Twin Hills Wind Farm Pty Ltd

Twin Hills Wind Farm

Transport Impact Statement & Route Survey

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1 Introduction

1.1 Background

PJA has been engaged by *Twin Hills Wind Farm Pty Ltd (C/- Wind Prospect)* ('the Applicant') to prepare a *Transport Impact Statement* (TIS) and Route Survey to support a development application (DA) for a proposed wind farm. This is proposed to be located across multiple lots in Kadathinni/Arrowsmith East within the *Shire of Three Springs* local government authority (LGA) in the Mid-West region of Western Australia, approximately 35km northeast of the Eneabba townsite and 260km north radially of the Perth CBD. The extent of the proposed Twin Hills Wind Farm ('the Site') is shown in **Figure 1-1**.

Figure 1-1: Site Location

Base Image Source: Nearmap

The Site comprises of the lots provided in **Table 1-1**.

Table 1-1: Lot Details

Lot ID	Address	Jurisdiction	Plan Number	Lot Size (ha)
A	Lot 10895, 3282 Three Springs-Eneabba Road, Kadathinni	Shire of Three Springs	1705/383	1,443
B	Lot 10909, 3691 Three Springs-Eneabba Road, Kadathinni	Shire of Three Springs	1843/318	1,532
C	Lot 10910, 750 Kangaroo Road, Kadathinni	Shire of Three Springs	1911/348	1,993
D	Lot 101, 1204 Kangaroo Road, Kadathinni	Shire of Three Springs	2114/740	1,626
E	Lot 11, 934 First North Road, Kadathini	Shire of Three Springs	2535/199	1,613
F	Lot 100, Arrowsmith East	Shire of Three Springs	N/A	238
G	Lot 10211, 258 Beekeepers Road, Arrowsmith East	Shire of Three Springs	4066/879	1,417

1.2 Purpose of a TIS

The planning system in Western Australia stipulates that all developments go through a process of stages to ensure that the statutory planning is consistent with the strategic planning. A more detailed assessment of the transport networks for developments is required within the land use planning stages. The *Western Australian Planning Commission* (WAPC) guidelines for a Transport Impact Assessment (TIA) shows the level of detail required at each stage. The proposed Twin Hills Wind Farm falls under *Volume 4* of the WAPC Guidelines, where a *more* "localised/detailed technical assessment" of the existing and proposed transport networks will be undertaken. The intent of this TIS is to provide a greater level of technical detail on the development and its immediate surrounds.

The level of assessment required is generally dependent upon the number of vehicle trips the proposed development is considered to generate within the peak hour of the development. The proposed Twin Hills Wind Farm is anticipated to generate less than 100 vehicle trips within the peak hour and thus warrant a Transport Impact Statement to be provided in alignment with *Volume 4 Part C* of the WAPC TIA Guidelines, where the WAPC TIA Volume 4 Part B checklist is provided in **Appendix A**.

The key components of this TIS relevant to the DA are as follows:

- To assess the routes for equipment transport and vehicle movements.
- To assess the generation of traffic volumes of equipment to be transported.
- To assess the vehicle types and route requirements.
- To assess the access locations.

This TIS will also cover a Route Study for the vehicle configurations and delivery of materials being classified as Over Size Over Mass (OSOM) vehicles, which will address the following information requested by *Main Roads WA* (MRWA).

- Routes for equipment transport and vehicle movements.
- Volumes of equipment to be transported.
- Discussion of different traffic types (e.g. light vehicles, standard heavy transport, and Over Size Over Mass).
- For OSOM loads: estimates for load numbers, load dimensions, length of construction period, delivery frequency and timeframes, and associated capacity of vessels used to import equipment.
- Any new roads proposed to be built to facilitate access for the project.

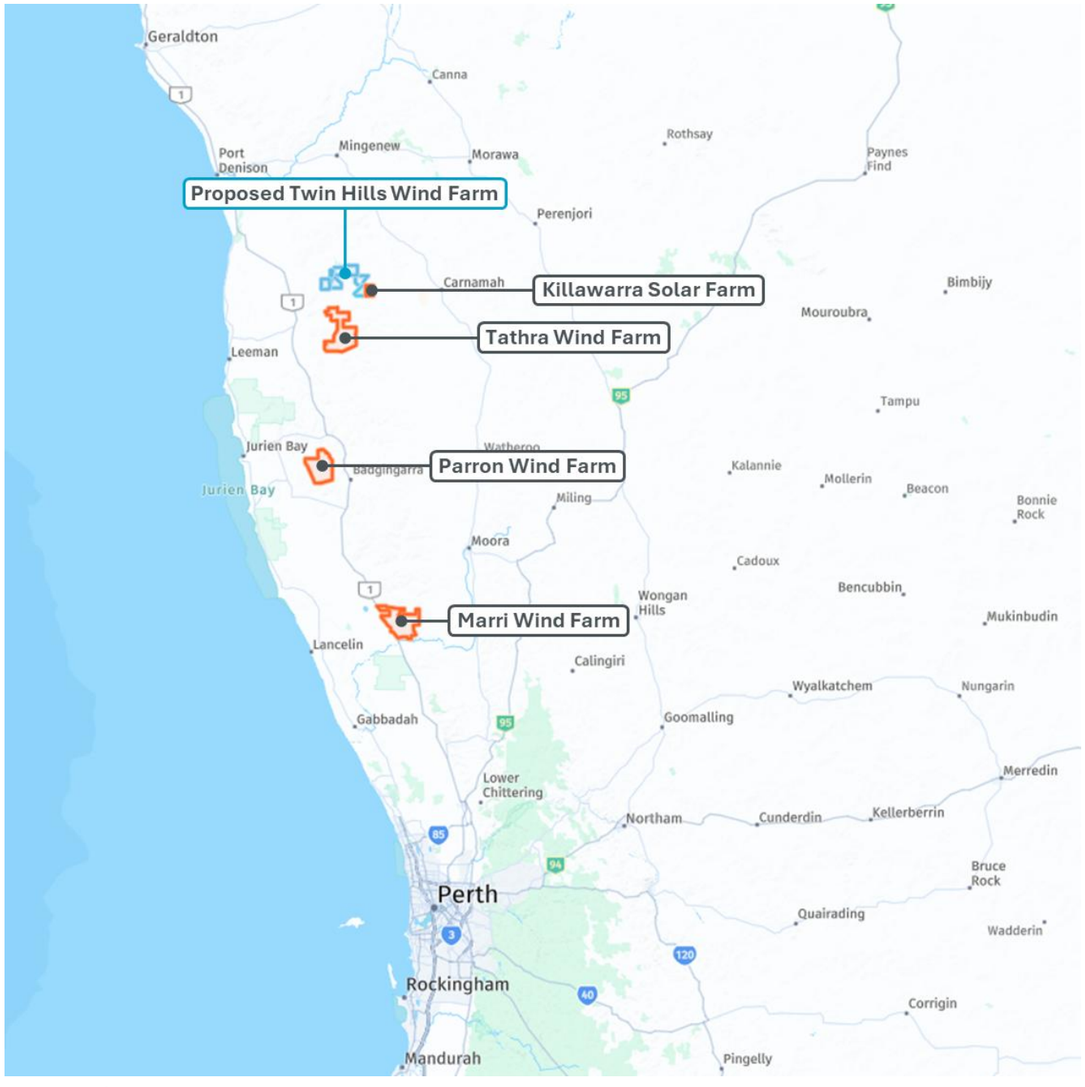
1.3 Planning Context

All of the lots within the Site are zoned as 'Rural' under the *Shire of Three Springs Local Planning Scheme No. 2* (December 2016) and there is no overarching district or structure planning for the Site.

1.4 Prior Assessments

There have been no prior assessments directly related to the Site. However, the following relevant wind farm projects (locations shown in **Figure 1-2**) have been reviewed to develop an understanding of the route and vehicle type requirements that may be applicable to the proposed Twin Hills Wind Farm project.

Figure 1-2: Location of Similar Surrounding Projects



Base Image Source: Nearmap

Tathra Wind Farm, Shire of Carnamah, WA

The *Tathra Wind Farm* (located approximately 20km southwest of the Site and either side of Carnamah-Eneabba Road) comprised of 140 wind turbine generators and utilised a route for transporting the wind turbine blades and components from the *Australian Marine Complex* (AMC) *Western Australia* located in Henderson to Eneabba (Shire of Carnamah). PJA has reviewed this project's Transport Impact Statement (TIS) (*Shawmac*, August 2025) and the Over Size Over Mass (OSOM) Route Study (*Ares Group*, May 2025) to understand the similarities and differences between the projects. A summary of the key findings in the review is as follows.

- Access Route: Quill Way → Cockburn Road → Rockingham Road → Thomas Road → Tonkin Highway → Brand Highway → Three Springs-Eneabba Road → Brimson Road.
- WTG Blades (Goldwind GW182): 90.2m long, 3.6m high
- WTG Tower (base section): 5.7m diameter
- 18-24 month project stages with a peak of 200 staff, generating 133 light vehicle trips per day (each-way), assuming an average vehicle occupancy of 1.5 people. The distribution of staff trips was based on 80% of staff residing in Eneabba and 20% residing in Jurien Bay between the times of 5.30am-7am and 4.30pm-6.30pm, where 80% of these light vehicle trips occur in the road network peak.
- At peak construction stages, up to 72 heavy vehicle (HV) and over size over mass (OSOM) trips per day, where 20% coincides with the road network daily peak.
- Truck & Trailer Combinations:
  - Blade transport: Block Truck (6x4 sleeper cab-over) towing 3x4-3x4 extendable self-steering dolly with a 45.5m wheelbase spacing. Overall dimensions: 101.74m L x 4.5m W x 5.06m H
  - Tower (Base) transport: Prime Mover (6x4 day cab-over) with 5x8 low loader and 5-axle dolly. Overall dimensions: 39.14m L x 5.7m W x 5.94m H.
  - Tower (Top) transport: Block Truck (6x4 sleeper cab bonneted) towing 5x8-5x8 extendable self-steering dolly with a 19.0m wheelbase spacing. Overall dimensions: 45.27m L x 5.7m W x 5.29m H.
  - Nacelle transport: Prime Mover (6x4 day cab bonneted) with 2x8 dolly and 5x8 low loader. Overall dimensions: 25.86m L x 4.3m W x 4.96m H.
  - Drivetrain transport: Block Truck (6x4 sleeper cab bonneted) towing 10x8 self-steering platform. Overall dimensions: 31.28 m L x 5.5m W x 5.02 m H.
  - Hub transport: Prime Mover (6x4 day cab bonneted) with 2x8 dolly and 5x8 low loader. Overall dimensions: 25.86m L x 5.0m W x 4.93m H.

- Required modifications to accommodate transport of WTG components:
  - Quill Way & Cockburn Road intersection: 2x light poles to be relocated, 4x signs to be made removeable.
  - Cockburn Road & Rockingham Road intersection: Temporary hardstand to be laid down (approx. 50m^2).
  - Rockingham Road & Thomas Road intersection: Temporary hardstand to be laid down (approx. 730m^2).
  - Thomas Road & Central Avenue intersection: Temporary hardstand to be laid down (approx. 290m^2), 1x sign to be made removeable.
  - Thomas Road & Nicholson Road intersection: Temporary hardstand to be laid down (approx. 170m^2), 1x sign to be made removeable.
  - Thomas Road & Kargotich Road intersection: Temporary hardstand to be laid down (approx. 70m^2), 2x signs to be made removeable.
  - Thomas Road & Tonkin Highway intersection: Temporary hardstand to be laid down (approx. 220m^2), 2x signs to be made removeable
  - Tonkin Highway & Dunreath Drive intersection: Temporary hardstand to be laid down (approx. 220m^2), 2x signs to be made removeable, bollards to be removed.
  - Brand Highway & Three Springs-Eneabba Road intersection: Temporary hardstand to be laid down (approx. 220m^2), 2x signs to be made removeable.

Killawarra Solar, Battery Energy Storage System (BESS) & Substation Project, Shire of Carnamah, WA

The TIA prepared by *SLR Consulting* (April 2025) for the *Killawarra Solar, Battery Energy Storage System (BESS) & Substation Project* located on Lot 10896, directly adjacent to the southeast of the Site with two accesses on Turkey Flat Road. The solar panels, other materials, and construction machinery were proposed be transported to the site via Brand Highway from the Port of Geraldton. Therefore, the external route differs from the Twin Hills Wind Farm proposed route. However, the TIA provides *Austraffic* data from automated tube count (ATC) surveys on Brand highway (800m north of Three Springs-Eneabba Road) and on Three Springs-Eneabba Road (500m west of Turkey Flat Road) from Wednesday, 30 October 2024, to Wednesday, 13 November 2024. This data is provided in **Section 3.2**.

The proposed transport fleet primarily consists of vehicles at or below the RAV 4 network, with the transport of the 200t transformers centred on two 12-axle suspension platform trailers controlled by a 3-2 block truck pull-push formation with approximate overall dimensions of 108m L (53m L trailer combination) x 4.5m W and 4.3m H.

The workforce employee trips were assumed to comprise of small buses, vans and utility vehicles, distributed via the following directions over a 15–18-month construction period:

- 70% from East on Three Springs-Eneabba Road from Three Springs, Carnamah and Mingenew.
- 15% from North on Brand Highway from various towns between Eneabba and Geraldton.
- 15% from South on Brand Highway from various towns between Eneabba and Perth.

The total traffic generation associated with the construction peak was anticipated to be in the order of 90vpd. The indicative peak workforce was estimated at 250 people, with 240 arriving by bus (14 buses) and 10 supervisors arriving by private vehicle.

The intersection of Eneabba–Three Springs Road & Turkey Flat Road was proposed to be upgraded with basic left-turn (BAL) and basic right-turn (BAR) treatments.

Parron Wind Farm, Shire of Three Springs, WA

The *Parron Wind Farm* (located approximately 80km south of the Site) comprised of 79 wind turbine generators and utilised a route for transporting the wind turbine blades and components from the Geraldton Port to Badgingarra (Shire of Three Springs). PJA has reviewed the projects Transport Impact Statement (TIS) prepared by *Porter Consulting Engineers* (September 2024). A summary of the project findings is as follows.

- WTG Blades (Vestas V162 6.2MW): 79m long
- WTG Tower (base section): 5.7m diameter
- Delivery of components for 1-2 WTG's per week.

The total traffic generation associated with the construction peak was anticipated to be in the order of 275-305vpd with 25-50vpd (heavy vehicles), 5-10vpd (OSOM), 40 staff living on-site generating 80vpd (light vehicles) and 360 staff living off-site generating 32vpd (bus) and 133vpd (light vehicles) where the capacity per vehicle average was 20 people and 1.2 people, respectively.

Marri Wind Farm, Shire of Dandaragan, WA

The Marri Wind Farm (located approximately 145km south of the Site) comprised of 82 wind turbine generators with 91m long blades and utilised a route for transporting the wind turbine blades and components from the Australian Marine Complex (AMC) Western Australia located in Henderson to Yatharoo (Shire of Dandaragan). PJA has reviewed the projects Transport Impact Statement (TIS) prepared by *Aurecon* (September 2025) with a summary of the key findings as follows.

- On-site staff capacity during construction of 450 people where the majority reside on-site and 160 people travel to/from site each day, split between light vehicle and bus trips.
- 15-month earthworks and civil stage followed by a 12-month construction stage where the peak traffic generation was estimated to comprise of the following:
  - Light vehicles: 80 per day / 40 per hour
  - Heavy vehicles: 197 per day / 19 per hour
  - OSOM vehicles: 8 per day / 1 per hour

2 Development Proposal

2.1 Proposed Land Uses and Layout

The Twin Hills Wind Farm proposes to accommodate 93 wind turbine generators (WTGs) and associated infrastructure, including two grid terminal stations and battery energy storage systems are proposed to connect to an internal wind farm substation via transmission cabling, in addition to connecting to existing *Western Power* grid transmission line.

To facilitate the construction and installation of the proposed WTGs, a series of construction site offices and compounds are proposed within the lots. These are supplemented with a proposed site operations and maintenance office, carpark, concrete batching plant and washdown facilities.

The proposed layout of the Site shown in **Figure 2-1** and the indicative specifications (to be confirmed upon procurement) of the WTG components to be transported to the Site are provided in **Table 2-1**.

Table 2-1: Indicative Wind Turbine Generator Components and Specifications

WTG Component	Quantity per WTG	Dimensions	Mass
Blade	3	100.0m L x 4.5m W x 4.2m H	30T
Tower - Base	1	10.0m L x 5.7m (diameter)	110T
Tower - Top	1	36.0m L x 4.3m (diameter)	80T
Turbine Drivetrain	1	7.5m L x 2.7m W x 2.7m H	100T
Turbine Nacelle	1	12.7m L x 4.0m W x 3.7m H	22.5T
Turbine Hub	1	4.8m L x 4.3m W x 4.0m H	60T

Each WTG is typically made up of one base tower section, concrete tower sections (cast on-site), one top tower sections, one drivetrain, one hub, one nacelle and three blades.

There is potential that the specifications of WTGs commissioned for the Twin Hills Wind Farm will be *Vestas EnVentus V172-6.8MW*, which comprise of approximately 85m blades and a 150m tower height. However, this assessment has adopted a worst case 100m blade length for the purpose of planning the impact of transport on the road network. If an 85m blade length is adopted, this is 5m shorter than the *Tathra Wind Farm* blades and thus require no further modifications to the road network to access the general site vicinity. Local access impacts at the individual sites will also be less, compared to the longer 100m blades notes above, but the 100m blade assessment has been adopted as a worst case to allow for construction flexibility.

There is no proposal for accommodation to be provided on-site. Therefore, all construction, operational and maintenance workers would reside externally from the Site.

Figure 2-1: Proposed Site Layout and Land Uses

Base Image Source: Wind Prospect (March 2026)

2.2 Proposed Operations and Project Stages

The project is scheduled to undergo a combined site establishment and construction period over 24 to 26-months, followed by operations and maintenance over a 25-year design life in which the WTGs will be decommissioned over a 12-month period. The following standard working hours are proposed:

- Monday to Saturday: 7am to 7pm
- Sunday (excluding Public Holidays): 9am to 7pm.

It is noted that there may also be some out-of-hours work required (e.g. to transport OSOM loads under police escort, concrete pours that cannot stop/ start, blade/ nacelle lifts that must be undertaken under safe wind conditions). Whilst it is expected the majority of site construction works would occur within operating hours, works outside of these times will be required for certain activities and will be assessed on a case-by-case basis with consideration for impacts on stakeholders, and covered by a construction management plan (CMP).

The proposed phases project phases are outlined as follows:

- **Stage 1 (2027-2029)**: Site Establishment (earthworks, road improvements) and Construction (equipment mobilisation, construction of foundations/WTG's).
- **Stage 2 (2029-2054)**: Operations and Maintenance.
- **Stage 3 (2054-2055)**: Decommissioning.

Stage 1: Site Establishment and Construction (24-26 months)

Stage 1 of the project would comprise of site earthworks and road improvements to facilitate the preliminary works required for the construction stage to commence. Stage 1 of the project is anticipated to have the greatest impact on the road network in comparison to Stage 2 and Stage 3.

Prior to the transport of the WTG components, the proposed site facilities and amenities would be constructed/mobilised. The key components of this include the construction of the concrete batching plant, site office, carpark and washdown facilities. Following this, the construction of hardstand areas, mobilisation of equipment (e.g. cranes and piling rigs), installation of transmission cable and the construction of the proposed substations and battery energy storage systems would occur. This construction period would correlate with the transport of equipment and materials, in addition to daily employee commuter trips.

Stage 2: Operations & Maintenance (25-years)

After the WTGs are commissioned, regular operations and maintenance will be undertaken for the project life (25-years). It is assumed that around 12 staff (1 employee to 8 WTGs) will be employed during this stage and commute to and from the Site each day to undertake general operational maintenance activities. Typically, this would require hand tools, however, there could be exceptions where larger maintenance activities are required and at the worst-case require components to be replaced. Stage 2 is anticipated to have the least impact on the transport network of all three stages.

