Appendix A Updated Project Description and Schedule of Lands

A.1 Updated Project Description

UPDATED PROJECT DESCRIPTION

Oxley Solar Farm

October 2022

Project Number: 21-393

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Suite 4, Level 5, 87 Wickham Terrace Spring Hill QLD 4000 **T.** (07) 3129 7633

CANBERRA - NSW SE & ACT
8/27 Yallourn Street (PO Box 62) Fyshwick ACT 2609 **T.** (02) 6280 5053

GOLD COAST
PO Box 466
Tugun QLD 4224 **T.** (07) 3129 7633

E. ngh@nghconsulting.com.au

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Hamilton NSW 2303 **T.** (02) 4929 2301

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Updates to the project description since the exhibition of the Environmental Impact Statement are shown in red.

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1. THE PROPOSAL

1.1. PROPOSAL SUMMARY TABLE

The key features of the proposal are summarised in Table 4-1 below. The component specifications are subject to change during detailed design. Where required, upper limit quantities and power level estimates are provided to ensure the assessment and any subsequent approval maintains the flexibility required in the detailed design stage, post approval.

Table 1-1 Summary of key features of the proposal

Proposal element	Description
Proposal	Oxley Solar Farm.
Proponent	Oxley Solar Development Pty Ltd. (Oxley Solar Development).
Capacity	Approximately 215 MW (AC).
Proposal site area	The broader area of land considered for siting of the solar farm. The Proposal site is **1,048ha**
Development footprint area	The area of land that would be directly impacted by the Proposal. This includes all stages; construction, operation and decommissioning. It includes all impacts, temporary and permanent, including access and a buffer to account for 'constructability' i.e. installation of environmental controls. The Development footprint for the Proposal is **268ha.**
Site description	**Proposal site:** Lot 5 DP253346, Lot 2 DP1206469, Lot 6 DP625427, Lot 7003 DP1060201, Lot 7004 DP1060201 and Lot 1 DP1206469 **Site Access:** Lot 1 DP1206469, Lot 2 DP1206469, Lot 7004 DP1060201, and Lot 7003 DP1060201 off Waterfall Way (Grafton Road). **Gara Road and Gara River causeway upgrades:** Lot 6 DP625427 and Lot 5 DP253346 All land zoned as RU1 Primary Production under Armidale Dumaresq LEP.
Local Government	Armidale Regional Council.
Subdivision	The Proposal would require three subdivisions; 1) The proposed onsite substation (to Transgrid), 2) The land to enable connection to the transmission lines and which will be incorporated into an expanded Lot 5 DP253346 (to the proponent), and 3) The BESS zone (to the proponent). The subdivision areas shown are indicative only and would be formalised through subsequent subdivision applications.
Solar array	Number of panels: approximately 385,280. Area of panels including access roads: approximately 195.25 ha.

Proposal element	Description
	Row spacing: approximately 8m. Height: up to approximately 4m .
Substation	Approximately 6ha. 132kV outdoor substation. 2 x 132/33kV transformers and associated infrastructure. Maximum height of 6m subject to final design.
Battery storage	Located within the northern portion of the site close to the substation and laydown area. With an electricity storage capacity of up to 50 MWh (i.e. 50 MW power output for one hour) and comprising of lithium ion batteries with inverters. Estimated 25 shipping containers (40 foot each). The footprint would be approximately 100m x 150m.
Site access	One new access point will be established**,** turning off Waterfall Way (Grafton Road) via the existing Council landfill access road, and running east to join the Proposal site via a new access track.
Access tracks	Internal access tracks: up to 50km of 7m wide unsealed gravel
Operations and maintenance buildings	Steel framed, ColorBond finish demountable buildings to accommodate: • 33kV switch gear. • Control and protection equipment. • Site office. • Staff amenities. • Warehouse. These would likely be housed in two buildings including: • A control room with a 15m x 8m footprint • An operation and maintenance shed with a footprint of 25m x 25m Maximum height of 6m subject to final design
Security fencing, lighting and CCTV	Steel security fence 2.3m high with barbed wire topping. Security system with CCTV and local flood lighting. Flood lighting would only be activated during (infrequent) out of hours maintenance or emergency situations. Under normal conditions out of hours lighting would be minimised to only enable safe entry to the site.
Construction hours	Standard daytime construction hours would be 7.00am to 6.00pm Monday to Friday and 8.00am to 1.00pm on Saturdays. Any construction outside of these standard construction hours, if required, would only be undertaken with prior approval from relevant authorities, or unless in emergency circumstances e.g. to make work safe.
Construction timing	About 12 to 18 months anticipated to commence Q1 2024

Proposal element	Description
Workforce	Construction – approximately 300 staff during peak construction (approximately 6 – 9 months). Operation – around 5 full time equivalent staff.
Operation period	Anticipated to be 30 years. After which the site would be refurbished to extend the solar farms operation life or decommissioned and returned to pre-project state.
Decommissioning	The site would be returned to its pre-works land capability. All above ground infrastructure would be removed to a depth of 500mm. The site would be rehabilitated consistent with land use requirements. All infrastructure would be removed with the exception of the substation. The site would be rehabilitated consistent with future land use requirements.
Capital investment	Estimated $372million.

Refer to:

Figure 1-1 Updated Development footprint

Figure 1-2 Updated environmental constraints over updated Development footprint

1.2. SUBDIVISION

The Proposal would require three subdivisions; 1) The proposed onsite substation (to Transgrid), 2) The land to enable connection to the transmission lines and which will be incorporated into an expanded Lot 5 DP253346 (to the proponent), and 3) The BESS zone (to the proponent).

Boundaries of both Lot 2 DP1206469 and Lot 5 DP253346 would be modified by the proposed subdivision. Figure 1-3 shows the lots within and surrounding the Proposal site. The indicative subdivision of the site is indicated in Figure 1-4. The areas have been shown as:

Lot A, residual agricultural land, about 208 ha, to be retained by the existing landowner.

Lot B, to enable connection to 132 kV easement, about 26.5 ha, to be incorporated into an expanded Lot 5 DP253346.

Lot C, substation, about 2.4 ha.

Lot D, solar farm, about 668 ha.

Lot E, BESS, about 3 ha.

Pending approval, the subdivisions would be administered through consultation with Armidale Regional Council. The subdivision areas shown are indicative only and would be formalised through subsequent subdivision applications.

