Traffic Impact Assessment

Gelliondale Wind Farm

V220239

Prepared for
Synergy Wind Pty Ltd

13 June 2023

Cardno

now

Stantec

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Document Information

Prepared for	Synergy Wind Pty Ltd
Project Name	Gelliondale Wind Farm
File Reference	V220239REP001F01.docx
Job Reference	V220239
Date	13 June 2023
Version Number	F01
Effective Date	13/06/2023
Date Approved	13/06/2023

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
D01	25/11/2022	First Draft	Joshua Carroll	Luke Smith
D02	15/12/2022	Second Draft	Joshua Carroll	Luke Smith
D03	20/03/2023	Third Draft	Joshua Carroll	Luke Smith
D04	05/05/2023	Fourth Draft	Joshua Carroll	Luke Smith
F01	13/06/2023	Final Issue	Joshua Carroll	Luke Smith

Executive Summary

Synergy Wind Pty Ltd is proposing to develop Gelliondale Wind Farm (the Wind Farm) in the Wellington Shire Council local government area (LGA) in south-east Victoria, 8km east of Welshpool and 3km west of Alberton.

The Wind Farm is proposed to consist of up to 13 wind turbine generators (WTGs) with a maximum tip height of up to 210m above ground level.

The South Gippsland Highway extends in an east-west direction adjacent to the Wind Farm site and will act as the primary access route to the Wind Farm.

In assessing the traffic impacts and associated mitigation measures, consideration has been given to:

> The suitability of roads within the Wind Farm area to accommodate traffic generated by the Wind Farm project; and

> Over dimensional (OD) and over-size, over-mass (OSOM) haulage route options between Port Anthony and the Wind Farm site for WTG components and other major imported componentry.

Wind Farm traffic generation scenarios assessed include:

> External traffic associated with materials haulage (bulk construction materials and WTG/major components) and staff vehicles during the Wind Farm construction;

> Operational traffic generated across the life of the Wind Farm; and

> Post operation traffic generated during the Wind Farm decommissioning.

As the most intense period of site activity, specific consideration has been given to traffic impacts and mitigation measures required during the Wind Farm construction period. During times of peak construction activity, based on advice provided by Synergy Wind Pty Ltd and assumptions made by Cardno, now Stantec, the Wind Farm is expected to generate approximately 400 vehicle movements per day to and from the Wind Farm site. Based on the existing capacity of the surrounding road network, the traffic generated by the Wind Farm during the construction and operation periods will be accommodated with minimal impact.

Traffic generation scenarios assessed within this report assume the estimated Wind Farm project scope and construction timeframes as advised by Synergy Energy. The OSOM haulage route assessment conservatively assumes the largest likely WTG blade length of 85 metres and that WTG components will be delivered through Port Anthony.

Having consideration for the base traffic levels and the anticipated traffic generated by the Wind Farm during the construction and operation of the Wind Farm, it is expected that the Wind Farm traffic will be reasonably accommodated by the public roads with negligible impact. It is anticipated that specific plans will be produced over time to cover the delivery to the Wind Farm site of plant and equipment.

Table of Contents

Executive Summary			iii
1	Introduction		1
2	Background & Existing Conditions		2
	2.1	Location	2
	2.2	Site Context	2
	2.3	Existing Traffic Volumes	4
	2.4	Traffic Growth	5
	2.5	Planning and Policy Context	5
3	Proposed Wind Farm Development		7
	3.1	Overview	7
	3.2	Delivery Timeframes	9
	3.3	Wind Farm Project Construction	9
	3.4	Construction Materials	9
	3.5	Construction Vehicle Access	9
	3.6	Wind Farm Operation Vehicle Access	10
	3.7	Delivery Vehicle Requirements	10
	3.8	External Traffic Generation	11
4	Traffic Impact Review		12
	4.1	Peak Daily Traffic Impact	12
	4.2	External Road Network Capacity Analysis	13
	4.3	Wind Farm Operating Traffic Generation	14
	4.4	Wind Farm Decommissioning	14
5	Haulage Route Review		15
	5.1	WTG Primary Haulage Route Review	15
6	Traffic Management Plan		16
7	Native Vegetation Impacts		17
8	Conclusions		18

Appendices

Appendix A OSOM Route Assessment

Appendix B Flora & Fauna Assessment - Extract

Appendix C Indicative External Traffic Generation

Tables

Table 2-1	Wind Farm Site Local Road Classification and Status	4
Table 2-2	Existing AADT Traffic Volumes - 2020	4
Table 3-1	Delivery & Convoy Vehicle Requirements	11
Table 4-1	Peak Daily Traffic Generation - Personnel	12
Table 4-2	Peak Heavy Vehicle Movements	12
Table 4-3	Wind Farm Construction Traffic Impacts	13
Table 4-4	Traffic Capacity Analysis	13
Table C-1	Gelliondale Wind Farm – Indicative External Vehicle Movements	i

Figures

Figure 2-1	Site Locality	2
Figure 2-2	South Gippsland Highway looking north-east near Site Access 1	3
Figure 2-3	South Gippsland Highway looking south-west near Old Alberton West Road intersection	3
Figure 2-4	2020 AADT Existing Traffic Volumes	4
Figure 2-5	Traffic Growth Patterns – Light Vehicles & Heavy Vehicles	5
Figure 2-6	Planning Zones and Overlays	6
Figure 3-1	Wind Farm Site Infrastructure Layout	8
Figure 3-2	VicRoads Certified Pilot Requirements for Oversized Loads	10

1 Introduction

Synergy Wind Pty Ltd is proposing to develop Gelliondale Wind Farm (the Wind Farm) in the Wellington Shire Council local government area (LGA) in south-east Victoria, 8km east of Welshpool and 3km west of Alberton. It is important to note that whilst the Wind Farm site is located within the Wellington Shire Council, access roads utilised by construction traffic are managed by South Gippsland Shire Council (west of the site).

The Wind Farm is proposed to consist of up to 13 wind turbine generators (WTGs) with a maximum tip height of up to 210m above ground level. Currently, a supplier for WTG componentry is yet to be confirmed.

On advice from Synergy Wind Pty Ltd, this assessment also assumes Port Anthony as the preferred port of entry for all WTG and other major imported componentry. We understand that, subject to a range of factors, the use of alternate or multiple ports may be considered.

It is important to note that some assumptions regarding traffic generated by the site have been adapted from previous work performed at similar wind farms. Both timeline and wind farm capacity have been used as scaling factors where necessary.

In the course of undertaking this assessment, the Wind Farm site, its surroundings and key road links relevant to the movement of materials, plans of the wind farm and site access, and relevant traffic data have all been inspected and/or analysed accordingly. Consideration was also given to current VicRoads 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:

- VicRoads Heavy Vehicle Network Maps (www.vicroads.vic.gov.au/business-and-industry/heavy-vehicle-industry/heavy-vehicle-map-networks-in-victoria);
- Guidelines and Framework for Assessing Wind Farm Energy Projects and Associated Traffic Management Plans (Draft), Version 4 (VicRoads, 17 October 2012);
- Wellington Shire Council Road Management Plan (Wellington Shire Council, 2021);
- Wellington Shire Council Register of Public Roads (March 2022);
- South Gippsland Shire Council Road Management Plan (February 2022);
- South Gippsland Shire Council Road Register (October 2019); and
- Austroads Guide to Traffic Management Part 3 – Transport Study and Analysis Methods (2020).

2 Background & Existing Conditions

2.1 Location

The Gelliondale Wind Farm (GWF) site is located approximately 8km east of Welshpool and 3km west of Alberton. The wind farm site itself extends across approximately 1,500 hectares of cleared agricultural land.

The location of the site in the context of the broader region is shown in Figure 2-1.

Figure 2-1 Site Locality

2.2 Site Context

As described above, land across the wind farm site is typically used for dairy farming and silage and is relatively flat with some areas of undulation, significant vegetation generally limited to locations around homesteads, low points or outcrops and road reserves.

South Gippsland Highway is the significant road within the wind farm site and extends to Welshpool in the west and Alberton in the east.

Identified as a 'Class A' Arterial Road, the South Gippsland Highway is managed by the Department of Transport (DoT). It consists of a central seal of approximately 8.0 metres with single lanes of traffic in each direction accompanied by a ~1.5m shoulder on each side.

South Gippsland Highway is a rural highway and accommodates all forms of travel in the area. Along the length of the South Gippsland Highway in the vicinity of the project site, there are numerous property accesses. The road may be utilised by the local school bus for morning pick-up and afternoon drop-off, however this has not yet been confirmed.

Figure 2-2 to Figure 2-3 show views of the various sections of the South Gippsland Highway in the vicinity of the Wind Farm site.

Figure 2-2 South Gippsland Highway looking north-east near Site Access 1

Figure 2-3 South Gippsland Highway looking south-west near Old Alberton West Road intersection

Old Alberton West Road is a local access B-road that extends through the north-eastern section of the wind farm site. This road provides direct access to Site Access 6, 8.

Coal Mine Road is a local access track not classified with the Wellington Shire Council Register of Public Roads. This road provides direct access to Site Access 2, 3, 11 & 12.

The classification and standard of roads within the Wind Farm site, as per the Register of Public Roads published by the Wellington Shire Council (WSC), is shown in Table 2-1.

Table 2-1 Wind Farm Site Local Road Classification and Status

Road	Section	Classification	Sealed/Unsealed
Old Alberton Road West	South Gippsland Hwy to Crangs Road	Local Access B Road	Unsealed
Coal Mine Road	South Gippsland Hwy to Gordon Track	Unclassified	Unsealed

Local Access B-Roads within the WSC are identified by a minor access road for local residential or commercial traffic.

2.3 Existing Traffic Volumes

Traffic volume data has been sourced from the Department of Transport's 'Open Data Hub – Traffic Volumes for Freeways and Arterial Roads' online resource. The most recent data available was recorded during 2020, with results found below in Table 2-2.

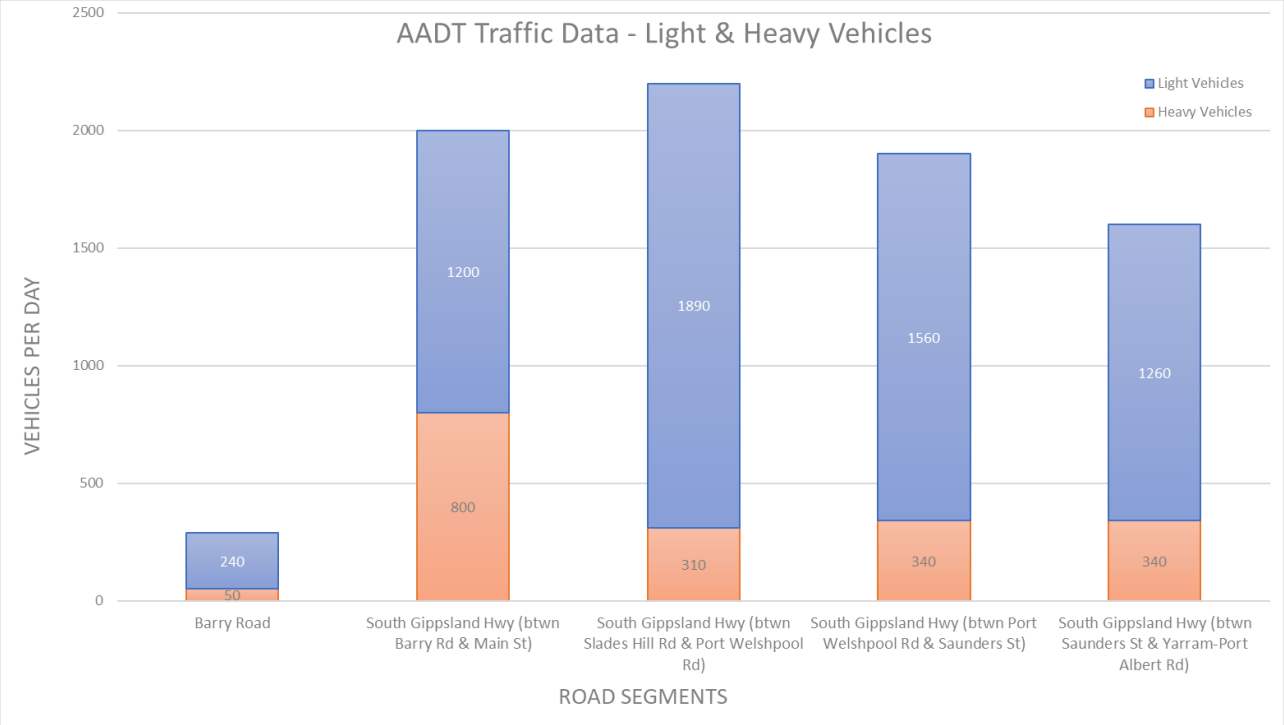
Table 2-2 Existing AADT Traffic Volumes - 2020

Road Name	Section	2020 AADT Volumes			
		AADT	LV's	HV's	HV %
Barry Road	Port Anthony to South Gippsland Hwy	290	240	50	17.24%
South Gippsland Highway	Barry Rd to Main St (Welshpool)	2000	1200	800	40.00%
South Gippsland Highway	Slades Hill Rd to Port Welshpool Rd	2200	1890	310	14.09%
South Gippsland Highway	Port Welshpool Rd to Saunders St	1900	1560	340	17.89%
South Gippsland Highway	Saunders St to Yarram-Port Albert Rd	1600	1260	340	21.25%

Source: Department of Transport Open Data Hub – Traffic Volumes for Freeways and Arterial Roads

The above data is presented below in Figure 2-4.