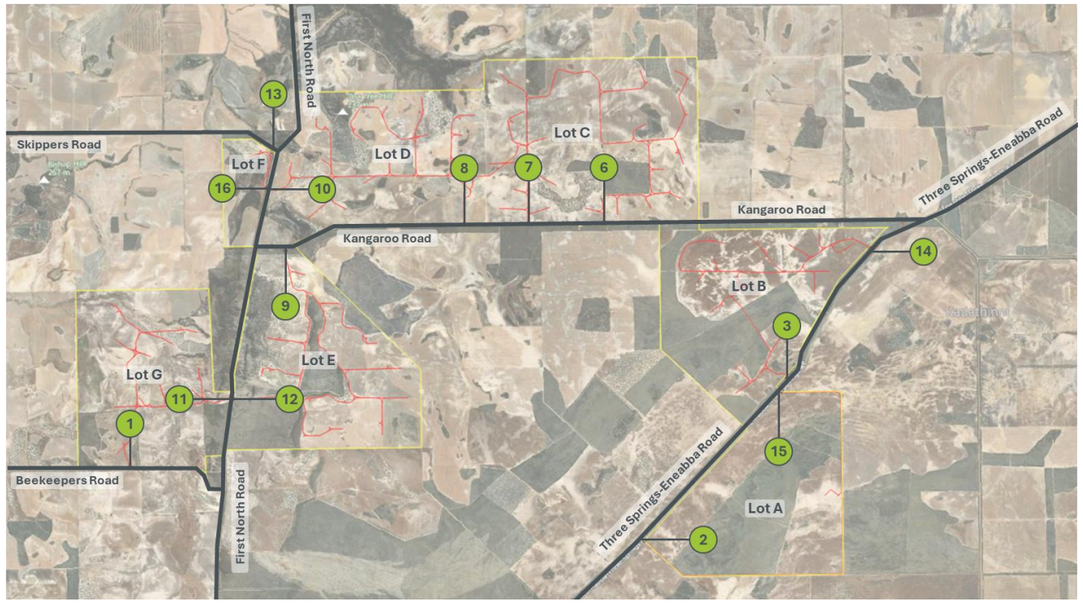
Stage 3: Decommissioning (12-months)

Stage 3 of the project involves the end-of-life decommissioning of the WTGs and would require components to be dismantled and removed from the Site. However, it is likely to have less transport impacts than Stage 1 of the project.

2.3 Proposed Access Locations

The proposed site access locations are shown in **Figure 2-2** and detailed in **Table 2-2**. Noting that the naming convention is consistent with preliminary project planning and not in numerical order, as Gates 4 and 5 were allocated to a lot no longer included as part of this DA.

Figure 2-2: Proposed Access Locations



Base Image Source: Wind Prospect (March 2026)

Table 2-2: Proposed Site Access Locations

Gate No.	Access Type	Lot ID Access	Location
1	Bushfire Egress	G	Beekeepers Road (SLK 2.59)
2	Bushfire Egress	A	Three Springs – Eneabba Road (SLK 34.09)
3	Operational	B	Three Springs – Eneabba Road (SLK 28.97)
6	Operational	C	Kangaroo Road (SLK 7.56)
7	Operational	C	Kangaroo Road (SLK 9.37)
8	Operational	D	Kangaroo Road (SLK 10.95)
9	Operational	E	Kangaroo Road (SLK 15.26)
10	Operational	D	First North Road (SLK 0.83)
11	Operational	G	First North Road (SLK 5.90)
12	Bushfire Egress	E	First North Road (SLK 5.90)
13	Bushfire Egress	F	Skippers Road (SLK 0.07)
14	Operational	B	Three Springs – Eneabba Road (SLK 25.20)
15	Operational	A	Three Springs – Eneabba Road (SLK 29.28)
16	Operational	F	First North Road (SLK 0.83)

A series of internal unsealed access tracks are proposed to facilitate the movement of vehicles and machinery from the external access locations and the proposed construction/compound areas. *Austroads Guide to Road Design Part 3: Geometric Design* recommends that the *ARRB Unsealed Roads Manual: Guidelines to Good Practice* be adopted for guidance on the design of unsealed roads. The functional classification system for unsealed roads is shown in **Figure 2-3**.

Figure 2-3: ARRB Unsealed Roads Manual: Guidelines to Good Practice - Unsealed Roads Classification System

Road class	Class type	Service function description	Road type description
4A	Main road > 150 ADT	This type of road is used for major movements between population centres and connection to adjacent areas. High traffic volumes occur, and the road can carry large vehicles.	• All weather road, predominantly two-lane and unsealed. Can be sealed if economically justified. • Operating speed standard of 50–80 km/h according to terrain. • Minimum carriageway width is 7 m.
4B	Minor road 50–150 ADT	This type of road is used for connection between local centres of population and links to the primary network. Roads may or may not be sealed depending on the importance and function of the road.	• All-weather two-lane road formed and gravelled or single-lane sealed road with gravel shoulders. • Operating speed standard of 30–70 km/h according to terrain. • Minimum carriageway width is 5.5 m.
4C	Access road 10–50 ADT	Provides access to low use areas or individual rural property sites and forest areas. Caters for low travel speed and a range of vehicles and may be seasonally closed.	• Substantially a single lane two-way, generally dry weather, formed road. • Operating speeds standard of < 20–40 km/h according to terrain. • Minimum carriageway width is 4 m. • May be restricted to four-wheel drive vehicles.
4D	Tracks < 10 ADT	Mainly used for fire protection purposes, management access and limited recreational activities.	• Predominantly a single-lane two-way earth track (unformed) at or near the natural surface level. • Predominantly not conforming to any geometric design standards. • Minimum cleared width is 3 m. • Primarily for four-wheel drive vehicles.

Source: ARRB (October 2020)

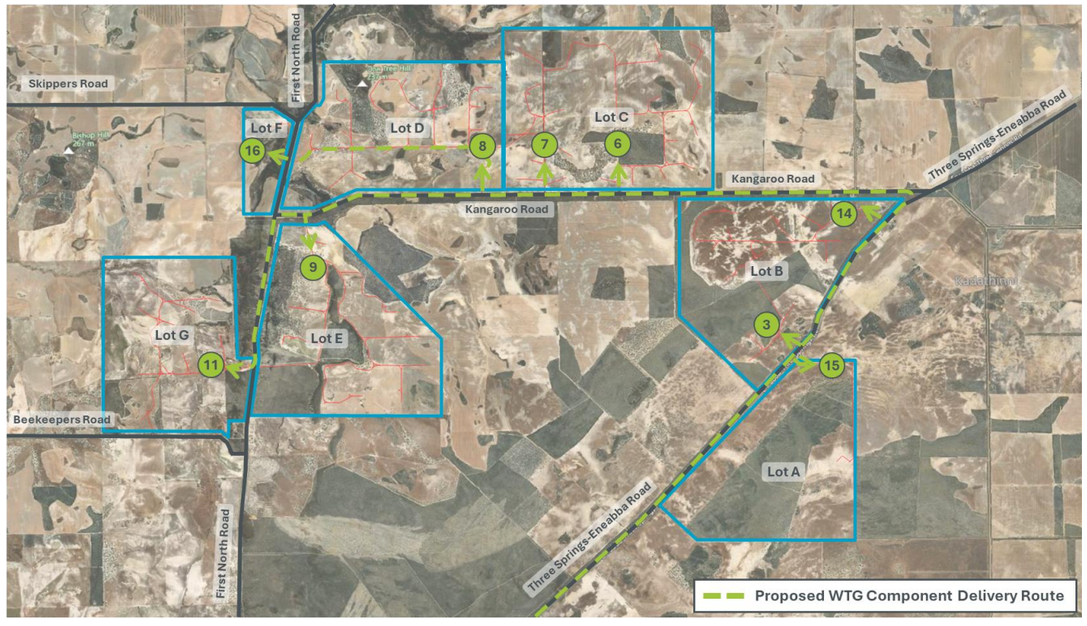
The internal access tracks are proposed for 'Road Class 4B' which accommodate around 50-150 vehicles per day within a 5.5m wide carriageway for two-way low-speed traffic movements. A 5.5m wide carriageway is also sufficient for accommodating the proposed OSOM loads in a single direction.

The proposed access route for delivery of the WTG components and substation/battery energy storage system (BESS) infrastructure is described in **Table 2-3** and shown in **Figure 2-4**.

Table 2-3: Proposed WTG Component / Substation and BESS Delivery Access Route

Lot ID	Access Gate ID	Access Route
A	15	Right-turn from Three Springs-Eneabba Road
B	3 or 14	Left-turn from Three Springs-Eneabba Road
C	6 or 7	Right-turn from Kangaroo Road via Three Springs-Eneabba Road
D	8	Right-turn from Kangaroo Road via Three Springs-Eneabba Road
E	9	Left-turn from Kangaroo Road via Three Springs-Eneabba Road
F	16	Through Gate 10 via Lot D internal access tracks from Gate 8
G	11	Right-turn from First North Road from Kangaroo Road via Three Springs-Eneabba Road

Figure 2-4: Proposed WTG Component / Substation and BESS Delivery Access Route



Base Image Source: Wind Prospect (March 2026)

All other operational accesses will be designed to accommodate restricted access vehicles, as required.

2.4 Proposed Vehicle Types

The proposed vehicle types will primarily be 4WD light vehicle (LV) and buses for employee commuter traffic and standard heavy vehicle (HV) / restricted access vehicle (RAV) traffic for construction equipment and material delivery.

The indicative vehicle types for transportation of the WTG components and substation/battery energy storage system (BESS) infrastructure are provided in , which are based on examples of similar projects for feasibility planning purposes only. The final vehicle configurations and loaded mass are subject to WTG component/infrastructure and transport logistics procurement.

Table 2-4: Indicative OSOM Vehicle Types for WTG Component/Infrastructure Transportation

Component	OSOM Vehicle Configuration	Indicative Overall Dimensions	Gross Vehicle Mass (GVM)
Blade	Block Truck with 3x4 Extendable Blade Trailer	110.74m L x 4.5m W x 5.06m H	70T
Tower - Base	Prime Mover with 5x8 Low Loader and 5x8 Bookend Jinker	31.94m L x 5.7m W x 5.94m H	150T
Tower - Top	Block Truck with 5x8 Extendable Blade Trailer	45.27m L x 4.3m W x 5.29m H	120T
Drivetrain	Block Truck with 10x8 Platform Trailer	31.28m L x 5.5m W x 5.02m H	200T
Nacelle	Prime Mover with 2x4 Dolly and 5x8 Low Loader	25.86m L x 4.2m W x 4.94m H	205T
Hub	Prime Mover with 2x4 Dolly and 5x8 Low Loader	25.86m L x 5.0m W x 4.93m H	110T
Transformer	4x Block Truck (2-Push/2-Pull) with 2x 10x8 Self-Steering Platform Trailers loaded by beamset configuration	55.2m L x 3.5m W x 4.9m H	200T

The vehicle configuration for transportation of the WTG blade has been adopted as the design vehicle for movements at intersections as this is anticipated to have the largest impact on existing infrastructure and roadsides. The adopted wheelbase spacing between the WTG blade support frames on the extendable blade trailer is around 50m, which has a load overhang of around 46m.

The maximum loaded height is anticipated to be in the order of 5.94m (base tower section), in which all drive under structures would require sufficient height clearance (including tolerances) for these loads to pass under.

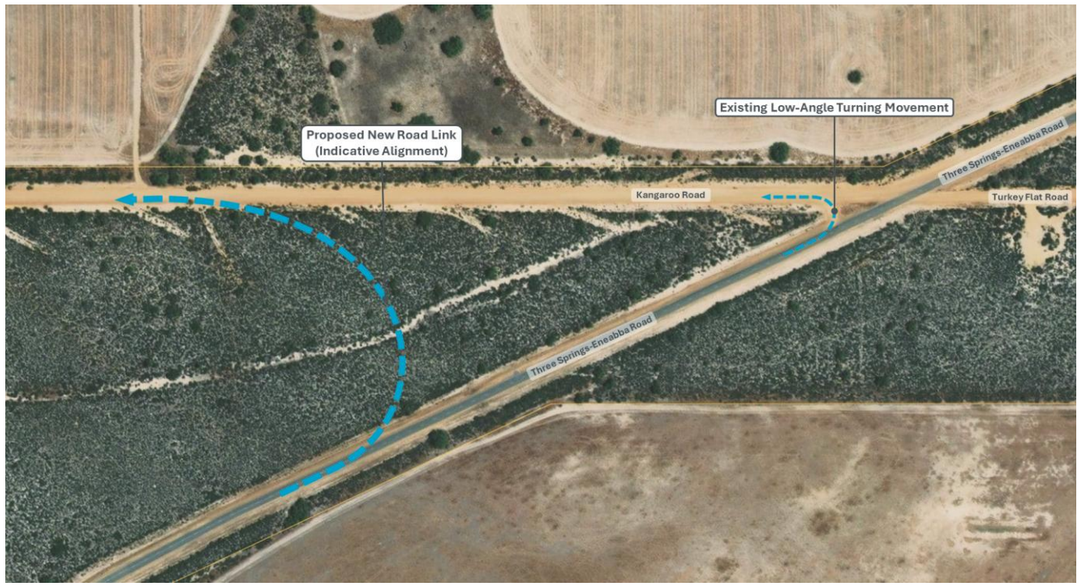
The maximum loaded width is anticipated to be in the order of 5.7m (base tower section), in which all roads and roadsides would require sufficient width (including tolerances) for these loads to travel on.

The maximum loaded GVM is anticipated to be in the order of 205T (nacelle), in which all drive over structures and pavement structures would require sufficient load rating (including tolerances) for these loads to travel on.

2.5 Proposed Road Modifications

Kangaroo Road is proposed to be accessed by vehicles for construction and WTG component deliveries, where vehicles are most likely to undertake a left-turn from Three Springs-Eneabba Road at the existing Three Springs-Eneabba Road & Kangaroo Road intersection. The left-turn movement requires a 155-degree manoeuvre which is restrictive for some truck and trailer combinations. Therefore, it is proposed that a new road section is constructed to the west of the intersection to facilitate a more achievable sweeping movement from Three Springs-Eneabba Road to Kangaroo Road, as shown in **Figure 2-5**.

Figure 2-5: Proposed New Road Link Between Three Springs-Eneabba Road and Kangaroo Road



Base Image Source: Nearmap

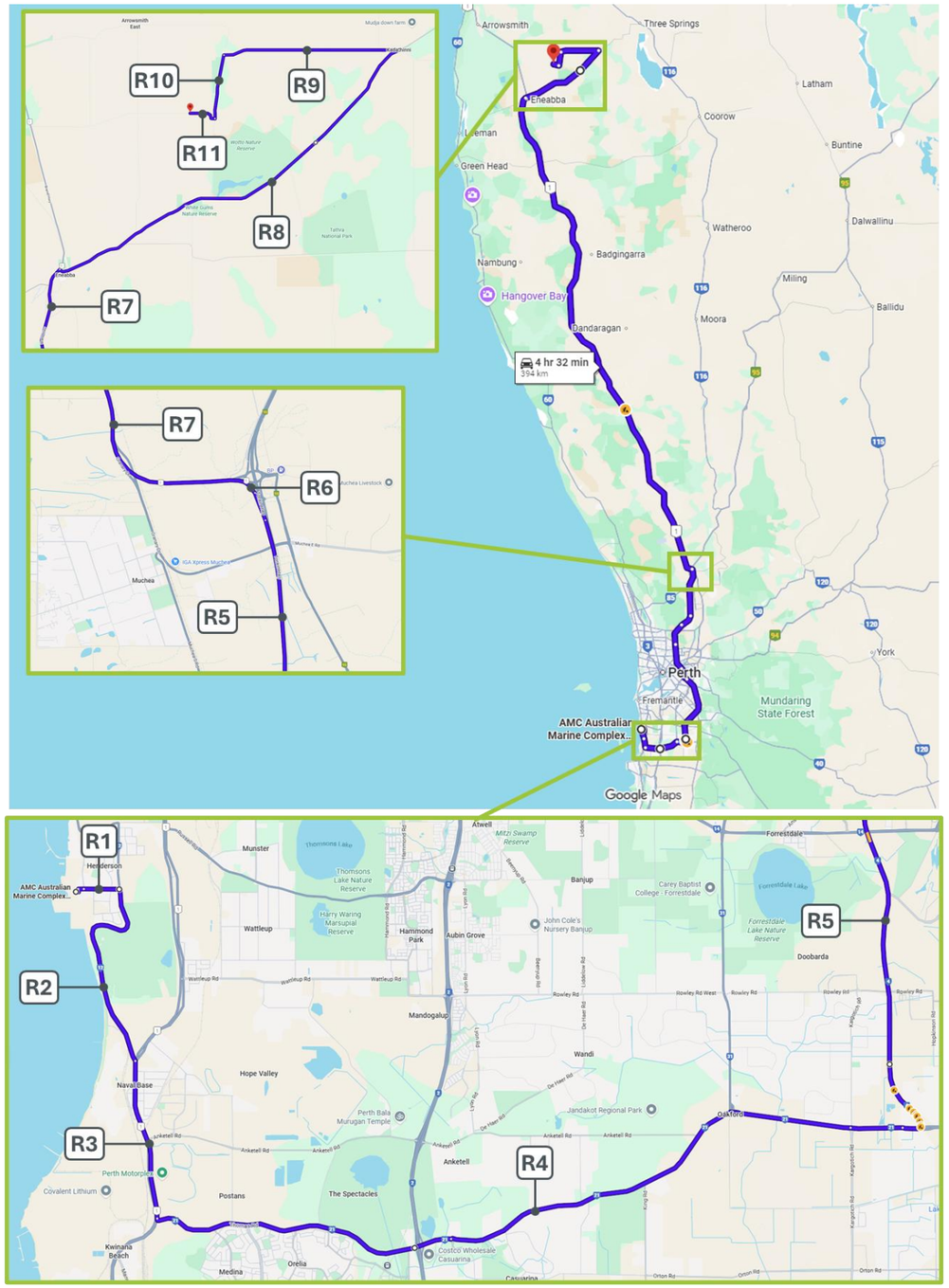
2.6 Proposed External Access Route

The wind turbine components are proposed to be shipped to the *Australian Marine Complex* (AMC) *Western Australia* located in Henderson and transported to the Site by road via the following routes (with reference to the MRWA road number and straight-line kilometre (SLK) section of the route) provided in **Table 2-5** and shown in **Figure 2-6**.

Table 2-5: Proposed Route Sections

Route Segment	MRWA Road No.	Road Name	SLK Extent	Distance Travelled
R1	1031493	Quill Way	1.22 - 2.05	~0.8km
R2	1031744 / 1050619	Cockburn Road	1.49 - 4.81 / 0.00 - 1.57	~4.9km
R3	H002	Rockingham Road	17.00 - 20.62	~3.62km
R4	H038	Thomas Road	0.04 - 18.50	~18.5km
R5	H017	Tonkin Highway	1.33 - 81.25	~79.9km
R6	H367	Tonkin Highway Off-Ramp to Brand Highway	0.00 - 0.32	~0.3km
R7	H004	Brand Highway	0.24 - 225.04	~224.8km
R8	5010125 / 5150105	Three Springs – Eneabba Road	0.00 - 22.06 / 23.85 - 39.94	~38.1km
R9	5150094	Kangaroo Road	0.00 - 16.00	~16.0km
R10	5150010	First North Road	0.00 - 8.10	~8.1km
R11	5150034	Beekeepers Road	0.00 - 2.59	~2.6km
R12	5150004	Skippers Road	0.00 - 0.07	~0.1km

Figure 2-6: Proposed External Access Route



Base Image Source: Google Maps

2.7 Proposed Traffic Generation

PJA has undertaken analysis of other wind farm projects to determine appropriate trip generation rates across a minimum of five case studies (refer **Appendix E**). The following rates have been adopted and would apply to the peak traffic generating stage of the project:

- Total daily vehicle trips (two-way) per WTG: 2.90 – 3.21
- Total daily HV/OSOM trips (two-way) per WTG: 1.26 – 1.42
- Total staff/WTG: 4.78
- Total daily vehicle trips (two-way) per staff: 0.77 – 0.84

Applying these rates to the proposed 93 WTGs, it is estimated that the Site would have in the order of 450 personnel on-site with a total traffic generation during the peak construction stage of 320vpd (two-way), of which 195vpd would be LV trips and 125vpd would be HV/OSOM trips.

