Clarence Town Transport and Movement Assessment

Dungog Shire Council

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SECAsolution

Transport and Movement Assessment

Clarence Town, NSW

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Contents

1 Introduction

Background

Seca Solution Pty Ltd has been commissioned by Ethos Urban on behalf of Dungog Shire Council to prepare a Transport and Movement Opportunities and Constraints Assessment to inform the Clarence Town Structure Plan for the township of Clarence Town.

As part of the project, Seca Solution has current traffic data at key locations, has reviewed existing road conditions and have observed the traffic operations in the locality of the site throughout the day and evening.

1.1 Scope of Report

The scope of this report is to review and assess the external traffic arrangements for the town centre and identify opportunities and constraints to allow for future development over a 30 year design horizon.

The report also provides advice to inform the Movement and Place study forming part of the Structure Plan being prepared by Ethos Urban.

1.2 Issues and Objectives of the study

The issues relative to the proposal are to:

- Review relevant Council plans and documents that provide information on existing identified future infrastructure needs, committed projects, and funding requirements.
- Prepare a **Transport and Movement Study** which undertakes the following:
    - Review the road hierarchy and traffic flow within and around the centre including pedestrian connections, movement and parking.
    - Review key movement corridors between Clarence Town and other centres.
- Advise on opportunities and constraints of transport infrastructure to service existing and future populations, taking into account any details on location and timing of the new Clarence Town bridge.

The objective of the report is to document the impacts of future development and provide advice on any infrastructure work required as part of this.

1.3 Planning Context

In preparing this document, the following guides and publications were used:

- Guide to Traffic Management Part 12, Austroads 2020
- RTA Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 “Update Traffic surveys August 2013”.
- Dungog Council Development Control Plan Part D Clarence Town Local Area Plan
- Dungog Shire Council Roads Management Strategy (adopted 2011)
- Australian / New Zealand Standard – Parking Facilities Part 1 : off-street car parking (AS2890.1:2004)

2 Existing Situation

2.1 Site Location

The township of Clarence Town is located within the Dungog Shire Council Local Government Area with a population of 2,265 (estimate resident population 2023). The town centre, a series of local roads in a grid pattern are shown below in Figure 2-1 whilst the broader road network and study area are shown in Figures 2-2 and 2-3.

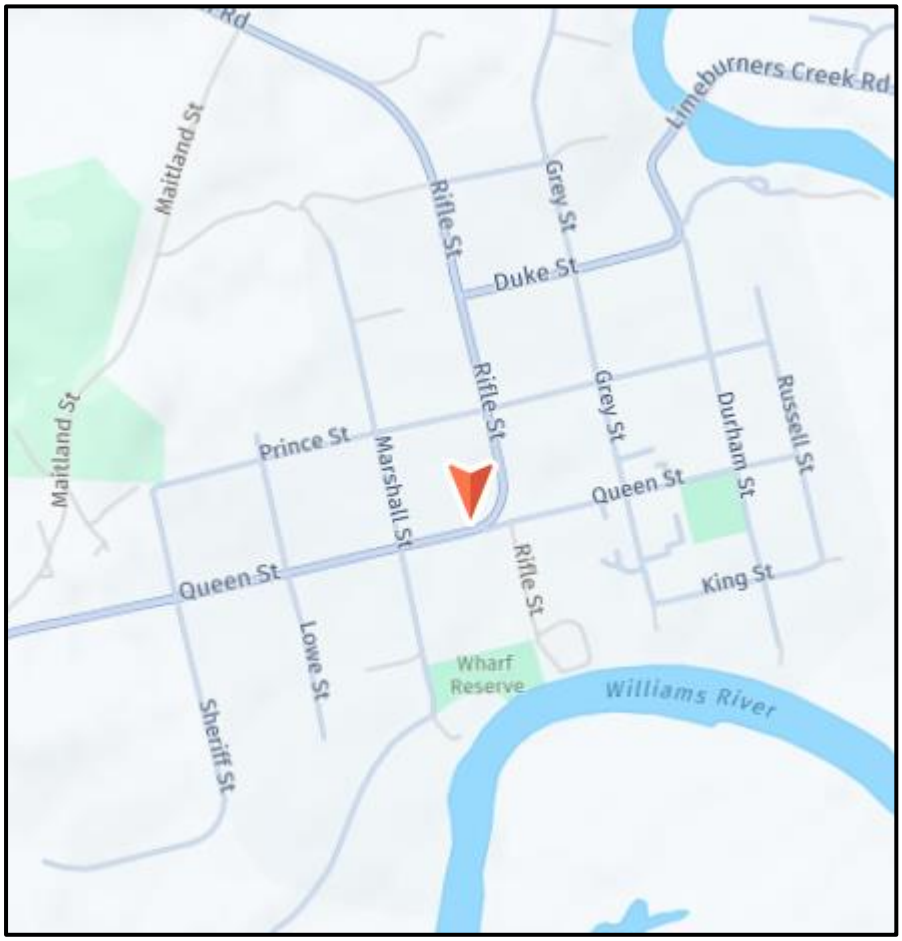
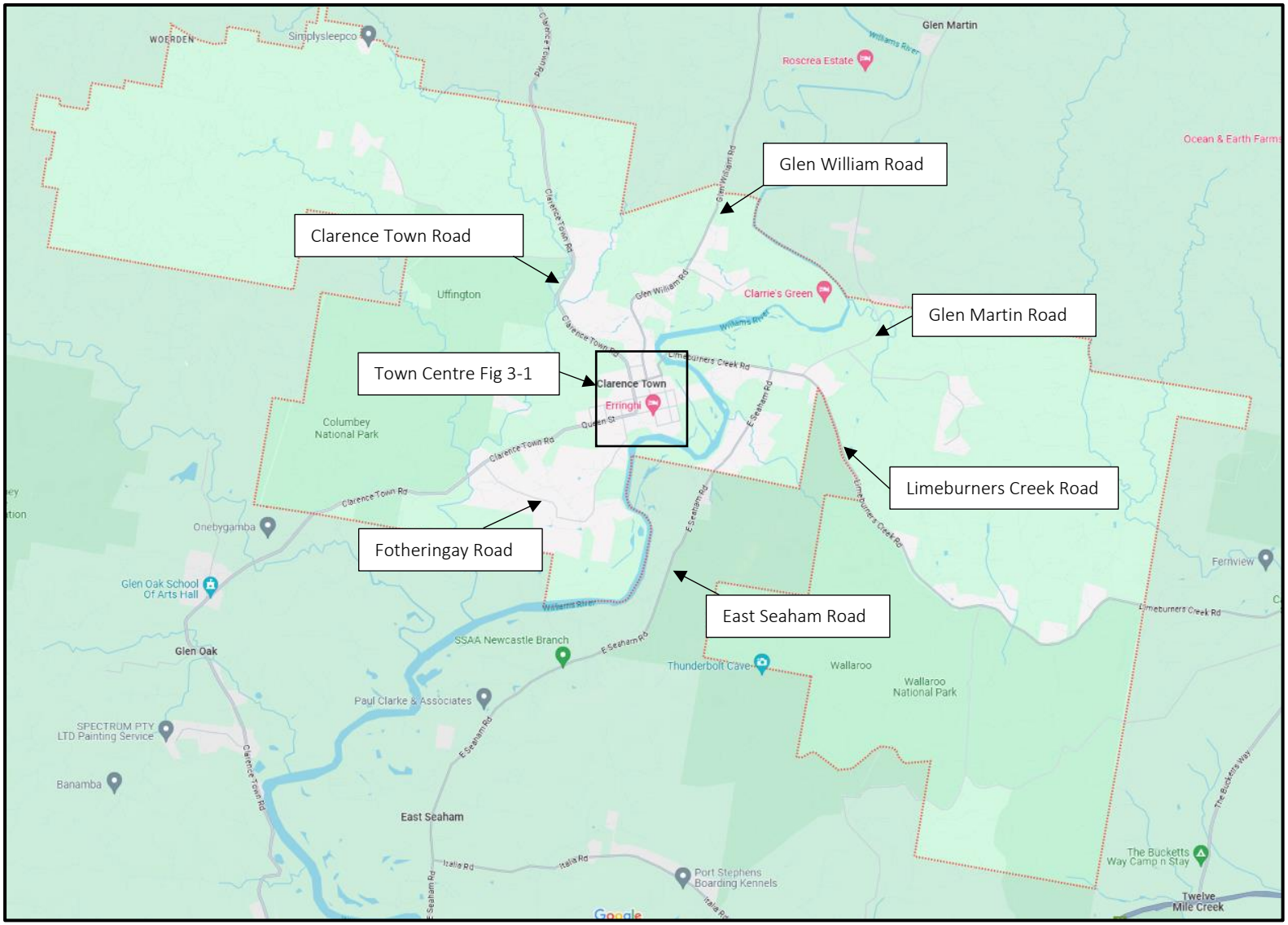
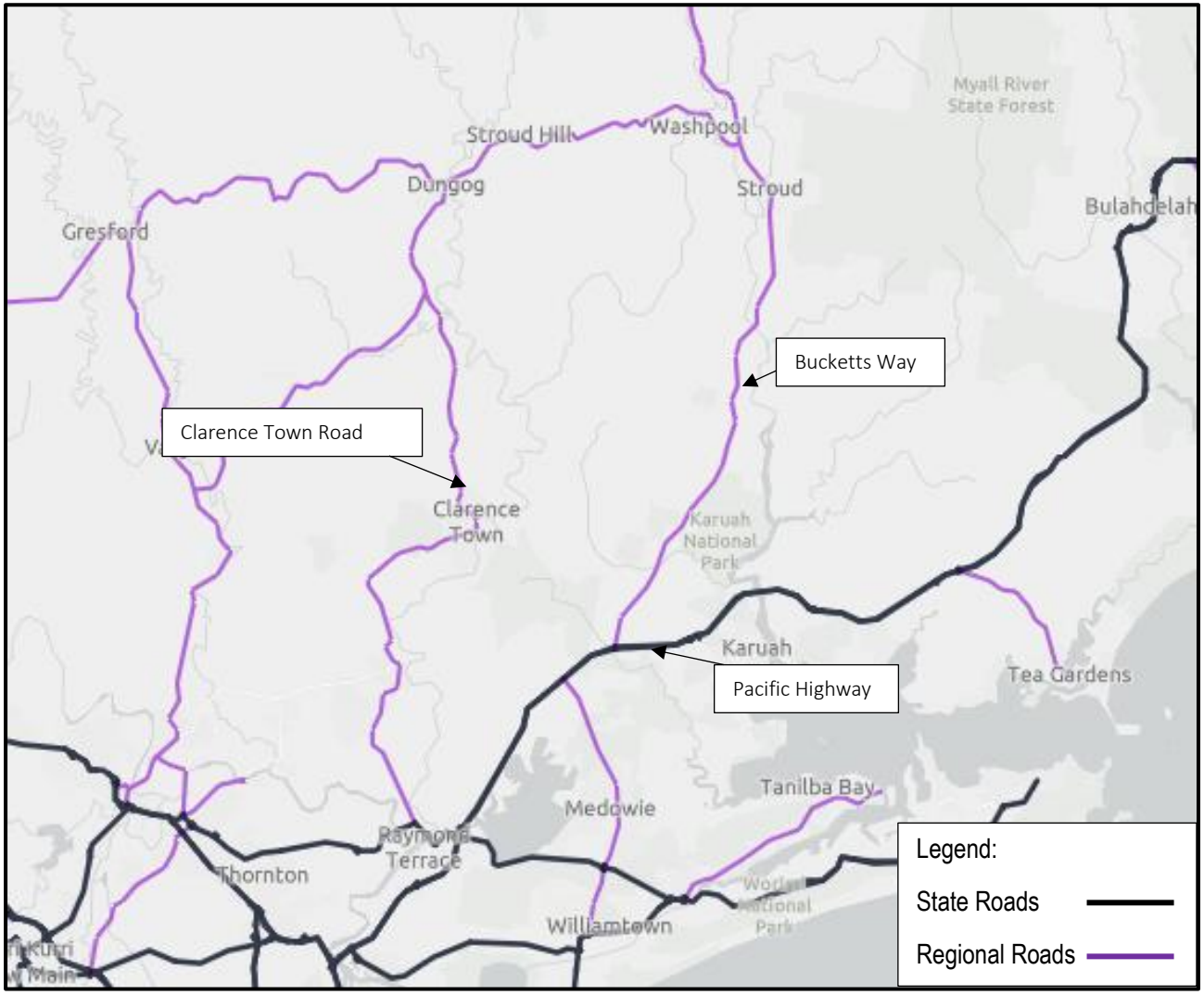


