B.7.3 Traffic Information Response & Road Impact Assessment (Incorporating Traffic Impact Assessment, Pavement Impact Assessment & Road Safety Assessment)

Our Ref: 510357:ASJ
Contact: Andy Johnston

30 October 2020

Kalfresh
6206 Cunningham Highway
Kalbar QLD 4309

Attention: David Krause

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Dear David,

SCENIC RIM AGRICULTURAL INDUSTRIAL PRECINCT
RESPONSE TO COORDINATOR GENERAL'S INFORMATION REQUEST

Cardno has been commissioned by Kalfresh to provide traffic engineering and transport advice for the proposed Scenic Rim Agricultural Industrial Precinct (SRAIP) project.

As part of the draft impact assessment report (IAR) prepared for the SRAIP project, Cardno prepared a Road Impact Assessment report which outlined the traffic generating assumptions and impacts of the project on the road network.

This letter has been prepared to respond to the Coordinator General's Request for Information (RFI) issued for the project.

With respect to traffic impacts, the items were raised by Scenic Rim Regional Council (SRRC), the Department of Transport and Main Roads (TMR) and Green Grow Pty Ltd. Table 1-1 summarises the traffic related items raised in the RFI.

A formal response has been prepared for SRRC and TMR. Each of the relevant items has been reproduced herein, with a response provided by Cardno following each item.

In preparation of these responses, the SRAIP plan has been amended in minor aspects. Some of these changes, including slight changes to allotment areas, have impact on the traffic assessment. In order to reflect the most recent version of the plans, a revised Road Impact Assessment report has been prepared. A copy of this report in enclosed at **Appendix 1**.

Table 1-1 SRAIP Request for Information Items

Sub No.	ID	Issue	Response
Green Grow Pty Ltd			
24	24.08	The operations and activities permitted or encouraged by the SRAIP will cause substantial adverse impacts to the Grow Green operation, including: (b) unacceptable traffic movements on Cunningham Highway and the access road on Lot 2	The Road Impact Assessment presents a detailed analysis of the traffic impacts, which indicates that the SRAIP traffic will be suitably accommodated by the site access intersection.
	24.26	Further, the expected impacts of traffic generation once the SRAIP evolves has not been the subject of sufficient investigation and interrogation.	
Department of Transport and Main Roads			
30	30.01	**Pavement Impact Assessment – Cardno dated 9 April 2020:** Pavement impact assessment (PIA) – unable to verify contribution identified. The department has reviewed the PIA submitted and has been unable to replicate the applicant's results based on the information provided. As such the department is unable to confirm that the methodology/contribution proposed by the applicant is accepted. The applicant needs to provide the department with a copy of the Appendix C calculations so that the department can undertake a more detailed assessment of the pavement impact methodology and the proposed contribution. NOTE: the calculations may be impacted by the second issue outlined below.	Cardno has liaised with TMR regarding the PIA calculations. Furthermore, the PIA has been revised to account for new staging information and revised lot areas. Refer to the revised Road Impact Assessment report at **Appendix 1.**
	30.02	Section 9.5 of the report makes the recommendation that before each non Kalfresh lot is constructed a PIA is to be completed to assess the anticipated impact. The applicant has currently shown the total pavement contributions of the non Kalfresh lots as being $0. The department is interested in understanding how the applicant envisages future developers of the non Kalfresh lots being conditioned to undertake a PIA and pay a contribution to the department (if applicable). This is due to the fact the department is not certain that it will be 'triggered for referral' in relation to the future development of the non Kalfresh lots under this variation to the planning scheme given the nature of some of the uses that have the potential to generate pavement impact will be considered accepted development under the proposed development codes. It is requested that the applicant provide further detail as to how they envisage the department's interests in relation to further pavement impacts from the non Kalfresh lots on the state-controlled road network being protected through conditions relating to this variation to the planning scheme. There are some uses that will likely be identified under the variation as being accepted development that may in fact generate a pavement impact to the state-controlled road network from a cumulative perspective when the quarry and Kalfresh are also taken into account. Due to the uncertainty around the likely future approvals as well as the department being uncertain around what mechanism will be used to assess future impacts of development on the SCR, further information is required.	The PIA has been revised to account for new staging information and revised lot areas. Refer to the revised Road Impact Assessment report at **Appendix 1.**
Scenic Rim Regional Council			
15	15.38	TIA doesn't address turning movements at new intersection for largest anticipated vehicle based on 22m pavement (parking lanes). Review TIA assessment to confirm	Swept paths for the site access intersection have been prepared, refer **Appendix 2.**
	15.39	Confirmation required that pavement widths are sufficient to carry services. Review TIA assessment to confirm	

Department of Transport and Main Roads

Item 30.01

The department has reviewed the PIA submitted and has been unable to replicate the applicant's results based on the information provided. As such the department is unable to confirm that the methodology/contribution proposed by the applicant is accepted.

The applicant needs to provide the department with a copy of the Appendix C calculations so that the department can undertake a more detailed assessment of the pavement impact methodology and the proposed contribution.

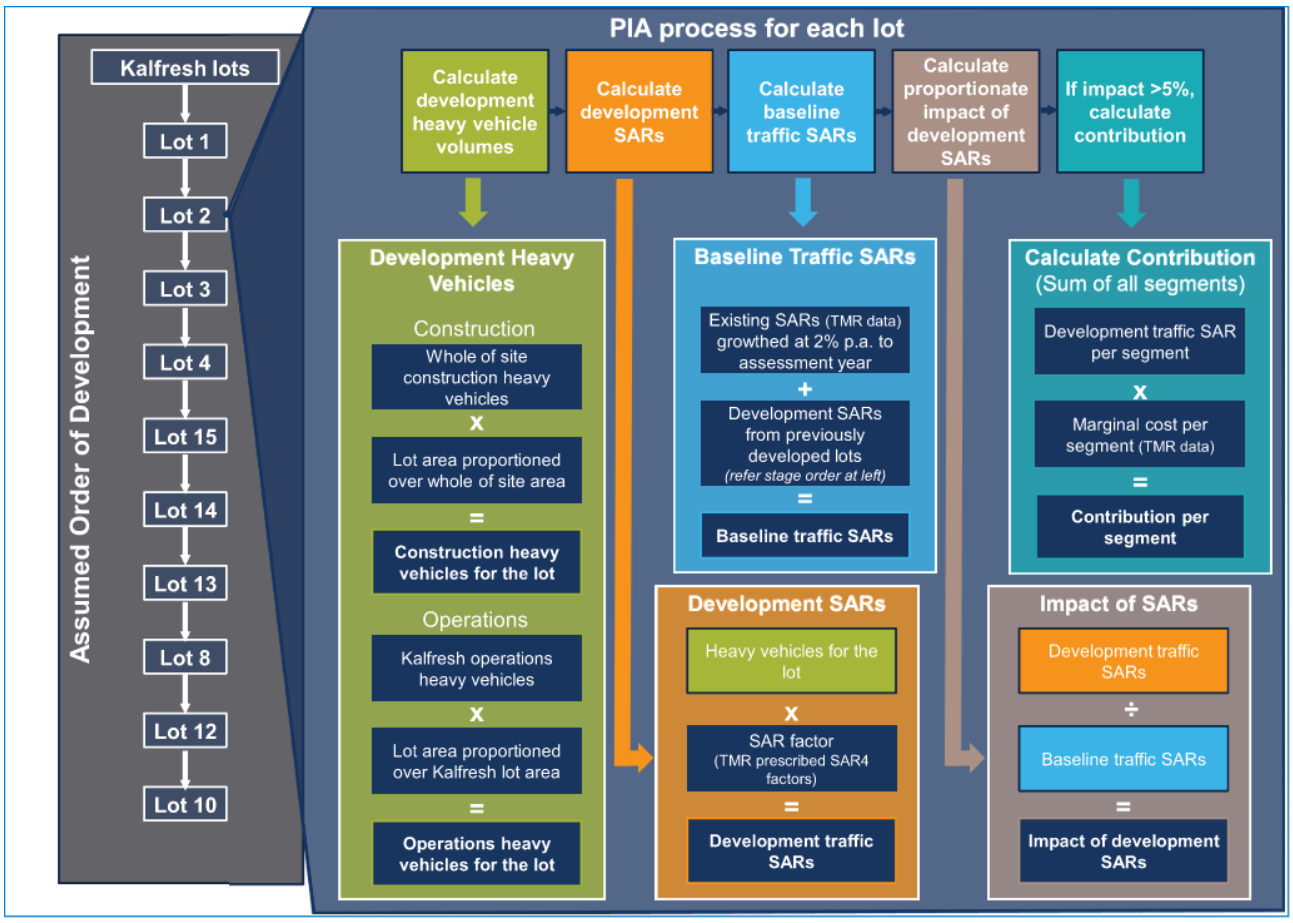
NOTE: the calculations may be impacted by the second issue outlined below.

Response to Item 30.01:

Cardno engaged in discussions with the Department of Transport and Main Roads (TMR) regarding this matter and provided copies of the PIA methodology and calculations. The calculations were compiled and issued to TMR on 3rd July 2020 for review.

Following this, additional information explaining the methodology process was provided to TMR on 30th July 2020, as shown on Figure 1-1. This explained that the PIA assessed each allotment as a new stage, which is reflective of each allotment being completed separately, as is likely to occur in reality. The alternative approach, to assess the entire SRAIP project as one, would severely overstate the pavement impacts as the site would develop over a long period, not at one time.

Figure 1-1 PIA Process



Item 30.02

Section 9.5 of the report makes the recommendation that before each non Kalfresh lot is constructed a PIA is to be completed to assess the anticipated impact. The applicant has currently shown the total pavement contributions of the non Kalfresh lots as being $0.

The department is interested in understanding how the applicant envisages future developers of the non Kalfresh lots being conditioned to undertake a PIA and pay a contribution to the department (if applicable). This is due to the fact the department is not certain that it will be 'triggered for referral' in relation to the future development of the non Kalfresh lots under this variation to the planning scheme given the nature of some of the uses that have the potential to generate pavement impact will be considered accepted development under the proposed development codes.

It is requested that the applicant provide further detail as to how they envisage the department's interests in relation to further pavement impacts from the non Kalfresh lots on the state-controlled road network being protected through conditions relating to this variation to the planning scheme.

There are some uses that will likely be identified under the variation as being accepted development that may in fact generate a pavement impact to the state-controlled road network from a cumulative perspective when the quarry and Kalfresh are also taken into account.

Due to the uncertainty around the likely future approvals as well as the department being uncertain around what mechanism will be used to assess future impacts of development on the SCR, further information is required.

Response to Item 30.02:

The SRAIP plan has been refined to identify development staging of the allotments. This staging plan is shown on the RPS plan 142489-11L. Table 1-2 summarises the staging timing and proposed allotments delivered in each stage.

Table 1-2 SRAIP Staging

Stage	Approximate Timing	Allotments
3*	2021 - 2022	5, 6, 8, 9, 16, 50, 60, 61
4	2021 – 2022	10, 11
5	2022 – 2023	1, 2, 3, 4
6	2023 – 2024	12, 13
7	2025 – 2026	14, 15

Note * no external operational traffic associated with allotments 16, 50, 60 or 61

The pavement impact assessment has been updated to reflect these stages. The revised Road Impact Assessment report at **Appendix 1** outlines the updated calculations and impact outcomes.

In summary, the estimated contribution as a result of the pavement impact is outlined in Table 1-2.

Table 1-3 SRAIP Estimated Pavement Contributions

Stage	Allotments	Estimated Pavement Contribution
3*	5, 6, 8, 9, 16, 50, 60, 61	$111,598
4	10, 11	$ -
5	1, 2, 3, 4	$15,480
6	12, 13	$ -
7	14, 15	$ -
Total		**$127,078**

Note * no external operational traffic associated with allotments 16, 50, 60 or 61

In comparison to the original assessment, which reported a contribution of $105,784, this indicates that the pavement contribution will increase by $21,294 to a total contribution of $127,078.

With respect to TMR's concerns for how owners of non-Kalfresh allotments could be assessed appropriately, in the case that a referral is not triggered, it is suggested that a condition is placed over the SRAIP which requires a pavement impact assessment to be undertaken for any allotment which triggers an upper limit of

heavy vehicle traffic on the Cunningham Highway. This upper limit would be determined based on the 5% threshold for the proposed year of opening.

Scenic Rim Regional Council

Item 15.38

TIA doesn't address turning movements at new intersection for largest anticipated vehicle based on 22m pavement (parking lanes). Review TIA assessment to confirm.

Response to Item 15.38:

The design of the new access intersection on the Cunningham Highway has been based on the swept path movement of the design service vehicle, being a B-double. The swept path drawings 510357 – SK07-SK10 enclosed at **Appendix 2** demonstrate the suitability of the intersection design.

Item 15.39

Confirmation required that pavement widths are sufficient to carry services. Review TIA assessment to confirm.

Response to Item 15.39:

A review of the environmental capacity of the proposed internal road has been included in the TIA, at section 8.1.1. The daily traffic demands from the SRAIP and the approved Frazerview quarry are confirmed to be within the daily limits, and therefore the proposed road cross section is considered to be appropriate.

Yours sincerely,

Andy Johnston
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for Cardno
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Enc: Revised Road Impact Assessment
Swept Path Drawings

Road Impact Assessment

Scenic Rim Agricultural Industrial Precinct

510357

Prepared for

Kalfresh Pty Ltd

30 October 2020

Cardno

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01	27/11/2019	Draft for client review	JP / AXS	ASJ
02	28/11/2019	Draft for client review, appendix updated	JP / AXS	ASJ
03	19/12/2019	Final	JP / AXS	ASJ
04	14/02/2020	Revised Final	JP / AXS	ASJ
05	09/04/2020	Revised Final with Updated Plans	JP / AXS	ASJ
06	30/10/2020	Revised for CG RFI Item	TA / AXS	ASJ

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Figures

1 Report Structure

This report provides a comprehensive road impact assessment for the proposed development, an expansion of the existing agricultural / industrial operations owned by Kalfresh. The report includes the following components:

- **Traffic Impact Assessment** – reviewing the traffic related aspects of the development including traffic impacts on the road network, internal road layout, parking provision and servicing provision.
- **Pavement Impact Assessment** – reviewing the impact of the development generated heavy vehicle trips on the existing pavement
- **Road Safety Assessment** – reviewing the safety aspects of the development with particular focus on crash trends, intersection arrangements and site access design.

Each of these components is clearly indicated with an internal dividing page. For continuity and ease of reading, section numbers are continuous.

Traffic Impact Assessment

2 Introduction

2.1 Overview

Cardno Qld Pty Ltd (Cardno) has been engaged by Kalfresh Pty Ltd to provide traffic and transport engineering advice in relation to the proposed expansion of an existing Kalfresh produce site located 4km west of Kalbar and 84km south of Brisbane within Scenic Rim Regional Council's local government area.

This project proposes of an expansion of Kalfresh's existing agricultural processing warehouse business to provide approximately 40 hectares (ha) of developable land for rural infrastructure. The proposed infrastructure includes the following:

- 40 ha of developable land for industrial allotments ranging from 5,000 m^2 to 20 ha (specific land uses discussed in Section 4.1)
- Internal roads, project office areas and perimeter fence
- Construction of access points to highway
- Onsite sewerage and wastewater treatment
- Connection to power, telecommunications and water utilities.

The development layout is enclosed Appendix A.