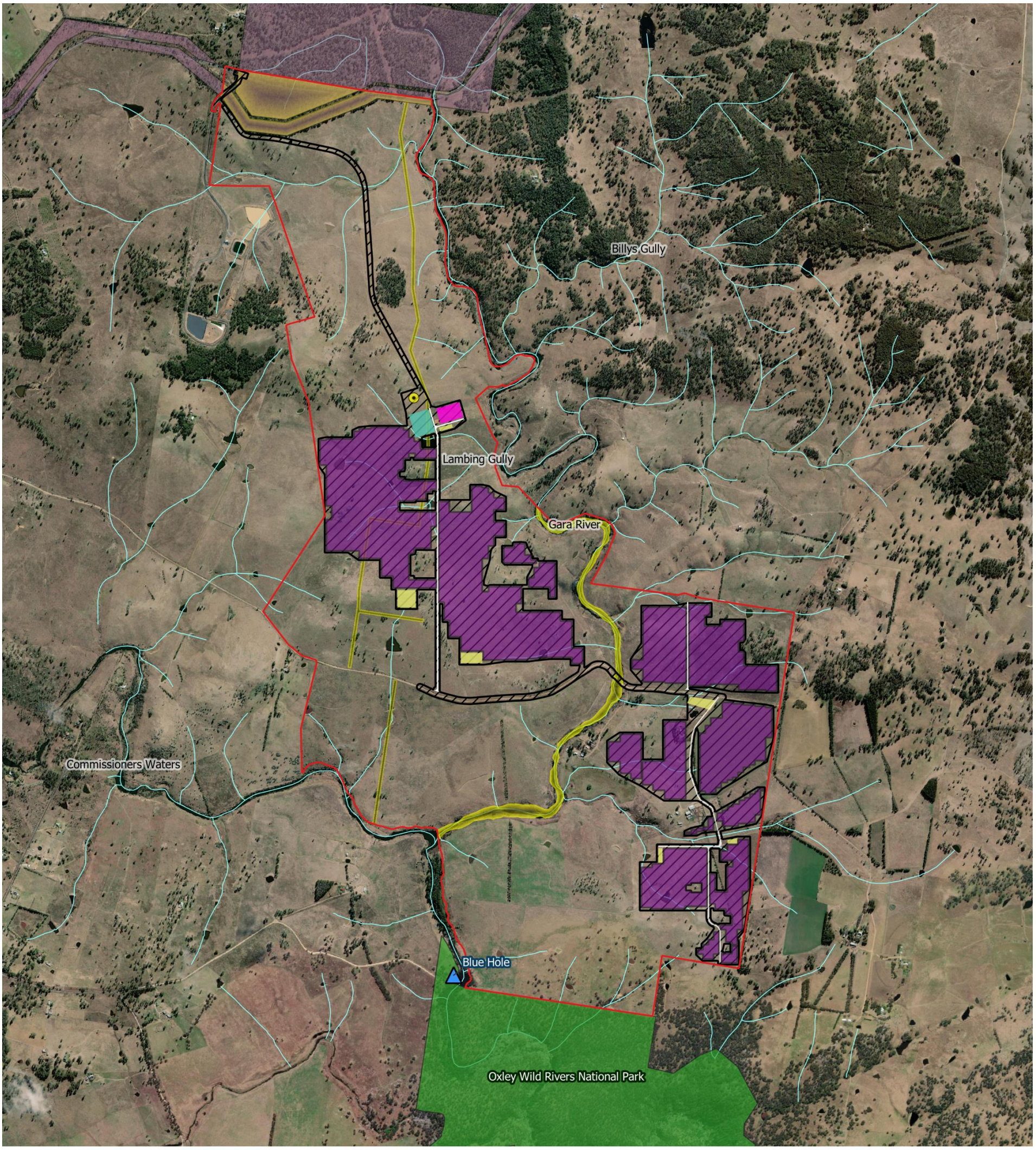
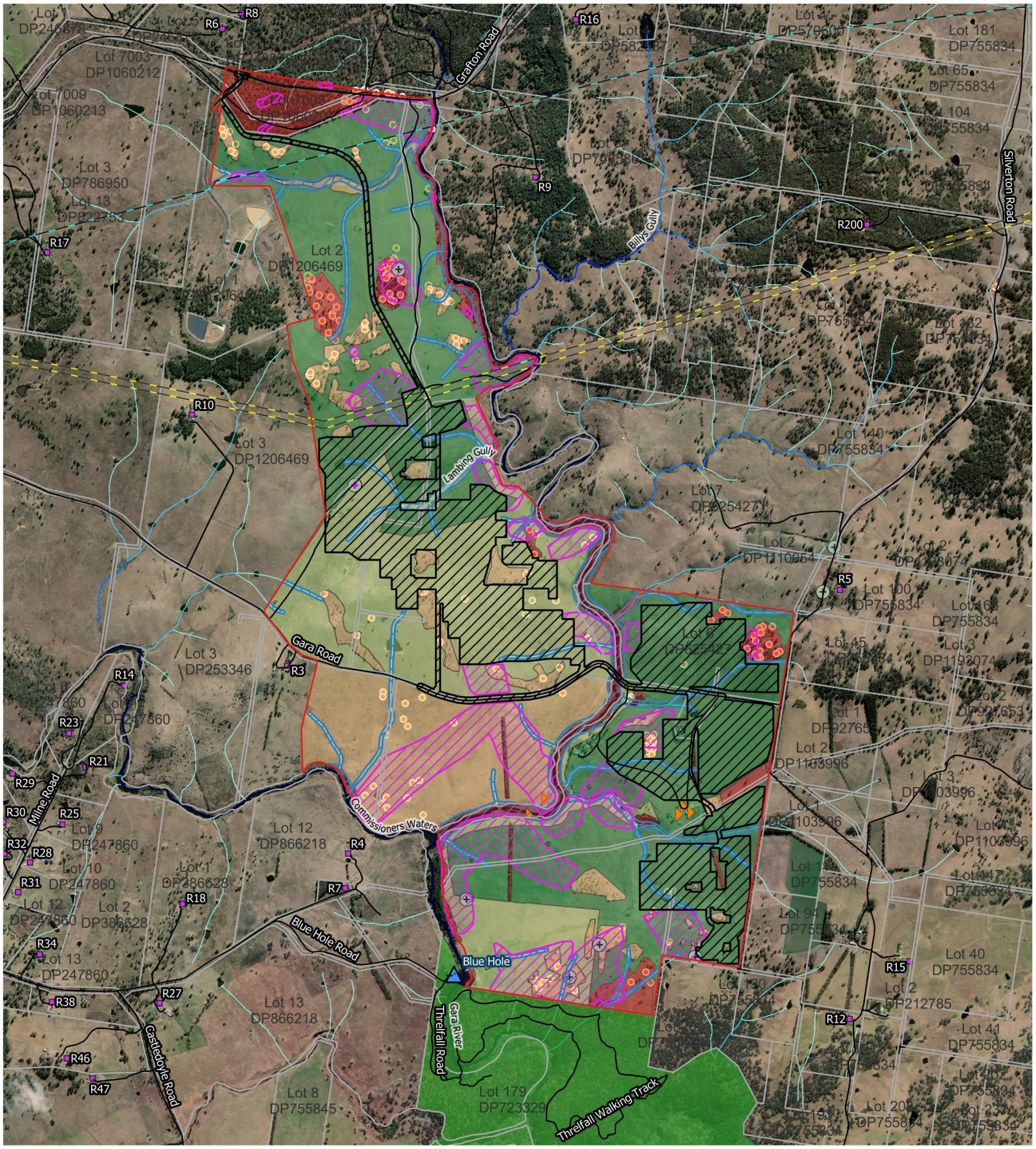


Figure 1-1 Updated Development footprint



Environmental constraints

Legend

- Proposal site
- Development Footprint
- Roads

Waterways

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- >5th Order Stream
- National Park
- Blue Hole Picnic Area
- Sensitive receivers
- Aboriginal heritage no go zones
- Possible historic heritage items
- Waterway buffers
- Hollow Bearing Trees
- Cultural heritage trees

