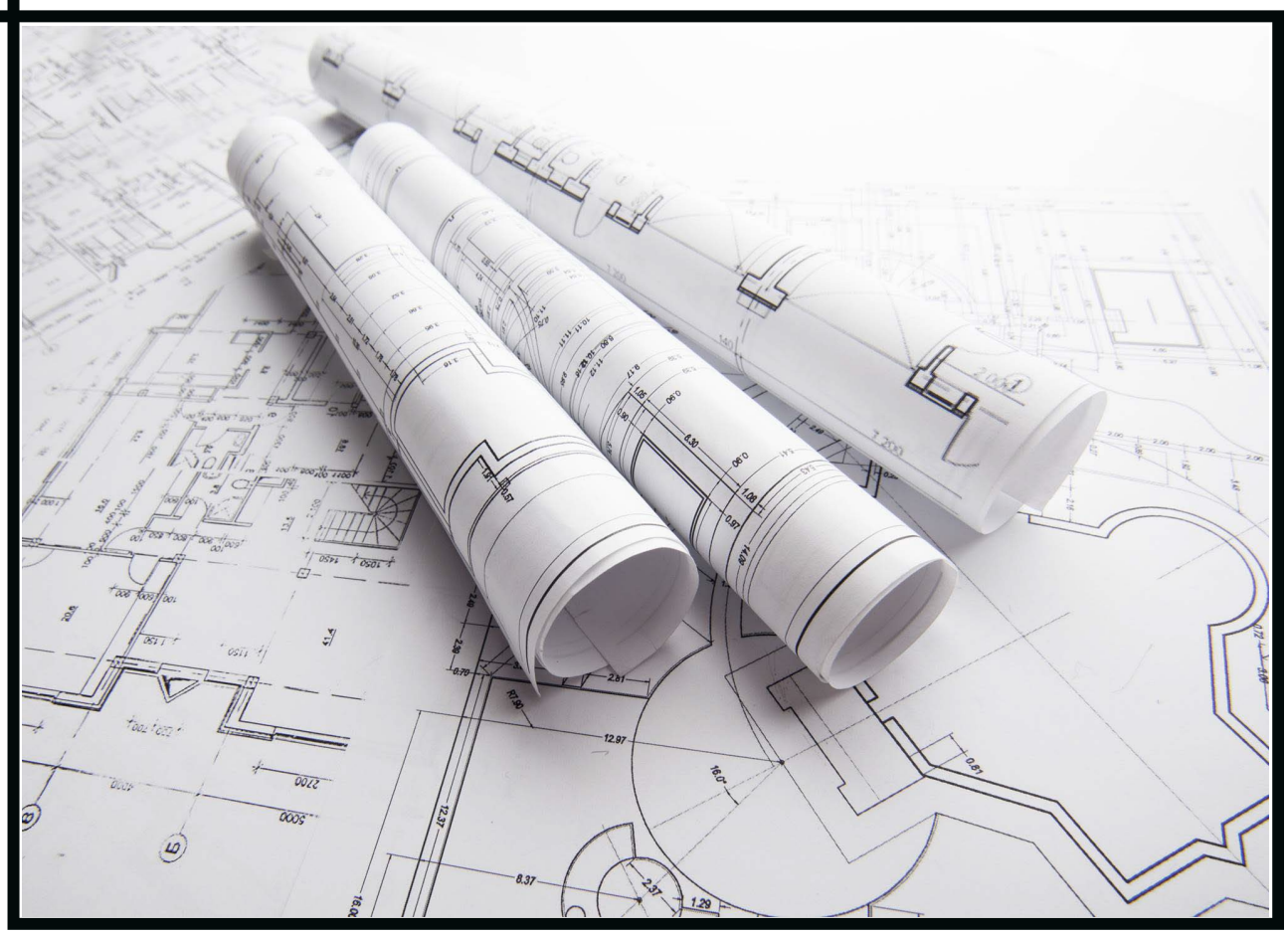

TRANSPORT IMPACT ASSESSMENT- BARWON SOLAR FARM

ADVERTISED PLAN

Prepared for
ELGIN ENERGY
6 April 2023

URBIS

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Graham McCabe
Associate Director	Supun Perera
Consultant	Lucas Biurra-Hoy
Project Code	P0031400
Report Number	Final

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We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

ADVERTISED PLAN

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1. INTRODUCTION

1.1. OVERVIEW

Urbis has been engaged by Elgin Energy to prepare a Transport Impact Assessment (TIA) for the proposed Barwon Solar Farm development. This TIA accompanies the Planning Permit application for the development of land for a solar farm and ancillary services.

Urbis has assessed the proposed development, provided input to the design, and confirms that the proposal will achieve satisfactory traffic and transport outcomes and is designed in accordance with the relevant Australian Standard and Council guidelines.

1.2. REPORT STRUCTURE

This report outlines an assessment of the potential transport impacts of the proposed development, including

- Existing transport and traffic networks serving the site.
- Proposed development.
- Outline of the development.
- Construction requirements of the development.
- The transport and traffic implications of the proposed development.
- Conclusion.

