5	148	2.5	0.418	19.6	LOS C	1.7	12.2	0.86	1.01	27.9
NorthEast: Cussen Street													
26	R2	2	2.5	2	2.5	0.020	39.4	LOS E	0.1	0.4	0.91	0.96	17.8
Approach		2	2.5	2	2.5	0.020	39.4	LOS E	0.1	0.4	0.91	0.96	17.8
NorthWest: Drake Brockman Drive West													
27	L2	11	2.5	11	2.5	0.579	5.7	LOS A	0.0	0.0	0.00	0.01	57.1
28	T1	1111	2.5	1111	2.5	0.579	0.1	LOS A	0.0	0.0	0.00	0.01	59.7
Approach		1122	2.5	1122	2.5	0.579	0.2	NA	0.0	0.0	0.00	0.01	59.6
All Vehicles		1594	2.5	1594	2.5	0.579	2.4	NA	1.7	12.2	0.10	0.13	55.4

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2021 PM DBD / Cussen Street

Network: 2021 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1080	2.5	1080	2.5	0.557	0.1	LOS A	0.0	0.0	0.00	0.00	59.8
23	R2	157	2.5	157	2.5	0.111	6.6	LOS A	0.6	4.3	0.38	0.57	51.1
Approach		1237	2.5	1237	2.5	0.557	0.9	NA	0.6	4.3	0.05	0.07	58.1
East: Cussen Street 2													
4b	L3	36	2.5	36	2.5	0.028	7.4	LOS A	0.1	0.9	0.34	0.58	41.0
6a	R1	4	2.5	4	2.5	0.046	41.4	LOS E	0.1	0.9	0.92	0.96	17.1
Approach		40	2.5	40	2.5	0.046	11.0	LOS B	0.1	0.9	0.40	0.62	35.9
NorthEast: Cussen Street													
26	R2	4	2.5	4	2.5	0.006	8.7	LOS A	0.0	0.2	0.48	0.60	39.4
Approach		4	2.5	4	2.5	0.006	8.7	LOS A	0.0	0.2	0.48	0.60	39.4
NorthWest: Drake Brockman Drive West													
27	L2	5	2.5	5	2.5	0.140	5.6	LOS A	0.0	0.0	0.00	0.01	57.2
28	T1	267	2.5	267	2.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		272	2.5	272	2.5	0.140	0.1	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		1553	2.5	1553	2.5	0.557	1.1	NA	0.6	4.3	0.05	0.08	57.9

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 AM DBD / Cussen Street

Network: 2026 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	412	2.5	412	2.5	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	45	2.5	45	2.5	0.217	25.7	LOS D	0.7	5.4	0.91	0.97	39.2
Approach		457	2.5	457	2.5	0.217	2.6	NA	0.7	5.4	0.09	0.10	56.0
East: Cussen Street 2													
4b	L3	77	2.5	77	2.5	0.374	29.2	LOS D	1.3	9.6	0.92	1.02	22.1
6a	R1	2	2.5	2	2.5	0.004	8.0	LOS A	0.0	0.1	0.50	0.58	40.4
Approach		79	2.5	79	2.5	0.374	28.6	LOS D	1.3	9.6	0.91	1.01	22.4
NorthEast: Cussen Street													
26	R2	2	2.5	2	2.5	0.040	73.7	LOS F	0.1	0.8	0.95	0.98	11.0
Approach		2	2.5	2	2.5	0.040	73.7	LOS F	0.1	0.8	0.95	0.98	11.0
NorthWest: Drake Brockman Drive West													
27	L2	14	2.5	14	2.5	0.700	5.7	LOS A	0.0	0.0	0.00	0.01	57.0
28	T1	1342	2.5	1342	2.5	0.700	0.2	LOS A	0.0	0.0	0.00	0.01	59.5
Approach		1356	2.5	1356	2.5	0.700	0.2	NA	0.0	0.0	0.00	0.01	59.5
All Vehicles		1894	2.5	1894	2.5	0.700	2.1	NA	1.3	9.6	0.06	0.07	56.2

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:49:34 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2026 PM DBD / Cussen Street

Network: 2026 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1259	2.5	1259	2.5	0.649	0.2	LOS A	0.0	0.0	0.00	0.00	59.7
23	R2	131	2.5	131	2.5	0.101	7.0	LOS A	0.5	3.8	0.44	0.60	50.9
Approach		1390	2.5	1390	2.5	0.649	0.8	NA	0.5	3.8	0.04	0.06	58.4
East: Cussen Street 2													
4b	L3	52	2.5	52	2.5	0.043	7.8	LOS A	0.2	1.4	0.40	0.61	40.6
6a	R1	3	2.5	3	2.5	0.081	88.6	LOS F	0.2	1.5	0.97	0.98	9.4
Approach		55	2.5	55	2.5	0.081	12.4	LOS B	0.2	1.5	0.43	0.63	34.3
NorthEast: Cussen Street													
26	R2	3	2.5	3	2.5	0.005	9.3	LOS A	0.0	0.1	0.52	0.61	38.4
Approach		3	2.5	3	2.5	0.005	9.3	LOS A	0.0	0.1	0.52	0.61	38.4
NorthWest: Drake Brockman Drive West													
27	L2	6	2.5	6	2.5	0.187	5.6	LOS A	0.0	0.0	0.00	0.01	57.2
28	T1	356	2.5	356	2.5	0.187	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		362	2.5	362	2.5	0.187	0.1	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		1810	2.5	1810	2.5	0.649	1.0	NA	0.5	3.8	0.05	0.07	58.0

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2031 AM DBD / Cussen Street

Network: 2031 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	548	2.5	548	2.5	0.283	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
23	R2	45	2.5	45	2.5	0.337	41.1	LOS E	1.1	8.2	0.95	1.01	32.9
Approach		593	2.5	593	2.5	0.337	3.2	NA	1.1	8.2	0.07	0.08	55.2
East: Cussen Street 2													
4b	L3	6	2.5	6	2.5	0.047	32.6	LOS D	0.1	1.0	0.92	0.97	20.6
6a	R1	1	2.5	1	2.5	0.002	10.2	LOS B	0.0	0.1	0.59	0.61	37.2
Approach		7	2.5	7	2.5	0.047	29.4	LOS D	0.1	1.0	0.87	0.92	21.9
NorthEast: Cussen Street													
26	R2	1	1.0	1	1.0	0.035	117.8	LOS F	0.1	0.6	0.97	0.99	7.4
Approach		1	1.0	1	1.0	0.035	117.8	LOS F	0.1	0.6	0.97	0.99	7.4
NorthWest: Drake Brockman Drive West													
27	L2	16	2.5	15	2.5	0.765	5.8	LOS A	0.0	0.0	0.00	0.01	56.9
28	T1	1573	2.5	1468	2.5	0.765	0.3	LOS A	0.0	0.0	0.00	0.01	59.4
Approach		1589	2.5	1483 [N1]	2.5	0.765	0.3	NA	0.0	0.0	0.00	0.01	59.3
All Vehicles		2190	2.5	2085 [N1]	2.6	0.765	1.3	NA	1.1	8.2	0.02	0.03	57.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 2031 PM DBD / Cussen Street

Network: 2031 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1438	2.5	1395	2.5	0.720	0.3	LOS A	0.0	0.0	0.00	0.00	59.6
23	R2	105	2.5	102	2.5	0.089	7.4	LOS A	0.4	2.9	0.49	0.65	50.7
Approach		1543	2.5	1497 N1	2.5	0.720	0.7	NA	0.4	2.9	0.03	0.04	58.6
East: Cussen Street 2													
4b	L3	67	2.5	67	2.5	0.063	8.2	LOS A	0.3	1.8	0.46	0.67	40.3
6a	R1	1	2.5	1	2.5	0.064	189.6	LOS F	0.2	1.1	0.99	0.99	4.8
Approach		68	2.5	68	2.5	0.064	11.0	LOS B	0.3	1.8	0.46	0.67	36.3
NorthEast: Cussen Street													
26	R2	1	2.5	1	2.5	0.002	10.4	LOS B	0.0	0.1	0.56	0.61	36.9
Approach		1	2.5	1	2.5	0.002	10.4	LOS B	0.0	0.1	0.56	0.61	36.9
NorthWest: Drake Brockman Drive West													
27	L2	7	2.5	7	2.5	0.234	5.6	LOS A	0.0	0.0	0.00	0.01	57.2
28	T1	446	2.5	446	2.5	0.234	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		453	2.5	453	2.5	0.234	0.1	NA	0.0	0.0	0.00	0.01	59.7
All Vehicles		2065	2.5	2020 N1	2.6	0.720	1.0	NA	0.4	2.9	0.04	0.06	58.2

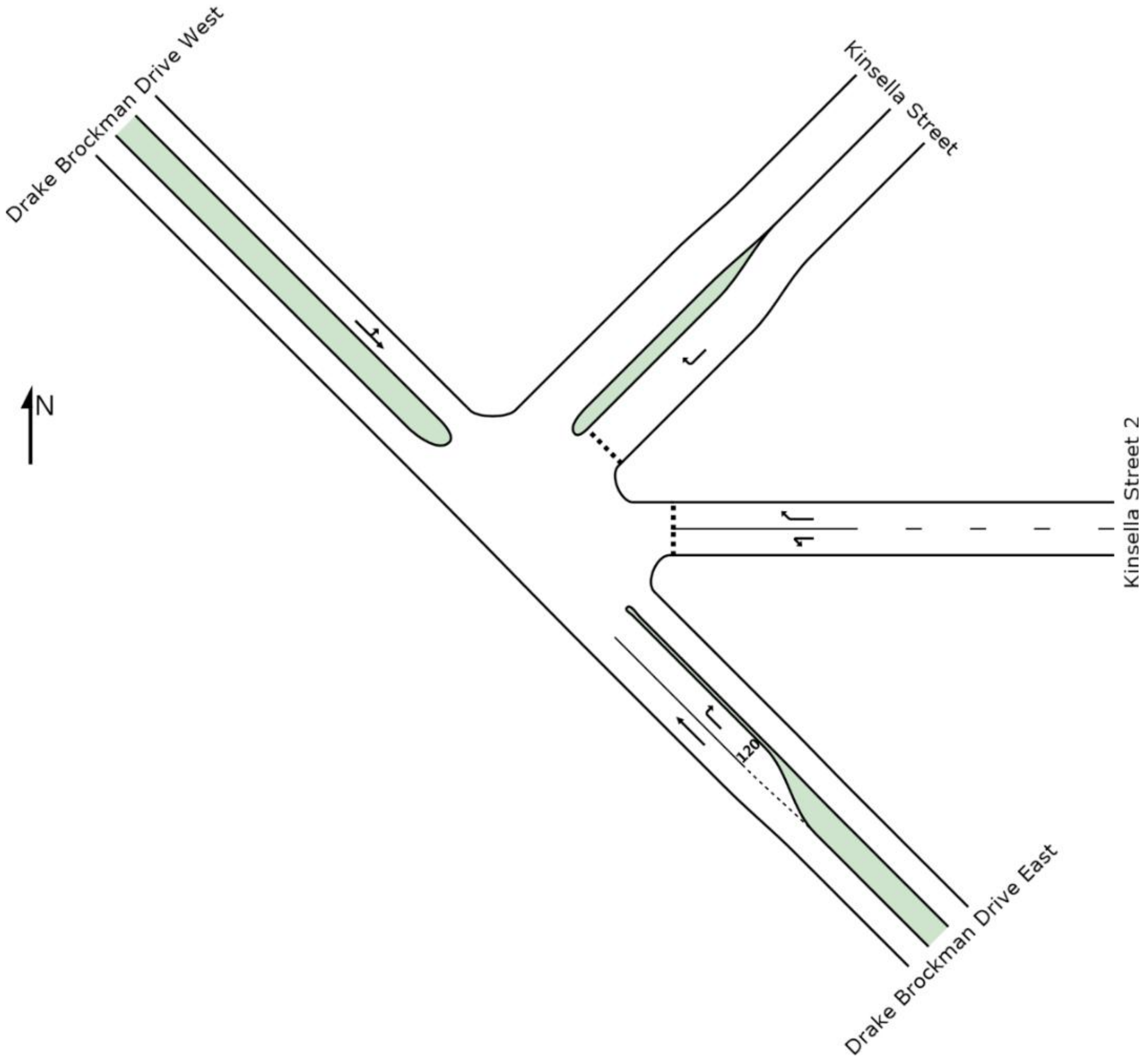
Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

SITE LAYOUT

Site: 2021 AM DBD / Kinsella Street

Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 2021 AM DBD / Kinsella Street

Network: 2021 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	344	2.5	344	2.5	0.177	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	9	2.5	9	2.5	0.027	15.8	LOS C	0.1	0.6	0.82	0.92	46.4
Approach		353	2.5	353	2.5	0.177	0.4	NA	0.1	0.6	0.02	0.02	59.1
East: Kinsella Street 2													
4b	L3	71	2.5	71	2.5	0.221	18.0	LOS C	0.7	5.3	0.84	0.95	38.1
6a	R1	2	2.5	2	2.5	0.003	7.2	LOS A	0.0	0.1	0.46	0.55	48.7
Approach		73	2.5	73	2.5	0.221	17.7	LOS C	0.7	5.3	0.83	0.94	38.4
NorthEast: Kinsella Street													
26	R2	2	2.5	2	2.5	0.024	44.6	LOS E	0.1	0.5	0.92	0.97	24.6
Approach		2	2.5	2	2.5	0.024	44.6	LOS E	0.1	0.5	0.92	0.97	24.6
NorthWest: Drake Brockman Drive West													
27	L2	8	2.5	8	2.5	0.579	5.7	LOS A	0.0	0.0	0.00	0.00	58.2
28	T1	1114	2.5	1114	2.5	0.579	0.1	LOS A	0.0	0.0	0.00	0.00	59.7
Approach		1122	2.5	1122	2.5	0.579	0.2	NA	0.0	0.0	0.00	0.00	59.7
All Vehicles		1550	2.5	1550	2.5	0.579	1.1	NA	0.7	5.3	0.04	0.05	58.1

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2021 PM DBD / Kinsella Street

Network: 2021 PM

Giveway / Yield (Two-Way)

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1318	2.5	1318	2.5	0.680	0.2	LOS A	0.0	0.0	0.00	0.00	59.7
23	R2	71	2.5	71	2.5	0.052	6.5	LOS A	0.2	1.6	0.37	0.58	52.3
Approach		1389	2.5	1389	2.5	0.680	0.5	NA	0.2	1.6	0.02	0.03	58.9
East: Kinsella Street 2													
4b	L3	18	2.5	18	2.5	0.014	7.3	LOS A	0.1	0.4	0.33	0.58	48.0
6a	R1	2	2.5	2	2.5	0.076	120.1	LOS F	0.2	1.4	0.98	0.99	12.3
Approach		20	2.5	20	2.5	0.076	19.2	LOS C	0.2	1.4	0.40	0.63	36.9
NorthEast: Kinsella Street													
26	R2	2	2.5	2	2.5	0.003	8.2	LOS A	0.0	0.1	0.45	0.58	47.5
Approach		2	2.5	2	2.5	0.003	8.2	LOS A	0.0	0.1	0.45	0.58	47.5
NorthWest: Drake Brockman Drive West													
27	L2	5	2.5	5	2.5	0.139	5.6	LOS A	0.0	0.0	0.00	0.01	58.3
28	T1	265	2.5	265	2.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		270	2.5	270	2.5	0.139	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehicles		1681	2.5	1681	2.5	0.680	0.7	NA	0.2	1.6	0.02	0.03	58.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 AM DBD / Kinsella Street

Network: 2026 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	488	2.5	488	2.5	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
23	R2	10	2.5	10	2.5	0.065	28.5	LOS D	0.2	1.4	0.92	0.97	39.9
Approach		498	2.5	498	2.5	0.252	0.6	NA	0.2	1.4	0.02	0.02	58.8
East: Kinsella Street 2													
4b	L3	136	2.5	136	2.5	0.897	78.2	LOS F	4.9	35.0	0.99	1.36	17.2
6a	R1	2	2.5	2	2.5	0.004	9.2	LOS A	0.0	0.1	0.55	0.61	46.3
Approach		138	2.5	138	2.5	0.897	77.1	LOS F	4.9	35.0	0.98	1.35	17.4
NorthEast: Kinsella Street													
26	R2	2	2.5	2	2.5	0.073	121.3	LOS F	0.2	1.3	0.98	0.99	12.2
Approach		2	2.5	2	2.5	0.073	121.3	LOS F	0.2	1.3	0.98	0.99	12.2
NorthWest: Drake Brockman Drive West													
27	L2	10	2.5	10	2.5	0.701	5.8	LOS A	0.0	0.0	0.00	0.00	58.0
28	T1	1348	2.5	1348	2.5	0.701	0.2	LOS A	0.0	0.0	0.00	0.00	59.6
Approach		1358	2.5	1358	2.5	0.701	0.3	NA	0.0	0.0	0.00	0.00	59.5
All Vehicles		1996	2.5	1996	2.5	0.897	5.8	NA	4.9	35.0	0.07	0.10	51.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 PM DBD / Kinsella Street

Network: 2026 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1526	2.5	1526	2.5	0.787	0.3	LOS A	0.0	0.0	0.00	0.00	59.4
23	R2	62	2.5	62	2.5	0.050	6.9	LOS A	0.2	1.5	0.43	0.61	52.1
Approach		1588	2.5	1588	2.5	0.787	0.6	NA	0.2	1.5	0.02	0.02	58.8
East: Kinsella Street 2													
4b	L3	25	2.5	25	2.5	0.022	7.7	LOS A	0.1	0.6	0.39	0.62	47.7
6a	R1	3	2.5	3	2.5	0.552	824.5	LOS F	1.3	9.2	1.00	1.01	2.2
Approach		28	2.5	28	2.5	0.552	98.5	LOS F	1.3	9.2	0.46	0.66	14.5
NorthEast: Kinsella Street													
26	R2	3	2.5	3	2.5	0.005	9.2	LOS A	0.0	0.1	0.50	0.62	46.3
Approach		3	2.5	3	2.5	0.005	9.2	LOS A	0.0	0.1	0.50	0.62	46.3
NorthWest: Drake Brockman Drive West													
27	L2	5	2.5	5	2.5	0.186	5.6	LOS A	0.0	0.0	0.00	0.01	58.3
28	T1	356	2.5	356	2.5	0.186	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		361	2.5	361	2.5	0.186	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehicles		1980	2.5	1980	2.5	0.787	1.9	NA	1.3	9.2	0.02	0.03	56.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2031 AM DBD / Kinsella Street

Network: 2031 AM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	631	2.5	631	2.5	0.325	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
23	R2	11	2.5	11	2.5	0.135	47.9	LOS E	0.4	2.7	0.96	0.98	32.8
Approach		642	2.5	642	2.5	0.325	0.9	NA	0.4	2.7	0.02	0.02	58.3
East: Kinsella Street 2													
4b	L3	201	2.5	201	2.5	2.454	1379.5	LOS F	81.3	581.5	1.00	3.94	1.3
6a	R1	2	2.5	2	2.5	0.006	12.0	LOS B	0.0	0.1	0.65	0.69	43.2
Approach		203	2.5	203	2.5	2.454	1365.3	LOS F	81.3	581.5	1.00	3.91	1.3
NorthEast: Kinsella Street													
26	R2	2	2.5	2	2.5	0.175	293.5	LOS F	0.4	3.0	0.99	1.00	5.7
Approach		2	2.5	2	2.5	0.175	293.5	LOS F	0.4	3.0	0.99	1.00	5.7
NorthWest: Drake Brockman Drive West													
27	L2	13	2.5	12	2.5	0.781	5.9	LOS A	0.0	0.0	0.00	0.00	57.9
28	T1	1581	2.5	1483	2.5	0.781	0.4	LOS A	0.0	0.0	0.00	0.00	59.3
Approach		1594	2.5	1496 N1	2.5	0.781	0.4	NA	0.0	0.0	0.00	0.00	59.3
All Vehicles		2441	2.5	2343 N1	2.6	2.454	119.1	NA	81.3	581.5	0.09	0.35	13.6

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: AECOM AUSTRALIA PTY LTD | Processed: Thursday, 27 July 2017 9:07:26 AM
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

MOVEMENT SUMMARY

Site: 2031 PM DBD / Kinsella Street

Network: 2031 PM

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Drake Brockman Drive East													
22	T1	1733	2.5	1681	2.5	0.867	0.5	LOS A	0.0	0.0	0.00	0.00	59.0
23	R2	54	2.5	52	2.5	0.047	7.3	LOS A	0.2	1.4	0.48	0.65	51.9
Approach		1787	2.5	1734 N1	2.5	0.867	0.7	NA	0.2	1.4	0.01	0.02	58.5
East: Kinsella Street 2													
4b	L3	34	2.5	34	2.5	0.032	8.2	LOS A	0.1	0.9	0.45	0.66	47.5
6a	R1	4	2.5	4	2.5	1.000	1314.6	LOS F	2.4	17.2	1.00	1.05	1.4
Approach		38	2.5	38	2.5	1.000	153.3	LOS F	2.4	17.2	0.51	0.70	10.2
NorthEast: Kinsella Street													
26	R2	4	2.5	4	2.5	0.008	10.3	LOS B	0.0	0.2	0.55	0.67	45.0
Approach		4	2.5	4	2.5	0.008	10.3	LOS B	0.0	0.2	0.55	0.67	45.0
NorthWest: Drake Brockman Drive West													
27	L2	6	2.5	6	2.5	0.233	5.6	LOS A	0.0	0.0	0.00	0.01	58.3
28	T1	446	2.5	446	2.5	0.233	0.0	LOS A	0.0	0.0	0.00	0.01	59.8
Approach		452	2.5	452	2.5	0.233	0.1	NA	0.0	0.0	0.00	0.01	59.8
All Vehicles		2281	2.5	2228 N1	2.6	1.000	3.2	NA	2.4	17.2	0.02	0.03	54.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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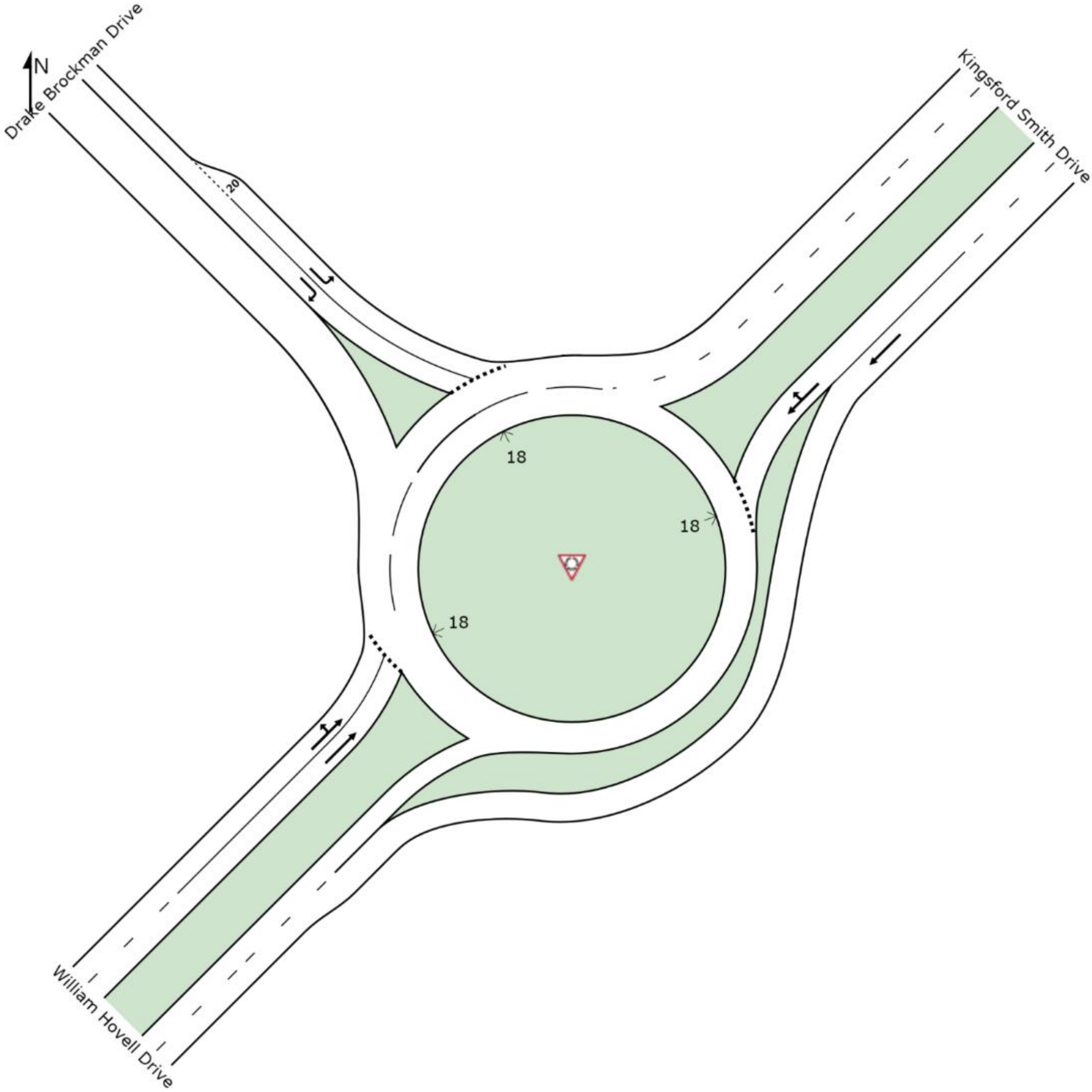
Project: P:\CBR\60501930\4. Tech work area\4.1 Traffic\SIDRA\DBD SIDRA STAGE 2 PSP.sip6

SITE LAYOUT

Site: 2021 AM DBD / WHD / KSD

Roundabout



MOVEMENT SUMMARY

Site: 2021 AM DBD / WHD / KSD

Network: 2021 AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	924	2.5	924	2.5	0.350	5.2	LOS A	2.5	17.8	0.18	0.51	54.2
26	R2	105	2.5	105	2.5	0.350	13.0	LOS B	2.5	17.8	0.80	0.82	39.2
Approach		1029	2.5	1029	2.5	0.350	6.0	LOS A	2.5	17.8	0.24	0.54	53.4
NorthWest: Drake Brockman Drive													
27	L2	432	2.5	432	2.5	0.365	4.8	LOS A	2.4	17.2	0.30	0.50	52.3
29	R2	786	2.5	786	2.5	0.541	9.2	LOS A	4.6	33.0	0.35	0.60	51.8
Approach		1218	2.5	1218	2.5	0.541	7.6	LOS A	4.6	33.0	0.33	0.56	51.9
SouthWest: William Hovell Drive													
30	L2	67	2.5	67	2.5	0.053	4.6	LOS A	0.3	2.4	0.30	0.47	50.9
31	T1	77	2.5	77	2.5	0.053	4.8	LOS A	0.3	2.4	0.31	0.43	53.6
Approach		144	2.5	144	2.5	0.053	4.7	LOS A	0.3	2.4	0.31	0.45	52.6
All Vehicles		2391	2.5	2391	2.5	0.541	6.7	LOS A	4.6	33.0	0.29	0.55	52.5

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2021 PM DBD / WHD / KSD

Network: 2021 PM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	386	2.5	386	2.5	0.189	4.2	LOS A	0.0	0.0	0.00	0.42	55.6
26	R2	346	2.5	346	2.5	0.249	9.2	LOS A	1.6	11.2	0.38	0.63	39.6
Approach		732	2.5	732	2.5	0.249	6.6	LOS A	1.6	11.2	0.18	0.52	50.2
NorthWest: Drake Brockman Drive													
27	L2	140	2.5	140	2.5	0.241	8.7	LOS A	1.3	9.3	0.76	0.88	49.4
29	R2	172	2.5	172	2.5	0.251	12.4	LOS B	1.4	10.2	0.77	0.89	50.2
Approach		312	2.5	312	2.5	0.251	10.7	LOS B	1.4	10.2	0.76	0.88	49.9
SouthWest: William Hovell Drive													
30	L2	585	2.5	585	2.5	0.657	8.0	LOS A	7.4	52.9	0.80	0.76	47.5
31	T1	882	2.5	882	2.5	0.657	8.9	LOS A	7.4	52.9	0.82	0.80	50.9
Approach		1467	2.5	1467	2.5	0.657	8.6	LOS A	7.4	52.9	0.81	0.78	49.8
All Vehicles		2511	2.5	2511	2.5	0.657	8.3	LOS A	7.4	52.9	0.62	0.72	49.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2026 AM DBD / WHD / KSD

Network: 2026 AM

Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	877	2.5	877	2.5	0.393	4.9	LOS A	3.4	24.4	0.09	0.47	54.7
26	R2	129	2.5	129	2.5	0.393	16.0	LOS B	3.4	24.4	1.00	0.93	34.6
Approach		1006	2.5	1006	2.5	0.393	6.3	LOS A	3.4	24.4	0.20	0.53	53.0
NorthWest: Drake Brockman Drive													
27	L2	461	2.5	461	2.5	0.435	5.3	LOS A	3.1	22.2	0.43	0.54	51.8
29	R2	987	2.5	987	2.5	1.001	30.5	LOS C	40.8	291.5	1.00	0.79	40.4
Approach		1448	2.5	1448	2.5	1.001	22.5	LOS C	40.8	291.5	0.82	0.71	42.8
SouthWest: William Hovell Drive													
30	L2	197	2.5	197	2.5	0.141	4.8	LOS A	1.0	7.2	0.38	0.50	50.6
31	T1	124	2.5	124	2.5	0.106	5.0	LOS A	0.7	5.0	0.38	0.45	53.2
Approach		321	2.5	321	2.5	0.141	4.9	LOS A	1.0	7.2	0.38	0.48	51.9
All Vehicles		2775	2.5	2775	2.5	1.001	14.6	LOS B	40.8	291.5	0.55	0.62	46.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
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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MOVEMENT SUMMARY

Site: 2026 PM DBD / WHD / KSD

Network: 2026 PM

Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	303	2.5	303	2.5	0.149	4.2	LOS A	0.0	0.0	0.00	0.42	55.6
26	R2	472	2.5	472	2.5	0.355	9.6	LOS A	2.5	17.8	0.49	0.66	39.0
Approach		775	2.5	775	2.5	0.355	7.5	LOS A	2.5	17.8	0.30	0.57	47.7
NorthWest: Drake Brockman Drive													
27	L2	172	2.5	172	2.5	0.308	9.1	LOS A	1.8	13.0	0.81	0.90	49.0
29	R2	230	2.5	230	2.5	0.345	12.8	LOS B	2.2	15.9	0.83	0.91	49.9
Approach		402	2.5	402	2.5	0.345	11.2	LOS B	2.2	15.9	0.82	0.91	49.6
SouthWest: William Hovell Drive													
30	L2	807	2.5	807	2.5	0.832	15.5	LOS B	16.0	114.4	1.00	1.12	40.0
31	T1	823	2.5	823	2.5	0.832	17.8	LOS B	16.0	114.4	1.00	1.18	44.1
Approach		1630	2.5	1630	2.5	0.832	16.7	LOS B	16.0	114.4	1.00	1.15	42.5
All Vehicles		2807	2.5	2807	2.5	0.832	13.3	LOS B	16.0	114.4	0.78	0.95	44.8

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2031 AM DBD / WHD / KSD

Network: 2031 AM

Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	829	2.5	829	2.5	0.386	4.6	LOS A	3.3	23.9	0.05	0.45	55.0
26	R2	154	2.5	154	2.5	0.386	16.3	LOS B	3.3	23.9	1.00	0.93	33.7
Approach		983	2.5	983	2.5	0.386	6.4	LOS A	3.3	23.9	0.20	0.52	52.7
NorthWest: Drake Brockman Drive													
27	L2	491	2.5	431	2.5	0.453	5.9	LOS A	3.2	23.0	0.52	0.60	51.4
29	R2	1187	2.5	1042	2.5	1.039	61.4	LOS E	59.5	425.1	1.00	1.37	30.2
Approach		1678	2.5	1473 N1	2.5	1.039	45.2	LOS D	59.5	425.1	0.86	1.14	33.5
SouthWest: William Hovell Drive													
30	L2	327	2.5	327	2.5	0.237	5.0	LOS A	1.8	13.0	0.44	0.52	50.2
31	T1	171	2.5	171	2.5	0.156	5.3	LOS A	1.1	7.5	0.44	0.48	52.9
Approach		498	2.5	498	2.5	0.237	5.1	LOS A	1.8	13.0	0.44	0.51	51.4
All Vehicles		3159	2.5	2954 N1	2.7	1.039	25.5	LOS C	59.5	425.1	0.57	0.83	39.5

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 2031 PM DBD / WHD / KSD

Network: 2031 PM

Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
NorthEast: Kingsford Smith Drive													
25	T1	259	2.5	259	2.5	0.127	4.2	LOS A	0.0	0.0	0.00	0.42	55.6
26	R2	558	2.5	558	2.5	0.445	10.0	LOS A	3.5	24.8	0.61	0.69	38.4
Approach		817	2.5	817	2.5	0.445	8.1	LOS A	3.5	24.8	0.41	0.61	46.0
NorthWest: Drake Brockman Drive													
27	L2	203	2.5	203	2.5	0.411	11.1	LOS B	3.0	21.7	0.92	0.97	47.4
29	R2	288	2.5	288	2.5	0.488	15.6	LOS B	4.2	30.3	0.96	1.00	48.1
Approach		491	2.5	491	2.5	0.488	13.8	LOS B	4.2	30.3	0.94	0.98	47.9
SouthWest: William Hovell Drive													
30	L2	1030	2.5	1030	2.5	1.055	84.4	LOS F	69.0	493.4	1.00	2.83	16.0
31	T1	764	2.5	764	2.5	0.980	49.4	LOS D	35.1	251.0	1.00	1.94	30.0
Approach		1794	2.5	1794	2.5	1.055	69.5	LOS E	69.0	493.4	1.00	2.45	21.4
All Vehicles		3102	2.5	3102	2.5	1.055	44.5	LOS D	69.0	493.4	0.84	1.73	27.9

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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.
Roundabout Capacity Model: SIDRA Standard.
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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PROJECT
DRAKE BROCKMAN DRIVE UPGRADE

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REGISTRATION
0 6.25 12.5 m
1:250

PROJECT MANAGEMENT INITIALS

DESIGNER	CHECKED	APPROVED

PROJECT DATA

DATUM		SURVEY	

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	12.07.17	INFORMATION

PROJECT NUMBER
60501930

SHEET TITLE
DRAKE BROCKMAN DRIVE - STAGE 2
SITE PLAN
SHEET 5

SHEET NUMBER
21-2000-CA-0105

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PROJECT

DRAKE BROCKMAN DRIVE UPGRADE

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REGISTRATION

0 6.25 12.5 m
1:250

PROJECT MANAGEMENT INITIALS

DESIGNER	CHECKED	APPROVED

PROJECT DATA

DATUM		SURVEY	

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	12.07.17	INFORMATION

PROJECT NUMBER

60501930

SHEET TITLE

DRAKE BROCKMAN DRIVE - STAGE 2
SITE PLAN
SHEET 7

SHEET NUMBER

21-2000-CA-0107

ISO A1 594mm x 841mm

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0 6.25 12.5 m
1:250

PROJECT MANAGEMENT INITIALS

DESIGNER	CHECKED	APPROVED

PROJECT DATA

DATUM		SURVEY	

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	12.07.17	INFORMATION

PROJECT NUMBER

60501930

SHEET TITLE

DRAKE BROCKMAN DRIVE - STAGE 2
SITE PLAN
SHEET 10

SHEET NUMBER

21-2000-CA-0110

21-000393

TRAFFIC IMPACT ASSESSMENT REPORT

MACNAMARA NH2 EDP2 DEVELOPMENT

Prepared for **Ginninderry**

Document information

GENERAL INFORMATION

Author(s)	[redacted]
Version	1
Prepared by (author)	[redacted]
Reviewed by	[redacted]
Approved by	[redacted]
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Version	Date	Checked by
1	21-Aug-2023	[redacted]

Version	Date	Approved by
1	21-Aug-2023	[redacted]

egis

TABLE OF CONTENTS

TABLE OF FIGURES

1 INTRODUCTION

As part of the continued development of the Ginninderry estate, Egis (formerly Calibre) has been engaged by Ginninderry Group to undertake traffic analysis that will support the second Estate Development Plan (EDP) for Ginninderry Neighbourhood 2 (NH2). This neighbourhood is located at the eastern edge of Macnamara, just to the west of the Strathnairn developments, with development proposed to straddle Pro Hart Avenue to the north and south. A plan of the NH2 development, showing the location of both EDP1 and EDP2, can be seen in Figure 1.1.

FIGURE 1.1 SITE LOCALITY PLAN

As part of this analysis, traffic volume forecasts and performance analysis of key intersections within and adjacent to NH2 EDP2 has been undertaken under interim conditions (full occupation of Ginninderry NH1 and NH2). Operation and upgrade/duplication of the road network under ultimate conditions (full occupation of the Ginninderry Estate) have not been separately assessed as part of this study, as previous reports and analysis has detailed its operation under these conditions suitably. Further information into these other reports is provided within Section 2 of this report.

1.1 Technical References

To support the development of the traffic analysis, the following guidelines and codes have been referenced during the preparation of this analysis:

- Guide to Traffic Generating Developments (RTA, 2002)
- Guide to Traffic Generating Developments – Updated Traffic Surveys (RTA, 2012)
- 2008 Territory Plan - Estate Development Code (EPSDD, 2020)
- TCCS Guidelines for Transport Impact Assessment (TCCS, 2020)
- Roads and Maritime Services Traffic Modelling Guidelines (TfNSW, 2013)

In addition to the above codes, the findings of the following traffic reports were reviewed to confirm the extent and assumptions of the previously completed Ginninderry traffic modelling:

- *West Belconnen Technical Traffic Report (AECOM, 2015)*
- *West Belconnen Neighbourhood One EDP - Traffic Modelling Report (AECOM, 2016)*
- *West Belconnen Stage 1 – Traffic Impact Assessment Technical Memorandum (Calibre, 2016)*

- *Ginninderry Stage 2 EDP – Traffic Modelling Report (AECOM, 2017)*
- *Ginninderry Stage 2 – Traffic Impact Assessment (Calibre, 2017)*
- *Ginninderry Neighbourhood 2 EDP1 – Traffic Analysis Report (Calibre, 2020)*
- *Ginninderry Development Traffic Report – Stage 1 – CSTM Strategic Assessment (AECOM, 2021)*
- *Ginninderry – Macnamara – Strategic Intersection Testing Memorandum (AECOM, 2021)*
- *Strathnairn School Site – Traffic Impact and Parking Assessment (Calibre, 2022)*
- *Green Waste Drop-Off Facility – Traffic Impact Assessment (Calibre 2023)*

The findings and relevance of each of these reports to the current study is summarised in Section 2 of this report.

2 PREVIOUS STUDIES AND ANALYSIS

2.1 Ginninderry Estate

In 2015, AECOM were engaged to prepare a strategic and microsimulation transport model for the whole of the Ginninderry estate. The *West Belconnen Technical Traffic Report* published in February 2015 had made the following assumptions:

- The whole estate would contain 11,500 dwellings (30,000 population) upon completion.
- 39,500m^2 GFA of commercial developments (4,400 jobs) would be present in the estate.
- School developments with capacity for 4,000 school enrolments would be developed.

This analysis identified a range of likely improvements that would be required to the external road network as a result of the proposed Ginninderry estate development.

An update of this strategic and microsimulation transport model was completed by AECOM in 2021, to allow for changes in the proposed yields and total population, as well as undertake high-level sensitivity analysis for increased 40,000 and 50,000 population scenarios. This report made the following assumptions:

- For the 30,000 pop scenario approx. land uses were assumed:
  - 11,500 dwellings.
  - 45,000m^2 GFA (4,750 jobs).
  - 7,800 school enrolments.
- For the 40,000 pop. scenario approx. land uses were assumed:
  - 15,500 dwellings.
  - 67,500m^2 GFA (7,625 jobs).
  - 10,500 school enrolments.
- For the 50,000 pop. scenario approx. land uses were assumed:
  - 19,000 dwellings.
  - 90,000m^2 GFA (10,500 jobs).
  - 13,000 school enrolments.
- Under these scenarios, without duplication of key road connections:
  - Road capacity is exceeded across all three population scenarios, and traffic performance is expected to be poor.
- Under these scenarios, with duplication of key road connections:
  - Road capacity is suitable and traffic is expected to operate within acceptable levels for the 30,000 pop. scenario.
  - Southern Cross Drive is expected to experience some capacity issues, while all other key roads operate at acceptable levels under the 40,000 pop. scenario.
  - All key road connections are expected to operate above road capacity, and traffic performance is expected to be poor under the 50,000 pop. scenario.

These assessments were utilised to allow for high level estimates of future traffic volumes and trip distributions for vehicle movements across the entire Ginninderry estate and along the key arterial roads through the network. As no ultimate scenario modelling was undertaken as part of this assessment however, these assumptions or duplication options were not typically adopted within this modelling exercise.

2.2 Ginninderry Neighbourhood One Stage 1 & Stage 2 Reports

2.2.1 AECOM

In 2016, AECOM were engaged to revise their strategic and microsimulation transport modelling and to undertake analytical intersection modelling for the first stage (EDP1) of Ginninderry NH1. The *West Belconnen Neighbourhood One EDP – Traffic Modelling Report* published in April 2016 undertook SIDRA modelling for a number of intersections in this area. In 2017, AECOM were again engaged to undertake a similar assessment of the second stage (EDP2) of Ginninderry NH1. This engagement produced the *Ginninderry Stage 2 EDP Traffic Modelling* Report published in August 2017. Across these assessments, the following assumptions were used:

- Under ultimate conditions, Ginninderry NH1 would include:
    - Approx. 1,000 dwellings.
    - 750 school enrolments.
- Ultimate conditions mode shares would achieve:
    - 77.3% cars.
    - 19.4% public transport.
    - 3.2% bicycle.
- External land uses from the Canberra Strategic Transport Model (CSTM) were adopted.

These assessments identified no significant concerns with the operation of NH1 in the ultimate scenario, with all intersections operating at satisfactory levels.

2.2.2 Calibre

Calibre were engaged initially in 2016, and then again in 2017 to complete further analytical intersection modelling for the NH1 EDP1 & EDP2 development, with particular focus on operation of the network under the interim conditions. The *West Belconnen Stage 1 – Traffic Impact Assessment Technical Memorandum* published in April 2016, and the *Ginninderry Stage 2 – Traffic Impact Assessment Report* published September 2017 completed modelling for the same intersections as the above AECOM reports, however utilised the following assumptions:

- Ginninderry NH1 would have approx. 1,200 dwellings in ultimate conditions, with 350 of these dwellings located in EDP1.
- The Estate Development Code was used to identify residential traffic generation rates, as follows:
    - 8 vpd for low density residential.
    - 7 vpd for medium density residential.
    - 6 vpd for high density residential.
- Peak hour factor of 10% is applicable for both morning and evening peak hours.
- Tidal in-out trip distributions of 80% exiting were suitable for residential land uses in the AM peak, while the inverse was suitable in the PM peak.

This assessment identified no significant concerns with the operation of NH1 in the ultimate scenario, with all intersections operating at satisfactory levels.

Both the abovementioned Calibre and AECOM reports have been used within this study to identify the key assumptions and land uses adopted within NH1, and provide indicative traffic volumes and distributions along the road network in the area. It is noted though that NH1 has been partially developed at this stage, and changes to the land uses have occurred since the development of these reports. As such, recent traffic counts have also been used to augment the outcomes provided in these reports.

2.3 Ginninderry Neighbourhood Two Stage 1 Report (Calibre)

Calibre were engaged in 2020 to undertake intersection analysis in support of the NH2 EDP1 submission. This analysis involved SIDRA assessment of several key intersections along Pro Hart Avenue and within the EDP1 road network in both interim (full occupation of Ginninderry NH1 and NH2) and ultimate (full occupation of Ginninderry estate) conditions. The following key assumptions were adopted for this analysis:

- The full Ginninderry estate contains:
  - 11,500 dwellings.
  - 12,000m^2 GLFA of shopping centre.
  - 4,000 education places.
- NH2 EDP1 is proposed to be purely residential with 830 dwellings.
- Estate Development Code daily rates were assumed for residential land uses. The peak hour factor was refined to 10% of the daily volume in the AM peak and 8% in the PM peak period.
- School generation rates and in-out splits were determined from the *RMS School Trip Generation Surveys Analysis Report*.
- Group centre traffic generation rates were identified from the *RTA Guide to Traffic Generating Developments (2002)*. The assumption that the AM peak generation is 75% of the PM peak generation was adopted.
- External traffic distributions in the ultimate scenario were identified as:
  - South along Pro Hart Avenue – 62%.
  - East along Parkwood Road – 31%.
  - North along the future Ginninderra Drive extension – 7%.
  - In interim conditions, all movements along Ginninderra Drive are assumed to use Parkwood Road instead.
- From this analysis, no significant performance issues were identified in either the interim or ultimate scenarios.

Given the proximity of this site to the current development and its consideration of the NH EDP2 land use and yield, the findings and assumptions adopted in this report were referenced heavily during the preparation of this assessment. This allows for consistency with the previous assumptions made for within the area, with updates made where information is outdated or has changed.

This report also demonstrates that the operation of several of the key intersections being considered in this assessment will operate at a suitable level during the ultimate scenario. Based on these outcomes and the outcomes discussed in the report below, no additional traffic modelling has been conducted for the ultimate scenario operation in this assessment.

2.4 Ginninderry Strategic Intersection Testing Memo (AECOM)

To provide additional information to the 2021 strategic and microsimulation report prepared by AECOM (discussed in Section 2.1), a separate memorandum was prepared which reviewed the performance of the Road 140 / Pro Hart Avenue and Road 140 / Road 2 intersection under the ultimate scenario, and detailed layout options to account for the 40,000 and 50,000 population scenarios.

From this assessment, it was seen that all the proposed intersection options would operate at a suitable level in the 2040 and 2050 scenarios. These options assume the duplication of Pro Hart Avenue, but not of Road 140.

This report also demonstrates that the operation of several of the key intersections being considered in this assessment will operate at a suitable level during the ultimate scenario. Based on these outcomes and the outcomes discussed in the report above, no additional traffic modelling has been conducted for the ultimate scenario operation in this assessment.

2.5 Additional Traffic Reports for Ginninderry Area

In addition to the abovementioned reports which have been completed for the Ginninderry area and key road networks, several other traffic assessments have been completed in the area. The three other reports which have been reviewed as part of this assessment were:

- *Strathnairn School Site -Traffic Impact and Parking Assessment (Calibre, 2022)*
- *Drake Brockman Drive / Pro Hart Avenue Intersection Upgrade Timing Memo (Calibre, 2022)*
- *Green-Waste Drop-Off Facility – Traffic Impact Assessment (Calibre 2023)*

These reports address items of the Ginninderry Estate which are not directly adjacent to the NH2 EDP 2 development, and have no direct impact on the traffic travelling into or past the site. These reports do however include assumptions around traffic volumes along Pro Hart Avenue, as well as land uses and generation rates that are applicable within the Ginninderry estate. Existing traffic count data is also available for Pro Hart Avenue.

This assessment has reviewed these reports to ensure consistent assumptions for generation rates and traffic distribution are consistent between previous reports and this current report.

3 PROPOSED DEVELOPMENT AND ADJACENT AREA

3.1 Development Site

The Ginninderry Estate is located approximately 15km northwest of Canberra City and 8km west of Belconnen Town Centre. The estate lies to the northeast of the Murrumbidgee River, to the south of Ginninderra Creek, and to the west of the existing residential suburbs of Holt and Macgregor. The location of the estate can be seen in Figure 3.1.

When completed, the estate is going to consist of a number of neighbourhoods. The focus of this report is NH2, which is located along the southern edge of the estate straddling Pro Hart Avenue, directly adjacent to NH1 which is currently under construction. The location of NH2 in relation to the rest of the Ginninderry estate can be seen in Figure 3.2.

FIGURE 3.1 GINNINDERRY ESTATE LOCALITY PLAN

FIGURE 3.2 GINNINDERRY ESTATE MASTER PLAN AND STAGES

3.2 Road Network

Within the interim conditions, access to NH2 is provided via Drake Brockman Drive to the south, and Parkwood Road to the north. For internal movements through the site, Pro Hart Avenue connects into Drake Brockman Drive and currently passes through NH1 under existing conditions. With the development of NH2, this road is proposed to be extended to service this area and future stages of Ginninderry further to the west. No existing connection to Parkwood Road is currently available, but with the development of NH2, an internal north-south connection of Road 140 between Parkwood Road and Pro Hart Avenue is being designed. This road will run directly through the centre of the NH2 EDP2 area.

The location of both these roads can be seen in Figure 1.1, while details on aspects of these roads and additional key road connections are provided below.

3.2.1 Pro Hart Avenue

Under existing conditions, Pro Hart Avenue is a major collector road that is proposed to be extended in the future, with the existing section travelling between Drake Brockman Drive to the east and the end of Strathnairn (NH1) to the west. The existing portion of road is laid out as a dual-carriageway road separated by a 14m wide grassed median, with a single traffic lane in each direction where it passes through the Ginninderry estate. No on-road cycling is present along the road, however both off-road shared and cycleways are provided within each road verge. Several indented and in-lane bus stops are present along the road, allowing for busses to service stops present along its length. Indented on-street parking is also available along both edges of the road. The existing speed environment along this road is signposted at 60km/h.

For the future extension of this road to service NH2, it is assumed that the existing layout and conditions will be matched under the interim conditions. Traffic volumes are however expected to increase to volumes more closely resembling an arterial road. This road is expected to require duplication to two traffic lanes in each direction during the ultimate scenario.

3.2.2 Parkwood Road

Parkwood Road is an existing rural road which extends from Southern Cross Drive to the east to the Quarry at the western end. For the section which runs adjacent to the proposed NH2 development, the road consists of a single carriageway with one traffic lane in each direction. No allowance for on-road cycling or bus movements are included along this road. The existing speed environment along this road is signposted at 60km/h.

No changes are proposed to occur to this roads layout or operation as part of the interim scenario or connection of Road 140 into it.

3.2.3 Proposed Road 140

As part of the NH2 development, a new arterial road is proposed to run from Parkwood Road to the north down to Pro Hart Avenue to the south. This road will run directly through the NH2 EDP2, and will consist of a dual carriageway separated by a 13m wide median, with a single traffic lane in each direction. Indented on-street parking is proposed to be included along both sides of the road. No on-road cycle lanes are proposed, with off-road pedestrian and cycle paths being provided along both verges instead. The proposed speed environment is expected to be posted at 60km/h, so as to be consistent with both roads it connects to.

The median width of this road is sufficient to allow for duplication of this road in the ultimate condition, should it be required.

3.2.4 Proposed Road 2 / 2A

The key connecting road through the NH2 EDP2 development is Road 2. This road is proposed as a minor collector road for its length, with Road 2 travelling between Pro Hart Avenue and Road 140. Road 2A is the extension of this road on the other side of Road 140, connecting into Sally Ross Way. Both Road 2 and 2A are proposed to have a single carriageway with one traffic lane in each direction. Driveway access for several of the residential dwellings is provided along the southern verge, while indented on-street parking is present along both north and south verges. No on-road cycling allowance is provided, with off road paths being provided instead. As a residential estate road, the speed environment for this road is expected to be posted at 50km/h.

No changes would be expected to occur along this road during the ultimate scenario.

3.3 Active Travel Network

As part of the Ginninderry estate development, an Active Travel Network Plan has been prepared to demonstrate the existing and future active travel network proposed for the area. The active travel plan for the NH2 area can be seen in Figure 3.3.

From this figure, it can be seen that the existing principal cycling training route and existing local on-road cycling route is proposed to be continued into NH2, with both expected to turn north and travel along Road 140. Road 140 is also expected to be a part of the future recreational trail and future access community route feeder trails as well. This is expected to be provided by the 2m wide pedestrian path and separate 2m wide cycle path proposed along both east and west verges of Road 140. The path arrangement for this is expected to be similar to what is provided along the existing section of Pro Hart Avenue.

The extension of Pro Hart Avenue through NH2 is also expected to be a part of the future access community route feeder and local on-road cycle route. These are expected to be provided through the extension of the 2m wide pedestrian path and separate 2m wide cycle path currently constructed along Pro Hart Avenue. It is noted that the existing Pro Hart Avenue arrangement does not allow for any provision to support on-road cycling, such as cycle lanes in the shoulders, and as such the on-road cycling provision is expected to remain informal through the new NH2 road section.

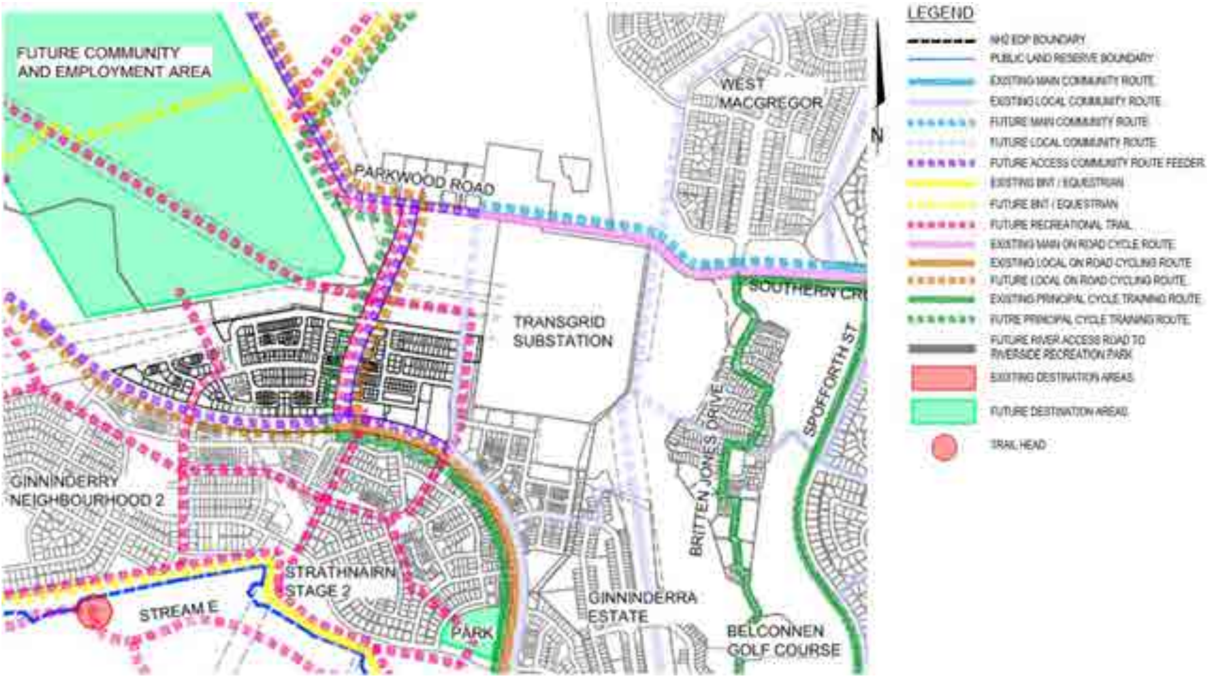


FIGURE 3.3 EXISTING AND PROPOSED ACTIVE TRAVEL PLAN

3.3.1 Bicentennial National Trail

It is noted that the current alignment for the Bicentennial National Trail (BNT) crosses Parkwood Road and travels through the NH2 EDP2 site. As such, the BNT is proposed to be relocated as part of the NH2 EDP2 works. This new alignment will see the BNT travel west just outside of the northern verge of Road 2 / 2A, crossing Road 140 at the Road 140 / Road 2 intersection. From here, the BNT is proposed to cross Pro Hart Avenue and navigate the edge of NH2 EDP1, before connecting back into its current alignment.