Plant community constraints

- High
- Moderate
- Low-Moderate
- Low

Electricity transmission lines

- 132kV
- 66kV

Figure 1-2 Updated environmental constraints over updated Development footprint

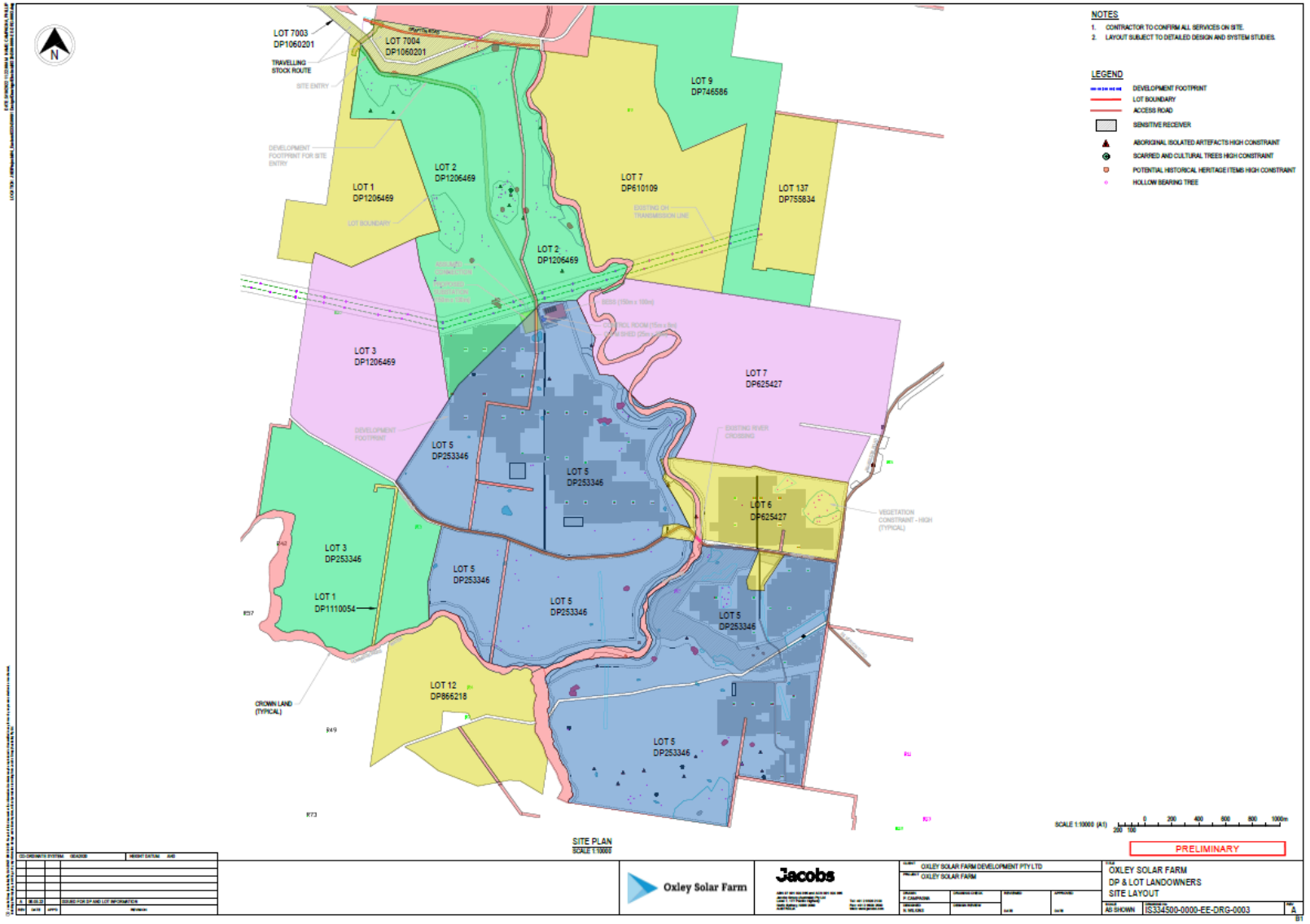


Figure 1-3 Lots and DP's (including neighbouring lots)

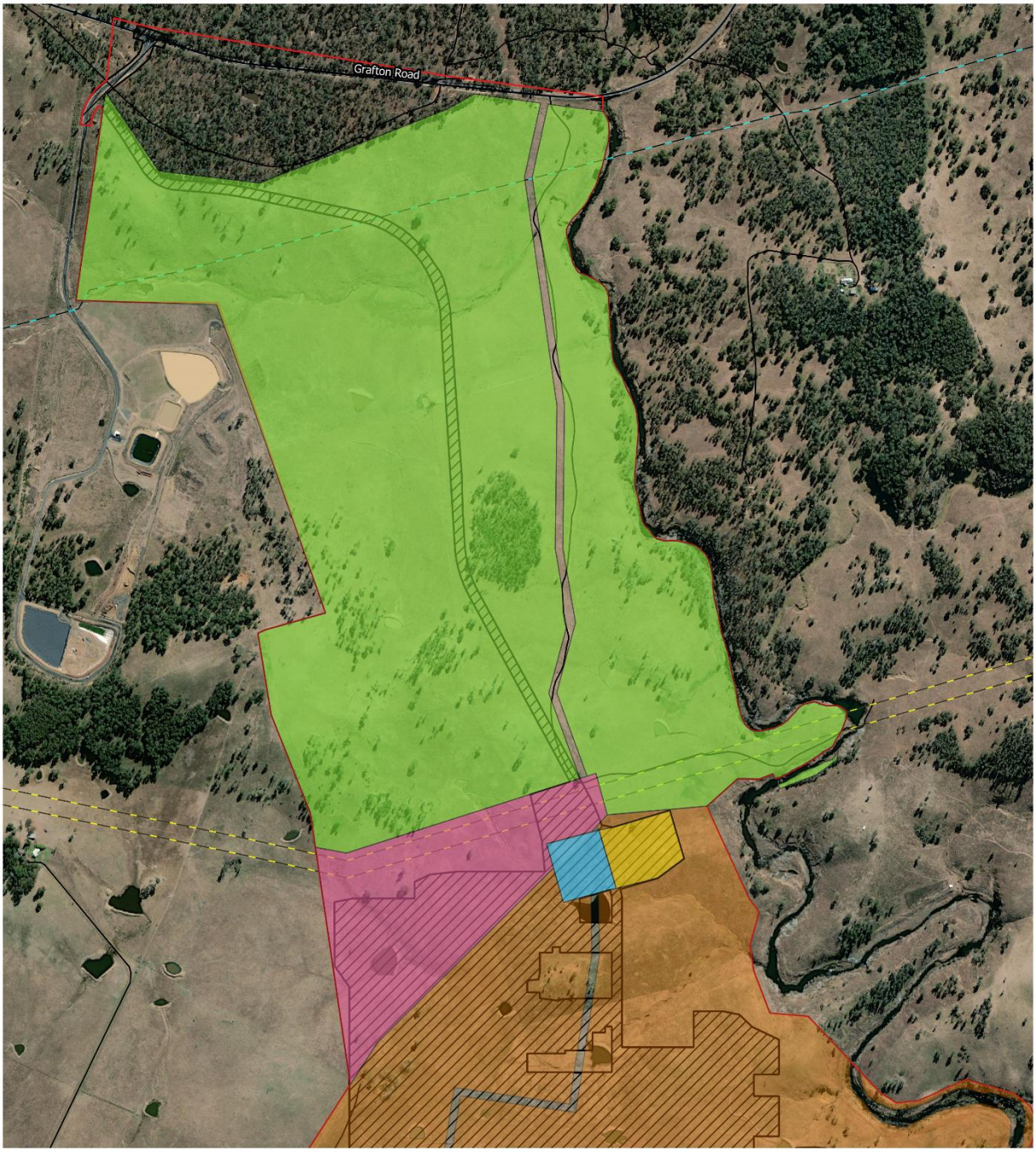


Figure 1-4 Indicative area to be subdivided from Lot 2 DP1206469 and Lot 5 DP253346

1.3. PROPOSED INFRASTRUCTURE

The proposed Oxley Solar Farm comprises of the following key items of infrastructure:

- Approximately 385,280 PV solar panels mounted on either fixed or tracking systems, both of which are considered feasible for the site and this project:
    - Fixed-tilted structures in a north orientation at an angle of 32 degrees, or
    - East-west horizontal tracking systems.
- Approximately 43 PCU composed of two inverters, a transformer and associated control equipment to convert DC energy generated by the solar panels to 33kV AC energy.
- Steel mounting frames with driven or screwed pile foundations.
- An onsite 132kV substation containing up to two transformers and associated switchgear to facilitate connection to the national electricity grid via the existing 132kV transmission lines onsite.
- Underground power cabling to connect solar panels, combiner boxes and PCUs.
- Underground auxiliary cabling for power supplies, data services and communications.
- Buildings to accommodate a site office, 33kV switchgear, protection and control facilities, maintenance facilities and staff amenities.
- Internal access tracks for construction, operation and maintenance activities.
- A battery storage facility with a capacity of up to 50 MWh (i.e. 50 MW power output for one hour) comprising of lithium ion batteries with inverters.
- Perimeter security fencing up to 2.3m high.
- Native vegetation planting to provide visual screening for specific receivers.
- Site access: One site access option identified, turning off Waterfall, via the existing Council landfill access road, and running east to join the Proposal site via a new access track.
- Gara Road and Gara River causeway would also be upgraded to facility heavy vehicles travel along Gara Road, improve safety and flood immunity.