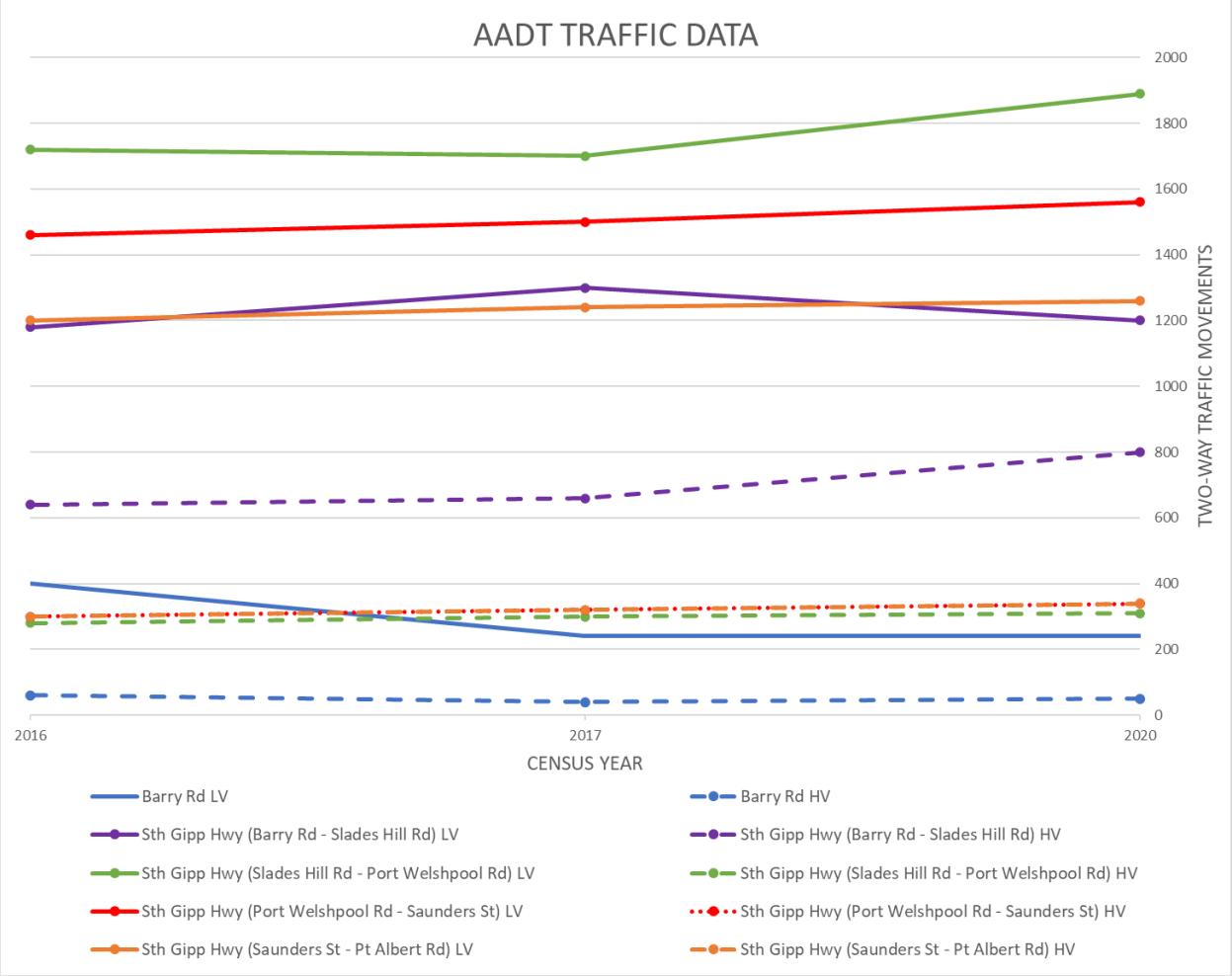
Figure 2-4 2020 AADT Existing Traffic Volumes



2.4 Traffic Growth

The Department of Transport's traffic census data for previous years has been reviewed to understand the traffic growth patterns on Barry Road and the South Gippsland Highway sections within close proximity to the project site. Figure 2-5 illustrates the corresponding traffic volumes for the previously available traffic data, for light vehicles and heavy vehicles.

Figure 2-5 Traffic Growth Patterns – Light Vehicles & Heavy Vehicles



LV: Light Vehicles. HV: Heavy vehicles. Source: Department of Transport.

The data shown in Figure 2-5 demonstrates that the AADT during the previously available traffic data has fluctuated, with no obvious significant growth. Overall, the traffic census data indicates a consistent trend with no major traffic growth or major generators on the subject roads, where considerations for background traffic growth are not required in this assessment. Furthermore, data from 2020 is not shown to be adversely affected by the impacts of Covid-19.

2.5 Planning and Policy Context

2.5.1 Planning Context

The site is located within the Wellington local government area (LGA).

In the vicinity of the Wind Farm area, the land consists of Farming Zones and Public Conservation and Resource Zones, with no applicable traffic overlays.

Zoning and overlays that apply to the site and surrounds are shown in Figure 2-6.

Figure 2-6 Planning Zones and Overlays

2.5.2 Planning Framework

2.5.2.1 Clause 52.32 – Wind Energy Facilities

Clause 52.32 of the Victorian Planning Provisions outlines the relevant requirements associated with the development of Wind Energy Facilities. Sub-clause 52.32-4 relates to traffic and access matters and requires a site and context analysis for the surrounding area that looks at access to infrastructure.

2.5.2.2 Clause 35.07 – Farming Zone

A Wind Energy Facility is defined as a Section 2 use permitted within a Farming Zone and so is also subject to the requirements of Clause 35.07. As such, in considering an application for use and buildings and works an application must include how the use and development makes use of existing infrastructure and services.

3 Proposed Wind Farm Development

3.1 Overview

The Wind Farm will consist of a wind energy facility comprising up to 13 wind turbine generators (WTGs). Turbines will be three-bladed and have an expected capacity of approximately 5-7MW. The maximum height to the tip of the rotor at its highest extent will not likely exceed 210m. The turbines will most likely consist of five (5) tubular steel tower sections, which could be up to 30 metres (based on a typical long section of a 110m tower), with a mounted nacelle containing the generator, gear box and electrical equipment. Hardstand crane pads will be located at the base of each turbine tower.

The proposed Wind Farm layout is shown in Figure 3-1.

As stated in the Introduction, a supplier for WTG componentry is yet to be confirmed.

WTG sites will be accessed via a network of new access tracks and sections within the Wind Farm site. New access tracks will be approximately 5.5m wide to allow access for construction and for ongoing maintenance throughout the life of the Wind Farm. Some sections will be upgraded to 6m wide to allow for ease of relocating cranes. In total, approximately 14km of access tracks will be constructed to facilitate movement within the Wind Farm.

The Wind Farm will also likely include the following facilities on site:

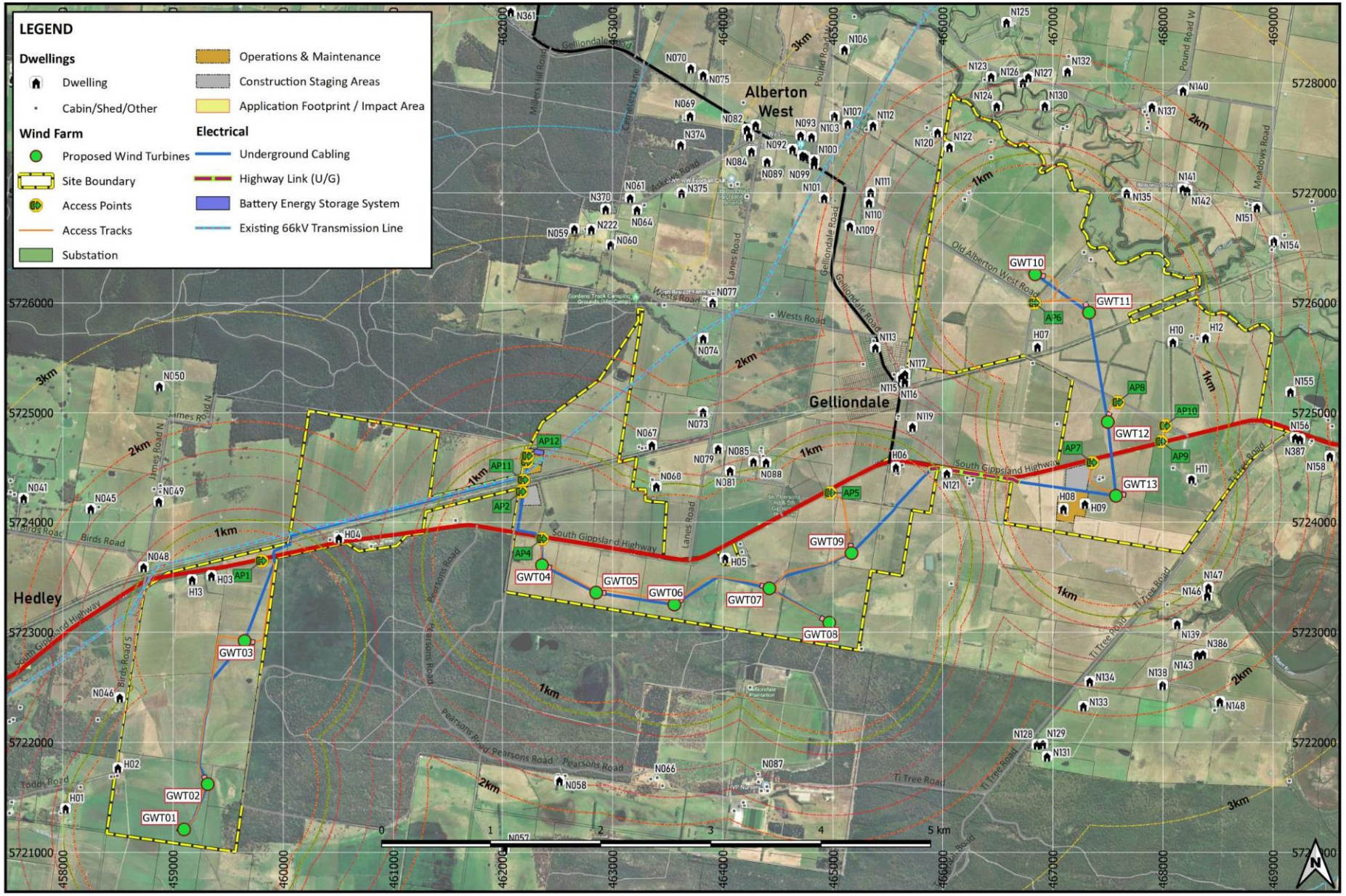
- One (1) operations and maintenance facilities;
- One (1) substation;
- One (1) construction compound (may be temporary);
- Construction laydown areas;
- One (1) Battery Energy Storage System (BESS); and
- Two (2) concrete batching plants – will either be located off-site or be a temporary facility if located on-site.

12 site access locations are provided, with five (5) located on the South Gippsland Highway, four (4) located on Coal Mine Road and three (3) located on Old Alberton West Road. All temporary infrastructure will be removed at the end of the construction period and the sites rehabilitated if required.

Synergy Wind Pty Ltd will connect the Gelliondale Wind Farm to an existing 66kV transmission line in the area through a series of underground cables. An on-site substation will be supported by a proposed ~40MW BESS.

The Wind Farm will have an expected operating life of 30 years.

Figure 3-1 Wind Farm Site Infrastructure Layout



3.2 Delivery Timeframes

On advice from Synergy Wind Pty Ltd, the following indicative construction timeframes for the project have been adopted.

- Site Establishment — Weeks 1 – 11;
- Civil Construction Works — Weeks 6 – 54;
- WTG Component Delivery & Crane Mobilisation — Weeks 52 – 84;
- Substation Works — Weeks 7 – 63;
- WTG Erection & Install — Weeks 53 – 86; and
- Commissioning — Weeks 59 – 93.

Some overlap between each work phases is expected, with site establishment, civil construction works, WTG component delivery and erection to be undertaken on a rolling basis.

3.3 Wind Farm Project Construction

During the construction phase, traffic generated by the site will include the following activities:

- Construction personnel travelling to and from the site;
- Pavement materials for access tracks and hardstands largely sourced off-site;
- Materials sourced and delivered following off-site concrete batching;
- Major wind turbine components and substation equipment (i.e. transformers, turbine tower sections, turbine generators, nacelles and blades) being transported to the site;
- Excavation and construction of the foundations and hardstands for the wind turbines;
- Erection of the wind turbines;
- Installation of electric cabling; and
- Construction of the Operations and Maintenance facility.

3.4 Construction Materials

On advice from Synergy Wind Pty Ltd, it is anticipated that access road and hardstand area works will likely comprise of:

- 14 kilometres of access roads with typical pavement widths of approximately 5.5 metres and depth of approximately 400mm;
- 1,400m^3 of concrete and 97 tonnes of reinforcement per turbine foundation;
- 3,600 sq.m hardstand pavement area for wind turbines;
- 15,000 sq.m hardstand area for the site compound – this will be removed and rehabilitated once construction is complete; and
- 2,700 sq.m hardstand area for an O&M building.

3.5 Construction Vehicle Access

3.5.1 External Construction Materials Delivery

Externally sourced materials required for construction will access the Wind Farm site via one of the 12 site access locations. All external construction material deliveries are expected to be delivered directly to the required destination on-site. Synergy Wind Pty Ltd advises Cardno, now Stantec that the two (2) following quarries are likely to supply construction aggregates.

1. South Gippsland Quarries. Address is Nerrena Road, Nerrena (just over 2kms east of Leongatha); and
2. 'Davidson's Quarry', now Yarram Quarries, Yarram. Address is 1178 Yarram-Morwell Road, Staceys Bridge.

It is noted that all other construction materials will be supplied from further external sources which are yet to be determined.

3.5.2 WTG/Substation Components

Synergy Wind Pty Ltd has identified Port Anthony as the preferred port of entry for the WTG and tower componentry. All details regarding OSOM vehicle movements and routes can be found in Cardno, now Stantec's report *V220239MEM001D01*, also attached as Appendix A.

3.5.3 Construction Staff

Synergy Wind Pty Ltd advises Cardno, now Stantec that approximately 50 staff will be active on-site during peak construction periods.