Figure 2-1 – Town Centre Map (Source: Nearmap)

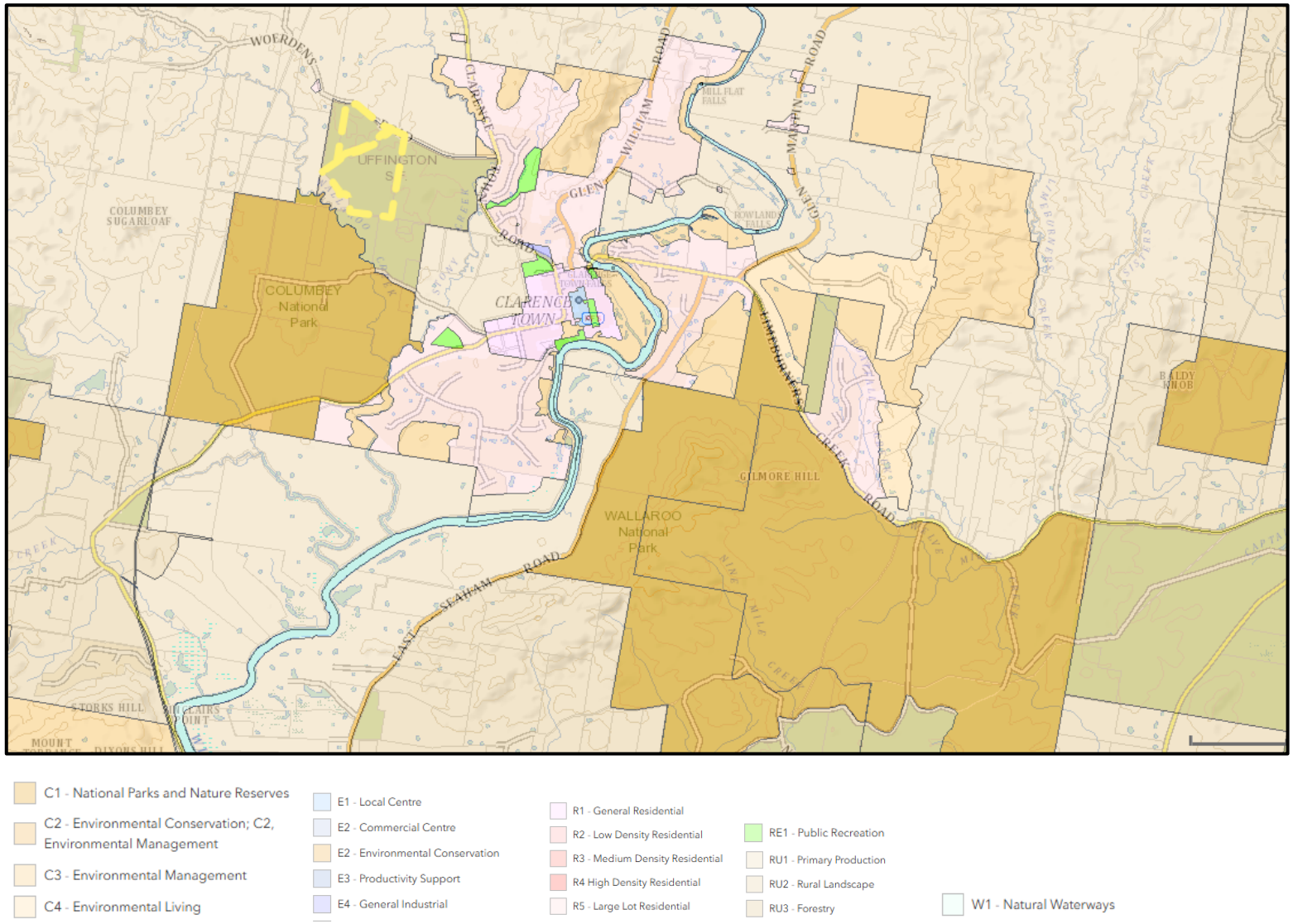


■ *Figure 2-2 – Study Area within context of local road network (source: Google Maps)*



■ *Figure 2-3 –Clarence Town within context of broader road network (source: TfNSW)*

2.1.1 Zoning and Adjacent Land Use



■ *Figure 2-4 – Study Area within context of land uses (Source: NSW Planning Portal)*

2.2 Road Hierarchy

Clarence Town Road and Limeburners Creek Road provide the two key movement corridors through Clarence Town with both roads carrying a mix of local and regional traffic. The upgrade to the historic Clarence Town Bridge over the Williams River will increase opportunities for heavy vehicle traffic to use Limeburners Creek Road.

The town centre road network provides a grid arrangement allowing the distribution of local traffic across various routes. The majority of local traffic is contained east of Clarence Town Road associated with the commercial centre and recreational facilities however the public school and community pre-school are both located to the east requiring an interaction with through traffic.

Clarence Town Road (MR301)

- Regional Road with a north-south orientation -From Raymond Terrace - Maitland Road north-west of Fitzgerald Bridge over the Williams River west of Raymond Terrace via Nelsons Plains, Seaham, Glen Oak, Clarence Town and Brookfield to the Paterson - Dungog Road at Wiragulla.
- This is a sealed road providing a single lane of travel in both directions
- It is approximately 6-7 meters wide, with no formal shoulders or footpath
- Outside of Clarence Town it is rural in nature providing access to a number of rural residential lots as well as access to small farm holdings
- It provides a connection between Clarence Town to the south and rural land towards Dungog to the north and allows for a direct through route for traffic
- Traffic flows on this road are very low, associated with local residential access as well as some larger vehicles associated with the various rural land holdings in this location
- It operates under the posted speed limit of 90 km/h and reduces to 50 km/h as the road enters the urban area of Clarence Town
- Through the township it is Queen Street to the south and Rifle Road to the north.

Limeburners Creek Road (Id 29057)

- Local Road with an east-west orientation
- This is a sealed road providing a single lane of travel in both directions
- It is approximately 6-7 meters wide, with no formal shoulders or footpath
- Outside of Clarence Town it is rural in nature providing access to a number of rural residential lots as well as access to small farm holdings
- It provides a connection between Clarence Town to the west and Bucketts Way (MR0090) to the east
- It crosses the Williams River north of the town over a single lane historic bridge with load and size constraints
- Traffic flows on this road are very low, associated with local residential access as well as some larger vehicles associated with the various rural land holdings east of the bridge
- It operates under the posted speed limit of 80 km/h and reduces to 50 km/h as the road approaches the Clarence Town Bridge
- Through the township it becomes Durham Street and then Duke Street

Glen William Road

- Local Road with a north-south orientation
- This is a sealed road providing a single lane of travel in both directions
- It is approximately 6-7 meters wide, with no formal shoulders or footpath
- Outside of Clarence Town it is rural in nature providing access to rural residential lots as well as access to small farm holdings
- It provides a connection between Clarence Town and Glen William to the north being an extension of Grey Street
- Traffic flows on this road are very low, associated with local residential access as well as some larger vehicles associated with the various rural land holdings north of the town
- It operates under the posted speed limit of 80 km/h and reduces to 50 km/h as the road approaches Grey Street

- At Glen William there is a school zone associated with the Glen William Public School

Glen Martin Road (Id 19637)

- Local Road with a north-south orientation located on the eastern side of the river connecting to Limeburners Creek Road
- This is a sealed road providing a single lane of travel in both directions
- It is approximately 5-6 meters wide, with no formal shoulders or footpath
- Outside of Clarence Town it is rural in nature providing access to rural residential lots as well as access to small farm holdings
- It provides a connection between Clarence Town and the locality of Glen Martin to the north
- Traffic flows on this road are very low, associated with local residential access as well as some larger vehicles associated with the various rural land holdings north of the town
- It operates under the posted speed limit of 80 km/h

Fotheringay Road (Id 66165)

- Local Road as an extension from Marshall Street
- This is a sealed road providing a single lane of travel in both directions
- It is approximately 6-7 meters wide, with no formal shoulders or footpath
- Outside of Clarence Town it is rural in nature providing access to rural residential lots as well as access to small farm holdings
- It provides a connection to other rural roads in area
- Traffic flows on this road are very low
- It operates under the posted speed limit of 80 km/h and reduces to 50 km/h as the road approaches Marshall Street

A summary of the town centre local streets follows with abbreviations per the Local Road Strategy (Appendix A).

The following guidance for urban roads, on the number of vehicles per day for development purposes, is nominated in the Dungog Shire Council Roads Management Strategy 2011.

