Warracknabeal Energy Park

Attachment A.11: Traffic Impact Assessment

Traffix Group

Traffic Impact Assessment

Proposed Energy Farm

Warracknabeal Energy Park

Prepared for
Warracknabeal Energy Park Pty Ltd

March 2023

G31803R-01D

Level 28, 459 Collins St
Melbourne Victoria 3000

T: 03 9822 2888
admin@traffixgroup.com.au

Traffix Group Pty Ltd
ABN: 32 100 481 570

traffixgroup.com.au

Document Control

Our Reference: G31803R-01D

Issue No.	Type	Date	Prepared By	Approved By
A	Draft	13/07/22	K. Bullock	D. Trotter (RPE 6797)
B	Final	07/10/22	K. Bullock	D. Trotter (RPE 6797)
C	Amended Final	22/11/22	K. Bullock	D. Trotter (RPE 6797)
D	Amended Final	22/03/23	K. Bullock	D. Trotter (RPE 6797)

Table of Contents

List of Figures

List of Tables

List of Appendices

1. Introduction

Traffix Group has been engaged by Warracknabeal Energy Park Pty Ltd to undertake a Traffic Impact Assessment for the Proposed Energy Farm at Warracknabeal Energy Park.

Traffix Group understands that Warracknabeal Energy Park Pty Ltd is lodging environmental referrals for the proposed project with current plans showing 211 wind turbine generators, with a tower height of up to 180m, maximum blade length of up to 100m and maximum tip height of up to 280m. The proposed site extents are nominated within the Development Plan which is reproduced within Appendix A of this report.

This report provides a detailed traffic engineering assessment of the anticipated construction traffic and likely transport impacts. In particular, this traffic impact assessment report has had consideration to the following:

- An existing conditions survey of public roads in the vicinity of the site that may be used for site access and internal vehicle circulation.
- The anticipated traffic volumes generated during the wind farm construction.
- The impact of the wind farm construction traffic volumes on the surrounding arterial and local road network.
- The identification of required road network improvement measures to accommodate the anticipated wind farm construction traffic.
- An assessment of appropriate construction and transport vehicle routes to the site.
- The identification of appropriate vehicle access points to the site from the surrounding road network.

2. Existing Conditions

2.1. Subject Site

The overall subject site comprises two sites, referred to as the northern and southern sites, that are located approximately 4km northwest and 10km southwest of the Warracknabeal township respectively.

The location of the subject site in the context of the surrounding area is presented at Figure 1 and Figure 2.

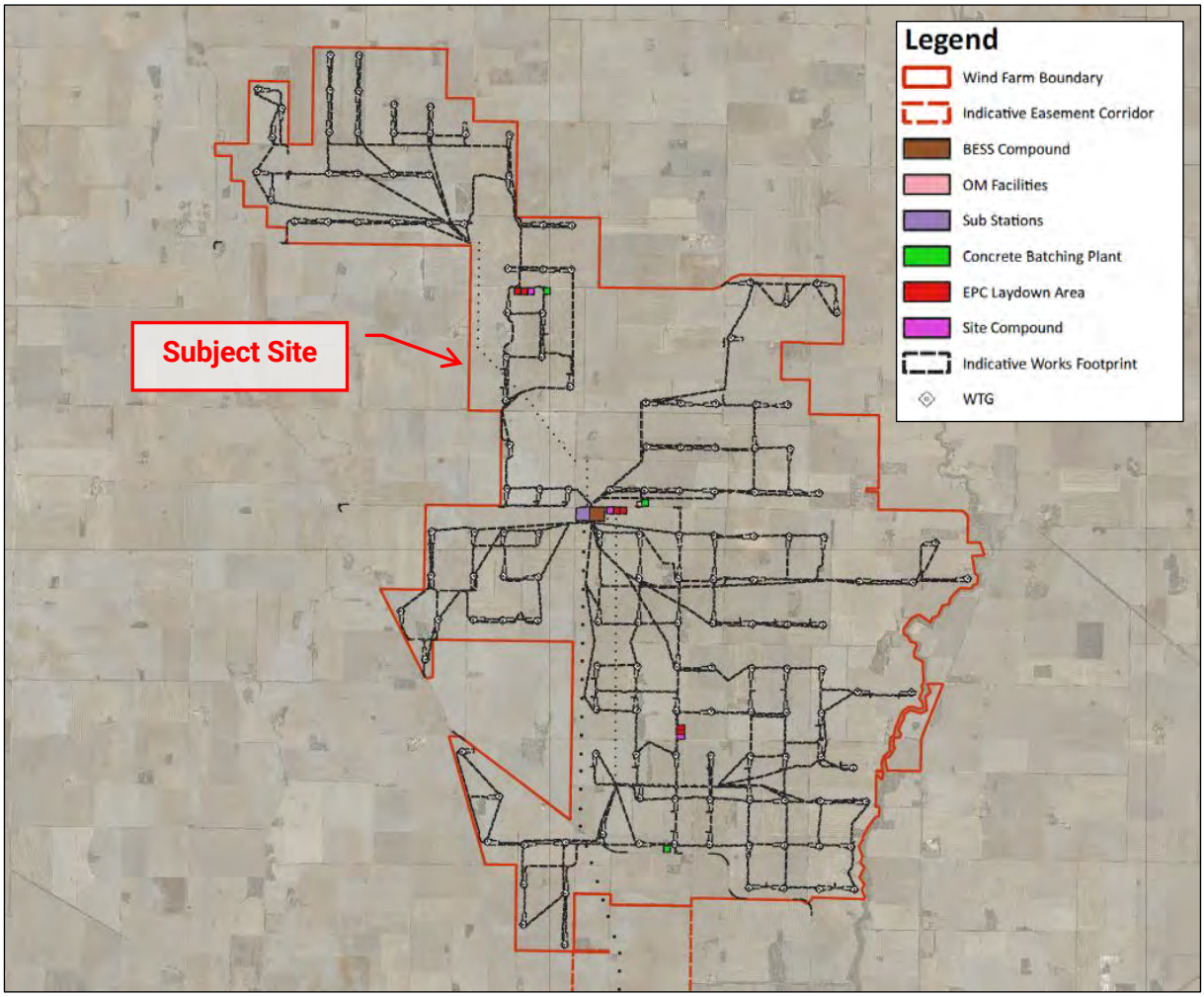


Figure 1: Locality Plan (Northern Section)

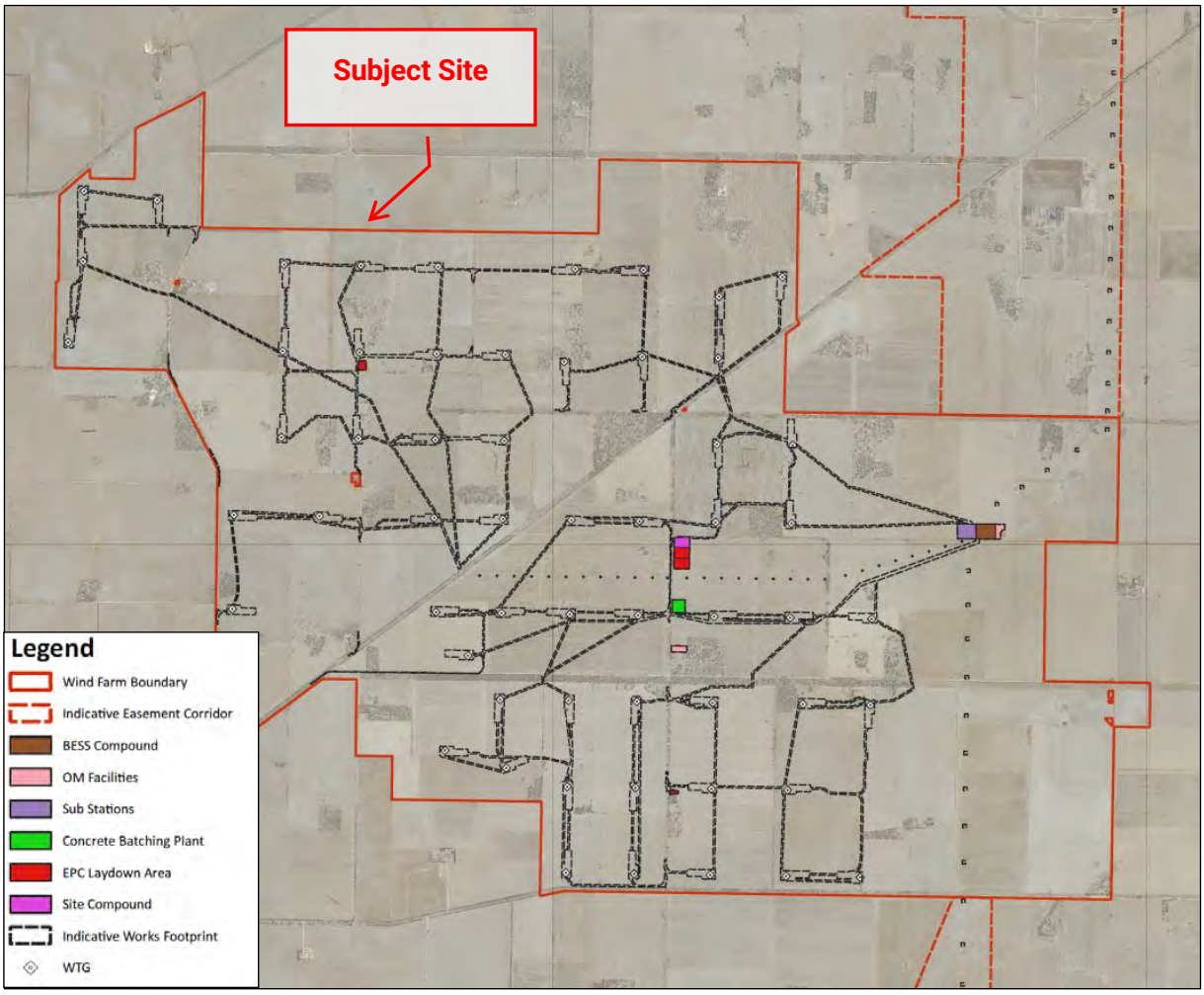


Figure 2: Locality Plan (Southern Section)

2.2. Road Network

The characteristics of the key roads internal to, bounding and in the vicinity of the subject site are presented in Table 1, with photographs of the road network shown within Appendix B.

Roads have been classified in accordance with the Yarriambiack Shire Council Road Register, with the characteristics of these road classifications summarised within Table 2.