It is assumed that 80% of staff would travel to/from site by a private bus carrying 14 passengers and 20% would travel by private car with approximately 1.25 passengers per vehicle. This equates to 26 buses and 72 cars. It is worth noting that not all staff may work 10-12-hours per day, 7-days per week and the worst-case scenario where all 450 staff travel to/from site at the start/end of the day may only occur infrequently over the duration of the project.

The proportion of OSOM loads is based upon an average of 5 WTGs being constructed per month over an 18.5-month period, with WTG components being transported over an 18-month period (548 days). This equates to an average of 1.4 WTG components being transported to site each day or 19 loads per fortnight across the 14 working days. It is assumed that each OSOM load would be accompanied by an average of three escort/pilot vehicles and make a return trip the following day i.e. 4 vehicles per OSOM trip or an average 5.43 vehicle trips per day (inbound). It is assumed return trips will occur the same or the following day and no longer to travel in a convoy e.g. 0.9 return trips per day or 10vpd (two-way).

The transport of equipment during construction would likely consist of one trip to site with the equipment remaining on-site for the duration required prior to undertaking a return trip when no longer required. It is assumed that construction plant would remain on-site for an average of 1-month and have an average of 50 plant on-site at any given time. Therefore, an average of 3.29 vehicle trips per day (two-way) is estimated to occur for equipment transport vehicles.

The transport of materials during construction would likely be spread over the work day. It is assumed that an average of 1.5 vehicle trips per delivery occur per day. Therefore, accounting for the OSOM and equipment loads in the total HV/OSOM traffic generated (125vpd), this equates to an average of 75 inbound deliveries per day or an average of 112vpd (two-way).

The anticipated traffic generated by each stage of the project is outlined as follows.

Stage 1: Site Establishment and Construction

The primary equipment required for site earthworks and road improvements would typically consist of excavators, graders, loaders, dozers, rollers, watercarts and tipper trucks. The construction of 93 WTGs would require the components to be transported, in addition to the transport of materials and equipment (cranes etc.). The indicative vehicle types and anticipated traffic generation during Stage 1 is provided in **Table 2-6**.

Table 2-6: Anticipated Stage 1 Traffic Generation

Trip Type	Total Quantity Over Duration	Unit Average	Vehicle Frequency	Vehicles per Peak Hour (Two-Way)	Vehicles per Day (Two-Way)
Employee Commute	450 staff	72 cars and 26 buses per day (98 vehicles)	2 per vehicle per day	98vph	195vpd
Transport of Materials	55,000 deliveries	75 deliveries per day	1.5 per delivery per day	11vph	112vpd
Transport of Equipment	1,300 plant	50 plant per month	2 per plant per month	1vph	3vpd
Transport of WTG Components	744 components	1.4 component per day	7.6 per component per day	4vph	10vpd

It is noted that each trip type peak hour would unlikely correlate e.g. commuter trips would likely occur within 30-minute periods of the prior to start/after end times and deliveries likely to occur outside of these windows to maximise productivity and efficiency.

Stage 1 is anticipated to typically generate a total of 320vpd (two-way) or 98vph in the peak hour.

Stage 2: Operations & Maintenance

Stage 2 of the project would comprise of the least impact on the road network in comparison to Stage 1 and Stage 3. The indicative vehicle types and anticipated traffic generation during Stage 2 is provided in **Table 2-7**.

Table 2-7: Anticipated Stage 2 Traffic Generation

Trip Type	Total Quantity Over Duration	Unit Average	Vehicle Frequency	Vehicles per Peak Hour (Two-Way)	Vehicles per Day (Two-Way)
Employee Commute	12 staff	12 cars (12 vehicles)	2 per vehicle per day	12vph	24vpd
Transport of Materials	600 deliveries	2 deliveries per month	2 per delivery per month	0vph	0vpd
Transport of Equipment	300 plant	1 plant per month	2 per plant per month	0vph	0vpd
Transport of WTG Components	25 components	1 component per year	4 per component per year	0vph	0vpd

Stage 2 is anticipated to generate a total of 24vpd (two-way) or 12vph in the peak hour on typical days. However, the occasional HV, RAV or OSOM load would generate between 1-8vpd (two-way) in addition.

Stage 3: Decommissioning

Stage 3 of the project would involve the transport of staff and equipment required to dismantle and dispose of the site works. The traffic generated in Stage 3 is considered to be lesser than Stage 1 due to less staff (assumed at 3.2 per WTG), materials (assumed 30 loads per WTG) and equipment (assumed 100 plant per month staying on-site for 3-months) likely to be required. The indicative vehicle types and anticipated traffic generation during Stage 3 is provided in **Table 2-8**.

Table 2-8: Anticipated Stage 3 Traffic Generation

Trip Type	Total Quantity Over Duration	Unit Average	Vehicle Frequency	Vehicles per Peak Hour (Two-Way)	Vehicles per Day (Two-Way)
Employee Commute	300 staff	48 cars and 17 buses per day (65 vehicles)	2 per vehicle per day	65vph	130vpd
Transport of Materials	2,790 loads	30 loads per WTG / 7.6 loads per day	2 per load per day	2vph	15vpd
Transport of Equipment	1,200 plant	100 plant per month	2 per plant per month	1vph	7vpd
Transport of WTG Components	769 components (crushed/shredded)	2.1 components per day	2 per component per day	1vph	4vpd

Stage 3 is anticipated to generate a total 156vpd (two-way) or 65vph in the peak hour.

2.8 Proposed Traffic Distribution

The distribution of employee commuter trips is assumed to be the same as the adopted distributions for the adjacent *Killawarra Solar Farm* site, as follows.

- 70% from East on Three Springs-Eneabba Road from Three Springs, Carnamah and Mingenew.
- 15% from North on Brand Highway from various towns between Eneabba and Geraldton.
- 15% from South on Brand Highway from various towns between Eneabba and Perth.

It is assumed that all heavy vehicle traffic with be via Brand Highway with 75% from the south and 25% from the north of Three Springs-Eneabba Road. The anticipated traffic volume distributed via these routes during Stage 2 is outlined as follows.

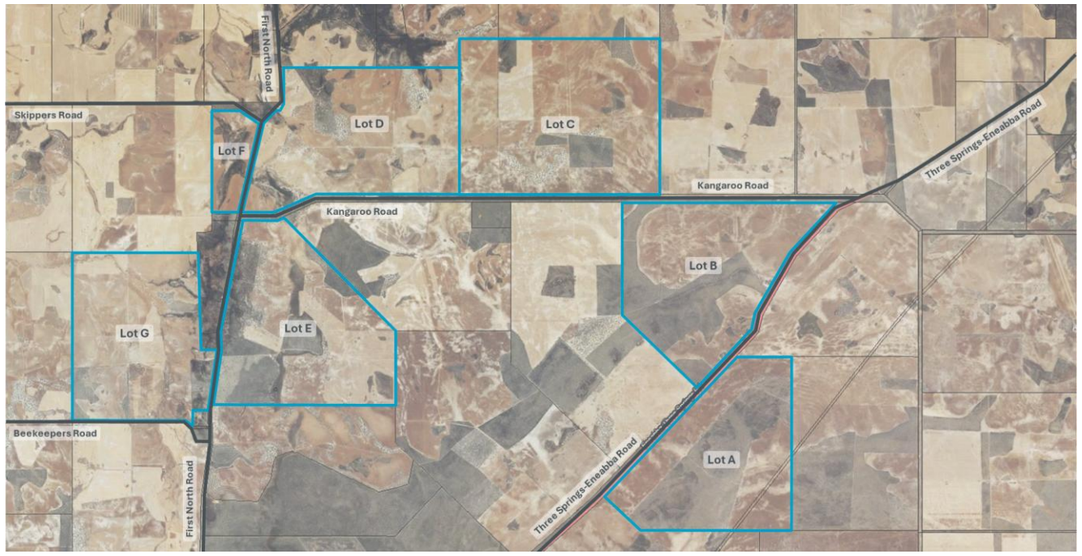
- East on Three Springs-Eneabba Road from Three Springs, Carnamah and Mingenew.
  - 137vpd: 85vpd (light vehicles), 52vpd (buses).
- North on Brand Highway from various towns between Eneabba and Geraldton.
  - 57vpd: 29vpd (light vehicles), 28vpd (heavy vehicles).
- South on Brand Highway from various towns between Eneabba and Perth.
  - 123vpd: 29vpd (light vehicles), 84vpd (heavy vehicles), 10vpd (OSOM).

3 Existing Situation

3.1 Existing Site Context

There are multiple existing gated access tracks to the lots within the Site for residential and maintenance purposes. Therefore, the existing accesses are designed to different standards and specifications to the proposed land use.

Figure 3-1: Existing Site Context



Base Image Source: Bing Maps

The construction workforce employees would likely be from local surrounding townsites, where possible. However, for employees relocating for the construction periods, the existing accommodation facilities at surrounding townsites and the radial distances from the Site are outlined below:

- Three Springs (Hotel and Motel) – 25km east of Site.
- Arrowsmith East (Caravan Park) – 30km west of Site.
- Carnamah (Caravan Park and Hotel Motel) – 35km east of Site.
- Coorow (Caravan Park and Hotel) – 55km southeast of Site.
- Leeman (Caravan Park and Holiday Units) – 60km southwest of Site.
- Morawa (Caravan Park, Hotel and Guesthouse) – 65km northeast of Site.
- Green Head (Caravan Park and Beach Stay) – 70km southwest of Site.
- Port Denison/Dongara (Hotels, Motels and Beach Resort) – 70km northwest of Site.
- Perenjori (Caravan Park, Hotel and Motel) – 75km northeast of Site.
- Jurien Bay (Short-Stay Accommodation, Motel Apartments, Tourist Park and future Resort Hotel) – 90km southwest of Site.
- Cervantes (Lodge, Holiday Park and Resort) – 105km southwest of Site.
- Geraldton (Caravan Park, Hotels, Motels and Lodge) - 130km northwest of Site.

There does not appear to be any public accommodation within the Eneabba townsite where other surrounding existing accommodation is relatively spread, with the closest accommodation primarily to the east of the Site and accommodation within built-up areas primarily along the coast to the west of the Site.

3.2 Existing Route Information

The existing road information and restricted access vehicle (RAV) network permits for the roads along the proposed route and frontage access roads is provided in **Table 3-1**.

Table 3-1: Existing Road Information

Route	Road Hierarchy	Speed Limit	Tandem Drive RAV Network	8TPA Low Loader RAV Network
Quill Way	Distributor B	60km/h	4.3 (without conditions)	6 (without conditions)
Cockburn Road	Distributor A	70km/h	4.3 (without conditions)	6 (without conditions)
Rockingham Road	Primary Distributor	70-80km/h	7.3 (without conditions)	6 (without conditions)
Thomas Road	Primary Distributor	70-80km/h	7.3 (without conditions)	6 (without conditions)
Tonkin Highway	Primary Distributor	70-110km/h	7.3 (without conditions)	6 (without conditions)
Tonkin Highway Off-Ramp to Brand Highway	Primary Distributor	80km/h	7.3 (without conditions)	6 (without conditions)
Brand Highway	Primary Distributor	110km/h	7.3 (without conditions)	6 (without conditions)
Three Springs – Eneabba Road	Regional Distributor	80-110km/h	7.3 (without conditions)* 7.1 (without conditions)**	N/A
Kangaroo Road	Access Road	Default (up to 110km/h)	7.1 (without conditions)	N/A
First North Road	Local Distributor	Default (up to 110km/h)	7.1 (without conditions)	N/A
Beekeepers Road	Access Road	Default (up to 110km/h)	7.1 (without conditions)	N/A
Skippers Road	Access Road	Default (up to 110km/h)	7.1 (without conditions)	N/A

**SLK 15.56 to SLK 22.06 (Brand Highway to Carnamah-Eneabba Road)*

***SLK 0.00 to SLK 22.06 / SLK 0.00 to SLK 39.9 (Brand Highway to Midlands Road)*

The tandem drive maximum length and maximum concessional mass limit for the RAV categories permitted on the proposed route is provided in **Table 3-2**.

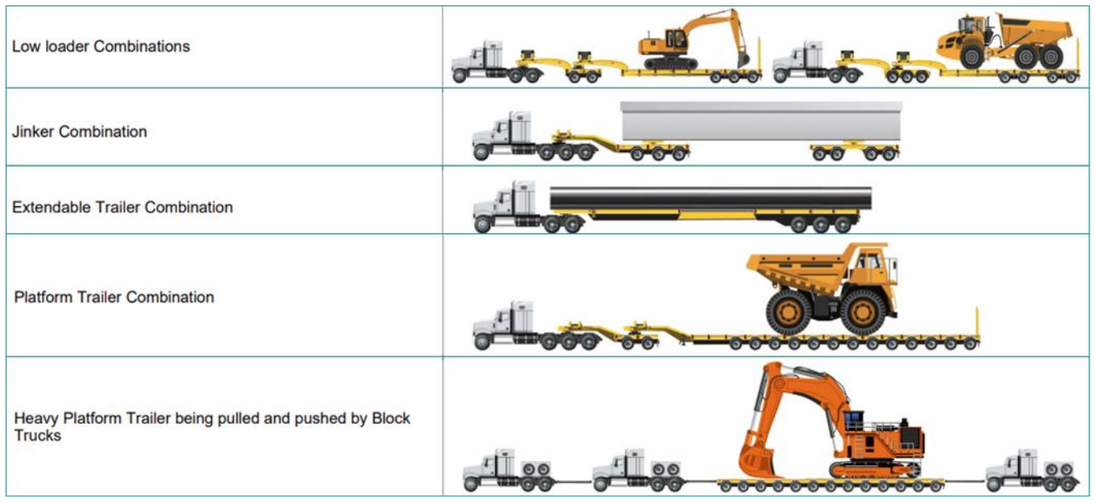
Table 3-2: RAV Categories

RAV Category	Maximum Combination Length	Maximum Concessional Mass Limit		
		Level 1	Level 2	Level 3
Tandem Drive Network 4	27.5m	93.5t	96.5t	100t
Tandem Drive Network 7	36.5m	115t	119t	123.5t
8TPA Low Loader Network 6 (3.7m ground contact width)	33.3m (front to rear axle)	13.75t*	Dolly: 9t* Low Loader: 13.75t*	Dolly: 14t* Low Loader: 13.75t*

**Mass per axle*

A RAV exceeding the maximum combination length would be classified as being 'over size' and a RAV exceeding the maximum concessional mass limit would be classified as being 'over mass'. Where a RAV exceeding both thresholds would be classified as 'over size over mass' (OSOM). OSOM vehicles are typically Class 1 RAVs carrying large indivisible loads, as shown in **Figure 3-2**.

Figure 3-2: Common Class 1 Vehicles Carrying Large Indivisible Items - OSOM



Source: Main Roads WA

The wider RAV 4 network is permitted via Russell Road, Kwinana Freeway and Roe Highway as a more direct route to Tonkin Highway for vehicles that are not classified as OSOM.

The typical pavement formation of the roads along the proposed route and frontage access roads is provided in **Table 3-3**.

Table 3-3: Existing Typical Route Pavement Formation

Route	No. of Lanes	Divided	Typical Pavement Width	Road Edge
Quill Way	2	No	10.0m (sealed)	Semi-mountable kerb
Cockburn Road	2	No	10.0m (sealed)	Semi-mountable kerb
Rockingham Road	4	Yes (raised)	10.5m (sealed)	Unsealed shoulder
Thomas Road	4 (SLK 0.00 – 7.40) 2 (SLK 7.40 -18.50)	Yes (raised) No	9.0m (sealed) 12.5m (sealed)	Unsealed shoulder Unsealed shoulder
Tonkin Highway	4	Yes (raised)	11.5m (sealed)	Road safety barrier / unsealed shoulder
Tonkin Highway Off-Ramp to Brand Highway	1	No	7.2m (sealed)	Road safety barrier / semi-mountable kerb
Brand Highway	2	No	7.0m (sealed)	1.0m sealed shoulder
Three Springs – Eneabba Road	2	No	9.0m (sealed)	Unsealed shoulder
Kangaroo Road	2	No	13.0m (unsealed)	Vegetation
First North Road	2	No	11.0m (unsealed)	Vegetation
Beekeepers Road	2	No	9.0m (unsealed)	Vegetation
Skippers Road	2	No	12.0m (unsealed)	Vegetation

The available existing traffic volume data for the average two-way weekday (Monday to Friday) daily traffic in vehicles per day (vpd) at locations along the proposed route is provided in **Table 3-4**.

