WIND PROSPECT

ENERGY FORMS

WILLATOOK WIND FARM

Planning Application Report

Appendix F Traffic and transport

APRIL 2022

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Transport Impact Assessment

Willatook Wind Farm Project

April 2022

Transport:report

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ratio:consultants

[redacted]

Prepared for:

Willatook Wind Farm Pty Ltd
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1 Executive Summary

Ratio Consultants has been engaged by Willatook Wind Farm Pty Ltd ('the Proponent') to undertake a review of the traffic generation and access impacts associated with the development and operation of the proposed Willatook Wind Farm Project (the Project).

This report seeks to identify and assess the potential road transport impacts of the Project during the construction, operation, and decommissioning phases.

This report responds to the traffic and road elements of the August 2019 Willatook Windfarm EES Scoping Requirements.

Key aspects of the Project that frame this traffic impact assessment are:

— Project traffic is most critical during the Project construction phase, with this the period of greatest activity;
— Wind Turbine Generator (WTG) components will be transported to the Project site from Port of Portland; and
— Construction materials will be sourced as local to the Project area as practical, with the opportunity to source most aggregate and raw water on-site.

Methodology

Across each Project phase, this report seeks to:

— Identify the key roads and road transport infrastructure relied on by the Project;
— Assess the traffic generation characteristics of the Project through each Project phase;
— Identify the effect and impact of Project traffic and operation on external roads;
— Identify avoidance measures, mitigating works / traffic management measures in response to the impact of Project traffic and Project activity; and
— Identify and assess the residual impact of the Project following the implementation of the avoidance/mitigation response.

Existing conditions have been assessed through an initial desktop study, on-site assessment and review of relevant Department of Transport and Council data sources.

The traffic effects of the Project have been determined by:

— An assessment of the additional Project traffic generated to external roads;
— Assessment of the Project on local roads and local access opportunity;
— Specific review of the transport of WTG components to the Project site; and
— Identification of other likely local traffic impacts during construction and decommissioning activity.

Existing Conditions

The Wind Farm site is located in the Moyne Shire Council local government area, approximately 22 kilometres to the north of Port Fairy and extends along the south side of the Woolsthorpe-Heywood Road, between Penhurst-Warrnambool Road and Hamilton-Port Fairy Road and provides the main access to the site. Tarrone Lane and Tarrone North Road are local sealed roads. Tarrone Lane is to the south of the Project site. Tarrone North Road connects Tarrone Lane to Woolsthorpe-Heywood Road, bisecting the Project site.

A series of other minor local rural roads extend through the site. The minor roads are unsealed and typically provide access to the land within the Wind Farm site and surrounds.

Roads within the Project area typically carry low volumes, with Woolsthorpe-Heywood Road carrying less than 300 vehicles per day.

Public transport routes do not extend through the Project area, but services do operate on roads that will be used by Project traffic. School buses operate on some roads within the Project area.

Impact Prediction and Mitigation

The potential impacts on the operation of the road network relied on by the Project are identified as follows:

- That the standard and capacity of existing road infrastructure is appropriate to accommodate Project traffic (across all Project phases) and the potential consequence of Project generated traffic on road function and safety;
- Disruption to through traffic and regional public transport during construction phase due to Project generated traffic including OSOM transport; and
- Impacts on local access as a result of construction activity within the Project area.

Detailed descriptions of these potential impacts and associated impact pathways are outlined in Section 8.1.

Possible avoidance and mitigation measures identified in response to these potential impacts are:

- Site access, road upgrade and temporary infrastructure works within the Project area and along the OSOM / WTG component haulage route;
- Traffic Management Plans to manage Project traffic movements and mitigate specific short and long term traffic impacts:
- Green Travel Plans to encourage sustainable travel and to minimise Project traffic generation;
- Road maintenance agreements to manage short term impacts to local roads and key arterial road sections to maintain road conditions for all users during Project construction; and
- Stakeholder consultation and engagement to assist the development of appropriate traffic management measures and to communicate any road network changes required.

Impact Assessment

The assessment of potential Project traffic impacts has sought to:

- Undertake detailed analysis to qualify the likely impact generated by the Project, for both on-site and off-site materials sourcing scenarios; and
- Confirm the mitigation measures that should be employed to minimise this impact and off-set risk.

From the impact assessment, key findings are:

- Wind Farm traffic generated to external roads during construction will be limited to staff vehicles, HV traffic associated with external bulk materials haulage and OD/OSOM vehicles associated with WTG and other major component delivery. Additional traffic associated with internal Wind Farm traffic will also be generated to local sections of Woolsthorpe – Heywood Road within the Wind Farm site;
- At the time of peak construction activity, external Wind Farm traffic will add a maximum of between 299-359 vehicle movements per day on Woolsthorpe – Heywood Road to the east of Tarrone North Road subject to the level of on-site materials sourcing. This traffic can comfortably be catered for within Woolsthorpe – Heywood Road east of the site with the exception of the 2.4-kilometre single lane section of road between Poyntons Road and No 2169 Woolsthorpe – Heywood Road which will require widening;
- Additional traffic generated to Woolsthorpe – Heywood Road to the west of the site will be limited to 107 vehicle movements per day. This additional traffic does not warrant significant road improvements acknowledging that maintenance of the road pavement and shoulders will be undertaken by the Proponent for the duration of construction works;
- Having consideration of base traffic and usage, and upgrades to be provided to support Wind Farm construction traffic, traffic generated by the Wind Farm during operation to public roads can reasonably be accommodated;
- Subject to the resolution of specific traffic management requirements, the identified over dimensional vehicle route option from the Port of Portland to the Wind Farm site for the transport for WTG and other imported major components have been assessed and are suitable for OD and OSOM transport vehicles; and
- Local traffic impacts within the Project area during all Project phases can be suitability and safely managed.

2 Introduction:

2.1 Report Purpose

Ratio Consultants has been engaged by Willatook Wind Farm Pty Ltd (the Proponent) to undertake a review of the traffic and access impact associated with the development and operation of the proposed Willatook Wind Farm Project (the Project).

This traffic impact assessment considers the advised Willatook Wind Farm project, as at the time of writing, is based on a maximum of 59 Wind Turbine Generator (WTG) sites and the largest possible WTG's to be adopted (250 metre high / 93 metre blade length).

This assessment also assumes the Port of Portland as the preferred port of entry for all WTG and other major imported componentry.

We understand that, subject to a range of factors including the resolution of WTG's, the use of an alternate, or multiple ports, may be considered.

In the course of undertaking this assessment the subject site, its environs and key road links relevant to the movement of materials have been inspected, plans of the wind farm and site access reviewed and relevant traffic data collected and analysed.

To understand specific and local issues, Ratio has liaised with representatives of Moyne Shire Council, and Regional Roads Victoria (RRV) as well as having regard to current VicRoads/Department of Transport (DoT) policy relevant to wind farm projects and requirements for over dimensional (OD) and over-size / over-mass (OSOM) transport and associated traffic management.

Documents reviewed and considered as part of this assessment include:

- Scoping Requirements for Willatook Wind Farm Environment Effects Statement, August 2019
- Moyne Shire Council Municipal Road Management Plan, Version 4, 23 May 2017
- Moyne Shire Road Hierarchy Plan, MSCGIS0011.wor, 2 February 2006
- Policy and Planning Guidelines – Development of Wind Energy Facilities in Victoria, Department of Environment, Land, Water and Planning, March 2019
- Department of Transport (VicRoads) Heavy Vehicle Network Maps (www.vicroads.vic.gov.au/business-and-industry/heavy-vehicle-industry/heavy-vehicle-map-networks-in-victoria)
- Wind Prospect Willatook Wind Farm Development Plan, 16 April 2021 and updated in December 2021.
- Other documents as referenced.

3 Willatook Project

3.1 Location

The Willatook Wind Farm site is located approximately 22 kilometres to the north of Port Fairy and extends to the south of the Woolsthorpe-Heywood Road, between Penhurst-Warrnambool Road and Hamilton-Port Fairy Road.

The site extends across approximately 4,154 hectares of public and private land. The farming land is currently used for grazing and dairy, centred around the intersection of the Woolsthorpe-Heywood Road and Tarrone North Road.

The 132kV Macarthur Wind Farm high voltage transmission line bisects the site, north to south, linking to the 500kV Moorabool to Portland transmission line at the Tarrone Substation that abuts the southernmost area of the Wind Farm site south of Woolsthorpe-Heywood Road.

The location of the site in the context of the broader region is shown in Figure 3.1.

Figure 3.1 Site Location

3.2 Project Description

The Project will consist of a wind energy facility comprising:

- 59 wind turbine generators (WTG's);
- Up to three (3) wind mast sites; and
- A central battery energy storage system (BESS) and operations area.

The Project also includes a new line, of approximately 300 metres, from the substation to Tarrone Terminal Station.

The Wind Farm will have an expected operating life of up to 25 years following some three years of pre-development and construction activities.

WTG's will be three bladed and reach a maximum height to the tip of the rotor not exceeding 250 metres. The turbines will comprise steel section towers, a nacelle containing the generator, gearbox and electrical equipment. It is assumed that a total of 5 sections are required for each tower, with the lower tower sections to be provided in segments for transporting. Each turbine will require a transformer and switchgear which will be housed inside the tower base, or externally, immediately adjacent to the base. Hardstand crane pads of approximately 140 metres by 20 metres will be located near the base of each turbine tower.

The Wind Farm will include operations and maintenance facility, battery energy storage facility and substation which will be co-located centrally to the Wind Farm site, to the south of Woolsthorpe – Heywood Road. Access to this area will be via a gate to Tarrone North Road immediate north of the existing Tarrone Terminal Substation access (see Figure 3.2).

The utility area will be in a secure enclosed compound and will comprise an operations and maintenance building, car parking, a site office, warehousing/workshop facility and an external yard area for storage which may include a bunded area for fuel storage, and other ancillary equipment. The collector/switchyard will be in a secure enclosed compound and will be where underground cables from the wind farm collection system will be terminated.

The substation will also be in a secure enclosed compound and will house equipment to enable the step-up voltage to a 132kV transmission line to run south from the terminal substation to the existing Tarrone Terminal Station, for connection to the 500kV Heywood-Moorabool Transmission line. Internally, electricity will be distributed from each wind turbine to the terminal station via a network of medium voltage 33kV underground cables.

Additional to the above, there will be other temporary infrastructure associated with the construction of the Wind Farm including:

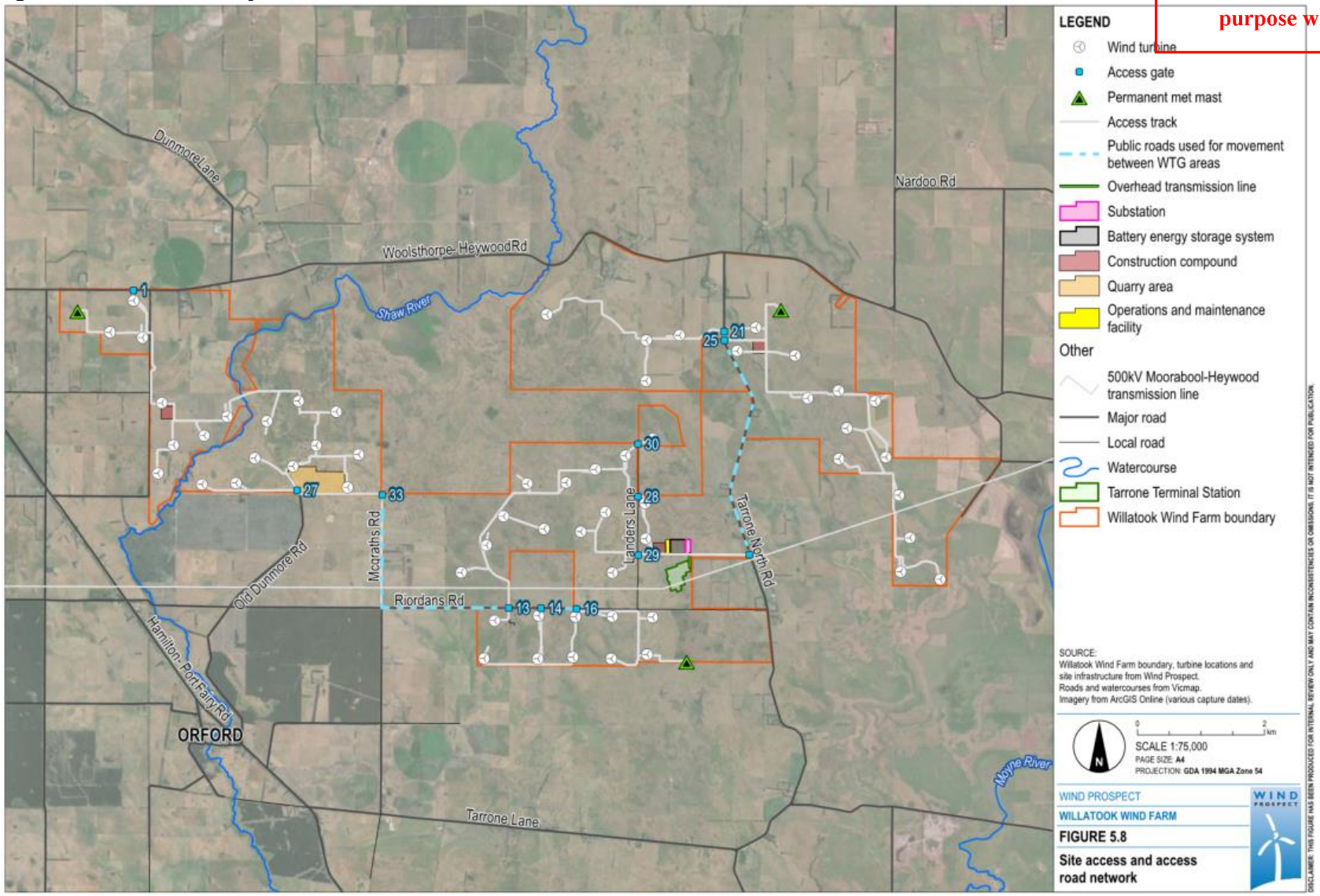
— A site construction compound including concrete batching plant, temporary site office and associated staff facilities;
— Additional construction compounds, including concrete batching plants, in the west and east of the Project area;
— Three storage sheds and workshop;
— Hardstand laydown areas for WTG components and other equipment; and
— A temporary construction compound.

All temporary infrastructure will be removed at the end of the construction programme and areas rehabilitated where required.

The Project may also include the development of an on-site quarry to provide crushed rock for the construction of internal access roads and hardstand areas. The on-site quarry is the preferred option but it is subject to a separate Work Authority approvals process. Non-potable water may also be sourced within the Project area.

The proposed Wind Farm layout is shown in Figure 3.2.

Figure 3.2 Wind Farm Layout



3.3 Project Area Access

WTG sites and Project infrastructure will be accessed via a network of internal access tracks extending from Woolsthorpe-Heywood Road, Tarrone North Road, and Riordans Road.

Internal access tracks will be approximately 6.0 metres to 8.0 metres wide to allow access for construction and for ongoing maintenance throughout the lifetime of the Wind Farm. Total length of access tracks to be constructed will be approximately 60 kilometres.

The Project will also rely on some sections of public roads as links between various areas of the Wind Farm site (refer to Figure 3.2) including:

- Tarrone North Road between Woolsthorpe-Heywood Road and Point B;
- Riordans Road, from McGraths Road to Point C; and
- McGraths Road, north of Riordans Road

Access treatments at gate locations to external roads will be constructed in accordance with VicRoads Type B – 'Truck Access to Rural Property' (see Appendix A).

3.4 Project Transport Elements

Construction

The Proponent has advised that construction and delivery of the Willatook Wind Farm occurring across a 24 month period (approximately) and will include the following key work phases and indicative tasks:

- Site Establishment – includes the establishment of the temporary concrete batching plant, delivery of key plant and construction vehicles and the construction of initial internal access tracks required for the delivery of materials and goods for further construction. Also includes the establishment of on-site quarrying and water sourcing (if pursued);
- Public Interface works – includes required road and intersection upgrades, and vegetation management;
- Civil Construction Works – includes the construction of the balance of internal access tracks, WTG site hardstand areas, WTG footings, terminal station construction and internal power infrastructure;
- WTG Component Delivery – includes wind turbine blade delivery, tower section delivery and other associated WTG components; and
- WTG Erection – includes the use of mobile cranes and associated infrastructure.

Significant overlap between each work phase is expected, with site preparation, WTG component delivery and erection to be undertaken on a rolling basis.

The Project will include a centrally located construction compound that will incorporate a range of temporary infrastructure including offices/staff facilities and temporary concrete batching plant. Vehicle wash-down areas will also be placed at the construction compound to prevent mud being tracked onto sealed road surfaces and to allow for the removal of excess mud at the site.

As noted in Section 3.2, subject to further detailed investigation, on-site sourcing of coarse aggregate (for road/hardstand construction and potentially concrete production) and non-potable water is likely.

Additional temporary infrastructure to support this on-site sourcing would include a quarry / mobile crushing plant and water storage dam/s, with this activity undertaken as part of the site establishment works. Establishment of the on-site quarry will rely on Old Dunmore Road and Riordans Road between Old Dunmore Road and Hamilton-Port Fairy Road.

Decommissioning of the quarry would occur at the end of the construction stage, with plant removed from site.