The purpose of this report is to assess the traffic and transport components of the proposed development against the requirements of the Scenic Rim Regional Council planning document Boonah Shire Planning Scheme 2006. Therefore, the report addresses the following:

- State controlled road access
- External road network traffic impacts
- Road crash analysis and risk assessment
- Intersection operation analysis
- Internal traffic arrangements, including:
  - Car park design compliance
  - Car parking quantum
  - Access driveway design
  - Servicing provisions
- Active and public transport connections

2.2 References

The following resources were referred to in the preparation of the report:

- Australian Building Codes Board, *Building Code of Australia* (BCA), 2019
- Australian Standards, *Parking Facilities Part 1: Off-street Car Parking (AS2890.1:2004),* 2004
- Australian Standards, *Parking Facilities Part 2 - Off-street Commercial Vehicle Facilities* (AS2890.2:2002) 2002
- Australian Standards, *Parking Facilities Part 6 - Off-street Parking for People with Disabilities* (AS2890.6:2009) 2009
- Institute of Municipal Engineering Australia Queensland Division, *Queensland Streets: Design Guidelines for Subdivisional Streetworks*, 1993
- Kalfresh, *Initial Advice Statement (IAS) for Scenic Rim Agricultural Industrial Precinct*, 2019
- Pekol Traffic & Transport (PTT), *Proposed Frazerview Quarry Horan Road, Frazerview Traffic Impact Assessment*, 2019

- Queensland Department of Transport and Main Roads (TMR), *Guide to Traffic Impact Assessments* (GTIA), 2017
- Queensland Department of Transport and Main Roads (TMR), *Traffic Generation Database*, 2018
- Roads and Maritime Services (RMS), NSW Government, *Guide to Traffic Generating Developments: Updated Traffic Surveys,* 2013
- Scenic Rim Regional Council, *Boonah Shire Planning Scheme 2006*, 2018

2.3 Limitations

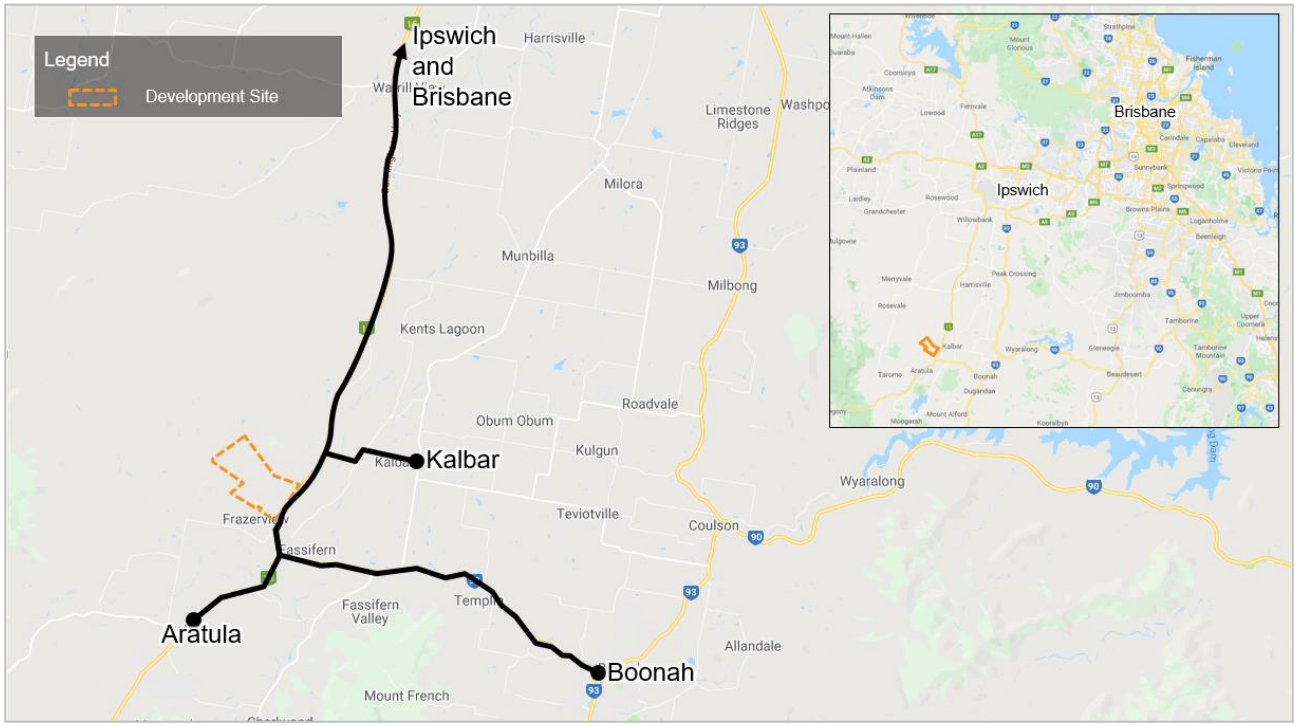
Cardno has completed this traffic report in accordance with the usual care and thoroughness of the consulting profession. The assessment is based on accepted traffic engineering practises and standards applicable at the time of undertaking the assessment. The assessment was completed in November 2019 and updated in April 2020 and October 2020, and is based upon the conditions encountered and project information available at the time. Cardno disclaims responsibility for any changes to project planning or road conditions that may occur after completion of the assessment.

3 Existing Conditions

3.1 Site Location

The existing site location is situated 4km west of Kalbar and 84km south of Brisbane within the Scenic Rim Regional Council's boundary. The existing Kalfresh site has frontage to the east by the Cunningham Highway, Figure 3-1 illustrates the site context in relation to the local area and the wider region.

Figure 3-1 Site Context

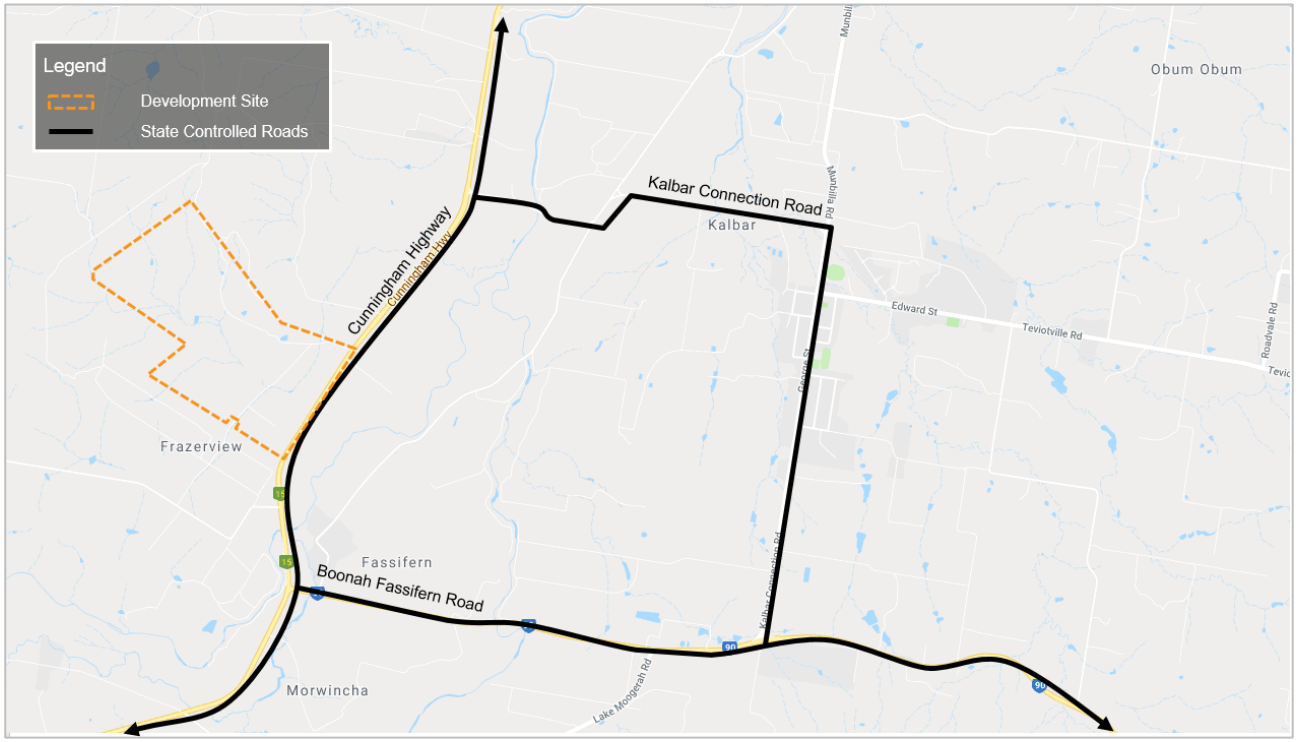


Source: Google Maps

3.2 Local Road Network

The site has frontage along Cunningham Highway to the east. The key roads related to the development are illustrated on Figure 3-2 with the key characteristics of these roads summarised in Table 3-1.

Figure 3-2 Existing Local Road Network



Source: Google Maps

Table 3-1 Local Road Network Characteristics

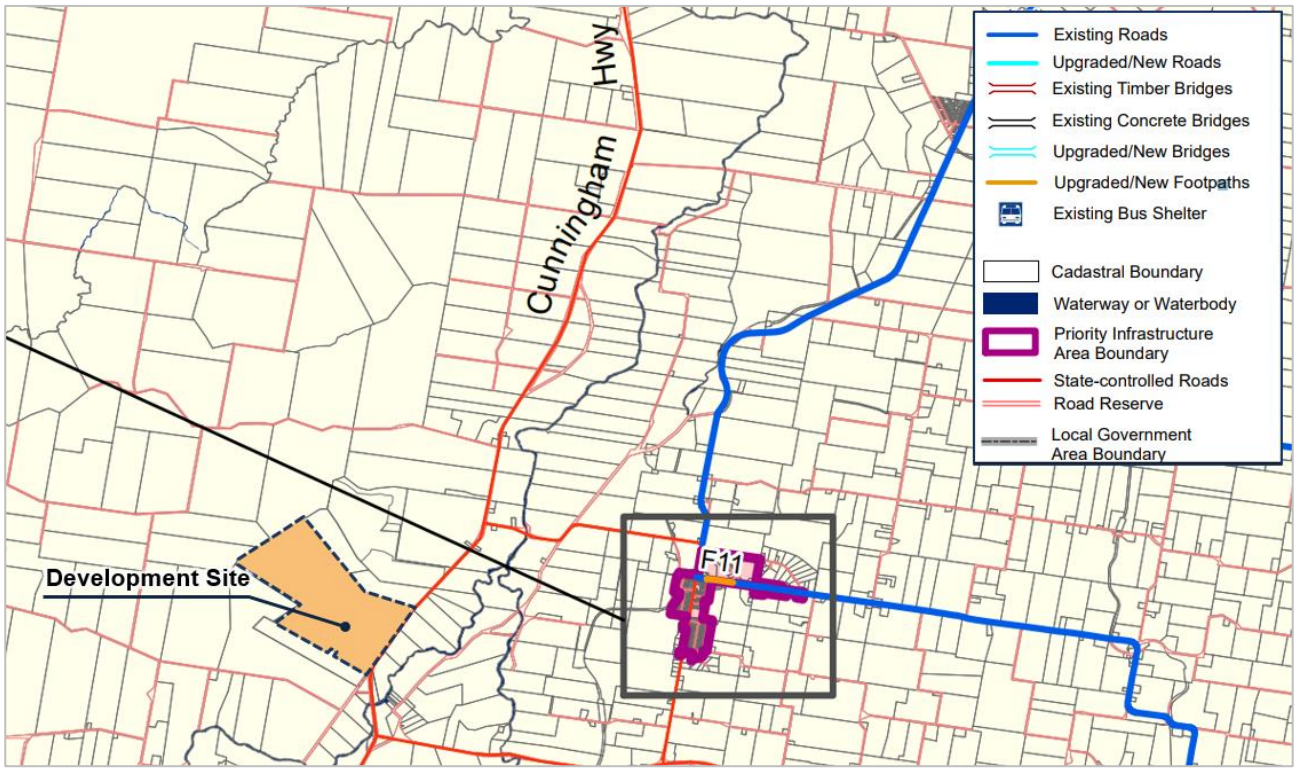
Road	Authority	Classification	Posted Speed Limit	Typical Form
Cunningham Highway	TMR	State Controlled Road	100km/hr	Two lane, undivided, with shoulder
Kalbar Connection Road	TMR	State Controlled Road	100km/hr heading west 80km/hr heading east	Two lane, undivided, no shoulder
Boonah Fassifern Road	TMR	State Controlled Road	100km/hr	Two lane, undivided, no shoulder

3.3 Planned Road/Intersection Upgrades

3.3.1 Scenic Rim Regional Council LGIP

The Scenic Rim Regional Council Local Government Infrastructure Plan (LGIP) has been referenced to identify any future planned transport infrastructure in the vicinity of the development site. The LGIP does not identify any future transport related upgrades in the vicinity of the site, as illustrated on Figure 3-3 which indicates that the nearest upgrade would be within the Priority Infrastructure Area at Kalbar located 4.5km east of the site.

Figure 3-3 LGIP Context Map



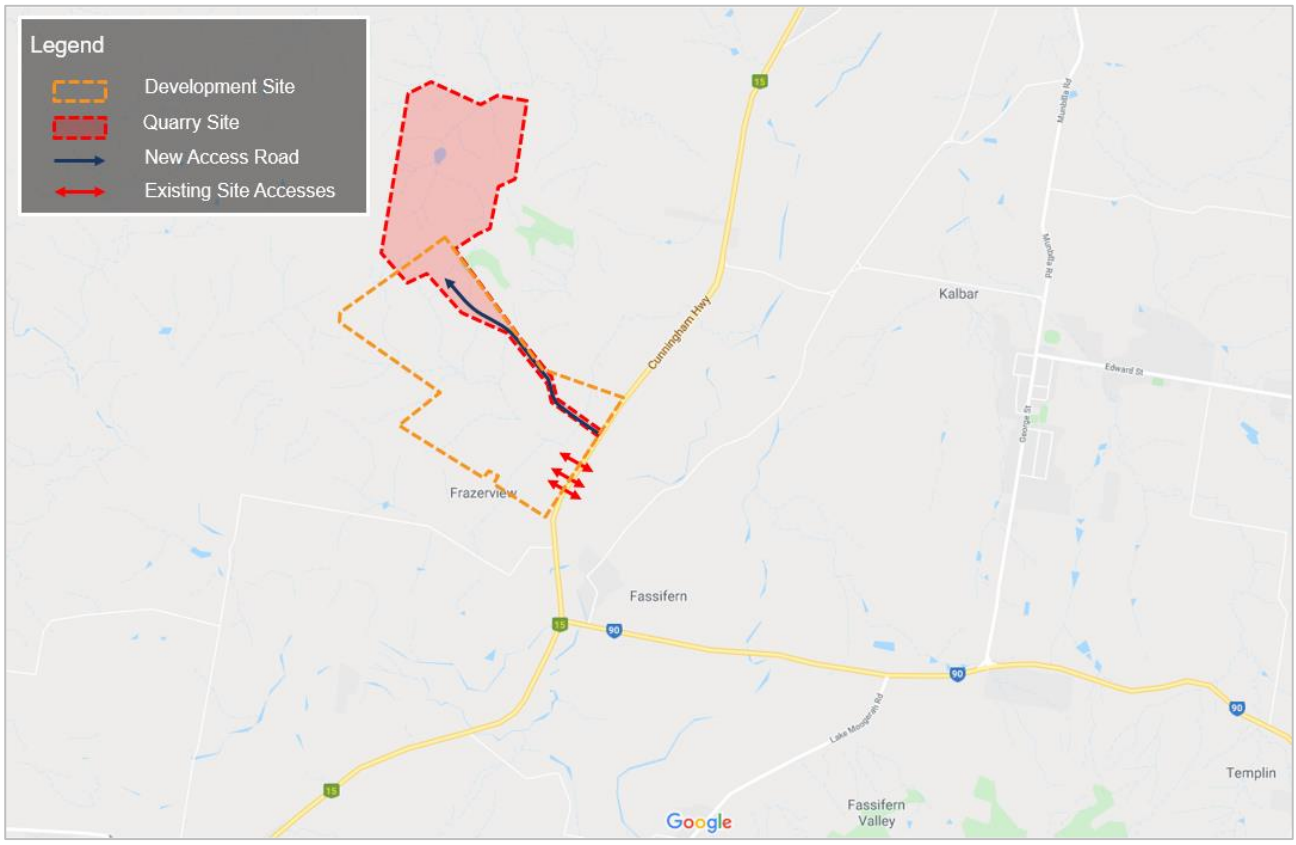
Source: Scenic Rim Regional Council LGIP Map PFTI T-1

3.3.2 Frazerview Quarry New Road

The Frazerview Quarry project proposes to provide a new road on the border of the subject site which will be used to provide access to the proposed Kalfresh expansion. The location of the quarry site with reference to the proposed development is illustrated on Figure 3-4.

The Frazerview Quarry development expects to produce 20 staff trips and 22 truck trips in the peak hour, this has been included in the traffic impact assessment, further discussed in Section 5. The design vehicle for the quarry is a 25-26m long B-double with the possibility of 30-36m A-doubles, this has been taken into consideration for the intersection design. Section 4.2 provides context to the proposed new access road.

Figure 3-4 Quarry Location



Source: Google Maps

4 Proposed Development

4.1 Land Uses

The expansion of the Kalfresh development proposes the following land uses outlined in Table 4-1 and illustrated on Figure 4-1. It is understood that the on-site Digester / Energy Site and Drainage / Bio Basin will serve as ancillary uses to the overall site and as such, a developable area has not been determined.

Table 4-1 Development Yield Breakdown

Allotment	Land Use	Land Area	Developable Area*
(Kalfresh) 5, 6, 8, 9	Agricultural / Industrial	98,180 sq.m	44,181 sq.m
(Non-Kalfresh) 1, 2, 3, 4, 8, 10, 12, 13, 14, 15	Agricultural / Industrial	217,650 sq.m	97,943 sq.m
11	Digester (ancillary)	50,000 sq.m	N/A
Drainage / Bio Basin / Sewer Treatment Plant	Ancillary	11,430 sq.m	N/A

*A 45% site coverage as Developable Area assumption has been adopted

Figure 4-1 Proposed Development Layout – Allotment Breakdown (TO BE UPDATED WITH FINAL PLAN)

Source: RPS

4.2 Access

Vehicle access to the site is proposed via a new road, located approximately 430m north from the existing main crossover onto the Cunningham Highway. The intersection with the Cunningham Highway has been determined as a seagull priority controlled T-junction. A concept sketch of the intersection form is provided at Appendix B.

The access arrangement to each development allotment is proposed as rear lot access in comparison to the existing access off the Cunningham Highway, context is provided in Figure 4-2. The existing access points on Cunningham Highway are proposed to be permanently closed.