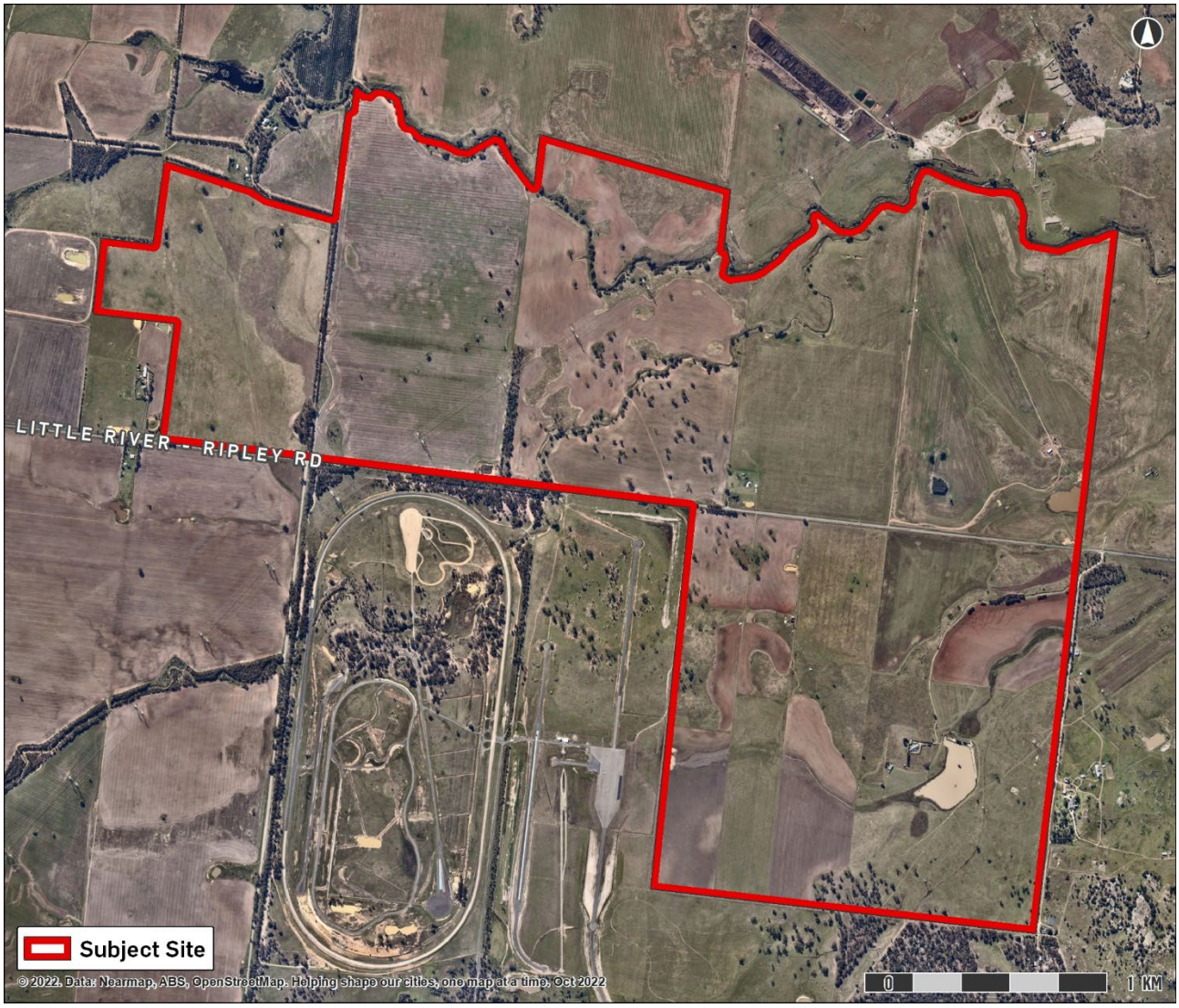
2. EXISTING CONDITIONS

2.1. THE SITE

The site of the proposed solar farm is located on Lots 2\LP140470, 17\PP3910, 1\PS434520, 2\TP15944, 24\PP3910, 23\PP3910, 22\PP3910 on Little River Ripley Road in Barwon, rural Victoria. The site is surrounded by other rural and agricultural land uses. The Ford proving ground is located opposite and adjacent to the various lots encompassing the site.

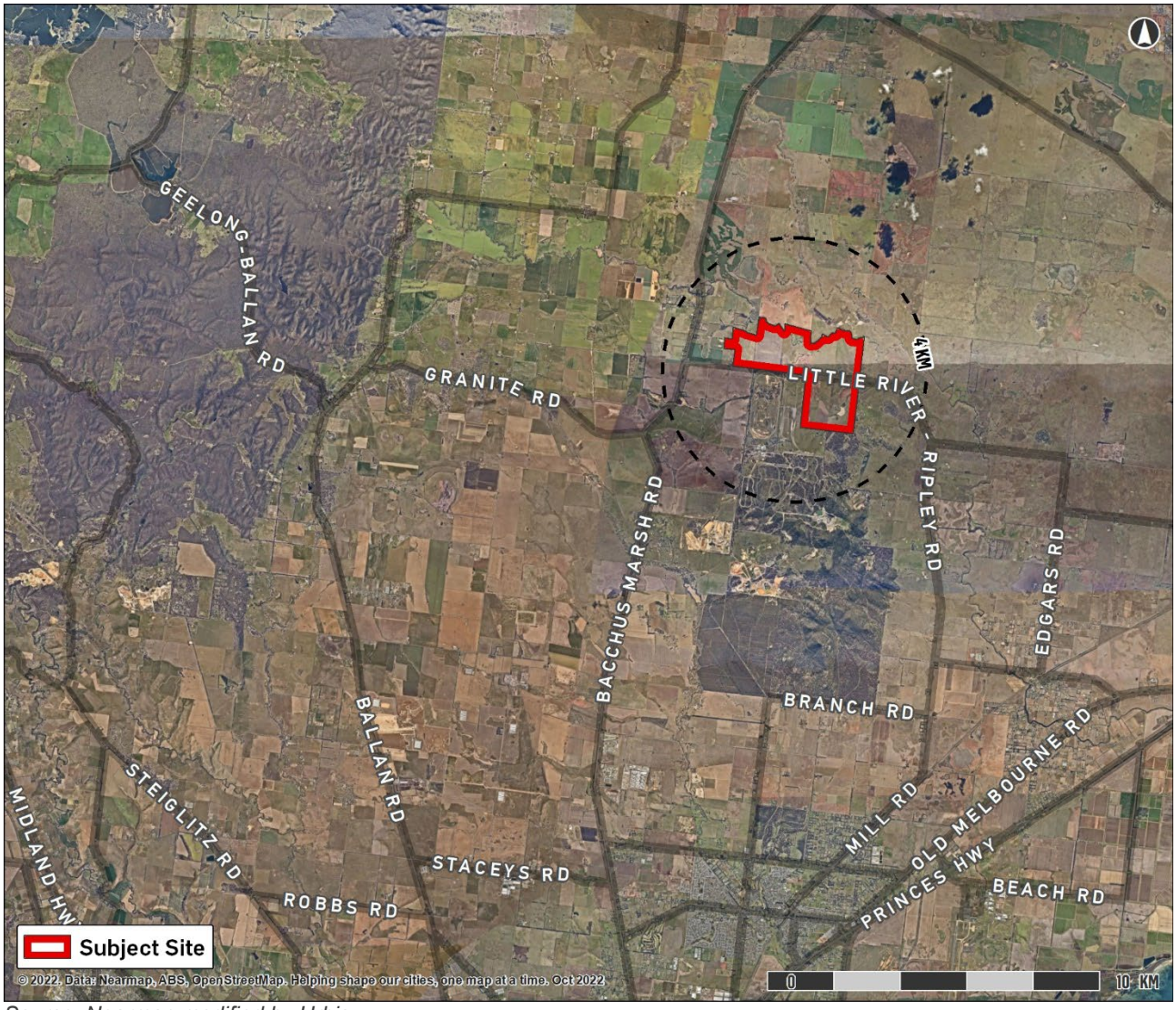
The site is approximately 735 Ha in size, is relatively flat, and is currently used for agricultural purposes. There are a few scattered structures on the site, the largest of which is the farmhouse located on the southern portion of the site. Little River Ripley Road separates the northern and southern portions of the site and is a sealed road with one lane in each direction. It connects with Bacchus Marsh Road to the west and You Yangs Road to the southeast, which leads into the town of Little River. The current internal road network of the site includes a series of dirt roads, connecting the roads surrounding the site boundary to agricultural infrastructure and the farmhouse.

Figure 1 Site map



Source: Nearmap modified by Urbis

Figure 2 Site context



Source: Nearmap modified by Urbis

2.2. LAND USE PATTERNS

The site is located on FZ Farming Zone land. The purpose of this zoning is to enable land use for agriculture and to encourage the retention of productive agricultural land. The lands surrounding the site to the north, south and west are also zoned FZ. To the east of the site, the land is zoned RCZ Rural Conservation Zone.

2.3. EXISTING TRANSPORT NETWORK

2.3.1. Road Hierarchy

Roads within Victoria are categorised by classification (ownership) and function (use).

Road Classification

Roads are classified (as defined by the Road Management Act 2004) based on their importance to the movement of people and goods within Victoria (as a primary means of communication).

The classification of a road allows the Department of Transport to exercise authority on all or part of the road. Classified roads include Freeways, Arterial Roads Municipal Roads, and Non-Arterial State Roads.

- **Freeways** – Major links through Victoria and between and within major urban areas. They are the principal traffic-carrying roads and are controlled and maintained by either VicRoads or a private operator. Privately operated Freeways include Eastlink and Peninsular Link.
- **Arterial –** Roads of secondary importance between Freeways and Municipal Road which provide the main connections to and between urban centres. Arterial roads are the responsibility of VicRoads for maintenance funding, though councils fund and maintain service roads, pathways, and the roadside.
- **Municipal –** Municipal Roads are the responsibility of councils for maintenance funding. These roads provide connections within local centres and form part of the respective municipalities' local road network. VicRoads may fund some maintenance and improvements based on specific programs (e.g., urban bus routes and road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from VicRoads.
- **Non-Arterial State Road** – A State Road which is not an arterial road. These roads provide access to key services such as dams as well as access to national parks. These roads are the authority of the Department of Environment Land Water and Planning or Parks Victoria.