3.5.4 Local and Internal Access

During construction all vehicle movements, including water cartage and the haulage of materials, will utilise the new internal Wind Farm access tracks after exiting the South Gippsland Highway.

The key internal Wind Farm access routes are shown in Figure 3-1.

The proposed network of internal access tracks deliberately seeks to limit internal construction traffic (such as access track/hardstand materials haulage, concrete trucks and internal staff vehicles) to internal access roads which would be maintained by Synergy Wind Pty Ltd during construction.

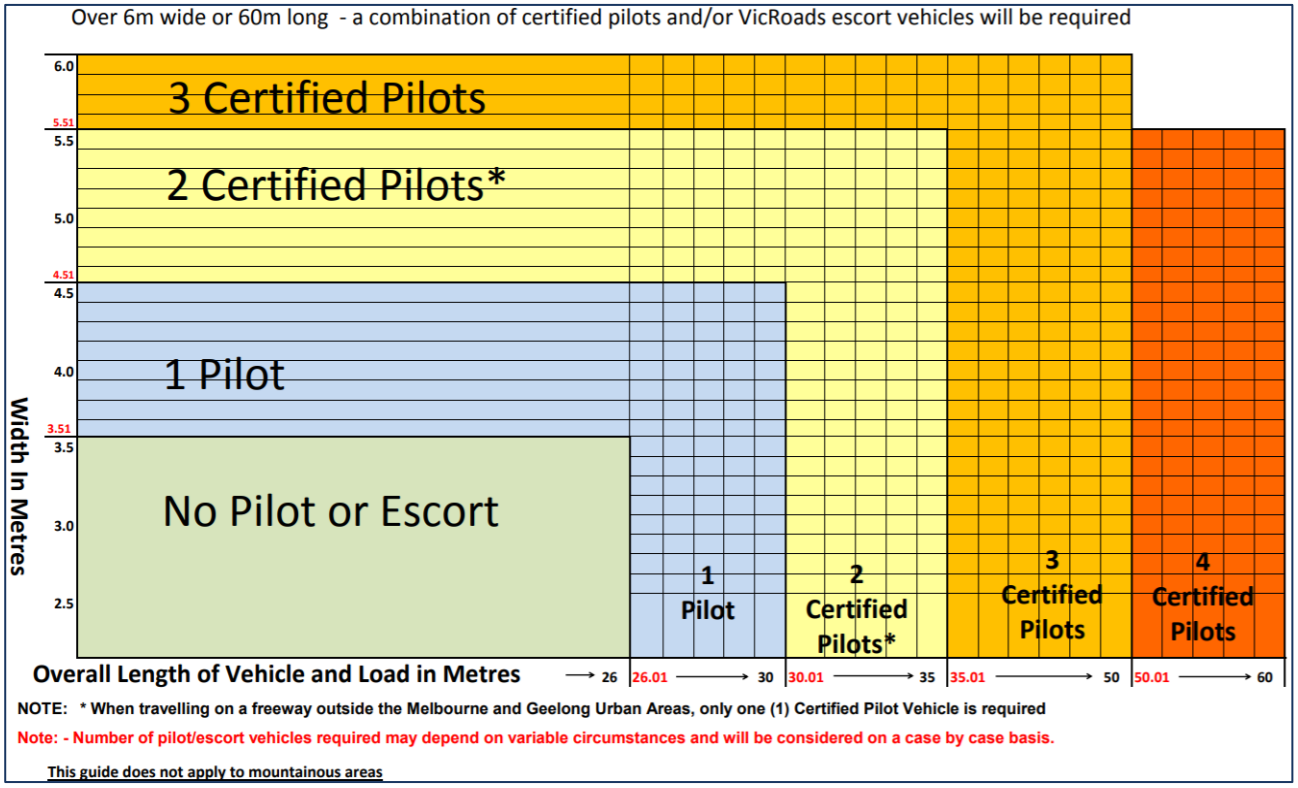
3.6 Wind Farm Operation Vehicle Access

During operation, vehicles accessing the Wind Farm site will initially typically use the South Gippsland Highway to navigate to the new internal Wind Farm road network.

3.7 Delivery Vehicle Requirements

VicRoads requires certified pilots to accompany the oversized load componentry delivery vehicles to maintain safety during transport. Figure 3-2 highlights the pilot vehicle requirements based on the length and width of the componentry being delivered.

Figure 3-2 VicRoads Certified Pilot Requirements for Oversized Loads



Each major component of the WTGs will require one prime mover and platform trailer, with the trailer type and size dependent on load.

Based on the proposed GWF comprising of 13 WTG's, utilising Table 1-1 from Cardno, now Stantec's report *V220239MEM001D01* (see attached as Appendix A), and the pilot vehicle requirements outlined in Figure 3-2, the following pilot vehicle convoy and delivery vehicle requirements have been assumed for each component delivered and is shown in Table 3-1.

Table 3-1 Delivery & Convoy Vehicle Requirements

WTG Componentry	Pilot Vehicles Required	Total Pilot Vehicles
Tower Mid-Section A	3x Pilot, 1x VMS	4
Tower Mid-Section B	3x Pilot, 1x VMS	4
Tower Mid-Section C	3x Pilot, 1x VMS	4
Tower Mid-Section D	3x Pilot, 1x VMS	4
Tower Mid-Section E	3x Pilot, 1x VMS	4
Hub	1x Pilot	1
Blade (3x components per WTG)	3x Pilot, 1x VMS, 1x VicRoads	15
Nacelle	2x Pilot, 1x VMS	3
WTG Transformer	1x pilot, 1x VMS	2
	Total Pilot Vehicles Per WTG	41

** VMS refers to Vehicle Mounted Signs*
***Pilot vehicle requirements to be further discussed with VicRoads*
****Worst case convoy requirements assumed if not confirmed currently*

3.8 External Traffic Generation

The indicative external traffic generated by the site has been split across three broad categories:

- Light Vehicles (LV) generated by staff travelling to / from the site (i.e. private cars and utes);
- Heavy Vehicles (HV) used for delivery of the smaller WTG components, and externally sourced construction materials, such as aggregate and cement for concrete; and
- Over-size Over-mass (OSOM) used for the delivery of large WTG components and miscellaneous items.

Based on information provided by Synergy Wind Pty Ltd, Table C-1 found in Appendix C summarises the likely indicative traffic mix and various activities that are anticipated to occur during the WWF construction phase. The values quoted in the table represent indicative one-way traffic movements, estimated with the most complete and up-to-date information available at the time of writing. The following assumptions have been utilised in developing the following information:

- Five (5) working days per week, 22 working days on average per month;
- Conservatively assumed approximately 50 light vehicle trips (100 vpd) across the project duration;
- All concrete batching will occur off-site, thus reducing the heavy vehicle traffic within the vicinity of the site; and
- A conservative construction period of 52 weeks, with all traffic for each activity distributed throughout this period.

4 Traffic Impact Review

The overall traffic impact generated by the proposed GWF will be discussed in the following sub-sections, with consideration for:

- Peak traffic condition and subsequent impact; and
- External road network capacity.

4.1 Peak Daily Traffic Impact

4.1.1 Personnel Movements

Using Table C-1 found in Appendix C and advice from Synergy Wind Pty Ltd, Cardno, now Stantec conservatively estimate approximately 50 staff will be active on-site during peak construction periods.

Table 4-1 Peak Daily Traffic Generation - Personnel

Trip Type	Daily Trips		
	In	Out	Total VPD
Personnel	50 trips	50 trips	100 vpd

4.1.2 Heavy Vehicle Movements

On advice from Synergy Wind Pty Ltd, the peak heavy vehicle movements during construction will occur during turbine foundation main concrete pours. During these periods, an estimated 75 additional heavy vehicle trips will be generated. For this peak assessment, OSOM vehicle movements have not been considered as they will not form part of the anticipated peak condition based on the proposed construction timeline.

Using Table C-1 and the above information, the following daily peak heavy vehicle traffic data can be determined per month.

Table 4-2 Peak Heavy Vehicle Movements

Trip Type	Comments	Peak Daily HV Traffic – per month											
		1	2	3	4	5	6	7	8	9	10	11	12
Average Daily Traffic	HV only	41	54	67	66	66	54	26	16	15	13	3	2
Average Daily HV traffic	Excluding main pour concrete deliveries	41	54	60	59	59	47	19	16	15	13	3	2
Estimated Peak Daily Traffic*	Outside of main concrete pours	49	65	72	71	71	56	23	19	18	16	3	2
Peak Concrete Traffic	For 13x main foundation pours	-	-	75	75	75	75	75	-	-	-	-	-
Total Indicative Peak Daily HV Traffic		**49**	**65**	**147**	**146**	**146**	**131**	**98**	**19**	**18**	**16**	**3**	**2**

*Inclusive of a 1.2 peaking factor to account for additional trips.

As per Table 4-2 above, it can be observed that approximately 150 heavy vehicle trips (300 vpd) will occur during the peak construction periods.

4.1.3 Peak Traffic Impact

In order to distribute the anticipated traffic on the road network, it has been conservatively assumed that 100% of traffic associated with the GWF could either arrive from the east or west respectively.

Table 4-3 below outlines the expected daily impact on the external road network as a result of the additional wind farm traffic. For this analysis, it has been assumed all light and heavy vehicles (100 LV vpd and 300 HV vpd) will either arrive / depart to / from the west and east respectively.

Table 4-3 Wind Farm Construction Traffic Impacts

Road Name	Section	Existing 2020 AADT	Wind Farm Traffic	Proportional Impact
Barry Road	Port Anthony to South Gippsland Hwy	290 vpd (17.24% HV)	OSOM-related only (Max 10 vpd)	Insignificant
South Gippsland Highway	Barry Rd to Main St (Welshpool)	2000 vpd (40% HV)	+ 400 vpd	+20%
South Gippsland Highway	Slades Hill Rd to Port Welshpool Rd	2200 vpd (14.09% HV)	+ 400 vpd	+18%
South Gippsland Highway	Port Welshpool Rd to Saunders St	1900 vpd (17.89% HV)	+ 400 vpd	+21%
South Gippsland Highway	Saunders St to Yarram-Port Albert Rd	1600 vpd (21.25% HV)	+ 400 vpd	+25%

From Table 4-3, it can be concluded that the anticipated external traffic generated by the GWF development will increase the overall traffic on the external road network by around 18% - 25%.

4.2 External Road Network Capacity Analysis

In order to demonstrate that the anticipated construction associated with the GWF development will be accommodated within the existing road network, a traffic capacity analysis has been undertaken. As per Section 5.2 of Austroads Guide to Traffic Management Part 3, "*the capacity of a two-lane highway is 1700pc/h (passenger cars per hour) for each direction of travel and is nearly independent of the directional distribution of traffic*".

Table 4-4 below provides a summary of the traffic capacity analysis. In undertaking this assessment, the following assumptions have been made:

- A passenger car equivalent (PCE) for heavy vehicles for two-lane highway segment under congestion levels A and B has been determined as 2.2;
- A 10% peak hour factor has been applied to existing AADT traffic data;
- All peak daily GWF-related traffic could arrive / depart the project site within a single hour (i.e all arrivals or departures will occur within a single hour); and
- All staff will arrive individually in light vehicles.

It should be noted that the above assumptions are conservative and it is likely vehicle loadings will be less in practice.

Table 4-4 Traffic Capacity Analysis

Road Name	Section	Existing 2020 Peak Hour	Wind Farm Traffic Peak Hour	Total Peak Hour <1700pc/h
Barry Road	Port Anthony to South Gippsland Hwy	29 pc/h (17.24% HV)	OSOM-related only (Max 10 pc/h)	Yes
South Gippsland Highway	Barry Rd to Main St (Welshpool)	200 pc/h (40% HV)	+ 380 pc/h	Yes
South Gippsland Highway	Slades Hill Rd to Port Welshpool Rd	220 pc/h (14.09% HV)	+ 380 pc/h	Yes
South Gippsland Highway	Port Welshpool Rd to Saunders St	190 pc/h (17.89% HV)	+ 380 pc/h	Yes
South Gippsland Highway	Saunders St to Yarram-Port Albert Rd	160 pc/h (21.25% HV)	+ 380 pc/h	Yes

Despite the increase in traffic on the external road network, it can be determined that based on the theoretical capacity (1,700 pc/h) of both Barry Road and the South Gippsland Highway, the Wind Farm construction traffic will be sufficiently accommodated within the existing road network.

4.3 Wind Farm Operating Traffic Generation

Once operational, wind farms manage with limited staff and generate minimal traffic movements. Accordingly, apart from the initial construction phase, the proposal is anticipated to have a negligible impact upon traffic on the local road network. Details of likely traffic generation during operation are detailed as follows:

- Fortnightly minor maintenance to be carried out by a small team. This will involve a team of generally less than 10 people attending the site, with up to five (5) vehicles. This increase is insignificant;
- Occasional maintenance may occur when components of the development need to be replaced, such as replacing a blade or gearbox. This is expected to only occur very occasionally and will be subject to approval processes with the relevant authorities; and
- Visitors to the site such as office-based staff and courier delivers etc.

In the context of Wind Farm construction traffic and background traffic on surrounding roads, operating traffic will be negligible. By virtue of the minimal use of other local roads, Wind Farm operating traffic will have no material impact.

4.4 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 500mm. This excludes the portion of foundations deeper than 500mm 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.

The specific impacts and mitigation measures would be reviewed and resolved at the time of decommissioning.

5 Haulage Route Review

5.1 WTG Primary Haulage Route Review

A review of the primary haulage route as described in Section 3.4 has been undertaken by way of a swept path analysis conducted utilising an 85-metre blade truck as the design vehicle. The findings of this review are discussed as follows, with swept path diagrams included as Appendix A.

