Transport Impact Statement

Project:	Tathra Wind Farm Project Scott River Region
Client:	SynergyRED c/o Urbis
Author:	Liomar De Leon
Date:	4th August 2025
Shawmac Document #:	2502003-TIS-001

CONSULTING CIVIL AND TRAFFIC ENGINEERS
1 ST. FLOOR, 908 ALBANY HIGHWAY, EAST VICTORIA PARK WA 6101.
PHONE|+61 8 9355 1300
EMAIL| admin@ shawmac.com.au

Document Status: Client Review

Version	Prepared By	Reviewed By	Approved By	Date
A	L. De Leon	P. Nguyen	P. Nguyen	11/06/2025
B	L. De Leon	-	P. Nguyen	04/07/2025
C	L. De Leon	-	P. Nguyen	04/08/2025

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File Reference: Y:\Jobs Active 2025\T&T - Traffic & Parking\Urbis_Tathra Wind Farm_TIS_2502003\3. Documents\3.20 TIS\Urbis_Tathra Wind Farm_TIS_Rev C.docx

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1 Introduction

1.1 Proponent

Synergy Renewable Energy Developments (SynergyRED) are proposing to develop a renewable energy project in the mid-west of Western Australia, referred to as the Tathra Wind Farm.

Shawmac has been commissioned by Urbis on behalf of SynergyRED to prepare a Transport Impact Statement (TIS) in accordance with the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines Volume 4 – Individual Developments*. The assessment considers the following key matters:

- Details of the proposed development,
- Vehicle access,
- Provision for service vehicles,
- Hours of operation,
- Daily traffic volumes and vehicle types,
- Traffic management on frontage streets,
- Site specific and safety issues.

The TIS focuses mainly on the construction phase of the project as this is when most traffic movements will occur. Once established, the site will be up to 30-full time staff throughout the life of the project.

The site is located within the Shire of Carnamah, approximately 15km east of Eneabba town site and approximately 300km north of Perth.

The general site location is shown in **Figure 1**.

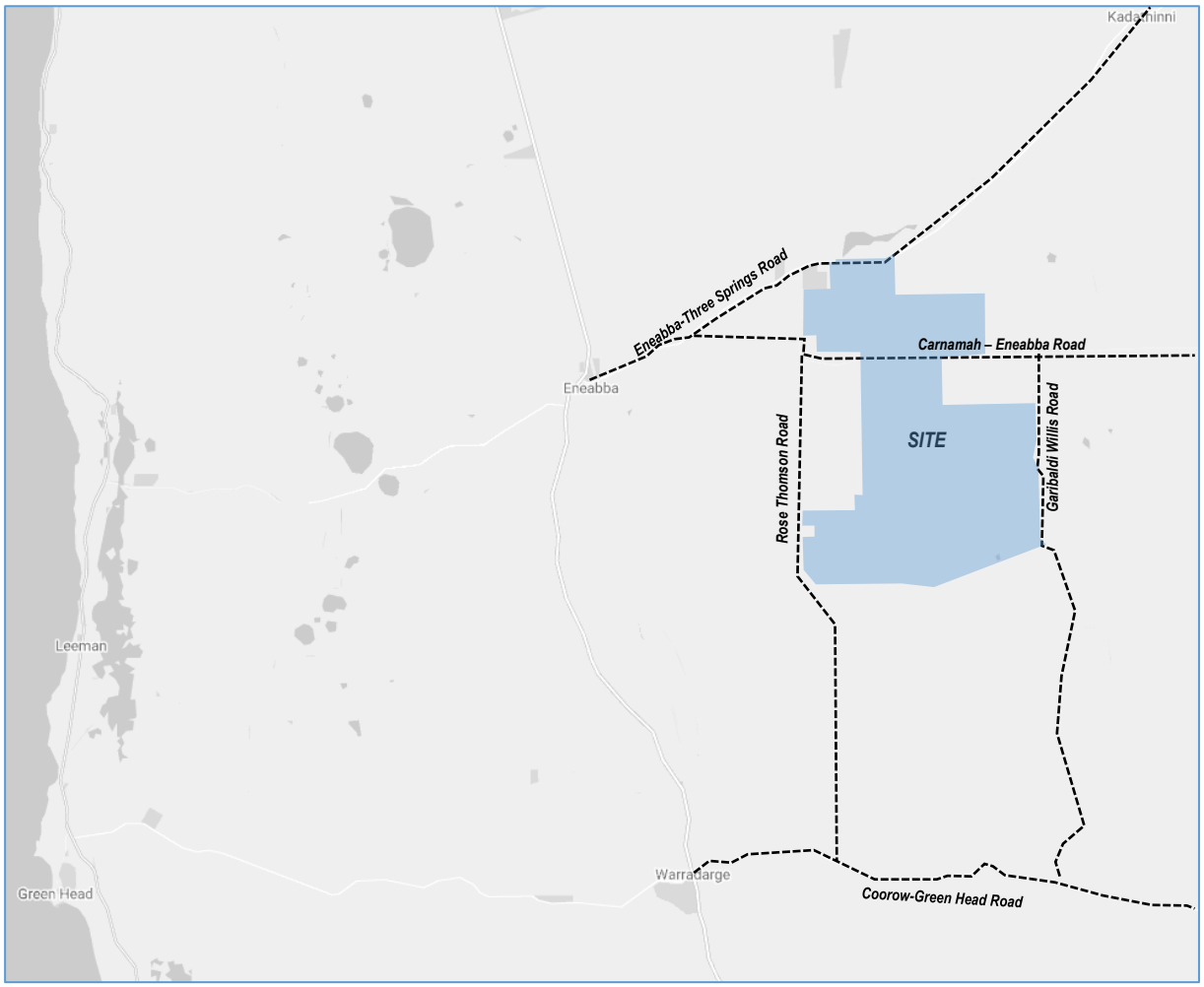


Figure 1: General Site Location

An aerial view of the existing site is shown in **Figure 2**.

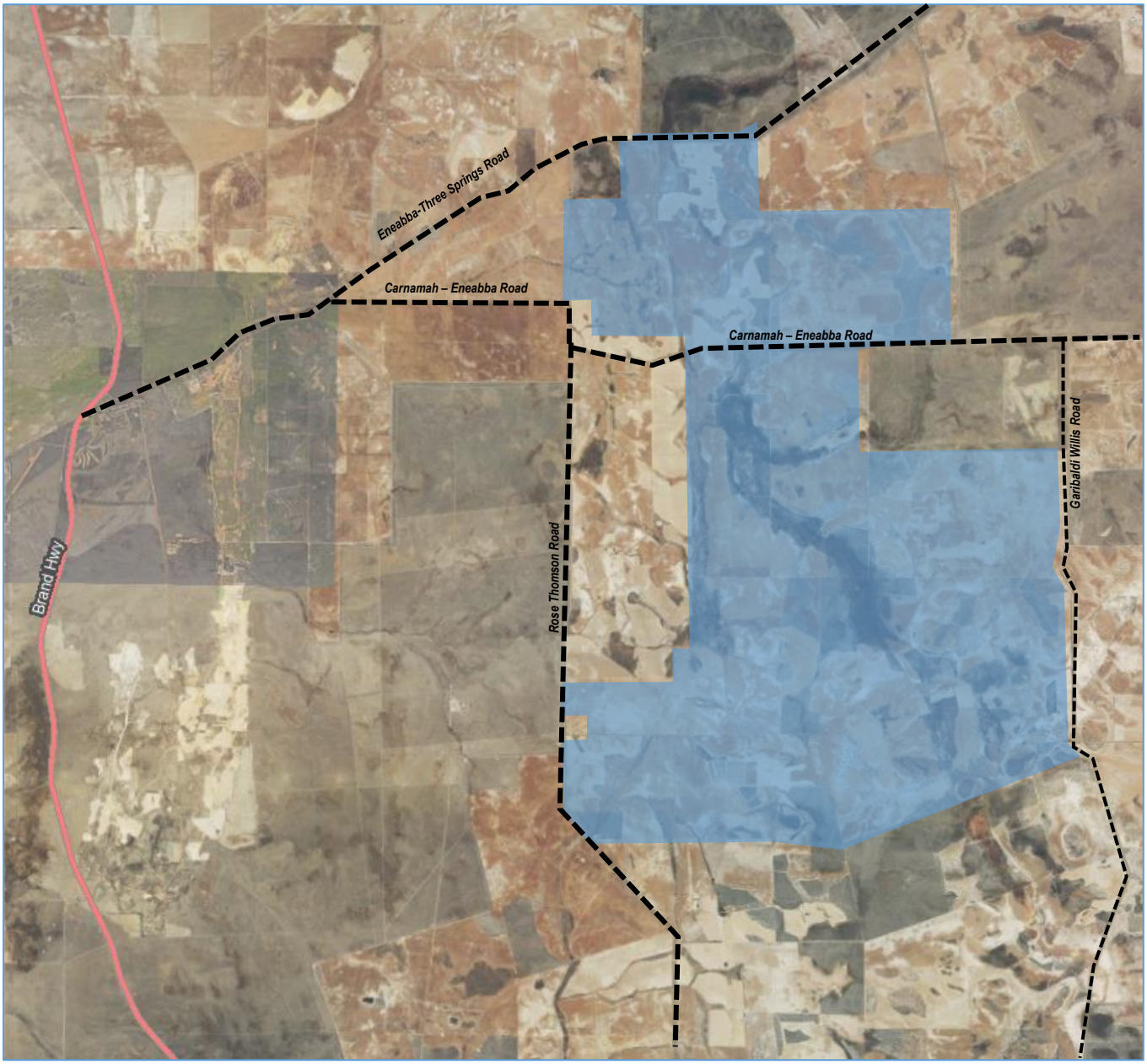


Figure 2: Aerial View

2 Proposed Development

2.1 Land Use

The project is located on predominantly cleared land currently used for agriculture which will connect into the South-West Interconnected System (SWIS) via the existing 330kW transmission lines which are situated within the development envelope.

