Appendix A Updated Project description

3. Updated Project description

3.1 Project location

The Project is in the Forbes Shire Council LGA of central western NSW. The Project area encompasses the solar farm site, electricity transmission line (ETL) easement, road upgrade works and switchyard site (Figure 3.1).

The proposed solar farm site is located approximately 11 km northeast of Forbes. The solar farm site is approximately 300 hectares (ha) on land legally described as Lot 77 in Deposited Plan 750183. The solar farm site will be accessed from the northern boundary via Troubalgie Road.

The topography of the proposed solar farm site is generally uniform with an average elevation of 245 m above the Australian Height Datum (AHD). The land is largely cleared, having been highly modified by past disturbances associated with land clearing, cropping, and livestock grazing. Six farm dams are present within the solar farm site and a natural watercourse runs to the east of the property boundary, intersecting the site in the southeast corner. Small ephemeral waterholes, known locally as gilgai, are present in some paddocks, predominately in the south-eastern section of the site. These have been progressively ploughed and levelled by farming activities over time.

The surrounding land use is predominately agricultural. The Central West Livestock Exchange is located within the Central West Industrial Park on Back Yamma Road, 2.5 km to the west of the site. Back Yamma State Forest is situated 7 km to the east at an elevation of 340 m AHD, and the closest National Park is Goobang National Park, 30 km to the northeast. The Lachlan River runs approximately 3.5 km from the southern boundary of the site.

The ETL connects the substation on the solar farm site to a switchyard near the existing Forbes-Parkes 132 kV transmission line. The ETL is approximately 8.5 km long and traverses six private properties, road and rail reserves and Crown land. The average elevation along the ETL is 245 m above AHD.

The road upgrade works proposed include the upgrade of the Back Yamma/Troubalgie Road intersection and widening of Troubalgie Road between the junction of Back Yamma Road and the solar farm access point. The road will be widened and sealed such that it provides two sealed lands of 3.25m and sealed shoulders 1m wide (overall width of seal will be 8.5m).

The switchyard site (250 m above AHD) is located approximately 5.5 km north of Forbes on Lot 14 in Deposited Plan 750158. The switchyard site is adjacent to the existing Forbes-Parkes 132 kV transmission line located approximately 500 m west of the Newell Highway. It will be accessed from Daroobalgie Road.

3.2 Land

3.2.1 Landholders

Landholders in the Project area are summarised in Table 3.1.

Table 3.1 Land ownership details

Landholder (refer Figure 3.2)	Project component	Land description
1	Solar farm site	Lot 77 DP 750183
2	ETL	Vol 78 Folio 750183
3	ETL	Vol 2 Folio 220212
4	ETL	Vol 88 Folio 750183 DP 1272667
5	ETL	Vol 12 Folio 1046542
6	ETL	Vol 1340 Folio 750158
7	ETL Switchyard site	Vol 38 Folio 1242538 Vol 14 Folio 750158 Lot 1408 DP 750157
Transport for NSW (TfNSW)	ETL	Crossing of Newell Highway

Landholder (refer Figure 3.2)	Project component	Land description
Forbes Shire Council	ETL Road upgrades	Forest Road, Troubalgie Road and Back Yamma Road – road reserve
Australian Rail Track Corporation (ARTC) /TfNSW	ETL	Lot 6402 DP 1257397 Crossing of Stockinbingal – Parkes railway line
Crown land - Travelling Stock Reserve (managed by Local Land Services)	ETL	Lot 1664 DP 750158 Lot 7003 DP 1060435

3.2.2 Surrounding dwellings

There are no residential dwellings within the proposed site. The nearest dwelling (an associated dwelling[1]) is located approximately 600 m to the northwest of the western boundary. There are 29 existing dwellings within 5 km of the site (Figure 3.2). Table 3.2 provides the elevation and distance to the proposed Project for the dwellings closest to proposed infrastructure. The Newell Highway runs north-south, approximately 5.5 km to the west of the proposed solar farm site.

Table 3.2 Surrounding dwellings

House number	Associated/non associated	Elevation (m)*	Distance to solar farm site (closest point) (m)**	Distance to ETL (m)***	Distance to Switchyard (m)****
10	Associated	255	3975	2590	4720
11	Associated	245	600	830	7481
12	Associated	243	906	197	6850
13	Associated	257	2915	4163	11800
14	Associated	257	2806	3992	11558
15	Non associated	260	3154	3739	10440
16	Non associated	255	2499	3837	11571
17	Associated	240	4022	425	3631
18	Associated	240	4635	445	3016
19	Non associated	240	4472	916	3315
35	Non associated	240	1816	3947	9309
47	Non associated	240	5187	306	2454
48	Associated	253	7739	267	271
49	Non associated	250	8096	432	388
50	Non associated	247	7979	422	306
51	Non associated	247	8046	561	441
52	Non associated	247	8213	679	567
53	Non associated	250	5967	249	1705
54	Non associated	243	5867	299	1782

[1] An associated dwelling is owned by a landholder in the Project area who is receiving monetary benefits as a result of the Project

House number	Associated/non associated	Elevation (m)*	Distance to solar farm site (closest point) (m)**	Distance to ETL (m)***	Distance to Switchyard (m)****
55	Non associated	250	5848	420	1864
56	Non associated	255	5741	759	2097
57	Non associated	253	5662	742	2164
58	Non associated	253	5641	735	2180
59	Non associated	253	5625	732	2194

.* Elevations estimated from 10m contour data

.**Distance to site boundary

.***Distance to ETL alignment

.****Distance to switchyard boundary

3.2.3 Mineral, coal and petroleum resources

There are no existing petroleum or coal leases or exploration licences in the Project area. Three mineral exploration licences (EL) cover the Project area as shown in Figure 3.3.

- EL 8990 held by FMG Resources Pty Ltd. This licence was first granted on 25th June 2020 and expires on 25 June 2023. The EL applies to group 1 metallic minerals. The EL covers the solar farm site and the eastern section of the ETL
- EL 8555 held by Godolphin Tenements Pty Ltd (previously held by Ardea Exploration Pty Ltd). This licence was first granted on 5 May 2017, was renewed on 21 July 2020 and is due to expire on 5 May 2023. The EL applies to group 1 metallic minerals. The EL covers a small section of the ETL
- EL 8580 held by Godolphin Tenements Pty Ltd (previously held by Ardea Exploration Pty Ltd). This licence was first granted on 26 May 2017 and is due to expire on 26 May 2023. The EL applies to group 1 metallic minerals. The EL covers the western section of the ETL and switchyard site

There is a mining lease (ML 739) held by TriAusMin Pty Ltd (a wholly owned subsidiary of Godolphin Resources Pty Ltd) approximately one kilometre southwest of the switchyard site. The lease was granted on 23 May 1979 and was last renewed on 23 May 2021. It expires 22 May 2031. The title area is 53.41 ha and the resource targets are gold, platinum and silver.

Details of consultation with mineral exploration licence holders is provided in section 5.3.2.