During the construction phase, temporary ancillary facilities would be established within the development footprint on the site and may include:

- Laydown areas
- Construction site offices and amenities
- Car and bus parking areas for construction staff.

1.3.1. Solar arrays

The solar arrays would consist of PV solar panels that would be grouped into arrays. Fixed and tracking systems are both considered feasible and would include the following:

1. Fixed tilted array: solar panels would be configured in a north facing orientation; or
2. East-west horizontal tracking systems: solar panels would be mounted on single axis trackers that would track sun from east-west.

It is anticipated that 385,280 solar panels would be installed with the capacity to generate 215MW (AC). The individual solar panel dimensions would measure approximately 2.4 m x 1.3m.

The fixed tilt solar arrays would be 4m high at most (reflecting the taller tracking option) with a row spacing of approximately 8m. The solar arrays would be installed on steel piles that are driven or screwed into the ground at a depth of approximately 2 - 3m. Excluding mounts, the array would be installed not less than 1.5m in height at its lowest point to ensure placement above 1% Annual Exceedance Probability (AEP) flood levels.

Detailed design, availability and commercial considerations at the time of construction would inform the final quantity of solar panels and layout configuration.

Figure 1-5 Typical fixed tilted system.

Figure 1-6 Typical single-axis tracking system.

1.3.2. Power Conversion Units (PCUs)

Array blocks consisting of approximately 16,000 solar panels would be connected to a PCU (Figure 1-7). Each array block would each generate approximately 5MW (AC). This would allow for approximately 43 PCUs that would convert DC energy generated by the solar panels to AC energy. Each PCU consists of two inverters, as transformer and associated control equipment. The PCUs may be housed in a container measuring up to 10m long, 4m high and 3m wide (Figure 1-8). The containers would be mounted on concrete footings or piles to raise them above potential flood levels.

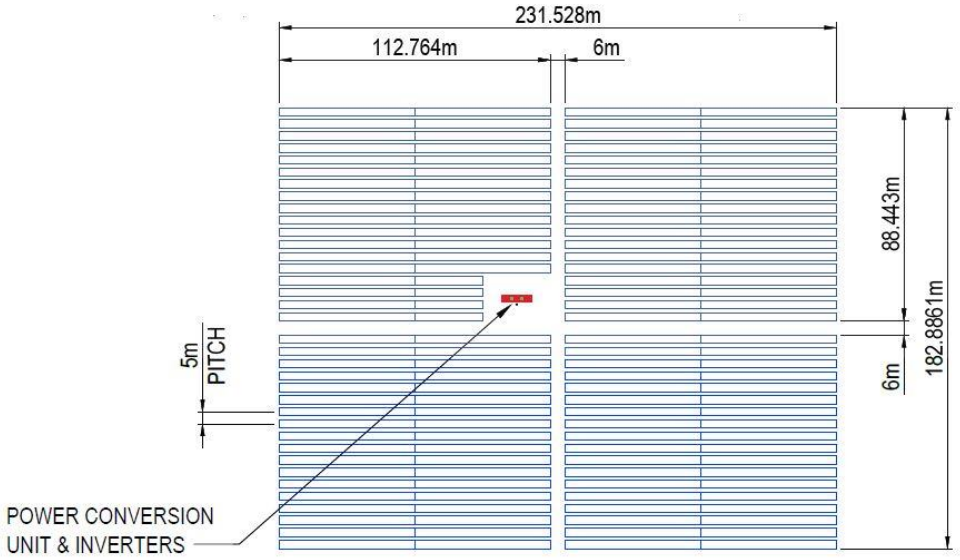


Figure 1-7 Typical array block showing location of PCU.

Figure 1-8 Typical illustration of a PCU within the array.

Distributed Inverters

During the detailed design phase of the solar farm, consideration would be given to an alternative configuration whereby the inverting equipment is distributed throughout the array block rather than centralising it in the PCU.

If this option is adopted, inverters would be installed at the end of each row of solar cells with the AC output being connected to transformers located within the middle of each array block. The inverters would be housed in weatherproof containers approximately 1.0 x 0.6 x 0.3m in size. With this arrangement, the PCU would be replaced with a smaller cabinet which would contain only a transformer and certain control and protection equipment.

1.3.3. Transmission network connection

The proposal site is traversed by two TransGrid owned and operated 132kV transmission lines (Figure 1-9) that connects to the Armidale 330/132kV substation. The Armidale substation is located approximately 9km to the west of the site. The solar farm would connect to the national grid via a new substation constructed in the northern portion of the proposal site. TransGrid would maintain and operate the proposed new substation to be constructed onsite for connection of the solar farm to the national grid by connecting the existing 132kV transmission lines to the new substation. No works are proposed to occur offsite for the transmission network connection.

The onsite 132kV substation would contain up to two transformers, three or four 132kV circuit breakers, current transformers and high voltage conductors to facilitate connection to the national electricity grid. The substation would be outdoors and built in accordance with

Australian and TransGrid standards. The two transformers would be used to transform the 33kV energy from the PCUs to 132kV in order to connect to the national grid. The transformers would be oil-fill, with waterproof bunds and other containment measures to ensure that in the event of an oil leakage, the oil is contained and cannot leak into the surrounding environment. The transformers would be located close to the connection point and would be approximately 200m from the nearest waterway (an ephemeral tributary of Lambing Gully).

Figure 1-9 Existing 132kV transmission lines traversing the proposal site that will connect the solar farm to the Armidale substation.

1.3.4. Underground cabling

Underground cabling would be required for:

- Connection of solar panels via a DC cable to a PCU
- Connection of approximately 5 – 10 PCUs into a grouping
- Connection of PCU grouping to the 33kV switchboard via a single 33kV feeder cable
- Provision of auxiliary power, data services and communication facilities.

Underground cabling on the site would be designed in accordance with Australian and International standards and the cable routes would be designed to minimise ground disturbance.

The cables would be installed in trenches approximately 900mm deep and the cables may be protected by conduits. A marking tape would be provided to reduce the possibility of accidental damage and ground markers would be provided to identify the cable routes.

Copper conductors would be used wherever necessary to electrically bond the metal structures to earth to protect personnel and equipment in the event of lightning strikes and electrical faults.

1.3.5. Ancillary infrastructure

One or more buildings would be constructed to accommodate the following:

- Control and protection equipment
- Staff amenities including kitchen and bathroom
- Workshop and storage facilities
- Water tanks
- Wastewater system
- 33kV switchgear.