3.3.2 Equestrian Trails

With the Belconnen Pony Club located along Parkwood Road, there are several recognised equestrian trails present in the area which will be impacted by the NH2 EDP2 development. The main trail impacted is a 12m wide grassed corridor that connects from the Belconnen Pony Club and travels south along the same alignment as the current BNT. This alignment can be seen in Figure 3.4. This trail is expected to be relocated to the same alignment as the new proposed BNT, with the trail running along the outside edge of the NH2 EDP2 development and crossing Road 140 at the intersection with Road 2.

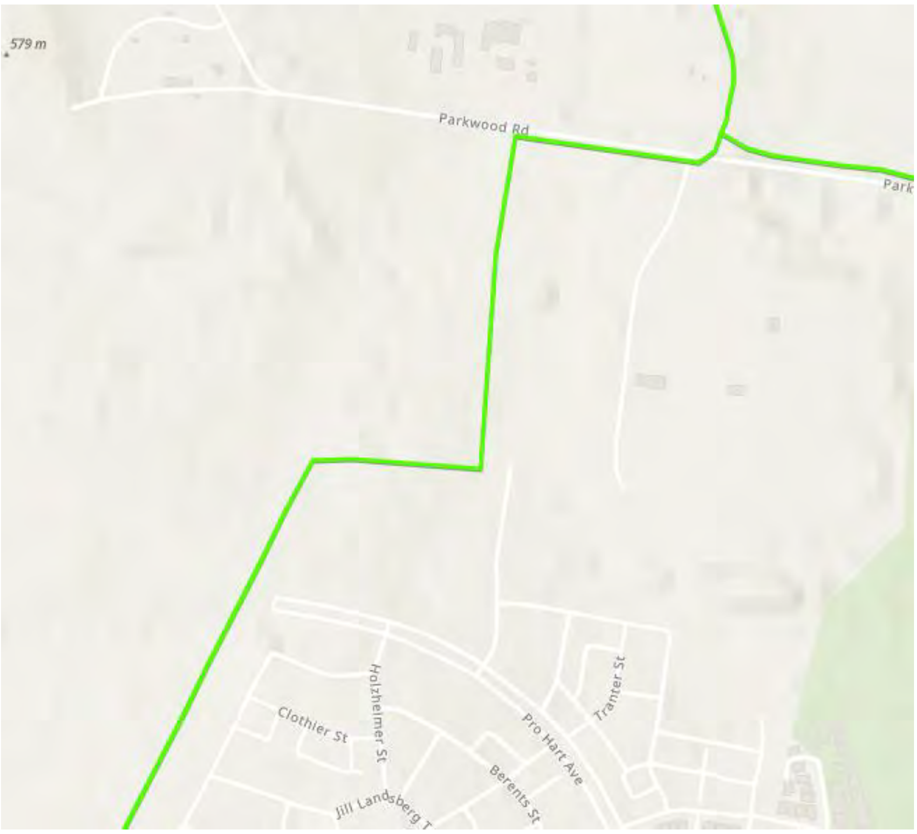


FIGURE 3.4 CURRENT EQUESTRIAN TRAIL ALIGNMENT

3.4 Public Transport Network

There is currently one shuttle route that runs along Pro Hart Avenue which services the existing Ginninderry area. The shuttle route is the 903 Kippax to Strathnairn Loop which runs the length of Pro Hart Avenue. A map of this route can be seen in Figure 3.5. This shuttle route is expected to be extended to service the NH2 dwellings upon their completion, with the design of Road 140 including bus stops along its length.

FIGURE 3.5 KIPPAX TO STRATHNAIRN BUS LOOP – 903

3.5 Development Yields

For the interim conditions modelling being completed as part of this assessment, it is being assumed that NH1 and NH2 will be fully developed, while none of the other Ginninderry neighbourhoods will have commenced. The breakdown of assumed traffic yields for each of the neighbourhoods can be seen below.

3.5.1 NH1 Yields

The land yields assumed for NH1 were assumed based on the Neighbourhood One Stage 1 and 2 traffic reports (detailed within Section 2.2), as well as the more recent Strathnairn School Site traffic report (mentioned in Section 2.5). This assumed the following yields across the neighbourhood:

- 1,170 residential dwellings, consisting of:
  - 402 dwellings with block area greater than 360m^2
  - 351 dwellings with block area less than 360m^2
  - 417 multi-unit (MU) dwellings
- A school site with:
  - 780 primary school students
  - 130 space Early Childhood Education Centre (ECEC)
- A 3,400m^2 local centre development
- Allowance for the recreational riverside park land use

3.5.2 NH2 EDP1 Yields

The land yields assumed for NH2 EDP1 were adopted based off the volumes used in the previous Calibre NH2 EDP1 traffic report (detailed within Section 2.3). This document assumed that the full NH2 EDP1 area was to be used for residential land use, as follows:

- 828 residential dwellings, consisting of:
  - 372 dwellings with block area greater than 360m^2
  - 268 dwellings with block area less than 360m^2

- o 188 MU dwellings

3.5.3 NH2 EDP2 Yields

The NH2 EDP2 yields were calculated from the latest site plans prepared for the EDP2 submission. This plan noted the following land uses within the site:

- 594 residential dwellings, consisting of:
  - o 58 dwellings with block area greater than 360m^2
  - o 227 dwellings with block area less than 360m^2
  - o 337 MU Dwellings
- A commercial block of 10,800m^2. Due to uncertainty in the expected land uses and layout of this site, the following has been assumed:
  - o GFA of the block will be 4,320m^2 GFA (40% of the total block area, in line with other commercial office buildings and local centre layouts around the ACT).
  - o The full block will function as a single storey shopping centre for the purposes of traffic modelling (shopping centre selected as a conservative assumption given the higher traffic generation compared to other commercial land uses).

4 TRAFFIC ANALYSIS

4.1 Interim Conditions

4.1.1 Traffic Generation Rates

Based on the Land use yields for NH1 and NH2 listed above, traffic generation for the sites has been adopted. The following traffic generation rates were used for this assessment.

4.1.1.1 Residential Land Use

Daily traffic generation rates for residential land use were taken from the *Territory Plan Estate Development Code*. AM peak hour traffic was calculated from the daily rate using the assumption that this peak typically makes up for 10% of the daily traffic. The PM peak was calculated with a similar method; however it is assumed that this peak makes up for 8% of the daily traffic. As such, the adopted traffic generation rates for residential land uses are as follows:

- For single dwelling blocks larger than 360m^2:
  - o 8 vehicles per day per dwelling
  - o 0.8 vehicles per hour per dwelling in the AM peak
  - o 0.65 vehicles per hour per dwelling in the PM peak
- For single dwelling blocks smaller than 360m^2:
  - o 7 vehicles per day per dwelling
  - o 0.7 vehicles per hour per dwelling in the AM peak
  - o 0.57 vehicles per hour per dwelling in the PM peak
- For multi-unit sites:
  - o 6 vehicles per day per dwelling
  - o 0.6 vehicles per hour per dwelling in the AM peak
  - o 0.49 vehicles per hour per dwelling in the PM peak

Table 4.1 below presents the adopted residential traffic generation for the NH1 and NH2 developments within the Ginninderry estate, based on the residential dwelling numbers specified in Section 3.5 above. As outlined in that section, the land yields for NH1 and NH2 EDP1 have been assumed to match the volumes identified in previous reports.

TABLE 4.1 RESIDENTIAL TRAFFIC GENERATION – INTERIM CONDITIONS

Dwelling Type	Number of Dwellings	Daily		AM Commuter Peak		PM Commuter Peak	
Ginninderry Neighbourhood 1							
Single Dwellings >360m^2	402 dwellings	8 vpd / dwelling	3,216 vpd	0.8 vph / dwelling	322 vph	0.65 vph / dwelling	263 vph
Single Dwellings ≤360m^2	351 dwellings	7 vpd / dwelling	2,457 vpd	0.7 vph / dwelling	246 vph	0.57 vph / dwelling	201 vph
Multi-Unit Dwellings	417 dwellings	6 vpd / dwelling	2,502 vpd	0.6 vph / dwelling	250 vph	0.49 vph / dwelling	205 vph
Sub-Total	**1,170 dwellings**	-	**8,175 vpd**	-	**818 vph**	-	**669 vph**
Ginninderry Neighbourhood 2 EDP 1							
Single Dwellings >360m^2	372 dwellings	8 vpd / dwelling	2,976 vpd	0.8 vph / dwelling	298 vph	0.65 vph / dwelling	243 vph
Single Dwellings ≤360m^2	268 dwellings	7 vpd / dwelling	1,876 vpd	0.7 vph / dwelling	188 vph	0.57 vph / dwelling	153 vph
Multi-Unit Dwellings	188 dwellings	6 vpd / dwelling	1,128 vpd	0.6 vph / dwelling	113 vph	0.49 vph / dwelling	92 vph
Sub-Total	**828 dwellings**	-	**5,980 vpd**	-	**598 vph**	-	**488 vph**
Ginninderry Neighbourhood 2 EDP 2							
Single Dwellings >360m^2	58 dwellings	8 vpd / dwelling	464 vpd	0.8 vph / dwelling	46 vph	0.65 vph / dwelling	38 vph
Single Dwellings ≤360m^2	227 dwellings	7 vpd / dwelling	1,589 vpd	0.7 vph / dwelling	159 vph	0.57 vph / dwelling	130 vph
Multi-Unit Dwellings	337 dwellings	6 vpd / dwelling	2,022 vpd	0.6 vph / dwelling	202 vph	0.49 vph / dwelling	165 vph
Sub-Total	**622 dwellings**	-	**4,075 vpd**	-	**407 vph**	-	**333 vph**
Total	**2,620 dwellings**	-	**18,230 vpd**	-	**1,823 vph**	-	**1,490 vph**

4.1.1.2 Commercial Land Uses

Daily and peak traffic generation rates for the commercial land uses within the Ginninderry area have been taken from the *RTA Guide to Traffic Generating Developments (2002)* or the more recent *RMS Guide to Traffic Generating Developments – Updated Traffic Surveys (2013)* where provided. For the data which is not provided, the following assumptions have been made.

- For these retail land uses, only the daily and PM peak hour traffic generations are typically provided. As such, it has been assumed that the AM peak would consist of 75% of the PM peak volume.
- The peak shopping centre rate has been taken for a typical Thursday, as this has the highest traffic generation of any weekday.
- Gross Lettable Floor Area (GLFA) is assumed to be 75% of the Gross Floor Area (GFA)
- Given the higher traffic generation rate associated with shopping centres compared to other commercial land uses suitable for this site, commercial areas have been conservatively assumed to operate as single storey shopping centre unless specified otherwise.

Based on the above assumptions, the following traffic generation rates have been adopted for each of the commercial land uses:

- For shopping centres:
    - 121 vehicles per day per $100m^2$ GLFA for shopping centres
    - 12.3 vehicles per hour per $100m^2$ GLFA for shopping centres in the PM peak
    - 9.25 vehicles per hour per $100m^2$ GLFA for shopping centres in the AM peak
- For faster trade retail stores:
    - 52.8 vehicles per day per $100m^2$ GLFA for faster trades
    - 5.1 vehicles per hour per $100m^2$ GLFA for faster trades in the PM peak
    - 3.8 vehicles per hour per $100m^2$ GLFA for faster trades in the AM peak
- For specialty shops:
    - 55.5 vehicles per day per $100m^2$ GLFA for specialty shops
    - 4.6 vehicles per hour per $100m^2$ GLFA for specialty shops in the PM peak
    - 3.45 vehicles per hour per $100m^2$ GLFA for specialty shops in the AM peak

Table 4.2 below presents the adopted retail traffic generation for the NH1 and NH2 developments within the Ginninderry estate, based on the land use volumes specified in Section 3.5 above. As outlined in that section, the land yields for NH1 and NH2 EDP1 have been assumed to match the volumes identified in previous reports.

As the retail developments can service the whole of the Ginninderry estate, it has been assumed that trips will be split proportionally with residential traffic generation across all developed residences within the Ginninderry estate (NH1 and NH2 for interim.

TABLE 4.2 RETAIL TRAFFIC GENERATION – INTERIM CONDITIONS

Land Use	Yield	Daily		AM Commuter Peak		PM Commuter Peak	
Ginninderry Neighbourhood 1							
Faster Trades	1,100m^2 GFA	52.8 vpd / 100m^2 GLFA	436 vpd	3.8 vpd / 100m^2 GLFA	31 vph	5.1 vpd / 100m^2 GLFA	22 vph
Supermarket	1,200m^2 GFA	121 vpd / 100m^2 GLFA	998 vpd	11.6 vpd / 100m^2 GLFA	96 vph	15.5 vpd / 100m^2 GLFA	155 vph
Specialty Shops	1,100m^2 GFA	55.5 vpd / 100m^2 GLFA	500 vpd	3.45 vpd / 100m^2 GLFA	31 vph	4.6 vpd / 100m^2 GLFA	23 vph
Sub-Total	**3,400m^2 GFA**	**-**	**1,934 vpd**	**-**	**158 vph**	**-**	**200 vph**
Ginninderry Neighbourhood 2 EDP 2							
Shopping Centre	4,316m^2 GFA	121 vpd / 100m^2 GLFA	3,917 vpd	9.25 vpd / 100m^2 GLFA	299 vph	12.3 vpd / 100m^2 GLFA	398 vph
Total	**7,716m^2 GFA**	**-**	**5,851 vpd**	**-**	**457 vph**	**-**	**598 vph**

4.1.1.3 School Land Uses

The traffic generation rates for the schools located throughout the Ginninderry estate have been adopted based on the rates specified in the *RMS School Trip Generation Surveys and Analysis Report* and the *RTA Guide to Traffic Generating Developments*. The rates and assumptions used for this assessment are the same as those adopted within the Calibre traffic report for Strathnairn School (2022). The key assumptions which are made for these land uses are as follows:

- All vehicle movements by both staff and students are accounted for within the school generation rates.
- All trips to the school within NH1 are expected to be from local residents within the NH1 and NH2 areas. No trips external to these neighbourhoods have been allowed.
- Given school operating periods, the school peak times and the commuter peak times do not align perfectly. As the commuter peak period is the period of interest, a scaling factor has been applied to the calculated school peak periods as follows:
  - No scaling factor is applied within the AM peak period.
  - A factor of 0.48 has been applied to the PM peak period.
- For the ECEC land use, it has been assumed that generation rates for a pre-school are suitable for use by the site.
- Where no daily traffic generation rate was available, it has been assumed that the daily traffic for educational establishments was 3 times the morning peak.

Based on the above assumptions, the following traffic generation rates have been adopted for each of the school land uses:

- For Primary Schools
  - 4.05 vehicle trips per student per day
  - 0.88 vehicle trips per student per hour in the AM peak period
  - 0.34 vehicle trips per student per hour in the PM commuter peak period
- For the ECEC
  - 4.2 vehicle trips per student per day
  - 1.4 vehicle trips per student per hour in the AM peak period
  - 0 vehicle trips per student per hour in the PM peak period

Table 4.3 below presents the adopted residential traffic generation for the NH1 and NH2 developments within the Ginninderry estate, based on the residential dwelling numbers specified in Section 3.5 above. As outlined in that section, the land yields for NH1 and NH2 EDP1 have been assumed to match the volumes identified in previous reports.

4.1.1.4 Recreation Land Use

As discussed within the Strathnairn School Traffic Report completed by Calibre (Section 2.5), the Riverside Park is expected to also generate traffic from the nearby neighbourhoods of Ginninderry. As no applicable traffic generation rate could be identified for parkland land use, a first principles approach was adopted to determine the traffic generation for this site. This was calculated to be 300 vehicles per day, and 30 vehicles in both AM and PM peak periods. This is consistent with what was adopted in the previous reports.

TABLE 4.3 SCHOOL TRAFFIC GENERATION – INTERIM CONDITIONS

Land Use	Yield	Daily		AM Commuter Peak		PM Commuter Peak	
Ginninderry Neighbourhood 1							
Primary School	780 students	4.05 vpd / student	3,159 vpd	0.88 vph / student	686 vph	0.34 vph / student	266 vph
ECEC	130 students	4.2 vpd / student	546 vpd	1.4 vph / student	182 vph	0 vph / student	0 vph
Total	**910 students**	**-**	**3,705 vpd**	**-**	**868 vph**	**-**	**266 vph**

4.1.2 Traffic Distribution

4.1.2.1 In-Out Trip Distribution

The in-out distribution of trips associated with the various land use components under the interim conditions has been adopted and presented in Table 4.4.

On a daily basis, an equal in-out directional split is expected at all land use components. This reflects no net accumulation of vehicles at any of the land uses from one day to the next. For peak periods, directional splits reflect the tidal nature of the residential dwellings, while the retail and school developments reflect the quick turnaround visitation that typically occurs at these locations.

TABLE 4.4 IN-OUT DIRECTIONAL SPLITS – INTERIM CONDITIONS

Land Use Component	Daily		AM Commuter Peak		PM Commuter Peak	
	In	Out	In	Out	In	Out
Residences	50%	50%	20%	80%	70%	30%
Retail	50%	50%	71%	29%	49%	51%
School	50%	50%	51%	49%	40%	60%
Recreation	50%	50%	50%	50%	80%	20%
Work	50%	50%	95%	5%	8%	92%

4.1.2.2 Traffic Distribution Matrices

As aforementioned, the trips generated by the retail developments are assumed to be made up of vehicles from across the entire Ginninderry estate. Similarly, the school developments are assumed to be made up of vehicles from the NH1 and NH2 land uses. To reflect the complexity associated with trips between multiple destinations, data from the Victorian Integrated Survey of Travel and Activity (VISTA) was analysed to identify the typical travel patterns associated with the non-residential land uses during each of the analysis time periods. The proportion of trips associated with the residential land uses within the Ginninderry NH1 and NH2 developments, between each of the origin-destination pairs derived for this analysis are presented in Table 4.5 to Table 4.7 below.

TABLE 4.5 DAILY TRAFFIC DISTRIBUTION MATRIX – INTERIM CONDITIONS

		Destination				
		Residential	Shopping Centre	School	Work	Total
Origin	Residential	0%	4%	8%	34%	**46%**
	Shopping Centre	6%	0%	1%	1%	**8%**
	School	8%	1%	0%	1%	**10%**
	Work	33%	2%	1%	0%	**36%**
	Total	**47%**	**7%**	**10%**	**36%**	

TABLE 4.6 AM PEAK TRAFFIC DISTRIBUTION MATRIX – INTERIM CONDITIONS

		Destination				
		Residential	**Shopping Centre**	**School**	**Work**	**Total**
Origin	Residential	0%	3%	18%	48%	**69%**
	Shopping Centre	1%	0%	0%	1%	**2%**
	School	14%	1%	0%	1%	**16%**
	Work	12%	1%	0%	0%	**13%**
	Total	**27%**	**5%**	**18%**	**50%**	

TABLE 4.7 PM PEAK TRAFFIC DISTRIBUTION MATRIX – INTERIM CONDITIONS

		Destination				
		Residential	**Shopping Centre**	**School**	**Work**	**Total**
Origin	Residential	0%	2%	5%	21%	**28%**
	Shopping Centre	5%	0%	1%	0%	**6%**
	School	10%	1%	0%	1%	**12%**
	Work	49%	3%	2%	0%	**54%**
	Total	**64%**	**6%**	**8%**	**22%**	

4.1.2.3 External Traffic Distribution

The distribution of trips from within the Ginninderry estate to the external road network has been based on journey-to-work (JTW) data from the 2022 Australian Census. For respondents with a 'place of usual residence' within the Holt or Macgregor (SA2) statistical areas, the corresponding split across the 'place of work' (SA3) statistical areas was adopted as the expected external trip distribution. These 'place of work' statistical areas were grouped according to the shortest path route between Ginninderry NH2 and the 'place of work'. On this basis, the following two JTW directions were adopted to represent the external trip distribution under the interim conditions:

- South (via Pro Hart Avenue and Drake Brockman Drive) – 25% of trips.
- East (via Parkwood Road and Southern Cross Drive) – 75% of trips.

4.1.3 Traffic Assignment

All trips throughout the internal road network, have been assigned to the route with shortest travel time between their origin and destination. This assignment has assumed that delays due to congestion will be minimal across the network and that motorists prefer to travel along higher order roads (through the use of a cost factor). As such, the travel time calculation is based on the road length and the equivalent speed of each road section.

Figure 4.1 below presents the posted speed, adopted cost factor, and equivalent speed for each road classification.

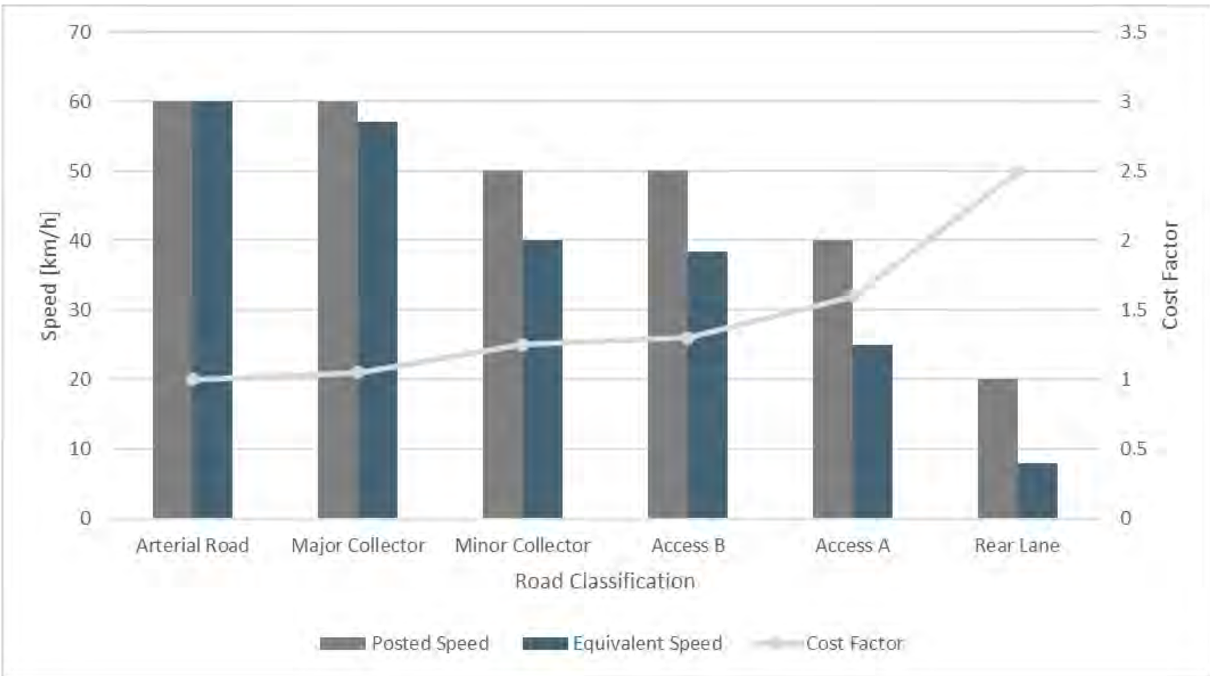


FIGURE 4.1 ADOPTED COST FACTORS FOR ROAD HIERARCHIES

4.1.4 Internal Road Traffic Demands

Based on the daily traffic generation, distribution, and assignment discussed in the sections above, the daily maximum traffic volumes were calculated along each of the internal roads within NH2 EDP2. These volumes are listed in Table 4.8.

TABLE 4.8 MAXIMUM DAILY TRAFFIC VOLUMES – INTERIM CONDITIONS

Maximum Daily Traffic Volumes	
Parkwood Road	7,721 vpd
Pro Hart Avenue	6,573 vpd
Sally Ross Way	2,498 vpd
Road 1	155 vpd
Road 2	2,329 vpd
Road 2A	2,833 vpd
Road 3	438 vpd
Road 4	1,198 vpd
Road 5	319 vpd
Road 6	1,339 vpd
Road 140	7,721 vpd
Road 142	552 vpd
Road 146	400 vpd
Lane 1	135 vpd
Lane 2	33 vpd
Lane 3	150 vpd
Lane 4	124 vpd
Lane 5	124 vpd
Lane 6	156 vpd
Lane 7	152 vpd
Lane 8	27 vpd
Lane 9	77 vpd
Lane 10	56 vpd
Lane 143a	115 vpd
Lane 145	80 vpd
Lane 147	160 vpd

4.1.5 Road Hierarchy

The road hierarchy within Ginninderry NH2 EDP2 has been developed in accordance with the requirements of the EDC. Key factors that were considered in the development of the road hierarchy included:

- Road function
- Road connectivity
- Maximum daily traffic volumes
- Adjacent land-use
- Provision for services within the verge

On this basis, Table 4.9 presents the Ginninderry NH2 EDP2 road hierarchy and key parameters for each of the road classifications. The full Ginninderry NH2 EDP2 road hierarchy, showing key daily traffic volumes, is presented at Appendix A.

TABLE 4.9 DAILY TRAFFIC VOLUMES BY ROAD HIERARCHY – INTERIM CONDITIONS

Road Classification	Daily Traffic Volume Range	Ginninderry NH2 EDP2 Roads	Maximum Daily Traffic Volume
Arterial Road	>6,000 vpd	Parkwood Road, Pro Hart Avenue, Road 140,	7,721 vpd
Major Collector	3,001-6,000 vpd	Sally Ross Way	2,498 vpd
Minor Collector	1,001-3,000 vpd	Road 142, Road 2, Road 2A	2,833 vpd
Access B	301-1,000 vpd	Road 1, Road 3, Road 4, Road 6, Road 146	1,339 vpd
Access A	0-300 vpd	Road 3, Road 5	438 vpd
Rear Lane	0-160 vpd	Lane 1-10, Lane 143a, Lane 145, Lane 147	160 vpd

As shown in the above two tables, the majority of roads within Ginninderry NH2 EDP2 are expected to carry traffic demands within the daily traffic volume ranges identified in the EDC. It is further noted that the daily traffic volume ranges published in the EDC do not reflect a physical capacity, but rather the ranges of daily traffic volumes that broadly result in acceptable levels of safety and amenity for land uses adjacent to each road classification.

The four roads which are noted to exceed the daily traffic volume range for their selected road classification are Road 3, Road 4, Road 5, and Road 6. Road 3 and Road 5 are Access A class roads, with each road expected to handle up to 438 and 319 vehicles per day, respectively. At its worst, this exceeds the limit of this road type by 138 vpd. Given this equates to approximately an additional 14 vehicles an hour in peak conditions (one additional vehicle every 4 minutes), the overall impact on safety and amenity caused by this increased volume is expected to be minimal. With the residential nature of both these roads, providing access to numerous houses and several rear lanes, it is considered appropriate to leave both Road 3 and Road 5 classified as Access A.

Similarly to the above, both Road 4 and Road 6 are only expected to exceed the specified maximum volume by a small amount over the course of the day. Both these roads are classified as Access B roads, with Road 4 expected to handle 1,198 vpd, and Road 6 expected to handle 1,339 vpd. With the largest difference form the maximum advised limit being 339 vpd, which equates to 34 vehicles in peak hours, or an additional vehicle every 2 minutes, the impact on safety and amenity of both these roads is expected to be minor. With both Road 4 and Road 6 still servicing residential areas internal to the estate, it is viewed as appropriate to maintain the classification of Access B for both roads.

4.1.6 Intersection Performance Analysis Criteria

The *RMS Traffic Modelling Guidelines* identify the maximum practical DOS for various intersection controls as presented in Table 4.10.

TABLE 4.10 MAXIMUM PRACTICAL DOS BY INTERSECTION CONTROL

Intersection Control	Maximum Practical DOS
Traffic Signals	0.90
Roundabouts (incl. Metered)	0.85
Priority-Controlled	0.80

Intersections operating in excess of their maximum practical capacity typically experience unstable traffic flow whereby small disruptions result in excessive congestion and flow breakdown.

The *RMS Traffic Modelling Guidelines* also identify LOS criteria for intersections as shown in Table 4.11.

TABLE 4.11 LOS CRITERIA FOR THE INTERSECTIONS (RTA NSW METHOD)

LOS	Average delay per vehicle	Description
A	≤ 14s	Good operation
B	15s – 28s	Acceptable delays and spare capacity
C	29s – 42s	Satisfactory
D	43s – 56s	Near capacity
E	57s – 70s	At capacity, priority-control not suitable
F	> 71s	Unsatisfactory with excessive queueing

The TCCS *Traffic Impact Assessment Guidelines*, similarly, identifies intersections operating at LOS D or better as acceptable.

95th percentile queue lengths have been assessed to ensure that queues in short lanes do not extend back to impact traffic in adjacent lanes and that queues in full-length lanes do not extend back to impact upstream intersections.

4.1.7 Intersection Performance Modelling

For this traffic analysis, SIDRA Intersection 9 modelling software (SIDRA) was used to assess the performance criteria listed above of several key intersections within the NH2 EDP2 road network. This modelling was completed as a network model, allowing for consideration into how signalised intersections interact, and identification on how extensive queue lengths impact upon adjacent modelled intersections.

The key intersections which were modelled as part of this assessment are as follows:

- Pro Hart Avenue / Road 2 / Road 102
- Pro Hart Avenue / Road 140
- Road 140 / Road 2 / Road 2A
- Road 140 / Parkwood Road

Each of these intersections has been modelled under AM peak and PM peak conditions, with the traffic volumes and distributions adopted as per the values specified in Sections 4.1.1 to 4.1.3 above.

4.1.7.1 Overall Network Performance

From review of the outputs of the SIDRA modelling under both Interim AM Peak and PM peak traffic conditions, it is expected that all of the key intersections throughout or adjacent to NH2 EDP2 will be operating within acceptable parameters. Output diagrams are provided in Figure 4.2 and Figure 4.3, which show the degree of saturation (DOS) and level of service (LOS) values achieved by each leg of the key intersections.

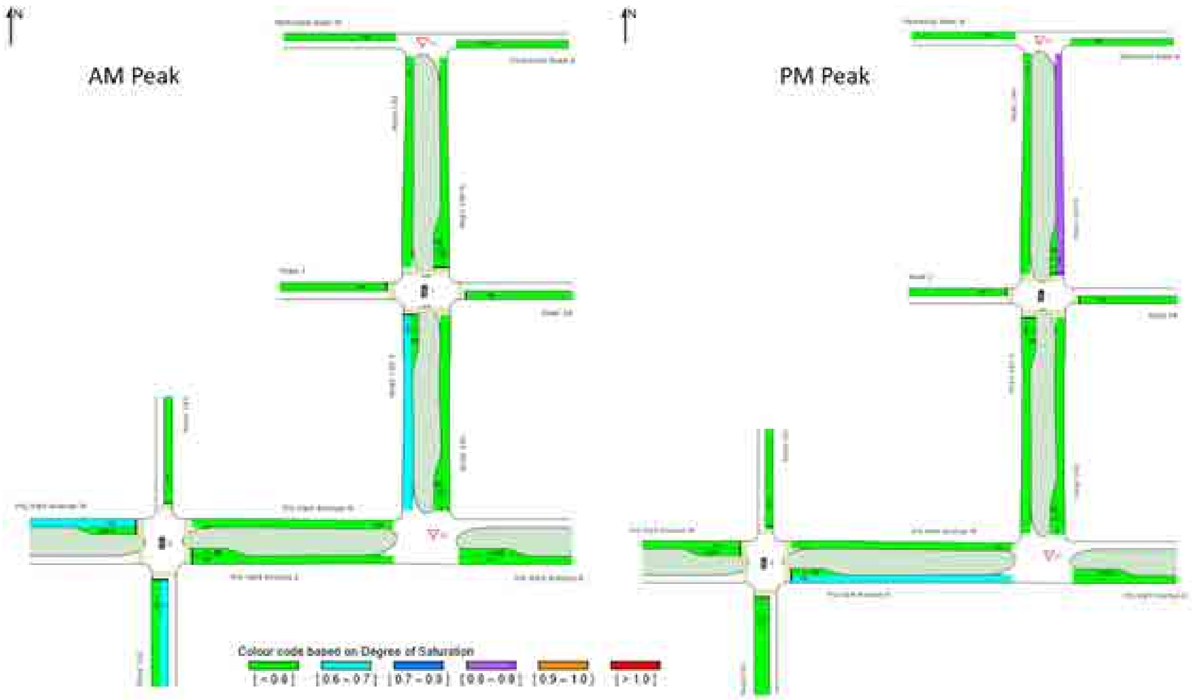


FIGURE 4.2 DEGREE OF SATURATION FOR NH2 EDP2 ROAD NETWORK – INTERIM CONDITIONS

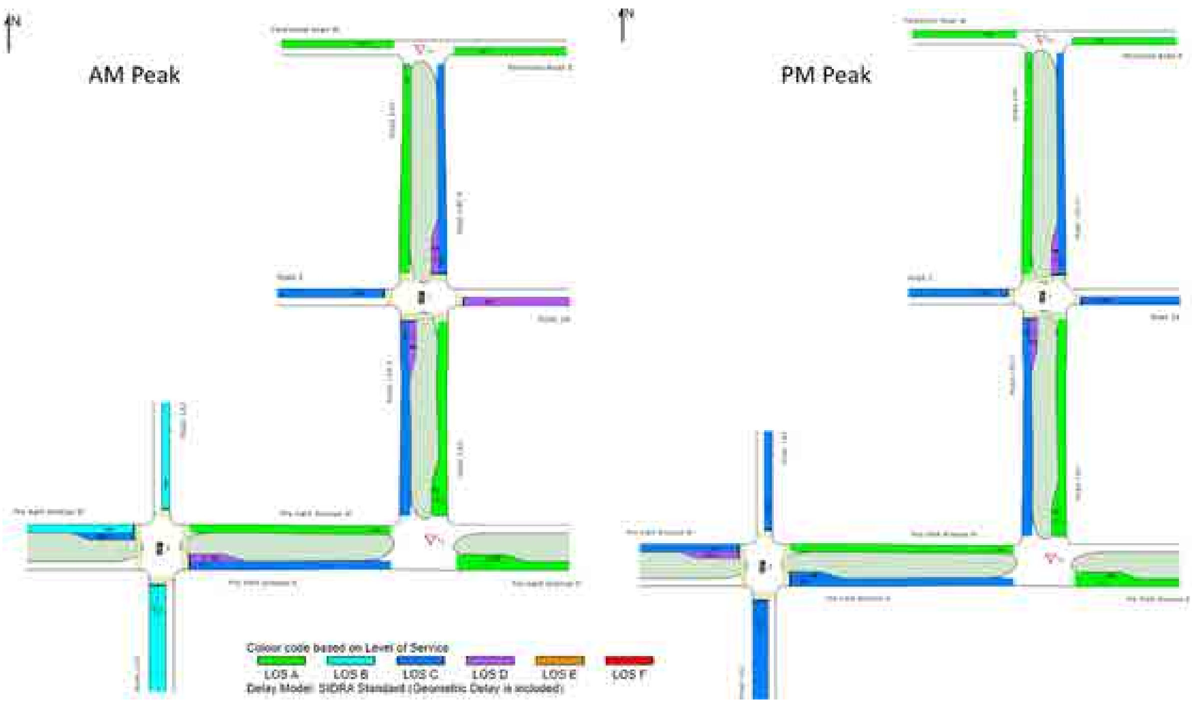


FIGURE 4.3 LEVEL OF SERVICE FOR NH2 EDP2 ROAD NETWORK – INTERIM CONDITIONS

As can be seen from these images, all intersections are operating at acceptable levels across both peak periods. In the AM peak, all unsignalised intersections are operating with DOS less than 0.7, while the signalised intersections are operating with DOS values below 0.81. Delays for all intersections are below 52 seconds (LOS D). Queue lengths were also reviewed and confirmed to not extend back far enough to impact adjacent intersections or extend past the back of auxiliary lanes. Greater detail into the proposed interim design and operation for each of the intersections can be found within the sections below. The outputs of the SIDRA intersection modelling is also available within Appendix B.

4.1.7.2 Pro Hart Avenue / Road 2 / Road 102 Intersection

The intersection of Pro Hart Avenue, Road 2, and Road 102 is a 4-way signalised intersection which connects both NH2 EDP1 and EDP2 with Pro Hart Avenue. The intersection consists of a dual carriageway along Pro Hart Avenue, with a single through traffic lane in each direction. Road 2 and Road 102 both consist of a single through traffic lane in each direction. Road 102 also possesses a full length right-turn lane, which is present until the adjacent southern intersection. Auxiliary right-turn lanes are also proposed along both legs of Pro Hart Avenue, with both approximately 100m in length. Layout of the intersection, as modelled in SIDRA, can be seen in Figure 4.4.

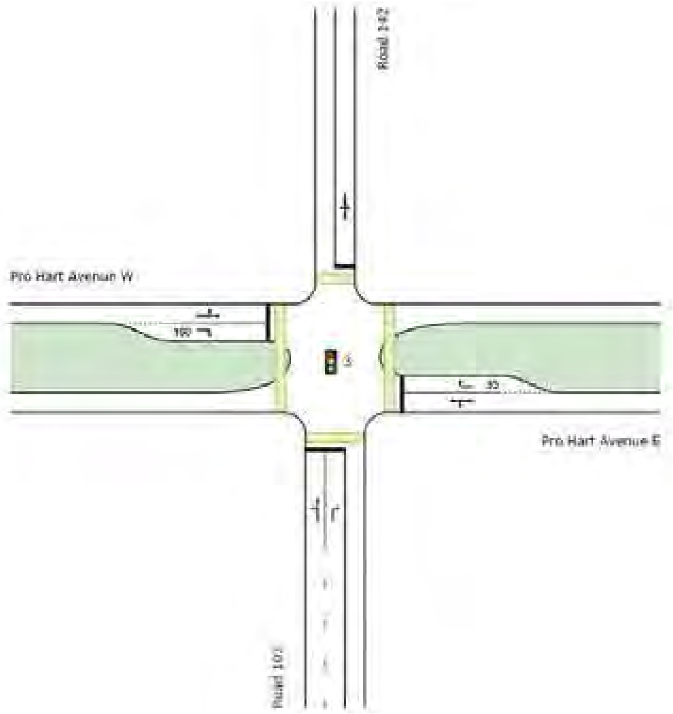


FIGURE 4.4 SIDRA INTERSECTION LAYOUT – PRO HART AVE / RD 2 / RD 102

The intersection is proposed to operate as a diamond phase signal layout, with an AM peak cycle time of 60 seconds and a PM peak cycle time of 75 seconds. The adopted signal phasing for each can be seen below in Figure 4.5.

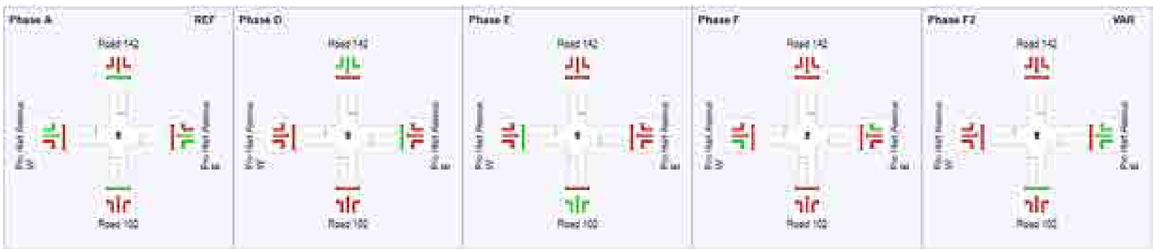


FIGURE 4.5 SIGNAL PHASING – PRO HART AVE / RD 2 / RD 102

As can be seen from Figure 4.2 and Figure 4.3 above, intersection performance is expected to be suitable along all legs of this intersection, with a maximum DOS of 0.68 along Pro Hart Avenue (east) in the PM peak, and a maximum delay of 52 seconds along Pro Hart Avenue (west), also in the PM peak. A summary of the performance metrics along each leg can be found in Table 4.12.

TABLE 4.12 SIDRA PERFORMANCE SUMMARY – PRO HART AVE / RD 2 / RD 102

	AM Peak				PM Peak			
Leg	**DOS**	**Delay**	**LOS**	**Queue**	**DOS**	**Delay**	**LOS**	**Queue**
North – Rd 2	0.14	28s	B	8m	0.06	33s	C	3m
East – Pro Hart	0.46	32s	C	24m	0.68	31s	C	56m
South – Rd 102	0.65	25s	B	64m	0.39	34s	C	18m
West – Pro Hart	0.60	29s	B	33m	0.17	30s	C	8m

4.1.7.3 Pro Hart Avenue / Road 140 Intersection

The intersection of Pro Hart Avenue and Road 140 is proposed to operate as a priority (give-way) controlled intersection which will connect NH2 EDP with Pro Hart Avenue, as well as provide a direct connection to Parkwood Road to the north. Pro Hart Avenue will function as the major leg, with Road 140 giving way to these movements. This intersection is proposed to be laid out with two carriageways along Pro Hart Avenue, each with a single through traffic lane in each direction. An auxiliary right-turn lane of 100m is also proposed along the eastern leg. Road 140 will also consist of a dual carriageway layout, with a single full-length approach and departure lane. In addition, a 70m long right-turn auxiliary lane is also provided. Layout of the intersection, as modelled in SIDRA, can be seen in Figure 4.6.

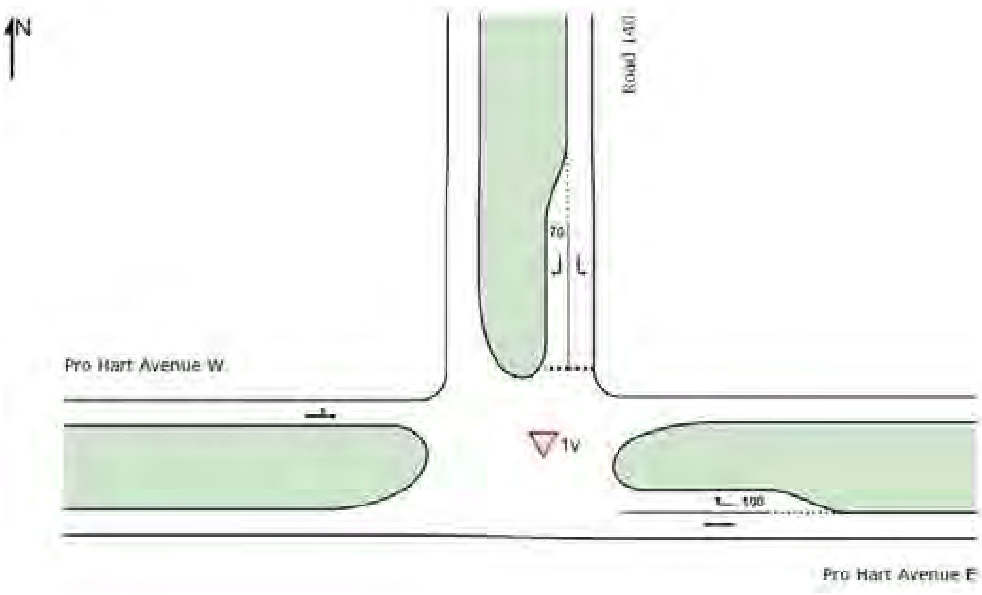


FIGURE 4.6 SIDRA INTERSECTION LAYOUT – PRO HART AVE / RD 140

As can be seen from Figure 4.2 and Figure 4.3 above, intersection performance is expected to be suitable along all legs of this intersection, with a maximum DOS of 0.29 along Road 140 in the PM peak, and a maximum delay of 8 seconds (LOS A) across all legs in both peaks. A summary of the performance metrics along each leg can be found in Table 4.13.

TABLE 4.13 SIDRA PERFORMANCE SUMMARY – PRO HART AVE / RD 140

	AM Peak				PM Peak			
Leg	**DOS**	**Delay**	**LOS**	**Queue**	**DOS**	**Delay**	**LOS**	**Queue**
North – Rd 140	0.11	8s	A	3m	0.29	8s	A	3m
East – Pro Hart	0.03	8s	A	0m	0.10	6s	A	0m
West – Pro Hart	0.27	6s	A	0m	0.10	6s	A	0m

4.1.7.4 Road 140 / Road 2 / Road 2A Intersection

The intersection of Pro Hart Avenue, Road 2, and Road 2A is a 4-way signalised intersection which connects the east and west sides of NH2 EDP2 to Road 140. The intersection consists of a dual carriageway along Road 140, with a single through traffic lane in each direction. Both north and south approaches along Road 140 also possess an auxiliary right-turn lane of approximately 80m in length. Road 2 and Road 102 both consist of a single through traffic lane in each direction which handles all movements out of each leg. Layout of the intersection, as modelled in SIDRA, can be seen in Figure 4.7.

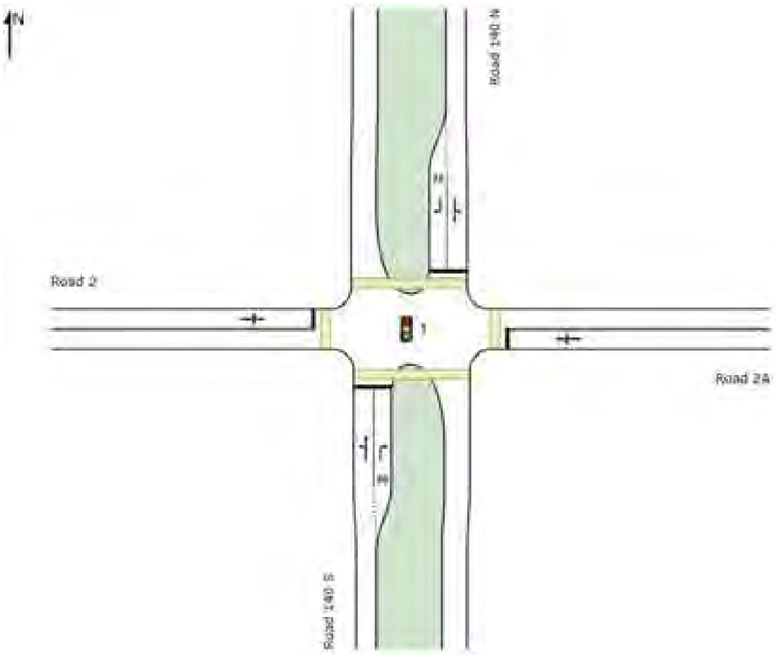


FIGURE 4.7 SIDRA INTERSECTION LAYOUT – RD 140 / RD 2 / RD 2A

The intersection is proposed to operate as a diamond phase signal layout, with an AM and PM peak cycle time of 90 seconds. The adopted signal phasing and timings for each can be seen below in Figure 4.8.

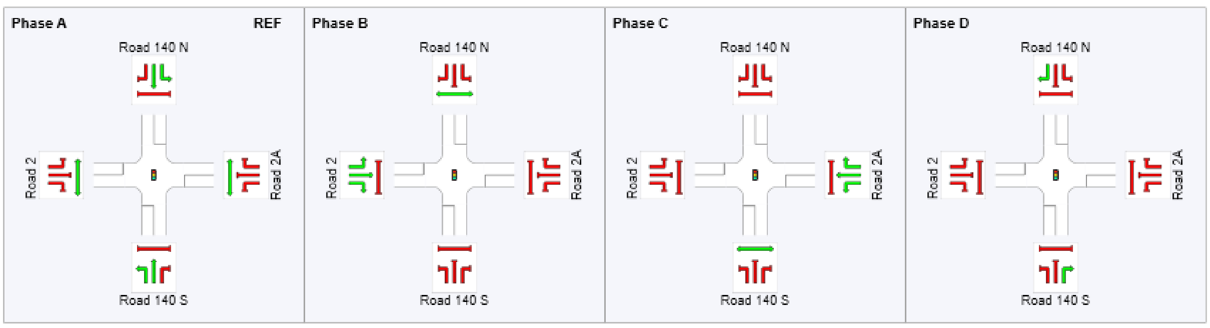


FIGURE 4.8 SIGNAL PHASING – RD 140 / RD 2 / RD 2A

As can be seen from Figure 4.2 and Figure 4.3 above, intersection performance is expected to be suitable along all legs of this intersection, with a maximum DOS of 0.80 along Road 140 (north) in the PM peak, and a maximum delay of 51 seconds along the same leg in the same period. A summary of the performance metrics along each leg can be found in Table 4.14.

TABLE 4.14 SIDRA PERFORMANCE SUMMARY – RD 140 / RD 2 / RD 2A

	AM Peak				PM Peak			
Leg	**DOS**	**Delay**	**LOS**	**Queue**	**DOS**	**Delay**	**LOS**	**Queue**
North – Rd 140	0.31	35s	C	39m	0.80	43s	C	78m
East – Rd 2A	0.52	43s	C	51m	0.25	39s	C	14m
South – Rd 140	0.65	33s	C	93m	0.23	30s	C	18m
West – Rd 2	0.55	41s	C	55m	0.19	38s	C	11m

4.1.7.5 Road 140 / Parkwood Road Intersection

The intersection of Parkwood Road and Road 140 is proposed to operate as a priority (give-way) controlled intersection and will provide a second access option for vehicles within the Ginninderry development instead of the existing Pro Hart Avenue connection. In this arrangement, Parkwood Road will function as the major leg, with Road 140 giving way to these movements.

This intersection is proposed to be laid out with a dual carriageway along Road 140, each with a single through traffic lane in each direction. Parkwood Road is proposed to operate under the same arrangement which is currently present along this road, consisting of a single carriageway with single traffic lane in each direction. Layout of the intersection, as modelled in SIDRA, can be seen in Figure 4.9.

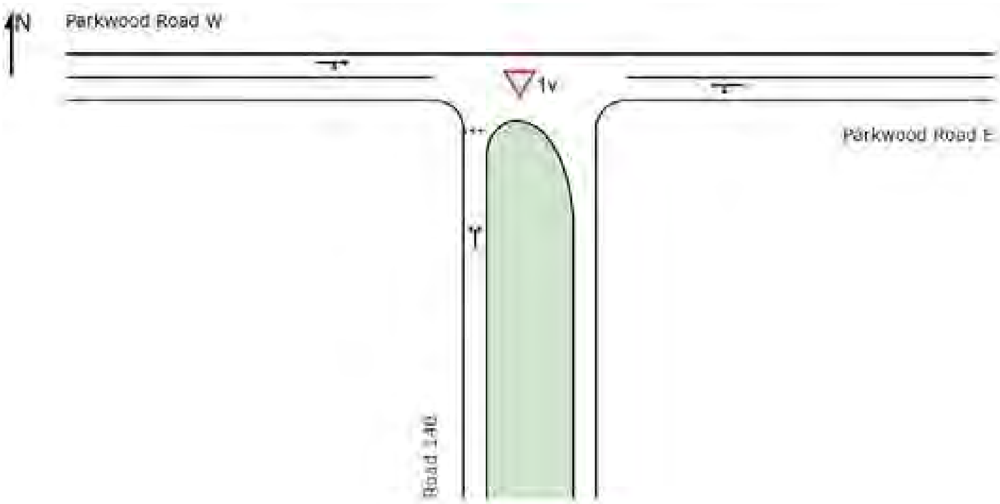


FIGURE 4.9 SIDRA INTERSECTION LAYOUT – RD 140 / PARKWOOD ROAD

As can be seen from Figure 4.2 and Figure 4.3 above, intersection performance is expected to be suitable along all legs of this intersection, with a maximum DOS of 0.54 along Road 140 in the AM peak, and a maximum delay of 7 seconds across all legs in all peaks. A summary of the performance metrics along each leg can be found in Table 4.13.

TABLE 4.15 SIDRA PERFORMANCE SUMMARY – PRO HART AVE / RD 140

	AM Peak				PM Peak			
Leg	**DOS**	**Delay**	**LOS**	**Queue**	**DOS**	**Delay**	**LOS**	**Queue**
South – Rd 140	0.54	6s	A	19m	0.19	7s	A	2m
East – Pro Hart	0.10	6s	A	0m	0.27	6s	A	0m
West – Pro Hart	0.00	6s	A	0m	0.00	7s	A	0m

4.2 Ultimate Conditions

Modelling for the NH2 EDP2 ultimate conditions have not been completed as part of this assessment. This is due to it being accepted that duplication of several key roads, including Pro Hart Avenue and Road 140 is likely to be required, and as such an updated traffic model will need to be undertaken at the time of that development. Additionally, modelling of the ultimate conditions for intersections across Ginninderry NH2 has been undertaken in several previous traffic reports. The most recent reports which cover the operation of NH2 intersections under the ultimate traffic scenario are the *Ginninderry Neighbourhood 2 EDP1 – Traffic Analysis Report (Calibre, 2020)* and the *Ginninderry – Macnamara – Strategic Intersection Testing Memorandum (AECOM, 2021)*.

Between these two reports, ultimate scenario traffic modelling has been completed for the following intersections:

- Pro Hart Avenue / Road 2 / Road 102
- Pro Hart Avenue / Road 140
- Road 140 / Road 2 / Road 2A

From the modelling completed for each of these intersections, it was identified that traffic performance is expected to be suitable in the ultimate scenario once Pro Hart Avenue has been duplicated.

Based off these results, it has been assumed that traffic operation in the ultimate scenario will be suitable assuming duplication of key roads occurs when required.

5 CONCLUSION

To allow for the continued development of the Ginninderry estate, Egis were engaged by the Ginninderry Group to undertake a traffic analysis which will support the Macnamara NH2 EDP2 development. This assessment expanded upon the works completed during previous stages of the Ginninderry development, with the key reports referenced being:

- The *West Belconnen Technical Traffic Report (AECOM, 2015)*
- *West Belconnen Technical Traffic Report (AECOM, 2015)*
- *West Belconnen Neighbourhood One EDP - Traffic Modelling Report (AECOM, 2016)*
- *West Belconnen Stage 1 – Traffic Impact Assessment Technical Memorandum (Calibre, 2016)*
- *Ginninderry Stage 2 EDP – Traffic Modelling Report (AECOM, 2017)*
- *Ginninderry Stage 2 – Traffic Impact Assessment (Calibre, 2017)*
- *Ginninderry Neighbourhood 2 EDP1 – Traffic Analysis Report (Calibre, 2020)*
- *Ginninderry Development Traffic Report – Stage 1 – CSTM Strategic Assessment (AECOM, 2021)*
- *Ginninderry – Macnamara – Strategic Intersection Testing Memorandum (AECOM, 2021)*
- *Strathnairn School Site – Traffic Impact and Parking Assessment (Calibre, 2022)*
- *Green Waste Drop-Off Facility – Traffic Impact Assessment (Calibre 2023)*

From these reports, the traffic generation and distribution for the surrounding road network in the future developed conditions was determined and used to populate the background traffic data in the models.