Urban Sub-Arterial (USA)	NA
Urban Collector (UC)	>500 vpd
Urban Distributor (UD)	>300 vpd
Urban Local 1 (UL1)	>100 vpd
Urban Local 2 (UL2)	<100 vpd
Urban Commercial Industrial	NA

Road Name	**Sherriff Street**
Road Class	UL2
Carriageway width	≈6m K to K where K&G exists
Seal width	≈4m where no K&G
Kerb & gutter	Minimal SA K&G south of Queen St otherwise none
Sealed verge	Only where K&G
Pedestrian/cycling facilities	None
Streetlights	At intersection with Queen St otherwise none
Speed	50 km/h
Parking	Permitted
Other	Residential including larger lots

Looking north across Queen Street intersection

Road Name	**Lowe Street**
Road Class	UL2
Carriageway width	≈7.5m south of Queen St ≈12m north of Queen St
Seal width	5m south of Queen St 10m north of Queen St
Kerb & gutter	Minimal SA south of Queen St otherwise none. SA east side only north of Queen St
Sealed verge	East side only north of Queen St
Pedestrian/cycling facilities	None
Streetlights	Intersection with Queen St and 2 south of Queen St, also Prince St.
Speed	50km/h
Parking	Permitted
Other	Residential

Looking south from near Prince Street

Road Name	**Marshall Street**
Road Class	UL1 / UL2
Carriageway width	≈7.5m – 8.5m except outside school where it is ≈18m
Seal width	South of Queen St ≈6m except outside school ≈18m From 4.5m – 12m north of Queen St
Kerb & gutter	SA close to Queen St and between Queen St and Prince St
Sealed verge	Only where K&G
Pedestrian/cycling facilities	None
Streetlights	Int with Queen St otherwise none
Speed	50km/h
Parking	45° rear to kerb outside school
Other	Residential + school. Becomes Fotheringay Road to the south

Looking north towards school

Looking south from northern end

Road Name	**Rifle Street (Clarence Town Road)**
Road Class	Classified regional road
Carriageway width	≈4m south of Queen St ≈7.5m Queen St to Prince St ≈13m Prince St to Earl St
Seal width	≈4m south of Queen St ≈7.5m Queen St to Prince St ≈13m Prince St to Earl St
Kerb & gutter	SA both sides Queen St to Earl St None south of Queen St
Sealed verge	Yes
Pedestrian/cycling facilities	None
Streetlights	Intersections only
Speed	50km/h
Parking	Parallel parking lane provided Prince St to Earl St
Other	Residential

Looking north towards Dungog

Intersection of Rifle St and Queen St

Road Name	**Grey Street**
Road Class	Varies
Carriageway width	≈19m S Duke St ≈5m-6m north of Duke St
Seal width	≈19m S Duke St ≈5m-6m north of Duke St
Kerb & gutter	SA south of Duke St, both sides None north of Duke St
Sealed verge	South of Duke St
Pedestrian/cycling facilities	Footpath outside hotel
Streetlights	Yes, only south of Duke St
Speed	50km/h
Parking	45° rear to kerb in commercial area (Bakery, IGA, Hotel and Hardware) Queen St to Duke St parallel
Other	Residential, commercial Becomes Glen Willam Road to the north

Looking south from Duke Street

Looking north towards Duke Street intersection

Northern end looking south towards Duke Street

Looking north along Grey Street from hotel

Looking south showing parking at southern end of Grey Street

Road Name	**Durham Street**
Road Class	Varies
Carriageway width	≈8m-9m south of sports field ≈10m adjacent to sports field ≈13m north of Prince St
Seal width	≈7m south of Prince St ≈13m north of Prince St
Kerb & gutter	SA east side full length. West side Prince St to Duke St.
Sealed verge	Only when K to K
Pedestrian/cycling facilities	None
Streetlights	Intersections
Speed	50km/h
Parking	Parallel but 90^0 adjacent to sport field
Other	Residential and sports field

Looking north towards intersection with Limeburners Creek Road/Duke Street

Durham Street showing typical cross section looking south

Looking north with sports fields to left of photo

Road Name	**Russell Street**
Road Class	UL2
Carriageway width	≈8.5m
Seal width	≈7m
Kerb & gutter	SA west side and in turn head otherwise none
Sealed verge	No
Pedestrian/cycling facilities	None
Streetlights	Intersections + one at south end
Speed	50km/h
Parking	Parallel
Other	Residential

Looking south from northern end near Prince Street

Road Name	**King Street**
Road Class	UL2
Carriageway width	≈7.5m west of Durham St ≈7m east of Durham St
Seal width	≈4.5m
Kerb & gutter	None
Sealed verge	No – houses set back with wide verge
Pedestrian/cycling facilities	None
Streetlights	No
Speed	50km/h
Parking	
Other	Residential Clarence Town Village Green at western end Requires maintenance

Road Name	**Queen Street (includes part of Clarence Town Road)**
Road Class	Varies
Carriageway width	≈11m west of Sherriff St ≈13.5m Sherriff St to Rifle St ≈10m Rifle St to Grey St ≈15m east of Grey St to sports field
Seal width	≈11m west of Sherriff St ≈13.5m Sherriff St to Rifle St ≈6m Rifle St to Grey St ≈15m east of Grey St to sports field
Kerb & gutter	SA both sides to Rifle St SA Rifle St to Grey St on south side, north side near Grey St SA Grey St to sport field incl. turn head
Sealed verge	K to K when in place
Pedestrian/cycling facilities	New footpath on south side between Grey St and sportsfield, elsewhere none
Streetlights	Yes
Speed	50km/h
Parking	Generally parallel, marked lane where regional road. Angled parking on north side east of Grey St
Other	Residential and school. Sports fields at eastern end. Main road in and through town. Sign posted within town centre (Grey St) as route to Raymond Terrace, Maitland and Newcastle

Looking east in vicinity of school

Worn sign directing traffic to Raymond Terrace, Maitland and Newcastle

Looking west from Grey St

Road Name	**Prince Street**
Road Class	
Carriageway width	Majority ≈10m west of Lowe St ≈11.5m - 12m east of Lowe St except near shops, ≈18m
Seal width	Majority 6m west of Marshall St ≈12m Marshall St to Durham St ≈10m east of Durham St
Kerb & gutter	SA north side Marshall St to Russell St, SA south side Rifle St to Durham St, otherwise none
Sealed verge	When K to K
Pedestrian/cycling facilities	Footpath outside commercial businesses
Streetlights	Yes
Speed	50km/h
Parking	Parallel 90° near commercial area 45° near tennis courts
Other	Residential, commercial, bowling club

Looking east towards shopping centre from Rifle Street

Looking west towards Rifle Street intersection

Road Name	**Duke Street**
Road Class	UL1
Carriageway width	≈10m
Seal width	≈10m
Kerb & gutter	SA majority of street
Sealed verge	Yes
Pedestrian/cycling facilities	None
Streetlights	Intersections with Durham and Grey streets
Speed	50km/h
Parking	Parallel
Other	Residential West of Rifle Street – short length off Marshall. No facilities, seal only.

Looking east from Grey Street towards Durham Street

Road Name	**Earl Street**
Road Class	UL2
Carriageway width	≈9.5m
Seal width	≈5.5m
Kerb & gutter	None
Sealed verge	No
Pedestrian/cycling facilities	None
Streetlights	No
Speed	50km/h
Parking	Permitted
Other	Residential West of Rifle St -unsealed with no facilities.

Earl Street looking east from Rifle Street towards Grey Street

Looking east from west of Rifle Road

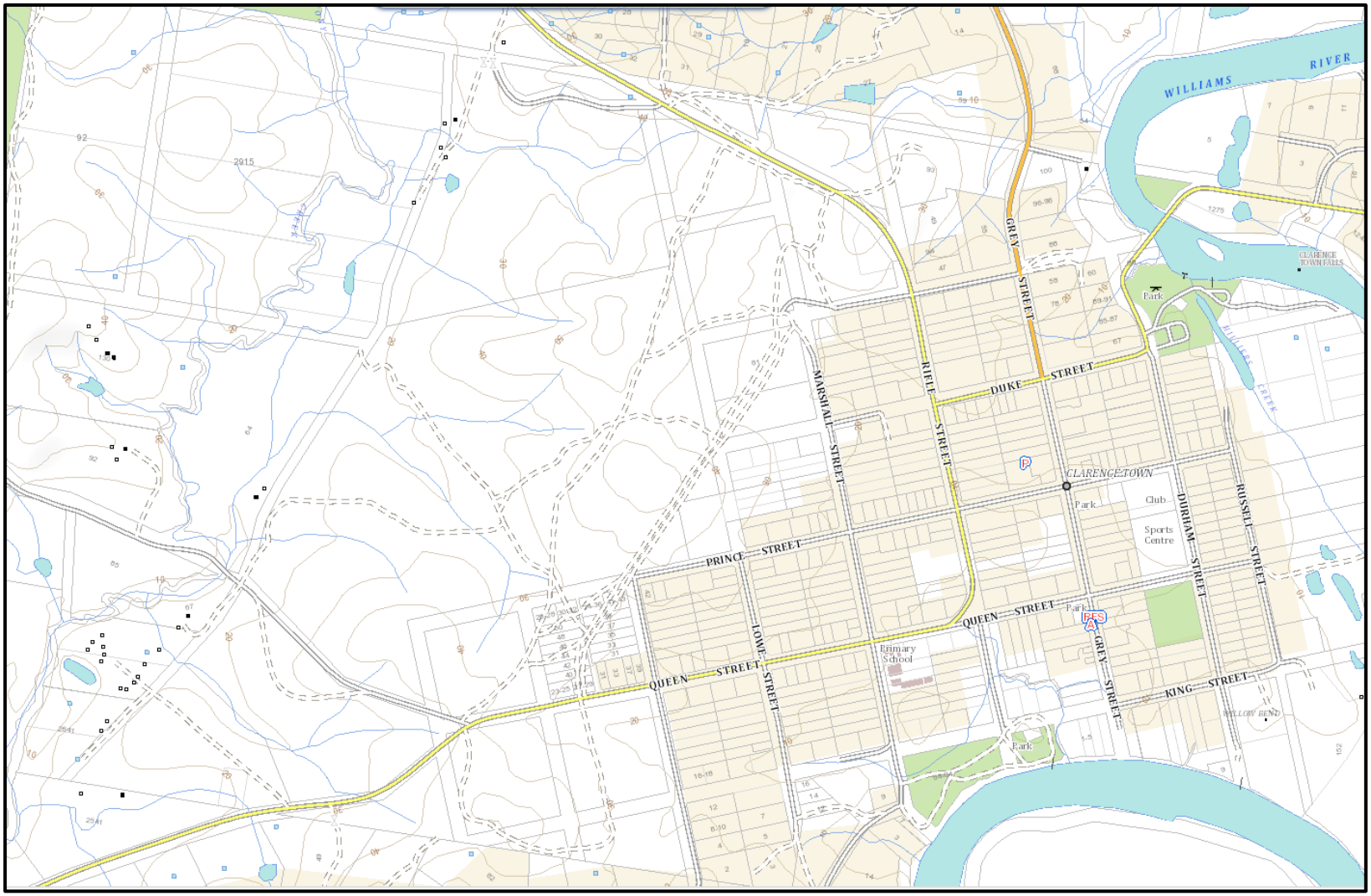


Figure 2-5 – Road corridors reflecting paper roads ( )

2.2.1 Unformed Paper Roads

Clarence Town, in particular the town centre, has a number of unformed or paper roads reflecting the historical nature of the township and its early planning. These road reserves are shown on the plan above and are located primarily to the west of Sheriff Street and north of Earl Street. Of particular note is the corridor reflecting a straight extension of Limeburners Creek Road westbound over the river. The bridge however is located south of this and so Limeburners Creek Road joins Duke Street to extend to Rifle Street (Clarence Town Road).

There are also numerous unformed roads providing unsealed tracks and trails throughout the area.

2.2.2 Clarence Town Bypass

The Dungog DCP Sec D Clarence Town Local Area Plan notes that a route has been identified for the development of the Clarence Town by-pass.

This route is shown below in red and impacts a number of potential lots to the west of Sheriff Street.