1.3.6. Site access and internal tracks

Site access

One site access option is included which would meet the Transport for NSW safety requirements:

- Turning off Waterfall Way (Grafton Road), via the existing Council landfill access road, and running east to join the Proposal site via a new access track.
- Widening of the access would be required through a section of TSR within Lot 7003 DP1060201, and for a short distance within Armidale Regional Council's land at Lot 1 DP1206469.
- This access does not require any works on Waterfall Way (Grafton Road) since the existing landfill access is already designed as an Austroads Type BAL and CHR-S intersection.
- Widening of the existing landfill access road would be required between approximately 100m and 300m south of Waterfall Way (Grafton Road) to create a two-way road suitable for heavy vehicles to pass.
- Security fencing and landfill access systems require modification to ensure no unauthorised landfill access.
- A longer internal access road would require construction within Lot 2 DP1206469.

It is intended that the existing property access at 1352 Grafton Road would be closed and fenced to prevent ongoing access at this point, so that all future access to Lot 2 D1206469 would occur via on of the new property accesses described above.

Site access is sealed beyond 150m of the intersection and would not require further sealing.

Gara Road and Gara River causeway upgrades

Gara Road traverses the proposal site and would be used for access within the proposal site (i.e. north and south of Gara Road). New property entrances and intersections would be constructed within the proposal site to improve safety along Gara Road.

Improvements will be made along Gara Road between approximate chainages 7.78km and 9.70km, to facilitate heavy vehicles. Improvements would include localised widening and course straightening to allow heavy vehicles to pass, three new heavy vehicle property entrances, and upgrading in the vicinity of the Gara River causeway crossing where road width and sight distances are constrained (Figure 1-10).

The access points will follow Austroads intersection guidelines and the Armidale Regional Council engineering standards. Given there is little through-access at this part of the road, consideration may be given to temporary traffic control measures to control traffic in the vicinity of the Gara River crossing, in consultation with Armidale Regional Council.

The Gara River causeway upgrading will improve road safety, amenity and flood immunity, avoiding the need for vehicles to queue on approaches under traffic control or for 'wet' causeway crossings, while ensuring the structure requires minimal ongoing maintenance and is commensurate with long term traffic needs. The causeway would involve raising the road by up to 1.3m, that would include culverts as shown in the concept design in Figure 1-10.

The causeway upgrade will improve access and safety for the construction of the Oxley Solar Farm and in the long term for the public. The 1.3m level would allow dry crossings of the Gara River during most regular flow levels of the waterway. Construction of the Proposal would be suspended if the causeway does become flooded. Flood depth markers would also be installed.

Figure 1-10 Concept of Causeway Upgrading, Gara Road Chainage 9.05km

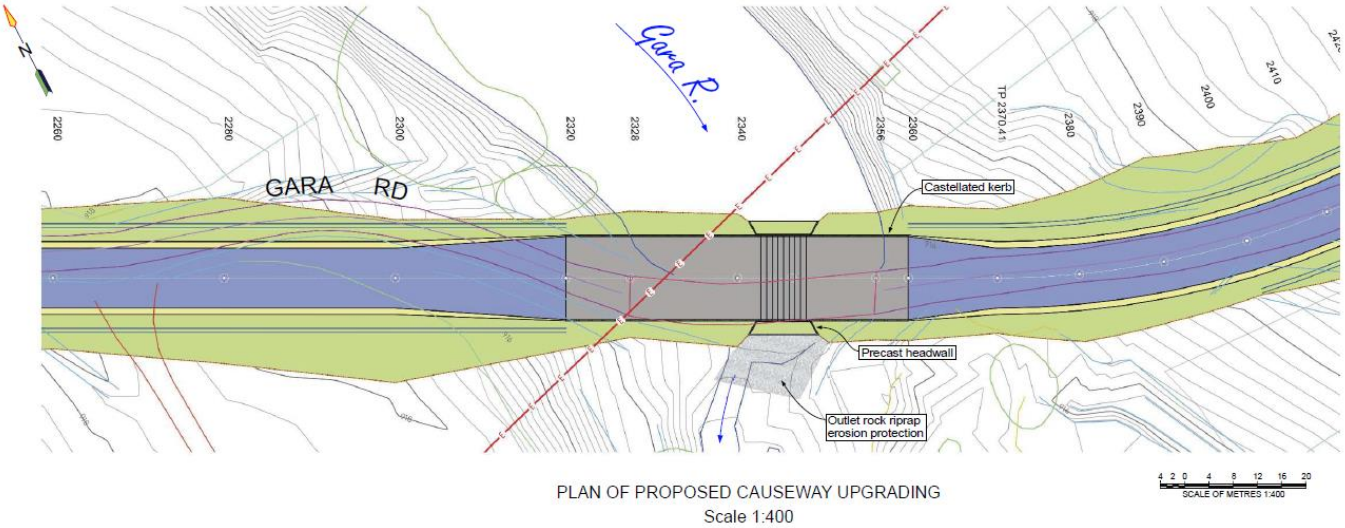


Figure 1-11 Aerial plan view of proposed Gara Road causeway upgrade

Silverton Road

Silverton Road is accessed from Waterfall Way (Grafton Road). Most of the construction and operational workforce will access the site from Waterfall Way (Grafton Road). Light vehicles may occasionally access site via either Gara Road or Silverton Road. All of the construction and operational workforce will be instructed to access the site from Waterfall Way (Grafton Road) as part of site inductions.

Internal access

Internal access tracks would be constructed to each PCU and to the substation for use during the construction of the proposal and to facilitate ongoing maintenance. The internal roads would be approximately 7m wide to facilitate transport, unloading and mounting of the PCUs. They will be constructed in accordance with the AustRoad Guideline requirements. The actual locations of the roads would be determined during the detailed design phase of the solar farm.

Internal access tracks would require some waterway crossings. Erosion and waterway protection would be ensured by designing waterway crossings in accordance with the following:

- *Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge, 2003).
- *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW DPI, 2003).
- *Guidelines for Watercourse Crossings on Waterfront Land* (NSW DPI, 2012).

The site access road and all internal tracks would be maintained throughout the construction and operation of the solar farm. If required, water trucks would be used to suppress dust on unsealed access roads and tracks during construction. Additional stabilising techniques and/or environmentally acceptable dust control would also be applied if required to suppress dust.

Based on the estimated peak daily demand being 20 buses and 30 cars, safe set-down and pick-up areas should be designated for bus passengers, and minimum all-weather off-street parking provision provided for 30 light vehicles.

1.3.7. Battery storage

The proposed Oxley Solar Farm would include a provision for a battery storage facility with a capacity of up to 50MWh (i.e. 50MW power output for one hour) consisting of approximately 25 containers (40 foot each). The battery storage infrastructure would be installed once the solar farm is in operation and would consist of power packs comprising of lithium ion batteries with inverters (Figure 1-12). They would be installed in one designated area near the substation (Figure 1-1), rather than distributed through the site. The exact location of the future battery storage would be determined during detailed design but would be located within the development footprint.

Figure 1-12 Typical battery storage units, located together.

1.3.8. Security and fencing

The following security measures would be established within the proposal site:

- The infrastructure on the site would typically be enclosed by a 2.3m high chain wire fence with wire strands. This fence type would be confirmed during the design phase and constructed early in the construction phase.

- The 132kV substation would be enclosed by a security fence in accordance with TransGrid requirements.
- An electronic security system would be established prior to commissioning of the solar farm.
- Security lighting would be installed around the entrance gates and main building areas.

1.3.9. Landscaping and vegetation

Landscaping and screening for the proposal would include:

- A wide band of native plantings of trees up to 5-10m in height for the southern boundary of the proposal site to address potential visual impacts from the Oxley Wild Rivers National Park. These can be positioned in three (3) rows (or approximately 6 - 9m wide) between the property boundary and security fence. The tree canopy should not intrude into the zone that exists between the edge of the security fence and the solar panels
- Screen planting along the proposal site eastern boundary, adjacent to Silverton Road to assist in screening views from residences to the east and reducing the visual impact from Silverton Road.
- Screen planting on the western boundary of the site to reduce the potential visual impact from residences to the west.