The following infrastructure is proposed:

- Up to 140 wind turbine generators (WTGs) with a total capacity of up to 1,000MW across the site.
- Up to 500MW capacity in solar and 500MW in Battery Energy Storage Systems (BESS), including associated roads, foundations and drainage.
- Associated turbine foundations and hard stand areas.
- Site entrances from public roads and internal access roads between wind turbines and supporting infrastructure.
- Overhead transmission poles or towers and power lines, and underground electrical cables.
- Electrical substations and switchyards, including ancillary electrical equipment.
- Operations and maintenance buildings, workshops and associated car parking.
- Temporary construction facilities, including site offices, construction compounds, laydown areas, gravel borrow pits and concrete batching plant.
- Water abstraction bores for construction activities and associated infrastructure.
- Fire water tanks.
- Communication towers and monitoring mast up to 150m tall.

The site plan is shown in **Figure 3**.

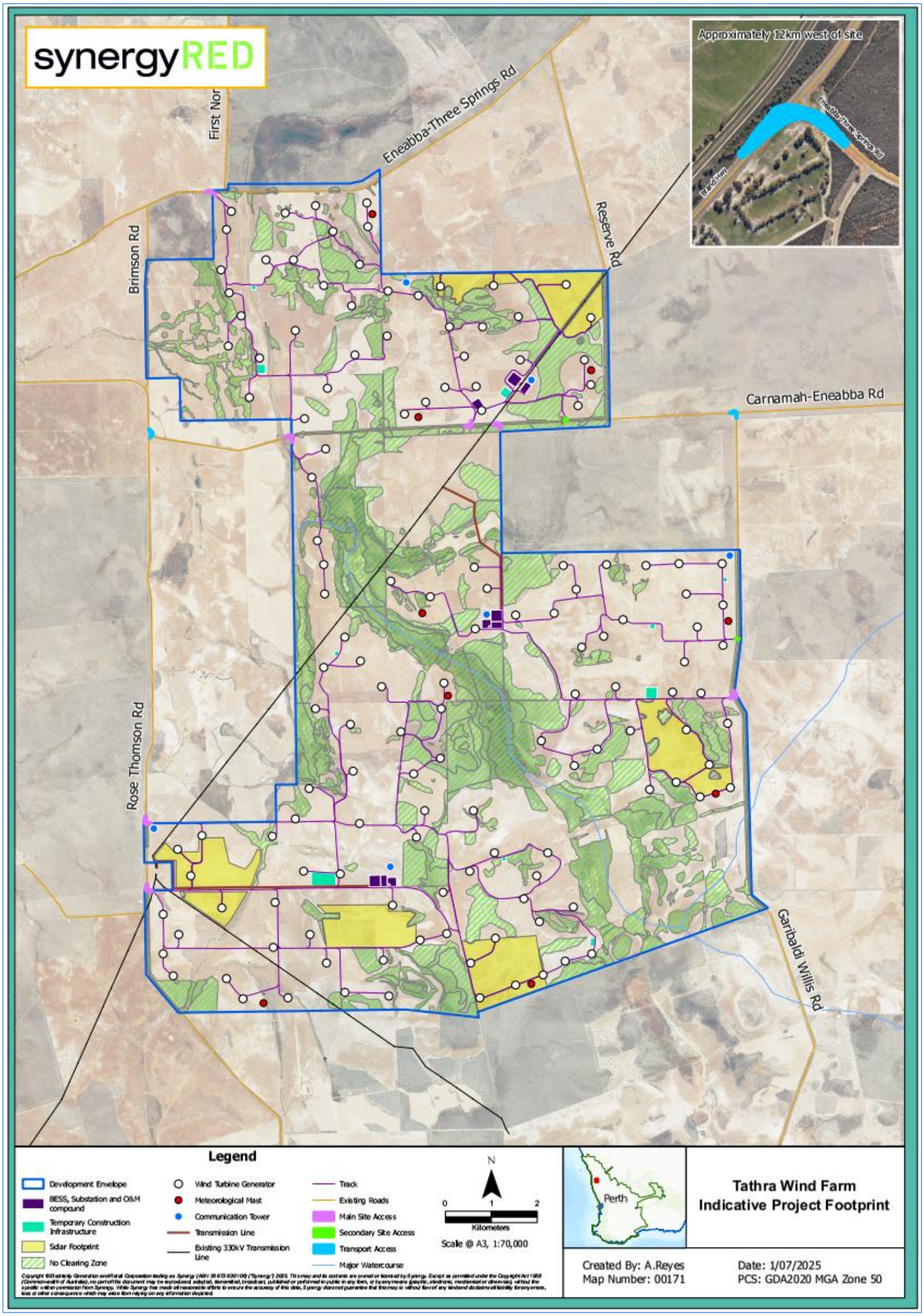


Figure 3: Site Layout

3 Traffic Management on Frontage Streets

3.1 Road Network

The layout and hierarchy of the existing local road network according to the Main Roads WA *Road Information Mapping System* is shown in **Figure 4**.

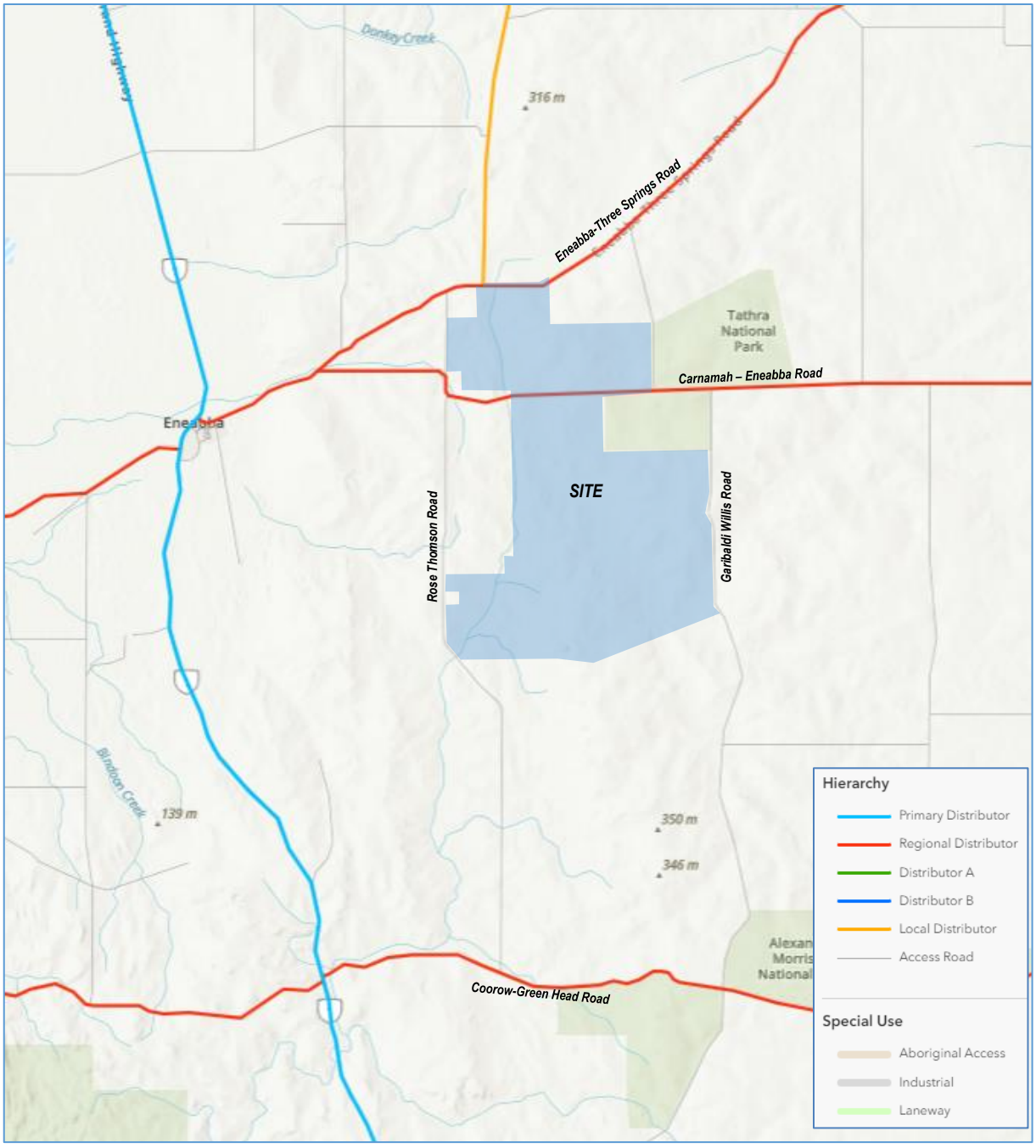


Figure 4: Existing Road Network Hierarchy

3.2 Speed Limits

The existing speed limits on the surrounding roads are shown in **Figure 5**.