NH2 EDP2 yields were calculated off the EDP masterplan layout, with a total of:

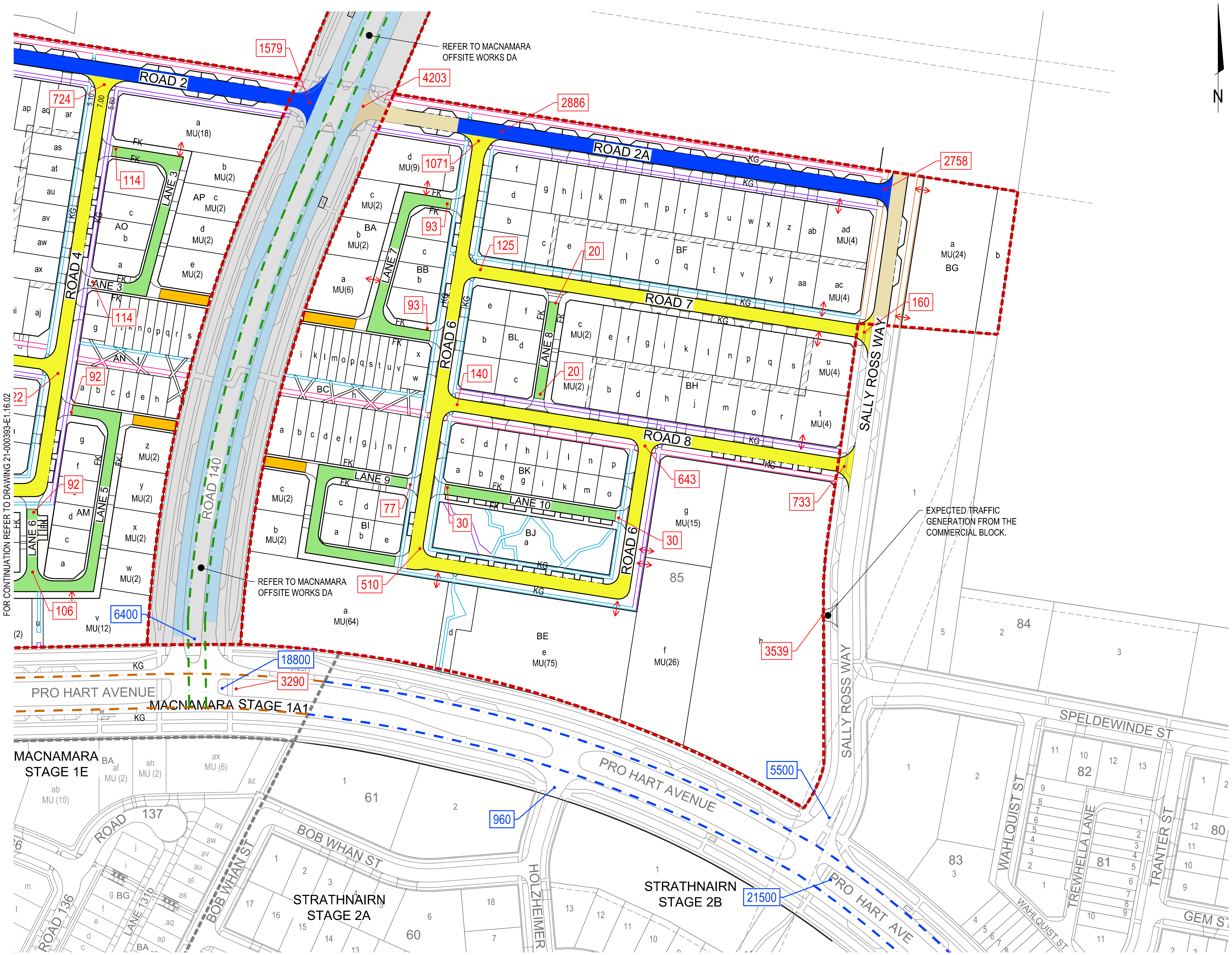
- 594 residential dwellings, consisting of:
  - 58 dwellings with block area greater than $360m^2$
  - 227 dwellings with block area less than $360m^2$
  - 309 MU Dwellings
- A shopping centre with $4{,}316m^2$ GFA, including:

Based off the traffic generation and distribution calculated for NH1 and NH2 developments, a review of the road hierarchy plans was undertaken to determine whether all roads were suitably classified. From this assessment, it was found that three roads; Road 3, Road 4, and Road 6 were in excess of the advised daily traffic volume range. In all three cases, it was determined that the overall impact to the safety and amenity of these roads due to the additional traffic volumes was not significant enough to warrant increasing the road hierarchy of any of the roads, particularly when considering each of the roads function and operation.

The traffic generation and distribution data was also used to undertake SIDRA intersection modelling for an interim scenario, which does not allow for the full development of Ginninderry estate or duplication of key road connections. This modelling determined that the key modelled intersections within the road network are expected to operate within acceptable levels for DOS, delay, and queuing in both AM and PM peak periods.

No further modelling for ultimate scenarios has been completed as part of this assessment, due to several previous reports already having modelled these outcomes and determined that the road network will operate suitably under these ultimate conditions.

APPENDIX A:
ROAD HIERARCHY PLANS



LEGEND

KG	KERB AND GUTTER
KO	KERB ONLY
PK	PERMEABLE KERB
FK	FLUSH KERB
MK	MOUNTABLE KERB
OCI	OPEN CONCRETE INVERT
900	2041 VEHICLES PER DAY (NUMBER)
900	NEIGHBOURHOOD 2 VEHICLES PER DAY (NUMBER) (SEE NOTE 1)
	STAGE 2 EDP BOUNDARY
	ARTERIAL ROAD AND BUS ROUTE
	MAJOR COLLECTOR ROAD
	MINOR COLLECTOR ROAD
	ACCESS STREET B
	ACCESS STREET A
	REAR LANE
	SHARED DRIVEWAY
	STAMPED ASPHALT THRESHOLD TREATMENT
	INDICATIVE MU SITE DRIVEWAYS
	DRIVEWAY THRESHOLD
	EXISTING BUS ROUTES
	PROPOSED GINNINDERRY NH 2 BUS ROUTE (LOCAL AND EXPRESS)
	FUTURE LOCAL AND EXPRESS BUS ROUTES
	PROPOSED BUS STOP

NOTES

1. TRAFFIC GENERATION BASED ON ESTATE DEVELOPMENT CODE.
2. REFER DRAWING 21-000393-E1.16.04 FOR DATA TABLE.
3. ALL KERBS SHALL BE KERB AND GUTTER EXCEPT WHERE SHOWN.
4. PARKING BAYS SHALL HAVE K4A AND OCI.

INITIAL ISSUE	DES	DRN	CHK	APP	DATE	AMENDMENT DETAILS
	JS	SKT			24/08/2023	

STATUS: ESTATE DEVELOPMENT PLAN

APPROVED
BY: NO:
SIGN: DATE:

SCALE: 0 10 20 30 40 50 60 70 80 — SCALE 1:1000 (A1) SCALE 1:2000 (A3)

egis

www.egis-group.com

CLIENT:

WAE No: .

PROJECT: MACNAMARA EDP 2

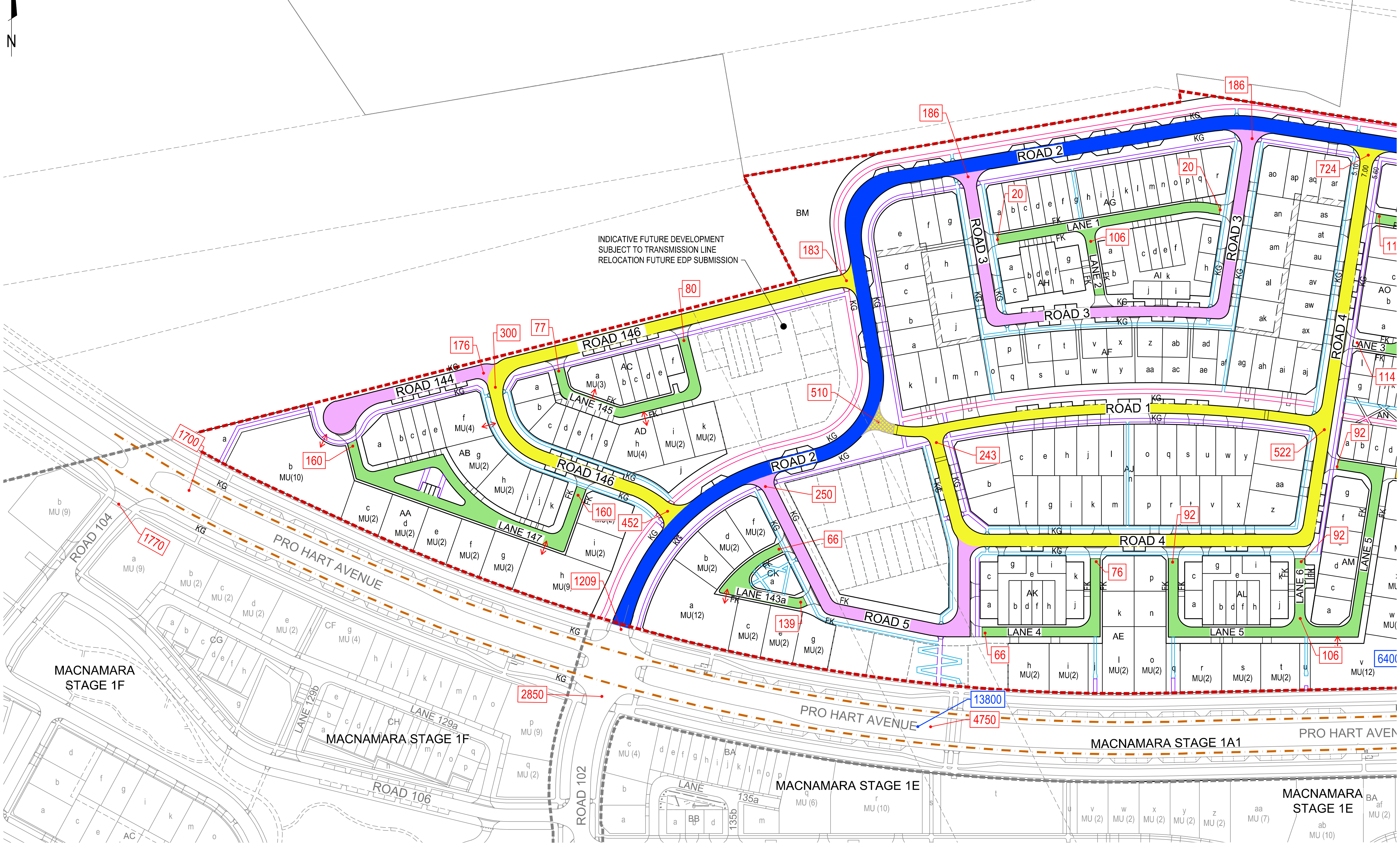
DRAWING TITLE: ROAD HIERARCHY AND TRAFFIC ANALYSIS PLAN SHEET 1 OF 3

PROJECT No.	DRAWING No.	EDP No	REVISION
21-000393	E1.16.01	.	

N

NOTES

1. REFER TO DRAWING 21-000393-E1.16.01 FOR NOTES AND LEGEND.



INITIAL ISSUE	DES	DRN	CHK	APP	DATE	AMENDMENT DETAILS
	JS	SKT			24/08/2023	

STATUS: ESTATE DEVELOPMENT PLAN

APPROVED
BY: NO:
SIGN: DATE:

SCALE: 0 10 20 30 40 50 60 70 80
SCALE 1:1000 (A1) SCALE 1:2000 (A3)

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CLIENT:

WAE No: .

PROJECT: MACNAMARA EDP 2

DRAWING TITLE: ROAD HIERARCHY AND TRAFFIC ANALYSIS PLAN SHEET 2 OF 3

PROJECT No.	DRAWING No.	EDP No	REVISION
21-000393	E1.16.02	.	

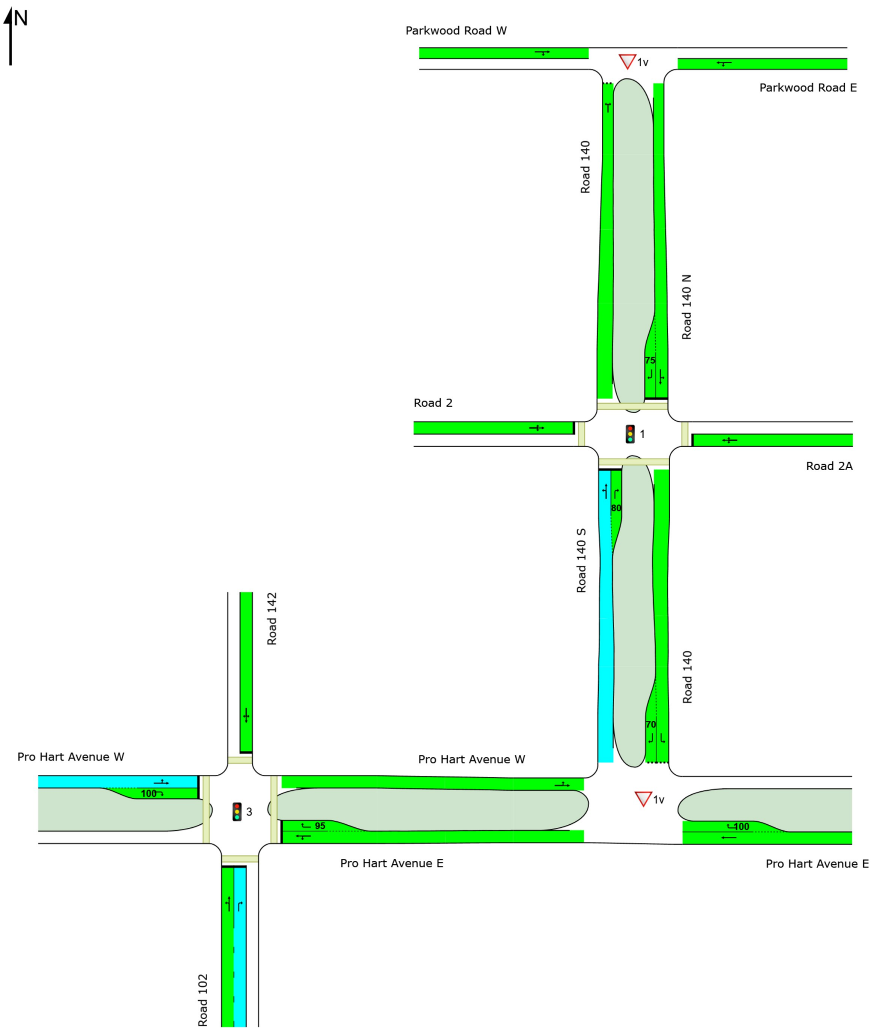
APPENDIX B:
SIDRA OUTPUTS

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Pro Hart Avenue / Road 140 / Parkwood Road
Signalised and unsignalised intersection road network
Interim Traffic Demands
Network Category: (None)
Network Cycle Time = 90 seconds (Network User-Given Cycle Time)



Colour code based on Degree of Saturation

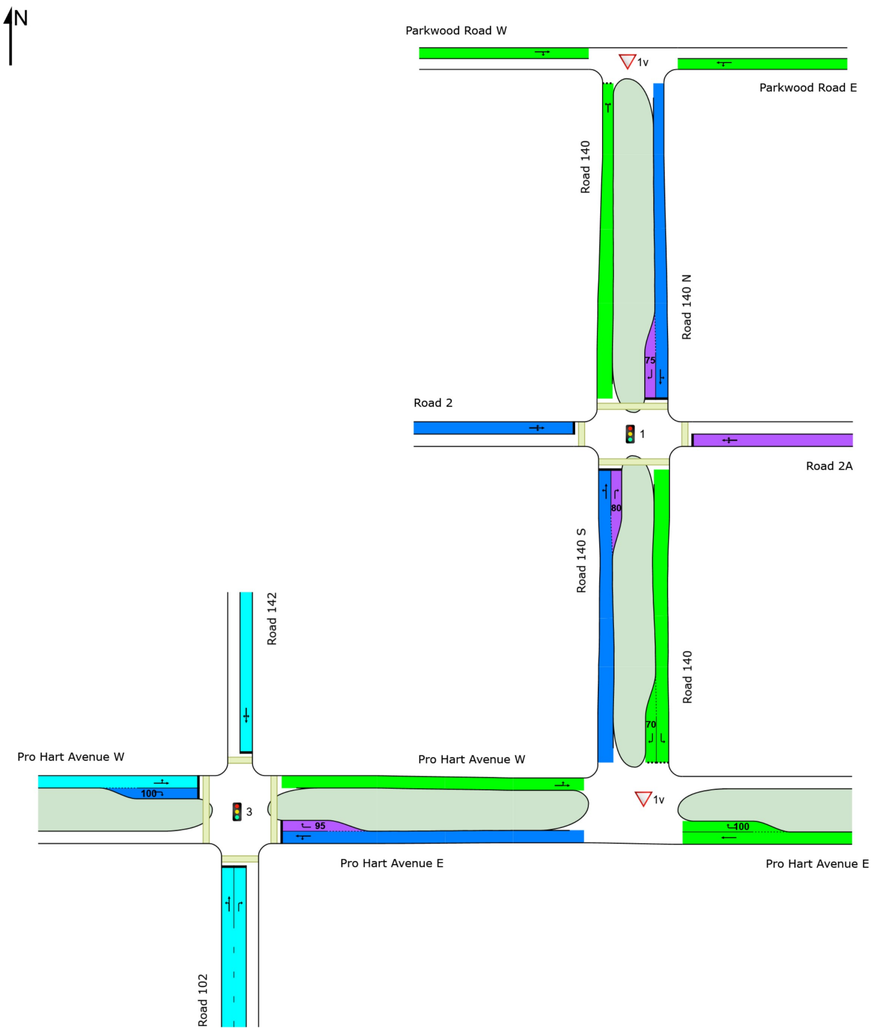
[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

LEVEL OF SERVICE

Lane Level of Service

Network: N101 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Pro Hart Avenue / Road 140 / Parkwood Road
Signalised and unsignalised intersection road network
Interim Traffic Demands
Network Category: (None)
Network Cycle Time = 90 seconds (Network User-Given Cycle Time)



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: Macnamara EDP2 Traffic Analysis

Template: Site User Report

Site: 3 [Interim AM - ProHartAve-Rd102-Rd142 (Site Folder: Interim AM)]

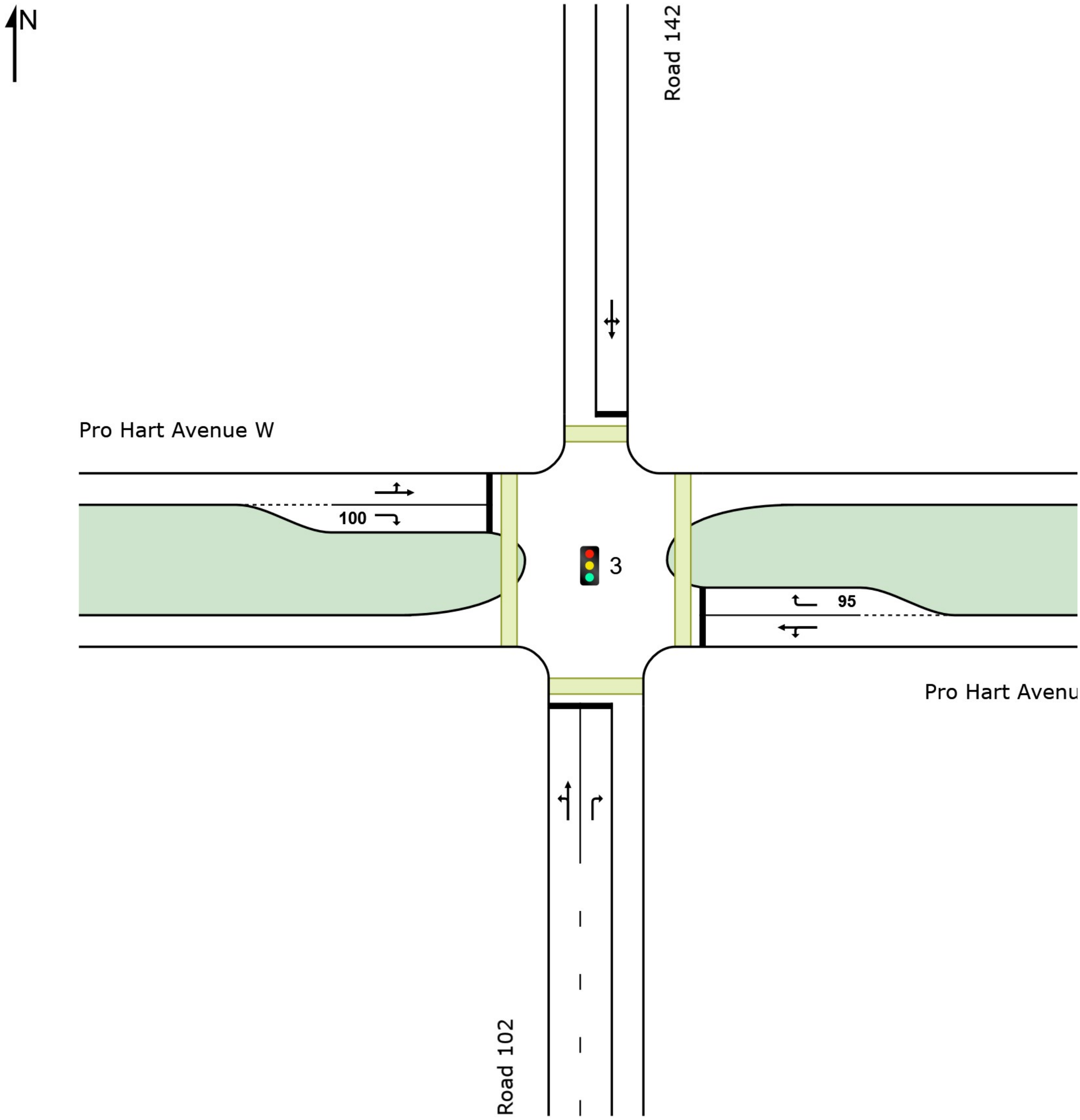
Network: 1 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Pro Hart Avenue / Road 102 / Road 142
Signalised Cross-Intersection
Interim Traffic Demands
Site Category: Interim AM Peak
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Single Diamond / Split Approach
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, F1*, F2*
Output Phase Sequence: A, D, E, F
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Road 142
Pro Hart Avenue W
100
3
95
Pro Hart Avenu
Road 102

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 102														
1	L2	1	5.0	1	5.0	0.004	20.0	LOS B	0.0	0.3	0.75	0.53	0.75	28.0
2	T1	1	2.0	1	2.0	0.004	17.3	LOS B	0.0	0.3	0.75	0.53	0.75	33.8
3	R2	324	5.0	324	5.0	* 0.654	25.0	LOS B	8.9	64.8	0.94	0.84	0.98	5.2
Approach		326	5.0	326	5.0	0.654	25.0	LOS B	8.9	64.8	0.94	0.84	0.98	5.5
East: Pro Hart Avenue E														
4	L2	80	2.0	80	2.0	0.461	33.1	LOS C	3.4	24.4	0.97	0.77	0.97	28.3
5	T1	38	5.0	38	5.0	0.461	27.5	LOS B	3.4	24.4	0.97	0.77	0.97	35.2
6	R2	11	2.0	11	2.0	* 0.341	44.4	LOS D	0.4	2.7	1.00	0.65	1.00	31.7
Approach		128	2.9	128	2.9	0.461	32.4	LOS C	3.4	24.4	0.97	0.76	0.97	30.9
North: Road 142														
7	L2	42	5.0	42	5.0	0.142	28.5	LOS C	1.2	8.4	0.89	0.72	0.89	28.3
8	T1	1	2.0	1	2.0	* 0.142	23.9	LOS B	1.2	8.4	0.89	0.72	0.89	28.9
9	R2	1	5.0	1	5.0	0.142	28.5	LOS C	1.2	8.4	0.89	0.72	0.89	33.7
Approach		44	4.9	44	4.9	0.142	28.4	LOS B	1.2	8.4	0.89	0.72	0.89	28.5
West: Pro Hart Avenue W														
10	L2	1	2.0	1	2.0	0.601	34.0	LOS C	4.7	34.0	0.99	0.81	1.04	34.4
11	T1	156	5.0	156	5.0	* 0.601	28.4	LOS B	4.7	34.0	0.99	0.81	1.04	22.8
12	R2	1	2.0	1	2.0	0.034	42.3	LOS C	0.0	0.3	1.00	0.57	1.00	18.1
Approach		158	5.0	158	5.0	0.601	28.6	LOS C	4.7	34.0	0.99	0.81	1.04	22.9
All Vehicles		657	4.6	657	4.6	0.654	27.5	LOS B	8.9	64.8	0.95	0.81	0.98	20.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

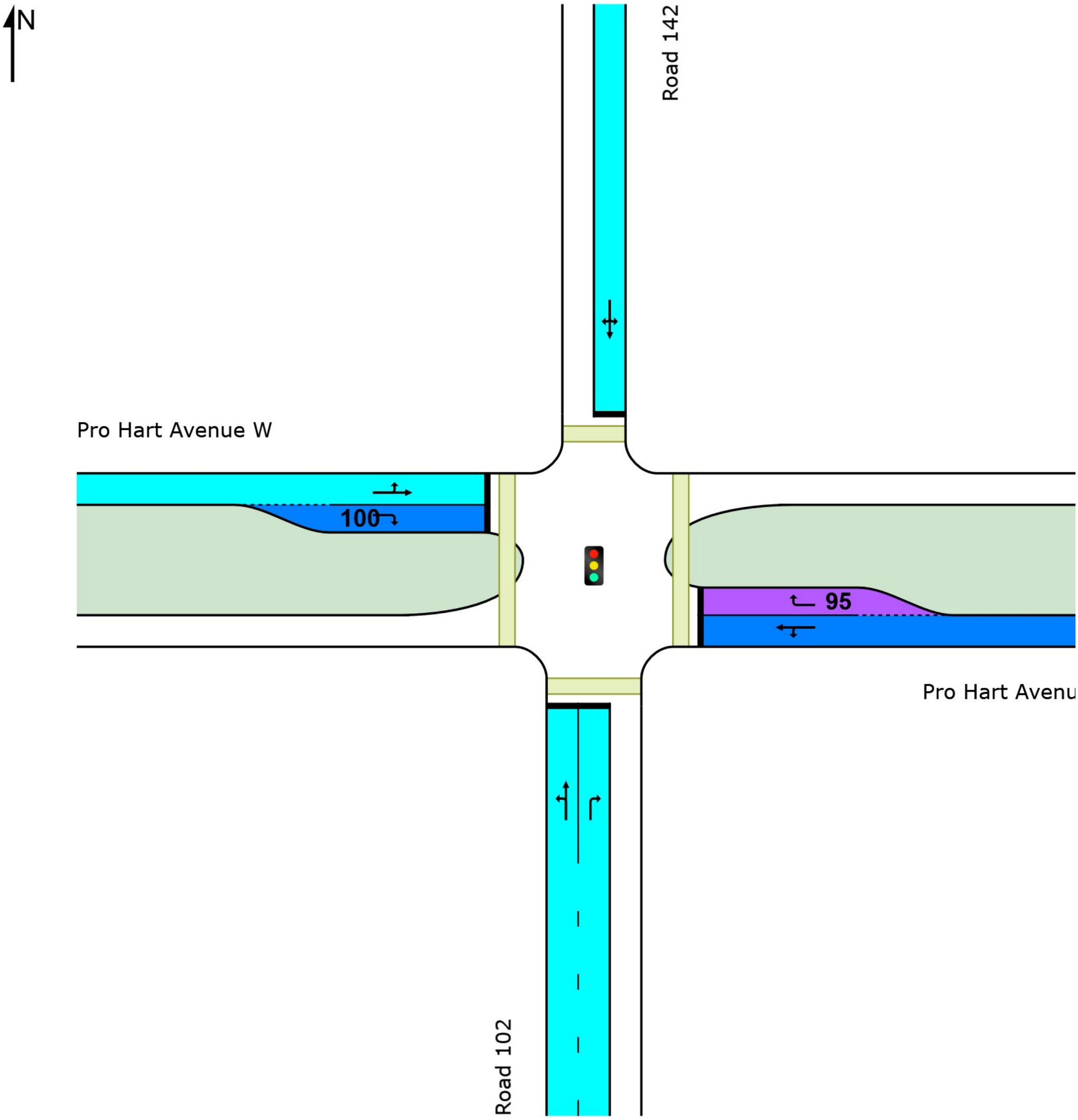
* Critical Movement (Signal Timing)

Lane Use and Performance															
	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Road 102															
Lane 1	2	3.5	2	3.5	513	0.004	100	18.7	LOS B	0.0	0.3	Full	25	0.0	0.0
Lane 2	324	5.0	324	5.0	496	0.654	100	25.0	LOS B	8.9	64.8	Full	25	0.0	94.9
Approach	326	5.0	326	5.0		0.654		25.0	LOS B	8.9	64.8				
East: Pro Hart Avenue E															
Lane 1	118	3.0	118	3.0	256	0.461	100	31.3	LOS C	3.4	24.4	Full	450	0.0	0.0
Lane 2	11	2.0	11	2.0	31	0.341	100	44.4	LOS D	0.4	2.7	Short	95	0.0	NA
Approach	128	2.9	128	2.9		0.461		32.4	LOS C	3.4	24.4				
North: Road 142															
Lane 1	44	4.9	44	4.9	310	0.142	100	28.4	LOS B	1.2	8.4	Full	500	0.0	0.0
Approach	44	4.9	44	4.9		0.142		28.4	LOS B	1.2	8.4				
West: Pro Hart Avenue W															
Lane 1	157	5.0	157	5.0	261	0.601	100	28.5	LOS B	4.7	34.0	Full	275	0.0	0.0
Lane 2	1	2.0	1	2.0	31	0.034	100	42.3	LOS C	0.0	0.3	Short	100	0.0	NA
Approach	158	5.0	158	5.0		0.601		28.6	LOS C	4.7	34.0				
Intersection	657	4.6	657	4.6		0.654		27.5	LOS B	8.9	64.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches				Intersection
	South	East	North	West	
LOS	B	C	B	C	B

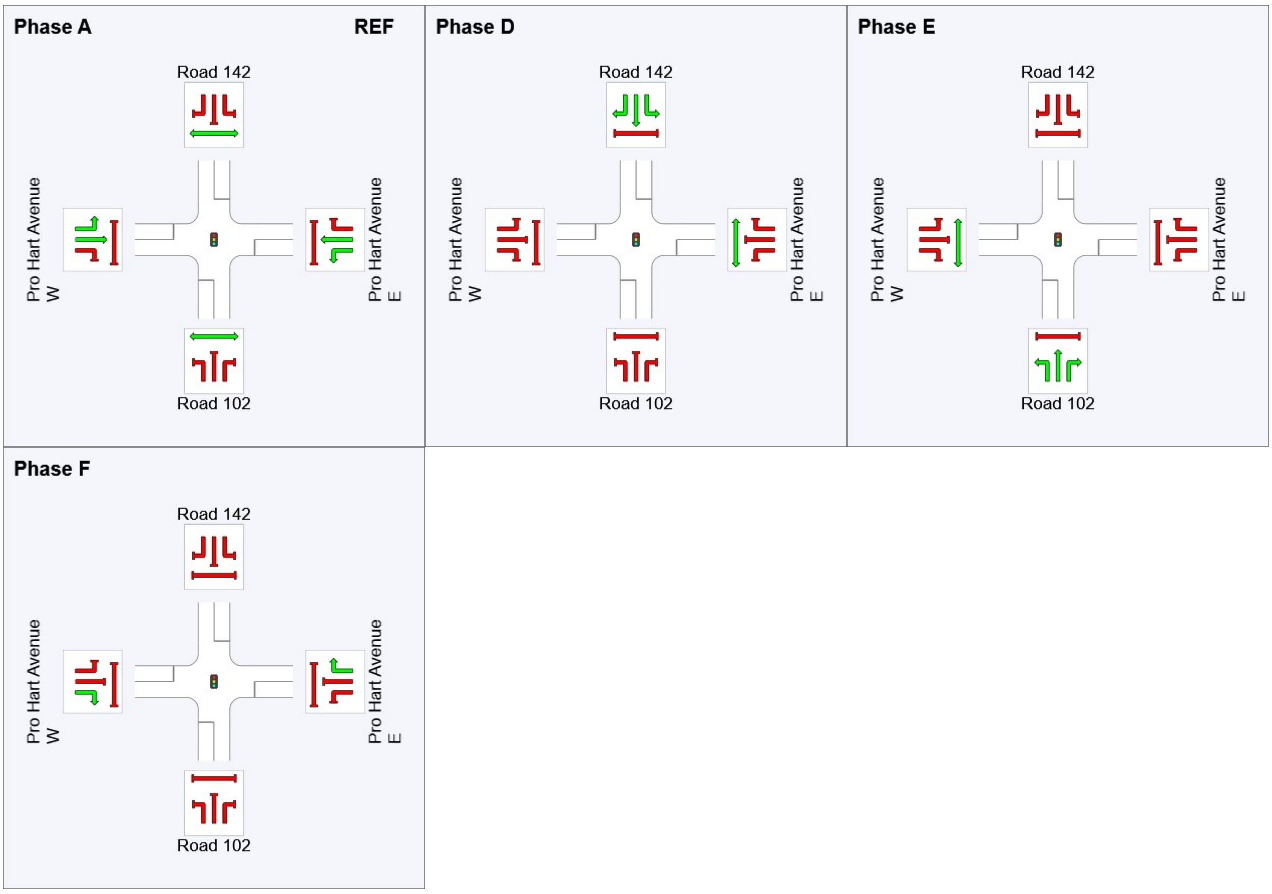


Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Phase Timing Summary

Phase	A	D	E	F
Phase Change Time (sec)	0	16	33	57
Green Time (sec)	8	10	16	1
Phase Time (sec)	15	18	18	9
Phase Split	25%	30%	30%	15%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

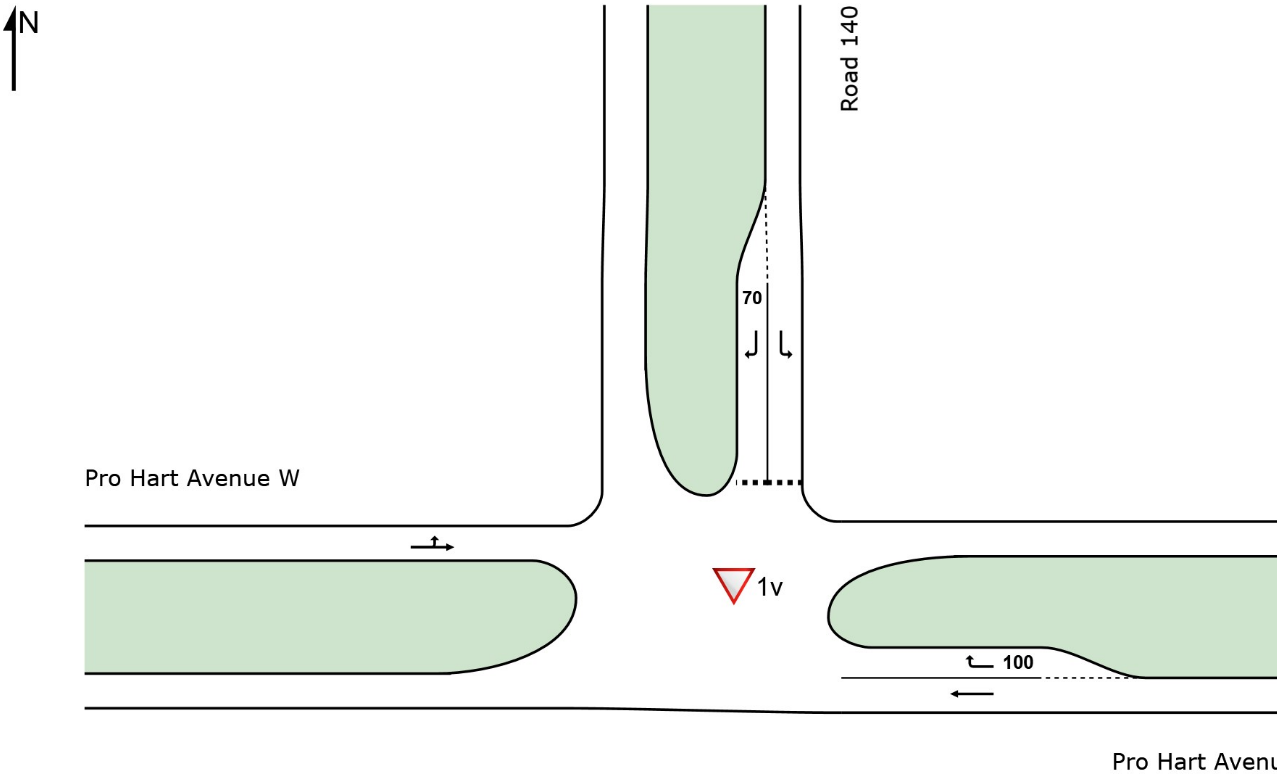
Site: 1v [Interim AM - ProHartAve-Rd140 (Site Folder: Interim AM)]

Network: 1 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Pro Hart Avenue / Road 140
Unsignalised T-Intersection
Interim Traffic Demands
Site Category: Interim AM Peak
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Pro Hart Avenue E														
5	T1	48	5.0	48	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	11	2.0	11	2.0	0.010	7.6	LOS A	0.0	0.3	0.51	0.58	0.51	48.1
Approach		59	4.5	59	4.5	0.025	1.4	NA	0.0	0.3	0.09	0.10	0.09	57.5
North: Road 140														
7	L2	27	5.0	27	5.0	0.020	6.3	LOS A	0.1	0.6	0.22	0.55	0.22	51.1
9	R2	80	5.0	80	5.0	0.108	8.3	LOS A	0.4	2.7	0.40	0.67	0.40	41.3
Approach		107	5.0	107	5.0	0.108	7.8	LOS A	0.4	2.7	0.35	0.64	0.35	45.4
West: Pro Hart Avenue W														
10	L2	319	2.0	319	2.0	0.272	5.6	LOS A	0.0	0.0	0.00	0.36	0.00	53.3
11	T1	203	5.0	203	5.0	0.272	0.1	LOS A	0.0	0.0	0.00	0.36	0.00	56.5
Approach		522	3.2	522	3.2	0.272	3.5	NA	0.0	0.0	0.00	0.36	0.00	55.1
All Vehicles		688	3.6	688	3.6	0.272	4.0	NA	0.4	2.7	0.06	0.38	0.06	54.0

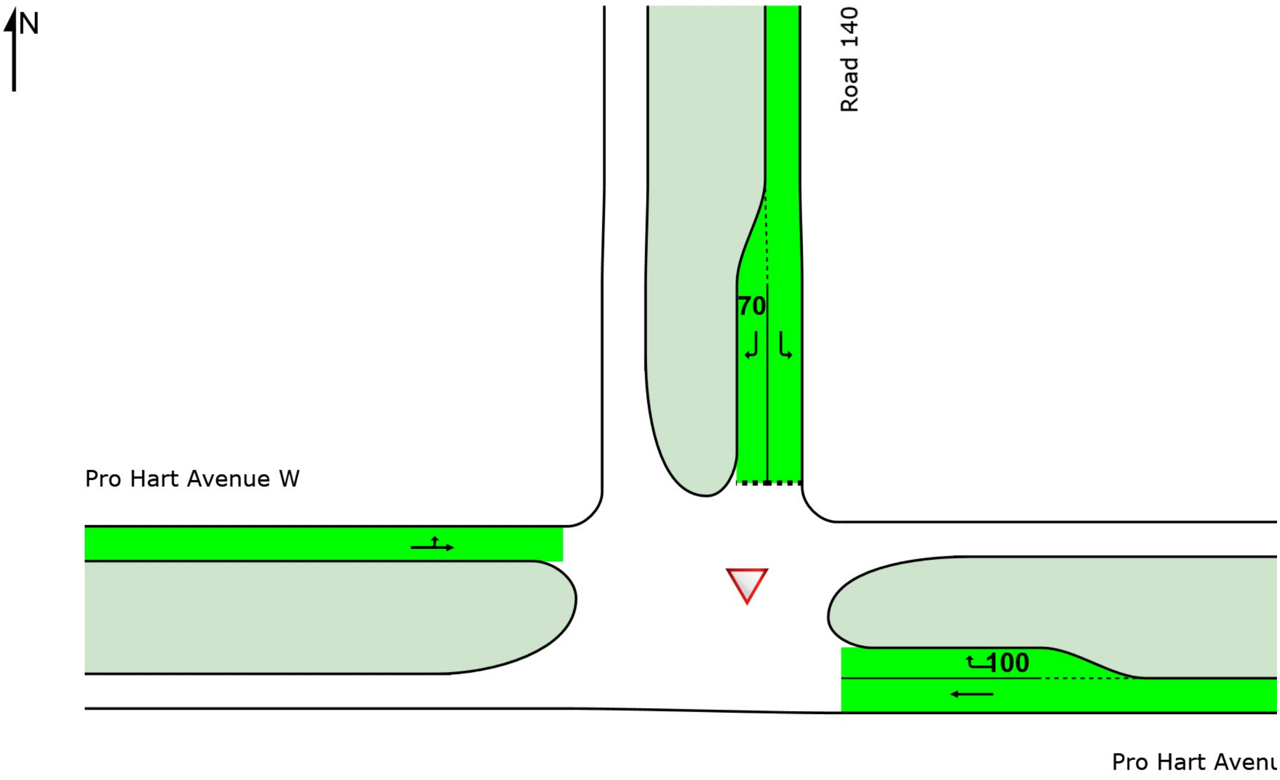
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and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

Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
East: Pro Hart Avenue E															
Lane 1	48	5.0	48	5.0	1957	0.025	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	11	2.0	11	2.0	1090	0.010	100	7.6	LOS A	0.0	0.3	Short	100	0.0	NA
Approach	59	4.5	59	4.5		0.025		1.4	NA	0.0	0.3				
North: Road 140															
Lane 1	27	5.0	27	5.0	1349	0.020	100	6.3	LOS A	0.1	0.6	Full	290	0.0	0.0
Lane 2	80	5.0	80	5.0	740	0.108	100	8.3	LOS A	0.4	2.7	Short	70	0.0	NA
Approach	107	5.0	107	5.0		0.108		7.8	LOS A	0.4	2.7				
West: Pro Hart Avenue W															
Lane 1	522	3.2	522	3.2	1920	0.272	100	3.5	LOS A	0.0	0.0	Full	450	0.0	0.0
Approach	522	3.2	522	3.2		0.272		3.5	NA	0.0	0.0				
Intersection	688	3.6	688	3.6		0.272		4.0	NA	0.4	2.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Site: 1 [Interim AM - Rd 2-Rd140-Rd 2A (Site Folder: Interim AM)]

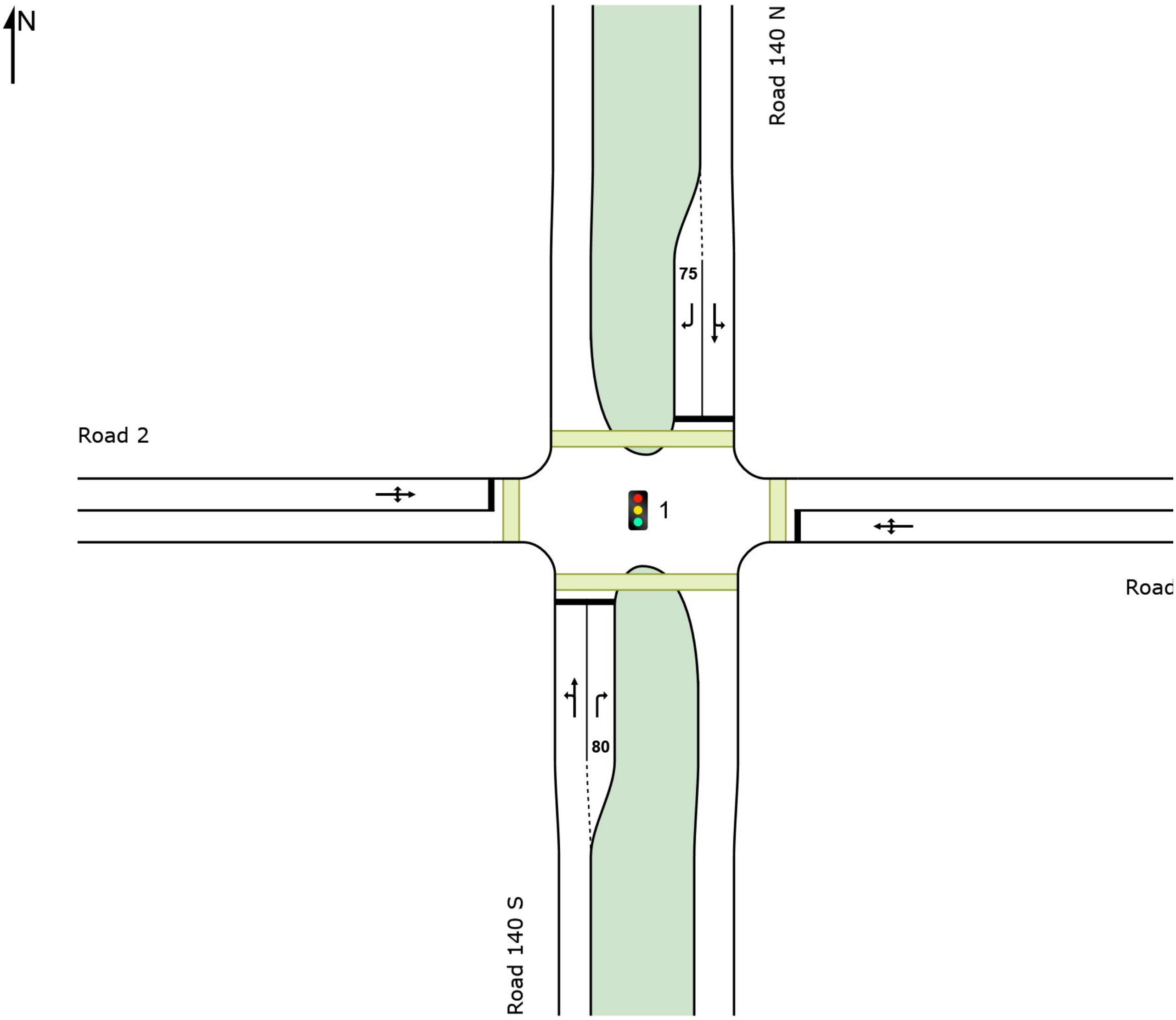
Network: 1 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Road 142 / Road 140
Signalised Cross-Intersection
Interim Traffic Demands
Site Category: Interim AM Peak
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 90 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Split Approach
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 140 S														
1	L2	6	2.0	6	2.0	0.647	38.2	LOS C	13.1	93.4	0.95	0.81	0.95	32.9
2	T1	323	2.0	323	2.0	* 0.647	32.7	LOS C	13.1	93.4	0.95	0.81	0.95	21.3
3	R2	1	2.0	1	2.0	0.006	46.4	LOS D	0.0	0.3	0.93	0.59	0.93	24.0
Approach		331	2.0	331	2.0	0.647	32.8	LOS C	13.1	93.4	0.95	0.81	0.95	21.7
East: Road 2A														
4	L2	1	2.0	1	2.0	0.520	42.7	LOS D	7.2	51.3	0.95	0.80	0.95	16.6
5	T1	5	2.0	5	2.0	* 0.520	37.2	LOS C	7.2	51.3	0.95	0.80	0.95	31.3
6	R2	169	2.0	169	2.0	0.520	42.7	LOS D	7.2	51.3	0.95	0.80	0.95	16.6
Approach		176	2.0	176	2.0	0.520	42.6	LOS D	7.2	51.3	0.95	0.80	0.95	17.3
North: Road 140 N														
7	L2	72	2.0	72	2.0	0.307	35.0	LOS C	5.5	39.0	0.85	0.73	0.85	31.1
8	T1	81	2.0	81	2.0	0.307	29.4	LOS C	5.5	39.0	0.85	0.73	0.85	25.3
9	R2	34	2.0	34	2.0	* 0.205	48.6	LOS D	1.4	10.3	0.96	0.72	0.96	29.4
Approach		186	2.0	186	2.0	0.307	35.0	LOS C	5.5	39.0	0.87	0.73	0.87	28.7
West: Road 2														
10	L2	134	2.0	134	2.0	0.554	42.0	LOS C	7.8	55.4	0.96	0.80	0.96	23.7
11	T1	28	2.0	28	2.0	* 0.554	37.4	LOS C	7.8	55.4	0.96	0.80	0.96	28.7
12	R2	26	2.0	26	2.0	0.554	42.0	LOS C	7.8	55.4	0.96	0.80	0.96	23.7
Approach		188	2.0	188	2.0	0.554	41.3	LOS C	7.8	55.4	0.96	0.80	0.96	24.6
All Vehicles		881	2.0	881	2.0	0.647	37.1	LOS C	13.1	93.4	0.94	0.79	0.94	23.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

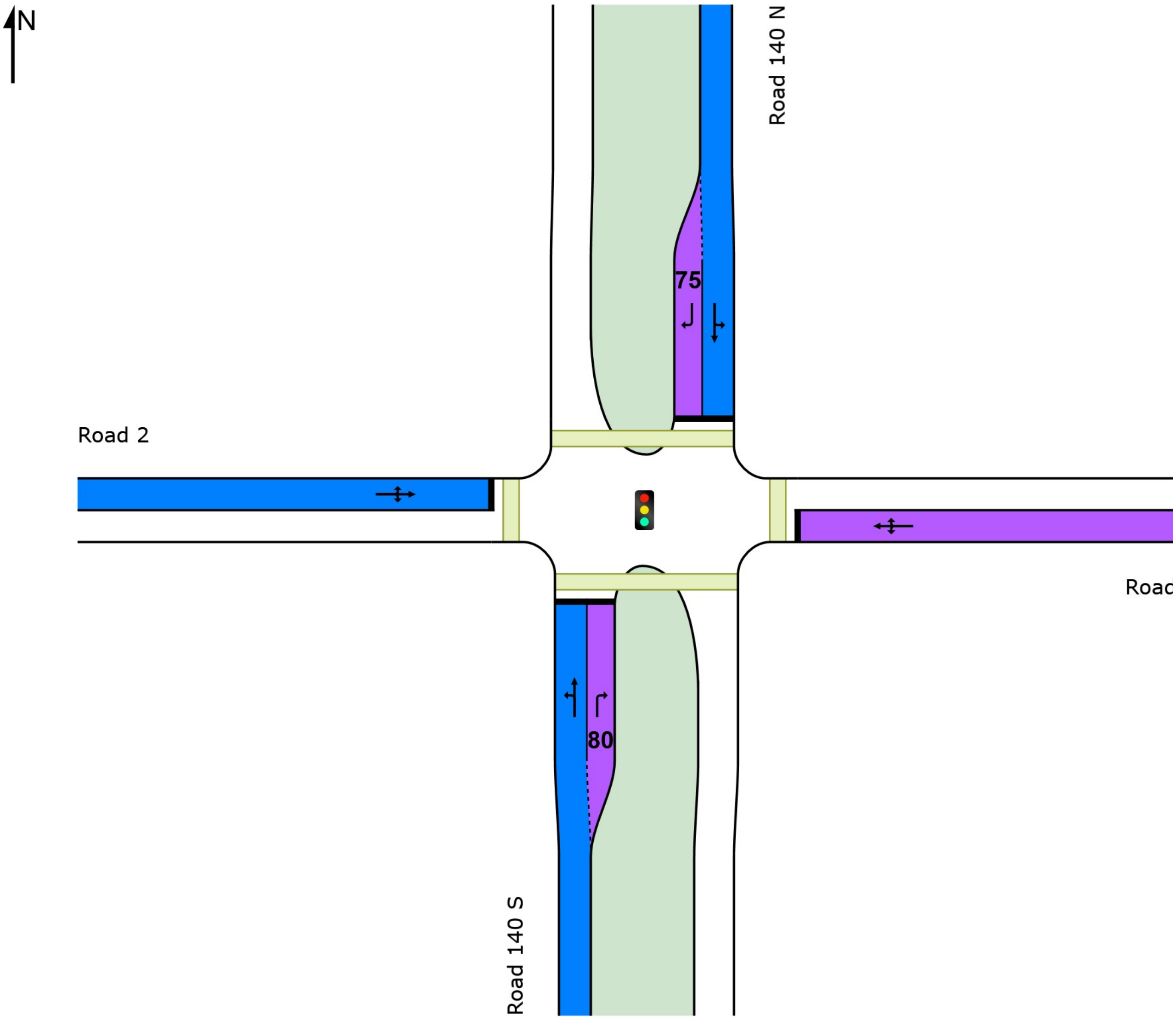
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Road 140 S															
Lane 1	329	2.0	329	2.0	509	0.647	100	32.8	LOS C	13.1	93.4	Full	290	0.0	0.0
Lane 2	1	2.0	1	2.0	164	0.006	100	46.4	LOS D	0.0	0.3	Short	80	0.0	NA
Approach	331	2.0	331	2.0		0.647		32.8	LOS C	13.1	93.4				
East: Road 2A															
Lane 1	176	2.0	176	2.0	338	0.520	100	42.6	LOS D	7.2	51.3	Full	255	0.0	0.0
Approach	176	2.0	176	2.0		0.520		42.6	LOS D	7.2	51.3				
North: Road 140 N															
Lane 1	153	2.0	153	2.0	498	0.307	100	32.0	LOS C	5.5	39.0	Full	375	0.0	0.0
Lane 2	34	2.0	34	2.0	164	0.205	100	48.6	LOS D	1.4	10.3	Short	75	0.0	NA
Approach	186	2.0	186	2.0		0.307		35.0	LOS C	5.5	39.0				
West: Road 2															
Lane 1	188	2.0	188	2.0	340	0.554	100	41.3	LOS C	7.8	55.4	Full	500	0.0	0.0
Approach	188	2.0	188	2.0		0.554		41.3	LOS C	7.8	55.4				
Intersection	881	2.0	881	2.0		0.647		37.1	LOS C	13.1	93.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches				Intersection
	South	East	North	West	
LOS	C	D	C	C	C

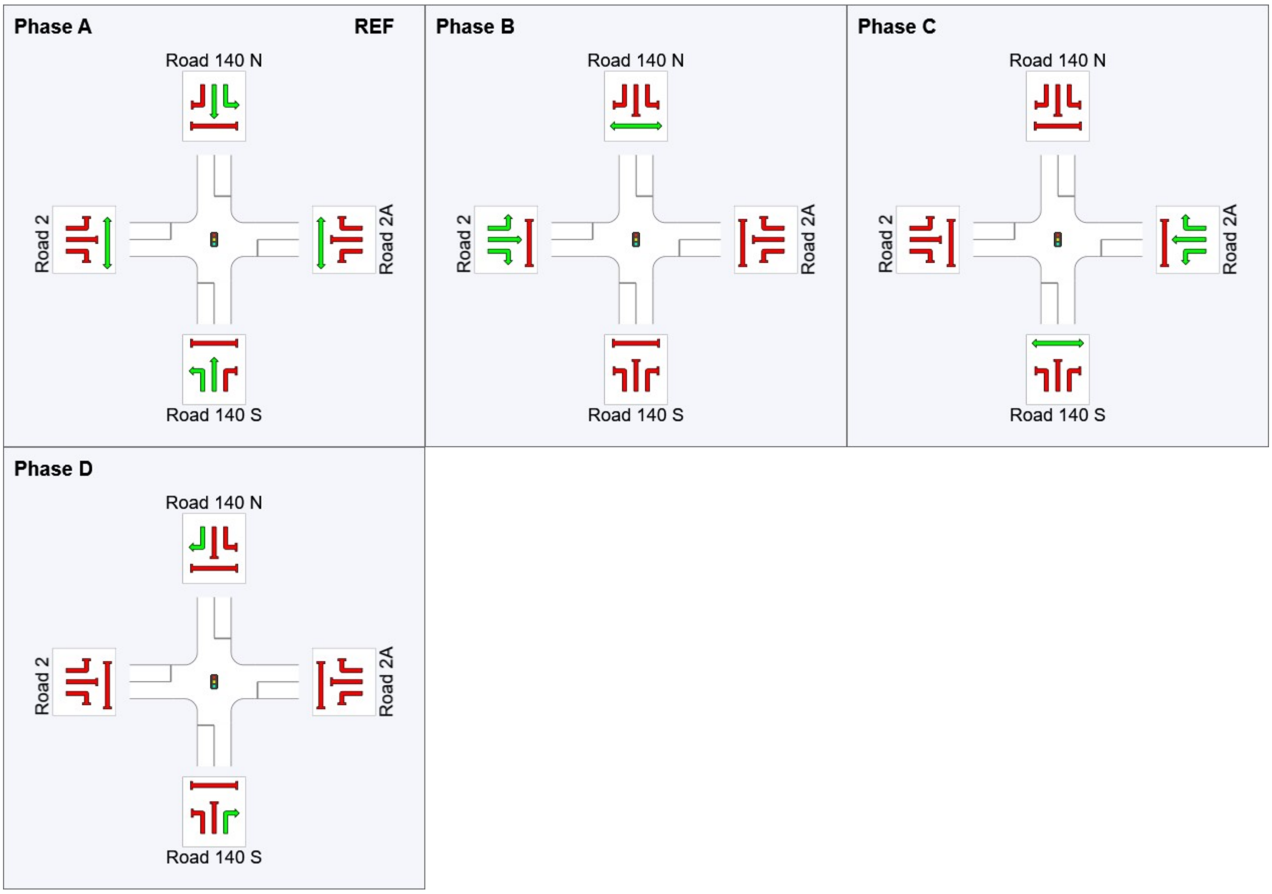


Colour code based on Level of Service

LOS A   LOS B   LOS C   LOS D   LOS E   LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	29	52	75
Green Time (sec)	23	16	16	8
Phase Time (sec)	30	23	23	14
Phase Split	33%	26%	26%	16%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

