TRAFFIC MANAGEMENT PLAN

23-047 TARONG WEST WIND FARM

Prepared for:

RES AUSTRALIA PTY LTD

icubed consulting

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Travis Smith
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STATEMENT OF LIMITATION

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1 Introduction

icubed consulting were commissioned by RES Australia Pty Ltd (RES) to develop a Traffic Management Plan, to be included with a development application under the provisions of the Queensland State Code 23 - Wind Farm Development Code, for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot in Queensland.

This report details the overarching vehicle movement planning in accordance with the project requirements and relevant standards. An evaluation of public vehicular and pedestrian traffic, and construction worker hazard exposure will be conducted.

This report has been produced for Development Application to the State Assessment and Referral Agency (SARA) in consultation with South Burnett Regional Council (SBRC) and Department of Transport and Main Roads (TMR). Once the project reaches the detailed design stage of works and a contractor has been engaged, the results of this report should be re-assessed to either confirm the impact results or provide amended outcomes.

1.1 Limits of Report

The above tasks have been carried out based on information supplied by other members of the Project team, together with observations on site and information from relevant authorities. These are detailed in the report.

While icubed has taken care in the preparation of this report, it neither accepts liability nor responsibility whatsoever in respect of:

- Any use of this report by any third party
- Any third party whose interests may be affected by any decision made regarding the contents of this report.

2 Existing Conditions

2.1 Site Location

The subject site is located at Ironpot Road, Ironpot, and is described as:

- Lots 4 and 7 on RP890694
- Lot 36 on BO236
- Lot 6 on BO250
- Lot 5 on BO330
- Lot 44 on FTZ37207
- Lot 43 on FTZ237338
- Lots 60, 62 and 63 on BO188
- Lots 64, 66 and 93 on BO190
- Lot 67 on BO490
- Lot 68 on RP800291
- Lot 10 on SP168643
- Lot 29 on BO243.

The main proposed access point for the site is from Jumma Road and Ironpot Road, accessed via:

- Mannuem Road, off the Bunya Highway for OSOM vehicles only
- Nords Road and Red Tank Road, off the Bunya Highway for all non-OSOM vehicles approaching from the South (Brisbane, Toowoomba, Dalby and surrounding towns).
- Nords Road and Red Tank Road, off the Bunya Highway for all heavy vehicles approaching from the East (Kingaroy and surrounding towns)
- The Bunya Highway for light vehicles approaching from the East (Kingaroy and surrounding towns)

Other internal access locations include a second entry off Ironpot Road to the West of the site, for all vehicles. These access locations are shown in Figure 1.

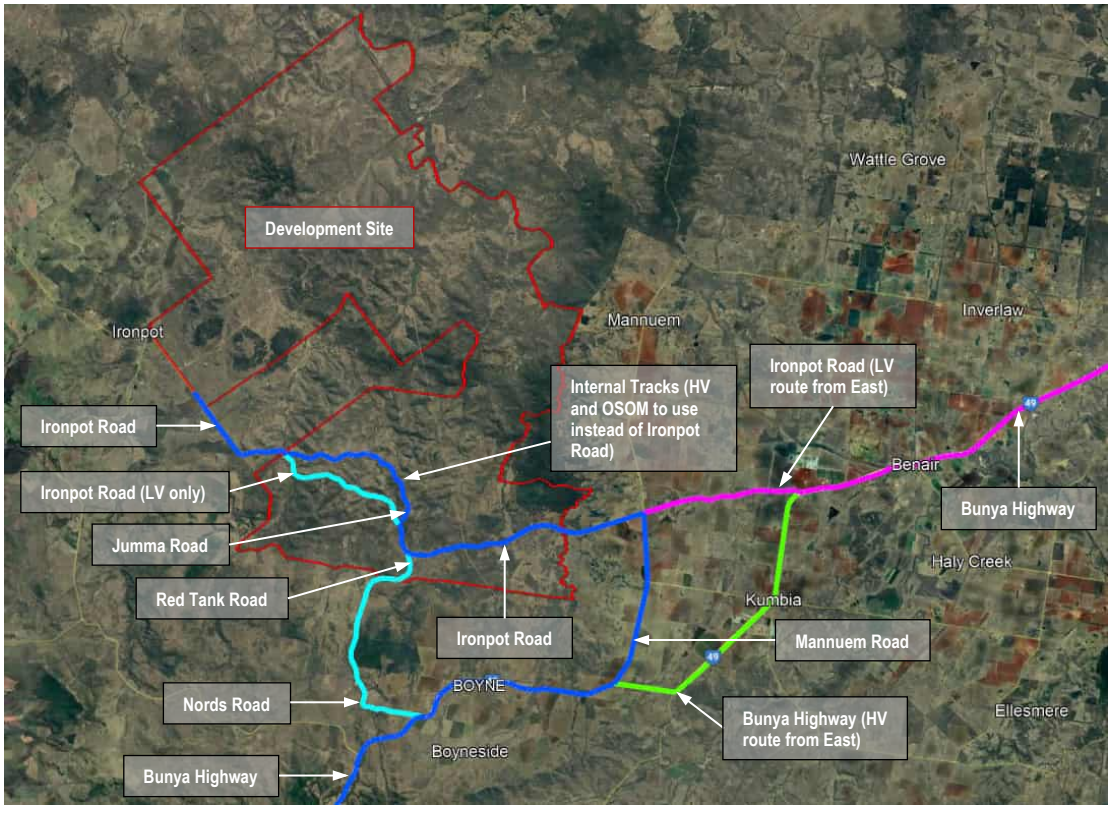


Figure 1: Site Locality Plan and Proposed Access Roads (Google Earth, 2023)

2.2 Existing Land Use

The site comprises of approximately 17,500 ha of land, which is currently used predominantly for grazing activities. The Boyne Rive and Mannuem Creek run along the Northern and Eastern sides of the site area, McMurdys Road and Red Tank Road are located on the southern side, and Ironpot Road and Greystonlea Road run along the Western side of the site area. Some of the surrounding properties and properties within the development site have existing transmission power lines which run throughout.

2.3 Existing Road Network

The identified transport routes to the proposed Wind Farm site are from Brisbane, Toowoomba, Dalby, Kingaroy and surrounding towns. The road networks detailed in Table 1 have been extracted from the identified transport routes in the Traffic Impact Assessment (TIA) prepared by icubed consulting, which can be found in Appendix B.

Table 1: Road Networks

Road Classification	Road Name
State controlled roads	Port of Brisbane Motorway Gateway Motorway Ipswich Motorway (Gailes – Riverview) Warrego Highway (Riverview – Toowoomba) Toowoomba Bypass Toowoomba Connection Road Warrego Highway (Toowoomba – Dalby) Jandowae Road Dalby Jandowae Rd MacAlister Bell Rd Bunya Highway (Dalby – Kingaroy)
Regional council roads (Authority)	Volker Street (optional) (Western Downs Regional Council) Mannuem Road (South Burnett Regional Council) Ironpot Road (South Burnett Regional Council) Jumma Road (South Burnett Regional Council) Nords Road (South Burnett Regional Council) Red Tank Road (South Burnett Regional Council)
Privately owned roads	Port Drive owned by Port of Brisbane Gateway Motorway (Eight Mile Plains – Logan Motorway) operated by Transurban Logan Motorway (Gateway Motorway – Gailes) operated by Transurban

2.4 Existing Traffic Volumes

The impact to the existing traffic volumes for the relevant roads was assessed in the TIA (Appendix B), based on data provided by TMR. Where the Annual Average Daily Traffic (AADT) data has been noted as *"Actual",* this refers to transport data that has growth rate factors applied, between the count year and first year of construction. A summary of the existing traffic data required for the TIA is shown in Table 2.

Data along the transport routes for Port Drive, Gateway Motorway, Logan Motorway and Toowoomba Bypass is unavailable, as these roads are privately owned. Given the high existing traffic volumes on these roads, it is expected that the additional traffic caused by this development will not have a significant impact. Data along the transport routes for Mannuem Road, Ironpot Road, Jumma Road, Nords Road and Red Tank Road is also unavailable. Given the low existing traffic volumes on these roads, it is expected that the additional traffic caused by this development will have an impact, but the overall traffic would remain relatively low and would have very little impact on the operation of the local road network. Assumptions for the data analysis is as follows:

- Both directions of travel have been analysed, as it is assumed that vehicles would travel back to their starting location using the same transport route.
- For the state-controlled networks, annual growth rates were provided based on one, five, and ten-year data. For the purpose of this assessment, the five-year growth rate has been adopted.
- Where the annual five-year growth rate indicated negative growth, that rate was taken as zero.
- Where the annual five-year growth rate was not available for a section of road the growth rate from adjacent sections of road were adopted and averaged.
- Where the percentage of heavy vehicles was not available for a road section, the percentage of heavy vehicles from the adjacent sections of road were adopted and averaged.

Table 2: Summary of "Actual" Traffic Impact Data

Road Section ID	Site ID	Road Section Name	Combined Bi-directional Traffic Data				
			Historic AADT	Count Year	% Heavy Vehicles	Annual Growth Rate	AADT ("Actual")
Data for Port Drive unavailable							
U27	136238	Port of Brisbane Motorway	10860	2022	42.20%	0.00% [1]	10860
Data for Gateway Motorway and Logan Motorway unavailable							
17A	140035	Cunningham Highway (Ipswich Motorway)	117415	2022	1.44%	1.46%	120869
	140027	Cunningham Highway (Ipswich Motorway)	102601	2022	7.78% [3]	2.12%	106997
	136081	Cunningham Highway (Ipswich Motorway)	114498	2022	7.78% [3]	3.05%	121589
18A	135546	Warrego Highway (Ipswich - Toowoomba)	63191	2022	14.11%	1.71%	65371
	135715	Warrego Highway (Ipswich - Toowoomba)	48026	2022	21.95%	1.48%	49458
	135964	Warrego Highway (Ipswich - Toowoomba)	35301	2022	17.89%	2.52%	37103
	10021	Warrego Highway (Ipswich - Toowoomba)	31843	2022	22.72%	1.17%	32592
	160004	Warrego Highway (Ipswich - Toowoomba)	21183	2022	26.95%	0.00% [1]	21183
	30066	Warrego Highway (Ipswich - Toowoomba)	25202	2022	21.52%	2.67%	26566
	30041	Warrego Highway (Ipswich - Toowoomba)	18343	2022	23.14%	2.73%	19358
	30070	Warrego Highway (Ipswich - Toowoomba)	22906	2022	17.89% [3]	1.37% [2]	23536
Data for Toowoomba Bypass unavailable							
315	38644	Toowoomba Connection Road	17189	2022	12.64%	1.37% [2]	17661
	32636	Toowoomba Connection Road	20806	2022	13.88%	0.00% [1]	20806
	37610	Toowoomba Connection Road	14064	2022	9.76%	0.00% [1]	14064
	32686	Toowoomba Connection Road	14029	2022	12.91%	0.00% [1]	14029
	30071	Toowoomba Connection Road	18692	2022	7.52%	0.00% [1]	18692
	37608	Toowoomba Connection Road	12005	2022	13.21%	0.00% [1]	12005
	30074	Toowoomba Connection Road	9559	2022	6.86%	0.00% [1 2]	9559
	30075	Toowoomba Connection Road	16892	2022	9.15%	0.00% [1]	16892
	32645	Toowoomba Connection Road	11755	2022	11.86%	0.00% [1]	11755
	38586	Toowoomba Connection Road	10754	2022	21.99%	0.90% [2]	10948

18B	38587	Warrego Highway (Toowoomba - Dalby)	12665	2022	20.82%	0.90% [2]	12894
	30025	Warrego Highway (Toowoomba - Dalby)	14075	2022	20.35%	1.80%	14586
	32641	Warrego Highway (Toowoomba - Dalby)	10455	2022	21.84%	0.24%	10505
	32559	Warrego Highway (Toowoomba - Dalby)	6117	2021	27.28%	3.71%	6823
	30004	Warrego Highway (Toowoomba - Dalby)	6218	2022	29.54%	2.55%	6539
	30012	Warrego Highway (Toowoomba - Dalby)	8092	2022	29.22%	2.46%	8495
	32693	Warrego Highway (Toowoomba - Dalby)	15085	2022	22.13%	1.55% [2]	15555
18C	32633	Warrego Highway (Dalby - Miles)	9517	2022	21.55%	0.63%	9637
421	32707	Dalby - Jandowae Road	2680	2022	18.83%	4.53%	2928
	32057	Dalby - Jandowae Road	970	2022	27.07%	0.00% [1]	970
422	32119	Macalister - Bell Road	129	2022	31.88%	1.89% [2]	134
45A	32632	Bunya Highway (Dalby - Kingaroy)	5233	2022	13.55%	3.77%	5635
	32699	Bunya Highway (Dalby - Kingaroy)	2887	2022	12.98%	3.53%	3094
	30017	Bunya Highway (Dalby - Kingaroy)	976	2022	20.55%	2.21%	1020
	30045	Bunya Highway (Dalby - Kingaroy)	638	2022	25.57%	0.00% [1]	638
	37737	Bunya Highway (Dalby - Kingaroy)	836	2022	18.31%	0.49%	844
	20542	Bunya Highway (Dalby - Kingaroy)	1108	2022	26.81%	0.00% [1]	1108
	30107	Bunya Highway (Dalby - Kingaroy)	2565	2022	14.80%	0.00% [1]	2565
	20431	Bunya Highway (Dalby - Kingaroy)	4981	2022	9.24%	1.05%	5086
Data for Mannuem Road unavailable							
Data for Ironpot Road unavailable							
Data for Jumma Road unavailable							
Data for Nords Road unavailable							
Data for Red Tank Road unavailable							

[1] The published growth rates for the road section was negative. A growth rate of zero was adopted.
[2] The annual five-year growth rate was not available for this section. The growth rate from the adjacent sections of road were adopted and averaged.
[3] Percentage heavy vehicles not available for this section. The percent heavy vehicles from the adjacent sections of road were adopted and averaged.

3 Proposed Development

3.1 Description of Proposed Development

The proposed development will comprise of a wind farm which is intended to be built in a single stage.

The wind farm will comprise of up to 97 Wind Turbine Generators (WTG) spread across the subject site, with each having a nominal ground to hub height of up to 190m and an approximate name plate capacity of 4.5 MW, combining for an overall rated capacity of up to 436.5 MW. The WTG tower configuration is yet to be finalised and the WTG blade will be up to 90m long.

It is anticipated that construction will commence in Q4 2024 and continue through to Q1 2027. While the exact timing for construction may vary, it is anticipated that the entire project will be completed and operational in Q2 2027.

The proposed site layout is provided in Appendix A.

3.2 Identified Transport Routes

There have been five identified transport routes that the development traffic is expected to follow, to and from the site. Figure 2 depicts the transport routes and Table 3 lists the relevant transport route identifier, description, constituting roads and transport purpose.

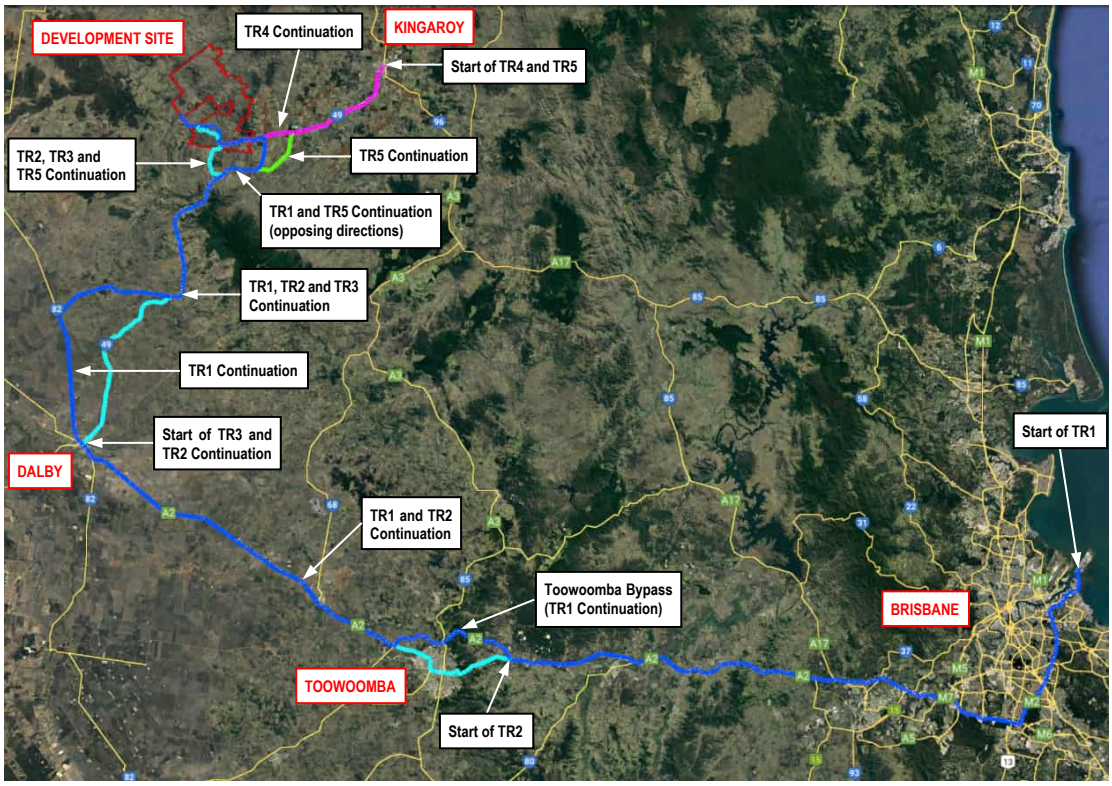


Figure 2: Transport Routes (Google Earth, 2023)

Table 3: Transport Routes

Transport Route ID	Transport Route Description	Constituting Roads	Transport Purpose
TR1	Port of Brisbane to Tarong West Wind Farm	Port Drive Port of Brisbane Motorway Gateway Motorway Logan Motorway Ipswich Motorway Warrego Highway Toowoomba Bypass Warrego Highway *(Join TR2)* Volker Street (optional) Jandowae Road Dalby Jandowae Rd MacAlister Bell Rd Bunya Highway *(Join TR2)* Mannuem Road Ironpot Road / Jumma Road *(Site Entry)*	• Transportation of OSOM Components • Transport of equipment • Transport of materials
TR2	Toowoomba to Tarong West Wind Farm	Toowoomba Connection Road Warrego Highway *(Join TR1)* *(Split from TR1 and Start of TR3)* Bunya Highway (Dalby – Bell) Bunya Highway *(Join TR1)* *(Split from TR1 and Join TR5)* Nords Road Red Tank Road Ironpot Road / Jumma Road *(Site Entry)*	• Transport of equipment • Transport of materials • Transport of workers
TR3	Dalby to Tarong West Wind Farm	Same as TR2 from Bunya Highway (Dalby) onwards	• Transport of equipment • Transport of materials • Transport of workers
TR4	Kingaroy to Tarong West Wind Farm (LV)	Bunya Highway *(Split from TR5)* Ironpot Road / Jumma Road *(Site Entry)*	• Transport of workers
TR5	Kingaroy to Tarong West Wind Farm (HV)	Bunya Highway Same as TR2 from Nords Road onwards	• Transport of equipment • Transport of materials

3.3 Construction Trip Generation and Distribution

Table 4 shows the trip generation data extracted from the TIA (Appendix B), which shows the percentage distribution of the construction equipment / materials / resources, and the locations which they are expected to be transported from, with the relevant transport route (Refer Table 3).

Table 4: Indicative Traffic Distribution for Construction Equipment / Materials / Resources

Construction Equipment / Materials / Resources	Percentage of total quantity transported	Transported From	Transport Route
Workers	5%	Toowoomba	TR2
	35%	Dalby	TR3
	60%	Kingaroy	TR4
Water Trucks*	50%	Dalby	TR3
	50%	Kingaroy	TR5
Cement Tankers	100%	Brisbane	TR1
Flyash	100%	Dalby	TR3
Silica Fume	100%	Brisbane	TR1
20mm Concrete Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
10mm Concrete Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Gravel	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
14mm Sealing Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
7mm Sealing Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
River-sand	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Crusher Dust	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Reinforced Concrete Pipe	100%	Toowoomba	TR2
Formwork	100%	Toowoomba	TR2
WTG - Steel Embedments	100%	Brisbane	TR1
Steel Reinforcement	100%	Brisbane	TR1
Electrical - Cable / Overhead Lines	100%	Brisbane	TR1
Electrical - Overhead Line Equipment	100%	Brisbane	TR1
Electrical - Power Poles	100%	Brisbane	TR1
Electrical - Transformers	100%	Brisbane	TR1
Electrical - Switch Room	100%	Brisbane	TR1
WTG - Blades	100%	Brisbane	TR1
WTG - Nacelle	100%	Brisbane	TR1
WTG - Hub	100%	Brisbane	TR1
WTG - Tower Sections (7 per tower)	100%	Brisbane	TR1
Cranes	100%	Brisbane	TR1
Portable Buildings	100%	Brisbane	TR1

* Water Trucks will only be required to transport potable water for concrete mixing and for worker use / consumption (approximately 30% of the total water demand). It is assumed that the remainder of the water required for construction will be sourced on site (approximately 70% of the total water demand).

3.4 Construction Forecast Project Traffic Volumes

The indicative traffic distribution results shown in Table 4 can be used to assess the forecasted traffic volumes for each transport route (refer Table 3), based on the anticipated construction quantities, vehicles and timelines. Table 5 shows the total daily two-way vehicle trips resulting from the transportation of the construction equipment / materials / resources to the development site, for each of the transport routes.

Table 5: Daily Project Related Traffic Volumes

Transport Route	Construction Activity	Total daily two-way vehicle trips			
		Light vehicle trips	Heavy vehicle trips	Over dimensional vehicle trips	Total trips
TR1 (Brisbane)	Cement Tankers	0	2	0	2
	Silica Fume	0	1	0	1
	WTG - Steel Embedments	0	1	0	1
	Steel Reinforcement	0	1	0	1
	Electrical - Cable / Overhead Lines	0	1	0	1
	Electrical - Overhead Line Equipment	0	1	0	1
	Electrical - Power Poles	0	0	1	1
	Electrical - Transformers	0	0	1	1
	Electrical - Switch Room	0	0	1	1
	WTG - Blades	0	0	2	2
	WTG - Nacelle	0	0	1	1
	WTG - Hub	0	0	1	1
	WTG - Tower Sections	0	0	3	3
	Cranes	0	0	1	1
	Portable Buildings	0	0	1	1
TR2 (Toowoomba)	Workers	13	0	0	13
	20mm Concrete Aggregate	0	3	0	3
	10mm Concrete Aggregate	0	2	0	2
	Gravel	0	11	0	11
	14mm Sealing Aggregate	0	1	0	1
	7mm Sealing Aggregate	0	1	0	1
	River-sand	0	3	0	3
	Crusher Dust	0	2	0	2
	Reinforced Concrete Pipe	0	1	0	1
	Formwork	0	1	0	1
TR3 (Dalby)	Workers	86	0	0	86
	Water Trucks	0	6	0	6
	Flyash	0	1	0	1
TR4 (LV) (Kingaroy)	Workers	146	0	0	146
TR5 (HV) (Kingaroy)	Water Trucks	0	6	0	6
	20mm Concrete Aggregate	0	3	0	3
	10mm Concrete Aggregate	0	2	0	2
	Gravel	0	11	0	11
	14mm Sealing Aggregate	0	1	0	1
	7mm Sealing Aggregate	0	1	0	1
	River-sand	0	3	0	3
	Crusher Dust	0	2	0	2

3.5 Development Related Issues and Risks

Some of the issues and risks that are expected to impact workers during construction, are summarised in Table 6. It is recommended that when a contractor is engaged, that a Development Risk Register and Assessment is conducted to aid in minimising and/or eliminating identified risks.

Table 6: Development Related Issues and Risks

Issue / Risk	Impact	Management Strategy
Heavy vehicles required to travel to site using motorways, highways and local roads during peak hours	Disturbance to the public	The TIA (Appendix B) shows that there is not a large increase in peak hour traffic related to the development. The impacts on the traffic and pavement are generally within the required ranges around the major towns.
Heavy traffic travelling on unsealed roads to site access point	Damage to local roads	Unsealed roads are recommended to be upgraded to cater for the heavy vehicles.
Heavy traffic within development site	Accident risk increased	Appropriate onsite signage and construction programming to reduce this risk.

4 Construction Traffic Management and Control

4.1 Transport Route Management

4.1.1 Transport Route

The Transport Route Study (TRS - Appendix C) details the existing conditions of the proposed OSOM transport route, and identifies the expected road or intersection upgrades required to enable blade vehicles to navigate from the Port of Brisbane to the development site. The OSOM transport route is considered to be the critical route to the project site, with smaller delivery vehicles expected to use the existing road network to travel to site, without the need for road or intersection upgrades.

4.1.2 Traffic and Pavement Impact

The Traffic Impact Assessment (TIA - Appendix B) identifies areas where the project is increasing the traffic and pavement impacts to the existing roads constituting the identified transport routes. The TIA has outlined recommendations for dilapidation studies where required, however the detailed assessment and recommendation for pavement structural upgrade is beyond the scope of this study.

There are no excessive gradients or crossings identified in the transport routes, however this is to be reviewed upon confirmation of the OSOM vehicle configurations.

4.2 Construction Worker Driver Management

4.2.1 Driver Conduct

All vehicle drivers related to the Wind Farm Facility are to uphold a high level of professional conduct, and at minimum comply with the following:

- Follow all posted speed limits and road signage to reduce fugitive dust, and reduce risk to drivers, workers and the public;
- Follow instructions as given by Police, Road and Traffic Authorities and all other relevant authorities;
- Be mindful of pedestrians and other road users along the designated transport routes (Refer Table 3);
- Vehicles travelling to and from site are to have all loads covered;
- Vehicles are only allowed to unload and reload onsite;
- Littering will not be tolerated;
- Reduce noise impacts:
    - Use of the horn only as a warning device;
    - Limiting truck compression braking and use of engine brakes in residential areas.

4.2.2 Workplace Safety

The chosen contractor will be responsible to ensure that all reasonable measures have been taken to ensure that all potential risks have been minimised or eliminated for both onsite and offsite activities.

All employees, contractors and visitors have a responsibility to act in a responsible manner when carrying out works related to the development as to prevent injury to themselves and others.

All accidents and incidents are to be recorded onsite and reported to the Site Management as soon as practically reasonable.

4.2.3 Drivers Licence Requirements

All drivers must have the appropriate licence class for the vehicles they are driving, including appropriate heavy vehicle Drivers Licences for commercial and heavy vehicle drivers.

All vehicle drivers must keep their Drivers Licence with them at all times and make it available when requested by Site Management and relevant authorities.

4.2.4 Drug and Alcohol Policy

A zero drug and alcohol policy will be implemented with all activities relating to the Wind Farm development. A drug and alcohol test will be required at the beginning of works for all site personnel. All workers may also be randomly selected to undergo a drug and alcohol test during the works.

4.2.5 Peak Travel Times

Ensuring public pedestrian and vehicle safety is imperative. The largest risk associated with public safety will be during peak hours with the public travelling to work or school.

Most towns have overpasses or underpasses crossing the relevant highways along the transport route which improve traffic flow for different directions of travel and reduce conflicts between local traffic and highway traffic. The towns listed in Table 7 do not have these overpasses or underpasses available, which may cause some conflict with development traffic.

Table 7: Towns Impacted by Traffic During Peak Hours

Town	Transport Route	Development Vehicles Passing Through Town
Toowoomba	TR2	Light vehicles – transport of workers Heavy vehicles – transport of equipment and materials
Jondaryan	TR1, TR2	Light vehicles – transport of workers Heavy vehicles – transport of equipment and materials Over dimensional vehicles – transport of equipment and materials
Dalby	TR1, TR2, TR3	Light vehicles – transport of workers Heavy vehicles – transport of equipment and materials Over dimensional vehicles – transport of equipment and materials
Bell	TR1, TR2, TR3	Light vehicles – transport of workers Heavy vehicles – transport of equipment and materials Over dimensional vehicles – transport of equipment and materials
Kingaroy	TR4, TR5	Light vehicles – transport of workers Heavy vehicles – transport of equipment and materials
Kumbia	TR5	Heavy vehicles – transport of equipment and materials

The results of the traffic and pavement impact assessments in the TIA (Appendix B) show that the development traffic does not exceed 5% additional loading on the network for these town crossings. Therefore, it is expected that there would be no substantial additional risk to public safety, as the public will be aware of traffic conditions during peak hours.

Development traffic is to be expected along the transport routes, 7 days a week. For all non-OSOM vehicles, the hours of operation on privately owned and state controlled roads are expected to be 24 hours, whilst the hours of operation on local roads are expected to be between 6am-6pm. OSOM vehicles, are expected to operate overnight as required, and be off any state controlled roads by 6am, and operate on local roads between 5am-7am.

To further aid in limiting the risk to the general public, it will be recommended to the contractor and workers to avoid being on the road particularly during school pick-up and drop-off times, when reasonably practical. Signage for areas with dense heavy vehicle usage will also be recommended to make the public more aware of heavy vehicle zones.

4.2.6 Driver Fatigue

The longest identified transport route to site is from Brisbane, which is expected to take approximately 4 hours one way subject to traffic conditions.

To ensure the safety of themselves and to other road users, drivers have a duty to stop driving (where appropriate) while impaired by fatigue and are expected to rest when the signs of fatigue first start to appear. The transport contractor is expected to have management plans and processes in place to prevent driver fatigue from occurring, such as appropriate delivery timetables and rosters for drivers.

5 Conclusion

This report represents the Traffic Management Plan for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot. It is anticipated that construction will commence in Q4 2024 and continue through to Q1 2027. While the exact timing for construction may vary, it is anticipated that the entire project will be completed and operational in Q2 2027.