Table 3-4: Existing Daily Traffic Volume Data

Route	Location	Daily (vpd)	%HV	Date	MRWA Site No.
Quill Way	S of Cockburn Rd	4,300	9.3%	2017/18	1031493
Cockburn Road	N of Hogg Rd N of Rockingham Rd	13,000 14,400	6.9% 8.1%	2023/24 2023/24	6041 7603
Rockingham Road	S of Cockburn Rd S of Anketell Rd	36,100 39,200	9.6% 11.3%	2023/24 2023/24	3652 8275
Thomas Road	E of Rockingham Rd W of Gilmore Ave E of Orelia Ave W of Johnson Rd E of Marri Park Rd W of Nicholson Rd E of Nicholson Rd E of Kargotich Rd	18,800 19,100 22,100 19,700 11,100 23,000 11,700 12,000	14.3% 15.0% 14.0% 19.0% 15.7% 13.7% 19.7% 14.1%	2023/24 2023/24 2023/24 2023/24 2023/24 2024/25 2023/24 2023/24	5523 5524 5291 6709 51026 3189 4591 8375
Tonkin Highway	N of Thomas Rd N of Rowley Rd N of Albany Hwy At Roe Hwy Bridge S of Kewdale Rd S of Great Eastern Hwy At Redcliffe Bridge N of Collier Rd N of Gnangara Overpass Ramp N of The Promenade	28,000 32,300 51,100 47,400 94,000 104,500 121,900 103,600 42,100 19,200	9.0% 9.5% 16.2% 14.7% 14.3% 13.7% 13.2% 15.6% 13.6% 24.9%	2023/24 2023/24 2024/25 2024/25 2021/22 2021/22 2020/21 2020/21 2024/25 2025/26	9130 8411 52245 50937 51978 50128 6226 5261 53039 53003
Brand Highway	N of Dewar Rd S of Regan Ford	2,800 2,500	34.9% 49.0%	2025/26 2024/25	5074 50714

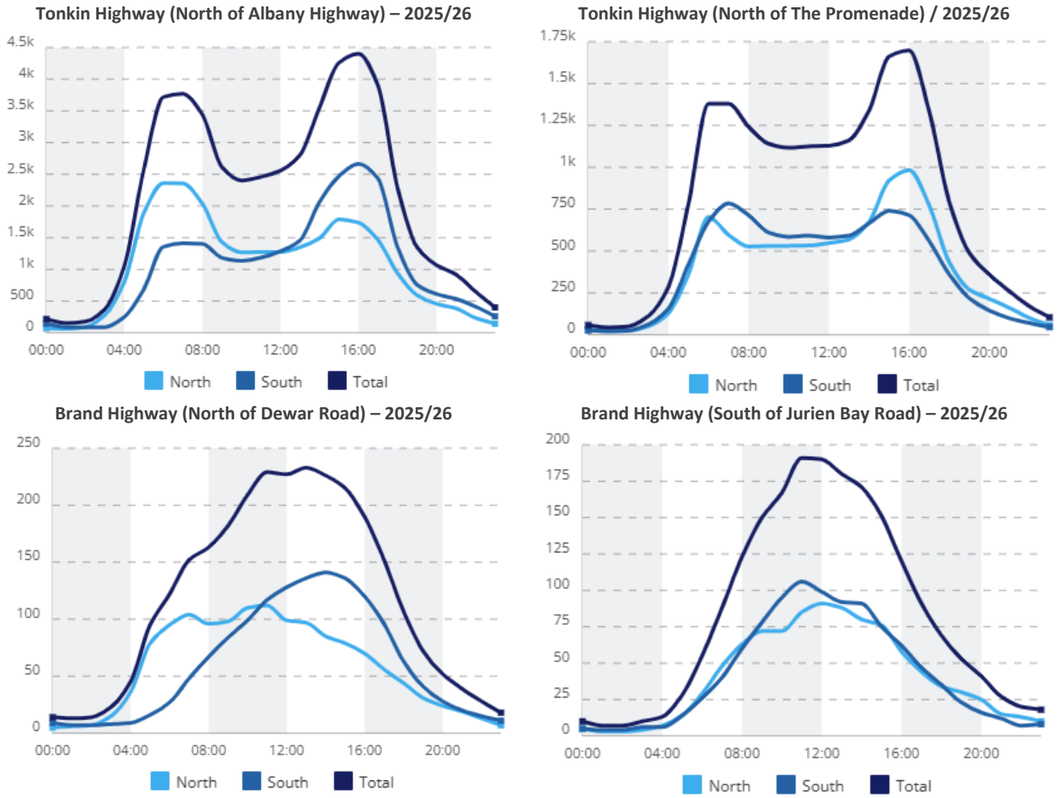
Route	Location	Daily (vpd)	%HV	Date	MRWA Site No.
	S of Cataby Rd	2,300	33.3%	2024/25	16036
	S of Jurien Bay Rd	2,000	30.5%	2025/26	51781
	S of Coorow Green Head Rd	2,300	33.2%	2024/25	19050
	N of Three Springs-Eneabba Rd	1,300	26.9%	Oct 2024	*
Three Springs – Eneabba Road	S of Nebru Rd	160	40.3%	2011/12	5190
	W of Turkey Flat Rd	100	52.1%	Oct 2024	*

**Sourced from Killawarra Solar, Battery Energy Storage System (BESS) & Substation Project TIA (SLR, April 2025)*

There is no available traffic volume data for the roads along the route, east of Brand Highway. However, based on site observations, there was approximately 1-2 vehicles per hour (vph) on both Kangaroo Road and First North Road. Therefore, it is estimated that the two-way daily traffic volumes could be in the order of 10-20vpd.

The typical hourly traffic volume distribution on an average weekday (Monday to Friday) are shown in **Figure 3-3** at the available MRWA 24-hour network performance sites for Tonkin Highway and Brand Highway and the latest individual network performance sites for other roads along the proposed route.

Figure 3-3: Existing Hourly Traffic Volume Distribution



Source: Main Roads WA

The general time period for the transportation of materials and/or equipment to/from the Perth Metropolitan Area which is likely to cause the least disruption to other road users is before 5am, between 8am to 2pm and after 5pm.

The peak periods on the road network on Brand Highway at Three Springs-Eneabba Road at the time of the survey occurred at 9am and 3pm with an interpeak at 1pm which was also the daily peak.

The traffic volume recorded on Three Springs-Eneabba Road is very low at 10vph (two-way) with peaks occurring every 3-hours between 7am and 3pm.

3.3 Existing Intersections

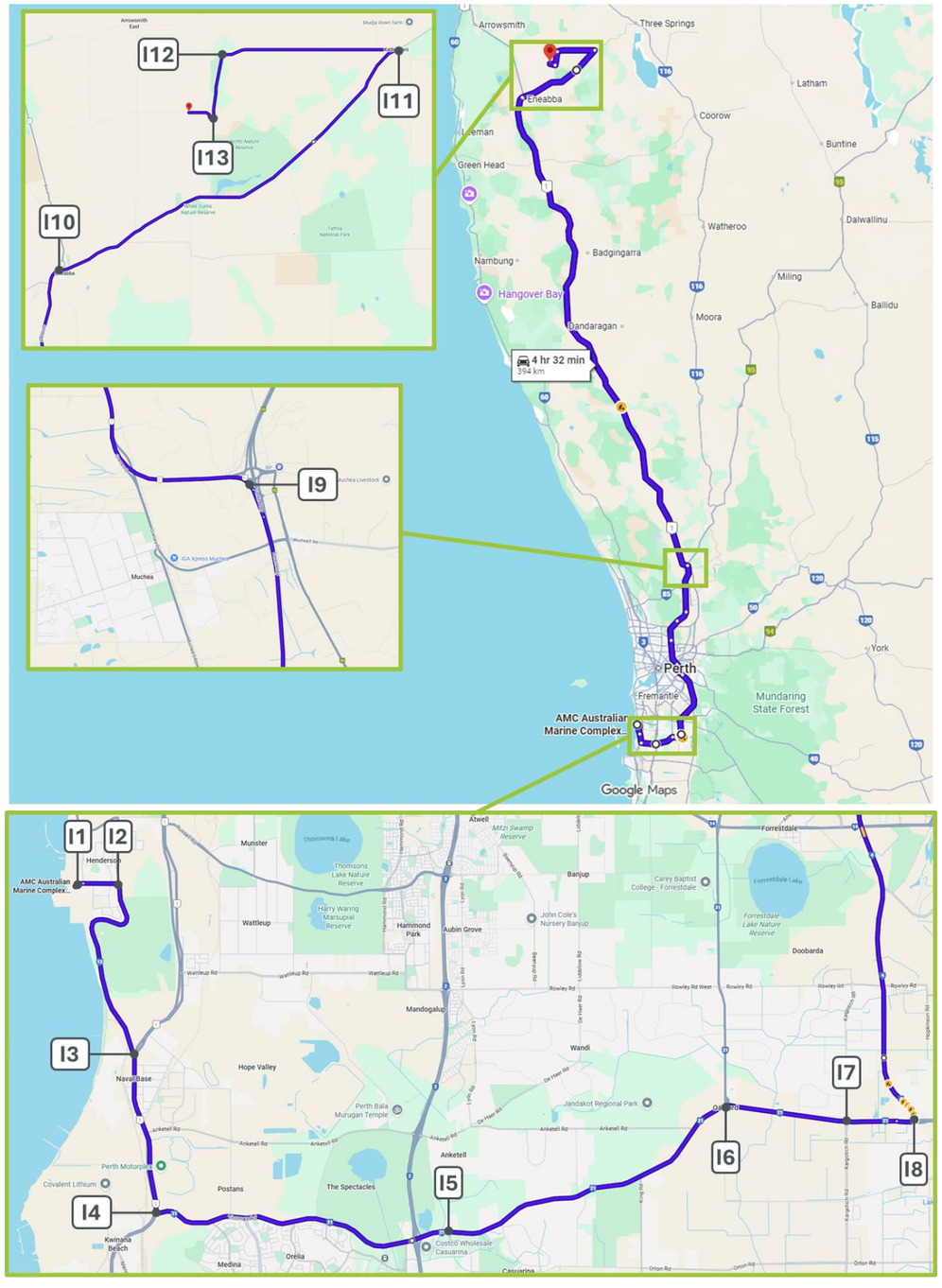
The existing intersections on the proposed OSOM route that would require additional negotiation to continue the route are provided in **Table 3-5** and shown in **Figure 3-4**.

Table 3-5: Existing Intersections

Intersection	Control	Route Movement
1. AMC Access & Quill Way	Priority T-Intersection	Right-Turn
2. Quill Way & Cockburn Road	Traffic Signals	Right-Turn
3. Cockburn Road & Rockingham Road	Traffic Signals	Right-Turn
4. Rockingham Road & Thomas Road	Traffic Signals	Left-Turn
5. Thomas Road & Central Avenue / Treeby Road	Roundabout	Through
6. Thomas Road & Nicholson Road	Roundabout	Through
7. Thomas Road & Kargotich Road	Roundabout	Through
8. *Thomas Road & Tonkin Highway**	Traffic Signals	Left-Turn
9. Tonkin Highway & Off-Ramp to Brand Highway	Interchange	Exit Left
10. Brand Highway & Three Springs-Eneabba Road	Priority T-Intersection	Right-Turn
11. Three Springs-Eneabba Road & Kangaroo Road	Priority T-Intersection	Left-Turn
12. Kangaroo Road & First North Road	Priority T-Intersection	Left-Turn
13. First North Road & Beekeepers Road	Priority T-Intersection	Right-Turn

**Intersection under construction*

Figure 3-4: Existing Intersections on Proposed OSOM Route



Base Image Source: Google Maps

3.4 Existing Drive Over Structures

The potential obstructions/limitations along the route that have been identified through a desktop assessment of the *Main Roads WA Structures Web App* and the *Restricted Structures RAV Mapping Tool* are provided in **Table 3-6**, in order of the route travel direction.

Table 3-6: Identified Drive Over Structures on Proposed Route

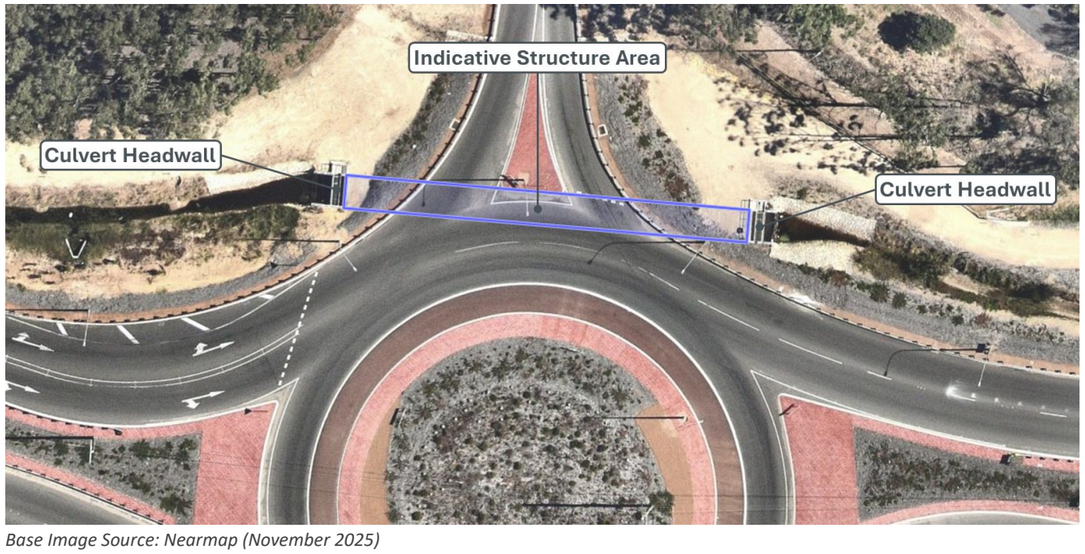
Asset	Asset Owner	Location	Asset No.	Class 1 RAV Low Loader Overmass Restriction
Bridge: Over Rail	Main Roads WA	H002 SLK 18.60	1225	N/A
Bridge: Over Rail	Main Roads WA	H038 SLK 6.24	1535	N/A
Bridge: Pedestrian Underpass	Main Roads WA	H038 SLK 6.16	9230	N/A
Bridge: Over Road	Main Roads WA	H038 SLK 5.75	1455	N/A
Culvert	Main Roads WA / Water Corporation	H038 SLK 15.26	0861A	N/A
Culvert	**Water Corporation**	**1080009 SLK 3.09**	**4453**	**Category 1**
Bridge: Stock Underpass	Main Roads WA	H017 SLK 79.43	9265	N/A
Culvert	Main Roads WA	H017 SLK 69.32	1562	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 66.36	1560	N/A
Bridge: Over Road and Rail	Main Roads WA	H017 SLK 65.75	1555	N/A
Culvert	Main Roads WA	H017 SLK 65.07	1559	N/A
Bridge: Pedestrian Underpass	Main Roads WA	H017 SLK 64.76	9261	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 59.75	1170	N/A
Bridge: Over Road and Rail	Main Roads WA	H017 SLK 52.56	1211	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 52.30	1185	N/A
Bridge: Pedestrian Underpass	Main Roads WA	H017 SLK 49.65	9387	N/A
Bridge: Over Road	Main Roads WA	H012 SLK 22.58	1716	N/A
Culvert	Main Roads WA	H395 SLK 0.62	1858	N/A
Bridge: Over Road	Main Roads WA	H005 SLK 6.40	1201	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 44.27	1220	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 43.37	1205	N/A
Bridge: Over Rail	Main Roads WA	H017 SLK 43.23	1206	N/A
Bridge: Over Rail	Main Roads WA	H017 SLK 42.85	1869	N/A
Bridge: Over Road	Main Roads WA	H281 SLK 0.35	1769	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 39.75	1771	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 39.66	1770	N/A
Bridge: Pedestrian Underpass	Main Roads WA	H017 SLK 39.62	9435	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 34.49	1783	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 34.35	1785	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 32.21	1811	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 28.78	1788	N/A
Bridge: Pedestrian Underpass	Main Roads WA	H017 SLK 28.51	9443	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 15.57	1801	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 15.43	1802	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 10.84	1793	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 10.70	1794	N/A
Bridge: Over Road and Rail	Main Roads WA	H017 SLK 5.56	1795	N/A
Culvert	Main Roads WA	H017 SLK 4.03	1796	N/A
Bridge: Over Road	Main Roads WA	H017 SLK 1.73	1797	N/A
Culvert	Main Roads WA	H004 SLK 0.46	1798	N/A
Bridge: Over Road and Rail	Main Roads WA	H004 SLK 1.62	1799	N/A
Culvert	Main Roads WA	H004 SLK 75.92	0664	N/A
Culvert	Main Roads WA	H004 SLK 88.58	0665	N/A
Culvert	Main Roads WA	H004 SLK 106.63	0666	N/A
Culvert	Main Roads WA	H004 SLK 113.05	0667	N/A
Culvert	Main Roads WA	H004 SLK 157.89	0966	N/A
Culvert	Main Roads WA	H004 SLK 165.80	0668	N/A

Legend

Timber
Timber Hybrid
Steel
Reinforced Concrete
Steel/Concrete Composite
Culvert
Prestressed Concrete
Sign Gantry
Tunnel

All identified drive-over structures are permitted on the 'Class 1 RAV Low Loader Overmass Category 3' network, with the exception of *Asset No. 4453* at the intersection of Thomas Road & Kargotich Road that is restricted for 'Category 1' vehicles. A desktop aerial assessment of the structure indicates the left-lane for eastbound traffic is likely to track over the culvert structure, as shown in **Figure 3-5**, and would require approval from *Water Corporation* to travel over or adjacent to the structure.

Figure 3-5: Drive Over Structure No. 4453



Base Image Source: Nearmap (November 2025)

3.5 Existing Drive Under Structures

The potential obstructions/limitations along the route that have been identified through a desktop assessment of the *Main Roads WA Structures Web App* are provided in **Table 3-7**, in order of the route travel direction. The *Main Roads WA Structure Height Register* (January 2026) was cross-referenced to obtain the maximum height of a load passing under the structures.

Table 3-7: Identified Drive Under Structures on Proposed Route

Asset	Asset Owner	Location	Asset No.	Max. Load Height
Sign Gantry	Main Roads WA	H017 SLK 54.09	8101	6.83m
Bridge: Over Road	Main Roads WA	H0253 SLK 1.48	1725	7.4m
Bridge: Over Road	Main Roads WA	H0253 SLK 1.48	1725	6.7m
Bridge: Over Road	**Main Roads WA**	**H018 SLK 28.56**	**1345**	**5.73m**
Sign Gantry	Main Roads WA	H017 SLK 52.54	8100	6.84m
Sign Gantry	Main Roads WA	H017 SLK 52.03	8087	6.29m
Sign Gantry	Main Roads WA	H017 SLK 51.01	8086	6.33m
Bridge: Over Road	Main Roads WA	H065 SLK 0.01	1720	6.31m
Bridge: Over Road	Main Roads WA	H012 SLK 22.58	1716	7.68m
Sign Gantry	Main Roads WA	H017 SLK 47.25	8097	7.09m
Bridge: Over Road	**Main Roads WA**	**H259 SLK 0.19**	**1727**	**5.73m**
Bridge: Over Road	Main Roads WA	1130027 SLK 0.77	1194	6.2m
Bridge: Over Road	Main Roads WA	H005 SLK 6.40	1201	5.95m
Bridge: Over Road	Main Roads WA	H281 SLK 0.35	1769	6.55m
Bridge: Over Road and Rail	Main Roads WA	1120006 SLK 2.90	1186A	6.85m
Sign Gantry	Main Roads WA	H017 SLK 38.43	8179	6.71m
Bridge: Over Road	Main Roads WA	1120014 SLK 2.72	1766	6.8m
Sign Gantry	Main Roads WA	H017 SLK 37.87	8145	6.69m
Bridge: Over Road and Rail	Main Roads WA	H017 SLK 37.84	9122A	6.87m
Bridge: Over Road	Main Roads WA	H300 SLK 0.74	1780	6.63m
Bridge: Over Road	Main Roads WA	H301 SLK 0.41	1779	7.0m
Bridge: Over Road and Rail	Main Roads WA	H021 SLK 14.25	1777	7.03m
Bridge: Over Road and Rail	Main Roads WA	1090564 SLK 4.65	1782	6.64m
Sign Gantry	Main Roads WA	H017 SLK 35.53	8127	6.89m
Bridge: Over Road	Main Roads WA	H017 SLK 35.48	9560	7.66m
Sign Gantry	Main Roads WA	H017 SLK 35.15	8145	6.69m
Bridge: Over Road	Main Roads WA	H429 SLK 0.07	1789	6.91m
Bridge: Over Road	Main Roads WA	H429 SLK 0.35	1790	6.85m
Bridge: Over Road	Main Roads WA	109Z038 SLK 0.03	1815	6.33m
Sign Gantry	Main Roads WA	H017 SLK 17.72	8170	6.59m

Legend

- Timber
- Timber Hybrid
- Steel
- Reinforced Concrete
- Steel/Concrete Composite
- Culvert
- Prestressed Concrete
- Sign Gantry
- Tunnel

Generally, MRWA require a safety buffer of at least 300mm between the top of the load and the underside of the structure. This safety buffer takes into consideration vertical movement of the load due to fifth wheel lash and/or suspension lash; relative movement of the load due to irregularities of the pavement and vehicle, such as load sway, displaced load, cross-fall and road geometry; a margin of error; structure abutment and pier settlement; resurfacing and paving overlays; and the driver's comfort margin.

The proposed maximum loaded vehicle height is 5.94m (base tower section). Therefore, *Asset No. 1345* (Roe Highway over Tonkin Highway) and Asset No. *1727* (Dunreath Road over Tonkin Highway) have insufficient clearance to accommodate the movement for base tower section. However, these loads are able to utilise the Tonkin Highway on and off-ramps to bypass these structures, as discussed further in **Section 6.5**. All of the other WTG components have a maximum loaded height within the clearance limits of the identified drive under structures and thus have sufficient clearance to accommodate those movements.

A site visit of the road network along the proposed route and surrounding the Site was undertaken to identify further drive under structures and no others were noted.

3.6 Existing Railway Level Crossings

There is one existing railway level crossing on the proposed access route located on Brand Highway at SLK 220.56. The crossing is controlled by a flashing lights and boom gates, as shown in **Figure 3-6**. Prior approval from *Arc Infrastructure* may be required to travel through the crossing and ensure there is no interference with schedule freight services on the Dongara-Eneabba Line between Eneabba and Iluka South.