Figure 2-6 – Route previously identified for Clarence Town Bypass

2.3 Traffic Volumes and Conditions

2.3.1 Peak Hour Flows

SECA Solution undertook peak hour traffic surveys on Wednesday 19th June (3pm-5.30pm) and Thursday 20th June (7am-9.00am). The peak periods were determined to be 8-9am and 4.30-5.30pm.

Table 2-1 Peak hour traffic flows

Road	AM 8-9AM	AM Two-Way	PM 4.30-5.30PM	PM Two-Way
Northbound on Rifle St (north of Duke St)	117 vph		147 vph	
Southbound on Rifle St (north of Duke St)	121 vph	238 vph	107 vph	254 vph
Northbound on Rifle St (south of Duke St)	108 vph		137 vph	
Southbound on Rifle St (south of Duke St)	157 vph	265 vph	114 vph	251 vph
Northbound on Grey St (south of Duke St)	40 vph		56 vph	
Southbound on Grey St (south of Duke St	37 vph	77vph	44 vph	100 vph
Eastbound on Duke St (east of Rifle St)	50 vph		61 vph	
Westbound on Duke St (east of Rifle St)	85 vph	135vph	78 vph	139 vph
Eastbound on Prince St (east of Rifle St)	39 vph		77 vph	
Westbound on Prince St (east of Rifle St)	36 vph	75 vph	69 vph	146 vph
Durham Street (south of Limeburners Creek Rd)		20 vph		

2.3.2 Daily Traffic Flows

There is no published daily traffic data for Clarence Town Road or Limeburners Creek Road.

Allowing peak hour flows to represent 10% of the daily flows the following has been determined.

Table 2-2 Daily traffic flows

Road	Daily Flows
Rifle St (north of Duke St)	2500 vpd
Rifle St (south of Duke St)	2600 vpd
Grey St (south of Duke St)	900 vpd
Duke St (east of Rifle St)	1400 vpd
Prince St (east of Rifle St)	1150 vpd
Durham Street (south of Limeburners Creek Rd)	200 vpd

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced with the above data indicating a slight bias in movements southbound in the morning and the reverse in the afternoon as people travel south towards Raymond Terrace and Maitland for schooling and employment. Traffic flows into and out of the town centre is reflected in right turn demands from Rifle Street into Prince Street and turn demands off Duke Street into Grey Street.

The Community Pre-School on Prince Street west of Rifle Street is an attractor as is the local public school on the corner of Queen Street and Marshall Street.

2.3.4 Heavy Vehicle Flows

A reasonably high volume of heavy vehicles use Rifle Street and Duke Street (5%). The majority of these are buses associated with various school services.

The upgrade of the Clarence Town Bridge is however expected to see an increase in heavy vehicles in this area.

2.3.5 Current Road Network Operation

Observations on site during the peak periods show there are no delays for traffic movements along Clarence Town Road.

The Guide to Traffic Generating Developments provides the following (Table 4.5) to assess the level of service (LoS) of a rural road and as a guide to when two traffic lanes per direction are required, based on the projected peak hour traffic flows and on the appropriate level of service as shown below.

Table 4.5
peak hour flow on two-lane rural roads (veh/hr)
(Design speed of 100km/hr)

Terrain	Level of Service	Percent of Heavy Vehicles			
		0	5	10	15
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

The data for Table 4.5 assumes the following criteria:

- *terrain level* with 20% no overtaking.
- *rolling* with 40% no overtaking.
- *mountainous* with 60% no overtaking.
- 3.7 m traffic lane width with side clearances of at least 2m.
- 60/40 directional split of traffic.

This table sets out two-way hourly road capacities for two-lane roads for different levels of service, with a design speed of 100 km/hr, based on different terrain types. The capacity assumes a 60/40 directional split of traffic. Where design speeds of 80 km/hr are used, the resulting capacities are between 85-95% of the figures quoted, depending on the level of service. Single lane capacities are affected by overtaking opportunities.

Weekday Peak Hour Flows.
Major roads: Level of service C
Minor roads: Level of service C desirable.
Recreational Peak Hours (weekends).
Major roads: Level of service D
Minor roads: Level of service D desirable.

Allowing for 5% heavy vehicle content on a rolling road Clarence Town Road north of Clarence Town would operate at LoS B being less than 378vph (90% x 420).

Limeburners Creek Road with two way flows of 146 vph would also operate at LoS B as would most other rural roads accessing Clarence Town town centre.

The Guide to Traffic Generating Developments also provides the following to assesses the mid-block capacity of urban roads.

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Applying this to the roads surveyed all town centre roads operate with directional flows of less than 200vph and so operate at LoS A.

The priority controlled T-intersection of Duke Street and Rifle Street operates well with minimal delays for all vehicles. SIDRA analyses indicates that the intersection is operating at a very low saturation level of 0.074 (AM peak) and 0.077 (PM peak) with minimal delays for turning traffic (maximum 5.6 seconds in both the AM and PM peak periods).

Table 4.1 from Austroads Part 5 Intersections at Grade provides advice on intersection operation (reproduced below). Where these limits are not met, traffic effectively does not suffer from any delay.

Major Road Type[1]	Major Road Flow (vph)[2]	Minor Road Flow (vph)[3]
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

Source: Table 4.1 Austroads Part 5 Intersection at Grade
Figure 2-7 Intersection performance thresholds

It can be seen that for the current traffic flows two-way flows on Rifle Street are well below 400 vph whilst Duke Street as the minor road has flows less than 140 vph.

If flows on both roads increased by 2% per annum for 30 years, flows on Rifle Road would be around 515 vph and Duke Street would be 171 vph. This intersection would still operate without delays.

Other intersections within the town centre operate with lower demands and so would operate as well or better than this.

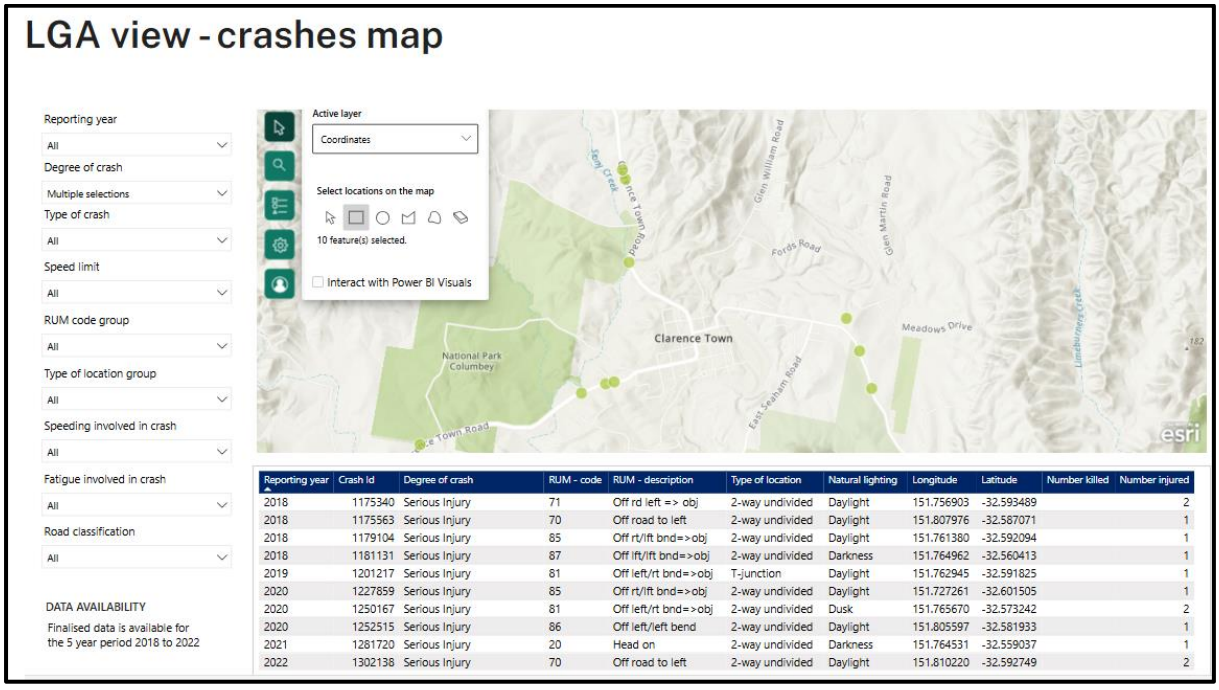
SIDRA intersection modelling has been undertaken in the following chapter however it is noted that should the growth considered in this modelling (scenarios 5 through 9 be considered) a wider town study (possibly SIDRA Network analysis) looking at the performance of other intersections should be undertaken.

2.4 Traffic Safety and Accident History

A review of Fatal and Serious Crashes during the past five years (2018-2022) published by Transport for NSW indicates there has been no fatalities and no serious crashes within the immediate vicinity of the town centre. A further review of all crash types indicated that there have been no crashes of any type within the town centre.

This confirms observations on site that local roads and intersections are well laid out with clear visibility for road users.

A review of the crash descriptions indicates that all but one of these ten collisions were however off-road crashes with the other a head-on. Six involved speed.



Reporting year	Crash Id	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Latitude	Number killed	Number injured
2018	1175340	Serious Injury	71	Off rd left => obj	2-way undivided	Daylight	151.756903	-32.593489		2
2018	1175563	Serious Injury	70	Off road to left	2-way undivided	Daylight	151.807976	-32.587071		1
2018	1179104	Serious Injury	85	Off rt/lft bnd=>obj	2-way undivided	Daylight	151.761380	-32.592094		1
2018	1181131	Serious Injury	87	Off lft/lft bnd=>obj	2-way undivided	Darkness	151.764962	-32.560413		1
2019	1201217	Serious Injury	81	Off left/rt bnd=>obj	T-junction	Daylight	151.762945	-32.591825		1
2020	1227859	Serious Injury	85	Off rt/lft bnd=>obj	2-way undivided	Daylight	151.727261	-32.601505		1
2020	1250167	Serious Injury	81	Off left/rt bnd=>obj	2-way undivided	Dusk	151.765670	-32.573242		2
2020	1252515	Serious Injury	86	Off left/left bend	2-way undivided	Daylight	151.805597	-32.581933		1
2021	1281720	Serious Injury	20	Head on	2-way undivided	Darkness	151.764531	-32.559037		1
2022	1302138	Serious Injury	70	Off road to left	2-way undivided	Daylight	151.810220	-32.592749		2