The traffic assessments produced for the proposed wind farm provide information on the following:

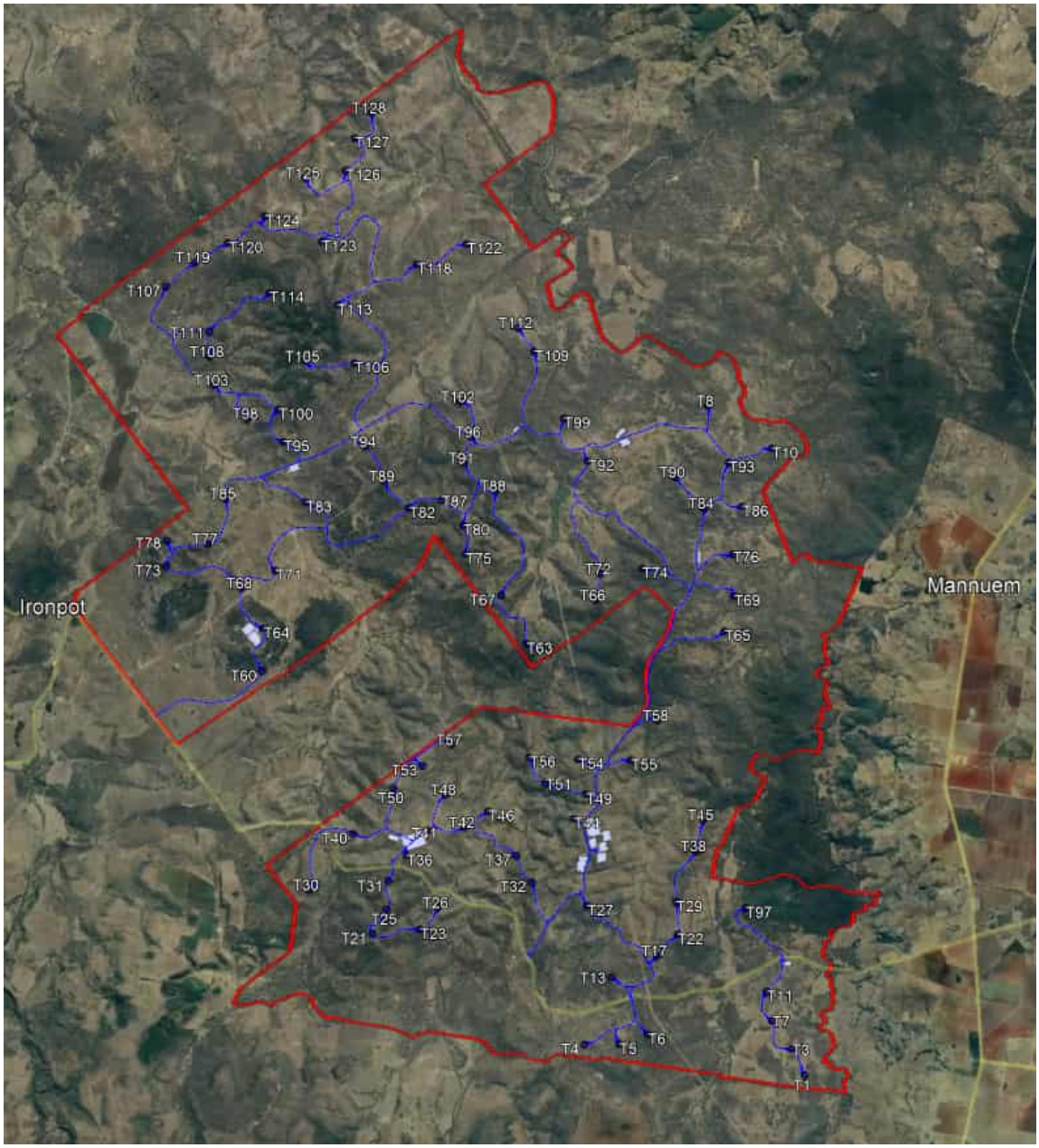
- Overall impact of the proposed development on the relevant road networks;
- Road upgrades required for the transportation of vehicles (specifically OSOM vehicles) to site;
- Traffic Management requirements to reduce the risks to the public and workers.

A summary of the TIA and TRS are as follows:

- The assessment on the existing and proposed construction traffic and pavement loading shows that there will be several road sections with traffic or pavement impacts greater than the required 5% impact value (Refer to the TIA in Appendix B for details);
- A blade truck and trailer capable of transporting a 90m long blade, can navigate to the Wind Farm site with some minor intersection upgrades, including temporarily removing above ground infrastructure or gravel widening (Refer to the TRS in Appendix C for details);
- The largest vehicle able to travel to site has a maximum height of 5.8m utilising the assessed detours (Refer to the TRS in Appendix C for details).

This report has been produced for Development Application to the State Assessment and Referral Agency (SARA) in consultation with South Burnett Regional Council (SBRC) and Department of Transport and Main Roads (TMR). This report has been provided to demonstrate compliance with PO13 of State Code 23, in conjunction with the Transport Route Study and Traffic Impact Assessment. Once the Project reaches the detailed design stage of works and a contractor has been engaged, the results of this report should be re-assessed to either confirm the impact results or provide amended outcomes.

Appendix A – Site Plan



Appendix B – Traffic Impact Assessment (TIA)

shown overleaf

TRAFFIC IMPACT ASSESSMENT

23-047 TARONG WEST WIND FARM

Prepared for:

RES AUSTRALIA PTY LTD

icubed consulting

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STATEMENT OF LIMITATION

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1 Introduction

icubed consulting were commissioned by RES Australia Pty Ltd (RES) to undertake a Traffic Impact Assessment, to be included with a development application under the provisions of the Queensland State Code 23 - Wind Farm Development Code, for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot in Queensland.

This report details the results of this assessment, including an evaluation of:

- Existing traffic conditions
- The proposed access arrangements
- The proposed development traffic requirements
- The impact of the proposed development on the surrounding road network.

This report has been produced for Development Application to the State Assessment and Referral Agency (SARA) in consultation with South Burnett Regional Council (SBRC) and Department of Transport and Main Roads (TMR). Once the project reaches the detailed design stage of works and a contractor has been engaged, the results of this report should be re-assessed to either confirm the impact results or provide amended outcomes.

1.1 Limits of Report

The above tasks have been carried out based on information supplied by other members of the Project team, together with observations on site and information from relevant authorities. These are detailed in the report.

While icubed has taken care in the preparation of this report, it neither accepts liability nor responsibility whatsoever in respect of:

- Any use of this report by any third party
- Any third party whose interests may be affected by any decision made regarding the contents of this report.

2 Existing Conditions

2.1 Site Location

The subject site is located at Ironpot Road, Ironpot in Queensland and is described as:

- Lots 4 and 7 on RP890694
- Lot 36 on BO236
- Lot 6 on BO250
- Lot 5 on BO330
- Lot 44 on FTZ37207
- Lot 43 on FTZ237338
- Lots 60, 62 and 63 on BO188
- Lots 64, 66 and 93 on BO190
- Lot 67 on BO490
- Lot 68 on RP800291
- Lot 10 on SP168643
- Lot 29 on BO243.

The main proposed access point for the site is from Jumma Road and Ironpot Road, accessed via:

- Mannuem Road, off the Bunya Highway for OSOM vehicles only
- Nords Road and Red Tank Road, off the Bunya Highway for all non-OSOM vehicles approaching from the South (Brisbane, Toowoomba, Dalby and surrounding towns).
- Nords Road and Red Tank Road, off the Bunya Highway for all heavy vehicles approaching from the East (Kingaroy and surrounding towns)
- The Bunya Highway for light vehicles approaching from the East (Kingaroy and surrounding towns)

Other internal access locations include a second entry off Ironpot Road to the West of the site, for all vehicles. These access locations are shown in Figure 1.

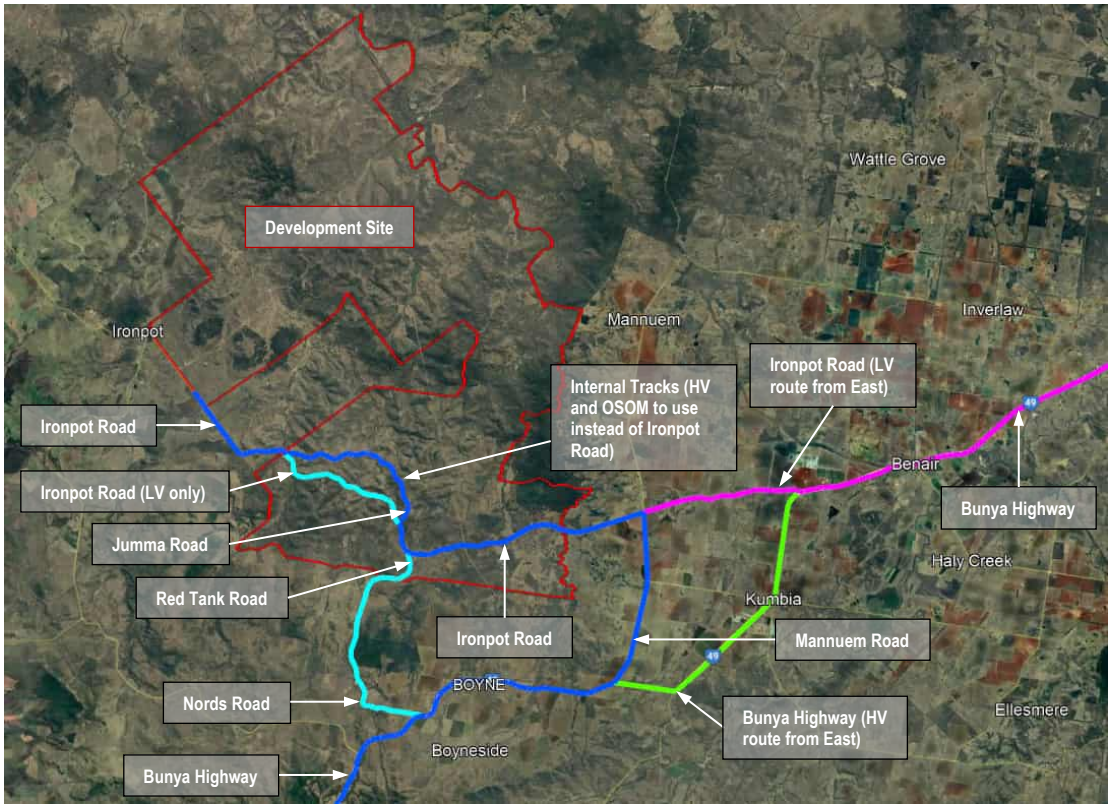

Figure 1: Site Locality Plan and Proposed Access Roads (Google Earth, 2023)

2.2 Existing Land Use

The site comprises of approximately 17,500 ha of land, which is currently used predominantly for grazing activities. The Boyne Rive and Mannuem Creek run along the Northern and Eastern sides of the site area, McMurdys Road and Red Tank Road are located on the southern side, and Ironpot Road and Greystonlea Road run along the Western side of the site area. Some of the surrounding properties and properties within the development site have existing transmission power lines which run throughout.

2.3 Existing Local Road Network

Vehicles will travel along regional council roads between the Bunya Highway (state-controlled road) and the development site, as shown in Figure 1. A summary of the existing conditions and intended use of these roads is provided in Table 1, based on inspections carried out in 2023 and online mapping. Images of the local road network intersections have been provided in Appendix B.

Table 1: Existing Local Road Network

Road Name	Relative Location	Intended Use	Existing Conditions
Mannuem Road	South East of Site running North / South	OSOM vehicles	• Sealed one-way road approximately 3.6m wide • Very few culverts • Several overhead lines crossing road
Ironpot Road	Through South of Site and along South West of the project boundary	All vehicles	• Predominantly sealed one-way and two-way road ranging from 3.6-6.4m in width • Partially unsealed gravel / dirt road approximately 5.6m wide • Significant number of major and minor culverts • Several significant bridges and bed level crossings • Very few overhead lines crossing road • Very few cattle grids
Jumma Road	Internal road from South of site through to centre	All vehicles	• Unsealed dirt road ranging from 3.6m-5.2m in width • *Note Jumma Road was not assessed in detail*
Nords Road	South of Site	Non-OSOM vehicles	• Unsealed dirt road ranging from 3.6m-6.2m in width • Few major culverts and significant number of minor culverts • Very few overhead lines crossing road • Some nearby properties • Adjacent to High Category Waterway
Red Tank Road	South of Site	Non-OSOM vehicles	• Unsealed dirt / gravel road ranging 3.6m-4.2m wide • Few minor culverts • Very few overhead lines crossing road

A construction phase Traffic Management Plan (TMP) is proposed to implement appropriate signage and controls to create an appropriate level of awareness for increased vehicle movements in these areas.

3 Proposed Development

3.1 Description of Proposed Development

The proposed development will comprise of a wind farm which is intended to be built in a single stage.

The wind farm will comprise of up to 97 Wind Turbine Generators (WTG) spread across the subject site, with each having a nominal ground to hub height of up to 190m and an approximate name plate capacity of 4.5 MW, combining for an overall rated capacity of up to 436.5 MW. The WTG tower configuration is yet to be finalised and the WTG blade will be up to 90m long.

It is anticipated that construction will commence in Q4 2024 and continue through to Q1 2027. While the exact timing for construction may vary, it is anticipated that the entire project will be completed and operational in Q2 2027.

The proposed site layout is provided in Appendix A.

3.2 Identified Transport Routes

The Construction Phase traffic impact created by the wind farm development will be due to:

- Transportation of OSOM Components
- Transportation of equipment
- Transportation of materials
- Transportation of workers.

The vehicle clearance requirements and route study outcomes have been assessed in the Transport Route Study (TRS) prepared by icubed consulting. There have been five transport routes identified that the development traffic is expected to follow, to and from the site. Figure 2 depicts the transport routes and Table 2 lists the relevant transport route identifier, description, constituting roads and transport purpose.

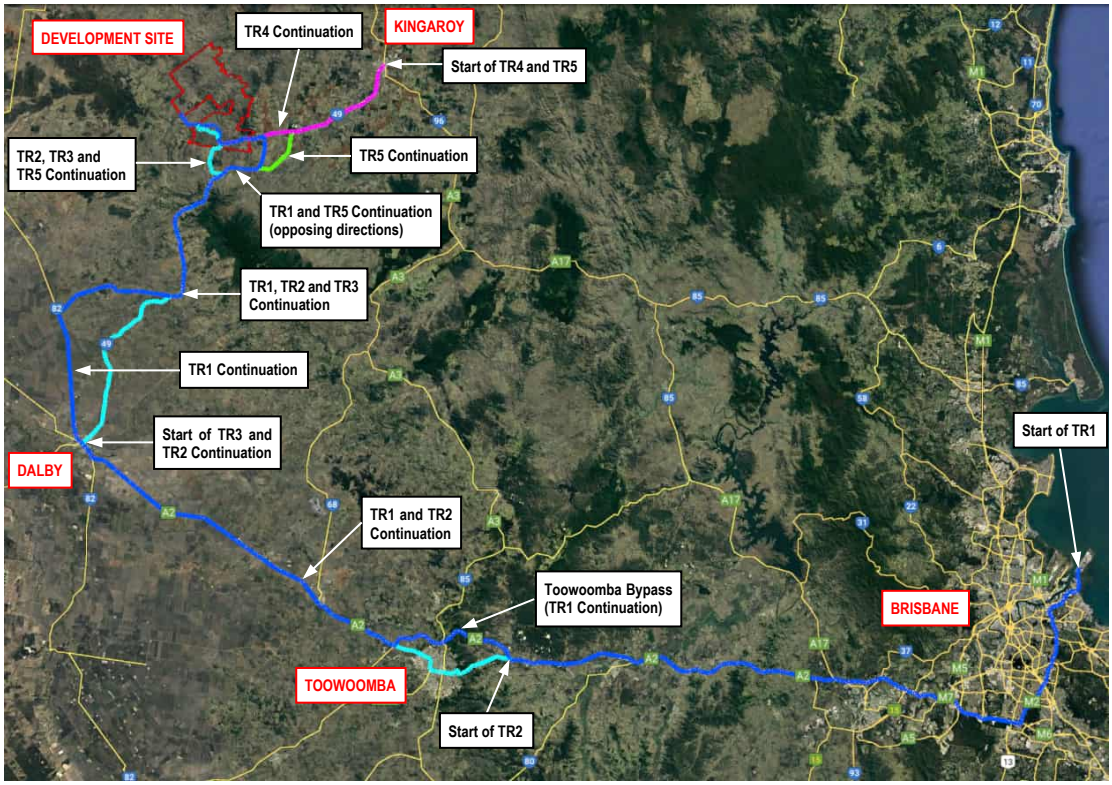

Figure 2: Transport Routes (Google Earth, 2023)

Table 2: Transport Routes

Transport Route ID	Transport Route Description	Constituting Roads	Transport Purpose
TR1	Port of Brisbane to Tarong West Wind Farm	Port Drive Port of Brisbane Motorway Gateway Motorway Logan Motorway Ipswich Motorway Warrego Highway Toowoomba Bypass Warrego Highway *(Join TR2)* Volker Street (optional) Jandowae Road Dalby Jandowae Rd MacAlister Bell Rd Bunya Highway *(Join TR2)* Mannuem Road Ironpot Road / Jumma Road *(Site Entry)*	• Transportation of OSOM Components • Transport of equipment • Transport of materials
TR2	Toowoomba to Tarong West Wind Farm	Toowoomba Connection Road Warrego Highway *(Join TR1)* *(Split from TR1 and Start of TR3)* Bunya Highway (Dalby – Bell) Bunya Highway *(Join TR1)* *(Split from TR1 and Join TR5)* Nords Road Red Tank Road Ironpot Road / Jumma Road *(Site Entry)*	• Transport of equipment • Transport of materials • Transport of workers
TR3	Dalby to Tarong West Wind Farm	Same as TR2 from Bunya Highway (Dalby) onwards	• Transport of equipment • Transport of materials • Transport of workers
TR4	Kingaroy to Tarong West Wind Farm (LV)	Bunya Highway *(Split from TR5)* Ironpot Road / Jumma Road *(Site Entry)*	• Transport of workers
TR5	Kingaroy to Tarong West Wind Farm (HV)	Bunya Highway Same as TR2 from Nords Road onwards	• Transport of equipment • Transport of materials

3.3 Parking and Internal Layout

There will be sufficient areas assigned for parking during the construction stages of this Project to accommodate the anticipated number of construction and employee vehicles. Approximately 270 full-time equivalent staff are expected during the peak construction period of the development, with 10% expected to carpool.

The site layout will consist of a series of internal access roads, which will be designed and constructed to safely and efficiently allow for the movement of vehicles to all turbine locations and ancillary infrastructure locations throughout the construction and operation phases of the Project.

The operation & maintenance facility and substation facility will be provided with car parking spaces for staff likely to be employed at the facility. It is currently expected that the number of workers to be employed during the operational phase of the wind farm will not be more than 10 staff, with very few visitors.

4 Existing Condition Assessment

4.1 Road Network

The identified transport routes to the proposed Wind Farm site are from Brisbane, Toowoomba, Dalby, Kingaroy and surrounding towns. The site will be serviced from these locations by state controlled, regional council and privately owned roads as detailed below in Table 3.

Table 3: Road Networks

Road Classification	Road Name
State controlled roads	Port of Brisbane Motorway Gateway Motorway Ipswich Motorway (Gailes – Riverview) Warrego Highway (Riverview – Toowoomba) Toowoomba Bypass Toowoomba Connection Road Warrego Highway (Toowoomba – Dalby) Jandowae Road Dalby Jandowae Rd MacAlister Bell Rd Bunya Highway (Dalby – Kingaroy)
Regional council roads (Authority)	Volker Street (optional) (Western Downs Regional Council) Mannuem Road (South Burnett Regional Council) Ironpot Road (South Burnett Regional Council) Jumma Road (South Burnett Regional Council) Nords Road (South Burnett Regional Council) Red Tank Road (South Burnett Regional Council)
Privately owned roads	Port Drive owned by Port of Brisbane Gateway Motorway (Eight Mile Plains – Logan Motorway) operated by Transurban Logan Motorway (Gateway Motorway – Gailes) operated by Transurban

4.2 Traffic Volumes

The impact to the existing traffic volumes for the relevant roads was assessed, based on data provided by TMR. Where the Annual Average Daily Traffic (AADT) data has been noted as *"Actual",* this refers to transport data that has growth rate factors applied, between the count year and first year of construction. A summary of information required for the Traffic Impact Assessment is shown in Table 4.

Data along the transport routes for Port Drive, Gateway Motorway, Logan Motorway and Toowoomba Bypass is unavailable, as these roads are privately owned. Given the high existing traffic volumes on these roads, it is expected that the additional traffic caused by this development will not have a significant impact. Data along the transport routes for Mannuem Road, Ironpot Road, Jumma Road, Nords Road and Red Tank Road is also unavailable. Given the low existing traffic volumes on these roads, it is expected that the additional traffic caused by this development will have an impact, but the overall traffic would remain relatively low and would have very little impact on the operation of the local road network. Assumptions for the data analysis is as follows:

- Both directions of travel have been analysed, as it is assumed that vehicles would travel back to their starting location using the same transport route.
- For the state-controlled networks, annual growth rates were provided based on one, five, and ten-year data. For the purpose of this assessment, the five-year growth rate has been adopted.
- Where the annual five-year growth rate indicated negative growth, that rate was taken as zero.
- Where the annual five-year growth rate was not available for a section of road the growth rate from adjacent sections of road were adopted and averaged.
- Where the percentage of heavy vehicles was not available for a road section, the percentage of heavy vehicles from the adjacent sections of road were adopted and averaged.

Table 4: Summary of "Actual" Traffic Impact Data

Road Section ID	Site ID	Road Section Name	Combined Bi-directional Traffic Data				
			Historic AADT	Count Year	% Heavy Vehicles	Annual Growth Rate	AADT ("Actual")
Data for Port Drive unavailable							
U27	136238	Port of Brisbane Motorway	10860	2022	42.20%	0.00% [1]	10860
Data for Gateway Motorway and Logan Motorway unavailable							
17A	140035	Cunningham Highway (Ipswich Motorway)	117415	2022	1.44%	1.46%	120869
	140027	Cunningham Highway (Ipswich Motorway)	102601	2022	7.78% [3]	2.12%	106997
	136081	Cunningham Highway (Ipswich Motorway)	114498	2022	7.78% [3]	3.05%	121589
18A	135546	Warrego Highway (Ipswich - Toowoomba)	63191	2022	14.11%	1.71%	65371
	135715	Warrego Highway (Ipswich - Toowoomba)	48026	2022	21.95%	1.48%	49458
	135964	Warrego Highway (Ipswich - Toowoomba)	35301	2022	17.89%	2.52%	37103
	10021	Warrego Highway (Ipswich - Toowoomba)	31843	2022	22.72%	1.17%	32592
	160004	Warrego Highway (Ipswich - Toowoomba)	21183	2022	26.95%	0.00% [1]	21183
	30066	Warrego Highway (Ipswich - Toowoomba)	25202	2022	21.52%	2.67%	26566
	30041	Warrego Highway (Ipswich - Toowoomba)	18343	2022	23.14%	2.73%	19358
	30070	Warrego Highway (Ipswich - Toowoomba)	22906	2022	17.89% [3]	1.37% [2]	23536
Data for Toowoomba Bypass unavailable							
315	38644	Toowoomba Connection Road	17189	2022	12.64%	1.37% [2]	17661
	32636	Toowoomba Connection Road	20806	2022	13.88%	0.00% [1]	20806
	37610	Toowoomba Connection Road	14064	2022	9.76%	0.00% [1]	14064
	32686	Toowoomba Connection Road	14029	2022	12.91%	0.00% [1]	14029
	30071	Toowoomba Connection Road	18692	2022	7.52%	0.00% [1]	18692
	37608	Toowoomba Connection Road	12005	2022	13.21%	0.00% [1]	12005
	30074	Toowoomba Connection Road	9559	2022	6.86%	0.00% [1 2]	9559
	30075	Toowoomba Connection Road	16892	2022	9.15%	0.00% [1]	16892
	32645	Toowoomba Connection Road	11755	2022	11.86%	0.00% [1]	11755
	38586	Toowoomba Connection Road	10754	2022	21.99%	0.90% [2]	10948

18B	38587	Warrego Highway (Toowoomba - Dalby)	12665	2022	20.82%	0.90% [2]	12894
	30025	Warrego Highway (Toowoomba - Dalby)	14075	2022	20.35%	1.80%	14586
	32641	Warrego Highway (Toowoomba - Dalby)	10455	2022	21.84%	0.24%	10505
	32559	Warrego Highway (Toowoomba - Dalby)	6117	2021	27.28%	3.71%	6823
	30004	Warrego Highway (Toowoomba - Dalby)	6218	2022	29.54%	2.55%	6539
	30012	Warrego Highway (Toowoomba - Dalby)	8092	2022	29.22%	2.46%	8495
	32693	Warrego Highway (Toowoomba - Dalby)	15085	2022	22.13%	1.55% [2]	15555
18C	32633	Warrego Highway (Dalby - Miles)	9517	2022	21.55%	0.63%	9637
421	32707	Dalby - Jandowae Road	2680	2022	18.83%	4.53%	2928
	32057	Dalby - Jandowae Road	970	2022	27.07%	0.00% [1]	970
422	32119	Macalister - Bell Road	129	2022	31.88%	1.89% [2]	134
45A	32632	Bunya Highway (Dalby - Kingaroy)	5233	2022	13.55%	3.77%	5635
	32699	Bunya Highway (Dalby - Kingaroy)	2887	2022	12.98%	3.53%	3094
	30017	Bunya Highway (Dalby - Kingaroy)	976	2022	20.55%	2.21%	1020
	30045	Bunya Highway (Dalby - Kingaroy)	638	2022	25.57%	0.00% [1]	638
	37737	Bunya Highway (Dalby - Kingaroy)	836	2022	18.31%	0.49%	844
	20542	Bunya Highway (Dalby - Kingaroy)	1108	2022	26.81%	0.00% [1]	1108
	30107	Bunya Highway (Dalby - Kingaroy)	2565	2022	14.80%	0.00% [1]	2565
	20431	Bunya Highway (Dalby - Kingaroy)	4981	2022	9.24%	1.05%	5086
Data for Mannuem Road unavailable							
Data for Ironpot Road unavailable							
Data for Jumma Road unavailable							
Data for Nords Road unavailable							
Data for Red Tank Road unavailable							

[1] The published growth rates for the road section was negative. A growth rate of zero was adopted.
[2] The annual five-year growth rate was not available for this section. The growth rate from the adjacent sections of road were adopted and averaged.
[3] Percentage heavy vehicles not available for this section. The percent heavy vehicles from the adjacent sections of road were adopted and averaged.

4.3 Traffic ESA Data

The impact to the existing loading on the relevant roads, was assessed based on data provided by TMR. Where the Annual Average Daily Traffic (AADT) data has been noted as *"Actual",* this refers to transport data that has growth rate factors applied, between the count year and first year of construction. A summary of information required for the Pavement Impact Assessment is shown in Table 5.

Data along the transport routes for Port Drive, Gateway Motorway, Logan Motorway and Toowoomba Bypass is unavailable, as these roads are privately owned. Given the high existing traffic volumes on these roads, it is expected that the additional traffic caused by this development will not have a significant impact. Data along the transport routes for Mannuem Road, Ironpot Road, Jumma Road, Nords Road and Red Tank Road is also unavailable. Dilapidation surveys and reports will be carried out on these roads, pre and post construction (or as required by Council). Any damage identified as being a result of these works will be rectified. Assumptions for the data analysis is as follows:

- Both directions of travel have been analysed, as it is assumed that vehicles would travel back to their starting location using the same transport route.
- For the state-controlled networks, annual growth rates were provided based on one, five, and ten-year data. For the purpose of this assessment, the five-year growth rate has been adopted.
- Where the annual five-year growth rate indicated negative growth, that rate was taken as zero.
- Where the annual five-year growth rate was not available for a section of road the growth rate from adjacent sections of road were adopted and averaged.
- Where the percentage of heavy vehicles was not available for a road section, the percentage of heavy vehicles from the adjacent sections of road were adopted and averaged.

Table 5: Summary of "Actual" Pavement Impact Data

Road Section ID	Site ID	Road Section Name	Available Traffic Data					Assumed ESA Values		"Actual" Traffic Data	
			AADT	Data Year	% Heavy Vehicles	% Light Vehicles	Annual growth Rate	HV ESA	LV ESA	AADT	Background traffic ESA
Data for Port Drive unavailable											
U27	136238	Port of Brisbane Motorway	10860	2022	42.20%	57.80%	0.00% [1]	3.2	1.18	10860	22072
Data for Gateway Motorway and Logan Motorway unavailable											
17A	140035	Cunningham Highway (Ipswich Motorway)	117415	2022	1.44%	98.56%	1.46%	3.2	1.18	120869	146141
	140027	Cunningham Highway (Ipswich Motorway)	102601	2022	7.78% [3]	92.23%	2.12%	3.2	1.18	106997	143061
	136081	Cunningham Highway (Ipswich Motorway)	114498	2022	7.78% [3]	92.23%	3.05%	3.2	1.18	121589	162571
18A	135546	Warrego Highway (Ipswich - Toowoomba)	63191	2022	14.11%	85.89%	1.71%	3.2	1.18	65371	95769
	135715	Warrego Highway (Ipswich - Toowoomba)	48026	2022	21.95%	78.05%	1.48%	3.2	1.18	49458	80290
	135964	Warrego Highway (Ipswich - Toowoomba)	35301	2022	17.89%	82.11%	2.52%	3.2	1.18	37103	57189
	10021	Warrego Highway (Ipswich - Toowoomba)	31843	2022	22.72%	77.28%	1.17%	3.2	1.18	32592	53417
	160004	Warrego Highway (Ipswich - Toowoomba)	21183	2022	26.95%	73.05%	0.00% [1]	3.2	1.18	21183	36528
	30066	Warrego Highway (Ipswich - Toowoomba)	25202	2022	21.52%	78.48%	2.67%	3.2	1.18	26566	42896
	30041	Warrego Highway (Ipswich - Toowoomba)	18343	2022	23.14%	76.86%	2.73%	3.2	1.18	19358	31891
	30070	Warrego Highway (Ipswich - Toowoomba)	22906	2022	17.89% [3]	82.11%	1.37% [2]	3.2	1.18	23536	36277
Data for Toowoomba Bypass unavailable											
315	38644	Toowoomba Connection Road	17189	2022	12.64%	87.36%	1.37% [2]	3.2	1.18	17661	25350
	32636	Toowoomba Connection Road	20806	2022	13.88%	86.12%	0.00% [1]	3.2	1.18	20806	30385
	37610	Toowoomba Connection Road	14064	2022	9.76%	90.24%	0.00% [1]	3.2	1.18	14064	19368
	32686	Toowoomba Connection Road	14029	2022	12.91%	87.09%	0.00% [1]	3.2	1.18	14029	20213
	30071	Toowoomba Connection Road	18692	2022	7.52%	92.48%	0.00% [1]	3.2	1.18	18692	24896
	37608	Toowoomba Connection Road	12005	2022	13.21%	86.79%	0.00% [1]	3.2	1.18	12005	17369
	30074	Toowoomba Connection Road	9559	2022	6.86%	93.14%	0.00% [1 2]	3.2	1.18	9559	12604
	30075	Toowoomba Connection Road	16892	2022	9.15%	90.85%	0.00% [1]	3.2	1.18	16892	23055
	32645	Toowoomba Connection Road	11755	2022	11.86%	88.14%	0.00% [1]	3.2	1.18	11755	16687
	38586	Toowoomba Connection Road	10754	2022	21.99%	78.01%	0.90% [2]	3.2	1.18	10948	17782

18B	38587	Warrego Highway (Toowoomba - Dalby)	12665	2022	20.82%	79.18%	0.90% [2]	3.2	1.18	12894	20638
	30025	Warrego Highway (Toowoomba - Dalby)	14075	2022	20.35%	79.65%	1.80%	3.2	1.18	14586	23208
	32641	Warrego Highway (Toowoomba - Dalby)	10455	2022	21.84%	78.16%	0.24%	3.2	1.18	10505	17031
	32559	Warrego Highway (Toowoomba - Dalby)	6117	2021	27.28%	72.72%	3.71%	3.2	1.18	6823	11812
	30004	Warrego Highway (Toowoomba - Dalby)	6218	2022	29.54%	70.46%	2.55%	3.2	1.18	6539	11618
	30012	Warrego Highway (Toowoomba - Dalby)	8092	2022	29.22%	70.78%	2.46%	3.2	1.18	8495	15038
	32693	Warrego Highway (Toowoomba - Dalby)	15085	2022	22.13%	77.87%	1.55% [2]	3.2	1.18	15555	25308
18C	32633	Warrego Highway (Dalby - Miles)	9517	2022	21.55%	78.45%	0.63%	3.2	1.18	9637	15567
421	32707	Dalby - Jandowae Road	2680	2022	18.83%	81.17%	4.53%	3.2	1.18	2928	4569
	32057	Dalby - Jandowae Road	970	2022	27.07%	72.93%	0.00% [1]	3.2	1.18	970	1675
422	32119	Macalister - Bell Road	129	2022	31.88%	68.12%	1.89% [2]	3.2	1.18	134	244
45A	32632	Bunya Highway (Dalby - Kingaroy)	5233	2022	13.55%	86.45%	3.77%	3.2	1.18	5635	8192
	32699	Bunya Highway (Dalby - Kingaroy)	2887	2022	12.98%	87.02%	3.53%	3.2	1.18	3094	4463
	30017	Bunya Highway (Dalby - Kingaroy)	976	2022	20.55%	79.45%	2.21%	3.2	1.18	1020	1626
	30045	Bunya Highway (Dalby - Kingaroy)	638	2022	25.57%	74.43%	0.00% [1]	3.2	1.18	638	1082
	37737	Bunya Highway (Dalby - Kingaroy)	836	2022	18.31%	81.69%	0.49%	3.2	1.18	844	1308
	20542	Bunya Highway (Dalby - Kingaroy)	1108	2022	26.81%	73.19%	0.00% [1]	3.2	1.18	1108	1907
	30107	Bunya Highway (Dalby - Kingaroy)	2565	2022	14.80%	85.20%	0.00% [1]	3.2	1.18	2565	3794
	20431	Bunya Highway (Dalby - Kingaroy)	4981	2022	9.24%	90.76%	1.05%	3.2	1.18	5086	6951
Data for Mannuem Road unavailable											
Data for Ironpot Road unavailable											
Data for Jumma Road unavailable											
Data for Nords Road unavailable											
Data for Red Tank Road unavailable											

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[2] The annual five-year growth rate was not available for this section. The growth rate from the adjacent sections of road were adopted and averaged.
[3] Percentage heavy vehicles not available for this section. The percent heavy vehicles from the adjacent sections of road were adopted and averaged.