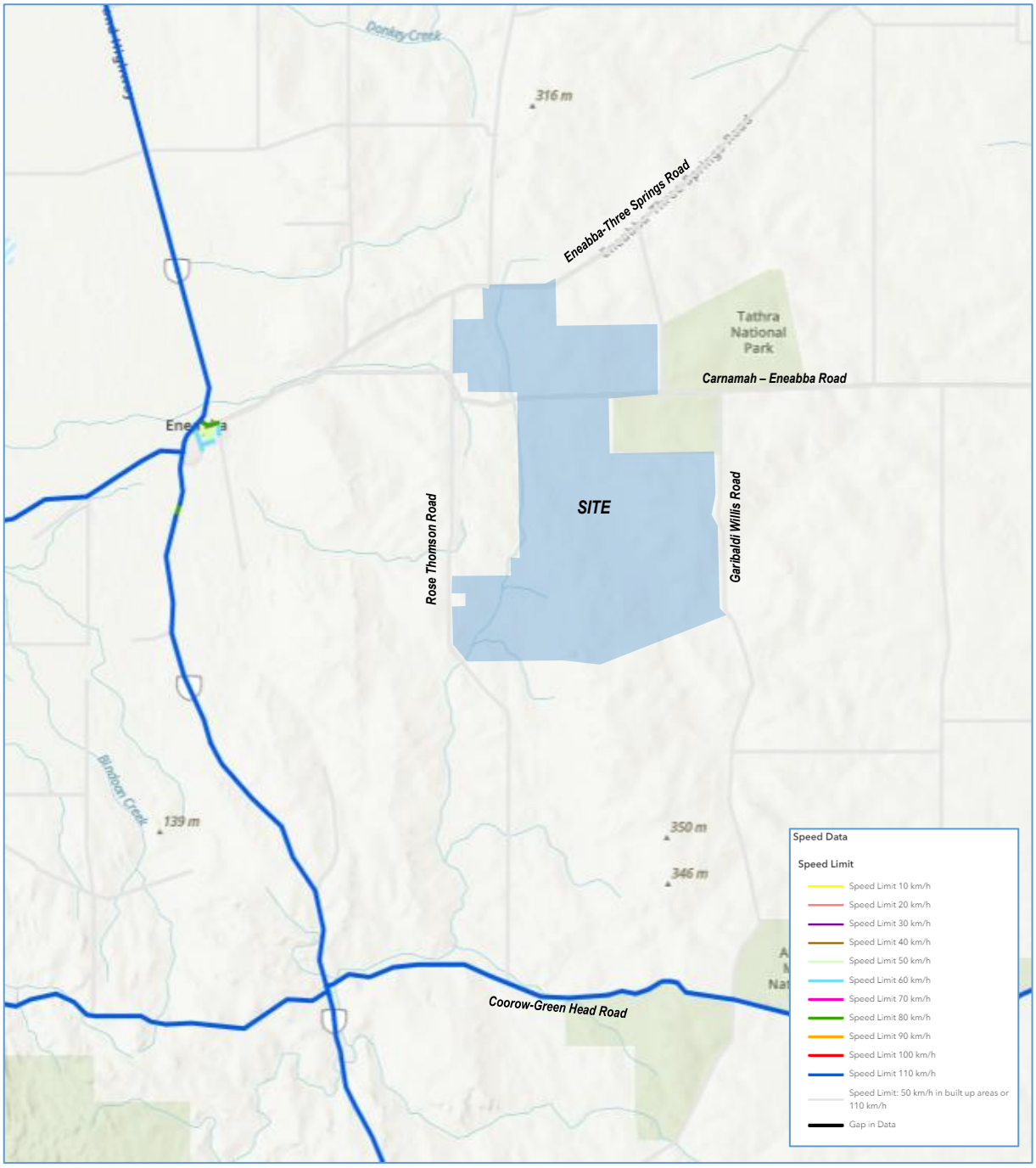


Figure 5: Existing Speed Limits

3.3 RAV Network

The current Restricted Access Vehicle (RAV) network according to Main Roads WA's Heavy Vehicle Services (HVS) network mapping tool is shown in **Figure 6** and **Figure 7**.