Figure 4-2 Proposed Site Access (TO BE UPDATED WITH FINAL PLAN)

Source: Google Maps, RPS

5 Traffic Assumptions and Characteristics

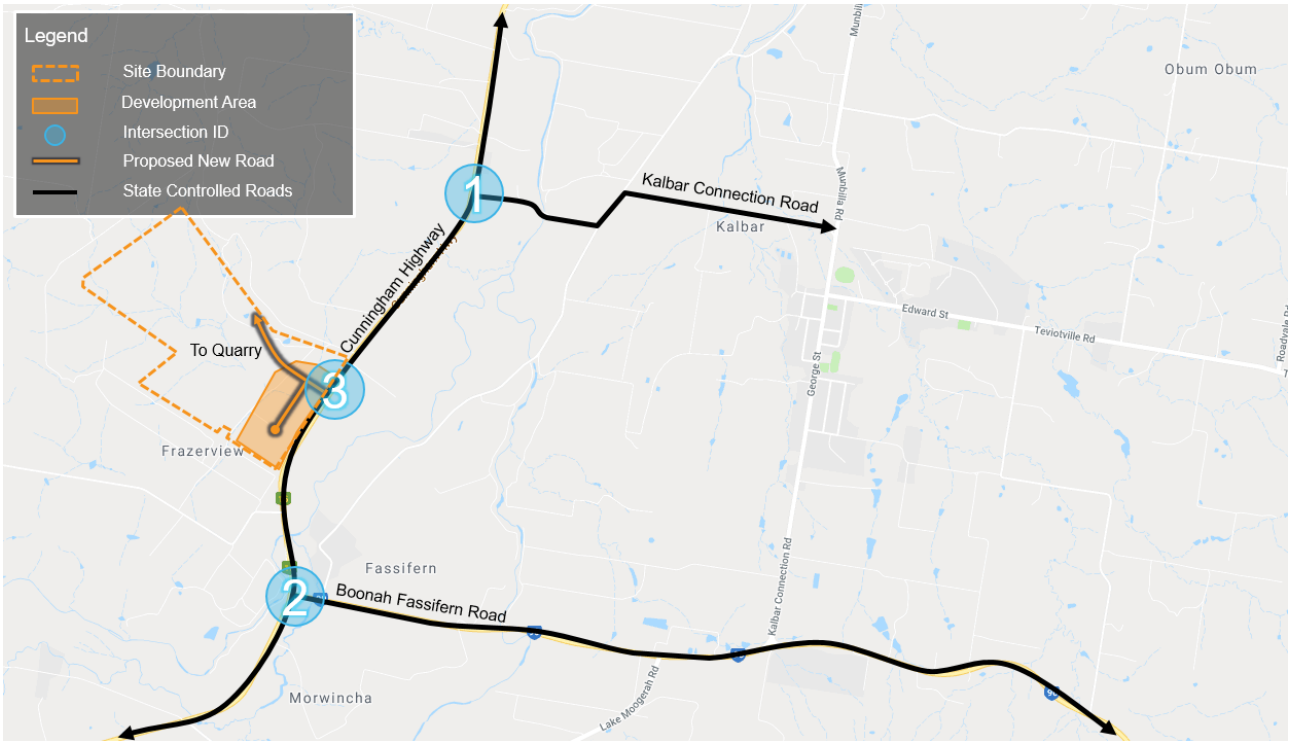
5.1 Study Area

For this traffic study, the following intersections have been assessed as part of the traffic impact assessment:

1. Cunningham Highway / Kalbar Connection Road
2. Cunningham Highway / Boonah Fassifern Road
3. Cunningham Highway / New Road

Figure 5-1 illustrates the location of the study intersections:

Figure 5-1 Study Intersections



Source: Google Maps

5.2 Background Traffic Volumes

To understand the existing traffic conditions, traffic surveys were undertaken by Austraffic during the 3-hour AM and PM peak periods on Friday 11th October 2019, for the following intersections:

1. Cunningham Highway / Kalbar Connection Road intersection
2. Cunningham Highway / Boonah Fassifern Road

A review of the surveys indicated that the road network AM peak period was between 7:00am – 8:00am and the road network PM peak period was between 2:45pm – 3:45pm. It is noted that the development peak periods have been adopted for this assessment, which relate to the key shift changeover times outlined by Kalfresh.

> Adopted AM peak: 5:30pm – 6:30pm

> Adopted PM peak: 3:30pm – 4:30pm

These peak hours represent the thirty minutes before and after the shift changeover time to capture the arriving trips for staff starting work and the departing trips for staff finishing work.

5.3 Traffic Growth

An investigation into the historic TMR AADT data along Cunningham Highway was used to estimate an appropriate growth on the external road network. The data is represented on Table 5-1.

Table 5-1 Background Traffic Growth – Cunningham Highway 1.77km North of Kalbar Connection Road (Counter 10014)

Year	AADT	Annual Growth (linear)
2014	4,930	-
2015	5,097	3.28%
2016	5,234	2.62%
2017	5,221	-0.25%
2018	5,329	2.03%
Average annual growth		**1.92%**

The historical data indicated an average growth rate of 1.92% over the past four (4) years. As a conservative estimate, this has been rounded up to 2% per annum applied linearly and has been adopted for the assessment herein.

5.4 Development Traffic Volumes

The traffic impact assessment for the proposed development has been undertaken to account for the following development elements:

- Construction Traffic Impact
  - Existing Kalfresh site operations traffic
  - Construction traffic
- Proposed Development Traffic Impact
  - Quarry traffic (determined by others)
  - Proposed development traffic (Kalfresh allotments and Non-Kalfresh allotments)

The following sections detail the anticipated traffic generation for the abovementioned elements of the development.

To gain an understanding of the existing site traffic, the Client (Kalfresh) has provided Cardno with existing staff and operations numbers in the assumptions memorandum dated 2 October 2019. This data has been used to form the basis of a first principles assessment of the existing operations and construction traffic movements. The traffic generation for the proposed expansion of the site (Kalfresh and Non-Kalfresh allotments) have been based on floor area rates.

5.4.1 Existing Kalfresh Operations Traffic

To determine the existing day to day operations of the Kalfresh site, Cardno has undertaken a first principles assessment with data supplied from the Client to gain an understanding of daily traffic associated with the existing site.

It is understood that Kalfresh grows and sells both conventional and certified organic vegetables. This process involves receiving unprocessed fruits and vegetables from local farms and processing, packaging and distributing the produce to domestic and international vendors. The existing site provides the following facilities (as described in the Initial Advice Statement):

- Workshop Area
- Carrot Unloading
- Carrot Processing
- Office
- Onion Packing
- Onion Grading
- Onion Drying Warehouse
- Pumpkin Washing & Packing Shed
- Shared Fire & Water Recycled Water IML

5.4.1.1 *Existing Kalfresh Operations Traffic (Workforce)*

This section outlines the trip generation related to the existing workforce employed at the current Kalfresh site. The existing operations workforce as advised by Kalfresh is outlined in Table 5-2.

Table 5-2 Existing Operations Workforce

Staff	Operations
Permanent Staff	50 staff (admin, trucking, packing, farming)
Casual Staff	50 to 150 staff (varies depending on the season, consists of operations in the packing sheds)

The proposed workforce distribution is summarised in Table 5-3 below. Kalfresh has advised that generally at least 20 of staff are usually passengers (car pooling) and as a result, 80% of staff person trips will result in driving trips.

Table 5-3 Workforce Distribution – Existing Operations and Construction

Direction	Origin	Vehicle Type	Distribution		
			Car as driver	Car as passenger^	Distribution as % of driving trips
North	Brisbane / Ipswich	Light vehicle	10%	2.5%	**12.5%**
North-East	Kalbar		30%	7.5%	**37.5%**
South-East	Boonah		30%	7.5%	**37.5%**
South*	Aratula		10%	2.5%	**12.5%**
Total			**80%**	**20%**	**100%**

Note: * Assumed remaining 10% originates from the South, ^ 20% passenger split between the various origin locations

The estimated driving trips for the existing workforce are summarised in Table 5-4 below.

Table 5-4 Traffic Generation - Existing Operations

Staff Type	No. of Staff	Daily Person Trips#	% Driving Trips	Daily Driving Trips	AM peak % of Daily	PM peak % of Daily	AM Peak Trips	PM Peak Trips
Permanent staff	50	100	80%	80	50%†	50%†	40	40
Casual staff	150*	300	80%	240	33%^	33%^	40	40
Total				**320 vpd**			**80 vph**	**80 vph**

Note: # Assume two person trips per staff per day * Assumed upper limit of casual staff representing peak season operations, † Assumed permanent staff arrive during peak hours only, ^ Assume casual staff work in three (3) shifts per day with equal staff per shift, arriving during peak hours

Table 5-5 summarises the directional distribution of the existing workforce trips in the AM and PM peaks. It is noted that the casual staff trips represent a shift change over during the peak periods therefore, staff for one shift will be departing and staff for the next shift will be arriving during the peak hour.

Table 5-5 In/Out Split - Existing Operations

Staff Type	No. of Staff	AM In %	AM Out %	PM In %	PM Out %
Permanent staff	50	100%	0%	0%	100%
Casual staff	150	100%	100%	100%	100%

The resultant traffic generated by direction for the existing workforce is summarised in Table 5-6.

Table 5-6 Directional Traffic Generation - Existing Operations

Staff Type	No. of Staff	Trip Generation (vph)			
		AM In	AM Out	PM In	PM Out
Permanent staff	50	40	0	0	40
Casual staff	150	40	40	40	40
Total		**80 vph**	**40 vph**	**40 vph**	**80 vph**

5.4.1.2 *Existing Kalfresh Operations Traffic (Operations)*

5.4.1.2.1 Deliveries from Site

This section outlines the trip generation related to the existing operations (deliveries) at the current Kalfresh site. Existing operation distribution patterns for deliveries departing site (processed produce) are outlined in Table 5-7 to 5-8, as advised by Kalfresh.

Table 5-7 Existing Operations Distribution – Deliveries Departing Site

Origin	Destination	Direction	Vehicle	Daily Trucks	AM % of Daily Trips	PM % of Daily Trips
Kalfresh site	WW DC	North	Class 9 truck	4	50%	50%
Kalfresh site	Coles DC	North	Class 9 truck	4	50%	50%
Kalfresh site	Brisbane Markets / Brisbane	North	Class 9 truck	1	100%*	100%*
Kalfresh site	Nolans (Gatton) for interstate	North	Class 9 truck	3	50%	50%

* Adopted conservative assumption for each peak that trucks arrive and depart in both peaks

Table 5-8 Existing Operations Trips – Deliveries Departing Site

Origin	Destination	Vehicle	Daily Trucks	Daily Trips	AM Trips	PM Trips
Kalfresh site	WW DC	Class 9 truck	4	8	4	4
Kalfresh site	Coles DC	Class 9 truck	4	8	4	4
Kalfresh site	Brisbane Markets / Brisbane	Class 9 truck	1	2	2	2
Kalfresh site	Nolans (Gatton) for interstate	Class 9 truck	3	6	3	3
Total				**24**	**13 vph**	**13 vph**

5.4.1.2.2 Deliveries to Site

Existing operation distribution patterns for deliveries arriving to site (unprocessed produce) are outlined in Table 5-9 to 5-10, as advised by Kalfresh.

Table 5-9 Existing Operations Distribution – Deliveries Arriving to Site

Origin	Destination	Direction	Vehicle	Daily Trucks	AM % of Daily Trips	PM % of Daily Trips
Kalbar/Lockyer	Kalfresh site	North-east	Class 9 Truck	2	50%	50%
Liston/Downs	Kalfresh site	South	Class 9 Truck	2	50%	50%
Kalbar/Lockyer	Kalfresh site	North-east	Class 5 Truck	2	50%	50%
Liston/Downs	Kalfresh site	South	Class 5 Truck	2	50%	50%
Nolans (Gatton)	Kalfresh site	North	Class 9 Truck	3	50%	50%
Bowen*	Kalfresh site	North	Class 9 Truck	1	100%*	100%*

* Adopted conservative assumption for each peak that trucks arrive and depart in both peaks

Table 5-10 Existing Operations Trips – Deliveries Arriving to Site

Origin	Destination	Vehicle	Daily Trucks	Daily Trips	AM Trips	PM Trips
Kalbar/Lockyer	Kalfresh site	Class 9 Truck	2	4	2	2
Liston/Downs	Kalfresh site	Class 9 Truck	2	4	2	2
Kalbar/Lockyer	Kalfresh site	Class 5 Truck	2	4	2	2
Liston/Downs	Kalfresh site	Class 5 Truck	2	4	2	2
Nolans (Gatton)	Kalfresh site	Class 9 Truck	3	6	3	3
Bowen	Kalfresh site	Class 9 Truck	1	2	2*	2*
Total				**24 vph**	**13 vph**	**13 vph**

* Adopted conservative assumption for each peak that trucks arrive and depart in both peaks

As shown, a total of 26 vph are estimated for both deliveries to and from site in each peak period. It is noted that the total of the peak period trips result in a larger value than the estimated daily trips. This is due to adoption of the conservative assumption that deliveries occurring once per day will arrive and depart in both peak periods, to ensure both peaks include the impact of the delivery.

5.4.2 Construction Traffic

To determine the traffic generated during the construction works for the expansion of the Kalfresh site, Cardno has undertaken a first principles assessment with data supplied from the Client to gain an understanding of daily traffic associated with the existing site.

Table 5-11 outlines the assumptions adopted when calculating the anticipated traffic generation proposed for the construction workforce, with the adopted traffic generation rates outlined in Table 5-11.

Table 5-11 Construction Phase Assumptions

Construction Phase		Assumptions
Phase 3: Groundworks and Construction	32 workers^	▪ Earthworks activities: 1 truck (B-doubles, AVs) every 10 mins over 10 hrs per day ▪ Import of earthworks would have the greatest heavy vehicle traffic impact
Phase 5: Digester Construction	33 workers^	▪ Assume all workforce trips are single occupant vehicle trips
Phase 5: Building Construction	403 workers*	▪ Allotments would likely be constructed over a period of time, not all at once. Figure 5-2 outlines the assumed staging of allotments from 2021 to 2025, as informed from the RPS staging plan ▪ Assume 33 construction workforce per allotment ▪ Assume all workforce trips are single occupant vehicle trips

Note ^ Kalfresh assumption, * Based on Cardno assumptions

Figure 5-2 Assumed Construction Workforce Staging (2021- 2025)

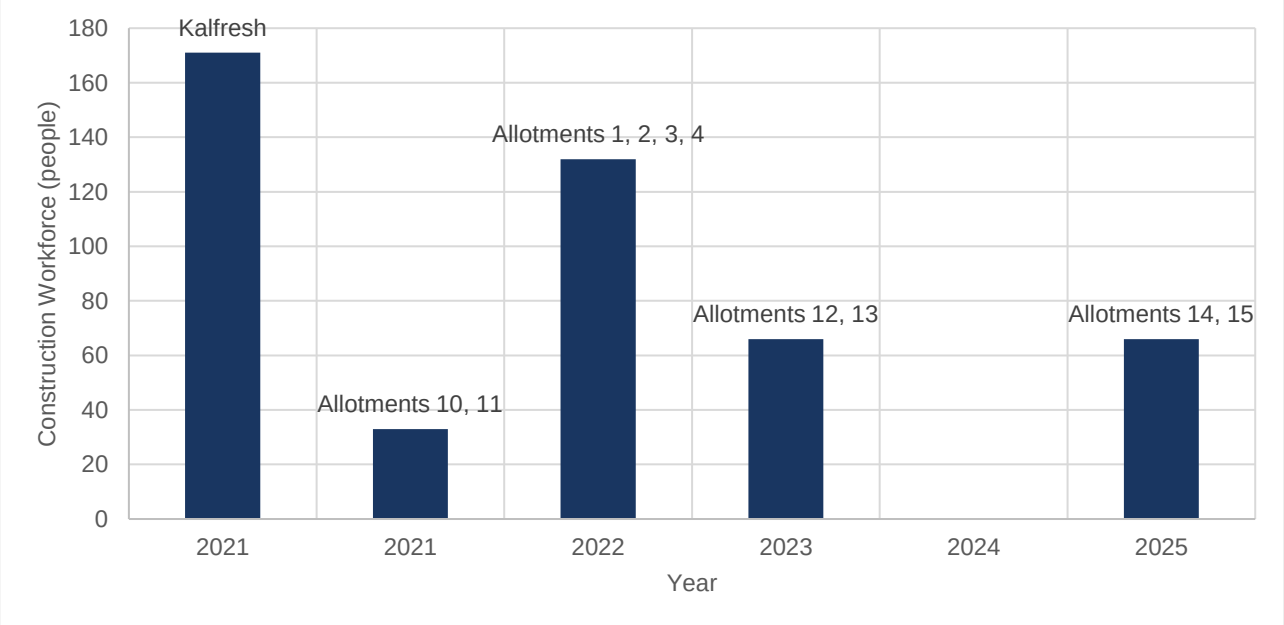


Table 5-12 Construction Workforce Trip Generation

Construction Phase	No. of Workers	Trip Generation Rate (trips per worker)		
		AM	PM	Daily
Phase 3: Groundworks and Construction	32	1	1	2
Phase 5: Digester Construction	33	1	1	2
Phase 5: Building Construction	403	1	1	2

The estimated traffic generation associated with the construction workforce is outlined in Table 5-13.

