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Latrobe Valley Battery Energy Storage System

Traffic Impact Assessment

Tilt Renewables

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1 Introduction

1.1 Background

A planning permit is currently being sought for a Battery Energy Storage System (BESS) facility at 240 Monash Way, 3 km south of Morwell and 140 km southeast from Melbourne (the Project). The subject site is situated adjacent to the existing Morwell Terminal Station (MWTS) and to the east Morwell Power Station. The proposal includes:

- the construction of a number of battery storage units with a capacity of up to 203 MW / 812 MWh over two sites (Northern BESS and Southern BESS),
- installation of two 66 kV transformers (one per site), 33 kV transformers and 3.5 MW inverters, and
- upgrade works within the MWTS to facilitate connection of the proposed BESS facility to the MWTS (via an underground connection).

Aurecon Australasia Pty Ltd (Aurecon) has been engaged by Tilt Renewables (the Proponent) to prepare a traffic impact assessment (TIA) for submission as part of the planning permit application for the Project.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated parking, traffic and transport implications of the Project, including consideration of the following:

- traffic movements generated by the Project during construction and operation & maintenance phases,
- adequacy of proposed access arrangements and impacts to the wider local road network, including construction and operation & maintenance phases,
- adequacy of proposed car parking provision and layout arrangements, and
- adequacy of proposed internal vehicle and loading access and layout arrangements.

In the course of preparing this assessment, a desktop review of the subject site and its environs has been completed, plans of the development (*Latrobe Valley Site Layout 509891-0000-DRG-EE-0001-0*) reviewed, and all relevant traffic data collected and analysed.

Relevant standards and guidelines relied upon are noted and referenced as necessary throughout this report.

2 Existing Conditions

2.1 Subject Site

The subject site is located adjacent Monash Way approximately three kilometres south of Morwell (identified as Lot 2\PS725239, generally located at 240 Monash Way) and approximately 150 km east of Melbourne in the Latrobe Valley. The site is bound by Morwell Power Station to the north and west, the PineGro Green Waste Morwell Facility to the south, and the existing MWTS to the east.

The MWTS (identified as 6N~A\PP2749) is situated north of the Monash Way / PineGro Green Waste Access (private access road) intersection.

The Project is located within an Industrial Zone (IN1Z) under the Latrobe Planning Scheme. Monash Way is a designated Road Zone Category 1 (RZ1). Other energy production and industrial uses generally surround the Project Area.

The location of the Project Area is shown in Figure 1, and the land zoning is shown in Figure 2.

Figure 1 Latrobe Valley BESS Project Area

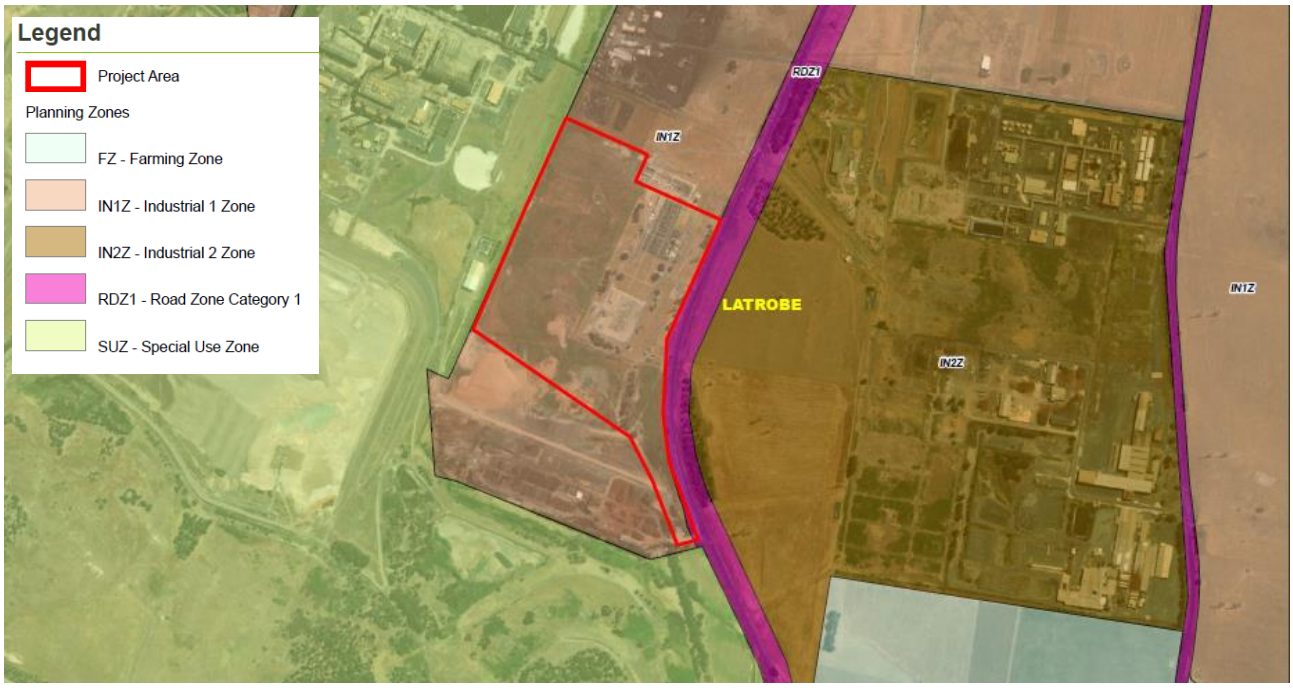


Figure 2 Land Zoning Map

2.2 Transport Network

2.2.1 Road Network

Monash Way

Monash Way is an arterial road generally aligned north-west to south-east in the vicinity of the subject site. It comprises a 6.8 m sealed two-lane two-way single carriageway with 2.0 m paved shoulders and generally set within a 20 m road reserve (in the vicinity of the site and approximate). There is no provision for bicycles or pedestrians along this section of Monash way.

Monash Way provides a connection between Morwell in the north and townships to the south such as Churchill and Boolarra. It also provides connections to the Jeeralang Power Station, and the now decommissioned Energy Brix (Morwell) and Hazelwood power stations.

Monash Way has a 100 km/hr posted speed limit and carries in the order of 10,000 vehicles per day (7% HV)[1].

PineGro Green Waste Access Road

The PineGro Green Waste (PineGro) access road is a private access road which connects PineGro and a Wood Pallet shed (located to the west of the subject site) to Monash Way. The intersection with Monash Way is sealed and internal to the site forms a T-intersection with one leg leading to PineGro (west) and the other to the Wood Pallet Shed and the subject site (north), with both continuing as unsealed roads. 90-degree parking spaces are also provided on the internal road.

The Monash Way / Pine Gro access intersection is a give-way controlled intersection and includes a 100 m channelised right turn and a 70 m auxiliary left turn lane (approximate). The existing Monash Way / PineGro Access Road is illustrated in Figure 3.

The PineGro Access Road is expected to carry in the order of 130 vehicles per day[2].

[1] VicRoads Open Data Traffic Volume Data.
[2] Refer Section 2.3.2.

Figure 3 Monash Way / PineGro Access Road (source: Nearmap)

2.2.2 Public Transport Network

There are currently no active public transport services, or stops, along Monash Way – refer to Figure 4 for Morwell's public transport network.

