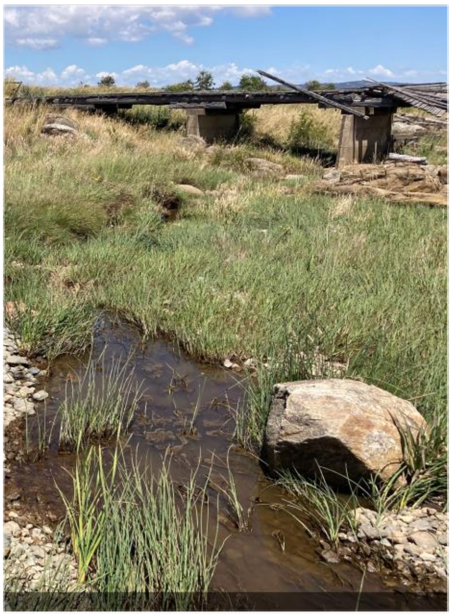
Project Description

Blind Creek Solar Farm

November 2022

Project Number: 22-319



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1. The Project

1.1. Project summary

The key features of the Project are summarised in Table 1-1, and the indicative layout of infrastructure in context of the Study area's identified constraints is shown in Figure 1-1.

The component specifications and location of infrastructure 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. The assessment of a broader Development site also provides resilience to minor layout changes.

* Red text denotes project amendments

Table 1-1 Summary of key features of the Project

Feature	Description
Project	Blind Creek Solar Farm (BCSF)
Proponent	Blind Creek Solar Farm Pty Ltd (BCSF Pty Ltd)
Nominal Capacity	Estimated capacity of up to 350MW AC (420MW DC)
Study area	The area surveyed for the assessment prior to identifying the constraints and exclusions. Approximately 1,225 ha.
Development site	The Development site is the area where development is proposed and where landowner consent (freehold and Crown land) has been obtained. The area is 1,026ha.
Development footprint	The uppermost area of land that would be directly impacted by the Project. Approximately 682.5ha
Exclusion zones	As identified by the EIS investigations, approximately 529.86ha within the Study area would be protected from impacts. These exclusion zones reflect: • 46.06ha of land with high biodiversity values • 73.61 ha of waterways and their riparian buffers made up of Butmaroo Creek (57.20 ha), Wrights Creek (4.22 ha) and the associated overland flow path of Wrights Creek (12.19 ha – approximate and indicative only); a high catchment value. • 479.6ha of land with high heritage values (Aboriginal Heritage and Non-Aboriginal Heritage) • 33.86 ha of land to offset habitat for the threatened White Fronted Chat • 19.56 ha of visual offsetting. Additionally, no solar panel arrays would be placed within the approximately 8ha of existing electricity easement traversing the site nor within a flow path connecting Wrights Creek and the downstream wetland in accordance with *Guidelines for Riparian Corridors on*

Feature	Description
	Waterfront Land. This treats the undefined part of the creek as a fourth order stream without banks, achieving an average exclusion of not less than 40m either side over the length of the Creek. A 40m buffer either side of Butmaroo Creek has also been established. This has been included in the high catchment value area above.
Indicative infrastructure layout	Approximate location of key infrastructure components within the Development Footprint; subject to detailed design.
Subdivision requirements	The Project would require subdivision of: • Lot 17 DP535180, to separate the solar facility from Capital Wind Farm. • Lot 1 DP456698, to separate 'shared network' electricity assets. Refer to the subdivision plan, Figure 1-4.
Local Government Area and land zoning	Queanbeyan-Palerang Local Government Area (LGA). RU1 Primary Production and C3 Environmental management.
Solar array	Single-axis tracking system Indicative number of panels: Approximately 850,000 Tracker (row) spacing: 5.25m or greater row spacing Clear space between panels (pitch): Approximately 3.1m or greater. Height: Approximately 5m (at a 60 degree tilt). Refer to Figure 1-5 Up to 93 inverters and transformers in containers, distributed throughout the array, for power conversion.
Transmission line connections	Existing 330kV transmission line that traverses the site, via a purpose-built on-site switchyard and adjacent substation. This line connects Canberra to Kangaroo Valley.
Substation	The substation would have a nominal transfer capacity of approximately 350MVA and host up to 4 transformers. It would require approximately 1ha for the 330kV switchyard. The Project's dedicated assets would be adjacent, including transformers and switching equipment, O&M building, car parking and storage facility.
Battery storage (BESS)	An electrochemical BESS with a nominal capacity of 300MW and 2-hour duration, partly grouped in containerised modules near the substation on a pad of approximately 3ha (AC coupled), and/or wholly partly distributed throughout the array in containers adjacent to the solar inverters (DC coupled).
Site access and intersection upgrades	The entrance to the site for all stages of the project is off Tarago Road (administered by Queanbeyan City Council). The intersection of Tarago Road and a private road on Lot 1 DP1154765 (henceforth, Blind Creek Road Entrance) would be upgraded. The project requires a new left turn passing lane to allow passing traffic