Table 5-13 Construction Workforce Traffic Generation

Construction Phase	No. of Workers	Trip Generation		
		AM	PM	Daily
Phase 3: Groundworks and Construction	32	32 vph	32 vph	64 vpd
Phase 5: Digester Construction	33	33 vph	33 vph	66 vpd
Phase 5: Building Construction	403	403 vph	403 vph	806 vpd

5.4.2.1 Construction Phase 5 Traffic – Peak Traffic Impact

It is anticipated that the peak construction traffic in terms of overall vehicle trips will occur during Phase 5. This is largely attributed to the workforce numbers which are considered to be overestimated due to the assumption that all allotments will be constructed at the same time. While this is not considered to be a likely outcome, this assessment has been undertaken to anticipate the worst case construction traffic impact.

Table 5-14 outlines the directional distribution expected for Phase 5 workforce trips, with the resultant traffic generation outlined in Table 5-15.

Table 5-14 Construction Workforce Directional Distribution

Construction Phase	No. of Workers	Distribution			
		AM in	AM out	PM in	PM out
Phase 5: Digester Construction	33	100%	0%	0%	100%
Phase 5: Building Construction	403	100%	0%	0%	100%

Table 5-15 Construction Workforce Traffic Generation

Construction Phase	No. of Workers	Trip Generation			
		AM in	AM out	PM in	PM out
Phase 5: Digester Construction	33	33	0	0	33
Phase 5: Building Construction	403	403	0	0	403
Total		**436 vph**	**0 vph**	**0 vph**	**436 vph**

As shown, the Phase 5 construction activities are estimated to generate 436 vph in each peak period.

5.4.3 Frazerview Quarry Traffic

The Frazerview Quarry traffic volumes have been considered in this assessment and have been sourced from the PTT Frazerview Quarry Traffic Impact Assessment dated 22 January 2019. The development gained approved on 14 September 2020. An updated traffic assessment, dated 20 April 2020, was submitted for the application, however a copy of this report was not made available. Therefore, until this report is received, Cardno has referred to the available information at the time, which are the volumes reported in the Traffic Impact Assessment dated 22 January 2019.

The report indicates that a total daily two way volume of 290 vpd would be generated by the development.

The proposed peak hour volumes generated from the Frazerview Quarry are outlined in Table 5-16.

Table 5-16 Traffic Generation - Frazerview Quarry

User	Traffic Generation			
	AM In	AM Out	PM In	PM Out
Staff	16	4	4	16
Trucks	11	11	11	11

The external network distribution adopted for the assessment is outlined in Table 5-17.

Table 5-17 Trip Distribution - Frazerview Quarry

User	North	South
Staff	50%	50%
Trucks	90%	10%

5.4.4 Proposed Development

5.4.4.1 *Kalfresh Expansion Development*

The proposed expansion is planned to be separated into two components:

- Allotments owned and operated by Kalfresh
- Allotments sold and operated by others

The classification of the allotments are indicated on Figure 5-3.

Figure 5-3 Development Allotment Breakdown – Kalfresh and Non-Kalfresh (TO BE UPDATED WITH FINAL PLAN)

Source: RPS

The uses for the overall site are to remain consistent with the planning for the area, that is, Agricultural / Industrial uses. At this early stage of planning, a high level yield estimate has been adopted for the purposes of the traffic assessment. This has been informed by the town planning team, which has indicated that 45% developable area over the allotment area should be adopted. Table 5-18 provides a summary of the assumed yields.

Table 5-18 Anticipated Kalfresh Expansion Workforce

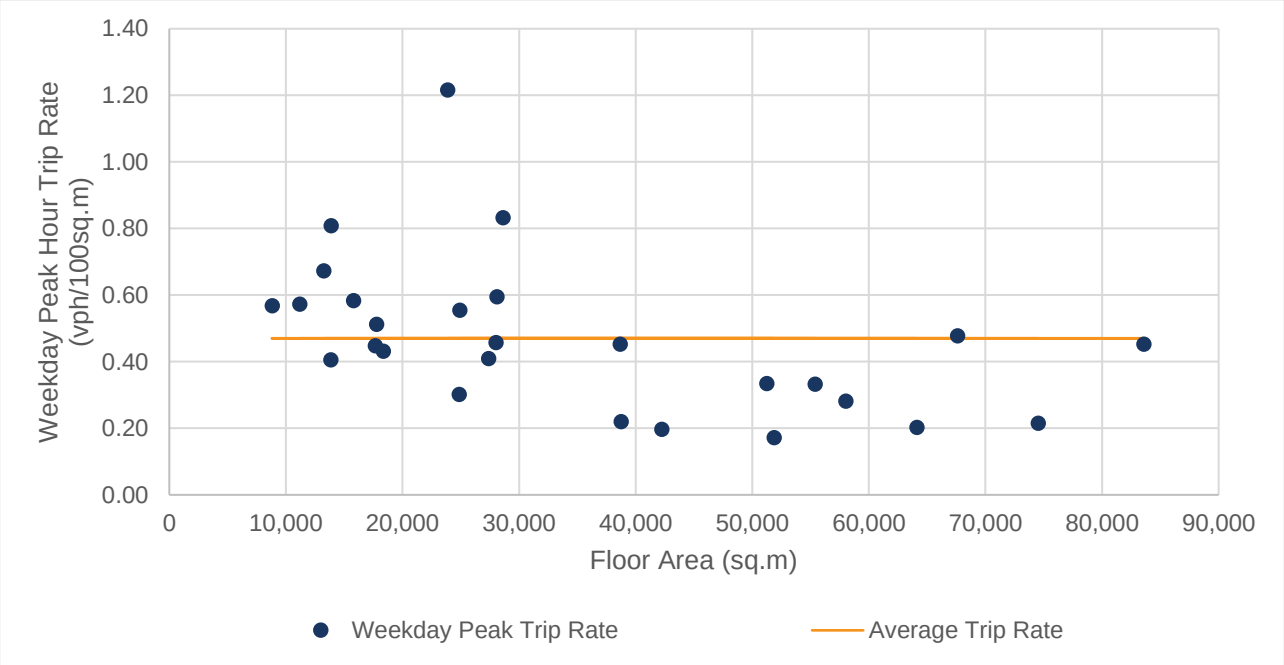
Indicative Allotments	Land Use	Approximate Land Area	Approximate Developable Area*
(Kalfresh) 5, 6, 8, 9	Agricultural / Industrial	98,180 sq.m	44,181 sq.m
(Non-Kalfresh) 1, 2, 3, 4, 8, 10, 12, 13, 14, 15	Agricultural / Industrial	217,650 sq.m	97,943 sq.m
Total		**315,830 sq.m**	**142,124 sq.m**

*A 45% site coverage as Developable Area assumption has been adopted

5.4.4.2 *Trip Generation*

Traffic generation rates for Agricultural / Industrial land use have been sourced from TMR's Trip Generation Database (2018) for Industrial uses. The average weekday development peak trip rate has been adopted for this assessment. The sourced data is illustrated on Figure 5-4. The orange line represents the average trip rate across the data set, which equates to 0.47 vph/100sq.m. The average daily trip rate was determined to be 5.65 vpd/100sq.m.

Figure 5-4 Trip Generation Rate – Industrial Uses



Source: TMR Trip Generation Database, 2018

Table 5-19 outlines the traffic generation for the proposed development. As shown, the proposed development is anticipated to generate 668 vph in each AM and PM peak period.

Table 5-19 Development Traffic Generation

Use	Land Use	Development Yield	Trip Generation Rates (trips/100sq.m)			Trip Generation		
			AM	PM	Daily	AM	PM	Daily
Kalfresh	Agricultural / Industrial	44,181 sq.m	0.47	0.47	5.65	208 vph	208 vph	2,496 vpd
Non-Kalfresh	Agricultural / Industrial	97,943 sq.m	0.47	0.47	5.65	460 vph	460 vph	5,534 vpd
Total		**142,124 sq.m**				**668 vph**	**668 vph**	**8,030 vpd**

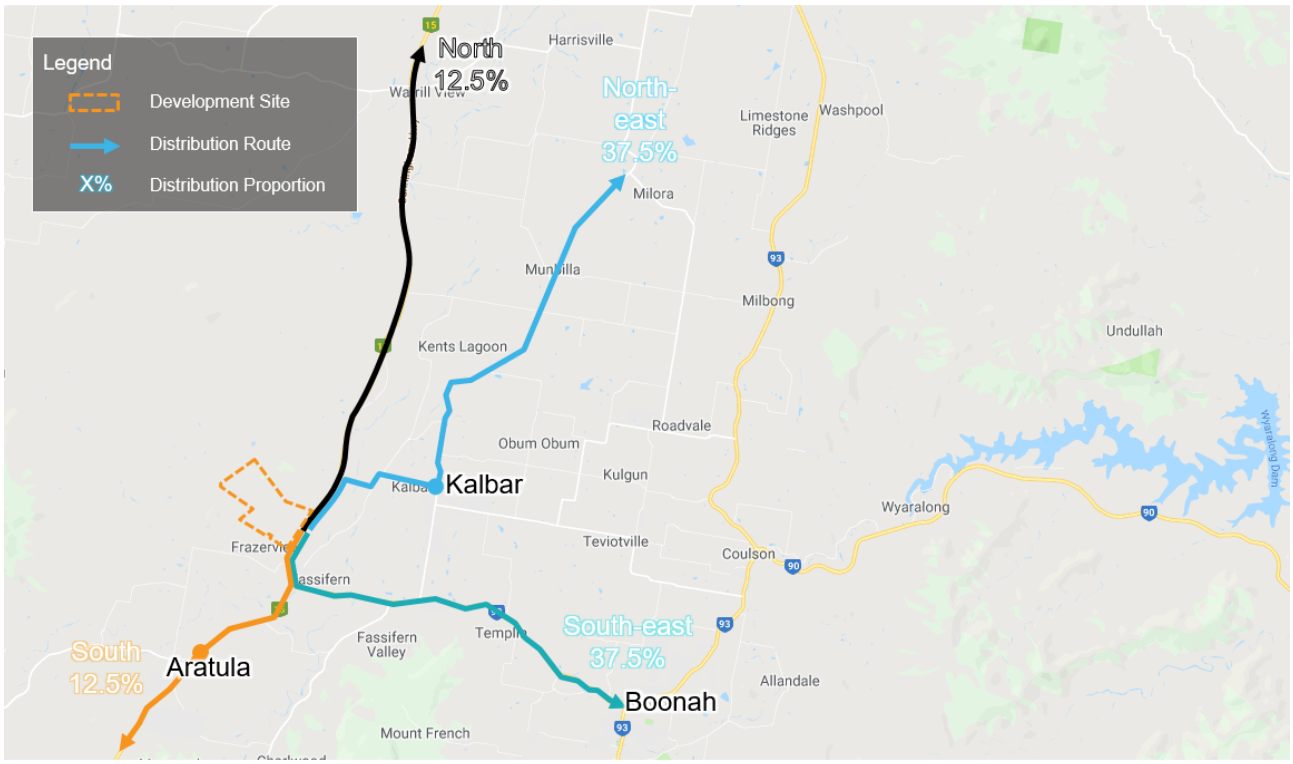
5.4.4.3 *External Distribution*

The distribution expected for the proposed development is advised to follow the existing distribution patterns, as outlined in section 5.4.1.1. Table 5-20 outlines the distribution assumed for workforce trips, and illustrated on Figure 5-4.

Table 5-20 Distribution – Proposed Development

Direction	Origin	Distribution
North	Brisbane / Ipswich	12.5%
North-East	Kalbar	37.5%
South-East	Boonah	37.5%
South	Aratula	12.5%
Total		**100%**

Figure 5-5 External Traffic Distribution



Source: Google Maps

5.4.4.4 *Directional Distribution*

Directional distribution for the proposed development has been estimated as follows:

- **Kalfresh allotments**: based on advised shift breakdown, as per Table 5-21
- **Non-Kalfresh allotments**: based on generally accepted distribution splits

The shift breakdown was advised by Kalfresh as follows:

Table 5-21 Kalfresh Shift Operations

Shift	Shift Time	Proportion of Staff
1	6am to 4pm	45%
2	4pm to 12am	45%
3	12am to 6am	10%
Total		**100%**

The trip movements associated with each shift at each peak period is outlined in Table 5-22.

Table 5-22 Kalfresh Trip Movements by Shift

Shift	Shift Times (**bold** signifies coincides with peak period)	Proportion of Staff	Trip Movements			
			AM in	AM out	PM in	PM out
1	**6am** to **4pm**	45%	**100%**	0%	0%	**100%**
2	**4pm** to 12am	45%	0%	0%	**100%**	0%
3	12am to **6am**	10%	0%	**100%**	0%	0%
Sub-total		**100%**	**45%**	**10%**	**45%**	**45%**
Total			**AM Peak: 55%**		**PM Peak: 90%**	

This results in the following directional splits for the Kalfresh operations:

- **AM Peak**: of the total **55%** staff trips occurring in the peak:
  - 82% in
  - 18% out
- **PM Peak**: of the total **90%** staff trips occurring in the peak:
  - 50% in
  - 50% out

The resultant directional distribution is outlined in Table 5-23.

Table 5-23 Directional Distribution – Proposed Development

Use	Trip Generation			
	AM in	AM out	PM in	PM out
Kalfresh	82%	18%	50%	50%
Non-Kalfresh	70%	30%	30%	70%

5.4.4.5 *Traffic Generation*

The anticipated traffic generated from both the Kalfresh and Non-Kalfresh components of the proposed development is outlined in Table 5-24.

Table 5-24 Proposed Development Traffic

Use	Trip Generation			
	AM in	AM out	PM in	PM out
Kalfresh	170 vph	38 vph	104 vph	104 vph
Non-Kalfresh	322 vph	138 vph	138 vph	322 vph
Total	**492 vph**	**176 vph**	**242 vph**	**426 vph**

6 Operational Assessment

6.1 Assessment Scenarios

In accordance with the DTMR G*uide to Traffic Impact Assessment* (2017), the impact assessment year has been categorised based on the impact type. For the purpose of this assessment, the impact on the site access / frontage, and intersection delay are applicable.

Therefore, the impact assessment year for the site access should be the year of opening and 10 years after the year of opening. Whereas the impact on the external intersections should be assessed for the year of opening.

The Kalfresh development has been assumed to be completed in one stage with construction beginning 2020. The construction is proposed to finish end of 2020 and 2021 will be considered the year of opening.

The Non-Kalfresh developments are assumed to be developed over 10 years (1 allotment per year) with the first allotment beginning operations in 2022 and the final allotment beginning operations in 2031, therefore the design horizon of the ultimate development is 2041.

The Frazerview Quarry year of opening has been taken as 2020 and has been included in all relevant scenarios during 2020 and post 2020. While it has been noted by TMR that this year of opening is not considered to be feasible, for the purposes of the assessment, the quarry traffic volumes are assumed to be constant 'background' traffic for the proposed development. Therefore, including the quarry in the 2020 scenarios is considered to provide a conservative assessment of the road network.

Table 6-1 summarises the traffic impact assessment scenarios.

Table 6-1 Traffic Impact Assessment Scenarios

Assessment Scenario	Background Traffic	Existing Kalfresh Operations	Construction (Phase 5) Traffic	Quarry Traffic	Proposed Development Traffic	Study Intersections
2019 BG (surveyed year)	✓					External Intersection
2020 BG	✓					External Intersection
2020 BG + Con + Quarry (Quarry year of open)	✓	✓	✓	✓		All intersections
2021 BG + Quarry	✓			✓		All intersections
2021 BG + Quarry + Dev (Year of open Kalfresh Operations)	✓			✓	✓	All intersections
2031 BG + Quarry	✓			✓		All intersections
2031 BG + Quarry + Dev	✓			✓	✓	All intersections
2041 BG + Quarry	✓			✓		Site Access
2041 BG + Quarry + Dev (Design Horizon)	✓			✓	✓	Site Access

6.2 Assessment Criteria

The performance of the study intersections have been analysed using SIDRA Intersection 8.0 (SIDRA). SIDRA is an industry recognised analysis tool that estimates the capacity and performance of intersections based on input parameters, including geometry and traffic volumes, and provides estimates of an intersection's Degree of Saturation (DOS), queues and delays.

6.2.1 Intersection Delay

The TMR GTIA recognises the intersection delay as a greater indicator of intersection performance in comparison to the previous TMR GARID's focus on the degree of saturation (DOS) criteria. The TMR GTIA appreciates that in urban networks, the DOS of an intersection may not be the most accurate representation of the intersection's operation as it is expected that existing intersections are approaching capacity with the growth of our cities.

The desired outcome outlined by the GTIA is to ensure that the sum of all intersection delays on the base traffic within the study area does not significantly worsen (i.e. does not increase average delays by more than 5% in aggregate) as a result of the development.

The TMR GTIA outlines that the proposed development should seek to achieve no net worsening to efficiency across the impact assessment area. While Council intersections should be included in the impact assessment area, the no net worsening calculations should only apply to intersections with at least one state-controlled road approach, unless otherwise stated by Council.