Road Function

The Department of Transport considers two essential needs which must be met when considering the functionality of a road

- The traffic movement, or mobility, function – providing the means by which people and goods can move from one place to another.
- The access function – providing access to properties and land uses adjacent to the road.

In Victoria, road function is classified as follows

- **Arterial roads** – The main function of which is to provide for the safe and efficient movement of people and freight.
- **Local roads** – Provide direct access to abutting land uses and contribute to the overall functioning of areas bounded by arterial roads or other barriers. The basic function of a local road is to provide a good environment in which to live or conduct a business and to enable vehicular access to abutting land.

2.3.2. Surrounding Roads

The characteristics of the surrounding road network are detailed in **Table 1**. The surrounding road network is shown in **Figure 2**.

Table 1 Characteristics of surrounding roads

Road	Little River Ripley Road	Sandy Creek Road	Mt Rothwell Road	Bacchus Marsh Road
Classification / Function	Municipal	Municipal	Municipal	Arterial
Sealed (yes / no)	Yes	No	No	Yes
Movement lanes	One lane in each direction	One lane in each direction	One lane in each direction	One lane in each direction
Parking lanes	No	No	No	No
Carriageway width (approx.) (m)	5	10	7	10

Road	Little River Ripley Road	Sandy Creek Road	Mt Rothwell Road	Bacchus Marsh Road
Signposted speed (km / h)	100	100	100	100
Line marking / divided lanes	Yes - near Bacchus Marsh Road, no otherwise	No	No	Yes
Pedestrian pathways	No	No	No	No
Bus stops	No	No	No	No

Source: Nearmap, Google Street View

Figure 3 Surrounding road network

Source: Urbis

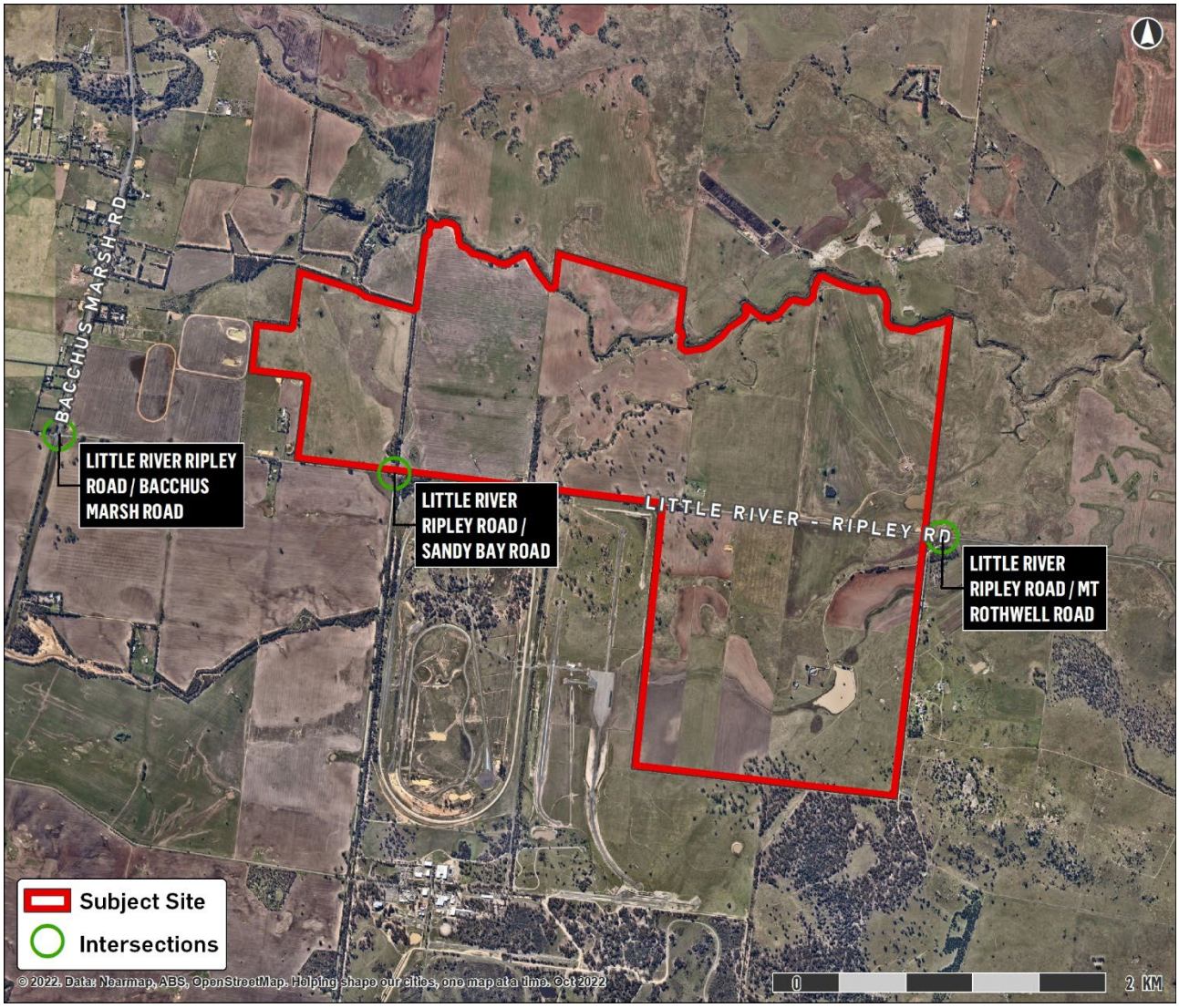
2.3.3. Nearby Intersections

The following intersections are situated within proximity to the site

- Bacchus Marsh Road / Little River Ripley Road.
  - Priority Controlled intersection.
- Little River Ripley Road / Sandy Bay Road.
  - Priority Controlled Intersection.
- Litter River Ripley Road / Mt Rothwell Road.
  - Priority Controlled Intersection.

Figure 4 highlights the surrounding intersections.

Figure 4 Surrounding intersections



Source: Urbis

2.3.4. Existing Road Traffic Volumes

Traffic volumes for Bacchus Marsh Road are provided in the VicRoads Open Data Hub, which provides bi-directional Annual Average Daily Traffic (AADT). The AADT for Bacchus Marsh Road near the intersection of Little River Ripley Road is

- 6,400 vehicles in the northbound direction with six per cent of AADT being heavy vehicles.
- 6,300 vehicles in the southbound direction with eight per cent of AADT being heavy vehicles.

2.3.5. Crash History

Crash and casualty statistics from the VicRoads Safety and Road Rules webpage were analysed for the surrounding road network. These statistics only report crashes that involve tow-away, police reports or ambulance attendance.

There were four crashes reported in the five years between 2016 and 2021 in the area immediately surrounding the site. One of these crashes occurred on Bacchus Marsh Road, one occurred north of Little River Ripley Road and two occurred on Sandy Creek Road.

The nature of the crash that occurred on Bacchus Marsh Road was

- A serious crash in 2017, resulting in one serious injury and one other injury. This crash was described as 'left off the carriageway into an object'. This crash happened in daytime lighting conditions.

The nature of the crash that occurred on Little River Ripley Road was

- A non-serious crash in 2017, resulting in one other injury. This crash was described as 'off the carriageway on a right bend and was a vehicle that rolled'. This crash happened during dawn/dusk lighting conditions.