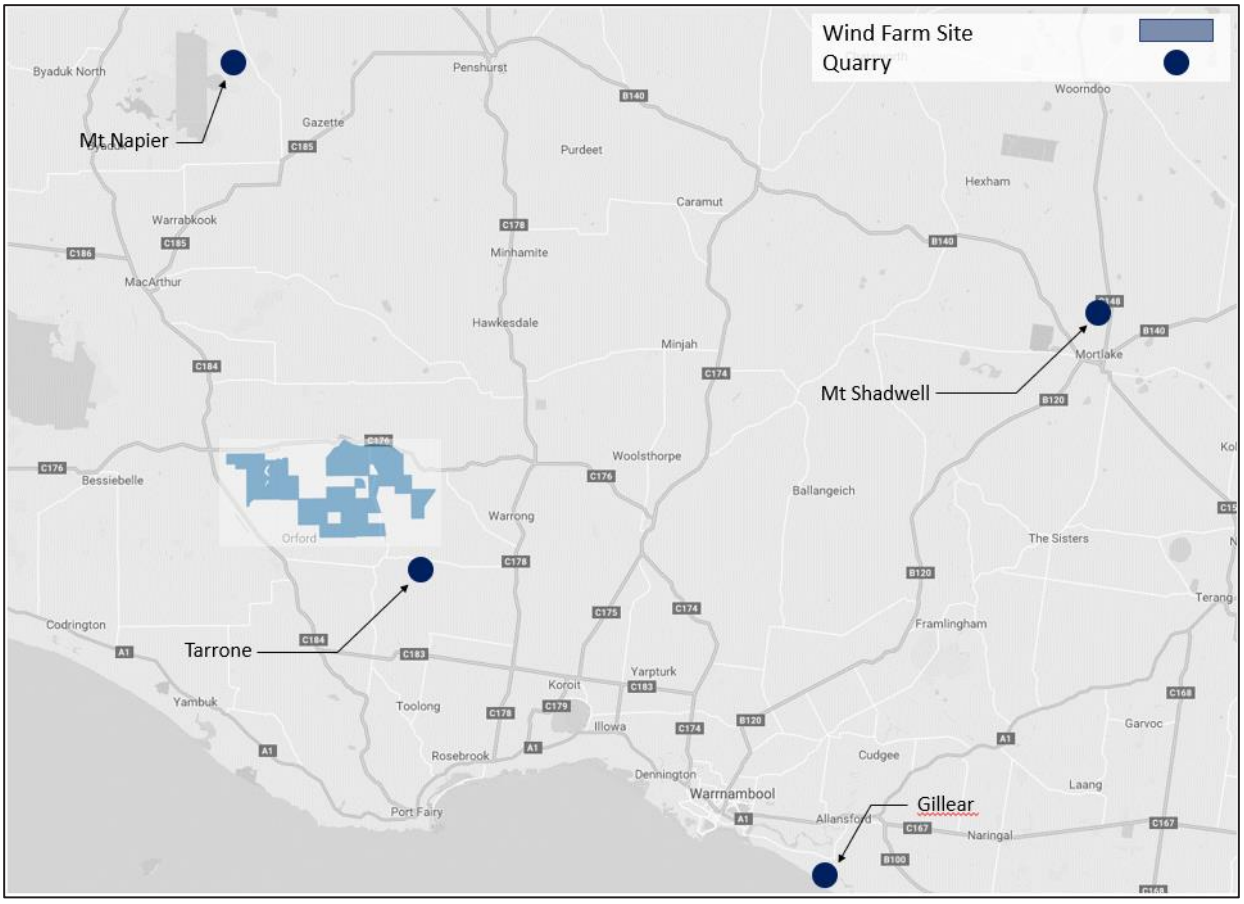
EXTERNAL CONSTRUCTION MATERIALS DELIVERY

Willatook Wind Farm has advised that where practical, construction materials not sourced on-site will be sourced within the local region. Four quarries have been identified as potential sources, being Tarrone Quarry to the south, as well as Mt Napier to the north, Mt Shadwell to the north-east near Mortlake and Gillear sand and limestone quarry at Allansford to the south-east. (see Figure 3.3). Cement and other key construction materials will likely be sourced from Warrnambool.

Externally sourced materials required for construction will primarily access the Wind Farm site via Woolsthorpe – Heywood Road from Penhurst – Warrnambool Road and/or Hamilton – Port Fairy Road.

With the exception of some road/hardstand construction material that may be delivered directly to the relevant work-site (subject to the establishment of the on-site quarry), all external construction material deliveries will be to the main construction site compound in the first instance. Materials deliveries would then proceed to the various areas across the Wind Farm site via the internal access track network or Woolsthorpe – Heywood Road, and the other roads listed in Section 3.3, to the eastern parts of the Wind Farm site.

Figure 3.3 External Quarry Locations



WTG, SUBSTATION/BATTERY COMPONENTS

The Port of Portland is currently the preferred port of entry for WTG and other major imported componentry. On this basis, an over-dimensional (OD) vehicle haulage route has been identified between the Port of Portland and the Wind Farm site based on the maximum expected WTG component being a 93.0 metre turbine blade.

The Port of Portland is also the preferred port of entry for major substation and battery energy storage components.

CONSTRUCTION STAFF

The Proponent has advised that an average equivalent full time construction workforce of 180 persons is expected, with a peak construction workforce of up to 270 persons on-site during times of peak construction activity. External staff movements will be focused toward the construction compounds, with staff relying on the internal road network to move throughout the Project area wherever practical.

During delivery of the project, construction staff will likely be accommodated in Port Fairy, Warrnambool, with Koroit as a third potential accommodation location. All movements from accommodation locations will travel to/from the site using arterial roads. Staff accommodated in Port Fairy will access the Wind Farm site from the west via Hamilton – Port Fairy Road.

Staff accommodated in Warrnambool and Koroit will likely approach from the east via Warrnambool-Caramut Road and/or Penhurst – Warrnambool Road.

LOCAL AND INTERNAL ACCESS

To avoid additional handling and heavy vehicle movements, externally sourced material for road and hardstand construction, as well as WTG components, would be delivered directly the work sites in each relevant area of the Wind Farm. This will likely reduce the number of trips between each access point.

All other vehicle movements, including water cartage and the haulage of any material quarried on-site, will use the new internal Wind Farm access tracks and, where necessary sections of Woolsthorpe – Heywood Road. Riordans Road, McGraths Road and Tarrone North Road to move between access points either side of the public road network.

The use of external roads by internal construction traffic will be limited to the movement of construction materials not able to be stored at each work area and/or quarried aggregate (if permitted) between the central construction compound and Wind Farm areas not accessible by internal access roads

During construction, various techniques will be used to mitigate the production of dust, including the spraying of water (potentially with wetting or binding agents added) onto road surfaces, including internal access tracks.

Operation

The Proponent expects the following activity during operation:

- Daily routine maintenance to be carried out by two to five people.
- Weekly/fortnightly regular minor maintenance to be carried out by a small team. This will involve a team of no more than fifteen people attending the site, with up to four vehicles.
- Occasional maintenance will occur when components of the development need to be replaced, such as replacing a gearbox. This is expected to only occur very occasionally and will be subject to approval processes with the relevant authorities.
- Visitors to the site such as office-based staff and courier deliveries etc.

Transport activity during the operations stage will be limited to light vehicle traffic and maintenance vehicles associated with this activity. External vehicle traffic will typically originate from/to the operations compound via Tarrone North Road, with Project traffic movements within the Wind Farm area relying on the internal road network.

Decommissioning

The eventual decommissioning of the Wind Farm site will involve the removal of any structure above ground and to a depth of one metre. This excludes the portion of foundations deeper than 1 metre and access tracks kept in agreement with landowners.

Transport requirements during this stage will be:

- The transport of plant to the site required for the dismantling of WTG's and other Project structures;

— Heavy vehicle movements associated with the removal of materials and componentry from the site; and
— OSOM movements associated with the back haulage of WTG and substation components from the site.

4 EES Scoping Requirements

The August 2019 Scoping Requirements for the Willatook Wind Farm EES relevant to traffic and roads are as follows:

4.8 Traffic and Roads

Key Issues

— Managing traffic disruptions for residents, businesses and travellers during the construction of the project,
— Potential damage to local and regional road surfaces along transport routes and increased risk to road safety on transport routes.

Existing Environment

— Describe the existing road network surrounding the project area, including proposed construction transport route options, in terms of capacity, condition, accessibility, potential sensitive users and travel,
— Describe the source and predicted volumes of construction materials for wind turbines and associated infrastructure.

Likely Effects

— Assess the potential effects of construction activities on existing traffic, preferred traffic routes and road conditions. This assessment should take account of amenity and accessibility impacts on adjoining residents and in nearby townships, environmental effects arising from such works and physical impacts on the road infrastructure.
— Identify any additional road works / upgrades required to accommodate the project traffic during the construction stage (including having consideration of the type of vehicles) and any significant environmental effects arising from such works.
— Assess the potential effects to traffic and roads during operation and decommissioning of the project.

Design and Mitigation

— Identify the required road upgrades to accommodate construction traffic and additional road maintenance regime to address adverse impacts from project construction (including with reference to potentially limited construction windows due to projects area's climate),
— Describe and evaluate the proposed traffic management and safety principles to address changed traffic conditions during construction of the project, covering (where appropriate) road safety, temporary or permanent diversions, different traffic routes, hours of use, vehicle operating speeds, types of vehicles and emergency services provisions,
— Describe consultation undertaken with Moyne Shire Council and VicRoads, to coordinate scheduled roadworks and upgrades and additional roadworks and upgrades required for project traffic.

Design and Mitigation

— Outline and evaluate proposed measures designed to manage and monitor residual effects on road users and describe contingency measures for responding to unexpected impacts.

In addressing the above Scoping Requirements, the evaluation objective for the development is to avoid and minimize adverse effects on roads and road users during construction, operation and decommissioning of the project.

5 Legislation and Policy Context

5.1 Legislation and Standards / Guidelines

Relevant legislation, standards and guidelines that apply to the traffic and transport elements of the Project are summarised in Table 5-1..

Table 5-1 Application Legislation, Standards and Guidelines

Document	Description	Relevance
Legislation		
Road Management Act 2004 (Vic)	The Road Management Act provides a statutory framework for the management of road networks and the coordination of road reserves.	The Road Management Act requires approval for any construction project that may impact on or change access to a controlled access road (Site access points to external roads)
Road Safety Act 1986 - Road Safety (Traffic Management) Regulations 2009	The Traffic Management Regulations set out the responsibilities in implementing traffic control devices on roads, including for traffic management at worksites.	Relevant to works within public roads to deliver the site access intersections and/or to upgrade public roads for Project use. The transport impact assessment uses this framework as a reference to prescribe traffic management requirements.
Moyne Shire Council Municipal Road Management Plan (Version 5, 3 August 2021)	Prepared under the Road Management Act 2004 to establish a framework for the classification, management and maintenance of local roads administer by Moyne Shire Council	Provides guidance on road standard (cross section and pavement elements) against road classifications and expectations of maintenance. The TIA relies on this framework to assess Project impacts on local roads within the Project area.
Standards / Guidelines		
Austroads Guide to Road Design Part 4	The AGRD is a primary national reference for the development of safe, economical and efficient road design.	AGRD Part 4 provides guidance on intersection design such as design considerations, design process, choice of design vehicle
Austroads Guide to Traffic Management Part 3	The AGTM is a comprehensive reference for the development of safe, economical and efficient road design.	ADGT Part 3 provides a framework for transport studies and analysis methodologies
Standards Australia: AS1742.3-2009 Manual of uniform traffic control devices – traffic control for works on roads	AS1742.3 specifies the traffic control measures and devices to be used to warn, instruct and guide road users in the safe negotiation of work sites on roads and within road reserves	A Traffic Management Plan will be required for works in Wimmera Highway be submitted to Regional Roads Victoria (RRV) for review.

5.2 Planning Context

Land Use Zones

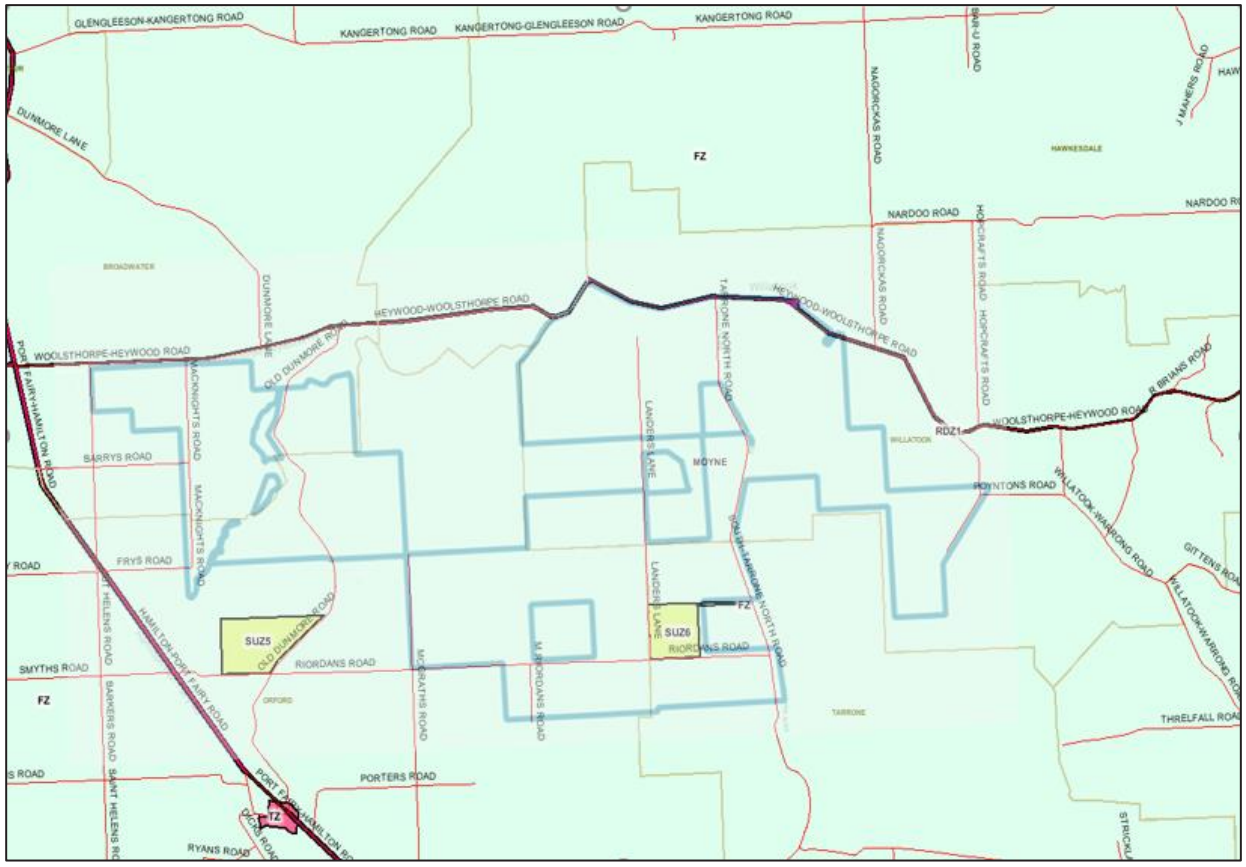
All land within and bordering the Wind Farm area is Farming Zone with the exception of two Special Use Zone areas that provide for the development of the Shaw River gas fired power station (SUZ4) and Tarrone Sub Station and proposed Tarrone gas fired power station (SUZ5), as shown in Figure 5.1.

A Wind Energy Facility is a section 2 use with the Farming Zone subject to meeting the requirements of Clause 52.32 of the Victorian Planning Scheme.

Relevant to access for the proposed wind energy facility, in considering an application for use and buildings and works, the decision guidelines listed under Clause 35.07-6 include:

— *How the use and development makes use of existing infrastructure and services.*

Figure 5.1 Planning Zones



Clause 52.32 – Wind Energy Facilities

Clause 52.32 of the Victorian Planning Provisions outlines the relevant application requirements associated with the development of Wind Energy Facilities. Relevant to traffic and access matters, considerations under Clause 52.32 include:

Clause 52.32-4 - Application requirements

— *Site and context analysis*

In relation to the surrounding area:

— *Access to infrastructure*
— *Direction and distances to nearby dwellings, townships, urban areas, significant conservation and recreation areas, water features, tourist routes and walking tracks, major roads, airports, aerodromes and existing and proposed wind energy facilities*

6 Stakeholder Engagement

6.1 Historic Stakeholder Engagement

Relevant to transport and Project traffic effects, Wind Prospect has engaged with the following stakeholders :

- Department of Transport (Regional Roads Victoria);
- Moyne Shire Council; and
- Local stakeholder engagement (undertaken by Wind Prospect)

Key traffic themes and concerns raised during this engagement are summarised below:

- Some local roads may not be of a suitable standard to cater for sustained heavy vehicle traffic associated with Project construction and decommissioning. It is preferred that heavy vehicle traffic rely on arterial roads as much as possible (MSC)
- Where local roads are relied on by Project heavy vehicle traffic, upgrade, maintenance and/or reinstatement may be required (MSC)
- Shoulders along single lane sections of Woolsthorpe-Heywood Road are susceptible to damage where excessively relied on. This is exacerbated during periods of wet weather (MSC / DoT)
- Project traffic effects on local road users, including school buses and agricultural traffic (MSC/DoT);
- Clarity on how construction materials haulage traffic would be assessed and suitably managed during Project construction, specifically how heavy vehicle volumes on any particular arterial road would be managed (DoT); and
- Confirmation of the preferred OSOM route (DoT)

6.2 Future Consultation

Ongoing stakeholder consultation and community engagement will be undertaken by the Proponent during the Project construction and operation phases that will include;

- Consultation with DoT, Moyne Shire Council, and local community during the site access approvals and construction works;
- Engagement with Moyne Shire Council and other relevant stakeholders during the Project construction period;
- Consultation with Moyne Shire Council, other LGA's, DoT and local landholders during operations to manage local road management during operations; and
- Ongoing engagement with Moyne Shire Council, DoT and other relevant community stakeholders during the Project decommission phase to evaluate and monitor Project traffic and materials haulage operations etc.