Following inspection, the following intersections were considered in detail as part of this review:

- Barry Road – corner at Port Anthony entry gates;
- Barry Road – corner north of *Barry Beach Engineering*;
- Barry Road / South Gippsland Highway;
- South Gippsland Highway / Site Access 1;
- South Gippsland Highway / Site Access 5;
- South Gippsland Highway / Site Access 7;
- South Gippsland Highway / Old Alberton West Road;
- Old Alberton West Road / Site Access 8;
- Old Alberton West Road – corner near 174 Old Alberton West Road; and
- Old Alberton West Road / Site Access 6.

As shown on the swept path diagrams included in Appendix A, the above intersections will require some median and/or roadside infill works, potential roadside furniture removal and traffic management works to cater for 85-metre turbine blade vehicles. All recommendations can be found in Cardno, now Stantec's report *V220239MEM001D01*, attached as Appendix A.

6 Traffic Management Plan

Traffic Management Plans (TMPs) will be prepared for specific deliveries as required throughout construction. It is anticipated that there will be no access issues which will prevent the construction of the project site.

In general, TMPs would include:

- Confirmation of the Wind Farm construction timeframe and works stages;
- Confirmation of expected traffic volumes generated by the wind farm for all work stages;
- Identification/qualification of all HV and OD vehicle haulage routes for all work stages;
- A mechanism to review identified haulage route road conditions prior to the commencement of works;
- Mechanisms/agreements to maintain haulage route roads and road infrastructure, including local public roads used by internal site traffic, during construction works and to reinstate roads to at least pre-construction conditions;
- Qualify any requirement for specific work stage construction traffic management plans; and
- Qualify and identify relevant mechanisms for OD vehicle permits and traffic management requirements.

7 Native Vegetation Impacts

Within the project site, native vegetation removal amounts to only 0.61Ha, while the transport route (blade turning circles) external to the site will result in the removal of 0.65Ha of native vegetation, including two (2) large trees.

Further details can be found in the attached Appendix B as an extract from the *Flora and Fauna Assessment Report No. 14107 (3.8)* undertaken by Nature Advisory.

8 Conclusions

In consideration of the foregoing, it is our view that:

- As proposed, the Wind Farm project and proposed access road network will limit external traffic generated during construction to staff vehicles, HV traffic associated with external bulk materials haulage and OSOM vehicles associated with WTG and other major component delivery. Internal construction traffic will be limited to new internal access tracks to be constructed as part of the Wind Farm;
- At the time of peak construction activity, the indicative external traffic generated by the Wind Farm will add approximately 400 vehicles per day on the surrounding road network including 300 HV and OSOM vehicles and 100 light vehicles. This will be in addition to the existing traffic on all external roads as specified Table 2-2;
- Based the on the existing capacity of the surrounding road network, the traffic generated by the Wind Farm during the construction and operation periods will be accommodated with minimal impact;
- Subject to the resolution of specific traffic management requirements and procedures, the identified primary OSOM vehicle route option from Port Anthony to the Wind Farm site for the transport for WTG and other imported major components has been assessed and is suitable for OSOM transport vehicles;
- Native vegetation removal amounts to only 0.61Ha, while the transport route (blade turning circles) external to the site will result in the removal of 0.65Ha of native vegetation, including two (2) large trees; and
- It is anticipated that the preparation of TMPs will be completed as required for specific deliverables throughout construction.

APPENDIX

A

OSOM ROUTE ASSESSMENT

Cardno

now

Stantec

OSOM Route Assessment

Project No: V220239 **Date:** 2 June 2023

Project: Gelliondale Wind Farm

Subject: Port Anthony – Traffic Assessment

To: Adam Gray	**Company:** Synergy Wind Pty Ltd	**Email/Fax:**
From: Joshua Carroll Luke Smith	**Phone:**	**Email:**

CC	Attention	Company	Email/Fax
☒			
☒			
☐			
☐			

☐ **Urgent** ☒ **For your review** ☐ **Reply ASAP** ☐ **Please comment** ☐ **Original in mail**

Attachments: ☐ ☐

Synergy Pty Ltd is proposing to develop the Gelliondale Wind Farm (the Project) in the Wellington Shire Council local government area (LGA) in south-east Victoria, 8km east of Welshpool and 3km west of Alberton.

The Project is proposed to consist of up to 13 wind turbine generators (WTGs) with a maximum tip height of up to 210m above ground level.

The following memo details an assessment of the proposed key OSOM routes from Port Anthony to the Project site. It includes commentary and suggestions regarding the major locations and potential problem areas that have been identified along the routes assessed. Subject to the resolution of specific traffic management requirements and procedures, the identified primary OSOM vehicle route option from Port Anthony to the Wind Farm site for the transport for WTG and other imported major components has been assessed and is suitable for OSOM transport vehicles.

One (1) route has been assessed to provide access from the Port to the Project site for all WTG and tower componentry. A summary of the OSOM route from Port Anthony is as follows:

- Barry Road (Port Anthony) – Barry Road / South Gippsland Highway (Agnes);
- South Gippsland Highway (Agnes) – Old Alberton Road West (Gelliondale);
- Old Alberton Road West (Gelliondale) – Proposed Site Access 6 (Gelliondale).

An assessment of the route using aerials from MetroMap was conducted prior to the site visits undertaken on Tuesday 10th May 2022. This preliminary assessment was used to identify potential problem areas that could be seen from aerial views such as bridges, road bends and intersections. These locations were then inspected during the site visits, with additional locations such as culverts and overhead structures recorded as they were identified.

When undertaking the assessment, the following assumptions were considered regarding key components of the wind farm and transportation methods:

- The trailer height for the drive train was assumed to be 1 metre high;
  - Taken from average height of low-loader vehicles;
- Bridge clearances taken from the *'VicRoads Height Clearance under Overhead Structure'* were taken as exact measurements.

Table 1-1 provides a breakdown for the turbine componentry specifications.

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Table 1-1 Turbine Componentry Specifications

Component	Length (m)	Width (m)	Height (m)	Weight (T)
Nacelles	18.3 m	4.18 m	4.35 m	87.8 T
Drive Train	77.6 m	2.87 m	2.89 m	105 T
Cooler Top	3.38 m	4.50 m	4.78 m	1.58 T
Hubs	4.70 m	4.40 m	4.10 m	70.0 T
Blades	85.0 m	4.45 m	3.90 m	33.0 T
Section 1 Towers	13.2 m	5.3 m	5.3 m	88.0 T
Section 2 Towers	19.3 m	5.0 m	5.0 m	90.0 T
Section 3 Towers	23.8 m	5.0 m	5.0 m	89.0 T
Section 4 Towers	19.8 m	5.0 m	5.0 m	84.0 T
Section 5 Towers	30.0 m	5.0 m	5.0 m	61.0 T

The following section provides the aerial images used to identify potential problem locations, photos taken from the site visit, and specific commentary and recommendations relating to each area. In total there were nine (9) potential problem locations identified from the preliminary desktop assessment, with three (3) additional locations identified during the site inspection.

This assessment contains a summary of the sites identified. For all sites along the OSOM routes that are either an intersection, roundabout, or require turning manoeuvres, swept path assessments have been undertaken as part of this assessment and can be observed in Appendix A.

OSOM Route Selection

Prior to undertaking the OSOM route site inspection, analysis was undertaken to identify the most appropriate route from Port Anthony. Factors considered in this analysis included:

- The number of problematic locations identified from aerial analysis;
- The severity of the problematic locations;
- The distance covered to travel to site;
- The existing road conditions along the proposed routes; and
- Routes previously used by other surrounding wind farms to minimise the number of potential road upgrades.

The following options were assessed.

Figure 1-2 Port Anthony to Site – Option 1

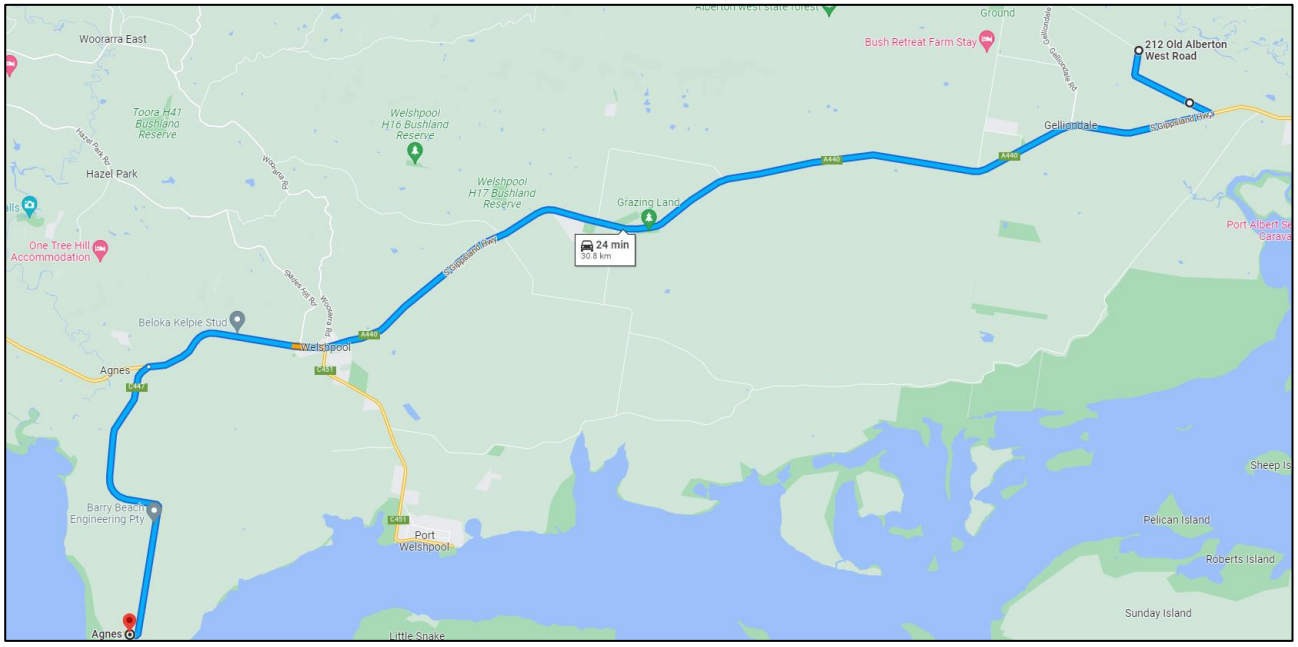
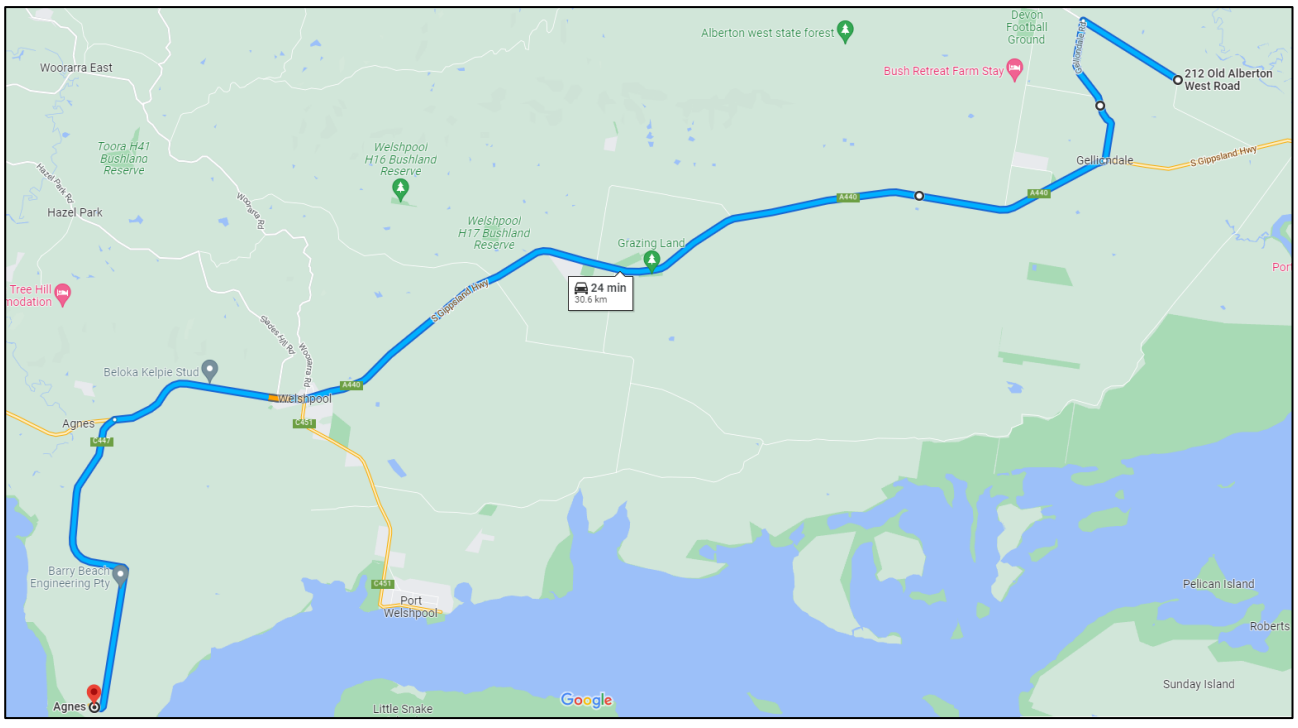


Figure 1-3 Port Anthony to Site – Option 2



In analysing the two options, the following can be concluded:

- Option 1 has a total of 10 problematic locations relating to turning manoeuvres;
- Option 2 has a total of 13 problematic locations relating to turning manoeuvres;
- Option 1 and Option 2 both travel an approximate distance of 30km; and
- The existing road conditions along the majority of Option 1 are better than those along Option 2.
    - Less distance travelled along local unsealed roads.

From this, it can be concluded Option 1 is the preferred route of choice from Port Anthony.

Site Access & Swept Path Assessment

During the site inspection, all site access locations and potential routes were assessed. From this inspection, the following observations were made:

- South Gippsland Highway (A440) is suitable to act as the main service road for OSOM vehicles without the need for major road upgrades. Road widening upgrades will likely be limited sites access areas to allow for safe OSOM vehicle movements;

Following this, swept path assessments were undertaken for all problematic locations identified. A detailed drawing schedule can be found in Table 1-2.