Intersection mitigation measures (avoid, manage or mitigate) must be considered where the sum of all intersection delays on the base traffic is greater than 5% in aggregate. Where this threshold has been exceeded, Cardno has made further comments.

Furthermore, for priority controlled intersections and roundabouts, where the average peak hour delays for any movement exceeds 42 seconds, as outlined in the GTIA, the intersection should be upgraded for safety reasons. At an individual intersection-level, where this threshold has been exceeded, Cardno has made further comments. For signalised intersections, given the delay is dependent on the cycle length and phasing arrangement, the DOS is still considered.

6.2.2 Intersection Degree of Saturation

While the movement delay is considered to provide a better indication of intersection performance and safety for priority controlled intersections and roundabouts, the DOS should still be considered when assessing the performance of the intersection.

Table 6-2 provides the DOS thresholds adopted for the assessment.

Table 6-2 Adopted Intersection Performance Threshold – Degree of Saturation

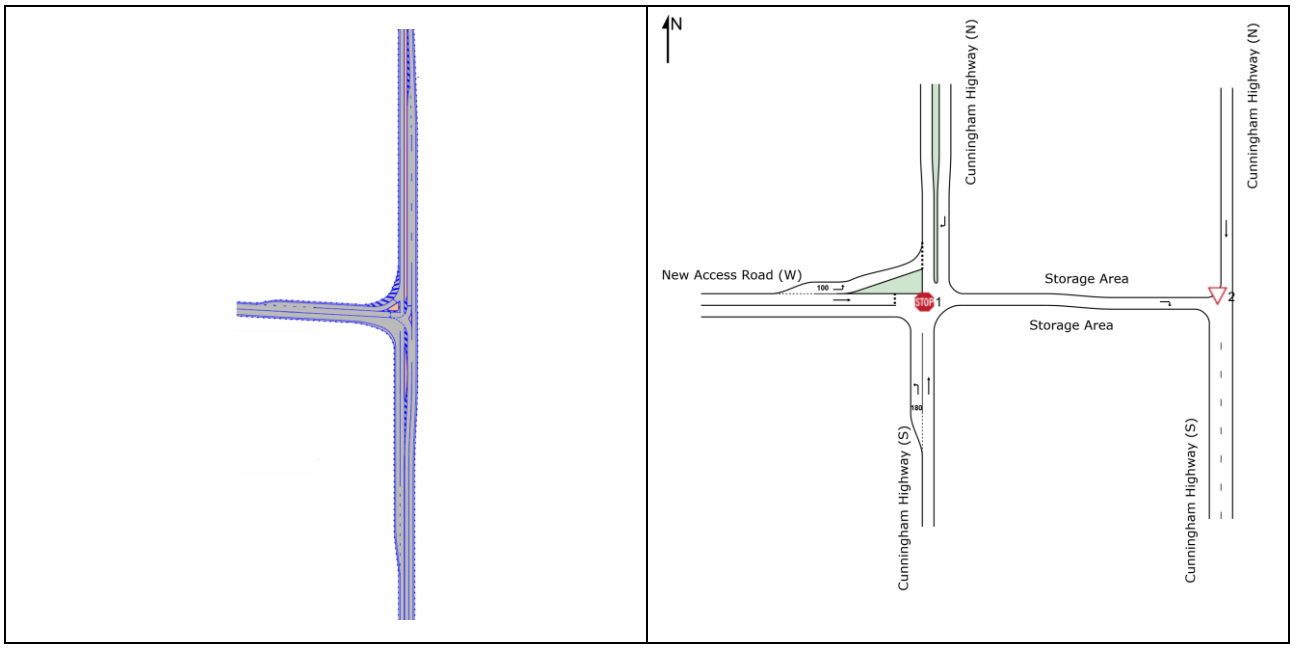
Intersection Treatment	DOS Threshold
Signalised Intersections	Less than or equal to 0.90
Roundabouts	Less than or equal to 0.85
Priority controlled intersections	Less than or equal to 0.80

Source: TMR Guidelines for Assessment of Road Impacts Development

6.3 Cunningham Highway / New Road (Seagull arrangement)

The proposed configuration of this intersection adopts a three way priority controlled seagull arrangement. The SIDRA assessed layout as a two stage intersection is illustrated on Figure 6-1. It is noted that this intersection was modelled as a Network in SIDRA.

Figure 6-1 Proposed SIDRA Assessed Layout – Cunningham Highway / New Road



The results of the SIDRA assessment, for all assessed scenarios, are summarised in Table 6-3.

Table 6-3 SIDRA Results - Cunningham Highway / New Road

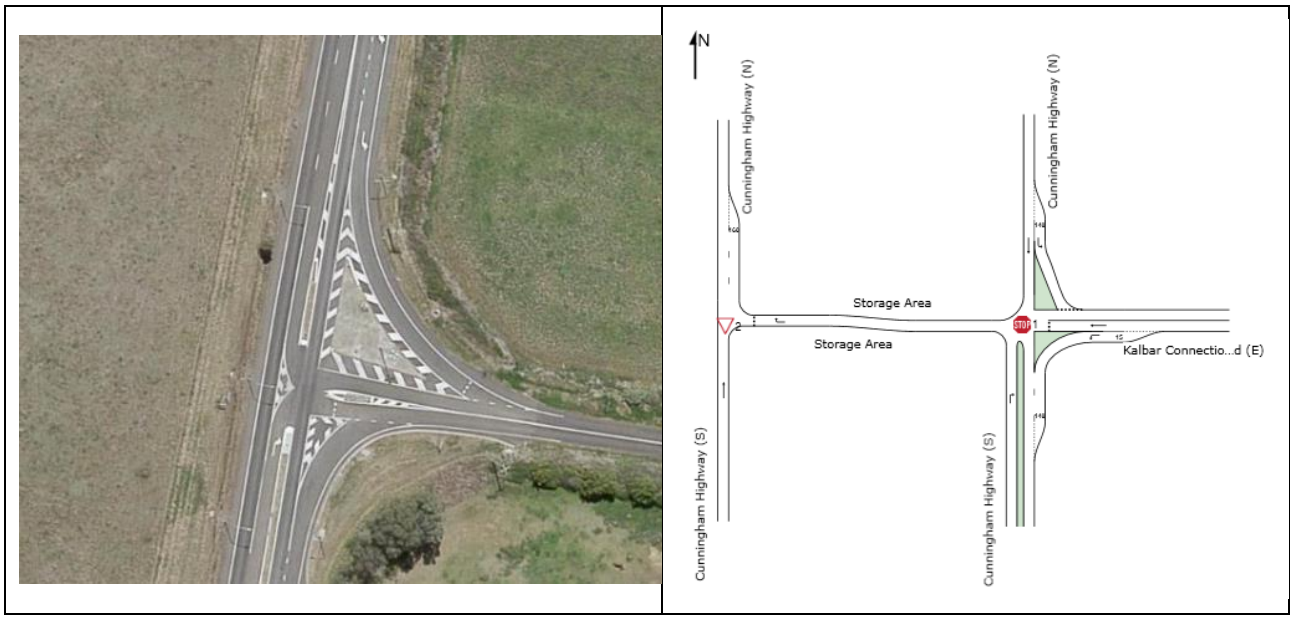
Scenarios	AM Peak			PM Peak		
	DOS	Delay (sec)	95th %ile Queue (m)	DOS	Delay (sec)	95th %ile Queue (m)
2020 BG + Con + Quarry (Quarry year of open)	0.104	9.6	1.3	0.159	10.1	1.2
2021 BG + Quarry	0.078	8.7	0.2	0.136	9.2	0.2
2021 BG + Quarry + Dev (Year of open Kalfresh Operations)	0.100	9.3	1.3	0.124	10.0	1.0
2031 BG + Quarry	0.093	8.8	0.2	0.148	9.8	0.2
2031 BG + Quarry + Dev	0.362	11.9	6.2	0.427	11.2	7.7
2041 BG + Quarry	0.108	9.1	0.2	0.172	10.3	0.2
2041 BG + Quarry + Dev	0.374	12.3	6.5	0.458	11.7	8.4

The results of the analysis indicate that the three way priority controlled seagull arrangement operates within the typical performance thresholds (DOS ≤ 0.80 for priority controlled), for all assessed scenarios.

6.4 Cunningham Highway / Kalbar Connection Road

The proposed configuration of this intersection adopts a three way priority controlled seagull arrangement. The aerial and SIDRA assessed layout as a two stage intersection are illustrated on Figure 6-2. It is noted that this intersection was modelled as a Network in SIDRA.

Figure 6-2 Current and SIDRA Assessed Layout – Cunningham Highway / Kalbar Connection Road



The results of the SIDRA assessment, for all assessed scenarios, are summarised in Table 6-4.

Table 6-4 SIDRA Results - Cunningham Highway / Kalbar Connection Road

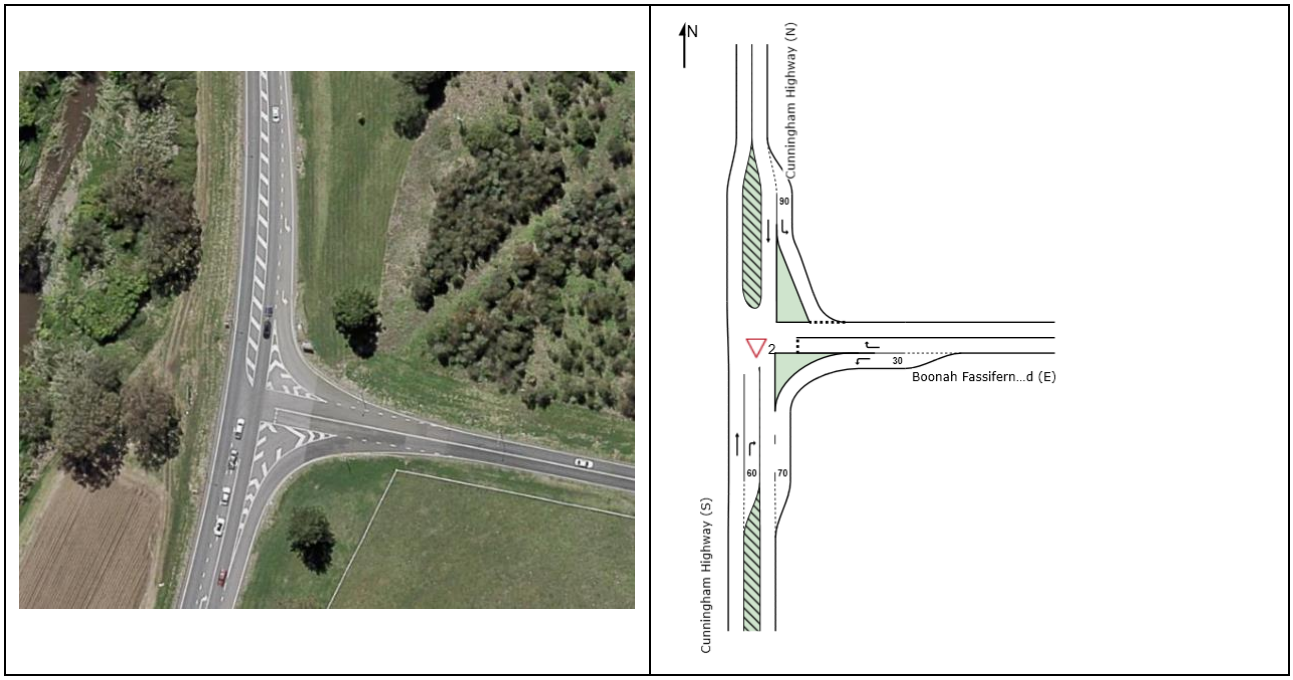
Scenarios	AM Peak			PM Peak		
	DOS	Delay (sec)	95th %ile Queue (m)	DOS	Delay (sec)	95th %ile Queue (m)
2019 BG (surveyed year)	0.073	10.0	0.1	0.114	9.5	0.2
2020 BG	0.074	10.0	0.1	0.116	9.6	0.2
2020 BG + Con + Quarry (Quarry year of open)	0.127	10.1	0.3	0.139	11.1	1.2
2021 BG + Quarry	0.084	10.0	0.1	0.127	9.9	0.3
2021 BG + Quarry + Dev (Year of open Kalfresh Operations)	0.091	10.0	0.2	0.135	10.7	0.8
2031 BG + Quarry	0.092	10.0	0.1	0.151	10.6	0.4
2031 BG + Quarry + Dev	0.136	10.3	0.9	0.224	14.4	3.2
2041 BG + Quarry	0.106	10.0	0.2	0.174	11.4	0.4
2041 BG + Quarry + Dev	0.151	10.4	0.9	0.241	15.6	3.4

The results of the analysis indicate that the three way priority controlled seagull arrangement operates well within the typical performance thresholds (DOS ≤ 0.80 for priority controlled, delay < 42 seconds), for all assessed scenarios. It is noted that with the inclusion of the proposed expansion traffic, the average delay and 95th percentile queue are not significantly impacted when compared to the background scenarios.

6.5 Cunningham Highway / Boonah Fassifern Road

The proposed configuration of this intersection adopts a three way priority controlled seagull arrangement. The aerial and SIDRA assessed layout are illustrated on Figure 6-3.

Figure 6-3 Current and SIDRA Assessed Layout – Cunningham Highway / Boonah Fassifern Road



The results of the SIDRA assessment, for all assessed scenarios, are summarised in Table 6-5.

Table 6-5 SIDRA Results - Cunningham Highway / Boonah Fassifern Road

Scenarios	AM Peak			PM Peak		
	DOS	Delay (sec)	95th %ile Queue (m)	DOS	Delay (sec)	95th %ile Queue (m)
2019 BG (surveyed year)	0.058	9.7	1.2	0.109	11.2	1.7
2020 BG	0.059	9.7	1.2	0.111	11.3	1.8
2020 BG + Con + Quarry (Quarry year of open)	0.163	10.1	5.2	0.126	13.7	3.3
2021 BG + Quarry	0.061	9.6	1.5	0.114	11.5	1.8
2021 BG + Quarry + Dev (Year of open Kalfresh Operations)	0.130	10.0	4.1	0.143	13.5	4.3
2031 BG + Quarry	0.073	10.1	1.8	0.137	12.7	2.2
2031 BG + Quarry + Dev	0.382	13.0	16.3	0.401	20.9	14.6
2041 BG + Quarry	0.084	10.6	2.2	0.159	14.2	2.7
2041 BG + Quarry + Dev	0.419	14.1	18.6	0.500	25.8	18.9

The results of the analysis indicate that the three way priority controlled intersection will operate within the typical performance thresholds (DOS ≤ 0.80 for priority controlled, delay > 42 seconds), for all assessed scenarios.

7 Parking Provision

7.1 Acceptable Parking Solution

A summary of Council's acceptable solution for the Kalfresh development car parking when calculated in accordance with the rates outlined in the Plan of Development is outlined in Table 7-1.

Table 7-1 Acceptable Solution Car Parking Provision

Use	Developable Area*	Land Use	Acceptable Solution Rate	Acceptable Solution
Kalfresh	44,181 sq.m	Industry (all classes including Rural Industry)	1 space per 100sq.m of gross floor area.	442 car parking spaces
Non-Kalfresh	97,943 sq.m		1 space per 100sq.m of gross floor area.	980 car parking spaces

*A 45% site coverage as Developable Area assumption has been adopted as advised by RPS

As outlined in Table 7-1, the Kalfresh development allotments are recommended to supply in the order of 442 car parking spaces across all allotments, in accordance with the estimated yields and the parking rates outlined in the Plan of Development. The Non-Kalfresh allotments are recommended to provide 980 parking spaces across all allotments.

7.2 Parking for People With Disabilities

Additionally, in accordance with both the Car Parking, Access and Manoeuvrability policy in the Boonah Shire Planning Scheme and the Buildings Code of Australia (BCA), a minimum of one parking space per 100 standard parking spaces should be provided for people with disabilities (PWD). This results in a total of 5 spaces for the Kalfresh allotments and 10 spaces for the non-Kalfresh allotments.

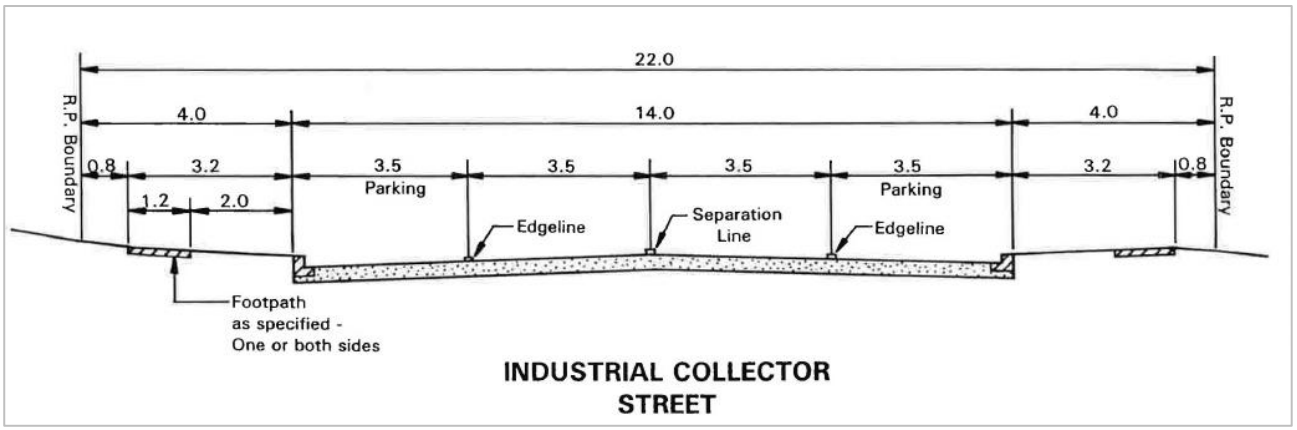
8 Design Considerations

8.1 Internal Road Network

8.1.1 Cross Sections

The road reserve for the internal roads have been designed with 22m width. This is in accordance with Queensland Streets, which is referenced in the Boonah Shire Planning Scheme. A typical industrial street cross section is illustrated on Figure 8-1, as extracted from Queensland Streets.