5 Development Traffic

5.1 Design Vehicles

The requirements for access to the development are expected to vary between the construction and operational phases of the Project.

During the construction phase, vehicles arriving on site will be a combination of workers in light vehicles and delivery of construction materials in heavy vehicles. It is expected that the largest delivery vehicles during the construction phase will be a B-Double vehicle (HV) and a WTG blade trailer vehicle (OSOM).

During the operational phase of the Project, there are expected to be occasional visits for inspections, security, maintenance and system monitoring by staff in light vehicles. Heavy vehicles will be required intermittently throughout the operation phase for transportation of materials. OSOM vehicles will only be required in the rare event that a large turbine component, such as a blade, needs replacing.

5.2 Trip Generation – Construction Phase

The trip generation characteristics of the proposed development are anticipated to be significantly different during the construction and operational phase of the Project. The majority of the traffic impact from the development will occur during the construction phase when a significant number of vehicles will be accessing the site.

The number of trips expected to be generated during the construction phase of the Wind Farm was estimated using anticipated construction quantities, vehicles and timelines, based on information provided by RES (the Project proponent) and icubed consulting's experience with wind farm Projects:

- Phase 1: Material Deliveries and Construction – 117 weeks estimated (Q4 2024 – Q1 2027)
- Phase 2: Operation

Several assumptions were made in calculating the peak hour trip generation during the construction of the Wind Farm development, including:

- The workers travelling in light vehicles (cars) are expected to arrive during the morning peak hour, and depart during the evening peak hour
- 10% of employees are expected to carpool
- Heavy equipment is expected to be delivered to site at the beginning of construction phases and removed at the end, and will not be transported to/from the site every day
- Gravel, concrete materials and water truck arrivals / departures are expected to be evenly distributed throughout the day
- Transportation of wind turbine components using OSOM vehicles are assumed to be off peak.

The estimated number of trips generated during construction is summarised in Table 6, with more detailed calculations provided in Appendix C.

Table 6: Peak Hour Trip Generation During Construction

Phase	Morning Peak (veh/hr)	Afternoon Peak (veh/hr)
Phase 1 – Construction	313	313

Based on the estimates of worker numbers, it is expected that approximately 78% of the vehicles during these peak hours will be light vehicles (cars), throughout the construction period. The remainder of the vehicles are expected to be heavy vehicles or OSOM vehicles including:

- Flatbed trucks
- Water trucks
- Truck and Dog quarry trucks

- 19m AV trucks
- B-double trucks
- Over-dimension Vehicles (Oversize / Over-mass vehicles) for delivery of substation transformer and electricity transmission poles
- Over-dimensional Vehicles (Oversize / Over-mass vehicles) for delivery of wind farm turbine components (Blades, Towers, Nacelle, Hub)
- Large mobile cranes (approx. 800 Tonne)
- Small mobile cranes (i.e. 25 Tonne Franna)
- Other equipment delivery trucks and/or heavy equipment mobilising to the site at the beginning of construction

5.3 Trip Generation – Operational Phase

During the operational phase, it is estimated that up to 10 full time equivalent (FTE) workers would be employed to conduct routine maintenance on the Wind Farm. It is anticipated that the staff will travel from Kingaroy to the site during the morning peak and return to Kingaroy during the evening peak, each day.

With the limited number of maintenance workers and very few visitors expected at the site, it is considered that the traffic impacts will be negligible with no more than 12 daily two-way trips generated by the facility, which includes workers as well as maintenance and delivery vehicles. The estimated number of trips generated during operation is summarised in Table 7, with more detailed calculations provided in Appendix C.

Table 7: Peak Hour Trip Generation During Operation

Phase	Morning Peak (veh/hr)	Afternoon Peak (veh/hr)
Phase 2 – Operation	12	12

6 Impact Assessment and Mitigation

6.1 Construction Trip Generation and Distribution

The trip generation data detailed in Section 5 of this report only covers the Construction and Operational Phases, as these phases will produce the most impact on traffic and pavements. The Decommissioning Phase will require a new TMP to be prepared, as the Wind Farm Operator may choose to either replace the wind turbines with newer models or decommission the wind turbines and other above-ground infrastructure. Both of these decommissioning options will have significant differences in traffic loadings, and as such, cannot be foreseen.

Table 8 shows the trip generation data that has been summarised from Section 5. The additional detail in this table shows the percentage distribution of the construction equipment / materials / resources, and the locations which they are expected to be transported from, with the relevant transport route (Refer Table 2).

Table 8: Indicative Traffic Distribution for Construction Equipment / Materials / Resources

Construction Equipment / Materials / Resources	Percentage of total quantity transported	Transported From	Transport Route
Workers	5%	Toowoomba	TR2
	35%	Dalby	TR3
	60%	Kingaroy	TR4
Water Trucks*	50%	Dalby	TR3
	50%	Kingaroy	TR5
Cement Tankers	100%	Brisbane	TR1
Flyash	100%	Dalby	TR3
Silica Fume	100%	Brisbane	TR1
20mm Concrete Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
10mm Concrete Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Gravel	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
14mm Sealing Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
7mm Sealing Aggregate	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
River-sand	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Crusher Dust	50%	Toowoomba	TR2
	50%	Kingaroy	TR5
Reinforced Concrete Pipe	100%	Toowoomba	TR2
Formwork	100%	Toowoomba	TR2
WTG - Steel Embedments	100%	Brisbane	TR1
Steel Reinforcement	100%	Brisbane	TR1
Electrical - Cable / Overhead Lines	100%	Brisbane	TR1
Electrical - Overhead Line Equipment	100%	Brisbane	TR1
Electrical - Power Poles	100%	Brisbane	TR1
Electrical - Transformers	100%	Brisbane	TR1
Electrical - Switch Room	100%	Brisbane	TR1
WTG - Blades	100%	Brisbane	TR1
WTG - Nacelle	100%	Brisbane	TR1
WTG - Hub	100%	Brisbane	TR1
WTG - Tower Sections (7 per tower)	100%	Brisbane	TR1
Cranes	100%	Brisbane	TR1
Portable Buildings	100%	Brisbane	TR1

* Water Trucks will only be required to transport potable water for concrete mixing and for worker use / consumption (approximately 30% of the total water demand). It is assumed that the remainder of the water required for construction will be sourced on site (approximately 70% of the total water demand).

6.2 Construction Forecast Project Traffic Volumes

The indicative traffic distribution shown in Table 8 can be used to assess the forecasted traffic volumes for each transport route (refer Table 2), based on the anticipated construction quantities, vehicles and timelines. Tables 9 to 13 show the total daily two-way vehicle trips resulting from the transportation of the construction equipment / materials / resources to the development site, for each of the transport routes.

Table 9: TR1 - Daily Project Related Traffic Volumes from Brisbane to Site

Construction Equipment / Materials / Resources	Total daily two-way vehicle trips			
	Light vehicle trips	Heavy vehicle trips	OSOM vehicle trips	Total trips
Cement Tankers	0	2	0	2
Silica Fume	0	1	0	1
WTG - Steel Embedments	0	1	0	1
Steel Reinforcement	0	1	0	1
Electrical - Cable / Overhead Lines	0	1	0	1
Electrical - Overhead Line Equipment	0	1	0	1
Electrical - Power Poles	0	0	1	1
Electrical - Transformers	0	0	1	1
Electrical - Switch Room	0	0	1	1
WTG - Blades	0	0	2	2
WTG - Nacelle	0	0	1	1
WTG - Hub	0	0	1	1
WTG - Tower Sections	0	0	3	3
Cranes	0	0	1	1
Portable Buildings	0	0	1	1
Total Trips	0	7	12	19

Table 10: TR2 - Daily Project Related Traffic Volumes from Toowoomba to Site

Construction Equipment / Materials / Resources	Total daily two-way vehicle trips			
	Light vehicle trips	Heavy vehicle trips	OSOM vehicle trips	Total trips
Workers	13	0	0	13
20mm Concrete Aggregate	0	3	0	3
10mm Concrete Aggregate	0	2	0	2
Gravel	0	11	0	11
14mm Sealing Aggregate	0	1	0	1
7mm Sealing Aggregate	0	1	0	1
River-sand	0	3	0	3
Crusher Dust	0	2	0	2
Reinforced Concrete Pipe	0	1	0	1
Formwork	0	1	0	1
Total Trips	13	25	0	38

Table 11: TR3 - Daily Project Related Traffic Volumes from Dalby to Site

Construction Equipment / Materials / Resources	Total daily two-way vehicle trips			
	Light vehicle trips	Heavy vehicle trips	OSOM vehicle trips	Total trips
Workers	86	0	0	86
Water Trucks	0	6	0	6
Flyash	0	1	0	1
Total Trips	86	7	0	93

Table 12: TR4 - Daily Project Related Traffic Volumes from Kingaroy to Site (Light Vehicles)

Construction Equipment / Materials / Resources	Total daily two-way vehicle trips			
	Light vehicle trips	Heavy vehicle trips	OSOM vehicle trips	Total trips
Workers	146	0	0	146
Total Trips	146	0	0	146

Table 13: TR5 - Daily Project Related Traffic Volumes from Kingaroy to Site (Heavy Vehicles)

Construction Equipment / Materials / Resources	Total daily two-way vehicle trips			
	Light vehicle trips	Heavy vehicle trips	OSOM vehicle trips	Total trips
Water Trucks	0	6	0	6
20mm Concrete Aggregate	0	3	0	3
10mm Concrete Aggregate	0	2	0	2
Gravel	0	11	0	11
14mm Sealing Aggregate	0	1	0	1
7mm Sealing Aggregate	0	1	0	1
River-sand	0	3	0	3
Crusher Dust	0	2	0	2
Total Trips	0	29	0	29

6.3 Construction Phase Road Impact Assessment

The following assessments were used to determine the impacts of traffic generated by the wind farm development, on the surrounding transport network during the Construction Phase, as this phase will have the largest impact on the network. The assessments identified the following:

- Traffic impact: >5% increase from existing traffic compared to the development related traffic
- Pavement impact: >5% increase from existing Equivalent Standard Axle (ESA) compared to the development related ESA

6.3.1 Traffic Impact Assessment and Mitigation

The traffic impact assessment assumed that traffic relating to the project construction will travel to site along the identified traffic routes and return via the same path. With this assumption governing the assessment, the following process was followed:

- "Actual" AADT data was calculated using traffic counts and growth rate factors provided by TMR, to provide a better estimate for the existing traffic conditions at the time of construction.
- The trip generation data (refer Tables 8 to 13 and Appendix C) was applied to the relevant road sections, forming the development related AADT.
- The percent increase between the "Actual" and development related AADT were calculated.

The results of the traffic impact assessment are provided in Table 14. The results show that the traffic impact to all road sections from Port of Brisbane Motorway (Site ID 136238) to Dalby Jandowae Road (Site ID 32057) will be equal to or below the specified 5% traffic impact value. The first section of TR3 / TR2 continuation (Site ID 32632 and 32699), first section of TR4 / TR5 (Site ID 20431) and TR5 continuation (Site ID 20542) along the Bunya Highway, also fall below the specified 5% traffic impact value.

There are 5 road sections that exceed the specified 5% traffic impact value, along MacAlister Bell Road and the Bunya Highway. This is largely attributed to the low usage of vehicles on these roads. The majority of the traffic loading is expected to be caused by light vehicles for the workers travelling to site or heavy vehicles for the transportation of materials to site.

Table 14: Traffic Impact Assessment Results

Road section ID	Site ID	Road section name	Available Traffic Data			"Actual" AADT Traffic Data	Traffic Impact Assessment Results	
			AADT	Data Year	Annual growth Rate		Development related AADT	Increase in Development AADT from "Actual" (%)
Data for Port Drive unavailable								
U27	136238	Port of Brisbane Motorway	10860	2022	0.00%	10860	19	0.17
Data for Gateway Motorway and Logan Motorway unavailable								
17A	140035	Cunningham Highway (Ipswich Motorway)	117415	2022	1.46%	120869	19	0.02
	140027	Cunningham Highway (Ipswich Motorway)	102601	2022	2.12%	106997	19	0.02
	136081	Cunningham Highway (Ipswich Motorway)	114498	2022	3.05%	121589	19	0.02
18A	135546	Warrego Highway (Ipswich - Toowoomba)	63191	2022	1.71%	65371	19	0.03
	135715	Warrego Highway (Ipswich - Toowoomba)	48026	2022	1.48%	49458	19	0.04
	135964	Warrego Highway (Ipswich - Toowoomba)	35301	2022	2.52%	37103	19	0.05
	10021	Warrego Highway (Ipswich - Toowoomba)	31843	2022	1.17%	32592	19	0.06
	160004	Warrego Highway (Ipswich - Toowoomba)	21183	2022	0.00%	21183	19	0.09
	30066	Warrego Highway (Ipswich - Toowoomba)	25202	2022	2.67%	26566	19	0.07
	30041	Warrego Highway (Ipswich - Toowoomba)	18343	2022	2.73%	19358	19	0.10
	30070	Warrego Highway (Ipswich - Toowoomba)	22906	2022	1.37%	23536	19	0.08
Data for Toowoomba Bypass unavailable								
315	38644	Toowoomba Connection Road	17189	2022	1.37%	17661	38	0.22
	32636	Toowoomba Connection Road	20806	2022	0.00%	20806	38	0.18
	37610	Toowoomba Connection Road	14064	2022	0.00%	14064	38	0.27
	32686	Toowoomba Connection Road	14029	2022	0.00%	14029	38	0.27
	30071	Toowoomba Connection Road	18692	2022	0.00%	18692	38	0.20
	37608	Toowoomba Connection Road	12005	2022	0.00%	12005	38	0.32
	30074	Toowoomba Connection Road	9559	2022	0.00%	9559	38	0.40
	30075	Toowoomba Connection Road	16892	2022	0.00%	16892	38	0.22
	32645	Toowoomba Connection Road	11755	2022	0.00%	11755	38	0.32

	38586	Toowoomba Connection Road	10754	2022	0.90%	10948	38	0.35
18B	38587	Warrego Highway (Toowoomba - Dalby)	12665	2022	0.90%	12894	57	0.44
	30025	Warrego Highway (Toowoomba - Dalby)	14075	2022	1.80%	14586	57	0.39
	32641	Warrego Highway (Toowoomba - Dalby)	10455	2022	0.24%	10505	57	0.54
	32559	Warrego Highway (Toowoomba - Dalby)	6117	2021	3.71%	6823	57	0.84
	30004	Warrego Highway (Toowoomba - Dalby)	6218	2022	2.55%	6539	57	0.87
	30012	Warrego Highway (Toowoomba - Dalby)	8092	2022	2.46%	8495	57	0.67
	32693	Warrego Highway (Toowoomba - Dalby)	15085	2022	1.55%	15555	57	0.37
18C	32633	Warrego Highway (Dalby - Miles)	9517	2022	0.63%	9637	19	0.20
421	32707	Dalby - Jandowae Road	2680	2022	4.53%	2928	19	0.65
	32057	Dalby - Jandowae Road	970	2022	0.00%	970	19	1.96
422	32119	Macalister - Bell Road	129	2022	1.89%	134	19	14.19
45A	32632	Bunya Highway (Dalby - Kingaroy)	5233	2022	3.77%	5635	131	2.32
	32699	Bunya Highway (Dalby - Kingaroy)	2887	2022	3.53%	3094	131	4.23
	30017	Bunya Highway (Dalby - Kingaroy)	976	2022	2.21%	1020	131	12.85
	30045	Bunya Highway (Dalby - Kingaroy)	638	2022	0.00%	638	150	23.51
	37737	Bunya Highway (Dalby - Kingaroy)	836	2022	0.49%	844	29	3.44
	20542	Bunya Highway (Dalby - Kingaroy)	1108	2022	0.00%	1108	175	15.79
	30107	Bunya Highway (Dalby - Kingaroy)	2565	2022	0.00%	2565	175	6.82
	20431	Bunya Highway (Dalby - Kingaroy)	4981	2022	1.05%	5086	175	3.44
Data for Mannuem Road unavailable								
Data for Ironpot Road unavailable								
Data for Jumma Road unavailable								
Data for Nords Road unavailable								
Data for Red Tank Road unavailable								

Denotes traffic impact equal to or below the specified 5% value

Denotes traffic impact above the specified 5% value

6.3.2 *Pavement Impact Assessment and Mitigation*

The pavement impact assessment assumed that traffic relating to the project construction will travel to site along the identified traffic routes and return via the same path. With this assumption governing the assessment, the following process was followed:

- "Actual" ESA data was calculated using the "Actual" AADT data and proportions of light and heavy vehicles (provided by TMR) in combination with the assumptions below:
  - Assumed heavy vehicle ESA for the existing traffic data was 3.2
  - Assumed light vehicle ESA for the existing traffic data was 1.18
- The trip generation data (refer Tables 8 to 13 and Appendix C) was applied to the relevant road sections, forming the development related ESA values. Table 15 shows the factors used to determine the development related traffic ESA values for various loaded and unloaded vehicles.
- The percent increase between the "Actual" and development related ESA values were calculated.

Table 15: ESA Loading Status

Construction Vehicle Type	Vehicle Classification	Vehicle Class (Austroads)	Axle Count	Load Status (Calculated ESA's 4th Power)[1]		
				0%	50%	100%
Passenger vehicle	Light vehicle	1	2	0.42	1.18	3.00
HRV	Heavy vehicle	4	3	0.51	1.27	3.58
Double tanker	Heavy vehicle	10	9	1.69	2.8	6.91
Truck and dog	Heavy vehicle	10	7	1.64	2.45	6.15
19m AV (tri-axle)	Heavy vehicle	9	6	1.68	2.59	5.54
B double	Heavy vehicle	10	9	1.69	2.8	6.91
Over dimensional / higher mass limit vehicle (special permit vehicle)	Over dimensional / higher mass limit vehicle	12	16	1.76	3.91	12.42

[1] Load status data extracted from Australian Trucking Association's Technical Advisory Procedure document *"Truck impact chart"*, Edition 2.2, March 2018.

The results of the pavement impact assessment are provided in Table 16. The results show that the pavement impact to all road sections from Port of Brisbane Motorway (Site ID 136238) to the Warrego Highway (Site ID 32633) will be equal to or below the specified 5% pavement impact value.

There are 11 road sections that exceed the specified 5% pavement impact value, from the towns of Dalby and Kingaroy to site. This is largely attributed to the low usage of vehicles on these roads, and also the limited usage of heavy in comparison to light vehicles on these roads.

Table 16: Pavement Impact Assessment Results

Road section ID	Site ID	Road section name	Available Traffic Data			"Actual" Traffic Data		Traffic Impact Result Assessment	
			AADT	Data Year	Annual growth Rate	AADT	"Actual" traffic ESA	Development related ESA	Increase in Development ESA from "Actual" (%)
Data for Port Drive unavailable									
U27	136238	Port of Brisbane Motorway	10860	2022	0.00%	10860	22072	229	1.04
Data for Gateway Motorway and Logan Motorway unavailable									
17A	140035	Cunningham Highway (Ipswich Motorway)	117415	2022	1.46%	120869	146141	229	0.16
	140027	Cunningham Highway (Ipswich Motorway)	102601	2022	2.12%	106997	143061	229	0.16
	136081	Cunningham Highway (Ipswich Motorway)	114498	2022	3.05%	121589	162571	229	0.14
18A	135546	Warrego Highway (Ipswich - Toowoomba)	63191	2022	1.71%	65371	95769	229	0.24
	135715	Warrego Highway (Ipswich - Toowoomba)	48026	2022	1.48%	49458	80290	229	0.29
	135964	Warrego Highway (Ipswich - Toowoomba)	35301	2022	2.52%	37103	57189	229	0.40
	10021	Warrego Highway (Ipswich - Toowoomba)	31843	2022	1.17%	32592	53417	229	0.43
	160004	Warrego Highway (Ipswich - Toowoomba)	21183	2022	0.00%	21183	36528	229	0.63
	30066	Warrego Highway (Ipswich - Toowoomba)	25202	2022	2.67%	26566	42896	229	0.53
	30041	Warrego Highway (Ipswich - Toowoomba)	18343	2022	2.73%	19358	31891	229	0.72
	30070	Warrego Highway (Ipswich - Toowoomba)	22906	2022	1.37%	23536	36277	229	0.63
Data for Toowoomba Bypass unavailable									
315	38644	Toowoomba Connection Road	17189	2022	1.37%	17661	25350	251	0.99
	32636	Toowoomba Connection Road	20806	2022	0.00%	20806	30385	251	0.83
	37610	Toowoomba Connection Road	14064	2022	0.00%	14064	19368	251	1.30
	32686	Toowoomba Connection Road	14029	2022	0.00%	14029	20213	251	1.24
	30071	Toowoomba Connection Road	18692	2022	0.00%	18692	24896	251	1.01
	37608	Toowoomba Connection Road	12005	2022	0.00%	12005	17369	251	1.44
	30074	Toowoomba Connection Road	9559	2022	0.00%	9559	12604	251	1.99
	30075	Toowoomba Connection Road	16892	2022	0.00%	16892	23055	251	1.09
	32645	Toowoomba Connection Road	11755	2022	0.00%	11755	16687	251	1.50

	38586	Toowoomba Connection Road	10754	2022	0.90%	10948	17782	251	1.41
18B	38587	Warrego Highway (Toowoomba - Dalby)	12665	2022	0.90%	12894	20638	480	2.33
	30025	Warrego Highway (Toowoomba - Dalby)	14075	2022	1.80%	14586	23208	480	2.07
	32641	Warrego Highway (Toowoomba - Dalby)	10455	2022	0.24%	10505	17031	480	2.82
	32559	Warrego Highway (Toowoomba - Dalby)	6117	2021	3.71%	6823	11812	480	4.06
	30004	Warrego Highway (Toowoomba - Dalby)	6218	2022	2.55%	6539	11618	480	4.13
	30012	Warrego Highway (Toowoomba - Dalby)	8092	2022	2.46%	8495	15038	480	3.19
	32693	Warrego Highway (Toowoomba - Dalby)	15085	2022	1.55%	15555	25308	480	1.90
18C	32633	Warrego Highway (Dalby - Miles)	9517	2022	0.63%	9637	15567	229	1.47
421	32707	Dalby - Jandowae Road	2680	2022	4.53%	2928	4569	229	5.01
	32057	Dalby - Jandowae Road	970	2022	0.00%	970	1675	229	13.67
422	32119	Macalister - Bell Road	129	2022	1.89%	134	244	229	93.75
45A	32632	Bunya Highway (Dalby - Kingaroy)	5233	2022	3.77%	5635	8192	792	9.67
	32699	Bunya Highway (Dalby - Kingaroy)	2887	2022	3.53%	3094	4463	792	17.75
	30017	Bunya Highway (Dalby - Kingaroy)	976	2022	2.21%	1020	1626	792	48.72
	30045	Bunya Highway (Dalby - Kingaroy)	638	2022	0.00%	638	1082	1021	94.36
	37737	Bunya Highway (Dalby - Kingaroy)	836	2022	0.49%	844	1308	186	14.22
	20542	Bunya Highway (Dalby - Kingaroy)	1108	2022	0.00%	1108	1907	1061	55.62
	30107	Bunya Highway (Dalby - Kingaroy)	2565	2022	0.00%	2565	3794	1061	27.97
	20431	Bunya Highway (Dalby - Kingaroy)	4981	2022	1.05%	5086	6951	1061	15.26
Data for Mannuem Road unavailable									
Data for Ironpot Road unavailable									
Data for Jumma Road unavailable									
Data for Nords Road unavailable									
Data for Red Tank Road unavailable									

Denotes traffic impact equal to or below the specified 5% value

Denotes traffic impact above the specified 5% value

6.4 Operational Phase Road Impact Assessment

During the operational phase, it is estimated that up to 10 full time equivalent (FTE) workers would be employed to conduct routine maintenance on the Wind Farm. It is anticipated that the staff will travel from Kingaroy to the site during the morning peak and return to Kingaroy during the evening peak, each day.

With the limited number of maintenance workers and very few visitors expected at the site, it is considered that the traffic impacts will be negligible with no more than 12 daily two-way trips generated by the facility, which includes workers as well as maintenance and delivery vehicles.

6.5 Additional Mitigation and Control Measures

It is recommended that the following upgrades and measures be implemented as a condition of approval for this Project:

- Conduct pre and post construction visual dilapidation survey and reports, on all roads significantly impacted by construction traffic (or as required by Council).
- Develop and implement a TMP with appropriate controls and signage for the local council roads through to the Project site entrance. The extent of this is to be determined and completed once a contractor has been engaged.
- Provide upgrades to intersections in line with the TRS produced by icubed consulting as some of these upgrades are likely to reduce impacts at intersections. Detailed design of works required to effect the upgrades outlined in the TRS shall be completed in accordance with the Road Planning and Design Manual (RPDM).
- Repair roads that have unsealed surfaces where damage has been caused from construction traffic.
- Dust control to be implemented on the relevant unsealed roads / intersections along the transport route during construction.

It is considered that these measures will be appropriate to mitigate the long- and short-term traffic impacts of this proposed development.

7 Conclusion and Recommendations

This report represents the Traffic Impact Assessment for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot. It is anticipated that construction will commence in Q4 2024 and continue through to Q1 2027. While the exact timing for construction may vary, it is anticipated that the entire project will be completed and operational in Q2 2027.

The traffic impact assessment considered both the construction and operation phases of the project and the impacts on traffic operation and pavement condition.

The identified Transport Routes and Trip Generation Assessment were used to determine the relative impacts to each of the relevant roads. It was found that 5 road sections had traffic impacts exceeding the specified 5% increase, while 11 road sections had pavement impacts exceeding the specified 5% increase. These can be attributed to low road usages and specifically low usage of heavy vehicles in most of these areas.

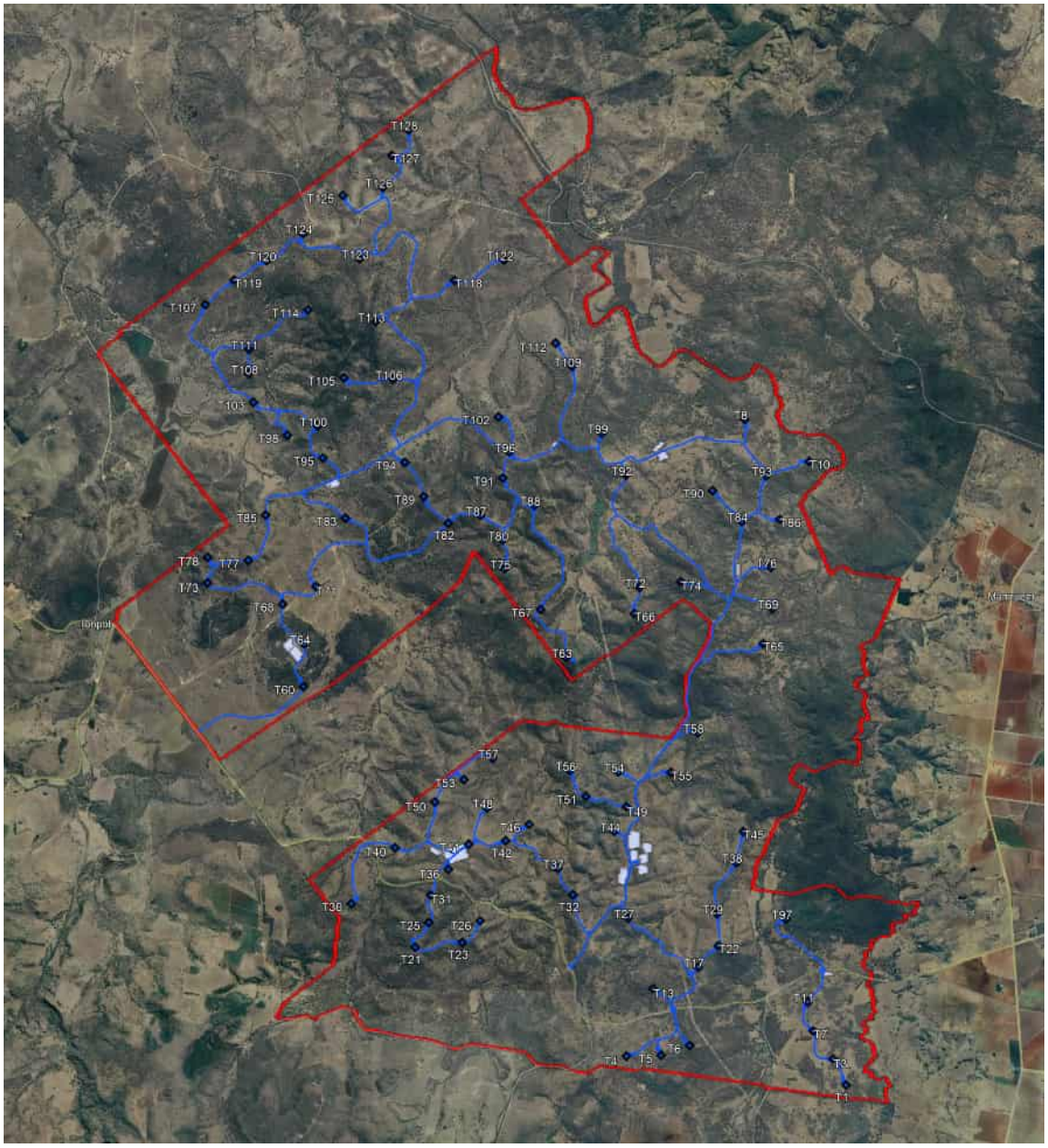
The main intersections expected to be most affected by the development during construction are:

- Warrego Highway / Jandowae Road
- Dalby Jandowae Road / MacAlister Bell Road
- MacAlister Bell Road / Bunya Highway
- Bunya Highway / Mannuem Road
- Mannuem Road / Ironpot Road
- Bunya Highway / Ironpot Road
- Bunya Highway / Nords Road
- Nords Road / Red Tank Road
- Red Tank Road / Ironpot Road

The recommended construction phase controls are outlined in Section 6.5 of this report.