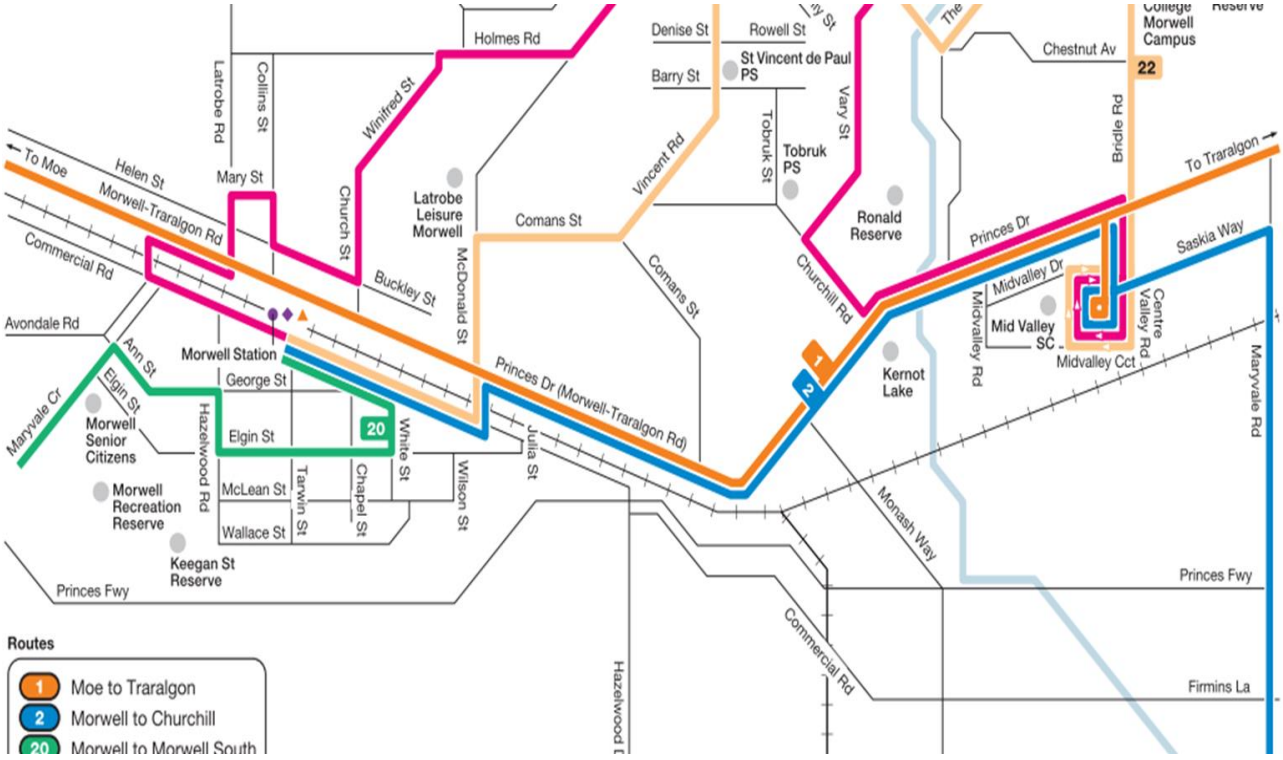


Figure 4 Morwell Public Transport Network (source: Public Transport Victoria, 2019)

2.2.3 Active Travel

There are currently no formal pedestrian and/or cyclist paths within the vicinity of the subject site.

2.3 Traffic Volumes

2.3.1 Monash Way

Existing traffic data for Monash Way has been collated from VicRoads open data traffic volumes (2020) and summarised in Table 1.

Table 1 Hyland Highway – Existing Traffic Volumes

Location	Direction	AM peak	PM peak	Daily
Monash Way (btw Commercial Rd & Brodribb Rd)	Northbound	490 vph	470 vph	4,800 vpd (10% HV)
	Southbound	360 vph	520 vph	5,200 vpd (7% HV)

vph (vehicles per hour), vpd (vehicles per day), HV (heavy vehicles), data rounded to nearest 10 vehicles.

2.3.2 PineGro Access Road

PineGro access traffic volume estimates have been provided by the applicant and include:

- 50 truck movements per day 'in' and 'out' of the PineGro facility, and
- 15 truck movements per day 'in' and 'out' of the Wood Pallet Shed (located to the west of the proposed BESS facility and sharing the northern leg of the private access road illustrated in Figure 3).

On this basis, and assuming a 10% peak to daily factor, Table 2 has been prepared to summarise PineGro Access Road's estimated peak hour and daily traffic volumes.

Table 2 PineGro Access Road – Existing Traffic Volumes (estimate)

Location	Direction	AM peak*	PM peak*	Daily
PineGro Access Road (PineGro facility and Wood Pellet Shed)	Inbound	7 vph	7 vph	65 vpd (100% HV)
	Outbound	7 vph	7 vph	65 vpd (100% HV)

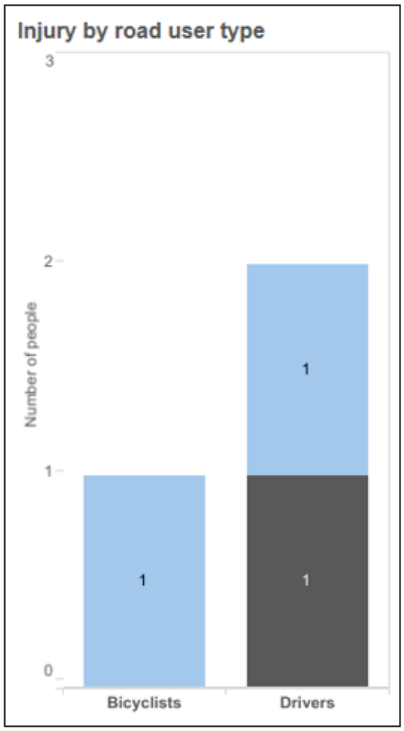
vph (vehicles per hour (approximate)), vpd (vehicles per day (approximate)), HV (heavy vehicles)

2.4 Crash History

Two crashes have occurred on Monash Way in the vicinity of the subject site from 2014 to 2019 (VicRoads' crash statistics). The first, a rear end collision, occurred in 2015 and the second, a struck animal, in 2018. Three persons were involved in the crashes, two being serious injuries and one a non-injury.

It is noted that the rear end was a serious injury crash which involved a bicycle rear ended by a car.

The first occurred approximately 200 m north of the proposed northern access and the second approximately 200 m south of PineGro Access Road. Please refer to Figure 5 for crash locations and further details on the crashes.



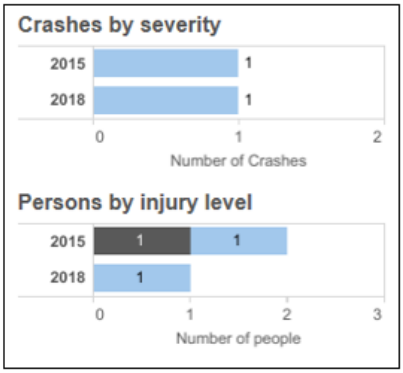


Figure 5 Crash Data (source: VicRoads)

3 BESS Proposal

3.1 Development Proposal

The Project includes the construction of a number of battery storage units with a capacity of 203 MW / 812 MWh, installation of two 66 kV transformers (one per BESS Site), 33 kV transformers and 3.5 MW inverters. The Project is illustrated below in Figure 6.