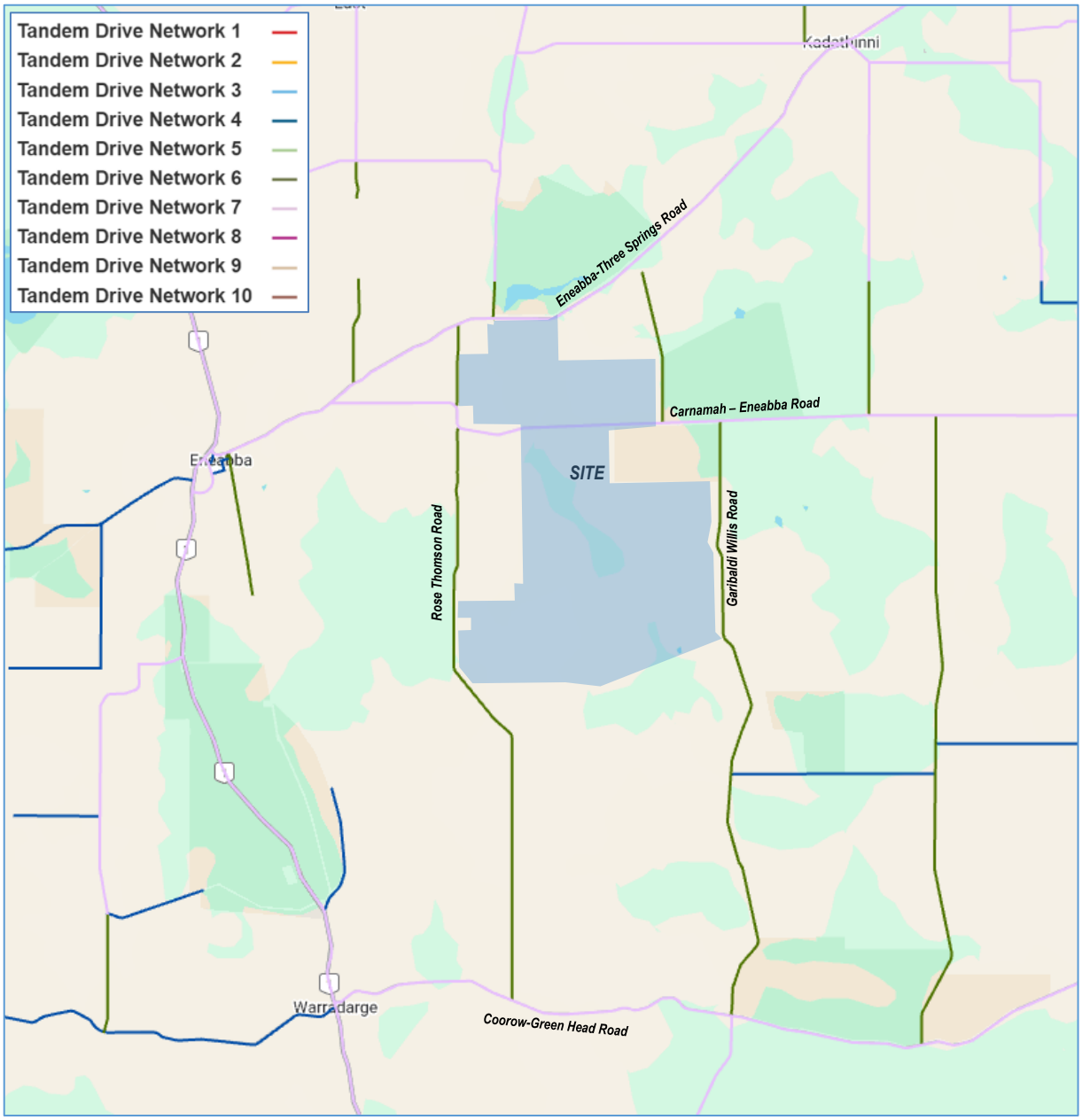


Figure 6: Tandem Drive RAV Network

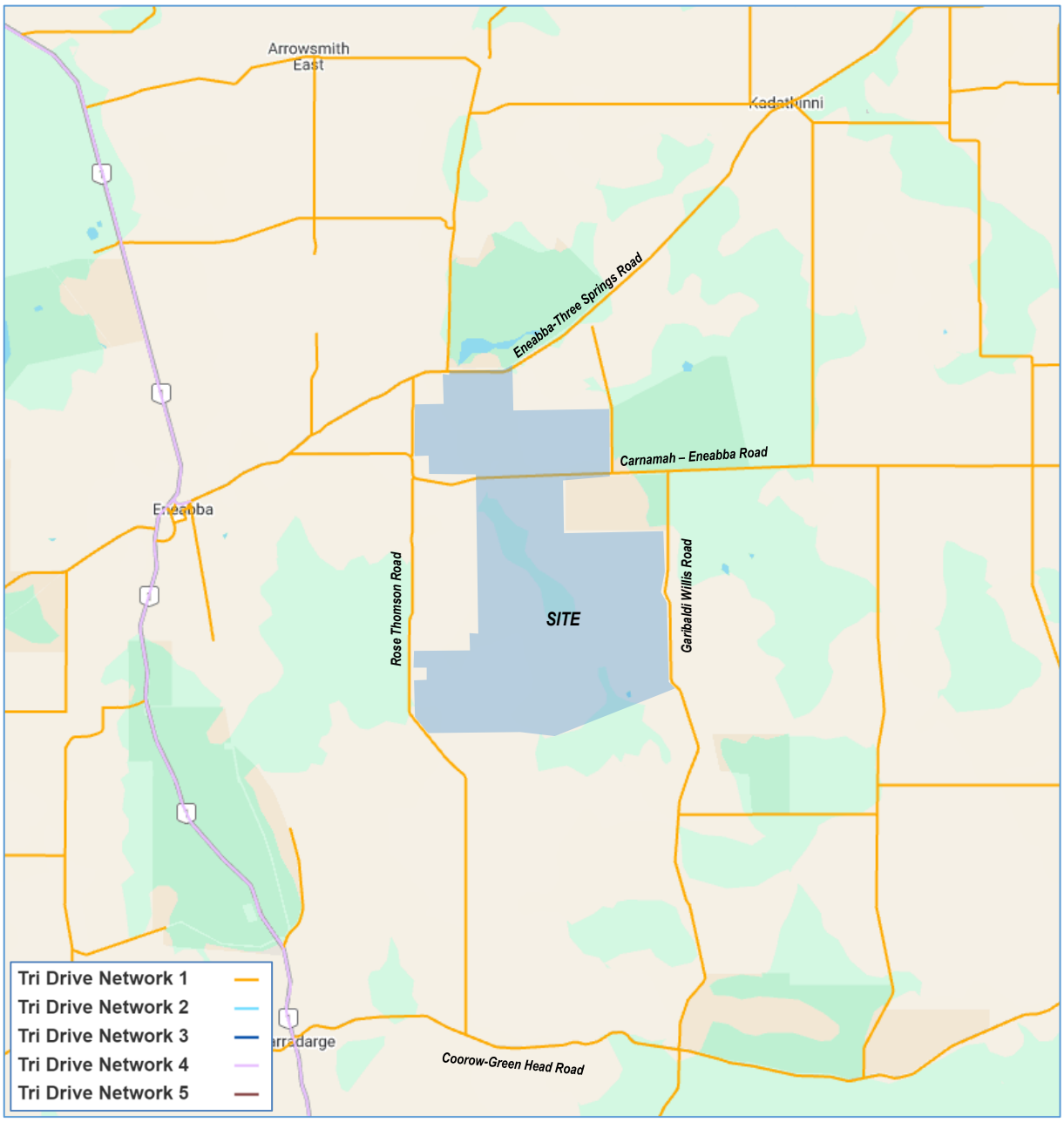


Figure 7: Tri Drive RAV Network

3.4 Traffic Volumes

The existing traffic volumes were sourced from Main Roads WA Road Information Mapping. The available traffic data along the proposed routes and surrounding road network is shown in **Figure 8**.

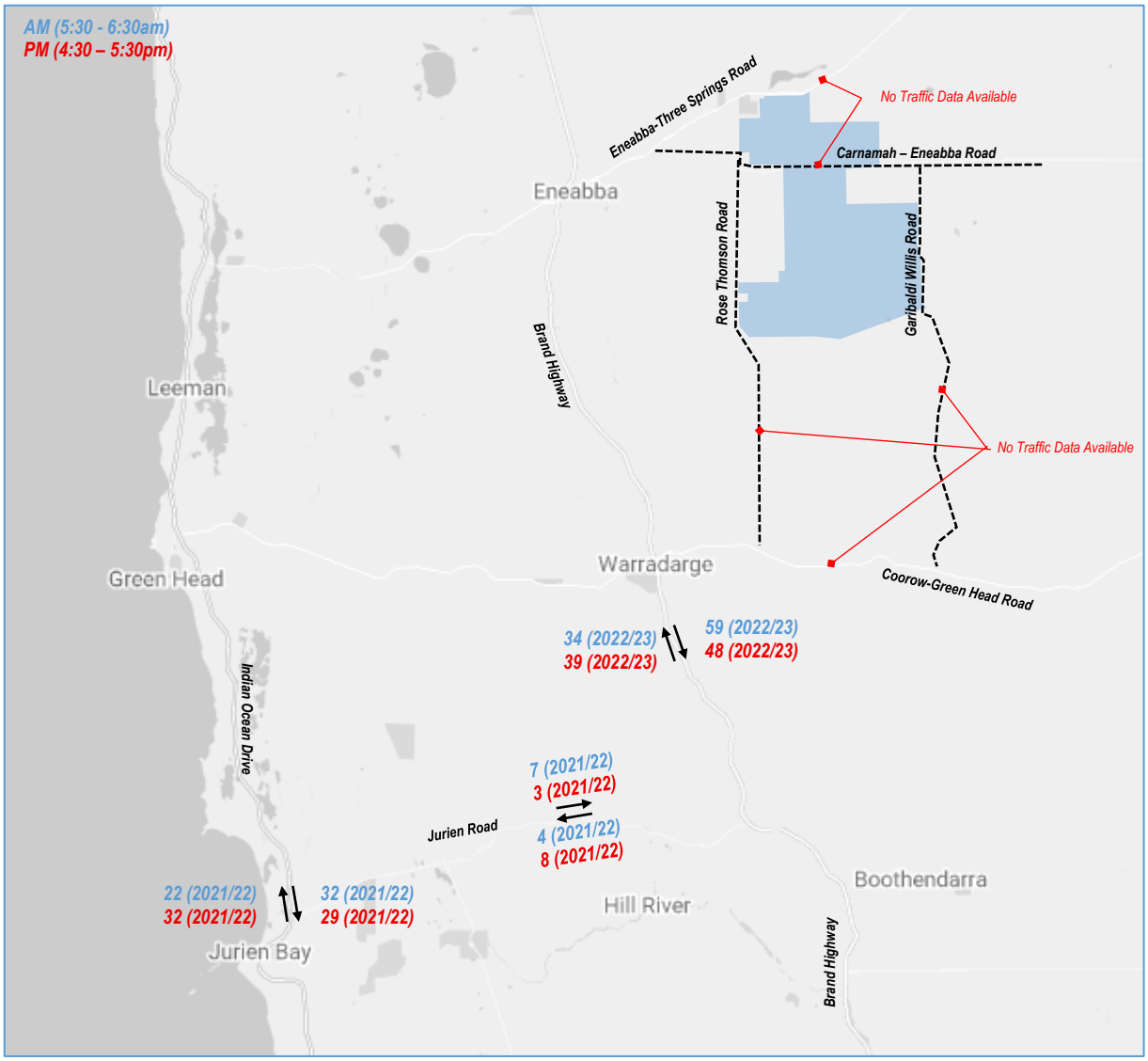


Figure 8: Available Traffic Data

4 Vehicle Access Assessment

4.1 Access Arrangements

Vehicle access to the site is proposed via Eneabba-Three Springs Road, Carnamah-Eneabba Road, Rose Thomson Road and Garibaldi Willis Road are indicatively shown in **Figure 9**.

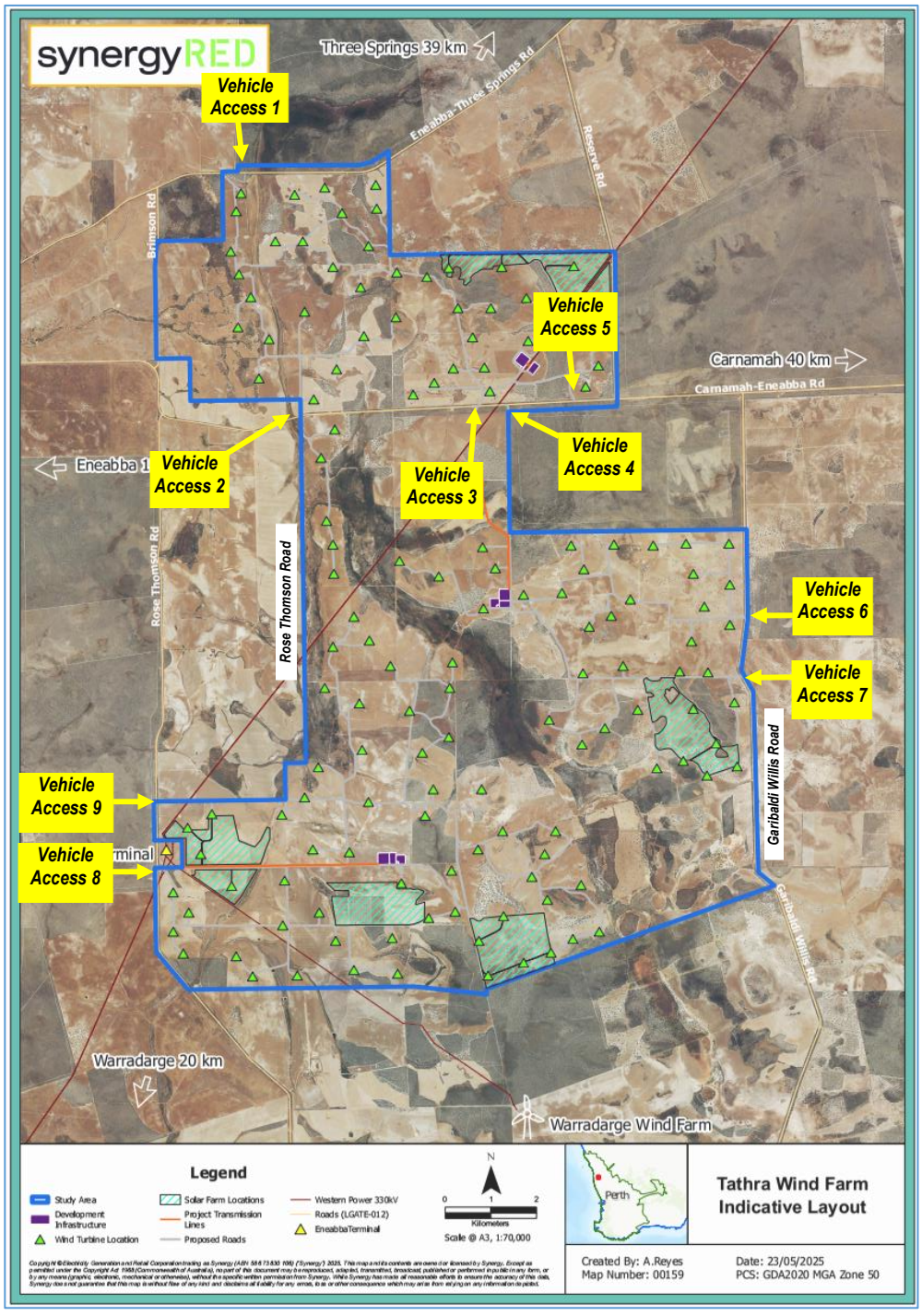


Figure 9: Indicative Vehicle Access

4.2 Sight Distance

Sight distance requirements from vehicle exit points for RAV vehicles are defined in Main Roads WA Standard Restricted Access Vehicles Route Assessment Guidelines (RAV Guidelines) as shown in **Table 1**.