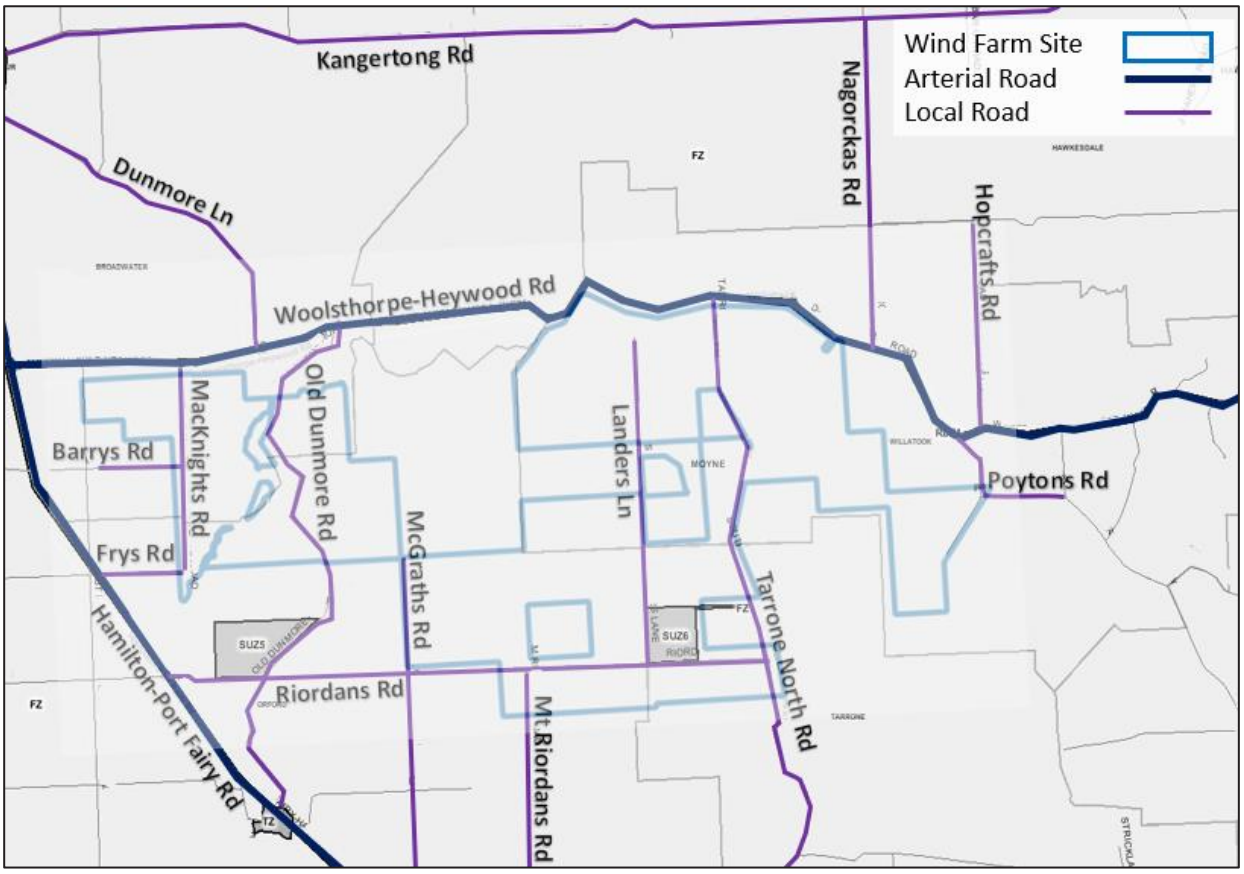
Additional detail on the above is discussed in Section 8.

7 Existing Conditions

7.1 Project Area Road Network

As described above, the land across the wind farm site is currently used for a mix of sheep and cattle grazing and also some dairy. The land is typical of pastoral areas of the Western Victorian Volcanic Plains and is largely undulating open farmland with areas of rocky outcrops.

Figure 7.1 Subject Site and Surrounding Road Network



Woolsthorpe – Heywood Road, an arterial C class road, is the significant road through the Wind Farm site and extends east from Henty Highway, Heywood to Warrnambool-Caramut Road at Woolsthorpe.

The cross-section and construction standard of the road varies along its length and through the Wind Farm site, with older sections typically constructed as a central single 4.0 metre seal with gravelled shoulders (see Figure 7.2) and with newer, reconstructed sections provided within a 7.0 metre two-lane sealed carriageway (see Figure 7.3). Shoulder condition varies and can deteriorate during periods of poor weather.

Widened two-lane sections of the road have progressively been delivered along lengths where warranted in response to road geometry (horizontal and vertical) and where pavement failures have necessitated reconstruction.

From traffic volume information sourced from DoT, Woolsthorpe – Heywood Road currently carries in the order of 270 vehicles per day (AADT) with 40 heavy vehicles per day.

Figure 7.2 Woolsthorpe – Heywood Road, east from Macknights Road

Figure 7.3 Woolsthorpe – Heywood Road, east of Tarrone North Road

Tarrone North Road extends south from Woolsthorpe-Heywood Road and is a two-lane sealed road (see Figure 7.4) continuing with a central single 4.0 metre seal with gravelled shoulders south of the Tarrone Substation access (see Figure 7.5) to Tarrone Lane.

The construction standard of the road is good noting that the northern section of the road was reconstructed to facilitate the Tarrone Substation, with more recent pavement works undertaken along the southern single width section under the Federal Government Roads to Recovery Program.

The intersection of Tarrone North Road with Woolsthorpe-Heywood Road forms a T-intersection with priority to Woolsthorpe-Heywood Road by way of give-way statutory controls to Tarrone North Road. The intersection of Tarrone Lane with Tarrone North Road is a Y-intersection, with priority to Tarrone Lane.

Figure 7.4 Tarrone North Road, north from Tarrone Substation Access

Figure 7.5 Tarrone North Road, south from Tarrone Substation Access

Dunmore Lane (refer to Figure 7.6) runs south-east to north-west between Woolsthorpe – Heywood Road and east of Hamilton – Port Fairy Road as an unsealed local access road. Dunmore Lane forms a T-intersection with Woolsthorpe – Heywood Road with priority to Woolsthorpe – Heywood Road.

Figure 7.6 Dunmore Lane, north from Woolsthorpe – Heywood Road

Macknights Road (refer to Figure 7.7) extends south from Woolsthorpe – Heywood Road as an unmade track to Frys Road. Give-way signage is provided at the intersection with Woolsthorpe – Heywood Road.

Figure 7.7 Macknights Road, south from Woolsthorpe – Heywood Road

Old Dunmore Road (refer to Figure 7.8) extends north from Hamilton- Port Fairy Road as an unsealed local access road, crossing Riordans Road and continuing a short distance further to the north.

The road provides local property access only and does not cater for regional through traffic. Reflecting the road function, the pavement width and condition of the Old Dunmore Road varies, but generally provides for two-way traffic to pass with care in most locations.

Give-way signage is provided at the intersection with Hamilton – Port Fairy Road.

Figure 7.8 Old Dunmore Road, north from Hamilton – Port Fairy Road

Riordans Road (refer to Figure 7.9) extends east from Hamilton- Port Fairy Road as unsealed road to Tarrone Road North.

From Hamilton- Port Fairy Road to approximately 800 metres west of Landers Lane, Riordans Road has as formed carriageway of between 6-7 metres suitable of accommodating agricultural and logging vehicles that use the road for property access and access to timber plantations located towards Hamilton – Port Fairy Road. East from this location, the width and alignment of the Riordans Road carriageway responds to topography and local features and is generally suitable for light vehicles only.

The western section of Riordans Road from Hamilton-Port Fairy Road also has a 6-7 metre wide unsealed carriageway. This section of road is used to access a number of timber plantations located along both sides of the road.

Figure 7.9 Riordans Road

Other roads relevant to the Wind Farm project area include **Landers Lane** as well as **Barrys Road, Frys Road, McGraths Road** and **Poyntons Road**

Landers Lane, Barrys Road, Frys Road, McGraths Road and Poyntons Road are all lower order access roads that border or extend through/within the Wind Farm site and provide for local property access only.

Table 7-1 Wind Farm Project Area Local Road Classification and Status

Road	Section	Classification	
DoT			
Woolsthorpe - Heywood Road	Hamilton – Port Fairy Road to No 3261. Woolsthorpe-Heywood Road [3.2 km]	Arterial	Sealed – Single lane
	No 3261. Woolsthorpe -Heywood Road to No 2923. Woolsthorpe-Heywood Road	Arterial	Sealed – Two lane
	No 2923. Woolsthorpe -Heywood Road to Shaw River bridge (approx.) [2.6 km]	Arterial	Sealed – Single lane
	Shaw River bridge (approx.) to Tarrone No 2169. Woolsthorpe - Heywood Road	Arterial	Sealed – Two lane
	East of No 2169. Woolsthorpe -Heywood Road to Poynton Road [2.4 km]	Arterial	Sealed – Single lane
	Poynton Road to Penhurst – Warrnambool Road	Arterial	Sealed – Two lane
Moyne Shire Council			
Tarrone North Road	Woolsthorpe-Heywood Road to Tarrone Substation Access	Sub Arterial	Sealed – Two lane
	Tarrone Substation Access to Tarrone Lane	Sub Arterial	Sealed – Single lane
Nargorckas Road	North of Woolsthorpe-Heywood Road	Sub Arterial	Sealed – Single lane
Kangertong Road	West of Nargorckas Road	Sub Arterial	Sealed – Single lane
Macknights Road	South of Woolsthorpe-Heywood Road	Access	Formed / Unpaved
Dunmore Lane	North of Woolsthorpe-Heywood Road	Access	Gravel (Level 2)
Old Dunmore Road	South of Woolsthorpe-Heywood Road	Access	Gravel (Level 1)
Riordans Road	West of Tarrone North Road	Access	Gravel (Level 2) - west Gravel (Level 1)- east
Barrys Road and Frys Road	East of Hamilton – Port Fairy Road	Access	Gravel (Level 1)
McGraths Road	East of Hamilton – Port Fairy Road	Access	Gravel (Level 2)
Poyntons Road	South of Woolsthorpe-Heywood Road	Access	Gravel (Level 1)
Landers Lane	North of Riordans Road	Access	Unformed
Hopcrafts Road	North of Woolsthorpe-Heywood Road	Access	Gravel (Level 2)

7.2 External Construction Materials Haulage Roads

Responding to the advice from DoT and Moyne Shire Council during stakeholder engagement, in identifying preferred routes between quarry sites that may be used for external material sourcing, the following principles have been applied.

— Routes rely on arterial roads wherever possible. Use of local roads is limited to quarry access roads from the arterial road network only;
— Routes seek to adopt the shortest travel distance/most direct via the arterial road network between the quarry site and Project area; and
— Where alternate routes of approximately equivalent length are available, avoidance of townships and sensitive areas has been considered (i.e.. Kororoit from Gillear Quarry)

All roads relied on are approved for B-double and Higher Mass Limit vehicles. Use of local roads is limited to Quarry access roads under Council management and the section of Tarrone North Road included within the Project road network.

All route options presented have been subject to visual inspection to confirm suitability by Project materials haulage heavy vehicles.

Identified routes are shown in Figure 7-11. Route details are presented in Table 7-2.

Figure 7.10 Preferred Material Haulage Routes

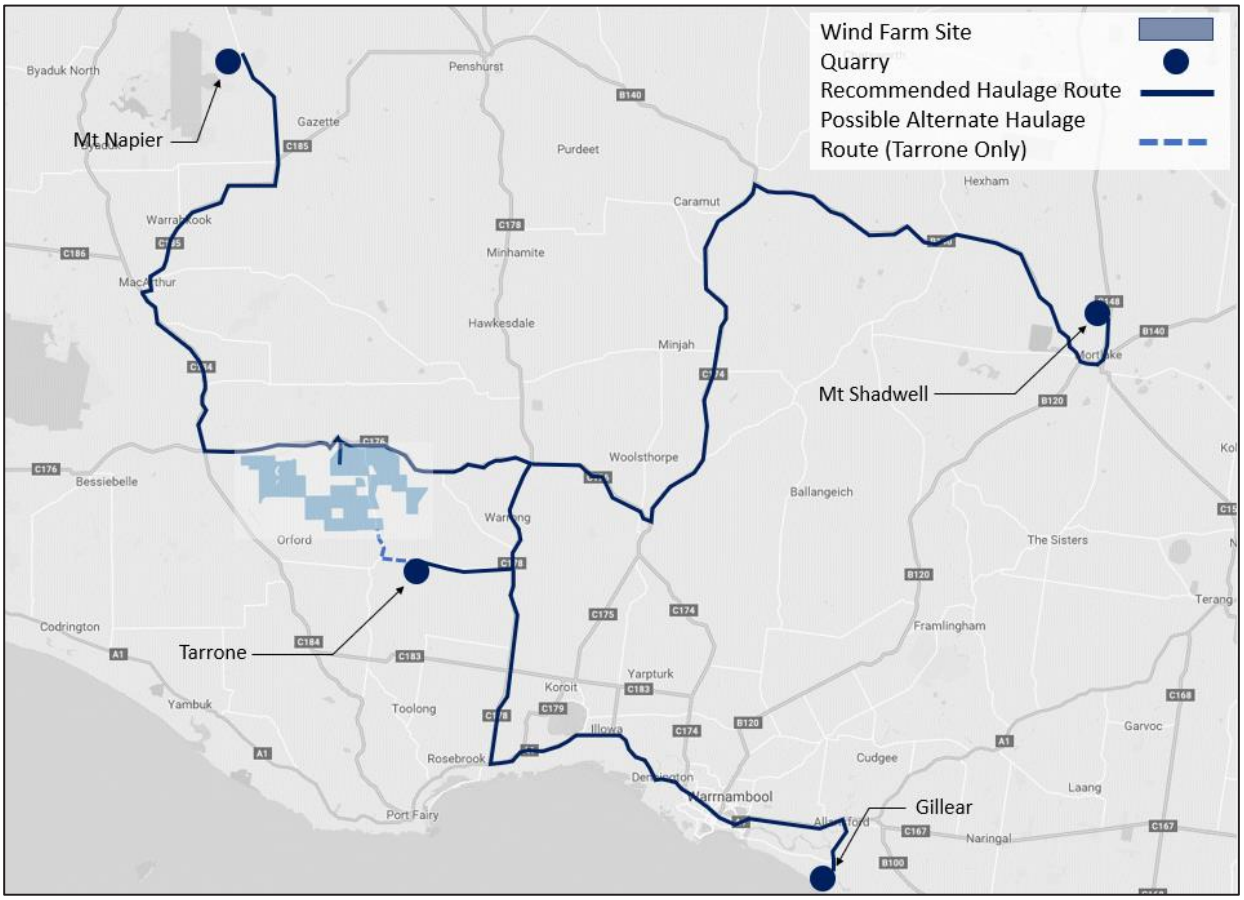


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Table 7-2: Haulage Route Road Segments

Material Source	Material Type	Road Authority	Road Name	Between	Length
Gillear Quarry	Lime and Sandstone	Warrnambool City Council	Buckleys Road	Gillear Quarry and Burkes Road	1.3km
			Burkes Road	Buckleys Road and Tooram Road	0.7km
			Tooram Road	Burkes Road and Ziegler Parade	3.2km
			Ziegler Parade	Tooram Road and Princes Highway	0.5km
		Regional Roads Victoria	Princes Highway	Allansford and Killarney	28.5km
			Penhurst – Port Fairy Road	Princes Highway and Woolsthorpe-Heywood Road	23km
			Woolsthrope-Heywood Road	Penhurst – Port Fairy Road and Site	13.5km
				Total Length:	**70.7km**
Mt Shadwell Quarry	Aggregate	Regional Roads Victoria	Mortlake – Ararat Road	Mt Shadwell Quarry and Hamilton Highway	2.5km
			Hamilton Highway	Mortlake and Caramut	33km
			Warrnambool – Caramut Road	Caramut and Woolsthorpe	29km
			Woolsthorpe – Heywood Road	Woolsthorpe and Site	24km
				Total Length:	**88.5km**
Mt Napier Quarry	Aggregate	Southern Grampians Shire Council	Mt Napier Road	Mt Napier Quarry and MacArthur – Penhurst Road	9.1km
		Regional Roads Victoria	MacArthur – Penhurst Road	Mt Napier Road and MacArthur	16km
			Hamilton – Port Fairy Road	Macarthur and Woolsthorpe – Heywood Road	13.5km
			Woolsthorpe – Heywood Road	Hamilton – Port Fairy Road and Site	3km
				Total Length:	**41.6km**
Tarrone Quarry	Aggregate	Moyne Shire Council	Tarrone Lane	Tarrone Quarry and Penhurst – Warrnambool Road	7.5km
		Regional Roads Victoria	Penhurst – Warrnambool Road	Tarrone Lane and Woolsthorpe – Heywood Road	8.5km
			Woolsthorpe – Heywood Road	Penhurst – Warrnambool Road and Site	13km
				Total Length:	**29km**
Tarrone Quarry Alternate Route		Moyne Shire Council Road	Tarrone Lane	Tarrone Quarry and Tarrone North Road	2.3km
			Tarrone North Road	Tarrone Lane and Site	2km
				Total Length:	**4.3km**