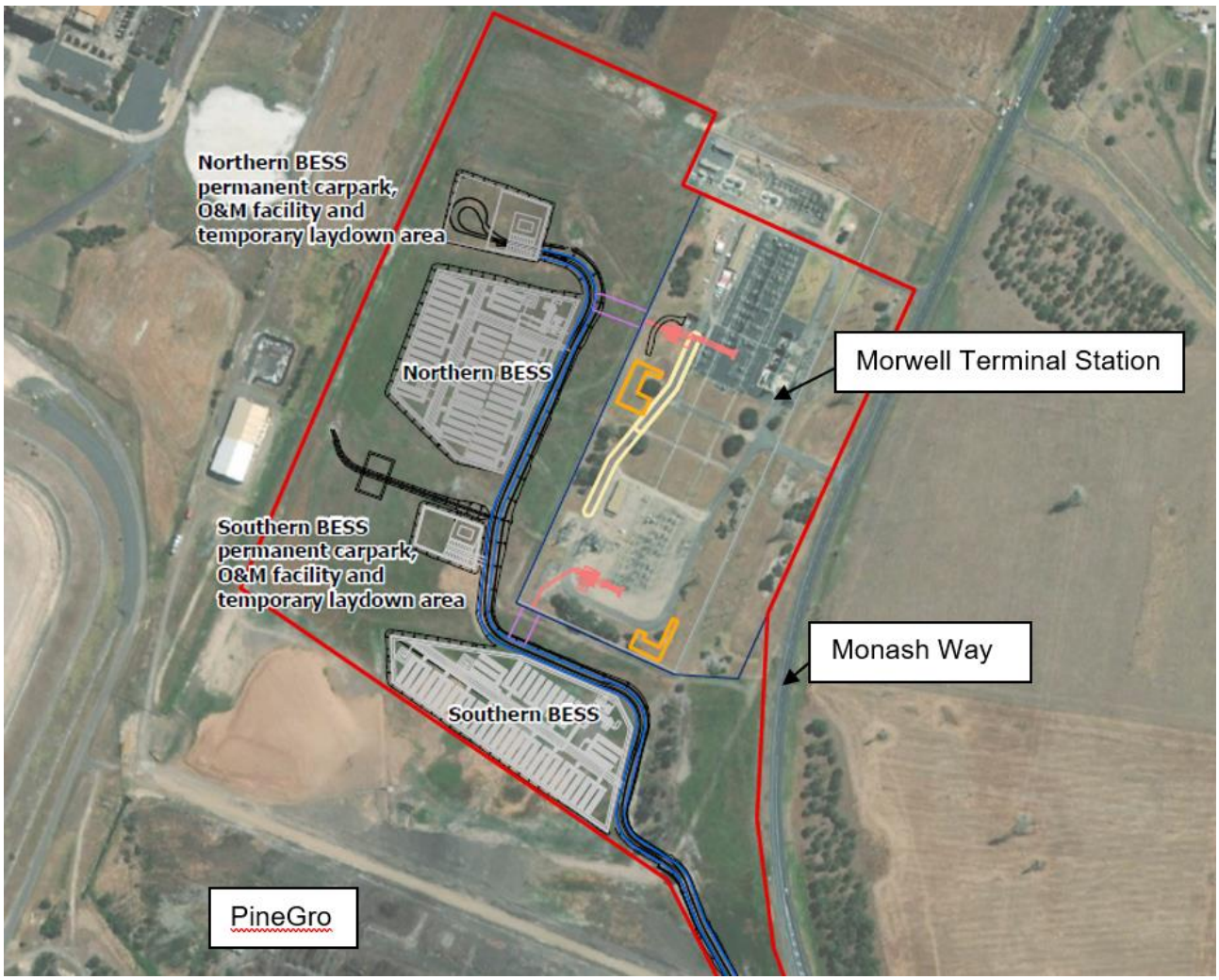


Figure 6 Latrobe Valley BESS Proposal (excerpt from Site Layout Plan)

Vehicle access to the site is proposed via the existing Monash Way / PineGro Access Road and then onto the Wood Pallet Shed and onto a new access track to the proposed Latrobe Valley BESS facility. As discussed in Section 4.2.2, minor road widening is proposed on the PineGro Access Road's approach to Monash Way and along the site's access track connection to the PineGro Access Road.

Primary internal access is proposed via a 7 m wide access road which connects to the existing PineGro Access Road, with secondary 4 m wide access roads providing access within each of the Northern BESS and Southern BESS as shown in Figure 7.

In addition to the Northern BESS and Southern BESS, two laydown areas with Operations and Management (O&M) storage sheds and permanent carparks are proposed. A total of thirty-two (32) permanent car spaces have been allowed across both carparks with sixteen (16) in each as part of the indicative design. The total number of car parking spaces will be confirmed post permit during the detail design phase following appointment of a preferred BESS supplier.

The proposed facility is expected to be remotely operated and normally not staffed, requiring infrequent inspections and maintenance activities by staff.

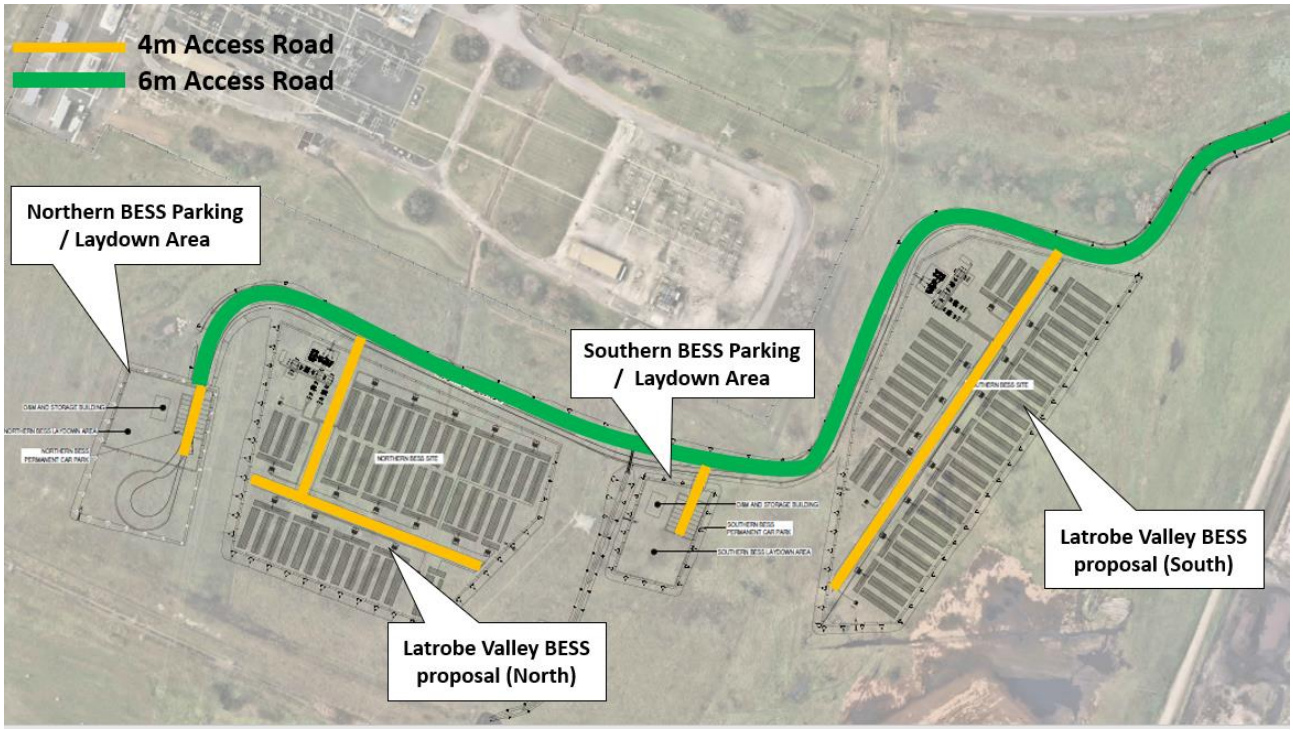


Figure 7 Latrobe Valley BESS - Internal Access

3.2 Construction Phase

On-site construction for the Project is largely limited to the preparation of footings, delivery and construction / installation of prefabricated items (control room, switching station, battery units, connection components, etc.).

For concrete and steel, batteries and inverters, they will require access to the site by 19 m semi-trailers. For civil material import, B-Double or truck and quad (standard, 25 m) will be utilised for site access. The site buildings and plant will be delivered using low loaded / float (standard). Staff will travel to the site via 4x4 light vehicles.