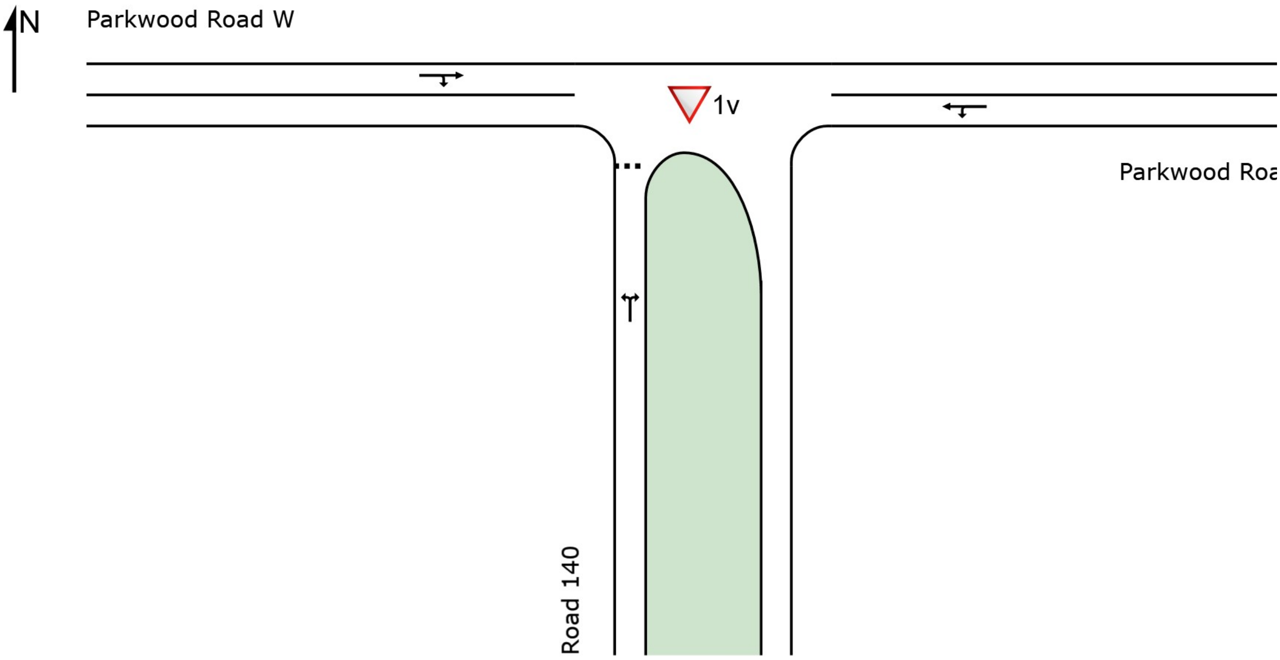
Site: 1v [Interim AM - Parkwood Rd-Rd140 (Site Folder: Interim AM)]

Network: 1 [ProHartAve-Rd140-Parkwood Rd - Interim AM (Network Folder: General)]

Parkwood Road / Road 140
UnSignalised T-Intersection
Interim Traffic Demands
Site Category: Interim AM Peak
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 140														
7	L2	1	2.0	1	2.0	0.535	5.6	LOS A	2.7	19.3	0.19	0.59	0.19	52.2
9	R2	626	2.0	626	2.0	0.535	6.2	LOS A	2.7	19.3	0.19	0.59	0.19	51.6
Approach		627	2.0	627	2.0	0.535	6.2	LOS A	2.7	19.3	0.19	0.59	0.19	51.7
East: Parkwood Road E														
10	L2	186	2.0	186	2.0	0.101	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
11	T1	1	2.0	1	2.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.57	0.00	55.0
Approach		187	2.0	187	2.0	0.101	5.6	NA	0.0	0.0	0.00	0.57	0.00	50.9
West: Parkwood Road W														
5	T1	1	2.0	1	2.0	0.001	0.4	LOS A	0.0	0.0	0.25	0.27	0.25	56.5
6	R2	1	2.0	1	2.0	0.001	6.0	LOS A	0.0	0.0	0.25	0.27	0.25	53.5
Approach		2	2.0	2	2.0	0.001	3.2	NA	0.0	0.0	0.25	0.27	0.25	55.5
All Vehicles		817	2.0	817	2.0	0.535	6.0	NA	2.7	19.3	0.15	0.59	0.15	51.6

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

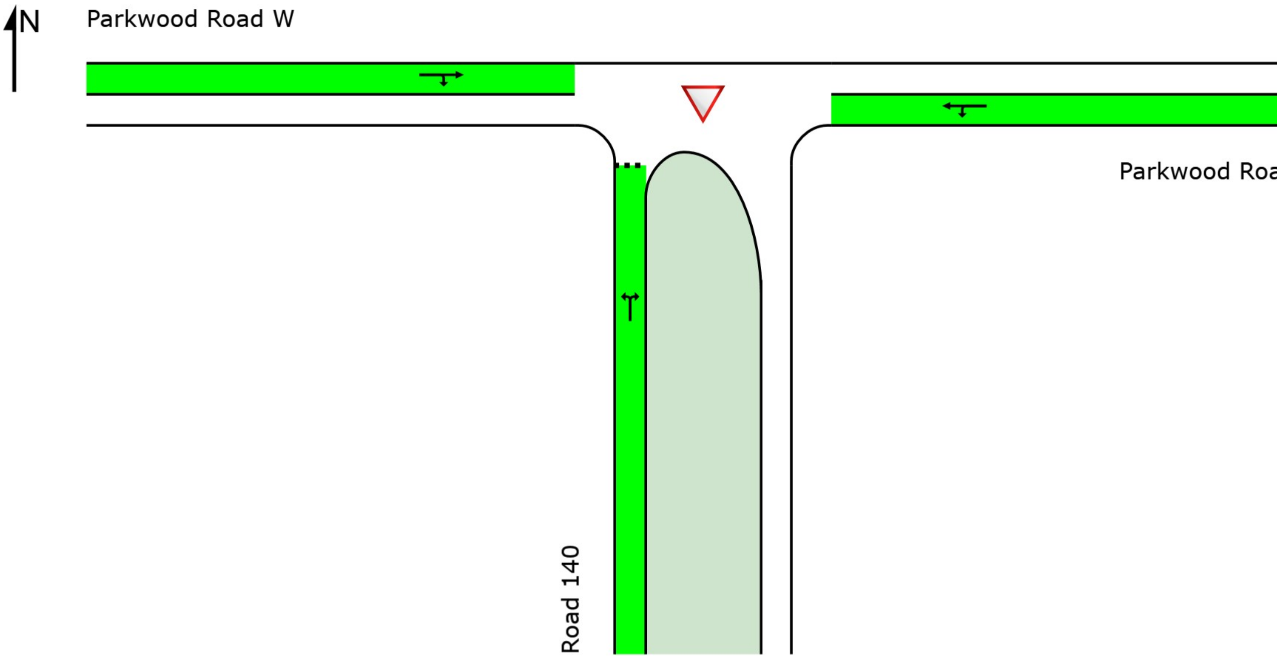
Lane Use and Performance

	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Road 140															
Lane 1	627	2.0	627	2.0	1173	0.535	100	6.2	LOS A	2.7	19.3	Full	375	0.0	0.0
Approach	627	2.0	627	2.0		0.535		6.2	LOS A	2.7	19.3				
East: Parkwood Road E															
Lane 1	187	2.0	187	2.0	1851	0.101	100	5.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	187	2.0	187	2.0		0.101		5.6	NA	0.0	0.0				
West: Parkwood Road W															
Lane 1	2	2.0	2	2.0	1676	0.001	100	3.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	2	2.0	2	2.0		0.001		3.2	NA	0.0	0.0				
Intersection	817	2.0	817	2.0		0.535		6.0	NA	2.7	19.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

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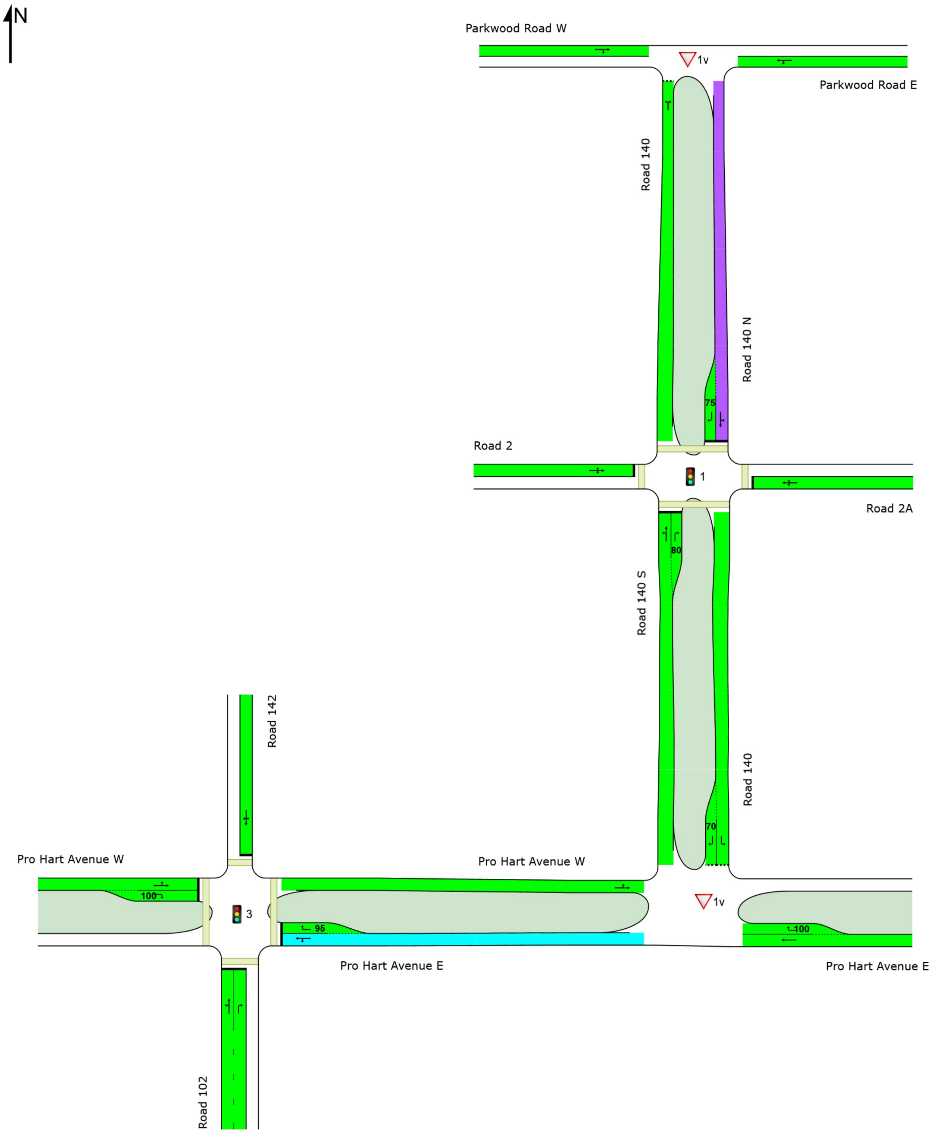
Project: \\cbrnas01.browncan.local\active\21\21-000393\9_Tech\Traffic\EDP2 Traffic Assessment\Macnamara EDP2 Traffic Analysis.sip9

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

Network: N101 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Pro Hart Avenue / Road 140 / Parkwood Road
Signalised and unsignalised intersection road network
Interim Traffic Demands
Network Category: (None)
Network Cycle Time = 90 seconds (Network User-Given Cycle Time)



Colour code based on Degree of Saturation

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

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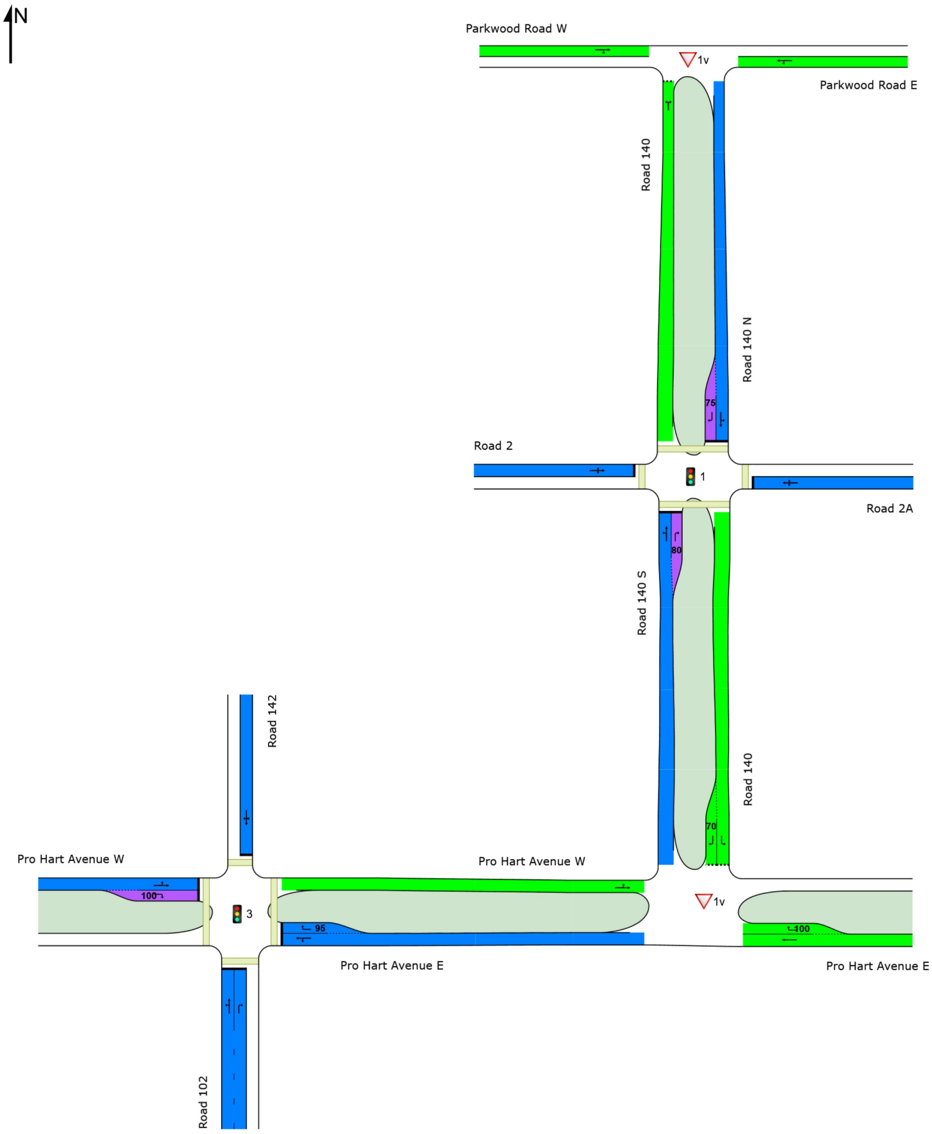
Project: \\cbrnas01.browncan.local\active\21\21-000393\9_Tech\Traffic\EDP2 Traffic Assessment\Macnamara EDP2 Traffic Analysis.sip9

LEVEL OF SERVICE

Lane Level of Service

Network: N101 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Pro Hart Avenue / Road 140 / Parkwood Road
Signalised and unsignalised intersection road network
Interim Traffic Demands
Network Category: (None)
Network Cycle Time = 90 seconds (Network User-Given Cycle Time)



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Delay Model: SIDRA Standard (Geometric Delay is included).

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Project: \\cbrnas01.browncan.local\active\21\21-000393\9_Tech\Traffic\EDP2 Traffic Assessment\Macnamara EDP2 Traffic Analysis.sip9

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: Macnamara EDP2 Traffic Analysis

Template: Site User Report

Site: 3 [Interim PM - ProHartAve-Rd102-Rd142 (Site Folder: Interim PM)]

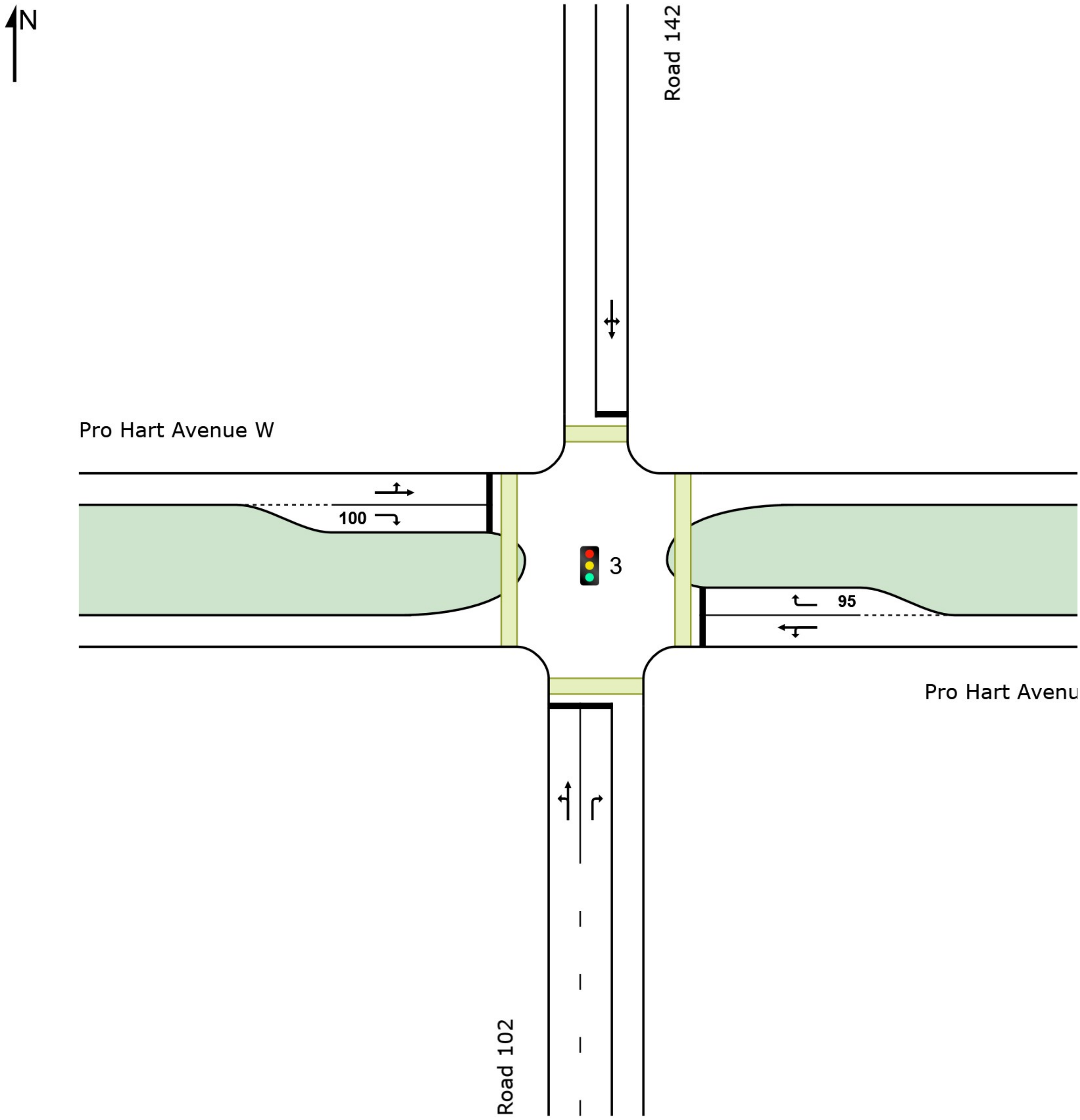
Network: 2 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Pro Hart Avenue / Road 102 / Road 142
Signalised Cross-Intersection
Interim Traffic Demands
Site Category: Interim PM Peak
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 75 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Single Diamond / Split Approach
Reference Phase: Phase A
Input Phase Sequence: A, D, E, F, F1*, F2*
Output Phase Sequence: A, D, E, F, F2*
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Road 142
Pro Hart Avenue W
100
3
95
Pro Hart Avenu
Road 102

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 102														
1	L2	1	5.0	1	5.0	0.007	31.4	LOS C	0.0	0.3	0.86	0.57	0.86	21.9
2	T1	1	2.0	1	2.0	0.007	28.6	LOS C	0.0	0.3	0.86	0.57	0.86	28.2
3	R2	116	5.0	116	5.0	* 0.389	34.4	LOS C	2.4	17.7	0.94	0.77	0.94	3.9
Approach		118	5.0	118	5.0	0.389	34.3	LOS C	2.4	17.7	0.94	0.77	0.94	4.5
East: Pro Hart Avenue E														
4	L2	258	2.0	258	2.0	0.676	31.5	LOS C	7.7	55.5	0.94	0.84	0.95	29.0
5	T1	122	5.0	122	5.0	* 0.676	26.0	LOS B	7.7	55.5	0.94	0.84	0.95	35.9
6	R2	36	2.0	36	2.0	0.161	38.8	LOS C	0.8	5.4	0.93	0.72	0.93	33.4
Approach		416	2.9	416	2.9	0.676	30.5	LOS C	7.7	55.5	0.94	0.83	0.95	31.8
North: Road 142														
7	L2	17	5.0	17	5.0	0.059	33.0	LOS C	0.4	2.6	0.86	0.68	0.86	26.6
8	T1	1	2.0	1	2.0	* 0.059	28.4	LOS B	0.4	2.6	0.86	0.68	0.86	27.2
9	R2	1	5.0	1	5.0	0.059	33.0	LOS C	0.4	2.6	0.86	0.68	0.86	32.0
Approach		19	4.8	19	4.8	0.059	32.8	LOS C	0.4	2.6	0.86	0.68	0.86	27.0
West: Pro Hart Avenue W														
10	L2	1	2.0	1	2.0	0.165	34.7	LOS C	1.1	8.0	0.89	0.67	0.89	34.1
11	T1	55	5.0	55	5.0	0.165	29.2	LOS C	1.1	8.0	0.89	0.67	0.89	22.4
12	R2	1	2.0	1	2.0	* 0.043	51.8	LOS D	0.0	0.2	1.00	0.57	1.00	15.7
Approach		57	4.9	57	4.9	0.165	29.7	LOS C	1.1	8.0	0.89	0.67	0.89	22.6
All Vehicles		609	3.5	609	3.5	0.676	31.3	LOS C	7.7	55.5	0.93	0.80	0.94	27.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

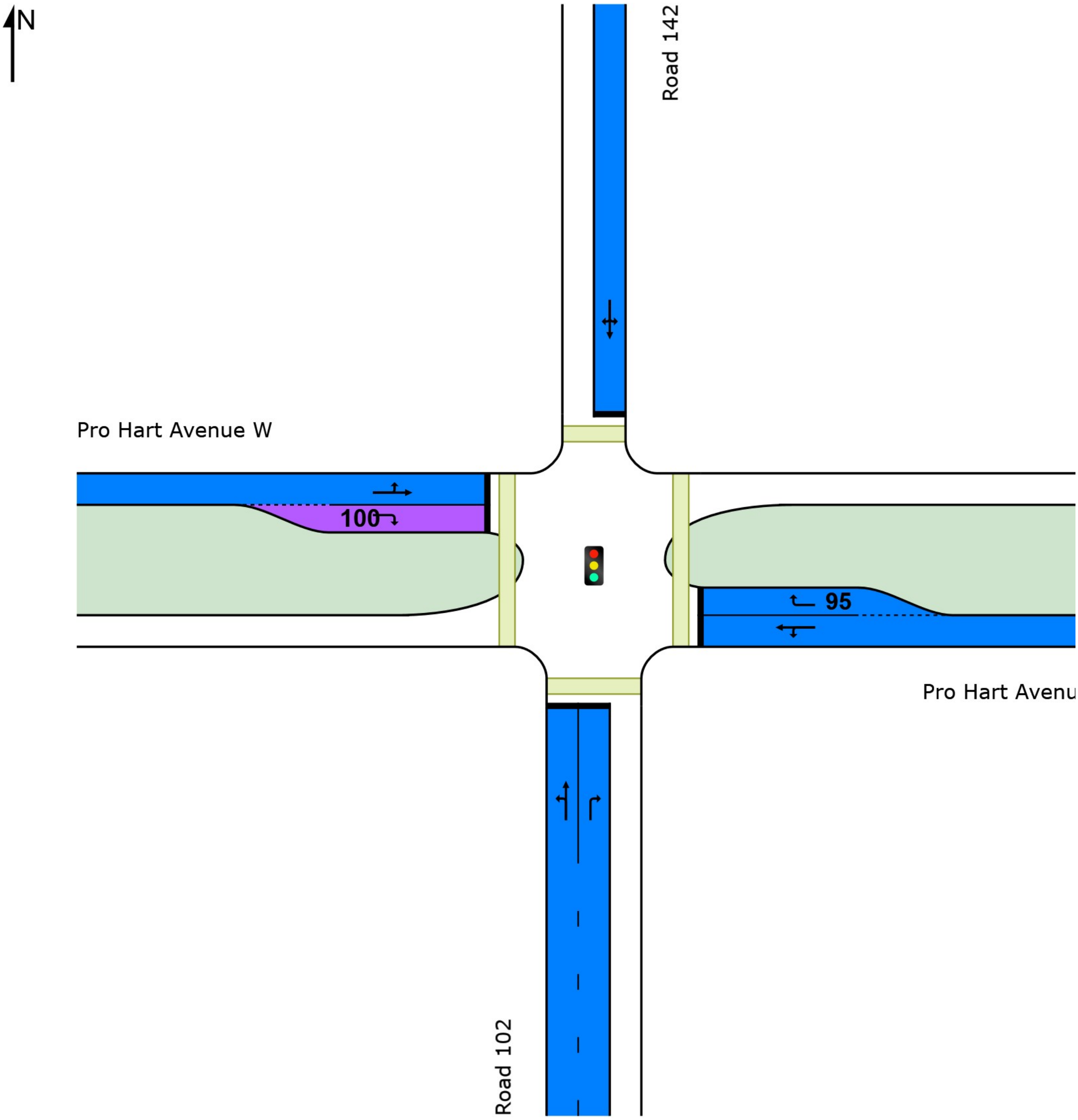
* Critical Movement (Signal Timing)

Lane Use and Performance	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Road 102															
Lane 1	2	3.5	2	3.5	308	0.007	100	30.0	LOS C	0.0	0.3	Full	25	0.0	0.0
Lane 2	116	5.0	116	5.0	297	0.389	100	34.4	LOS C	2.4	17.7	Full	25	0.0	18.1
Approach	118	5.0	118	5.0		0.389		34.3	LOS C	2.4	17.7				
East: Pro Hart Avenue E															
Lane 1	380	3.0	380	3.0	562	0.676	100	29.8	LOS C	7.7	55.5	Full	450	0.0	0.0
Lane 2	36	2.0	36	2.0	222	0.161	100	38.8	LOS C	0.8	5.4	Short	95	0.0	NA
Approach	416	2.9	416	2.9		0.676		30.5	LOS C	7.7	55.5				
North: Road 142															
Lane 1	19	4.8	19	4.8	323	0.059	100	32.8	LOS C	0.4	2.6	Full	500	0.0	0.0
Approach	19	4.8	19	4.8		0.059		32.8	LOS C	0.4	2.6				
West: Pro Hart Avenue W															
Lane 1	56	4.9	56	4.9	339	0.165	100	29.3	LOS C	1.1	8.0	Full	275	0.0	0.0
Lane 2	1	2.0	1	2.0	25	0.043	100	51.8	LOS D	0.0	0.2	Short	100	0.0	NA
Approach	57	4.9	57	4.9		0.165		29.7	LOS C	1.1	8.0				
Intersection	609	3.5	609	3.5		0.676		31.3	LOS C	7.7	55.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	C	C	C

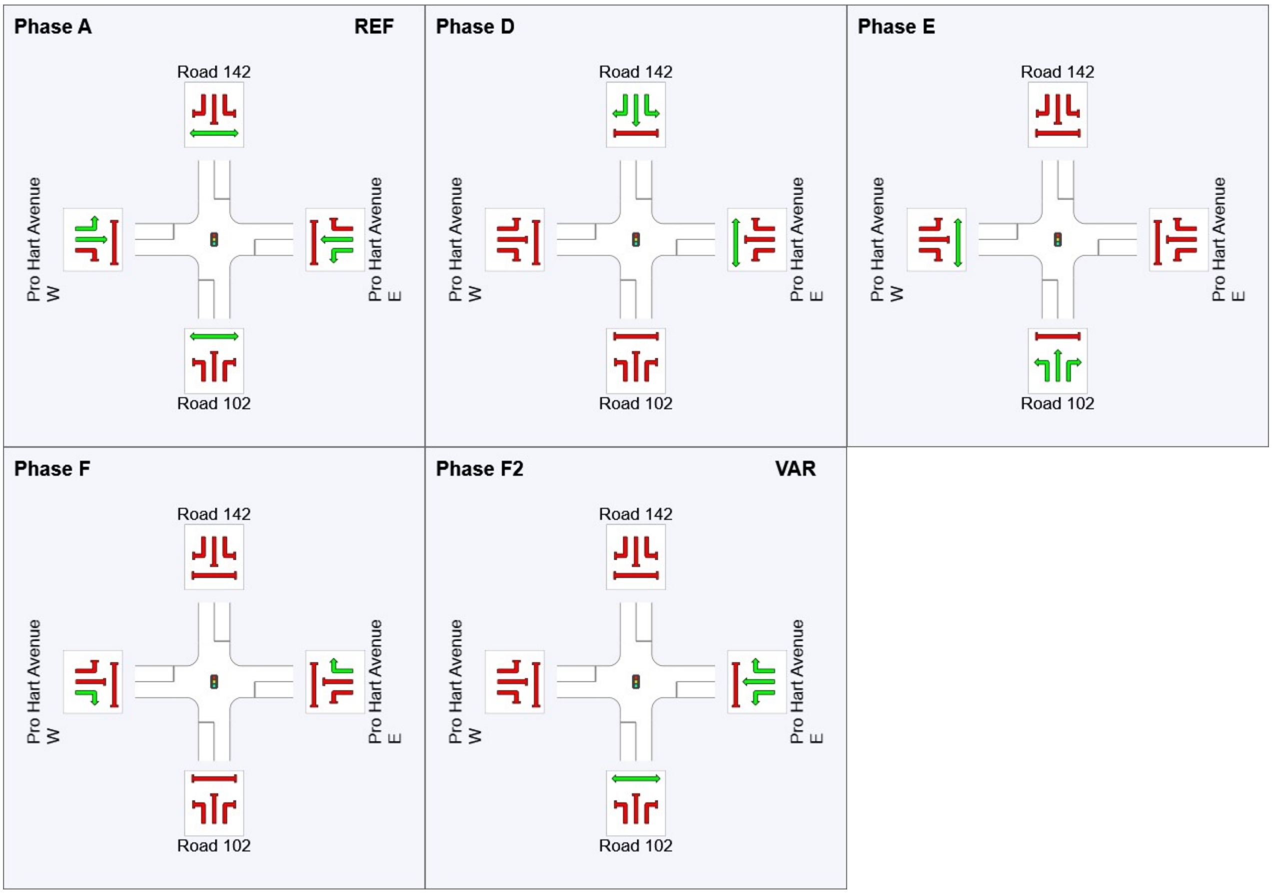


Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Phase Timing Summary

Phase	A	D	E	F	F2
Phase Change Time (sec)	0	22	42	62	67
Green Time (sec)	13	13	12	1	***
Phase Time (sec)	20	21	16	9	9
Phase Split	27%	28%	21%	12%	12%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

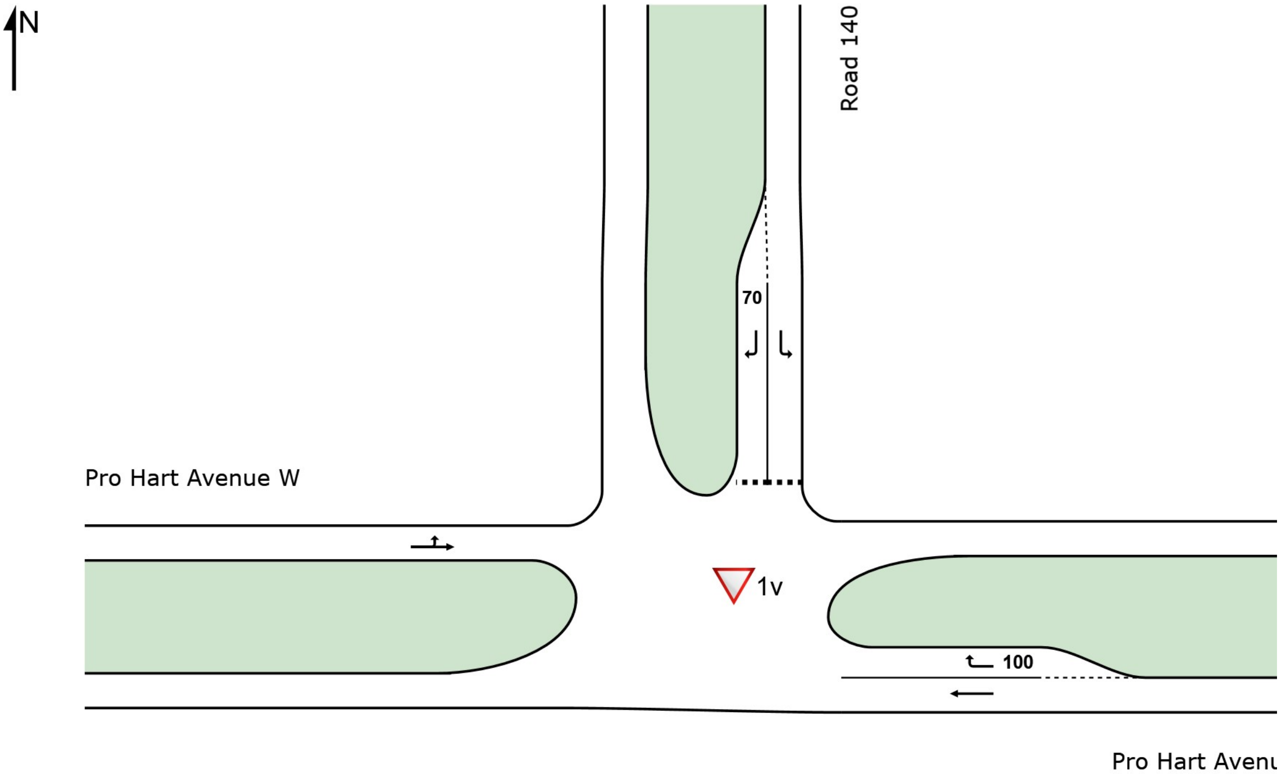
Site: 1v [Interim PM - ProHartAve-Rd140 (Site Folder: Interim PM)]

Network: 2 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Pro Hart Avenue / Road 140
Unsignalised T-Intersection
Interim Traffic Demands
Site Category: Interim PM Peak
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Pro Hart Avenue E														
5	T1	188	5.0	188	5.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	2.0	20	2.0	0.013	6.1	LOS A	0.0	0.2	0.29	0.52	0.29	49.3
Approach		208	4.7	208	4.7	0.096	0.6	NA	0.0	0.2	0.03	0.05	0.03	58.7
North: Road 140														
7	L2	11	5.0	11	5.0	0.007	5.9	LOS A	0.0	0.1	0.13	0.54	0.13	51.4
9	R2	227	5.0	227	5.0	0.287	8.2	LOS A	0.4	3.3	0.40	0.69	0.40	41.5
Approach		238	5.0	238	5.0	0.287	8.1	LOS A	0.4	3.3	0.39	0.68	0.39	42.4
West: Pro Hart Avenue W														
10	L2	95	2.0	95	2.0	0.097	5.6	LOS A	0.0	0.0	0.00	0.30	0.00	54.4
11	T1	92	5.0	92	5.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	57.1
Approach		186	3.5	186	3.5	0.097	2.8	NA	0.0	0.0	0.00	0.30	0.00	56.2
All Vehicles		633	4.5	633	4.5	0.287	4.1	NA	0.4	3.3	0.16	0.36	0.16	52.8

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

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

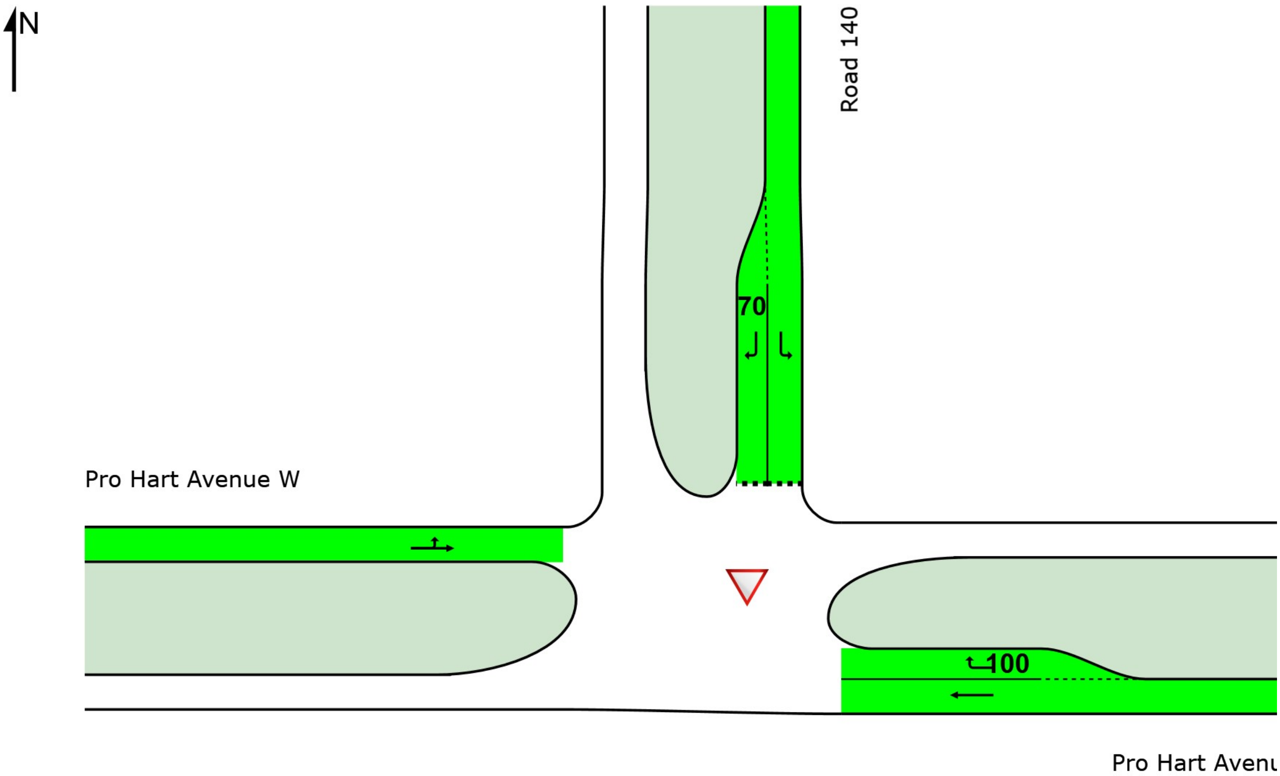
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
East: Pro Hart Avenue E															
Lane 1	188	5.0	188	5.0	1957	0.096	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	20	2.0	20	2.0	1526	0.013	100	6.1	LOS A	0.0	0.2	Short	100	0.0	NA
Approach	208	4.7	208	4.7		0.096		0.6	NA	0.0	0.2				
North: Road 140															
Lane 1	11	5.0	11	5.0	1484	0.007	100	5.9	LOS A	0.0	0.1	Full	290	0.0	0.0
Lane 2	227	5.0	227	5.0	792	0.287	100	8.2	LOS A	0.4	3.3	Short	70	0.0	NA
Approach	238	5.0	238	5.0		0.287		8.1	LOS A	0.4	3.3				
West: Pro Hart Avenue W															
Lane 1	186	3.5	186	3.5	1927	0.097	100	2.8	LOS A	0.0	0.0	Full	450	0.0	0.0
Approach	186	3.5	186	3.5		0.097		2.8	NA	0.0	0.0				
Intersection	633	4.5	633	4.5		0.287		4.1	NA	0.4	3.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	East	North	West	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Site: 1 [Interim PM - Rd 2-Rd140-Rd 2A (Site Folder: Interim PM)]

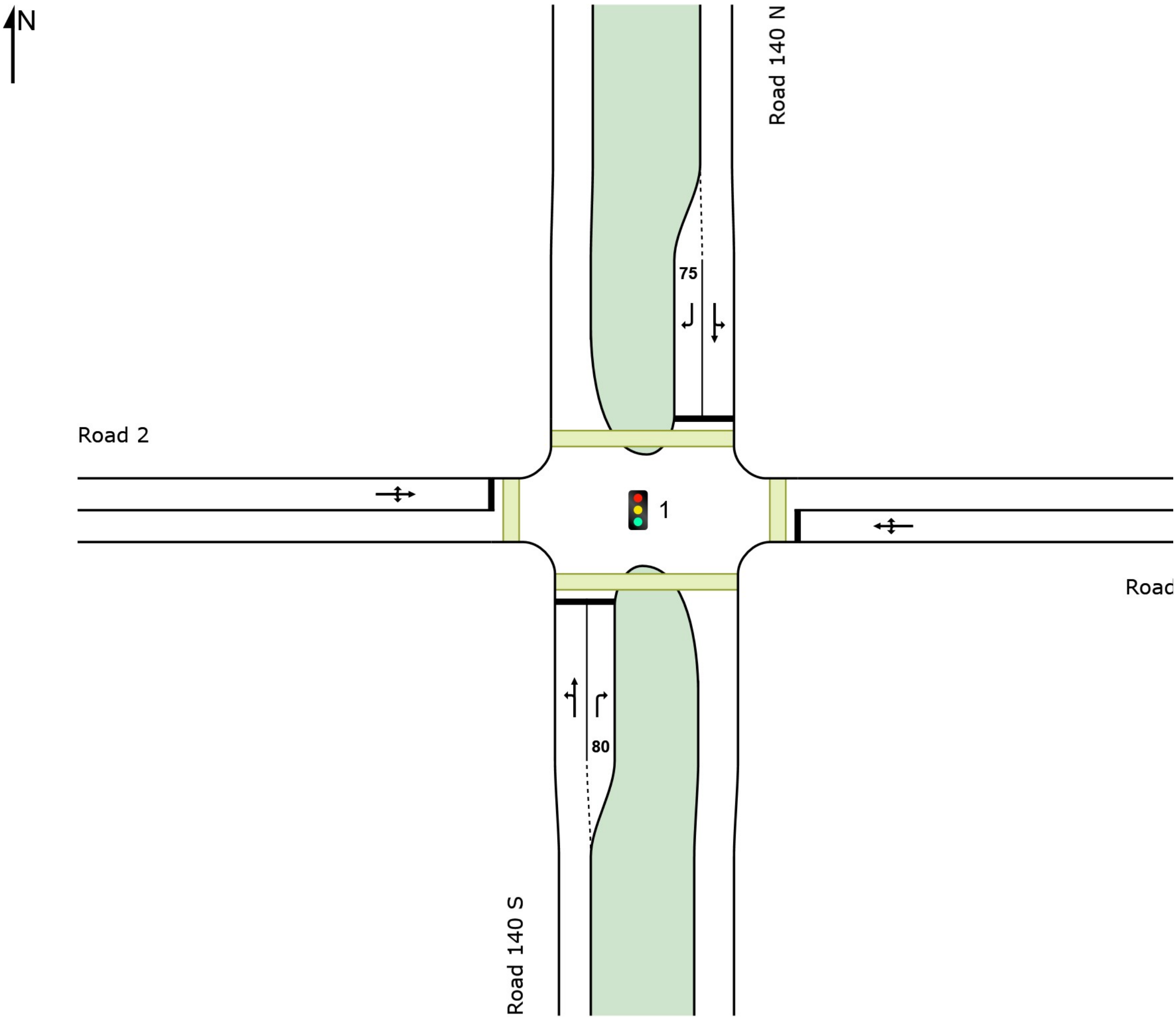
Network: 2 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Road 142 / Road 140
Signalised Cross-Intersection
Interim Traffic Demands
Site Category: Interim PM Peak
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 90 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Split Approach
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 140 S														
1	L2	19	2.0	19	2.0	0.227	34.3	LOS C	2.5	17.5	0.83	0.68	0.83	34.2
2	T1	96	2.0	96	2.0	0.227	28.7	LOS C	2.5	17.5	0.83	0.68	0.83	22.8
3	R2	1	2.0	1	2.0	0.006	46.4	LOS D	0.0	0.2	0.93	0.59	0.93	24.0
Approach		116	2.0	116	2.0	0.227	29.8	LOS C	2.5	17.5	0.83	0.68	0.83	25.7
East: Road 2A														
4	L2	1	2.0	1	2.0	0.248	40.6	LOS C	2.0	14.4	0.90	0.74	0.90	17.8
5	T1	33	2.0	33	2.0	* 0.248	35.0	LOS C	2.0	14.4	0.90	0.74	0.90	32.8
6	R2	52	2.0	52	2.0	0.248	40.6	LOS C	2.0	14.4	0.90	0.74	0.90	17.8
Approach		85	2.0	85	2.0	0.248	38.4	LOS C	2.0	14.4	0.90	0.74	0.90	25.2
North: Road 140 N														
7	L2	169	2.0	169	2.0	0.802	43.7	LOS D	11.0	78.4	1.00	0.94	1.13	27.9
8	T1	231	2.0	231	2.0	* 0.802	38.1	LOS C	11.0	78.4	1.00	0.94	1.13	21.9
9	R2	96	2.0	96	2.0	* 0.582	50.9	LOS D	2.7	18.9	1.00	0.79	1.04	28.8
Approach		496	2.0	496	2.0	0.802	42.5	LOS C	11.0	78.4	1.00	0.91	1.11	25.9
West: Road 2														
10	L2	40	2.0	40	2.0	0.188	39.1	LOS C	1.5	10.7	0.89	0.72	0.89	24.7
11	T1	17	2.0	17	2.0	* 0.188	34.5	LOS C	1.5	10.7	0.89	0.72	0.89	29.7
12	R2	7	2.0	7	2.0	0.188	39.1	LOS C	1.5	10.7	0.89	0.72	0.89	24.7
Approach		64	2.0	64	2.0	0.188	37.9	LOS C	1.5	10.7	0.89	0.72	0.89	26.3
All Vehicles		761	2.0	761	2.0	0.802	39.7	LOS C	11.0	78.4	0.95	0.84	1.03	25.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

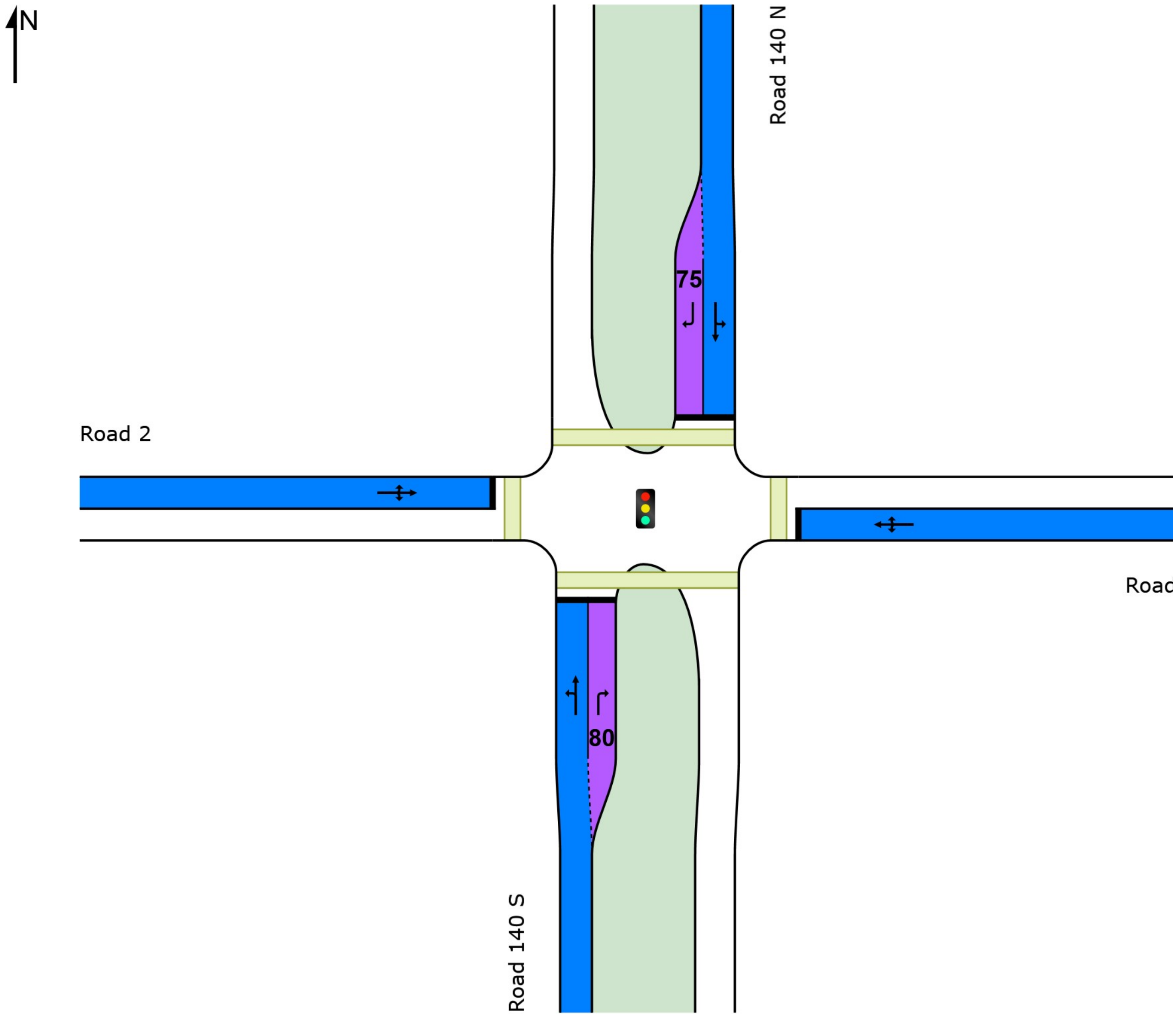
Lane Use and Performance

	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Road 140 S															
Lane 1	115	2.0	115	2.0	506	0.227	100	29.6	LOS C	2.5	17.5	Full	290	0.0	0.0
Lane 2	1	2.0	1	2.0	164	0.006	100	46.4	LOS D	0.0	0.2	Short	80	0.0	NA
Approach	116	2.0	116	2.0		0.227		29.8	LOS C	2.5	17.5				
East: Road 2A															
Lane 1	85	2.0	85	2.0	344	0.248	100	38.4	LOS C	2.0	14.4	Full	255	0.0	0.0
Approach	85	2.0	85	2.0		0.248		38.4	LOS C	2.0	14.4				
North: Road 140 N															
Lane 1	400	2.0	400	2.0	499	0.802	100	40.5	LOS C	11.0	78.4	Full	375	0.0	0.0
Lane 2	96	2.0	96	2.0	164	0.582	100	50.9	LOS D	2.7	18.9	Short	75	0.0	NA
Approach	496	2.0	496	2.0		0.802		42.5	LOS C	11.0	78.4				
West: Road 2															
Lane 1	64	2.0	64	2.0	342	0.188	100	37.9	LOS C	1.5	10.7	Full	500	0.0	0.0
Approach	64	2.0	64	2.0		0.188		37.9	LOS C	1.5	10.7				
Intersection	761	2.0	761	2.0		0.802		39.7	LOS C	11.0	78.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	C	C	C

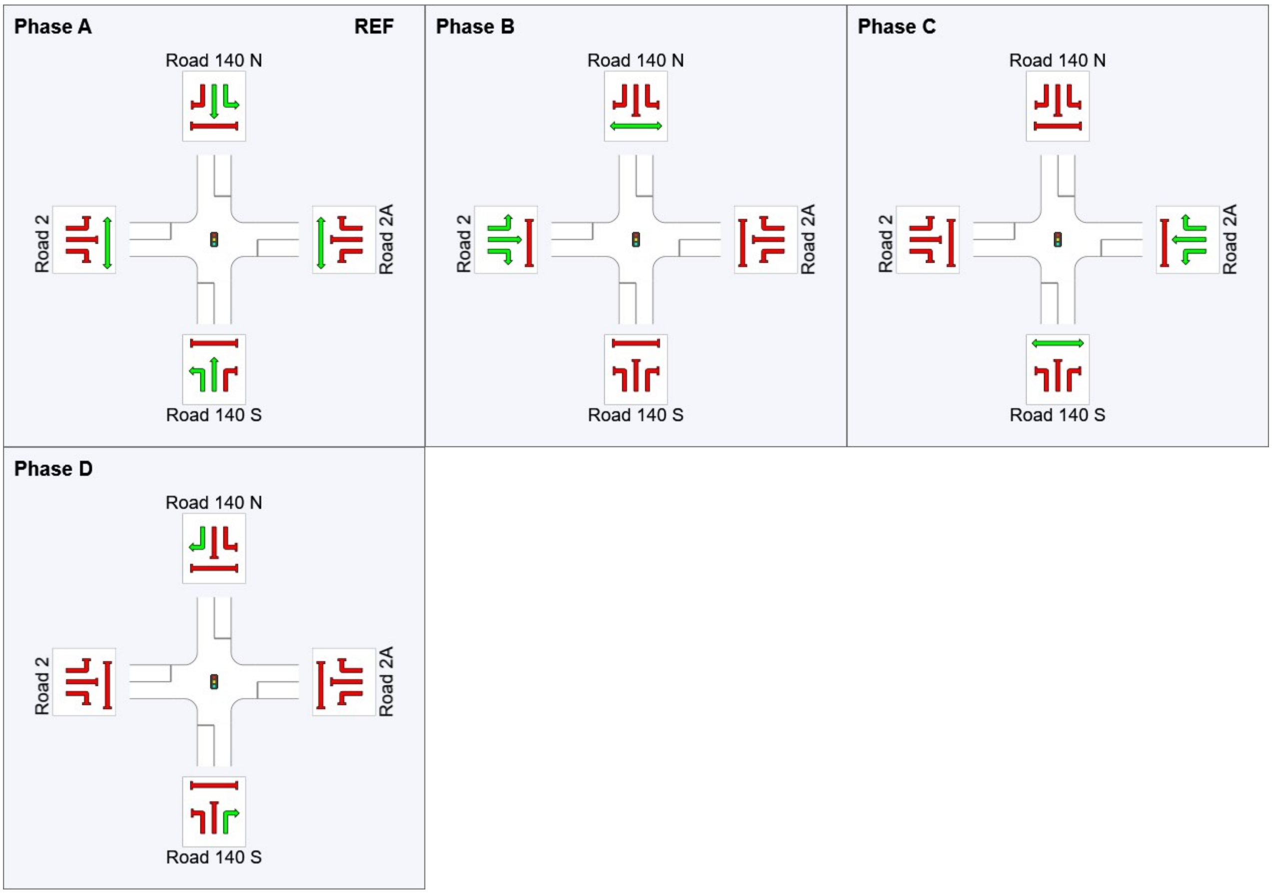


Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement
Permitted/Opposed
Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class (MC) Running
Undetected Movement
Mixed Running & Stopped MCs
Continuous Movement
Other Movement Class (MC) Stopped
Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	29	52	75
Green Time (sec)	23	16	16	8
Phase Time (sec)	30	23	23	14
Phase Split	33%	26%	26%	16%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