This report has been produced for Development Application to the State Assessment and Referral Agency (SARA) in consultation with South Burnett Regional Council (SBRC) and Department of Transport and Main Roads (TMR). This report has been provided to demonstrate compliance with PO13 of State Code 23, in conjunction with the TRS and TMP. Once the Project reaches the detailed design stage of works and a contractor has been engaged, the results of this report should be re-assessed to either confirm the impact results or provide amended outcomes.

Appendix A – Site Plan



Appendix B – Local Road Network Intersection Images

Image 1: Bunya Highway / Mannuem Road Intersection Looking South-West

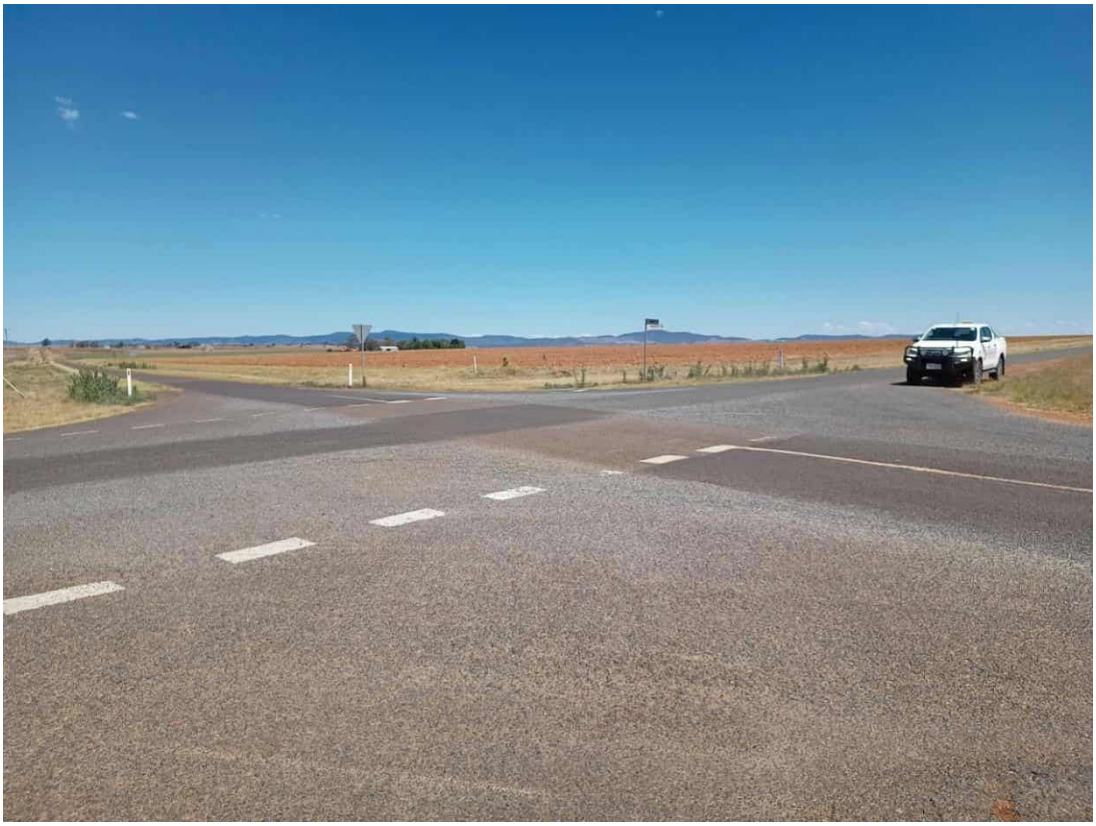


Image 2: Mannuem Road / Ironpot Road Intersection Looking South-West

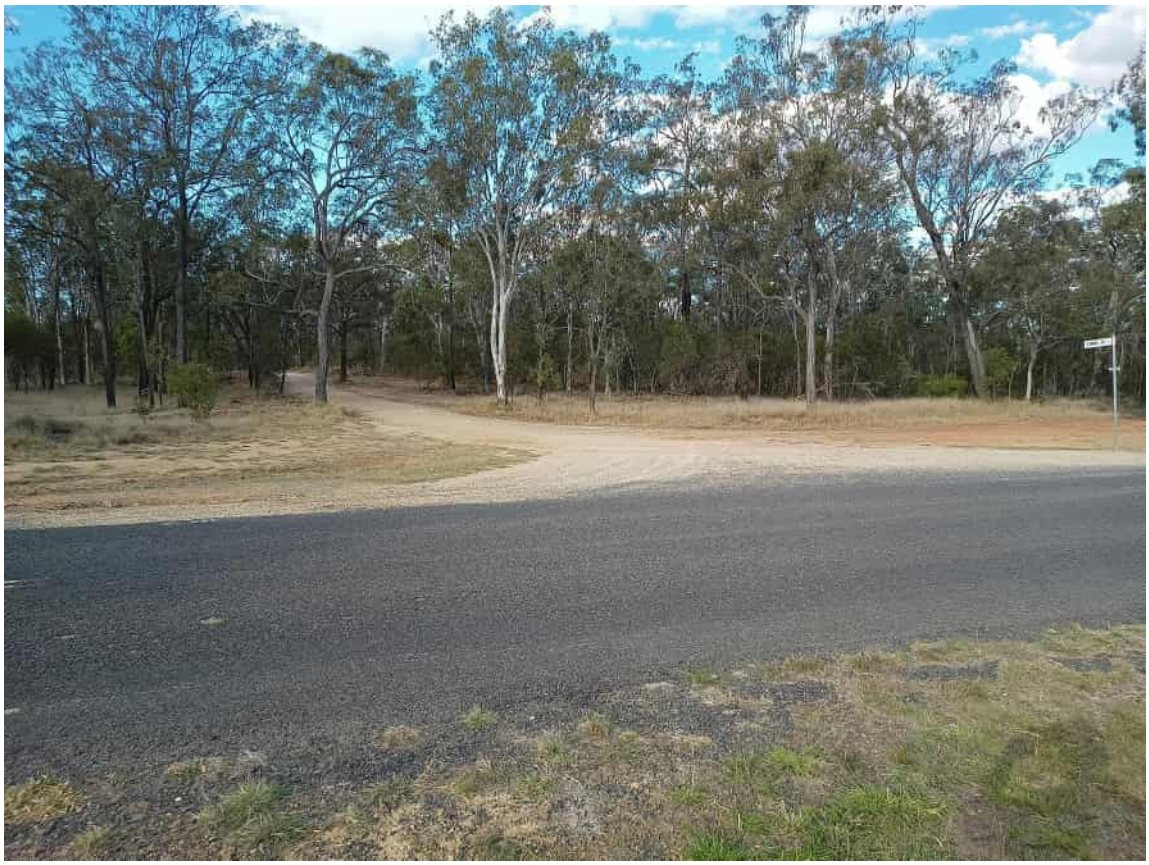


Image 3: Ironpot Road / Jumma Road Intersection Looking East

Image 4: Bunya Highway / Nords Road Intersection Looking West

Image 5: Nords Road / Red Tank Road Intersection Looking North-West

Image 6: Red Tank Road / Ironpot Road Intersection Looking North

Appendix C – Vehicle Generation Data

shown overleaf

23-047 - Tarong West Wind Farm
Trip Generation Stage

Phase 1 - Construction - Equiptment / Materials / Resources Deliveries (Peak Traffic)

Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	Morning Peak Hour					Evening Peak Hour				
				% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	LV - Light vehicle	243	100%	100%	243	0%	0	243	0%	0	100%	243	243
Water Trucks	HV - HRV	11	100%	25%	3	25%	3	6	25%	3	25%	3	6
Cement Tankers	HV - Double Tanker	2	100%	50%	1	50%	1	2	50%	1	50%	1	2
Flyash	HV - Double Tanker	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Silica Fume	HV - Double Tanker	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
20mm concrete aggregate	HV - Truck and Dog	6	100%	50%	3	50%	3	6	50%	3	50%	3	6
10mm concrete aggregate	HV - Truck and Dog	3	100%	50%	2	50%	2	4	50%	2	50%	2	4
Gravel - Quarry Import	HV - Truck and Dog	22	100%	50%	11	50%	11	22	50%	11	50%	11	22
14mm sealing aggregate	HV - Truck and Dog	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
7mm sealing aggregate	HV - Truck and Dog	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Riversand	HV - Truck and Dog	6	100%	50%	3	50%	3	6	50%	3	50%	3	6
Crusherdust	HV - Truck and Dog	3	100%	50%	2	50%	2	4	50%	2	50%	2	4
Reinforced Concrete Pipe	HV - 19m AV (tri-axle)	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Formwork	HV - 19m AV (tri-axle)	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
WTG - Steel embedments	HV - 19m AV (tri-axle)	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Steel reinforcement	HV - B Double	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Electrical Cable / OHL	HV - B Double	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Electrical OHL Equipment	HV - B Double	1	100%	50%	1	50%	1	2	50%	1	50%	1	2
Electrical Power Poles	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
Electrical Transformers	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
Electrical Switch Room	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
WTG - Blades	(O.D.) over-dimensional	2	0%	0%	0	0%	0	0	0%	0	0%	0	0
WTG - Nacelles	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
WTG - Hubs	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
WTG - Tower Sections	(O.D.) over-dimensional	3	0%	0%	0	0%	0	0	0%	0	0%	0	0
Cranes	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
Portable Buildings	(O.D.) over-dimensional	1	0%	0%	0	0%	0	0	0%	0	0%	0	0
Total		**318**			**278**		**35**	**313**		**35**		**278**	**313**
% Light Vehicles								**78%**					**78%**

Notes:

1. 10% of Workers are Assumed to Carpool
2. Average Labour Force has been Considered
3. Major Construction plant for earthworks and access will be delivered at the start of the project and remain on site for the construction phase.
4. The above summarises the major traffic movements related to construction.
5. WTG. Abrieviation is Wind Turbine Generators
6. Traffic generation above is for trips on Council roads adjacent to the site.

Phase 2 - Operation

Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	Morning Peak Hour					Evening Peak Hour				
				% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	Light vehicle	10	100%	100%	10	0%	0	10	0%	0	100%	10	10
Deliveries or maintenance	MRV	2	100%	50%	1	50%	1	2	50%	1	50%	1	2
Total		**12**			**11**		**1**	**12**		**1**		**11**	**12**
% Light Vehicles								**83%**					**83%**

Notes:

1. Average Labour Force has been Considered

Trip Generation Summary

Phase	Morning Peak	Afternoon Peak
Construction	313	313
Operations	12	12

Appendix C – Transport Route Study (TRS)

shown overleaf

TRANSPORT ROUTE STUDY

23-047 TARONG WEST WIND FARM

Prepared for:

RES AUSTRALIA PTY LTD

icubed consulting

Prepared By	Pranay Madhaparia
Released By	Travis Smith
Job Number	23-047
Date	20/12/2023
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Document Revision History

Version	Prepared by	Date	Revision History
1.0	PM	20/12/23	For Approval

Travis Smith
RPEQ 16400

20/12/2023

STATEMENT OF LIMITATION

Data and conclusions of this report are the findings and opinions of icubed consulting and are not an expressed or implied representation, warranty or guarantee. This report has been prepared for RES Australia Pty Ltd. icubed Consulting does not accept liability for any third party's use or reliance on this report.

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1 Introduction

icubed consulting were commissioned by RES Australia Pty Ltd (RES) to undertake an External Transport Route Study for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot, Queensland.

This report details the results of this assessment, including an evaluation of:

- Existing conditions of the proposed transport route, specifically for oversize, overmass (OSOM) vehicles, from the Port of Brisbane to the Project site
- Identifying the key intersections and turning manoeuvres the OSOM vehicles will undertake
- Investigating the most appropriate turning manoeuvres for the critical OSOM vehicles (blade trailer vehicle) to undertake at the key intersections through swept path analysis
- Investigation of any road or intersection upgrades required to enable blade vehicles to navigate from the Port of Brisbane to the Project site.

Preliminary investigations were conducted from a desktop study using aerial imagery and physical measurements of key overpasses where required.

Although several conflicts exist, it is considered that a viable route from the Port of Brisbane to the project site is available, subject to resolving the potential conflicts with the relevant stakeholders during the NHVR permit and secondary consent processes.

Of the components of wind farm infrastructure to be transported, turbine blades present the largest logistical challenge to horizontal geometry, as they must be transported as a single piece. Turbine tower sections also present considerable challenges, due to the loaded vehicle height, and potential conflict with fixed overhead structures.

1.1 Limits of Report

The above tasks have been carried out based on information supplied by other members of the project team, together with observations on site and information from relevant authorities. These are detailed in the report.

While icubed has taken care in the preparation of this report, it neither accepts liability nor responsibility whatsoever in respect of:

- Any use of this report by any third party
- Any third party whose interests may be affected by any decision made regarding the contents of this report.

2 Existing Conditions

2.1 Site Location

The subject site is located at Ironpot Road, Ironpot in Queensland and is described as:

- Lots 4 and 7 on RP890694
- Lot 36 on BO236
- Lot 6 on BO250
- Lot 5 on BO330
- Lot 44 on FTZ37207
- Lot 43 on FTZ237338
- Lots 60, 62 and 63 on BO188
- Lots 64, 66 and 93 on BO190
- Lot 67 on BO490
- Lot 68 on RP800291
- Lot 10 on SP168643
- Lot 29 on BO243.

The main proposed access point for oversize vehicles is from Jumma Road and Ironpot Road, which are accessed via Mannuem Road off the Bunya Highway (shown in Figure 1). Section 4 of this report describes an additional proposed access point for oversize vehicles, which uses a combination of internal tracks and external roads.

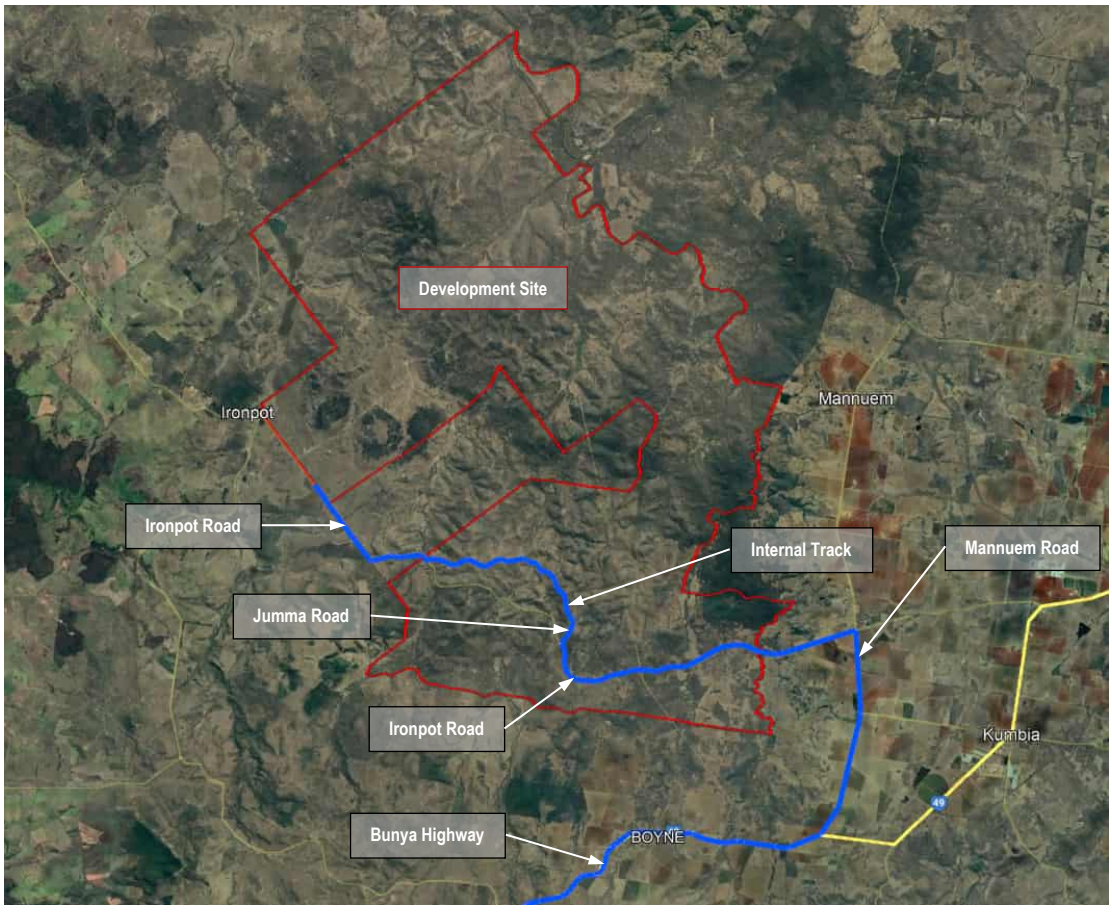


Figure 1: Site Locality Plan and Proposed Oversize Vehicle Access Roads (Google Earth, 2023)

3 Proposed Development

3.1 Description of Proposed Development

The proposed development will comprise of a wind farm which is intended to be built in a single stage.

The wind farm will comprise of up to 97 Wind Turbine Generators (WTG) spread across the subject site, with each having a nominal ground to hub height of up to 190m and an approximate name plate capacity of 4.5 MW, combining for an overall rated capacity of up to 436.5 MW. The WTG tower configuration is yet to be finalised and the WTG blade will be up to 90m long.

It is anticipated that construction will commence in Q4 2024 and continue through to Q1 2027. While the exact timing for construction may vary, it is anticipated that the entire project will be completed and operational in Q2 2027.

The proposed site layout is provided in Appendix A.

4 Oversize Transport Route

4.1 Proposed Oversize Transport Route

The proposed oversize transport route is shown in Figure 2, with a detailed list of the constituting roads in Table 1. Mannuem Road, Ironpot Road and Jumma Road are the three local roads that provide access to the development off the Bunya Highway.

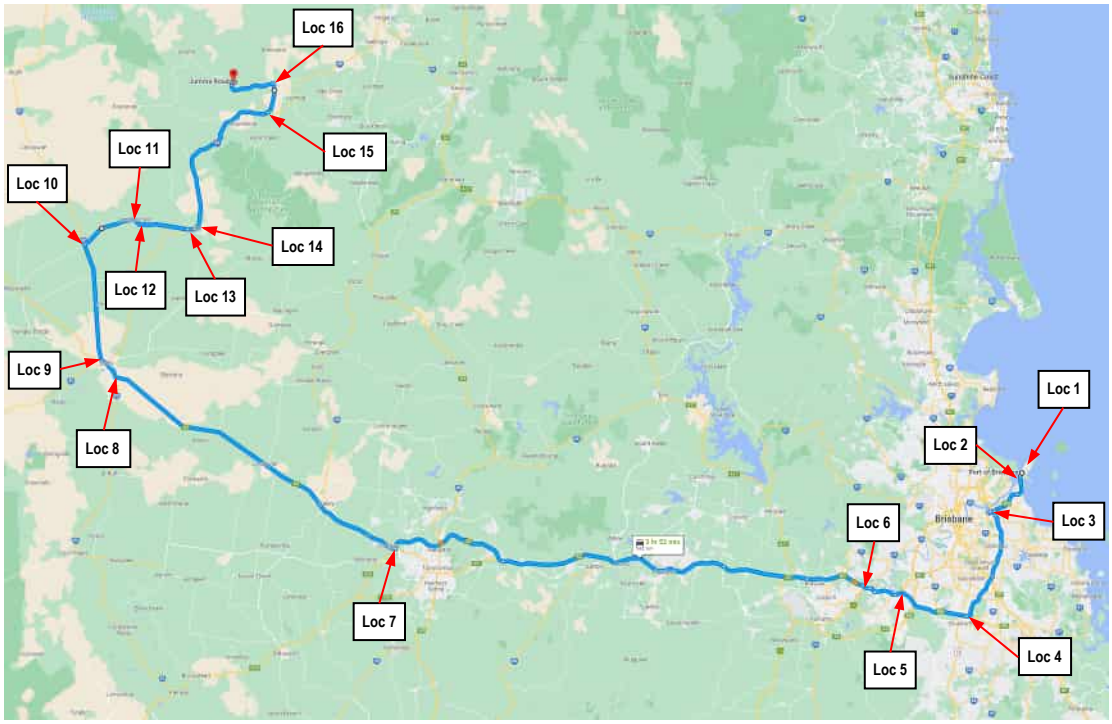


Figure 2: Proposed Oversize Transport Route (Google Maps, 2023)
* Loc = location. Refer Table 2 for location descriptions

Table 1: Proposed Oversize Transport Route

Oversize Transport Route Description	Constituting Roads
Port of Brisbane to Tarong West Wind Farm	Port Drive Port of Brisbane Motorway Gateway Motorway Logan Motorway Ipswich Motorway Warrego Highway Toowoomba Bypass Warrego Highway Volker Street (optional) Jandowae Road Dalby Jandowae Rd MacAlister Bell Rd Bunya Highway Mannuem Road Ironpot Road / Jumma Road

There are two WTG groups to the south of Ironpot Road (containing T30 and T31) that will not be accessed by OSOM vehicles turning left off Ironpot Road (see Figure 3). Instead, OSOM vehicles will access these groups by turning off Ironpot Road onto Jumma Road, then turning onto the internal access tracks which will "cross over" Ironpot Road. Furthermore, access to the T60 group to the north-west will also utilise the route via Jumma Road and the internal access tracks but will instead turn back onto Ironpot Road travelling north-west. The proposed OSOM vehicle routes are shown in Figure 3 in dark blue, and the section of Ironpot Road not to be utilised by OSOM vehicles is shown in light blue.

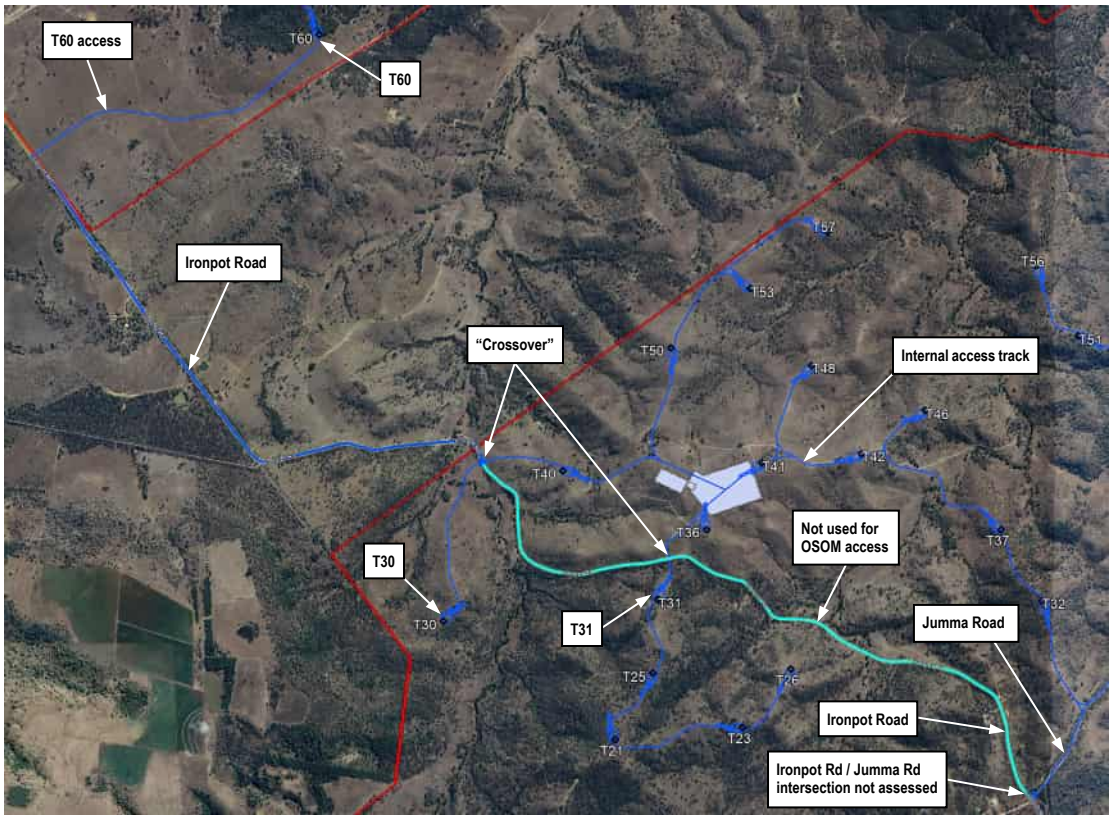


Figure 3: Proposed Oversize vehicle Access Roads (Google Earth, 2023)

Since the entirety of Jumma Road (including the intersection with Ironpot Road) is to be upgraded as part of the Project works, the Ironpot Road / Jumma Road intersection has been excluded from this assessment. The section of Ironpot Road between T30 and T60 was assessed to likely only require minor vegetation trimming/removal. This area should be reassessed following the acquisition of on-site survey.

These access points have been nominated for the purposes of completing the Traffic Reports and are to be confirmed prior to construction. The impacts of the final port of entry have been excluded from this report as further information about port logistics and protocol would be required. Rather, an arbitrary access point has been chosen to form the start of the transport route. The assessment undertaken considers a one-way (westbound) trip only, as the delivery vehicles will no longer be classified as OSOM on the return trip.

4.2 Design Vehicles

The largest size vehicle expected to deliver components to site during construction of the wind farm will be a WTG Blade Trailer vehicle as shown indicatively in Figure 4, which can carry a 90m long turbine blade. Given the large geometry of the blade trailer vehicle, it has been considered that upgrade works that cater for the blade vehicle will provide for a worst-case scenario.

Other large vehicles that are likely during construction, are OSOM vehicles for deliveries of other turbine and infrastructure components, and B-Double vehicles for other material deliveries. These are much smaller than the blade trailer vehicle, however the turbine tower sections will likely be the tallest deliveries.

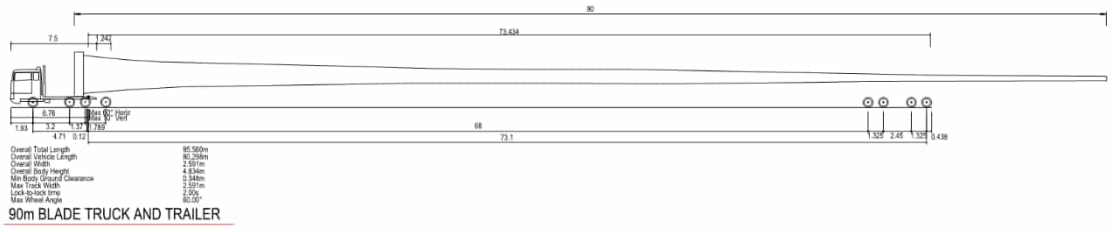


Figure 4: Dimensions of Oversize Vehicle for WTG Blade Transportation

4.3 Oversize Transport Permits

The use of OSOM vehicles in transportation of WTG components will require the Contractor's appointed transportation company to apply for OSOM permits to the National Heavy Vehicle Regulator (NHVR). As part of obtaining the OSOM permits, the proposed transport route will be assessed by NHVR and other referred assessors such as the Department of Transport and Main Roads (TMR). It is reasonable to expect that a conditional NHVR permit will require some pavement alignment upgrades and utility relocations. All of these activities would be required to be completed under an appropriate secondary consent in accordance with the responsible entity for the particular asset.

4.4 Oversize Length Assessment

To check the suitability of the proposed transport route, Vehicle Tracking software within AutoCAD was used to run vehicle swept paths for the 90m blade trailer (refer Section 4.2), at key intersections or sharp curves along the transport route. These swept paths were used to identify if temporary intersection upgrades are required to enable the oversize vehicles to manoeuvre through the key locations, and ultimately travel to the site. Table 2 summarises the road intersections and curves that were reviewed as potential areas of concern along the transport route for the blade trailer vehicle.

Table 2: Assessed Transport Route Locations

Location No.	Location Description	Map Reference Coordinates	Vehicle Manoeuvre	Modifications Required
1	Bishop Drive / Lucinda Drive, Port of Brisbane (Fisherman Island)	-27.371985, 153.185811	Right turn	Yes
2	Lucinda Drive / Port Drive, Port of Brisbane (Fisherman Island)	-27.394669, 153.163221	Left curve	No
3	Port Drive / Gateway Motorway, Murarrie	-27.458506, 153.109355	Left curve	Yes
4	Gateway Motorway / Logan Motorway, Drewvale	-27.648877, 153.059022	Right curve	No
5	Logan Motorway / Ipswich Motorway, Gailes	-27.605730, 152.918631	Left curve	No
6	Ipswich Motorway / Warrego Hwy, Riverview	-27.596328, 152.841681	Right curve	No
7 (Option A & B)	Toowoomba Bypass / Warrego Hwy	-27.523399, 151.863203	Right turn, **or** 3-point turn	Yes
8	Warrego Hwy / Dalby Cecil Plains Road, Dalby	-27.205541, 151.281477	Right curve	No
9 (Option A)	Warrego Hwy / Jandowae Rd, Dalby	-27.176730, 151.251591	Right turn	Yes
9 (Option B, turn 1 of 2)	Warrego Hwy / Volker Street, Dalby	-27.175286, 151.246937	Right turn	Yes
9 (Option B, turn 2 of 2)	Volker Street / Jandowae Rd, Dalby	-27.172015, 151.250925	Left turn	Yes
10	Dalby Jandowae Rd / MacAlister Bell Rd, Jimbour East	-26.960823, 151.215901	Right turn	Yes
11	MacAlister Rd / Spring Flat Rd, Jimbour East	-26.915414, 151.320395	Right curve	No
12	MacAlister Rd, Jimbour East	-26.924031, 151.328655	Left curve	No
13	MacAlister Bell Rd / Bunya Hwy Rd, Bell	-26.933217, 151.431823	Left turn	Yes
14	Bunya Hwy / Crawshay St, Bell	-26.930849, 151.452214	Left curve	Yes
15	Bunya Hwy / Mannuem Rd, Mannuem	-26.715863, 151.599356	Left turn	Yes
16	Mannuem Rd / Ironpot Rd, Mannuem	-26.661429, 151.609766	Left turn	Yes

4.5 Overhead Obstruction Assessment

A review has been carried out on each of the overpasses along the proposed transport route to ensure adequate vertical clearance is available. Table 3 summarises the overpasses identified along the transport route with signed and measured heights. Other overhead obstructions (such as signboards, overhead lines, vegetation, etc.) should be assessed once a delivery contractor is engaged. Whilst care has been taken to assess these fixed obstructions, there are considerable utility obstructions, specifically power and communications cables, that will need to be assessed as part of any secondary consent processes for the project.