3.2.4 Subdivision for the switchyard

Negotiations with TransGrid to understand their requirements with respect to how the switchyard infrastructure is to be owned and operated are ongoing. Therefore, the area of land to be subdivided, at the switchyard site is yet to be determined. A map showing the indicative subdivision plan is provided in Figure 3.4. The land is zoned RU1 Primary Production with a minimum lot size of 200 ha therefore any proposed subdivision will require the approval of the Minster for Planning under the provisions of section 4.38 of the EP&A Act.

- Solar Farm Site
- Proposed Solar PV arrays
- Proposed O&M compound (including substation and BESS)
- Proposed Construction Laydown Area
- Switchyard Site
- Electricity Transmission Line (ETL)
- Existing Transmission Line (132kV)
- Main Access Tracks
- Road Upgrade
- Railway
- Waterway
- Public Road
- Forbes Central West Livestock Exchange
- Crown land
- Cadastral boundary

PROJECT: Daroobalgie Solar Farm, Australia

TITLE: Figure 3.1: Project Area

DRAWING NO: AU-3015-ENG-PHA-GN-MAP-00005

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED: M.Yee

CLEARED: L. Ferlazzo

APPROVED: K. Munro

DATE: 24/11/22

0 250 500 1,000 Meters

N

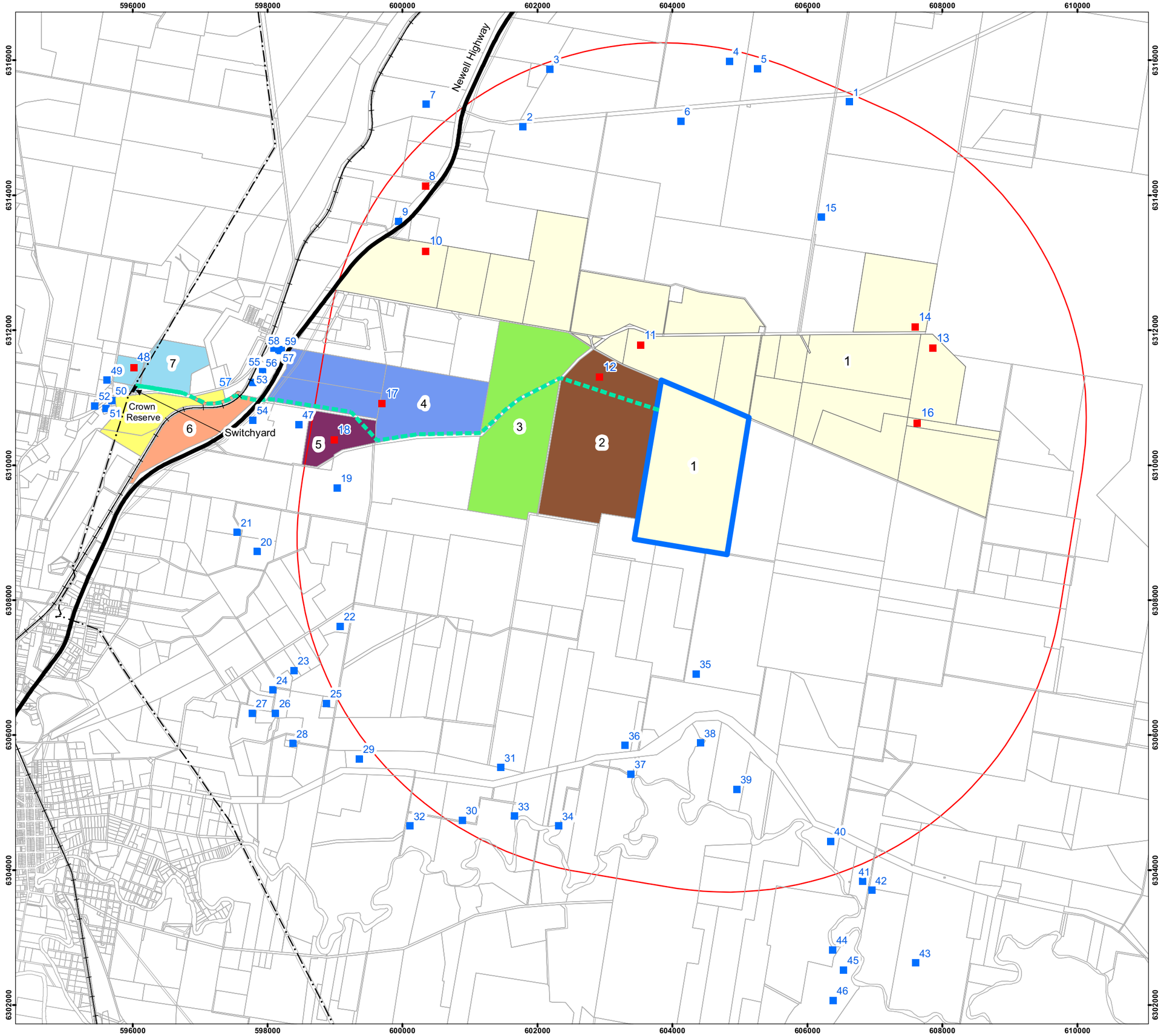
SCALE: 1:25,000 A3

COORDINATE SYSTEM: MGA94 (55S)

REV: B

FOR EXTERNAL DISTRIBUTION

PacificHydro



PROJECT
Daroobalgie Australia

TITLE
Figure 3.2: Nearest Sensitive Receptors

DRAWING NO
AU-3015-ENG-PHA-GN-MAP-00001

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED	M. Yee
CLEARED	K. Munro
APPROVED	K. Derriman
DATE	12/11/21
SCALE	1:50,000 A3
DATUM	MGA94 (z55)
REV	C

N

0 500 1,000 2,000 m

PacificHydro

FOR EXTERNAL DISTRIBUTION

- Solar Farm Site
- ETL
- Existing Transmission Line (132kV)
- Switchyard Site

Dwelling
- Associated
- Non-Associated

Participating Landholders
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- Crown Reserve

- 5km Distance from Solar Farm Site
- Cadastral Boundary *
- Main Road
- Rail Line

Data Source:
* NSW Gov, 15/07/20

PROJECT
Daroobalgie Solar Farm, Australia

TITLE
Figure 3.3: Exploration and Mining Titles

DRAWING NO
AU-3017-ENG-PHA-GN-MAP-00010

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED: M. Yee
CLEARED: K. Munro
APPROVED: K. Derriman
DATE: 16/11/21

N

0 1,000 2,000 4,000 6,000 m

SCALE: 1:140,000 A3
DATUM: MGA94 (z55)
REV: B

PacificHydro

FOR EXTERNAL DISTRIBUTION

- Solar Farm Site
- Electricity Transmission Line (ETL)
- Existing Transmission Line (132kV)
- Switchyard
- Mining Exploration Licence*
- Mining Lease*
- Urban Centres and Localities (UCL)
- Local Government Area (LGA) Boundary
- Public Road

Data Source:
* Geological Survey of NSW, 20/05/2021, https;//minview.geoscience.nsw.gov.au/