Figure 2-8 Fatal and Serious Crash statistics for Clarence Town

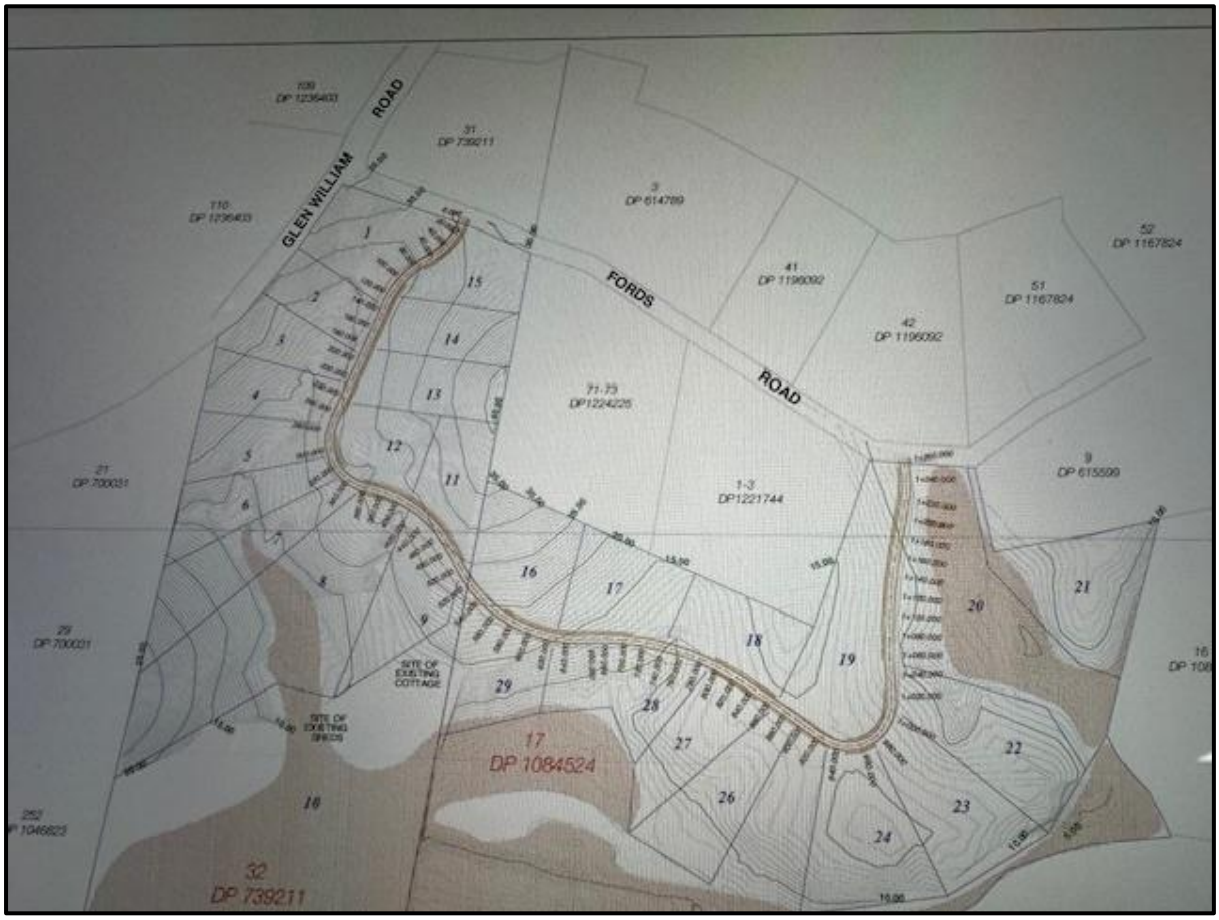
3 Background Developments

Council provided information regarding previously submitted residential developments (rezoning or similar) which upon investigation have not yet been approved.

Per the Guide to Traffic Generating Developments a regional traffic generation rate of 0.85 trips per lot has been applied and a daily rate of 7.4 trips per lot.

Fords Road

Located north of the township off Glen William Road.



Approximately 29 lots

55 vehicle movements in and out of the site onto Glen William Road.

214 trips per day, split 107 inbound and 107 outbound typically per day.

Woerdens Road

Located north of the township off Woerdens Road

39 Large Lot Residential lots to be developed across the site

34 vehicle movements in and out of the site onto Clarence Town Road.

288 trips per day, split 144 inbound and 144 outbound typically per day.

Clarence Town road widened to 10m between Woerdens Road and Erringhi Street, and includes right-turn facilities at these T-junctions.

Woerdens Road 5.5m – 6m wide allowing two-way traffic, and is zoned 80km/hr

The traffic report prepared for the rezoning recommended that "the available sight distance from Woerdens Road looking south is likely less than desirable for safe intersection operation, however, it may meet minimum requirements for stopping to avoid a hazard".

2915 Clarence Town Road

Located north of the township off Clarence Town Road.

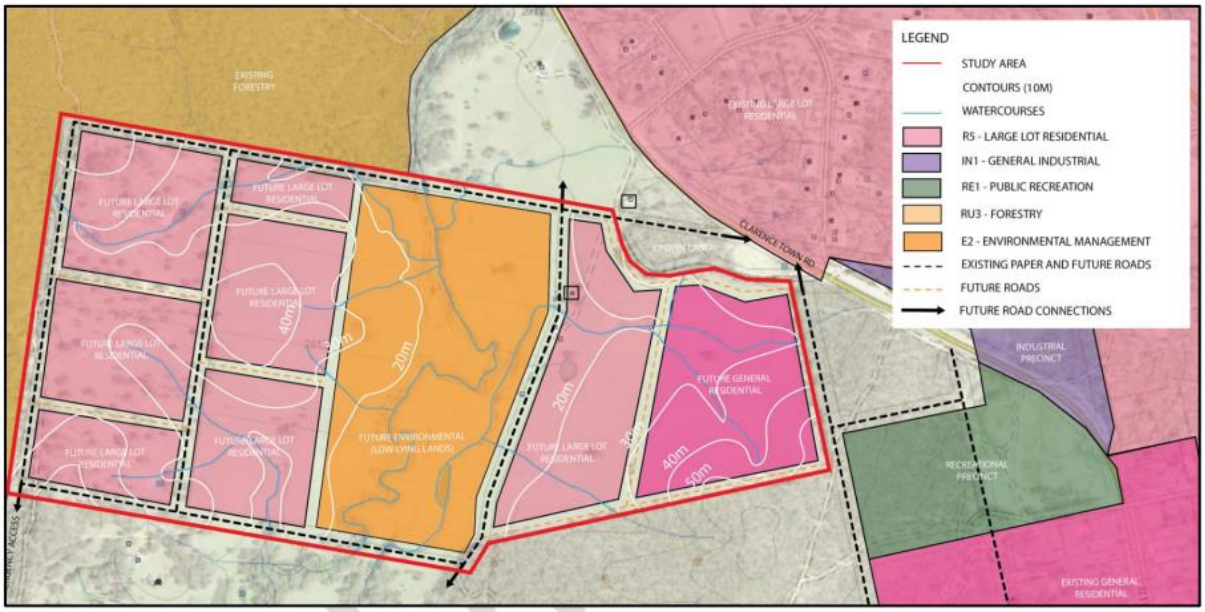


Figure 1 – Rezoning plan for overall site layout

50 lots to be developed across the site

45 vehicle movements in and out of the site onto Clarence Town Road.

370 trips per day, split 185 inbound and 185 outbound typically per day.

Traffic Report notes that "access to the site can be provided to meet these (Austroads Sight Distance) requirements, subject to detailed design. Moving the potential access further north than shown allows the sight lines to be achieved, with no reduction required in the posted speed limit."

3.1 Cumulative Traffic

Allowing for both Woerdens Road and 2015 Clarence Town Road sites to access Clarence Town Road the cumulative impacts of these two developments would be:

- 79 vehicle movements in and out of the site onto Clarence Town Road.
- 558 trips per day, split 279 inbound and 279 outbound typically per day.

The Fords Road subdivision would see all traffic access via Glen William Road.

- 55 vehicle movements in and out of the site onto Glen William Road.
- 214 trips per day, split 107 inbound and 107 outbound typically per day.

3.1.1 Location and trip distribution

The location of these sites is shown below in Figure 3-1.

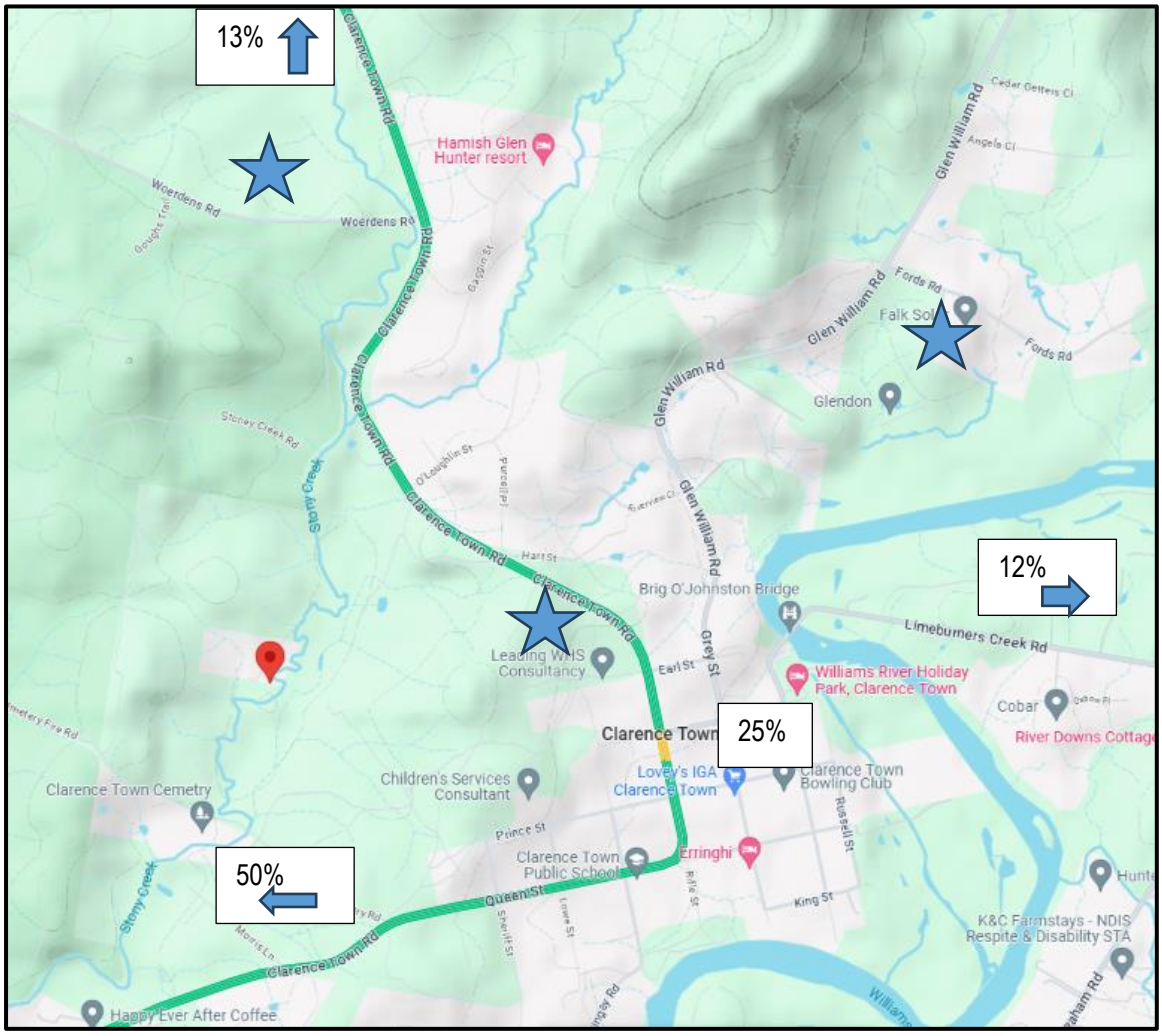


Figure 3-1 Indicative trip distribution

Allowing for the location of these known developments 25% of all trips have been allocated to the town centre as contained trips, consistent with the Guide to Traffic Generating Developments, being associated with local trips to shops, school, recreation etc, with the balance split to the north towards Dungog (13%), east towards Buckett Way (12%) and south towards Raymond Terrace and Maitland (50%).