3.2.1 Vehicle Types

The following vehicle types are anticipated to deliver materials and equipment during the construction phase as summarised in Table 3

Table 3 Anticipated Construction Phase Vehicle Types

Load Type	Vehicle Type	Design Vehicle
Site Buildings & Plan	Low loader / float (standard)	19 m Semi-trailer
Staff / Visitor	Passenger vehicle (4x4, car, etc)	99th percentile car (B99 car)
Civil Material Import / Export (bulk earthworks)	Truck & Quad Dog or B-double truck	19 m Truck & Quad Dog or 25 m / 26 m B-double Truck
Concrete & Steel	Semi-trailer and Concrete Truck	19 m semi-trailer and ≈ 8.8 m Medium Rigid Vehicle (MRV)
Batteries, inverters, transformers, conduits & cable	Semi-trailer	19 m Semi-trailer
Crane	Mobile 50-100t crane	≤ 12.5 m Heavy Rigid Vehicle (HRV) [1]
66kV Transformer (x2)	Prime mover & custom multiple axle low platform trailer	*N/A - Refer discussion below*

[1] Approximate equivalent as mobile cranes of this type have all wheel steering / multiple wheel steering with relatively smaller turning circles.

The majority of vehicles expected to service the site during construction include a vehicle size *up to* and including 19 m semi-trailer trucks and truck and quad dog combination trucks.

A smaller number of bulk earthworks vehicles may include 25 m/26 m B-double trucks while the delivery of the two 66 kV transformers will include a prime mover truck with a multiple axle low platform 'gooseneck' trailer. An example of a 105 t transformer delivery vehicle is illustrated in Figure 8 below (total length in the order of 30 m).

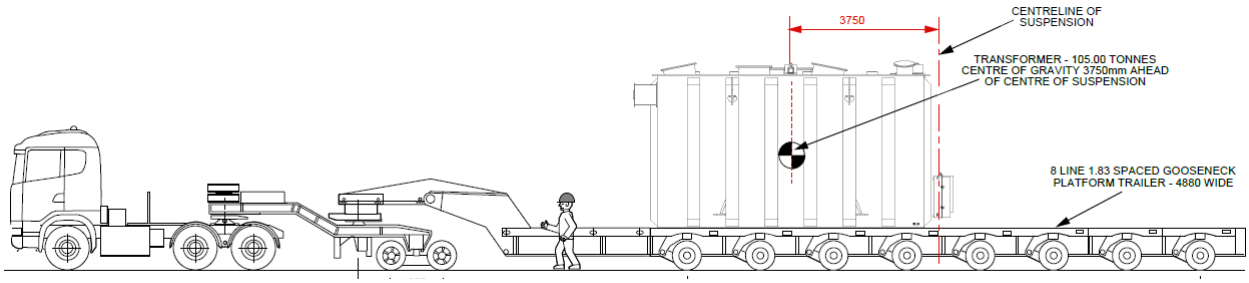


Figure 8 Example 105t Transformer Delivery Vehicle

Multiple axle low platform trailers of this type include independent hydraulic wheel height control to navigate longitudinal crests and dips and all wheel steering or multiple wheel electronic steering which provides higher degrees of turning control and relatively small turning circles (comparative to its 30 m length).

An excerpt of this example vehicle's full lock (45º) turning circle is illustrated below in Figure 9.

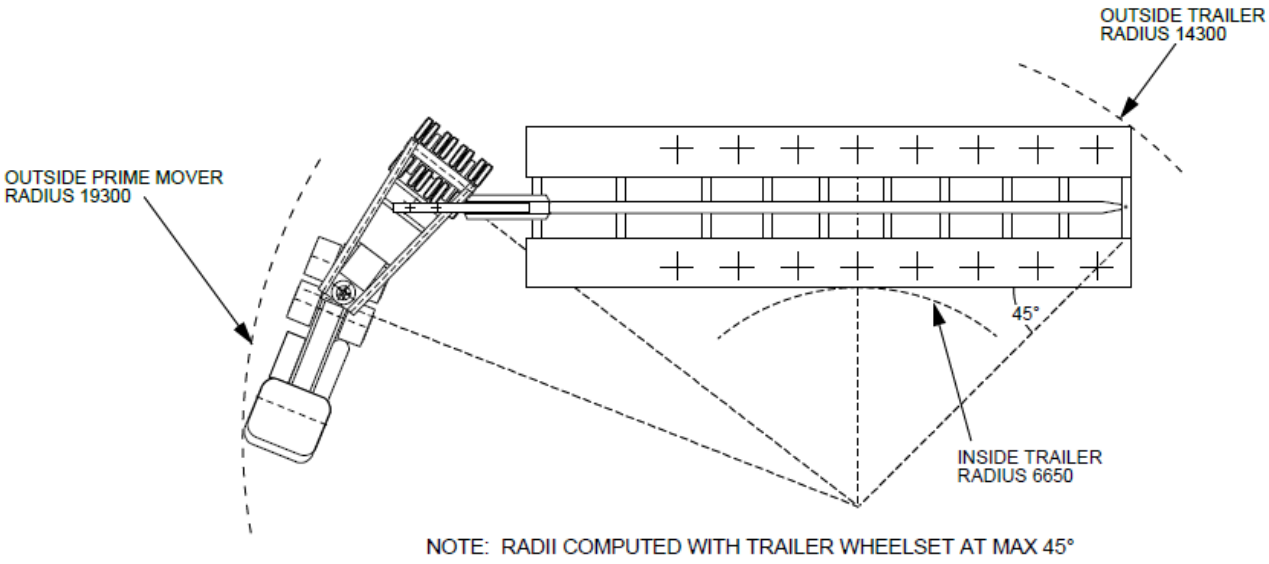


Figure 9 Example 105t Transformer Delivery Vehicle – Turning Circle

Notwithstanding the above, construction vehicle types will be confirmed following appointment of a construction team (after a planning permit has been issued).

At this post approval stage, specific traffic management measures will be identified for each as necessary and detailed in an appropriate Construction Traffic Management Plan (CTMP) or Traffic Management Plan (TMP). This is especially the case for OD / OSOM (Over Dimension / Over Size Over Mass) vehicles such as the transformer delivery vehicle above.

3.2.2 Access Routes

Construction Vehicles & Deliveries

As discussed with the Proponent, it is expected that delivery of imported plant, equipment and materials will occur at one of two potential port of origins: Port of Melbourne (140 km from site) or the Port of Hastings (Western Port Bay) (105 km from site).

Non-imported plant, equipment and materials are expected to be sourced from various areas throughout Victoria and locally in Morwell and its surrounds.

For each point option, there are convenient heavy vehicle approved access routes for delivery of plant, equipment, and materials (depending on their origin and vehicle size), including but not limited to:

- From Port of Melbourne:
  - Webb Dock Drive → Todd Road → Cook Street → West Gate Freeway → W3 → West Gate Freeway → Citylink → West Gate Freeway → Citylink → South Eastern Freeway → Monash Freeway → South Eastern Freeway → Monash Freeway → South Eastern Artl → Monash Freeway → South Eastern Artl → Monash Freeway → South Eastern Artl → Monash Freeway → Hallam Bypass → Monash Freeway → Hallam Bypass → Monash Freeway → Princes Freeway → Monash Way → PineGro Access Road to the subject site
- From Port of Hastings:
  - Bayview Road → Barclay Cres → Marine Parade → Frankston-Flinders Road → Western Port Highway → Dandenong-Hastings Road → Western Port Highway → Dandenong-Hastings Road → Cranbourne-Frankston Road → Princes Highway → Western Port Highway → Princes Highway → Western Port Highway → Dandenong-Hastings Road → Princes Highway → South Gippsland Freeway → Princes Highway → Princes Freeway → Monash Way → PineGro Access Road to the subject site

Following appointment of a construction team, specific access routes would then be confirmed and adopted for the construction phase and detailed in an appropriate CTMP or TMP.