Figure 8-1 Industrial Street Cross Section



Source: IMEAQ, Queensland Streets Figure 9.7.A

Queensland Streets also outlines the daily traffic capacity of industrial collector streets as 12,000 vpd. As outlined in Table 5-19, the daily traffic generated by the site is 8,030 vpd. In addition to the daily traffic from the Frazerview Quarry, which was reported as 290 vpd, this equates to a total daily demand of 8,320 vpd.

Therefore, as the daily traffic threshold is not exceeded, the 22m cross section is considered to be appropriate.

8.1.2 Intersection Spacing

The Boonah Shire Planning Scheme 2006 indicates that intersection spacing should be provided in accordance with Table 3 of the Planning Scheme Policy, extracted as follows:

Table 8-1 Road Intersection Spacing Requirements

Road Type	Minimum Intersection Spacing	
	On Same Side of Through Road	On opposite Side of Through Road
Access Place	60m	40m
Collector Street	60m	40m

Source: Boonah Shire Planning Scheme, Table 3: Road Intersection Spacing Requirements

The development layout indicates that the first internal intersection is located 200m from the site access intersection with the Cunningham Highway, as illustrated on Figure 8-2. This is in excess of the minimum spacing requirements for Collector Streets, as indicated in Table 8-1, and thus is sufficient.

Figure 8-2 Internal Intersection Spacing (TO BE UPDATED WITH FINAL PLAN)

Source: RPS

8.2 Car Park Design Parameters

Carpark design recommendations have been formulated from relevant national standards and guidelines including:

- Australian Standards: Parking Facilities Part 1 - Off-street Car Parking (AS2890.1) 2004
- Australian Standards: Parking Facilities Part 6 - Off-street Parking for People with Disabilities (AS2890.6) 2009

It is recommended the detailed allotment designs adhere to the design standards put forward to achieve a suitable carpark design solution.

In accordance with the car parking design requirements set out in AS2890.1, the following design parameters outlined in Table 8-2 are recommended for on-site car parking for both Kalfresh and Non-Kalfresh allotments.

Table 8-2 Parking Design Parameters

Design Criteria	Design Standard
Bay length	5.4m
Bay width	2.6m
Bay length – People with Disability	5.4m
Bay width – People with Disability	2.4m plus 2.4m shared zone
Aisle width	Min. 6.2m
Maximum continuous aisle length	100m (if above 100m, install speed humps)
Terminating aisle extension	1.0m

8.3 Servicing

8.3.1 Design Vehicle

It has been advised by Kalfresh that the largest servicing vehicle used for operations is a Class 9 truck, which is a 19m articulated vehicle (AV). This is a standard heavy vehicle for industrial allotments and as such, the proposed cross section will be sufficient to cater for the movement of these trucks.

8.3.2 Servicing Area

It is recommended that the individual allotments are designed in order to safely accommodate the movement of AVs. In accordance with Australian Standards Parking Facilities Part 2 - Off-street Commercial Vehicle Facilities (AS2890.2) 2002, servicing areas should be designed to allow for the dimensions outlined in Table 8-3.

Table 8-3 Servicing Design Parameters

Design Criteria	Design Standard
Servicing bay length (AV)	19m
Servicing bay width (AV)	3.5m
Servicing aisle width (two way)	Min. 6.5m

8.4 Turn Warrant Assessment

Table 8-4 provides a summary of turn warrant assessment at the site access location. It is identified that the proposed form, a seagull treatment with turn lanes, will be appropriate.

Table 8-4 Summary of Turn Warrant Assessment

Intersection	Proposed Treatment		Identified Treatment		Form Acceptable?
	Left Turn Treatment	Right Turn Treatment	Left Turn Treatment	Right Turn Treatment	
Cunningham Hwy / New Road Access	AUL	CHR	AUL	CHR	Yes

The turn warrant assessment graph results for the site access intersection for each peak period is shown on Figure 8-3 and Figure 8-4.

Figure 8-3 Turn Warrant Assessments – Cunningham Hwy / New Road Access - AM Peak

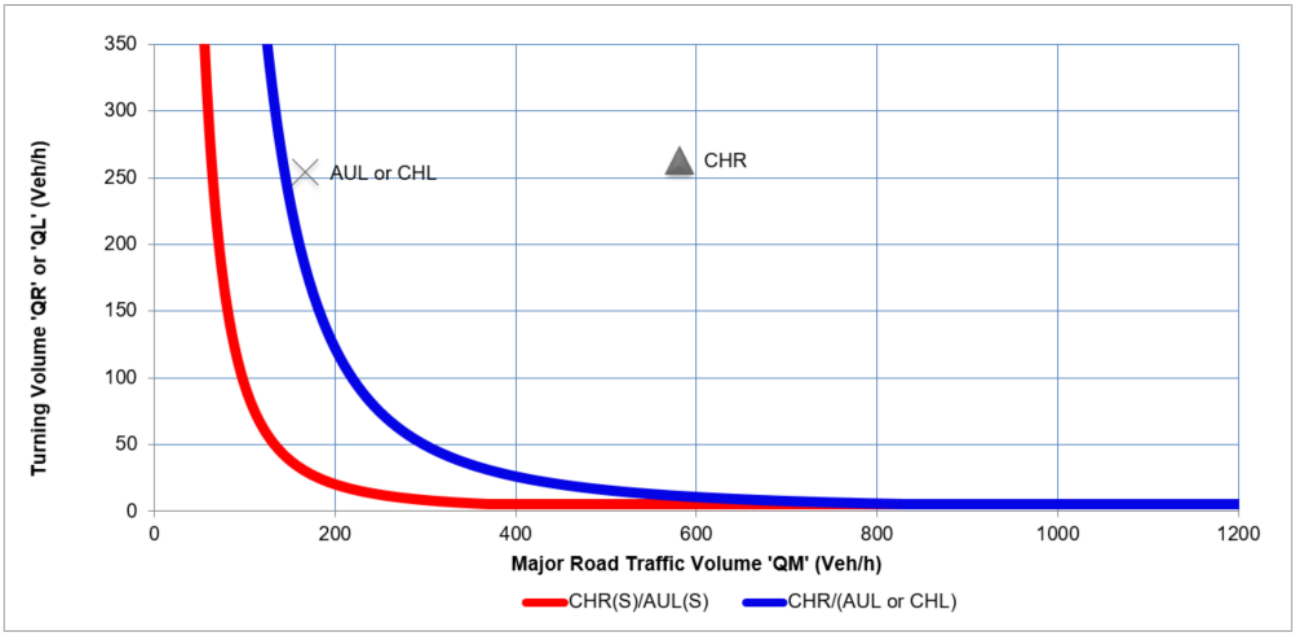
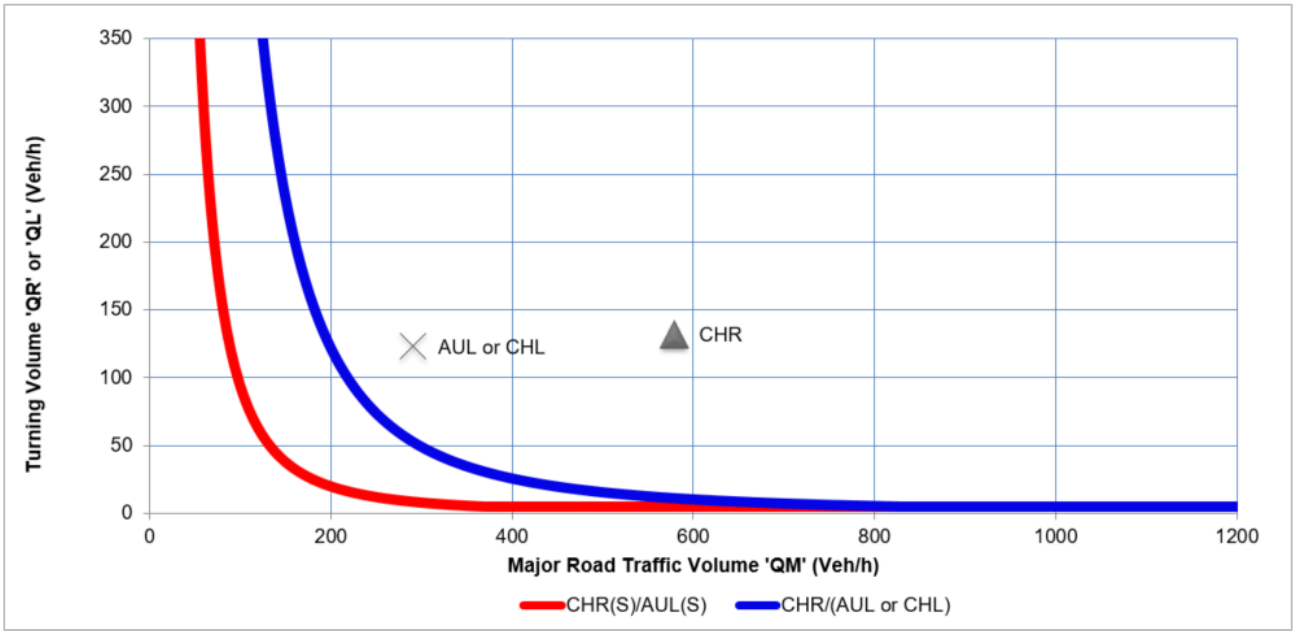


Figure 8-4 Turn Warrant Assessments – Cunningham Hwy / New Road Access - PM Peak



8.5 Sight Distance Review

A sight distance review of the proposed new road location was undertaken in accordance with Austroads standards which provides access to the development. The sight distance requirements for a posted speed of 100km/hr (110km/hr design speed) along the Cunningham Highway is summarised in Table 8-5.

Table 8-5 Sight Distance Requirements

Sight Distance Criteria	Design Speed	Requirement
Safe Intersection Stopping Distance (SISD)	110km/hr	285m

Source: Austroads Guide to Road Design Part 4A

From the site inspection, the sight distance review indicated that the proposed new road location can achieve the requirement of 285m set out in Austroads Guide to Road Design Part 4A in both directions on the Cunningham Highway. Figure 8-1 demonstrates the sight distance for both approaches (north and south), which is in excess of 500m in both directions.

Figure 8-5 Proposed New Road Sight Distance Review (Left – looking North, Right – looking South)

Source: Cardno

Therefore, the proposed new road location is considered to be appropriate in terms of achieving sufficient sight distance.

Pavement Impact Assessment

PIA Abbreviations

List of PIA Abbreviations

Term	Definition
AADT	Annual average daily traffic
DTMR	Department of Transport and Main Roads
SCR	State Controlled Road
GTIA	Guide to Traffic Impact Assessment
PIA	Pavement Impact Assessment
FAMLIT	Freight Axel Mass Limits Investigation Tool
SAR	Standard Axle repetition
WIM	Weigh-in-motion

9 Project Overview

9.1 General

This section documents the pavement impacts associated with the proposed expansion on the State Controlled Road (SCR) network in accordance with the Guide to Traffic Impact Assessment (GTIA) and Pavement Impact Assessment Practice Note, published by DTMR, December 2018 and December 2019 respectively.

9.2 Definitions

Table 9-1 provides definitions used in this Pavement Impact Assessment (PIA) report.

Table 9-1 Definitions

Term	Definition
State Controlled Road	A road or land, or part of a road or land declared as such under Section 24 of the Transport Infrastructure Ace 1994
Standard Axle Repetition	A measure defining the cumulative damaging effect to the pavement of the design traffic, it is expressed in terms of the equivalent number of 80kN axles on the pavement
Base traffic	The traffic volume without development traffic

9.3 Staging

The development proposes to be undertaken in five stages as outlined in Figure 9-1 and Table 9-2.

Figure 9-1 Proposed Development Staging (TO BE UPDATED WITH FINAL PLAN)

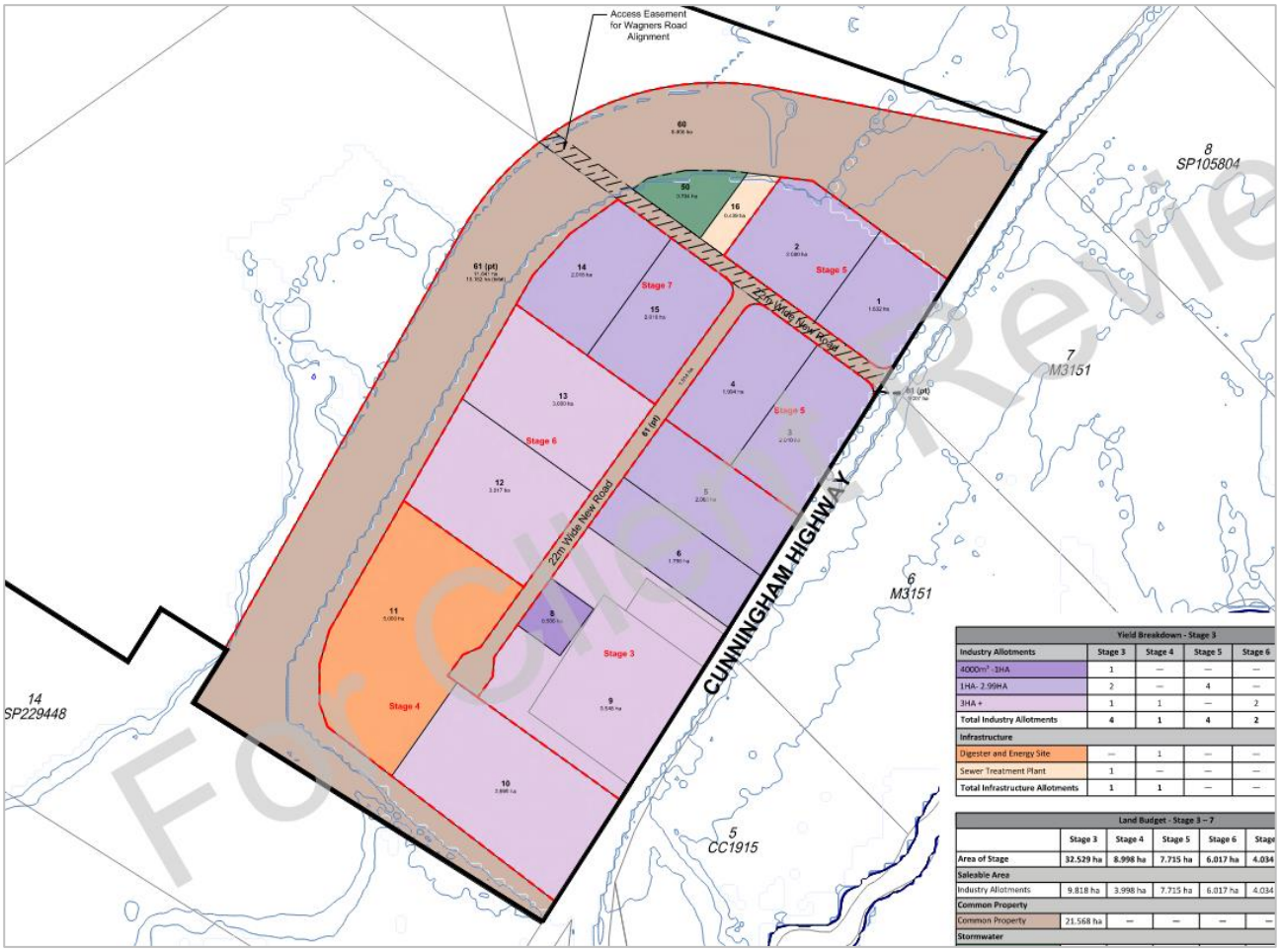


Table 9-2 Proposed Development Staging

Stage	Allotments	Estimated Timeframe
Stage 3	5, 6, 8, 9, 16, 50, 60, 61	2021 - 2022
Stage 4	10, 11	2021 – 2022
Stage 5	1, 2, 3, 4	2022 – 2023
Stage 6	12, 13	2023 – 2024
Stage 7	14, 15	2025 – 2026

For the pavement impact assessment these stages have been brown down in Kalfresh and Non-Kalfresh staging for a robust assessment.

9.3.2 Kalfresh Staging

Development of the groundworks and associated construction infrastructure is expected to be completed in the year 2022, In accordance with the GTIA, PIA assessment scope will include 20 years beyond the year of opening. Table 9-3 outlines the estimated timing of the assessed construction and operations phases.