Feature	Description
	from Bungendore direction. This supplements the existing right turn passing lane which allows traffic from Tarago to pass vehicles turning into the site. An emergency access point/route has been identified and is shown in Figure 1-1 with more detail provided in section 1.3.7 of the EIS.
Internal tracks and waterway crossings	The project requires approximately 6.6km of upgrades to existing tracks and approximately 20km of new internal tracks. The Project would use Currandooley Road, an existing unsealed private road suitable for all vehicle types, as well as construct an additional internal access network. The project requires upgrades to the existing low-level crossing on Blind Creek and a new crossing on Wrights Creek.
Operations and Maintenance (O&M) buildings	A permanent O&M facility with staff amenities and vehicle parking is required. It will include a control room with switch gear and have a height of approximately 5m, subject to final design.
Security fencing, lighting and CCTV	The solar array will include agricultural- style fencing. The switchyard, 330kV substation and O&M facilities would be enclosed by a 2.3m high chain wire security fence. Night lighting around the buildings and in the high voltage substation will be installed to comply with Australian/New Zealand *Standard AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version, but will only be used for maintenance and emergency purposes. Task lighting will be installed at PCUs. Lighting will be able to be remotely controlled as required. CCTV security cameras at the entrance gate and around the substation and battery storage, and O&M facilities and office areas.
Construction timing and hours	Approximately 12 to 18 months (peaking during the initial 6–9 months). Standard construction hours: Monday to Friday 7am to 6pm, and Saturday 8am to 1pm. No work on Sundays and Public Holidays.
Operation	The expected operational life of the Project is nominally 35 years. Future infrastructure upgrades may extend the operational life of the Project.
Hours of operation	The Project would operate continuously.
Decommissioning and rehabilitation	All infrastructure would be removed from the site including DC cabling and AC above-ground cabling. AC cabling buried deeper than 500mm would not be removed. The site would be rehabilitated to a safe, stable and non-polluting state, consistent with future land use requirements.
Employment	Up to approximately 300 full-time jobs during peak construction. Approximately 5 full-time equivalent jobs during operation.
Capital investment value	Estimated $**503,679,005** million AUD