Table 1: RAV Guidelines Sight Distance Requirements

Appendix D: Required Sight Distances

Posted Speed km/h	Downhill				Level	Uphill			
	-8%	*-6%*	*-4%*	*-2%*		*2%*	*4%*	*6%*	*8%*
40	74	72	70	68	66	65	64	62	61
50	102	98	95	92	89	87	85	84	82
60	134	128	123	119	116	112	110	107	105
70	170	162	155	149	144	140	136	133	130
80	209	198	190	182	176	170	165	161	157
90	252	239	228	218	210	203	197	191	186
100	308	290	275	263	252	242	234	227	220

The above values have been derived using the formula given in Austroads Guidelines with following factors:

Reaction Time	4.0 s

(Deceleration rate of 0.29g up to 90 km/h, 0.28g at 100 km/h.)

In accordance with the RAV guidelines, the minimum sight distance for all proposed access locations is summarised in **Table 2**.

As Rose Thomson Road and Garibaldi Willis Road are unsealed, there is no prescribed speed limit and the operating speed is based on the conditions of the road. For the purposes of this assessment, a 70km/h operating speed has been assumed.

Table 2: RAV - Sight Distance Requirements

Location	Road Surface	Direction	Vehicle Type	Design Speed (km/h)	Longitudinal Grade (%)*	Required Sight Distance (m)	Available Sight Distance (m)
Access 1	Sealed	Westbound	Trucks	100	-1	258	260m
		Eastbound			0	252	250m
Access 2	Sealed	Westbound	Trucks	100	3	238	280m
		Eastbound			-2	263	280m
Access 3	Sealed	Westbound	Trucks	100	-3	269	270m
		Eastbound			-1	258	270m
Access 4	Sealed	Westbound	Trucks	100	2	242	260m
		Eastbound			0	252	260m
Access 5	Sealed	Westbound	Trucks	100	0	252	300m
		Eastbound			-2	263	300m
Access 6	Sealed	Northbound	Trucks	70	2	140	150m
		Southbound			1	142	150m
Access 7	Unsealed	Northbound	Trucks	70	-1	146	200m
		Southbound			2	140	200m
Access 8	Unsealed	Northbound	Trucks	70	0	144	150m
		Southbound			0	144	150m
Access 9	Unsealed	Northbound	Trucks	70	0	144	150m
		Southbound			0	144	150m

As shown in **Figure 10** to **Figure 18**, the minimum required sight distance is achieved in both directions at all proposed access points.

Figure 10: Sight Distance Check – Access 1 on Three Springs Eneabba Road

Figure 11: Sight Distance Check – Access 2 on Carnamah Eneabba Road

Figure 12: Sight Distance Check – Access 3 on Carnamah Eneabba Road

Figure 13: Sight Distance Check – Access 4 on Carnamah Eneabba Road

Figure 14: Sight Distance Check – Access 5 on Carnamah Eneabba Road

Figure 15: Sight Distance Check – Access 6 on Garibaldi Willis Road

Figure 16: Sight Distance Check – Access 7 on Garibaldi Willis Road

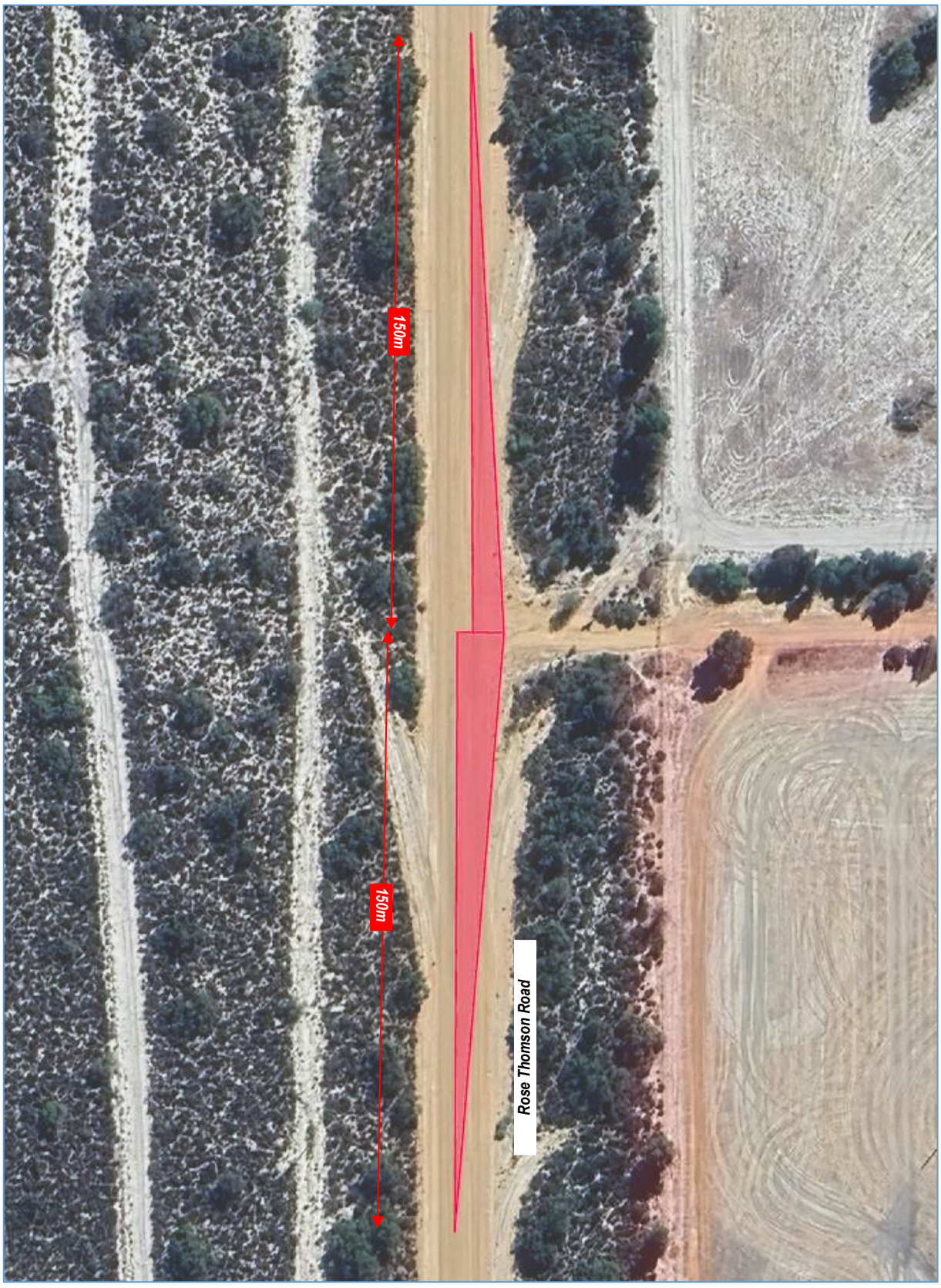


Figure 17: Sight Distance Check – Access 8 on Rose Thomson Road

Figure 18: Sight Distance Check – Access 9 on Rose Thomson Road

4.3 Access Geometry

The vehicle accesses will need to accommodate the turning movements of the largest proposed construction trucks and will need to be designed, widened and upgraded generally in accordance with the Main Roads WA's guideline drawings for rural driveways. An example rural driveway layout for typical 36.5m road train is shown in **Figure 19**.