580000 585000 590000 595000 600000 605000 610000 615000

6335000 6330000 6325000 6320000 6315000 6310000 6305000 6300000

Henry Parkes Way
Gunningbland
Parkes
Parkes Regional Airport
Parkes-Euggowra Rd
Monumea Gap State Forest
410 m
The Bogan Way
Nelungaloo
Parkes Shire Council
Forbes Shire Council
Warregal State Forest
Ulbobine
South W Woodla Natur Reser
427 m
Newell Hwy
EL8555
EL8580
EL8555
EL8990
Switchyard
ML739
EL8990
Back Yamma Road
Back Yamma State Forest
Troubalgie Road
Forest Road
Yarragong
Forbes Airport
Carrawabbity
Bland Creek
Forbes
The Escort Way
Newell Highway
Cumbijowa State Forest

PROJECT
Daroobalgie Solar Farm, Australia

TITLE
Figure 3.4: Indicative Subdivision Plan

DRAWING NO
AU-3015-ENG-PHA-GN-MAP-00025

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED	M. Yee
CLEARED	K. Munro
APPROVED	K. Munro
DATE	14/02/22
SCALE	1:10,000 A3
DATUM	MGA94 (z55)
REV	A

N

0 10 20 40 m

PacificHydro

FOR EXTERNAL DISTRIBUTION

- Switchyard Site/Potential Subdivision Area (~0.5ha)
- Existing Transmission Line (132kV)
- Cadastral boundary
- Crown land

3.3 Key Project components

The key components of the Daroobalgie Solar Farm are detailed below and shown in ***Road upgrades***

Road upgrade works proposed include:

- Upgrade of Back Yamma/Troubalgie Road and Troubalgie Road/solar farm site access intersections: These intersections will be reconstructed to provide a basic right turn (BAR) and basic left turn (BAL) 100 km/h design speed in accordance with Austroads guide to road design part 4A. The swept path analysis shown in Images 3-8 to 3-10 demonstrate that the upgraded intersections will be able to accommodate 26-m, B-double movement and the type of OSOM vehicle required.
- Widening of Troubalgie Road between the junction of Back Yamma Road and the solar farm access: This road will be widened and sealed such that it provides two sealed lands of 3.25m and sealed shoulders 1m wide (overall width of seal will be 8.5m)

A preliminary intersection and road upgrade design is provided in Appendix C. Detailed design of these road upgrade works will be undertaken prior to construction.

Image 3-8 Back Yamma Rd/Troubalgie Rd intersection proposed widening (B double movement)

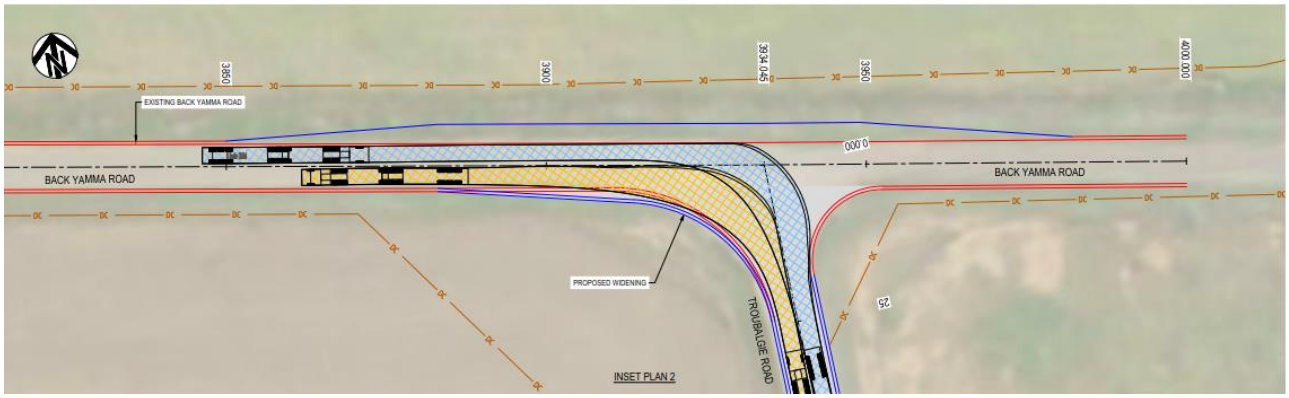


Image 3-9 Back Yamma Rd/Troubalgie Rd intersection proposed widening (OSOM vehicle movement)

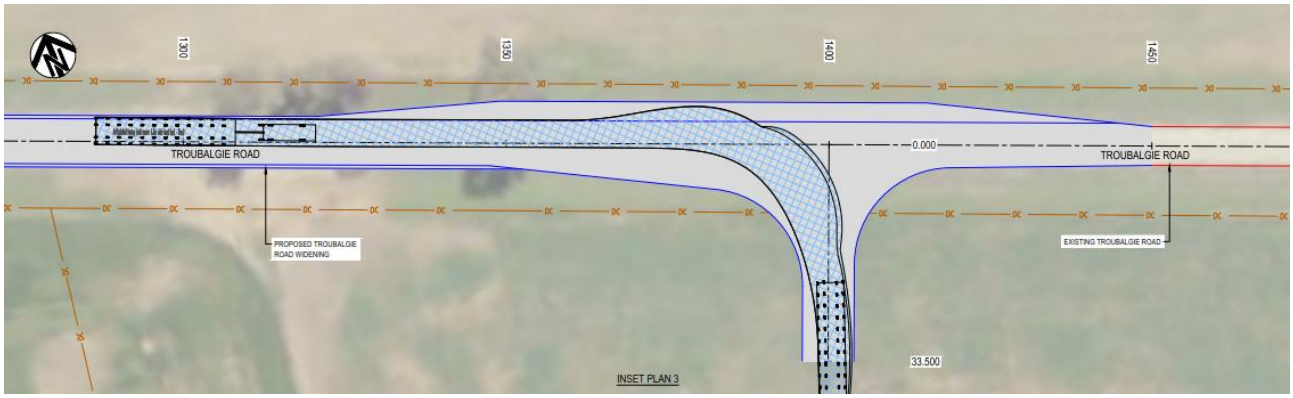


Image 3-10 Proposed Troubalgie Rd/solar farm site intersection

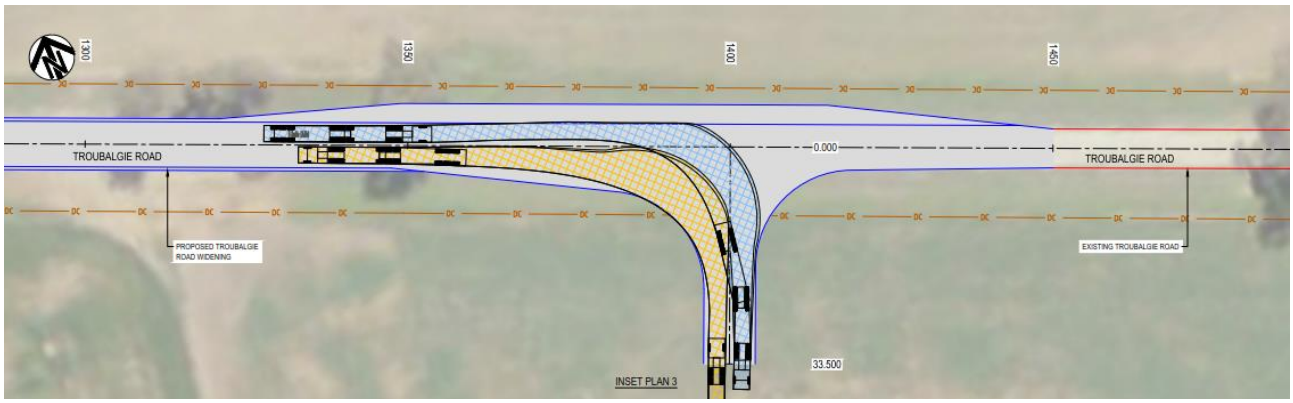


Figure 3.5.