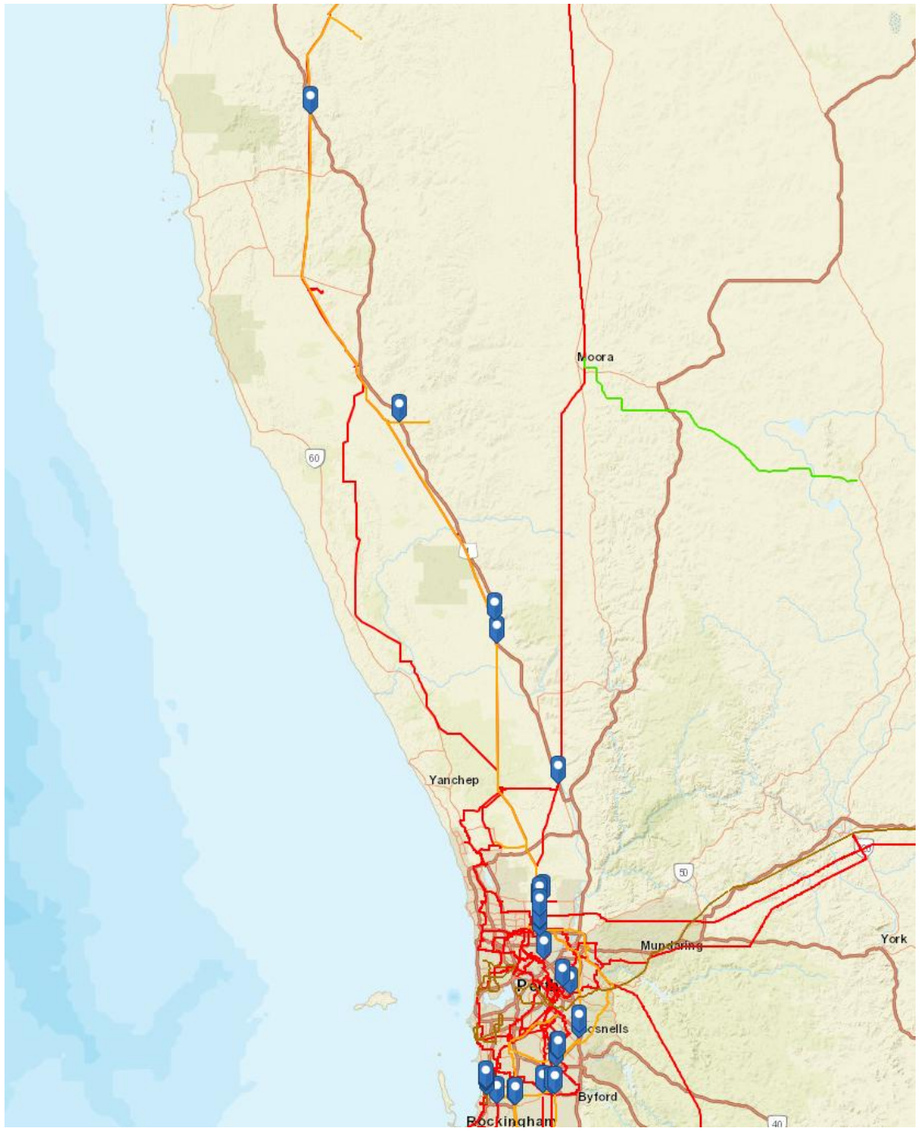
Figure 3-6: Existing Railway Level Crossing

Source: Google Street View (July 2022)

3.7 Existing Overhead Power Lines

The identified locations where high voltage overhead transmission lines cross over the proposed route are shown in **Figure 3-7**, with the locations provided in **Table 3-8**. These locations would require approval from *Western Power* prior to travel to identify where there is insufficient ground clearance (if any) and the provision of high wire escorts are present at the time of travel.

Figure 3-7: High Voltage Overhead Transmission Lines Crossing Proposed Route



Source: Western Power Network Capacity Mapping Tool

Table 3-8: Location of High Voltage Overhead Transmission Lines Crossing Proposed Route

High Voltage Overhead Transmission Line Type	Location of Crossing
132kV	Cockburn Road (1050619) SLK 1.53
132kV	Rockingham Road (H002) SLK 17.40
330kV	Rockingham Road (H002) SLK 17.57
330kV	Rockingham Road (H002) SLK 17.61
132kV	Rockingham Road (H002) SLK 17.72
132kV	Rockingham Road (H002) SLK 18.78
132kV	Thomas Road (H038) SLK 2.21
330kV	Thomas Road (H038) SLK 6.71
330kV	Thomas Road (H038) SLK 6.91
132kV	Thomas Road (H038) SLK 14.34
132kV	Thomas Road (H038) SLK 16.29
330kV	Thomas Road (H038) SLK 17.16
330kV	Tonkin Highway (H017) SLK 74.48
330kV	Tonkin Highway (H017) SLK 72.60
132kV	Tonkin Highway (H017) SLK 72.37
330kV	Tonkin Highway (H017) SLK 65.40
330kV	Tonkin Highway (H017) SLK 64.11
132kV	Tonkin Highway (H017) SLK 54.52
132kV	Tonkin Highway (H017) SLK 51.69
132kV	Tonkin Highway (H017) SLK 43.44
132kV	Tonkin Highway (H017) SLK 37.86
132kV	Tonkin Highway (H017) SLK 36.16
330kV	Tonkin Highway (H017) SLK 36.11
330kV	Tonkin Highway (H017) SLK 36.10
132kV	Tonkin Highway (H017) SLK 36.08
132kV	Tonkin Highway (H017) SLK 35.94
330kV	Tonkin Highway (H017) SLK 35.93
132kV	Tonkin Highway (H017) SLK 33.13
132kV	Tonkin Highway (H017) SLK 31.28
132kV	Tonkin Highway (H017) SLK 30.18
330kV	Tonkin Highway (H017) SLK 30.16
132kV	Tonkin Highway (H017) SLK 30.15
132kV	Tonkin Highway (H017) SLK 29.28
132kV	Brand Highway (H004) SLK 5.76
330kV	Brand Highway (H004) SLK 44.48
132kV	Brand Highway (H004) SLK 44.51
132kV	Brand Highway (H004) SLK 50.43
330kV	Brand Highway (H004) SLK 50.47
330kV	Brand Highway (H004) SLK 104.02
330kV	Brand Highway (H004) SLK 189.83
132kV	Brand Highway (H004) SLK 189.88

In addition to the Western Power overhead transmission lines, a number of local power lines were noted along the route during a site visit of the Site frontage roads. The asset owner is unknown but is likely to be *Horizon Power* or private power lines for grid supply to lot owners. The location of these is listed below and shown in **Figure 3-8**.

- Kangaroo Road SLK 11.25
- First North Road SLK 1.72
- Beekeepers Road SLK 0.40
- Beekeepers Road SLK 1.86

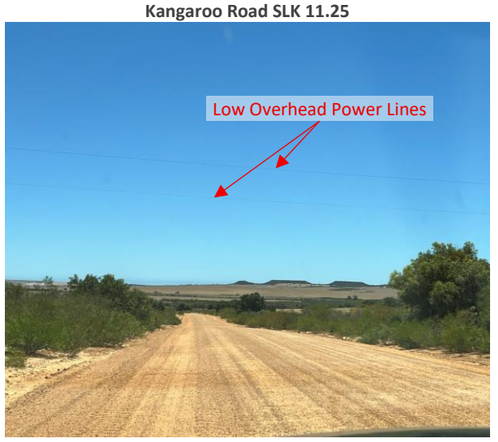
Figure 3-8: Existing Overhead Power Lines Crossing Site Frontage Roads

Base Image Source: Nearmap

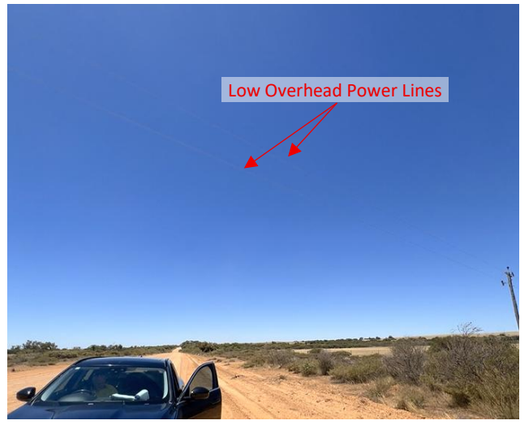
The height clearance of the existing overhead power lines on the Site frontage roads is unknown and would require approval from the supplier prior to travel to identify the ground clearance and allow for the provision of high wire escorts at the time of travel. The site visit photos for these powerlines are shown in **Figure 3-9**.

Figure 3-9: Other Identified Overhead Power Lines Crossing Roads

Kangaroo Road SLK 11.25



First North Road SLK 1.72



Beekeepers Road SLK 0.40

Beekeepers Road SLK 1.86

In addition to the identified low overhead power lines, an overhead power line to the left (northeast) of Gate 3 over Three Springs-Eneabba Road (approx. SLK 28.3) was observed. The height clearance appeared to be sufficient for the loaded height. However, this would need to be confirmed prior to the movement of OSOM loads in this area.

3.8 Rest Areas

The *Main Roads WA RAV Mapping Tool* was used to identify suitable dedicated rest areas for heavy vehicles in the direction of travel towards the Site, which are provided in **Table 3-9**. The minor rest areas have potential to be used for heavily delayed traffic to pass-through.

Table 3-9: Identified Rest Areas on Proposed Route

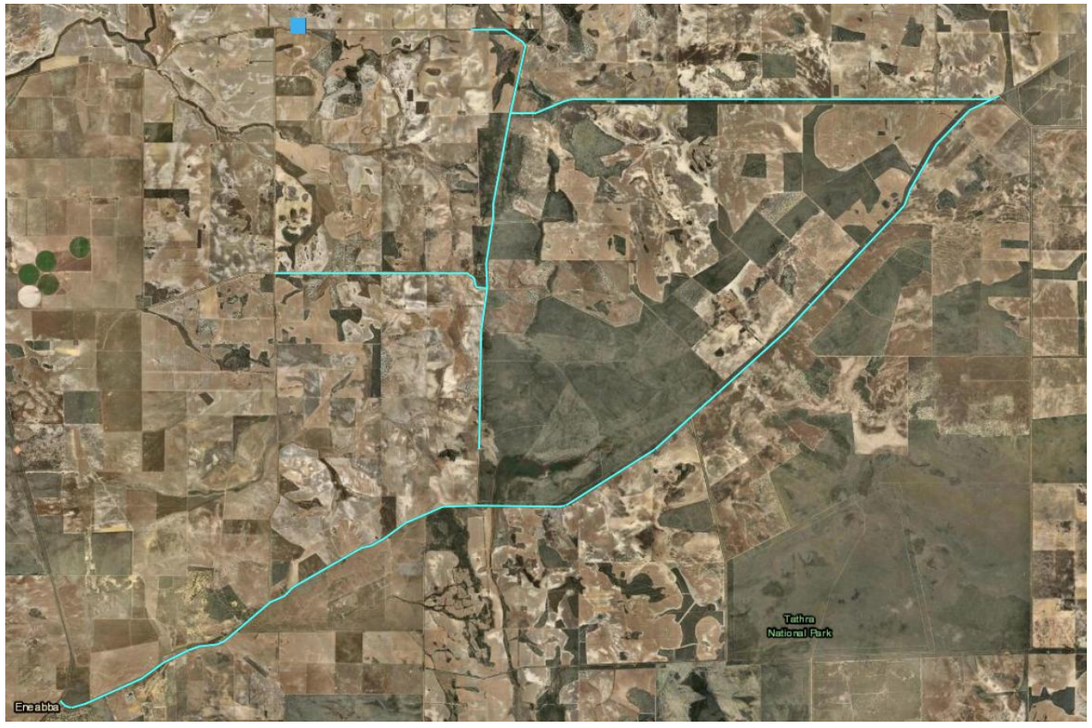
Type	Location	Facility
Heavy Vehicle Rest Area	Tonkin Highway (H017) SLK 78.62	Sealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 10.39	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 20.83	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 27.03	Sealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 52.46	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 60.26	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 66.57	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 94.60	Unsealed Truckstop Bay
Heavy Vehicle Rest Area	Brand Highway (H004) SLK 106.00	Roadhouse
Minor Rest Area	Brand Highway (H004) SLK 127.37	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 138.56	Sealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 157.68	Unsealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 182.46	Sealed Truckstop Bay
Minor Rest Area	Brand Highway (H004) SLK 197.63	Sealed Truckstop Bay
Heavy Vehicle Rest Area	Brand Highway (H004) SLK 201.00	Sealed Truckstop Bay

It is noted that the *Main Roads WA Travel Map* can be used by operators to show real-time impacts of current roadworks and plan appropriate places to rest.

3.9 Crash Data

A crash history extract of reported crashes in the last 5-year period (2020-2024) is shown in **Figure 3-10**.

Figure 3-10: Reported Crashes (2020-2024)



Source: Main Roads WA

There has been zero (0) reported crashes in the last 5-years on the roads fronting/accessing the Site at the local level. There has been a single unrelated Hospital severity Hit-Object crash approximately 7.5km west of the Site on Skipper Road. Therefore, the crash data does not indicate any pre-existing reported crash patterns that should be addressed.

4 Integration with Surrounding Area

4.1 Committed Developments

As noted previously in **Section 1.4**, the following land use development projects have been identified as being relevant to the proposed Twin Hills Wind Farm.

- Killawarra Solar, Battery Energy Storage System (BESS) & Substation Project, Shire of Carnamah, WA
- Tathra Wind Farm, Shire of Carnamah, WA
- Marri Wind Farm, Shire of Dandaragan, WA

It is assumed that the proposed OSOM movements for all sites will be coordinated by MRWA to minimise disruption.

4.2 Changes to Transport Networks

The MRWA projects[1] affecting the proposed transport route have been identified as follows.

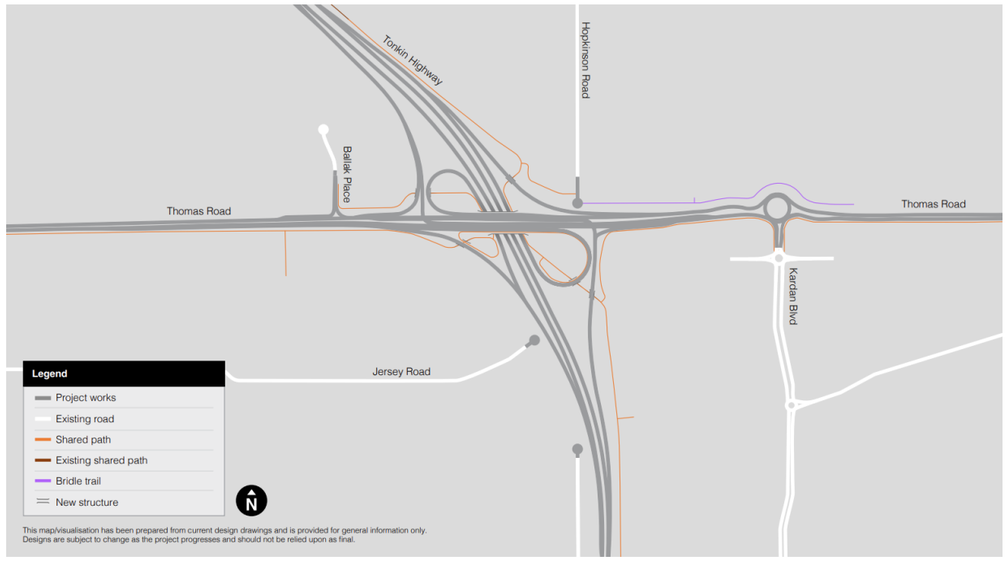
Tonkin Highway & Thomas Road Intersection Upgrade

As part of the wider Tonkin Highway Extension project (Thomas Road to South Western Highway via Orton Road, Bishop Road and Mundijong Road), Thomas Road will be upgraded over a 4.5 km section between Kargotich Road and South Western Highway. The project scope is shown in **Figure 4-1** and includes the following upgrades.

- Duplication of Thomas Road from a 2-lane two-way road to 4-lanes (two in each direction).
- A new grade-separated interchange with Tonkin Highway to improve traffic flow.
- A new 4.5 km shared path on the southern side.
- A signalised equine crossing connecting Byford and Darling Downs bridle paths.
- Intersection upgrades, including:
  - New roundabouts at Kardan Boulevard and Masters Road/Malarkey Road.
  - Left-in/left-out access at Ballak Place and Briggs Road.
  - Cul-de-sacs at Hopkinson Road (north and south of Thomas Road).
  - New traffic signals at Plaistowe Boulevard.
  - Reconstructed intersection at Wungong South Road.
- Realignment of the equine path network north of Thomas Road to maintain connectivity.

Construction commenced in mid-2025 and is scheduled to be completed in late-2028.

Figure 4-1: Thomas Road Upgrade and Tonkin Highway Interchange Project Map



Source: Main Roads WA (September 2025)

The Tonkin Highway & Thomas Road Intersection Upgrade project will directly impact the movement of OSOM loads passing through the intersection as additional modifications may be required throughout various stages of the project and require further planning to be undertaken.

Tonkin Highway Corridor Upgrades

The Tonkin Highway corridor between Roe Highway and Kelvin Road will be upgraded to improve safety and reduce delays along the heavily congested route. The project scope is shown in **Figure 4-2** and includes the following upgrades.

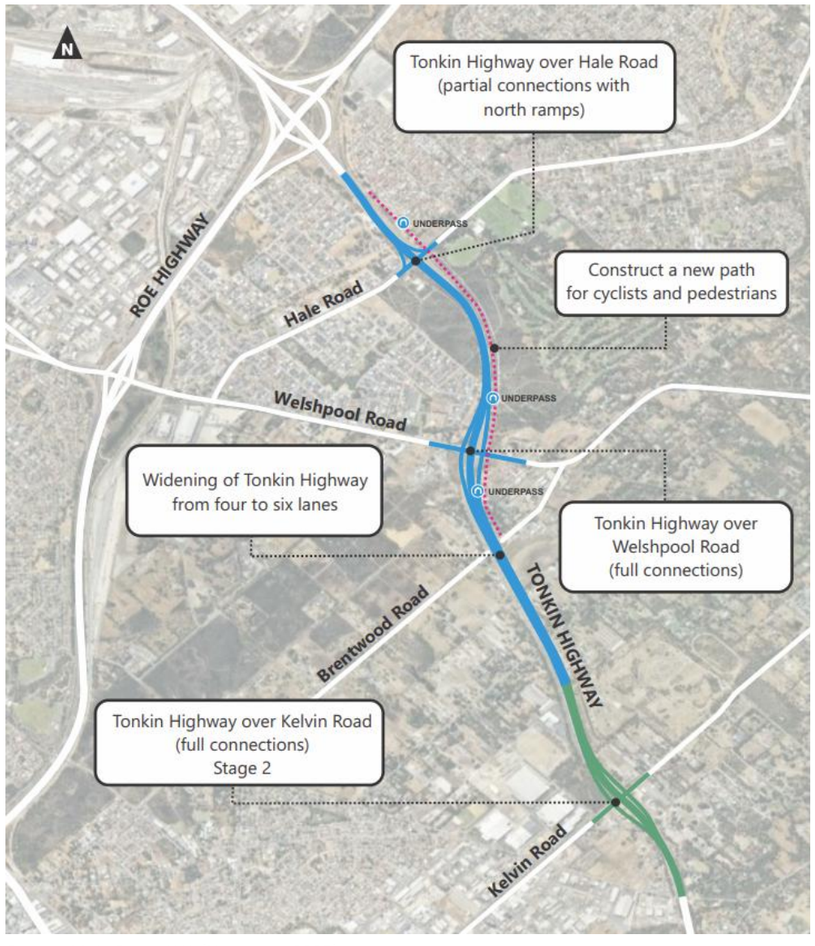
- Widening Tonkin Highway from four to six lanes from south of Roe Highway to Kelvin Road.
- Grade separations (Tonkin Highway travelling over intersections at):
  - Tonkin Highway / Welshpool Road – Connections to and from Tonkin Highway north and south.
  - Tonkin Highway / Hale Road – Partial connection with north-facing ramps (to and from the airport and Perth).
  - Tonkin Highway / Kelvin Road – Connections to and from Tonkin Highway north and south.
- Median and verge barriers.
- Principal Shared Path connecting to existing paths north on Tonkin Highway, including underpasses at ramps at the new intersections.