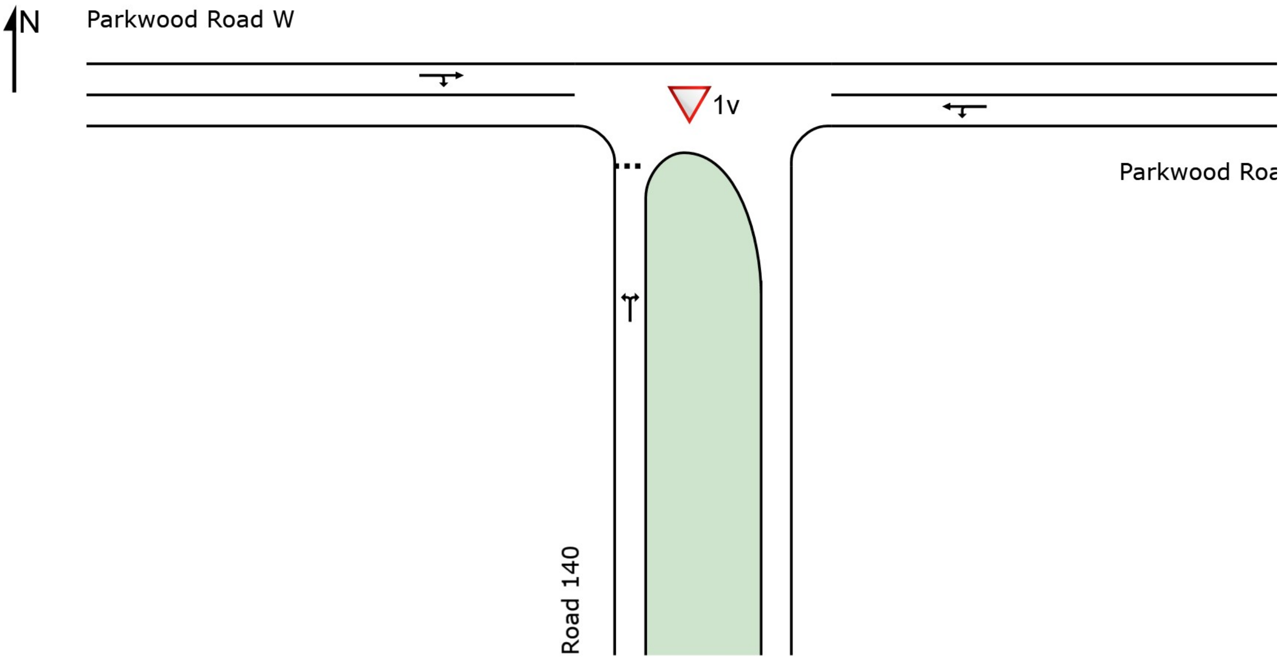
Site: 1v [Interim PM - Parkwood Rd-Rd140 (Site Folder: Interim PM)]

Network: 2 [ProHartAve-Rd140-Parkwood Rd - Interim PM (Network Folder: General)]

Parkwood Road / Road 140
UnSignalised T-Intersection
Interim Traffic Demands
Site Category: Interim PM Peak
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Road 140														
7	L2	1	2.0	1	2.0	0.186	5.6	LOS A	0.2	1.6	0.13	0.62	0.13	51.8
9	R2	187	2.0	187	2.0	0.186	6.6	LOS A	0.2	1.6	0.13	0.62	0.13	51.3
Approach		188	2.0	188	2.0	0.186	6.6	LOS A	0.2	1.6	0.13	0.62	0.13	51.3
East: Parkwood Road E														
10	L2	495	2.0	495	2.0	0.268	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	50.8
11	T1	1	2.0	1	2.0	0.268	0.1	LOS A	0.0	0.0	0.00	0.57	0.00	54.9
Approach		496	2.0	496	2.0	0.268	5.6	NA	0.0	0.0	0.00	0.57	0.00	50.8
West: Parkwood Road W														
5	T1	1	2.0	1	2.0	0.002	1.4	LOS A	0.0	0.0	0.44	0.29	0.44	55.8
6	R2	1	2.0	1	2.0	0.002	7.3	LOS A	0.0	0.0	0.44	0.29	0.44	52.3
Approach		2	2.0	2	2.0	0.002	4.4	NA	0.0	0.0	0.44	0.29	0.44	54.6
All Vehicles		686	2.0	686	2.0	0.268	5.9	NA	0.2	1.6	0.04	0.58	0.04	51.0

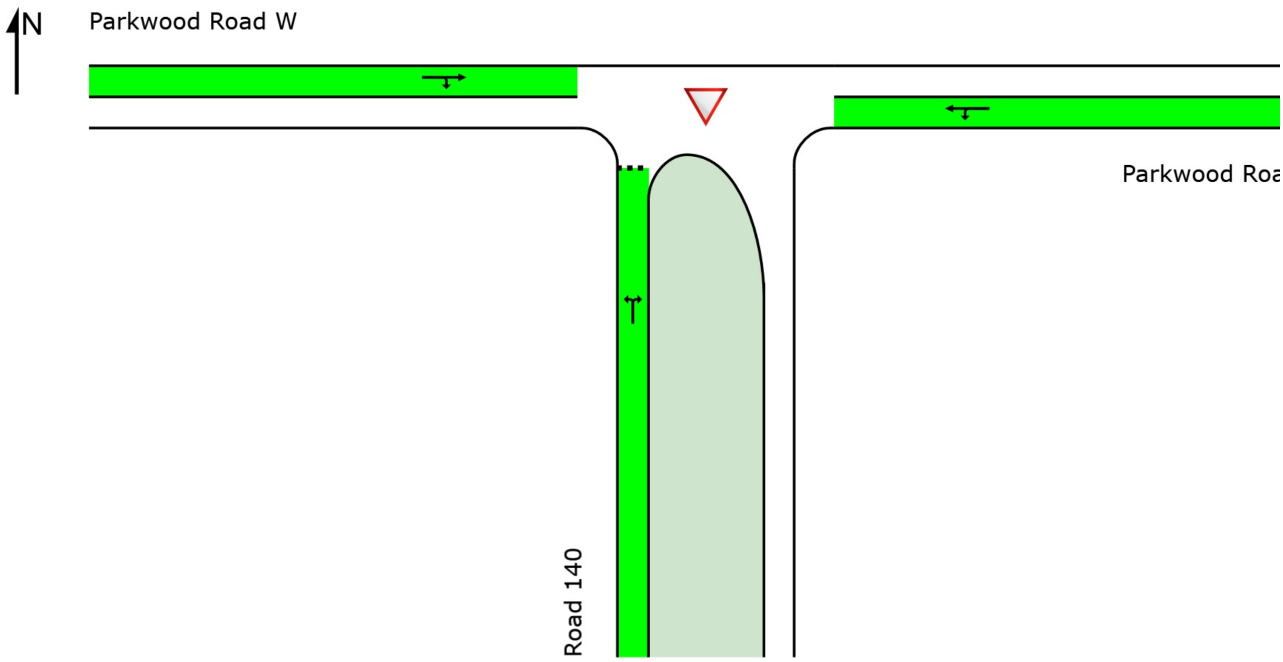
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and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

Lane Use and Performance														
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV] %	[Total veh/h	HV] %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Road 140															
Lane 1	188	2.0	188	2.0	1015	0.186	100	6.6	LOS A	0.2	1.6	Full	375	0.0	0.0
Approach	188	2.0	188	2.0		0.186		6.6	LOS A	0.2	1.6				
East: Parkwood Road E															
Lane 1	496	2.0	496	2.0	1850	0.268	100	5.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	496	2.0	496	2.0		0.268		5.6	NA	0.0	0.0				
West: Parkwood Road W															
Lane 1	2	2.0	2	2.0	1363	0.002	100	4.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	2	2.0	2	2.0		0.002		4.4	NA	0.0	0.0				
Intersection	686	2.0	686	2.0		0.268		5.9	NA	0.2	1.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

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Traffic Distribution - Inbound		
Direction	Residential Origin for Workers of Philip	Work Destination for Residents of Phillip
1 - East	27%	75%
2 - North	42%	12%
3 - West	31%	13%

Direction	Residential Origin for Workers of Phillip	Work Destination for Residents of Phillip
1	3653	2116
2	5727	353
3	4132	360

1			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Braidwood	15	0
2	Karabar	142	6
3	Queanbeyan	216	40
4	Queanbeyan - East	87	23
5	Queanbeyan West - Jerrabomberra	284	14
6	Googong	132	5
7	Queanbeyan Surrounds	242	3
8	Hume	0	55
9	Kowen	0	0
10	Canberra East	19	56
11	Canberra Airport	0	106
12	Majura	13	18
13	ACT - South West	26	0
14	Molonglo - East	0	0
15	Arboretum	0	0
16	O'Malley	42	7
17	Acton	44	51
18	Ainslie	99	3
19	Braddon	175	37
20	Civic	87	397
21	Dickson	66	26
22	Downer	71	0
23	Hackett	51	0
24	Turner	105	10
25	Watson	137	10
26	Black Mountain	0	0
27	Campbell	84	11
28	Duntroon	5	16
29	Parkes (ACT) - North	0	21
30	Reid	27	3
31	Russell	0	50
32	Deakin	78	119
33	Forrest	44	50
34	Griffith (ACT)	118	39
35	Lake Burley Griffin	0	0
36	Narrabundah	139	19
37	Parkes (ACT) - South	0	78
38	Red Hill (ACT)	74	19
39	Yarralumla	62	35
40	Barton	43	140
41	Fyshwick	0	151
42	Kingston (ACT)	164	53
43	Gilmore	68	0
44	Macarthur	45	0
45	Curtin	247	23
46	Garran	150	413
47	Hughes	156	9
48	Isaacs	96	0
Total		**3653**	**2116**

2			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Aranda	72	0
2	Belconnen	198	82
3	Bruce	191	88
4	Charnwood	44	0
5	Cook	65	0
6	Dunlop	138	0
7	Evatt	89	0
8	Florey	95	3
9	Flynn (ACT)	73	0
10	Fraser	23	0
11	Giralang	54	0
12	Gooromon	0	0
13	Hawker	48	0
14	Higgins	62	0
15	Holt	117	5
16	Kaleen	137	0
17	Latham	83	0
18	Lawson	69	0
19	Macgregor (ACT)	150	4
20	Macquarie	63	6
21	McKellar	51	0
22	Melba	30	0
23	Page	50	5
24	Scullin	58	0
25	Spence	50	0
26	Weetangera	49	0
27	Molonglo Corridor	0	0
28	Macnamara	0	0
29	Strathnairn	15	0
30	West Belconnen	0	0
31	Amaroo	116	0
32	Forde	73	0
33	Franklin	167	0
34	Gungahlin	157	18
35	Hall	5	0
36	Harrison	140	3
37	Mitchell	0	30
38	Ngunnawal	187	0
39	Nicholls	111	0
40	Palmerston	99	4
41	Gungahlin - East	0	0
42	Gungahlin - West	0	0
43	Jacka	6	0
44	Kenny	0	0
45	Moncrieff	130	0
46	Taylor	44	0
47	Lyneham	109	5
48	O'Connor (ACT)	114	3
49	Chapman	91	9
50	Duffy	152	3
51	Fisher	158	0
52	Holder	107	13
53	Rivett	132	4
54	Stirling	76	14
55	Waramanga	121	4
56	Weston	167	35
57	Scrivener	0	0
58	Lyons (ACT)	223	0
59	Coombs	243	4
60	Denman Prospect	128	4
61	Molonglo	0	0
62	Wright	181	0
63	Whitlam	0	0
64	Namadgi	0	0
65	Crace	102	0
66	Casey	135	3
67	Bonner	134	4
68	Throsby	45	0
Total		**5727**	**353**

3			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Banks	185	0
2	Bonython	147	4
3	Calwell	197	15
4	Chisholm	173	14
5	Conder	221	11
6	Fadden	142	0
7	Gordon (ACT)	302	3
8	Gowrie (ACT)	121	3
9	Greenway	167	176
10	Isabella Plains	147	4
11	Kambah	635	16
12	Monash	222	8
13	Mount Taylor	0	0
14	Oxley (ACT)	79	0
15	Richardson	98	7
16	Theodore	130	0
17	Tuggeranong	0	0
18	Wanniassa	353	27
19	Tuggeranong - West	0	0
20	Chifley	181	4
21	Farrer	152	16
22	Mawson	195	32
23	Pearce	171	17
24	Torrens	114	3
Total		**4132**	**360**

Traffic Distribution - Outbound		
Direction	Residential Origin for Workers of Phillip	Work Destination for Residents of Phillip
1 - East	49%	30%
2 - North	44%	68%
3 - West	8%	2%

Direction	Residential Origin for Workers of Phillip	Work Destination for Residents of Phillip
1	6556	860
2	5907	1913
3	1049	56

1			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Braidwood	15	0
2	Karabar	142	6
3	Queanbeyan	216	40
4	Queanbeyan - East	87	23
5	Queanbeyan West - Jerrabomberra	284	14
6	Googong	132	5
7	Queanbeyan Surrounds	242	3
8	Hume	0	55
9	Kowen	0	0
10	Canberra Airport	0	106
11	Majura	13	18
12	ACT - South West	26	0
13	Forde	73	0
14	Namadgi	0	0
15	Narrabundah	139	19
16	Red Hill (ACT)	74	19
17	Fyshwick	0	151
18	Banks	185	0
19	Bonython	147	4
20	Calwell	197	15
21	Chisholm	173	14
22	Conder	221	11
23	Fadden	142	0
24	Gilmore	68	0
25	Gordon (ACT)	302	3
26	Gowrie (ACT)	121	3
27	Greenway	167	176
28	Isabella Plains	147	4
29	Kambah	635	16
30	Macarthur	45	0
31	Monash	222	8
32	Mount Taylor	0	0
33	Oxley (ACT)	79	0
34	Richardson	98	7
35	Theodore	130	0
36	Tuggeranong	0	0
37	Wanniassa	353	27
38	Tuggeranong - West	0	0
39	Chapman	91	9
40	Duffy	152	3
41	Fisher	158	0
42	Rivett	132	4
43	Stirling	76	14
44	Waramanga	121	4
45	Chifley	181	4
46	Farrer	152	16
47	Isaacs	96	0
48	Mawson	195	32
49	O'Malley	42	7
50	Pearce	171	17
51	Torrens	114	3
Total		**6556**	**860**

2			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Aranda	72	0
2	Belconnen	198	82
3	Bruce	191	88
4	Charnwood	44	0
5	Cook	65	0
6	Dunlop	138	0
7	Evatt	89	0
8	Florey	95	3
9	Flynn (ACT)	73	0
10	Fraser	23	0
11	Giralang	54	0
12	Gooromon	0	0
13	Hawker	48	0
14	Higgins	62	0
15	Holt	117	5
16	Kaleen	137	0
17	Latham	83	0
18	Lawson	69	0
19	Macgregor (ACT)	150	4
20	Macquarie	63	6
21	McKellar	51	0
22	Melba	30	0
23	Page	50	5
24	Scullin	58	0
25	Spence	50	0
26	Weetangera	49	0
27	Macnamara	0	0
28	Strathnairn	15	0
29	West Belconnen	0	0
30	Canberra East	19	56
31	Amaroo	116	0
32	Casey	135	3
33	Crace	102	0
34	Franklin	167	0
35	Gungahlin	157	18
36	Hall	5	0
37	Harrison	140	3
38	Mitchell	0	30
39	Ngunnawal	187	0
40	Nicholls	111	0
41	Palmerston	99	4
42	Gungahlin - East	0	0
43	Gungahlin - West	0	0
44	Jacka	6	0
45	Kenny	0	0
46	Moncrieff	130	0
47	Taylor	44	0
48	Acton	44	51
49	Ainslie	99	3
50	Braddon	175	37
51	Civic	87	397
52	Dickson	66	26
53	Downer	71	0
54	Hackett	51	0
55	Lyneham	109	5
56	O'Connor (ACT)	114	3
57	Turner	105	10
58	Watson	137	10
59	Black Mountain	0	0
60	Campbell	84	11
61	Duntroon	5	16
62	Parkes (ACT) - North	0	21
63	Reid	27	3
64	Russell	0	50
65	Deakin	78	119
66	Forrest	44	50
67	Griffith (ACT)	118	39
68	Lake Burley Griffin	0	0
69	Parkes (ACT) - South	0	78
70	Yarralumla	62	35
71	Barton	43	140
72	Kingston (ACT)	164	53
73	Scrivener	0	0
74	Curtin	247	23
75	Garran	150	413
76	Hughes	156	9
77	Arboretum	0	0
78	Molonglo	0	0
79	Molonglo - East	0	0
80	Throsby	45	0
81	Bonner	134	4
Total		**5907**	**1913**

3			
No	Rigion	To Phillip (for work)	From Phillip (home)
1	Molonglo Corridor	0	0
2	Holder	107	13
3	Weston	167	35
4	Lyons (ACT)	223	0
5	Coombs	243	4
6	Denman Prospect	128	4
7	Wright	181	0
8	Whitlam	0	0
Total		**1049**	**56**

Report

Green Waste Drop-off Facility–Traffic Impact Assessment

PREPARED FOR RIVERVIEW PROJECTS

21-000475 | 21 April 2023

Calibre Professional Services
55 070 683 037

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
01	21/04/2023	Draft Issue	[redacted]	[redacted]	[redacted]

Contents

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Appendices

1 Introduction

In April 2023, Calibre was engaged by Riverview to undertake a Transport Impact Assessment (TIA) for the proposed Green Waste Dropoff Facility site proposed off Stockdill Drive. A Traffic Assessment of this site has been requested to help support the submission of the Development Application (DA) for the proposed Green Waste development.

The proposed location for the Green Waste Drop-off Facility is within Belconnen Block 1582, approximately 12 km Northwest of the Canberra CBD and 6KM West of Belconnen Town Centre. The estate is bounded by Stockdill Drive to the west and Pro Hart Avenue to the North, and undeveloped land to the east and south. An aerial image of the planned location for the site can be seen in Figure 1.1 & Figure 6.1. The proposed Green Waste site will have access via Stockdill Drive, requiring the construction of a standard rural driveway in accordance with *Roads standards policy (2017) (RD-POL-9)* driveway and a private gravel road.

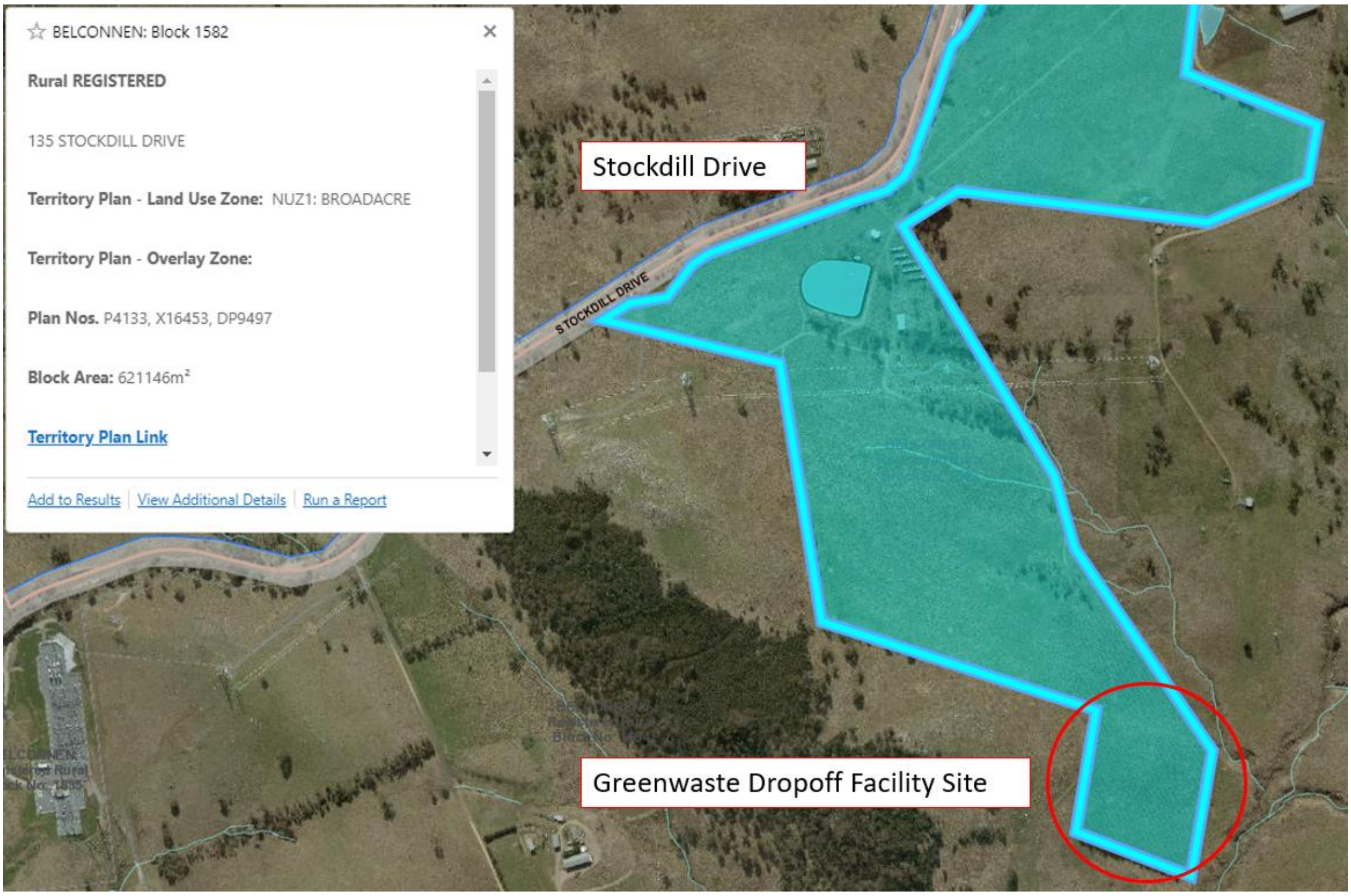

Figure 1.1 Proposed Green Waste Dropoff Facility site block

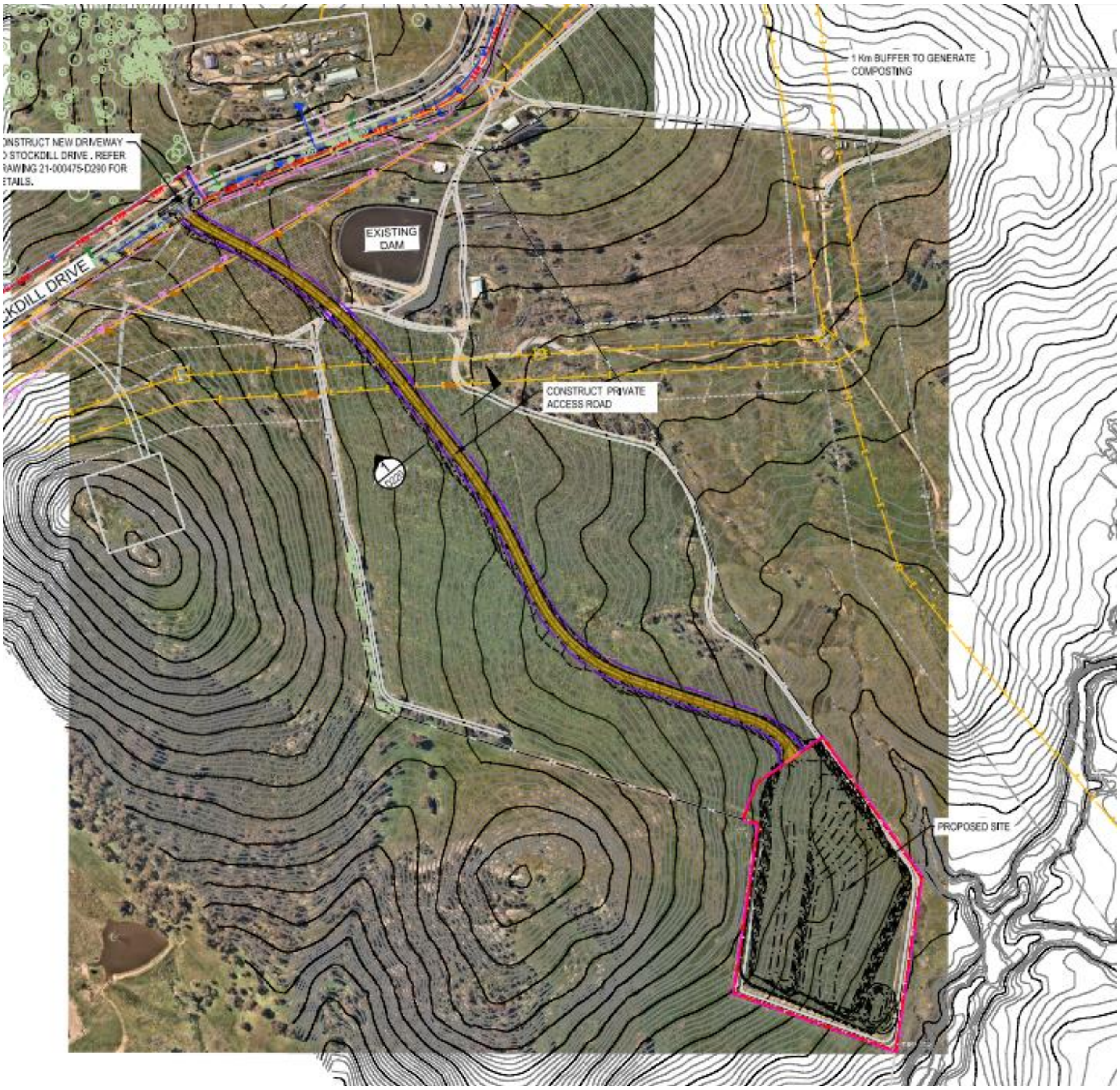

Figure 1.2 Green Waste Dropoff Facility Site Plan

1.1 Scope of Investigation

This report will provide a detailed analysis of the impact of the proposed Green Waste Drop-off Facilities impact on existing road networks. This will include traffic volume forecasts and performance analysis of key intersections connecting to the project site and the surrounding road network. Traffic values were taken from previous reports produced by Calibre and AECOM for the local Strathnairn and Ginninderry areas. These traffic volumes were used to ensure the road hierarchy for the proposed works was still adequate and to assess the performance of key intersections within and adjacent to the project site. Traffic volume forecasts developed by AECOM have been used to develop the 2041 ultimate traffic scenario and provide traffic values for the modelling of the ultimate scenario.

Key areas for investigation include:

- SIDRA assessment of Pro Hart Avenue and Stockdill Drive intersection to confirm whether its current configuration will be suitable with the traffic from fully occupied Strathnairn and Macnamara EDP1 plus Green Waste peak traffic (Approximate 5-year timeframe).
- SIDRA assessment of the access road AM and PM peaks using traffic generation numbers from Strathnairn and Macnamara EDP1 and a calculated ultimate scenario including Green Waste traffic rates.
- Review impacts of Green Waste volumes on AM and PM traffic volumes, road performance and on road hierarchy.
- Assessment of the site access suitability and supporting commentary
- Traffic assessment of the access road in SIDRA
- Generation of a TIA report to support the DA.

2 Existing Conditions

2.1 Road Network

There are three roads within close proximity to the proposed Green Waste site location. These are Stockdill Drive, Pro Hart Avenue and Yoornie Way.

Stockdill Drive is currently a rural road that runs North to South between Pro Hart Avenue to the north and the Lower Molonglo Quality Control Centre to the south. Stockdill Drive is a single carriageway 2 lane rural road which is currently 60km/hr from Block 1582 driveway to Pro Hart Avenue and 100-speed limit un-signposted to the south of the site. Stockdill Drive serves as access to the several rural land areas and the Lower Molonglo Water Quality Control Centre. The new connecting road for site access to the Green Waste site will branch off from Stockdill Drive and head east from the road. Stockdill Drive is identified as a minor collector road in the Strathnairn EDP.

Pro Hart Avenue runs from east to west from the edge of the Macnamara development through Strathnairn until it intersects with Drake Brockman Drive in the east which connects to Belconnen and the broader Canberra areas. The cross section of Pro Hart Avenue changes along its length and its carriageway is broken up by multiple islands and crossings including dedicated foot and bike paths to facilitate safer pedestrian and cycle active travel in the Strathnairn Area. Pro Hart Avenue includes multiple roadside parking bays and sidewalks for access to the surrounding residential area. Pro Hart Avenue has a sign posted speed limit of 60km/hr. Pro Hart Avenue will continue further west and is ear marked for duplication as part of proposed upgrades when traffic volumes, performance and safety dictate this to be required.

Yoornie Way is a small local access street that connects directly to Stockdill Drive and indirectly to Pro Hart Avenue through Gullifer Street. Yoornie Way provides residential access to 27 households.

2.1.1 Key Intersections

Pro Hart Avenue / Stockdill Drive

The Green Waste site's new access driveway will be connected to Stockdill Drive and the adjoining Pro Hart Avenue. The Pro Hart Avenue / Stockdill Drive intersection is the key intersection which will see majority of the traffic impact from this new development. The upgrade of Pro Hart Avenue between Lionel Rose St to Spofforth Drive and Drake Brockman Drive are being undertaken by the Ginninderry development as a separate project and these upgrade works will account for the proposed Green Waste site. The Pro Hart Avenue / Stockdill Drive Intersection is a give-way controlled T' intersection with dedicated turning lanes from Pro Hart Avenue into Stockdill Drive. There is a dedicated right turning lane from Stockdill Drive onto Pro Hart Avenue with Pro Hart Avenue having right of way. There is a median strip that runs along this portion of Pro Hart Avenue and a small seagull that can be used to ease the right-hand turn onto Pro Hart Avenue from Stockdill Drive. The seagull has storage space of 12m and can hold 2 cars. The dedicated right hand turning lane from Pro Hart Avenue to Stockdill Drive is approximately 85m in length and the dedicated right hand turning lane from Stockdill onto Pro Hart Avenue is approximately 60m in length. The Pro Hart Avenue / Stockdill Drive intersection can be seen in Figure 2.1 below.

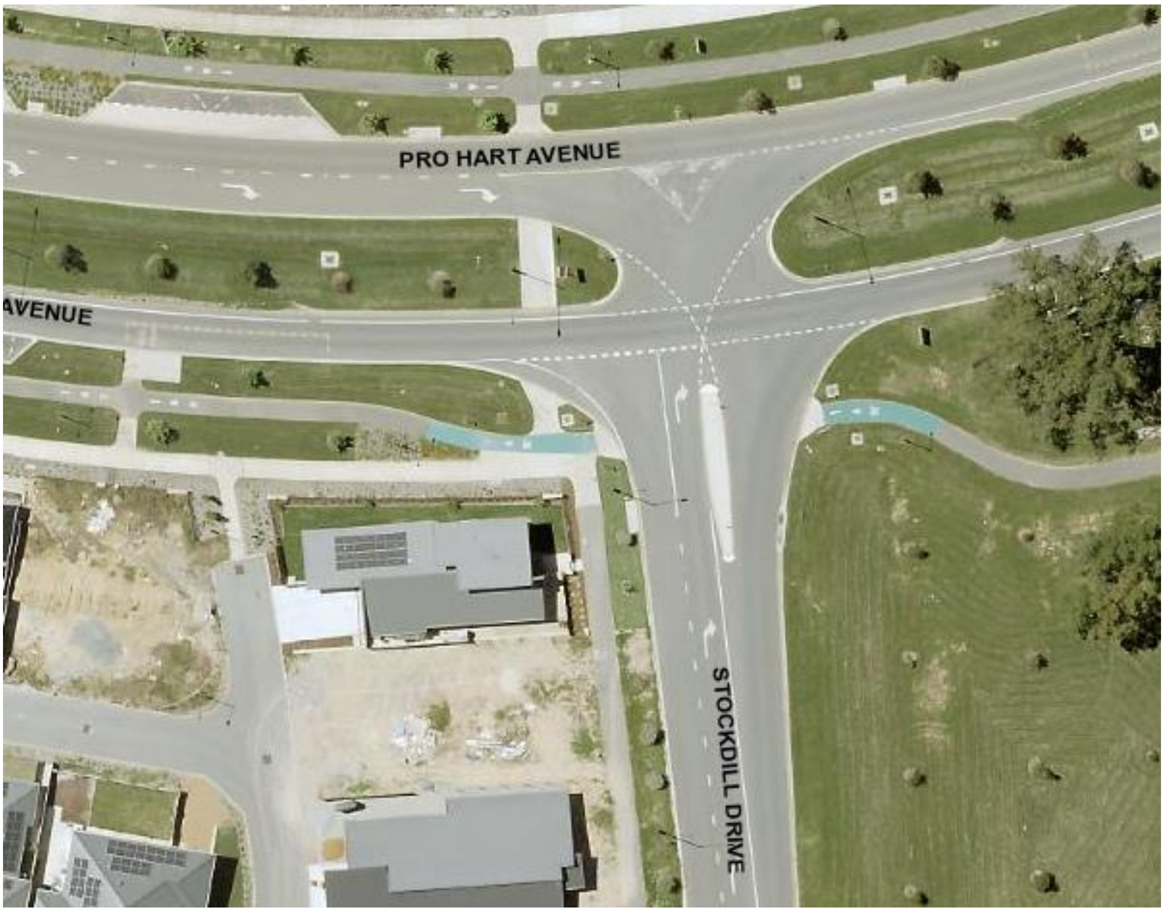

Figure 2.1 Pro Hart Avenue / Stockdill Drive Intersection

Yoornie Way / Stockdill Drive

The Yoornie Way and Stockdill Drive intersection is a split T-intersection providing access to the residential block to the west of Stockdill Drive and the south of Pro Hart Avenue. The impact on this intersection is expected to be minimal as residents can choose to use Gullifer Street to the west as access to Pro Hart Avenue. The Yoornie Way / Stockdill Drive intersection is a give-way controlled T-intersection with Stockdill Drive having priority. Stockdill Drive is the major leg of this intersection with Yoornie Way being the minor leg. There are no dedicated turning lanes or holding points for the Yoornie Way / Stockdill Drive intersection. Yoornie Way can be accessed from either lane of Stockdill Drive. The Yoornie Way / Stockdill Drive intersection can be seen in Figure 2.2 below.

Figure 2.2 Yoornie Way / Stockdill Drive Intersection

2.2 Active Travel Network

From review of the current active travel infrastructure within proximity of the proposed site location, it is noted that there is a dedicated 2.5m path in the western verge of Stockdill Drive. The Macnamara EDP1 Active Travel Plan is included in Figure 2.3 and shows Stockdill Drive is listed as an Existing On-Road Cycle Route and Existing Principal Cycle Training Route. These routes are proposed to be retained and the Green Waste development is expected to have minimal impact on the cycle routes. There is no dedicated active travel infrastructure provided along Stockdill Drive to coincide with this route, which is typical for low volume rural roads.

Pro Hart Avenue is listed as a Principal Cycle Training Route and a future recreational trail is planned to run adjacent to Pro Hart Avenue.

Along Pro Hart Avenue, there are dedicated cyclist only and shared paths providing access along Pro Hart Avenue and into the surrounding Strathnairn Suburb and connecting to the external active travel network.

The shared paths along Pro Hart Avenue crosses the Pro Hart Avenue / Stockdill Drive intersection at an uncontrolled crossing along the Western leg of Pro Hart Avenue, with vehicles having priority. There is a 9m median that pedestrians and cyclists can use to hold at and safely give way to traffic.

The dedicated bike path to the north of the Pro Hart Avenue / Stockdill Drive intersection is continuous and does not impact the intersection. The dedicated Bike Path to the south of the intersection crosses Stockdill Drive at an uncontrolled crossing where vehicles have priority. There is a small 2.5m median that crossing cyclists can use to hold at and give way to traffic.

The Ginninderry development has outlined an active travel plan for the Strathnairn, Ginninderry and Macnamara areas which can be seen below in Figure 2.3. The whole drawing has been attached in Appendix E.

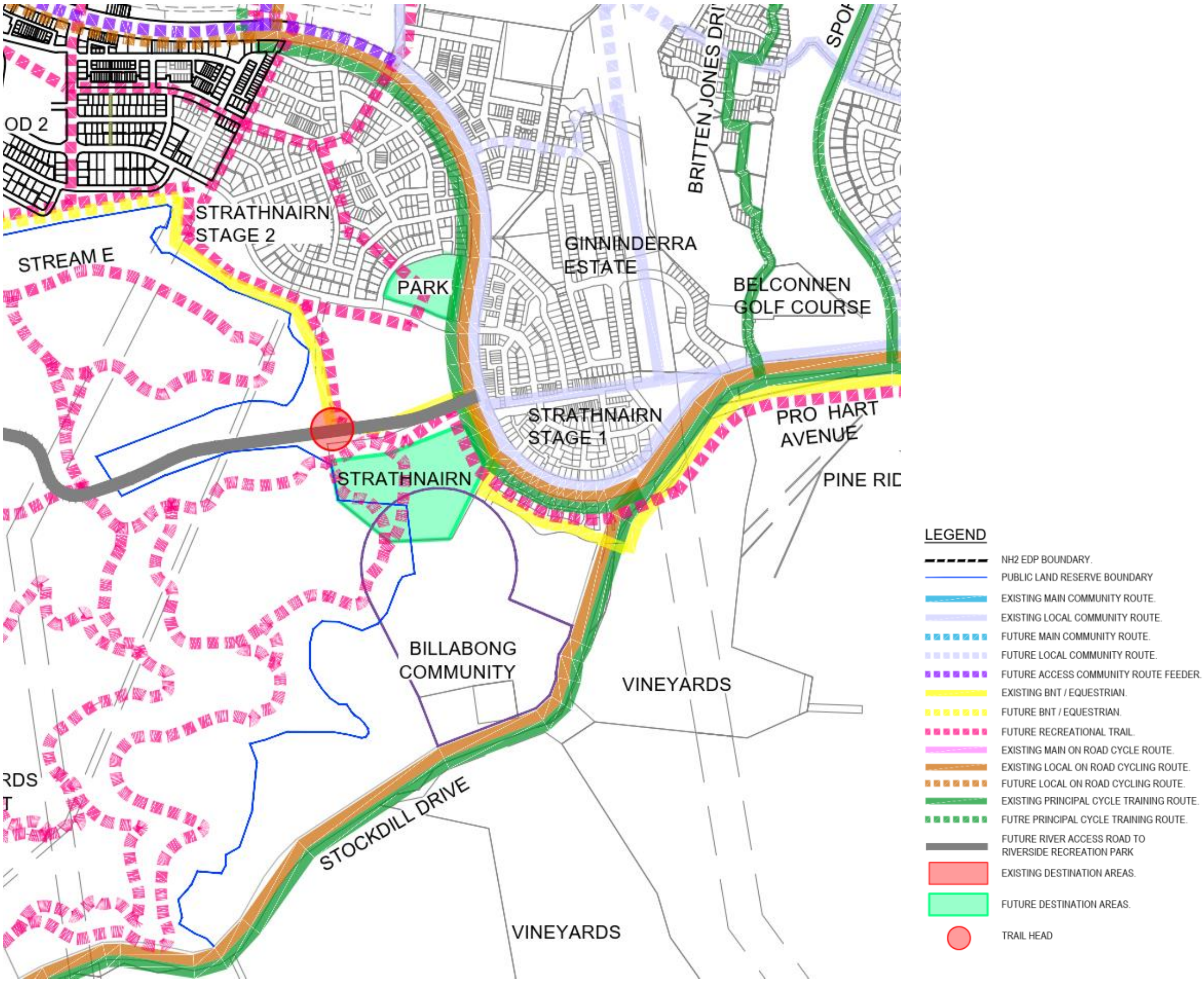

Figure 2.3 Macnamara EDP 1 Active Travel Plan

2.3 Public Transport Network

There is one bus route that runs along Pro Hart Avenue which services the local area. The bus route is the 903 Kippax to Strathnairn Loop which runs the length of Pro Hart Avenue. A map of the Bus route is available in Figure 2.4 below.

This bus route does not directly connect to Stockdill Drive, and the two bus stops directly to the east and west of the Stockdill Drive / Pro Hart Avenue intersection is approximately 1km from the proposed site location so are not deemed as acceptable for use. Due to the proposed land use, rural nature of Stockdill Drive, and limited residential dwellings located adjacent to the road, the lack of cyclist or pedestrian infrastructure and public transport is not viewed as a critical shortfall nor considered necessary for the site.

The ultimate bus route will only run along Pro Hart Avenue with no bus routes proposed along Stockdil Drive.

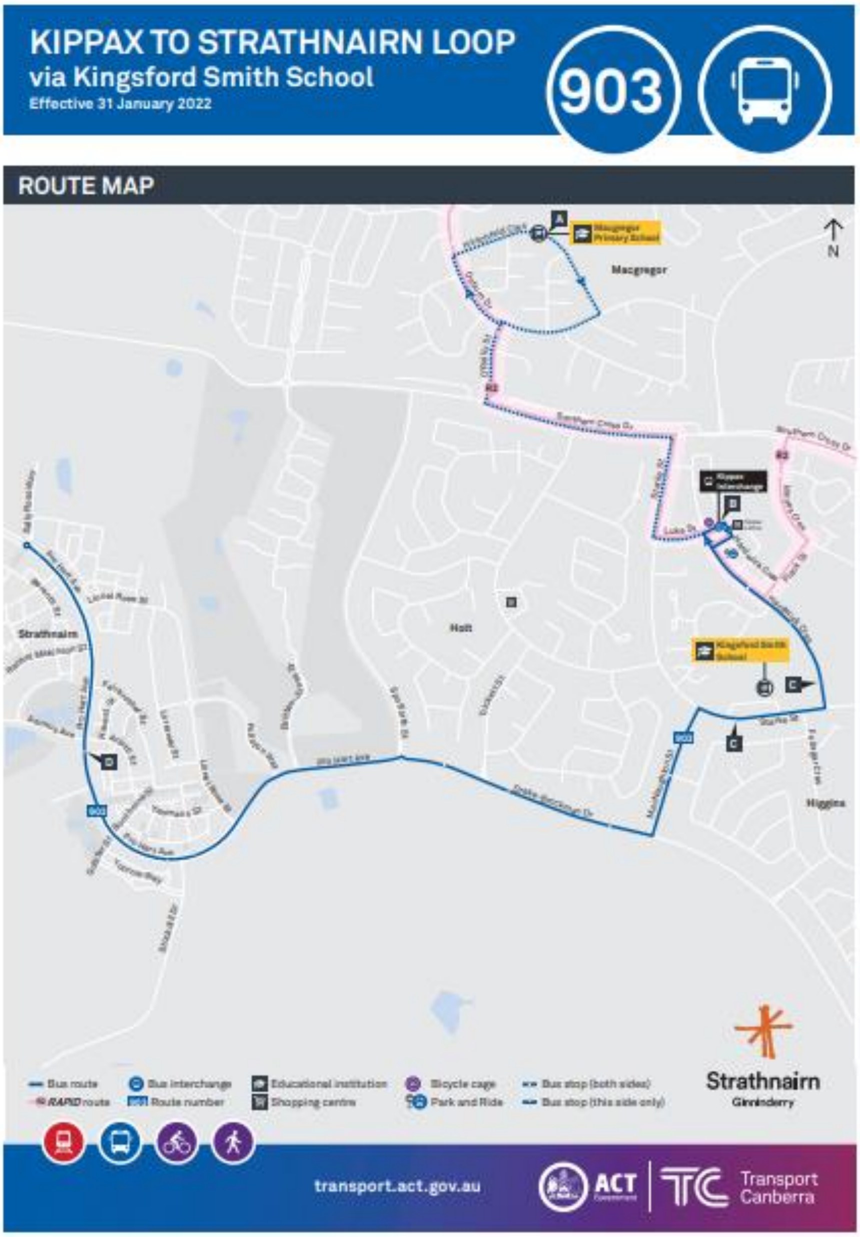

Figure 2.4 Kippax to Strathnairn Loop - 903

3 Previous Studies

The following previous studies were reviewed and utilised to guide this analysis:

- West Belconnen Technical Traffic Report published by AECOM in February 2015
- West Belconnen Stage 1 – Traffic Impact Assessment Technical Memorandum published by Calibre in April 2016
- Ginninderry Stage 2 – Traffic Impact Assessment Report published by Calibre in September 2017
- West Belconnen Neighbourhood One EDP Traffic Modelling Report published by AECOM in April 2016

The interim 2031 traffic values were derived from previous studies and included the full development of Strathnairn and Macnamara EDP 1.

The 2041 Traffic Modelling Report produced by AECOM served as the basis for modelling of the ultimate traffic scenario. The upgraded Pro Hart Avenue / Stockdill Drive intersection design was adopted from the AECOM report and the traffic signal phasing was also duplicated.

4 Ultimate Pro Hart Avenue Design

The growth of the local Strathnairn suburb and the additional traffic produced by the broader Ginninderry development will dramatically increase the vehicles per day travelling through Strathnairn via Pro Hart Avenue and the surrounding road network.

Pro Hart Avenue

The West Belconnen Neighbourhood One EDP Traffic Modelling Report published by AECOM in April 2016 proposed that Pro Hart Avenue be a dual carriageway road with the Pro Hart Avenue / Stockdill Drive intersection to be signalised. The Strathnairn Stage 1 EDP included this ultimate design for dual carriageway road and signalised intersection and included the interim construction of a single lane in each direction and unsignalised intersection. The constructed works are single carriageway in each direction and have been designed to suit this ultimate duplication upgrade works in the future when required.

A summary of the ultimate configuration recommended by AECOM to accommodate the ultimate traffic volumes are outlined below.

The ultimate Pro Hart Avenue / Stockdill Drive intersection will be signalised with dedicated turning lanes from Pro Hart Avenue to Stockdill Drive. The Upgraded intersection design can be seen in Figure 4.1 Updated Pro Hart Avenue / Stockdill Drive 2041 Intersection.

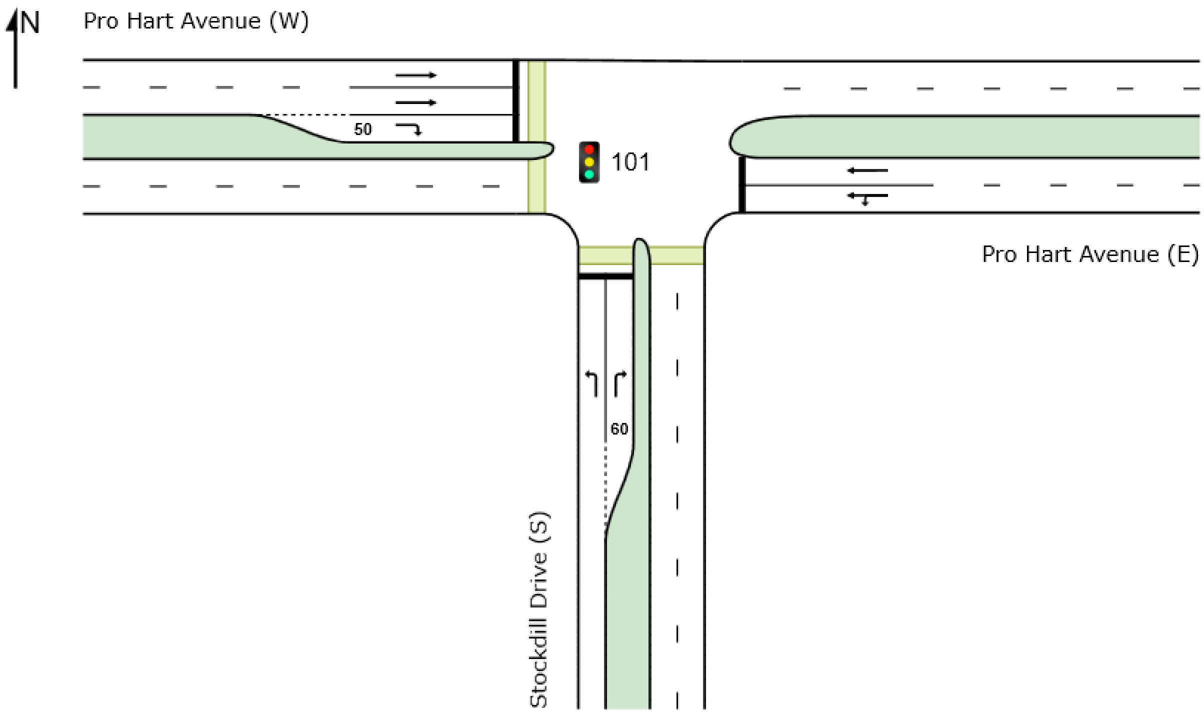

Figure 4.1 Updated Pro Hart Avenue / Stockdill Drive 2041 Intersection

Stockdill Drive

Stockdill Drive has been upgraded between Yoornie Way to Pro Hart Avenue to be a kerbed urban road. Currently Stockdill Drive is a rural road south of Yoornie Way. The Ginninderry development will extend further south of Yoornie Way past the proposed driveway to the proposed Green Waste site. It is planned to upgrade Stockdill Drive to an urban collector road as residential development extends south in the future.

5 Spofforth Street / Pro Hart Avenue / Drake Brockman Drive

The growth of the local Strathnairn suburb and the additional traffic produced by the broader Ginninderry development will dramatically increase the vehicles per day travelling through Strathnairn and utilising the Spofforth Street / Pro Hart Avenue / Drake Brockman Drive intersection.

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Figure 5.5.1 Spofforth Street / Pro Hart Avenue / Drake Brockman Drive Intersection

Comments were received from members of the community which raised concern about the safety of the existing intersection of Drake Brockman Drive and Spofforth Street when turning from Pro Hart Avenue right onto Drake Brockman Drive. As a result of these community concerns, an assessment of the site capacity was undertaken by Calibre as part of a separate traffic assessment exercise.

Results from the modelling identified that the additional expected traffic growth along the surrounding roads, in addition to the Green Waste vehicle generations, would cause the intersection to operate beyond suitable levels by the end of 2023. As an interim measure to ensure the continued suitable operation of this intersection prior to the major upgrade works required for the Drake Brockman Drive duplication in 2026, TCCS has agreed to the upgrade of this intersection within 2023 to better allow for management of traffic volumes. The new alignment of the intersection will change the priority-controlled leg to be Spofforth Street as opposed to Pro Hart Avenue, as is shown in Figure 5.2 below.

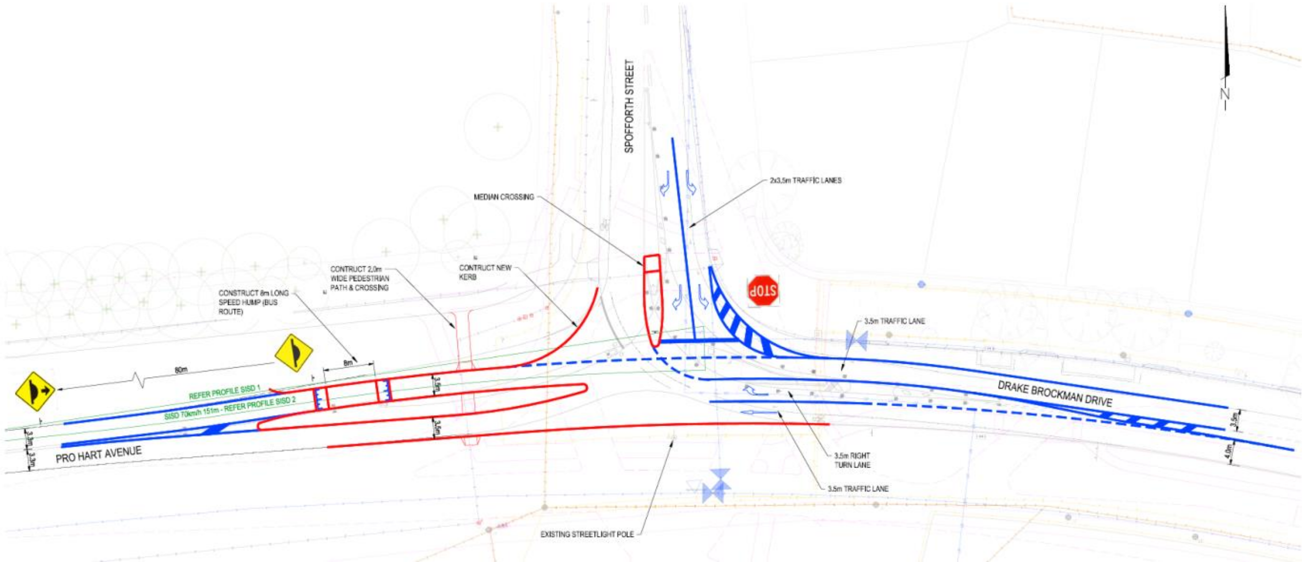


Figure 5.2 Drake Brockman Drive / Pro Hart Avenue / Spofforth Street Intersection Proposed Upgrade

These upgrade works are being addressed as part of a separate project, and so are not considered further as part of this assessment.

6 Proposed Development

6.1 Development Site Location and Access

The Green Waste site is located within Belconnen Block 1582, approximately 12 km Northwest of the Canberra CBD and 6KM West of Belconnen Town Centre. The estate is bounded by Stockdill Drive to the west and Pro Hart Avenue to the North, undeveloped land to the east and south. An aerial image of the planned location for the estate can be seen in Figure 6.1.

Vehicular access to the Green Waste site will be conveyed through a proposed new private gravel road that will branch off from Stockdill Drive to the east.

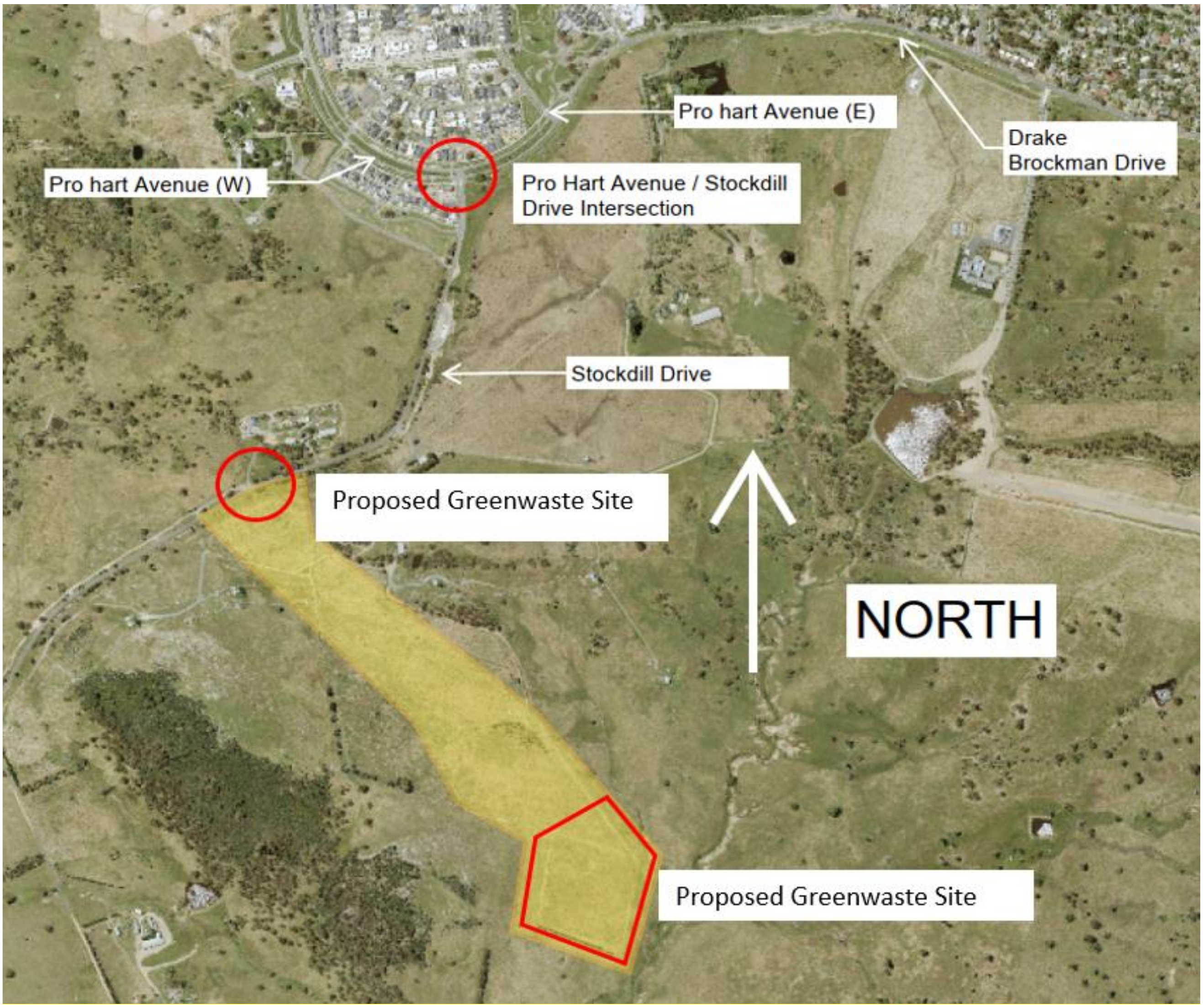


Figure 6.1 Aerial Image of the Proposed Green Waste Drop-off Facility Site Location

6.1.1 Development Details

Upon completion, the Green Waste site will act as a drop off location for green waste materials. The site will see deliveries of green waste via cars, trucks, and trailers.