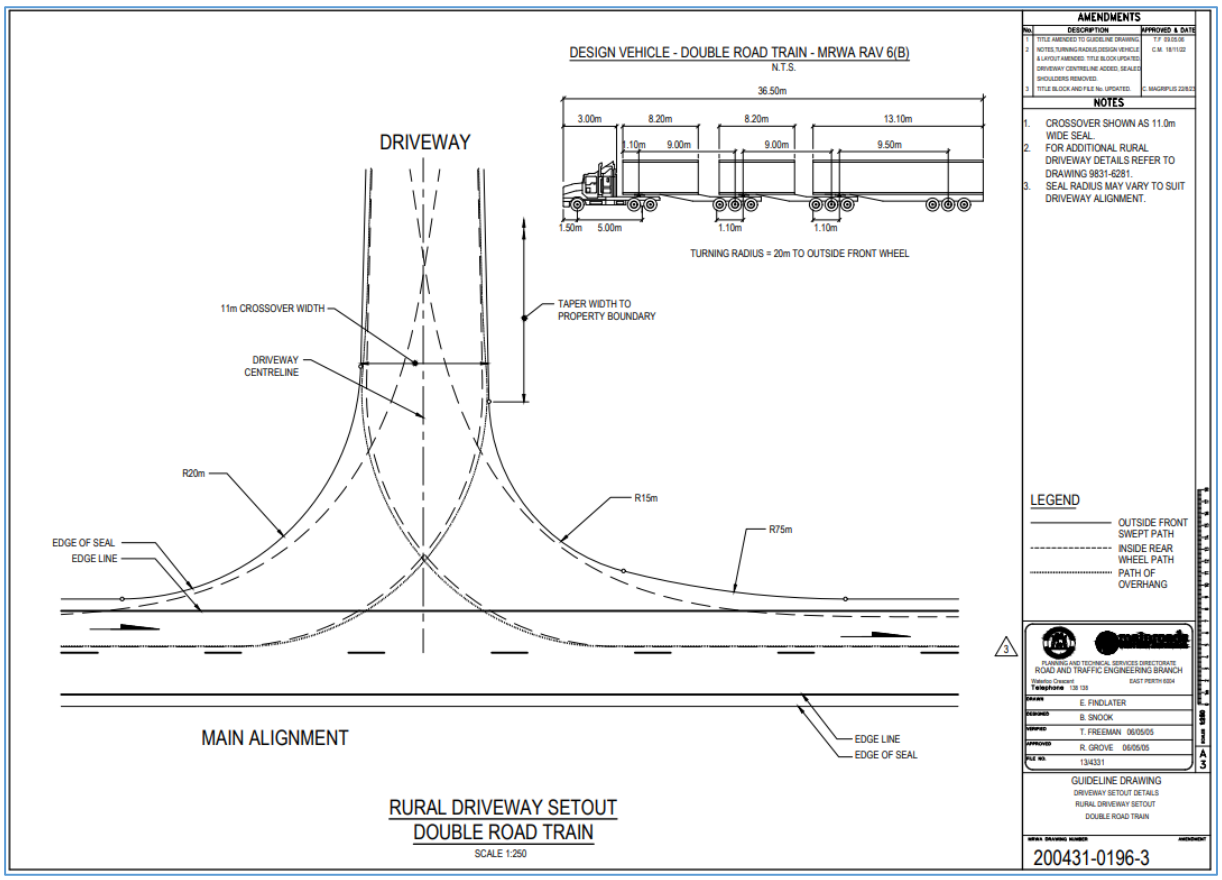


Figure 19: Example Main Roads WA's Rural Driveway Setout for 36.5m Double Road Train Access

Vehicle swept path analysis has been undertaken in AutoTURN using a RAV 6-7 road train templates for the accesses on Eneabba-Three Springs Road, Carnamah-Eneabba Road, Rose Thomson Road and Garibaldi Willis Road as shown in **Appendix A – Swept Path Analysis**.

The analysis concludes some vegetation clearing and widening of the driveways may be required to accommodate truck turning. Appropriate widening may also be required for over size, over mass (OSOM) vehicles and a separate OSOM route study has been undertaken separately to inform OSOM vehicle access during construction. OSOM vehicles will travel under escort and will require special permits to be assessed and approved by Main Roads WA. Updated swept path analysis may be required as vehicle access designs are prepared.

5 Traffic Impact

5.1 Traffic Generation

The volume of construction traffic during the peak period of construction has been estimated based on the following data and assumptions provided by the client:

- Given the size and scale of the project, it is most likely that construction of the assets will be delivered over multiple stages. Each stage is expected to take around 18-24 months with a workforce peaking at up to 200 personnel.
- Assuming there is a level of car-pooling and the average vehicle occupancy is 1.5 people per vehicle; a maximum of 133 light vehicle (LV) trips are expected per day.
- Multiple accesses are proposed across all road frontages. It is assumed that the northern section is accessed via Eneabba-Three Springs Road and Carnamah-Eneabba Road. The southern section is accessed via Rose Thomson Road and Garibaldi Willis Road.
- Workers will be located in Eneabba And Jurien Bay and 80% of the workforce is originating from Eneabba and 20% from Jurien Bay.
- Workers will travel to site between 5:30am to 7:00am in the morning and leave the site between 4:30pm and 6:30pm in the afternoon.
- 80% of the total LV movements are assumed to coincide with the road network peak hour. This accounts for some LV movements such as local trades occurring throughout the day.
- Given the majority of workers are proposed to be concentrated in a central location such as Eneabba or Jurien Bay, there is an opportunity to have shuttle buses to transport workers to and from the project site. This will significantly reduce the amount of LV traffic on the roads. However, as a worst-case scenario, it is assumed that no shuttle buses are used.
- Heavy Vehicle (HV) and OSOM movements will be evenly distributed across the day during the construction stage with an estimated 72 HV movements per day at peak construction. For the purpose of this assessment, 20% of the total HV and OSOM movements are assumed to coincide with the road network peak hour as a worst-case scenario.
- The OSOM movements are proposed to utilise the northern route via Brand Highway, Eneabba-Three Springs Road and Eneabba-Carnamah Road then to either Rose Thomson Road and Garibaldi Willis Road, as required.

The daily and peak hour traffic volumes during the peak months of construction are summarised in **Table 3**.

Table 3: Estimated Construction Traffic Generation

Type of Vehicles	Daily Traffic	Peak Hour Traffic
Light (LV)	133	106
Heavy (HV)	72	14
Total	**205**	**120**

As shown in **Table 3**, the estimated traffic generation during the peak months of construction is 205 vehicles per day, including 120 vehicles during the peak hours. The peak workforce and construction period typically lasts only a few months and the volume of traffic will gradually ramp up from the start of the project to the peak months and then gradually ramp down towards the end of the project.

5.2 Traffic Distribution

Construction staging of the assets has not been confirmed at this phase. However, an illustration of the traffic distribution and generation volumes, based on the staggered delivery of the project across several sections of the site (north section, east section and west section) is shown in **Figure 20**.

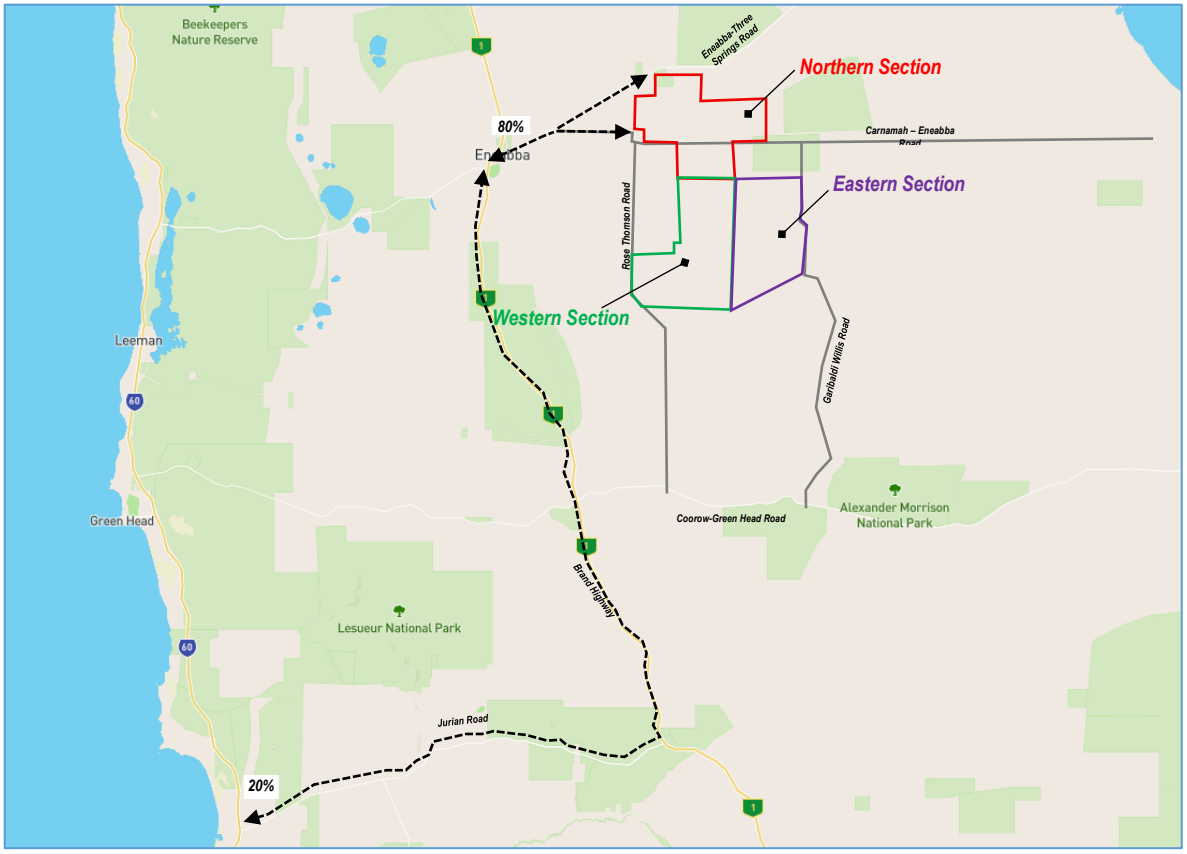


Figure 20: Project Sections

The peak construction traffic has been distributed to each section as shown in **Figure 21** and **Figure 22.**