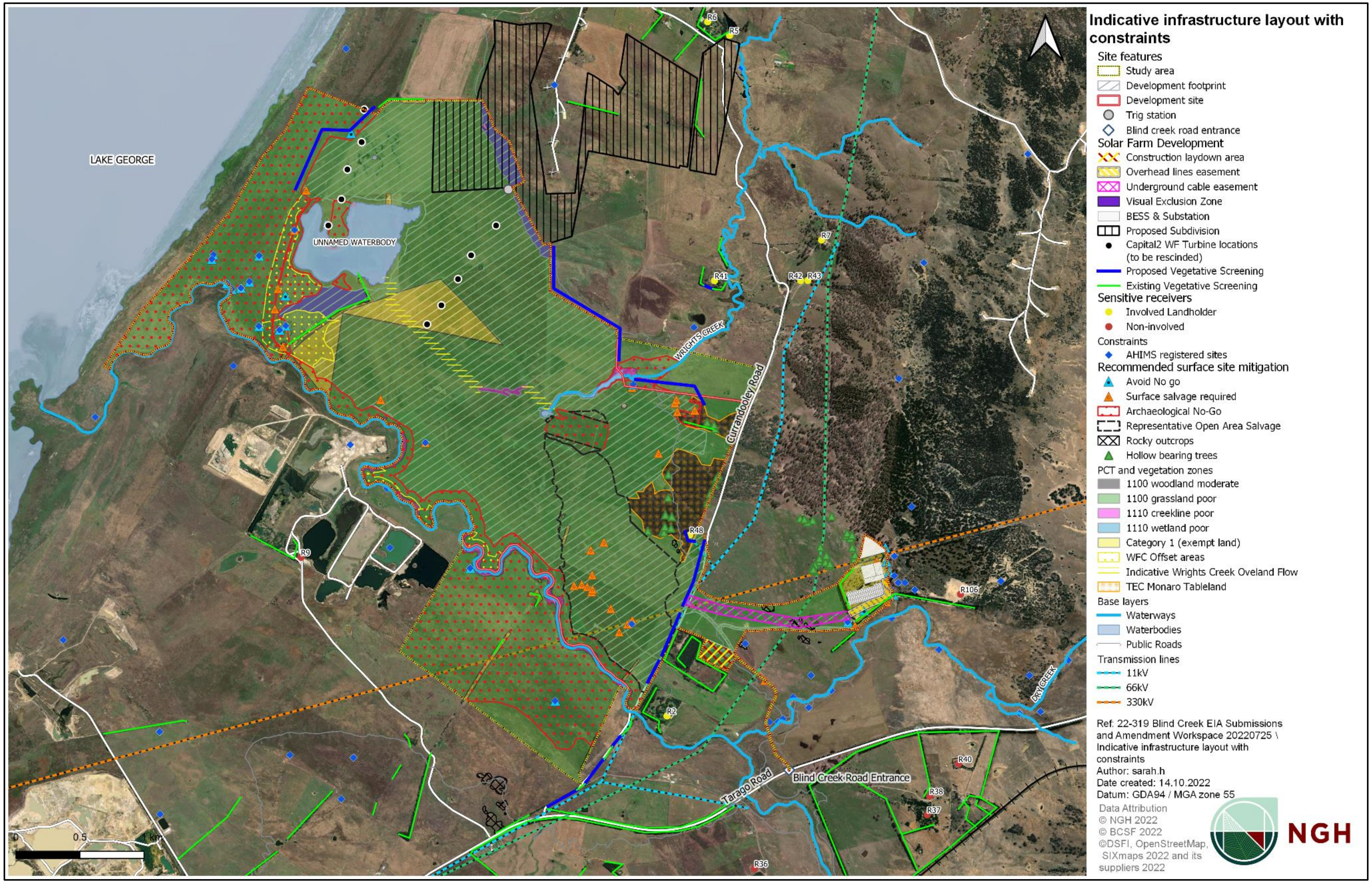

Figure 1-1 Project layout and constraints

1.1.1. The Subject land

The Blind Creek Solar Farm Project would be located on a 682.5ha site. The Subject land is defined as all lots affected by the development. Table 1-2 sets out a summary of the Subject Land by lot of ownership, existing and proposed uses on the affected lots. Affected lot boundaries are shown in Figure 1-2.

Table 1-2 Affected Lots, exiting land use and proposed use

Proposed infrastructure	Lot and DP	Owner	Existing land use	Proposed ownership arrangements
Solar farm array and ancillary infrastructure	Lot E DP38379	Private landowner 1	Agriculture	
	Lot 17 DP535180	Private landowner 2	Agriculture	Subdivide to separate facility from Capital Wind Farm
	Lot 1 DP456698	Private landowner 3	Agriculture	
	Lot 9 DP237079	Private landowner 4	Agriculture	
	Lot 2 DP1154765	Private landowner 5 An isolated segment of Crown road is contained within this lot	Agriculture	Letter of consent has been granted from Crown Land to the Proponent for lodgement and exhibition of the EIS and other applications required under other legislation. The proponent has submitted an application to purchase the relevant Crown road
	Lot 1 DP237079	Private landowner 6	Agriculture	
	Lot 2 DP237079			
	Lot 3 DP237079			
	Lot 4 DP237079			
Substation and battery (the latter if AC coupled)	Lot 1 DP456698	Private landowner 3 Crown road forms the southern boundary of Lot 1 DP 456698	Agriculture	Subdivide to separate 'shared network' electricity assets. Letter of consent has been granted from Crown Land to the Proponent for lodgement and exhibition of the EIS and other applications required
Tarago Road/ Blind Creek Road Entrance/ intersection	Lot 1 DP1154765			Council and Crown land

1.1.2. Associated receivers

The are nine associated receivers with the Project. Eight of these are located within the 2km buffer of the Development site, and one receiver (R3) is located outside this buffer, refer to Figure 1-3. Associated receivers are those that will either host project infrastructure or have entered into negotiated agreements with the proponent, accepting all Project impacts. Of the nine receivers, six will host infrastructure and three have interests in the project and have entered into negotiated agreements. The following table details the receivers hosting infrastructure and the receivers that have negotiated agreements.