6.2 Trip Generation

The Green Waste site is expected to act as a drop off location of green waste from the public from the Belconnen area.

Other similar Green Waste sites within Canberra have been used as a basis for generation and expectation for traffic movements. The Client team has advised the expected traffic numbers that will visit this Green Waste site, based off available information from the Belconnen green waste drop-off, provided below. A copy of their email has been provided in Appendix D.

A breakdown of trips generated:

- Green waste drop off of 500 cars per day (in one direction).
- Green waste drop off 25 trucks per day (in one direction).

Total vehicles per day (in + out) = **1050vpd**

Table 6.1 Green Waste Site Trip Generation – Peak Hour Generation rates.

Daily		Peak Hour
Provided Generation Rates	**Trips / Day**	**Peak Hour Generation Rate**
Vehicle Green Waste Drop-off	1000	100
Truck Green Waste Drop-off	50	5
-	**1050**	**105**

6.3 Traffic values for SIDRA Modelling

The traffic values to be modelled in SIDRA 9.0 are sourced from multiple previous Calibre and AECOM reports concerning the Strathnairn and Ginninderry area over the last 7 years. These reports are listed in Section 3 Previous Studies.

The provided Green Waste traffic values are added to each of the base values when modelling networks in SIDRA. Greater details on the adopted values for each scenario can be found in Appendix A.

The hours of operation for the Green Waste site are expected to be similar to other sites around Canberra which typically close between 4:30 – 5:00PM. As such, the site is not expected to generate significant volumes in the PM commuter peak (considered to be between 5-6pm from previous reports). To determine the traffic impact of the Green Waste site on the surrounding road network in the PM peak, a conservative rate of 20% of the calculated peak hr traffic has been applied. This reduction has been deemed reasonable as it reflects the lowered volume of traffic generated by the Green Waste due to their closing hours as employees and shipments may still be traveling to and from the site after common business hours have ceased. The AM peak will be impacted by Green Waste traffic generation and as such no scaling has been applied to the values attributed to the AM Peak.

6.4 Traffic Distribution

The distribution of trips from the Green Waste site to the external road network has been based on expected catchment areas and checked against journey-to-work (JTW) data from the 2016 Australian Census. Based on the other Green Waste sites, the relocated site is expected to cater for most of Belconnen, as well as Molonglo.

Based on expected projection to the broader road network, the following directions were adopted to represent the external trip distribution:

- East (Via Pro Hart Avenue) – 95% of trips
- West (Via Pro Hart Avenue) – 5% of Trips

The trip distribution values chosen were picked conservatively to reflect the greater right turn volumes of trips out of the Ginninderry/Strathnairn suburbs into the wider Belconnen area (critical movement). The upgraded 2041 Pro Hart Avenue / Stockdill Drive intersection is signalised and as such provides greater leeway and room for growth in the network. As the split between east and west changes over time due to further development of Strathnairn and Macnamara, the traffic signal phasing can be changed to account for it. Riverview will continue to review the operation and safety of the road networks based on actual volumes as the development progresses.

6.5 Proposed Green Waste Drop-off Facility Access Road

Green Waste Access Road

The proposed Green Waste Dropoff Facility Access Road location is situated on Stockdill Drive which is a 2-lane rural road. The addition of the access will involve the construction of a new standard rural driveway. The driveway will mesh with the existing road pavement and provide access for cars and trucks. The proposed Stockdill Drive / Green Waste Access Road intersection location can be seen in Figure 6.2.

Figure 6.2 Stockdill Drive / Green Waste Dropoff Facility Access Road Location

6.6 Green Waste Drop-off Facility Site Parking

Parking requirements for various land uses are outlined within the *Territory Plan - Parking and Vehicular Access Code. Section 3.5.5* outlines Recycling Facility parking requirements as "1 Space / Peak Shift Employee". As such, The parking requirements of the site will be fulfilled following the rate specified.

As advised by the Client, a maximum of 7 employees are expected to be present at the site at any given time. As such, the Green Waste site will provide 7 car parking spaces for employee use, which meets the requirement for parking outlined in the Territory Plan. The remainder of traffic from green waste drop off will be transitory and is not expected to require parking within the site as all vehicles will be standing within designated areas for waste drop off before leaving the site. There are no further facilities provided within the site that require parking for visitors or other users, and as such, no further parking provision has been allowed for.

7 Traffic Impact Assessment

7.1 Network Traffic Volumes

To ensure the adequate performance of the external road network connecting to the Green Waste site, intersection performance analysis has been undertaken for the Pro Hart Avenue / Stockdill Drive intersection and the Stockdill Drive / Green Waste Access Road. Analysis has been completed for 2031 and 2041 design years to assess both the interim performance and the predicted ultimate performance when the Green Waste development and surrounding areas are fully constructed.

The volumes for the interim 2031 assessment were taken from previous TIA's developed by Calibre and considered the full buildout of Strathnairn and Macnamara EDP 1. Traffic values for the ultimate 2041 development have been taken from the AECOM April 2016 traffic report and considered the completion of the Ginninderry development.

The volumes entering and exiting the Green Waste site were provided by the Green Waste team after a survey of vehicles entering other similar green waste sites within Canberra.

The SIDRA software represents intersection performance through the following four key parameters:

- Degree of Saturation (DOS) – The ratio of traffic demand to capacity,
- Delay – The average delay in seconds,
- Level of Service (LOS) – Conversion of the average delay into a letter grade, and
- Queue length – The length of the 95th percentile queue in metres.

7.1.1 Performance Criteria

The *RMS Traffic Modelling Guidelines* identify the maximum practical DOS for various intersection controls as presented in Table 7.1.

Table 7.1 Maximum Practical DOS by Intersection Control

Intersection Control	Maximum Practical DOS
Traffic Signals	0.90
Roundabouts (incl. Metered)	0.85
Priority-Controlled	0.80

Intersections operating in excess of their maximum practical capacity typically experience unstable traffic flow whereby small disruptions result in excessive congestion and flow breakdown.

The *RMS Traffic Modelling Guidelines* also identify LOS criteria for intersections as shown in Table 7.2 below.

Table 7.2 LOS Criteria for the Intersections (RTA NSW Method)

LOS	Average delay per vehicle	Description
A	≤ 14s	Good operation
B	15s – 28s	Acceptable delays and spare capacity
C	29s – 42s	Satisfactory
D	43s – 56s	Near capacity
E	57s – 70s	At capacity, priority-control not suitable
F	> 71s	Unsatisfactory with excessive queueing

The TCCS *Traffic Impact Assessment Guidelines,* similarly, identifies intersections operating at LOS D or better as acceptable.

95th percentile queue lengths have been assessed to ensure that queues in short lanes do not extend back to impact traffic in adjacent lanes and that queues in full-length lanes do not extend back to impact upstream intersections.

7.1.2 Summary of Tested Scenarios.

To develop an appropriate understanding of the traffic volumes and the impact of the Green Waste Development on the broader traffic network it was deemed appropriate for the Traffic Impact Assessment to be modelled on the 2031 Interim values and the 2041 Ultimate values. The 2031 volumes represent the build out of Macnamara EDP1 and Strathnairn.

The expected growth of the Ginninderry development and the surrounding areas of Strathnairn will lead to higher traffic volumes throughout the Strathnairn area, and particularly Pro Hart Avenue which is a key road for the Green Waste site.

The following locations and scenarios were tested as part of this assessment.

- Stockdill Drive / Pro Hart Avenue Interim (2031) Base Conditions without Green Waste
- Stockdill Drive / Pro Hart Avenue Interim (2031) With Green Waste Development Scenario
- Stockdill Drive / Pro Hart Avenue Ultimate (2041) without Green Waste
- Stockdill Drive / Pro Hart Avenue Ultimate (2041) With Green Waste Development Scenario
- Stockdill Drive / Green Waste Access Road 2031
- Stockdill Drive / Green Waste Access Road 2041

7.2 Road Hierarchy

A summary of the road hierarchy for the keys roads is outlined below.

Table 7.3 Traffic Values for determining Road Hierarchy

Traffic Volumes	Base 2031	Developed Green Waste 2031	AECOM Base 2041	Developed Green Waste 2041
Pro Hart Avenue (West)	9600	9615	22245	22260
Pro Hart Avenue (East)	9960	10990	23915	24945
Stockdill Drive	505	1555	2260	3305

7.2.1 Road Classifications

Table 7.4 Road Hierarchy changes between stages

Road Classification	Daily Traffic Volume Range	Base 2031 Values	Base 2031 + Green Waste Values	Ultimate 2041 Values	Ultimate 2041 + Green Waste Values
Arterial Road	>6,000 vpd	Pro Hart Avenue	Pro Hart Avenue	Pro Hart Avenue	Pro Hart Avenue
Major Collector	3,001-6000 vpd				Stockdill Drive
Minor Collector	1,001-3,000 vpd		Stockdill Drive	Stockdill Drive	
Access B	301-1,000 vpd	Stockdill Drive			
Access A	0-300 vpd				

The tables above outline the daily traffic volumes expected along Pro Hart Avenue and Stockdill Drive, these values are used along with the road function and road connectivity to determine the road hierarchy for Pro hart Avenue and Stockdill Drive in their Base, Base + Green Waste, Ultimate and Ultimate + Green Waste states.

At the time of writing (2022) Pro Hart Avenue is listed on *Active Travel Infrastructure Practitioners Tool* as a Major Collector and Stockdill Drive is a major collector from the intersection with Pro Hart Avenue changing to rural road after Yoornie Way. It is expected with natural growth of the Ginninderry area that Pro Hart Avenue will become an arterial road (>6,000 vpd).

Stockdill Drive's road hierarchy is expected to change to an Access road B by 2031 with natural growth. With the addition of the Green Waste site Stockdill Drive is expected to change to a minor collector road. The ultimate 2041 numbers without the Green Waste development are expected to push Stockdill Drive to a minor collector. The ultimate 2041 + Green Waste values will push Stockdill Drive to a major collector with an expected 3590 vpd traveling along Stockdill Drive. The section of Stockdill Drive within the Ginninderry development was constructed as a major collector road. The traffic from Green Waste occurs over an entire day with a more balanced distribution rather than sharp peaks with the busiest periods occurring on weekends. Truck movements also typically occur outside of the network peak and as such the site is expected to have little impact on operations during peak times. Given the dispersion of traffic across the day, if Stockdill Drive was constructed as a Minor Collector, south of Yoornie Way, this would not be expected to pose any risk to safety or amenity of the road users.

The classification of the roads is taken from the *Estate development code 2013 – table 1A Street Hierarchy for Estates in Residential Zones and CZ5.*

7.3 Stockdill Drive / Pro Hart Avenue Interim (2031) Conditions

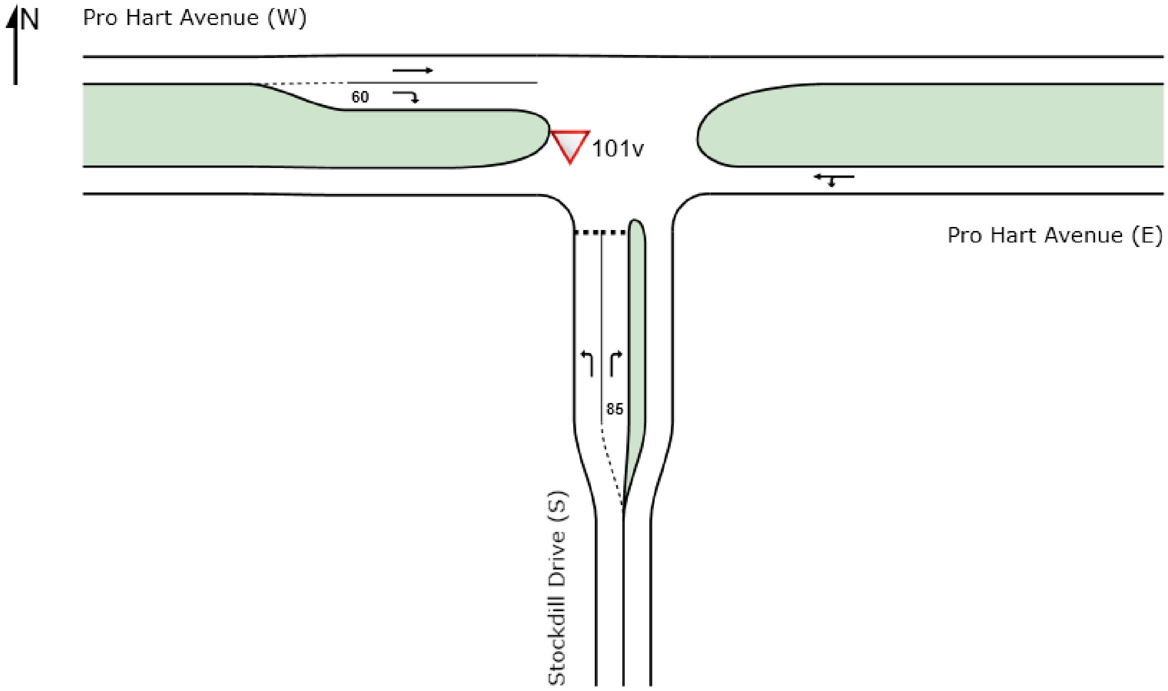
This model is for the existing single lane carriageway Pro Hart Avenue with existing unsignalised T intersection configuration with Stockdill Drive using 2031 traffic volumes.

SITE LAYOUT

▽ Site: 101v [Greenwaste Calculated Interim AM Pro Hart Avenue / Stockdill Drive (Site Folder: Greenwaste Stockdill/Prohart 2031)]

Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Interim Development
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: \\cbrnas01\Active\21\21-000475\9_Tech\Traffic\Greenwaste traffic\Greenwaste Site Operation.sip9

Figure 7.1 Intersection Layout – Pro Hart Avenue / Stockdill Drive

Both Table 7.5 and Table 7.6 summarise the key intersection performance parameters for the Pro Hart Avenue / Stockdill Drive intersection in both commuter peak hours on a typical weekday. For further information, the full SIDRA outputs have been provided in Appendix A.

Table 7.5 2031 BASE Intersection Performance Summary – Pro Hart Avenue / Stockdill Drive

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
East Approach: Pro Hart Avenue								
Through	0.091	0s	A	0m	0.466	0s	A	0m
Left	0.091	6s	A	0m	0.466	6s	A	0m
South Approach: Stockdill Drive								
Left	0.003	6s	A	0m	0.010	11s	A	0m
Right	0.158	21s	B	4m	0.042	20s	B	1m
West Approach: Pro Hart Avenue								
Right	0.001	6s	A	0m	0.010	0s	A	0m
Through	0.445	0s	A	0m	0.086	11s	A	1m
Total	**0.445**	**1s**	**A**	**4m**	**0.466**	**1s**	**A**	**1m**

Table 7.6 2031 Green Waste Intersection Performance Summary – Pro Hart Avenue / Stockdill Drive

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
East Approach: Pro Hart Avenue								
Through	0.14	0s	A	0m	0.468	0s	A	0m
Left	0.14	6s	A	0m	0.468	6s	A	0m
South Approach: Stockdill Drive								
Left	0.004	6s	A	0m	0.004	11s	A	0m
Right	0.271	24s	B	7m	0.118	21s	B	3m
West Approach: Pro Hart Avenue								
Right	0.004	0s	A	0m	0.01	11s	A	0m
Through	0.445	6s	A	0m	0.086	0s	A	0m
Total	**0.445**	**2.4s**	**A**	**9m**	**0.470**	**1.1 s**	**A**	**4m**

It can be seen that the existing give-way controlled intersection of Pro Hart Avenue and Stockdill Drive operate within the acceptable parameters for both capacity and delay during AM and PM peak periods without and with the Green Waste site and both Strathnairn and Macnamara EDP1 completed. During the AM peak, the maximum DOS seen across the Base and the Calculates + Base modes was 0.445 from the West Approach of Pro Hart Avenue through lane. This rose in the PM peak, with a value of 0.468 recorded in the through lane of the East approach along Pro Hart Avenue. Maximum delays at the intersection were similar for Base and Calculated + Base during both AM and PM peaks, with delays between 10 and 30 seconds (LOS B). Queueing at the intersection for both Base and Calculated + base was seen to be minimal during both peak periods along all legs.

7.4 Stockdill Drive / Pro Hart Avenue Ultimate report (2041)

This model is for when the Ginninderry development is fully completed with the ultimate dual carriageway Pro Hart Avenue, and signalised T intersection with Stockdill Drive proposed by AECOM.

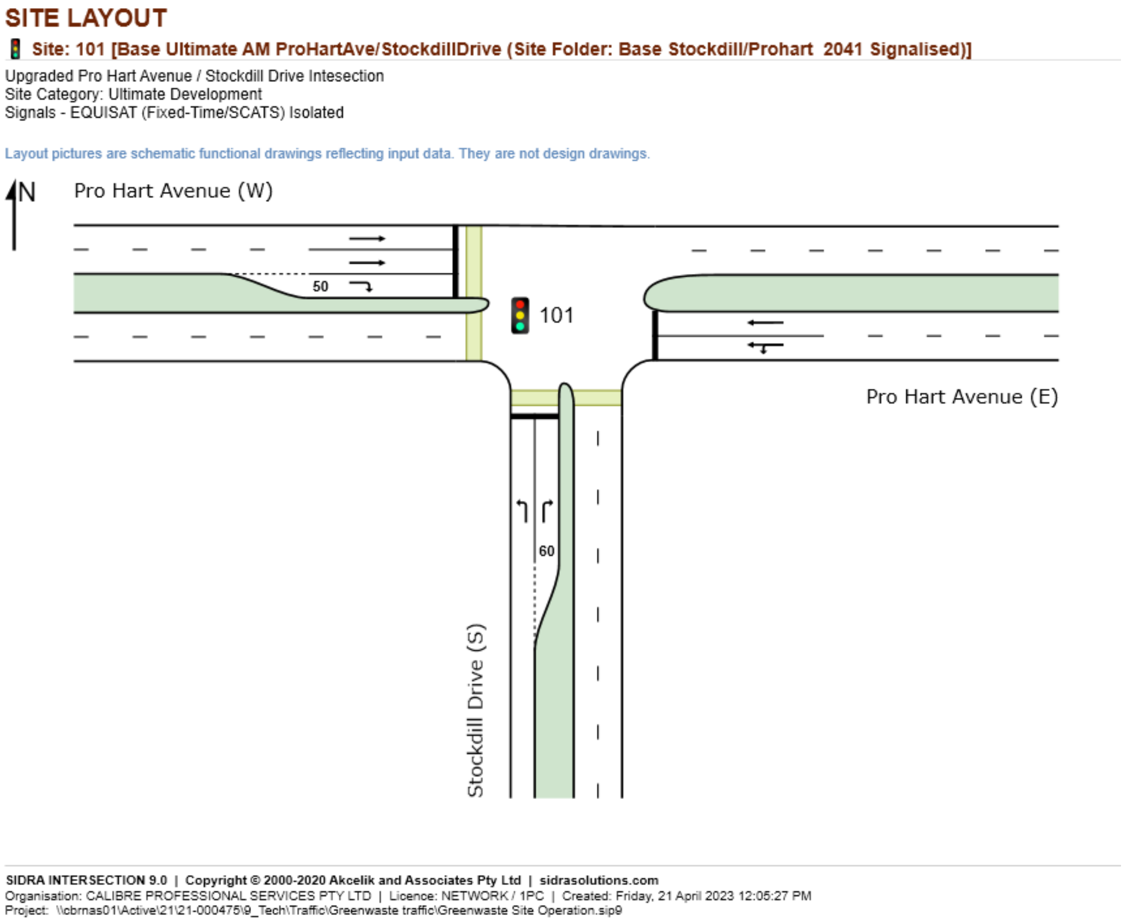


Figure 7.2 Intersection Layout – Pro Hart Avenue / Stockdill Drive Ultimate

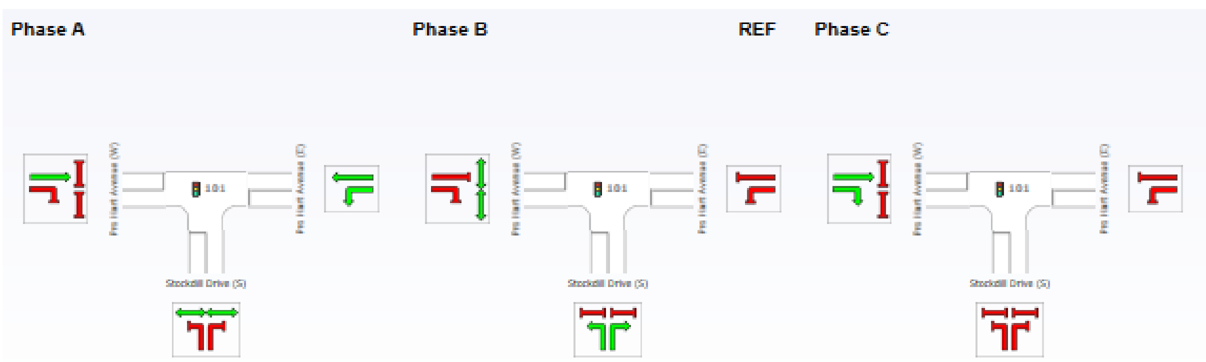


Figure 7.3 Signalised Intersection – Pro Hart Avenue / Stockdill Drive Intersection Phasing

Both Table 7.7 and Table 7.8 summarise the key intersection performance parameters for the Pro Hart Avenue / Stockdill Drive intersection in both commuter peak hours on a typical weekday for the base and with development scenarios. For further information, the full SIDRA outputs have been provided in Appendix A.

Table 7.7 2041 BASE Intersection Performance Summary – Pro Hart Avenue / Stockdill Drive

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
East Approach: Pro Hart Avenue								
Through	0.486	13s	A	50m	0.777	13s	A	200m
Left	0.486	18s	B	50m	* 0.777	18s	B	201m
South Approach: Stockdill Drive								
Left	0.054	28s	B	2m	0.069	45s	D	3m
Right	0.636	31s	C	26m	0.755	51s	D	42m
West Approach: Pro Hart Avenue								
Right	0.044	28s	B	2m	0.233	49s	D	9m
Through	0.675	6s	A	93m	0.204	3s	A	24m
Total	**0.675**	**9.6 s**	**A**	**93.3m**	**0.777**	**13s**	**A**	**201m**

Table 7.8 2041 Green Waste Intersection Performance Summary – Pro Hart Avenue / Stockdill Drive

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
East Approach: Pro Hart Avenue								
Through	0.470	12s	A	61m	0.756	13s	A	214m
Left	0.470	18s	B	60m	0.756	18s	B	212m
South Approach: Stockdill Drive								
Left	0.053	31s	C	3m	0.067	48s	D	4m
Right	0.660	35s	C	35m	0.764	55s	D	52m
West Approach: Pro Hart Avenue								
Right	0.053	33s	C	2m	0.260	55s	D	10m
Through	0.648	7s	A	103m	0.203	3s	A	25m
Total	**0.660**	**11s**	**A**	**103m**	**0.764**	**14s**	**A**	**213m**

It can be seen that the upgraded Pro Hart Avenue / Stockdill Drive Signalised intersection operates within the acceptable parameters for both capacity and delay during AM and PM peak periods with and without Green Waste development. During the AM peak, the maximum DOS seen across the Base and the Calculated + Base modes was 0.675 from the West Approach of Pro Hart Avenue through lane. This rose in the PM peak, with a value of 0.777 recorded in the Eastern approach of Pro Hart Avenue. Maximum delays at the intersection were similar for Base and Calculated + Base during both AM and PM peaks, with delays between 30 and 60 seconds (LOS C). Queueing at the intersection for both Base and Calculated + base was seen to be acceptable during both peak periods along all legs with maximum queuing of 214m. Given this, no impact to the greater road network is expected to occur from it.

7.5 Stockdill Drive / Green Waste Access Road 2031

SITE LAYOUT

▽ Site: 101 [Greenwaste Calculated Ultimate AM Site Access Road (Site Folder: Greenwaste Stockdill/Prohart 2041 Signalised)]

CSG Access Road
Site Category: Ultimate Development
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

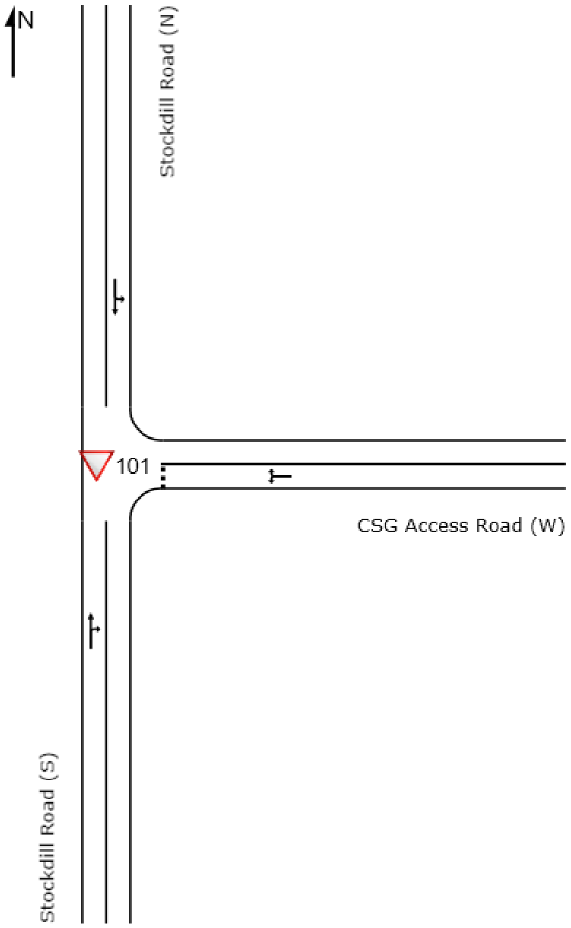


Figure 7.4 Intersection Layout – Stockdill Drive / Green Waste Access Road 2031

Both Table 7.9 and Table 7.10 summarise the key intersection performance parameters for the Stockdill Drive / Green Waste Access Road intersection in both commuter peak hours on a typical weekday for the Interim and ultimate scenario. For further information, the full SIDRA outputs have been provided in Appendix A

As there is no Stockdill Drive / Green Waste Access Road present in the base conditions only the Base + Green Waste Calculated scenarios have been modelled.

Table 7.9 2031 Green Waste Intersection Performance Summary – Stockdill Drive / Green Waste Access Road

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
South Approach: Stockdill Drive								
Through	0.034	0	A	0	0.016	0s	A	1m
Right	0.034	5.8	A	0	0.016	6s	A	1m
East Approach: Green Waste Access Road								
Left	0.019	5.6	A	1	0.015	6s	A	1m
Right	0.019	5.9	A	1	0.015	6s	A	1m
North Approach: Stockdill Road								
Left	0.058	5.6	A	0	0.022	6s	A	0m
Through	0.058	0	A	0	0.022	0s	A	0m
Total	0.058	3.3s	A	1m	0.028	2s	A	1m

Table 7.10 2041 Green Waste Intersection Performance Summary – Stockdill Drive / Green Waste Access Road

Movement	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
South Approach: Stockdill Drive								
Through	0.079	0	A	0	0.073	0s	A	1m
Right	0.079	6	A	0	0.073	6s	A	1m
East Approach: Green Waste Access Road								
Left	0.024	6	A	1	0.021	6s	A	1m
Right	0.024	6	A	1	0.021	6s	A	1m
North Approach: Stockdill Road								
Left	0.074	6	A	0	0.078	6s	A	0m
Through	0.074	0	A	0	0.078	0s	A	0m
Total	0.079	2	A	1m	0.078	2s	A	1m

It can be seen that the proposed Green Waste Access Road and Stockdill Drive operates within the acceptable parameters for both capacity and delay during AM and PM peak periods. All the values across the board are very low and each leg of the intersection passes with a LOS A. Given this, the access locations and treatment is considered appropriate.

8 Conclusion

In April 2023, Calibre was engaged by Riverview to undertake a Transport Impact Assessment (TIA) for the proposed development of a Green Waste Dropoff Facility at Belconnen Block 1582. The traffic assessment of this site was requested to help support the submission of the Development Application (DA) for the proposed works. This report has assessed the Pro Hart Avenue / Stockdill Drive intersection as well as the proposed site access point, the Stockdill Drive / Green Waste Access Road intersection.

The proposed location for the Green Waste drop-off facility site is located within Belconnen Block 1582, approximately 12 km Northwest of the Canberra CBD and 6KM West of Belconnen Town Centre. The estate is bounded by Stockdill Drive and Pro Hart Avenue. The proposed Green Waste site will have access via Stockdill Drive, requiring the construction of a typical rural driveway and a Gravel road. This will be a give-way controlled intersection. Upon completion of the Green Waste site the added traffic will impact the Pro Hart Avenue / Stockdill Drive Intersection and the Stockdill Drive / Green Waste Access Road intersection.

The existing active travel network within the area provides access to the Ginninderry area, with a separate cyclist and walking path on either side of Pro Hart Avenue. One bus route, 903, runs along Pro Hart Avenue connecting the Kippax interchange to the Strathnairn loop. The Green Waste development will have minimal impact on the active travel network.

Parking for a Green Waste drop-off facility is subject to individual assessment. 7 car parking spaces have been provided for in the plans to accommodate the code requirement for 1 space per peak shift employee. The nature of the drop-off will see all non-employee vehicles temporarily stand in designated drop-off locations before continuing from the site. There is not expected to be a public/visitor parking and the allowed for spaces are considered adequate.

The Road Hierarchy for Pro Hart Avenue and Stockdill Drive is expected to change. Pro Hart Avenue will change from a major collector to an arterial road in the base 2031 scenario and will stay an arterial road for the future development scenarios. Stockdill Drive will change from a rural road to an access road b in the 2031 base scenario and is expected to become a major collector in the ultimate 2041 + Green Waste scenario. Stockdill Drive was updated recently to function as a collector road and as such the increase in volumes along the road is considered to be acceptable.

Traffic impact assessment for the Pro Hart Avenue / Stockdill Drive and Stockdill Drive / Green Waste Access Road have been undertaken to assess the performance of the road network. All assessment has been completed for both the AM and PM commuter peak hours for a typical weekday. An Interim 2031 and an Ultimate 2041 model have been created to capture the expected traffic values for the current traffic system and the expected system at the completion of the Ginninderry development estimated for 2041.

The SIDRA modelling for both 2031 Interim (existing layout) and 2041 Ultimate (duplicated Pro Hart Avenue layout) scenarios showed both intersections operated within acceptable parameters with the Green Waste development and there is little adverse impact expected on the surrounding road network as a result of the proposed development. Given this, the intersections of Pro Hart Avenue / Stockdill Drive and Stockdill Drive / Green Waste Access Road are expected to perform adequately with their current and future layouts.

The current unsignalised configuration of the Pro Hart Ave / Stockdill Drive intersection is suitable for the fully occupied Strathnairn and Macnamara

GREEN WASTE DROP-OFF FACILITY–TRAFFIC IMPACT ASSESSMENT

Appendix A SIDRA Analysis

RIVERVIEW PROJECTS

USER REPORT FOR SITE

All Movement Classes

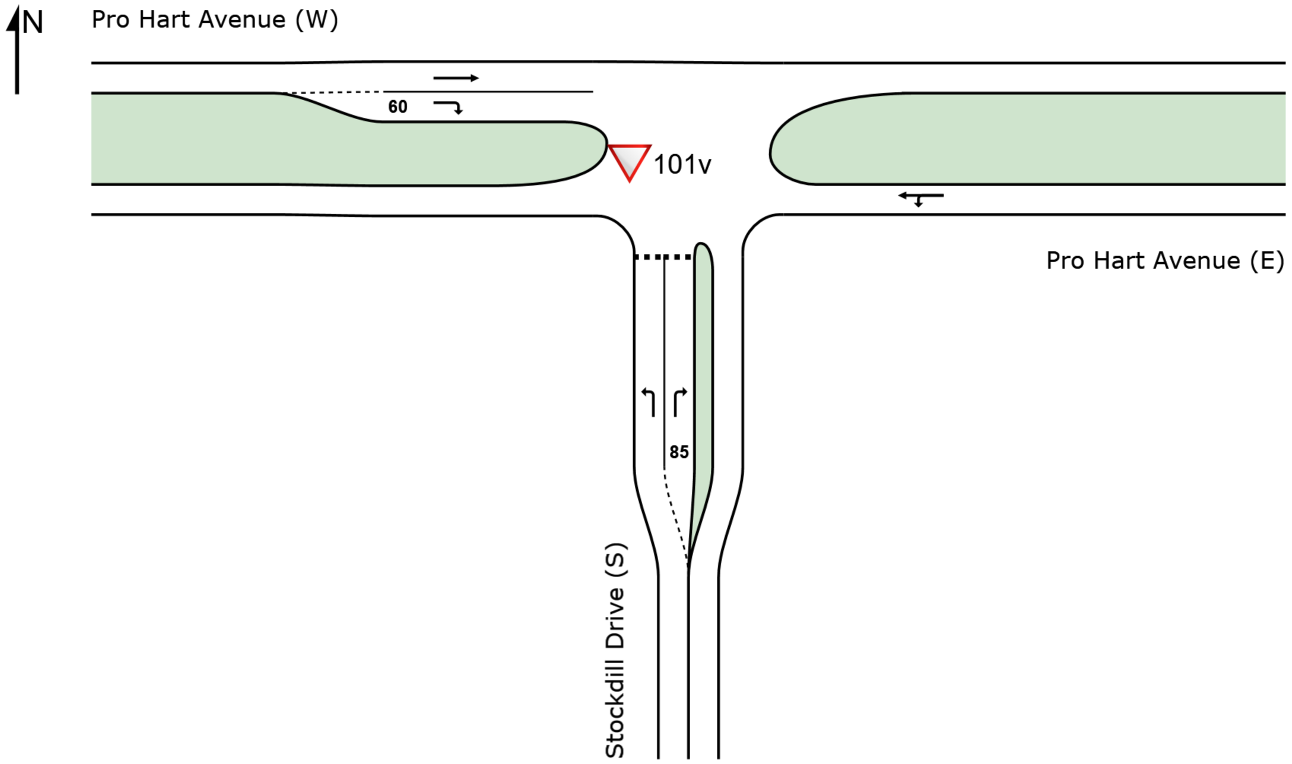
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101v [Base Interim AM Pro Hart Avenue / Stockdill Drive (Site Folder: Base Stockdill/ Prohart 2031)]

Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	4	5.0	4	5.0	0.003	6.1	LOS A	0.0	0.1	0.25	0.53	0.25	50.0
3	R2	35	5.0	37	5.0	0.158	20.6	LOS B	0.5	3.8	0.83	0.93	0.83	38.9
Approach		39	5.0	41	5.0	0.158	19.1	LOS B	0.5	3.8	0.77	0.89	0.77	39.8
East: Pro Hart Avenue (E)														
4	L2	9	5.0	9	5.0	0.091	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.0
5	T1	154	5.0	162	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.3
Approach		163	5.0	172	5.0	0.091	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.1
West: Pro Hart Avenue (W)														
11	T1	799	5.0	841	5.0	0.445	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
12	R2	1	5.0	1	5.0	0.001	6.1	LOS A	0.0	0.0	0.28	0.51	0.28	50.1
Approach		800	5.0	842	5.0	0.445	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		1002	5.0	1055	5.0	0.445	0.9	NA	0.5	3.8	0.03	0.04	0.03	57.8

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

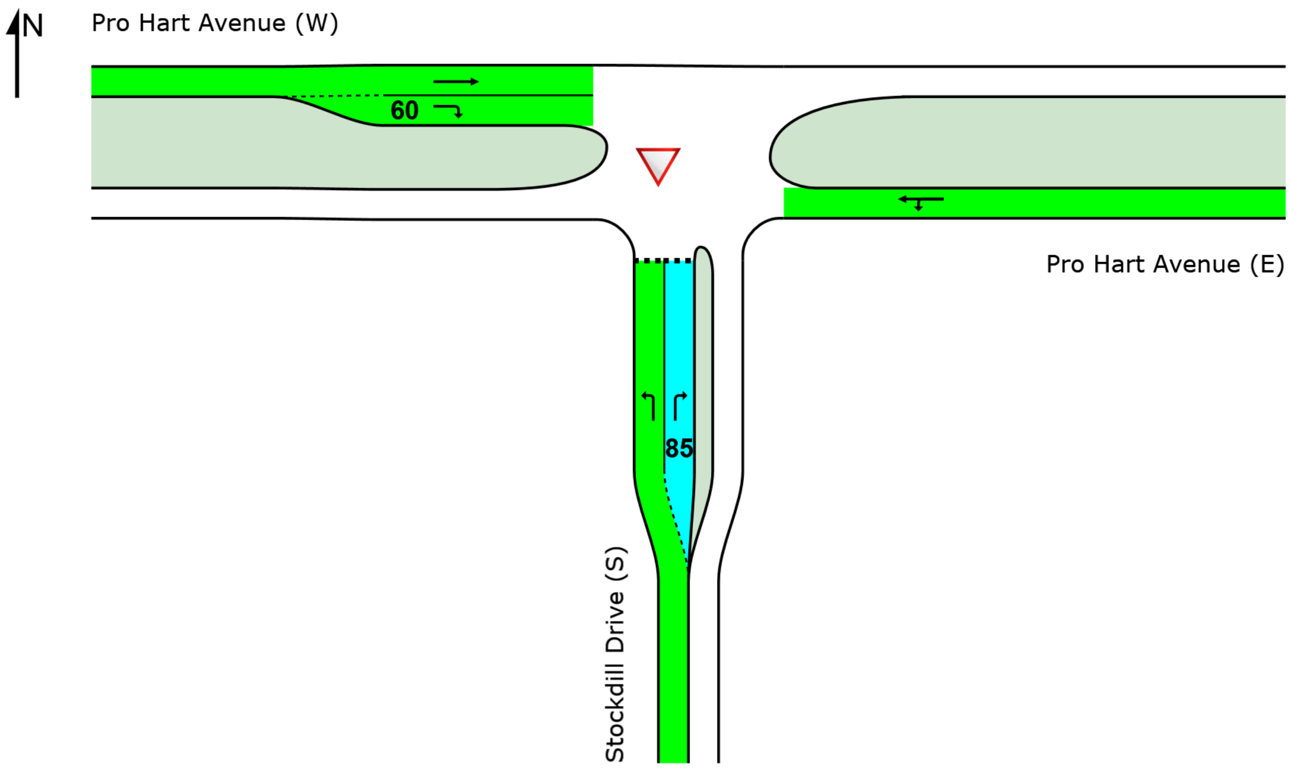
Lane Use and Performance

	DEMAND FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Stockdill Drive (S)													
Lane 1	4	5.0	1379	0.003	100	6.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Lane 2	37	5.0	233	0.158	100	20.6	LOS B	0.5	3.8	Short	85	0.0	NA
Approach	41	5.0		0.158		19.1	LOS B	0.5	3.8				
East: Pro Hart Avenue (E)													
Lane 1	172	5.0	1883	0.091	100	0.3	LOS A	0.0	0.0	Full	215	0.0	0.0
Approach	172	5.0		0.091		0.3	NA	0.0	0.0				
West: Pro Hart Avenue (W)													
Lane 1	841	5.0	1889	0.445	100	0.1	LOS A	0.0	0.0	Full	230	0.0	0.0
Lane 2	1	5.0	1496	0.001	100	6.1	LOS A	0.0	0.0	Short	60	0.0	NA
Approach	842	5.0		0.445		0.1	NA	0.0	0.0				
Intersection	1055	5.0		0.445		0.9	NA	0.5	3.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	B	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

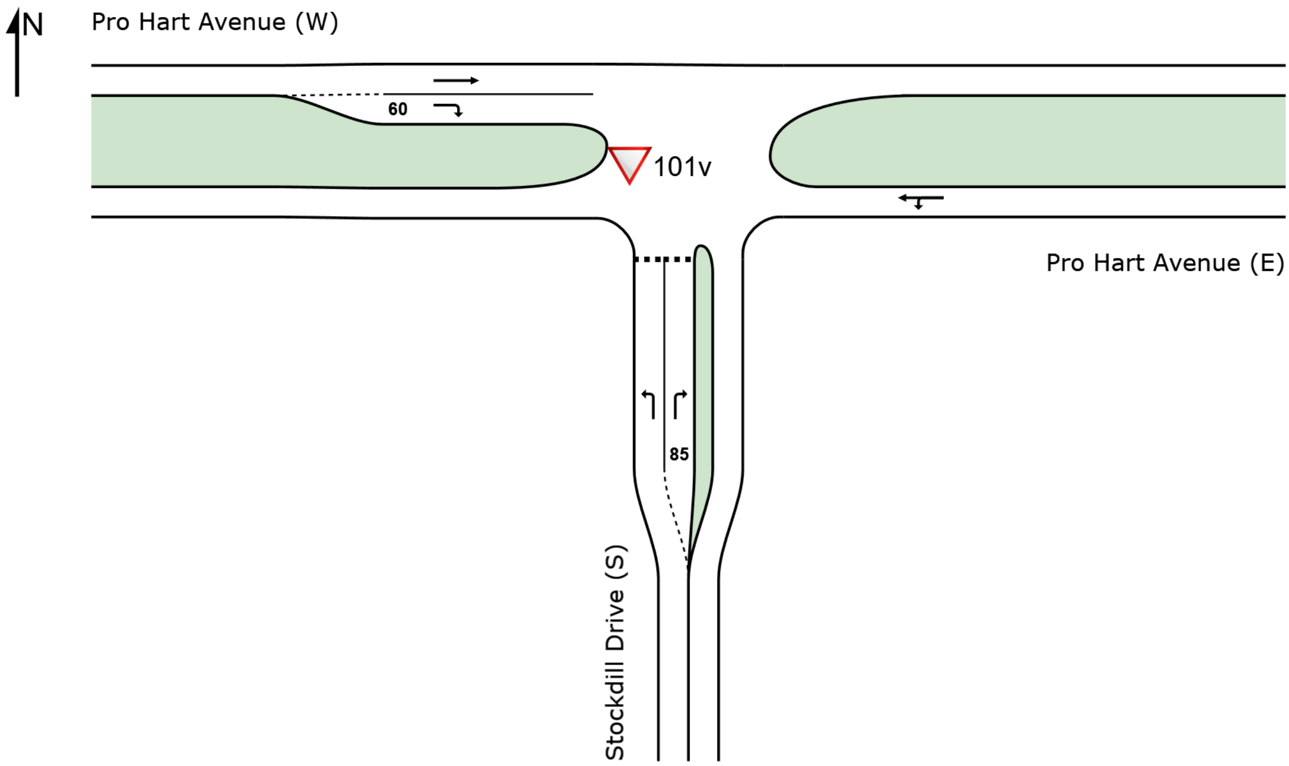
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101v [Base Interim PM Pro Hart Avenue / Stockdill Drive (Site Folder: Base Stockdill/ Prohart 2031)]

Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	5	5.0	5	5.0	0.010	10.6	LOS A	0.0	0.2	0.66	0.75	0.66	46.5
3	R2	9	5.0	9	5.0	0.042	20.4	LOS B	0.1	1.0	0.82	0.93	0.82	39.0
Approach		14	5.0	15	5.0	0.042	16.9	LOS B	0.1	1.0	0.76	0.86	0.76	41.5
East: Pro Hart Avenue (E)														
4	L2	35	5.0	37	5.0	0.466	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	56.8
5	T1	799	5.0	841	5.0	0.466	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.1
Approach		834	5.0	878	5.0	0.466	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.0
West: Pro Hart Avenue (W)														
11	T1	154	5.0	162	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	5	5.0	5	5.0	0.010	11.1	LOS A	0.0	0.3	0.69	0.75	0.69	46.2
Approach		159	5.0	167	5.0	0.086	0.4	NA	0.0	0.3	0.02	0.02	0.02	59.1
All Vehicles		1007	5.0	1060	5.0	0.466	0.6	NA	0.1	1.0	0.01	0.04	0.01	58.5

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

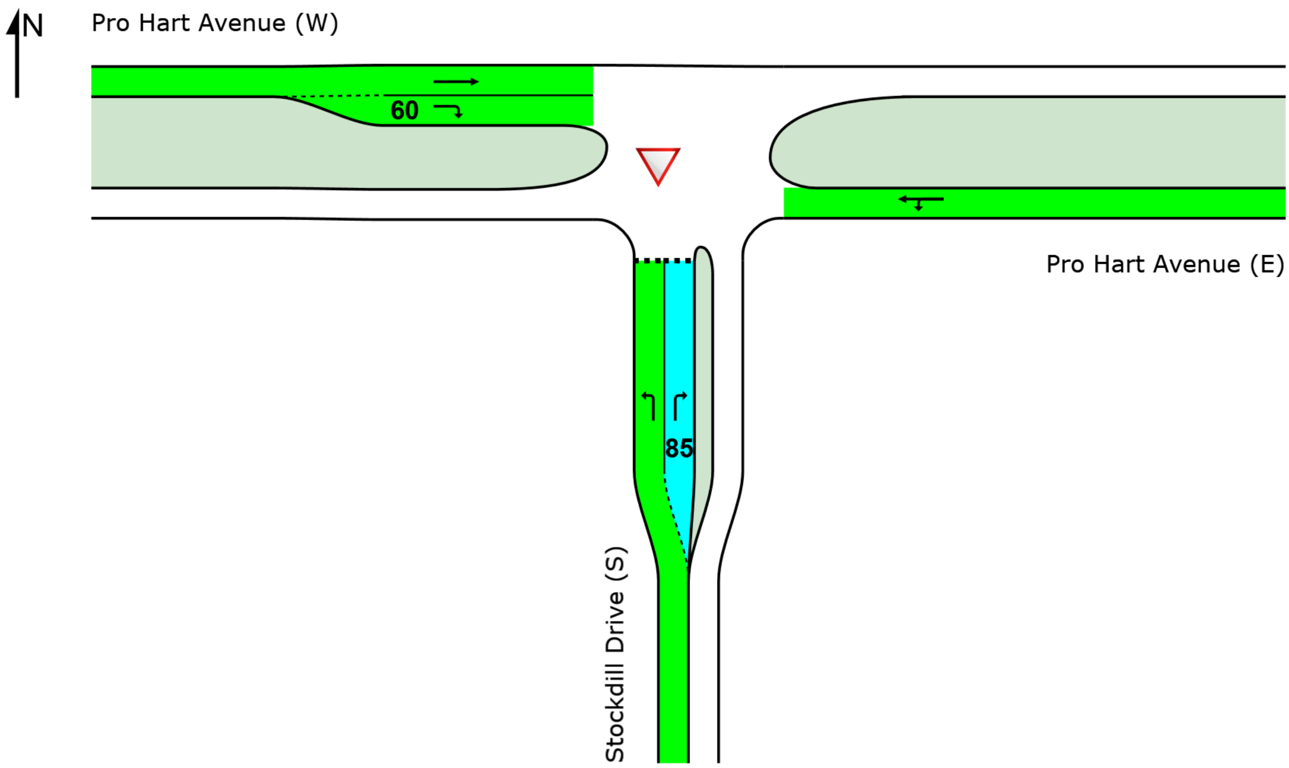
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Drive (S)													
Lane 1	5	5.0	553	0.010	100	10.6	LOS A	0.0	0.2	Full	500	0.0	0.0
Lane 2	9	5.0	224	0.042	100	20.4	LOS B	0.1	1.0	Short	85	0.0	NA
Approach	15	5.0		0.042		16.9	LOS B	0.1	1.0				
East: Pro Hart Avenue (E)													
Lane 1	878	5.0	1884	0.466	100	0.3	LOS A	0.0	0.0	Full	215	0.0	0.0
Approach	878	5.0		0.466		0.3	NA	0.0	0.0				
West: Pro Hart Avenue (W)													
Lane 1	162	5.0	1889	0.086	100	0.0	LOS A	0.0	0.0	Full	230	0.0	0.0
Lane 2	5	5.0	551	0.010	100	11.1	LOS A	0.0	0.3	Short	60	0.0	NA
Approach	167	5.0		0.086		0.4	NA	0.0	0.3				
Intersection	1060	5.0		0.466		0.6	NA	0.1	1.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	B	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Organisation: CALIBRE PROFESSIONAL SERVICES PTY LTD | Licence: NETWORK / 1PC | Created: Friday, 21 April 2023 5:04:01 PM
Project: \\cbrnas01\Active\21\21-000475\9_Tech\Traffic\Greenwaste traffic\Greenwaste Site Operation.sip9

USER REPORT FOR SITE

All Movement Classes

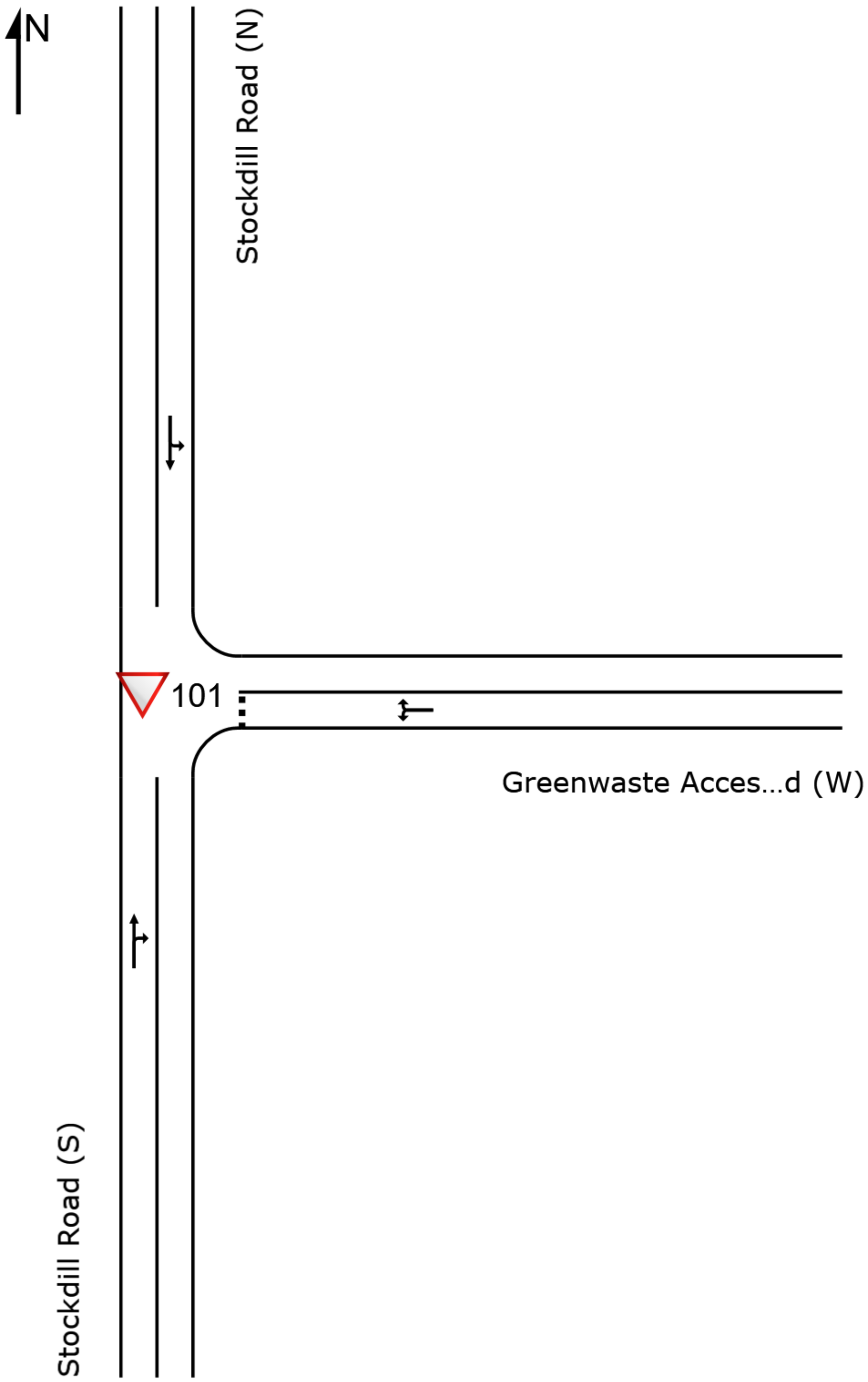
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101 [Greenwaste Calculated Interim AM Greenwaste Site Access Road (Site Folder: Greenwaste Stockdill/Prohart 2031)]

Greenwaste Access Road Intersection
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Stockdill Road (N)
101
Greenwaste Acces...d (W)
Stockdill Road (S)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Road (S)														
2	T1	60	5.0	63	5.0	0.034	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.9
3	R2	1	5.0	1	5.0	0.034	5.8	LOS A	0.0	0.1	0.01	0.01	0.01	57.4
Approach		61	5.0	64	5.0	0.034	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.8
East: Greenwaste Access Road (W)														
4	L2	1	5.0	1	5.0	0.019	5.6	LOS A	0.1	0.5	0.16	0.57	0.16	53.0
6	R2	20	5.0	21	5.0	0.019	5.9	LOS A	0.1	0.5	0.16	0.57	0.16	52.5
Approach		21	5.0	22	5.0	0.019	5.9	LOS A	0.1	0.5	0.16	0.57	0.16	52.5
North: Stockdill Road (N)														
7	L2	84	5.0	88	5.0	0.058	5.6	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
8	T1	15	5.0	16	5.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	55.7
Approach		99	5.0	104	5.0	0.058	4.8	NA	0.0	0.0	0.00	0.49	0.00	54.3
All Vehicles		181	5.0	191	5.0	0.058	3.3	NA	0.1	0.5	0.02	0.34	0.02	55.8