Solar arrays and PV modules

The Project proposes the installation PV panels mounted on single-axis-tracking structures that will be configured in rows and columns so that PV panels are oriented to the north to optimise power generation achieved at the site.

The PV panels will be elevated on the mounting system to ensure the minimum flood level freeboard[2] requirements at the site are achieved. PV panels are expected to have a maximum height of up to 4.0 m when fully tilted at 60 degrees. Initial investigations indicate approximately 420,000 PV panels could be installed for the Project however the final design will depend on a range of factors including available technologies, PV panel selection, available grid capacity and economies of scale.

Image 3-1 Solar photovoltaic panel tracking system

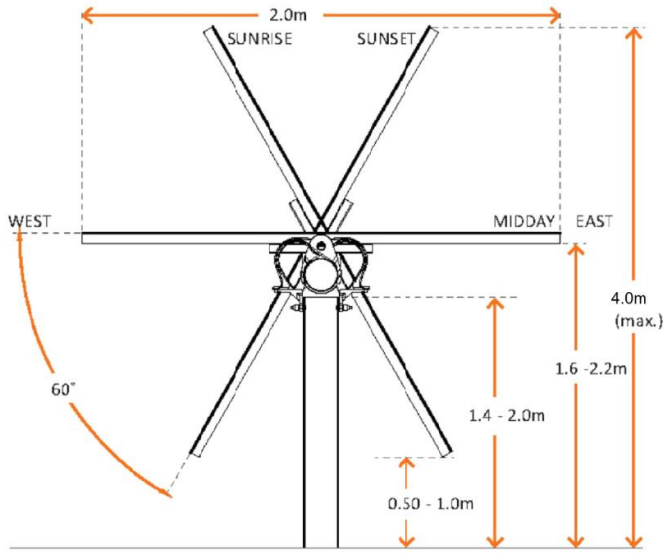


Image 3-2 Solar photovoltaic panels installed at Haughton Solar Farm

[2] Freeboard is a factor of safety expressed as the height above the flood used to determine the design floor level or ground level (Forbes Development Control Plan, 2013)

Source: Pacific Hydro

Collector network and substation

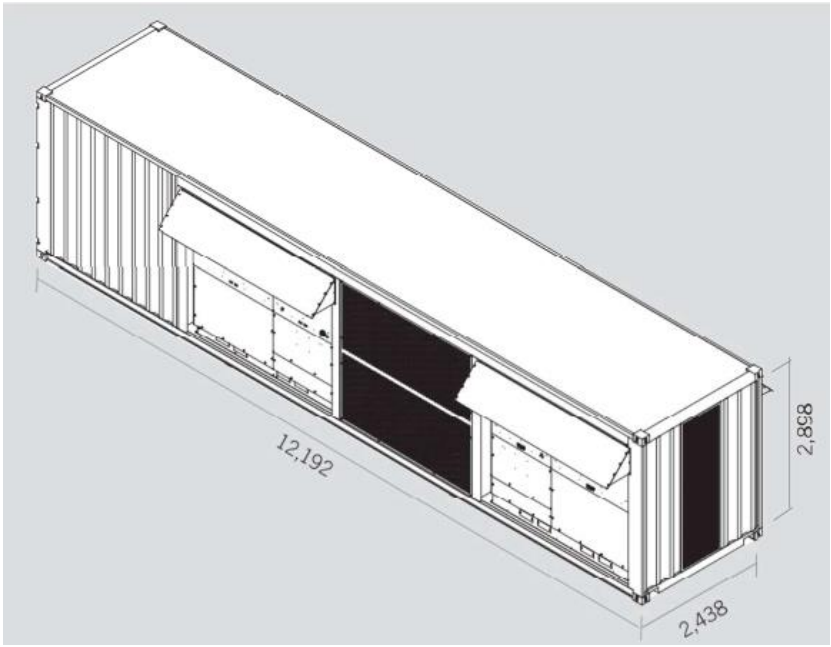
PV panels are wired in a string array with each group feeding a DC-AC inverter, which converts DC current generated from the PV panels into 33 kV AC current (i.e., DC-AC inversion) that can then be stepped up to 132 kV at the substation and subsequently exported to the national electricity grid.

Power Conversion Units (PCUs) will contain the DC-AC inverters, medium-voltage transformers, switchgear, Supervisory Control and Data Acquisition (SCADA) and communications equipment. They are normally housed within 40-foot shipping container-like structures that measure approximately 12 m long x 2.5 m wide x 2.9 m high. There will be approximately 26 PCUs required to support the ~420,000 PV panels proposed for the solar farm.

Underground electrical cabling is proposed to be installed between the PV panels, PCUs and the substation.

A new 33 kV/132 kV electrical substation will be constructed to enable a connection of the solar farm to the national electricity grid. The proposed 132 kV substation is designed to allow flexible upgrades and occupies approximately a footprint of 140 m long by 40 m wide. Its tallest component is the landing gantry that can reach approximately 12 to 14 m.

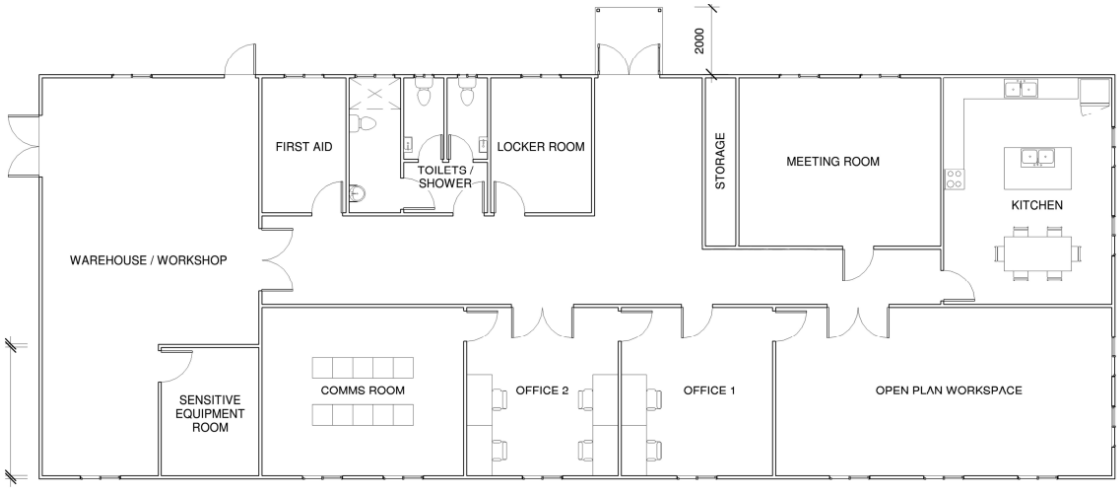
Image 3-3 Power conversion unit schematic