7.3 WTG Components / OSOM Haulage Roads

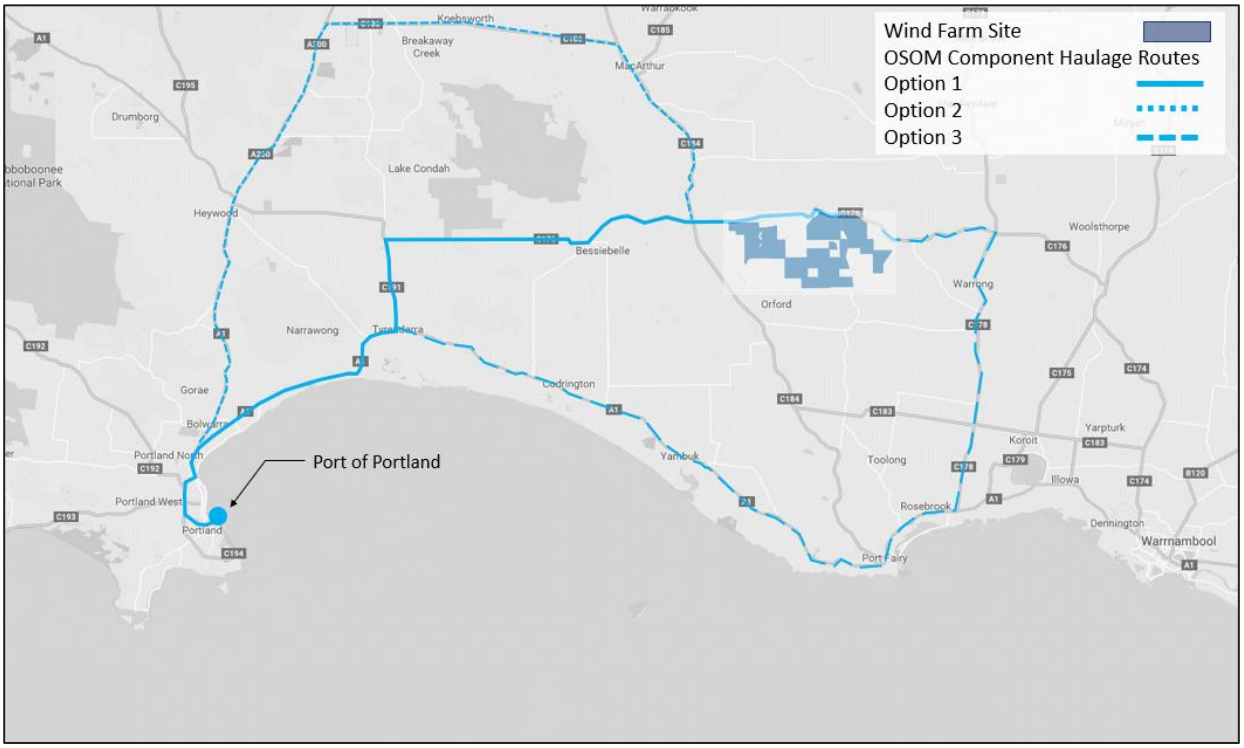
Through discussion with DoT regarding preferred and/or previously approved OSOM haulage routes from Port of Portland, three route options have been investigated (see Figure 7.11)

Option 1 is the shortest route (75 km approx.) and extends along approved or conditionally approved Over Size and Over Mass (OSOM) declared main roads via Henty Highway to Princes Highway, and then Tyrendarra-Ettrick Road to Woolsthorpe-Heywood Road, approaching the Wind Farm site from the west.

Option 2 is an alternate route (100 km approx..) investigated at the request of DoT as an extension of the WTG / OSOM route used by MacArthur Wind Farm, using Henty Highway, Myamyn-MacArthur Road, then approaching Woolsthorpe-Heywood Road from the north via Hamilton-Port Fairy Road.

Option 3 (120 km approx.) has been investigated as an alternate that would allow vehicles to approach the Wind Farm site from the east using Princes Highway through Port Fairy and then Penhurst – Port Fairy Road and Penhurst – Warrnambool Road has been identified.

Figure 7.11 OSOM / WTG Component Haulage Route Options



Visual inspection of all routes has been undertaken.

Both Option 1 and Option 2 include extended sections of road (along both Woolsthorpe-Heywood Road and Myamyn-MacArthur Road) that have a single width seal and rely on gravel shoulders to support passing traffic.

The ability to accommodate laden blade transport vehicles turning left from Hamilton-Port Fairy Road to Woolsthorpe-Heywood Road is limited by the position of the Hamilton-Port Fairy Road carriageway close the eastern side of the road reserve and the width of the Woolsthorpe-Heywood Road reservation at this intersection.

With the exception of Woolsthorpe-Heywood Road within the Project area, all roads along Option 3 are two-lane sealed roads. The route relies on the higher trafficked Princes Highway, including through the Port Fairy township.

In consultation with DoT and Moyne Shire Council, Option 1 has been identified as the preferred OSOM / WTG component haulage route on basis that:

- The route is shortest and most direct between Port of Portland and the Project site
- There is opportunity at all key intersections to undertake temporary works within the existing road reserve to cater for Project OSOM vehicles; and
- The route has least reliance on key freight routes of Princes Highway and Henty Highway such that there is a reduced disruption potential.

7.4 Accident Data

The last five (5) available years of accident data for key Project access roads has been sourced from the DoT Crashstats database. Data covers the period of 2 January 2015 to 25 May 2020.

To provide a comparative assessment, accident data has been processed for each road segment against AADT traffic volumes, presented as an accident rate per 100 million vehicle kilometres travelled across the data period. Fatality accidents along each road segment have also been identified.

Complete accident data is presented in Table 7-3.

On review of this data it is noted that:

- The greatest number of accidents correlates with road segments that have the greatest traffic volumes, typically within township areas (Portland of note);
- The highest rate of crashes generally reflects the highest trafficked sections of roads (within Portland). The exception is the length of Woolsthorpe-Heywood Road between Broadwater and Willatook, which is over-represented as a low volume road section;
- Outside of townships, most recorded accidents are away from intersections and are single vehicle incidents involving cars/light vehicles;
- Within township areas, accidents by in large occur at intersections and involve more than one vehicle;

Table 7-3 Crashstats Summary (2 January 2015 – 25 May 2020) – DoT Crashstats Database

Road	Section	AADT	Accidents Data[1]								
			2015	2016	2017	2018	2019	2020	Ave.	Accident Rate (per 100M KM)	Fatalities
Henty Highway	Port of Portland to Princes Hwy	8900	2	2	2	2	3	0	2	7.52	1
Princes Highway	Henty Hwy to Allstree	2900	0	0	1	0	0	0	0	3.78	
	Allstree to Narrawong		2	0	1	1	0	0	1	11.63	
	Narrawong to Tyrendarra		3	1	0	0	1	0	1	11.81	1
Tyrendarra – Ettrick Road	Tyrendarra to Woolsthorpe-Heywood Rd	300	0	0	0	0	0	0	0	0.00	
Woolsthorpe-Heywood Road	Tyrendarra-Ettick Rd to Bessiebelle	430	0	0	1	1	0	0	0	15.45	
	Bessiebelle to Broadwater		0	1	0	0	0	0	0	13.41	
	Broadwater to Willatook	290	2	1	0	0	0	0	1	28.34	
	Willatook to Penhurst-Warrnambool Rd		1	0	0	0	0	0	0	31.49	
Hamilton-Port Fairy Road	Woolsthorpe-Heywood Road to Old Dunmore Road	900	0	0	1	1	0	0	0	14.33	1
Tarrone Lane	Penhurst-Warrnambool Rd to Tarrone North Rd.	~500 (Council Road)	1	1	1	0	0	0	1	32.88	1

[1] All accidents (casualty and fatality) by year

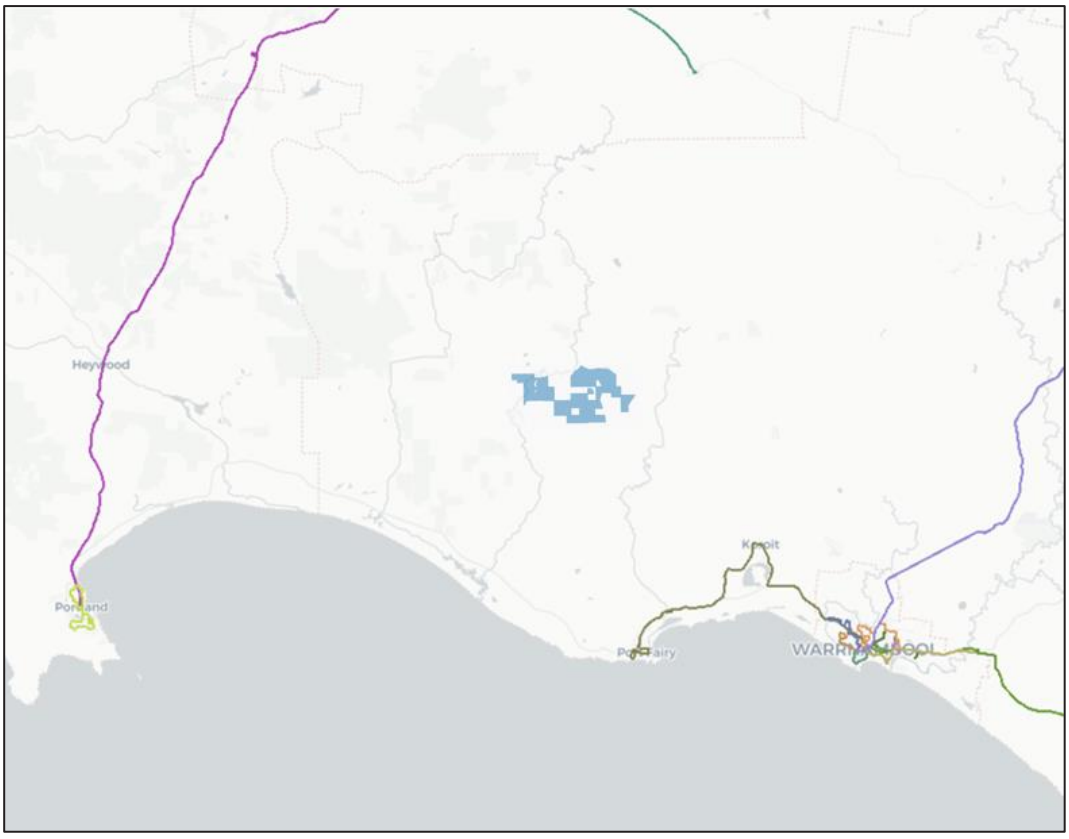
7.5 Public Transport

Regional bus, coach and school bus routes are shown in Figure 7.12, Figure 7.13 and Figure 7.14.

Bus and coach routes are predominantly limited to higher order arterial roads. No services extend on roads through the Project area or rely on Woolsthorpe-Heywood Road.

Current school bus routes extend along Woolsthorpe-Heywood Road, Tarrone Lane, Tarrone North Road and other immediate road connections within the Project area and extend along sections of all arterial route options that are identified for construction materials haulage and WTG / OSOM haulage.

Figure 7.12 Public Transport – Regional Bus Routes

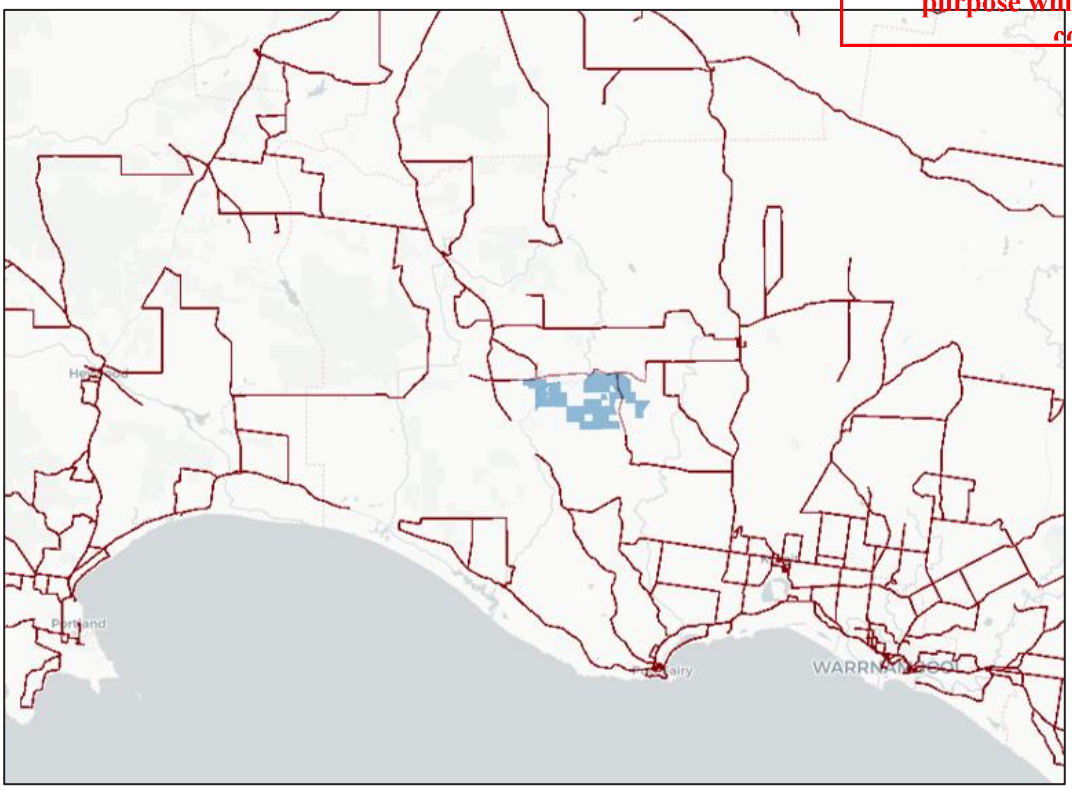


Source: Regional Roads Victoria – Regional Surface Transport – Grampians – August 2021

Figure 7.13 Public Transport – Regional Coach Routes

Source: Regional Roads Victoria – Regional Surface Transport – Grampians – August 2021 (Yellow Route Added)

Figure 7.14 Regional School Bus Routes



Source: Regional Roads Victoria – Regional Surface Transport – Grampians – August 2021

7.6 Road Improvement Projects

South-west Victoria Green Triangle Freight Routes

The Green Triangle Freight Routes works program is a four year (2016-2020) $40 million funding commitment to improve key arterial roads in the south-west region of Victoria to the South Australian Border supporting increased freight movements and regional productivity. Program works are largely associated with pavement rehabilitation and stabilization, with much of the program works complete.

This program is combined with an additional $40 million commitment from Federal and State Governments to upgrade the condition of Princes Highway west of Colac to the South Australian border.

Relevant to the Project haulage route options, the Green Triangle Freight Routes program includes the following road links:

- Princes Highway between Tyrendarra and Portland
- Henty Highway between Dutton Way and Portland;
- Port of Portland access roads; and
- Relevant sections of Princes Highway around Warrnambool, subject to quarry aggregate source confirmation.

The Green Triangle Freight Routes works are illustrated in Figure 7.15.

Figure 7.15 Green Triangle Freight Routes Project

Great South Coast – High Productivity Freight Vehicle Planning

To facilitate High Productivity Freight Vehicles (HPFV) as part of establishing the A-double network, Department of Transport (Regional Road Victoria) undertook detailed structural analysis of bridges along Henty Highway and Princes Highway to determine:

— The current structural capacity of each bridge;
— Strengthening and/or replacement works to accommodate HPFV's greater than 70 tonnes; and
— Costing for these works.

No funding has yet been committed to any bridge upgrades relevant to the OD/OSOM haulage route.

8 Impact Identification and Characterisation

8.1 Potential Traffic Impacts

The effects of the Project on roads and road users, within and external to the Project area, have been considered across the following receptors:

- Local road users (within the Project area);
- Arterial road users (external to the Project area and Woolsthorpe-Heywood Road within the Project area); and
- Public road infrastructure relied on by Project traffic.

From assessment and through stakeholder consultation, the following broad potential Project traffic impacts and impact pathways have been identified:

- Additional traffic during Project construction may exceed the capacity of the road network and result in increased congestion and compromise road safety;
- External road infrastructure relied on by the Project may not be of suitable standard to cater for the expected vehicle types, compromising road function and safety. This may be exacerbated by weather conditions (i.e. periods of heavy rainfall);
- Works on public roads within the Project area required by the Project (such as creating access or upgrading road segments) may disrupt and/or delay through traffic;
- Slow moving WTG componentry and OSOM vehicle traffic may disrupt and/or delay through traffic on the arterial road network;
- Temporary works on public roads external to the Project area to support WTG componentry and OSOM vehicle may disrupt and/or delay through traffic and may create a road safety hazard;
- Construction works may disrupt access to land within the Project area through the closure and diversion of existing local roads; and
- Construction activity and the use of some local roads within the Project area may impact agricultural activity.