Table 1: Road Network Summary

Road	Approx. Carriageway Width (m)	Approx. Road Reserve Width (m)	Surface and Condition	Road Classification
Arterial Road Network				
Borung Highway	8.1m	60m	Bitumen Fair	Arterial Road (VicRoads)
Jeparit-Warracknabeal Road	6.0m	20m	Bitumen Fair	Arterial Road (VicRoads)
Jeparit-Warracknabeal Road (Rainbow Road)	6.0m	30m	Bitumen Fair	Arterial Road (VicRoads)
Local Road Network				
Hollands Road	3.6m	20m	Unsealed Poor	Rural Access Road (Minor)
Dogwood Road	4.5m	40m	Unsealed Poor	Rural Access Road (Secondary)
Boundary Road	4.4m	60m	Unsealed Poor	Rural Access Road (Secondary)
Gregson Road	4.7m	20m	Unsealed Poor	Rural Access Road (Secondary)
Cannum School Road	4.2m	20m	Unsealed Poor	Rural Access Road (Secondary)
Blue Ribbon Road	3.8m	40m	Sealed Fair	Rural Collector Road
Exchange Road	4.3m	20m	Unsealed Poor	Rural Access Road (Primary)
Lah West Road	4.0m	20m	Sealed Fair	Rural Collector Road
Brim West Road	3.9m	20m	Sealed Fair	Rural Collector Road

Road	Approx. Carriageway Width (m)	Approx. Road Reserve Width (m)	Surface and Condition	Road Classification
Fishers Road	4.8m	20m	Unsealed Poor	Rural Access Road (Primary)
Brikkle Road	7.2m	20m	Unsealed Poor	Rural Access Road (Secondary)
Brennans Road	5.3m	20m	Unsealed Poor	Rural Access Road (Secondary)
Batchica West Road	4.0m	20m	Unsealed Poor	Rural Access Road (Secondary)
Hein Lane	4.3m	40m	Unsealed Poor	Rural Access Road (Secondary)

Table 2: Road Hierarchy Summary

Hierachy	Function [1]	Target Construction Standard
Arterial Road	N/A [2]	
Rural Collector Road	A road that provides, or is part of a secondary link between two areas, two roads of a higher classification or a combination thereof.	Sealed or other all weather surface
Rural Access Road (Primary)	A road that is designated primary all weather access to 1 or more occupied farm houses. (The house(s) must be the primary residence of the occupant).	All weather surface
Rural Access Road (Secondary)	A road that does not meet the criteria to be a Link Road, a Collector Road or a Rural Access (Primary) Road but is used on a regular basis to provide access to other parts of a property for farming purposes or to a business enterprise (E.g. Grain Receival or Transport Company).	Earth formation
Rural Access Road (Minor)	A road used occasionally (but not regularly) for farm access. Any other rural road with minimal use.	No construction

[1] As defined within the Yarriambiack Shire Council Road Hierarchy.

[2] Arterial Roads are not specifically defined within the Yarriambiack Shire Council Road Hierarchy.

2.3. Existing Road Surfaces and Overhead Obstructions

Traffix Group undertook a visual inspection of each of the roads set out in Table 1 in June 2022 to identify the current standard of the roads, surface conditions and obstructions.

The road surface of sealed roads were observed to be generally in good condition with the majority of (but not all) unsealed roads observed to be in poor condition[1]. Key observations of the road network are summarised as follows:

- Fences, signs and trees are located within the road reservation for most roads and are generally set back sufficiently to not impact any vehicles travelling along such roads. The exception being Hollands Road where trees were identified to significantly encroach over the carriageway. Prior to any construction vehicles accessing the area, a site inspection will need to be undertaken, in conjunction with the relevant authority, to determine the precise location of tree canopies and the current height clearance provision as well as any necessary increases in these clearances.
- Overhead telephone wires were observed on Rainbow Road near its intersection with Exchange Road. Prior to any construction vehicles accessing the area, a site inspection will need to be undertaken, in conjunction with the relevant authority, to determine the precise location of the telephone lines and the current height clearance provision as well as any necessary increases in these clearances.
- Overhead wires were observed on Hollands Road within the vicinity of the site. Prior to any construction vehicles accessing the area, a site inspection will need to be undertaken, in conjunction with the relevant authority, to determine the precise location of the power lines and the current height clearance provision as well as any necessary increases in these clearances.

2.4. Traffic Volumes

Traffix Group has sourced daily traffic volumes for key roads in the vicinity of the site which are presented at Table 3. These volumes have been sourced from the VicRoads Traffic Volume Database which was most recently updated in May 2020.

Table 3: External Road Network Daily Traffic Volumes

Road Name	Road Classification	Daily Average Weekday Traffic Volumes (Two Way)
Borung Highway (between Dimboola Road and Blue Ribbon Road)	Arterial	600 veh/day
Jeparit-Warracknabeal Road	Arterial	100 veh/day
Rainbow Road (south of Jeparit-Warracknabeal Road)	Arterial	250 veh/day
Rainbow Road (north of Jeparit-Warracknabeal Road)	Arterial	100 veh/day

[1] The site inspection was completed during and following a rain event which emphasised varying degrees of deterioration in the road surface.

3. Proposed Wind Farm Arrangements

3.1. Anticipated Construction Timeline

The total construction timeframe is expected to be approximately 45 months for the northern area of the wind farm and approximately 15 months for the southern area of the wind farm. This includes a turbine component delivery timeframe across approximately 20 and 7.5 months respectively for the northern and southern areas.

On average, approximately 8 turbine deliveries are anticipated each month with peak periods expected to generate in the order of 3 deliveries per week.

It will be necessary to undertake various road improvement works to the local road network to accommodate the size and weight of the vehicles associated with the construction of the wind farm. Further details of these improvement works are presented in Section 7 of this report.

3.2. Location of On-Site Facilities

It is proposed to provide the following facilities on the site:

- Operations and Maintenance (O&M) facilities
- Temporary batching plants
- Temporary lay down areas
- Substation / collector stations

The proposed site layout is shown in Appendix A of this report.

3.3. On-Site Loading and Storage Areas

Wind turbine generator components will be unloaded at each wind turbine generator site during construction. Various construction compounds for staging of component deliveries will also be provided on-site.

3.4. Car Parking

Car parking for construction workers will be provided at the site compounds, located at the main entrances within the site.

3.5. Restriction on Construction Operations

In deriving appropriate hours of operation, the needs of local residents, Warracknabeal Energy Park Pty Ltd and other road users will need to be balanced. It will also need to be recognised that there may be some instances where certain deliveries to the wind farm site (such as over-dimensional deliveries) will need to occur outside of the regular working hours of operation for the site.

A Traffic Management Plan will need to be agreed between Yarriambiack Shire Council, DoT and Warracknabeal Energy Park Pty Ltd whereby the relevant authorities (Yarriambiack Shire Council and DoT) are given sufficient warning of an out of hours delivery to allow them to advise local residents and other road users of the forthcoming event.

The size of vehicles that are anticipated to deliver wind turbine generator components to the site are significant and will have an impact on the times that it will be possible to transport over-dimensional loads on the road network. Deliveries of the largest over-dimensional loads (an approximate maximum blade length of up to 100m) are expected to occur outside of the road network and school peak hours which typically occur on a weekday from 8:00am to 9:30am, 2:30pm to 4:00pm and 5:00pm to 6:00pm. The actual peak road network times that will need to be avoided will be agreed with DoT.

Furthermore, the hours of over-dimensional deliveries will need to occur at times when the impact of slowing or stopping existing traffic movements on the road network can be achieved safely and with the minimum of disruption to the operation of the road network. This will likely include a curfew on heavy vehicle movements during school bus operations (i.e. on roads carrying school buses during school pick up and drop off times). Times will be controlled through the application for the relevant over-dimensional permits.

4. Traffic Generation

4.1. Over-Dimensional Traffic

A number of over-dimensional vehicles will access the subject site in order to transport the individual components of each wind turbine generator. An estimation of the number of over-dimensional trips[2] is provided in Table 4[3].

Table 4: Over-Dimensional Trips Summary

Component	Vehicle Trips per Turbine	Overall No. of Vehicle Trips (Project Duration) [1]
Tower	8	1,688 trips
Nacelle	1	211 trips
Blades	3	633 trips
Drivetrain	1	211 trips
Hub	1	211 trips
Turbine Transformer	1	211 trips
Tower Base Ring	1	211 trips
Sub-Total	***16***	***3,376* trips**
Substation Transformers	N/A	No more than 8 trips [2]
Total		***3,384* trips [3]**

[1] Based upon 211 turbines within the site.
[2] Number of vehicle trips dependent on final substation configuration.

[3] 3,384 both entry and exit trips, that being a total of 6,768 road network movements.

Table 4 indicates that the proposed wind farm could be expected to generate up to 3,384 over-dimensional vehicle trips during construction. It is noted that a trip reflects a single entry and exit movement from the site. In many instances, depending on the component being delivered and vehicle utilised, it is the entry movement to the site which is most critical, as the exit movement is undertaken by an unloaded vehicle of reduced weight and/or reduced length (i.e. as the component no longer needs to be stored on the vehicle).

Examples of the over-dimensional vehicle types that may be used to transport the tower sections and blades are presented in Figure 3 and Figure 4.

[2] Each trip comprises both an entry and exit movement, that is one trip equates to two road network movements.
[3] Information provided by Warracknabeal Energy Park Pty Ltd

Figure 3: Example Tower Transport Vehicle

Figure 4: Example Blade Transport Vehicle

4.2. Heavy Vehicles

In addition to the over-dimensional traffic, there will be other construction traffic movements associated with the wind farm.

The total estimated number and type of vehicles expected during the construction period is presented in Table 5. The expected volumes have been advised by Warracknabeal Energy Park Pty Ltd and appear largely consistent with those adopted for other wind farm developments in Victoria.

Table 5: Heavy Vehicle Traffic Volumes

Traffic Source	Overall No. of Vehicle Trips (Project Duration) [1]
Road Upgrades	400 trips
Site Establishment	510 trips
Dust Suppression	5,769 trips
Turbine Erection	308 trips
Electrical Infrastructure	12,233 trips
Concrete Delivery	27,533 trips
Concrete Mixing Materials	14,013 trips
Quarry Materials	42,632 trips
Total Trips	***103,398 trips [2]***

[1] One trip constitutes two movements, being the arrival and departure movements.

[2] 103,398 both entry and exit trips, that being a total of 206,796 road network movements.

Based on the above, the proposed wind farm could be expected to generate in the order of 103,398 heavy vehicle trips (excluding the over-dimensional vehicle movements) within the external road network over the 45-month construction period. This equates to approximately 96 heavy vehicle trips each day[4].

In addition to the truck movements within the external road network, there are expected to be a significant number of vehicle movements within the internal road network of the site. It is noted that these internal vehicle movements aren't excluded from Table 5, in other words Table 5 represent a conservative worst case traffic movement scenario. These internal movements are associated with the following:

- Concrete agitators
- Concrete batching water
- Water tankers for dust suppression

[4] Assumes an average of 24 working days for each month. 96 heavy vehicle entry and exit trips, that being a total of 192 road network movements each day.

- Track construction
- Hardstand construction

It is re-emphasised that the volumes presented at Table 5 do not exclude internal road movements, therefore representing a conservative worst-case traffic movement scenario.

4.3. Light Vehicles

Personnel (Staff)

The level of personnel (staff) traffic will be dependent on the number of staff ultimately employed as part of the project. Across the project an average of 150-200 personnel is anticipated on-site each day during the construction phase. For the purposes of this analysis, 200 personnel are conservatively assumed. Assuming one person per vehicle and a project duration of 45 months (average of 24 working days per month) this equates to a total of 216,000 light vehicle trips over the 45-month construction period.

4.4. Summary

Based on the above, a summary of the forecast traffic generation during the wind farm construction is provided in Table 6.

Table 6: Total Construction Traffic Trips

Vehicle Type	Vehicle Trips [1]
Over Dimensional	3,384 trips
Heavy Vehicle	103,398 trips
Personnel (Light Vehicle)	216,000 trips
Total	***322,782 trips [2]***

[1] One trip constitutes two movements, being the arrival and departure movements.

[2] 322,782 both entry and exit trips, that being a total of 645,564 road network movements. Assuming a 45-month construction program, 24 working days per month, this equates to 299 trips per day, being 598 road network movements per day.

5. Vehicle Access to Wind Farm

5.1. Anticipated Traffic Routes

Portland is anticipated to be the port location where the wind turbine generator components will be delivered.