The proposed landscaping and screening can be seen on Figure 1-13 and Figure 1-14.

The landscaping and screening would keep within the existing vegetation typologies (scattered grouping of a variety of natives). The trees would be planted at varying heights and arranged randomly (i.e. not straight lines). This would ensure a naturalistic effect that blends rather than contrasts with the overall landscape.

To ensure that mitigation planting is successful all landscape works would be maintained regularly for a period of 24 months.

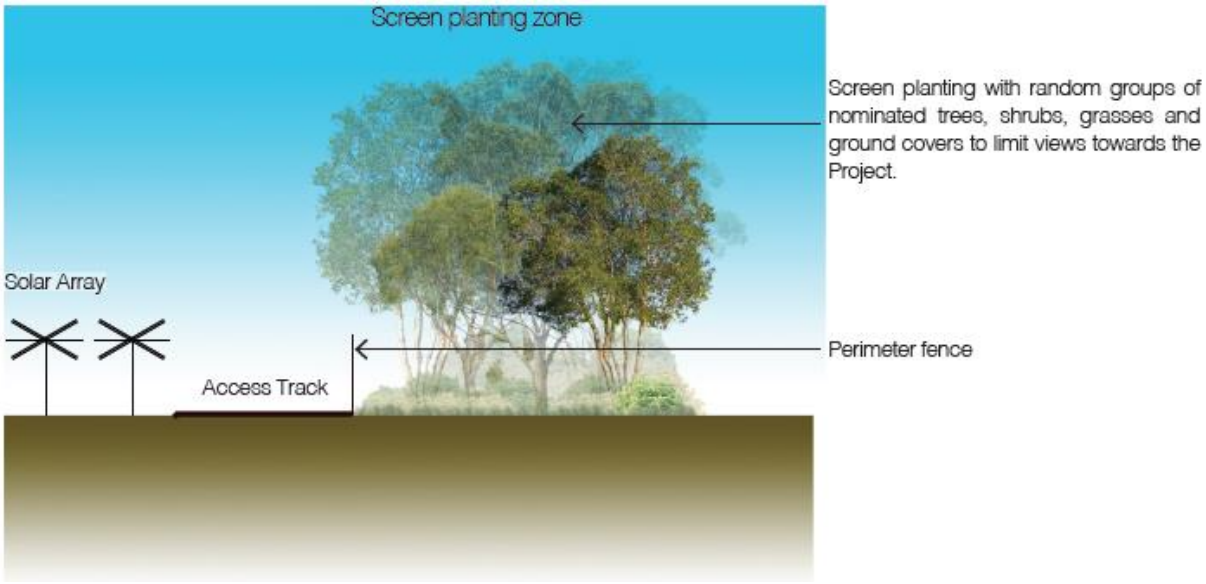


Figure 1-13 Example screening for a substation (Moir Landscapes, 2022).

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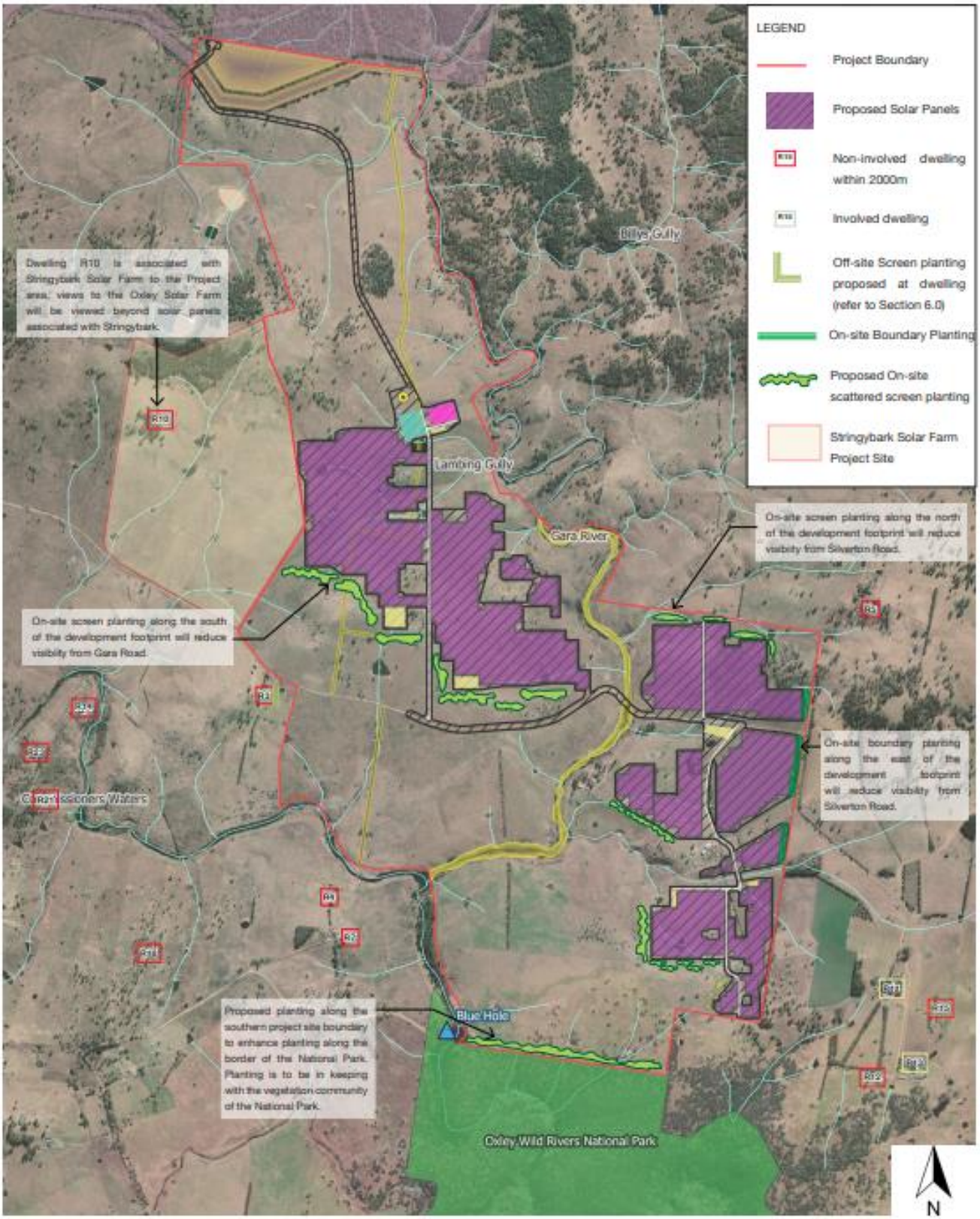

Figure 1-14 Proposed onsite screen planting (Moir Landscapes, 2022).

1.3.10. Temporary construction facilities

Temporary facilities would be located within the site boundary during the construction phase and would include:

- Material laydown areas
- Temporary construction site offices
- Temporary car and bus parking for construction worker's transportation. When the construction work is completed, a small car park would be retained for maintenance staff and occasional visitors
- Temporary staff amenities.

The staff amenities would be designed to cater for the peak number of construction staff expected to be onsite and would include:

- Sanitary modules with water flush systems connected to holding tanks. The tanks would be fitted with high level alarms and they would be pumped out regularly.
- Water tanks
- Changing rooms
- Lunchrooms
- Administrative offices
- Covered walkways
- Emergency muster point
- Generator – if required
- Electrical, data and water reticulation.

A steel or concrete water storage tank would be installed near the entrance to the site for firefighting and other non-potable water uses. Rainwater tanks to be installed beside the site buildings for staff amenities. Suitable fire extinguishers would be maintained at site buildings.