Table 1-2 Drawing Schedule

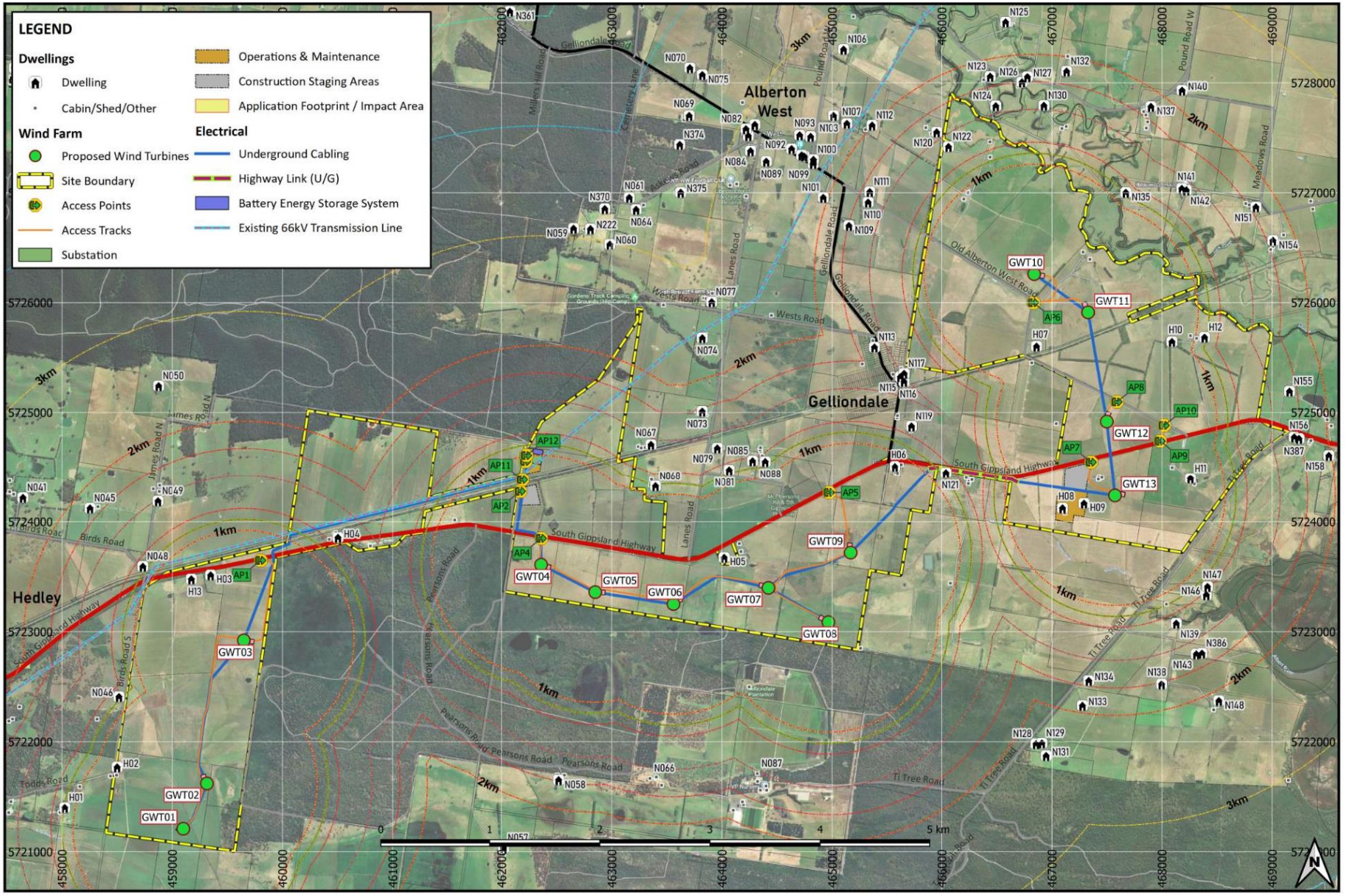
LOCATION	DRAWING NUMBER
Barry Road – Entry / Exit Gates at Port Anthony	V220239-TR-SK-0001
Barry Road – North-East 90º corner	V220239-TR-SK-0002
Barry Road / South Gippsland Highway	V220239-TR-SK-0003
South Gippsland Highway / Site Access 1	V220239-TR-SK-0004
South Gippsland Highway / Site Access 5	V220239-TR-SK-0005
South Gippsland Highway / Site Access 7	V220239-TR-SK-0006
South Gippsland Hwy / Old Alberton West Road	V220239-TR-SK-0007
Old Alberton West Road / Site Access 8	V220239-TR-SK-0008
Old Alberton West Road – Southern 90º Corner	V220239-TR-SK-0009
Old Alberton West Road / Site Access 6	V220239-TR-SK-0010

From this analysis, key observations included:

- Vegetation removal required to accommodate OSOM blade movements;
- Areas of fencing removal required to facilitate OSOM blade movements;
  - May require additional liaison with landowners in the area;
- Westbound traffic on the South Gippsland Highway will need to be stopped to allow for OSOM movements into site; and
- Areas of infill required to support OSOM loads.

Further comments for each location can be found in the detailed assessment from Port Anthony. Figure 1-4 below outlines the proposed Wind Farm layout.

Figure 1-4 Site Access Locations

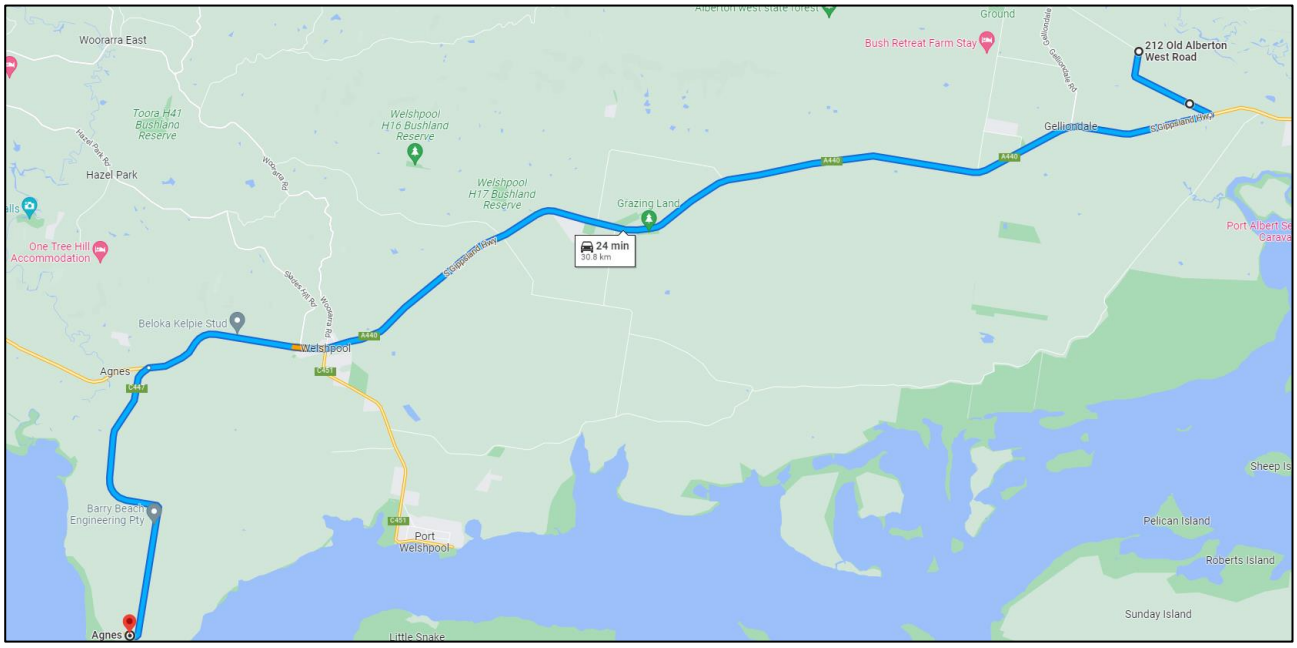


Port Anthony to Site (Option 1)

A summary of the OSOM route from Port Anthony is as follows:

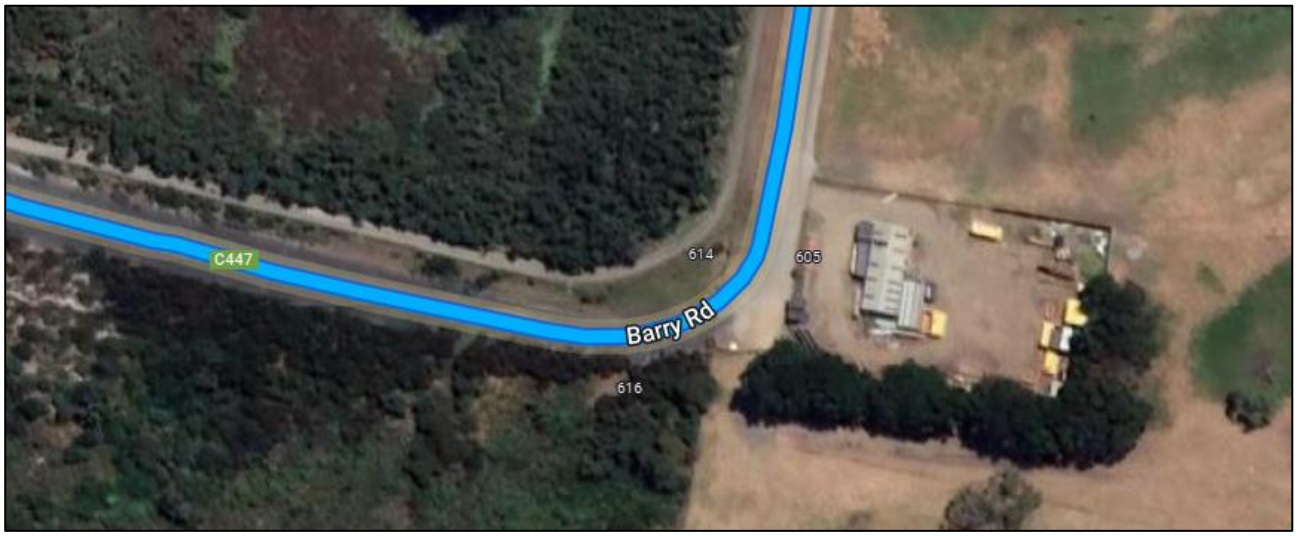
- Barry Road (Port Anthony) – Barry Road / South Gippsland Highway (Agnes);
- South Gippsland Highway (Agnes) – Old Alberton Road West (Gelliondale);
- Old Alberton Road West (Gelliondale) – Proposed Site Access 6 (Gelliondale).

Figure 1-5 Port Anthony to Site OSOM Route – Option 1



Site 1 – Barry Road / Port Anthony Exit

Figure 1-6 Site No. 1 – Aerial



ISSUES / COMMENTS:

Tight 90º degree corner on the exit of Port Anthony with narrow width gates limiting the turning manoeuvres in and out of the Port. Gates, vegetation and signage will require removal to allow OSOM movements. Infill required on north-western corner. Entryway is in the process of being updated – will seek clarification on design specifications. See V220239-TR-SK-0001 in Appendix A for swept path analysis.

Figure 1-7 Site No. 1 – Inspection Images

Site 2 – Barry Road – North-East 90º Corner

Figure 1-8 Site No. 2 – Aerial

ISSUES / COMMENTS:

Tight 90º degree corner on the north-eastern portion of Barry Road. Signage removal required on north-eastern shoulder to allow OSOM movements. Infill required on south-western corner. Fencing removal required on the eastern shoulder to facilitate OSOM blade movements. See V220239-TR-SK-0002 in Appendix A for swept path analysis.

Figure 1-9 Site No. 2 – Inspection Images

Site 3 – Barry Road / South Gippsland Highway

Figure 1-10 Site No. 3 – Aerial

ISSUES / COMMENTS:

OSOM vehicles required to cross onto the wrong side of the road and utilise the southbound exit lane from the South Gippsland Highway. Signage removal is required in centre median – see V220239-TR-SK-0003 in Appendix A for swept path analysis.

Figure 1-11 Site No. 3 – Inspection Images

Site 4 – South Gippsland Highway (Shady Creek Bridge, Welshpool)

Figure 1-12 Site No. 4 – Aerial

ISSUES / COMMENTS:

Small bridge, low to the ground and structurally sound. Minimal span width. No issue.