The above potential impacts and pathways, and applicability to each Project stage, are presented in Table 8-1.

Table 8-1 Potential Traffic Impacts and Pathways

Impact Item	Project stage[2]	Potential Impact (Description of activity/effect, pathway, receptor, potential impact)
TI-01	O	Project operational traffic may exceed the capacity of the local road network and result in increased congestion and/or compromise road safety for other users and activities.
TI-02	C, D	General Project traffic during construction and decommissioning may exceed the capacity of the arterial road network and result in increased congestion and compromise road safety for other users.
TI-03	C, D	Heavy vehicle traffic during construction and decommissioning may exceed the capacity of the local road network and result in increased congestion and compromise road safety for other users.

[2] C - Construction, O – Operation, D- Decommissioning

TI-04	C, D	Works to establish Project area access to the external road network may impact traffic during construction which may result in increased congestion and compromise road safety for existing road users.
TI-05	C	OSOM / WTG component haulage may result in congestion and delay and may impact road safety for the duration of haulage activity
TI-06	C, D	Possible degradation of local roads and shoulders of identified sections of Woolsthorpe-Heywood Road may impact traffic during construction which may result in increased congestion and compromise road safety for existing road users
TI-07	C, D	Project construction and decommissioning activity may require local road closures and/or deviations that could impact public access to land within the Project area resulting in material ongoing inconvenience to road users.

8.2 Significance and Consequence of Impact

The effect of Project traffic has the potential to cause traffic impacts as identified in Table 8-1.

Consequence rating criteria have been derived to classify the effect level of each of these potential impacts and any residual impacts. These rating criteria are presented in Table 8-2.

Table 8-2 Traffic Effects Consequence Rating Criteria

Level	Qualitative Description
Negligible	Local, small-scale, easily reversible change in road user experience. Road users can easily adapt or cope with change. No detectable change in a local transport operational setting. Negligible adverse impact on traffic conditions or road safety.
Minor	Short-term recoverable change in road user experience. Road users have substantial capacity to adapt and cope with change. Short-term, reversible changes in a local transport operational setting. Detectable change in traffic conditions and minor increase risk of collisions.
Moderate	Medium-term recoverable change in road user experience. Road users have some capacity to adapt and cope with change. Long-term but limited changes to transport operational setting that are able to be managed. Detectable change in traffic conditions and moderate increase risk of collisions.
Major	Long-term recoverable change in in road user experience. Road users have limited capacity to adapt and cope with change. Long-term, significant changes resulting in risk to the function of the transport network beyond the Project Area. Traffic congestion and delays exceed acceptable levels and high risk of collisions.
Severe	Long-term, irreversible change in road user experience. Road users have limited capacity to adapt and cope with change. Irreversible, significant changes resulting in widespread risks to the function of the transport network at a regional scale. Traffic congestion and delays severely restrict accessibility and high increase in risk of collisions or an increase in number of fatalities.

The likelihood of each risk pathway has also been considered against the guide presented in Table 8-3.

Table 8-3 Likelihood Guide

Level	Qualitative Description
Rare	May occur in rare circumstances
Unlikely	Could occur but is not expected
Possible	Could occur
Likely	Will probably occur
Almost Certain	Will likely occur and/or is planned for

8.3 Mitigation Measures

Possible mitigation measures to off-set identified potential traffic impacts have been drawn from standard traffic engineering best practice and accepted traffic management tools.

Relevant to the potential traffic impacts identified in the following measures have been considered:

Avoid

- Rely on the arterial road network for construction activity wherever possible;
- Rely on the internal roads for movement within the Project area wherever possible;
- Identification of a preferred construction materials and OSOM haulage routes between quarry sites / Port of Portland and the Project site; and
- Provide for the separation of Project traffic and agricultural activity on local roads (such a stock underpass) within the Project area where deemed appropriate.

Minimise

- Temporary road infrastructure improvements to facilitate short term Project transport effects;
- Permanent road infrastructure improvements where there is nexus with Project transport effects;
- Inclusion of an on-site quarry as the preferred sourcing option of crushed rock;
- Traffic Management Plans (TMP's) to manage Project traffic movements and avoid / mitigate specific short and long term traffic impacts;
- Road maintenance / road management agreements to address road maintenance and reinstatement; and
- Stakeholder consultation and engagement to assist the development of appropriate traffic management measures and to communicate any road network changes required by the Project.

Rehabilitate

- Road management agreements to remove external redundant transport Project infrastructure at the end of the Project life.

Traffic Management Plans (TMP's) are a common tool to manage short term traffic impacts during construction and other activities that alter road conditions.

TMP's will be completed by the construction contractor(s) prior to the commencement of construction activities to the satisfaction of the Road Authority and identify, assess and appropriately minimise likely impacts on road operations and road safety for road users. TMP's typically address:

- Confirmation of traffic activity and haulage / access routes for construction traffic and heavy vehicles with consideration for safety;
- Consideration of the impact on road users including vehicle traffic, slower moving farm machinery, public transport, school buses, emergency services, cyclists and pedestrians;

- Identify Project traffic operation expectations and requirements (vehicle operating speeds, driver behaviour and conduct, compliance and enforcement etc);
- Identify accessibility and detour routes for local landholders, where appropriate;
- Consider impacts to travel times and accessibility for emergency services and public transport; and
- Identify monitoring and auditing to be undertaken during construction to assess impact of the TMPs and advise of remedial action to be undertaken, if warranted.
- Include an engagement process to ensure that external stakeholders are aware of any proposed changes to Project traffic conditions and that risks associated with such changes are identified and mitigated.
- Include a mechanism to capture and respond to community and external stakeholder feedback, with stakeholders to include;
  - DoT
  - Moyne Shire Council
  - Emergency service providers
  - Public transport and school bus operators
  - Local community stakeholders
- Require annual review and require timely updates in response to:
  - Internal changes to Project traffic operation; and
  - External changes that impact the operation/performance of roads relied on by the Project (such as road network infrastructure upgrades, transport regulation changes, local policy changes etc).
- Provide an implementation and monitoring framework, including incident reporting and response.

Responding to matters raised by DoT and MSC during stakeholder engagement, specific items identified by DoT and Moyne Shire Council that must be addressed within TMP's to be prepared for the Project (noting that this is not an exhaustive list):

DoT

- The configuration and treatment of site access points from Woolsthorpe-Heywood Road (in consultation with MSC);
- Confirmation of the arterial road OSOM route to be used and expected associated traffic volumes (as Average Annual Daily Traffic [AADT]);
- Confirmation of arterial heavy vehicle haulage routes to be used and expected associated traffic volumes (as AADT); and '
- Include measures (management and/or maintenance) to minimise Project traffic impacts on unsealed road shoulders (notably Woolsthorpe-Heywood Road between Penshurst-Warrnambool Road and Tarrone North Road)

MSC Items

- Review and confirmation of existing local road conditions and use (surface condition, traffic management, school bus routes etc.) prior to the commencement of works;
- Expected traffic volumes to be generated on local roads relied on during construction, nominally Tarrone Lane and Tarrone North Road, for each relevant works stage;
- For each relevant works stage, details of:
  - Any signage/line marking requirements used to manage traffic movements and inform external road users;
  - Expected haulage hours, including identification of non-activity periods during school bus times; and
  - The recognition and management of stock crossing points on haulage routes.

Green Travel Plans are an on-going management tool that seek to promote sustainable transport initiatives with the intent to minimise private vehicle use. In the context of the Project, a GTP would focus on staff activity with the intent to encourage carpooling and/or rely on Project provided transit services. The GTP would be prepared by Willatook Windfarm Pty Ltd in consultation with Council and would include:

— Sustainable transport initiatives and associated incentives;
— Travel mode targets and timeframes; and
— Mechanisms to monitor, review and amend the GTP, where required.

Road maintenance and management agreements to outline Willatook Windfarm Pty Ltd obligations with regard to local roads within the Project area and/or relied on by Project traffic would be developed with DoT and/or MSC. Such agreements would typically outline:

— Existing road conditions prior to the commencement of works;
— Maintenance responsibility, triggers and standard for roads within the Project area and/or relied on by Project traffic;
— Regular inspection and independent audit of road conditions;
— An appropriate on-site contact for the reporting of road maintenance issues identified outside of regular inspections;
— Timeframes and procedures for rectification of identified issues; and
— Dispute resolution processes.

As resolved through stakeholder engagement with DoT and MSC, these agreements would be:

— Limited to construction and decommissioning Project phases only and linked to TMP's prepared for works during these phases (DoT and MSC);
— Apply to all local roads within the Project area and relied on by Project traffic during construction and decommissioning (MSC);
— Any local roads external to the Project area identified as a Project access route (MSC); and
— Sections of arterial roads on the OSOM / WTG component haulage route where passing relies on unsealed shoulders (DoT).

Project mitigation measures discussed above are summarised in Table 8-4.

Table 8-4: Identified Mitigation Measures

Mitigation Measure	Item	Summary
Avoid	MM01	Materials haulage routes to rely on higher order roads and/or routes gazetted as appropriate to cater for the types of traffic generated by the Project. Lower order roads were avoided.
	MM02	Deliver a connected internal Project area track network to allow Project traffic to rely on internal track network in preference to public roads. Where public roads are included within the Project area track network, provide suitable upgrades and/or facilities to safely accommodate on-going agricultural land uses
Minimise	MM03	Construction Traffic Management Plans will be established to manage construction and operation traffic and mitigate impacts associated with all phases of the Project construction and decommissioning works
	MM04	Green Travel Plan will be established to encourage sustainable travel and to minimize Project traffic generation throughout the construction, operation, and decommissioning
	MM05	Widening of Woolsthorpe-Heywood Road and local roads within the Project area to DoT/MSC standards
	MM06	Infrastructure improvements works at site Project area access locations
	MM07	Temporary infrastructure works on the OSOM route
	MM08	Road maintenance and management agreements will be established with the MSC for local roads that are relied on by Project during construction
	MM09	Road maintenance and management agreements will be established with DoT for the maintenance of shoulders along the single width seal sections of Woolsthorpe-Heywood Road west of the Project area for the duration of WTG/OSOM haulage operations
	MM10	A community engagement strategy will be established to identify and consult affected and interested stakeholders.
Rehabilitate	MM11	Road management agreements to remove external redundant transport Project infrastructure

9 Impact Assessment

9.1 Project Traffic Model

Construction

Traffic generated by the Wind Farm during construction will consist of:

- General traffic generated by staff travelling to/from the site (i.e. utes, vans and private cars);
- OD vehicles used for the delivery of large WTG components; and
- Other heavy vehicles (HV) which are used for the delivery of the smaller WTG components and importing construction materials such as aggregate and cement for the concrete.

ADOPTED WIND FARM DELIVERY TIMEFRAMES

With the exception of site establishment works, work phases will overlap and will be undertaken in tandem, with WTG component delivery and WTG erection to commence reasonably soon after the completion of the initial site footing and access works. Based on advice from the Proponent, the following indicative timeframes for each work phase as identified in Section 2.5 is assumed.

- Site Establishment — Weeks 1 – 12
- Civil Construction Works — Weeks 11 – 94
- WTG Component Delivery — Weeks 48 - 90
- WTG Erection — Weeks 50 – 98
- Site Disbandment — Weeks 95 - 104

MATERIAL SOURCING

The proponent intends to source aggregate from an on-site quarry and a draft Work Plan has been submitted as part of the EES. However, the on-site quarry is subject to a separate approvals process.

Therefore, for the purposes of this assessment, the traffic impact has been assessed to include two options for traffic generation:

- Scenario 1: approved on-site quarry for the purposes of 80% of all aggregate supply to the construction, or
- Scenario 2: all aggregate material will be sourced from off site.

VEHICLE CAPACITY

The following assumptions have been made for the capacity of the Heavy Vehicle (HV) vehicles that will deliver the majority of bulk materials for construction:

- Water Tanker: 27.0 cubic metres per HV
- Aggregate (Rock/Sand/Cement): 13.0 cubic metres per HV
- Reinforcement: 7.5 tonnes per HV

ACCESS ROADS AND HARDSTAND AREAS

Subject to resolving the establishment of an on-site quarry, unsealed internal access roads, hardstand areas and the upgrade/upkeep of local external roads used for Wind Farm construction traffic will be constructed from material sourced on-site.

Prior to the establishment of the on-site quarry, or in the event that on-site materials sourcing is not possible, material for road and hardstand construction will be sourced externally from one or more of the four quarries identified in Figure 3.3.

Access roads and hardstand area works will comprise:

- Approximately 60 kilometres of internal access roads with typical pavement widths of 6.0 metres, 8 metres and 12 metres, and depth of 0.3 metres;

- Pavement widths increase closer to the public road network access points, to facilitate the passing of vehicles and OD/OSOM delivery movements.

— Up to 59 WTG site hardstands at 60 metres by 40 metres and with a pavement depth of 0.4 metres;
— Crane hardstands of 140 metres by 20 metres for the construction of each WTG;
— A 250 metre by 250 metre temporary construction compound hardstand area with a pavement depth of 0.4 metres; and
— A 400 metre by 200 metre substation hardstand area with a pavement depth of 0.4 metres.

All access road and hardstand material sourced from an on-site quarry will be transported throughout the Wind Farm site using internal access tracks in preference to external roads. Woolsthorpe – Heywood Road would be used to transfer material between the various Wind Farm areas as required.

Where material is sourced externally, the material would be delivered directly to work sites in each relevant area of the Wind Farm.

WTG FOOTINGS

Concrete for WTG footings will be produced internally within the on-site concrete batching plant(s) from externally sourced aggregate, cement and reinforcement. Each WTG footing will require approximately 740 cubic metres of concrete and include 50 tonnes of reinforcing steel. It is assumed that cement required for concrete will be sourced from nearby townships, most likely Portland and/or Warrnambool.

Concrete aggregate will likely be sourced from one or more of the four quarries identified in Figure 3.3.

WTG COMPONENTS

Each of the 59 WTG's will comprise the following components:

— 3 blades (up to 93 metres);
— A hub and nacelle;
— An internal or external transformer; and
— WTG steel tower sections.

Blade and hub/nacelle WTG components will be delivered by OD/OSOM vehicles. The steel sections will be delivered in two forms for the five portions of the WTG tower. The bottom two sections will be delivered in multiple segments, with up to 4 steel segments per tower subject to the final WTG model specification. The remaining three sections of tower will be delivered in single full diameter segments to the site. Each steel tower section would be approximately 30 metres in length.

OTHER

Other materials delivery required for the construction of the Wind Farm will include:

— Electrical cabling and other materials/equipment for the internal distribution network:
— The substation transformer;
— Battery energy storage components;
— Construction equipment and plant;
— Meteorological masts; and
— Plant fuel and other miscellaneous items.

CONSTRUCTION TRAFFIC VOLUMES

The establishment on an on-site quarry and water sourcing would cater for approximately 80 percent of road/hardstand construction material and most non-potable water needs.

On this basis, and considering estimated project timeframes, expected external material requirements and typical vehicle types to be used across the project, estimated external daily

vehicle movements across the various stages of the Wind Farm delivery are summarised in Table 9-1.

Adopted staff movements conservatively assume that all staff will access the Wind Farm site by private vehicle with an average occupancy of 1.5 persons per vehicle. Staff movements to and from the Wind Farm site would be substantially reduced should communal transport be provided.

Table 9-1 External Daily Vehicle Movements – Willatook Wind Farm (On-site Materials Sourcing)

Phase	Staff		OD Vehicles		Heavy Vehicles		Total	
	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles /Day	Ave. Vehicle Movements / Day
Weeks 1-10	69	138	0	0	10	20	**79**	**158**
Weeks 11-48	116	233	0	0	29	57	**145**	**290**
Weeks 49-90	172	344	2	4	29	58	**203**	**406**
Weeks 91-94	147	294	0	0	28	56	**175**	**350**
Weeks 95-98	104	208	0	0	2	4	**106**	**212**
Weeks 99-104	69	138	0	0	2	4	**71**	**142**

Should on-site materials sourcing not be possible, estimated external daily traffic volumes are presented in Table 9-2, with the significant difference being an increase in up to 60 heavy vehicles per day during the peak construction period. This correlates to approximately 120 heavy vehicle movements per day.

Table 9-2 External Daily Vehicle Movements – Willatook Wind Farm (No On-site Materials Sourcing)

Phase	Staff		OD Vehicles		Heavy Vehicles		Total	
	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles / Day	Ave. Vehicle Movements / Day	Ave. Vehicles / Day	Ave. Vehicle Movements / Day
Weeks 1-10	69	138	0	0	28	56	**97**	**194**
Weeks 11-48	116	233	0	0	59	117	**175**	**350**
Weeks 49-90	172	344	2	4	58	118	**233**	**466**
Weeks 91-94	147	294	0	0	57	114	**204**	**408**
Weeks 95-98	104	208	0	0	2	4	**106**	**212**
Weeks 99-104	69	138	0	0	2	4	**71**	**142**

CONSTRUCTION TRAFFIC ACTIVITY

From Table 9-1 and Table 9-2 the substantive portion of daily Wind Farm traffic across all work stages is associated with staff movements to and from the site. This traffic will be concentrated at particular times of each day as staff move to and from the site, with comparatively little such activity at other times.