1.4. PRECONSTRUCTION WORKS

The proposed Oxley Solar Farm may include works prior to construction including upgrade of construction site access road, installation of fencing, artefact salvage, geotechnical drilling and/or surveying and preparation of construction compounds and site facilities.

1.5. CONSTRUCTION

1.5.1. Construction activities

Construction is anticipated to take approximately 12 – 18 months. The main construction activities would include:

- Geotechnical investigations and survey.
- Site establishment: site office, staff amenities, parking, fencing, laydown areas, access road and tracks
- Earthworks
- Installation of drainage
- Installation of footings: concrete foundations for buildings and equipment

- Installation of steel post and framing system for the solar panels
- Installation of cabling: trenching and backfilling
- Installation of solar panels
- Construction of buildings
- Installation of PCUs
- Installation of high voltage equipment, switchboards
- Cable termination
- Testing and commissioning
- Removal of construction facilities and rehabilitation
- Landscaping.

1.5.2. Site preparation and earthworks

Ground disturbance resulting from earthworks associated with the proposal would be minimal and limited to:

- The installation of piles supporting the solar panels which would be driven or screwed into the ground.
- Establishment of external access roads.
- Decommissioning of dams currently within the development footprint which would involve filling the dams with soil excavated from other parts of the site.
- Removal of existing fences.
- Cleaning and levelling the ground for buildings and structures and arrays.
- Localised areas of earthworks (cut and fill, grading and compacting) may be required in areas where there are sudden, significant changes in ground slope.
- Construction of internal access roads.
- Excavating cable trenches.

Groundcover vegetation and topsoil under the footprint of the array area would not be removed during the construction of the solar farm. Topsoil salvaged from the construction of the access tracks and other works would be securely stored for use in site rehabilitation.

Where required weed treatments would be undertaken prior to earth works commencing in order to reduce the potential for spread of these species within the proposal footprint.

1.5.3. Materials and resources

The main construction materials would include:

- Aggregates, road base and concrete.
- Fencing materials.
- Steel footings and frames to support the solar arrays.
- Cables, conduits, junction boxes.
- Steel framing and ColorBond sheeting for permanent buildings.
- Timber and fixtures for building fit-out.

Estimated quantities of required resources are shown in Table 1-2 and would be confirmed during the detailed design stage.

Table 1-2 Estimated resources required.

Resource	Estimated Quantity
Gravel (access tracks)	21,320 m^3
Sand (bedding for cables)	10,020 m^3
Concrete (PCU and buildings)	890 m^3
Estimated number of solar panels	385,280
Structural Steel	**2,214,109m^2**

Water requirements

Water would be supplied during construction by a licenced river offtake and not by use of any onsite bore. The Engineering Procurement and Construction (EPC) contractors, would apply for a Water Access Licence under Section 56 of the Water Management Act 2000 for the river offtake.

Between 2019 and 2021 the Gara River had two local utility Water access licences WAL (waterregister.waternsw.com.au/water-register-frame). These WALs had a total share component of 6902 ML at 100%. Of that allocation the use was 2077.8 ML (2021/22), 2526.8ML (2019/2020) and 3456.6ML (2018/2019). Between 2019 and 2021 the Gara River had eight unregulated River WALs. These WALs had a total share component of 1065 ML at 1ML per share. Of that allocation the use was 0.0ML. The expected 96 ML required for construction represents about 2% of water allocated but not utilised. This will have negligible impact on water levels and existing users.

Non-potable water requirements are anticipated to be an upper limit of 200 kilolitres (kL) /day and a total of 96ML for construction of the solar farm. Potable water requirements are anticipated to be approximately 0.4ML during the construction phase. Detailed water requirements would be determined by EPC contractors.

Non-potable construction water would likely be sourced from Gara River which runs through the site. Non-potable water would be taken from the river at a rate of 8-10 l/s to fill tanks on site and/or delivered to water carts by an overhead standpipe. Potable water would be sourced from a commercial potable water supplier, such as the Armidale Regional Council. Water sources would be subject to determination by EPC contractors.

Labour, machinery and equipment

It is anticipated that up to 300 construction staff comprising of supervisors, tradesmen and labourers would be engaged to complete the work during the peak construction phase (6 – 9 months). Up to 300 workers is a maximum estimation, the amount of workers required for proposal would likely be less. Every effort would be made to hire staff locally.

Staff would be accommodated in Armidale or nearby surrounding areas.

Plant to be used during construction would include:

- Small pile driving rig
- Crane
- Drum roller
- Padfoot roller

- Wheeled loader
- Dump truck
- 30t excavator
- Grader
- Chain trencher
- Water truck
- Telehandler
- Forklift.

1.5.4. Transport and access

Haulage route

Road transport is the preferred option for the delivery of construction infrastructure, as opposed to rail. It is expected that the haulage route for most vehicles, including heavy and over-dimensional vehicles during construction would be from Armidale, then to the site via a new property access to be constructed off Waterfall Way (Grafton Road), approximately 130m west of the existing property access. It is expected that the equipment would be transported from port facilities in either Sydney or Newcastle and delivered to the site in 12m shipping containers or other suitable transport mode. The larger transformers would likely be delivered by low loaders on up to two occasions.

The principle haulage routes would from Sydney or Newcastle ports via the Pacific Motorway (Sydney), Hunter Expressway (Newcastle), New England Highway and Waterfall Way (Grafton Road) to the proposal site. The proposed haulage route is an approved 19m B-double route on the Transport for NSW Restricted Access Vehicles Map.

Materials would generally be transported to the site on heavy vehicles up to B-double and would include, but not limited to the following:

- PV solar panels.
- Piles, mounting structures and frameworks.
- Electrical equipment and infrastructure including cabling, auxiliary electrical equipment and machinery, inverters, switchgear, and the onsite substation (and transformer).
- Construction and permanent buildings and associated infrastructure.
- Earthworks, grading and lifting machinery and equipment.

Local site access is proposed from Waterfall Way (Grafton Road) south towards the solar farm and associated substation via a newly constructed road across as shown in Figure 1-1. The new internal road would be about 1km in length with a 25m wide easement. The track would be 7m wide. The new internal road would be located within the Development footprint, but its exact location will be determined through detailed design. Silverton and Gara Roads (apart from light vehicles) are not proposed to be used for site access.

Specialist oversize equipment including the grid connection transformer and 200 Tonne cranes would require oversized vehicles to transport them to the proposal site. This equipment would have ‘Oversize’ transport management in place to transport these items to site. Further, the cumulative impact of the site traffic with nearby developments is expected to be minimal. A design, in accordance with the Traffic Impact Assessment (New England Surveying & Engineering , 2022), for

the intersection of the site access with Waterfall Way (Grafton Road). The access option is already sufficient for safe intersection access off Waterfall Way (Grafton Road), no intersection upgrade would be required.

A Construction Traffic Management Plan would be prepared following project approval to manage haulage traffic during the construction phase.

Traffic movements

Estimated total and maximum daily traffic movements during construction and peak construction are shown in Table 1-3, and detailed traffic volumes and requirements are shown in Table 1-4. The traffic volumes include the delivery of water to site.

Table 1-3 Estimated traffic volumes and requirements for the Oxley Solar Farm.

Type of vehicle	Estimated Vehicles over construction duration	Estimated peak maximum daily number of trips (one way)
Semi-Trailers	767	23
B Double	735	2
Oversized vehicles	5	1
Standard truck	1,670	5
Water tankers	6,590	15
Buses	5,840	20
Cars	7,040	30
Total	**22,647**	**96**

Table 1-4 Estimated detailed traffic volumes and requirements.