The VicRoads Class 1 pre-approved Oversize & Over Mass (OSOM) Annual Scheme Permit network map has been used to determine the most suitable route for the transport of the wind turbine generator components to the site.

The **proposed primary OD route (excluding wind blades)** to the site is as follows:

- Port of Portland
- Henty Highway (A200)
- Chrome Road
- Dartmoor-Hamilton Road (C187)
- Fairburns Road
- Glenelg Highway (B160)
- Henty Highway (A200)
- Jallumba-Mockinya Road
- Wonwondah-Toolondo Road
- Horsham-Noradjuha Road (C214)
- Wimmera Highway (B240)
- Curran Road
- Western Highway (A8)
- Borung Highway (C234)

As the wind blades are the longest component to be delivered to the site an alternate OD route has specifically been identified for the **wind blade delivery route** to the site as follows:

- Port of Portland
- Henty Highway (A200)
- Chrome Road
- Dartmoor-Hamilton Road (C187)
- Fairburns Road
- Glenelg Highway (B160)
- Coleraine-Edenhope Road (C206)
- Nhill-Harrow Road (C206)
- Western Highway (A8)

- Borung Highway (C234)

These routes, other than the final turn(s) into the site from Borung Highway, are consistent with the routes understood to have been utilised for the nearby Murra Warra Wind Farm and are presented in Figure 5. It is understood that significant upgrade works were undertaken along these routes to facilitate deliveries for the Murra Warra Wind Farm and it is expected that required upgrades for the Warracknabeal Energy Park will be significantly reduced as a result.

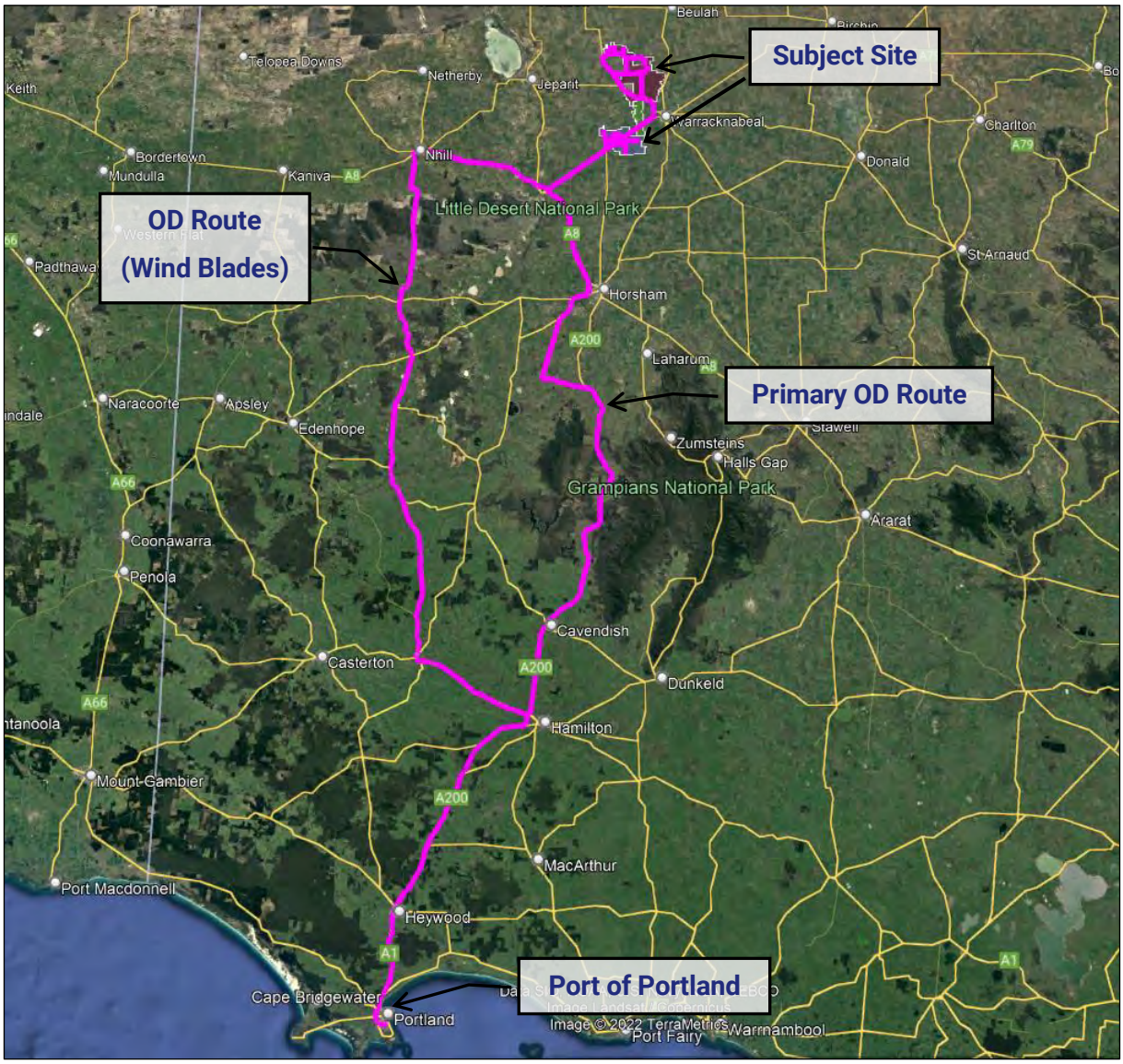


Figure 5: Portland to Site Transport Routes

It is anticipated that the raw construction materials will predominately be sourced from local quarries[5], local towns and regional centres. The raw materials will likely be transported in standard delivery vehicles not requiring a permit to travel to the subject site.

5.2. Swept Path Assessment

The proposed wind turbine generators will have a blade length of up to 100m with the blades being the longest component to transport. As the specific turbine and wind blades to be utilised are still to be determined, we have been advised that a 100m length represents the upper limit of the length of any wind blades which would need to be transported.

Swept path assessments (using AutoTURN) have been undertaken for the following key intersections:

- Borung Highway / Blue Ribbon Road
- Borung Highway / Cannum School Road
- Borung Highway / Proposed Transformer Access Point[6]
- Borung Highway / Fensomes Road
- Rainbow Road / Aubrey Road / Fensomes Road
- Rainbow Road / Lah West Road
- Rainbow Road / Brim West Road

The swept path results are presented in Appendix C with the over-dimensional vehicle profile used for the swept path assessment presented in Figure 6.

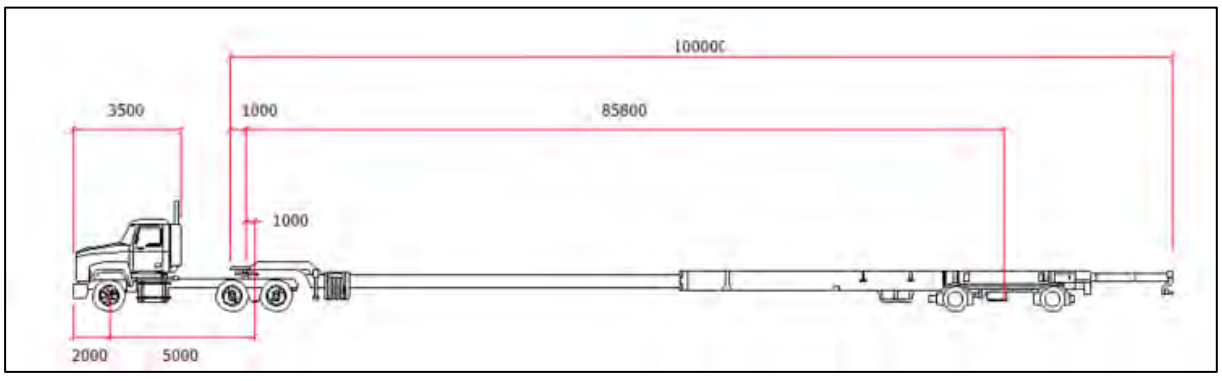


Figure 6: Over-dimensional Design Vehicle (Total Vehicle Length – 105m)

[5] Further investigations are being completed at this time. Preliminary investigations have identified that material may be sourced from the Stawell, Charlton and Tuckers Hill Quarries (Bluestone/concrete aggregate) and Albacutya Gypsum (Limestone for road construction).

[6] Vehicle access for wind blades may not be required at this location with swept paths shown for completeness only.

5.3. Vehicle Access to Wind Farm

The road width requirements for over-dimensional vehicles delivering the wind turbine generator components have been assessed through site inspections and electronic vehicle swept path assessments using AutoTURN computer software.

After unloading, it will be possible for the length of the trailers of the over-dimensional vehicles to be reduced. As such, the impact of the vehicles on exit from the site will be less than that of the entry movements. Therefore, only the entry movements have been assessed through the swept path assessment.

The swept path assessment indicates that there will be a number of instances where the over-dimensional vehicle will extend beyond the available road width. The major impacts as a result of the over-dimensional blade vehicle are summarised within Table 7.

Table 7: Swept Path Assessments - Intersection Modification Summary

Intersection [1]	Comments
Borung Highway / Blue Ribbon Road	Limited vegetation lopping / removal.
Borung Highway / Cannum School Road	Vegetation lopping / removal required.
Borung Highway / Fensomes Road	Limited vegetation lopping / removal required.
Rainbow Road / Aubrey Road / Fensomes Road	Use of existing road shoulder and potential improvements to shoulder area required.
Rainbow Road / Dunn Road	Road shoulder widening and limited vegetation lopping / removal required.
Rainbow Road / Gould Lane	Road shoulder widening and limited vegetation lopping / removal required. Future detailed assessment to confirm suitability of use of Batchica Channel culvert.
Rainbow Road / Lah West Road	Limited vegetation lopping / removal required.
Rainbow Road / Brim West Road	Limited vegetation lopping / removal required.
Rainbow Road / Batchica West Road	Vegetation lopping / removal required.

[1] Road reserves relative to the aerial image shown are indicative only and provided for contextual purposes only. In many instances, the Boring Highway / Cannum School Road intersection being one such example, there is a mismatch between the aerial overlay and the property boundaries shown.

6. Traffic Considerations

6.1. Daily Traffic on Surrounding Roads

Utilising the existing surveyed traffic volumes presented in Section 2.4 and the traffic generation estimates provided in Section 4.4, a broad estimate of the post development daily traffic volumes on the surrounding road network is provided in Table 8.

The assessment assumes that 50% of the total site generated traffic would occur along each of the four nominated road sections. That is, there is not considered to be a single point along the assessed road network where greater than 50% of the total site traffic generation will be 'funneled' through.

This split of traffic has regard to the various routes to/from the site (e.g. travelling to/from the north, east, south or west of the site) for various vehicles (particularly light vehicles) and that the site is split into a northern and southern site. As a simple example, a worker residing in the centre of the Warracknabeal township would have various route options in travelling to/from the site and would take different routes depending on where in the site they were working (e.g. likely utilise Borung Highway for accessing the southern site and likely utilise Rainbow Road in accessing the northern site).