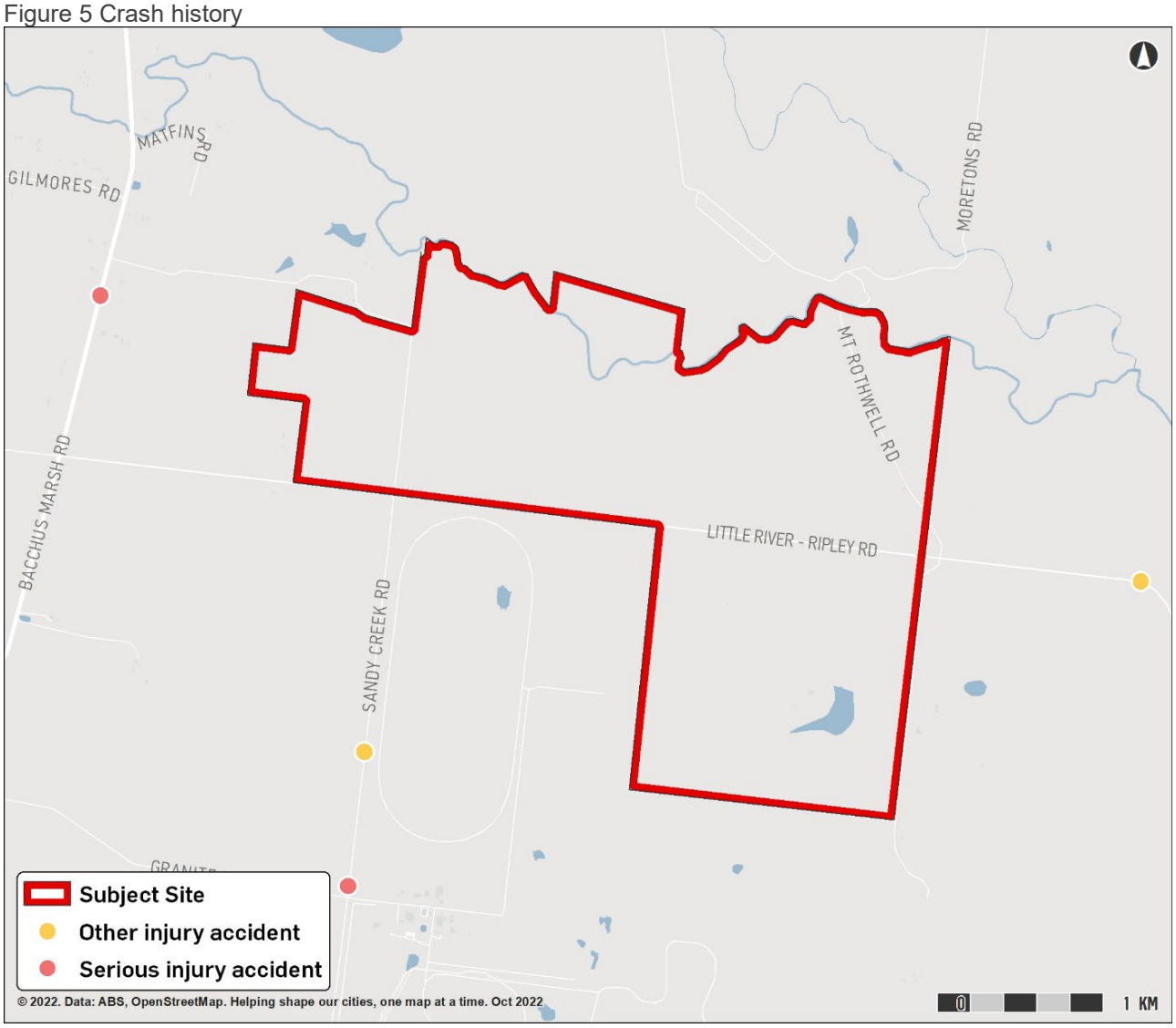
The nature of the crashes that occurred on Sandy Bay Road was

- A non-serious crash in 2020, resulting in three other injuries. This crash was described as 'right off the carriageway into an object'. This crash happened in daytime lighting conditions.
- A serious crash in 2019, resulting in one serious injury. This crash is described as 'right off the carriageway into an object'. This crash occurred in daytime lighting conditions.

The nature of the crashes on Bacchus Marsh Road and Sandy Bay Road indicates driver error and is not indicative of any underlying road safety issues. The crash that occurred on Little River Ripley Road may be due to speed / sight distance perception issues when approaching the curve in the road. There have been no recurring crash themes within the vicinity of the site, indicating no systemic road safety issues.

Figure 5 highlights the location of these crashes.

Figure 5 Crash history



Source: VicRoads

2.3.6. Public Transport Network

There is no public transport infrastructure or services that connect directly to the site. The closest public transport infrastructure is in the town of Little River.

2.3.7. Walking and Cycling Network

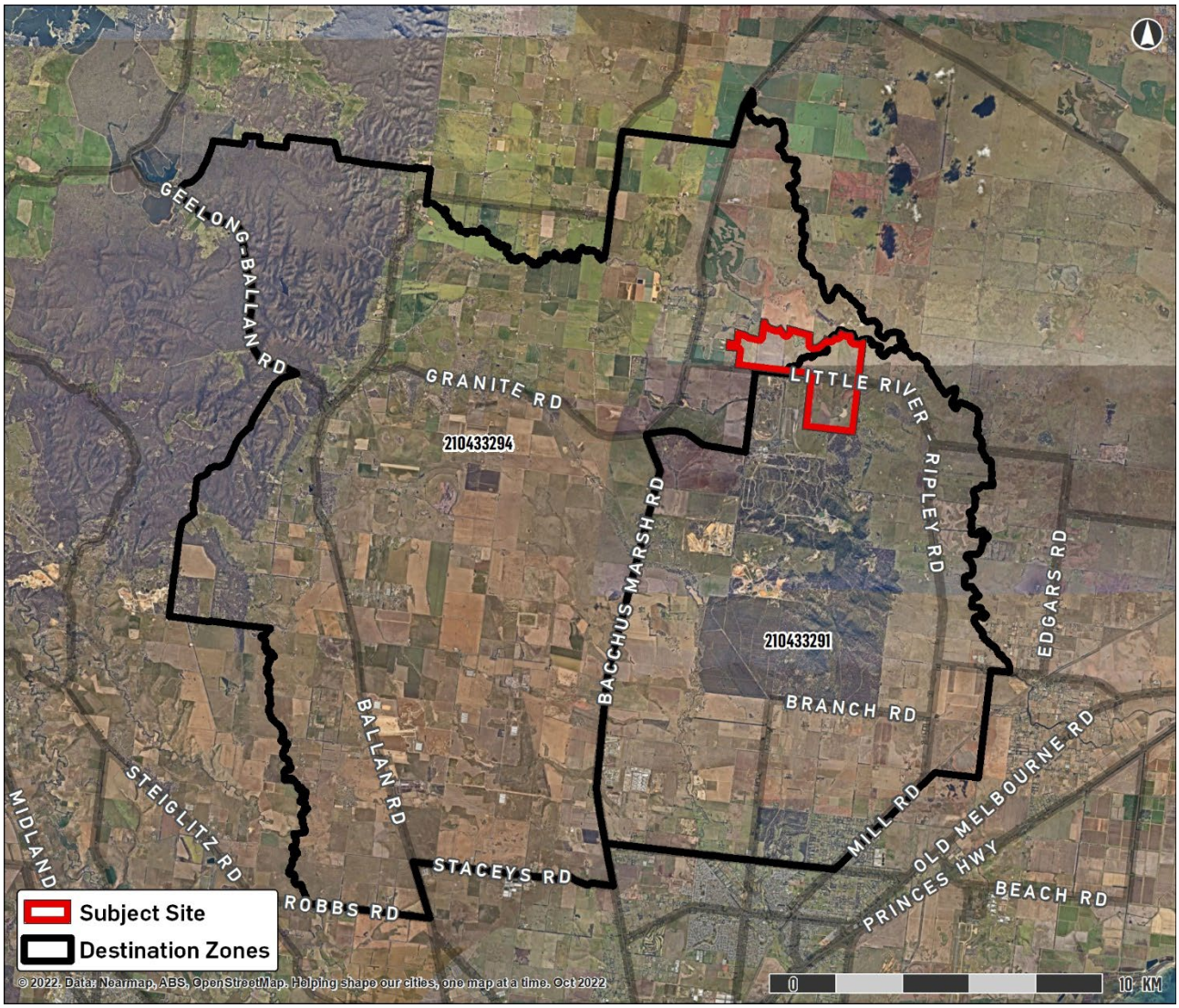
There is limited active transport infrastructure surrounding the site with no footpaths on the roads immediately surrounding the site to enable walking. Cycling is permitted on the shoulder of roads, however, the nature of these roads (often being unsealed or having an unsealed shoulder) makes cycling on these roads challenging even for experienced riders. Cycling is not a major form of transport in regional areas and is more likely used for recreational uses.