Figure 1-13 Site No. 4 – Inspection Images

Site 5 – South Gippsland Highway (Nine Mile Creek Bridge)

Figure 1-14 Site No. 5 – Aerial

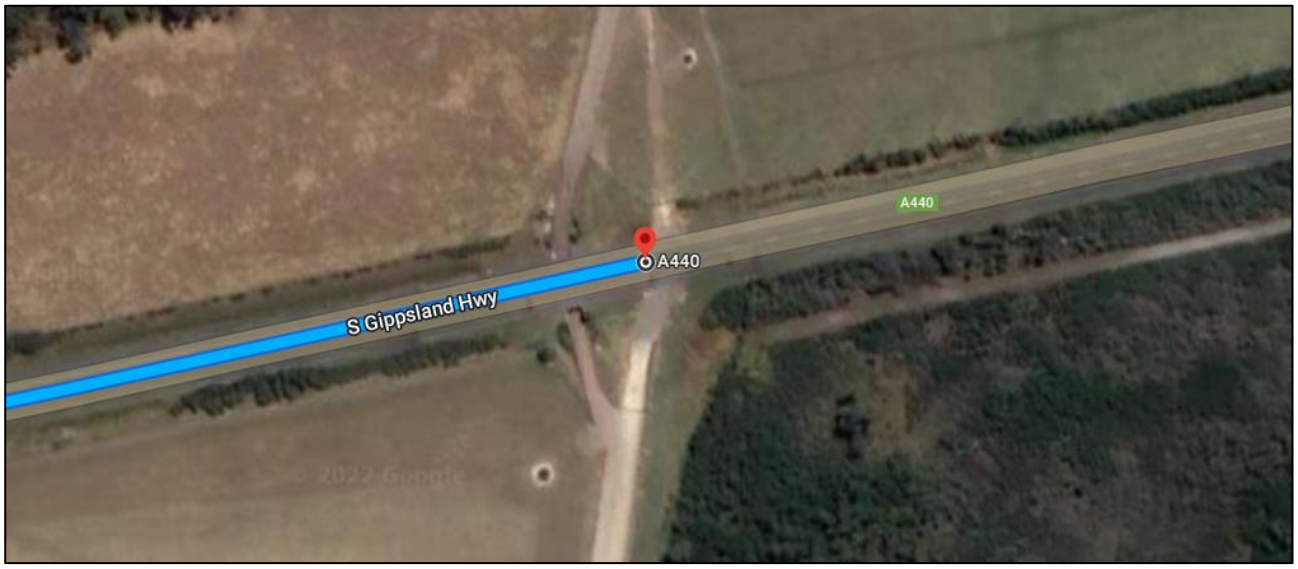
ISSUES / COMMENTS:

Small bridge, low to the ground and structurally sound. Two strut supports with an approximate 5m span. No issue.

Figure 1-15 Site No. 5 – Inspection Images

Site 6 – South Gippsland Highway / Site Access 1

Figure 1-16 Site No. 6 – Aerial



ISSUES / COMMENTS:

Cattle underpass on the western side of the proposed Site Access 1. This structure will limit the manoeuvrability of OSOM vehicles. Proposed to alter the OSOM access location further west to avoid the cattle underpass. Light vehicles to still utilise existing Site Access 1 location. Vegetation removal and infill required to facilitate OSOM blade movements and support OSOM loads. See V220239-TR-SK-0004 in Appendix A for swept path analysis.

Figure 1-17 Site No. 6 – Proposed New Site Access 1 Aerial

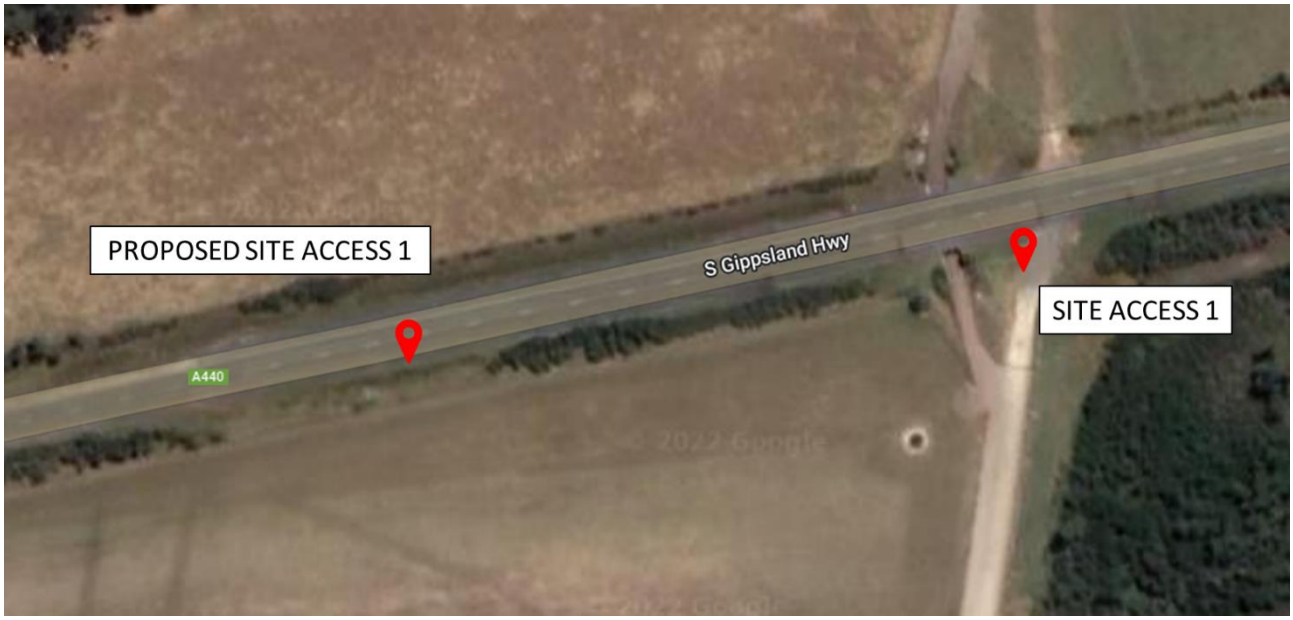


Figure 1-18 Site No. 6 – Inspection Images

Figure 1-19 Site No. 6 – Proposed New Site Access 1 Inspection

Site 7 – South Gippsland Highway / Site Access 5

Figure 1-20 Site No. 7 – Aerial

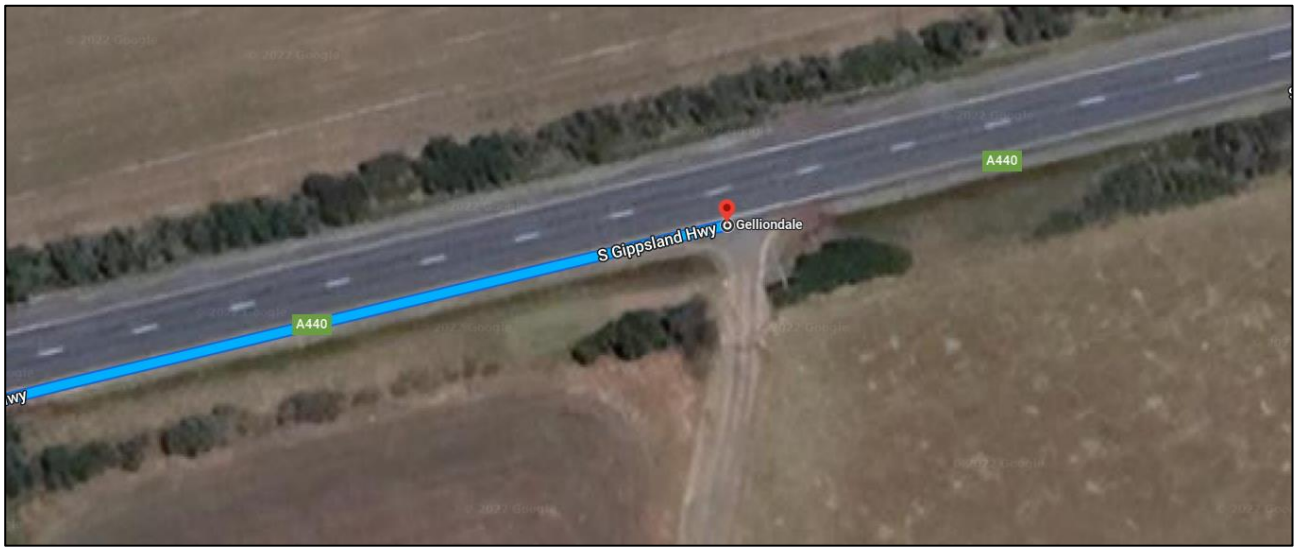
ISSUES / COMMENTS:

Natural swale drain on southern kerbside will require infill. Culvert drain present at proposed site access location. Culvert drain will require removal and replacement to facilitate OSOM movements. Total infill and vegetation impact can be observed in V220239-TR-SK-0005 in Appendix A for swept path analysis.

Figure 1-21 Site No. 7 – Inspection Images

Site 8 – South Gippsland Highway / Site Access 7

Figure 1-22 Site No. 8 – Aerial



ISSUES / COMMENTS:

Minimal vegetation removal required on western side of proposed access location. Vegetation removal required on the northern shoulder of the South Gippsland Highway to facilitate OSOM blade movements. See V220239-TR-SK-0005 in Appendix A for swept path analysis.

Figure 1-23 Site No. 8 – Inspection Images

Site 9 – South Gippsland Highway / Old Alberton Road Intersection

Figure 1-24 Site No. 9 – Aerial

ISSUES / COMMENTS:

Cattle underpass on the western side of the intersection. This structure will limit the manoeuvrability of OSOM vehicles. Proposed to alter OSOM access location further west to avoid cattle underpass. Light vehicles to still utilise South Gippsland Highway / Old Alberton Road Intersection. Infill required on northern shoulder of South Gippsland Highway to support OSOM loads. See V220239-TR-SK-0007 in Appendix A for swept path analysis results.

Figure 1-25 Site No. 9 – Proposed New Access Aerial

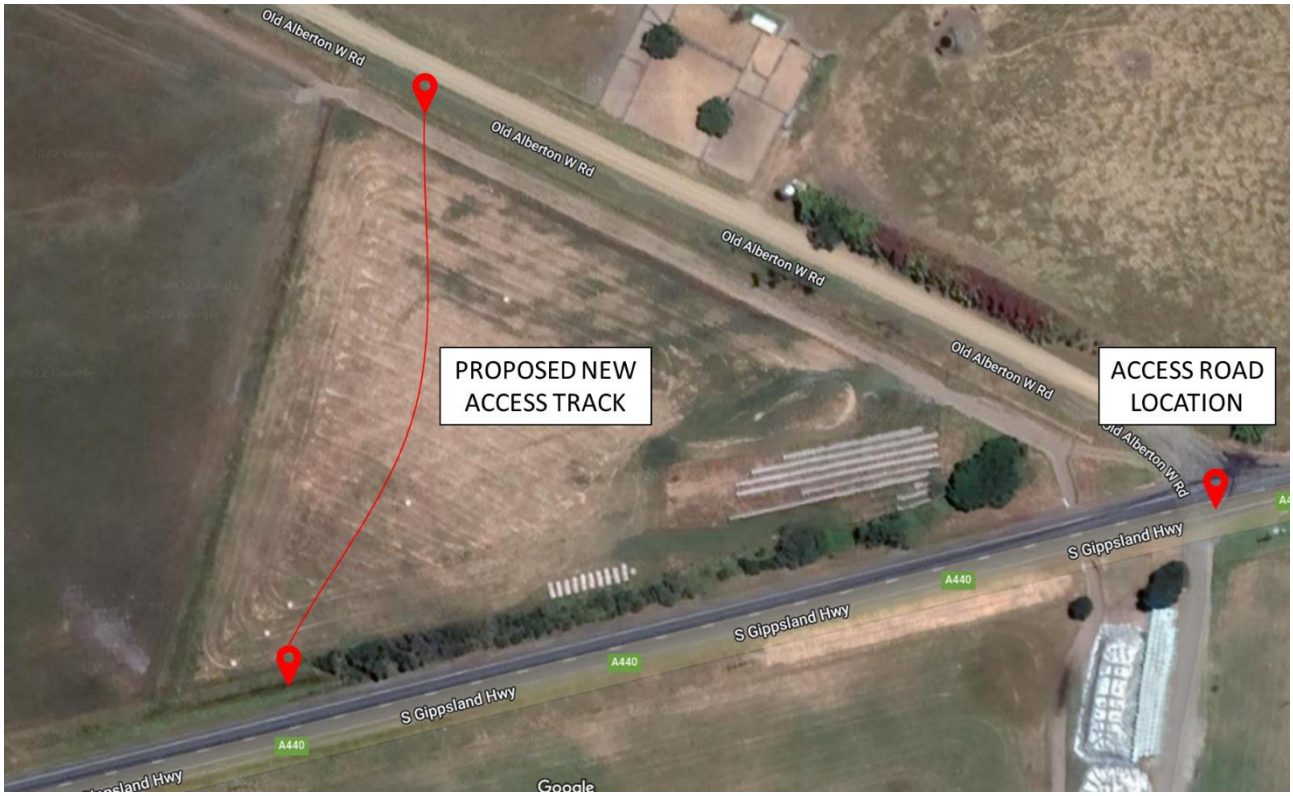
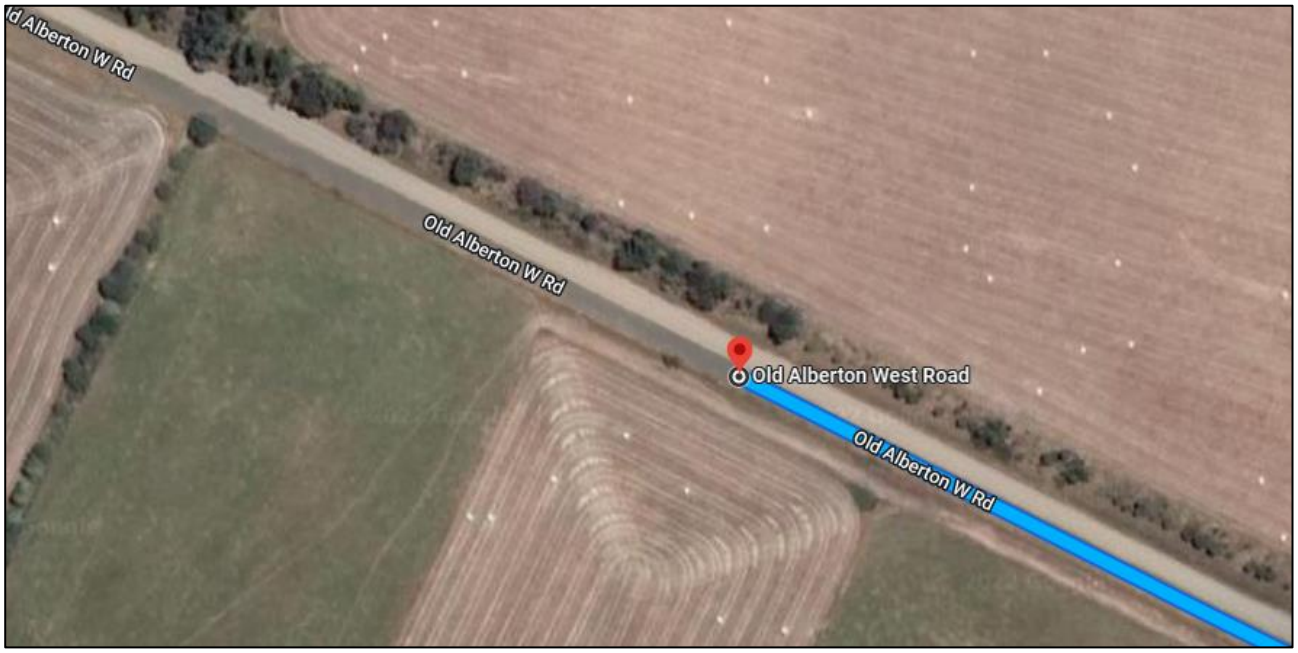