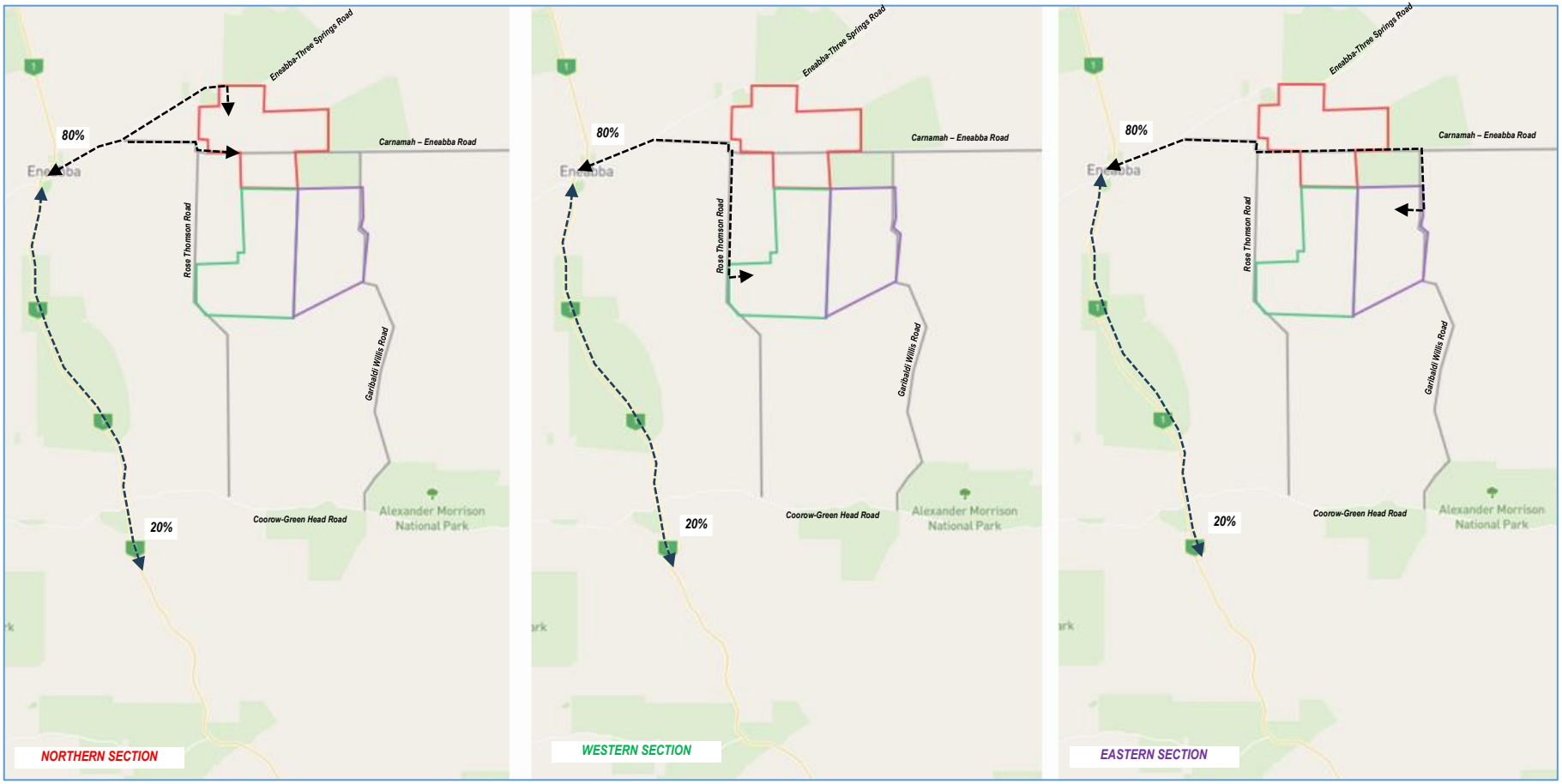


Figure 21: Traffic Distribution For Each Section

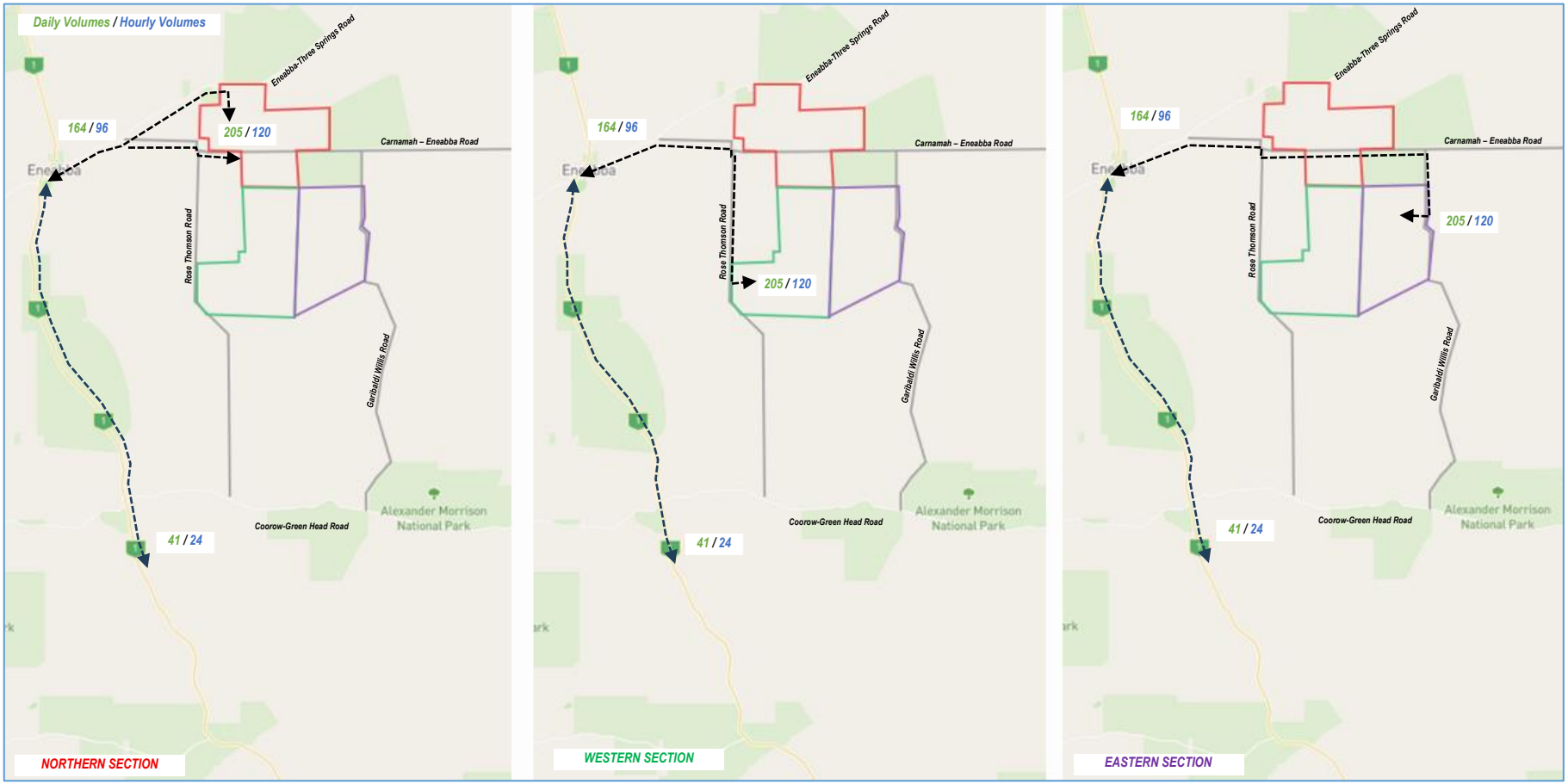


Figure 22: Traffic Generated Volumes

The existing and resulting peak hour traffic volumes on the surrounding roads are summarised in **Table 4.**

Table 4: Existing and Assumed Traffic Generation from the Site

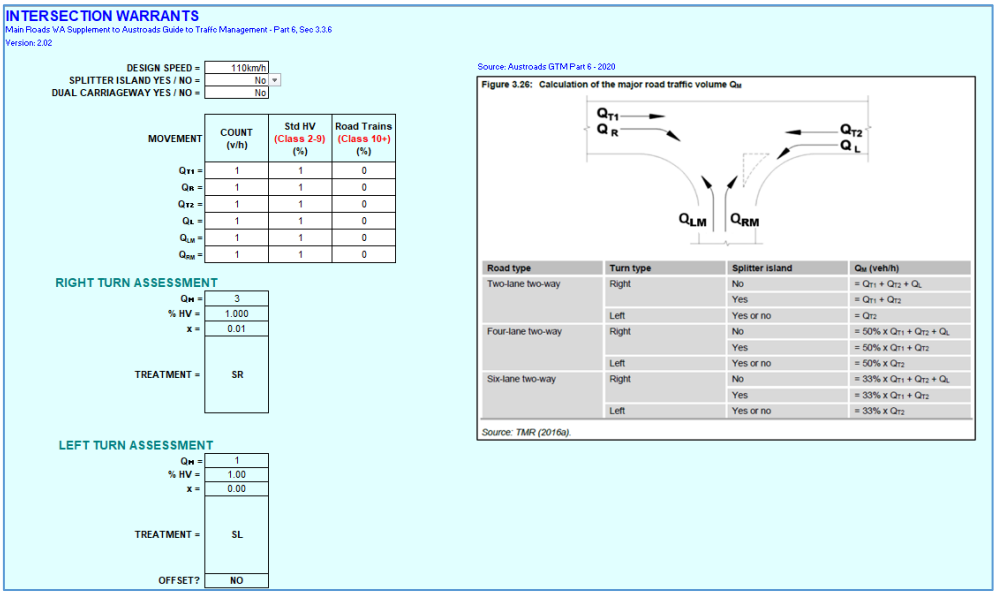
Road	Existing Traffic Volumes Peak Hour	Proposed Traffic Peak Hour
Indian Ocean Drive	22 – 32 vph	26 – 56 vph
Jurian Road	3 – 8 vph	27 – 32 vph
Brand Highway	34 – 49 vph	58 – 73 vph
Eneabba-Three Springs Road	<15 – Both Direction	≈ 120 vph
Carnamah-Eneabba Road	<15 – Both Direction	≈ 120 vph
Rose Thomson Road	<15 – Both Direction	≈ 120 vph
Garibaldi Willis Road	<15 – Both Direction	≈ 120 vph

The typical hourly mid-block capacity according to Section 5.2 of Austroads Guide to Traffic Management Part 3, for two-lane highway is 1,700pc/h (Passenger cars per hour) for each direction of travel and is nearly independent of the directional distribution of traffic. As shown, the resulting traffic volumes on the road network remain well within the capacity of the roads and so there is adequate capacity to accommodate the expected construction traffic.

As mentioned previously, the peak period of construction will last a few months and at all other times, traffic volumes will be lower.