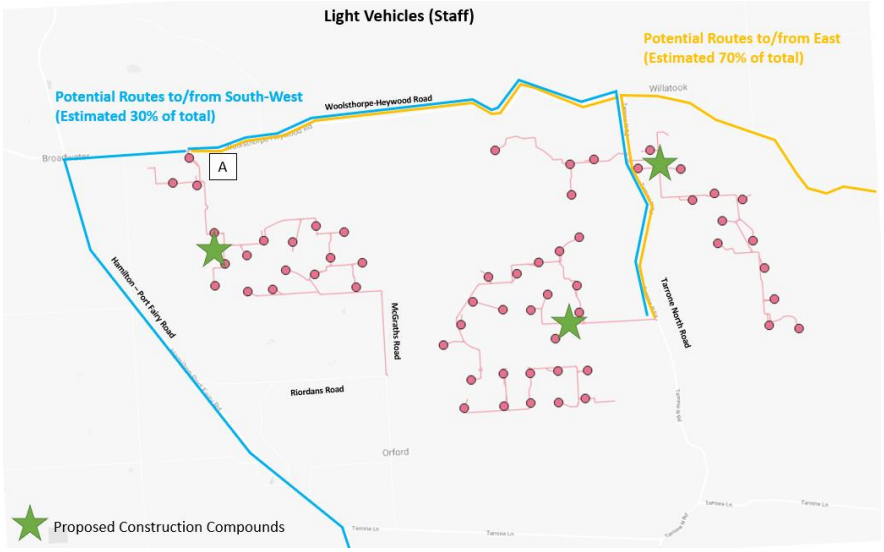
Heavy vehicle traffic will be more broadly spread, with expected daily volumes translating to an average of 4 heavy vehicles per hour where road/hardstand materials are sourced on-site and 8 heavy vehicles per hour where the material is all off-site.

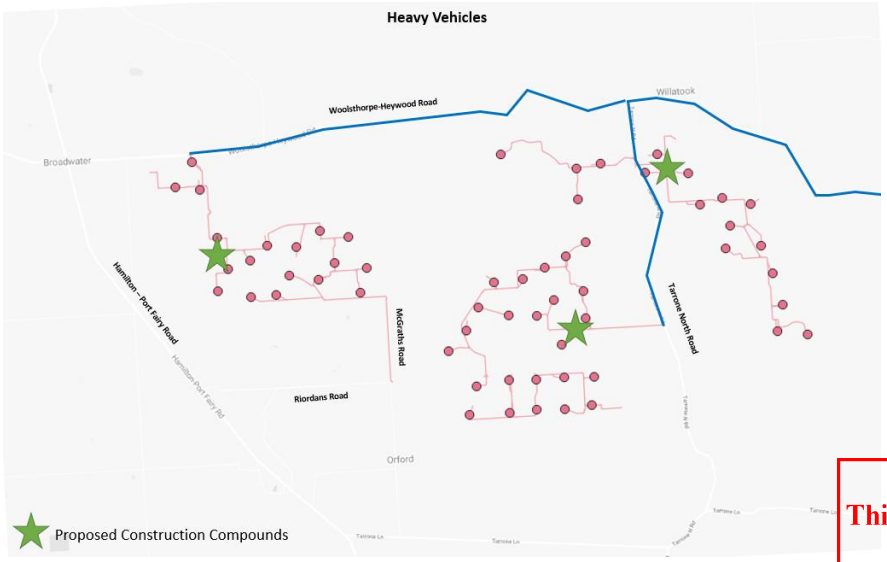
External Project traffic activity will be concentrated on Woolsthorpe – Heywood Road. The road can be considered in three sections:

- Hamilton-Port Fairy Road to Gate 1
- Gate 1 to Tarrone North Road; and
- From Tarrone North Road to the East.

Traffic to the west of Tarrone North Road will primarily be OD and OSOM traffic associated with WTG components, with limited staff and heavy vehicles (subject to staff being housed in Port Fairy and external materials sourcing from the Mt Napier Quarry). External traffic volumes to the east of Tarrone North Road will be higher due to greater likelihood of staff accommodation in Warrnambool and Koroit as well as the identified access routes for quarries to the east and south as per Figure 3.3. These likely routes are summarised below on Figure 9.1.

Figure 9.1 Project Area Transport Routes by Vehicle Type





From the above and assuming 30 per cent of Wind Farm staff are based in Port Fairy, external construction traffic generation on these sections of road would be as follows. Where a range is given, the lower number in the range is the scenario with on-site material sourcing. The higher number represents a scenario where most material is imported to the site.

- Hamilton-Port Fairy Road to Gate 1 — 107 vpd (4% HV or OSOM)
- Gate 1 to Tarrone North Road — 166-184 vpd (12-21% HV or OSOM)
- From Tarrone Point Road to the East. — 299-359 vpd (19-33% HV or OSOM).

In all cases, the substantive proportion of generated traffic is associated with staff movements to and from the Project area.

On the basis that on-site quarrying is pursued, the Project will rely on Riordans Road and McGraths Road from Hamilton-Port Fairy Road for the transfer of heavy plant and equipment to site.

This transport will involve a limited number of movements over a relatively short time period, with the level of traffic not problematic in regard to road capacity.

Wind Farm Operation

Details of likely traffic generation during the Project operation are as follows:

- Daily routine maintenance to be carried out by two to five people. Daily traffic generation is not expected to exceed four vehicle movements per day to the external road network, with all other movements being internal to the site.
- Weekly/fortnightly regular minor maintenance to be carried out by a small team. This will involve a team of no more than fifteen people attending the site, with up to four vehicle. This is expected to increase the daily traffic generation of the site up to a maximum of approximately 10 vehicle movements. Again, the majority of movements will be internal to the site and will not affect the surrounding road network.
- Occasional maintenance will occur when components of the development need to be replaced, such as replacing a gearbox. This is expected to only occur very occasionally and will be subject to approval processes with the relevant authorities.
- Visitors to the site such as office-based staff and courier deliveries etc.

Wind Farm Decommissioning

The eventual decommissioning of the Wind Farm site will involve the removal of any structure above ground and to a depth of one metre. This excludes the portion of foundations deeper than 1 metre and access tracks kept in agreement with landowners.

In comparison to the construction period, the traffic generated during decommissioning of the site will be significantly less but will include the use of OD and OSOM vehicles to remove WTG and other major components.

9.2 Impact Assessment

Project Area Roads

Subject to the sourcing of material on-site or off-site, as discussed in Section 9.1, traffic volumes on Woolsthorpe – Heywood Road will increase to up to 299-359 vehicle movements per day between Tarrone North Road and Penshurst – Warrnambool Road.

The additional maximum daily vehicle movements more than double the existing daily volumes on Woolsthorpe-Heywood Road and Tyrendarra-Ettrick Road.

Despite this increase, these volumes can comfortably be accommodated within the existing two-lane sections of Woolsthorpe – Heywood Road east of Tarrone North Road.

However, on the basis of off-site materials sourcing, Wind Farm construction traffic at this level will increase the likely incidence of passing traffic along the 2.4-kilometre single lane sealed length of

Woolsthorpe – Heywood Road between Poyntons Road and No 2169 Woolsthorpe – Heywood Road such that widening of this section of road to a two-lane two-way road is warranted.

Project heavy vehicle traffic reliant on Woolsthorpe – Heywood Road west of Tarrone Road North is limited to a maximum of 6 OSOM / WTG component haulage vehicle per day and some potential materials haulage, should product be sourced from the Mt Napier Quarry to the north west of the Project area. Materials haulage traffic, if this eventuates, would rely on the section of road west of Hamilton-Port Fairy Road only.

Willatook Windfarm Pty Ltd will maintain shoulders along those sections of Woolsthorpe – Heywood Road used by OSOM vehicles and where shoulders are relied on by passing vehicles for the duration of this haulage activity. This includes that section that may be used by materials haulage traffic. This is an appropriate response.

Local roads within the Project area relied on by Project traffic include:

- The northern section of Tarrone North Road, north of the Tarrone Terminal Station access road;
- Riordans Road between McGraths Road and Gate 16
- McGraths Road north of Riordans Road to Gate 33; and
- Subject to the establishment of the on-site quarry, Riordans Road between Hamilton-Port Fairy Road and McGraths Road.

The cross section and standard of Tarrone North Road is suitable for Project generated traffic during all Project phases.

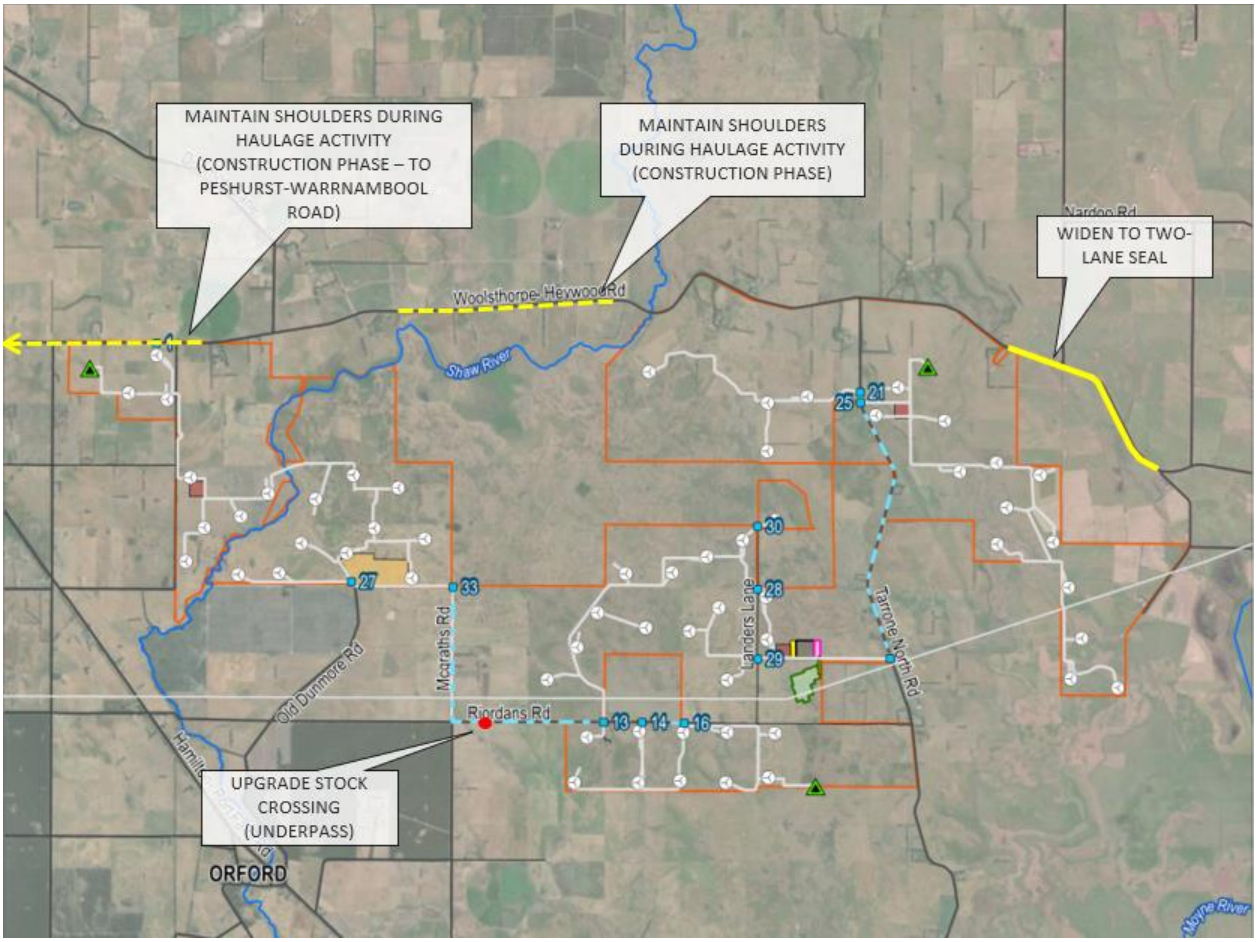
The western section of Riordans Road is currently used to access local timber plantations and is appropriate for limited heavy vehicle use and for the transfer of plant to the potential quarry site. McGraths Road is of a similar standard to Riordans Road and is also appropriate for limited heavy vehicle use and for the transfer of plant to the potential quarry site.

A stock crossing is located on Riordans approximately 470 metres to east of McGraths Road that is in use daily for the movement of dairy cattle. Given the frequency of use, a stock underpass should be considered in this location to avoid cattle interacting with Project traffic.

All local roads within the Project area would be maintained by Willatook Windfarm Pty Ltd during construction and decommissioning phases through agreement with MSC.

The above mitigation works are illustrated in Figure 9.2.

Figure 9.2 Project Area Roads – Mitigation Works



Construction Materials Haulage Routes

With the exception of Woolsthorpe-Heywood Road through the Project area, construction materials haulage from external sources rely on:

— Two-lane two-way arterial roads; and
— Local roads already in use to access the identified external quarry sites.

Arterial roads relied upon are all gazette B-double routes. Arterial roads relied upon are all declared main roads managed by DoT (RRV).

Under the Road Management Act, the classification and status of these roads requires that the road manager ensure these roads are “fit for purpose” in that:

— Road geometry, cross section and typology is appropriate for the road classification and function;
— Intersections relied on by permitted vehicles be of appropriate standard to safely cater for these vehicles and other road users; and
— The condition of roads and roadside infrastructure is maintained to a suitable standard.

From visual inspection these roads:

— Have pavement surfaces that are in good physical condition; and
— Are of appropriate standard / cross section to cater for Project traffic.

OSOM Haulage Route

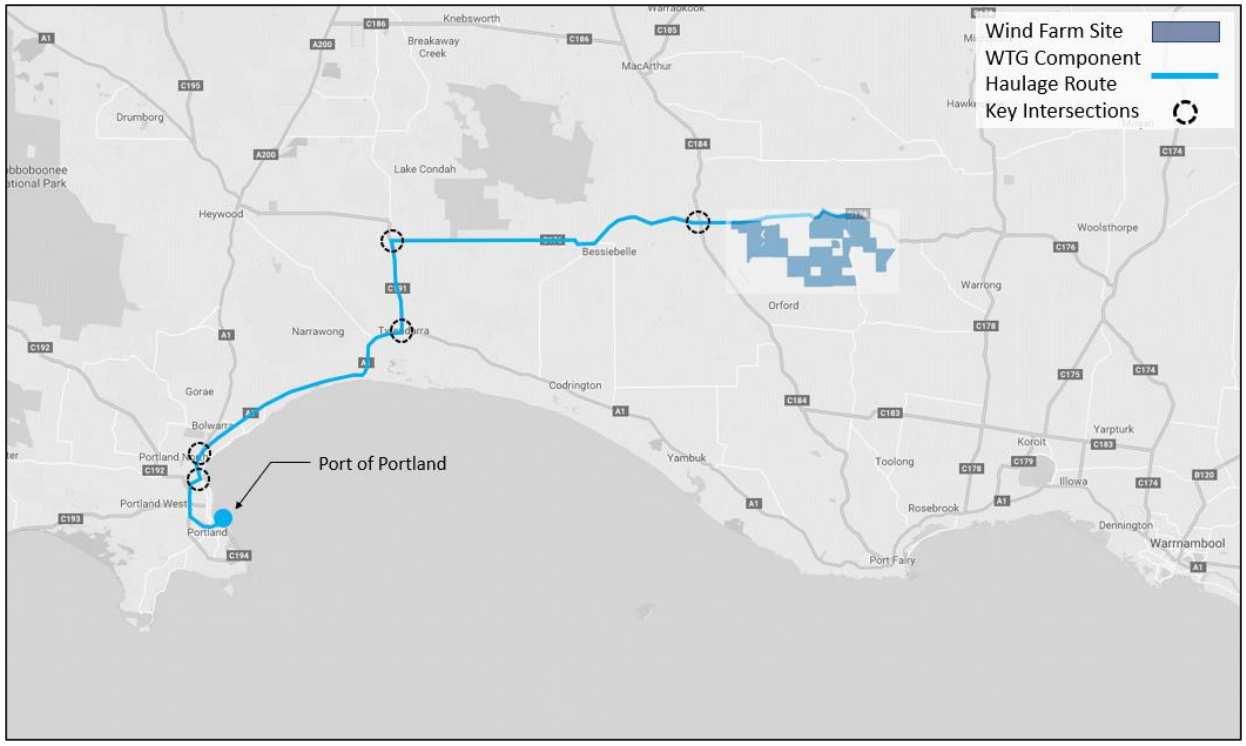
A detailed assessment of the preferred OSOM haulage route (Option 1, see Section 7.3) has been undertaken to determine specific temporary works required to support the movement of WTG components from Port of Portland to the Project site.

This has included swept path analysis conducted utilising the maximum anticipated OSOM load of a 93-metre blade truck at the following key intersections along the route:

- Henty Highway / New Street, Portland
- Princes Highway / Henty Highway, Portland
- Princes Highway / Tyrendarra-Ettrick Road, Tyrendarra
- Tyrendarra-Ettrick Road / Woolsthorpe-Heywood Road, Homerton
- Woolsthorpe-Heywood Road / Hamilton – Port Fairy Road, Broadwater

The location of these intersections are illustrated in Figure 9.2.

Figure 9.3 Preferred OSOM / WTG Component Haulage Route



The findings of this review, with reference to the swept path diagrams included as Appendix B, are summarized in Table 9-3.