2.3.8. Mode Split

A mode split average was determined from two 2016 Australian Bureau of Statistics (ABS) Destination Zones (DZN) that encompass the site. These two destination zones are 210433291 and 210433294. The DZN mode split shows how people working in the vicinity of the site travelled to work on Census Day in 2016

The mode split shown in **Figure 7** highlights the dependency on cars as a method of travel. The next highest mode was 'did not go to work'. This may be reflective of the seasonal workload associated with agriculture.

Figure 6 ABS Destination zone



Source: Urbis

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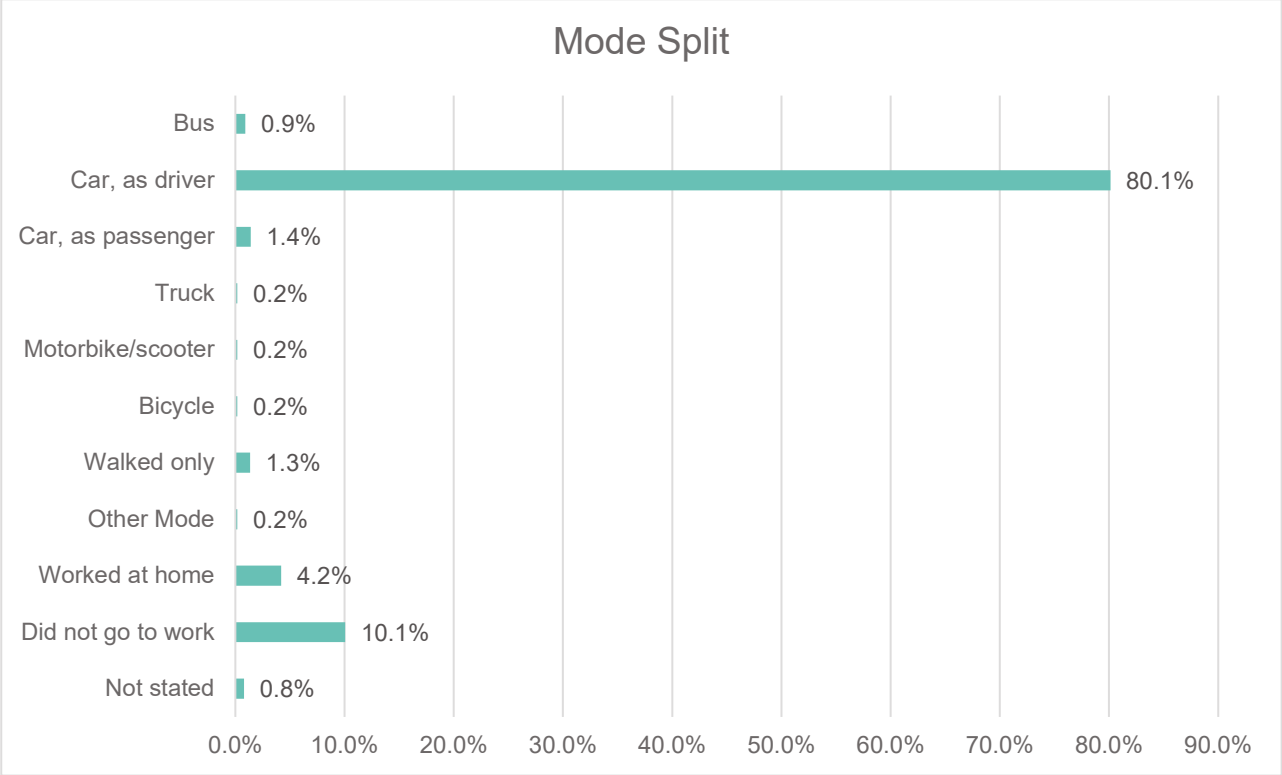
Figure 7 Mode splits



Source: ABS Tablebuilder

3. DEVELOPMENT PROPOSAL

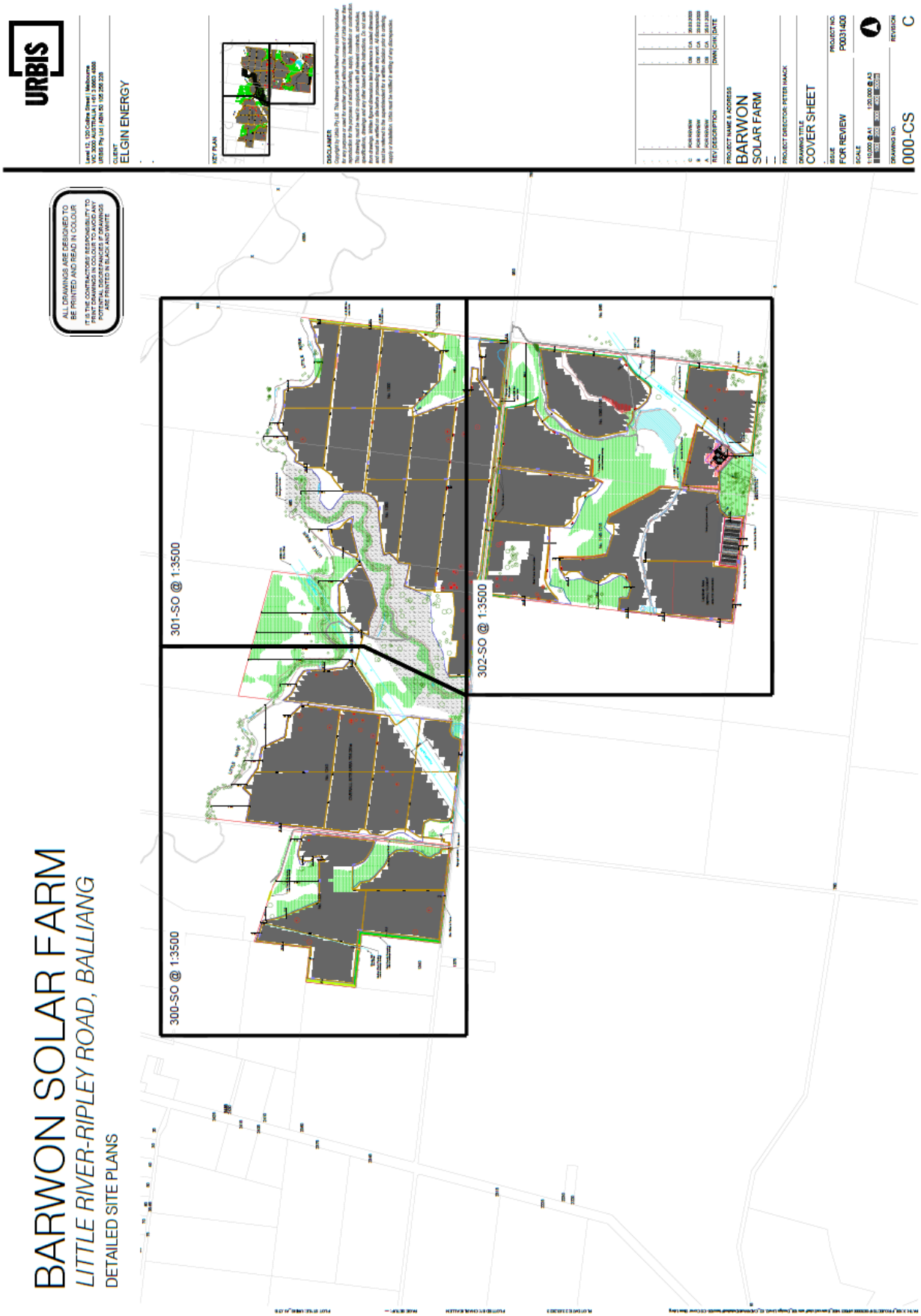
The proposed development is for the construction of a solar farm consisting of approximately 505 ha of solar panels (which will produce approximately 330 Megawatt Peak (MWp)), a battery storage facility capable of storing up to 500 Megawatt-Watt hours and supporting infrastructures such as transformers and high-voltage towers.