Table 3: Overhead Obstructions along the Transport Route

Location No.	Location Description (Queensland Globe)	Map Reference Coordinates	Overpass Height (m) - Signed	Overpass Height (m) - Measured
1	Port Drive Overpass	-27.383535, 153.168137	7.5*	-
2	Queensland Bulk Handling 1	-27.384107, 153.167748	10.8*	-
3	Queensland Bulk Handling 2	-27.391378, 153.163843	9.8*	-
4	Lucinda Drive Overpass	-27.393951, 153.163950	6.8*	-
5	Pritchard Street Overpass	-27.424857, 153.147835	7.7	-
6	Lindum Road Overpass	-27.439863, 153.137466	6.2	-
7	Hemmant Tingalpa Road Overpass	-27.447259, 153.126496	6.1	-
8	Port of Brisbane Motorway Overpass	-27.451651, 153.114702	6.1	-
9	Meadowlands Road Overpass	-27.493264, 153.125183	Not posted	6.6
10	Miles Platting Road Overpass	-27.577611, 153.105761	5.9	-
11	Compton Road Overpass	-27.613570, 153.078924	Not posted	6.9
12	Beaudesert Road Overpass 1	-27.648787, 153.053961	Not posted	7.6
13	Beaudesert Road Overpass 2	-27.647076, 153.041969	Not posted	7.3
14	Beaudesert Road Overpass 3	-27.647000, 153.041560	Not posted	8.3
15	Gateway Motorway Overpass	-27.646564, 153.040018	Not posted	7.0
16	Interstate Line Rail Overpass	-27.642380, 153.014924	5.2 [1]	-
17	Paradise Road Overpass	-27.641914, 153.011851	5.3 [1]	-
18	Stapylton Road Overpass	-27.641425, 152.985467	5.2 [2]	5.5 [2]
19	Woogaroo Street Overpass	-27.632345, 152.953563	5.7 [3]	-
20	Centenary Highway Overpass 1	-27.625483, 152.942498	5.6 [3]	6.5 [3]
21	Centenary Highway Overpass 2	-27.625319, 152.942325	5.3 [3]	6.5 [3]
22	Springfield Line Rail Overpass	-27.625083, 152.942077	Not posted [3]	12.3 [3]
23	Centenary Highway Overpass 3	-27.623871, 152.940935	5.4 [3]	5.8 [3]
24	Formation Street Overpass	-27.607835, 152.923854	6.6	-
25	Viking Drive Overpass 1	-27.605784, 152.918022	5.9	-
26	Viking Drive Overpass 2	-27.605833, 152.917372	5.9	-
27	Brisbane Road Overpass	-27.605914, 152.916830	5.9	-
28	Old Logan Road Overpass	-27.606586, 152.914803	8.5	-
29	Goodna Station Pedestrian Bridge	-27.609103, 152.900460	6.5	-
30	Albert Street / Woogaroo Street Pedestrian Bridge	-27.606015, 152.894967	6.6	-
31	Law Street Pedestrian Bridge	-27.604417, 152.866279	6.5	-
32	Tessman Street / McEwan Street Pedestrian Bridge	-27.597361, 152.851258	6.5	-
33	River Road Overpass	-27.590851, 152.833149	5.5 [4]	-
34	Mount Crosby Road Overpass	-27.574671, 152.789739	5.5 [5]	-
35	Kholo Road Overpass	-27.580691, 152.753253	6.0	-
36	Ipswich / Warrego Highway Connection Overpass	-27.580271, 152.724921	5.2	6.0
37	Brisbane Valley Highway Overpass	-27.576157, 152.700399	6.1	-
38	School Street Pedestrian Bridge	-27.563100, 152.592605	7.0	-
39	Laidley Plainland Road Overpass	-27.565042, 152.420419	6.7	-
40	Gatton College Access Overpass	-27.545370, 152.340255	5.5 [6]	-
41	Eastern Drive Overpass	-27.549366, 152.316932	6.4	-
42	Murphys Creek Road Overpass	-27.524397, 152.065569	6.1	-

43	New England Highway Overpass	-27.518916, 151.953021	Not posted	16.0
44	Hermitage Road Overpass	-27.518892, 151.935688	Not posted	6.7
45	Boundary Street Overpass	-27.506525, 151.909100	6.1	-
46	Toowoomba Bypass Overpass	-27.524293, 151.861090	Not posted	7.2
47	Kingsthorpe Haden Road Overpass	-27.497873, 151.804607	Not posted	7.9

* Overpass may not impact transport route depending on port logistics and actual route out of Port of Brisbane.

[1] For overpasses 14 and 15, an alternative route is available through turning left off the Logan Motorway, through the Paradise Road toll point, and back onto the Logan Motorway. The signed height of the overhead rail is 6.7m on the toll point off ramp, however the height of the overhead toll point structure is unknown.

[2] For overpass 16, an alternative route is available through taking the on / off ramps along Stradbroke Street.

[3] For overpasses 17 to 21, an alternative route is available through exiting the Logan Motorway onto Stapylton Road, turning right onto the Stapylton Road Overpass, left onto Wadeville Street, straight onto Forest Lake Boulevard, straight onto Garden Road, left onto Progress Road, left onto Wacol Station Road and Right onto the Ipswich Motorway. The right onto the Ipswich Motorway may require significant upgrades.

[4] For overpass 31, an alternative route is available through taking the on / off ramps along Ashburn Road.

[5] For overpass 32, an alternative route is available through taking the on / off ramps along Mount Crosby Road.

[6] For overpass 38, an alternative route is available through taking the left turn onto Moroney Road, right onto Crowley Vale Road, right onto Gatton Laidley Road West, right onto Eastern Drive, and left onto the Warrego Highway on ramp.

4.6 Mass Limit Assessment

The transport route from the Port of Brisbane to the development site was assessed for Higher Mass Limit (HML) roads using information available through the NHVR portal. From this assessment, it was determined that majority of the roads along the transport route (Port of Brisbane to Dalby) are approved HML roads, except for the roads listed in Table 4.

Table 4: Roads Requiring Higher Mass Limit Assessments

Road section	Approved Route with Conditions	Approved Route
Volker Street (optional)	N/A	No
Dalby Jandowae Road, north of Hustons Road	N/A	No
MacAlister Bell Road	N/A	No
Bunya Highway, heading north past Byrnes Road, Bell	N/A	No
Mannuem Road	N/A	No
Ironpot Road	N/A	No

Upon confirmation of the vehicle configurations, turbine component delivery vehicles running at HML loads on these roads, will require the Contractor's appointed transportation company to apply for HML permits to the NHVR. As part of obtaining the HML permits, the proposed transport route will be assessed by NHVR and other referred assessors such as TMR.

Table 5: Allowable Standard Axle Mass Limit Increases (NVHR, 2023)

Type of Axle Group	Maximum mass (tonnes) permitted under General Mass Limit (GML)	Maximum mass (tonnes) permitted under HML
Tandem axle group	16.5t	17.0t
Tri-axle group	20.0t	22.5t
Single drive axles on buses	9.0t	10.0t
Six tyred tandem axle groups	13.0t	14.0t

5 Road Intersection Upgrades

The swept path analysis of the proposed transport route requires the following upgrade works or temporary works, listed in Table 6, to enable oversize vehicles to negotiate the roads from the Port of Brisbane to the site. Drawings of the swept paths and proposed works are provided in Appendix B.

Table 6: Summary of Upgrades to Intersections and Road Curves

Location No.	Location Description	Authority or Landowner	Modifications Required
1	Bishop Drive / Lucinda Drive, Port of Brisbane (Fisherman Island)	Port of Brisbane Pty Ltd (PBPL) NHVR for oversize vehicles	• 2x street signs to be temporarily removed • 3x guideposts to be temporarily removed • Gravel widening (approx. 80m^2) • 2x light poles to be temporarily removed
3	Port of Brisbane Motorway / Gateway Motorway	TMR NHVR for oversize vehicles	• 7x street signs to be temporarily removed
7 **Option A**	Toowoomba Bypass / Warrego Hwy	TMR NHVR for oversize vehicles	• 1x street sign to be temporarily removed • Gravel widening (approx. 1000m^2) • 1x light pole to be temporarily removed • 2 x traffic signals to be temporarily removed • 1x guidepost to be temporarily removed • 1x traffic camera to be temporarily removed / relocated • Minor vegetation removal
7 **Option B**			• Approx. 30m^2 of concrete median to be removed • 3x light poles to be temporarily removed • 6x guideposts to be temporarily removed • Minor vegetation trimming
9 **Option A**	Warrego Hwy / Jandowae Rd, Dalby	TMR NHVR for oversize vehicles	• Timber barricade removal as required • Minor vegetation removal • Gravel widening (approx. 800m^2) • 1x guidepost to be temporarily removed
9 **Option B Turn 1**	Warrego Hwy / Volker St, Dalby	TMR (Warrego Hwy) & Western Downs Regional Council (Volker St) NHVR for oversize vehicles	• 4x guideposts to be temporarily removed • 3x existing signs to be temporarily removed / relocated • Minor vegetation trimming / removal • Gravel widening (approx. 200 m^2), with existing service pit to be avoided
9 **Option B Turn 2**	Volker St / Jandowae Rd, Dalby	Western Downs Regional Council (Volker St) & TMR (Warrego Hwy) NHVR for oversize vehicles	• 5x guidepost to be temporarily removed • 2x signs to be temporarily removed / relocated • Possible minor vegetation trimming
10	Dalby Jandowae Rd / MacAlister Bell Rd, Jimbour East	TMR NHVR for oversize vehicles	• 6x street signs to be temporarily removed / relocated • 2x guidepost to be temporarily removed • Minor vegetation trimming / removal • Possible minor gravel widening
13	MacAlister Bell Rd / Bunya Hwy Rd, Bell	TMR NHVR for oversize vehicles	• Minor vegetation trimming / removal

14	Bunya Hwy / Crawshay St, Bell	TMR NHVR for oversize vehicles	• 3x guideposts to be temporarily removed
15	Bunya Hwy / Mannuem Rd, Mannuem	TMR (Bunya Hwy) & South Burnett Regional Council (Mannuem Rd) NHVR for oversize vehicles	• 4x guideposts to be temporarily removed
16	Mannuem Rd / Ironpot Rd, Mannuem	South Burnett Regional Council NHVR for oversize vehicles	• 2x guideposts to be relocated • Gravel widening (approx. 1180m^2) • 2x Signs to be relocated • Resumption or agreement with landholder of Lot 52 on BO63 for upgrade works (approx. 1240m^2).

Note: Any trimming / removal of vegetation is only to occur after relevant approvals are granted by authorities, where applicable.

The Project has agreed terms with the landholder of Lot 52 on BO63 to facilitate passage of materials to site through the Mannuem Road / Ironpot Road Intersection (intersection 16).

5.1 Traffic Control Measures

Traffic Control Measures to be installed for road upgrade works, will be determined at a later stage by the appointed Civil Contractors' Traffic Management subcontractor. A Traffic Management Plan (TMP) by icubed consulting, has been issued in conjunction with this report, detailing the current scope of these traffic controls.

6 Conclusions and Recommendations

This report represents the External Transport Route Study for the proposed Tarong West Wind Farm located at Ironpot Road, Ironpot.

This study identified sixteen (16) locations along the proposed 330km transport route, from the Port of Brisbane to the development site, that have the potential to constrain component delivery due to existing infrastructure or potentially inadequate road width / turn radii to cater for the critical oversize transport vehicles. The sixteen (16) locations were checked using vehicle tracking software and it was found that nine (9) of the sixteen (16) locations are expected to require a minor to moderate level of upgrade. The upgrades expected are listed in Table 6, and typically require minor works such as temporary removal of street signs or gravel pavement widening. By carrying out these road upgrades, the OSOM delivery vehicles are expected to negotiate the transport route successfully.

Two manoeuvre options were assessed at Location 7 (Toowoomba Bypass / Warrego Highway intersection). Option A is considered to require more substantial modifications than Option B, largely due to the estimated requirement of 1000m^2 of gravel widening for the OSOM manoeuvre.

Two manoeuvre options were also assessed at Location 9 (Warrego Highway / Jandowae Road intersection). Option A is considered to require more substantial modifications than Option B, largely due to the estimated 800m^2 of gravel widening required for Option A versus the estimated 200m^2 requirement of Option B. However, Option B requires an additional turning manoeuvre, to get back onto Jandowae Rd from Volker St. Furthermore, Option B involves an additional local government road (Volker St) into the transport route and hence will require additional approvals from Western Downs Regional Council (who otherwise would not need to be engaged regarding this transport route). As Volker St is not a HML approved road, additional permits will be required if Option B is preferred to Option A at Location 9.

Through a desktop analysis and overpass measurements along the transport route, the results of which are shown in Table 3, it was determined that the largest vehicle able to travel to site has a maximum height of 5.8m utilising the assessed detours. Specialist transport operators shall configure beam, platform and bookend trailers, suitable for the components being delivered to site, within these operating / obstruction limits and under an appropriate TMP and NHVR permits. Note that signboard, overhead line and vegetation clearances have not been assessed.

Majority of the roads along the transport route (Port of Brisbane to Dalby) are approved HML roads, except for the roads listed in Table 4. Upon confirmation of the vehicle configurations, turbine component delivery vehicles running at HML loads on these roads, will require the Contractor's appointed transportation company to apply for HML permits to the NHVR. As part of obtaining the HML permits, the proposed transport route will be assessed by NHVR and other referred assessors such as TMR.

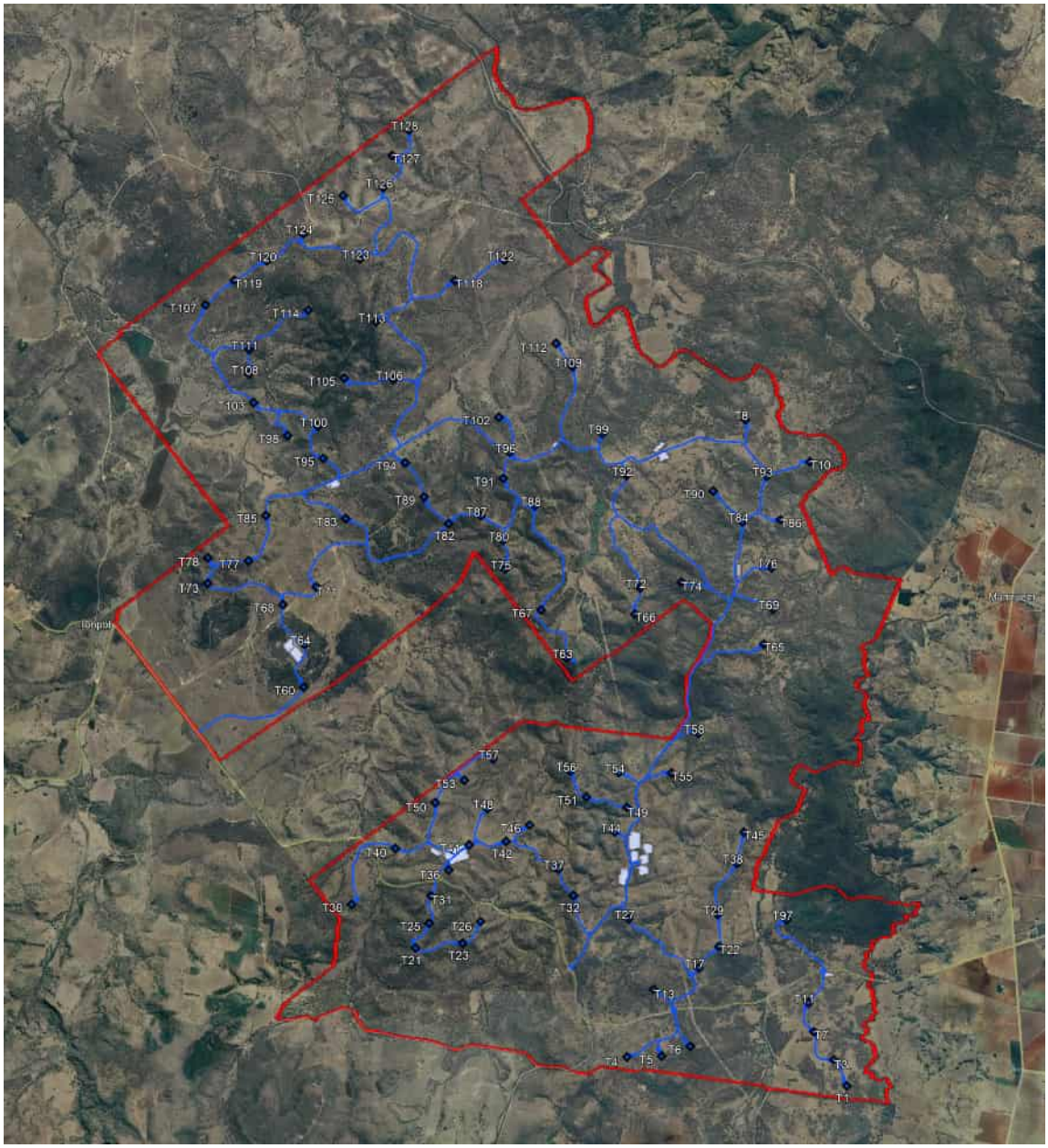
We note that further actions will be required to allow vehicles to utilise the proposed transport route from the Port of Brisbane. These actions include:

- Prior to delivery to the site, the transport contractor will need to conduct a survey of vertical height clearances at confined locations such as bridges, overhead telecommunication and electrical lines, signs and other infrastructure, to ensure clearances are suitable
- National Heavy Vehicle Regulator permits shall be applied for and obtained by the appointed transportation contractor prior to deliveries to site
- The load capacities of sections identified along the transport route (such as, but not limited to, culverts, bridges, unsealed or sealed pavements in poor condition) shall be checked and approved for use by the relevant authority
- Review whether any additional third-party land requirements exist along the delivery route once final vehicle dimensions are known. The Project has agreed terms with the landholder of Lot 52 on BO63 to facilitate passage of materials to site (refer section 5).

This report has been prepared based on assumptions for the configuration of the blade trailer vehicle, and the results of current construction work at several points along the route. It is recommended that once the dimensions of the components and vehicle configurations are confirmed that the clearances and manoeuvrers within this report be reviewed.

It is also recommended that access from other Ports be investigated should total vehicle heights greater than 5.8m be required for component delivery to the project.

Appendix A – Site Plan



Appendix B – Vehicle Swept Paths

Plans shown overleaf

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI — EXISTING SIGN
- LP — EXISTING LIGHT POLE
- PP — EXISTING POWER POLE
- TS — EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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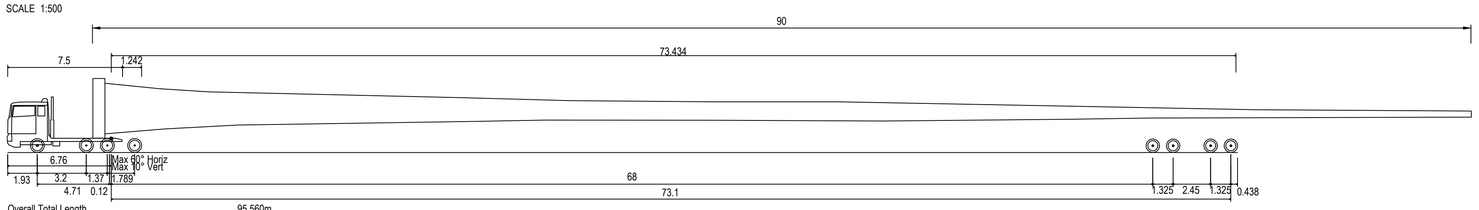
INTERSECTION 1 - BISHOP DRIVE / LUCINDA DRIVE INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500



Overall Total Length	95.560m
Overall Vehicle Length	80.296m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
1	FOR APPROVAL	P.M.	P.M.	T.S.	N.C.	20.12.2023

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COORDINATE REFERENCE SYSTEM
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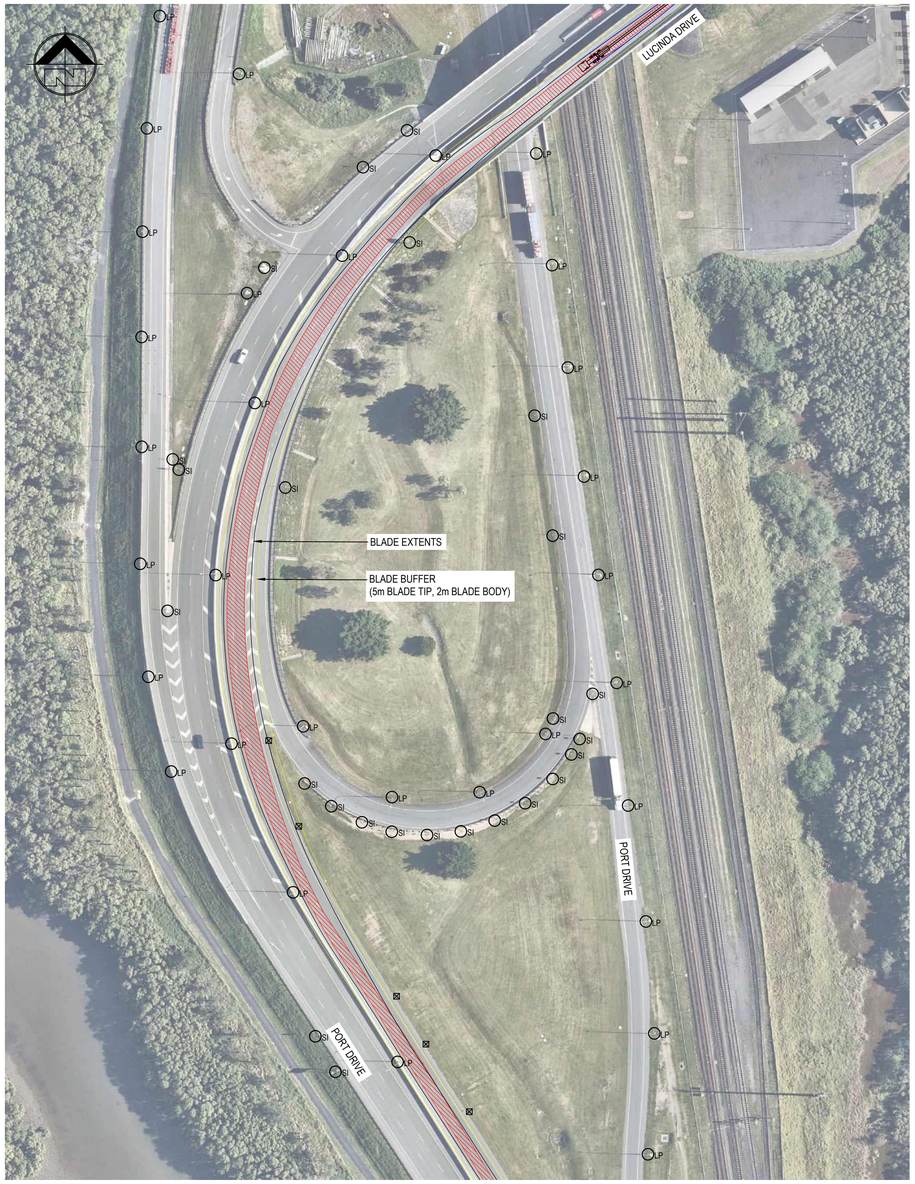
PROJECT
TARONG WEST WIND FARM

TITLE
BISHOP DRIVE / LUCINDA DRIVE INTERSECTION PLAN

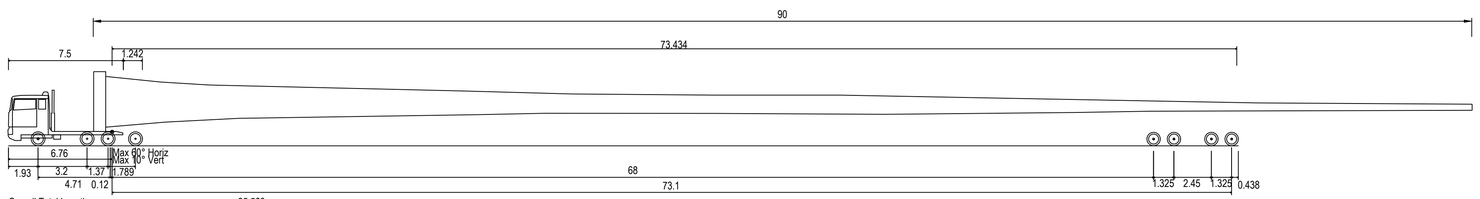
DRAWING No. 23-047-DWG-TR001

REV 1



INTERSECTION 2 - LUCINDA DRIVE / PORT DRIVE INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000



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90m BLADE TRUCK AND TRAILER

LEGEND

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1	FOR APPROVAL	P.M.	P.M.	T.S.	N.C.	20.12.2023

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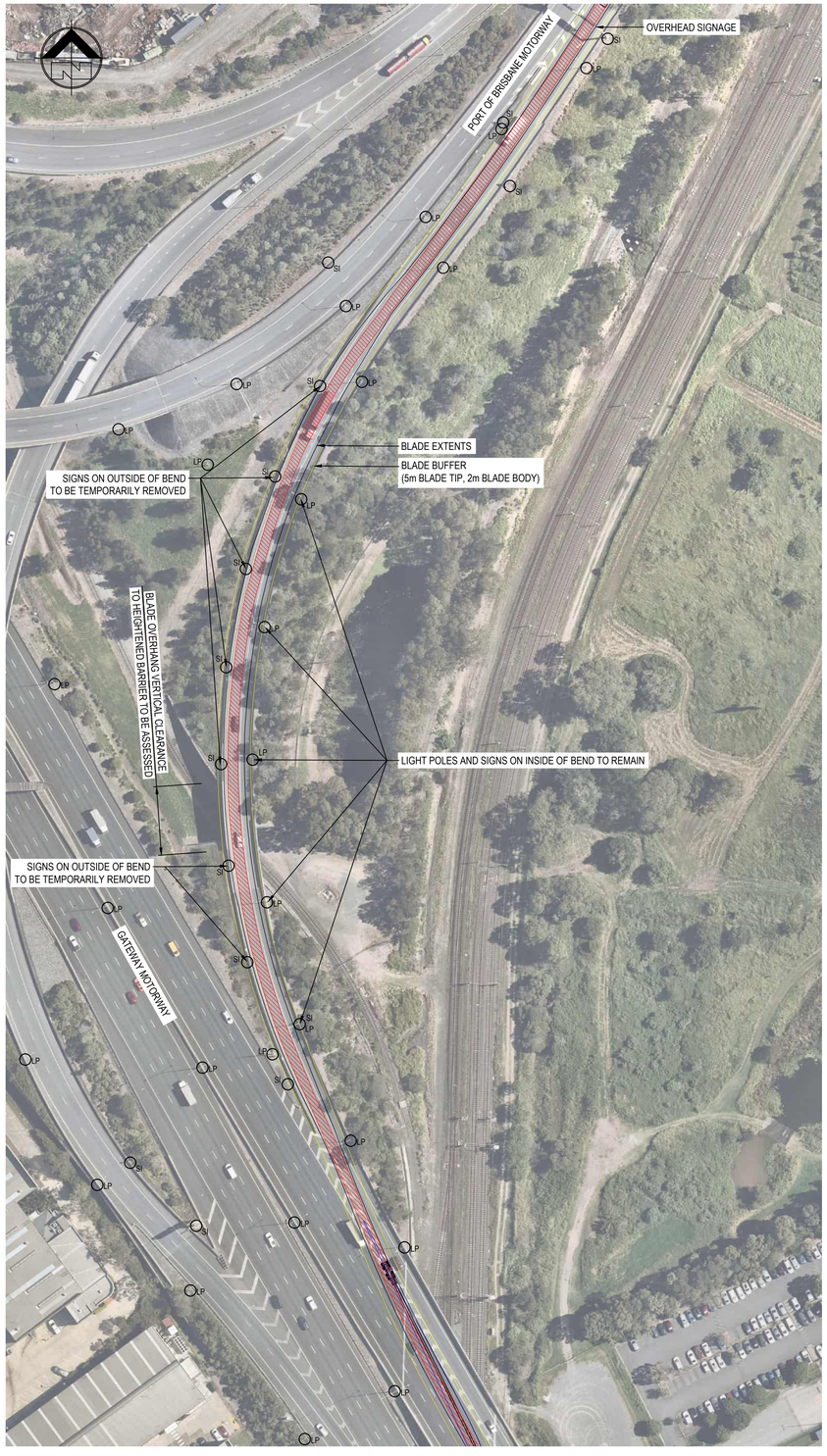
PROJECT TARONG WEST WIND FARM

TITLE LUCINDA DRIVE / PORT DRIVE INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR002

REV 1



LEGEND

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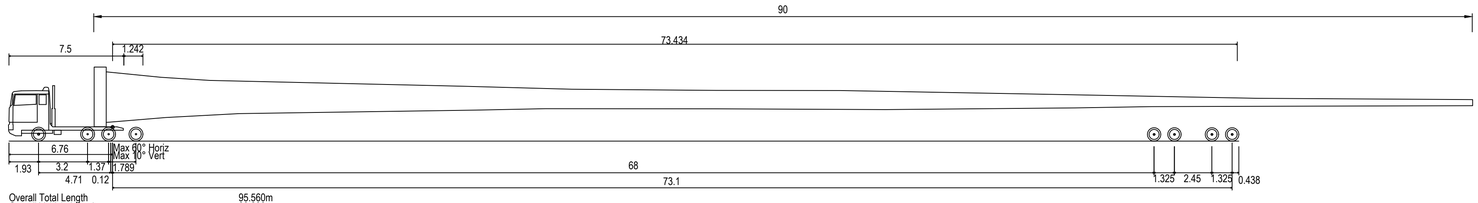

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90m BLADE TRUCK AND TRAILER

INTERSECTION 3 - PORT OF BRISBANE MOTORWAY / GATEWAY MOTORWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000

No	DESCRIPTION	P.M.	P.M.	T.S.	N.C.	DATE
1	FOR APPROVAL	P.M.	P.M.	T.S.	N.C.	20.12.2023

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PROJECT: TARONG WEST WIND FARM

TITLE: PORT DRIVE / GATEWAY MOTORWAY INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR003