Operation and maintenance facilities

The Operation and Maintenance (O&M) facilities are proposed to be co-located with the proposed substation and BESS. Structures will include offices, staff amenities, equipment storage sheds and at-grade car parking

Image 3-4 O&M building example layout

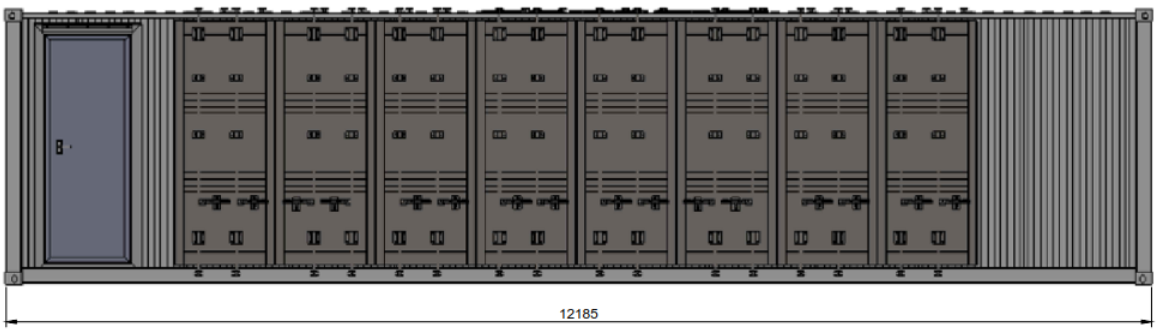


Battery Energy Storage System (BESS)

The BESS storage capacity is proposed to be 40 MW and 160 MWh, however the final sizing and design of the BESS will be determined during the detailed design process. The preferred size of the battery will be influenced by the network conditions and network security/ stability requirements applicable at the time of the grid connection application / agreement process. The most likely technology for the BESS is lithium-ion. The BESS compound will be approximately 150 m by 75 m, fully fenced and secured. The compound components will include:

- Battery container with external metal construction, generally in the form of shipping containers or similar sized custom containerised units with approximate dimensions of 12 m long by 2.5 m wide by 3.0 m high.
- Bidirectional inverters that converts power from DC to AC and allow charging of the batteries via AC to DC rectifiers
- Protection devices and circuit controls such as:
  - integrated circuit control systems to avoid voltage drift
  - current sensing circuits to avoid short circuiting
  - built-in positive temperature coefficient to protect against current surges
  - circuit interrupt device that opens at excess pressure
  - safety vent to release gases on excessive pressure build-up
  - an active fire suppression system
  - separator that inhibits ion-flow when exceeding a certain temperature threshold
  - a Battery Management System to properly manage the batteries state of change, including battery balancing devices, to avoid deterioration and individual cell over/ under voltage

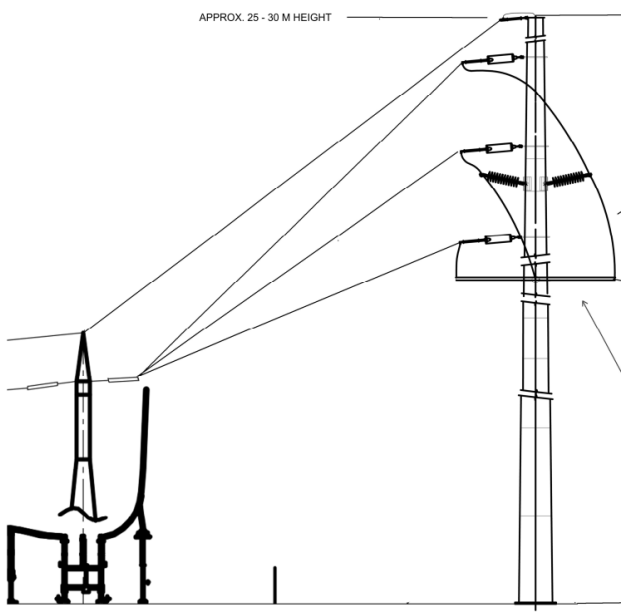
Image 3-5 Indicative external view of battery container



Electricity transmission line (ETL)

A new, single-circuit, 132 kV transmission line is proposed from the substation to a switchyard near the existing Forbes-Parkes 132 kV transmission line located approximately 500 m west of the Newell Highway. The ETL is approximately 8.5 km long and traverses a number of private properties, road reserves and Crown land. The ETL easement will be 45 m wide. Towers are likely to be monopole structures 25 to 30 m high.

Image 3-6 Monopole 132 KV single circuit single strain drawing



Switchyard

The 132 kV switchyard to connect to the existing TransGrid Transmission Line, is expected to occupy a footprint of approximately 90 m long x 55 m wide. Its tallest components are the landing gantries that can reach approximately 12 to14 m.

Image 3-7 132 kV switchyard at Clements Gap Wind Farm

Source: Pacific Hydro

Road upgrades

Road upgrade works proposed include:

- Upgrade of Back Yamma/Troubalgie Road and Troubalgie Road/solar farm site access intersections: These intersections will be reconstructed to provide a basic right turn (BAR) and basic left turn (BAL) 100 km/h design speed in accordance with Austroads guide to road design part 4A. The swept path analysis shown in Images 3-8 to 3-10 demonstrate that the upgraded intersections will be able to accommodate 26-m, B-double movement and the type of OSOM vehicle required.
- Widening of Troubalgie Road between the junction of Back Yamma Road and the solar farm access: This road will be widened and sealed such that it provides two sealed lands of 3.25m and sealed shoulders 1m wide (overall width of seal will be 8.5m)

A preliminary intersection and road upgrade design is provided in Appendix C. Detailed design of these road upgrade works will be undertaken prior to construction.