[1] https://www.mainroads.wa.gov.au/projects-initiatives/all-projects/

- Lighting and noise walls.
- Local urban design and landscaping opportunities.

Procurement commenced in late-2024 and is scheduled for Western Power relocation works on Hale Road to be commencing in early-2026, with construction works scheduled to commence thereafter by mid-2026.

Figure 4-2: Tonkin Highway Corridor Upgrades Project Map



Source: Main Roads WA (November 2025)

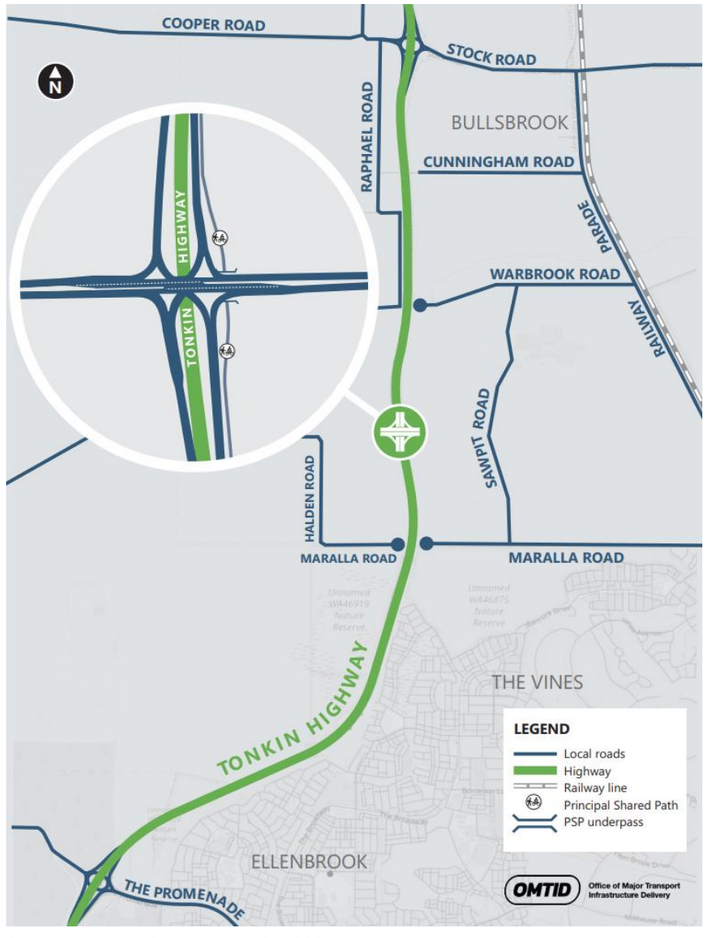
The Tonkin Highway Corridor Upgrades project would add three more drive-over structures on the proposed OSOM route, which would require adequate width and load rating to accommodate the proposed Twin Hills Wind Farm OSOM loads. It is assumed that these structures will be constructed to the same standard as the other drive-over structures on the Tonkin Highway corridor and thus be sufficiently designed to carry the proposed OSOM loads.

Tonkin Highway North Ellenbrook Interchange

As part of the land development in North Ellenbrook, there will be a new interchange on Tonkin Highway between Ellenbrook and Muchea. The project scope is shown in **Figure 4-3** and includes a grade separated interchange over Tonkin Highway.

The design and construction are scheduled to commence in 2026 and be completed in late-2027.

Figure 4-3: Tonkin Highway North Ellenbrook Interchange Project Map



Source: Main Roads WA (November 2025)

Similarly to the Tonkin Highway Corridor Upgrades project, the Tonkin Highway North Ellenbrook Interchange (THNEI) project would add a drive-over structure to the proposed OSOM route and is assumed be constructed to the same standard as the other drive-over structures on the Tonkin Highway corridor and thus be sufficiently designed to carry the proposed OSOM loads.

5 Analysis of Transport Network

5.1 Analysis of Development Accesses

The proposed development accesses have been assessed for a more conservative safe intersection sight distance (SISD) requirement in accordance with *Main Roads WA Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (July 2025). This has been adopted due to the size and amount of traffic that is expected to turn to and from each lot during the construction period. The minimum SISD required for a vehicle on the access road to view traffic on the major road at a viewing point measured 5.0m (absolute minimum of 3.0m) from the projected hold point is 300m for cars, based on a 2.5s reaction time, flat grade and 110km/h frontage road speed on a sealed pavement.

PJA conducted a site inspection of the proposed gate access locations where some of the access locations have been removed due to lot modifications. A site inspection summary is provided in **Appendix C** with sight distance findings for the accesses provided in **Table 5-1**.

Table 5-1: Development Access Sight Distance Assessment

Proposed Access Gate ID	Available SISD Looking Left	Available SISD Looking Right
1	Sufficient	Sufficient
2	Restricted by vegetation	Sufficient
3	Sufficient	Sufficient
6	Restricted by vegetation	Sufficient
7	Restricted by vegetation	Restricted by vegetation
8	Restricted by vegetation	Restricted by vegetation/crest
9	Sufficient	Restricted by vegetation
11	Sufficient	Sufficient
12	Sufficient	Sufficient
13	Sufficient	Sufficient
14	Sufficient	Sufficient
15	Sufficient	Sufficient

It is noted that the location of Gate 8 has since been revised by moving it further east (away from the crest) based on the findings and recommendations. The design of access crossovers is limited by the swept paths of OSOM loads. The required modifications to the crossovers for the inbound movements of the WTG blade loads have been marked up in the swept path analysis provided in **Appendix D**.

5.2 Impact on Surrounding Roads

The daily traffic volume on Three Springs-Eneabba Road (south of Turkey Flat/Kangaroo Road) was surveyed to be in the order of 100vpd (two-way) in October 2024. The *Killawarra Solar BESS & Substation* project accessing at Turkey Flat Road is anticipated to add around 90vpd onto Three Springs-Eneabba Road. With the addition of the anticipated traffic generation from the proposed *Twin Hills Wind Farm*, the two-way daily traffic volume could increase to around 510vpd. Furthermore, the two-way daily traffic volumes on Kangaroo Road and First North Road were estimated to be in the order of 10-20vpd, in which the proposed *Twin Hills Wind Farm* is anticipated to increase this to around 330vpd.

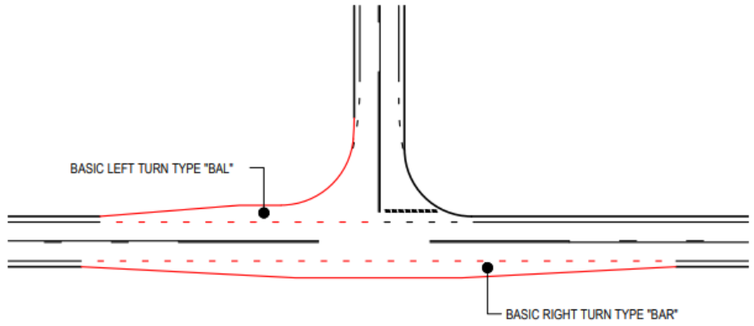
Austroads Guide to Road Design Part 3: Geometric Design indicates that Three Springs-Eneabba Road being designed with a sealed pavement width up to 9.0m and at least 1.0m wide unsealed shoulder, the design annual average daily traffic volume (AADT) accommodates up to 3,000vpd. Furthermore, the *ARRB Unsealed Roads Manual: Guidelines to Good Practice* indicates that existing width of the roads frontage the Site is appropriate for average daily traffic volumes greater than 150vpd. Therefore, upgrades to midblock sections of the surrounding road network to allow for an increase in capacity would not be necessary as the increase in traffic is still well within the design limits of these roads.

5.3 Impact on Intersections

The existing intersections identified in **Section 3.3** have been assessed using a swept path analysis for feasibility planning purposes to determine the necessary modifications required to accommodate the transport of the WTG components for the indicative vehicle types and configurations. The swept path analysis outputs are provided in **Appendix D**.

The traffic generated by the proposed development is not expected to have an adverse impact on the capacity and performance of intersections due to the existing low traffic volume on the surrounding local road network. However, where peak hour turning volumes are greater than 5vph, a rural basic left-turn (BAL) and/or basic right-turn (BAR) treatment is warranted under the *Main Roads WA Supplement to Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (AGTM6) to allow sufficient trafficable width for the design through vehicle to pass on the right (BAL) or left (BAR) of a stationary turning vehicle. In the peak construction stage and at peak hour commuter times, around 29vph and 69vph are anticipated to be turning left and right from Three Springs-Eneabba Road into Kangaroo Road, respectively. An example of rural BAL and BAR turning treatments are shown in **Figure 5-1**.

Figure 5-1: Example of BAL and BAR Turning Treatments



Source: Main Roads WA (October 2022)

It is noted that these treatments would only be required during Stage 1 of the project (24-26 months) and could be provided on a temporary basis during construction. There is potential for BAL to be designed with the new road connecting to Kangaroo Road and a BAR can be investigated at the existing Three Springs-Eneabba Road & Kangaroo Road intersection.

5.4 Road Safety

The travel of OSOM loads (applicable to the transportation of WTG components) would require obtaining 'OSOM Single Trip Permits' through an application to MRWA and comply with the *Main Roads WA Oversize Vehicle & Pilot Vehicle General Requirements Guideline* (October 2025).

The *Main Roads WA Heavy Vehicle Services* (HVS) branch typically requires a permit or order for a vehicle or vehicle combination exceeding any of the following limits.

- 2.5m in width, 4.3m in height and/or 12.5m in length for a rigid vehicle or 19m in length for a combination.
- 42.5t gross mass; 9t on a single axle; 6t on a single steer axle; 10t on a twin steer axle group (non-load sharing suspension); 11t on a twin steer axle group (load sharing suspension); 16.5t on a tandem axle group; 20t on a tri or quad axle group.

For the transportation of large indivisible loads (applicable to large equipment and machinery on low loader trailers), 'OSOM Class 1 RAV Period Permits' can also be obtained which allows for a vehicle and load to be up 5.5 metres in width, 5.5 metres in height and 40 metres in length and travel on a permit for a period of 12 months or 36 months.

The *Main Roads WA Movement of High Risk OSOM Vehicles Policy* (February 2026) classifies high-risk OSOM vehicle movements as follows.

- Exceeding 8.5m in width and/or 50m in length.
- Exceeding 3.5m in width and/or 26m in length that require access on or near a Freeway within the Metropolitan Area or exceeding 5.5m in width and/or 30m in length that require access into the Perth or Fremantle Central Zones.
- High-risk to other road users or is travelling on a particular road that is likely to cause excessive disruption to other road users.

With respect to the proposed turbine component delivery vehicle types, these would fall under the high-risk OSOM vehicle movement category and thus be required to move at night (in the Metropolitan Area) and with appropriate planning/approvals in accordance with the MRWA policy. The following restrictions also apply.

- Travel within the Metropolitan Area will only be approved between 9:30pm and 5:00am.
- Travel beyond the Metropolitan Area will not be approved until after sunrise, unless approval is granted subject to an OSOM transport management plan (OSOM-TMP), which will generally be under "rolling roadblock" arrangements.
  - The relevant exception to this applies to the sections of Tonkin Highway and Great Northern Highway from the Metropolitan Area boundary to the Muchea Road Train Assembly Area (RTAA), between 9:30pm and 5:00am.

High-risk OSOM vehicle movements also require a detailed route survey in alignment with the *Main Roads WA Oversize Vehicle Route Survey Audit Regime* (August 2025).

The roads surrounding/fronting the Site are approved on the RAV 7.1 network which permits truck and trailer combinations up to 36.5m in length under an AB-Triple (Prime Mover, Semi-trailer & B-double) combination or BA-Triple (B-double & Dog Trailer) combination with a maximum gross mass up to 115t under the *Main Roads WA Accredited Mass Management Scheme* (AMMS).

MRWA adopt a desirable 2.5s reaction time (minimum of 2.0s) when calculating sight distance requirements. Sight lines are measured from a driver's eye height of 2.4m for trucks, 1.1m for cars and 1.8m for buses to observe the top of a car (1.25m) in daytime or car headlights (0.65m) at nighttime. Braking on unsealed roads (Kangaroo Road, First North Road, Beekeepers Road and Skippers Road) reduces the coefficient of deceleration. The minimum stopping sight distance (SSD) for a driver to perceive, react and brake to a stop before reaching a hazard on the road ahead is 253m on a level grade for a design speed of 110km/h, reaction time of 2.5s and a coefficient of deceleration of 0.27 for an unsealed road.

5.5 Transport Management Plan

The *Main Roads WA Movement of High Risk OSOM Vehicles Policy* (February 2026) outlines the following requirements for a high-risk OSOM vehicle movement Transport Management Plan (OSOM-TMP).

- Positioning of the Traffic Escorts and Pilots to enable appropriate management of traffic.
- Details of any special arrangements for manoeuvring around road infrastructure.
- Pre-movement briefing procedure to ensure all parties are fully aware of their roles and responsibilities.
- Contingency plan in the event of poor visibility resulting from smoke or fog.
- Procedure for managing bridge crossings.
- Procedure for removing roadside furniture, such as signage or traffic signals.
- Procedure for managing any merging traffic.
- Procedure for managing vehicles stopped in emergency lanes or on the roadside.
- Procedure in the event of mechanical failure / breakdown.
- A clear schedule identifying stages of the movement and the time each stage is expected to be completed.
- A contingency plan in the event the stages have not been completed within the expected time.

An OSOM-TMP will be prepared as part of the later stages of the project once detail on the actual WTG components and the vehicle configurations required to transport are obtained.

6 OSOM Vehicle Route Survey

This section follows the *Main Roads WA OSOM Vehicle Route Survey Template*.

6.1 OSOM Vehicle and Loads

This route survey has been conducted for the vehicle and loads outlined in **Table 6-1**.

Table 6-1: Vehicle and Load Information

	WTG Blade	WTG Base Tower	WTG Top Tower
Load Description	100.0m L x 4.5m W x 4.2m H (30T)	10.0m L x 5.7m (diameter) (110T)	36.0m L x 4.3m (diameter) (80T)
Vehicle Configuration	Block Truck with 3x4 Extendable Blade Trailer	Prime Mover with 5x8 Low Loader and 5x8 Bookend Jinker	Block Truck with 5x8 Extendable Blade Trailer
Overall Width	4.5m	5.7m	4.3m
Overall Length	110.74m	31.94m	45.27m
Overall Height	5.06m	5.94m	5.29m
Ground Contact Width	Approx. 3.0m	Approx. 3.5m	Approx. 3.0m
Load Ground Clearance	Approx. 2.0m	Approx. 0.3m	Approx. 1.6m
Rear Overhang	Approx. 46m	0.0m	0.0m
Rear Projection	160-degree pitch (typical)	N/A	N/A

6.2 Route Details

This route survey has been conducted for the vehicle and load specified in **Section 6.1**, along the route outlined in **Table 6-2**.

Table 6-2: Route Details

Journey Start Location	Journey End Location
Australian Marine Complex (AMC) Western Australia, Henderson	Kadathinni (Shire of Three Springs)

Road Name	From	To
Quill Way	SLK 1.22 (AMC Henderson)	SLK 2.05 (Cockburn Road)
Cockburn Road	SLK 1.49 / 0.00 (Quill Way)	SLK 4.81 / 1.57 (Rockingham Road)
Rockingham Road	SLK 17.00 (Cockburn Road)	SLK 20.62 (Thomas Road)
Thomas Road	SLK 0.04 (Rockingham Road)	SLK 18.50 (Tonkin Highway)
Tonkin Highway	SLK 1.33 (Thomas Road)	SLK 81.25 (Off-Ramp to Brand Highway)
Tonkin Highway Off-Ramp to Brand Highway	SLK 0.00 (Tonkin Highway)	SLK 0.32 (Brand Highway)
Brand Highway	SLK 0.24 (Off-Ramp to Brand Highway)	SLK 225.04 (Three Springs-Eneabba Road)
Three Springs – Eneabba Road	SLK 0.00 / 23.85 (Brand Highway)	SLK 22.06 / 39.94 (Kangaroo Road)
Kangaroo Road	SLK 0.00 (Three Springs–Eneabba Road)	SLK 16.00 (First North Road)
First North Road	SLK 0.00 (Kangaroo Road)	SLK 8.10 (Skippers Road)
Beekeepers Road	SLK 0.00 (First North Road)	SLK 2.59 (Site Access)

6.3 Road Width and Roadside Impediments

There is sufficient road width along the route specified in **Section 6.2** to accommodate the vehicle and load specified in **Section 6.1**, except for the pinch points outlined in **Table 6-3**.

Table 6-3: Road Width and Roadside Impediments

Pinch Point	Procedure
AMC Access & Quill Way (Intersection)	Right-turn onto Quill Way using centre of roadway – utilising rear steering axle (as required)
Quill Way & Cockburn Road (Intersection)	Contraflow direction approach to right-turn onto Cockburn Road with-flow mounting central median – utilising rear steering axle (as required)
Cockburn Road Horizontal Curves (Lateral Clearance)	With-flow/contraflow travel to negotiate curves – utilising rear steering axle (as required)
Cockburn Road & Rockingham Road (Intersection)	With-flow right-turn onto Rockingham Road – utilising rear steering axle (as required)
Rockingham Road & Thomas Road (Intersection)	With-flow approach and right-turn onto Thomas Road in contraflow direction and return to with-flow direction – utilising rear steering axle (as required)
Thomas Road & Central Avenue / Treeby Road (Intersection)	With-flow through movement mounting roundabout – utilising rear steering axle (as required)
Thomas Road & Nicholson Road (Intersection)	With-flow approach in left-turn lane and undertake through movement mounting lane dividing median and roundabout – utilising rear steering axle (as required)
Thomas Road & Kargotich Road (Intersection)	With-flow through movement mounting roundabout – utilising rear steering axle (as required)
Thomas Road & Tonkin Highway* (Intersection)	TBC – with-flow left-turn onto Tonkin Highway in contraflow direction and return to with-flow direction– utilising rear steering axle (as required)
Brand Highway & Three Springs-Eneabba Road (Intersection)	Contraflow right-turn onto Three Springs-Eneabba Road left-turn lane and return to with flow direction – utilising rear steering axle (as required)
Three Springs-Eneabba Road & Kangaroo Road (Intersection)	Construction of new road - with-flow left-turn onto Kangaroo Road – utilising rear steering axle (as required)
Kangaroo Road & First North Road (Intersection)	With-flow left/right-turn onto First North Road – utilising rear steering axle (as required)

**Intersection under construction*

In addition to the above, the proposed access gates to the *Twin Hills Wind Farm* sites will require movements to approach in the contraflow direction for left-turn movements and the with-flow direction for right-turn movements. Appropriate modification and design of the accesses will be undertaken as part of the development site establishment phase.

6.4 Swept Paths

AutoTrack Swept Paths have been conducted for the intersections specified in **Section 6.2** and the pinch points specified in **Section 6.3** using *AutoTURN Pro 2025 v12* software with the following parameters.

- Design vehicle: Block Truck with 3x4 Extendable Blade Trailer (with rear steering axle) carrying 100m long WTG Blade
- Design speed: 5km/h
- Body and load clearance: 500mm (for conservative planning purposes noting that RAVs only require 200mm clearance for non-mountable kerbing or objects)

A copy of the swept path analysis is provided in **Appendix D**.