Item	Type of vehicle	Estimated number of vehicles during construction
Equipment		
Solar Panels	B Double	735
PCU's	Semi-Trailer	55
Switchboards	Semi-Trailer	2
Transformer and 200 Tonne Crane	Oversize vehicles	5
Total cables	Semi-Trailer	110
50 MWh battery storage	Semi-Trailer	50
Steel posts, tables and brackets	Semi-Trailer	495
Buildings		
Control room	Semi-Trailer	3
Warehouse	Semi-Trailer	1
Offices	Semi-Trailer	6

Item	Type of vehicle	Estimated number of vehicles during construction
Water tanks	Semi-Trailer	4
Fences		
Posts and wire mesh	Semi-Trailer	5
Earthworks and grading machine	Semi-Trailer	3
Heavy Machineries		
Telehandler	Semi-Trailer	30
Tractors/bulldozers	Semi-Trailer	3
Miscellaneous trucks	Standard truck	1,670
Water Tankers	20000L Tanker	6,590
Construction personnel		
Construction workers	Shuttle buses	5,840
	Cars	7,040

During peak construction, it is anticipated that up to 300 site personnel would be required to undertake the works. A shuttle bus system would likely be implemented to transport personnel to the site on 25 seater buses. This would generate up to 20 vehicle movements (10 to the site/10 from the site) equating to 40 daily vehicle movements. Additionally, extra allowance has been made for up to 60 daily light vehicle movements for workers to access the site.

It is expected that up to five one-way movements of oversized vehicles would be required for transport of the transformer and 200 tonne cranes.

1.5.5. Hours of operation during construction

During the construction phase of the solar farm, work would be undertaken during the following hours:

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

There may be a need to work outside these hours, for example:

- To avoid disrupting traffic when delivering bulky equipment.
- To avoid taking outages of existing high voltage transmission lines during periods of high load.
- To undertake emergency work to avoid serious injury or loss of property.

Any construction outside of these standard construction hours, if required, would only be undertaken with prior approval from relevant authorities.

1.6. OPERATION

1.6.1. Activities during operation

Once commissioned, the solar farm would be in operation continuously. The solar farm would only generate electricity during sunlight hours but the battery storage system could be activated at any time.

The solar farm would operate automatically but there would be provision to both locally and remotely monitor the performance of the equipment and to activate the battery storage system.

Activities undertaken during operation would include:

- Solar panel maintenance.
- Monitoring the performance of the solar farm.
- Inspection of the installation.
- Routine preventative maintenance.
- Emergency repair response (24 hours).
- Site security response (24 hours).
- Vegetation management within the development footprint in accordance with the fire management and biodiversity management plans.

1.6.2. Water requirements

Run off from the Operations and Maintenance (O&M) buildings would be captured in water tanks. This water would be used for firefighting needs and panel cleaning. Cleaning materials and spare parts would be made available on site for use by the maintenance staff. Panel cleaning may be required during drought conditions. As such, additional panel cleaning may also be required on occasion. As a 'maximum' upper limit, it is estimated that up to 500kL of water would be required to clean all of the panels once. Additional clean water for panel cleaning would be sourced commercially.

It is estimated that up to 1ML would be required per year under normal operating conditions. If insufficient water is collected on site from rainwater tanks and dams, water would be obtained from commercial water providers.

1.6.3. Transport and access

The travel demand during the operation phase of the proposal is anticipated to be significantly less than the construction phase. It is estimated that the daily peak travel demand during operation would be approximately 8 vehicles movements a day. Site access would be via the newly established access track off Waterfall Way (Grafton Road). During operation, water may need to be delivered to site if insufficient water is collected onsite. If this were to occur, it would be approximately one water truck per month.

1.6.4. Personnel and work hours

A total of five equivalent full time staff would be employed onsite when the solar farm is operational. Associated work would be undertaken during the standard working hours of:

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

Work would only be undertaken outside of these hours in an emergency and would be kept to a minimum.

During the life of the solar farm, it may be necessary to engage contract staff to undertake specific major tasks at which time there could be greater numbers of people onsite. Such work would most likely relate to the replacement/refurbishment of the battery storage system, as it is assumed that the batteries would have to be replaced at least once during the life of the solar farm.

It is anticipated that the staff would drive light vehicles to the site each working day via any available road.

As noted in Section 1.3.3, TransGrid would be responsible for the operation and maintenance of the 132kV substation and TransGrid staff would require access to that part of the site.

The TransGrid owned Armidale Substation is less than 10km from the proposal site so it is expected that the maintenance of the two sites would be coordinated and, in respect of TransGrid staff, the presence of the new substation would have minimal impact on traffic in the area.

The standard working hours for TransGrid staff are:

- Monday – Friday: 7am – 6pm

1.6.5. Lighting and CCTV

Under normal circumstances, there would be minimal night lighting on site. Flood lighting would only be activated during (infrequent) out of hours maintenance or emergency situations. Under normal conditions out of hours lighting would be minimised to only enable safe entry to the site.

External lighting would be provided around the buildings, and in the high voltage substation but they would only be enhanced on the rare occasions that staff are working on the site during the hours of darkness.

There may be some security lighting at critical locations around the perimeter of the site, but these would only be activated when the automatic security system senses an unauthorised site entry. Task lighting would be provided at PCU's.

CCTV security cameras would be located at the entrance gate and around the substation and battery storage, and O&M facilities and office areas.

1.6.6. Refurbishment and upgrading

It is estimated that the solar equipment would have a life of 30 years and the benefits of refurbishing the equipment would be considered closer to this time.

It is anticipated that the batteries that would be used in the battery storage system would have a life of 15 years, it is anticipated that they would need to be replaced at least once during the life of the solar farm.

1.7. DECOMMISSIONING AND REHABILITATION

The expected life of the proposed Oxley Solar Farm is around 30 years with the exception of the battery storage equipment which, because of the battery technology, is expected to have a life of approximately 15 years. It is anticipated that after 15 years the batteries would be replaced. Similarly, after 30 years, other solar farm infrastructure may be refurbished to continue operations or decommissioned.

When the solar farm is no longer viable, all above ground infrastructure, with the possible exception of the 132kV substation, would be removed and decommissioning and rehabilitation of the site would commence. It is noted that the 132kV substation would at that time form part of TransGrid's transmission system. Other works would need to be carried out to re-establish the link if the substation were to be removed.

The solar arrays would be removed and the steel piles on which they are supported, would be removed. Both the steel piles and the solar panels would be recycled, where possible.

All buildings would be removed, including the PCUs together with the associated footings.

Cabling would be removed where practical and recycled. Any cabling greater than 500mm below the ground may be left in place since this would not impact on future agricultural activities on the site once the restoration is complete.

The objective of this stage is to return the site to its existing land capability, for continued agricultural or other compatible land use options. The Oxley Solar Farm is largely reversible.

1.8. INDICATIVE TIMELINE

The earliest proposed construction timing, pending all relevant approvals, appointment of contractors and environmental planning requirements, is the third quarter of 2021. Once approved, it is understood that no end date is stipulated in the Development Consent; the consent is open ended. However, it is expected that at some point in the next 25-30 years the development will no longer be considered viable, may require refurbishment to remain so, or that an alternative land use may be preferred. After a relatively short decommissioning process that would mimic to a large degree the construction process, with its peak activity over several months, the site would be returned to its existing or better land capability and other land uses considered.

Table 1-5 Indicative timeline

Phase	Approximate commencement	Approximate duration
Construction	Q1 2024	12 - 18 months
Operation	Q4 2025	30 years
Decommissioning	2055	9 months

1.9. CAPITAL INVESTMENT

The Oxley Solar Farm would have an estimated capital investment of an estimated $372 million (including storage). A quantity surveyor's report confirming the capital investment has been provided to DPE.