Image 3-8 Back Yamma Rd/Troubalgie Rd intersection proposed widening (B double movement)

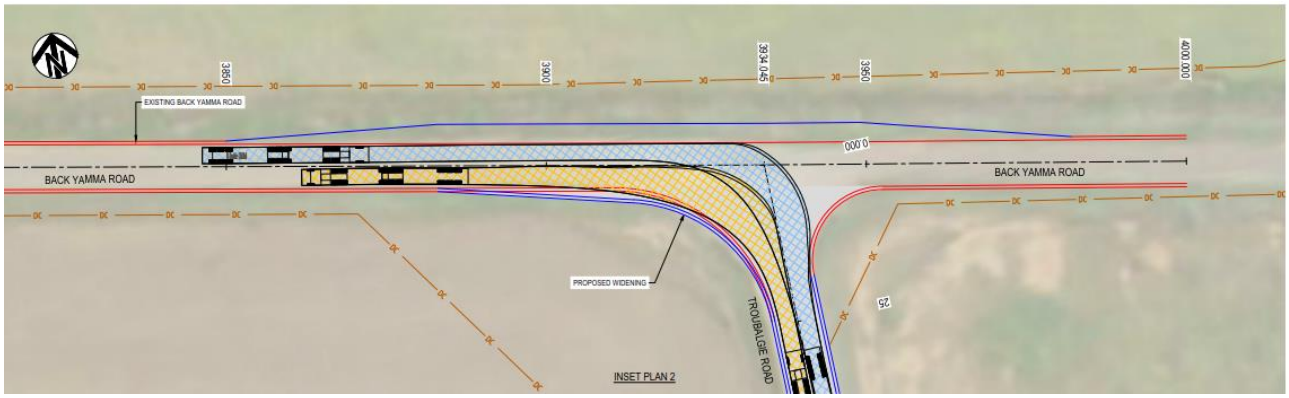


Image 3-9 Back Yamma Rd/Troubalgie Rd intersection proposed widening (OSOM vehicle movement)

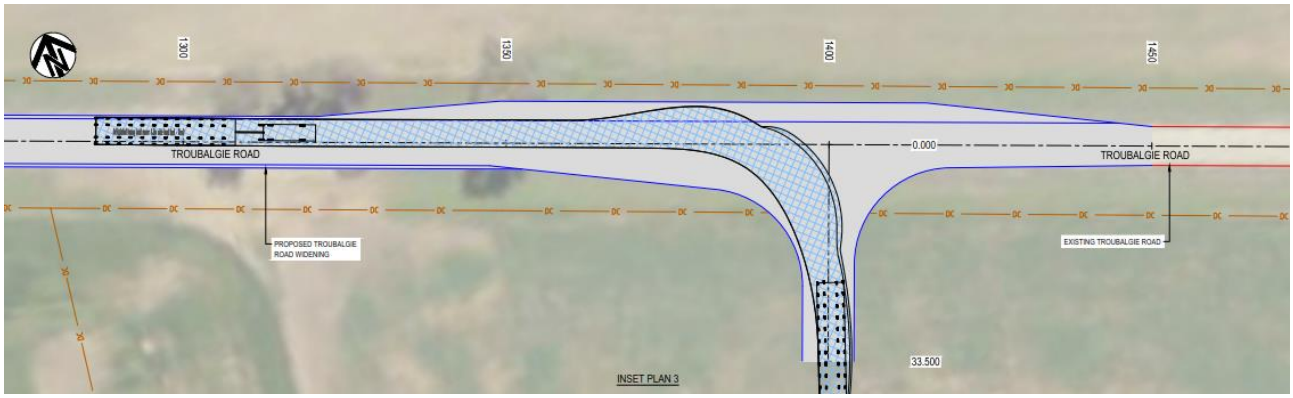
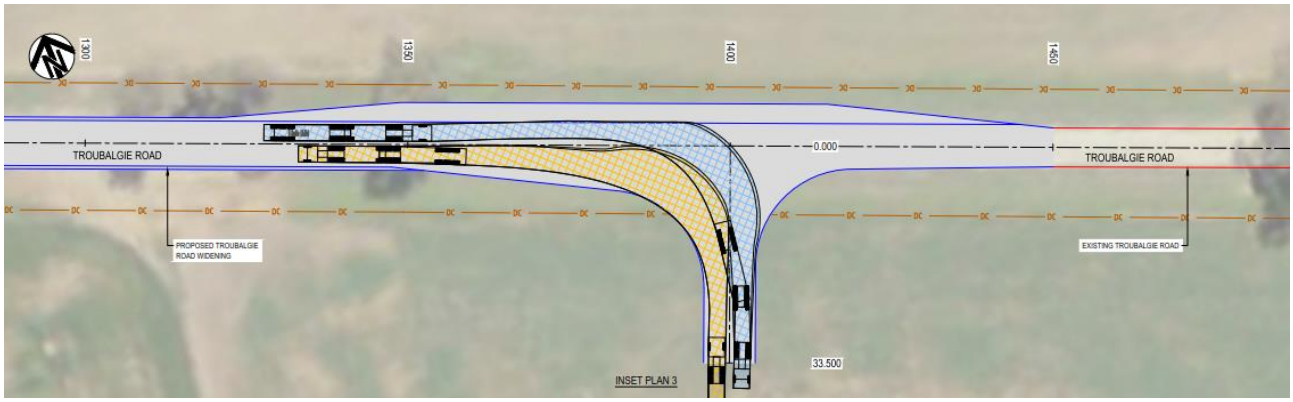


Image 3-10 Proposed Troubalgie Rd/solar farm site intersection



PROJECT
Daroobalgie Solar Farm, Australia

TITLE
Figure 3.5: Solar Farm Site - Key Project Components

DRAWING NO
AU-3015-ENG-PHA-GN-MAP-00006

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED	M. Yee
CLEARED	K. Munro
APPROVED	K. Munro
DATE	15/02/22
SCALE	1:10,000 A3
DATUM	MGA94 (z55)
REV	A