Table 8: Anticipated Construction Traffic Volumes

Road	Daily Traffic Volumes			
	Existing (vpd*)	Additional (vpd) [1]	Total during Construction (vpd)	Theoretical Road Capacity (vpd) [2]
Borung Highway (between Dimboola Road and Blue Ribbon Road)	600 vpd	+299 vpd	899 vpd	2,500-6,000 vpd
Jeparit-Warracknabeal Road	100 vpd	+299 vpd	399 vpd	2,500-6,000 vpd
Rainbow Road (south of Jeparit-Warracknabeal Road)	250 vpd	+299 vpd	549 vpd	2,500-6,000 vpd
Rainbow Road (north of Jeparit-Warracknabeal Road)	100 vpd	+299 vpd	399 vpd	2,500-6,000 vpd

*vpd denotes vehicles per day

[1] Based on an overall traffic generation of 645,564 movements (i.e. double the number of trips) spread evenly over a 45-month construction period and assuming 24 working days per month. This equates to a total of 598 vehicle movements per day (i.e. 299 arrival trips and 299 departure trips). Noted that assessment assumes that 50% of this traffic (50% of 598 vehicle movements per day) occurs along each of the four nominated road sections.

[2] Based upon a 'Collector/Connector Street Level 1' as per Table 2 of the Infrastructure Design Manual, with this road type considered to best represent the nominated roads.

Table 8 indicates that all roads are anticipated to operate within their theoretical capacity during construction.

6.2. Portland to Site Traffic Route

The routes from Portland to the site, are consistent with the preferred routes previously identified in conjunction with relevant authorities for other Wind Farms in the area, including the Murra Warra Wind Farm. These routes are contained to the OSOM and arterial road network (VicRoads controlled roads) and seeks to minimise impacts on surrounding residential communities. All roads on the route are configured with at least a sealed single traffic lane in each direction.

6.3. Rock Source Material

The source of rock material is still being investigated and is likely to comprise external local quarries.

We have been advised by the Applicant that this may occur from the Stawell Quarry, Charlton Quarry, Tuckers Hill Quarry and Albacutya Gypsum.

6.4. Concrete Deliveries

We have been advised by the Applicant that up to four concrete batching plants will be used on-site. Aggregate for the concrete batching plant may be sourced externally, with these vehicle movements outlined within Section 4.2 of this report.

6.5. Operational Traffic

Traffic generated during the operation of the wind farm will be negligible and will generally consist of maintenance vehicles.

Accordingly, there is expected to be negligible impact from the wind farm to the operation of the surrounding road network once the wind farm is operational.

7. Other Considerations

7.1. Intersection Upgrades

Swept path assessments of key intersections, as shown within Appendix C, indicate that nominated intersections will need to be upgraded to satisfactorily accommodate vehicles up to and including the wind blade transport vehicle. It is recommended that the intersection trafficable splays be widened (not required to be sealed), and trees pruned/removed, in order to accommodate the vehicle swept path requirements at these locations.

No formal turning treatments are considered required at these key intersections.

Both existing and additional development traffic volumes on all key roads mentioned previously in this report are relatively low, relative to these roads' theoretical capacity.

Having regard to this, no additional turning treatments or upgrades are considered required at these intersections (other than those for over-dimensional vehicles).

7.2. Road Upgrades

Having regard to the quantum of traffic associated with the development, and potential internal tracks/routes, it is recommended that consideration be given to upgrading of the road sections identified in Table 9.

For reference, an overview of the internal and surrounding road network is presented within Appendix A.

Table 9: Potential Road Upgrades

Road Name	Road Section Upgrade Extents [1]
Hollands Road	Dogwood Road to ~1.5km west of Ailsa Wheat Road
Dogwood Road	Borung Highway to Moloneys Road
Boundary Road	Borung Highway to Cannum School Road
Cannum School Road	Borung Highway to Boundary Road
Gregson Road	Keam Road to Crow Road
Exchange Road	Rainbow Road to ~600m east of Rainbow Road
Fishers Road	Brim West Road to Couzner Road
Couzner Road	Fishers Road to ~1.8km west of Brikkle Road
Brikkle Road	Brim West Road (eastern leg) to Golders Road
Batchica West Road	Rainbow Road to Averys Road
Hein Lane	Rainbow Road to Zanker Road

[1] The exact road surface upgrade and extents would be subject to further future design of internal access roads/routes and consideration as to both the types of vehicles and traffic volumes to utilise each road segment. This is expected to be outlined within a Traffic Management Plan.

7.3. Traffic Management

As part of the construction process, a Traffic Management Plan (TMP) will be prepared to outline the key traffic considerations of the wind farm construction process and its ongoing operation. The TMP will be developed upon selection of the final wind turbine model as part of the secondary consent process. The TMP will explore the following items as they relate to the wind farm site:

- Further identification of construction, delivery vehicle routes and site access strategy to the wind farm site.
- Recommended hours of operation and speed limits for trucks.
- Any mitigation works required to offset the impacts of construction vehicles.
- Identification of a timetable of required pre-construction road works.

It is expected that the updated TMP will be prepared in consultation with VicRoads and Yarriambiack Shire Council.

8. Conclusions

Based on the analysis and discussions presented within this report, the following conclusions are made:

a) The proponent is lodging environmental referrals relating to the Warracknabeal Energy Park project.

b) Current plans show 211 turbines with maximum tip height of 280m.

c) This assessment undertook analysis of proposed traffic movements to, from and around the project site. Traffix Group understands the proponent will most likely utilise nearby commercial quarries as material sources instead of developing an on-site quarry. This assessment has considered these commercial quarries as the sources of material for the project. Traffic movements from the quarries to the site are confined to major arterial roads which are designed to accommodate such loads.

d) The wind farm proposal is estimated to generate 322,782 total construction vehicle trips over a 45-month period. Assuming 24 working days per month this equates to 299 daily both entry and exit trips, that being a total of 598 road network movements per day.

e) The increase in traffic volumes on key surrounding roads will not exceed their theoretical capacity and we are satisfied that there will be no unreasonable traffic impact generated by this proposal.

f) Swept path diagrams of the largest over-dimensional vehicle (carrying a blade length of up to 100m) suggest that there will be some instances where the over-dimensional vehicle will extend beyond the available road width.

g) Recent upgrades undertaken for the Murra Warra Wind Farm will significantly reduce the extent and number of upgrades required to facilitate delivery of large components from Portland to the site.

h) In order to accommodate the wind blade trucks and the traffic associated with the construction, the following mitigating road works are recommended:

    a. Temporary removal of street signs and furniture and trimming of vegetation within the swept path extents (including the wind blade rear overhang).

    b. Additional pavement widening at key intersections, as outlined within this report.

    c. Potential upgrading of various road segments as outlined in Table 9.

Appendix A

Proposed Development Plan & Road Overview

Warracknabeal Energy Park

Project Infrastructure

Legend

- Wind Farm Boundary
- Indicative Easement Corridor
- BESS Compound
- OM Facilities
- Sub Stations
- Concrete Batching Plant
- EPC Laydown Area
- Site Compound
- Indicative Works Footprint
- WTG

Workspace:	WAEP_ProjectWorkspace_v05-02_TW
Layout Name:	WAEP_PIn_ProjectOverview_v08-
Layout Version:	2 copy
Paper Size:	A3
Scale:	40736
Date:	2023-03-22
Drawn By:	Tom Walker
QGIS Version:	32802
CRS:	EPSG:7854

N

Disclaimer

This product has been created with the highest degree of accuracy possible. However, WestWind Energy, nor any of its contractors or suppliers can be held responsible for any damages due to errors or omissions in this product. Depiction of boundaries is not authorative.

0.8 0 0.8 1.6 2.4 3.2 km

Warracknabeal Energy Park

607500E 608500E 609500E 610500E 611500E 612500E 613500E 614500E 615500E 616500E 617500E 618500E 619500E 620500E

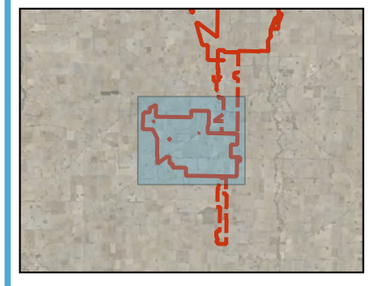
5985500N 5984500N 5983500N 5982500N 5981500N 5980500N 5979500N 5978500N 5977500N 5976500N 5975500N

Warracknabeal Energy Park

Project Infrastructure

Legend

- Wind Farm Boundary
- Indicative Easement Corridor
- BESS Compound
- OM Facilities
- Sub Stations
- Concrete Batching Plant
- EPC Laydown Area
- Site Compound
- Indicative Works Footprint
- WTG



Workspace:	WAEP_ProjectWorkspace_v05-02_TW
Layout Name:	WAEP_PIn_ProjectOverview_v08-
Layout Version:	2 copy
Paper Size:	A3
Scale:	80276
Date:	2023-03-22
Drawn By:	Tom Walker
QGIS Version:	32802
CRS:	EPSG:7854

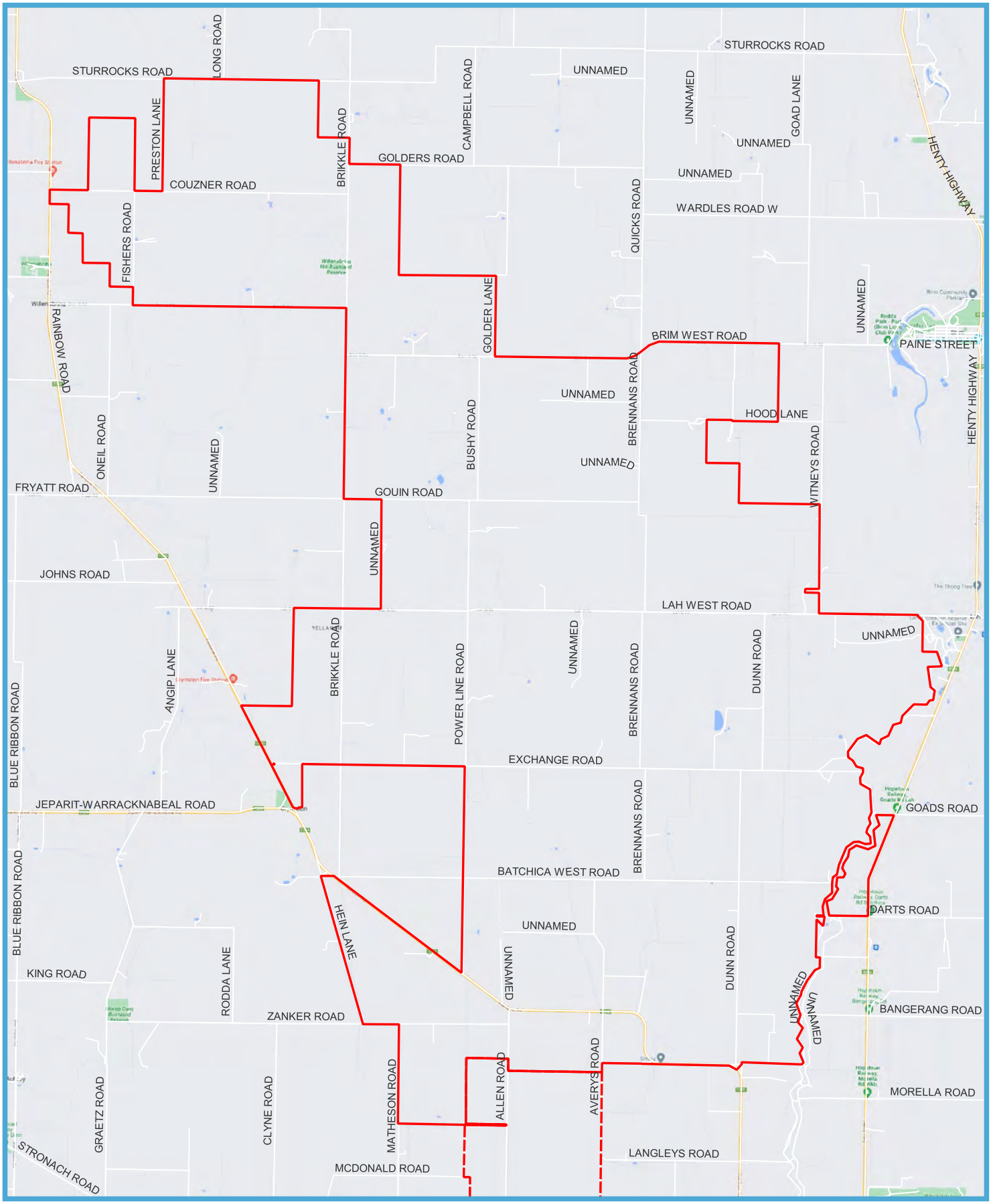
N

Disclaimer

This product has been created with the highest degree of accuracy possible. However, WestWind Energy, nor any of its contractors or suppliers can be held responsible for any damages due to errors or omissions in this product. Depiction of boundaries is not authorative.