REV 1

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
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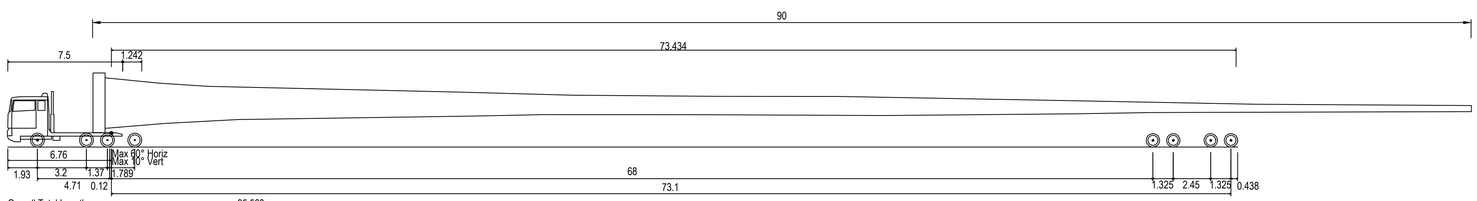
INTERSECTION 4 - GATEWAY MOTORWAY / LOGAN MOTORWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:2000



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Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	P.M. DES	P.M. DRN	T.S. CHK	N.C. APP	DATE
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PROJECT: TARONG WEST WIND FARM

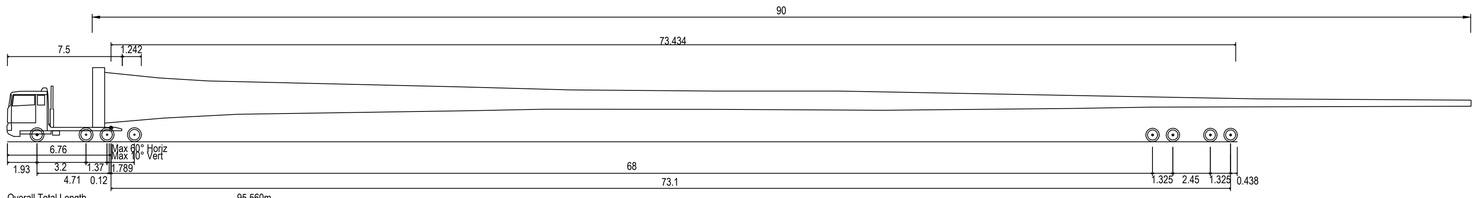
TITLE: GATEWAY MOTORWAY / LOGAN MOTORWAY INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR004

REV 1

INTERSECTION 5 - LOGAN MOTORWAY / IPSWICH MOTORWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:2000



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90m BLADE TRUCK AND TRAILER

LEGEND

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- OVER DIMENSIONAL TURNING AREA
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PROJECT
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TITLE
LOGAN MOTORWAY / IPSWICH MOTORWAY INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR005

REV 1

LEGEND

- EXISTING OVERHEAD POWER LINE
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- LP EXISTING LIGHT POLE
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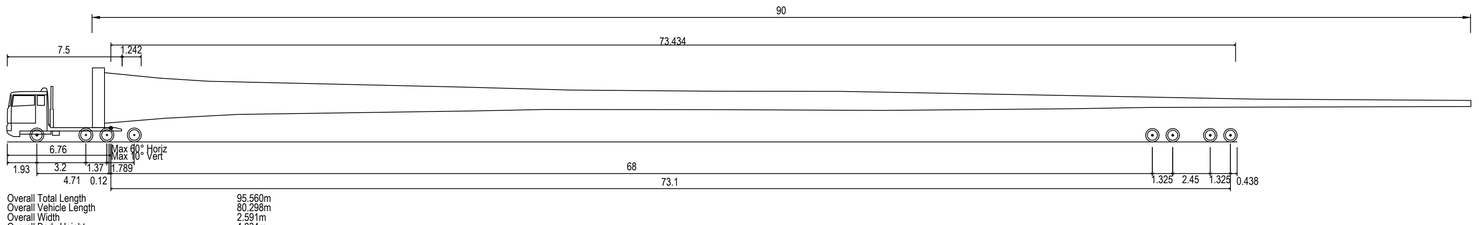
INTERSECTION 6 - IPSWICH MOTORWAY / WARREGO HIGHWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000



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Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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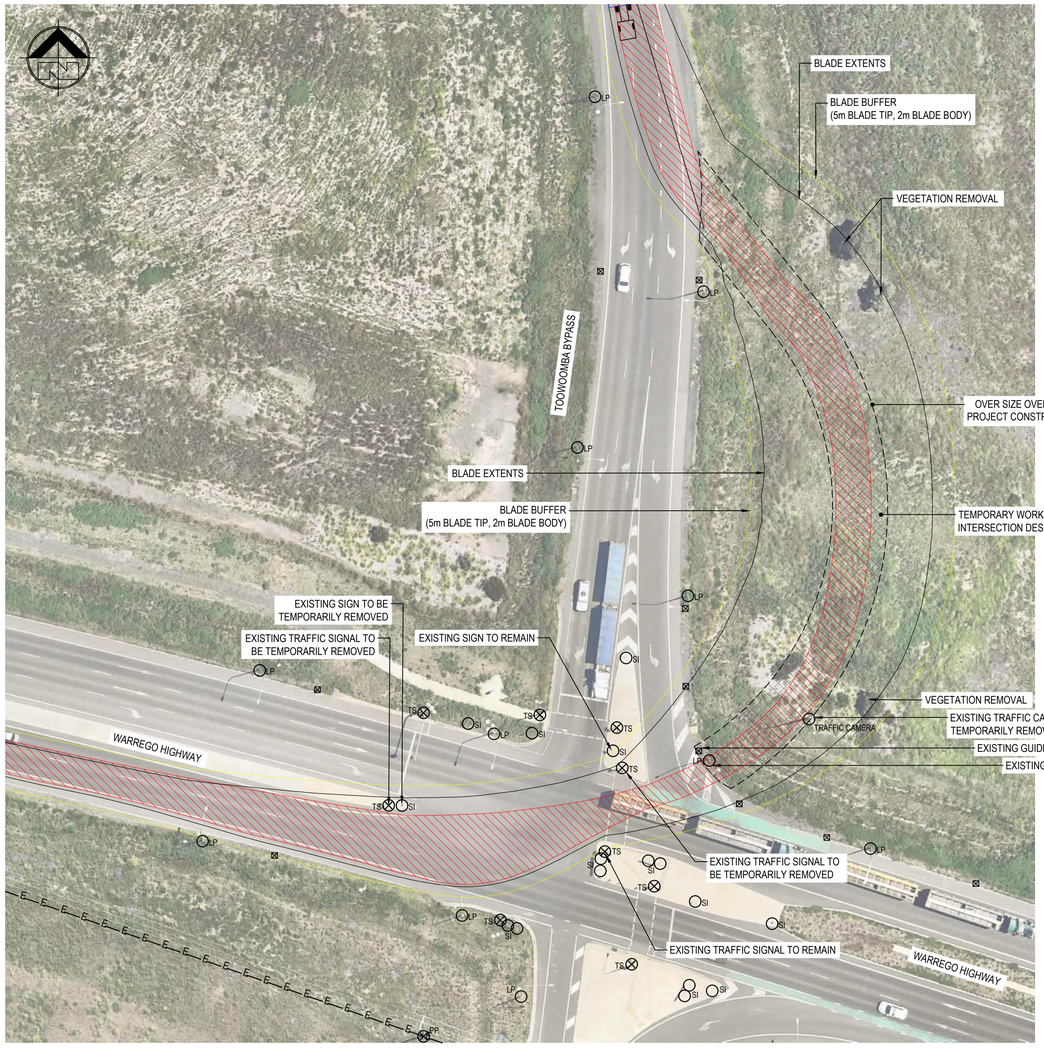
PROJECT TARONG WEST WIND FARM

TITLE IPSWICH MOTORWAY / WARREGO HIGHWAY INTERSECTION PLAN

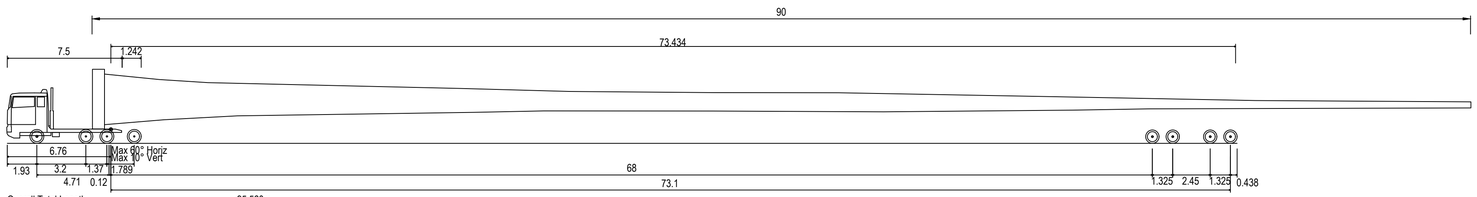
DRAWING No. 23-047-DWG-TR006

REV 1



INTERSECTION 7 - TOOWOOMBA BYPASS / WARREGO HIGHWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION A

SCALE 1:500



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90m BLADE TRUCK AND TRAILER

LEGEND

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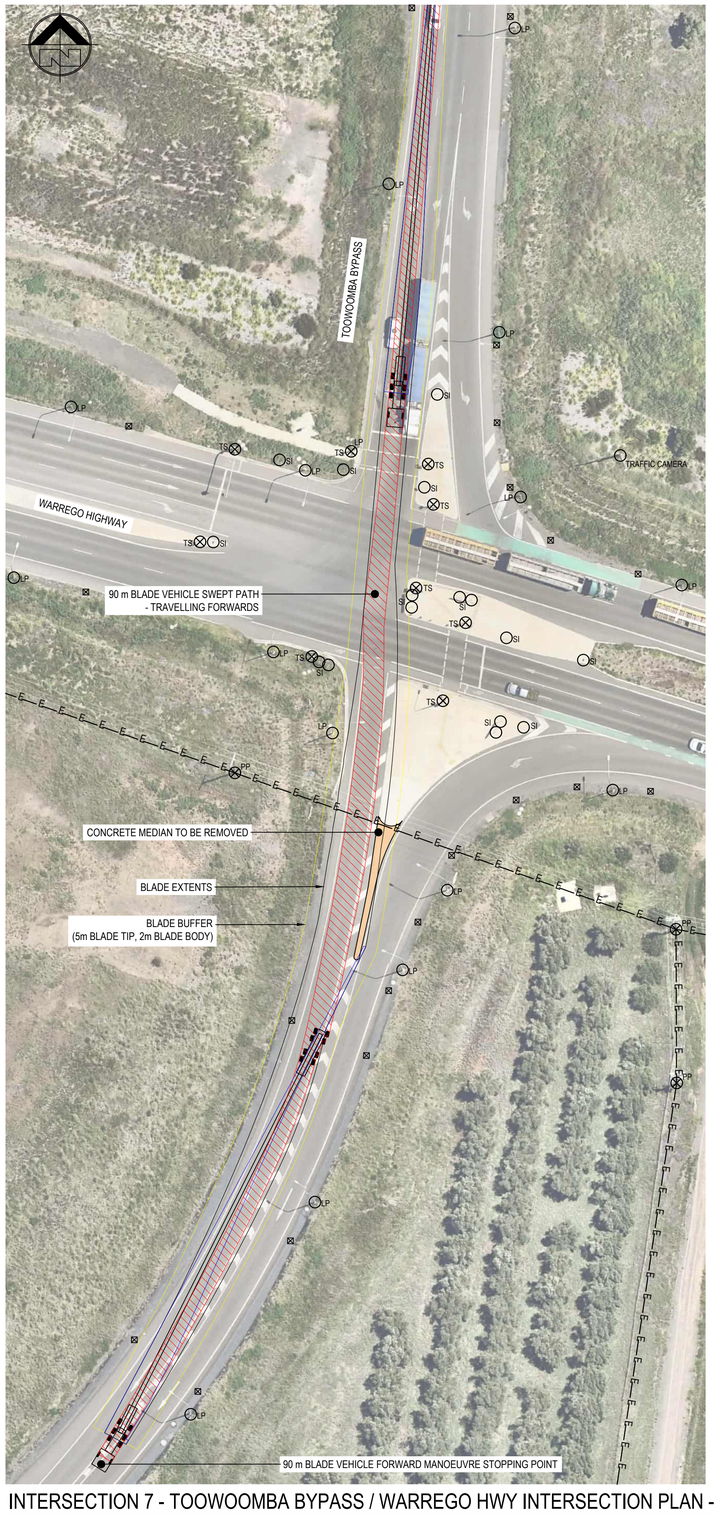
PROJECT TARONG WEST WIND FARM

TITLE TOOWOOMBA BYPASS / WARREGO HIGHWAY INTERSECTION PLAN - OPTION A

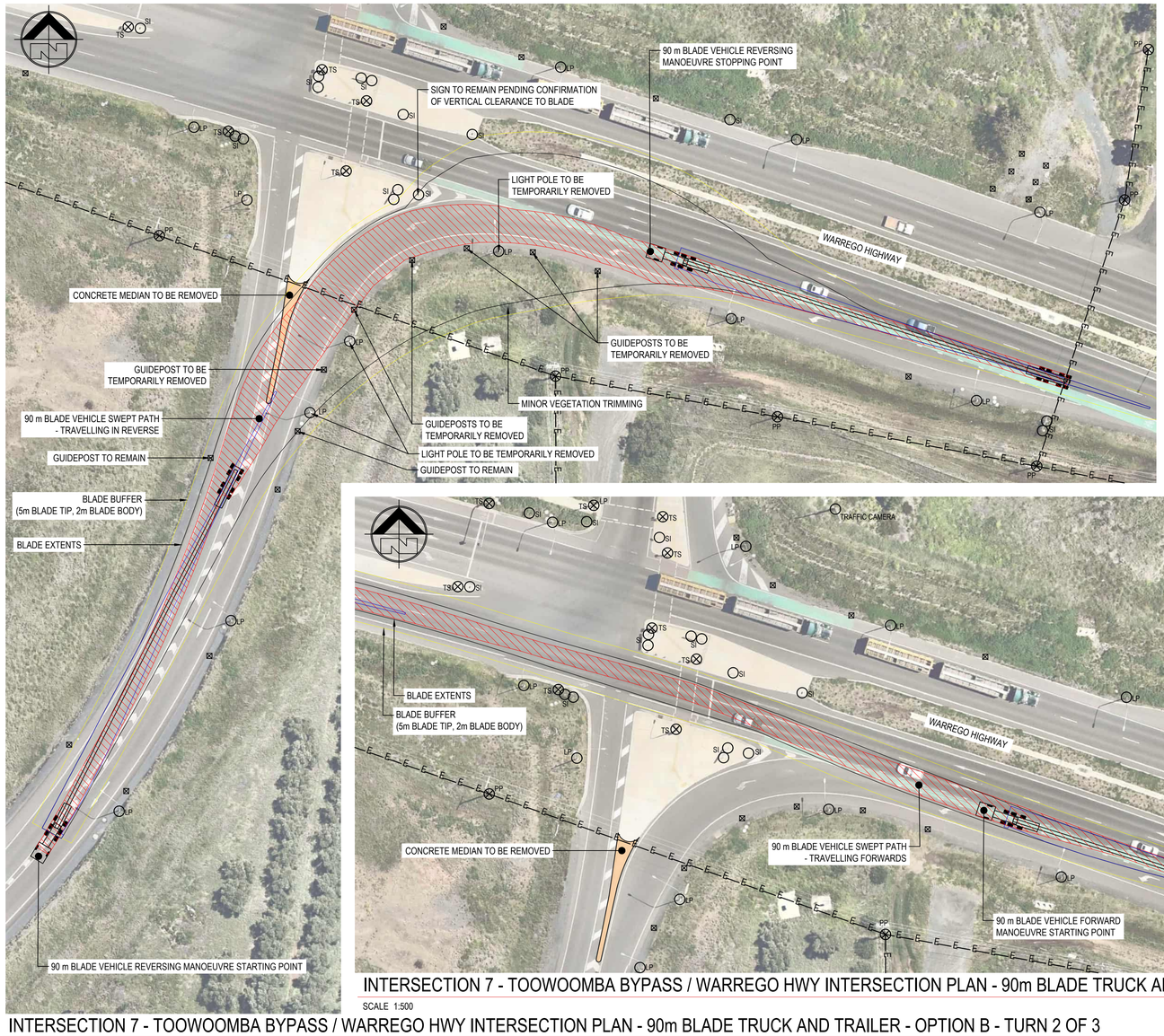
DRAWING No. 23-047-DWG-TR007

REV 1



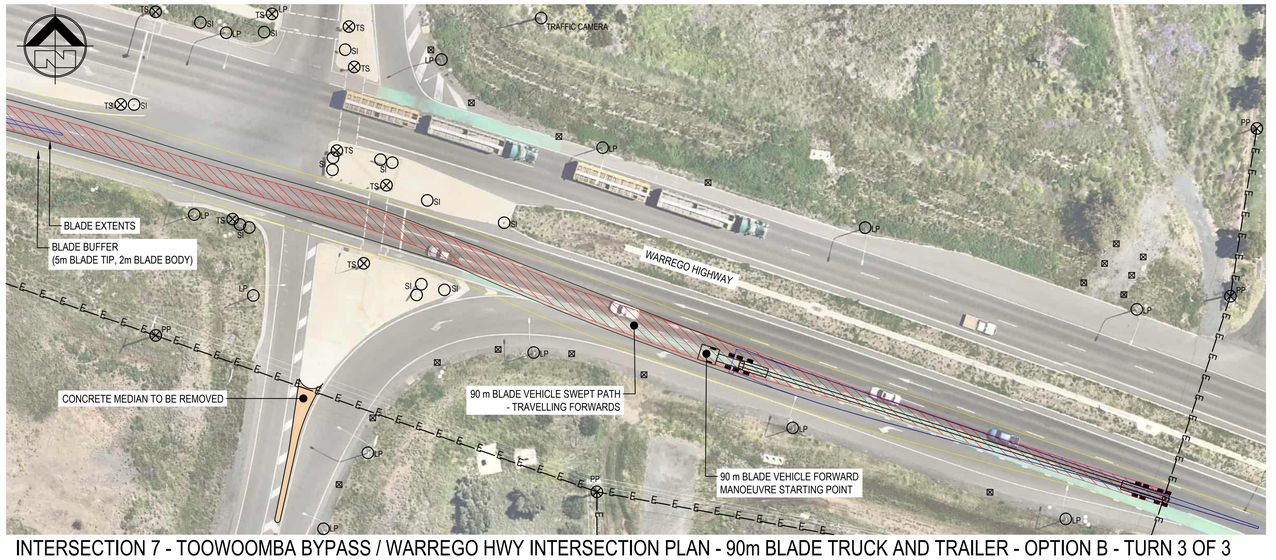
INTERSECTION 7 - TOOWOOMBA BYPASS / WARREGO HWY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION B - TURN 1 OF 3

SCALE 1:500



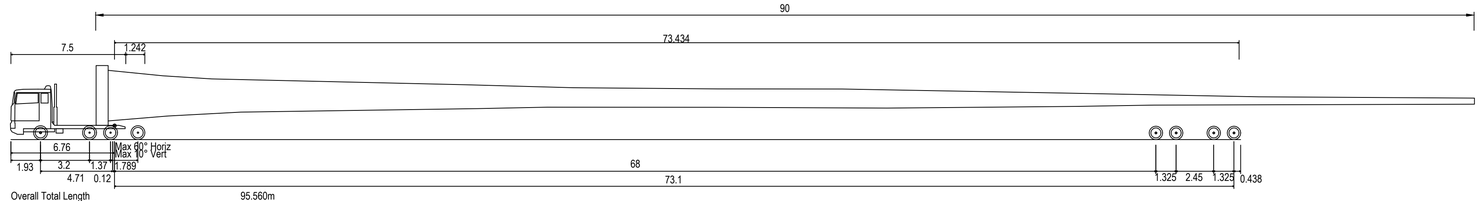
INTERSECTION 7 - TOOWOOMBA BYPASS / WARREGO HWY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION B - TURN 2 OF 3

SCALE 1:500



INTERSECTION 7 - TOOWOOMBA BYPASS / WARREGO HWY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION B - TURN 3 OF 3

SCALE 1:500



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

ALL GUIDEPOSTS WITHIN OVER-DIMENSIONAL VEHICLE BODY AND WHEEL PATH TO BE REMOVED PRIOR TO TRANSPORTATION OF WIND TURBINE BLADES

CLEARING OF VEGETATION SHALL ONLY BE PERFORMED AFTER RELEVANT AUTHORITY APPROVALS ARE OBTAINED, IF REQUIRED FOR ROAD UPGRADE

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POTENTIAL CLASHES BETWEEN OVER-DIMENSIONAL VEHICLES AND GUARDRAILS, TRAFFIC SIGNALS AND STREET LIGHTING TO BE CONFIRMED BY THE APPOINTED TRANSPORTATION CONTRACTOR

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
1	FOR APPROVAL	P.M.	P.M.	T.S.	N.C.	20.12.2023

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PROJECT
TARONG WEST WIND FARM

TITLE
TOOWOOMBA BYPASS / WARREGO HIGHWAY
INTERSECTION PLAN - OPTION B

DRAWING No. 23-047-DWG-TR007-1

REV 1

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI — EXISTING SIGN
- LP — EXISTING LIGHT POLE
- PP — EXISTING POWER POLE
- TS — EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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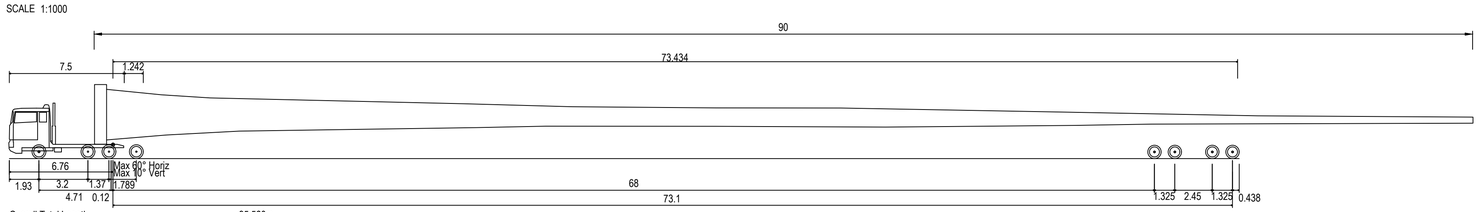
INTERSECTION 8 - WARREGO HIGHWAY / DALBY CECIL PLAINS ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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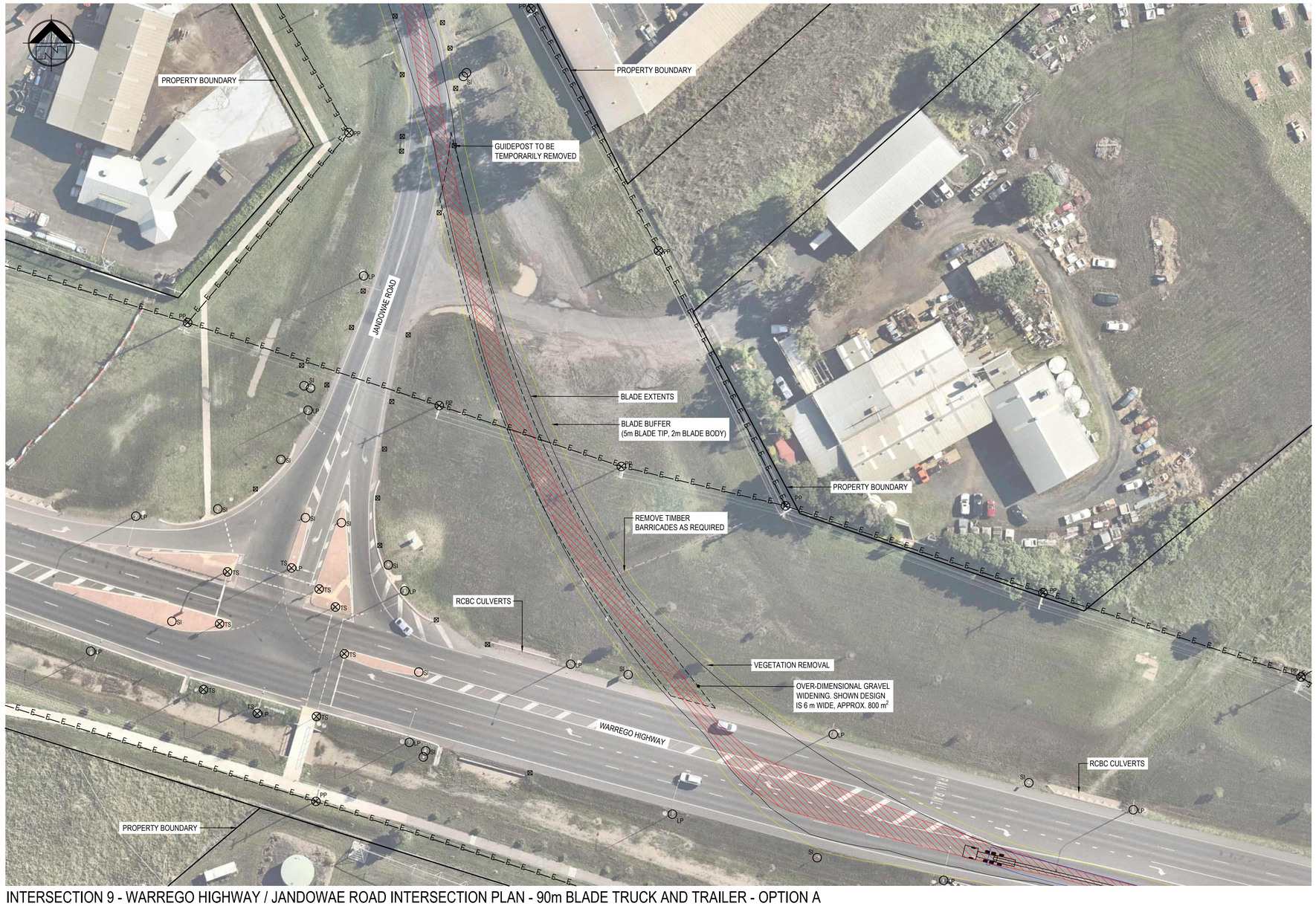
PROJECT
TARONG WEST WIND FARM

TITLE
WARREGO HWY / DALBY CECIL PLAINS ROAD INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR008

REV 1



LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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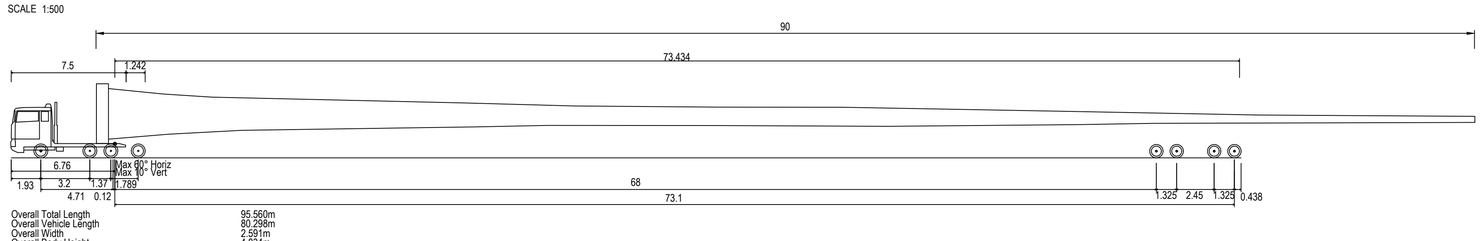
INTERSECTION 9 - WARREGO HIGHWAY / JANDOWAE ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION A

SCALE 1:500



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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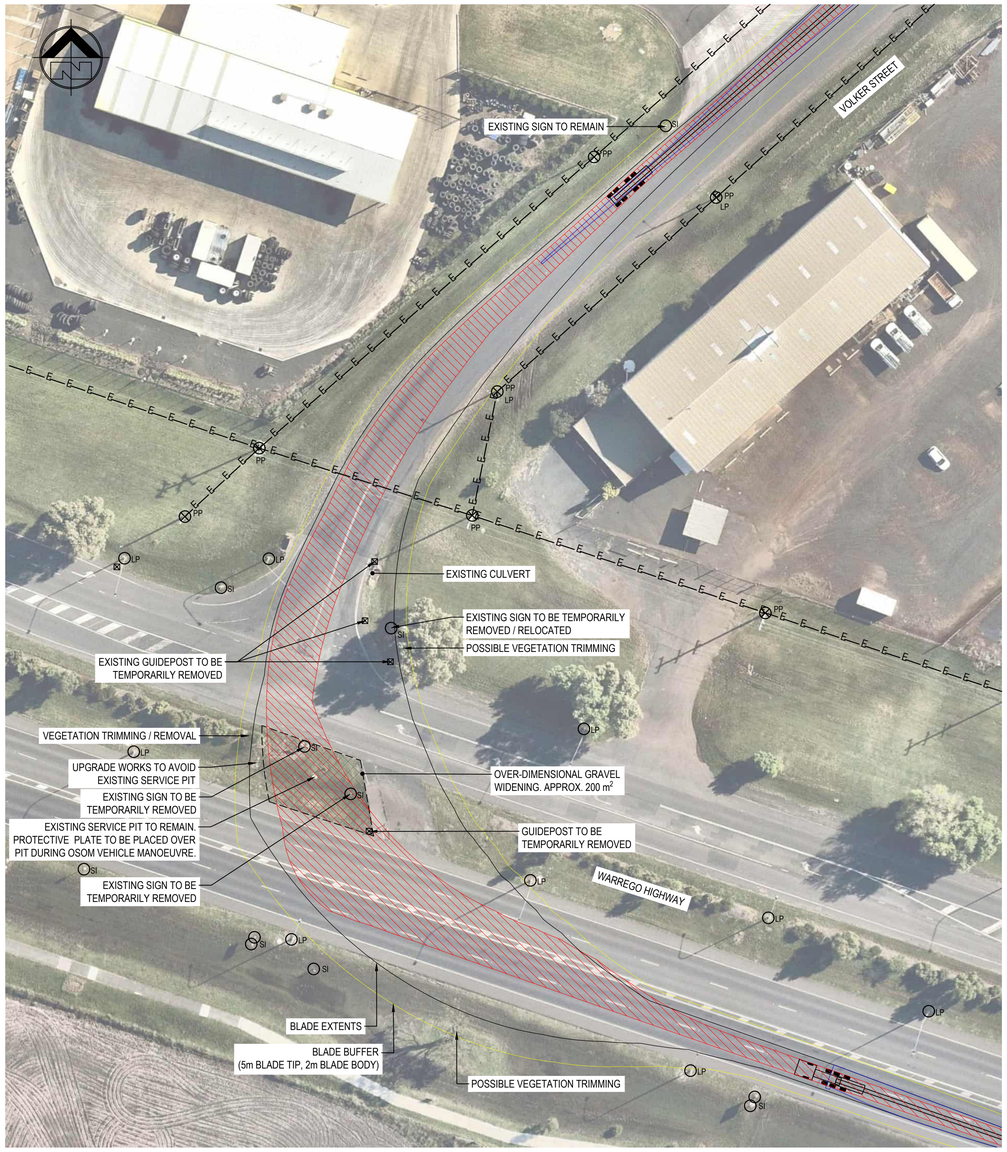
PROJECT
TARONG WEST WIND FARM