3.1. DEVELOPMENT OVERVIEW

The development seeks to

- Remediate existing land to support the development of a solar farm.
- Install solar panels.
- Install battery and other supporting infrastructure.
- Connect to the Victorian power grid.
- Protect key biodiversity and cultural heritage within the site.

Figure 8 Proposed development



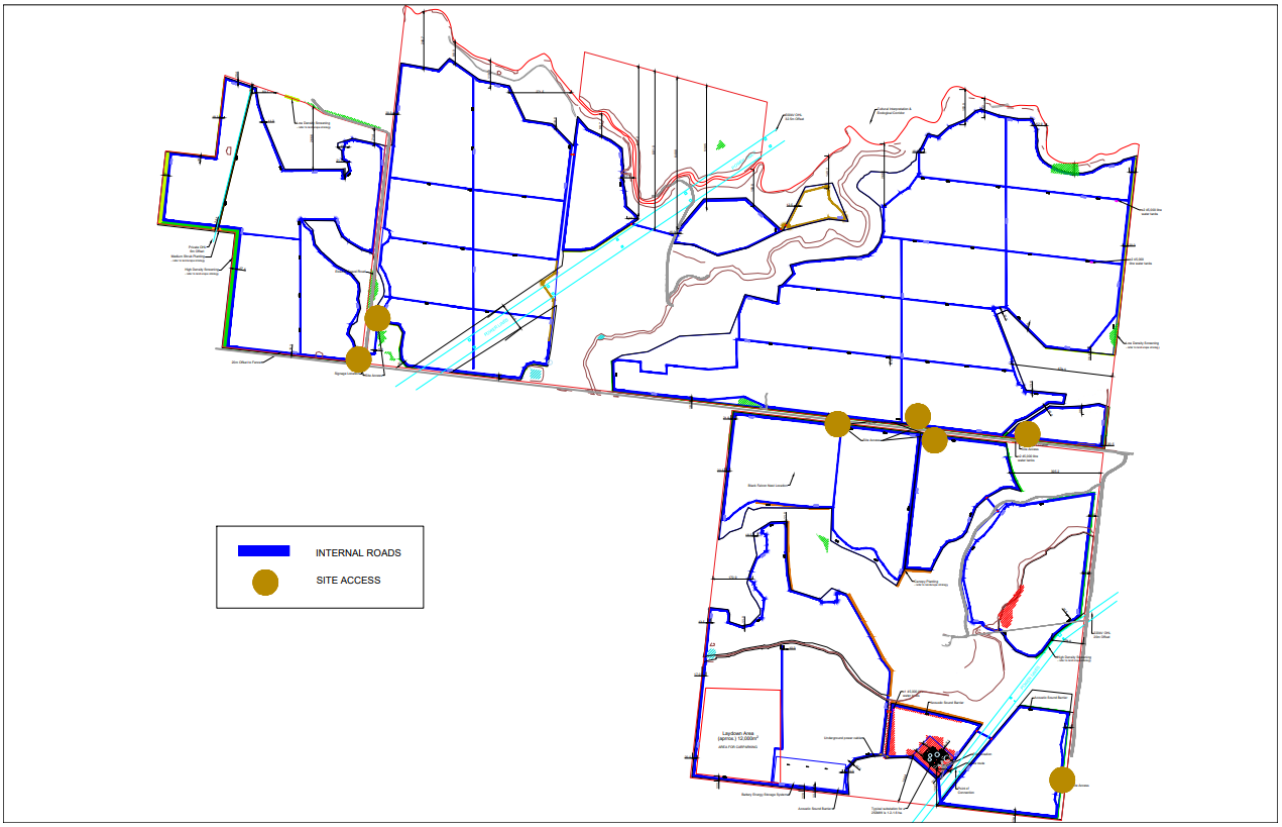
Source: Urbis

3.2. VEHICLE ACCESS

There will be seven vehicle access points to the site in order to comply with the Country Fire Authority (CFA) requirements, six of which will be from Little River Ripley Road and one from Mt Rothwell Road located near the south-eastern extent of the site. There will be two access points for the northwest portion of the site (west of the biodiversity corridor), two points for accessing the northeast portion of the site (east of the biodiversity corridor) and three access points for accessing the southern portion of the site. All of the entry points will be designed to accommodate a CFA firefighting vehicle at a minimum. All service vehicles associated with the development will also access the site from these entry points. The specific access point for service vehicles will depend on the task being undertaken and will likely change on a day-to-day basis.

The proposed location of vehicle access points is shown in **Figure 9**.

Figure 9 Vehicle access points



Source: Urbis

3.3. INTERNAL ROAD NETWORK

There are several roads located within the site. They are typically broken down by their function as follows

- Site ring road (enabling access to all parts of the site).
- Internal access way (the primary function of servicing the panels).

Table 4 describes the internal access roads.