0.4 0 0.4 0.8 1.2 1.6 km

Warracknabeal Energy Park



Warracknabeal Energy Park

Road Overview

Legend

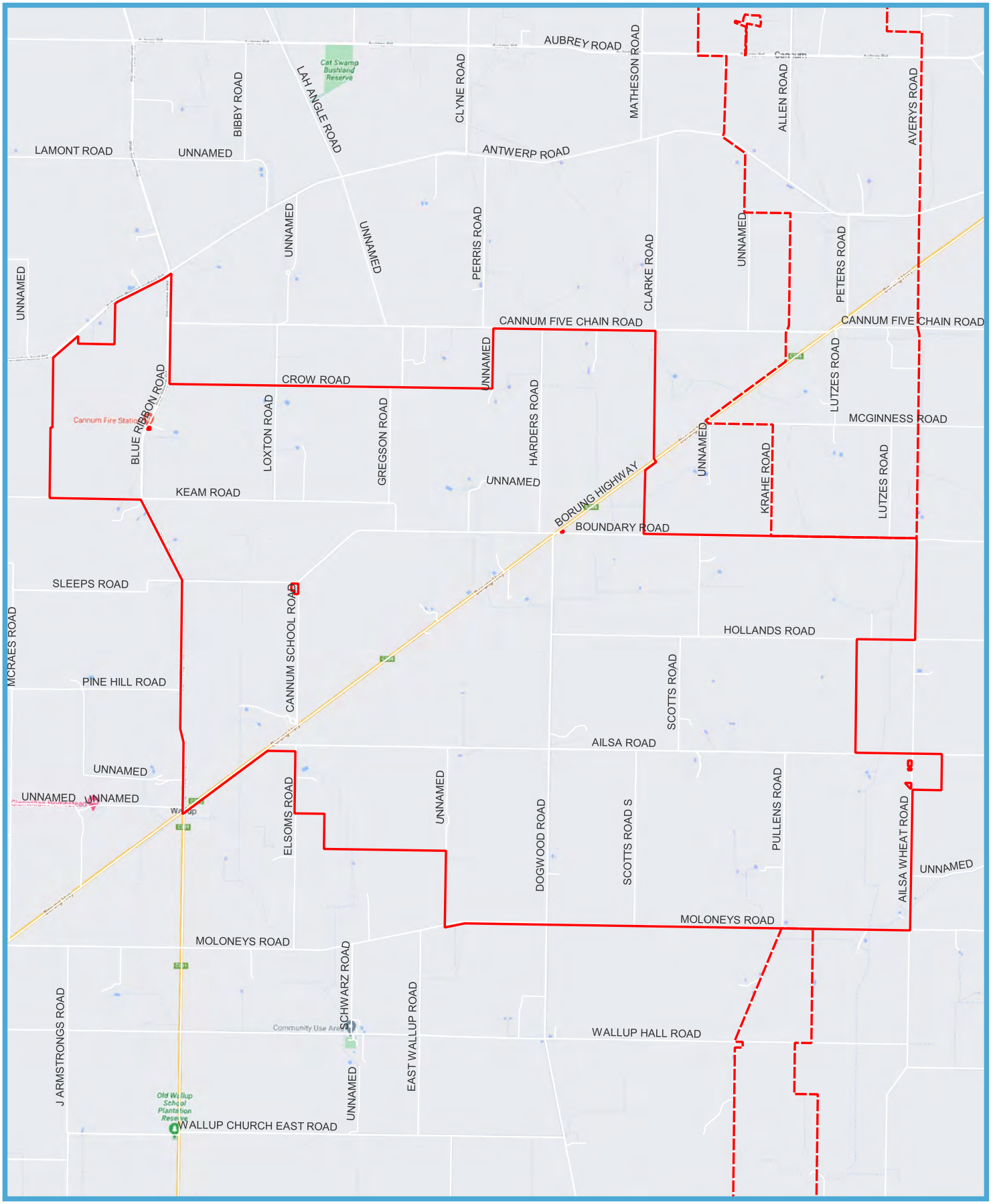
- Wind Farm Boundary
- Indicative Easement Corridor

Warracknabeal Energy Park

N

Disclaimer
This product has been created with the highest degree of accuracy possible. However, WestWind Energy, nor any of its contractors or suppliers can be held responsible for any damages due to errors or omissions in this product. Depiction of boundaries is not authorative.

Workspace: WAEP_Civil_ODtransport_v01-01 **Layout Name:** WAEP_RoadOverview_Atlas **Layout Version:** v01-01 **Paper Size:** A4 **Scale:** 99385 **Date:** 2023-03-22 **CRS:** EPSG:7854 **QGIS Version:** 32802



Warracknabeal Energy Park

Road Overview

Legend

- Wind Farm Boundary
- Indicative Easement Corridor

Warracknabeal Energy Park

N

Disclaimer
This product has been created with the highest degree of accuracy possible. However, WestWind Energy, nor any of its contractors or suppliers can be held responsible for any damages due to errors or omissions in this product. Depiction of boundaries is not authorative.

Workspace: WAEP_Civil_ODtransport_v01-01 **Layout Name:** WAEP_RoadOverview_Atlas **Layout Version:** v01-01 **Paper Size:** A4 **Scale:** 99385 **Date:** 2023-03-22 **CRS:** EPSG:7854 **QGIS Version:** 32802

Appendix B

Site Inspection Photographs

Photograph 1:

Borung Highway
View East

Photograph 2:

Borung Highway
View West

Photograph 3:

Jeparit-Warracknabeal Road
View East

Photograph 4:

Jeparit-Warracknabeal Road
View West

Photograph 5:

Jeparit-Warracknabeal Road (Rainbow Road)
View North

Photograph 6:

Jeparit-Warracknabeal Road (Rainbow Road)
View South

Photograph 7:

Hollands Road
View East

Photograph 8:

Hollands Road
View West

Photograph 9:

Dogwood Road
View North

Photograph 10:

Dogwood Road
View South

Photograph 11:

Boundary Road
View East

Photograph 12:

Boundary Road
View West

Photograph 13:

Gregson Road
View North

Photograph 14:

Gregson Road
View South

Photograph 15:

Cannum School Road
View North

Photograph 16:

Cannum School Road
View South

Photograph 17:

Blue Ribbon Road
(North of Borung Highway)
View North

Photograph 18:

Blue Ribbon Road
(North of Borung Highway)
View South

Photograph 19:

Exchange Road
View East

Photograph 20:

Exchange Road
View West

Photograph 21:

Lah West Road
View East

Photograph 22:

Lah West Road
View West

Photograph 23:

Brim West Road
View East

Photograph 24:

Brim West Road
View West

Photograph 25:

Fishers Road
View North

Photograph 26:

Fishers Road
View South

Photograph 27:

Brikkle Road
View North

Photograph 28:

Brikkle Road
View South

Photograph 29:

Brennans Road
View North

Photograph 30:

Brennans Road
View South

Photograph 31:

Batchica West Road
View East

Photograph 32:

Batchica West Road
View West

Photograph 33:

Hein Lane
View North

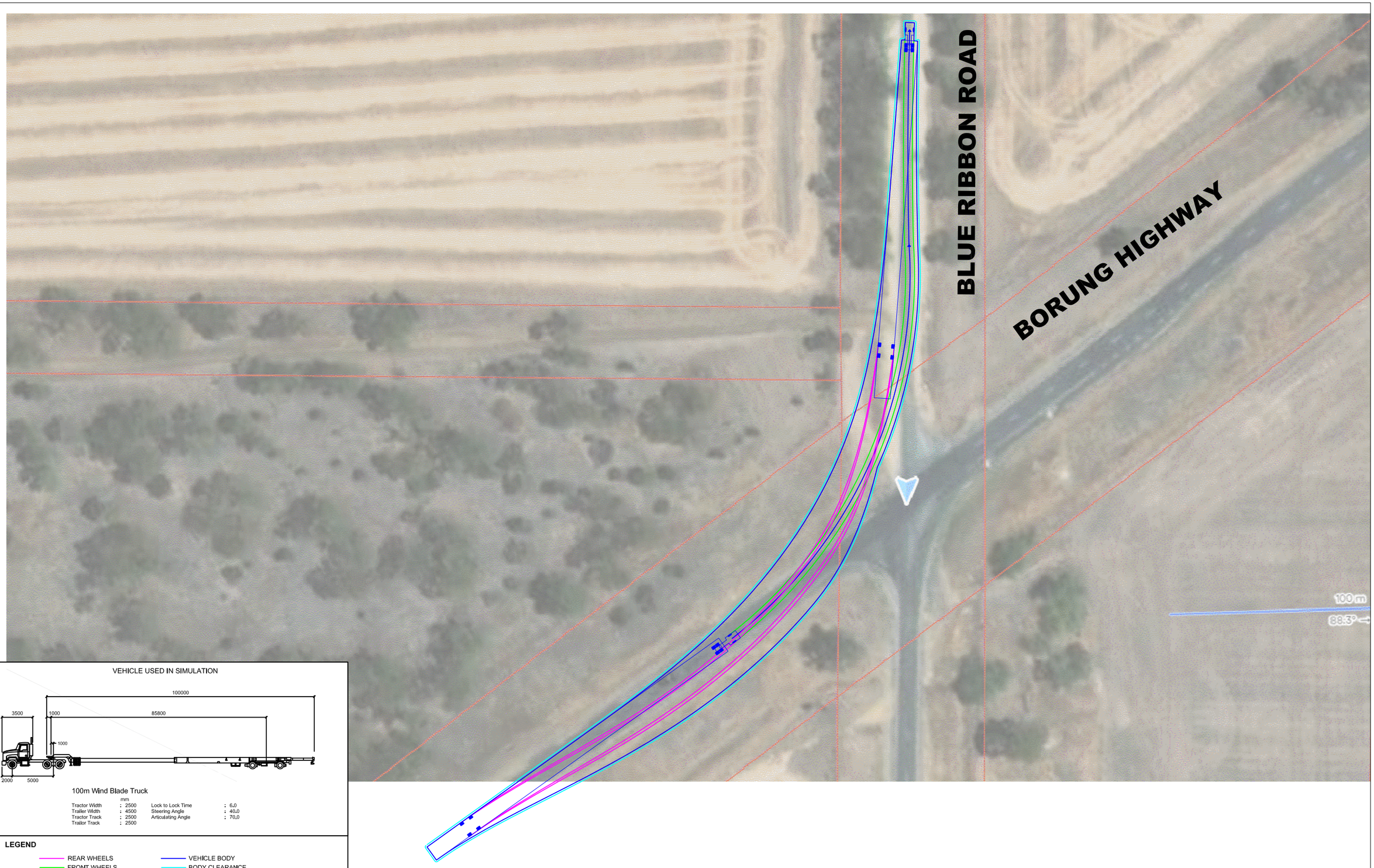
Photograph 34:

Hein Lane
View South

Appendix C

Swept Path Diagrams

BORUNG HIGHWAY - BLUE RIBBON ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6,0
Trailer Width	: 4500	Steering Angle	: 40,0
Tractor Track	: 2500	Articulating Angle	: 70,0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY
FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 01

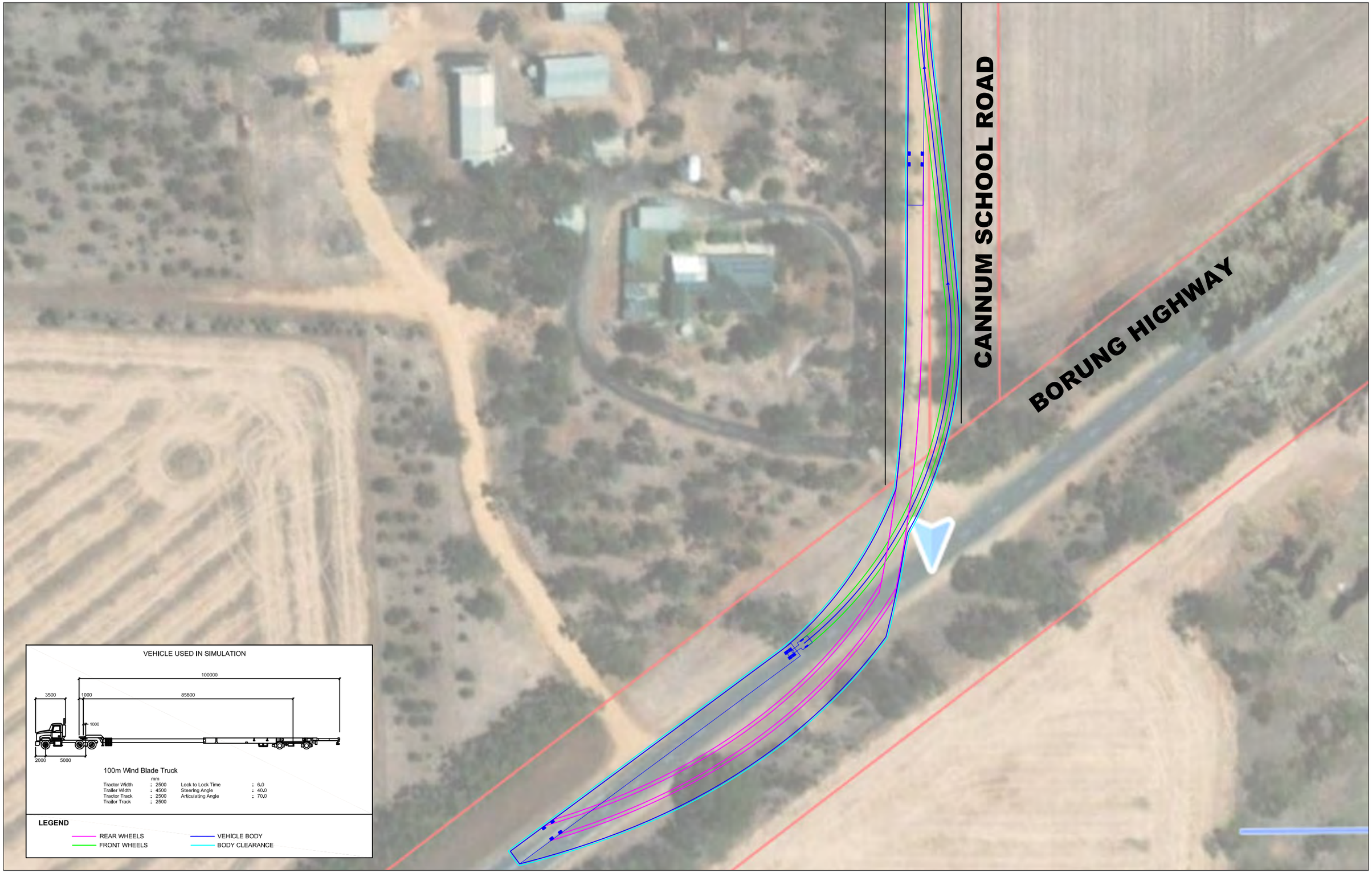
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

BORUNG HIGHWAY - CANNUM SCHOOL ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY

FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP
CANNUM SCHOOL ROAD ROAD RESERVATION EXTENTS MANUALLY ADJUSTED TO ALIGN WITH AERIAL IMAGE (SHOWN IN BLACK)

FILE NAME: 31803-01A

SHEET NO.: 02

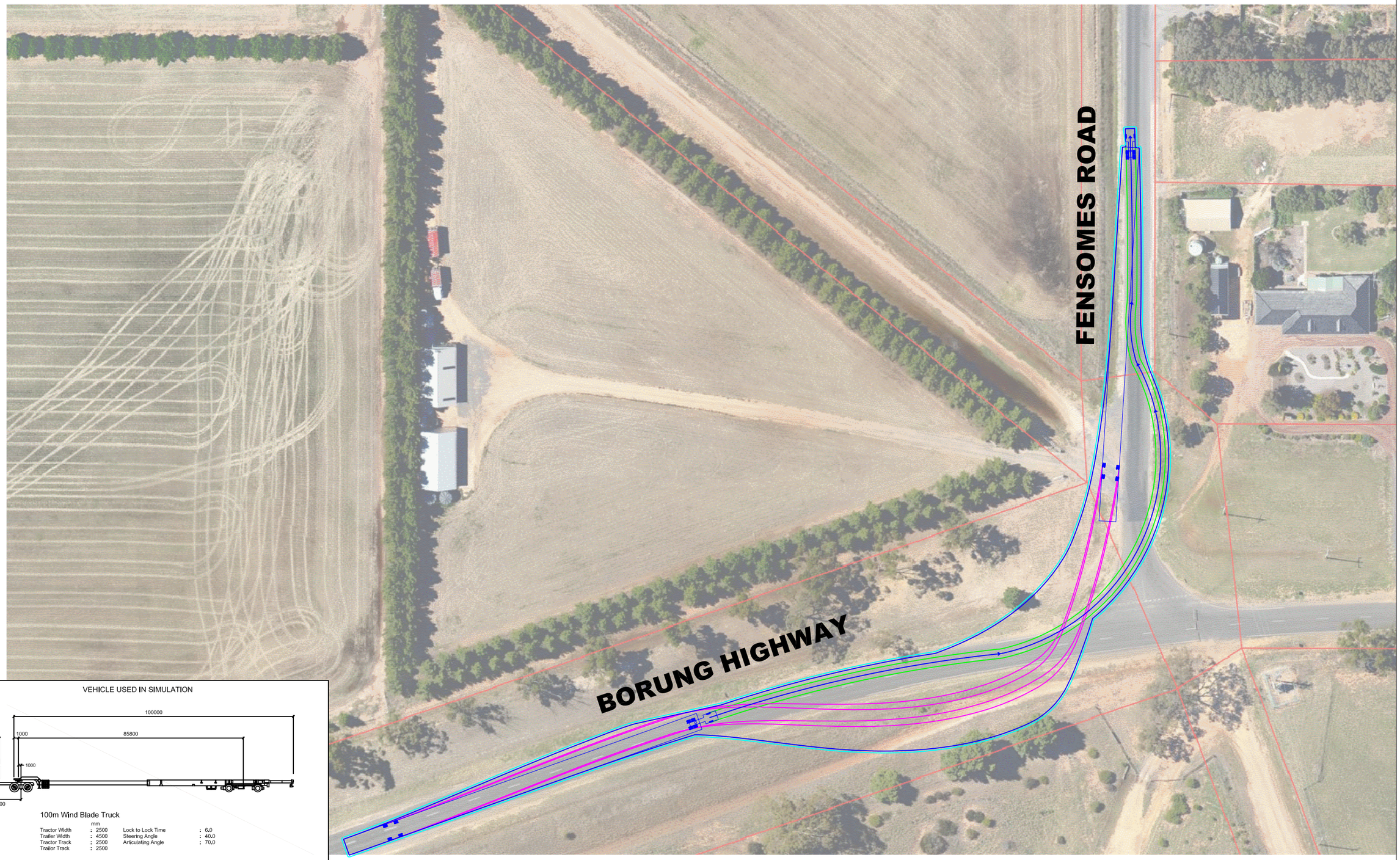
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

BORUNG HIGHWAY - FENSOMES ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY
FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 03

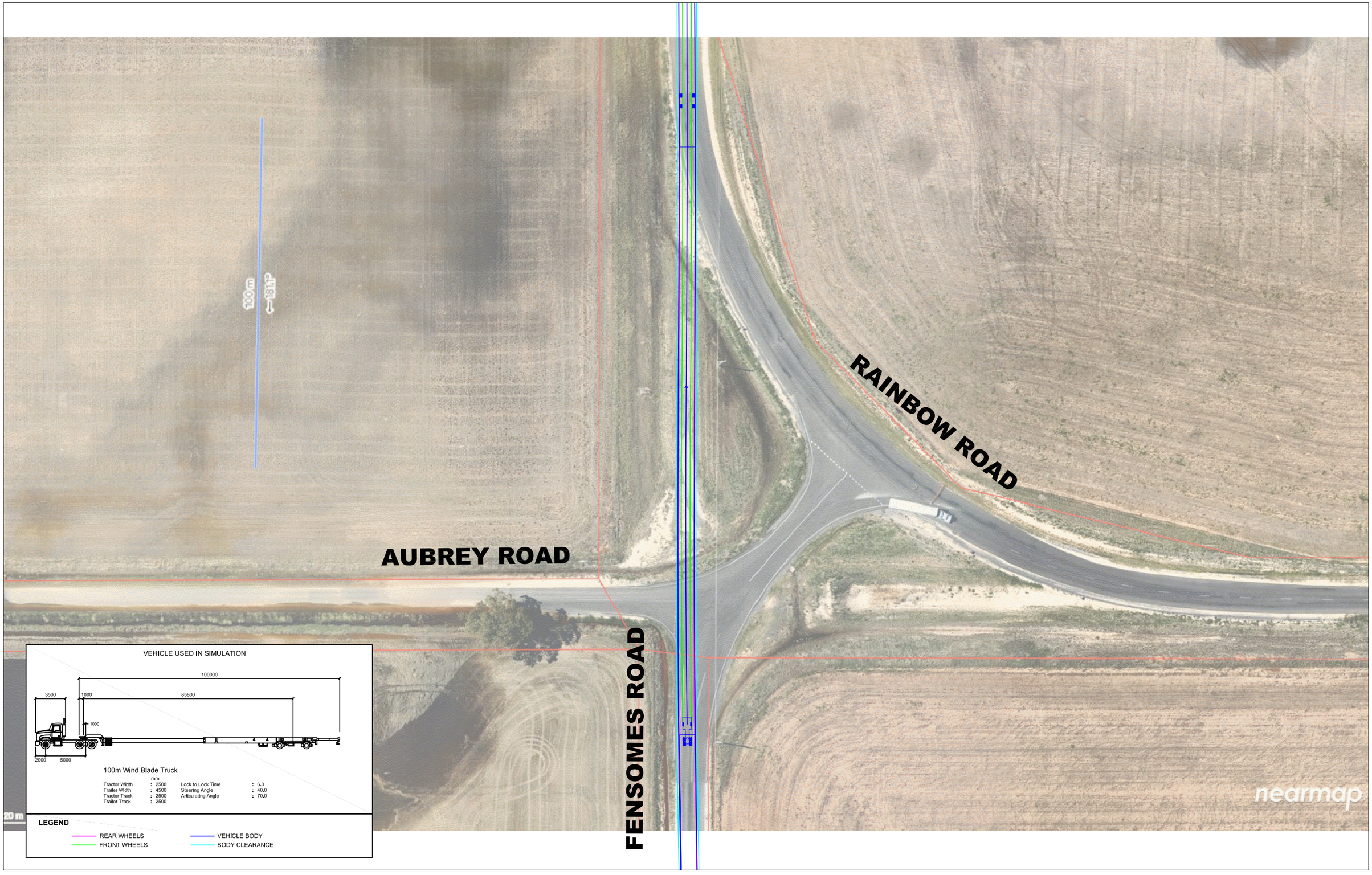
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