The indicative modifications likely to be required are summarised in **Section 7**.

6.5 Height Clearances

For the structures identified in **Section 3.5**, there is a minimum 300mm safety buffer between the highest part of the load and all overhead structures, without requiring the load to be lowered, on the route specified in **Section 6.2**, except for the pinch points outlined in **Table 6-4**.

Table 6-4: Height Clearance Pinch Points

Pinch Point	Procedure
MRWA Asset No. 1345 (Roe Highway Bridge over Tonkin Highway) - Max. loaded height: 5.73m	Travel with-flow on Tonkin Highway off-ramp to Roe Highway and travel through intersection from the right-turn lanes onto the Tonkin Highway on-ramp
MRWA Asset No. 1727 (Dunreath Road Bridge over Tonkin Highway) - Max. loaded height: 5.73m	Travel with-flow on Tonkin Highway off-ramp to Dunreath Drive and travel through intersection (tracking over roundabout bulb) onto the Tonkin Highway on-ramp

The identified height clearance pinch points are applicable to the base tower section only, where the anticipated loaded height is 5.94m.

6.6 Power Lines

Overhead power lines identified along the route specified in **Section 6.2** are provided in **Section 3.7**. Western Power and Horizon Power approval will be obtained as part of the OSOM-TMP to determine any locations where the power line height is insufficient for an OSOM vehicle movement to be undertaken. Typically, a *Western Power* escort would be required with two (2) line lifts to allow an OSOM vehicle to bypass under the overhead power line.

Low hanging overhead power lines were observed at the following approximate locations:

- Kangaroo Road SLK 11.25
- First North Road SLK 1.72
- Beekeepers Road SLK 0.40
- Beekeepers Road SLK 1.86

In addition to the identified low overhead power lines, an overhead power line to the left (northeast) of Gate 3 over Three Springs-Eneabba Road was observed. The height clearance appeared to be sufficient for the loaded height. However, this would need to be confirmed prior to the movement of OSOM loads in this area.

6.7 Road Information

Road Information tables have been checked as part of the route survey and will be checked on the day of the movement, prior to commencement. There are no RAV network conditions applicable to the route.

7 Identified Issues

The identified issues and mitigation measures are summarised in **Table 7-1**.

Table 7-1: Summary of Identified Issues and Mitigation Measures

ID	Location	Action(s) Required	Stakeholders
1	Henderson AMC & Quill Wy	• Remove existing temporary fencing	AMC
2	Cockburn Rd & Quill Wy	• Approx. 40m² hardstand required for wheel tracking area • R1-2 sign to be made removable • 4x light posts to be relocated • 3x traffic signal post clearance to be checked • R4-1 sign clearance to be checked • G9-15 & R2-3(L) signs to be made removable	MRWA / Western Power
3	Cockburn Rd Horizontal Curves	• Vegetation pruning required (x2)	City of Cockburn
4	Rockingham Rd & Cockburn Rd	• Approx. 180m² hardstand required for wheel tracking area • Traffic signal pole clearance to be checked • 2x R4-1 sign clearance to be checked • MR-GE-11(L) sign clearance to be checked • Vegetation pruning required	MRWA / City of Cockburn
5	Rockingham Rd & Thomas Rd	• Approx. 180m² hardstand required for wheel tracking area • Approx. 220m² hardstand required for wheel tracking area • Approx. 350m² hardstand required for wheel tracking area • Approx. 310m² hardstand required for wheel tracking area • R5-35(R) sign to be made removable • Traffic signal pole clearance to be checked • R1-2 sign clearance to be checked • 2x Light pole arm clearance to be checked	MRWA / Western Power
6	Thomas Rd & Central Av / Treeby Rd	• Approx. 180m² hardstand required for wheel tracking area • Approx. 150m² hardstand required for wheel tracking area • Approx. 16m² hardstand required for wheel tracking area • R1-3 sign clearance to be checked • D4-1-1(L) sign to be made removable	MRWA
7	Thomas Rd & Nicholson Rd	• Approx. 35m² hardstand required for wheel tracking area • R1-3 sign to be made removable • MR-WDAD-5C & MR-GS-4 sign clearance to be checked • Light post clearance to be checked • D4-1-1(L) sign to be made removable	MRWA / Western Power
8	Thomas Rd & Kargotich Rd	• Approx. 90m² hardstand required for wheel tracking area • D4-1-1(L) sign to be made removable	MRWA
9	Tonkin Hwy & Thomas Rd (Under Construction)	• Approx. 250m² hardstand required for wheel tracking area	MRWA
10	Roe Highway Bridge over Tonkin Highway	• Maximum loaded height: 5.73m • Route redirection via Tonkin Highway off-ramp to Roe Highway and travel through intersection from the right-turn lanes onto the Tonkin Highway on-ramp	MRWA
11	Dunreath Road Bridge over Tonkin Highway	• Maximum loaded height: 5.73m • Route redirection via Tonkin Highway off-ramp to Dunreath Drive and travel through intersection (tracking over roundabout bulb) onto the Tonkin Highway on-ramp • *Tathra Route Survey: approx. 220m² hardstand required, 2x signs to be made removeable and bollards to be removed.*	MRWA
12	Brand Hwy & Three Springs-Eneabba Rd	• 1x tree to be removed/pruned to required ground clearance of blade rear overhang • Approx. 180m² hardstand required for wheel tracking area • R2-3(L) sign to be made removable • W5-35(L) & W8-26 signs to be made removable • Double sided light post to be relocated • R1-2 sign clearance to be checked • Light post clearance to be checked	MRWA / Western Power / Shire of Carnamah
13	Three Springs-Eneabba Road (approx. SLK 28.3)	• Overhead power line clearance to be checked and provision of high wire escorts may be required	Western Power
14	Three Springs-Eneabba Rd & Kangaroo Rd	• Vegetation pruning required (approx. 1,450m²) • Approx. 1,970m² hardstand required for wheel tracking area	Shire of Three Springs
15	First N Rd & Kangaroo Rd	• Vegetation pruning required (approx.960m²) • Unsealed pavement load stability to be checked	Shire of Three Springs
16	Kangaroo Road SLK 11.25	• Overhead power line clearance to be checked and provision of high wire escorts may be required	Western Power
17	Gate 3 - Turbine Component Access	• 1x tree to be removed/pruned to required ground clearance of blade rear overhang • Approx. 365m² hardstand required for wheel tracking area • Approx. 300m² hardstand required for wheel tracking area	Shire of Three Springs
18	Gate 14 - Turbine Component Access	• 1x tree to be removed/pruned to required ground clearance of blade rear overhang • Approx. 470m² hardstand required for wheel tracking area • Approx. 560m² hardstand required for wheel tracking area • 3x tree to be removed/pruned to required ground clearance of blade rear overhang	Shire of Three Springs
19	Gate 15 - Turbine Component Access	• Approx. 280m² hardstand required for wheel tracking area • Approx. 40m² hardstand required for wheel tracking area	Shire of Three Springs
20	Gate 6 - Turbine Component Access	• Approx. 185m² hardstand required for wheel tracking area	Shire of Three Springs
21	Gate 7 - Turbine Component Access	• Approx. 165m² hardstand required for wheel tracking area • Approx. 175m² hardstand required for wheel tracking area • 1x tree to be removed/pruned to required ground clearance of blade rear overhang • Vegetation to be removed/pruned to satisfy sight distance requirements	Shire of Three Springs
22	Gate 8 - Turbine Component Access	• Approx. 420m² hardstand required for wheel tracking area • Vegetation to be removed/pruned to satisfy sight distance requirements (both sides)	Shire of Three Springs
23	Gate 9 - Turbine Component Access	• Approx. 200m² hardstand required for wheel tracking area • Approx. 565m² hardstand required for wheel tracking area	Shire of Three Springs
24	Gate 11 - Potential Turbine Component Access	• Approx. 200m² hardstand required for wheel tracking area	Shire of Three Springs

In comparison to the identified issues within the *Tathra Wind Farm Route Survey* (Ares Group, May 2025) for transporting a 90m WTG blade, the additional impacts caused by transporting a 100m WTG blade are summarised as follows, although it is noted that some signage had been flagged for removal by *Ares Group* but does not appear to be at that location upon PJA's review:

- Cockburn Road & Quill Way: construction of approx. 40m^2 hardstand, relocation of 2x light posts, clearance checks of 3x traffic signal posts.
- Rockingham Road & Cockburn Road: construction of approx. 130m^2 hardstand, clearance checks of 3x traffic signal posts and 3x signs, and vegetation pruning.
- Rockingham Road & Thomas Road: construction of approx. 330m^2 hardstand, removal of 1x sign, clearance checks of 2x traffic signal posts, 1x sign and 2x light posts.
- Thomas Road & Central Avenue / Treeby Road: construction of approx. 60m^2 hardstand, clearance checks of 1x sign.
- Thomas Road & Nicholson Road: removal of 1x sign and clearance checks of 1x light post and 2x signs. Note a lesser hardstand of approx. 135m^2 is required due to a different route procedure.
- Thomas Road & Kargotich Road: construction of approx. 20m^2 hardstand.
- Tonkin Highway & Thomas Road (Under Construction): note a potential lesser impact with intersection under construction.
- Brand Highway & Three Springs-Eneabba Road: relocation of 1x light post (double sided), removal/pruning of 1x tree and clearance checks for 1x light post and 1x sign. Note a lesser hardstand of approx. 40m^2 may be required.

8 Conclusions & Recommendations

The key findings relating to the *Transport Impact Statement* (TIS) and Route Survey prepared to support a development application (DA) for the proposed Twin Hills Wind Farm are summarised as follows.

a A total of 93 wind turbine generators (WTGs) and associated infrastructure is proposed to be developed across multiple lots in Kadathinni/Arrowsmith East within the *Shire of Three Springs* local government authority (LGA) in the Mid-West region of Western Australia, approximately 35km northeast of the Eneabba townsite and 260km north radially of the Perth CBD.

b The project is scheduled to undergo a combined site establishment and construction period over 24 to 26-months from 2027, followed by operations and maintenance over a 25-year design life in which the WTGs will be decommissioned over a 12-month period by approximately 2055. The standard working hours during construction are proposed to be 7am to 7pm (Monday to Saturday) and 9am to 7pm on Sunday (excluding Public Holidays).

c Each lot is proposed with two access locations, where a minimum of one functioning as an operational access and a secondary access for bushfire egress as required. The sight lines and available sight distance at the accesses are generally satisfied, noting that vegetation clearing is required at some locations and that the design of access crossovers is limited by the movements of heavy vehicles and over size over mass (OSOM) loads.

d A new road is proposed to the west of the Three Springs-Eneabba Road and Kangaroo Road intersection to improve the left-turn geometry. There is no other road upgrades required as part of this DA.

e There are three (3) MRWA current/future projects on Tonkin Highway that may affect transport during the construction stages.

f The WTG components are proposed to be transported from the *Australian Marine Complex* (AMC) *Western Australia* located in Henderson to the Site via Cockburn Road, Rockingham Road, Thomas Road, Tonkin Highway, Brand Highway and Three Springs-Eneabba Road. The longest vehicle type assessed as part of the Route Survey is a block truck with a 3x4 extendable blade trailer carrying a 100m long WTG blade where the overall vehicle length is around 111m. The widest and highest load is a prime mover with a 5x8 low loader and 5x8 bookend jinker carrying the WTG tower base section where the overall dimensions are 31.94m L x 5.7m W x 5.94m H.

g There are two drive-under structures that have insufficient height clearance for the WTG tower base section to be transported. These are MRWA Asset No. 1345 (Roe Highway Bridge over Tonkin Highway) and MRWA Asset No. 1727 (Dunreath Road Bridge over Tonkin Highway) where the maximum loaded height is 5.73m. Therefore, the loads are expected to utilise the off-ramps to pass over the structure.

h There are several overhead power lines located along the route, with the locations most likely to require a *Western Power* escort are Kangaroo Road (SLK 11.25), First North Road (SLK 1.72), Beekeepers Road (SLK 0.40) and Beekeepers Road (SLK 1.86).

i There is one existing railway level crossing on the proposed access route located on Brand Highway at SLK 220.56, where prior approval from *Arc Infrastructure* may be required.

j There are twelve (12) pinch points identified along the proposed OSOM route which require modifications to accommodate a 100m long WTG blade, as identified within the swept path analysis conducted. However, the project team are considering the commission of an 85m long WTG blade, in which the route would typically be covered by the modifications required by the 90m long WTG blade adopted for the *Tathra Wind Farm*.

k OSOM loads would require an 'OSOM Single Trip Permits' through an application to MRWA and large indivisible loads may require 'OSOM Class 1 RAV Period Permits' to travel to Site.

l It is estimated that the Site would generate in the order of 450 personnel on site with a total traffic generation during the peak construction stage of 320vpd (two-way), of which 195vpd would be light vehicle trips and 125vpd would be HV/OSOM trips. The typical traffic generation is anticipated to reduce to 24vpd (two-way) or 12vph in the peak hour during the 25-year operations and maintenance stage, then generate around 149vpd (two-way) or 65vph in the peak hour during the 12-month decommissioning stage.

m The traffic generated by the Site and the adjacent *Killawarra Solar BESS & Substation* project is anticipated to increase the two-way daily traffic volume on Three Springs-Eneabba Road from 100vpd to around 510vpd. Furthermore, the two-way daily traffic volumes on Kangaroo Road and First North Road are anticipated to increase from 10-20vpd to around 330vpd.

n In the peak construction stage and at peak hour commuter times, around 29vph and 69vph are anticipated to be turning left and right from Three Springs-Eneabba Road into Kangaroo Road, respectively. In which a rural basic left-turn (BAL) and basic right-turn (BAR) treatment would be warranted and could be designed as part of the proposed new road between Three Springs-Eneabba Road and Kangaroo Road.

o The minimum safe intersection sight distance (SISD) required for a vehicle on the access road to view traffic on the major road at a viewing point measured 5.0m (absolute minimum of 3.0m) from the projected hold point is 300m for cars, based on a 2.5s reaction time and 110km/h frontage road speed on a sealed pavement.

p The minimum stopping sight distance (SSD) for a driver to perceive, react and brake to a stop before reaching a hazard on the road ahead is 253m on a level grade for a design speed of 110km/h, reaction time of 2.5s and a coefficient of deceleration of 0.27 for an unsealed road.

Appendix A WAPC Individual Development TIS Checklist

ITEM	PROVIDED	COMMENTS/PROPOSALS
Proposed Development		
Existing Land Uses	☑ Section 3.1	
Proposed Land Use	☑ Section 2.1	
Context With Surrounds	☑ Section 4	
Vehicular Access and Parking		
Access Arrangements	☑ Section 2.3	
Public, Private, Disabled Parking Set Down/Pick Up	☑ Section 2.3	
Service Vehicles (Non-Residential)		
Access Arrangements	☑ Section 2.3	
On/Off-Site Loading Facilities	☑ Section 2.3	
Service Vehicles (Residential)	N/A	
Rubbish Collection and Emergency Vehicle Access		
Hours Of Operation (Non-Residential Only)	☑ Section 2.2	
Traffic Volumes		
Daily Or Peak Traffic Volumes	☑ Section 2.7	
Type Of Vehicles (For Example, Cars, Trucks)	☑ Section 2.6	
Traffic Management on Frontage Streets	☑ Section 3.2	
Public Transport Access	N/A	
Nearest Bus/Train Routes		
Nearest Bus Stops/Train Stations		
Pedestrian/Cycle Links to Bus Stops/Train Station		
Pedestrian Access/Facilities	N/A	
Existing Pedestrian Facilities Within the Development (If Any)		
Proposed Pedestrian Facilities Within Development		
Existing Pedestrian Facilities on Surrounding Roads		
Proposals To Improve Pedestrian Access		
Cycle Access/Facilities	N/A	
Existing Cycle Facilities Within the Development (If Any)		
Proposed Cycle Facilities Within Development		
Existing Cycle Facilities on Surrounding Roads		
Proposals To Improve Cycle Access		
Site Specific Issues	☑ Section 7	
Safety Issues	☑ Section 5.4	
Identify Issues	☑ Section 7	
Remedial Measures	☑ Section 7	

Appendix B Proposed Development Plans

Appendix C Site Visit Assessment

Appendix D Swept Path Analysis

Appendix E Traffic Generation Analysis

Reference Project	Tathra (WA)	Parron (WA)	Marri (WA)	Yathroo (WA)	Kings Rock (WA)	Bowmans Creek (VIC)
Total WTGs	140	79	82	65	30	60
Staff	200	400	450	450	150	
Light Vehicles (Two-Way)	266	133	80		25-50	150
Buses (Two-Way)		32				
Heavy Vehicles (Two-Way)	144	25-50	197		10-25	132
OSOM (Two-Way)		5-10	8		1-5	
Total Daily Traffic Generated (Two-Way)	**410**	**275-305**	**285**	**104**	**36-80**	**282**
Total per WTG	2.93	3.48-3.86	3.48	1.60	1.20-2.67	4.70
Total per Staff	2.05	0.69-0.76	0.63	0.23	0.24-0.53	
HV/OSOM per WTG	1.03	0.38-0.76	2.40		0.37-0.83	2.20
Staff per WTG	1.43	5.06	5.49	6.92	5.00	

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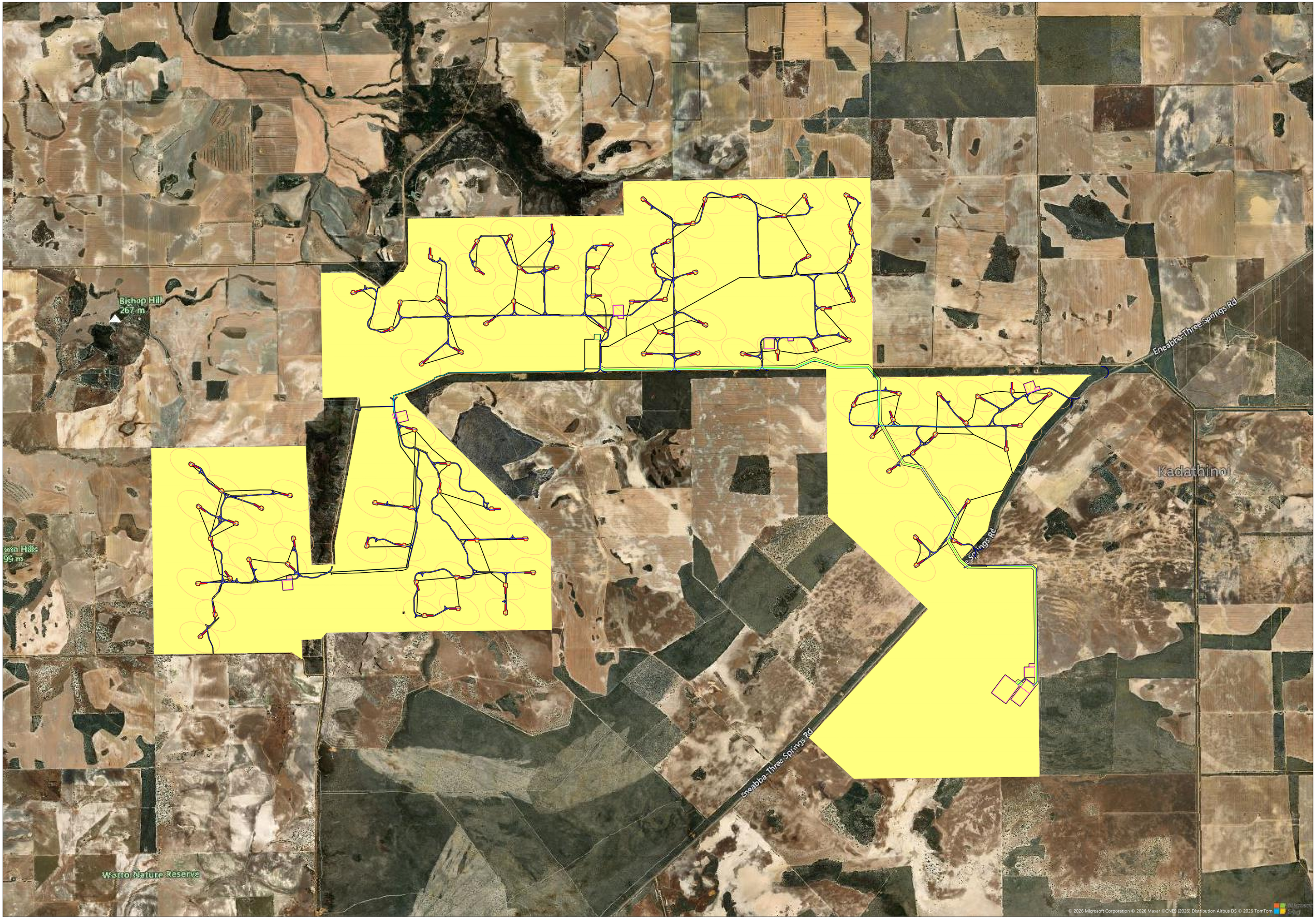
Bishop Hill
267 m
Eneabba-Three Springs Rd
Kadathinni
Springs Rd
Eneabba-Three Springs Rd
Warro Nature Reserve
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Site Visit Note