Workers

Based on information provided by the Proponent, it is understood approximately 50 full time construction workers are expected during construction. In regard to staff vehicle movements, this will depend on where workers live (and/or are housed from Melbourne or further afield) which is expected to be highly varied.

While not yet confirmed, it is likely that a large proportion of construction workers will comprise local staff from or be housed in Morwell in the north, Moe in the northwest and Traralgon in the northeast.

On this basis, the majority construction workers will access the site via Monash Way (from the north) and then via PineGro Access Road.

3.2.3 Site Access

The existing Monash Way / PineGro Access Road is proposed to service both construction phase and operation and maintenance phase related traffic movements. A new access track is proposed to connect to the PineGro Access Road to the Latrobe Valley BESS facility.

3.3 Operation & Maintenance Phase

BESS facilities are usually monitored remotely in real-time and do not require dedicated staff to be on-site at all times. Staff are however required to access the site from time to time for inspections and maintenance activities.

Based on information provided by the applicant it understood that up to two (2) staff could typically be expected to be on-site at any time. Vehicle movements are expected to include light vehicles (passenger cars, utility vans / trucks).

3.3.1 Access Routes

Operation and maintenance staff access, much like construction staff, will also depend on where staff live which is expected to be highly varied. It is however likely that staff will be from local areas which would likely include Morwell in the north, Moe in the northwest and Traralgon in the northeast.

Staff access routes to the proposed BESS facility will therefore be via Monash Way (from the north) and then via the PineGro Access Road.

3.3.2 Site Access

The proposed PineGro Access Road site access point is proposed to service both construction phase and operation and maintenance phase related traffic movements.

4 Car Parking & Access Assessment

4.1 Car Parking

4.1.1 Statutory Requirement

Statutory requirements for the provision of car parking (under the operation and maintenance phase) are set out in Clause 52.06 of the Latrobe Planning Scheme, with parking rates specified in Table 1 to Clause 52.06-5.

The scheme does not specifically incorporate a recommended parking rate for a BESS facility (utility installation land use). In such circumstances, the scheme notes:

In instances where a use is noted specific in Table 1 to Clause 52.06-5 or another provision within the planning scheme, car parking spaces are usually provided to the satisfaction of the responsible authority.

To this end, please refer to Section 4.1.2 for an assessment of anticipated parking demand and parking provision.

4.1.2 Parking Demand Assessment

A total of 32 permanent car parking spaces have been allowed with sixteen (16) provided in both the north and south laydown / parking areas as part of the indicative design. The total number of car parking spaces will be confirmed post permit during the detail design phase following appointment of a preferred BESS supplier.

As noted in Section 3.3, based on information provided by the Proponent it is understood that up to two (2) staff could be expected to be on-site at any time.

The proposed provision of total thirty-two (32) car parking spaces is therefore considered appropriate for nominal staff demands during the maintenance and operation phase of the BESS facility and also sufficient to accommodate additional parking demands during infrequent and irregular maintenance and operation activities.

4.1.3 Parking Layout

Car parking spaces are proposed with access from the internal access road located along the site's southern frontage. These car parking spaces are recommended to meet the dimensional requirements set out in Clause 52.06-9 of the Latrobe Planning Scheme (i.e. minimum 2.6 m wide x 4.9 m long accessed from a 6.4m wide aisle).

The access aisle measures 4 m wide and is recommended to be widened to 6.4 m (minimum) adjacent the 90^{o} parking spaces.

4.2 Access

As noted previously, access to the site is proposed via Monash Way / PineGro Access Road, then via the PineGro Access Road and the proposed new access track. The below section sets out an assessment of access via this route and internal access requirements.

In addition to the below access assessment, it is noted that any required traffic management treatments and/or mitigation works are to be identified and addressed by way of an approved CTMP or TMP. This is the responsibility of the Proponent and would be prepared in consultation with the construction contractor.

4.2.1 Sight Distance

A desktop sight distance assessment has been undertaken of the existing Monash Way / PineGro Access Road based on a 100 km/hr posted speed limit in accordance with the requirements of Austroads' *Guide to Road Design* (Part 4A).

This desktop assessment indicates that available sight distance at the development proposal's Monash Way site access exceeds the minimum requirements set out in the Austroads Guide.

4.2.2 Monash Way / PineGro Access Road

Swept Path Assessment

As noted in Section 3.2.1, the majority of vehicles expected to service the site during construction include a 19 m semi-trailer and truck and dog combination trucks. Larger 25 m / 26 m B-double trucks and the 66 kV transformer delivery vehicle will also service the site however much less frequently (two transformer deliveries will be required for example).

To this end, noting that the majority of truck movements could be expected to / from the north, concept swept path assessments have been undertaken at the Monash Way / PineGro Access Road for these vehicles travelling to and from the site as follows:

- 19 m semi-trailer truck:
  - Figure 10 illustrates simultaneous movements to / from the north, and
  - Figure 11 illustrates simultaneous movements to / from the south.
- 26 m B-double truck:
  - Figure 12 illustrates left turn out to the north, and
  - Figure 13 illustrates right tun in from the north.

  (noting these two movements are typically the worst-case scenario albeit infrequent movements).

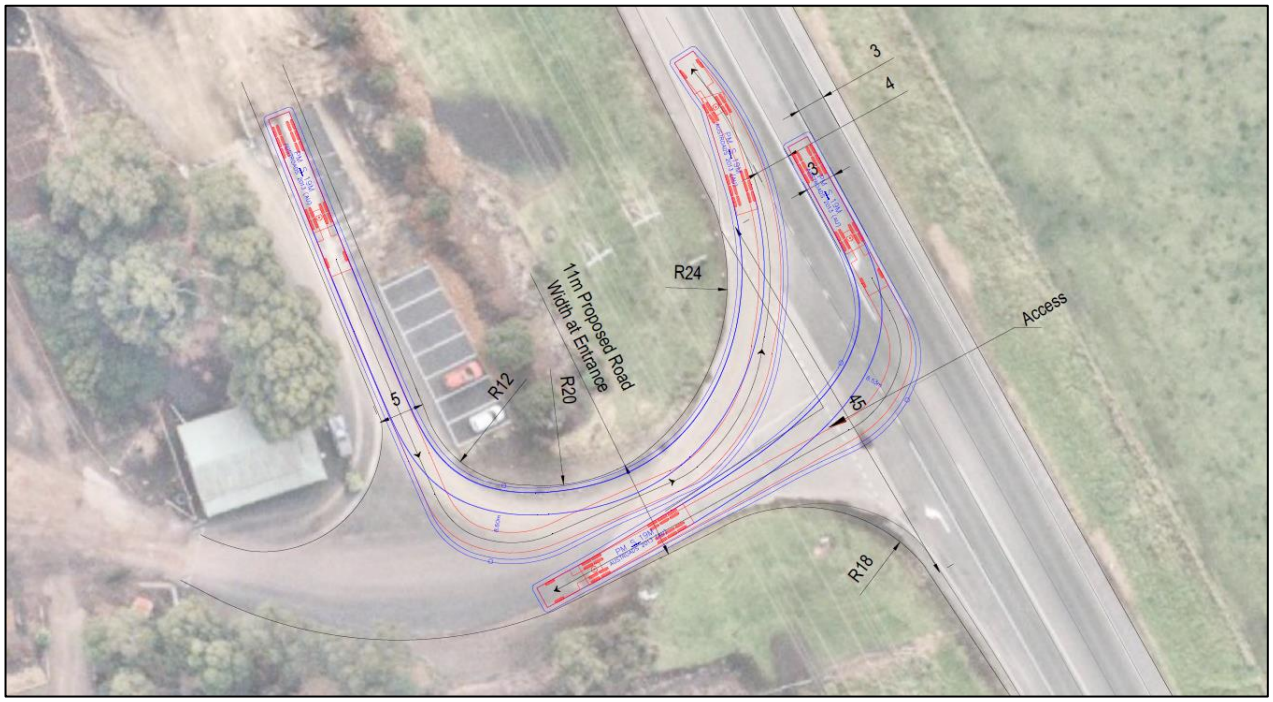


Figure 10 19m semi-trailer swept path (simultaneous to/from the north)