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

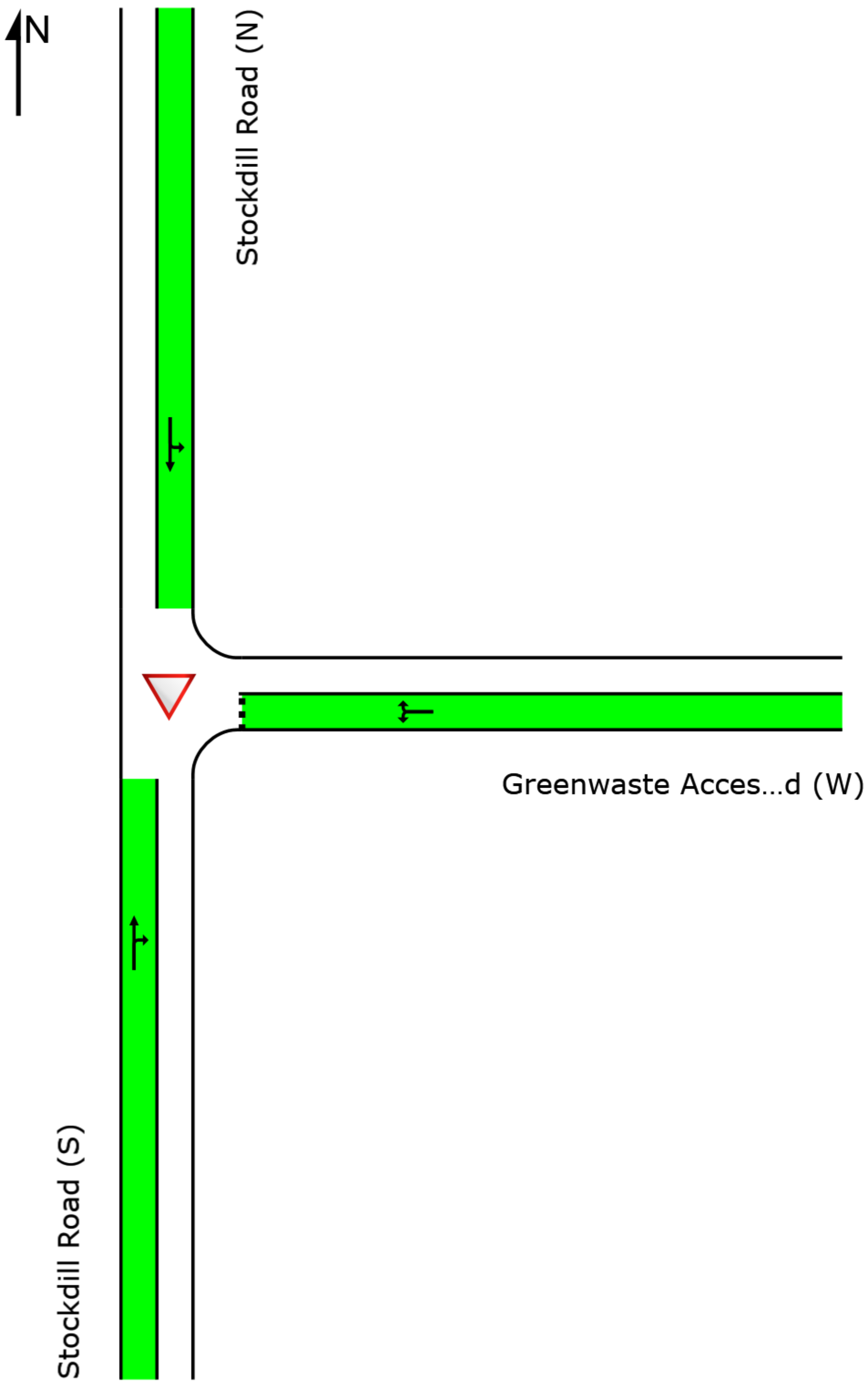
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Road (S)													
Lane 1	64	5.0	1881	0.034	100	0.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	64	5.0		0.034		0.1	NA	0.0	0.1				
East: Greenwaste Access Road (W)													
Lane 1	22	5.0	1140	0.019	100	5.9	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	22	5.0		0.019		5.9	LOS A	0.1	0.5				
North: Stockdill Road (N)													
Lane 1	104	5.0	1807	0.058	100	4.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	104	5.0		0.058		4.8	NA	0.0	0.0				
Intersection	191	5.0		0.058		3.3	NA	0.1	0.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

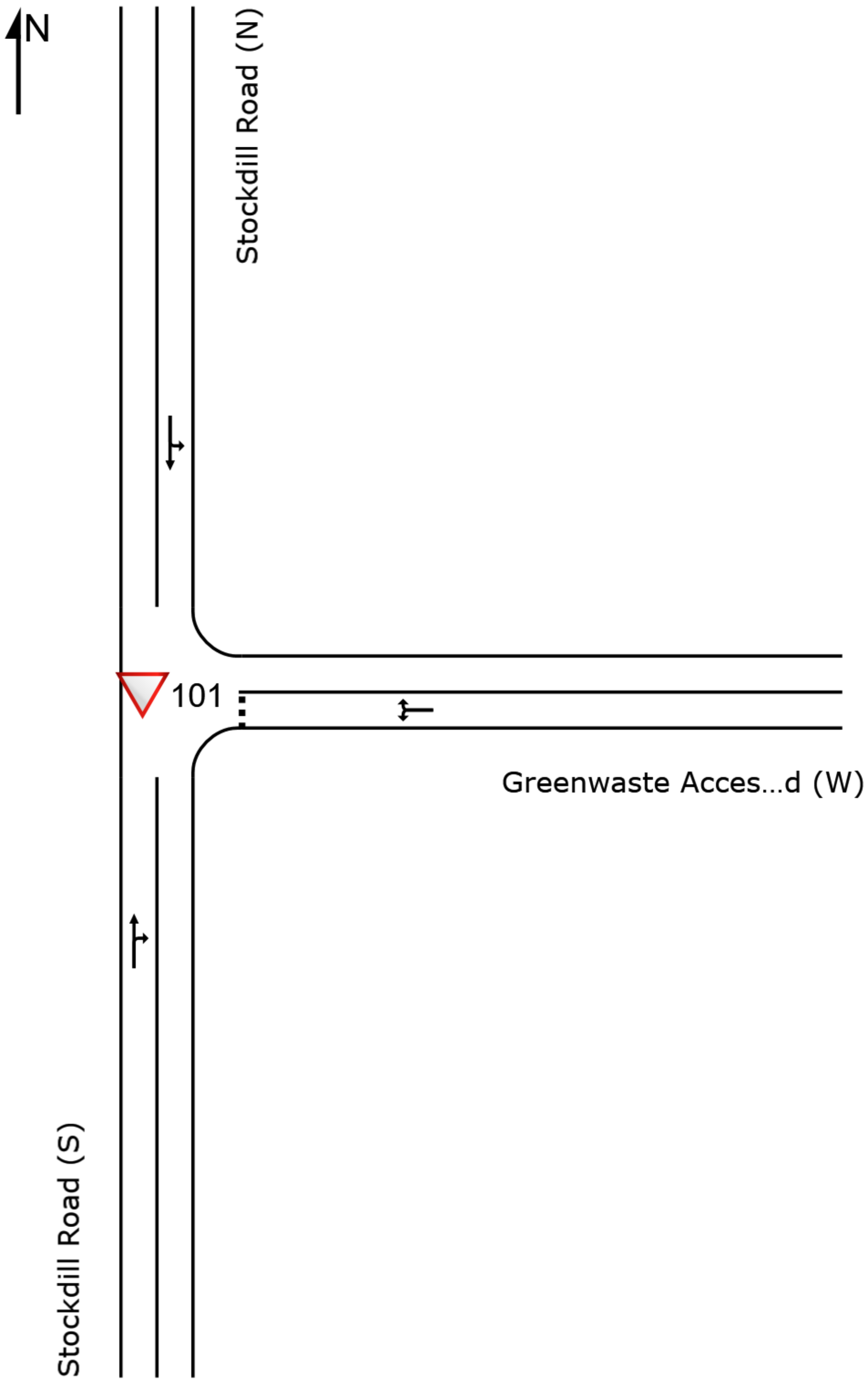
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101 [Greenwaste Calculated Interim PM Greenwaste Site Access Road (Site Folder: Greenwaste Stockdill/Prohart 2031)]

Greenwaste Access Road
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Stockdill Road (N)
101
Greenwaste Acces...d (W)
Stockdill Road (S)

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Road (S)														
2	T1	27	5.0	28	5.0	0.016	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.8
3	R2	1	5.0	1	5.0	0.016	5.6	LOS A	0.0	0.0	0.01	0.02	0.01	57.2
Approach		28	5.0	29	5.0	0.016	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.7
East: Greenwaste Access Road (W)														
4	L2	1	5.0	1	5.0	0.015	5.7	LOS A	0.0	0.3	0.13	0.56	0.13	53.1
6	R2	16	5.0	17	5.0	0.015	5.7	LOS A	0.0	0.3	0.13	0.56	0.13	52.5
Approach		17	5.0	18	5.0	0.015	5.7	LOS A	0.0	0.3	0.13	0.56	0.13	52.6
North: Stockdill Road (N)														
7	L2	4	5.0	4	5.0	0.022	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	57.6
8	T1	35	5.0	37	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.4
Approach		39	5.0	41	5.0	0.022	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.2
All Vehicles		84	5.0	88	5.0	0.022	1.5	NA	0.0	0.3	0.03	0.15	0.03	57.9

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

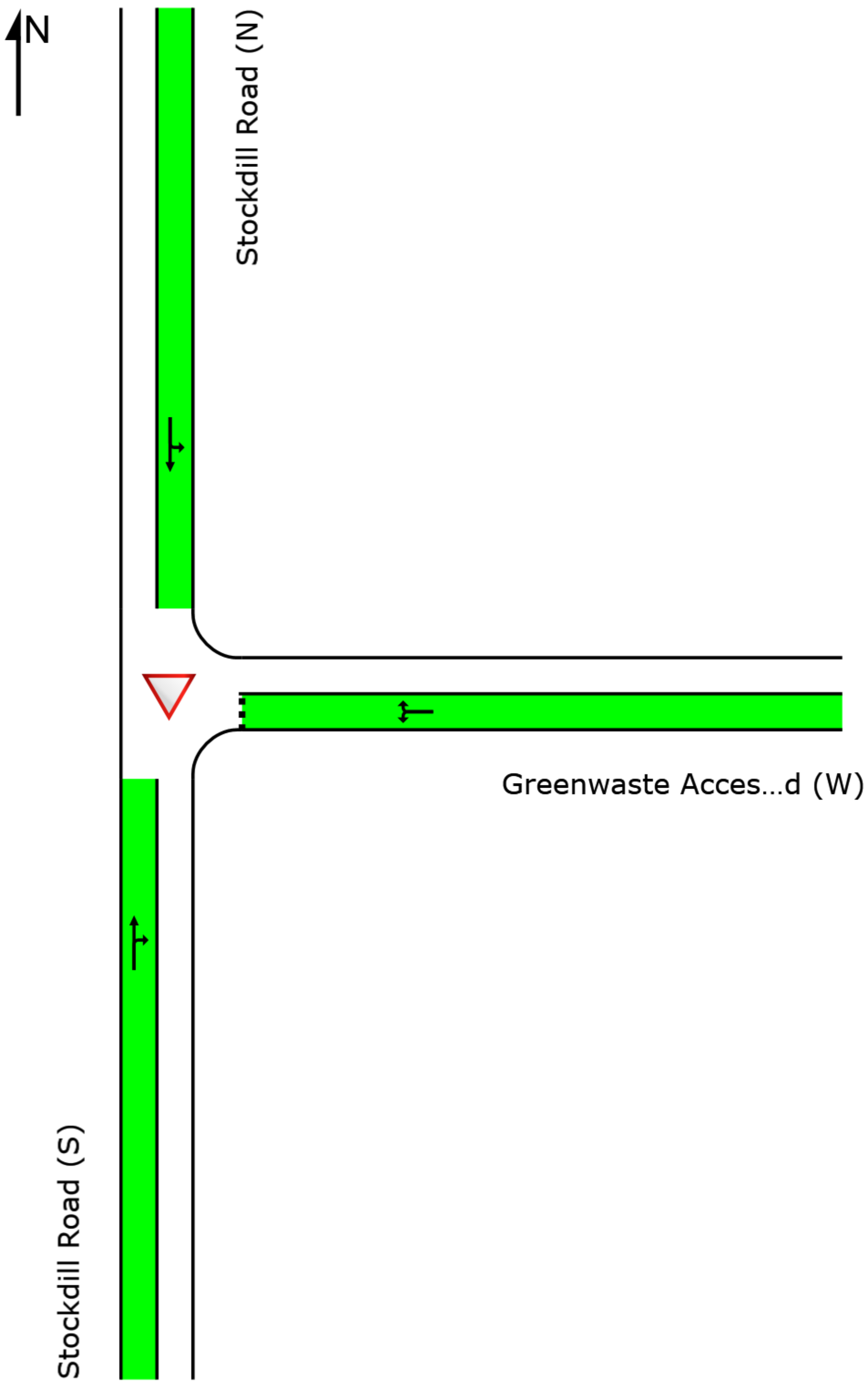
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Road (S)													
Lane 1	29	5.0	1877	0.016	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	29	5.0		0.016		0.2	NA	0.0	0.0				
East: Greenwaste Access Road (W)													
Lane 1	18	5.0	1199	0.015	100	5.7	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	18	5.0		0.015		5.7	LOS A	0.0	0.3				
North: Stockdill Road (N)													
Lane 1	41	5.0	1878	0.022	100	0.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	41	5.0		0.022		0.6	NA	0.0	0.0				
Intersection	88	5.0		0.022		1.5	NA	0.0	0.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

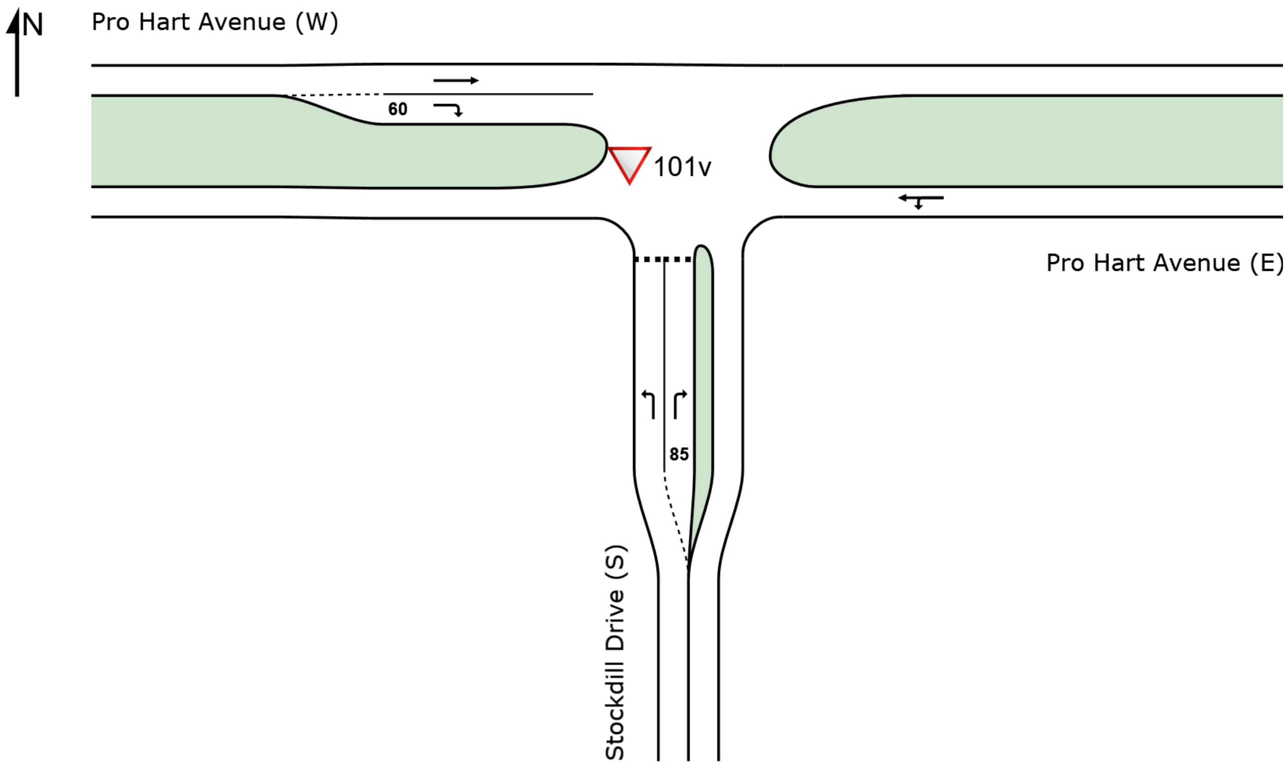
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101v [Greenwaste Calculated Interim AM Pro Hart Avenue / Stockdill Drive (Site Folder: Greenwaste Stockdill/Prohart 2031)]

Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	5	5.0	5	5.0	0.004	6.1	LOS A	0.0	0.1	0.25	0.53	0.25	50.0
3	R2	55	5.0	58	5.0	0.271	24.3	LOS B	1.0	7.0	0.86	0.97	0.97	36.9
Approach		60	5.0	63	5.0	0.271	22.8	LOS B	1.0	7.0	0.81	0.94	0.91	37.7
East: Pro Hart Avenue (E)														
4	L2	93	5.0	98	5.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.22	0.00	54.9
5	T1	154	5.0	162	5.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	55.7
Approach		247	5.0	260	5.0	0.140	2.1	NA	0.0	0.0	0.00	0.22	0.00	55.3
West: Pro Hart Avenue (W)														
11	T1	799	5.0	841	5.0	0.445	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
12	R2	5	5.0	5	5.0	0.004	6.4	LOS A	0.0	0.1	0.35	0.54	0.35	49.8
Approach		804	5.0	846	5.0	0.445	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.5
All Vehicles		1111	5.0	1169	5.0	0.445	1.8	NA	1.0	7.0	0.05	0.10	0.05	55.9

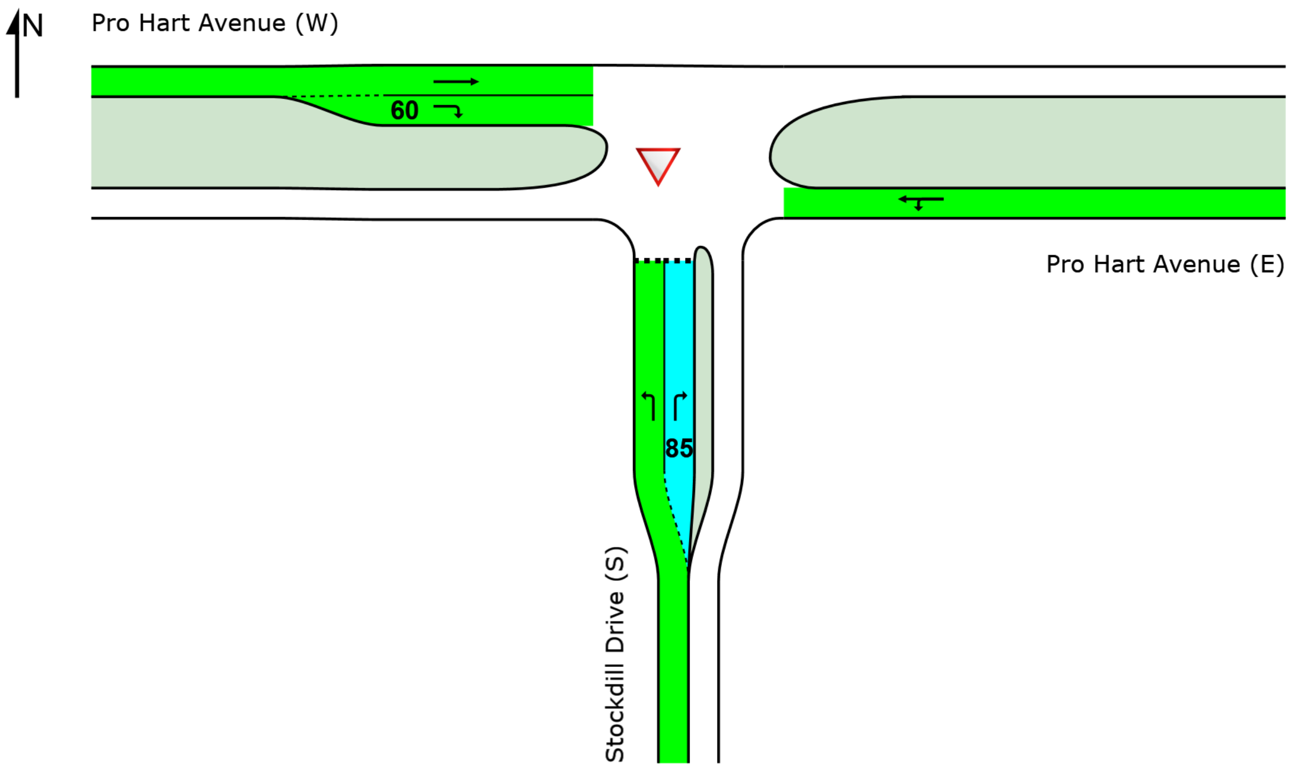
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS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

Lane Use and Performance													
	DEMAND FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Stockdill Drive (S)													
Lane 1	5	5.0	1379	0.004	100	6.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Lane 2	58	5.0	214	0.271	100	24.3	LOS B	1.0	7.0	Short	85	0.0	NA
Approach	63	5.0		0.271		22.8	LOS B	1.0	7.0				
East: Pro Hart Avenue (E)													
Lane 1	260	5.0	1852	0.140	100	2.1	LOS A	0.0	0.0	Full	215	0.0	0.0
Approach	260	5.0		0.140		2.1	NA	0.0	0.0				
West: Pro Hart Avenue (W)													
Lane 1	841	5.0	1889	0.445	100	0.1	LOS A	0.0	0.0	Full	230	0.0	0.0
Lane 2	5	5.0	1365	0.004	100	6.4	LOS A	0.0	0.1	Short	60	0.0	NA
Approach	846	5.0		0.445		0.1	NA	0.0	0.1				
Intersection	1169	5.0		0.445		1.8	NA	1.0	7.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	B	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

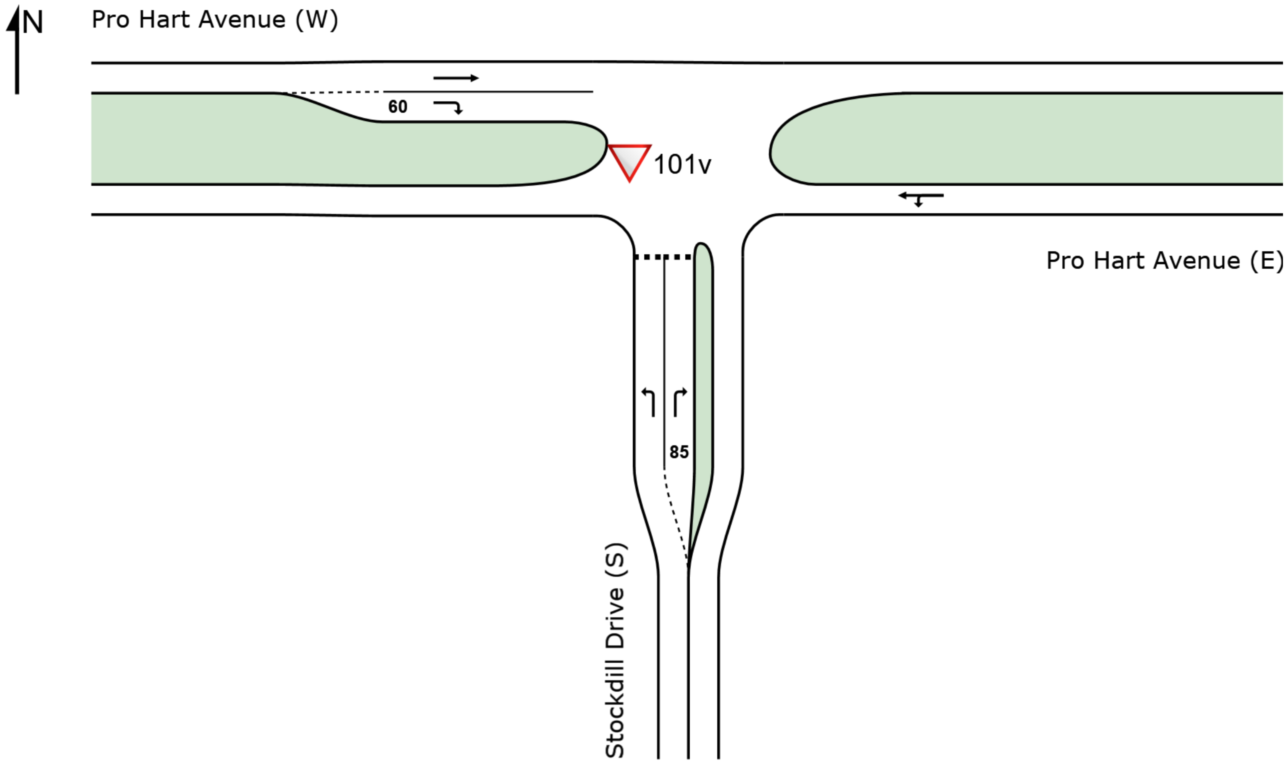
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101v [Greenwaste Calculated Interim PM Pro Hart Avenue / Stockdill Drive (Site Folder: Greenwaste Stockdill/Prohart 2031)]

Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Interim Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	2	5.0	2	5.0	0.004	10.5	LOS A	0.0	0.1	0.65	0.70	0.65	46.6
3	R2	25	5.0	26	5.0	0.118	21.1	LOS B	0.4	2.8	0.83	0.93	0.83	38.6
Approach		27	5.0	28	5.0	0.118	20.3	LOS B	0.4	2.8	0.82	0.91	0.82	39.1
East: Pro Hart Avenue (E)														
4	L2	39	5.0	41	5.0	0.468	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
5	T1	799	5.0	841	5.0	0.468	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.1
Approach		838	5.0	882	5.0	0.468	0.3	NA	0.0	0.0	0.00	0.03	0.00	58.9
West: Pro Hart Avenue (W)														
11	T1	154	5.0	162	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
12	R2	5	5.0	5	5.0	0.010	11.1	LOS A	0.0	0.3	0.69	0.76	0.69	46.2
Approach		159	5.0	167	5.0	0.086	0.4	NA	0.0	0.3	0.02	0.02	0.02	59.1
All Vehicles		1024	5.0	1078	5.0	0.468	0.9	NA	0.4	2.8	0.02	0.05	0.02	57.8

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

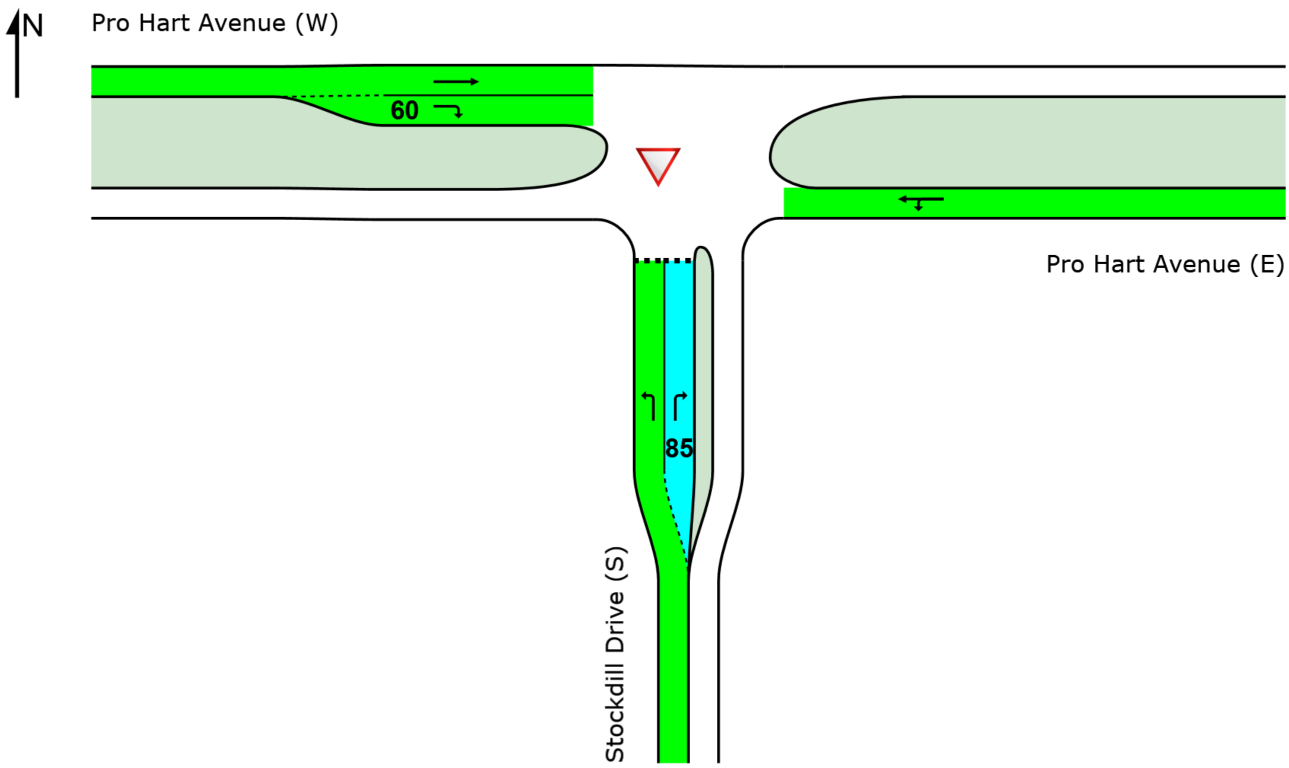
Lane Use and Performance

	DEMAND FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Stockdill Drive (S)													
Lane 1	2	5.0	553	0.004	100	10.5	LOS A	0.0	0.1	Full	500	0.0	0.0
Lane 2	26	5.0	223	0.118	100	21.1	LOS B	0.4	2.8	Short	85	0.0	NA
Approach	28	5.0		0.118		20.3	LOS B	0.4	2.8				
East: Pro Hart Avenue (E)													
Lane 1	882	5.0	1884	0.468	100	0.3	LOS A	0.0	0.0	Full	215	0.0	0.0
Approach	882	5.0		0.468		0.3	NA	0.0	0.0				
West: Pro Hart Avenue (W)													
Lane 1	162	5.0	1889	0.086	100	0.0	LOS A	0.0	0.0	Full	230	0.0	0.0
Lane 2	5	5.0	546	0.010	100	11.1	LOS A	0.0	0.3	Short	60	0.0	NA
Approach	167	5.0		0.086		0.4	NA	0.0	0.3				
Intersection	1078	5.0		0.468		0.9	NA	0.4	2.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	B	NA	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

Project: Greenwaste Site Operation **Template: Site User Report**

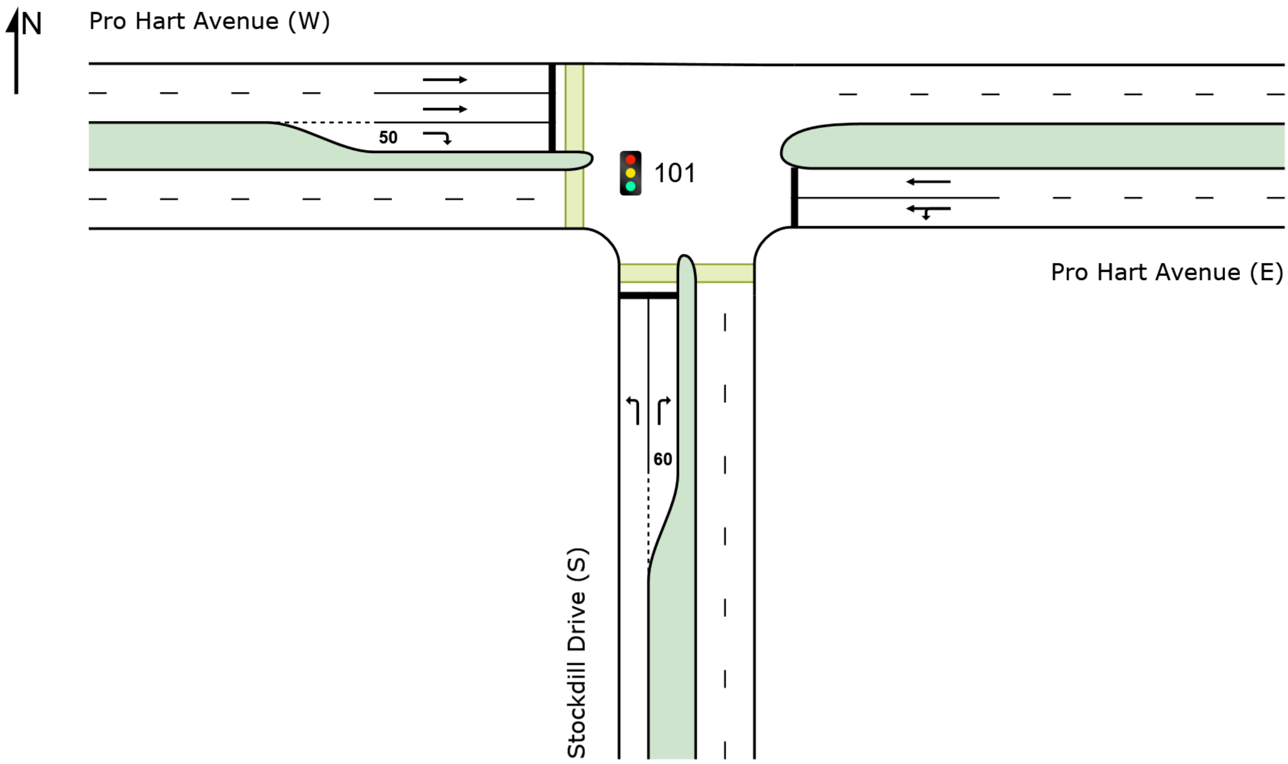
Site: 101 [Base Ultimate AM ProHartAve/StockdillDrive (Site Folder: Base Stockdill/Prohart 2041 Signalised)]

Upgraded Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Ultimate Development
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	11	5.0	12	5.0	0.054	27.8	LOS B	0.3	1.9	0.91	0.67	0.91	40.3
3	R2	130	5.0	137	5.0	* 0.636	30.9	LOS C	3.6	25.9	1.00	0.84	1.13	39.0
Approach		141	5.0	148	5.0	0.636	30.7	LOS C	3.6	25.9	0.99	0.83	1.12	39.1
East: Pro Hart Avenue (E)														
4	L2	35	5.0	37	5.0	0.486	17.9	LOS B	6.8	49.8	0.79	0.69	0.79	48.2
5	T1	661	5.0	696	5.0	0.486	12.3	LOS A	6.9	50.0	0.79	0.68	0.79	49.7
Approach		696	5.0	733	5.0	0.486	12.6	LOS A	6.9	50.0	0.79	0.68	0.79	49.6
West: Pro Hart Avenue (W)														
11	T1	1545	5.0	1626	5.0	* 0.675	6.2	LOS A	12.8	93.3	0.68	0.62	0.68	54.5
12	R2	9	5.0	9	5.0	0.044	27.7	LOS B	0.2	1.6	0.91	0.66	0.91	40.4
Approach		1554	5.0	1636	5.0	0.675	6.3	LOS A	12.8	93.3	0.68	0.62	0.68	54.4
All Vehicles		2391	5.0	2517	5.0	0.675	9.6	LOS A	12.8	93.3	0.73	0.65	0.74	51.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Lane Use and Performance

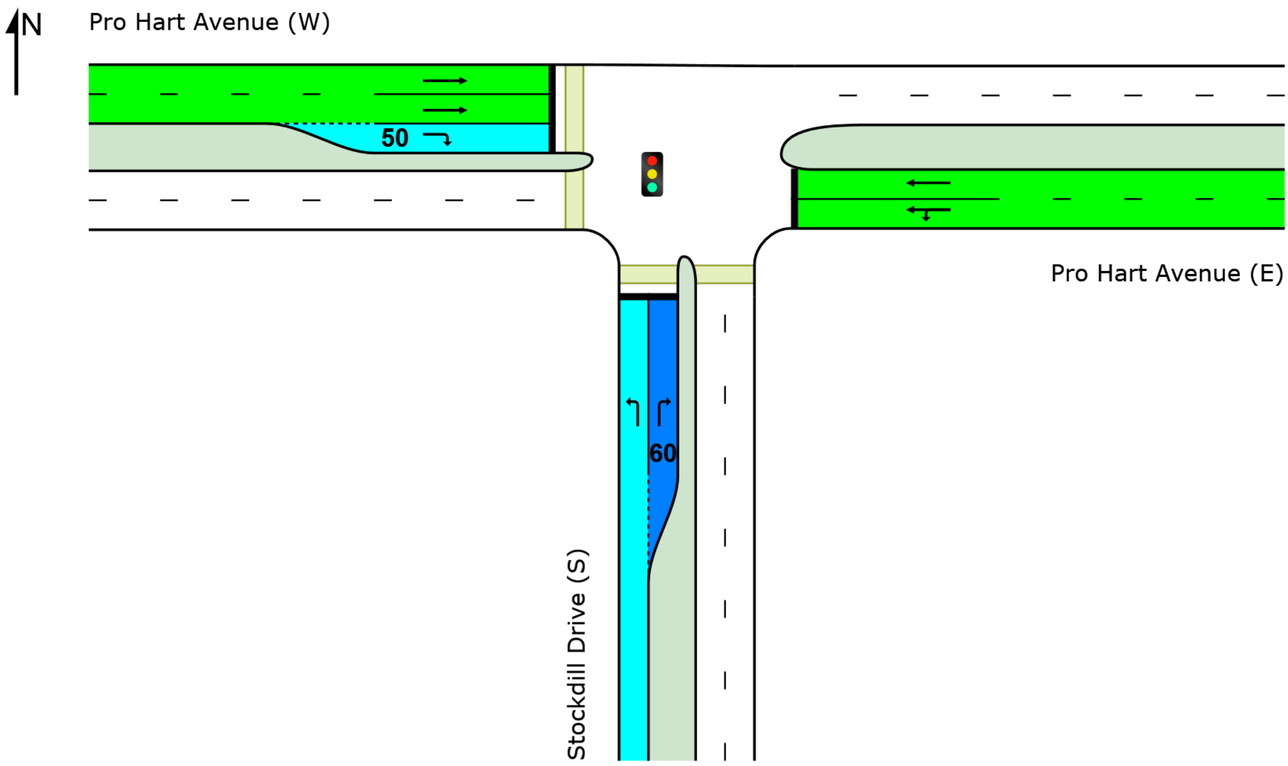
	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Drive (S)													
Lane 1	12	5.0	215	0.054	100	27.8	LOS B	0.3	1.9	Full	500	0.0	0.0
Lane 2	137	5.0	215	0.636	100	30.9	LOS C	3.6	25.9	Short	60	0.0	NA
Approach	148	5.0		0.636		30.7	LOS C	3.6	25.9				
East: Pro Hart Avenue (E)													
Lane 1	365	5.0	751	0.486	100	12.9	LOS A	6.8	49.8	Full	500	0.0	0.0
Lane 2	367	5.0	755	0.486	100	12.3	LOS A	6.9	50.0	Full	500	0.0	0.0
Approach	733	5.0		0.486		12.6	LOS A	6.9	50.0				
West: Pro Hart Avenue (W)													
Lane 1	816	5.0	1209	0.675	100	6.2	LOS A	12.8	93.3	Full	500	0.0	0.0
Lane 2	810	5.0	1200[1]	0.675	100	6.2	LOS A	12.6	92.1	Full	500	0.0	0.0
Lane 3	9	5.0	215	0.044	100	27.7	LOS B	0.2	1.6	Short	50	0.0	NA
Approach	1636	5.0		0.675		6.3	LOS A	12.8	93.3				
Intersection	2517	5.0		0.675		9.6	LOS A	12.8	93.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	C	A	A	A

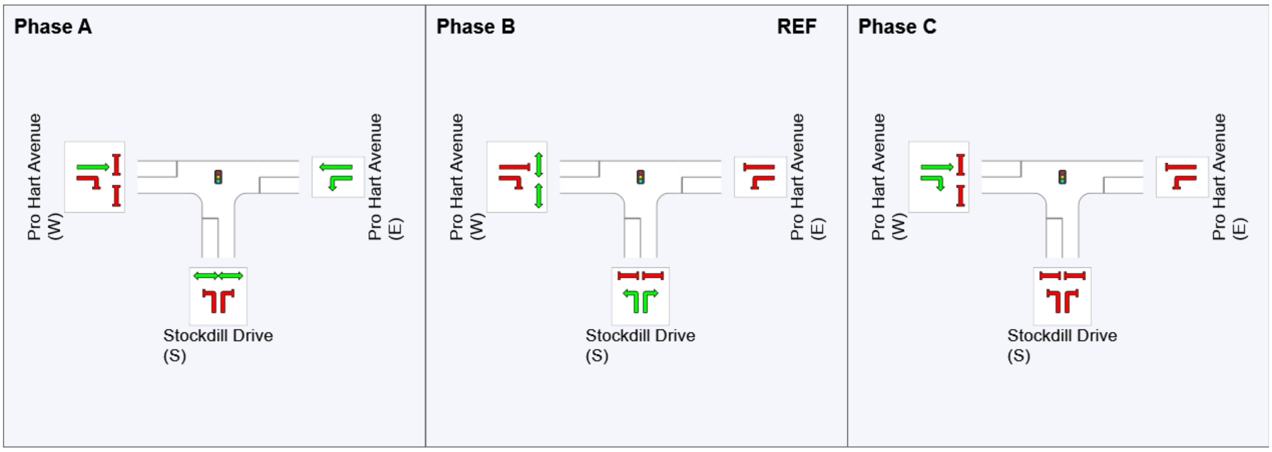


Colour code based on Level of Service

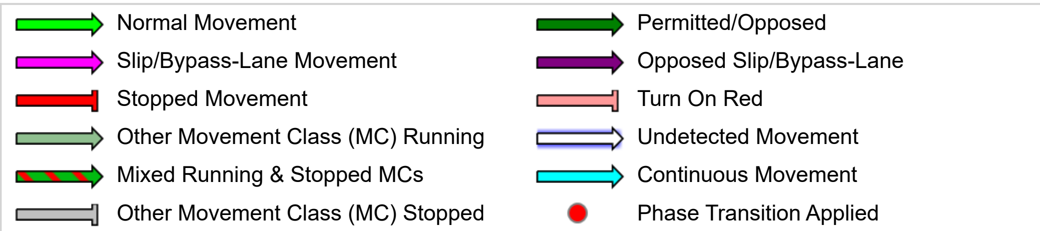
LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	24	0	12
Green Time (sec)	20	6	6
Phase Time (sec)	26	12	12
Phase Split	52%	24%	24%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

USER REPORT FOR SITE

All Movement Classes

Project: Greenwaste Site Operation

Template: Site User Report

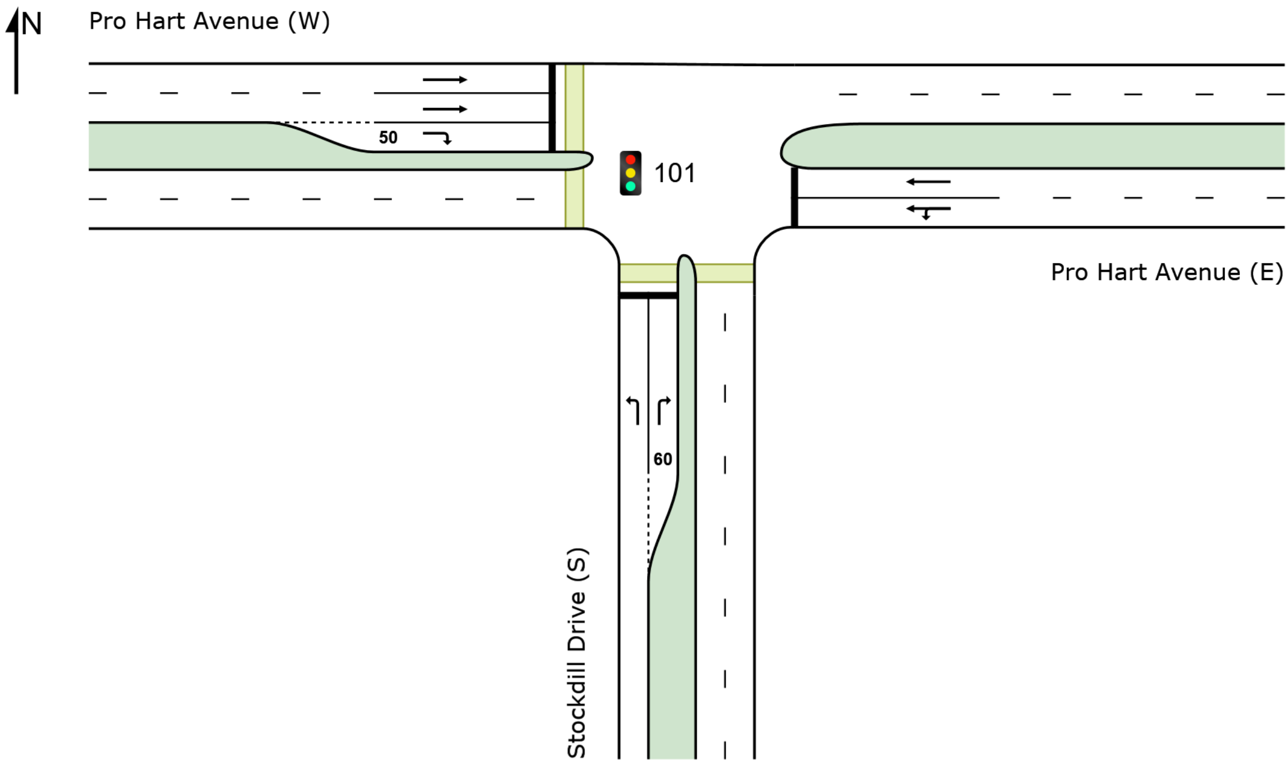
Site: 101 [Base Ultimate PM ProHartAve/StockdillDrive (Site Folder: Base Stockdill/Prohart 2041 Signalised)]

Upgraded Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Ultimate Development
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 85 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	11	5.0	12	5.0	0.069	45.0	LOS D	0.5	3.3	0.94	0.68	0.94	33.9
3	R2	121	5.0	127	5.0	* 0.755	51.1	LOS D	5.7	41.8	1.00	0.88	1.23	32.1
Approach		132	5.0	139	5.0	0.755	50.6	LOS D	5.7	41.8	0.99	0.87	1.21	32.2
East: Pro Hart Avenue (E)														
4	L2	107	5.0	113	5.0	0.777	18.1	LOS B	27.4	199.8	0.79	0.74	0.79	48.1
5	T1	1625	5.0	1711	5.0	* 0.777	12.5	LOS A	27.5	201.0	0.79	0.74	0.79	49.6
Approach		1732	5.0	1823	5.0	0.777	12.9	LOS A	27.5	201.0	0.79	0.74	0.79	49.5
West: Pro Hart Avenue (W)														
11	T1	559	5.0	588	5.0	0.204	2.9	LOS A	3.3	24.4	0.30	0.26	0.30	57.2
12	R2	28	5.0	29	5.0	* 0.233	48.6	LOS D	1.2	9.0	0.98	0.72	0.98	32.8
Approach		587	5.0	618	5.0	0.233	5.1	LOS A	3.3	24.4	0.33	0.28	0.33	55.3
All Vehicles		2451	5.0	2580	5.0	0.777	13.0	LOS A	27.5	201.0	0.69	0.63	0.70	49.3

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

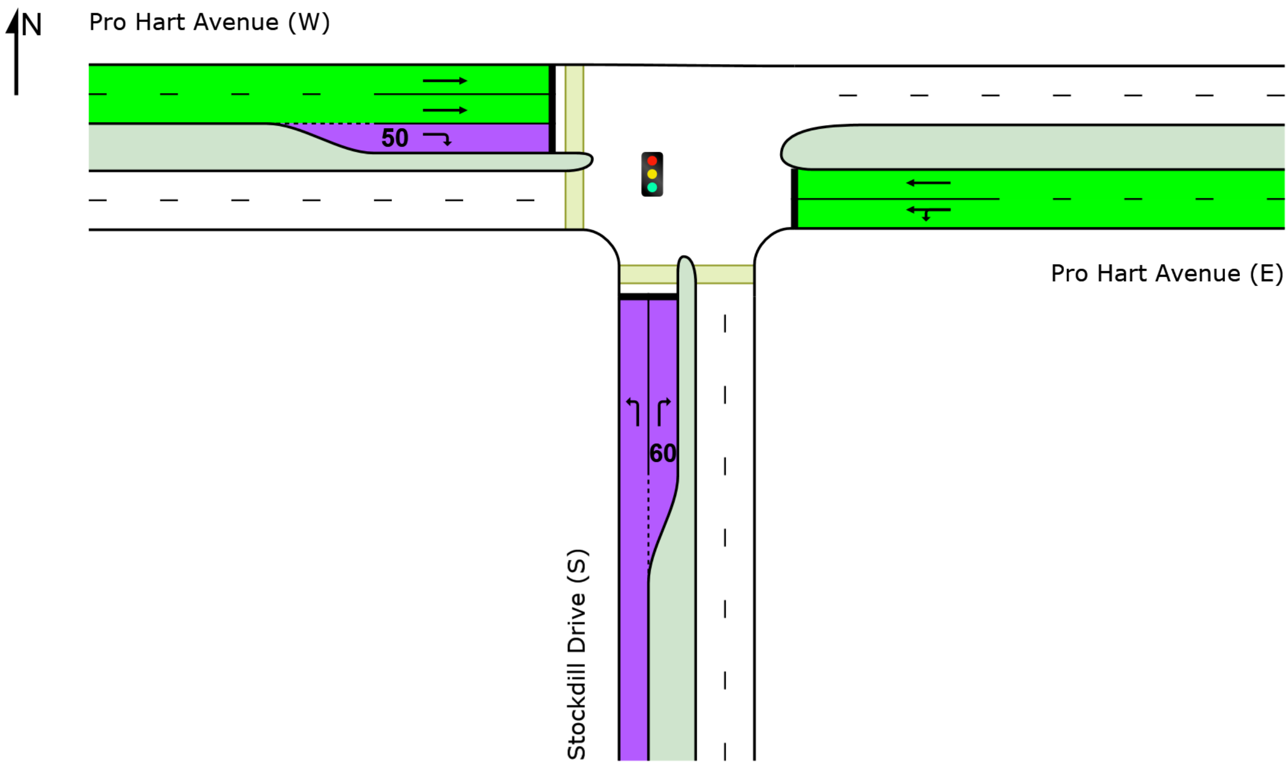
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Drive (S)													
Lane 1	12	5.0	169	0.069	100	45.0	LOS D	0.5	3.3	Full	500	0.0	0.0
Lane 2	127	5.0	169	0.755	100	51.1	LOS D	5.7	41.8	Short	60	0.0	NA
Approach	139	5.0		0.755		50.6	LOS D	5.7	41.8				
East: Pro Hart Avenue (E)													
Lane 1	909	5.0	1170	0.777	100	13.2	LOS A	27.4	199.8	Full	500	0.0	0.0
Lane 2	915	5.0	1178	0.777	100	12.5	LOS A	27.5	201.0	Full	500	0.0	0.0
Approach	1823	5.0		0.777		12.9	LOS A	27.5	201.0				
West: Pro Hart Avenue (W)													
Lane 1	294	5.0	1444	0.204	100	2.9	LOS A	3.3	24.4	Full	500	0.0	0.0
Lane 2	294	5.0	1444	0.204	100	2.9	LOS A	3.3	24.4	Full	500	0.0	0.0
Lane 3	29	5.0	127	0.233	100	48.6	LOS D	1.2	9.0	Short	50	0.0	NA
Approach	618	5.0		0.233		5.1	LOS A	3.3	24.4				
Intersection	2580	5.0		0.777		13.0	LOS A	27.5	201.0				

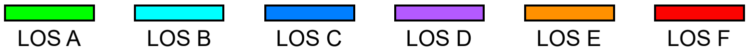
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	D	A	A	A

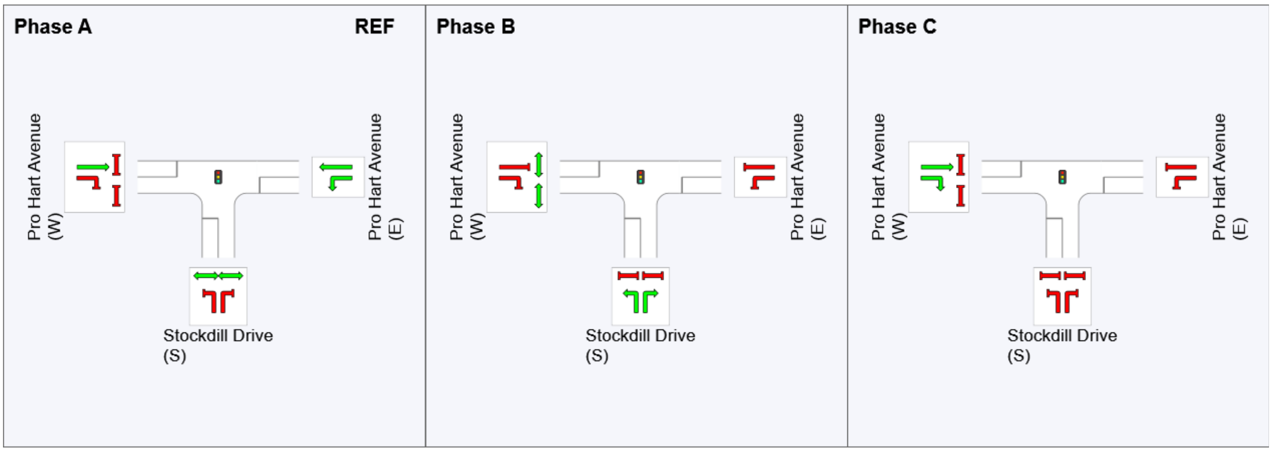


Colour code based on Level of Service

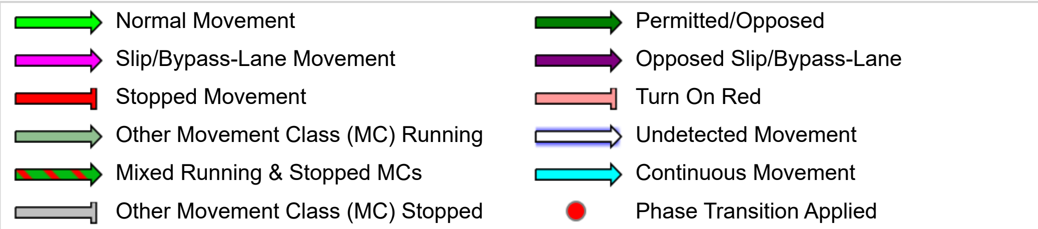


Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	59	73
Green Time (sec)	53	8	6
Phase Time (sec)	59	14	12
Phase Split	69%	16%	14%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