Figure 1-26 Site No. 9 – Inspection Images

Site 10 – Old Alberton W Road / Site Access 8

Figure 1-27 Site No. 10 – Aerial



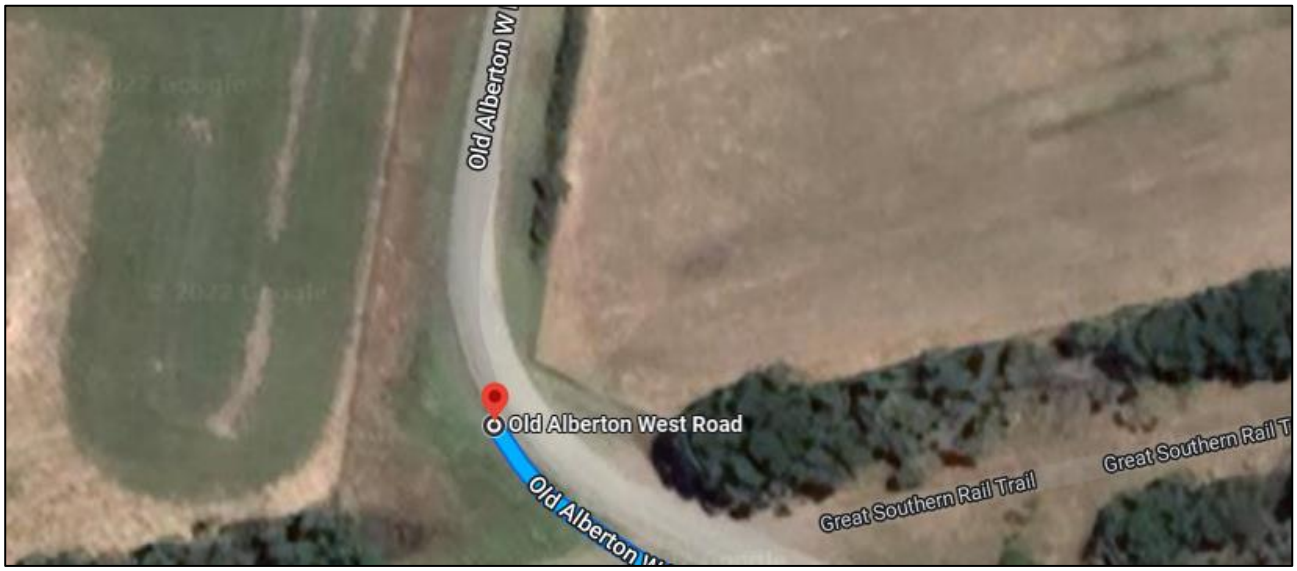
ISSUES / COMMENTS:

Vegetation removal in the vicinity of the proposed site access location. No issue. Infill required on the southern shoulder to support OSOM loads. See V220239-TR-SK-0008 in Appendix A for swept path analysis.

Figure 1-28 Site No. 10 – Inspection Images

Site 11 – Old Alberton W Road – Southern 90° Corner

Figure 1-29 Site No. 11 – Aerial



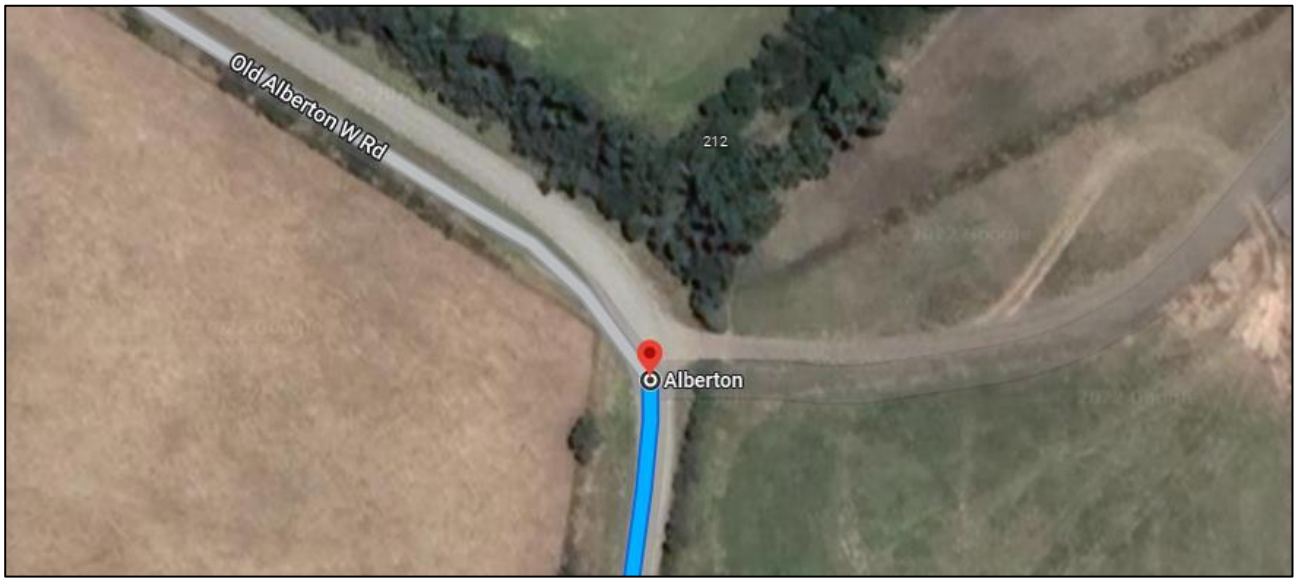
ISSUES / COMMENTS:

Signage on the south-western kerb will require removal. Fence on the north-eastern corner will require removal. Culverts present in southern portion of grassed off-road area will likely be impacted. Vegetation removal required on the north-eastern and south-western shoulders. See V220239-TR-SK-0009 in Appendix A for swept path analysis.

Figure 1-30 Site No. 11 – Inspection Images

Site 12 – Old Alberton W Road / Site Access 6

Figure 1-31 Site No. 12 – Aerial

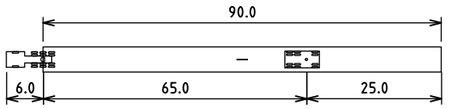


ISSUES / COMMENTS:

Natural swale drain on eastern kerbside will require infill. Culvert drain present at proposed site access location. Culvert drain will require removal and replacement to facilitate OSOM movements. Vegetation removal required on the eastern and western shoulders to facilitate OSOM blade movements. See V220239-TR-SK-0010 in Appendix A for swept path analysis.

Figure 1-32 Site No. 12 – Inspection Images

DESIGN VEHICLE



**NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY.
EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE**

BARRY ROAD

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

BARRY ROAD

N

0 8.75 17.5 35
1:1500 @ A3

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SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION: BARRY ROAD
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
RJM / JH	15.09.2022	1:1500	A3

Drawing Number	Revision
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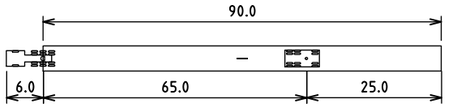
DESIGN VEHICLE



NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY. EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

CHEVRON SIGNAGE TO BE REMOVED

EXISTING POWER POLE TO BE REMOVED

BARRY ROAD

BARRY ROAD

N

0 8.75 17.5 35
1:1500 @ A3

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SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION: BARRY ROAD
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
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Drawing Number	Revision
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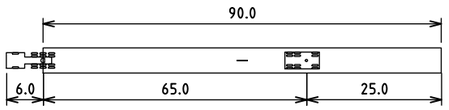
DESIGN VEHICLE



**NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY.
EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE**

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

SOUTH GIPPSLAND HIGHWAY

SIGNAGE ON TRAFFIC ISLANDS TO BE REMOVED

BARRY ROAD

N

0 8.75 17.5 35

1:1500 @ A3

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SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION: BARRY RD- STH GIPPSLAND HWAY
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
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Drawing Number	Revision
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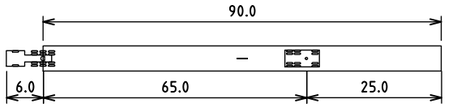
DESIGN VEHICLE



NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY. EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE

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SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION:STH GIPPSLAND HWY - SITE ACCESS 1
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
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Drawing Number	Revision
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BY: User:Russell.Meaney

DATE PLOTTED: 09/16/22 11:13:27

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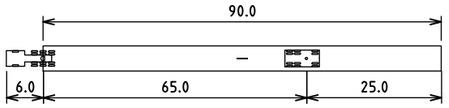

NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY. EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE

SOUTH GIPPSLAND HIGHWAY

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

N

0 8.75 17.5 35

1:1500 @ A3

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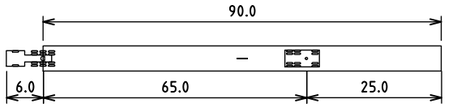
SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION:STH GIPPSLAND HWY - SITE ACCESS 5
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
RJM / JH	15.09.2022	1:1500	A3

Drawing Number	Revision
V220239-TR-SK-0005	1

DESIGN VEHICLE



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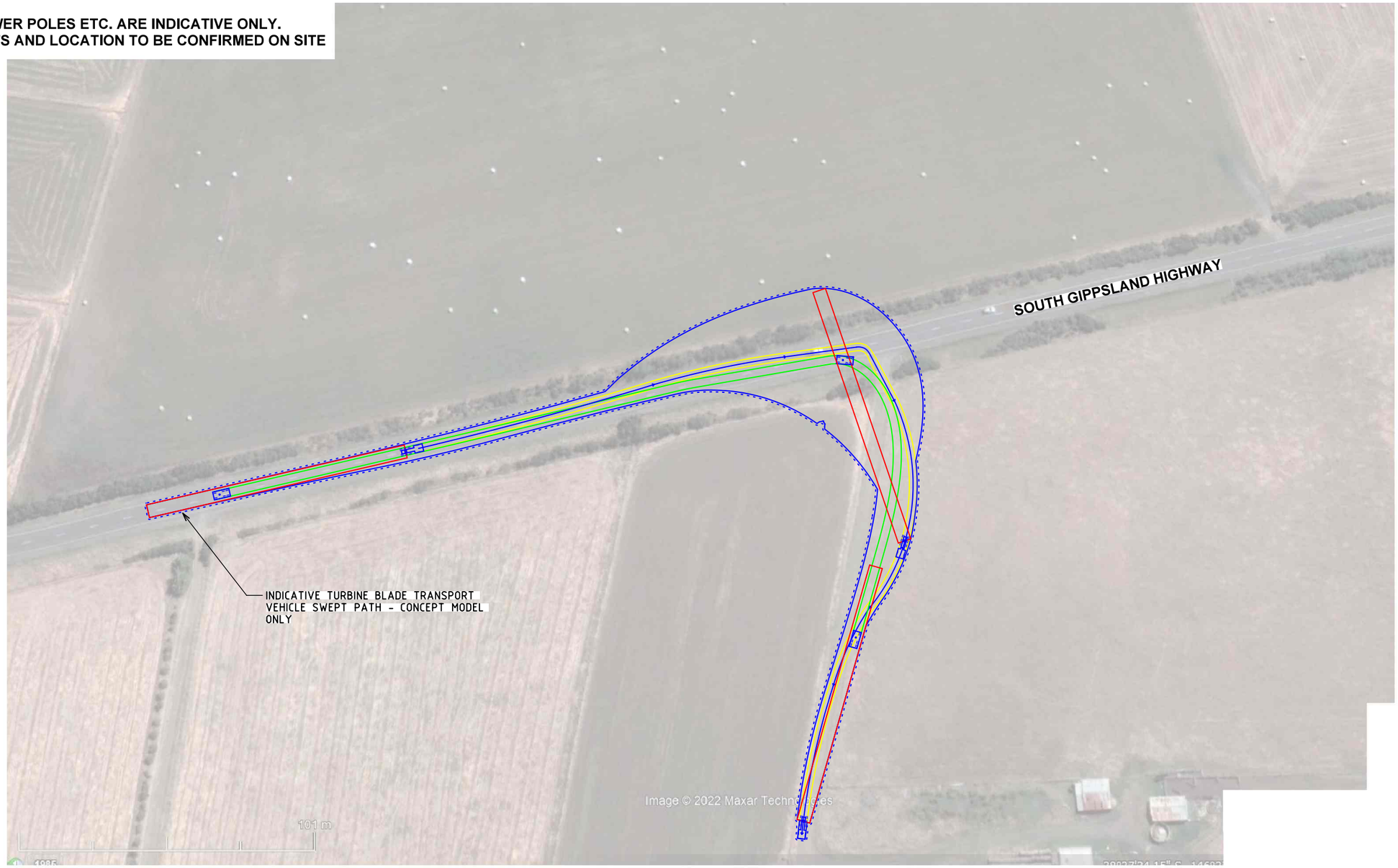

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SYNERGY WIND
GELLIONDALE WIND FARM
LOCATION:STH GIPPSLAND HWY - SITE ACCESS 7
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
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Drawing Number	Revision
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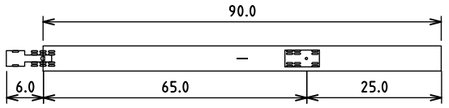
DESIGN VEHICLE