Table 9-3 Key Intersection OSOM Vehicle Traffic Management Requirements

Intersection	Movement	Traffic Management
Henty Highway / New Street, Portland	Vehicles approaching from the west will require the full width of Henty Highway on approach to intersection during left turn.	Temporary closure of right and left turns from Henty Highway (north) and New Street during transit.
Princes Highway / Henty Highway, Portland	To avoid street lighting and power poles, vehicles will cross median and median islands during right turn from Henty Highway to Princes Highway. There are two options which can facilitate this movement	Temporary removal of signage. Infill within Henty Highway centre median swale (impact on drainage to be considered). Temporary closure of Henty Highway southbound and Princes Highway southbound during transit.
Princes Highway / Tyrendarra-Ettrick Road, Tyrendarra	Vehicles approaching from the west will require the full width of Princes Highway and on approach and Tyrendarra – Ettrick Road in departure to intersection during left turn.	Temporary closure of intersection to all traffic during transit through this section of road. Infill and temporary removal of signage on north-west corner.
Tyrendarra-Ettrick Road / Woolsthorpe-Heywood Road, Homerton	Right turn from south requires full width of Tyrendarra-Ettrick Road on approach, road reserve area on south-east corner and full width of Woolsthorpe-Heywood Road on departure.	Temporary closure of intersection to all traffic during transit. Temporary removal of signage on Woolsthorpe-Heywood Road approach. Infill required on south-east corner of intersection.
Woolsthorpe-Heywood Road / Hamilton – Port Fairy Road, Broadwater	Vehicles to cut across southern verge on west approach to undertake a continuous movement west to east across Hamilton – Port Fairy Road.	Temporary closure of intersection to all traffic during transit. Infill required on south-west corner of intersection. Temporary removal of signage may be required.

Public Transport

No public transport services operate along roads within the Project area but do extend along identified materials haulage and OSOM / WTG component haulage routes.

TMP's prepared to manage these movements will require engagement with DoT and the relevant bus operator in development and implementation to ensure that haulage activity does not unreasonably delay services.

Construction/decommissioning stage TMP's will include provision to limit heavy vehicle movement during school bus times.

9.3 Summary of Traffic Impacts and Mitigation

Project traffic impacts discussed above have been assessed against the likelihood and consequence criteria identified in Section 8.2. Mitigation measures identified in Section 8.3 have been applied and residual impacts post the adoption of these mitigation measures further assessed.

The summary of impacts and mitigation measures and residual impacts is presented in Table 9-4, with residual impacts all deemed to be minor or negligible.

Table 9-4: Summary of Traffic Impacts and Control Measures

Impact Item	Project stage[3]	Potential Impact (Description of activity/effect, pathway, receptor, potential impact)	Likelihood /Consequence	Mitigation Measures	Residual Impact (Description of residual impact)
TI-01	O	Project operational traffic may exceed the capacity of the local road network and result in increased congestion and compromise road safety for other users.	Rare / Minor	MM02 / MM04	Project operational traffic volumes are low and able to be safely accommodated within existing roads. Internal tracks and some local road segments will be used to move throughout the Project area.
TI-02	C, D	General Project traffic during construction and decommissioning may exceed the capacity of the arterial road network and result in increased congestion and compromise road safety for other users.	Possible / Moderate	MM02 / MM03 / MM04 / MM05 / MM06	General traffic accessing the Project site during construction and decommissioning can be accommodated within the existing arterial road network. With mitigation measures in place the residual impacts are expected to be minor
TI-03	C, D	Heavy vehicle traffic during construction and decommissioning may exceed the capacity of the local road network and result in increased congestion and compromise road safety for other users.	Possible / Moderate	MM01 / MM02 / MM03 / MM05 / MM06 / MM08 / MM09 / MM10	Subject to materials sourcing locations, heavy vehicle traffic accessing the Project site during construction and decommissioning may warrant widening of sections of Woolsthorpe-Heywood Road within the Project area. Outside of the Project area, arterial roads are of suitable standard to cater for this traffic. With mitigation measures in place the residual impacts are expected to be minor
TI-04	C, D	Works to establish Project area access to the external road network may impact traffic during construction which may result in increased congestion and compromise road safety for existing road users.	Almost certain / Moderate	MM01 / MM02 / MM03 / MM05 / MM06 / MM08 / MM09 / MM10	Roadworks to construct Project site access may cause temporary delays for road users. With mitigation measures in place the residual impacts are expected to be minor.
TI-05	C	OSOM / WTG component haulage may result in congestion and delay and may impact road safety for the duration of haulage activity	Almost certain / Moderate	MM03 / MM05 / MM06 / MM07 / MM08 / MM09 / MM10 / MM11	The installation and removal of temporary intersection works and road maintenance works to cater for OSOM vehicles may cause temporary delays for road users. OSOM haulage activity may also cause delays to following through traffic on arterial roads. With mitigation measures in place the residual impacts are expected to be minor.

[3] C - Construction, O – Operation, D- Decommissioning

TI-06	C, D	Possible degradation of local roads and shoulders of identified sections of Woolsthorpe-Heywood Road may impact traffic during construction which may result in increased congestion and compromise road safety for existing road users	Likely / Moderate	MM03 / MM08 / MM10	Local roads relied on by the Project will be identified, assessed and maintained by the Proponent in agreeance with MSC during construction. Shoulders on Woolsthorpe-Heywood Road used by OSOM vehicle will also be maintained by the proponent in agreeance with DoT. With mitigation measures in place the residual impacts are expected to be minor.
TI-07	C, D	Project construction and decommissioning activity may require local road closures and/or deviations that could impact public access to land within the Project area resulting in material ongoing inconvenience to road users.	Possible / Moderate	MM03 / MM10	Construction activity may require local road closures at times and the provision of alternate access for landowners. With mitigation measures in place the residual impacts are expected to be negligible.

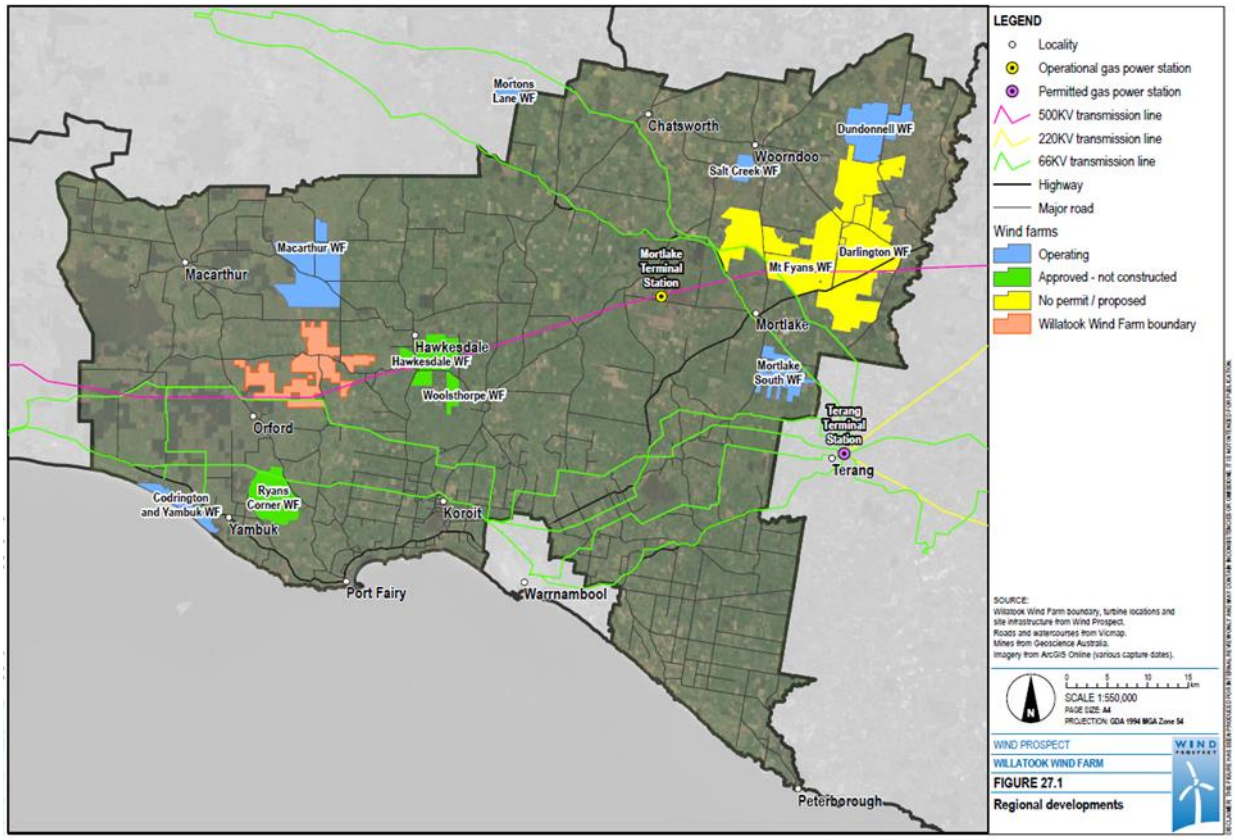
10 Cumulative Impacts

The location and status of other key infrastructure projects near the Willatook Wind Farm project area and within the Moyne local government area are shown in Figure 10.1.

All identified are other wind farm projects and include a number of approved projects yet to commence as well as known future proposed wind farms that are under consideration and/or currently seeking approval.

Indicative project timing for these projects against the Willatook project (construction, operation and decommissioning) sourced from publicly available information is presented in Figure 10.2.

Figure 10.1 Moyne LGA Wind Farm Projects



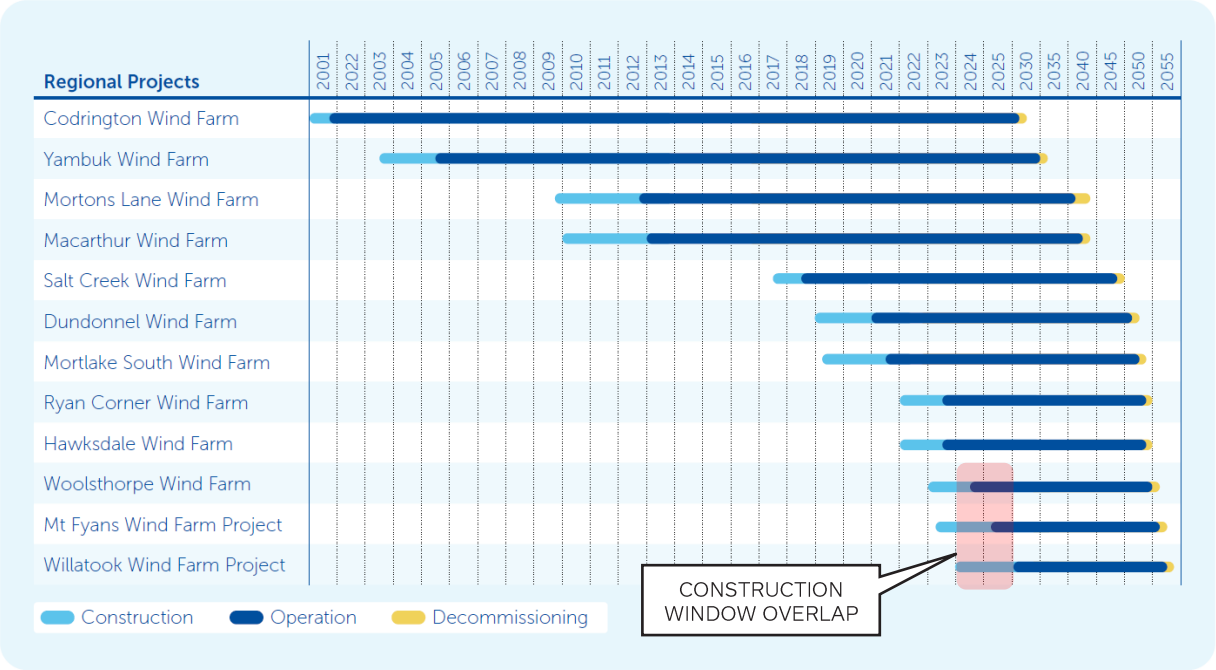
Source: Willatook Wind Farm Environment Effects Statement – Cumulative effects

Similar to the Willatook Wind Farm, traffic impacts of other identified wind farm projects will be most significant during the construction phase, with traffic generated during operation and decommissioning limited.

With reference to Figure 10.2, comparing the overlap of expected project construction phases, the key projects in relation to cumulative traffic impacts are:

— Woolsthorpe Wind Farm; and
— Mt Fyans Wind Farm.

Figure 10.2 Wind Farm Projects – Timelines (indicative)



Base source: Willatook Wind Farm Environment Effects Statement – Cumulative effects

Woolsthorpe Wind Farm is located approximately 12 kilometres to the east of the Willatook Wind Farm project area. The Woolsthorpe Wind Farm was approved on 2008 and consists of 20 WTG sites.

From the endorsed traffic management plan prepared for the Woolshorpe Wind Farm[4]:

- The preferred OSOM route for WTG and other major components haulage from Port of Portland is Princes Highway and Penshurst-Port Fairy / Penshurst-Warrnambool Road. Woolsthorpe-Heywood Road, west of Penshurst-Warrnambool Road is nominated as an alternate route in the circumstance the Shaw Road bridge load limits at Yambuk remain in place (since removed) ;
- Materials may be sourced from the Mount Shadwell and Holcim Tarrone quarries. Haulage routes from these locations include common sections of the arterial road network that may also be relied on by Willatook Wind Farm Project material haulage traffic; and
- The Woolshorpe Wind Farm project is expected to generate an additional 11 vehicle movements, including up to 7 heavy vehicle movements, per day to Woolsthorpe-Heywood Road, west of Penshurst-Warrnambool Road, during the project construction period.

From the above, should construction activity for both the Project and Woolsthorpe Wind Farm project overlap, traffic volumes on Woolsthorpe-Heywood Road, west of the Penshurst-Warrnambool Road and through past the Project area would be as follows

- Hamilton-Port Fairy Road to Gate 1 — 118 vpd (4% HV or OSOM)
- Gate 1 to Tarrone North Road — 177-195 vpd (12-21% HV or OSOM)
- From Tarrone Point Road to the East — 310-370 vpd (19-33% HV or OSOM).

The above represents a minor increase in expected traffic volumes above that generated to Woolsthorpe-Heywood by the Project and would not require additional mitigation over and above that to be implemented.

The **Mount Fyans Wind Farm** is located approximately 5 kilometres to the north of Mortlake and approximately 55 kilometres to the east of the Willatook Wind Farm project. A traffic impact assessment has been prepared for this Project but has not been publicly released.

From available information we understand that WTG components will likely be transferred from Port of Portland. Noting OSOM haulage routes adopted for the nearby Dundonnell and Salt Creek wind

[4] Woolsthorpe Wind Farm – Traffic Management Plan, Jacobs, 3 October 2019

farms sought to approach from the north via Lake Bolac, there is little potential for overlap with Willatook Wind Farm OSOM traffic beyond Henty Highway and Port access roads in Portland.

Source locations for other construction materials is not known, albeit we note the site is located a short distance to the north of the Mount Shadwell quarry. Staff accommodation locations are not known. However, noting the remoteness of the Mount Fyans Wind Farm project

Having regard to the above, and considering material and staff access routes for the Willatook project, we expect there is little potential for the direct overlap of constriction and staff traffic.

11 Conclusions

The preceding transport impact assessment has been undertaken to determine the potential impacts of the Project on key intersections, roads, and transport network and to identify recommended management and mitigation options where appropriate in order to reduce potential risks of the Willatook Wind Farm Project.

The assessment has considered the impact of Project generated traffic during the Project construction, operation, and decommissioning phases. Traffic effects and impacts have been assessed against the current road network infrastructure.

The potential impacts on the operation of the road network relied on by the Project are identified as follows:

— That the standard and capacity of existing road infrastructure is appropriate to accommodate Project traffic (across all Project phases) and the potential consequence of Project generated traffic on road function and safety;
— Impacts on local access as a result of local road closures and/or diversions within the Project area during wind farm operations.

Mitigation measures identified in response to these potential impacts are:

— Site access, road upgrade and temporary infrastructure works within the Project area and along the OSOM / WTG component haulage route;
— Traffic Management Plans to manage Project traffic movements and mitigate specific short and long term traffic impacts:
— Green Travel Plans to encourage sustainable travel and to minimise Project traffic generation;
— Road maintenance agreements to manage short term impacts to local roads and key arterial road sections to maintain road conditions for all users during Project construction;
— Stakeholder consultation and engagement to assist the development of appropriate traffic management measures and to communicate any road network changes required.