TITLE
WARREGO HIGHWAY / JANDOWAE ROAD INTERSECTION PLAN - OPTION A

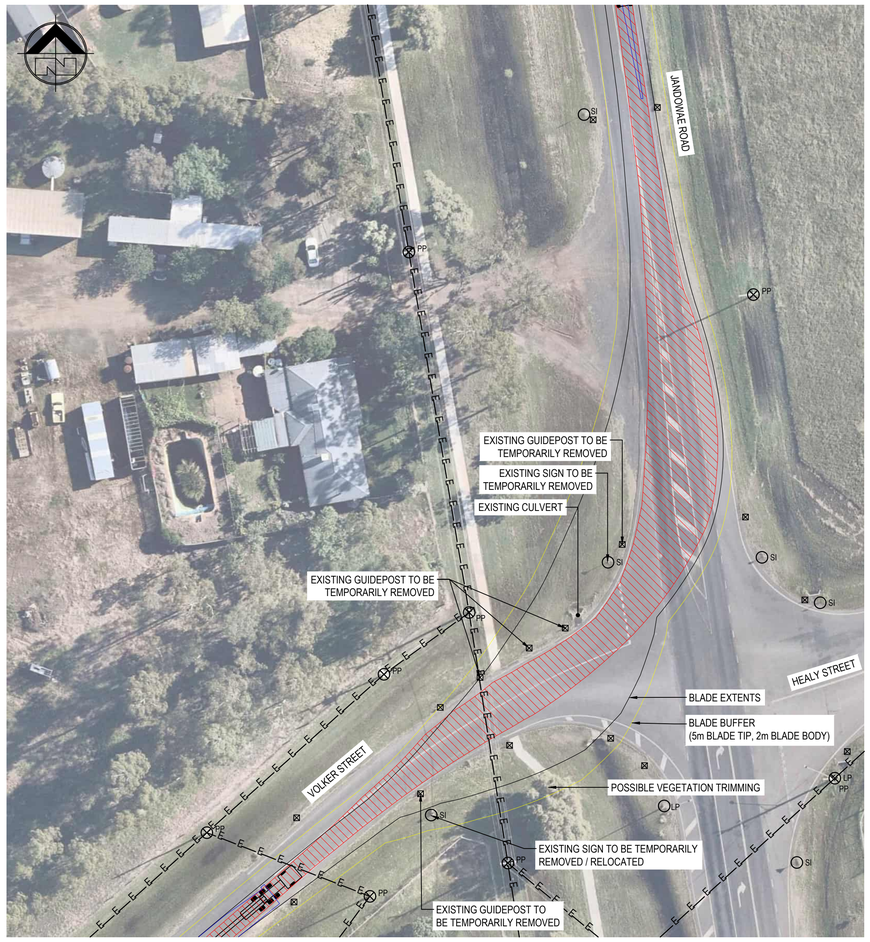
DRAWING No. 23-047-DWG-TR009

REV 1



INTERSECTION 9 - WARREGO HIGHWAY / VOLKER STREET INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION B - TURN 1 OF 2

SCALE 1:500



INTERSECTION 9 - VOLKER STREET / JANDOWAE ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER - OPTION B TURN 2 OF 2

SCALE 1:500

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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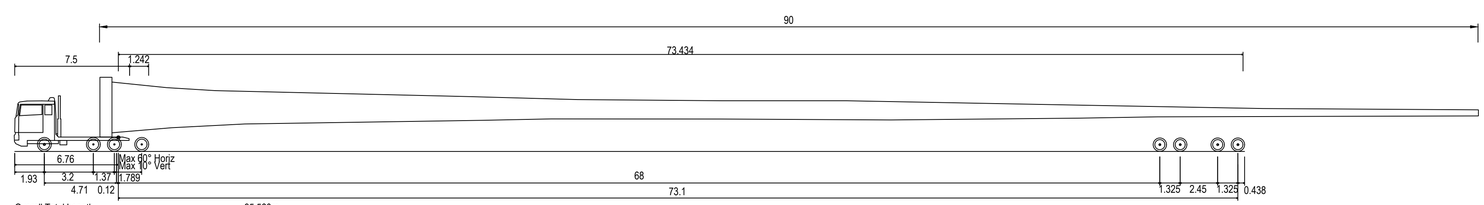

Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

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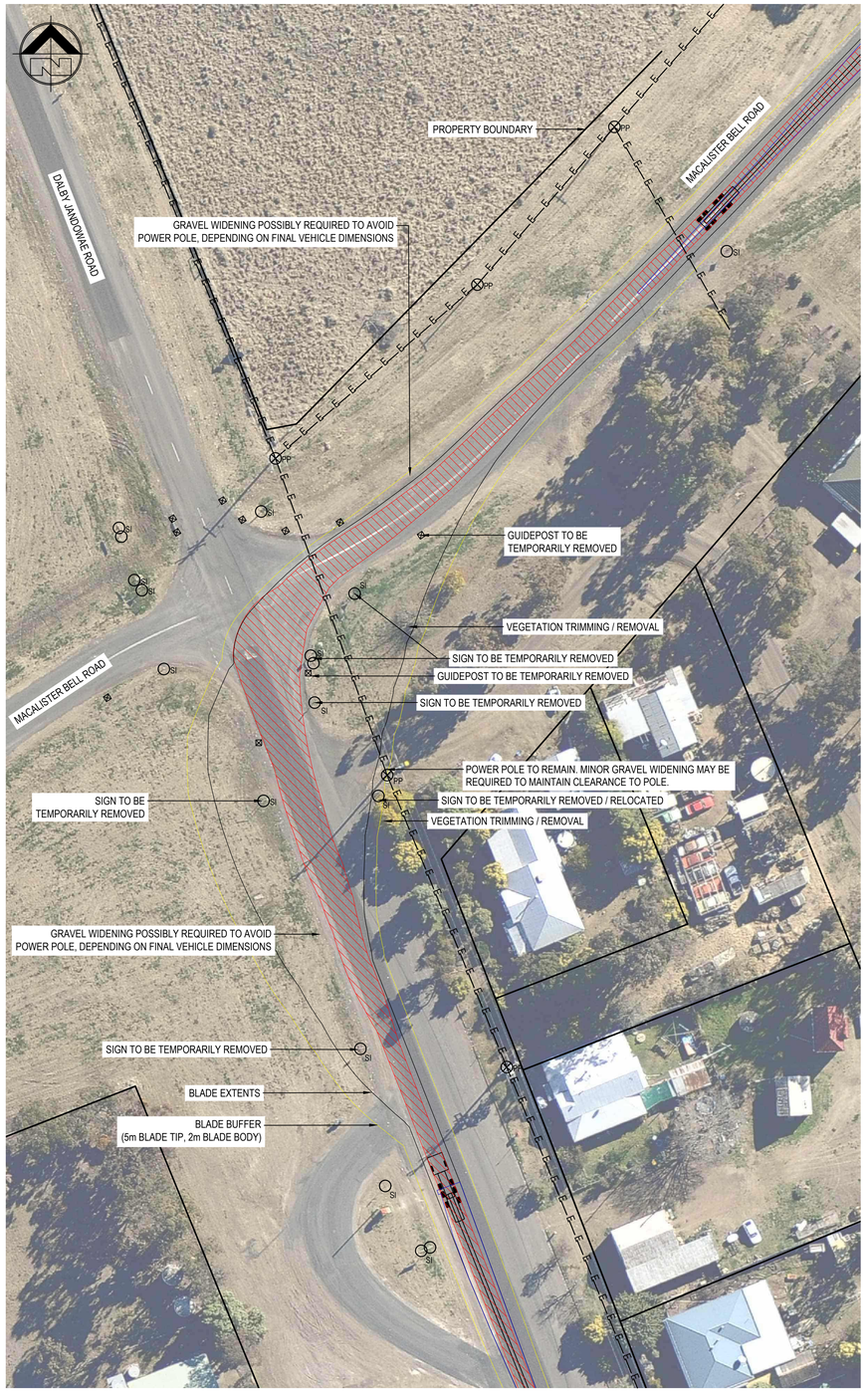
PROJECT
TARONG WEST WIND FARM

TITLE
WARREGO HIGHWAY / VOLKER STREET, AND VOLKER STREET / JANDOWAE ROAD INTERSECTION PLAN - OPTION B

DRAWING No. 23-047-DWG-TR009-1

REV 1



LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

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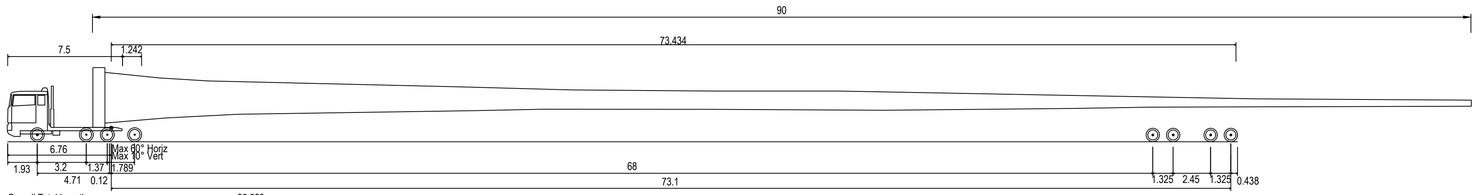

Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

INTERSECTION 10 - DALBY JANDOWAE ROAD / MACALISTER BELL ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500

No	DESCRIPTION	P.M. DES	P.M. DRN	T.S. CHK	N.C. APP	DATE
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COORDINATE REFERENCE SYSTEM: GDA94 - ZONE 56

PROJECT: TARONG WEST WIND FARM

TITLE: DALBY JANDOWAE RD / MACALISTER BELL RD INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR010 | REV 1

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

ALL GUIDEPOSTS WITHIN OVER-DIMENSIONAL VEHICLE BODY AND WHEEL PATH TO BE REMOVED PRIOR TO TRANSPORTATION OF WIND TURBINE BLADES

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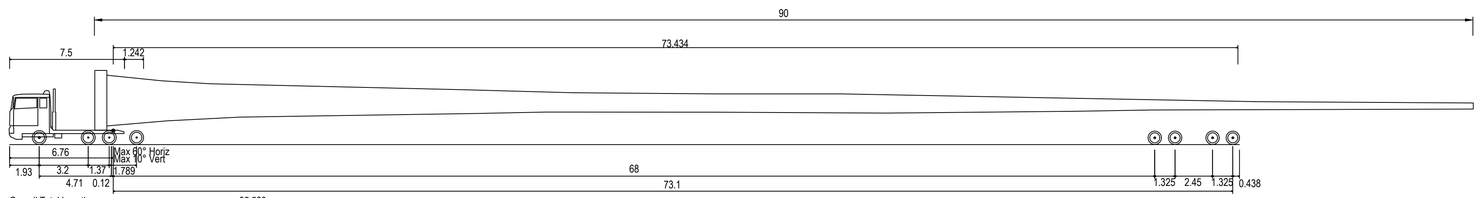
INTERSECTION 11 - MACALISTER ROAD / SPRING FLAT ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	P.M. DES	P.M. DRN	T.S. CHK	N.C. APP	DATE
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PROJECT TARONG WEST WIND FARM

TITLE MACALISTER RD / SPRING FLAT ROAD INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR011

REV 1

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

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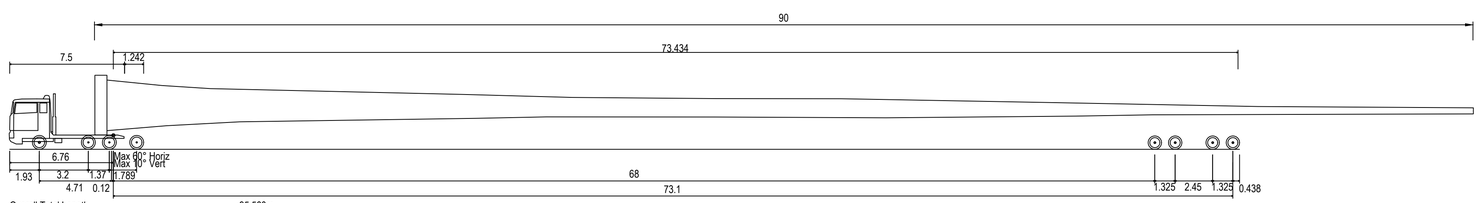
INTERSECTION 12 - MACALISTER ROAD INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:1000



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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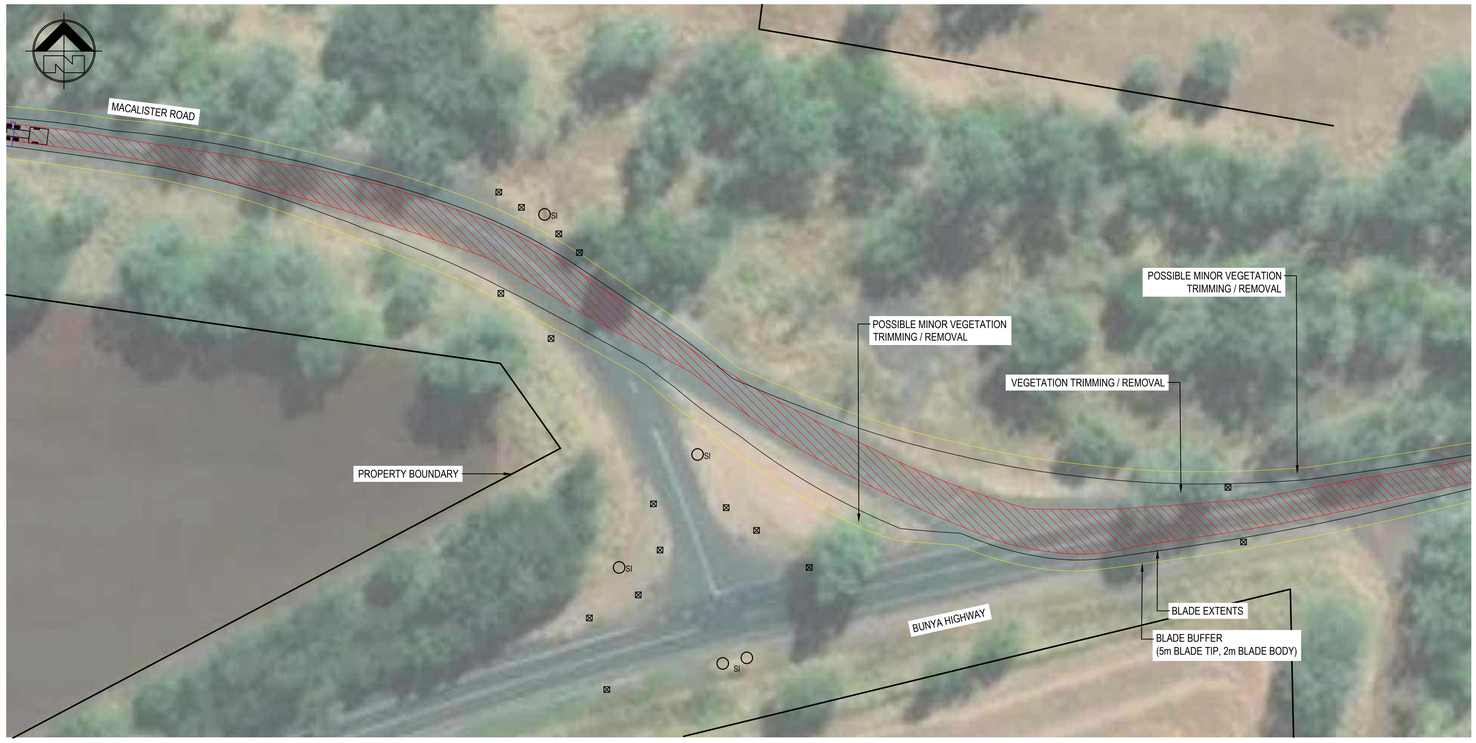
PROJECT: TARONG WEST WIND FARM

TITLE: MACALISTER ROAD INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR012

REV 1



INTERSECTION 13 - MACALISTER ROAD / BUNYA HIGHWAY INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
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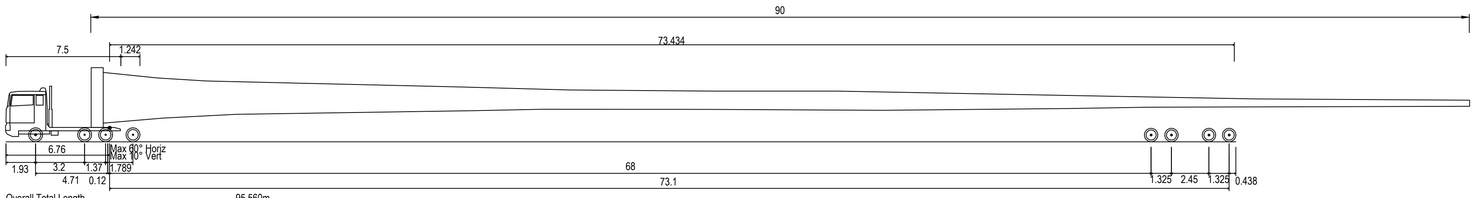

Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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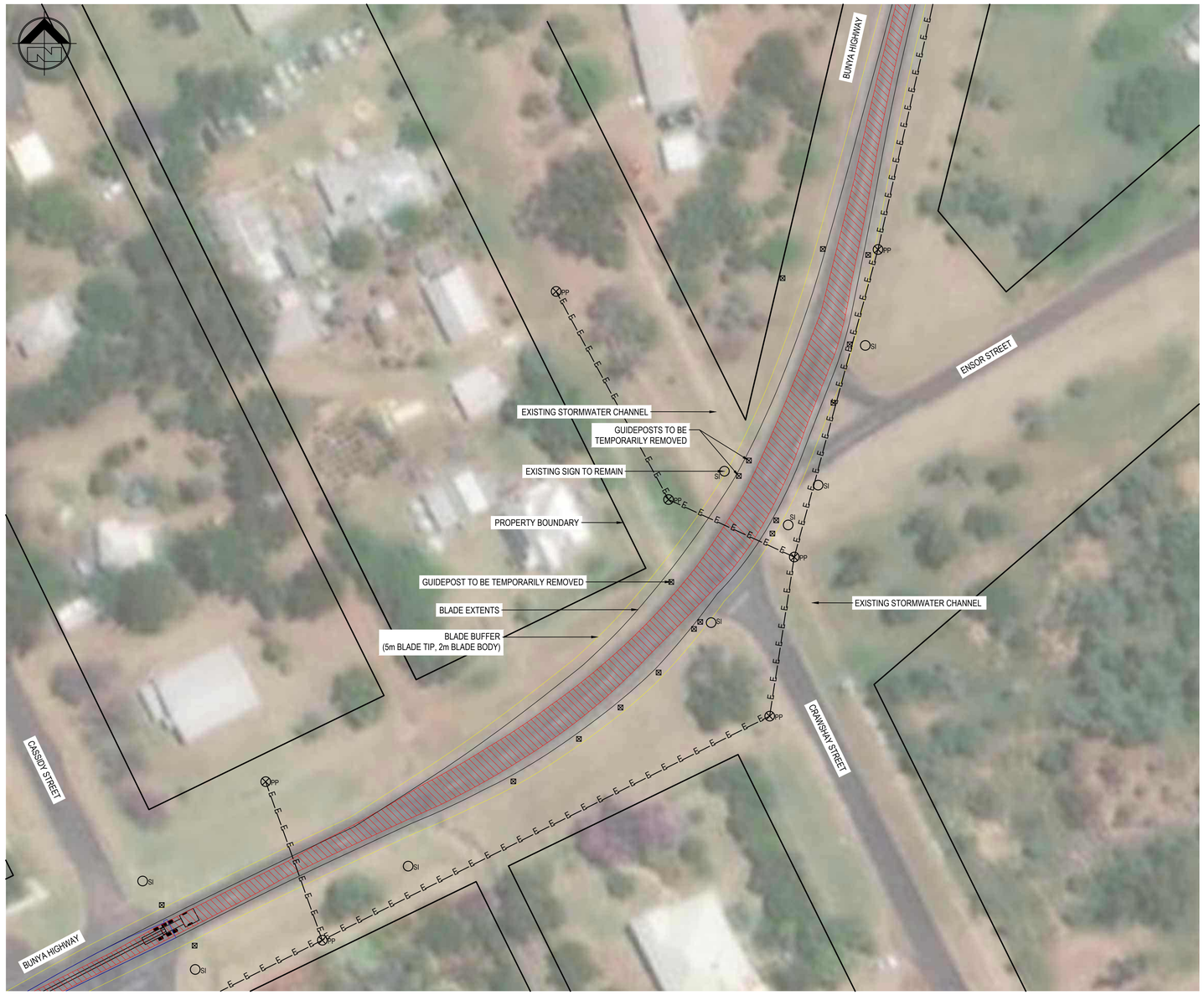
PROJECT TARONG WEST WIND FARM

TITLE MACALISTER BELL ROAD / BUNYA HIGHWAY INTERSECTION PLAN

DRAWING No. 23-047-DWG-TR013

REV 1



LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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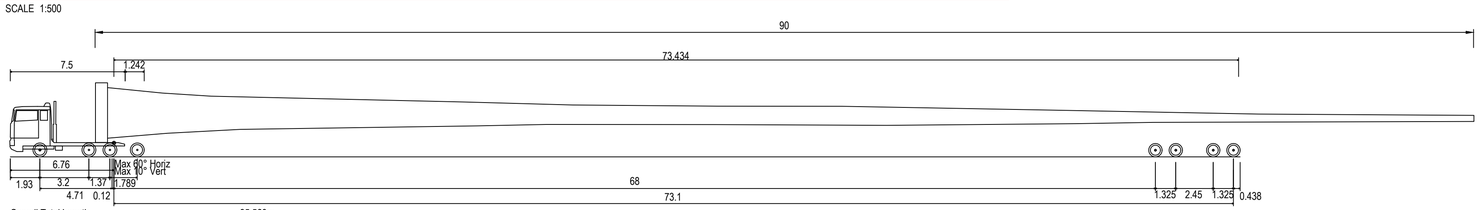
INTERSECTION 14 - BUNYA HIGHWAY / CRAWSHAY STREET INTERSECTION PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

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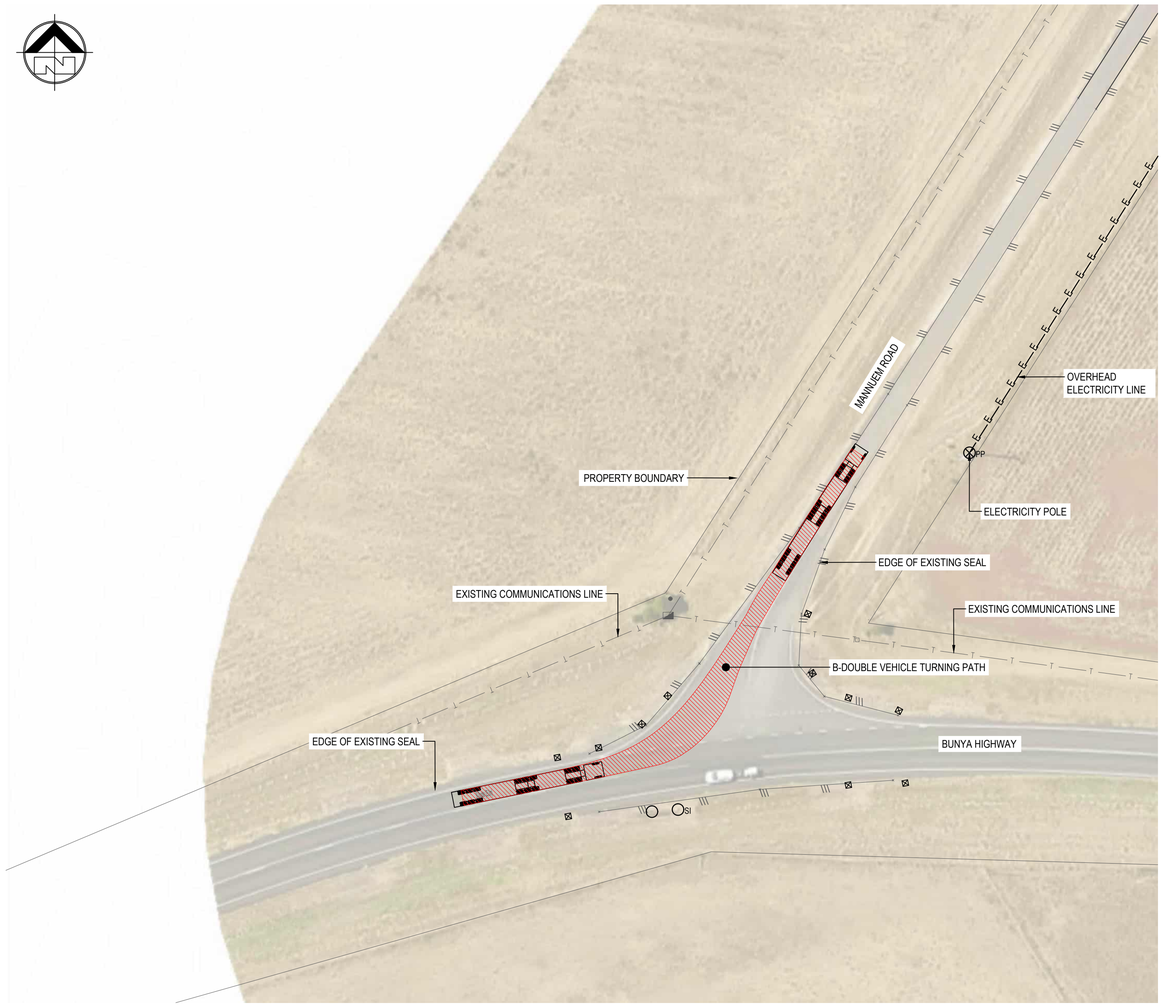
COORDINATE REFERENCE SYSTEM
GDA94 - ZONE 56

PROJECT TARONG WEST WIND FARM

TITLE BUNYA HIGHWAY / CRAWSHAY STEET INTERSECTION PLAN

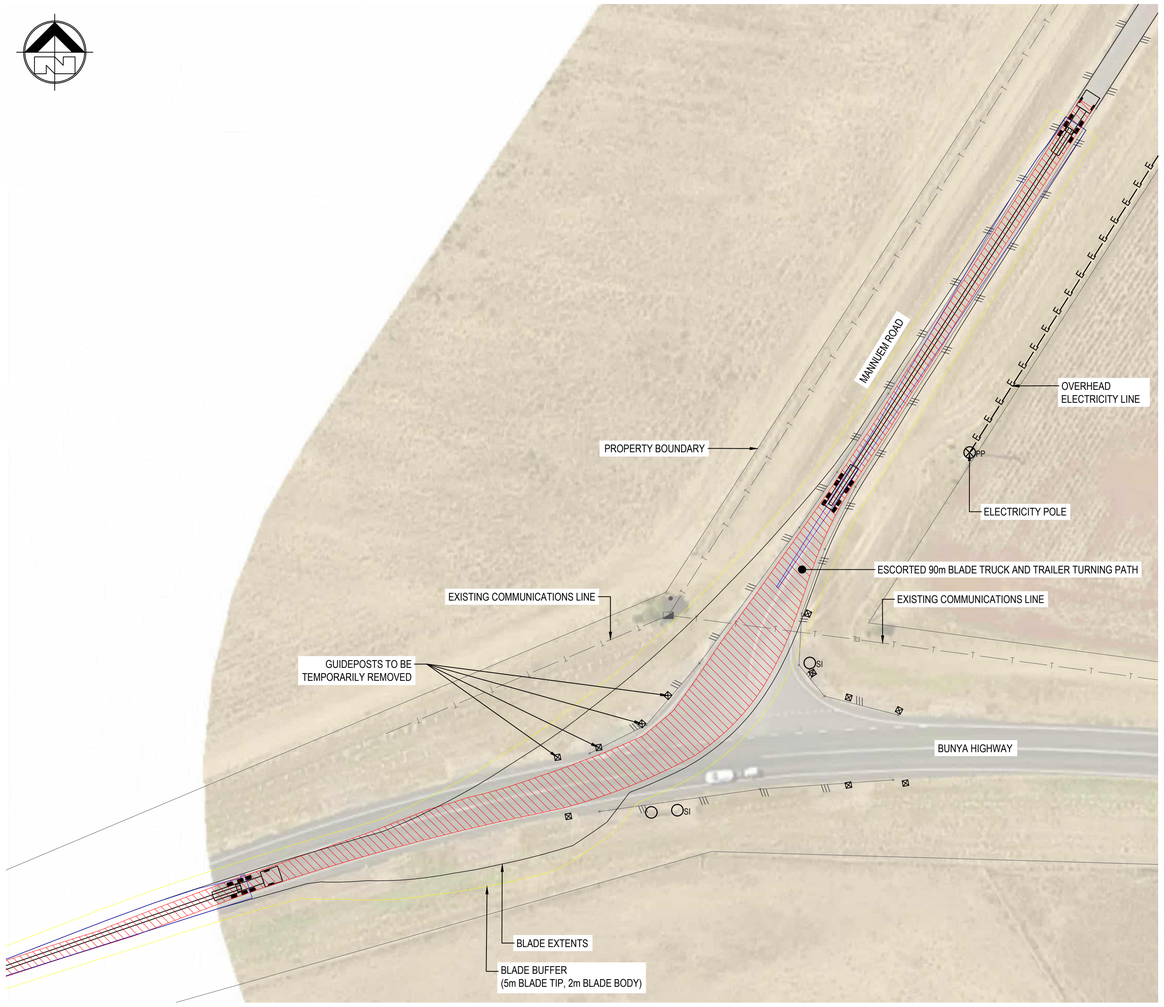
DRAWING No. 23-047-DWG-TR014

REV 1



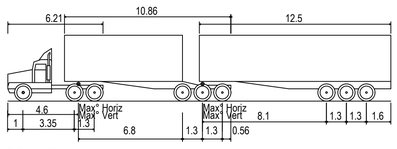
INTERSECTION 15 - BUNYA HIGHWAY / MANNUEM ROAD INTERSECTION UPGRADE PLAN - 25m B DOUBLE

SCALE 1:500



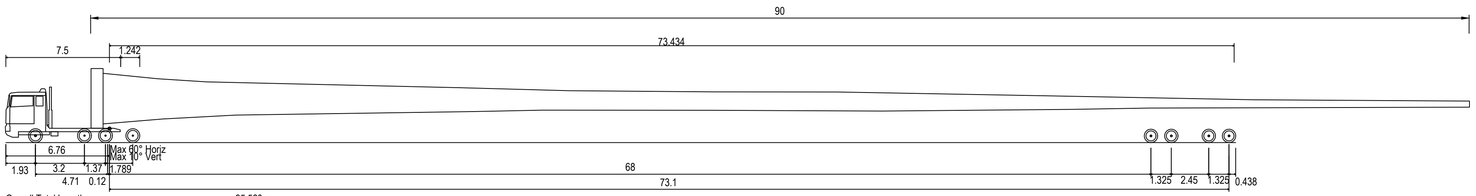
INTERSECTION 15 - BUNYA HIGHWAY / MANNUEM ROAD INTERSECTION UPGRADE PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500



B-Double (25.0m)	
Overall Length	25.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	15.000m

25m B-DOUBLE TRUCK



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

ALL GUIDEPOSTS WITHIN OVER-DIMENSIONAL VEHICLE BODY AND WHEEL PATH TO BE REMOVED PRIOR TO TRANSPORTATION OF WIND TURBINE BLADES