An 20/80 split has been allowed for inbound/outbound movements in the AM with the opposite in the PM.

Figure 3-2 Development trips distribution (AM outbound/inbound)

	Trips	North towards Dungog	Clarence Town town centre	East towards Bucketts Way	South
Woerdens/Clarence Town	79	2/8	4/16	2/8	7/32
Fords Road	55	1/6	3/11	1/6	5/22

3.2 Network Constraints

A rudimentary analysis has been undertaken to identify potential constraints within the road network.

Whilst the local roads have adequate capacity to accommodate future traffic demands, it is the performance of the intersections that typically become the constraint.

The Future Scenario has been based on:

- a linear growth factor of 2% pa for 30 years, given no advice to the contrary. This has been applied to the existing demands to allow for background growth along the key corridors of Clarence Town Road (north/south) and Limeburners Creek Road (east/west).
- traffic demands associated with the three rezoning applications - distributed to the road network including at the key intersections of Rifle Street and Duke Street, Duke Street and Grey Street and Rifle Street and Prince Street. SIDRA scenarios in scenarios 3 through 9 tabulated above.
- Development along Glen William Road towards Dungog has been allocated to Earl Street
- Local trips have been split equally between the town centre (west) and Prince Street (east) given the key attractors of the commercial centre, childcare centre and school. Town centre trips have been allocated to Grey Street (from the east or north along Glen William Road) or Prince Street (from the north or south from Clarence Town Road)

The intersection of Rifle Street and Duke Street is the key constraint given that it carries both regional and local traffic demands.

SECA Solution undertook SIDRA intersection modelling to assess the operation of this intersection should additional traffic in addition to background growth be applied to the intersection. This considered "Possible Development" as outlined above as well as allowing up to 150 additional trips on each movement.

SIDRA analysis indicated the following:

Intersection of Rifle Street and Duke Street

Scenario	Peak volume (sum of all movements)	Worst movement Degree of Saturation (DoS)	Level of Service (LoS)	Average delay for right turns from Duke Street (most delayed movement)
1. Existing geometry – AM Peak Thur 20-6-24	324	0.074	A – all movements	0.3
2. Existing geometry – PM Peak Wed 19-6-24	322	0.077	A – all movements	0.3
3. Existing geometry – AM Peak Thur 20-6-24 + 2% background growth over 30 years	587	0.157	A – all movements	0.6
4. Existing geometry – PM Peak Wed 19-6-24 + 2% background growth over 30 years	582	0.153	A – all movements	0.6
5. Existing geometry – AM Peak Thur 20-6-24 + 2% background growth over 30 years + Possible development traffic	690	0.184	A – all movements	0.7
6. Existing geometry – PM Peak Wed 19-6-24 + 2% background growth	685	0.156	A – all movements	0.6

over 30 years + Possible development traffic				
7. Existing geometry – AM Peak Thur 20-6-24 + 2% background growth over 30 years + Possible development traffic + High Growth scenario (additional 150 movements added to all movements)	1590	0.752 (Note: maximum practical capacity is approx. 0.5 – so upgrade is warranted)	C – Duke St	20.7

Note: Austroads Guidelines show that despite the analysis showing that the existing intersection has capacity to accommodate a certain amount of growth, the warrants for upgrades such as an Austroads CHR or CHR(s) override the analysis that may indicate that an unchannelised arrangemement may have sufficient capacity (see below).

A High Growth scenario of an additional 900 movements, which could be generated by a significant residential development of 1059 dwellings (for example), .would take the operation of the existing geometric arrangements at the intersection of Rifle Street and Duke Street to maximum practical capacity during the peak traffic periods.

To advise a suitable treatment to cater beyond this traffic loading, SECA Solution tested two options:

- A chanelised intersection, whereby the parking lanes over say, 60 metres on each side of the intersection on Rifle Street were converted to a through travel lane and a right turn lane into Duke Street provided on the current north bound through lane on Rifle Street, say 30 metres long, and the Duke Street centreline be moved north to provide a left turn and right turn lane (2 x 3.0 metres wide), with the northern lane reduced from 5 metres to 4.0 metres width (these widths are approximate).
- A single lane roundabout

SIDRA analysis determined the following:

Scenario	Peak volume (sum of all movements)	Worst movement Degree of Saturation (DoS)	Level of Service (LoS)	Average delay for right turns from Duke Street (most delayed movement)
8. Channelised intersection option – AM Peak Thur 20-6-24 + 2% background growth over 30 years + development + significant large development	1590	0.993 (exceeds maximum practical saturation of 0.85)	F – right turn from Duke St Treatment for this level of traffic is not suitable)	82.1 (increased delay due to increased gap acceptance to cross right turn lane)
9. Single lane roundabout option – AM Peak Thur 20-6-24 + 2% background growth over 30 years + development + significant large development	1590	0.490	A – all movements Excellent operating conditions, low delays, very good spare capacity Recommended longer term treatment	9.4

Applying additional traffic in the order of 900 vehicle movements through the intersection would require an upgrade to the existing priority controlled intersection.

The channelisation of the intersection does not add capacity to the operation of the intersection. The right turn movement from Duke Street would be further delayed due to the longer gap acceptance required to cross a wide pavement created by the conversion of the parking lane to a through travel lane.

A roundabout would reduce delays significantly for the right turning vehicles from Duke Street and only add minor additional delay to through movements on Rifle Street. A roundabout has additional benefits such as acting as a speed reduction device on Rifle Street and when built to current Austroads Guidelines would provide pedestrian refuge islands on all approaches. Should a roundabout be eventually installed, lighting would also need to be reviewed and most likely upgraded. Consideration should also be given to the requirements of cyclists.

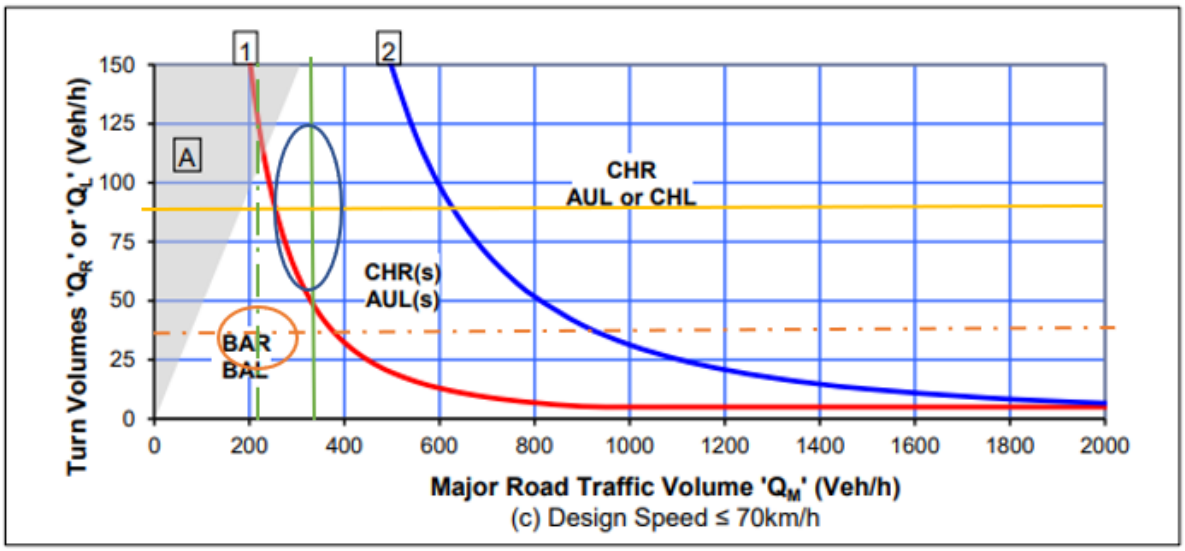
A single lane roundabout would provide improved road safety for vehicles, pedestrians and cyclists (meeting cyclist design guidelines outlined in Austroads) if installed today and also provide for future demand within the scope considered in this study.

Whilst such a roundabout would provide suitable capacity, signalised intersections (over roundabouts) may be justified on road safety grounds to support pedestrian movements as well as town centre traffic.

Such facilities could also be considered in conjunction with upgrades at the intersection of Prince Street/Rifle Street or Duke Street/Rifle Street (particularly if Duke Street is extended west) in response to land releases and resulting vehicle and pedestrian demands.

The Existing and Future Scenario was also plotted against the Austroads Turn Warrants which has confirmed that a CHR(S) right turn treatment will be required at this intersection to accommodate the extra demands although SIDRA analysis indicates that the existing arrangement could accommodate the existing peak traffic plus 2% background growth over 30 years plus the traffic generated from existing development applications. The Austroads Guidelines should be applied as a minimum treatment and then SIDRA analysis applied to evaluate other treatments such as a roundabout.

Growth beyond that included in existing development applications indicates that a facility such as roundabout should be the long term treatment with a CHR(s) being a suitable intermediate treatment that could be installed (subject to engineering survey and design) within the existing pavement widths as a suitable interim treatment.



Note: the minimum right-turn treatment for multilane roads is a CHR(s).

From the capacity review there is an opportunity for a further 800 to 900 trips distributed evenly on all existing movement volumes should an interim. At the rate of 0.85 trips per dwelling this could include:

- 450 lots to be developed to the north along Glen William Road or to the east along Limeburners Creek Road including Glen Martin Road
- 400 lots to be developed to the north along Clarence Town Road.
- 700 lots to be developed to the south of the township

Whilst this provides an indication of the opportunity for development there are multiple factors that shall also require consideration, and which may impact these findings.

1. Background growth rate – if the anticipated growth rate is lower than assessed then there is more capacity for development. The background growth rate has been applied for a 30 year horizon which should be reviewed within the context of a local land release strategy.
2. Traffic has been allocated based on the existing situation and known projects. The order with which future projects are developed will influence these findings as will the mix of development sites.
3. The grid pattern of the local roads allows trips to be distributed across various routes, reducing the impact at any one intersection. As the roads become busier motorists choose alternate routes to avoid congestion with traffic balancing across the network. This increases the capacity of the network as a whole as well as at single intersections.
4. No allowance has been made for individual developments within the town centre. It is assumed that the majority of these will benefit from the traffic that has been allowed for as contained trips. Some diverted trips from regional traffic may be attracted to the town centre eg petrol stations, cafes, tourist developments however the majority of these trips would typically occur of a weekend or outside the local road peak.
5. The intersection of Rifle Street and Duke Street is a key intersection within Clarence Town. The existing geometry, as indicated through SIDRA analysis, can accommodate a modest amount of growth. An interim treatment such as an Austroads CHR(s) will be required, regardless of the SIDRA analysis indicating that the existing arrangement can accommodate higher traffic volumes. Given the growth potential of the Clarence Town surrounds, a single lane roundabout would best provide for the likely longer term development demands and also provide a safety device in Clarence Town.