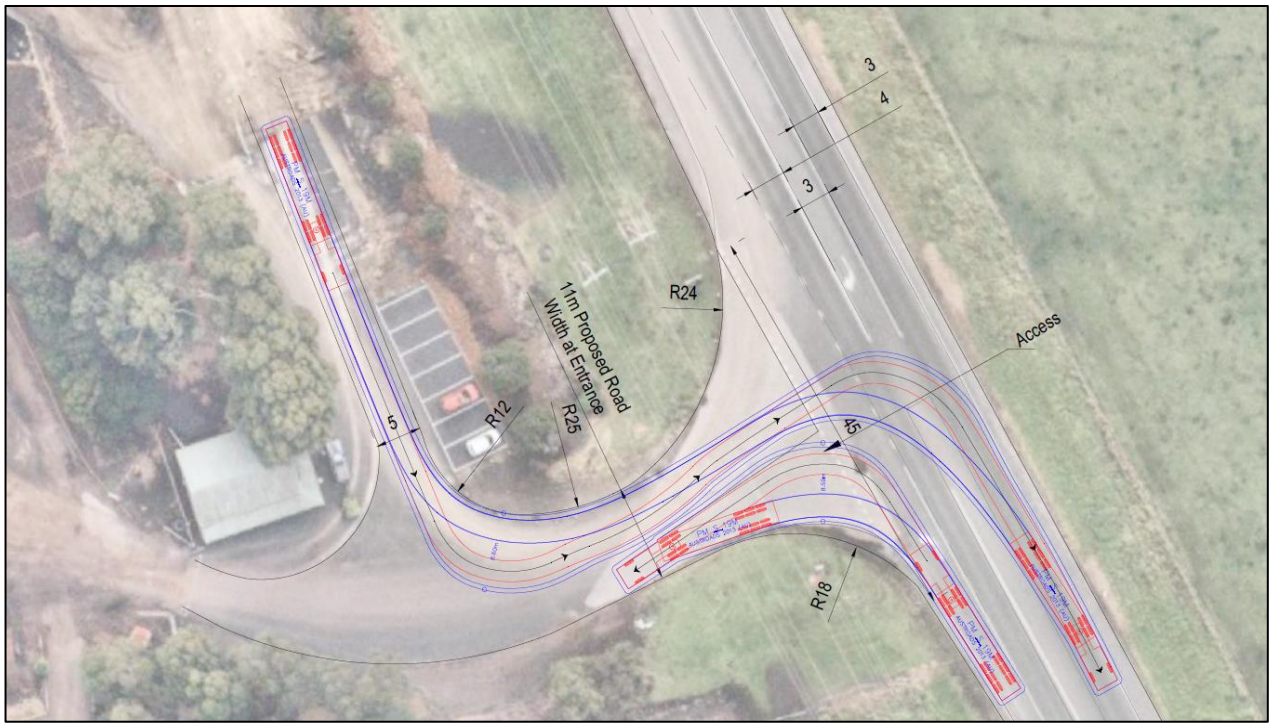


Figure 11 19m semi-trailer swept path (simultaneous to/from the south)

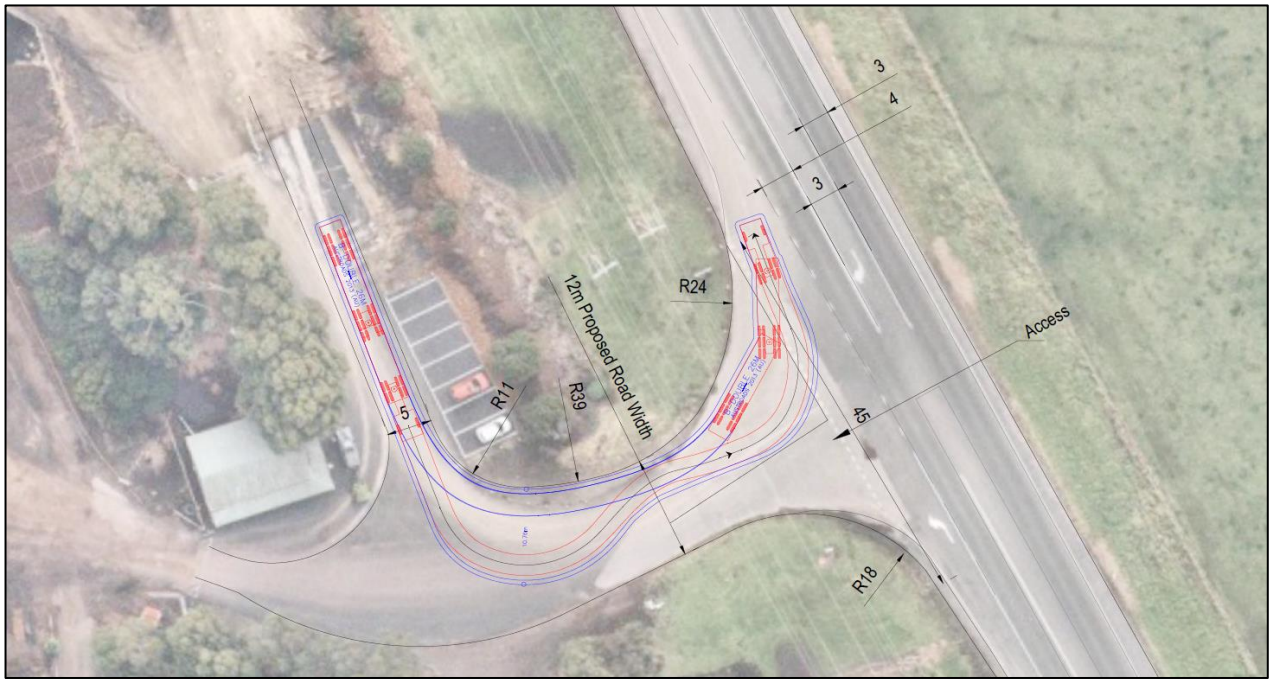


Figure 12 26m B-double swept path (left out)