From the impact assessment, key findings are:

— Wind Farm traffic generated to external roads during construction will be limited to staff vehicles, HV traffic associated with external bulk materials haulage and OD/OSOM vehicles associated with WTG and other major component delivery. Additional traffic associated with internal Wind Farm traffic will also be generated to local sections of Woolsthorpe – Heywood Road within the Wind Farm site;

— At the time of peak construction activity, external Wind Farm traffic will add a maximum of between 299-359 vehicle movements per day on Woolsthorpe – Heywood Road to the east Tarrone North Road subject to the level of on-site materials sourcing. This traffic can comfortably be catered for within Woolsthorpe – Heywood Road east of the site with the exception of the 2.4-kilometre single lane section of road between Poyntons Road and No 2169 Woolsthorpe – Heywood Road. This section of Woolsthorpe – Heywood Road will require widening;

— Additional traffic generated to Woolsthorpe – Heywood Road to the west of the site will be limited to an estimated 107 vehicle movements per day. This additional traffic does not warrant significant road improvements acknowledging that maintenance of the road pavement and shoulders will be undertaken by the Proponent for the duration of construction works;

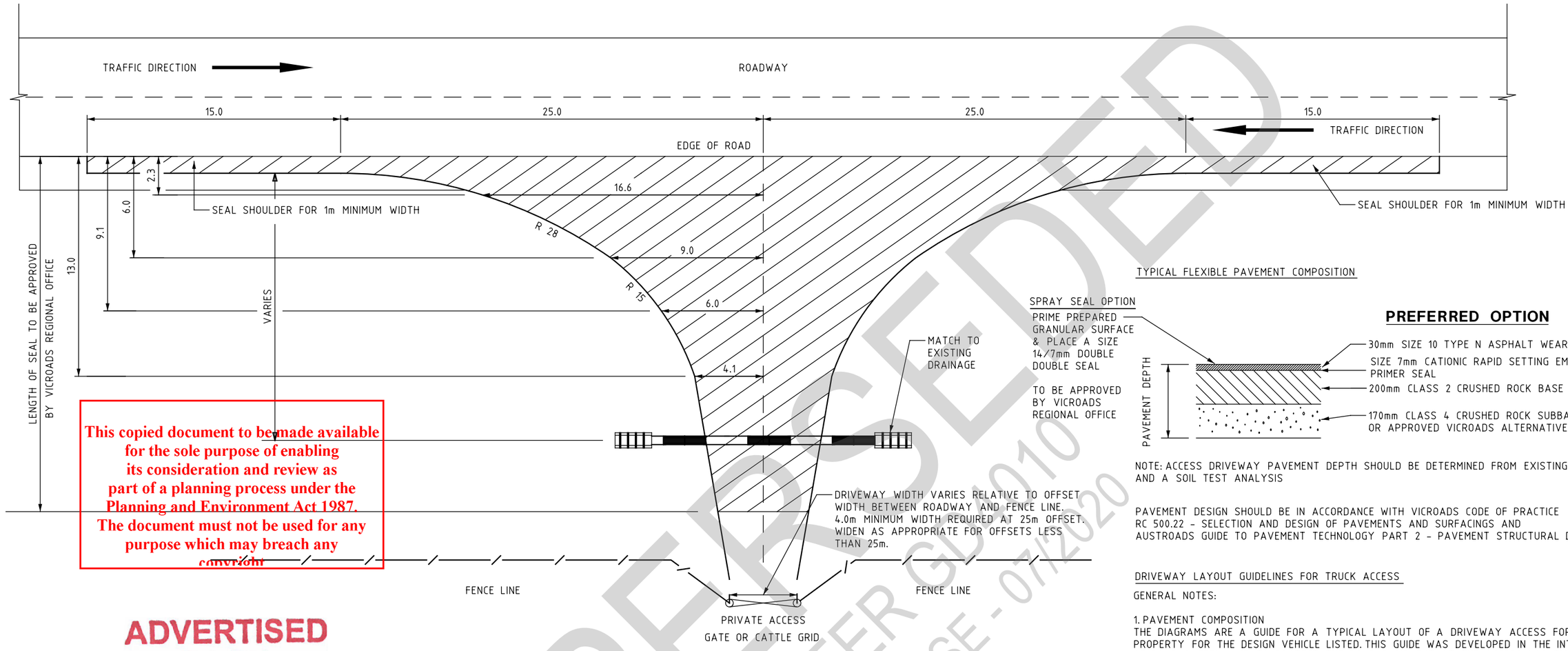
— Having consideration of base traffic and usage, and upgrades to be provided to support Wind Farm construction traffic, traffic generated by the Wind Farm during operation to public roads can reasonably be accommodated;

— Subject to the resolution of specific traffic management requirements, the identified over dimensional vehicle route option from the Port of Portland to the Wind Farm site for the transport for WTG and other imported major components have been assessed and are suitable for OD and OSOM transport vehicles; and

— Local traffic impacts within the Project area during all Project phases can be suitability and safely managed.

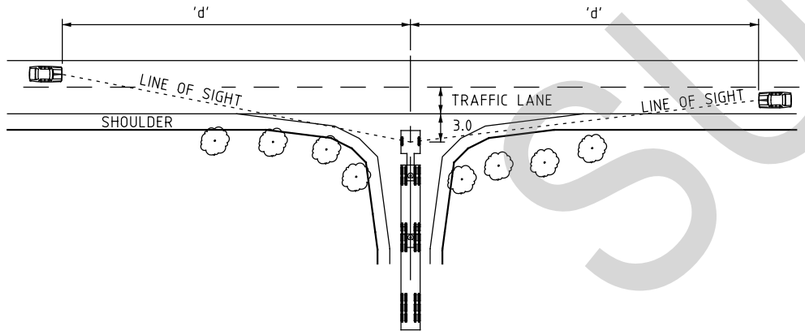
Appendix A VicRoads Type B Access Standard Drawing

ISSUE	APPROVED BY	DATE	AMENDMENT
B	R. FANNING	JAN 18	DRIVEWAY SHOULDERS REMOVED, SIGHT DISTANCE TABLE & DIAGRAM UPDATED, GENERAL NOTES AND REFERENCES AMENDED



PLAN - DRIVEWAY ACCESS LAYOUT

SAFE INTERSECTION SIGHT DISTANCE
(REFER REFERENCES & NOTE No. 4 AND TABLE 1)



MINIMUM VISIBILITY REQUIREMENTS
(NOT TO SCALE)

DESIGN SPEED (Km/h)	'd' SAFE INTERSECTION SIGHT DISTANCE (m)	CORRECTION (m)							
		ROADWAY UPGRADE				ROADWAY DOWNGRADE			
		2%	4%	6%	8%	2%	4%	6%	8%
60	123	-2	-4	-6	-7	2	5	8	11
70	151	-3	-5	-8	-10	3	7	11	15
80	181	-4	-7	-10	-13	4	9	14	20
90	226	-5	-9	-13	-16	5	11	18	25
100	262	-6	-11	-16	-20	6	14	22	31
110	300	-7	-13	-19	-24	8	17	26	38

THE DESIGN SPEED IS ASSUMMED TO BE 10km/h GREATER THAN THE POSTED SPEED LIMIT FOR RURAL HIGHWAYS AND ROADS

TABLE 1

TYPICAL FLEXIBLE PAVEMENT COMPOSITION

SPRAY SEAL OPTION

PRIME PREPARED GRANULAR SURFACE & PLACE A SIZE 14/7mm DOUBLE DOUBLE SEAL

TO BE APPROVED BY VICROADS REGIONAL OFFICE

PREFERRED OPTION

NOTE: ACCESS DRIVEWAY PAVEMENT DEPTH SHOULD BE DETERMINED FROM EXISTING PAVEMENT AND A SOIL TEST ANALYSIS

PAVEMENT DESIGN SHOULD BE IN ACCORDANCE WITH VICROADS CODE OF PRACTICE RC 500.22 - SELECTION AND DESIGN OF PAVEMENTS AND SURFACINGS AND AUSTROADS GUIDE TO PAVEMENT TECHNOLOGY PART 2 - PAVEMENT STRUCTURAL DESIGN.

DRIVEWAY LAYOUT GUIDELINES FOR TRUCK ACCESS

GENERAL NOTES:

1. PAVEMENT COMPOSITION
THE DIAGRAMS ARE A GUIDE FOR A TYPICAL LAYOUT OF A DRIVEWAY ACCESS FOR A RURAL PROPERTY FOR THE DESIGN VEHICLE LISTED. THIS GUIDE WAS DEVELOPED IN THE INTEREST OF ROAD SAFETY AND TO PROTECT THE ROAD PAVEMENT AT THE ACCESS LOCATION. FINAL PAVEMENT COMPOSITION SHOULD BE DETERMINED BY EXISTING PAVEMENT AND SOIL TESTS, AND APPROVED BY VICROADS REGIONAL OFFICE.

2. A PLANNING PERMIT IS REQUIRED FOR A NEW ACCESS OR ALTERATION TO AN EXISTING DRIVEWAY AND MAY BE REQUIRED FOR THE REMOVAL OF NATIVE VEGETATION.

3. A TRAFFIC MANAGEMENT PLAN MUST COMPLY WITH THE ROAD MANAGEMENT ACT AND APPLICABLE CODES IN RELATION TO ANY WORKS UNDERTAKEN WITHIN THE ROAD RESERVE.

4. TRUCK WARNING SIGNS & GUIDE POSTS SHOULD BE INSTALLED IN ACCORDANCE WITH AUSTROADS GUIDE TO TRAFFIC MANAGEMENT & VICROADS SUPPLEMENTS.

5. THE DRIVEWAY ACCESS CONSTRUCTION AND MAINTENANCE IS THE RESPONSIBILITY OF THE PROPERTY OWNER. MAINTENANCE ALSO INCLUDES ASSOCIATED DRAINAGE WORKS.

SIGHT DISTANCE

THE TRUCK DRIVER WHEN LOCATED 3m FROM THE EDGE OF THE TRAFFIC LANE NEEDS TO BE ABLE TO SEE A VEHICLE APPROACHING IN EITHER DIRECTION WHEN EXITING FROM A DRIVEWAY. REFER TO TABLE 1 FOR APPROPRIATE SIGHT DISTANCES. TREE CANOPIES, BUSHES OR OTHER OBJECTS SHALL BE REMOVED TO PROVIDE GOOD VISIBILITY AND TO PREVENT TRUCK DAMAGE.
ANY TREE CANOPIES OVERHANGING THE PATH OF A TRUCK SHALL BE A MINIMUM OF 5m ABOVE THE GROUND SURFACE.
SIGHT LINES MUST ACHEIVE THE MINIMUM SAFE INTERSECTION SIGHT DISTANCE BASED ON AN EYE HEIGHT OF 1.1m TO AN OBJECT HEIGHT OF 1.25m.

REFERENCES AND NOTES:
1. ALL DIMENSIONS ARE IN METRES
2. DESIGNED FOR: 26m LONG B-DOUBLE, 19m LONG SEMI - TRAILERS
3. AUSTROADS GUIDE ROAD DESIGN PART 4 AND VR SUPPLEMENT TO AGRD PART 4
4. AUSTROADS GUIDE ROAD DESIGN PART 4A AND VR SUPPLEMENT TO AGRD PART 4A

AUSTROADS GUIDE TO ASSET MANAGEMENT PART 5
AUSTROADS GUIDE TO PAVEMENT TECHNOLOGY PART 2
AUSTROADS GUIDE TO TRAFFIC MANAGEMENT & VICROADS SUPPLEMENTS
VICROADS SELECTION AND DESIGN OF PAVEMENT & SURFACING RC 500.22
SD 1991 DRIVEABLE CULVERT ENDWALLS - TYPE 1

vicroads
STANDARD DRAWING

ACCESS & STOPPING BAYS SD2065

TRUCK ACCESS TO RURAL PROPERTIES
TYPE B

0 2.5 5.0

APPROVED	SD NO.	ISSUE
DANIEL CASSAR (PRDE) 13-8-12	SD2065	B

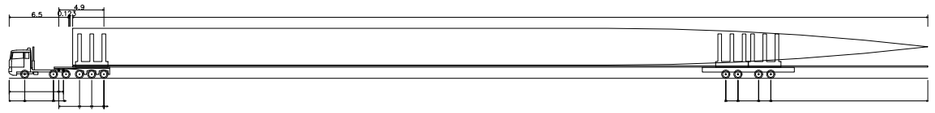
VICROADS DRAWING NO 720259

Appendix B Haulage Route Swept Paths – Blade Vehicles:

WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)

WHEEL TRACKING PATHS



Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES
1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17
2. BASE INFORMATION UPDATED FROM NEARMAP AND BING 14/06/19

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 7.5 15

ratio:
RATIO CONSULTANTS PTY LTD
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CREMORNE, VICTORIA 3121
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FACSIMILE (03)9429 3011

WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
HENTY HWY / NEW ST

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	1 OF 7	14558T SP01-1	B

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HENTY HIGHWAY

PRINCES HIGHWAY

INFILL AS REQUIRED

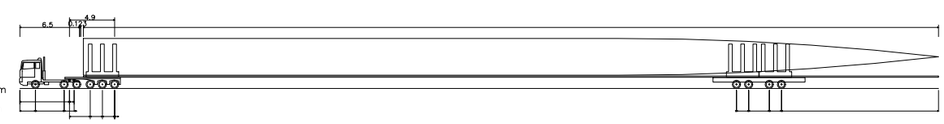
HENTY HIGHWAY

N

WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)
WHEEL TRACKING PATHS

Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°



ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES

1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 5 10

ratio:
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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
HENTY HWY / PRINCES HWY – OPTION 1

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	2 OF 7	14558T SP01-2	B

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WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)
WHEEL TRACKING PATHS

Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES
1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 5 10

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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
HENTY HWY / PRINCES HWY – OPTION 1

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21/06/2019	3 OF 7	14558T SP01-3	B

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HENTY HIGHWAY

PRINCES HIGHWAY

POWER POLE

STREET LIGHT

INFILL AS REQUIRED

STREET LIGHT

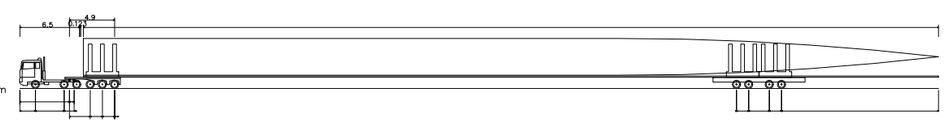
HENTY HIGHWAY

N

WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)
WHEEL TRACKING PATHS

Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°



ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES

1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 5 10

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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
HENTY HWY / PRINCES HWY – OPTION 2

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	3.1 OF 7	14558T SP01-3.1	B

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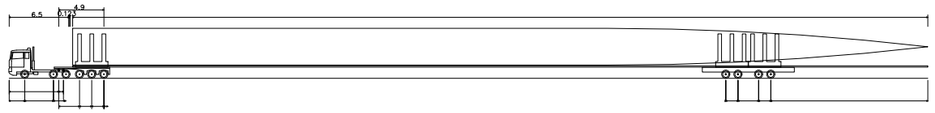
WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)

WHEEL TRACKING PATHS



Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

TYRENDARRA-ETTRICK ROAD

POWER POLE

INFILL AS REQUIRED

PRINCES HIGHWAY

STREET LIGHT

POWER POLE

POWER POLE

N

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ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES

1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 7.5 15

ratio:
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WILLATOOK WIND FARM

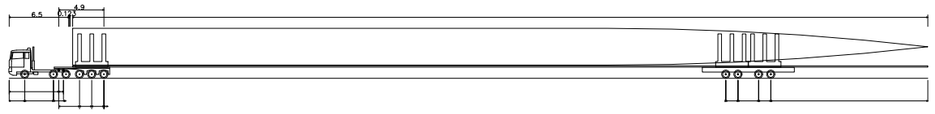
SWEPT PATH ASSESSMENT
PRINCES HWY / TYRENDARRA-ETTRICK RD

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	4 OF 7	14558T SP01-4	B

WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)

WHEEL TRACKING PATHS



Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

TYRENDARRA–ETTRICK ROAD

WOOLSTHORPE–HEYWOOD RD

INFILL AS REQUIRED

FENCELINE

TREE TO BE REMOVED

N

ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES

1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

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DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 5 10

ratio:
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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
TYRENDARRA / WOOLSTHORPE

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	5 OF 7	14558T SP01-5	B

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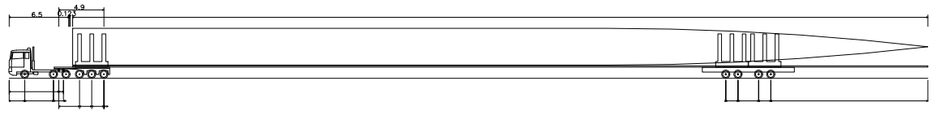
WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)

WHEEL TRACKING PATHS



Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

WOOLSTHORPE–HEYWOOD RD

HAMILTON–PORT FAIRY ROAD

POWER POLE

INFILL AS REQUIRED

POWER POLE

POWER POLE

WOOLSTHORPE–HEYWOOD RD

POWER POLE

N

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ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
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GENERAL NOTES

1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 5 10

ratio:
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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
WOOLSTHORPE / HAMILTON–PORT FAIRY

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	6 OF 7	14558T SP01–6	B

WTG Blade Transport Design Vehicle (93m Blade)

VEHICLE ENVELOPE (FORWARD)
WHEEL TRACKING PATHS

Overall Length	99.900m
Overall Width	4.301m
Track Width	2.500m
Lock-to-lock time	6.00s
Max Wheel Angle	37.50°

ISSUE	APP'D	DATE	AMENDMENT
B	–	17/06/19	PRELIMINARY ISSUE – INCREASE BLADE LENGTH
A	–	00/00/17	PRELIMINARY ISSUE

GENERAL NOTES
1. BASE INFORMATION OBTAINED FROM BING MAPS ON 17/11/17

ADVERTISED PLAN

DESIGNED	C HAMOND
CHECKED	B THOMSON
AUTHORISED	A WALLEY
SCALE	0 10 20

ratio:
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WILLATOOK WIND FARM

SWEPT PATH ASSESSMENT
WOOLSTHORPE – HEYWOOD ROAD

DATE	SHEET NO.	DRAWING NO.	ISSUE
21/06/2019	7 OF 7	14558T SP01-7	B

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