5.3 Turn Warrant Assessment

The requirements for turn treatments at the key intersections has been calculated using the Main Roads WA Intersection Warrants Calculator provided in Supplement to Austroads Guide to Road Design – Part 4 A.8 as shown in **Figure 23**.



INTERSECTION WARRANTS

Main Roads WA Supplement to Austroads Guide to Traffic Management - Part 6, Sec 3.3.6

Version: 2.02

DESIGN SPEED = 110km/h
SPLITTER ISLAND YES / NO = No
DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	Std HV (Class 2-9) (%)	Road Trains (Class 10+) (%)
Q_{T1} =	1	1	0
Q_R =	1	1	0
Q_{T2} =	1	1	0
Q_L =	1	1	0
Q_{LM} =	1	1	0
Q_{RM} =	1	1	0

RIGHT TURN ASSESSMENT

Q_H = 3
% HV = 1.000
x = 0.01
TREATMENT = SR

LEFT TURN ASSESSMENT

Q_H = 1
% HV = 1.00
x = 0.00
TREATMENT = SL
OFFSET? NO

Source: Austroads GTM Part 6 - 2020

Figure 3.26: Calculation of the major road traffic volume Q_M

Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Source: TMR (2016a).

Figure 23: Intersection Warrant Calculator

The key intersections are:

- Jurien Road / Brand Highway.
- Jurien Road / Indian Ocean Drive
- Brand Highway / Three Springs – Eneabba Road.

The results of the assessment for each access location are summarised in **Table 5**.

Table 5: Intersection Warrant Results Summary

Intersection	Speed (km/hr)	Scenario	QT1	QT2	QR	QL	QLM	QRM	Right Turn Treatment	Left Turn Treatment
Jurien Road / Indian Ocean Drive	110km/h	AM Peak	22	32	24	<10	<10	<10	BAR	BAL
		PM Peak	32	29	<10	<10	24	<10	BAR	BAL
Jurien Road / Brand Highway	110km/h	AM Peak	34	59	<10	<10	24	<10	BAR	BAL
		PM Peak	39	48	24	<10	<10	<10	BAR	BAL
Brand Highway / Three-Spring-Eneabba Road	110km/h	AM Peak	34	59	120	<10	<10	<10	AUR	BAL
		PM Peak	39	48	<10	<10	120	<10	AUR	BAL

As shown, the construction traffic would trigger a Basic Right (BAR) and Basic Left (BAL) at all assessed intersections with the exception for Brand Highway / Three-Springs Eneabba Road intersection which requires Auxiliary Right (AUR) and Basic Left (BAL).

As shown in **Figure 24** to **Figure 26**, the existing intersections have the high turn treatments and so no further upgrades are required.

Figure 24: Brand Highway / Three-Spring Eneabba Road Intersection

Figure 25: Jurien Road / Brand Highway Intersection

Figure 26: Jurien Road / Indian Ocean Road Intersection

6 Site Specific Issues and Safety Issues

6.1 Crash History

The crash history of the adjacent road network was sourced from the Main Roads WA's Reporting Centre. The search included the following sections of road:

- Eneabba Town Centre.
- Eneabba – Three Springs Road.
- Carnamah-Eneabba Road.
- Rose Thomson Road.
- Garibaldi Willis Road.

The crashes recorded over the five-year period from January 2020 to December 2024 are shown in **Figure 27**.

The crash history is low and does not appear to indicate any major safety issue on the road network. The proposed development will generate a low to moderate volume of additional traffic over a limited period of time and is unlikely to increase the risk of crashes unacceptably.

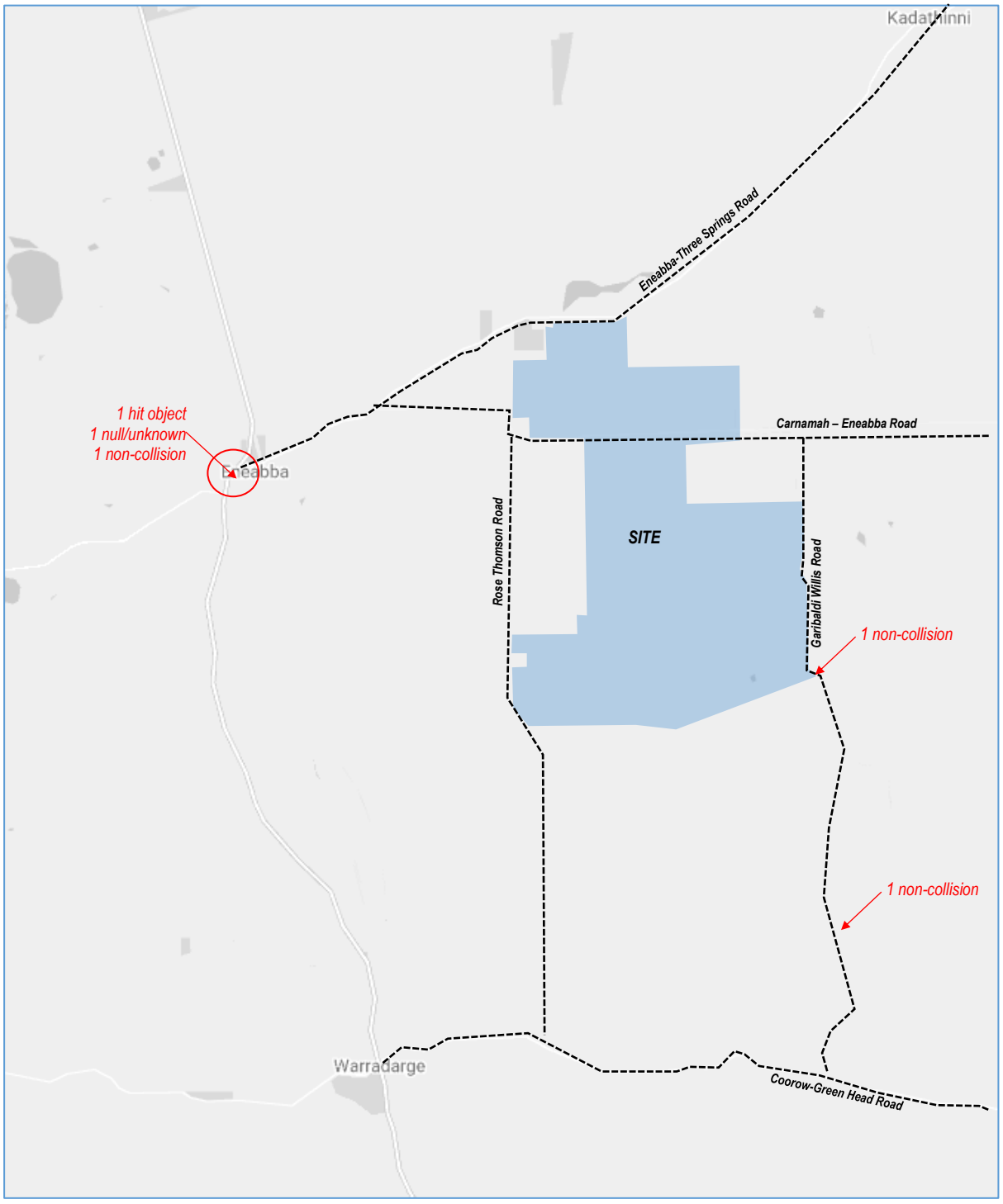


Figure 27: Recorded Crash History (January 2020 to December 2024)

7 Conclusion

This Transport Impact Statement for the proposed Tathra Wind Farm project concluded the following:

- Vehicle access to the site is proposed via Eneabba-Three Springs Road, Carnamah-Eneabba Road, Rose Thomson Road and Garibaldi Willis Road.
- The minimum required sight distance is achieved in both directions at all proposed access points.
- Vehicle swept path analysis has been undertaken in AutoTURN using a RAV 6-7 road train templates for the accesses on Eneabba-Three Springs Road, Carnamah-Eneabba Road, Rose Thomson Road and Garibaldi Willis Road.
- The analysis concludes some vegetation clearing and widening of the driveways may be required to accommodate truck turning. Appropriate widening may also be required for over size, over mass (OSOM) vehicles and a separate OSOM route study has been undertaken separately to inform OSOM vehicle access during construction. OSOM vehicles will travel under escort and will require special permits to be assessed and approved by Main Roads WA. Updated swept path analysis may be required as vehicle access designs are prepared.
- Given the size and scale of the project, it is most likely that construction of the assets will be delivered over multiple stages. Each stage is expected to take around 18-24 months with a workforce peaking at up to 200 personnel.
- The estimated traffic generation during the peak months of construction is 205 vehicles per day, including 120 vehicles during the peak hours. The peak workforce and construction period typically lasts only a few months and the volume of traffic will gradually ramp up from the start of the project to the peak months and then gradually ramp down towards the end of the project.
- The resulting traffic volumes on the road network remain well within the capacity of the roads and so there is adequate capacity to accommodate the expected construction traffic.
- The construction traffic would trigger a Basic Right (BAR) and Basic Left (BAL) at all assessed intersections with the exception for Brand Highway / Three-Springs Eneabba Road intersection which requires Auxiliary Right (AUR) and Basic Left (BAL).
- The crash history is low and does not appear to indicate any major safety issue on the road network. The proposed development will generate a low to moderate volume of additional traffic over a limited period of time and is unlikely to increase the risk of crashes unacceptably.

Appendix A – Swept Path Analysis


B – TRIPLE
AUSTROADS 2006 (AU)
B – TRIPLE
AUSTROADS 2006 (AU)
ENEABBA THREE-SPRINGS ROAD


B-TRIPLE
AUSTROADS 2006 (AU)
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AUSTROADS 2006 (AU)
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AUSTROADS 2006 (AU)
CARNAMAH - ENEABBA ROAD


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CARNAMAH - ENEABBA ROAD


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