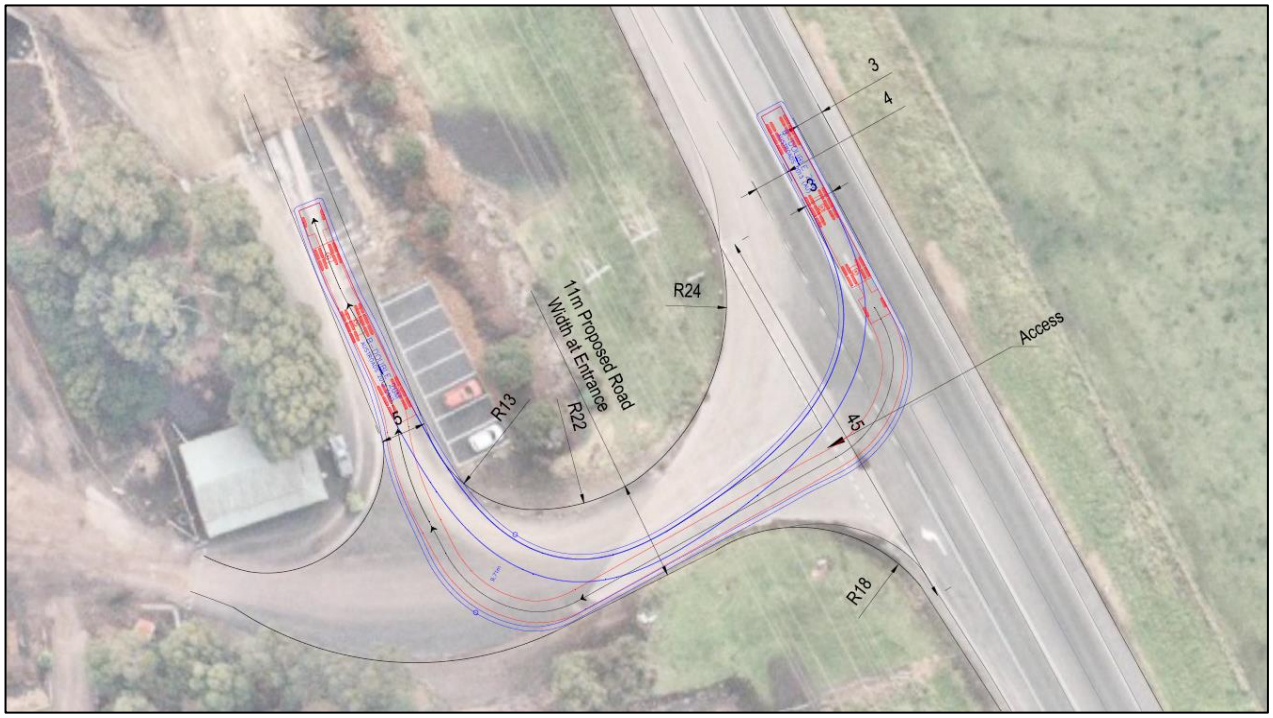


Figure 13 26m B-double swept path (right in)

On the basis of the above the following is noted and recommended:

- Simultaneous two-way (entry and exit) access from Monash Way is achievable for 19 m semi-trailer trucks noting:
  - The 9 m wide PineGro Access Road is recommended to be widened to 11 m, and
  - Internal to the site and separate to access to/from Monash Way, give-way stop/yield movements are required when turning left from the northern access road (egress) or right to the northern access road (entry) on the odd occasion two 19m semi-trailer trucks are entering and exiting at the same time. This is considered appropriate any may easily be managed during the construction period.
  - Minor temporary road widening on internal and external curve radii is recommended as generally shown in the above figures.

- 26 m B-double trucks are expected to be less frequent however a swept path assessment for left out and right in from the north indicate appropriate vehicle swept paths noting the above recommended minor temporary road widening on the PineGro Access Road.
- While not included in this report, a concept spatial assessment (using CAD) of the *one-off* delivery of the two 66kV transformers indicates appropriate access via Monash Way / PineGro Access Road and the access track noting it is anticipated that the Monash Way / PineGro Access Road will need to be temporarily closed to traffic to enable full pavement width swept paths.

The above will be confirmed and addressed appropriately by way of an approved CTMP or TMP to be completed by the construction contractor post permit, especially where OD / OSOM vehicle movements are concerned.

Height Clearance

It is noted that the example 66 kV delivery vehicles are expected to have a minimum vertical clearance requirement in excess of 5 m (in the order of 5.2 m subject to confirmation of specific dimensional requirements).

It is therefore recommended that available height clearances are confirmed along the relevant access routes including the existing overhead power lines at the Monash Way and PineGro Access Road intersection (for construction vehicles, transformer deliver and Country Fire Authority (CFA) requirements).

4.2.3 Latrobe Valley BESS Internal Access

Laydown Areas

The indicative northern laydown area includes an additional turn-around area for trucks; however, the southern laydown area does not currently provide a turn-around area for trucks.

It is recommended that when preparing the final design, both laydown areas include turn-around areas (as appropriate) for trucks. An example turning area is included in Figure 6 and Figure 7 within the northern laydown area.

The requirement for a turning circle will be confirmed during the Project's detail design phase following appointment of a preferred BESS supplier.

CFA Requirements

Internal access to the proposed BESS facility is expected to comply with the access requirements of the CFA, noting the following compliances and/or recommended changes. The Proponent will ensure these requirements are reflected in the detail design phase of the project in consultation with the CFA.

- CFA guidelines require a perimeter road for CFA appliances (vehicles) access to the entire site. While a perimeter road around the whole BESS facility is not currently proposed, subject to CFA approval a number of internal access roads are provided in addition to the southern boundary perimeter road (primary road access) which provides access to the various parts of the BESS facility.
- It is recommended that proposed internal access roads are sealed and comprise 'all-weather construction' and be able to accommodate 15 tonne CFA appliances (vehicles).
- Internal access roads comprise a min. 4 m trafficable width with a clear min. 4 m vertical clearance.
- Average grades are expected to be less than 1:7 with a max. 1:5 for no more than 50 m.
- Existing and proposed internal access roads are expected to have dips of no more than 1:8 (sag and summit grades).
- The main internal access road is sufficiently wide to allow two vehicles to pass (and effectively provide required 20m x 6m 'passing bays'). The remainder of secondary internal roads within the Northern and

Southern BESS sites comprises 4 m wide carriageways, however are sufficiently short that dedicated passing bays are not required under CFA guidelines.

- CFA requirements include a minimum of two access points for CFA appliances (vehicles) to access the BESS facility. In this instance one access is proposed due to the extent of flooding constraints within the site resulting in the feasibility of two access points being unlikely. This will require CFA approval and / or dispensation from this requirement.

Notwithstanding the above, it is recommended that a Bushfire Management Plan (BMP) and/or Emergency Management Plan (EMP) be prepared in consultation with the CFA and other relevant stakeholders.

5 Transport Impact Assessment

5.1 Traffic Generation

5.1.1 Construction Phase

Based on the information provided by the Proponent, under the worst-case scenario of Northern BESS and Southern BESS to be constructed simultaneously, the construction of the proposed BESS Facility is understood to generate the following *peak* traffic movements during *peak* construction activities as summarised below and illustrated in Figure 14:

- 70 light vehicles one-way ('in' or 'out') vehicle movements per day, and
- 8 heavy vehicles (truck) one-way ('in' or 'out') vehicle movements per day.

This equates to a total of 78 'in' or 'out' vehicle movements over an entire day (i.e. one-way movements), or 156 'in' and 'out' vehicle movements over an entire day (i.e. total two-way movements).

It is noted that during non-peak construction activities, construction related traffic movements are expected to be significantly less.

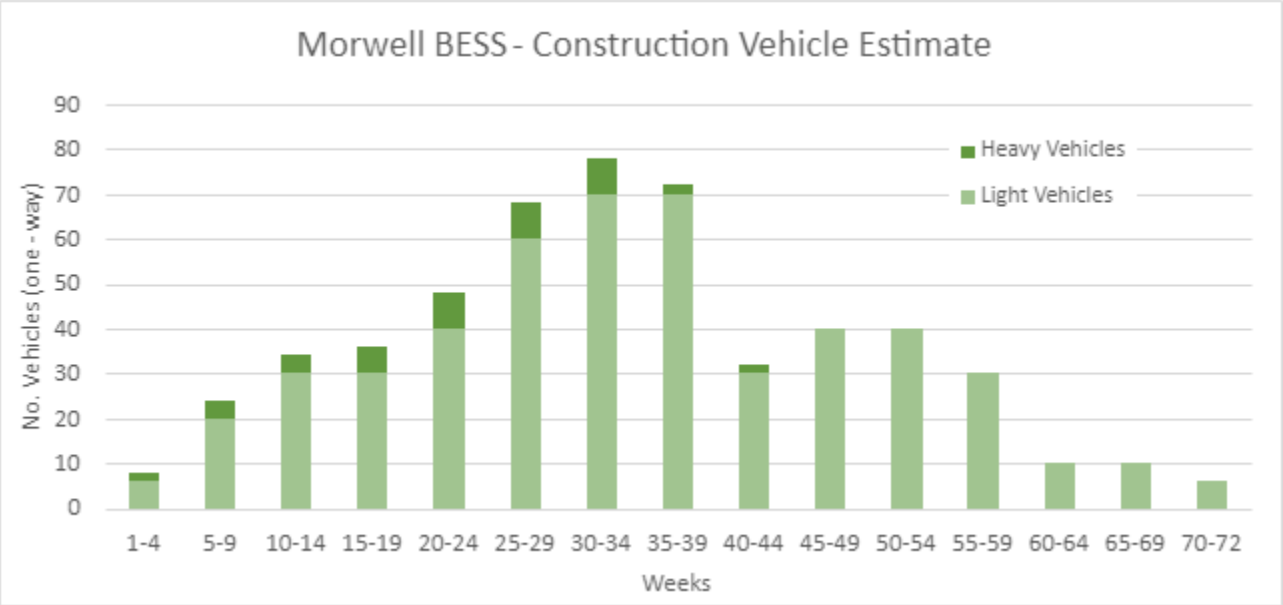


Figure 14 Latrobe Valley BESS - Construction Vehicle Estimate (daily)