FENSOMES ROAD - AUBREY ROAD - RAINBOW ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY

FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 04

N

SCALE: 1:1000 (A3)

0 10 20

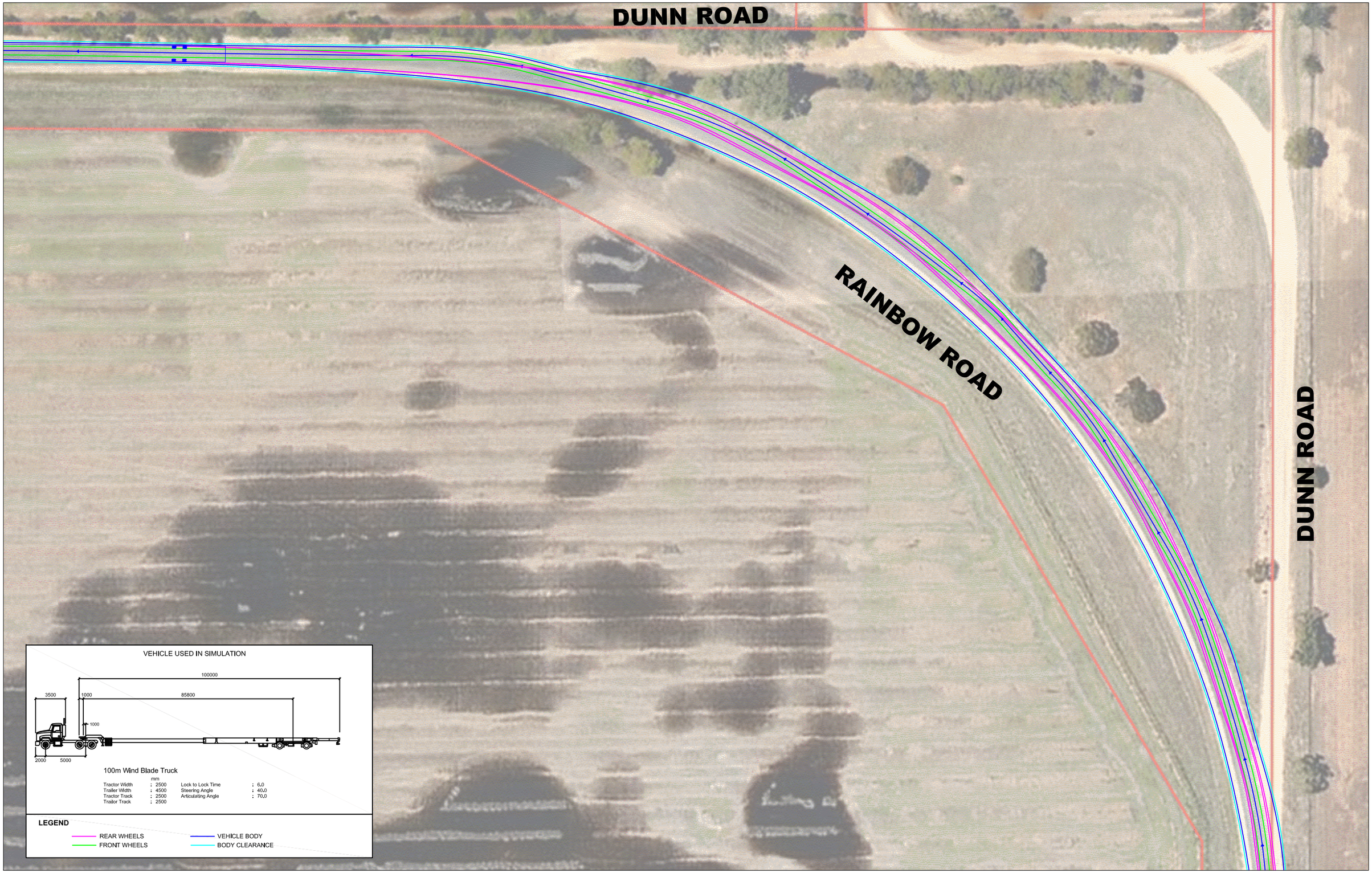
Traffix Group

Level 28, 459 Collins St, MELBOURNE VIC 3000

T: (03) 9822 2888

www.traffixgroup.com.au

RAINBOW ROAD CURVATURE AT DUNN ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 05

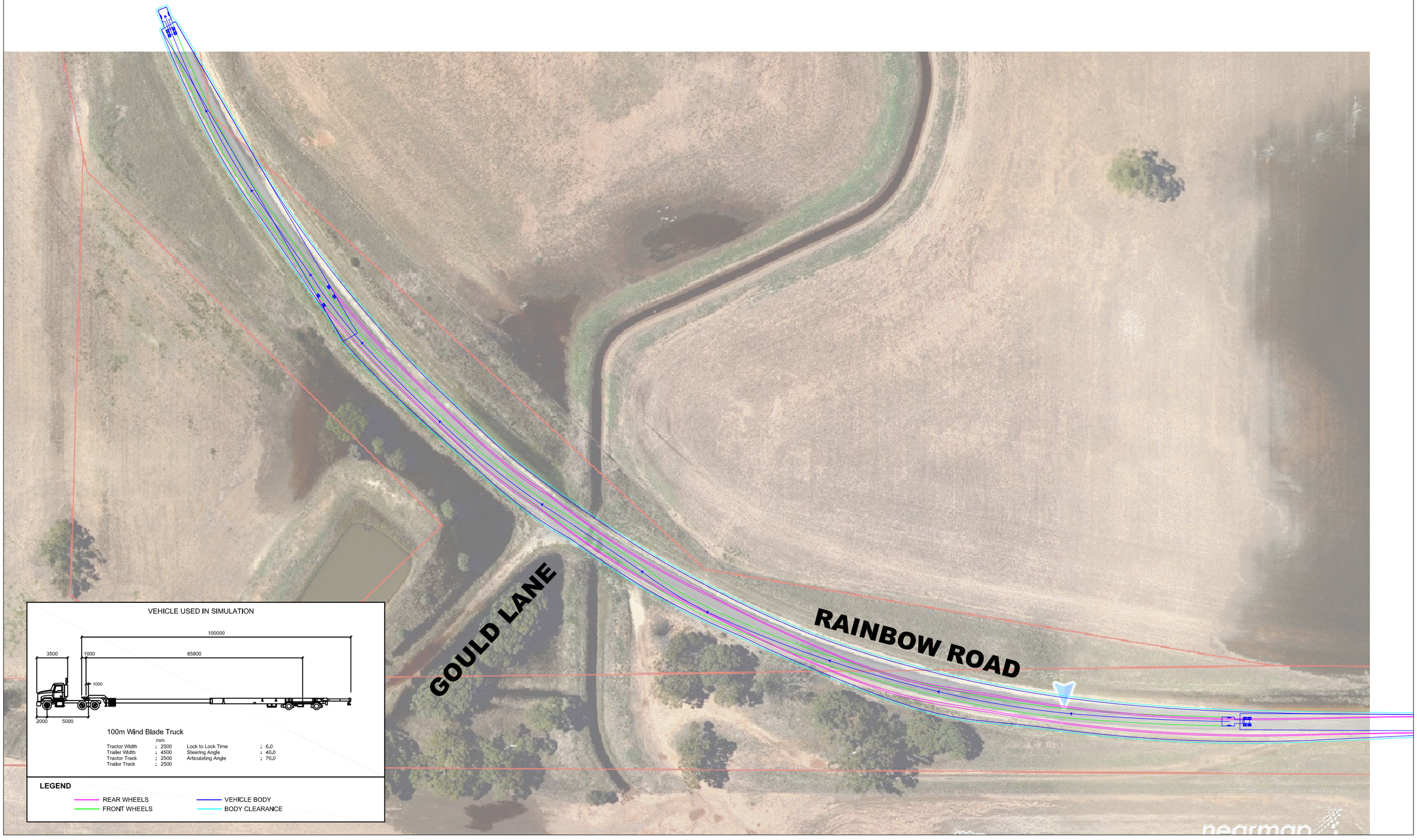
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

RAINBOW ROAD CURVATURE AT GOULD LANE INTERSECTION - 100M WIND BLADE CARRIER ACCESS



REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 06

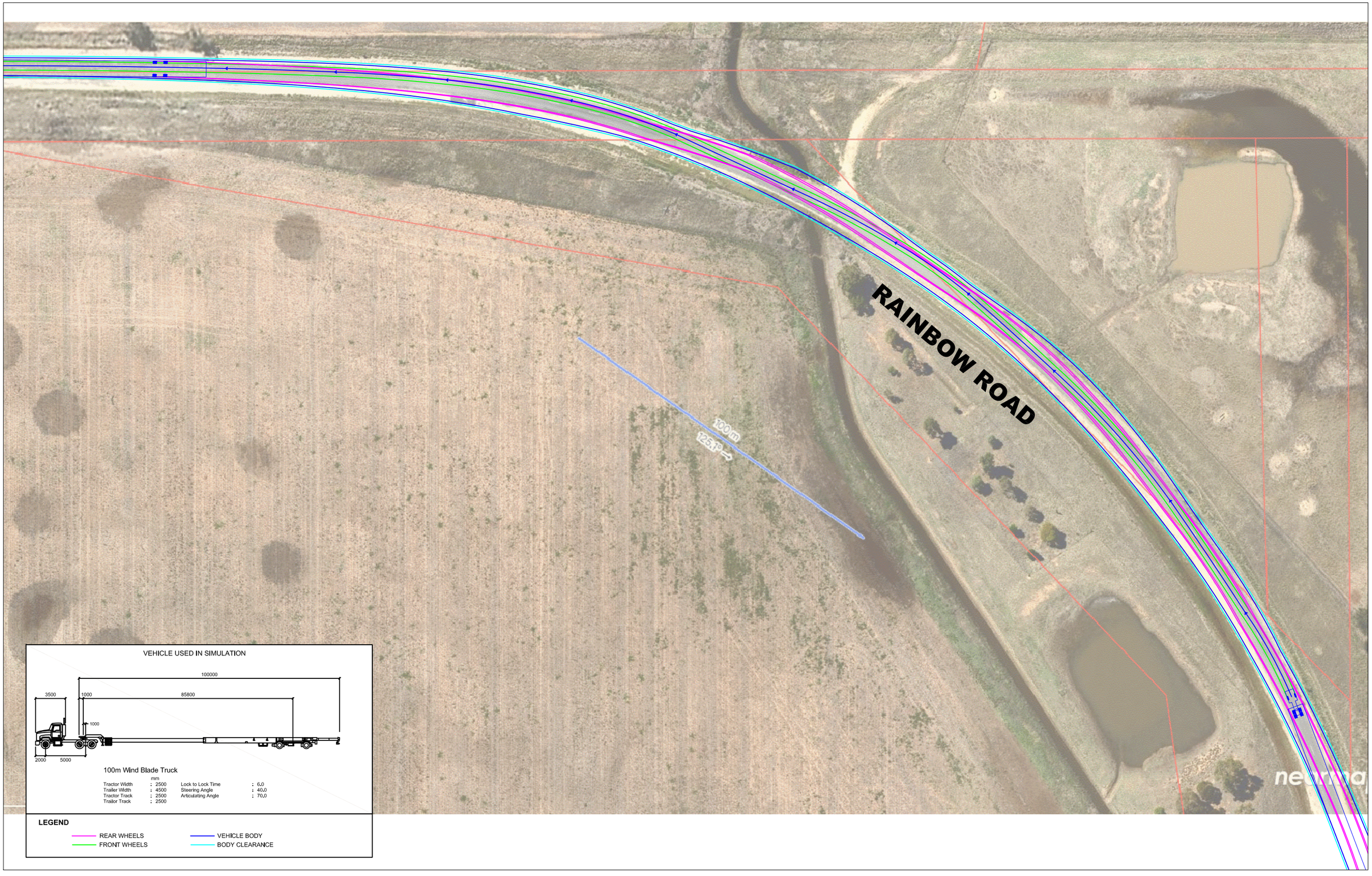
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