Table 9-3 Kalfresh (Stage 3) Timing

Phase	Approximate Timeline
Start of Construction	2021
End of Construction	2022
Start of Operations	2022
End of Assessment (20 years after year of opening)	2042

9.3.3 Non Kalfresh Staging

The final allotment tenancies are still yet to be finalised for non-Kalfresh allotments, however in accordance with the development staging plan, the approximate timeline is outlined in Table 9-4. This has assumed that construction will begin at the earlier of the estimated construction years.

Table 9-4 Non Kalfresh (Stages 4 – 7) Timing

Lot	Start of Construction	Start of Operations	End of Assessment Period
Stage 4	2021	2021	2041
Stage 5	2022	2022	2042
Stage 6	2023	2023	2043
Stage 7	2025	2025	2045

9.4 Construction Traffic

9.4.1 Peak Construction Phase

Section 5.4.3 outlies the varies stages of construction and the impacts of each stage. Phase 3 on construction activities requires the import of earthworks which is the most intensive in terms of construction heavy vehicle trips to/from the development. As a result, this pavement assessment only investigates the impacts associated with Phase 3 of the development.

9.4.1.1 *Construction Phase 3 Traffic – Peak Heavy Vehicle Activity*

The assumptions for heavy vehicle movements during Phase 3 are outlined in Table 9-5.

Table 9-5 Construction Trip Assumptions – Heavy Vehicles

Construction Phase	Activity	Assumption	Truck Type	Truck Capacity
Phase 3: Groundworks and Construction	Earthworks Fill Delivery and/or Cut Removal	1 truck per 10 mins for 10hr per day*	B-double AV	N/A
	Deliveries (general)	1-2 tonnes per day^	Class 4	13 tonnes
	Refuse Collection	3-4 tonnes per day^	Class 5	15 tonnes

Note * Cardno assumption based on previous civil experience, ^ Kalfresh assumption

Table 9-6 outlines the expected heavy vehicle traffic expected during Phase 3 of construction. It is noted that for the Deliveries and Refuse Collection, the truck capacity is greater than the daily haulage. Therefore, it is reasoned that these activities will not occur every day but rather once or twice a week. The peak hour and daily trips have been reported here as rounded values representing 1 trip per peak / day, however when assessed as part of the PIA, the annualised total of the actual trips has been adopted.

Table 9-6 Construction Trips – Heavy Vehicles

Construction Phase	Activity	Trip Generation		
		AM	PM	Daily
Phase 3: Groundworks and Construction	Earthworks Fill Delivery and/or Cut Removal	12 vph	12 vph	120 vpd
	Deliveries (general)	1 vph*	1 vph*	9 vpd
	Refuse Collection	1 vph*	1 vph*	1 vpd

Note * Rounded up to 1 vph during the peak periods

Table 9-7 outlines the directional distribution adopted for heavy vehicles during Phase 3 of construction. For the purposes of the PIA, only daily trips have been reported.

Table 9-7 Construction Trips - Directional Distribution

Construction Phase	Activity	Directional Distribution	
		Daily in	Daily out
Phase 3: Groundworks and Construction	Earthworks Fill Delivery and/or Cut Removal	50%	50%
	Deliveries (general)	50%	50%
	Refuse Collection	50%	50%

The resultant heavy vehicle traffic generated from Phase 3 of construction is outlined in Table 9-8.

Table 9-8 Construction Trips - Directional Traffic Generation

Land Use / User	Assumption	Trip Generation (vph)	
		Daily in	Daily out
Phase 3: Groundworks and Construction	1 truck per 10 mins for 10hr per day	6	6
Deliveries	1-2 tonnes per day in Class 4 truck	9	9
Refuse Collection	3-4 tonnes per day in Class 5 truck	1*	1*
Total			

Note * Rounded up to 1 trip for each direction per day

The external distribution associated with the construction heavy vehicle traffic is outlined in Table 9-9.

Table 9-9 Construction Heavy Vehicle Distribution

Direction	Distribution		
	Phase 3: Groundworks and Construction	Deliveries	Refuse Collection
North	100%	-	100%
North-east	-	100%	-
South	-	-	-
South-east	-	-	-
Total	**100%**	**100%**	**100%**

9.5 Kalfresh Operations Traffic

9.5.1 Deliveries from Site

The anticipated traffic generated as part of the produce deliveries departing from site during operations for the Kalfresh expansion are outlined in Table 9-10.

Table 9-10 Proposed Operations Distribution – Departing Site

Origin	Destination	Vehicle	Daily Trucks	Adopted Daily Trips
Kalfresh site	Brisbane	Class 9	19-23	46
Kalfresh site	Nolans (Gatton) interstate freight	Class 9	19-23	46
Total			**38-46 trucks per day**	**92 vpd**

Note: Assume 2 trips per truck per day

9.5.2 Deliveries to Site

The anticipated traffic generated as part of the produce deliveries arriving to site for the Kalfresh expansion are outlined in Table 9-11.

Table 9-11 Proposed Operations Distribution – Arriving at Site

Origin	Destination	Vehicle	Daily Trucks	Adopted Daily Trips
North (towards Brisbane via Cunningham Hwy)	Kalfresh site	Class 5	5 – 11	21
North East (towards Kalbar)	Kalfresh site	Class 5	5 – 11	21
East (towards Boonah)	Kalfresh site	Class 5	5 – 11	21
South (towards Aratula via Cunningham Hwy)	Kalfresh site	Class 5	5 – 11	21
Total			**20 - 44 trucks per day**	**84 vpd**

Note: Assume 2 trips per truck per day (one entry, one exit)

9.5.3 Operations Traffic Generation

The resultant traffic generation in the peak periods generated by the operations of the Kalfresh Site is outlined in Table 9-12.

Table 9-12 Traffic Generation - Kalfresh Operations

Origin	Destination	Vehicle	Daily Trips
Deliveries from Site			
Kalfresh site	Brisbane	Class 9	46 vpd
Kalfresh site	Nolans (Gatton) interstate freight	Class 9	46 vpd
Deliveries to Site			
North (towards Brisbane via Cunningham Hwy)	Kalfresh site	Class 5	21 vpd
North East (towards Kalbar)	Kalfresh site	Class 5	21 vpd
East (towards Boonah)	Kalfresh site	Class 5	21 vpd
South (towards Aratula via Cunningham Hwy)	Kalfresh site	Class 5	21 vpd
Total			**176 vpd**

9.6 Non Kalfresh Operations Traffic

Due to the uncertainty on allotment tenancies for non Kalfresh allotments, Cardno has made the assumption that each of these allotments will have a similar traffic generation to the Kalfresh allotments. Furthermore, the distribution patterns will likely be similar to the Kalfresh construction and operations with trips heading towards activity centres.

Construction trips for the non Kalfresh allotments will be the same as outlined in Table 9-5 to Table 9-9.

Operations trips have been based on the allotment area of each of the non Kalfresh allotments outlined in Table 9-13.

It is noted that the estimated of trips for operations is high level and should be review when further information is provided on the non Kalfresh allotments. Cardno recommends that before each non Kalfresh allotment is constructed, a PIA be completed to assess the anticipated impact.

Table 9-13 Traffic Generation – Non Kalfresh Operations

Origin	Destination	Vehicle	Stage 4	Stage 5	Stage 6	Stage 7
North (towards Brisbane via Cunningham Hwy)	Kalfresh site	Class 5 / Class 9	46 vpd	90 vpd	70 vpd	46 vpd
North East (towards Kalbar)	Kalfresh site	Class 5	8 vpd	17 vpd	13 vpd	8 vpd
East (towards Boonah)	Kalfresh site	Class 5	8 vpd	17 vpd	13 vpd	8 vpd
South (towards Aratula via Cunningham Hwy)	Kalfresh site	Class 5	8 vpd	17 vpd	13 vpd	8 vpd
Total			**70 vpd**	**141 vpd**	**109 vpd**	**70 vpd**

9.7 Delivery Route

The roads affected by the project and the relevant road authority for each link are outlined in Table 9-14.

Table 9-14 Haulage Routes and Road Authority

Road	Road Authority
Cunningham Highway (17B)	DTMR
Kalbar Connection Road (2102)	
Boonah – Fassifern Road (24)	

10 Pavement Impact Assessment

10.1 Guidelines

Pavement impacts of the utilised TMR roads have been assessed in line with the current GTIA published by DTMR, December 2018.

10.2 Limitations

Cost calculations are heavily reliant on DTMR data regarding SARs loads and marginal costs. The reliability of such has not been further investigated.

10.3 Impact Assessment Area

The impact assessment area has been agreed with DTMR to include all affected state controlled roads, as detailed in Table 10-1:

Table 10-1 Scope of Assessment

ID	Road Name	Start Chainage	End Chainage
17B	Cunningham Highway	0	55.61
2102	Kalbar Connection Road	0	6.6
24	Boonah – Fassifern Road	0	11.447

The Scenic Rim Agricultural Industrial project includes approximately ~74km of utilised TMR roads, located within the Scenic Rim Regional Council area.

10.4 Pavement Type

TMR has defined the following pavement types outlined in Table 10-2.

Table 10-2 Pavement Type Descriptions

TMR Pavement Type	FAMLIT pavement type	Load Damage Exponent
Sprayed seal over flexible pavement, including cement modified and lime stabilised layer types C4 and C5	GN	4
Sprayed seal or Asphalt over flexible pavement with bitumen stabilised pavement	AC	5
Asphalt over flexible pavement, including cement modified and lime stabilised layer types C4 and C5	AC	5
Sprayed seal over semi rigid/semi rigid composite pavement	CS	12
Asphalt over semi rigid/semi rigid composite pavement	CS	12

10.5 Project Haulage Vehicle

The design vehicle was identified to determine the impact of roadway degradation for the Scenic Rim Agricultural Industrial project. SAR4 has been adopted as the pavement type in addition to TMR design vehicle classes. The design vehicle SARs and pavement type have been provided by TMR and is detailed in Table 10-3 below.

Table 10-3 Design Vehicle SARs

Vehicle Type	Pavement Type by SAR category	Vehicle Class	Loaded SAR	Unloaded SAR
Class 4 Truck	GN	Class 4	3.57	0.5
Class 5 Truck	GN	Class 5	4.09	0.46
AV	GN	Class 6	4.43	0.6
Class 9	GN	Class 9	4.93	0.51
B-Double	GN	Class 10	6.3	0.53

The total SARs has been identified for each 100m segment based on the costing pavement type provided by DTMR inboth the loaded (gazettal) and unloaded (against gazettal) direction. The detailed calaculations are included at Appendix C.

10.6 Pavement Contribution

The pavement impact and resulting contribution has been assessed in accordance with the GTIA. Figure 10-1 shows the GTIA calculations for cost contributions.

Figure 10-1 Pavement Contribution Calculation

$$\text{Pavement contribution} = \sum_{i=1}^{n} [(C + O)_i \times MC_i \times L_i]$$

where:

I	is each road segment triggered
C	is construction period SARs
O	is operational period SARS for the impact mitigation period
MC	is the relevant marginal cost (per SAR-km) prescribed in the department's database for each road segment
L	is the length of road section in km
N	is the number of road segments triggered in the impact assessment area.

10.6.2 Development SARs

Due to the operations phase of the development having an impact on the pavement degragation, in accordance with the GTIA, 20 years of operations has been assessed. The detailed calculations are included in Appendix C.

10.6.3 Marginal Cost

The marginal cost per SAR per km is identifed and provided by DTMR for each 100m segment of road. The margnial cost values are provided at Appendix C.

10.6.4 Pavement Contribution

The pavement contribution (SAR x margnial cost) is calaculate for each 100m road segment and summarised for all segments. Table 10-4 outlines the pavement contibution associated with the total construction and 20 years of the operations phase. The cost is provided as an overall cost.

Table 10-4 Pavement Contribution

Allotment	ID	Road Name	Stage	Cost
Kalfresh (5, 6, 8, 9)				
	17B	Cunningham Highway	3	$0
	2102	Kalbar Connection Road	3	$111,598
	24	Boonah – Fassifern Road	3	$0
Non Kalfresh (1, 2, 3, 4, 10, 11, 12, 13, 14, 15)				
	17B	Cunningham Highway	4, 5, 6, 7	$0
	2102	Kalbar Connection Road	5	$15,480
	2102	Kalbar Connection Road	4, 6, 7	$0
	24	Boonah – Fassifern Road	4, 5, 6, 7	$0

10.7 Summary

The pavement impact contribution has been calculated in accordance with GTIA based on the construction and 20 years of the operations phase of the project. A total pavement contribution at **$127,078** is calculated based on the construction and operations phases for Stage 3 and 5. The terms and final sums of any potential contribution payment should be the subject of further negotiations between the client and State

Government. The high level assessment indicates that Stage 4, 6 and 7 have a total pavement contribution of $0, however it is recommended that the pavement impact assessment is re-examined before the construction of each non Kalfresh allotment.

Road Safety Assessment

11 Safety Considerations

11.1 Road Safety Audit

An independent road safety audit has been undertaken by senior road safety auditors, John Peace and Dana Geaboc. This can be found at Appendix D.

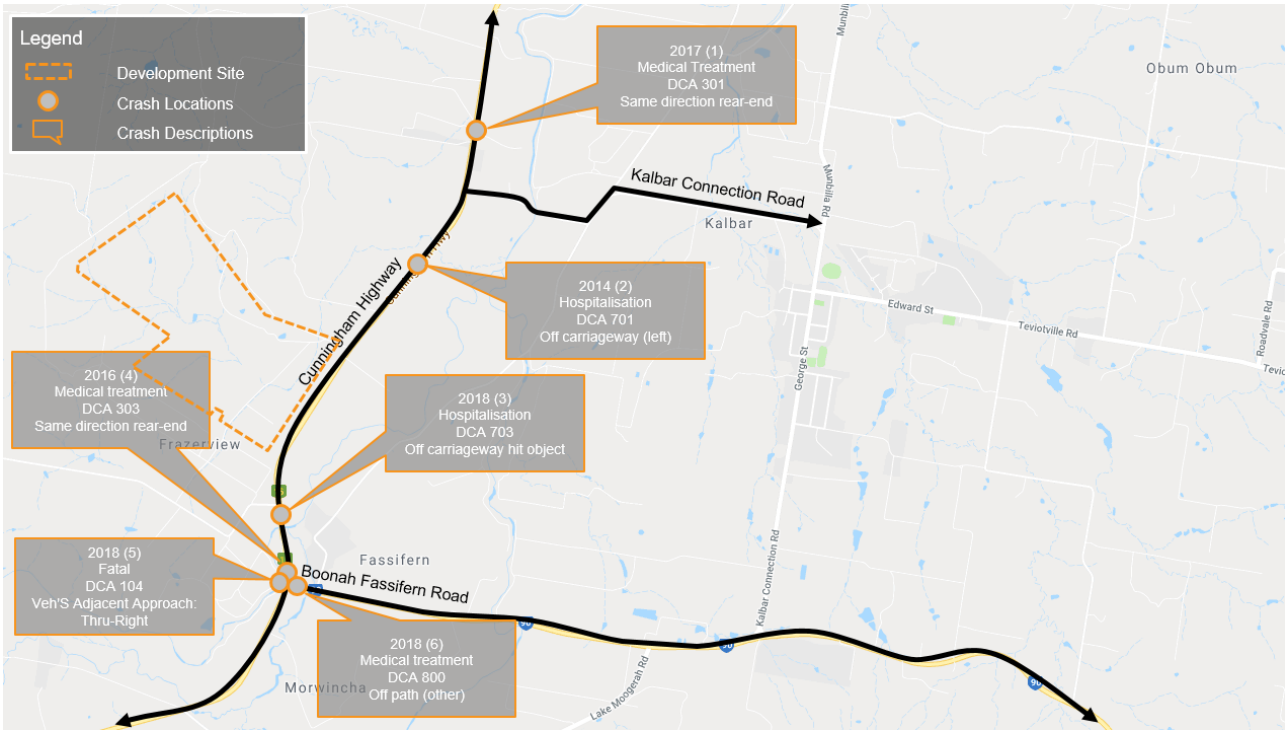
11.2 Crash History

Crash data has been sourced from TMR for the road network surrounding the project site for the most recent five-year period (2014-2018) of crash data made available. The supplied data indicates that a total of 6 crashes were recorded during the five-year period on the roads surrounding the study area. A summary of the crash data is provided in Table 11-1 and Figure 11-1.

Table 11-1 Crash history

Ref	Road / Intersection Location	Trend Crash Type (DCA Code)	Severity	Year
1	Cunningham Highway	DCA 301	Medical Treatment	2017
2	Cunningham Highway	DCA 701	Hospitalisation	2014
3	Cunningham Highway	DCA 703	Hospitalisation	2018
4	Cunningham Highway	DCA 303	Medical Treatment	2016
5	Boonah Fassifern Road	DCA 104	Fatal	2018
6	Boonah Fassifern Road	DCA 800	Medical Treatment	2018

Figure 11-1 Historical Crash Locations



Source: Google Maps

A review of the crash data provided by TMR indicates no trends which form along the roads surrounding the development site.