4 Town Centre Parking

4.1 Parking Supply and Demand

4.1.1 On-street Parking Provision

Parallel parking for vehicles is generally available on both sides of the local roads with minimal controls or restrictions except at intersections and driveways and in the vicinity of the school.

Angle parking is provided along Grey Street in front of the various businesses being on the eastern side at the northern end associated with the bakery, on the western side in front of the IGA development (cnr Grey Street and Prince Street) and at the southern end on both sides near the hotel, hardware store etc.

Angle parking is also provided on Marshall Street associated with the school, on Prince Street adjacent to the IGA development and near the Seniors Centre. The western side of Durham Street provides a very wide verge adjacent to the sports fields which is expected to be used for informal angle parking.

On-site observations indicate that current on street demands are generally low except where associated with these various businesses and the school. Kerb side parking on Prince Street, west of Grey Street appears to be used by staff of the commercial centre opposite.

Photo 4-1 Parking signage poorly maintained on Grey Street (near hotel)

4.1.2 Off-Street Parking Provision

Off-street parking is provided on Queen Street (east from Durham Street and west from Queen Street) associated with sports facilities. Similarly, off street parking is provided near the Council swimming pool and at the Bowling Club.

There is a parking area near the Lions Park and Caravan Park near the Williams River and as well less formal parking at the boat ramp and Wharf Reserve.

4.1.3 Parking Demand and Utilisation

Overall there appears to be adequate supply of parking available although as often is the case local residents wish to park as close to their destination as possible.

Disabled parking is also provided within the various parking areas.

4.1.4 Short term Set down or pick up areas

There are no set down or pick up areas noted.

A Bus Stop, Monday to Friday 7am-10am, is provided on Grey Street in front of the Clarence Town School of Arts (opposite IGA).

No equivalent afternoon bus stop was located.

There is also a bus stop on Queen Street alongside the school frontage.

5 Public Transport

5.1.1 Rail Station Locations

There is no railway station in Clarence Town however there is one in Dungog which is serviced by the Hunter Line (via Maitland).

5.1.2 Bus Routes and Associated Facilities

The main buses servicing Clarence Town are school buses noted to operate along Clarence Town Road, Duke Street and Grey Street run by Sheltons Bus Company.

Clarence Town Public School is serviced by a new service (route S444) in the morning and afternoon and includes stops in Glen William and Glen Martin, and the Boatfalls, Waterview and Riverdowns estates.

Hunter Valley Buses provide a school service from Clarence Town to Newcastle via Raymond Terrace (1272) as well as a route (2361) from Glen William to All Saints Maitland via Clarence Town.

Other services include various changes to services to connect with schools at Medowie and elsewhere.

Bus facilities are intermittent with some appearing redundant but others such as this one on Fothergray Street accommodating school pick ups.

Photo 5-1 Bus shelter on Fothergray Street

6 Pedestrian and Cycling Network

There are minimal pedestrian facilities in the town.

The width of the roads and low traffic volumes do allow people to walk on the streets which was noted with a parent pushing a pram and a senior in a mobility scooter.

Several parents were noted walking with their school children on Grey Street south of Duke Street.

Pathways are provided on:

- Queen Street between Rifle Street and the school entry.
- Queen Street southern side between Grey Street and Durham Street (recently completed)
- Queen Street adjacent to the new sports facility/building
- Grey Street on the western side between Queen Street and the last building south of the hotel.

Photo 6-1 Footpath on Queen Street approaching school

A School Crossing is provided across Queen Street at the school entry.

A footbridge connects the Clarence Town Village Green with the Wharf Reserve and Clarence Town Boat Ramp.

Photo 6-2 Footbridge between Clarence Town Village Green and Wharf Reserve

There are no formal cycling facilities in the town.

Two bicycles were noted parked in the school bike racks.

There is a bike rack at the swimming pool.

There is an opportunity to provide cycling facilities in the town.

6.1 Cycling Routes

Subject to design there may be an opportunity to provide a cycling route around the town centre that could connect various attractions and be provided as a wayfinding route with riding on street. This would combine Bike Friendly roads and unpaved trails to provide a route for tourists to explore the town but also for local residents to access facilities.

Upgrades to Durham Road (resealing, removing gravel etc) could allow for a signposted on street route given its connection to the caravan park, local sports facilities, the swimming pool and skate park. Durham Street is wide and has low traffic volumes. It does however have a downhill gradient to King Street which may require consideration.

This could then connect with King Street to the Village Green, across the bridge to Wharf Road and Rifle Street which would allow connection to the school or east along Queen Street.

With consideration to the safe movement of cyclists across Duke Street/Limeburners Creek Road this route could also connect with the future cycling facilities on the bridge upgrade.

This route allows for cyclists to ride along a quite street and circumnavigate the town compared with parts of Grey Street which is likely to see increases in traffic and a higher level of movement over time.

Grey Street can however provide on road cycling at its southern end with on-road bike lanes north of Prince Street.

Connecting the town centre to the broader area is possible through the inclusion of cycling facilities along main roads including Clarence Town Road, Duke Street and Limeburners Creek Road. As these roads carry higher traffic demands and heavy vehicles such facilities would be best designed off-road allowing for the separation of cyclists and vehicles.

7 Growth Scenarios

Various scenarios have been considered with regard to the impact on traffic, pedestrian and cycling demands. The final scenarios allowed for two optiond which both include infill and greenfield components. The infill element is consistent with both, with the difference being in the greenfield development.

The baseline scenario includes only delivery within the current minimum lot size controls whilst the aspirational scenario includes delivery with the potential of reduced minimum lot sizes.

The key findings are outlined below in Table 7-1.

Scenario 1 – Baseline Approach

Description and Key Drivers

This scenario considers a conservative approach for the investigation area, including:

• Retention of the existing minimum lot size control.
• Considers rezoning of low-constrained RU1 to R5 zone to satisfy residual housing demands to meet the housing target.
• Limit development within land that is subject to fixed constraints, including no increased residential development within flood prone land (1% AEP).

Outcomes
• The Baseline Scenario suggests theoretical delivery of 178 dwellings, taking into account a take-up rate of 40% until 2041. Growth of up to a total of 444 dwellings is possible within the 30 year structure plan. This scenario does not satisfy the dwelling target for Clarence Town (constrained by the minimum lot size, current environmental constraints and agricultural use) and would require increase dwelling delivery within other areas of Dungog LGA.

Scenario 2 – Aspirational Approach

This scenario considers an aspirational approach for the investigation area, including:
• Consideration of a reduced minimum lot size (subject to agreement with Hunter Water and other infrastructure stakeholders and agencies)
• A ratio of 30% infill to 70% greenfield development is identified as the benchmark for the Barrington District within the Hunter Regional Plan 2041. It is assumed this shall be managed across the broader LGA and shall not seek to be satisfied within Clarence Town.
• Extends the E1 zone north to meet Duke Street and restricts new detached dwellings within the E1 zone. Both scenarios assume an uptake of infill housing, which may include shop top housing. An up-take percentage is included as a way of managing market demand.
• Avoid expansion of residential zoned land into agricultural land where possible.
• Considers rezoning of low-constrained RU1 to R5 zone to satisfy residual housing demands to meet the housing target.
• Limit development within land that is subject to fixed constraints, including no development within flood prone land (1% AEP).

Outcomes

• The Aspirational Scenario suggests theoretical delivery of 679 dwellings, taking into account a take-up rate of 40% until 2041. Growth of up to a total of 1,698 dwellings is possible within the 30 year structure plan. This scenario satisfies the dwelling target for Clarence Town.

• Because of the volume of possible lots that may be delivered within the existing R5 land, it is possible to stage the delivery of residential land across this area to prioritise areas that are not currently agricultural use.
• The growth of the E1 zone to meet Duke Street draws visitors down to the main street from a major vehicle route, and encourages the growth of population serving uses where demand is identified.

7.1 Key Transport considerations for the growth scenarios

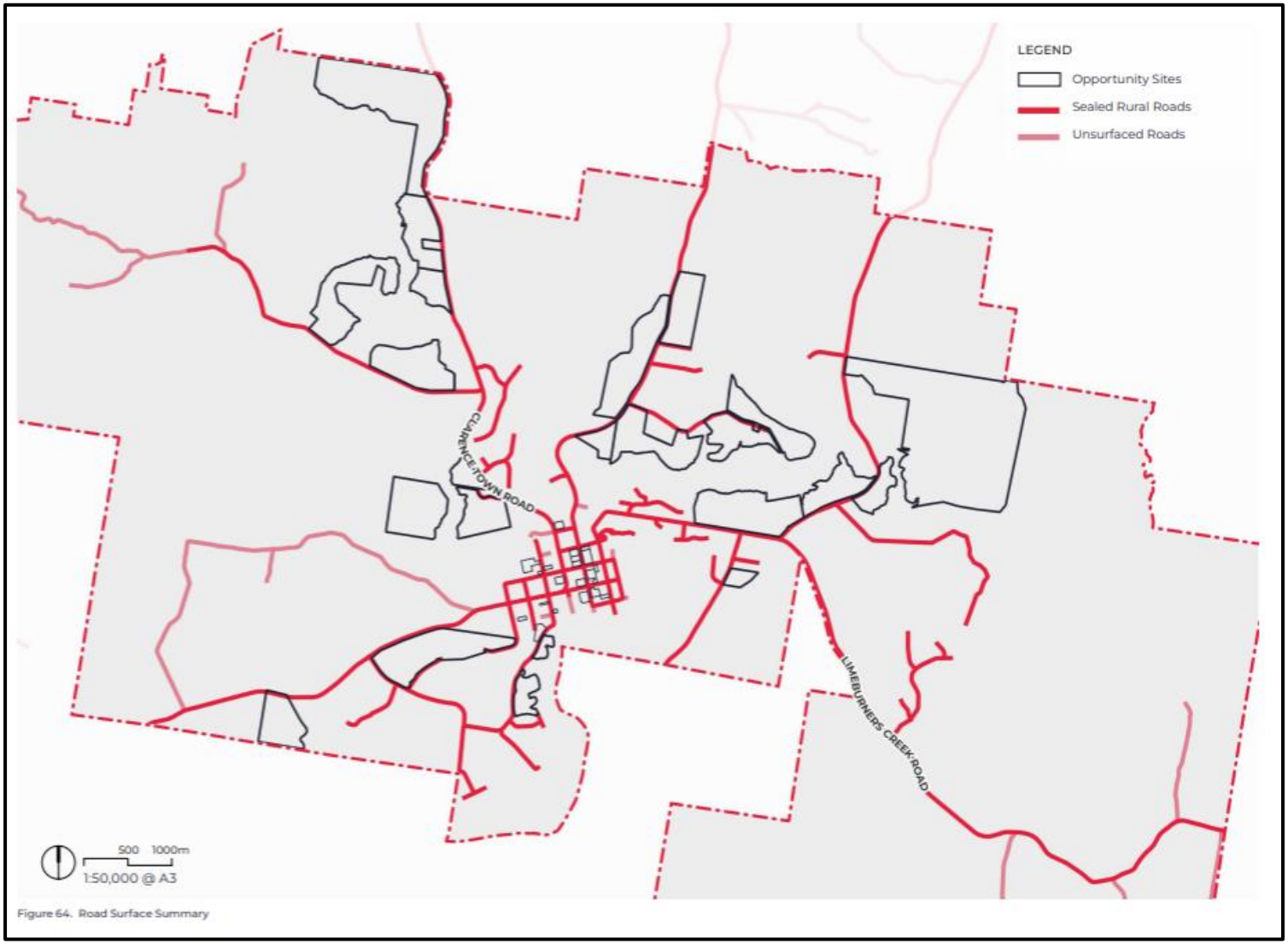
The two scenario are consistent with the indicative modelling undertaken above and the following summary is provided.