CLEARING OF VEGETATION SHALL ONLY BE PERFORMED AFTER RELEVANT AUTHORITY APPROVALS ARE OBTAINED, IF REQUIRED FOR ROAD UPGRADE

SURVEY OF HEIGHT CLEARANCES ALONG TRANSPORTATION ROUTE SHALL BE COMPLETED BY THE APPOINTED TRANSPORTATION CONTRACTOR

POTENTIAL CLASHES BETWEEN OVER-DIMENSIONAL VEHICLES AND GUARDRAILS, TRAFFIC SIGNALS AND STREET LIGHTING TO BE CONFIRMED BY THE APPOINTED TRANSPORTATION CONTRACTOR

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
1	FOR APPROVAL	P.M.	P.M.	T.S.	N.C.	20.12.2023

REVISION HISTORY

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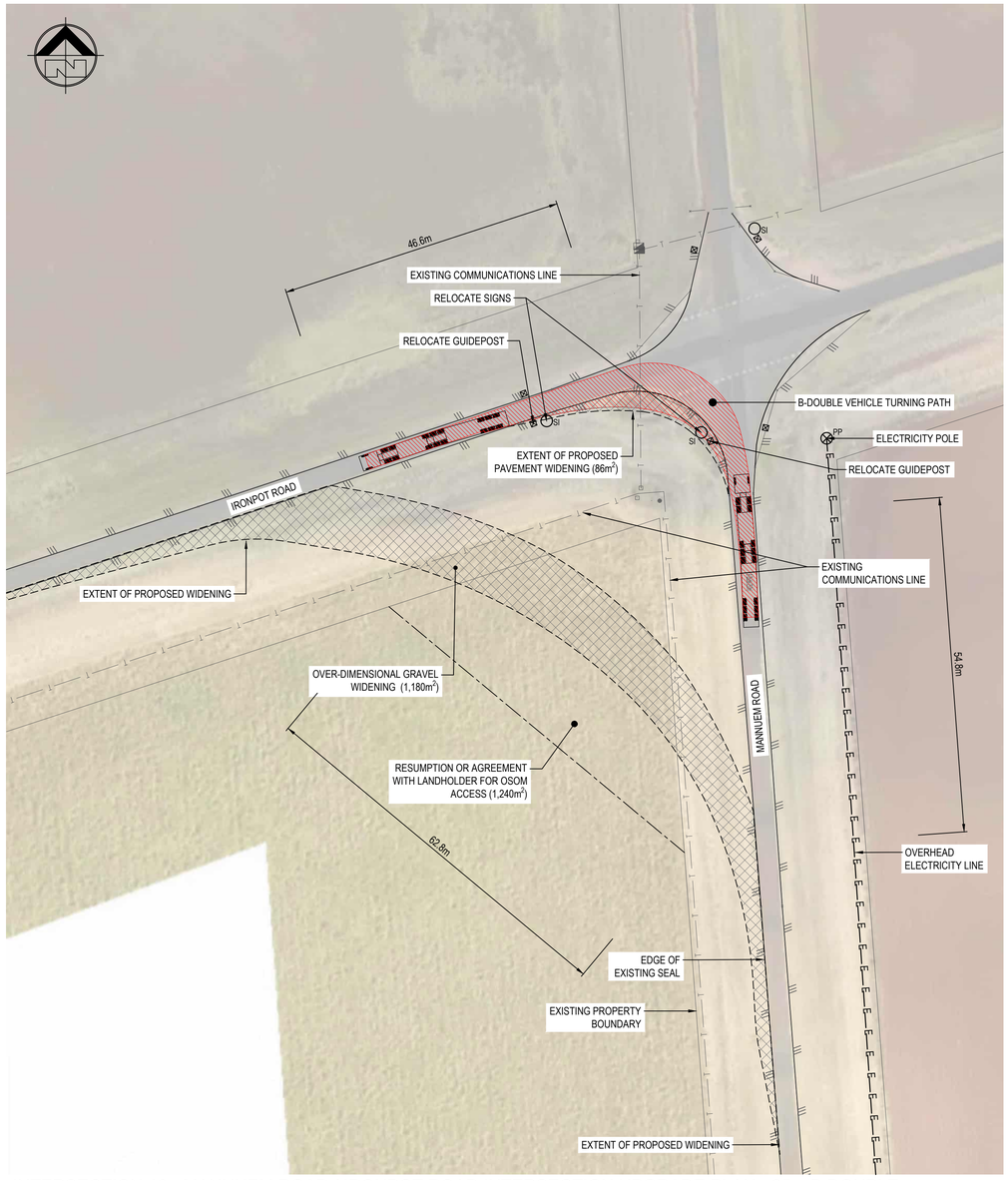
PROJECT
TARONG WEST WIND FARM

TITLE
BUNYA HIGHWAY / MANNUEM ROAD INTERSECTION UPGRADE PLAN

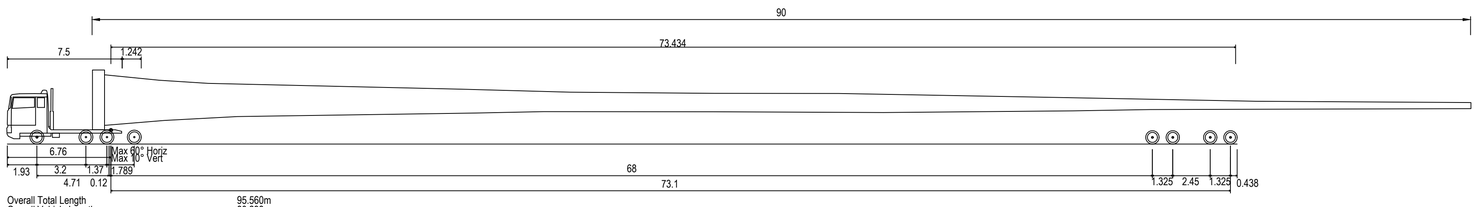
DRAWING No. 23-047-DWG-TR015

REV 1



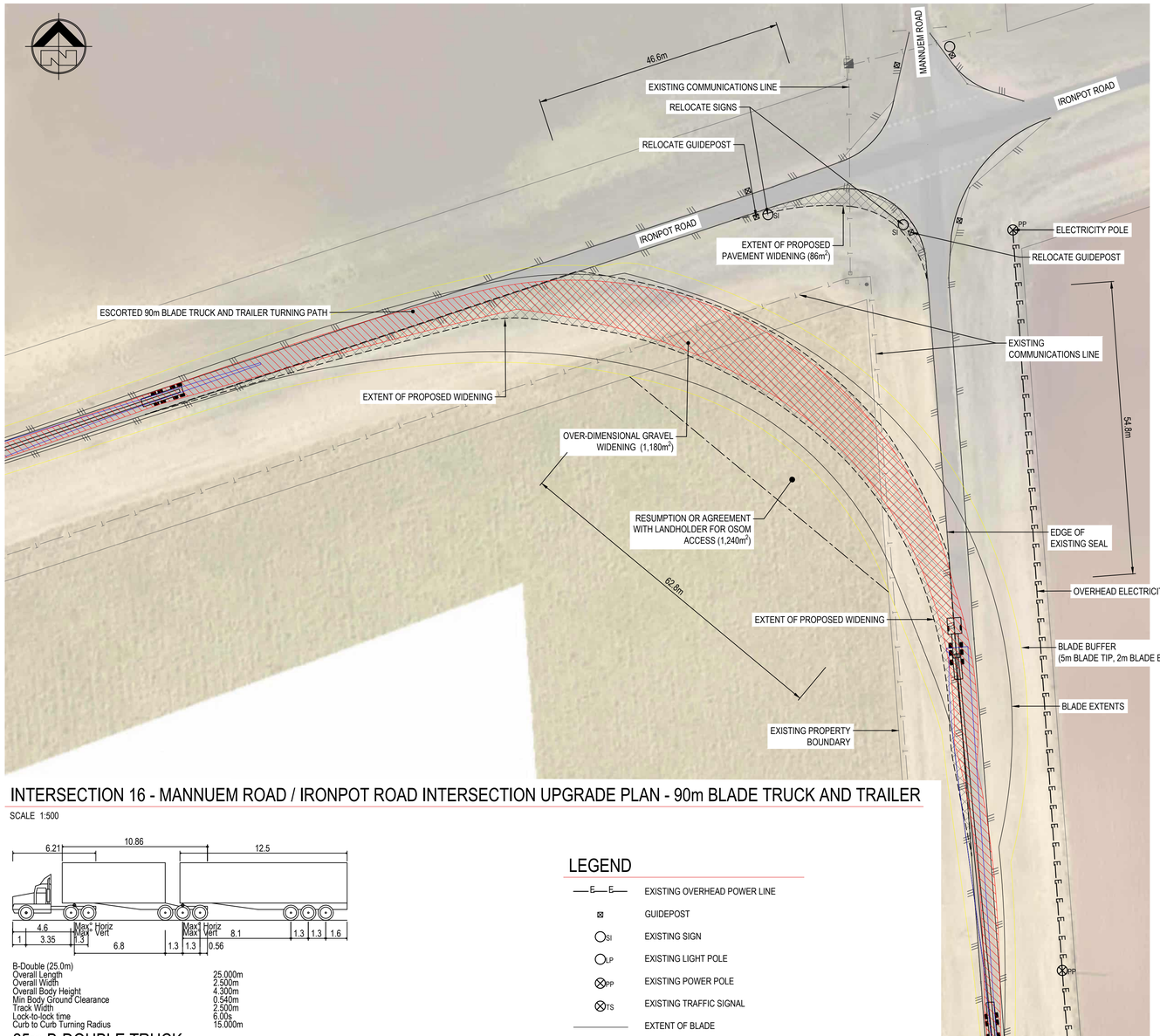
INTERSECTION 16 - MANNUEM ROAD / IRONPOT ROAD INTERSECTION UPGRADE PLAN - 25m B DOUBLE

SCALE 1:500



Overall Total Length	95.560m
Overall Vehicle Length	80.298m
Overall Width	2.591m
Overall Body Height	4.834m
Min Body Ground Clearance	0.348m
Max Track Width	2.591m
Lock-to-lock time	2.00s
Max Wheel Angle	60.00°

90m BLADE TRUCK AND TRAILER



INTERSECTION 16 - MANNUEM ROAD / IRONPOT ROAD INTERSECTION UPGRADE PLAN - 90m BLADE TRUCK AND TRAILER

SCALE 1:500

B-Double (25.0m)	
Overall Length	25.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	15.000m

25m B-DOUBLE TRUCK

LEGEND

- EXISTING OVERHEAD POWER LINE
- GUIDEPOST
- SI EXISTING SIGN
- LP EXISTING LIGHT POLE
- PP EXISTING POWER POLE
- TS EXISTING TRAFFIC SIGNAL
- EXTENT OF BLADE
- OVER DIMENSIONAL TURNING AREA
- PROPOSED GRAVEL WIDENING

NOTES

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PROJECT	TARONG WEST WIND FARM
TITLE	MANNUEM ROAD / IRONPOT ROAD INTERSECTION UPGRADE PLAN
DRAWING No.	23-047-DWG-TR016
REV	1

Appendix C – Proposed Transport Route Images

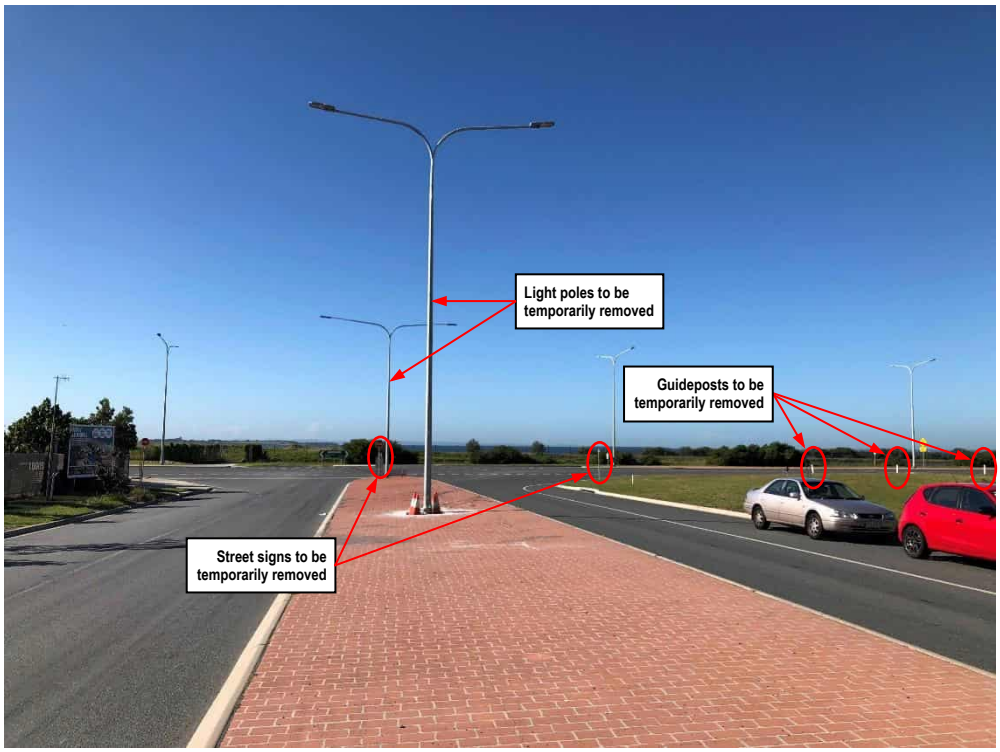

Image 1: Bishop Drive / Lucinda Drive Intersection (Location 1) Looking East

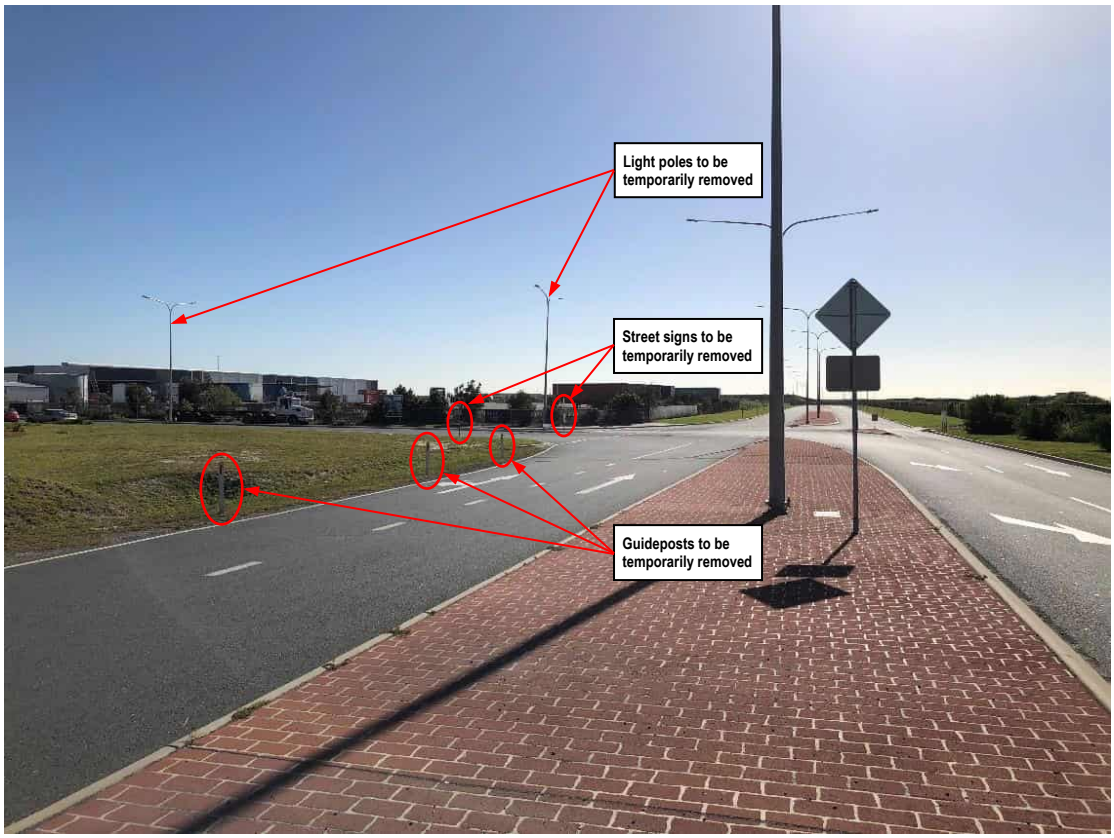

Image 2: Bishop Drive / Lucinda Drive Intersection (Location 1) Looking North

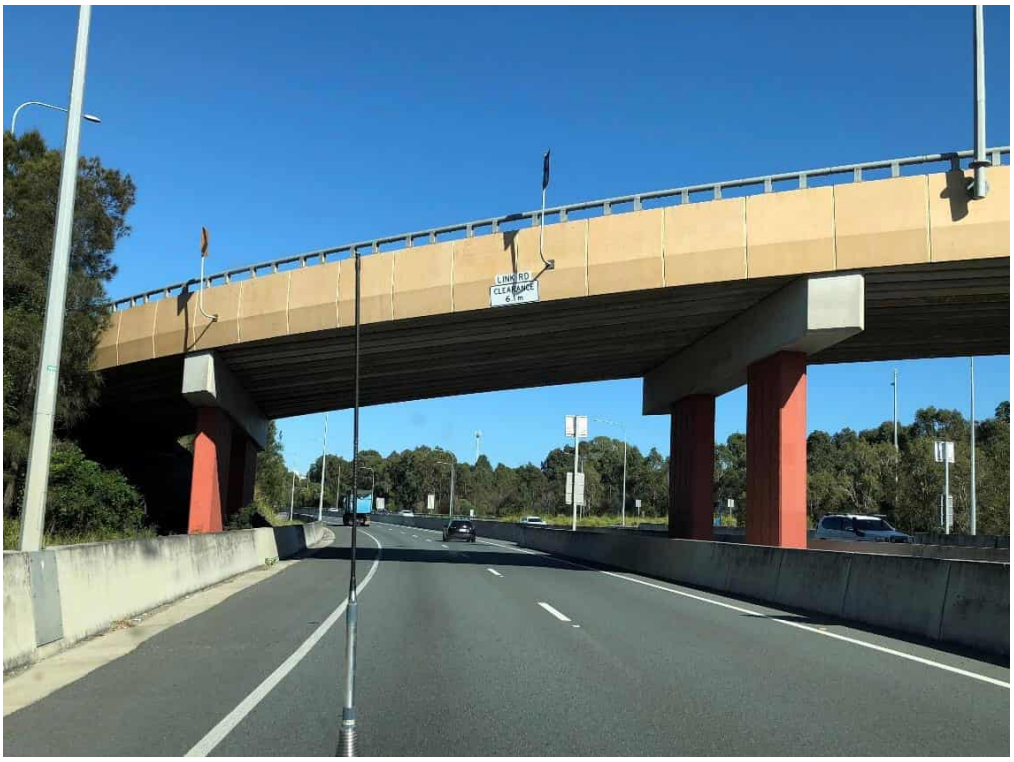

Image 3: Example Bridge Overpass on Port of Brisbane Motorway

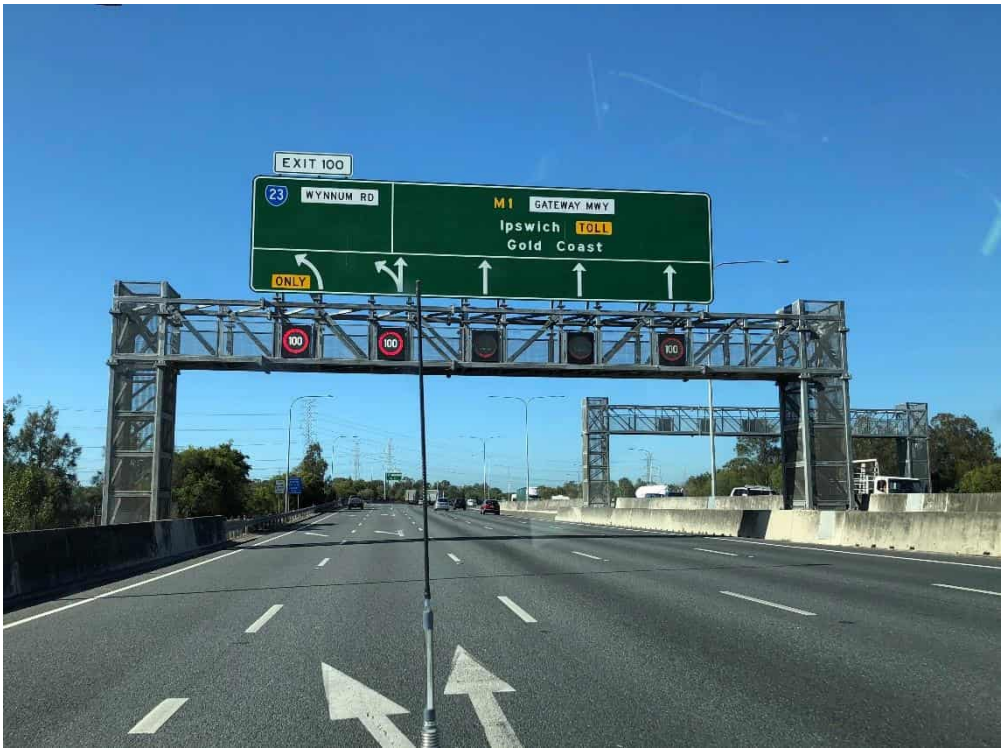

Image 4: Example Overhead Structures on Gateway Motorway

Image 5: Example Overhead electronic sign structures on Gateway Motorway

Image 6: Toowoomba Bypass / Warrego Highway Intersection (Location 7) Looking South

Image 7: Toowoomba Bypass / Warrego Highway Intersection (Location 7) Looking North-West

Image 8: Warrego Highway / Jandowae Road Intersection (Location 9) Looking North-East

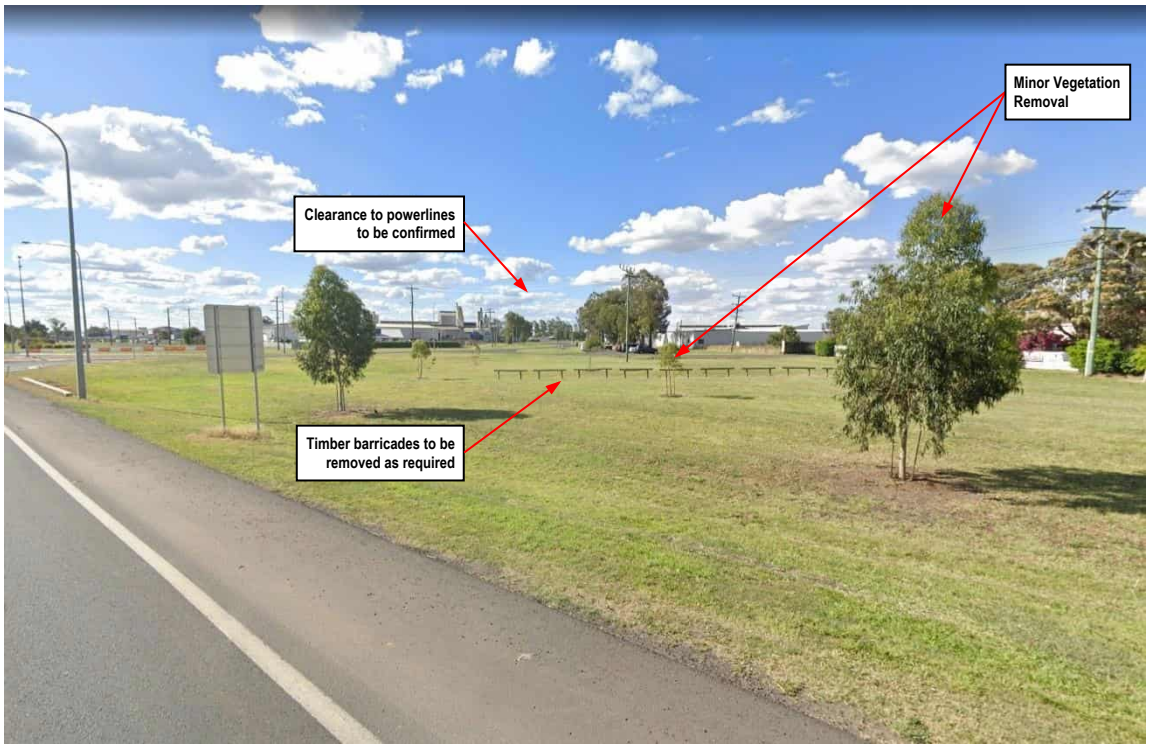

Image 9: Warrego Highway / Jandowae Road Intersection (Location 9 - Option A) Looking North

Image 10: Warrego Highway / Volker Street Intersection (Location 9 - Option B Turn 1) Looking North

Image 11: Volker Street / Jandowae Road Intersection (Location 9 - Option B Turn 2) Looking North

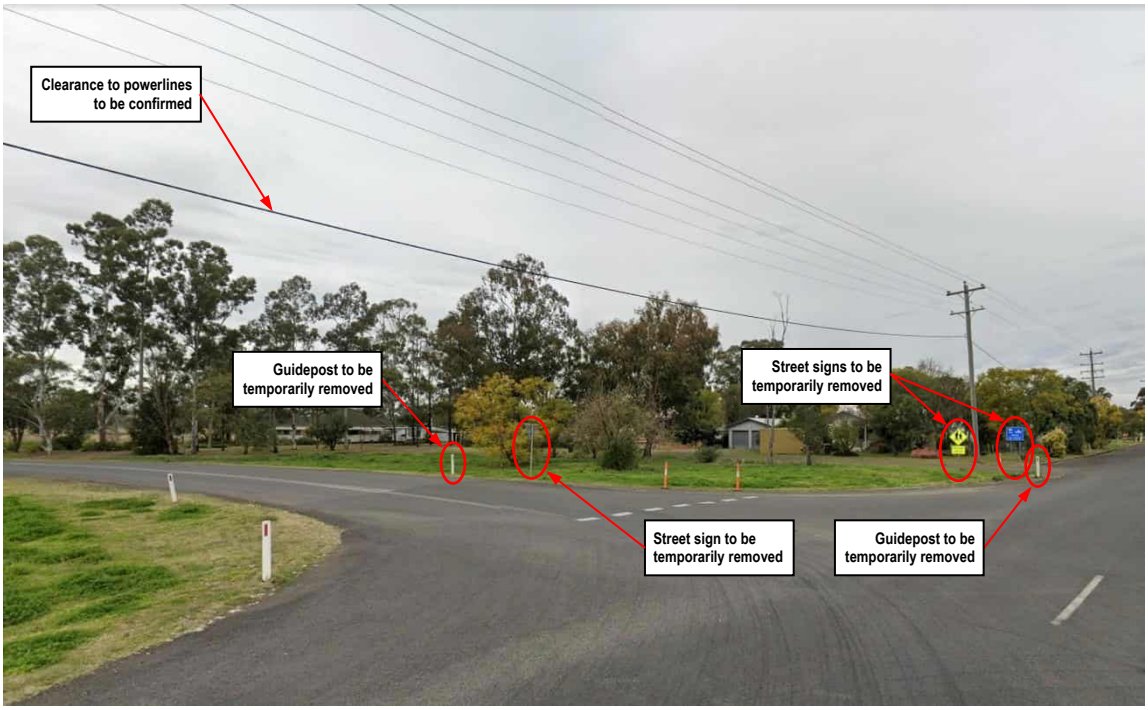

Image 12: Dalby Jandowae Road / MacAlister Bell Road Intersection (Location 10) Looking East

Image 13: MacAlister Bell Road / Bunya Highway Intersection (Location 13) Looking West

Image 14: Bunya Highway / Crawshay Street Intersection (Location 14) Looking North-East

Image 15: Bunya Highway / Mannuem Road Intersection (Location 15) Looking South-West

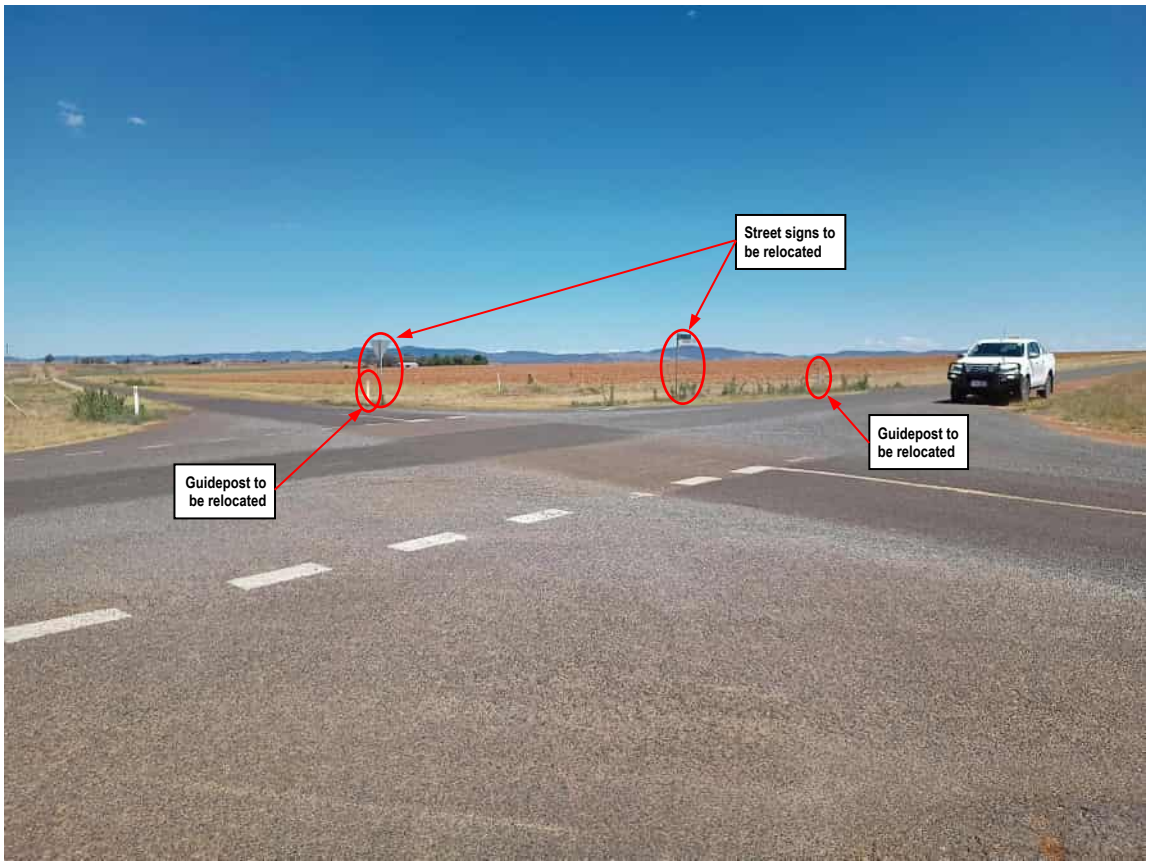

Image 16: Mannuem Road / Ironpot Road Intersection (Location 16) Looking South-West