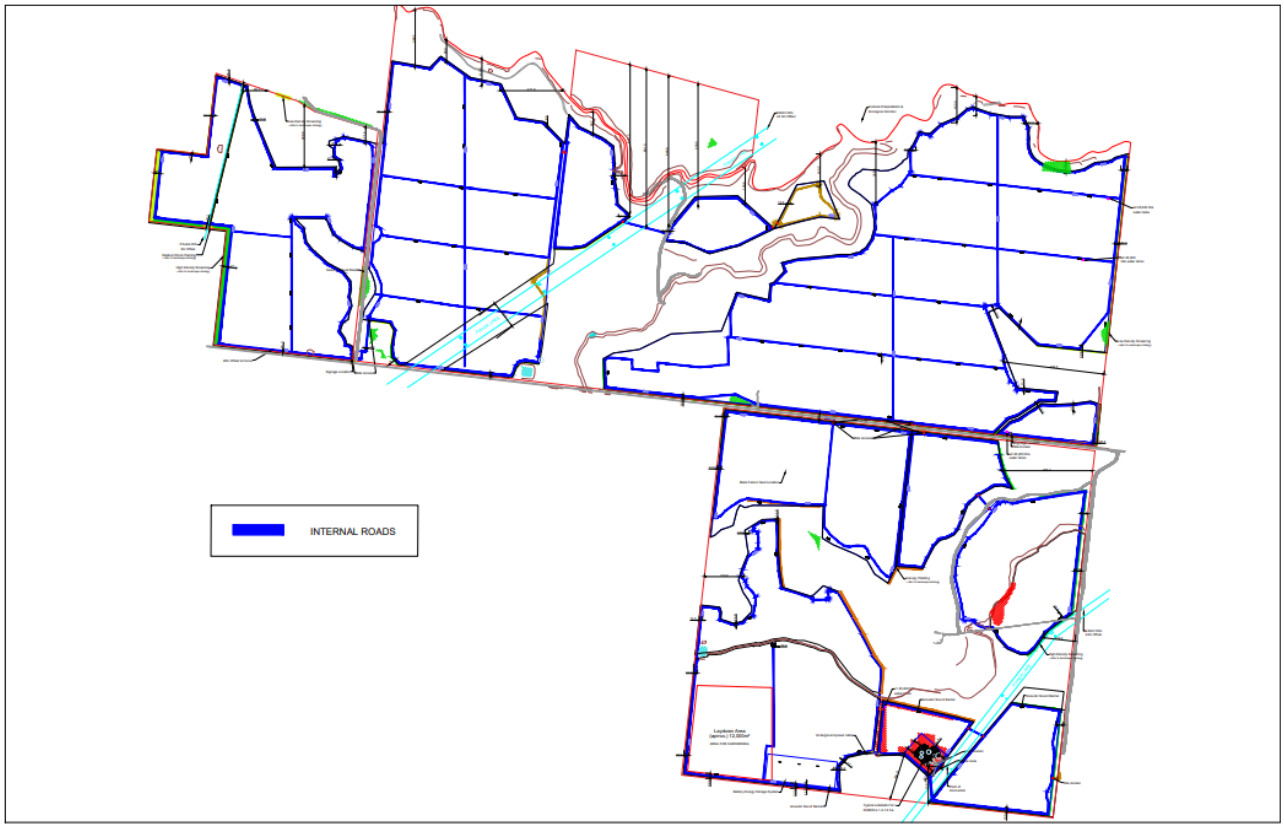
Table 2 Internal Road types

Name	Width at widest point	Function
Northern ring road	6 m	Brings vehicles in and out of the site and serves as the primary means of travelling around the site. Must comply with CFA guidelines of being an all-weather seal, must be four metres wide and must have a passing bay every 600 metres with a length of 20 metres and a carriageway width of 6 metres.
Northern internal access ways	6 m	Connects the ring road to the panels themselves, the primary function of these roads is to service and clean the panels. These roads are not subject to the same CFA requirements as the ring road.
Southern ring road	6 m	Brings vehicles in and out of the site and serves as the primary means of travel around the site. Must comply with CFA guidelines of being an all-weather seal, must be four metres wide and must have a passing bay every 600 metres with a length of 20 metres and a carriageway width of 6 metres.
Southern internal access way	6 m	Connects the ring road to the panels themselves, the primary function of these roads is to service and clean the panels. These roads are not subject to the same CFA requirements as the ring road.

Source: watch this SPACE design

The internal road network of the site is outlined in **Figure 10**.

Figure 10 internal road network



Source: Urbis

3.4. VEHICLE PARKING ARRANGEMENTS

There will be no on-site car parking for vehicles accessing the site. It is anticipated that only one or two vehicles will access the site on a daily basis to carry out routine maintenance and cleaning of the panels. These vehicles will pull over on one of the internal service roads to carry out this routine maintenance. Given that vehicle trip generation is expected to be no greater than two vehicles per day during the operational phase, this is deemed acceptable as the vehicles will not be blocking any traffic on the internal road network.

3.5. STAFFING LEVELS

While the facility is to operate 24 hours a day seven days a week, there is only expected to be one staff member on-site during the day (between 9 AM and 5 PM) to carry out routine maintenance and cleaning. This staff member will access the site with either a utility vehicle or van carrying maintenance or cleaning materials. The operational function of the site will be managed remotely in an offsite location.

4. CONSTRUCTION REQUIREMENTS

4.1. CONSTRUCTION VEHICLE SIZE

The largest standard vehicle accessing the site during the construction phase will be a B-Double measuring 26.5 metres in length and 2.5 metres in width. There will also be an oversized vehicle that will access the site to support the delivery of large items such as transformers and the battery pack.

Vehicles generated by construction can be categorised as follows

- Light vehicles associated with transporting staff to and from the site such as shuttle buses and personal vehicles.
- Medium and Heavy Rigid Trucks will be utilised for delivering raw materials and smaller plant materials, waste collection and foundation laying.
- Articulated Vehicles and B-Doubles, which will be utilised to transport larger plant materials such as solar panels.
- Oversized articulated vehicles will be used to transport large plant materials such as battery packs and transformers.

Separate approval will be required from Council to allow for the access of vehicles over 4.5 Gross Vehicle Mass (GVM) to travel along Litter River Ripley Road. An oversized / over-mass vehicle permit will also need to be obtained from the National Heavy Vehicle Regulator (NHVR) for oversized vehicles to access the site. Construction timing and scheduling for the arrival of these vehicles are to be outlined in further detail in a Construction Traffic Management Plan (CTMP).

4.2. CONSTRUCTION VEHICLE GENERATION

Table 3 outlines the anticipated construction traffic generation.

Table 3 Anticipated traffic generation during construction

Vehicle Type	**Peak vehicle movements per day**	
	Daily	Peak hour
Light Vehicles	53	22
Medium and Heavy Rigid Vehicles	7	2
Articulated Vehicles	9	3
Oversize / Overmass vehicles	Variable based on the construction schedule	2