RAINBOW ROAD CURVATURE - 800M EAST OF AVERYS ROAD - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY

FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 07

N

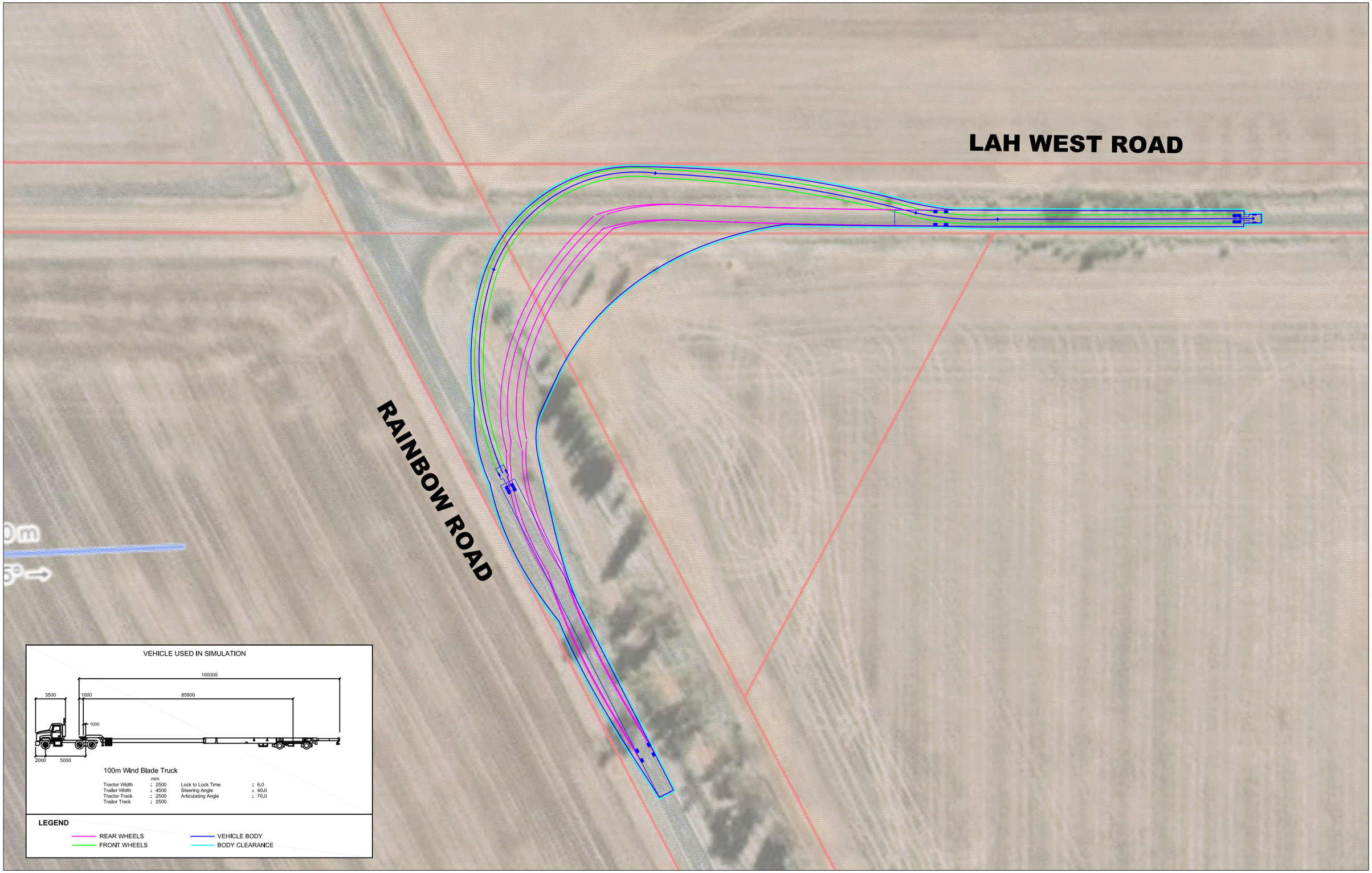
SCALE: 1:1000 (A3)

0 10 20

Traffix Group

Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

RAINBOW ROAD - LAH WEST ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 08

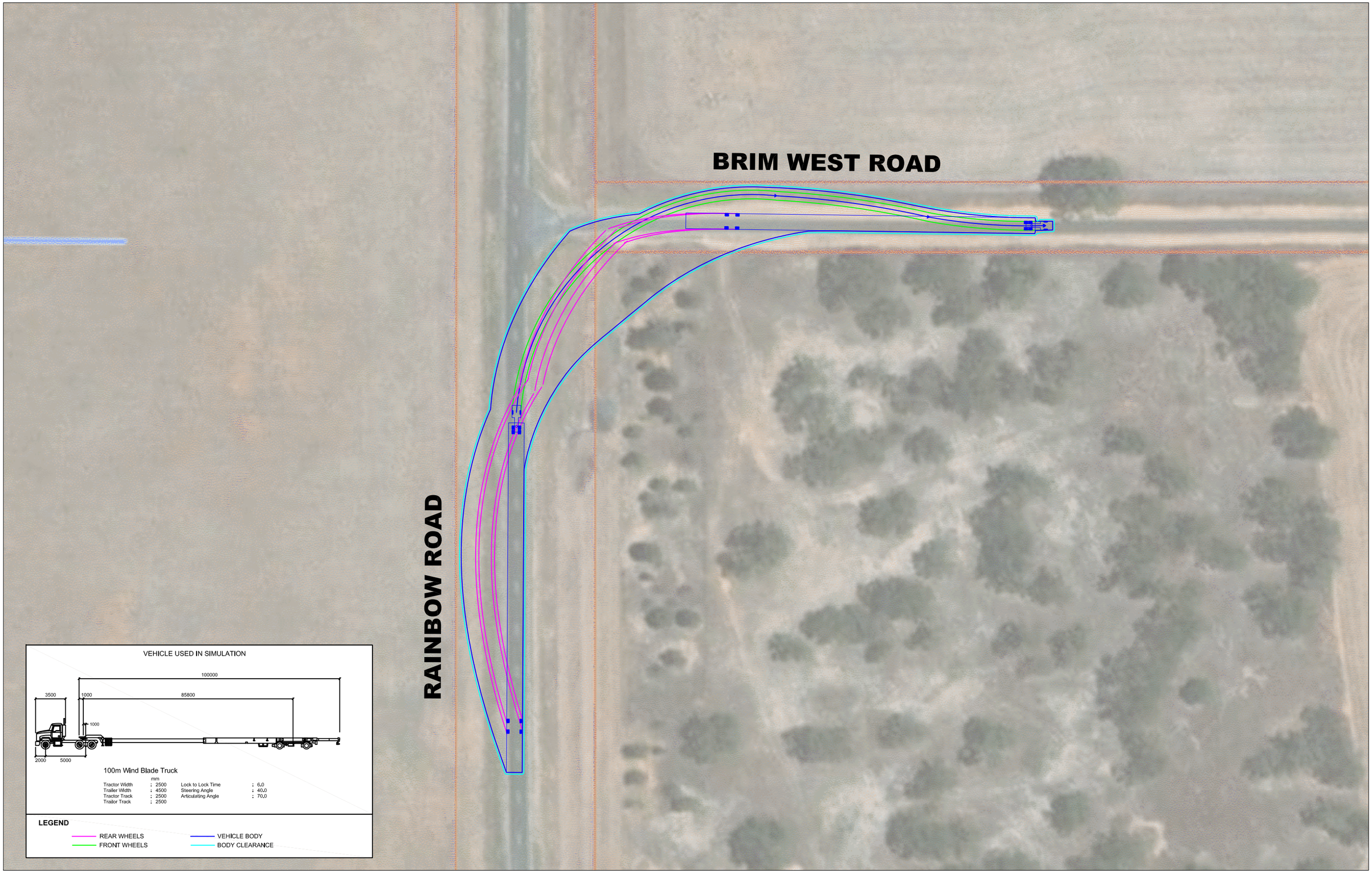
N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au

RAINBOW ROAD - BRIM WEST ROAD INTERSECTION - 100M WIND BLADE CARRIER ACCESS



VEHICLE USED IN SIMULATION

100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS — VEHICLE BODY

FRONT WHEELS — BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 09

N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group

Level 28, 459 Collins St, MELBOURNE VIC 3000

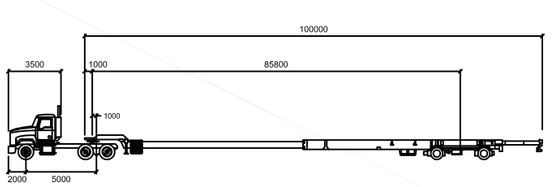
T: (03) 9822 2888

www.traffixgroup.com.au

BORUNG HIGHWAY TRANSFORMER ACCESS POINT (APPROXIMATELY 750M NORTHEAST OF CANNUM SCHOOL ROAD) - 100M WIND BLADE CARRIER ACCESS

BORUNG HIGHWAY

VEHICLE USED IN SIMULATION



100m Wind Blade Truck

mm

Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 4500	Steering Angle	: 40.0
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailor Track	: 2500		

LEGEND

REAR WHEELS
FRONT WHEELS
VEHICLE BODY
BODY CLEARANCE

REV	DATE	NOTES	DESIGNED BY	CHECKED BY
A	26-09-22	ORIGINAL ISSUE	K. BULLOCK	D. TROTTER

WARRACKNABEAL ENERGY PARK

PROPOSED ENERGY FARM

GENERAL NOTES:

AERIAL PHOTOGRAPH SOURCED FROM NEARMAP

FILE NAME: 31803-01A

SHEET NO.: 10

N

SCALE: 1:1000 (A3)

0 10 20

Traffix Group
Level 28, 459 Collins St, MELBOURNE VIC 3000
T: (03) 9822 2888
www.traffixgroup.com.au