Project: Twin Hills Wind Farm, Eneabba

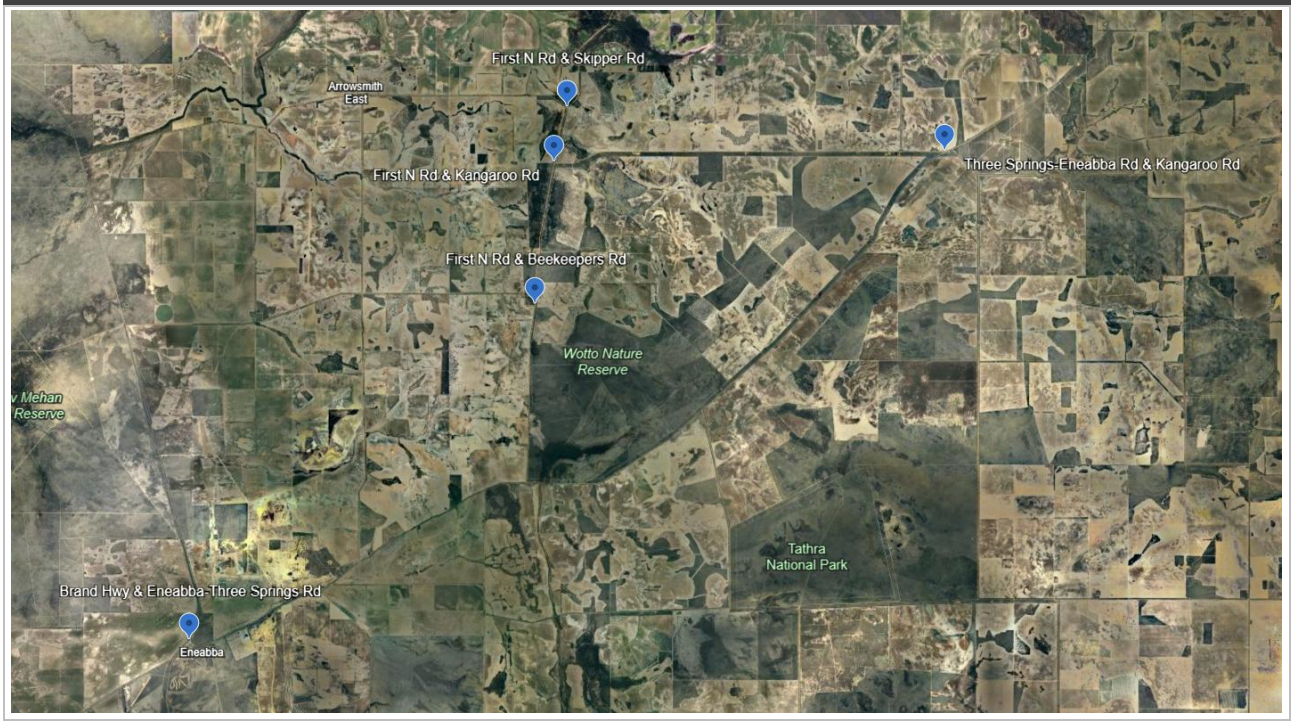
Subject: Site Visit Inspection Summary

Client:	Twin Hills Wind Farm Pty Ltd	**Version:**	B
Project No:	08752	**Attendees:**	Rodney Ding & Cameron Steel
Date of Inspection:	01/04/2026	**Weather Conditions:**	Sunny

Road Sections Inspected

- Three Springs-Eneabba Road
- Kangaroo Road
- First North Road
- Beekeepers Road
- Skippers Road

Intersections Inspected



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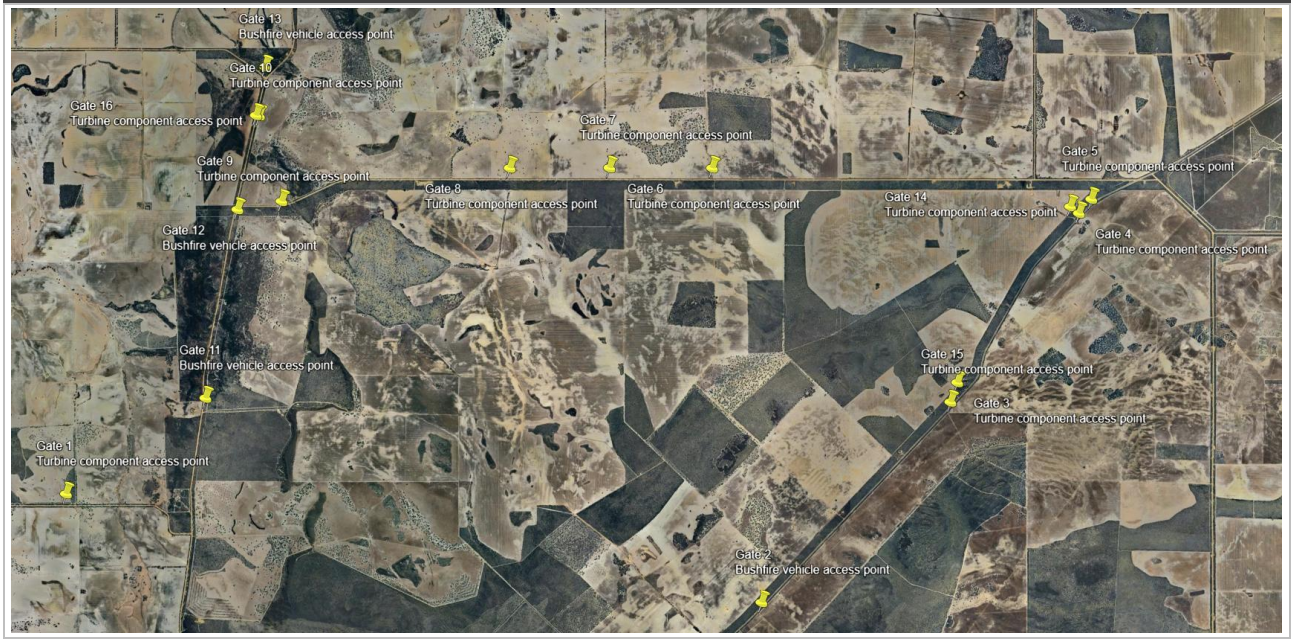
Access Gates Inspected



Section Reference	Location Reference	GPS Coordinates
1	Brand Highway & Three Springs-Eneabba Road Intersection	29°48'51"S 115°16'00"E
2	Three Springs-Eneabba Road & Kangaroo Road Intersection	29°38'25"S 115°34'33"E
3	Kangaroo Road & First N Road Intersection	29°38'23"S 115°25'14"E
4	First N Road & Beekeepers Road Intersection	29°41'30"S 115°24'45"E
5	First N Road & Skippers Road Intersection	29°37'11"S 115°25'34"E
6	Gate 1 (Bushfire Egress)	29°41'13"S 115°23'20"E
7	Gate 2 (Bushfire Egress)	29°42'15"S 115°30'57"E
8	Gate 3 (Turbine Component Access)	29°40'10"S 115°33'05"E
9	Gate 4 (Turbine Component Access) – removed from DA	29°38'33"S 115°34'25"E
10	Gate 5 (Turbine Component Access) – removed from DA	29°38'25"S 115°34'33"E
11	Gate 6 (Turbine Component Access)	29°38'08"S 115°30'24"E
12	Gate 7 (Turbine Component Access)	29°38'08"S 115°29'17"E
13	Gate 8 (Turbine Component Access) – relocated since visit	29°38'08"S 115°28'12"E
14	Gate 9 (Turbine Component Access)	29°38'27"S 115°25'42"E
15	Gate 10 (Turbine Component Access)	29°37'38"S 115°25'27"E
16	Gate 11 (Turbine Component Access)	29°40'19"S 115°24'52"E
17	Gate 12 (Bushfire Egress)	29°38'31"S 115°25'13"E
18	Gate 13 (Bushfire Egress)	29°37'10"S 115°25'31"E
19	Gate 14 (Turbine Component Access)	29°38'30"S 115°34'19"E
20	Gate 15 (Turbine Component Access)	29°40'21"S 115°33'00"E
21	Gate 16 (Turbine Component Access)	29°37'38"S 115°25'25"E

1 Brand Highway & Three Springs-Eneabba Road Intersection

Location: Brand Highway & Three Springs-Eneabba Road Intersection

F1.1: Three Springs-Eneabba Road Left-Turn Approach to Brand Highway Facing West on Southern Verge

Notes:

- Steep batter slope on inside of curve
- Stormwater drainage swale on verge

F1.2: Three Springs-Eneabba Road Left-Turn Approach to Brand Highway Facing West on Splitter Island

Notes:

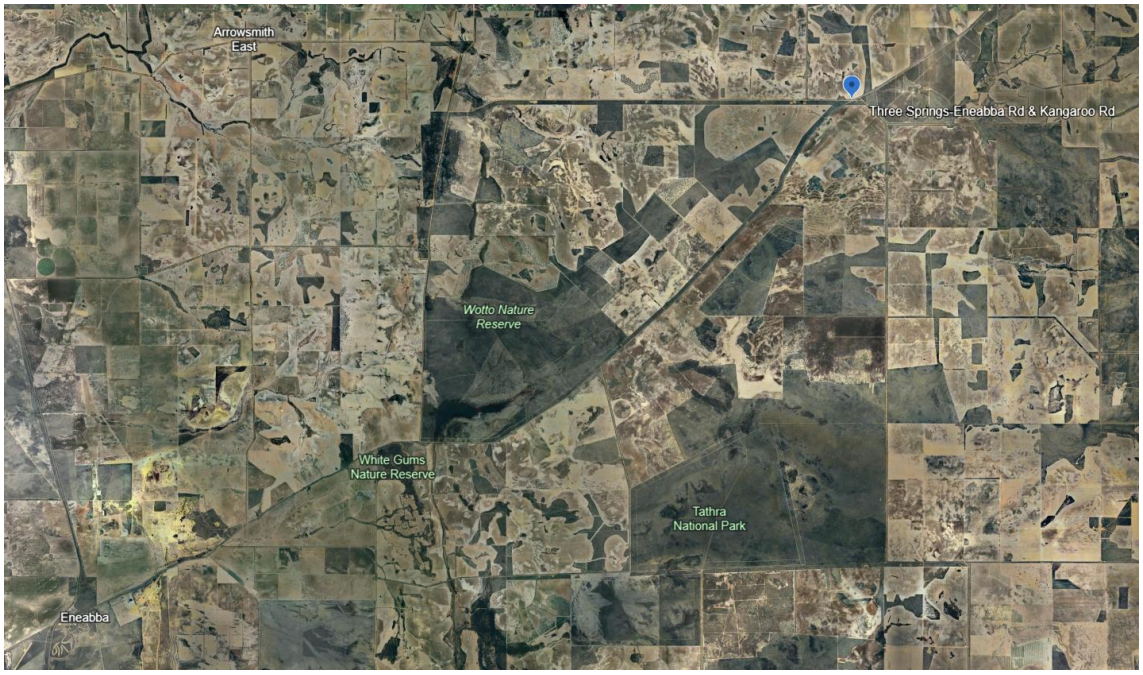
- Semi-mountable kerbing on splitter island
- Road signs and lighting present

F1.3: Brand Highway Facing South from Three Springs-Eneabba Road Splitter Island Centre	F1.4: Brand Highway Facing South from Three Springs-Eneabba Road Splitter Island Nose
	
Notes: • Road signs and lighting present	**Notes:** • Road signs and lighting present
F1.5: Brand Highway Facing North from Three Springs-Eneabba Road Splitter Island Centre	**F1.6: Three Springs-Eneabba Road Southern Verge Facing East**
	
Notes: • Road signs and lighting present	**Notes:** • Road signs and lighting present

F1.7: Three Springs-Eneabba Road Facing East from Southern Verge	F1.8: Brand Highway Western Verge Facing South
	
Notes: • Road lighting on southern verge within 1m of road edge	**Notes:** • Vegetation typically <1m high from road level • Some vegetation >2m located within 10m from the road edge
F1.9: Brand Highway Facing North from Western Verge	**F1.10: Brand Highway Facing South from Western Verge**
	
Notes: • Vegetation typically <1m high	**Notes:** • Vegetation typically <1m high from road level • Some vegetation >2m located within 10m from the road edge

2 Three Springs-Eneabba Road & Kangaroo Road Intersection

Location:



F2.1: Kangaroo Road Facing Three Springs-Eneabba Road

Notes:

- Acute angle turn from Three Springs-Eneabba Road

F2.2: Kangaroo Road From Three Springs-Eneabba Road

Notes:

- Wide unsealed road

F2.3: Indicative Area of New Road Alignment

Notes:

- Dense vegetation

F2.3: Indicative Area of New Road Alignment

Notes:

- Dense vegetation

3 Kangaroo Road & First N Road Intersection

Location:

F3.1: Kangaroo Road Approach Looking Left (South)

Notes:

- Adequate sight lines
- Sufficient sight distance

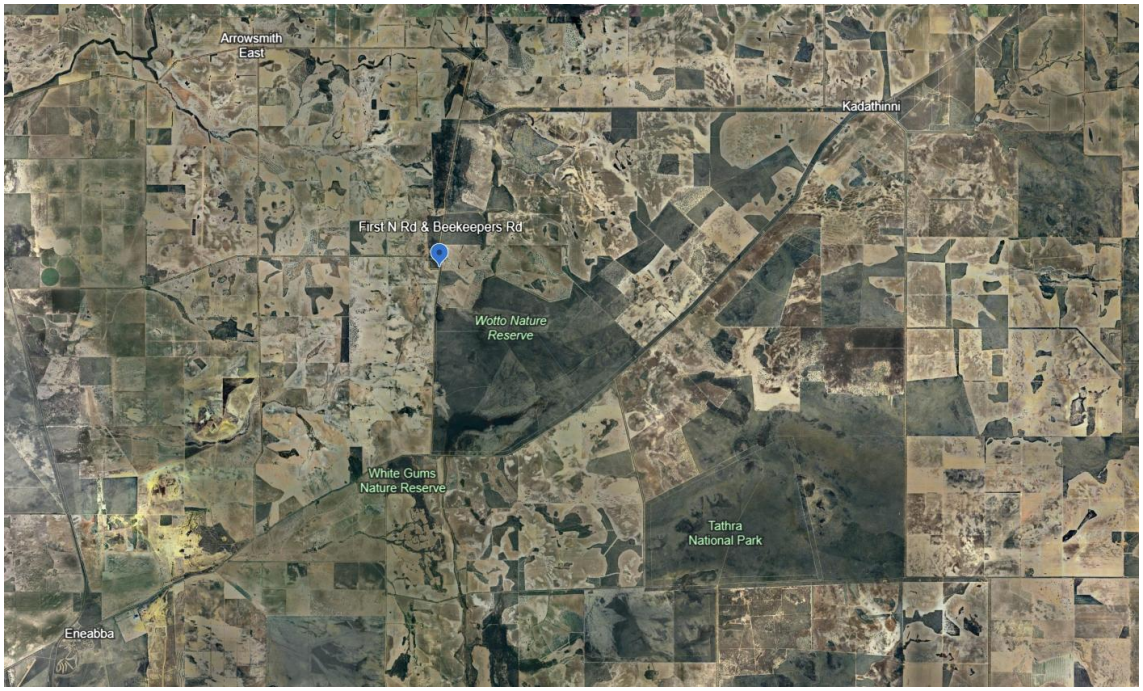
F3.2: Kangaroo Road Approach Looking Right (North)

Notes:

- Adequate sight lines
- Sufficient sight distance

4 First N Road & Beekeeper Road Intersection

Location:



F4.1: Beekeeper Road Approach Looking Left (North)

Notes:

- Sight lines restricted by vegetation
- Removal/pruning required to satisfy sight distance requirements

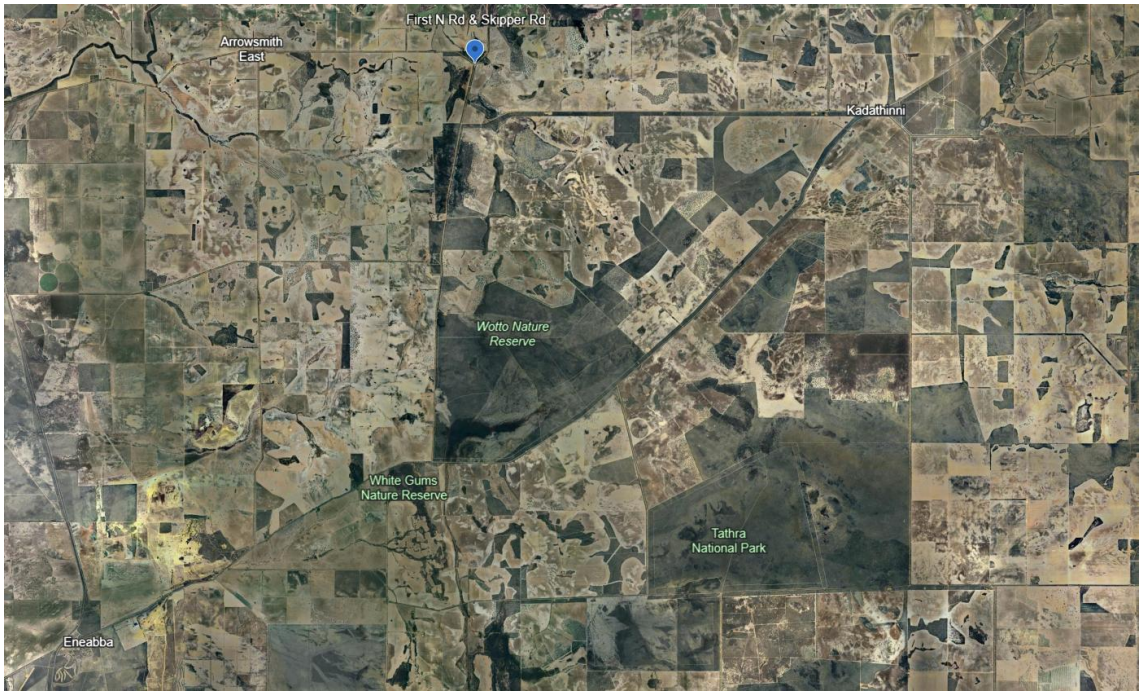
F4.2: Beekeeper Road Approach Looking Right (South)

Notes:

- Sight lines restricted by vegetation
- Removal/pruning required to satisfy sight distance requirements

5 First N Road & Skipper Road Intersection

Location:



F5.1: Skipper Road Facing First North Road

Notes:

- Signs and vegetation >1m high may require removal/pruning