Table 1-3 Relationship of associated receivers with the Project

Receiver ID	Host Project infrastructure or Agreement
R2	Host PV panels, BESS and substation
R3	Agreement
R5	Agreement
R6	Agreement
R7	Host PV panels
R41	Agreement
R42	Host PV panels
R43	Host PV panels
R48	Host PV panels, BESS and substation

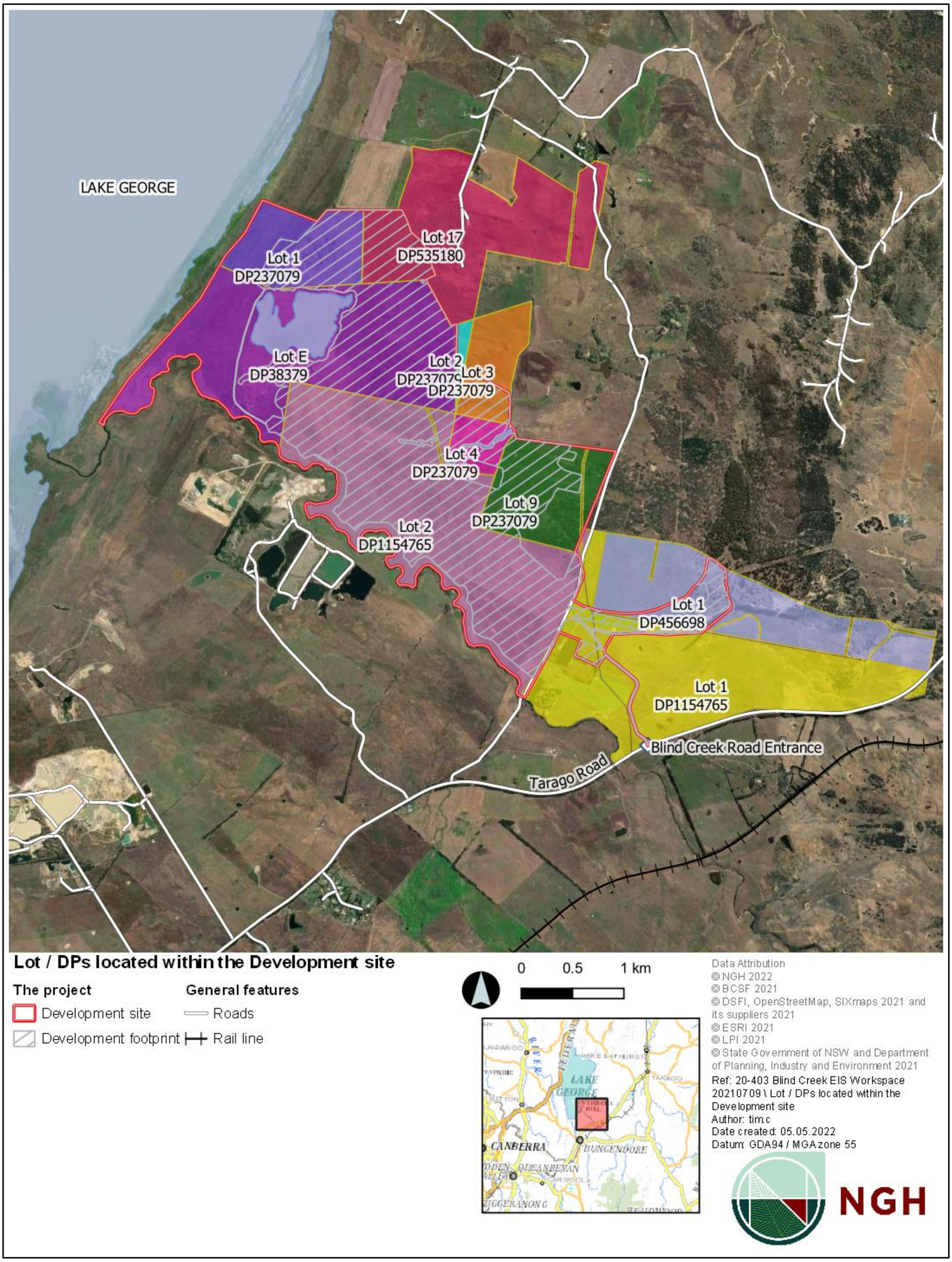

Figure 1-2 Lot / DPs intersecting the Development site

1.1.3. Environmental context

The Development site typically slopes from east to west with elevations ranging from about 670m AHD at Lake George to 720m AHD. On its northern flank the Development site abuts a relatively steep terrain which rises to an elevation of about 870m AHD.

The majority of the Development site consists of extensively cleared agricultural land, with a small area of remnant woodland vegetation in the eastern corner, that is associated with Plant Community Type (PCT) *1100 – Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*. The proposed Development footprint avoids this PCT.

Several watercourses traverse the Development site including Butmarro Creek (also known as Deep Creek), Blind Creek (also known as Dry or Bridge Creek) and Wrights Creek. All three watercourses within the Development site are ephemeral and would only contain flowing water during and shortly after rainfall events. The southwestern border of the Development footprint is bounded by Butmaroo Creek (Strahler order 6), flowing from the south-eastern area of the site and discharges into Lake George. Wrights Creek (Strahler order 4) roughly bisects the Development site. The Blind Creek Road crosses over Blind Creek. The edge of Lake George is adjacent to the north-western border of the site however the Development footprint is set back approximately 600m from the shoreline. There is an unnamed wetland in the north of the Development site which is avoided by the Development footprint. There are 5 dams and/or ephemeral wetlands within the Development site.

1.1.4. Related infrastructure

An existing TransGrid 330kV transmission line traverses the site. It will be used as the grid connection by the Project to the national electricity grid.

1.1.5. Nearby receivers: commercial

The Development site (the broader area assessed for the EIS) is in close proximity to Iberdrola Australia’s operational Capital Wind and two industrial sites used for extractive activities:

- Bungendore Sands quarry located approximately 240m southwest of the Development site (closest point); and