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EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE**

OLD ALBERTON WEST ROAD

SOUTH GIPPSLAND HIGHWAY

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

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SYNERGY WIND
GELLIONDALE WIND FARM
STH GIPPSLAND HWY-OLD ALBERTON W RD
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
RJM / JH	16.09.2022	1:1500	A3

Drawing Number	Revision
V220239-TR-SK-0007	1

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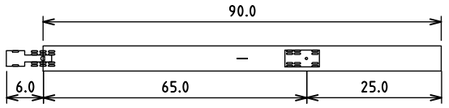
DESIGN VEHICLE



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EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE**

OLD ALBERTON WEST ROAD

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

N

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1:1500 @ A3

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SYNERGY WIND
GELLIONDALE WIND FARM
OLD ALBERTON WEST RD - SITE ACCESS 8
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
RJM / JH	03.05.2023	1:1500	A3

Drawing Number	Revision
V220239-TR-SK-0008	2

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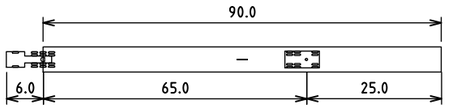

NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY. EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

OLD ALBERTON WEST ROAD

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SYNERGY WIND
GELLIONDALE WIND FARM
OLD ALBERTON WEST RD CORNER
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
RJM / JH	16.09.2022	1:1500	A3

Drawing Number	Revision
V220239-TR-SK-0009	1

BY: User:Russell.Meaney
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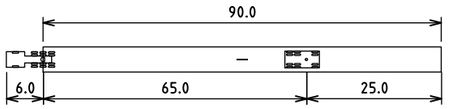
DESIGN VEHICLE



**NOTE: ALL SIGNS, POWER POLES ETC. ARE INDICATIVE ONLY.
EXACT MEASUREMENTS AND LOCATION TO BE CONFIRMED ON SITE**

INDICATIVE TURBINE BLADE TRANSPORT VEHICLE SWEPT PATH - CONCEPT MODEL ONLY

OLD ALBERTON WEST ROAD

0 8.75 17.5 35
1:1500 @ A3

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SYNERGY WIND
GELLIONDALE WIND FARM
OLD ALBERTON WEST RD - SITE ACCESS 6
TURBINE BLADE TRANSPORT VEHICLE
CONCEPT SWEPT PATH DIAGRAM

Drawn/Check	Date	Scale	Size
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Drawing Number	Revision
V220239-TR-SK-0010	1

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APPENDIX

B

FLORA & FAUNA ASSESSMENT - EXTRACT

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The Gang–gang Cockatoo is a strict woodland species and would only occasionally venture outside the woodland and is not expected to be significantly impacted.

Powerful Owl generally confines itself to forested habitats and dispersal of juvenile owls after breeding is finished would be a rare event, most likely confined to the areas where treed habitats are closest. Where this habitat occurs, either side of the South Gippsland Highway, no turbines are proposed to be constructed. The likelihood of an ongoing impact on this species is therefore considered to be low.

The White-bellied Sea-Eagle is not likely to be impacted by the operation of the wind farm as it is mostly found along the coast and may only on occasions venture inland passing over the wind farm site.

Native vegetation

A total of ***1.252 hectares*** of remnant patch native vegetation are ***proposed to be removed*** from the study area including ***two large trees***.

To compensate for this removal, an offset requirement of 0.526 General Habitat Units (GHUs) with a minimum Strategic Biodiversity Score of 0.324 must be secured prior to the removal of native vegetation. Offsets would need to be achieved within the West Gippsland CMA or Wellington or South Gippsland Shire Council areas.

A permit is required under *Environmental Significance Overlay – Schedule 3* and *Significant Landscape Overlay – Schedule 3* within the South Gippsland Planning Scheme to remove, destroy or lop any vegetation, including dead vegetation. A planning permit under Clause 52.17 of the Wellington and South Gippsland Planning Schemes is also required for the removal of native vegetation. The current proposal will be assessed under the detailed assessment pathway and will be referred to the state Department of Energy, Environment and Climate Action (DEECA).

A Referral under the EPBC Act was submitted in December 2016 for the initial layout (34 turbines) and the project was determined to be a 'controlled action'. The initial project (Alberton Wind Farm) has been assessed and approved under the bilateral agreement between the Commonwealth and the state of Victoria.

APPENDIX

C

INDICATIVE EXTERNAL TRAFFIC GENERATION

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Table C-1 Gelliondale Wind Farm – Indicative External Vehicle Movements

Operation	Purpose	Estimated Vehicle Load (tonnes)	Estimated Total Quantity	Approximate Total Trips	Comments	Traffic Distribution – Construction month from the start of mobilisation											
General						1	2	3	4	5	6	7	8	9	10	11	12
Construction Operations	Water Delivery	15	na	1,250	Generally assume nominal 10 trips per day for dust settling and road construction.	15%	15%	15%	15%	15%	5%	5%	5%	5%	5%		
	Main Fuel Delivery	15	na	100	Generally assume 2 main fuel deliveries per week to central storage tank	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%		
	Refuelling Operations			250	Mobile refuelling of plant (note access to public road required to move between each of the 5 separate work locations	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%		
	Skip Delivery	3	na	75	1 - 2 / week (nominal assumption)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%		
	Portaloo Deliveries	12	na	125	2 – 3 / week (nominal assumption)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%		
Site Establishment Works						1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment	Miscellaneous Establishment / Demobilisation Deliveries	5	na	50	Large scale construction compound (includes containers) - nominal volume assumed. Allow for mobilisation and progressive demobilisation	50%							20%	10%	10%		10%
	Earthworks Equipment Delivery	30	na	50	Nominal value assumed. Included for movement between work areas	40%	10%				10%		40%				
	Movement of plant between sites	na	na	100	Nominal value assumed.			20%	20%	20%	20%	10%	10%				
Wind Farm Civil Construction Works						1	2	3	4	5	6	7	8	9	10	11	12
Piling	Mobilise / demobilise piling rig	na	na	10			20%	20%	20%	20%							
	Precast concrete piles	na	na	26	Assumed 2 trucks per foundation (nom 30m depth)		20%	20%	20%	20%							
Road & Hard Standings	Imported material for site roads capping (400mm)	30	64,680	2,372	14km of 5.5m wide access track (100% of required material to be imported from local area)	10%	20%	20%	20%	20%	10%						
	Imported material for crane hardstands (400mm)	30	39,312	1,441			20%	20%	20%	20%	20%						
	Imported material for construction site compound (200mm)	30	8,400	308	200m x 100m x 0.2m x 2.1d (100% of required material to be imported from local area)	100%											
	Imported materials - other	30	11,239	412	Blade fingers, aux crane pads, turning heads, losses etc (allow additional 10%)		20%	20%	20%	20%	20%						
Foundation Construction	Heavy equipment delivery	30	na	100	Excavator, project concrete pump et al - nominal movements assumed	10%	10%	10%	15%	15%	15%	10%	10%	5%			
	Misc works	5	na	10	Concrete curing materials, minor equipment etc - nominal movements assumed		10%	10%	15%	15%	10%	10%	10%	10%	10%		
	Premix concrete deliveries - main Pour	na	7,800	975	600m3 per turbine foundation - assumed premix off-site				20%	20%	20%	20%	20%				
	Premix concrete deliveries - Plinth Pour	na	2,600	351	200m3 per turbine foundation - assumed premix off-site					20%	20%	20%	20%	20%			
	Reinforcing steel delivery	25	1,261	50	Assumed 97 T per footing			20%	20%	20%	20%	20%					

Operation	Purpose	Estimated Vehicle Load (tonnes)	Estimated Total Quantity	Approximate Total Trips	Comments	Traffic Distribution – Construction month from the start of mobilisation											
	Foundation bolts or steel insert delivery	12	na	13	1 delivery per turbine likely assumed			20%	20%	20%	20%	20%					
	Concrete pump for foundation	25	na	65	Assumes 5 visits per foundation (blinding, 3 x structure incl backup, backfill)				20%	20%	20%	20%	20%				
	Attendant mobile/Franna crane	15	na	150	Assumes multiple movements across site using public highway (Bottom mat reinforcing, top mat reinforcing, bolt set installation)				20%	20%	20%	20%	20%				
Turbine Components	Tool container delivery	15	na	20	Various equipment for turbine install crew HV - nominal amount estimated moved 4 times to be adjacent to work							20%	20%	20%	20%	20%	
	WTG container delivery	25	na	52	Nacelle sit packs							20%	20%	20%	20%	20%	
	Tower container delivery	25	na	52	Anchor cages and tower site packs							20%	20%	20%	20%	20%	
	External Transformer Substation or RMU	na	na	13							15%	15%	20%	20%	15%	15%	
	Escort Vehicles	na	na	403	Refer to Table 3-1.						15%	20%	20%	20%	20%	5%	
Cable Installation	Cable delivery	15	na	26	2 delivery per turbine assumed			20%	20%	20%	20%	20%					
	Excavator delivery	30	na	10	Cable install support equipment - nominal amount assumed. Relocation of equipment between work areas increases traffic			20%	10%	10%	10%	10%	20%	20%			
	Cable laying equipment	15	na	10	Specialised trenching equipment - nominal amount assumed. Relocation of equipment between work areas increases traffic			20%	10%	10%	10%	10%	20%	20%			
	Cable Bedding Sand	30	6,912	230	Assumed 36km of underground cabling	5%	10%	15%	15%	15%	10%	10%	10%	10%			
Cranage	Terrain crane (130t)	130	na	32	Associated HV movements. Will need to relocated 4 times (assume 8 heavy vehicle movements per relocation)						20%	20%	20%	20%	20%		
	Terrain crane (220t)	220	na	40	Associated HV movements. Will need to relocated 4 times (assume 10 heavy vehicle movements per relocation)						20%	20%	20%	20%	20%		
	Terrain crane (500t)	500	na	40	Associated HV movements. Will need to relocated 4 times (assume 10 heavy vehicle movements per relocation)						20%	20%	20%	20%	20%		
	Main Crane	30	na	160	Associated HV movements. Will need to relocated 4 times (assume 40 heavy vehicle movements per relocation)						20%	20%	20%	20%	15%	5%	
Wind Farm Substation Works						1	2	3	4	5	6	7	8	9	10	11	12
Substation Civils	Lime / Cement Stabilisation	17	90	2	3% lime stabilisation by mass		50%	50%									
	Imported Stone for substation compound	30	2,993	110	95m x 75m x 0.2m x 2.1d	30%	35%	35%									
	Geofabric/geogrid deliveries	30	na	15	To be confirmed subject to detailed methodology	10%	20%	25%	25%	20%							
	Switchgear etc.	15	na	4				50%	50%								
	Misc electrical equipment	5	na	10								30%	40%	30%			

Operation	Purpose	Estimated Vehicle Load (tonnes)	Estimated Total Quantity	Approximate Total Trips	Comments	Traffic Distribution – Construction month from the start of mobilisation											
	Switchgear cable and pylon delivery	24	450	2							40%	30%	30%				
WTG Component Deliveries						1	2	3	4	5	6	7	8	9	10	11	12
Turbine Components	Escort Vehicles	na	na	533	Refer to Table 3-1.						15%	20%	20%	20%	20%	5%	
	Operations building	15	59	4								100%					
	Transformer delivery – substation	130	130	2											100%		
	Top section delivery	50	na	13	5 section tower							25%	15%	30%	30%		
	Middle Section	50	na	13	5 section tower							25%	25%	25%	25%		
	Middle Section	50	na	13	5 section tower							25%	25%	25%	25%		
	Middle Section	50	na	13	5 section tower							25%	25%	25%	25%		
	Bottom Section Delivery	50	na	13	5 section tower							25%	25%	25%	25%		
	Blades delivery - single blade transport	10	na	39	3 blade turbine - assume non reticulated blades OD							25%	25%	25%	25%		
	Nacelle and Transformer	80	na	13	1 OD delivery per turbine							25%	25%	25%	25%		
	Drive Train	80	na	13	1 OD delivery per turbine							25%	25%	25%	25%		
	Hubs + Spinner	15	na	13	1 OD delivery per turbine							25%	25%	25%	25%		
	Power module	24	na	13	1 OD delivery per turbine							25%	25%	25%	25%		
Miscellaneous Deliveries						1	2	3	4	5	6	7	8	9	10	11	12
General	General Deliveries	na	na	100		10%	10%	10%	10%	10%	10%	10%	10%	5%	5%	5%	5%
	Testing and Commissioning	na	na	100										25%	25%	25%	25%
Project Staff						1	2	3	4	5	6	7	8	9	10	11	12
Misc. Small vehicles	Project Staff	N/A	N/A	13,200	Average of 50 LV trips per day.	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%
Total Estimated LV Traffic				13,733 trips (27,466 journeys)	Note that each vehicle trip will comprise of 2 vehicle movements (i.e vehicles per day, vpd, equals 2x trips).	1,144 trips	1,144 trips	1,144 trips	1, 144 trips	1, 144 trips	1, 144 trips	1, 144 trips	1,144 trips	1, 144 trips	1, 144 trips	1,144 trips	1,144 trips
Total Estimated OSOM Traffic				162 trips (324 journeys)		0 trips	0 trips	0 trips	0 trips	0 trips	0 trips	43 trips	38 trips	40 trips	42 trips	0 trips	0 trips
Total Estimated HV Traffic				9,528 trips (19,056 journeys)		899 trips	1,199 trips	1,475 trips	1,510 trips	1,507 trips	1,245 trips	652 trips	443 trips	351 trips	307 trips	85 trips	35 trips
Total Estimated Traffic for Project				23,423 trips (46,846 journeys)		2,033 trips	2,333 trips	2,609 trips	2,644 trips	2,641 trips	2,379 trips	1,829 trips	1,614 trips	1,525 trips	1,483 trips	1,219 trips	1,169 trips