Table 7-1 Comments relating to scenarios

	Comments
Trip distribution and containment	Opportunities for trip containment within the town centre with a focus on active transport (walking and cycling) for local trips. Higher pedestrian and cycling demands crossing Queen Street/Rifle Street (Clarence Town Road) may require upgraded crossing facilities where pedestrian desire lines are identified. Balance of trips otherwise reliant on car travel. Rural lifestyle lots may not be within walking distance, but some could be connected to the town centre with the provision of suitable cycling facilities. This is particularly relevant under the Aspirational Approach which provides more potential users for such facilities.
Impact of local trips	Town centre layout and current traffic demands allow for various routes enabling the distribution of traffic and reduced impacts on the local roads. Some lot expansion is reliant on the construction of planned (paper) roads. These include Duke Street (west) and Earl Street both to the north of the town centre and unnamed streets west of Sheriff Street.
	Local trips will primarily be reliant on car use and require travel along main roads (Clarence Town and Limeburners Creek roads) to connect with local and various rural roads. Both main roads have adequate capacity with the potential for upgrades at the intersection of Duke Street and Rifle Street in the future scenario as detailed in the SIDRA modelling assessment to allow for both local and background growth.
	Additional car-based trips to the town centre shall generate additional parking demands. The need for these will be greater under the Aspirational Approach. This would require the provision of public parking throughout the commercial area as well as parking associated with sports fields and other entertainment/recreational facilities. Future developments should therefore be required to consider parking provisions in accordance with the DCP. Access to lands from rural roads will be subject to assessment and design of suitable subdivision roads and intersection connections.

	Depending upon the location of the additional dwellings on the western side of Rifle Street there may be an increase in trips. Monitor the potential need for upgrades at the intersection of Prince Street/Rifle Street or Duke Street/Rifle Street (particularly if Duke Street is extended west to connect with land releases). Signalised intersections (over roundabouts) may be justified on road safety grounds to support pedestrian movements as well as town centre traffic.
External trips	The majority of trips will be external to the town centre being on either Limeburners Creek Road (destination to the east) or Clarence Town Road (destination north towards Dungog or south towards Raymond Terrace). Both roads have adequate capacity with the potential for upgrades at the intersection of Duke Street and Rifle Street in the future scenario as detailed in the SIDRA modelling assessment.
Public Transport	For infill and town based development public transport can be focused with increased demands for services not diluted across numerous routes. The inclusion of a site such as Site 8 may provide a hub for transport services.
	Less opportunity to service lots within 400m of routes. As housing is more widespread it is more difficult to provide access to bus services. Additional bus services would be dependent upon the extension of existing services. Services east of the river would be supported by the new bridge being constructed.

Figure 7-1 Indicative state of roads for future scenario



8 Summary of Opportunities and Constraints

8.1 Summary

In conclusion the following opportunities and constraints are drawn from the investigations into the traffic and transport demands for Clarence Town.

OPPORTUNITIES	CONSTRAINTS
Low existing traffic flows provide spare capacity for ongoing development	Site visibility to rural roads from side roads, given posted speeds on rural roads.
Trip distribution across various routes available within town centre	Minimal footpaths see people walking on roads
Wide roads, opportunities for angled parking, shared paths, kerb buildouts etc	Very limited street lighting
Local roads well laid out with no record of crashes	Development in some areas is proposed where road corridors have not been formally developed
Sub-arterial roads do not travel through town centre	The town centre is currently located to the east of Clarence Town Road however future growth will see further traffic to the west creating demands for cross traffic movements and pedestrian/cycling demands across Queen/Rifle streets (Clarence Town Road).
Low traffic flows on local streets in the short term support on road cycling. Consideration of cycling lanes or shared pathways to provide separation as traffic demands increase eg Grey Street north of Prince Street	Future growth sees the town expand with residential lots within the town centre being fragmented by the key roads (Clarence Town and Limeburners Creek roads).
Adequate capacity for parking along local street which can be optimised through the provision of angle parking. Future developments shall need to provide suitable on site parking to allow capacity for ongoing growth.	Regional roads with higher speeds and traffic demands do not support on road cycling in the area.

Appendix A - Minimum Design and Construction Standards

DUNGOG SHIRE COUNCIL – Draft Roads Management Strategy *April 2011*

Minimum Design and Construction Standards - Rural Roads

Road Class	No. of Traffic Lanes	Traffic Lane width 'L'	Shoulder Width 'Sh'	Bitumen Surfacing Required[3]	Width of Seal On Shoulder	Carriageway Width 'C'	Min Width of Seal 'S'	Min Road Reserve Width 'R'	Longitudinal Linemarking	Vehicles per Day For Development Purposes (VPD)[8]	Design Speed		Max Longitudinal Grades	Pavement Design ESA[1]	Pavement Depth (mm)[1]	Width of Verge 'V'		Waterway Annual Recurrence Interval		Eligible for Consideration for Council Maintenance
											Minimum	Desirable				Fill	Cut	Major[6] (Perennial)	Minor (Intermittent)	
Rural Sub-Arterial (RSA)	2	3.5	1.5	Yes	1.0	10.0	9.0	30.0	Yes	NA	80	100	12%	5×10^6	400	0.5	2.0	100	20	Yes
Rural Collector (RC)	2	3.5	1.0	Yes	0.5	9.0	8.0	20.0	Yes	>500	80	100	12%	1×10^6	350	0.5	2.0	50	10	Yes
Rural Distributor (RD)	2	3.25	0.75	Yes	0.25	8.0	7.0	20.0	Yes[2]	>350	60	80	12%	5×10^5	350	0.5	2.0	20	5	Yes
Rural Local 1 (RL1)	2	3.0	0.5	Yes	0.25	7.0	6.5	20.0	No	>200	60	80	15%	1×10^5	300	0.5	2.0	10	2	Yes
Rural Local 2 (RL2)	2	3.0	0	Yes	0	6.0	6.0	20.0[4]	No	50 - 200	40	60	15%	1×10^5	300	0.5	1.5	5	2	Yes
Rural Local Unsealed 1 (RLU1)	2	3.0	N/A	No	N/A	6.0	N/A	20.0	No	50 - 100	60	80	12%[7]	1×10^5	300	0.5	2.0	10	2	Yes
Rural Local Unsealed 2 (RLU2)	2	2.0	N/A	No	N/A	4.0	N/A	20.0[4]	No	<50	40	60	12%[7]	5×10^4	300	0.5	1.5	5	2	Yes
Right Of Way (ROW)	1	3.0	1.0	No	0.25	4.0	3.5	10.0[4]	No	<20	20	40	16%	5×10^4	250	0.5	0.5	5	2	No

1. *It is Council's preference that an AUSTROAD pavement design is to be carried out on all new roads or road reconstructions. Where this has not been undertaken, Council may allow the minimum pavement depth listed to be adopted. Pavements are to be designed on the basis of a **30 year design life**.*
2. *Intersection Linemarking only.*
3. *The requirements for whether a road should be sealed or unsealed apply to new and reconstructed roads only.*
4. *Width may need to be increased at the end of the new road to allow for the construction of adequate turning areas.*
5. *Community Title Roads are to meet the above standards but are not eligible for consideration for Council maintenance.*
6. *All Major waterway structures over classified rivers must meet ARI of 100. The standard for major waterway structures on all other roads is minimum ARI of 50.*
7. *Grades up to 15% will be allowed in these areas but these sections of road must be sealed.*
8. *The traffic volume qualification (VPD) is to be calculated using 9 vehicular movements per day per dwelling. Prior to selecting which classification should apply to a road, the following parameters should be considered:-*
   - *Projected traffic volume at the end of the design life of the road;*
   - *The potential for the use of the road to alter with future development; and*
   - *The possibility that the road may connect to an existing road in the future, thereby becoming a through road.*
9. *All dimensions are in metres unless otherwise stated.*

Minimum Design and Construction Standards - Urban Roads

Road Class	Min No. of traffic Lanes	Min traffic lane width 'L'	Surface Requirement[3]	Minimum Parking Lane Widths 'P'	Min Carriageway Width 'C'	Min Width of Seal 'S'	Min Road Reserve Width 'R'	Kerb and Gutter [2]	Longitudinal Linemarking	Vehicles per Day For Development Purposes (VPD)[3]	Design Speed		Max Longitudinal Grades	Pavement Design ESA (Min)[1]	Pavement Depth (mm)[1]	Min Width of Footpath 'F'		Waterway Annual Recurrence Interval		Eligible for Consideration for Council maintenance
											Minimum	Desirable				Fill	Cut	Major[5] (Perennial)	Minor (Intermittent)	
Urban Sub-Arterial (USA)	2	3.5	AC	2 x 3.5m	14.0	14.0	22.0	SA	Yes	NA	50	60	10%	1×10^7	450	4.0	4.0	50	10	Yes
Urban Collector (UC)	2	3.5	AC	2 x 2.5m	12.0	12.0	20.0	RT or SA	Yes	>500	50	60	12%	3×10^6	400	3.5	3.5	20	10	Yes
Urban Distributor (UD)	2	3.25	AC	2 x 2.0m	10.5	10.5	18.5	RT or SA	Yes[3]	>300	40	50	12%	1×10^6	350	3.0	3.0	20	5	Yes
Urban Local 1 (UL1)	2	4.5	AC	0	9.0	9.0	17.0[4]	RT or SA	Yes[3]	>100	40	50	16%	5×10^5	300	2.5	2.5	10	5	Yes
Urban Local 2 (UL2)	2	2.0	2 Coat Seal	0	4.0	4.0	10.0[4]	RT or SM	Yes[3]	<100	25	40	16%	1×10^5	250	2.0	2.0	5	2	Yes
Urban Commercial Industrial	2	3.5	AC	2 x 3.0m	13.0	13.0	21.0[4]	SA	Yes	NA	50	60	10%	1×10^7	450	4.0	4.0	50	10	Yes

1. *It is Council's preference that an AUSTROAD pavement design is to be carried out on all new roads or road reconstructions. Where this has not been undertaken, Council may allow the minimum pavement depth listed to be adopted. Pavements are to be designed on the basis of a **30 year design life**.*
2. *Abbreviations - RT is Roll back kerb, SA is square back kerb, SM is concrete edge strip (flush with road surface)*
3. *Intersection Linemarking only*
4. *Width may need to be increased at the end of the new road to allow for the construction of adequate turning areas.*
5. *All Major waterway structures over classified rivers must meet ARI of 100.*