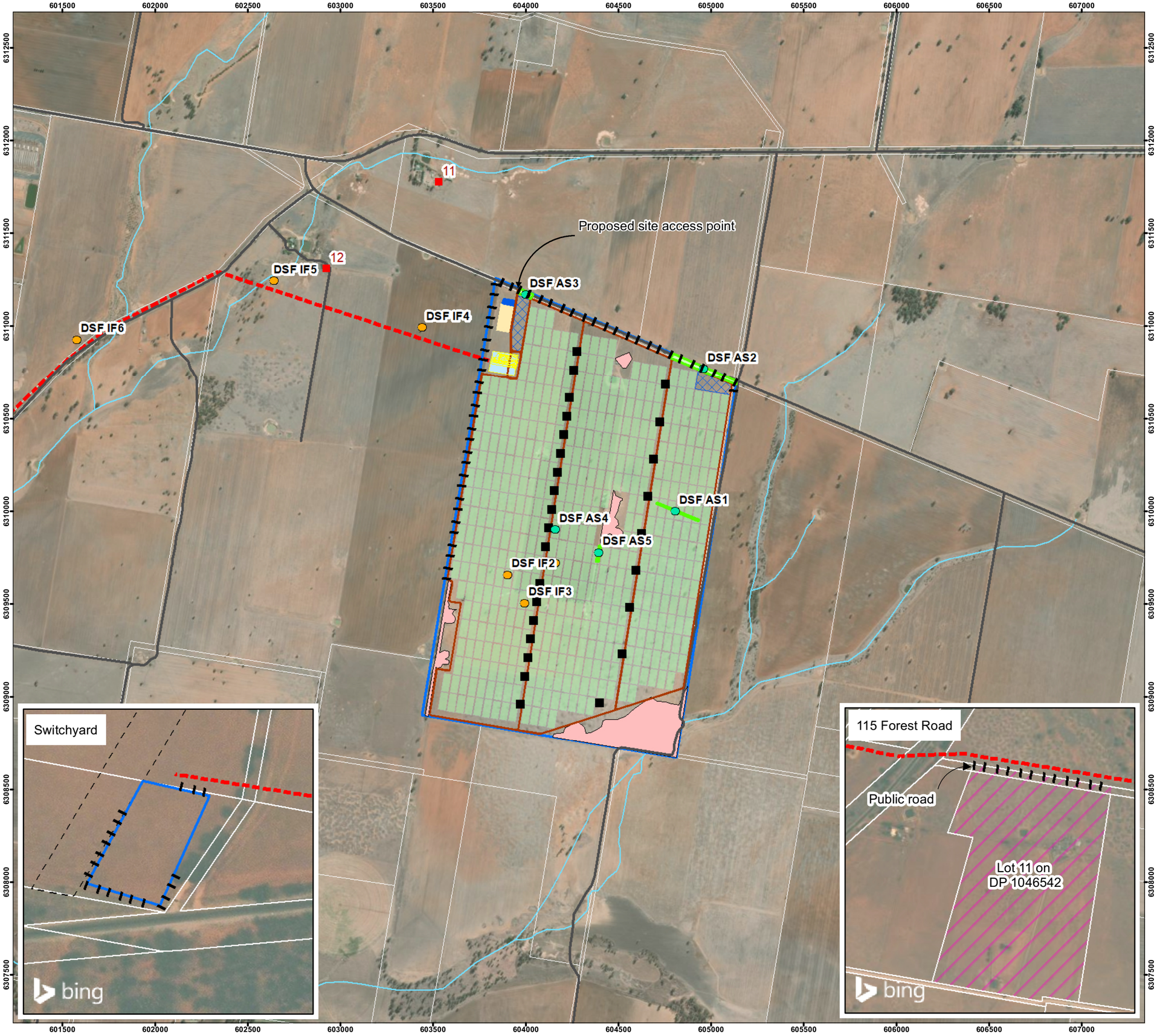
N

0 100 200 400 m

PacificHydro

FOR EXTERNAL DISTRIBUTION

- Solar Farm Site
- Solar PV arrays
- Substation Bench
- Battery Energy Storage System (BESS)
- O&M Compound
- Construction Laydown Area
- Power Conversion Unit (PCU)
- Substation
- Electricity Transmission Line
- Main Access Tracks
- Public Road
- Waterway
- Cadastral boundary



PROJECT
Daroobalgie Solar Farm, Australia

TITLE
Figure 3.6: Site Layout and Environmental/Cultural Constraints

DRAWING NO
AU-3015-ENG-PHA-GN-MAP-00024

Maps marked "Internal Use Only" contain information that is of a private and confidential nature.These maps may only be distributed to, and viewed by, current Pacific Hydro Employees.

Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.

CREATED	M. Yee
CLEARED	L. Ferlazzo
APPROVED	K. Munro
DATE	21/11/22
SCALE	1:20,000 A3
DATUM	MGA94 (z55)
REV	C

N

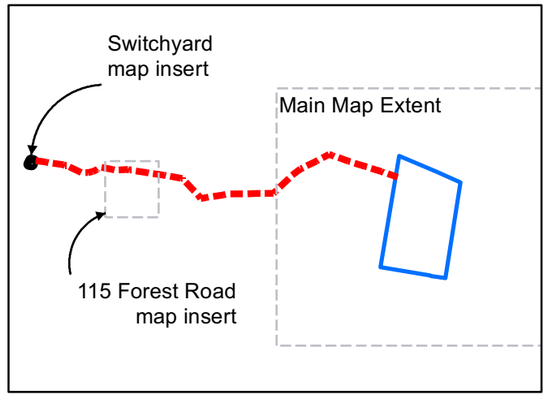
0 250 500 1,000 m

PacificHydro

FOR EXTERNAL DISTRIBUTION

- Solar Farm Site (including security fence)
- Solar PV arrays
- Substation Bench
- Battery Energy Storage System (BESS)
- O&M Compound
- Construction Laydown Area
- Power Conversion Unit (PCU)
- Substation
- Electricity Transmission Line
- Main Access Tracks
- Associated Dwelling
- Key Constraints
- Artefact Scatter Centre*
- Isolated Find*
- Artefact Scatter Extent**
- Proposed Screen Planting
- Public Road
- Waterway
- Existing Transmission Line Easement
- Cadastral boundary
- Land parcel (115 Forest Rd)

* Umwelt, 20/08/21
** Umwelt, 24/09/21



3.4 Construction

Construction of the Project will take approximately 12 to 18 months from commencement of site works. The exact timing for the commencement of construction will be determined post Project approval, and once the preferred engineering, procurement and construction contractor is selected, and Project financing is in place. The timeframes used as part of this EIS assume a commencement of construction no earlier than 2024.

Minor earthworks would be required for the preparation of the site, including clearing and "grubbing", minimal site levelling, laying of access track and site drainage works. Due to the relatively flat terrain of the Project area, minimal site preparation and civil works are anticipated prior to construction. Most of the infrastructure will be pre-fabricated off-site, delivered and then assembled and installed on site. Access to the site would be from Troubalgie Road.

Construction activities would be undertaken during the standard construction hours of:

- 7am – 6pm Monday to Friday
- 8am – 1pm Saturday

Exceptions to these standard working hours may arise from staff arriving and leaving site and the delivery of large solar farm components. Any activity outside normal construction hours will only be undertaken in accordance with approvals from relevant authorities. In general, construction activity will not take place on Sundays or public holidays.

3.4.1 Construction activities

3.4.1.1 Solar farm site

Site establishment works at the solar farm site would include:

- Removal of selected farm fences and other incidental structures to enable construction of access points, access tracks and other infrastructure required by the Project
- Site clearing and grubbing to prepare for levelling works including draining and placing clean engineered fill into the existing on-site farm dams that are not being retained
- Engineered soil treatment as needed to minimise reactive soil impacts
- Drainage and sediment control works (as required) and installation of other sediment control measures (e.g., temporary silt fencing)
- Construction of temporary site offices, material stockpile and laydown areas to accommodate the laydown of construction materials and infrastructure, and temporary car parking during the construction phase
- Construction of a new site access point off Troubalgie Road into the site and internal access tracks. The main access track will be approximately 6 m wide with crushed rock (or similar) and internal access tracks (i.e., between rows of PV panels) approximately 4 m wide constructed with compacted soil (or similar), engineered to withstand light traffic all year round after construction has finished
- Upgrade of Troubalgie Road between Back Yamma Road and the site access point to a sealed road
- Widening of the Back Yamma Road/Troubalgie Road intersection, to accommodate two-way heavy vehicle movements, including Oversize Overmass (OSOM) vehicles
- Establishment of foundations and hardstands for the BESS, substation and switchyard
- Installation of security fencing

Following site establishment works, construction activities at the solar farm site would include:

- DC and AC cable trenching, laying and backfilling
- Installation of framing piles, PV mounting structures and trackers
- Installation of PV panels
- Creation of engineered benches (substation, BESS and O&M compound)
- Installation of PCUs

- Erection of steelwork, equipment, buildings and transformers with the substation and BESS compound(s)

3.4.1.2 Electricity transmission line

Construction activities would include:

- Establishment of the easement including site surveys of pole locations, clearing of vegetation (where required) and installation of sediment control measures (as required)
- Establishment of construction work and a temporary laydown area at each pole location
- Excavation and installation of pole foundations. Footings for the poles will vary depending on soil conditions however a 3 to 4 m direct embedment with stays is anticipated. There are approximately 38 poles proposed approximately 300 m apart
- Erection of poles using a mobile crane. Poles proposed are single-circuit, suspension or tension poles
- Stringing of conductors along the new transmission line
- Connection into new substation and switchyard

3.4.1.3 Road upgrades

Construction activities would include:

- Earthworks to establish foundation level
- Preparation of subgrade and fitting of drainage systems
- Paving

3.4.1.4 Switchyard

Construction activities will include:

- Site establishment works including site clearing, grubbing and levelling
- Creation of engineered bench
- Drainage and installation of sediment control measures (as required)
- Establishment of foundation and erection of steelwork and equipment

3.4.2 Construction plant

The primary plant and equipment required for the construction of the Project will include:

- Delivery trucks
- Cement trucks
- Earthmoving machinery and equipment for site preparation
- Cable trenching and laying equipment
- Pile-driving equipment
- Assisted material handling equipment (forklifts and cranes)
- Machinery and equipment for connection infrastructure establishment (cherry-pickers, mobile cranes and other lifting equipment)
- Water trucks for dust suppression

3.4.3 Delivery of construction materials and infrastructure

It is likely that either the Port of Botany, Port of Newcastle or Port Kembla will be used to deliver manufactured equipment and materials to site (e.g., PV panels, steelwork, transformers etc). Raw materials and materials required for site establishment and civil works are also likely to come from the surrounding region. Construction materials are

most likely be transported to the solar farm site via road, however rail is another option to transport equipment and materials that will be explored during detail design.

Rail is a safe and efficient choice for transporting the many intermodal shipping containers that will be used to deliver solar panels and other components. The Stockinbingal-Parkes railway line which is managed by the Australian Rail Track Corporation (ARTC) is located close to the Project. Parkes, which is approximately 25 km north of the solar farm site, has access to all major cities in Australia and rail connections to all major seaports.

There are two primary road options available for the transportation of construction materials:

- The Newell Highway (A39) and/or Henry Parkes Way via Parkes from the north
- The Escort Way and Newell Highway via Forbes from the south

Both these options are designated heavy vehicle routes and would be able to accommodate additional heavy vehicle movements associated with the Project. Access to the solar farm site from the Newell Highway would be via local roads. Further discussion regarding traffic and transport impacts is provided in section 6.6.

3.5 Commissioning activities

Commissioning or testing is often staged as equipment is installed and undertaken to ensure all components are operating safely and within their design parameters.

3.6 Operational activities

Once operational, the primary activities conducted on site would include day-to-day routine operations, maintenance of infrastructure, general site maintenance and security. Operation of the solar farm will also likely be supported by local contractors for tasks such as repairs, minor works, weed/vegetation management, fencing and cleaning.

The operational lifespan of the facility is expected to be approximately 30 years, depending on the nature of solar PV technology and energy markets.

3.7 Workforce

During the construction phase, it is expected that the Project will require a peak of approximately 320 construction workers and site support staff. The construction workforce comprises a range of skilled and semi-skilled positions as presented in Table 3.3. Once operational, the Project would require up to six full-time employees.

Table 3.3 Peak construction workforce

	Trade assistant /labourers	Civil construction/ operators/ riggers	Sub-contractors	Electricians	Project management and delivery	Total
Proportion of workforce	30%	10%	15%	25%	20%	100%
Number of positions	96	32	48	80	64	320

3.8 Electricity, water use and wastewater

During construction, diesel generators will be utilised to provide power. Once operational the Project will be grid connected and able to draw power as required but primarily utilise renewable power generated from the solar farm.

It is estimated that up to 18 megalitres (ML) of non-potable water for dust suppression, revegetation and construction of roads and hardstand areas may be required. Approximately 250 kilolitres (KL) of potable water may be required during the construction period for drinking water. It is anticipated that bulk water tankers would be used to supply non-potable water to site and potable water will also be imported to the site.

During operations, water requirements are approximately two ML/year of non-potable water for cleaning panels, firefighting and other maintenance activities. This water is likely to be supplied from rainwater harvesting or water cartage. Approximately 20 KL/year of potable drinking water would be required.

Portable toilets would be provided for workers during construction. Portable toilets would be emptied by a licenced contractor as required. During operations, a septic tank system would be installed to treat and dispose of sewage. The septic tank would be maintained by a liquid waste licensed contractor.

3.9 Fire management

The Project has been designed with a 10 m Asset Protection Zone around both the perimeter of the site and around the substation, BESS and O&M compound. This zone will have a low fuel load (e.g., mown grass) and allow access for emergency vehicles. The Asset Protection Zone would include a minimum 4 m-wide access track around the perimeter of the site that allows for safe access for emergency vehicles.

All buildings and infrastructure would have fully compliant fire safety systems. A 20,000 L steel or concrete water storage tank fitted with a 65 mm Storz fitting would be located near to the site entrance on the main access track. Further mitigation and management measures to reduce risks of bushfire are detailed in section 6.8.

Vegetation will be cleared along the ETL in accordance with TransGrid easement guidelines. A bushfire risk management plan will be prepared that provides details of the inspection and maintenance activities along the ETL during the lifespan of the Project.

3.10 Security

The perimeter of the solar farm and switchyard sites would be fenced with a security fence. The security fencing would be 2.1 m high and made from a 1.8 m high chain-wire mesh and strainer wire and 0.3 m high barbed wire.

3.11 Lighting

Lighting is proposed in each PCU and at the substation, O&M facility and switchyard for maintenance purposes. Motion-activated security lighting will also be positioned around the perimeter of the site. Lighting would be managed and operated in accordance with *AS4282-1997 - Control of Obtrusive Effects of Outdoor Lighting* to ensure negligible light spill to adjoining properties.

3.12 End of life management

Once the Project reaches the end of its operational life, if the Project is decommissioned, all above-ground structures built as part of the Project will be removed and the site rehabilitated, generally to its pre-existing condition and land use, as far as practicable. The disposal and recycling of project infrastructure will be done in accordance with current waste management legislation and contemporary practice at the time of decommissioning. Wherever possible, efforts will be made to reduce the amount going to landfill in line with best practice sustainability principles.

If re-powering the Project is proposed, an appropriate stakeholder consultation process will be undertaken, and all necessary development approvals will be sought. In any repowering project, the same waste management and sustainability principles will be applied to order to minimise the extent of material going to landfill.