5.1.2 Operational and Maintenance Phase

As noted previously, BESS facilities are usually monitored remotely in real-time and do not require dedicated staff to be on-site. Staff are however required to access the site from time to time for inspections and maintenance activities. Based on information provided by the Proponent it is understood that up to two (2) staff could normally be expected to be on-site at any time.

On this basis up to two entry and egress movements per day (two 'in' and two 'out') could be expected to be generated by the proposed BESS facility during normal operation.

5.2 Impact Assessment

The performance measures adopted to assess the mid-block performance of the external road network (Monash Way and PineGro Access Road) are *Level of Service* (LOS) and *Volume over Capacity Ratio* (V/C Ratio (DOS)).

- LOS is defined in the Austroads *Guide to Traffic Management* (Part 3) as a quantitative measure for ranking operating conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience.

  LOS is rated from A (best, free flow conditions) to F (worst, breakdown in vehicle flow, congestion). LOS 'C' is considered a minimum desirable service level for both metropolitan fringe and rural areas.

  Mid-block LOS levels for V/C Ratios have been adopted from the *Highway Capacity Manual* (2010).

- V/C Ratio is broadly defined as the volume versus the available capacity (sometimes referred to as DOS) and is calculated by dividing the total one-way volume on a road by the road's mid-block vehicle capacity based on lane types defined in Austroads *Guide to Traffic Management* (Part 3). For the purposes of this assessment, lane capacities of 900 vehicles per hour in each direction of travel have been assumed (based on a four-lane divided carriageway).

On the above basis, an assessment of construction phase and maintenance & operation phase related traffic movements is included in the following section below.

5.2.1 Construction Phase

Monash Way

Table 4 below sets out a mid-block LOS assessment of Monash Way, conservatively (on the high side) assuming all 'in' movements occur in the AM peak hour and all 'out' movements occur in the PM peak hour.

The LOS assessments below are considered *highly conservative* as construction work movements and construction vehicle and delivery movements are also expected to occur before and after the road network peak hours, and also spread out over the day.

Table 4 Monash Way – Existing and Construction Phase Assessment

Direction	Existing AM		Construction AM		Existing PM		Construction PM	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Northbound	490 vph	**A**	568 vph	**B**	470 vph	**A**	470 vph	**A**
Southbound	360 vph	**A**	360 vph	**A**	520 vph	**A**	598 vph	**B**

vph (vehicles per hour (approximate))

Table 4 above indicates that under a conservative assessment, the anticipated peak construction related traffic movements slightly impact the operational service levels along Monash Way (LOS A changes to LOS B). Notwithstanding, overall Monash Way retains excellent and very good service levels in both directions.

PineGro Access Road

PineGro Access Road carries in the order of 130 vehicle movements per day and 10 vehicle movements in the AM and PM peak hours (estimated).

During *peak* construction activity, the Project could be expected to generate in the order of 156 vehicle movements per day comprising 140 light vehicle and 16 truck movements. This equates to 70 light vehicle and eight truck movements 'in' and 'out' during the AM and PM peak periods, respectively.

While in quantum this represents a relatively considerable increase in traffic against existing traffic volumes, the Monash Way / PineGro Access Road is expected to be able to accommodate this increase in traffic volumes from a capacity perspective.

Notwithstanding, necessary traffic management treatments will be confirmed and addressed appropriately by way of an approved CTMP or TMP.

On this basis, the PineGro Access Road is expected to include appropriate traffic management during the construction phase which may include additional signage, management of entry and exit movements and /or speed reductions on Monash Way.

5.2.2 Operational and Maintenance Phase

During normal activities during the operation and maintenance phase up to two staff could be expected on-site which is expected to result in 2 vehicle movements ‘in’ in the AM and 2 vehicle movements ‘out’ in the PM peak periods.

Against existing traffic volumes on Monash Way and the PineGro Access Road, the development proposal’s additional vehicle movements generated under the operation and maintenance phase (four vehicles per day), could not be expected to notably impact on the capacity or safety of the surrounding road network.

6 Summary

On the basis of the above discussions and analysis the following is summarised:

a) Two port options (Port of Melbourne and Port of Hastings) are feasible with several convenient heavy vehicle approved access routes exist for access to the proposed BESS facility from Morwell.

b) The current indicative design allows for thirty-two (32) permanent car parking spaces (16 spaces within both the north and south BESS sites) and is considered appropriate considering Clause 52.06 of the Latrobe Planning Scheme and anticipated operation and maintenance phase staff parking demands. The total car parking provision will be confirmed during the detailed design phase following appointment of a preferred BESS supplier.

c) The proposed parking layout accords with the requirements of Clause 52.6 of the Latrobe Planning Scheme subject to widening the access aisle to 6.4 m.

d) Construction (and operation and maintenance) phase vehicles are expected to be able to appropriately access the site via Monash Way and the Monash Way / PineGro Access Road noting the following:

   - 19 m semi-trailer trucks may access Monash Way and the PineGro Access Road with simultaneous two-way movements subject to minor temporary road widening on the PineGro Access Road as discussed in Section 4.2.2,
   - 26 m B-double trucks may access Monash Way and the PineGro Access Road noting the minor temporary road widening discussed in Section 4.2.2,
   - the largest delivery vehicle (two 66kV transformer prime mover and multiple axle low platform trailer) is expected to appropriately access the site via the Monash Way and the PineGro Access Road, and
   - It is recommended that available height clearances are confirmed along the relevant access routes included the existing overhead power lines at Monash Way / PineGro Access Road noting the example 66 kV delivery vehicle is expected to have a minimum vertical height clearance required in excess of 5 m.

   Notwithstanding the above, any required traffic management treatments and mitigation works are to be identified and addressed by way of an approved CTMP or TMP to be prepared by the construction contractor. This is the responsibility of the Proponent and would be prepared in consultation with the construction contractor.

e) It is recommended that when preparing the final design, both laydown areas include turn around areas (as appropriate) for trucks. This requirement will be confirmed during the detail design phase.

f) The BESS proposal is expected to comply with access requirements of the CFA. A BMP and/or EMP are recommended to be completed in consultation with the CFA during the Project's detailed design.

g) The proposed Project is estimated to generate the following vehicle movements during the *construction phase* during the peak construction period:

   - 70 light vehicle one-way movements per day (total 140 vehicle movements per day), and
   - 8 heavy vehicle one-way movements per day (total 16 vehicle movements per day).

h) Against existing traffic volumes on Monash Way and the PineGro Access Road:

   - Construction phase vehicle movements are expected to have a net zero to impact to operation service levels along Monash Way,
   - Construction phase vehicle movements are expected to be able to be accommodated by the Monash Way / PineGro Access Road intersection noting the PineGro Access Road is expected to include appropriate traffic management discussed in Section 5.2.1, and

- Operation and maintenance vehicle movements could not be expected to notably impact the capacity of safety of these roads (and the surrounding road network).

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