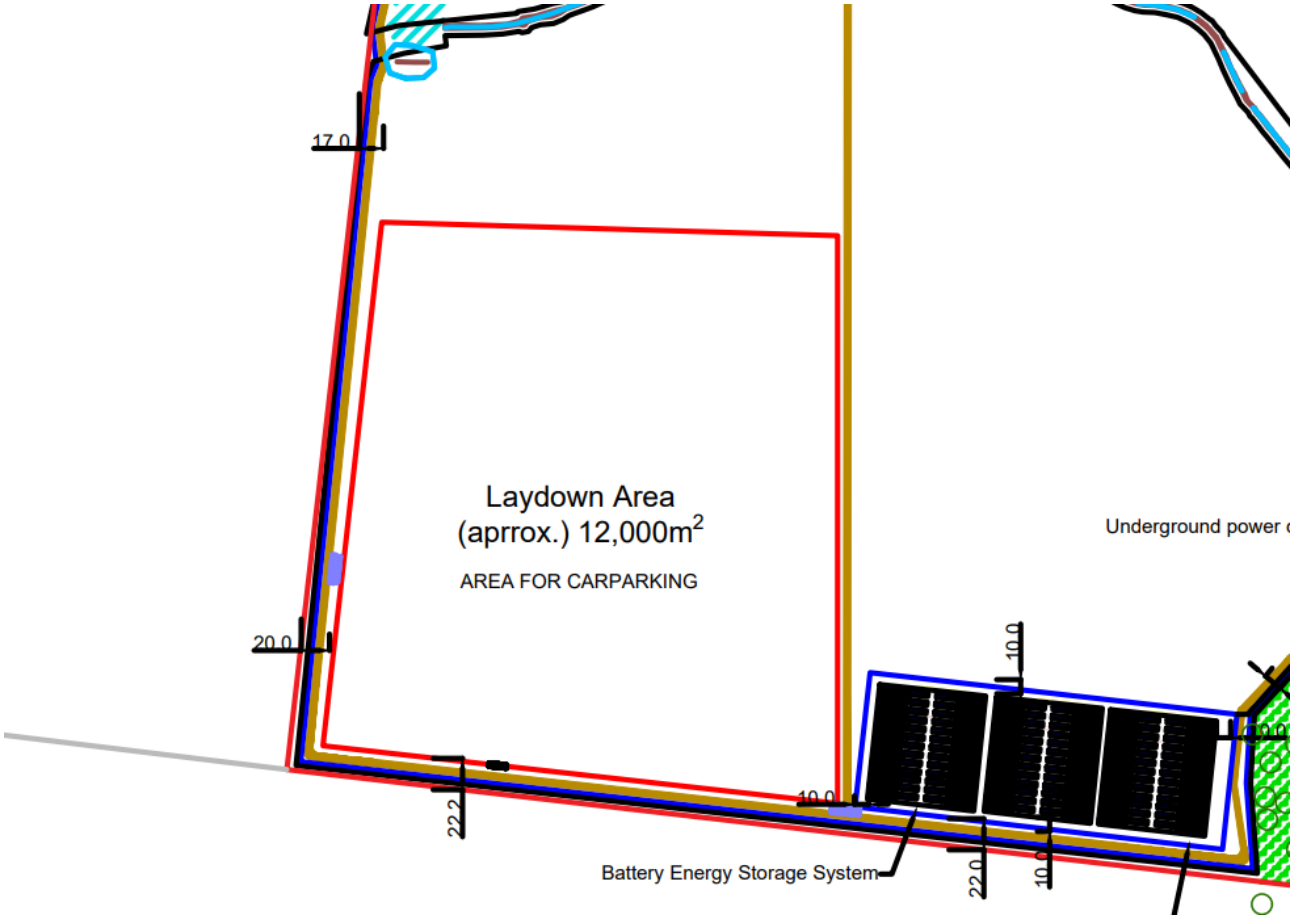
Source: Urbis

4.3. CONSTRUCTION VEHICLE ROUTE

Vehicles will be accessing the site from the port of Melbourne. Vehicles accessing the site will be approaching from the north of Bacchus Marsh Road before turning left onto Little River Ripley Road. Vehicles will then access the site from Little River Ripley Road or Mt Rothwell Road.

Due to heavy vehicle restrictions on Little River Ripley Road, heavy vehicles will not be able to turn out of the site and travel eastbound to circulate back onto Bacchus Marsh Road. Vehicles will be required to travel in the westbound direction and return to Bacchus Marsh Road the same way vehicles are arriving. As previously indicated, Little River Ripley Road has a narrow, sealed five metre wide carriageway with unsealed shoulders. This will make it challenging for articulated vehicles such as Semi-Trailers and B-Doubles to pass each other in the opposite direction. Further details of the delivery schedule to ensure that there are no vehicle conflicts should be outlined in the CTMP. An indicative laydown area is nominated within the site for construction material and construction worker parking as shown in **Figure 11**. Further details of this lay down area will be outlined in the CTMP. This laydown area has no bearing on the operation of the solar farm or battery facility.

Figure 11 Indicative construction laydown area



Source: Urbis

5. TRANSPORT IMPACT ASSESSMENT

5.1. PUBLIC AND ACTIVE TRANSPORT

5.1.1. Public Transport

There are no public transport services connecting to the site, it is anticipated that all staff during the operational phase of the development will be traveling to the site via private vehicles. Travel arrangements for construction workers will be confirmed in greater detail in the CTMP. No public transport routes will be impacted during both the construction and operational phase of the development.

5.1.2. Active Transport

As previously discussed, there is limited active transport infrastructure connecting to the site. None of the roads surrounding the site have footpaths. The remote location of the site also makes it impractical to access via walking. Cycling is permitted on the carriageway, however, the narrow width of Little River Ripley Road, and other surrounding roads being unsealed, make it impractical to access the site via cycling.

5.2. TRAFFIC AND ACCESS

5.2.1. Access and Servicing

There are seven proposed access points, which will be used to service the site, six of which will be from Little River Ripley Road, the sixth is accessed from Mt Rothwell Road. The access from Mt Rothwell Road will be used to access the battery storage system and the substation. The access point which is used on a day-to-day basis will vary based on the type of work that is being undertaken at the site on that specific day and will be at the discretion of the service vehicle operator.

5.2.2. Trip Generation

Trip generation during the operation phase of the development will be no more than two vehicle trips per day. These vehicles will be accessing the site to perform servicing activities such as cleaning the solar panels and servicing the battery / substation. This vehicle will likely be a B99 vehicle or Small Rigid Vehicle (SRV) in nature. Given that a maximum of two vehicle trips will be generated by the site on a daily basis, the traffic impact on the surrounding road network is expected to be negligible.

5.2.3. Emergency Vehicle Access

The CFA *Design Guidelines and Model Requirements for Renewable Energy Facilities (2022)* outlines design requirements for solar farms regarding access for emergency vehicles. *Section 6.2.1 Emergency Vehicle Access* of the CFA design guidelines outlines the following requirements for emergency vehicle access at a Solar Farm

a) Construction of a four (4) metre perimeter road within the perimeter fire break.

b) Roads must be of all-weather construction and capable of accommodating a vehicle of fifteen (15) tonnes.

c) Constructed roads should be a minimum of four (4) metres in trafficable width with a four (4) metre vertical clearance for the width of the formed road surface.

d) The average grade should be no more than 1 in 7 (14.4% or 8.1°) with a maximum of no more than 1 in 5 (20% or 11.3°) for no more than fifty (50) metres.

e) Dips in the road should have no more than a 1 in 8 (12.5% or 7.1°) entry and exit angle.

f) Roads must incorporate passing bays at least every 600 metres, which must be at least twenty (20) metres long and have a minimum trafficable width of six (6) metres. Where roads are less than 600 metres long, at least one passing bay must be incorporated.

g) Road networks must enable responding emergency services to access all areas of the facility, including fire service infrastructure, buildings, and battery energy storage systems and related infrastructure.

h) The provision of at least two (2) but preferably more access points to the facility, to ensure safe and efficient access to and egress from areas that may be impacted or involved in fire. The number of access points must be informed through a risk management process.

The design of the solar farm incorporates the following items to support the compliance of the proposed development with the CFA guidelines

- A perimeter road that is four metres wide with a passing bay of six metres wide and 20 metres long at least every 600 metres.
- Gravel perimeter roads will be constructed to accommodate a 15-tonne vehicle during all weather conditions.
- The maximum grade does not exceed one in five and the average grade does not exceed one in seven.
- The internal road network and perimeter roads are accessible from access points off Little River Ripley Road and Mt Rothwell Road. Given the size of the site, seven access points from the surrounding road network are provided.
- The internal road network allows for access to all areas of the site.
- The manoeuvrability of this vehicle will be swept path tested prior to the issue of a Construction Certificate.

6. CONCLUSION

Based on this assessment, the following can be concluded about the proposed solar farm development at Barwon.

During the peak construction stage of the development, approximately 20 vehicles will access the site per hour. Vehicles accessing the site for construction purposes will likely do so from the north of Bacchus Marsh Road before turning left into Little River Ripley Road. A Construction Traffic Management Plan will be prepared prior to the issue of a Construction Certificate, detailing the construction trip generation levels, the haulage routes, and the appropriate operational measures to mitigate any traffic impacts.

During the operational stage of the development, there will be a maximum of two vehicle trips per day accessing the site for maintenance and servicing. The size of this vehicle will be either that of a B99 or SRV. The access point used on the day will be at the discretion of the maintenance crew based on the works that are being undertaken on that day. The traffic generated from the operations of the proposed development will have a negligible impact on the surrounding road network.

The access points to the site's internal road network have been designed in accordance with Council, VicRoads and CFA guidelines. The proposed development includes seven access points from the road network and features six metre wide passing bays every 600 metres to allow for CFA fire truck access.

7. DISCLAIMER

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All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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