USER REPORT FOR SITE

All Movement Classes

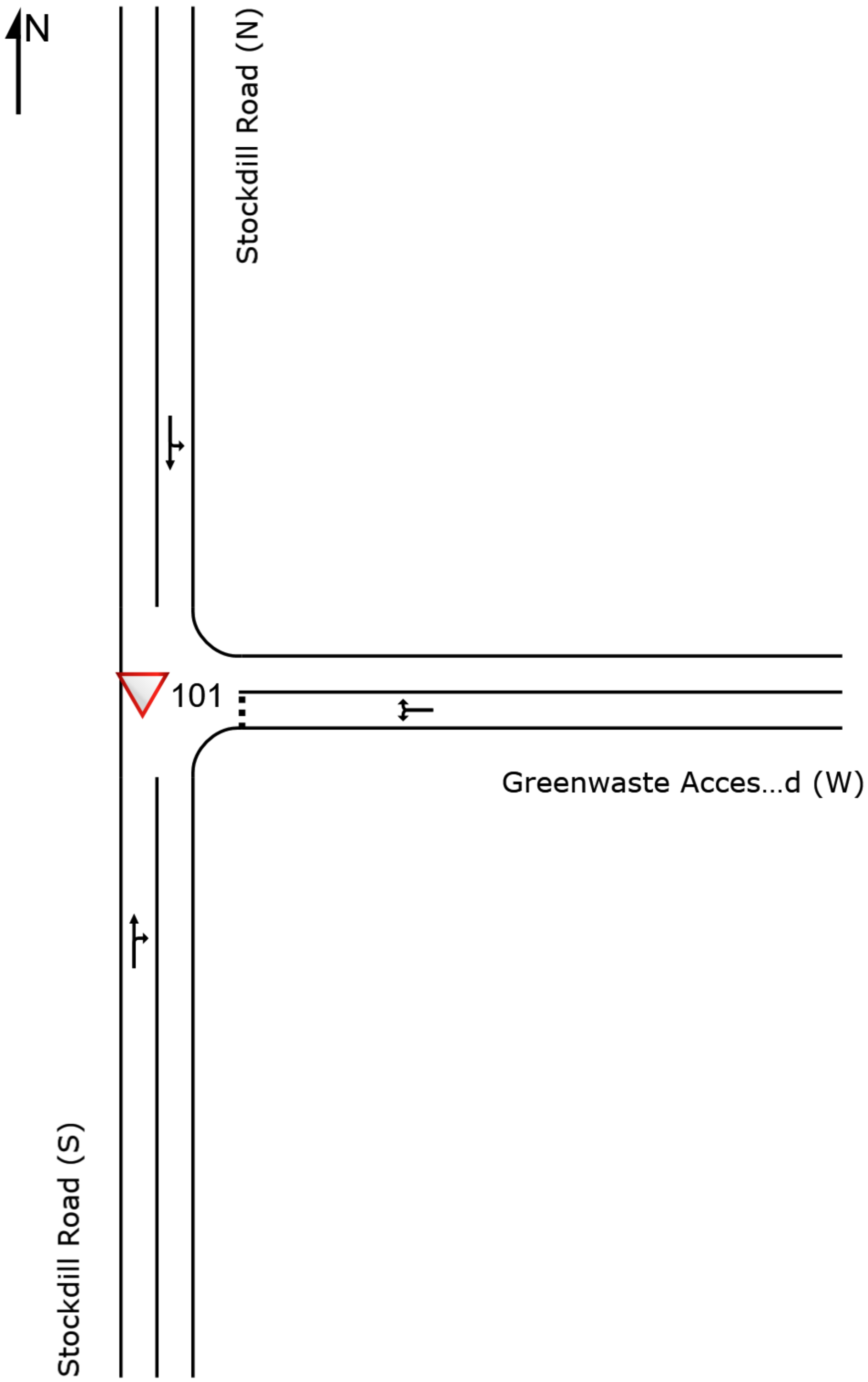
Project: Greenwaste Site Operation **Template: Site User Report**

Site: 101 [Greenwaste Calculated Ultimate AM Site Access Road (Site Folder: Greenwaste Stockdill/Prohart 2041 Signalised)]

Greenwaste Access Road
Site Category: Ultimate Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Stockdill Road (N)
101
Greenwaste Acces...d (W)
Stockdill Road (S)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Road (S)														
2	T1	140	5.0	147	5.0	0.079	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	59.9
3	R2	1	5.0	1	5.0	0.079	6.0	LOS A	0.0	0.1	0.00	0.00	0.00	57.4
Approach		141	5.0	148	5.0	0.079	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.9
East: Greenwaste Access Road (W)														
4	L2	1	5.0	1	5.0	0.024	5.7	LOS A	0.1	0.6	0.26	0.59	0.26	52.7
6	R2	22	5.0	23	5.0	0.024	6.4	LOS A	0.1	0.6	0.26	0.59	0.26	52.2
Approach		23	5.0	24	5.0	0.024	6.4	LOS A	0.1	0.6	0.26	0.59	0.26	52.2
North: Stockdill Road (N)														
7	L2	84	5.0	88	5.0	0.074	5.6	LOS A	0.0	0.0	0.00	0.38	0.00	54.9
8	T1	44	5.0	46	5.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.38	0.00	56.6
Approach		128	5.0	135	5.0	0.074	3.7	NA	0.0	0.0	0.00	0.38	0.00	55.5
All Vehicles		292	5.0	307	5.0	0.079	2.1	NA	0.1	0.6	0.02	0.22	0.02	57.2

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

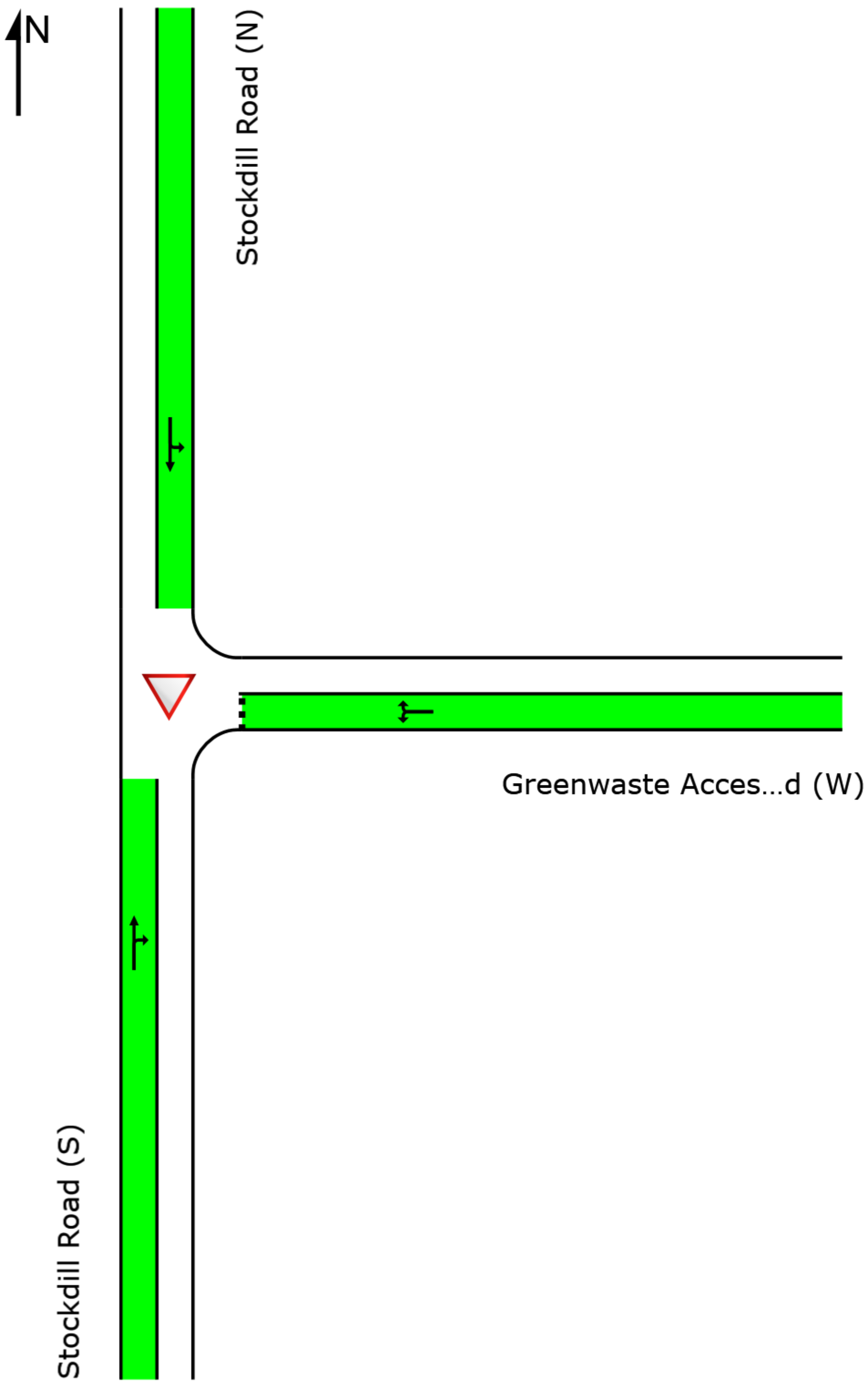
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Road (S)													
Lane 1	148	5.0	1885	0.079	100	0.0	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	148	5.0		0.079		0.0	NA	0.0	0.1				
East: Greenwaste Access Road (W)													
Lane 1	24	5.0	1024	0.024	100	6.4	LOS A	0.1	0.6	Full	500	0.0	0.0
Approach	24	5.0		0.024		6.4	LOS A	0.1	0.6				
North: Stockdill Road (N)													
Lane 1	135	5.0	1825	0.074	100	3.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	135	5.0		0.074		3.7	NA	0.0	0.0				
Intersection	307	5.0		0.079		2.1	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Project: \\cbrnas01\Active\21\21-000475\9_Tech\Traffic\Greenwaste traffic\Greenwaste Site Operation.sip9

USER REPORT FOR SITE

All Movement Classes

Project: Greenwaste Site Operation

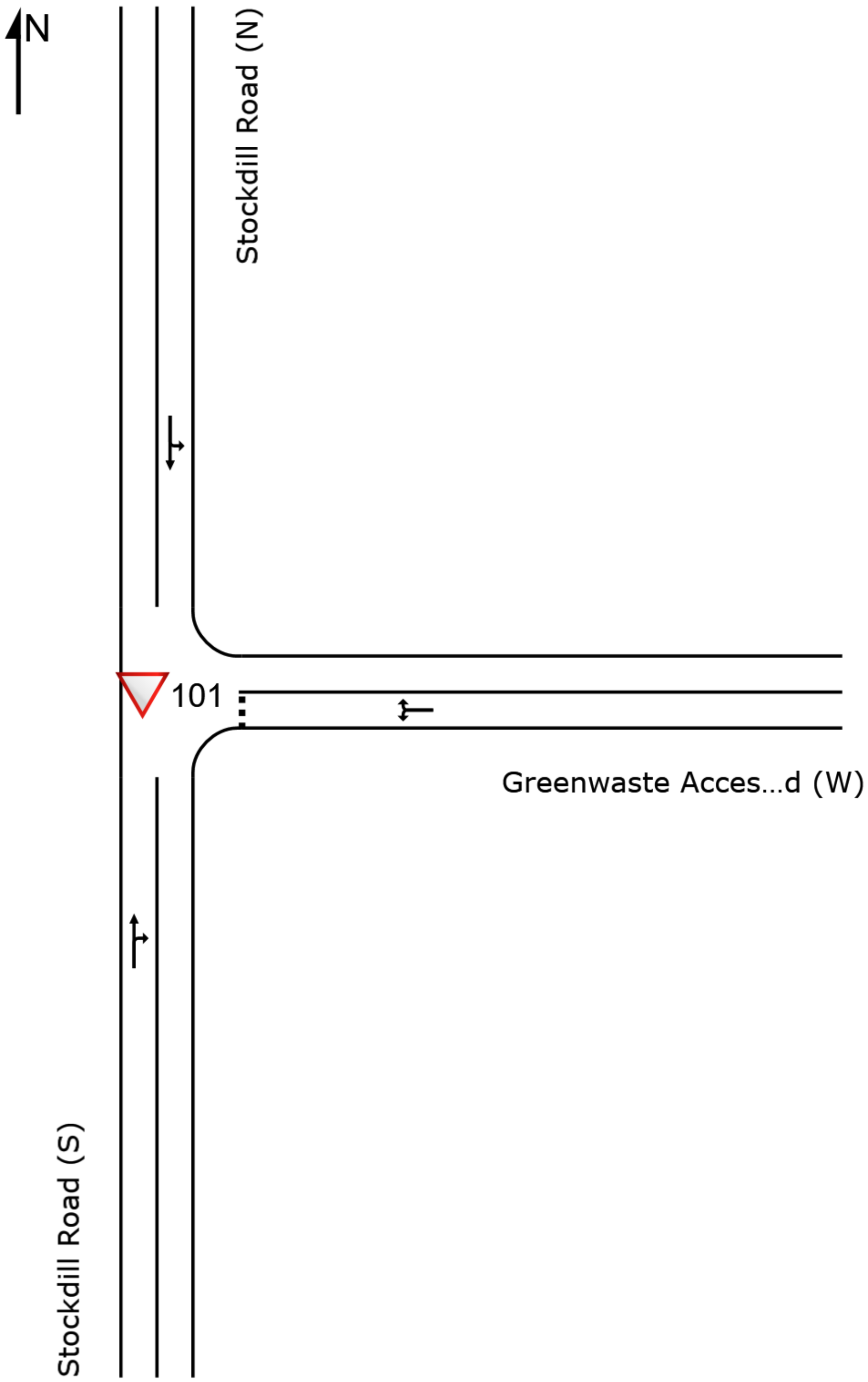
Template: Site User Report

Site: 101 [Greenwaste Calculated Ultimate PM Site Access Road (Site Folder: Greenwaste Stockdill/Prohart 2041 Signalised)]

Greenwaste Access Road
Site Category: Ultimate Development
Give-Way (Two-Way)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
Stockdill Road (N)
101
Greenwaste Acces...d (W)
Stockdill Road (S)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Road (S)														
2	T1	130	5.0	137	5.0	0.073	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	59.9
3	R2	1	5.0	1	5.0	0.073	6.0	LOS A	0.0	0.1	0.00	0.00	0.00	57.4
Approach		131	5.0	138	5.0	0.073	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.9
East: Greenwaste Access Road (W)														
4	L2	1	5.0	1	5.0	0.021	6.0	LOS A	0.1	0.5	0.31	0.60	0.31	52.6
6	R2	19	5.0	20	5.0	0.021	6.6	LOS A	0.1	0.5	0.31	0.60	0.31	52.1
Approach		20	5.0	21	5.0	0.021	6.6	LOS A	0.1	0.5	0.31	0.60	0.31	52.1
North: Stockdill Road (N)														
7	L2	4	5.0	4	5.0	0.078	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.9
8	T1	136	5.0	143	5.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		140	5.0	147	5.0	0.078	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		291	5.0	306	5.0	0.078	0.6	NA	0.1	0.5	0.02	0.05	0.02	59.2

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

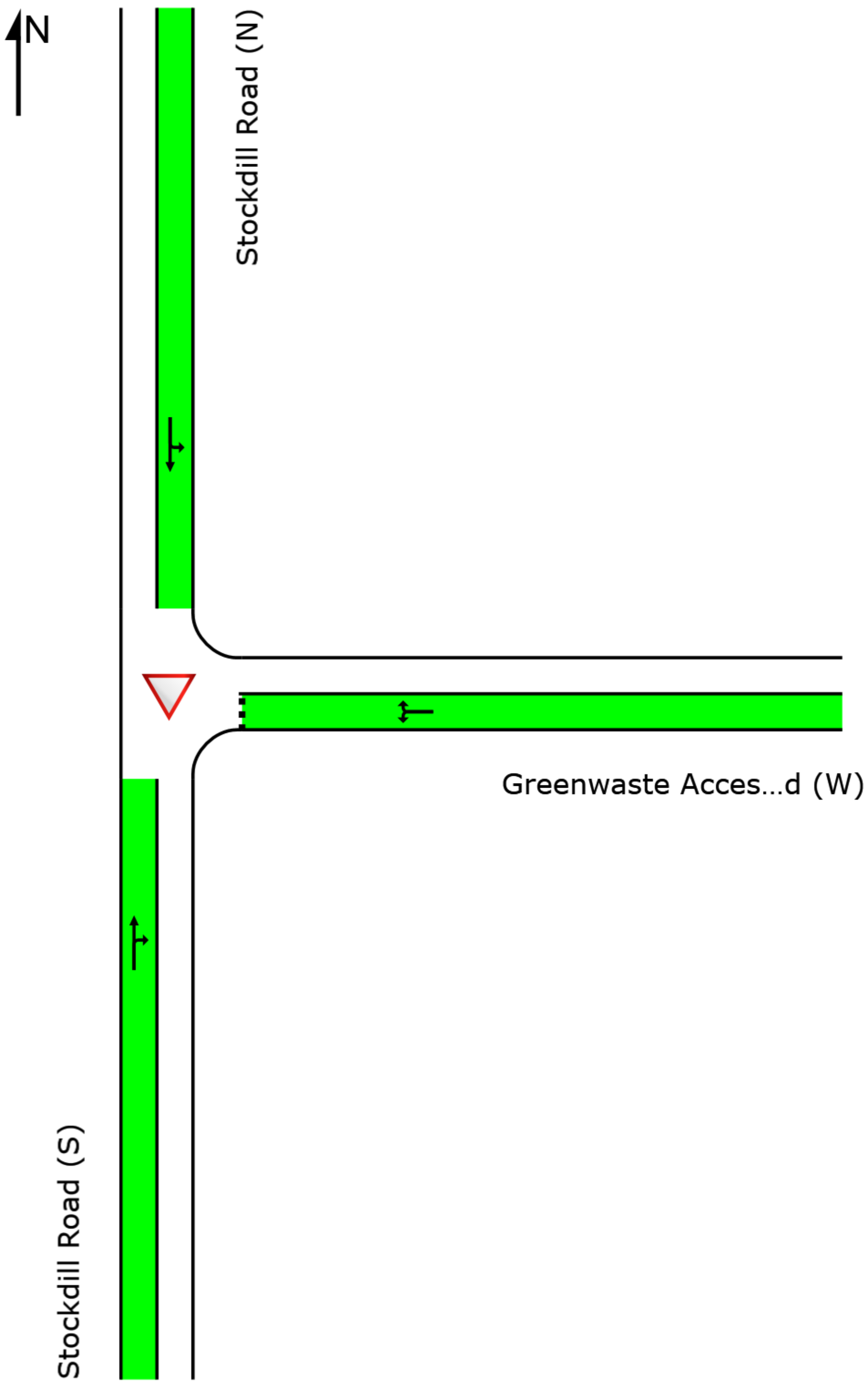
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Road (S)													
Lane 1	138	5.0	1885	0.073	100	0.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	138	5.0		0.073		0.1	NA	0.0	0.1				
East: Greenwaste Access Road (W)													
Lane 1	21	5.0	983	0.021	100	6.6	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	21	5.0		0.021		6.6	LOS A	0.1	0.5				
North: Stockdill Road (N)													
Lane 1	147	5.0	1886	0.078	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	147	5.0		0.078		0.2	NA	0.0	0.0				
Intersection	306	5.0		0.078		0.6	NA	0.1	0.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	North	
LOS	NA	A	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

Project: Greenwaste Site Operation **Template: Site User Report**

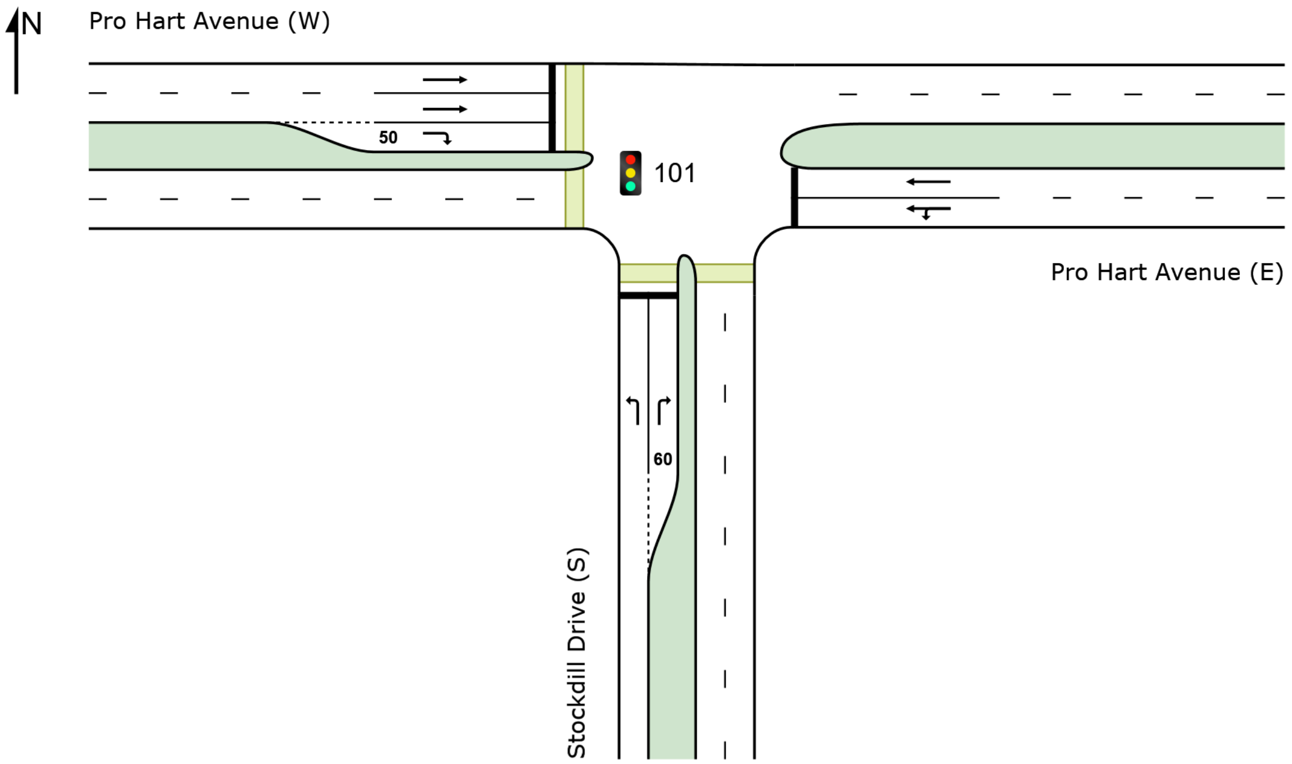
Site: 101 [Greenwaste Calculated Ultimate AM ProHartAve/StockdillDrive (Site Folder: Greenwaste Stockdill/Prohart 2041 Signalised)]

Upgraded Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Ultimate Development
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Greenwaste Ultiimate Signals
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	12	5.0	13	5.0	0.053	31.1	LOS C	0.3	2.5	0.90	0.68	0.90	38.9
3	R2	150	5.0	158	5.0	* 0.660	35.0	LOS C	4.8	35.3	1.00	0.85	1.12	37.4
Approach		162	5.0	171	5.0	0.660	34.7	LOS C	4.8	35.3	0.99	0.84	1.10	37.5
East: Pro Hart Avenue (E)														
4	L2	119	5.0	125	5.0	0.470	17.5	LOS B	8.2	60.2	0.73	0.68	0.73	47.8
5	T1	661	5.0	696	5.0	0.470	11.9	LOS A	8.4	61.2	0.73	0.65	0.73	49.7
Approach		780	5.0	821	5.0	0.470	12.8	LOS A	8.4	61.2	0.73	0.66	0.73	49.4
West: Pro Hart Avenue (W)														
11	T1	1545	5.0	1626	5.0	* 0.648	6.3	LOS A	14.1	102.8	0.63	0.57	0.63	54.4
12	R2	9	5.0	9	5.0	0.053	33.4	LOS C	0.3	1.9	0.93	0.66	0.93	38.0
Approach		1554	5.0	1636	5.0	0.648	6.5	LOS A	14.1	102.8	0.63	0.58	0.63	54.2
All Vehicles		2496	5.0	2627	5.0	0.660	10.3	LOS A	14.1	102.8	0.69	0.62	0.69	51.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Lane Use and Performance

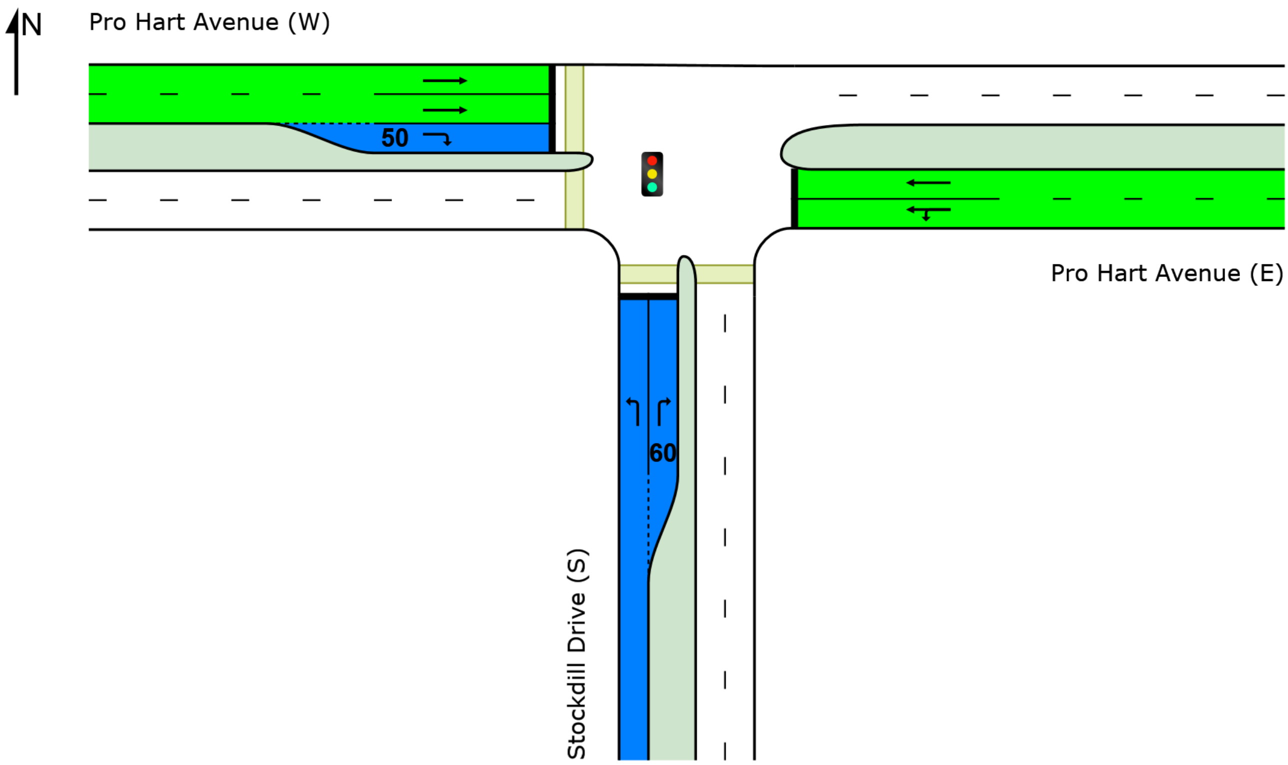
	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Stockdill Drive (S)													
Lane 1	13	5.0	239	0.053	100	31.1	LOS C	0.3	2.5	Full	500	0.0	0.0
Lane 2	158	5.0	239	0.660	100	35.0	LOS C	4.8	35.3	Short	60	0.0	NA
Approach	171	5.0		0.660		34.7	LOS C	4.8	35.3				
East: Pro Hart Avenue (E)													
Lane 1	407	5.0	867	0.470	100	13.6	LOS A	8.2	60.2	Full	500	0.0	0.0
Lane 2	414	5.0	881	0.470	100	11.9	LOS A	8.4	61.2	Full	500	0.0	0.0
Approach	821	5.0		0.470		12.8	LOS A	8.4	61.2				
West: Pro Hart Avenue (W)													
Lane 1	817	5.0	1259	0.648	100	6.3	LOS A	14.1	102.8	Full	500	0.0	0.0
Lane 2	810	5.0	1249[1]	0.648	100	6.3	LOS A	13.9	101.4	Full	500	0.0	0.0
Lane 3	9	5.0	179	0.053	100	33.4	LOS C	0.3	1.9	Short	50	0.0	NA
Approach	1636	5.0		0.648		6.5	LOS A	14.1	102.8				
Intersection	2627	5.0		0.660		10.3	LOS A	14.1	102.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	C	A	A	A

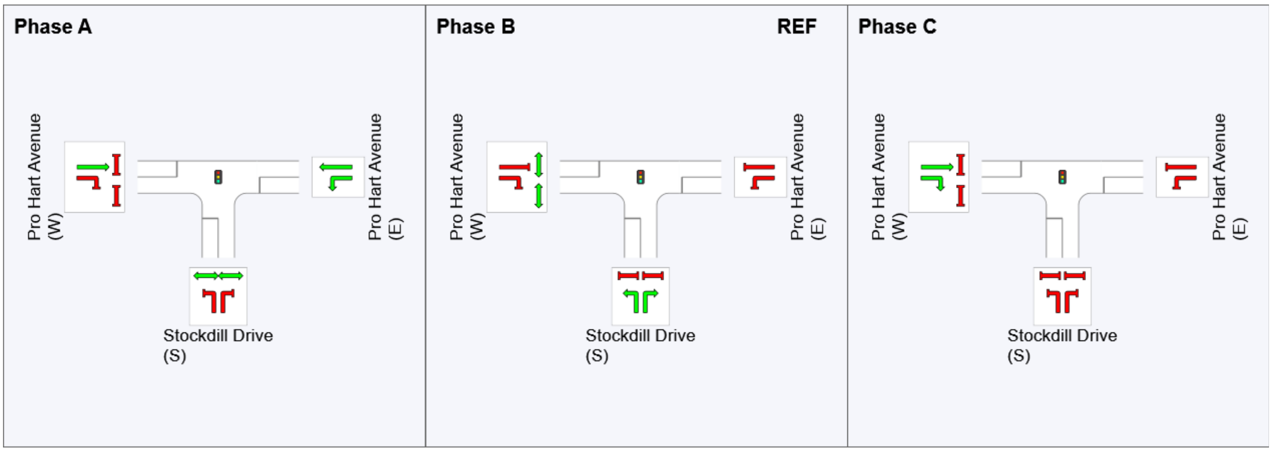


Colour code based on Level of Service

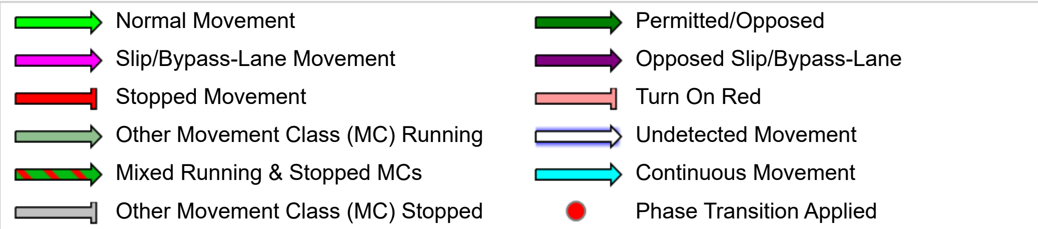
LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	26	0	14
Green Time (sec)	28	8	6
Phase Time (sec)	34	14	12
Phase Split	57%	23%	20%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Organisation: CALIBRE PROFESSIONAL SERVICES PTY LTD | Licence: NETWORK / 1PC | Created: Friday, 21 April 2023 5:09:57 PM
Project: \\cbrnas01\Active\21\21-000475\9_Tech\Traffic\Greenwaste traffic\Greenwaste Site Operation.sip9

USER REPORT FOR SITE

All Movement Classes

Project: Greenwaste Site Operation **Template: Site User Report**

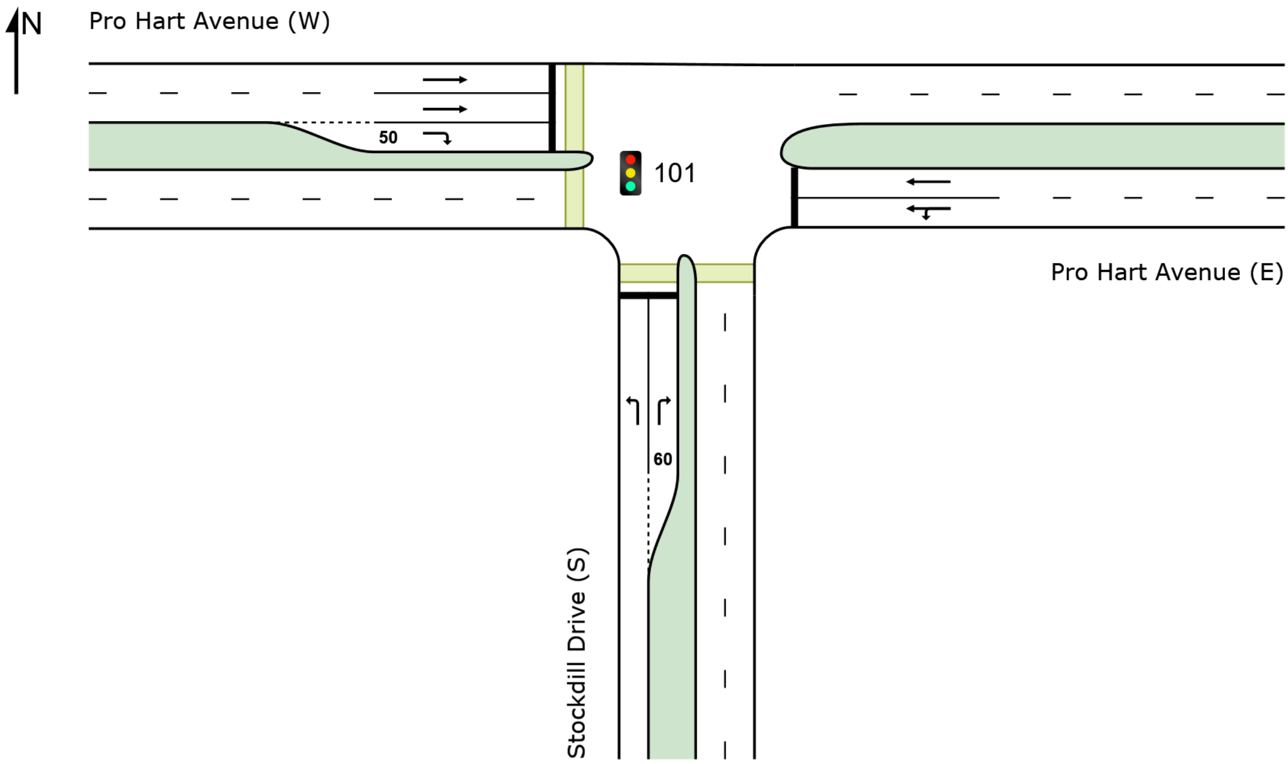
Site: 101 [Greenwaste Calculated Ultimate PM ProHartAve/StockdillDrive (Site Folder: Greenwaste Stockdill/Prohart 2041 Signalised)]

Upgraded Pro Hart Avenue / Stockdill Drive Intesection
Site Category: Ultimate Development
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 95 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Stockdill Drive (S)														
1	L2	12	5.0	13	5.0	0.067	48.1	LOS D	0.5	4.0	0.93	0.68	0.93	33.0
3	R2	137	5.0	144	5.0	* 0.764	55.2	LOS D	7.2	52.2	1.00	0.88	1.21	31.0
Approach		149	5.0	157	5.0	0.764	54.6	LOS D	7.2	52.2	0.99	0.87	1.19	31.1
East: Pro Hart Avenue (E)														
4	L2	111	5.0	117	5.0	0.756	18.2	LOS B	29.1	212.2	0.76	0.72	0.76	48.0
5	T1	1625	5.0	1711	5.0	* 0.756	12.6	LOS A	29.3	213.6	0.76	0.71	0.76	49.5
Approach		1736	5.0	1827	5.0	0.756	13.0	LOS A	29.3	213.6	0.76	0.71	0.76	49.4
West: Pro Hart Avenue (W)														
11	T1	559	5.0	588	5.0	0.203	3.2	LOS A	3.7	26.7	0.29	0.25	0.29	57.0
12	R2	28	5.0	29	5.0	* 0.260	54.5	LOS D	1.4	10.2	0.99	0.72	0.99	31.2
Approach		587	5.0	618	5.0	0.260	5.6	LOS A	3.7	26.7	0.33	0.28	0.33	54.9
All Vehicles		2472	5.0	2602	5.0	0.764	13.7	LOS A	29.3	213.6	0.67	0.61	0.68	48.8

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

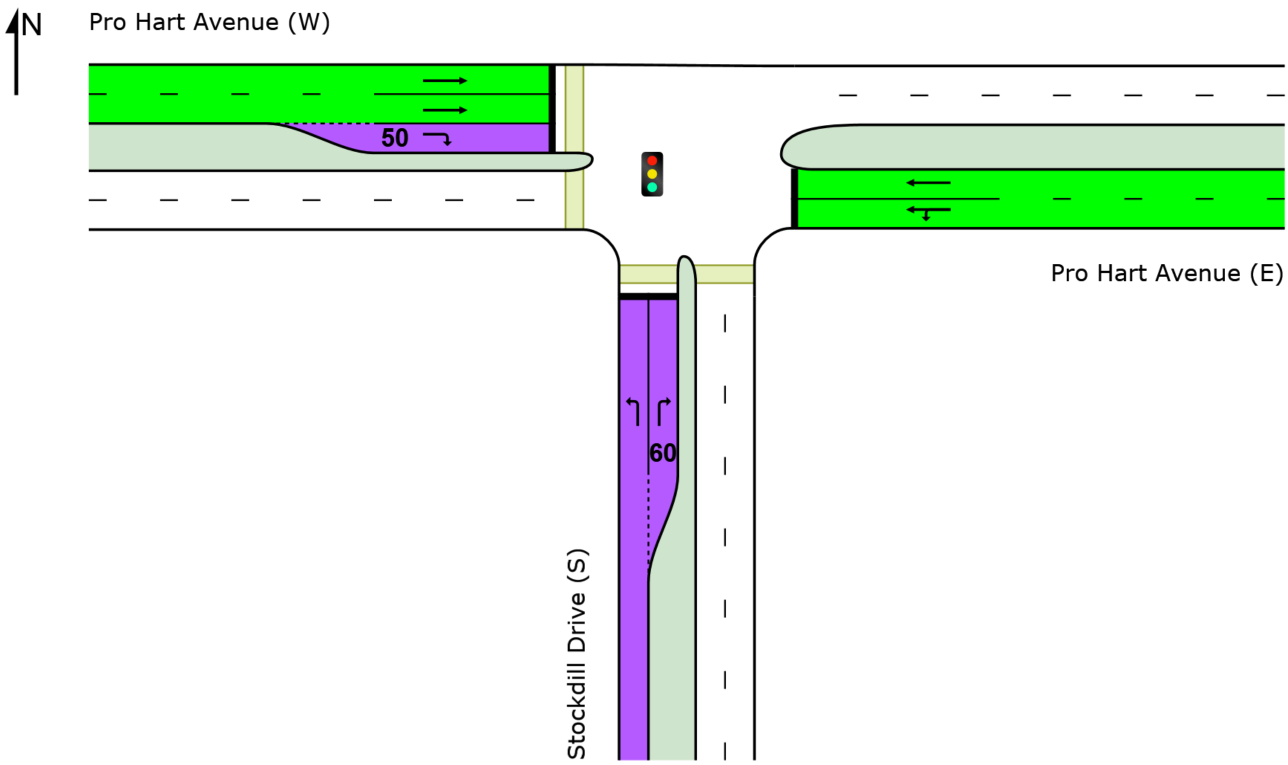
Lane Use and Performance

	DEMAND FLOWS [Total	HV]	Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Stockdill Drive (S)													
Lane 1	13	5.0	189	0.067	100	48.1	LOS D	0.5	4.0	Full	500	0.0	0.0
Lane 2	144	5.0	189	0.764	100	55.2	LOS D	7.2	52.2	Short	60	0.0	NA
Approach	157	5.0		0.764		54.6	LOS D	7.2	52.2				
East: Pro Hart Avenue (E)													
Lane 1	911	5.0	1204	0.756	100	13.3	LOS A	29.1	212.2	Full	500	0.0	0.0
Lane 2	917	5.0	1213	0.756	100	12.6	LOS A	29.3	213.6	Full	500	0.0	0.0
Approach	1827	5.0		0.756		13.0	LOS A	29.3	213.6				
West: Pro Hart Avenue (W)													
Lane 1	294	5.0	1451	0.203	100	3.2	LOS A	3.7	26.7	Full	500	0.0	0.0
Lane 2	294	5.0	1451	0.203	100	3.2	LOS A	3.7	26.7	Full	500	0.0	0.0
Lane 3	29	5.0	113	0.260	100	54.5	LOS D	1.4	10.2	Short	50	0.0	NA
Approach	618	5.0		0.260		5.6	LOS A	3.7	26.7				
Intersection	2602	5.0		0.764		13.7	LOS A	29.3	213.6				

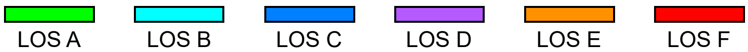
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Level of Service

	Approaches			Intersection
	South	East	West	
LOS	D	A	A	A

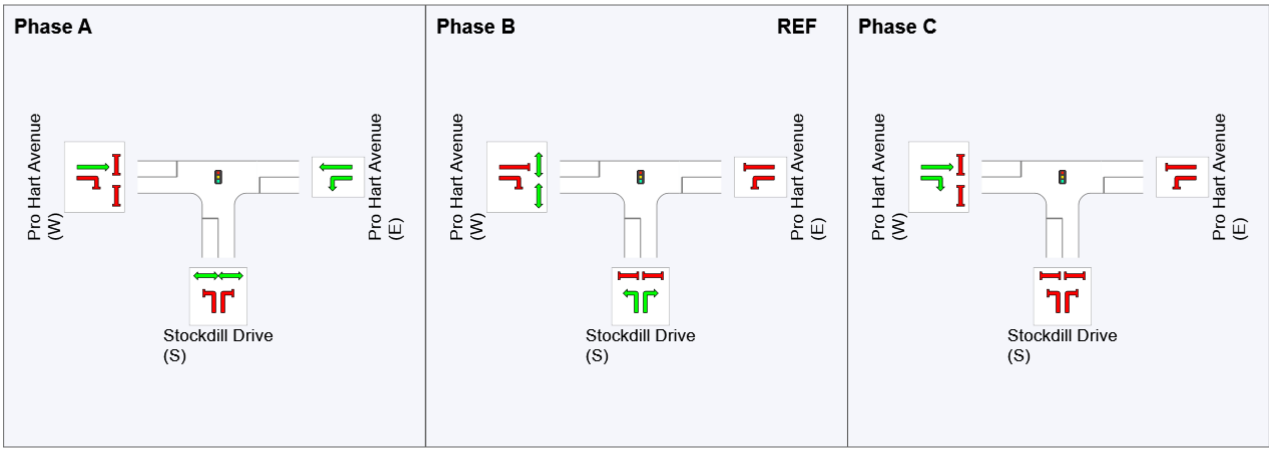


Colour code based on Level of Service

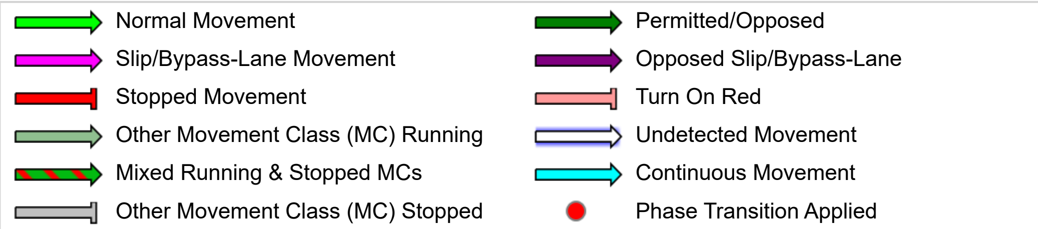


Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Delay Model: SIDRA Standard (Geometric Delay is included).

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

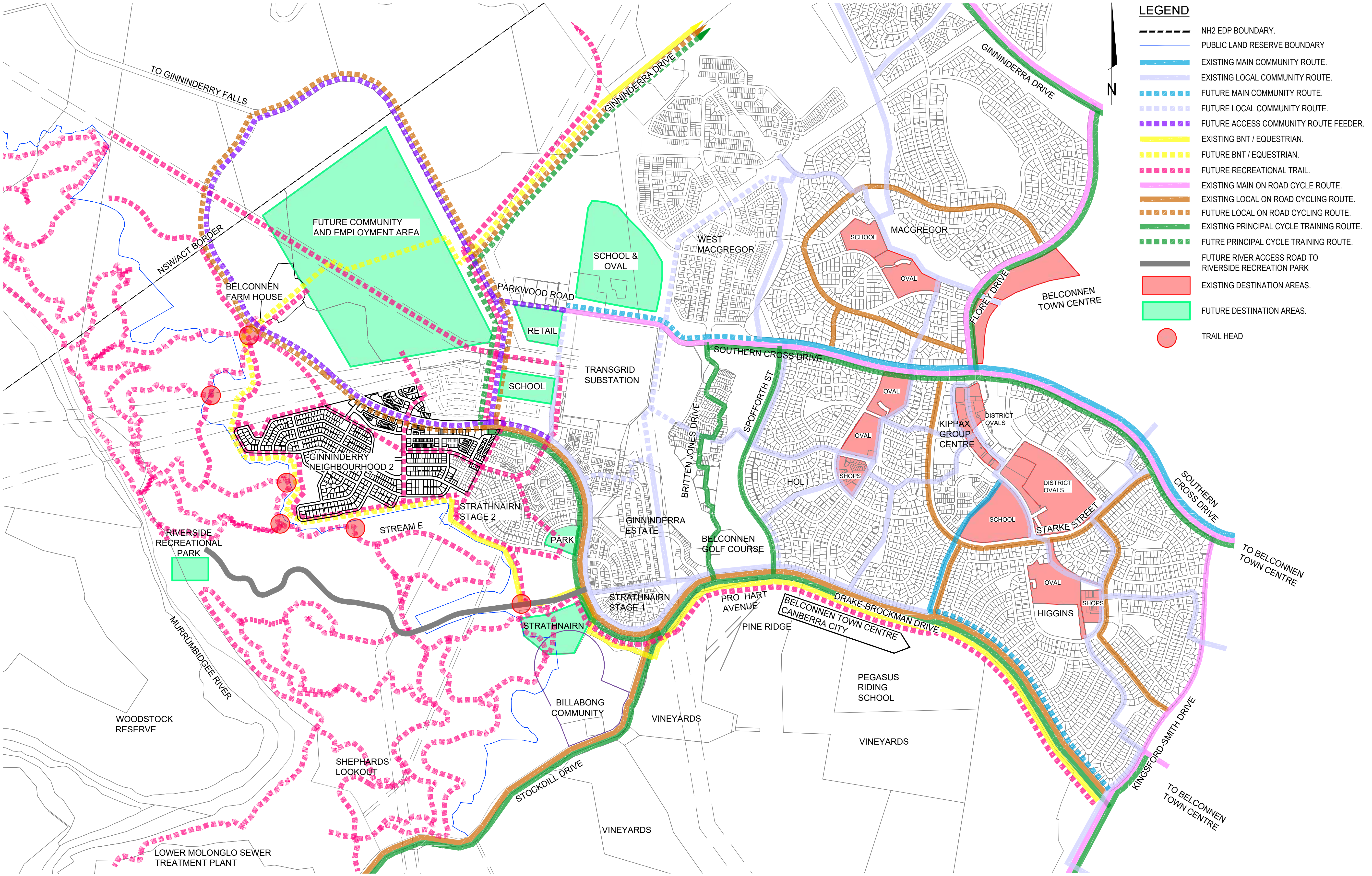
Phase	A	B	C
Phase Change Time (sec)	28	0	16
Green Time (sec)	61	10	6
Phase Time (sec)	67	16	12
Phase Split	71%	17%	13%

See the Timing Analysis 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, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

GREEN WASTE DROP-OFF FACILITY–TRAFFIC IMPACT ASSESSMENT

Appendix B Macnamara EDP1 Active Travel

RIVERVIEW PROJECTS



FIRST ISSUE	DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
	[redacted]				31/07/2020	
AMENDMENTS	[redacted]				18/12/2020	LAYOUT CHANGES & UPDATES FOR EDP COMMENTS
					30/03/2021	ISSUE FOR DA

STATUS
ESTATE DEVELOPMENT PLAN
Authorised for Issue:
BY:
SIGN: DATE:

SCALE
0 100 200 300 400 500 600 700 800
SCALE 1:10000 (A1) SCALE 1:20000 (A3)

WAE No.

CLIENT/CONSULTANTS
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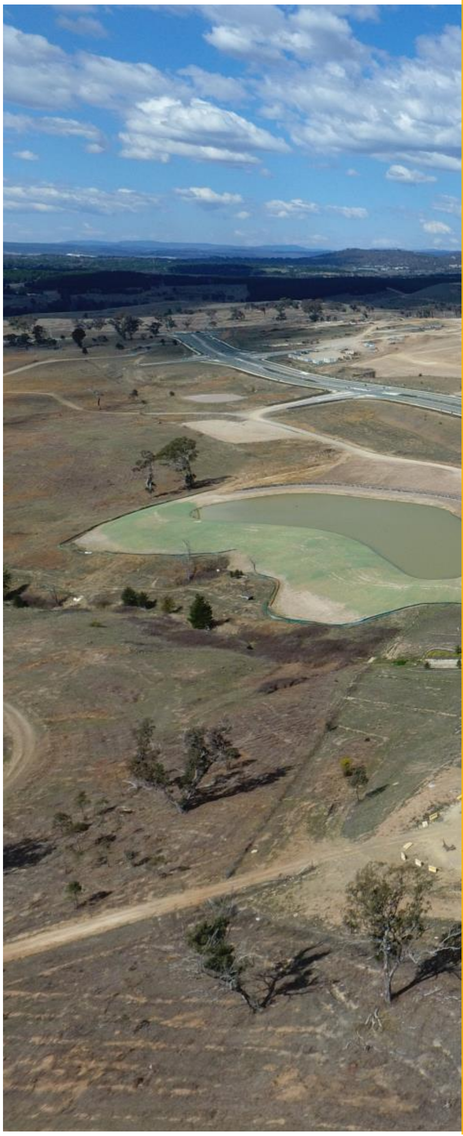
PROJECT
MACNAMARA EDP 1

DRAWING TITLE
ACTIVE TRAVEL NETWORK EXISTING AND FUTURE PLAN
SHEET 1 OF 4

PROJECT No.	DRAWING No.	REVISION
19-000561	E1.21.01	B

calibre

CONTACT US



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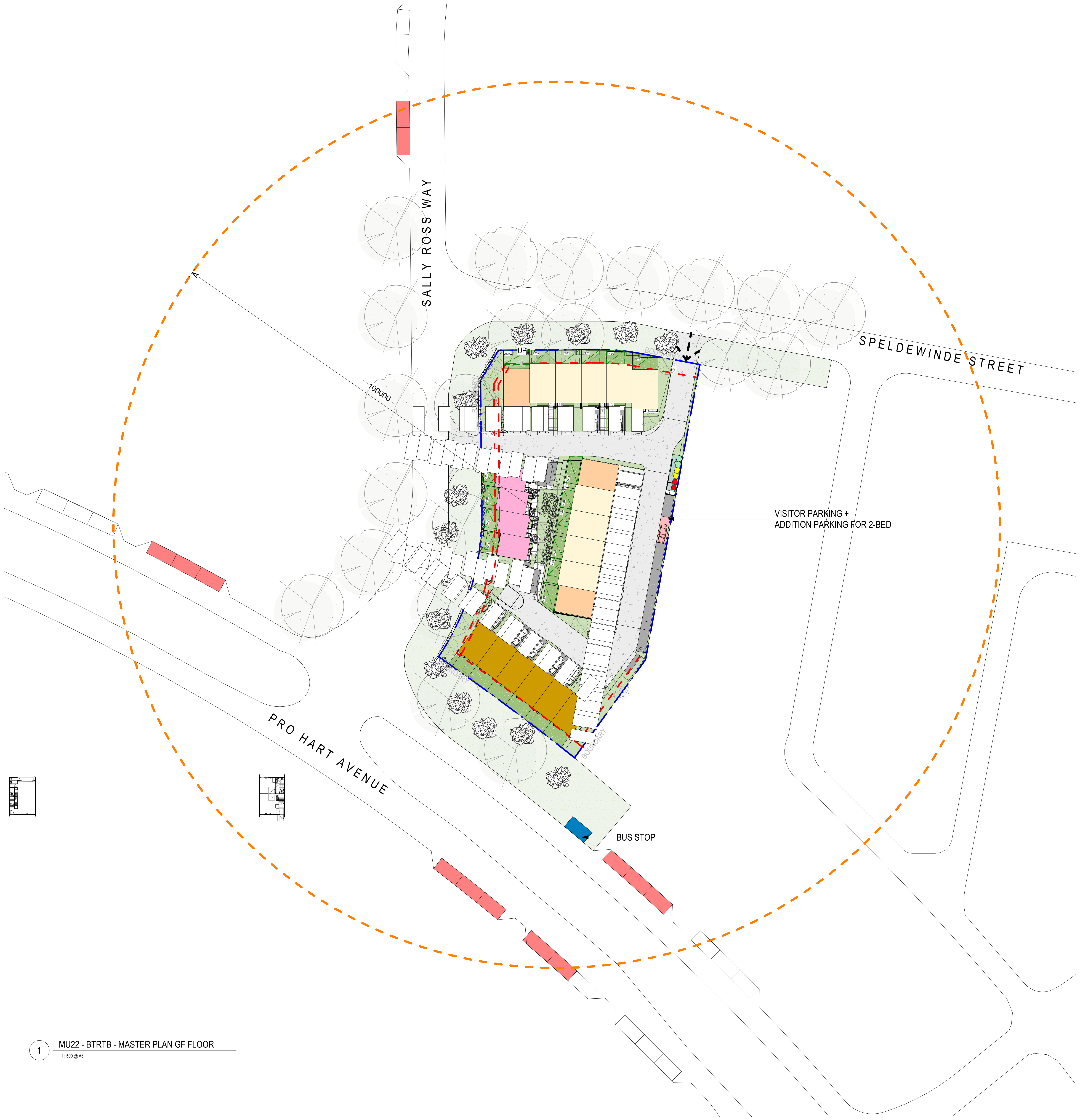

1 MU22 - BTRTB - MASTER PLAN GF FLOOR
1 : 500 @ A3

MASTERPLAN KEY

- BLOCK BOUNDARIES
- SETBACKS
- MANDATORY ALTERNATIVE PPOS MINIMUM DIMENSIONS 3 x 4m
- 100m VISITOR PARKING BOUNDARY
- SITE ACCESS
- WASTE ENCLOSURE
- PRIVATE GREEN SPACES
- PUBLIC GREEN SPACES
- WALKWAY
- DRIVE WAY
- VISITORS PARKING - ON SITE X1
- VISITORS PARKING - STREET WITHIN 100m
- BUS STOP
- MICRO LIVING - 1 BED - TYPE 1
- MICRO LIVING - 2 BED - TYPE 2
- MICRO LIVING - 2 BED - TYPE 3
- MICRO LIVING - 3 BED - TYPE 4
- SINGLE CAR PARK
- WASTE ENCLOSURE

STREET VISITORS PARKING WITHIN 100m OF SITE:

- 21 PARKING SPACES ON PRO HART AVENUE
- 6 PARKING SPACES ON SALLY ROSS WAY

SKETCH PLAN

NOTES

Contractor must verify all dimensions on the job before commencing any work or drawing of any shop drawings.

Do not scale drawings.

16/12/2022 11:16:33 AM

REVISION

Date	Rev.	Status or Amendment	Dwn	C/C
18/10/2022	A	ISSUE FOR MU28 REVIEW	[redacted]	CLIENT

REVIEW

File name (MA office use only):
C:\Users\Mani\Documents\2206 _GINN_MU22_MASTERPLAN_ 2022_maniKQL62.rvt

Design review (MA office use only):

Drawn Author	Date
Checked & Coordinated Checker	Date
Verified Approver	Date

MU 22

Ginninderry

CONSULTANTS

- Architecture
- Traffic
- Structure
- Civil
- Electrical
- Mechanical
- Fire
- Acoustic
- Hydraulic
- Landscape
- Survey
- Town Planner
- Certifier
- Access

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E: contact@matherarchitecture.com
W: www.matherarchitecture.com
nominated architect:
Jeremy Mather | Director | Architect ACT 2318 NSW 9349 RAIA RIBA

DRAWING INFORMATION

Project	MU18 STRATHNAIRN GINNINDERRY
Date	19/10/22
Block	1
Section	83
Division	STRATH
Drawing Title	MASTER PLAN - VISITORS PARKING
Drawing No.	SK109
Project No.	2206
Scale:	1 : 500
Revision:	A