11.3 Road Safety

Cardno undertook a site inspection on the 17th of October 2019 to observe and assess the road environment in the vicinity of the Kalfresh site. The following section will discuss the findings of the site investigation in conjunction with other safety considerations in the vicinity of the proposed development.

11.3.1 Kalbar Connection Road

Following a site investigation which included the Cunningham Highway / Kalbar Connection Road intersection, it was observed the sight distance towards the south allowed for approximately 200m of visibility of oncoming traffic due to a crest on the Cunningham Highway carriageway, as illustrated on Figure 11-2.

Figure 11-2 Kalbar Connection Road Sight Distance

Source: Cardno

In accordance with Austroads Guide to Road Design Part 4A, for a 100km/hr posted speed road, a safe intersection sight distance of 285m is required. It is observed that the crest which the Kalbar Connection Road intersection is located causes a sight constraint for vehicles turning right out of Kalbar Connection Road as indicated in Figure 11-2.

As the achievable sight distance observed is approximately 200m, a deficit of 85m exists. This is an existing arrangement and with reference to the crash history, there is no apparent crash trend at the intersection resulting from this sight constraint. This may be due to the upgrade on the Cunningham Highway on approach to the intersection, which may slow vehicle speeds.

Furthermore, the development will not add traffic to the right turn movement from Kalbar Connection Road, therefore will not exacerbate the existing risk level. As this is an existing sight constraint with no evidence of adverse safety impacts, it is considered that the development will have minimal impact on the road safety at this intersection.

11.3.2 Boonah Fassifern Road

The site investigation of Boonah Fassifern Road indicated appropriate sight distance (exceeding 285m) in accordance with Austroads Guide to Road Design Part 4A in both directions, Figure 11-3 provides context to the proposed road location sight distance in both directions.

Figure 11-3 Boonah Fassifern Road Sight Distance Review (Left – looking South, Right - looking North)

Source: Cardno

11.3.3 Site Access Road

A risk assessment has been undertaken to demonstrate the risks associated with the proposed new road which provides access to the development. This has been based on the Department of Transport and Main Roads (TMR) Guide to Traffic Impact Assessments (GTIA) safety risk score matrix (Figure 9.3.2(a)), a copy of which is outlined below.

Figure 11-4 Safety Risk Score Matrix

Figure 9.3.2(a) – Safety risk score matrix

		Potential consequence				
		Property only (1)	**Minor injury (2)**	**Medical treatment (3)**	**Hospitalisation (4)**	**Fatality (5)**
Potential likelihood	**Almost certain (5)**	M	M	H	H	H
	Likely (4)	M	M	M	H	H
	Moderate (3)	L	M	M	M	H
	Unlikely (2)	L	L	M	M	M
	Rare (1)	L	L	L	M	M

L: Low risk
M: Medium risk
H: High risk

Source: Guide to Traffic Impact Assessments (2017)

The rating descriptors are defined as the following:

Table 11-2 Risk Rating Descriptors

Rating Measure	Descriptor
Potential Likelihood of Incident Occurring	
Almost Certain (5)	Very likely. The event is expected to occur in most circumstances
Likely (4)	There is a strong possibility the event will occur
Possible (3)	The event might occur at some time
Unlikely (2)	Not expected, but there's a slight possibility it may occur at some time.
Rare (1)	Highly unlikely, but it may occur in exceptional circumstances. It could happen, but probably never will.
Potential Consequence of Incident Occurring	
Property Only (1)	
Minor Injury (2)	
Medical Treatment (3)	
Hospitalisation (4)	
Fatality (5)	
Potential Risk of Incident Occurring	
High	Should be corrected or the risk significantly reduced, even if the treatment costs is high
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high.
Low	Should be corrected or the risk reduced, if the treatment cost is low

The issues identified have been assigned a risk rating using the scoring matrix outlined in Figure 11-4, these issues were then assigned an appropriate mitigation measure, Table 11-3 outlines the risk evaluation.

Table 11-3 Risk Assessment Table

Introduced Risk with New Intersection with Cunningham Highway	Introduced Risk Score			Mitigation Measure	With Mitigation Risk Score		
	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
Left turning traffic from south approach; rear end collision with through traffic	4	4	H	Auxiliary left turn lane separating through traffic from left turners	2	2	L
Right turning traffic from north approach; rear end collision with through traffic	4	4	H	Auxiliary right turn lane separating through traffic from right turners	2	2	L
Right turn out traffic into high speed environment with no median storage	3	4	M	Seagull intersection form with median storage and separate exit lane (610m acceleration lane) for right turners	2	2	L
Left turn out traffic into high speed environment	3	4	M	High angle left turn slip lane provided with sufficient sight distance to observe gaps in through traffic	2	2	L

The risks indicated in Table 11-3 associated with the new intersection with the Cunningham Highway which provides access to the proposed Kalfresh expansion include two (2) 'High' risk scores which should be corrected or the risk significantly reduced, even if the treatment costs is high, as per the risk rating descriptors in the GTIA guideline.

The proposed intersection design consists of a seagull formation with separated left and right turn lanes into the site, ensuring no disruption of through traffic along Cunningham Highway. The form ensures traffic turning out of the development into a high speed environment is safely introduced via minimum 560m acceleration lanes in the southbound direction for right turning traffic out of the development. Left turning traffic out of the development will be facilitated with a high angle slip lane, giving way to Cunningham Highway traffic. The sight distance at the minor road approach is illustrated in Section 8.5 to be well in excess of the safe intersection sight distance, allowing drivers to safely observe gaps in the through traffic.

The risk assessment above indicates the potential risks introduced with the new intersection with the Cunningham Highway were significant, however given the proposed seagull intersection form, have reduced the risk score to a 'Low' score which is considered a safe solution. Therefore, the proposed site access intersection is considered to be safe and appropriate.

12 Summary

Cardno (Qld) Pty Ltd (Cardno) has been commissioned by Kalfresh Pty Ltd to prepare a traffic engineering assessment for a proposed expansion of the existing Kalfresh site on Cunningham Highway, Kalbar.

This traffic engineering assessment has identified the following:

- There are no known future upgrades identified in the Scenic Rim Regional Council LGIP in the immediate vicinity of the development site
- Vehicular access to the development is via a proposed new road intersecting with the Cunningham Highway approximately 430m north of the existing main Kalfresh site access
- The existing Kalfresh workforce generates 120 vph in both the AM peak and PM peak periods
- The existing Kalfresh operations of deliveries departing from site generate 13 vph in the AM peak and PM peak period
- The existing Kalfresh operations of deliveries arriving to site generate 13 vph in the AM peak and PM peak period
- The peak construction workforce is expected to generate 476 vph in the AM peak and PM peak periods during Phase 5 of construction
- The proposed expansion, inclusive of both Kalfresh owned and Non-Kalfresh allotments, is expected to produce 667 trips in the AM peak and 667 trips in the PM peak hour
- The developments impact on the Cunningham Highway / New Site Access intersection is not considered to be significant/adverse on the intersections performance in the design horizon (2041)
- The development impact on the Cunningham Highway / Kalbar Connection Road intersection is not considered to be significant/adverse on the intersections performance for the developments year of open (2021)
- The development impact on the Cunningham Highway / Boonah Fassifern Road intersection is not considered to be significant/adverse on the intersections performance for the developments year of open (2021)
- The on-site parking supply for the overall site is recommended to provide 1,003 parking spaces including 16 PWD spaces, in accordance with the Plan of Development
- Servicing for the development for each allotment should be designed to allow for an AV, unless otherwise required
- A turn warrant assessment of the access form for Cunningham Highway / New Access intersection results in an AUL and a CHR. The proposed form is a seagull which will provide for these turn treatments
- The sight distance assessment of the proposed new road with the Cunningham Highway is considered sufficient in both directions
- The road safety risk assessment identified new risks introduced with the proposed new road, mitigation measures however reduced the risk to an acceptable risk rating (Low) and is therefore considered a safe solution
- The existing sight distance at the Cunningham Highway / Kalbar Connection Road intersection is insufficient to meet safe intersection sight distance for the design speed (110km/hr). However, there are no apparent crash trends related to this constraint, and the proposed development will not add trips to the affected movement. Therefore, it is considered that the development will have minimal impact on the road safety at this intersection.

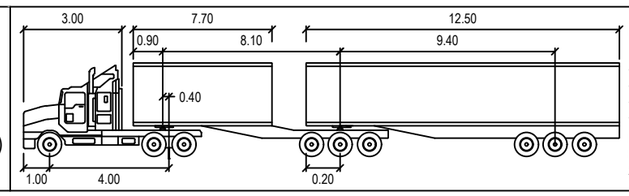
CONCEPT ONLY

3
2.000HA

1
1.628HA

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE



B-DOUBLE 25M

	Meters
Tractor Width	: 2.50
Trailer Width	: 2.50
Tractor Track	: 2.50
Trailer Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 20.6
Articulating Angle	: 70.0

NORTH

0 10 20 30 40 50m

6 4 2

SCALE 1:1000 @ A3

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Kalfresh Pty Ltd
Scenic Rim Agricultural Industrial Precinct
Intersection Concept Design
Left Turn Exit Manoeuvre
25m B-Double Swept Path

Drawn	Date	Scale	Size
T.Anang	06/08/2020	1:1000	A3

Drawing Number: 510357 - SK07
Revision: A

CAD File: G:\510357 - Kalfresh Agricultural Industrial\6. ACAD\510357 Kalbar Agricultural Industrial TIA 2020 02 13.dwg

Imagery supplied by nearmap, February 2020

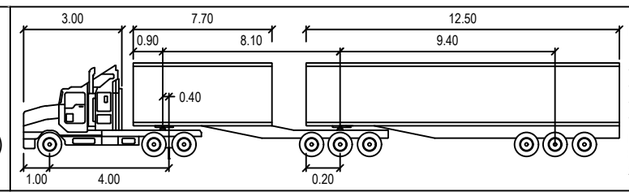
CONCEPT ONLY

3
2.000HA

1
1.628HA

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE



B-DOUBLE 25M

	Meters
Tractor Width	: 2.50
Trailer Width	: 2.50
Tractor Track	: 2.50
Trailer Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 20.6
Articulating Angle	: 70.0

NORTH

0 10 20 30 40 50m

6 4 2

SCALE 1:1000 @ A3

Cardno (Qld) Pty Ltd | ABN 57 051 074 992
Level 11, 515 St Paul's Terrace
Fortitude Valley, QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722
Web: www.cardno.com.au

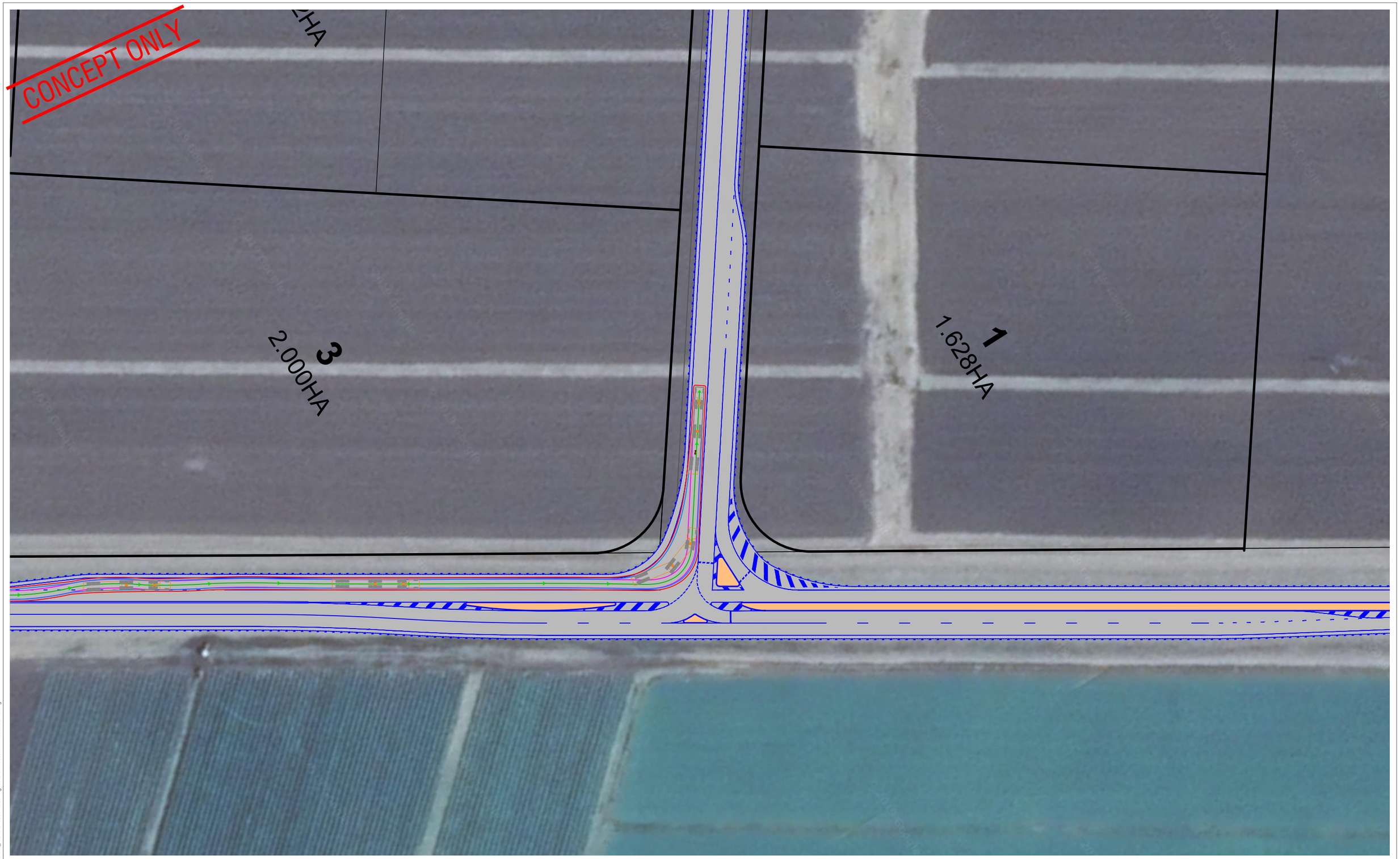
Kalfresh Pty Ltd
Scenic Rim Agricultural Industrial Precinct
Intersection Concept Design
Right Turn Exit Manoeuvre
25m B-Double Swept Path

Drawn	Date	Scale	Size
T.Anang	06/08/2020	1:1000	A3

Drawing Number: 510357 - SK08
Revision: A

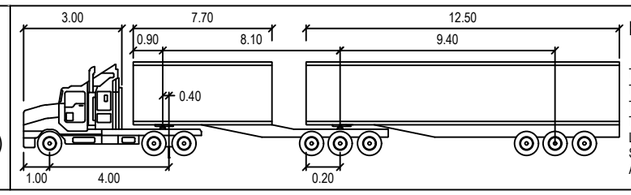
CAD File: G:\510357 - Kalfresh Agricultural Industrial\6_ACAD\510357 Kalbar Agricultural Industrial TIA 2020 02 13.dwg

Imagery supplied by nearmap, February 2020



SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE



B-DOUBLE 25M

	Meters
Tractor Width	: 2.50
Trailer Width	: 2.50
Tractor Track	: 2.50
Trailer Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 20.6
Articulating Angle	: 70.0

NORTH

0 10 20 30 40 50m

6 4 2

SCALE 1:1000 @ A3

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Kalfresh Pty Ltd
Scenic Rim Agricultural Industrial Precinct
Intersection Concept Design
Left Turn Entry Manoeuvre
25m B-Double Swept Path

Drawn	Date	Scale	Size
T.Anang	06/08/2020	1:1000	A3

Drawing Number: 510357 - SK09
Revision: A

CAD File: G:\510357 - Kalfresh Agricultural Industrial\6. ACAD\510357 Kalbar Agricultural Industrial TIA 2020 02 13.dwg

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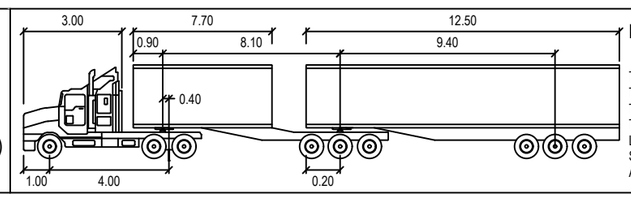
CONCEPT ONLY

3
2.000HA

1
1.628HA

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (500mm)
- VEHICLE



B-DOUBLE 25M

Meters

Tractor Width	: 2.50
Trailer Width	: 2.50
Tractor Track	: 2.50
Trailer Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 20.6
Articulating Angle	: 70.0

NORTH

0 10 20 30 40 50m

6 4 2

SCALE 1:1000 @ A3

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Kalfresh Pty Ltd
Scenic Rim Agricultural Industrial Precinct
Intersection Concept Design
Right Turn Entry Manoeuvre
25m B-Double Swept Path

Drawn	Date	Scale	Size
T.Anang	06/08/2020	1:1000	A3

Drawing Number: 510357 - SK10
Revision: A

CAD File: G:\510357 - Kalfresh Agricultural Industrial\6_ACAD\510357 Kalbar Agricultural Industrial TIA 2020 02 13.dwg

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