- Paragalli Sands quarry located approximately 524m east of the Development site (closest point).

Additionally, a small (private) airstrip is located within the Development site and is currently used by the associated landowner for recreation and aerial spraying of crops. It is proposed that this private airstrip will be decommissioned prior to the construction of the Project.

1.1.6. Nearby receivers: residential

There are eight associated residential receivers (dwellings) and four non associated receivers within the 2km buffer of the Development site, refer to **Error! Reference source not found.** (note R3 is an associated receiver but is outside the Development site). The closest non-associated residential receiver is 812m south of the Blind Creek Road Entrance to the Development site. The closest non-associated receiver to the infrastructure of the Blind Creek Solar Farm is approximately 1.4km to the BESS.

A residential estate occurs nearby; The Estate includes residences which are within 2.6 – 2.9km from the Development footprint. Of the 24 residences in the northern end of the Estate two have a potential view of the Project from the rear gardens. The other 22 residences' view is either blocked by topography or existing vegetation. Refer to **Error! Reference source not found.** and Appendix **Error! Bookmark not defined.**.

1.2. Zoning, tenure, subdivision and easements

1.2.1. Zoning and tenure

The Subject land includes primarily RU1 Primary Production and C3 Environmental Management land zoning under the *Palerang Local Environmental Plan 2014* (Palerang LEP). It is comprised of six private landholders as well as Crown land.

Table 1-2 sets out a summary by lot of ownership, existing and proposed uses on the affected lots. Affected lot boundaries is shown in Figure 1-2.

1.2.2. Subdivision and easements

The Project would require the subdivision of Lots as indicated in Table 1-4, for the purposes of creating new lots for the following uses:

- Solar Array area leasing on a title also used by the neighbouring Capital Wind Farm.
- Creation of a dedicated title for the 'shared asset' component of the grid connection as required by Transgrid.
- Easements and rights of way will also be created to facilitate the project.

The proposed subdivision on Lot 17 DP535180 is proposed to divide Lot 17 into two parcels:

- Lot 171 being 40.1 ha, and
- Lot 172 being 186.4 ha

The subdivision is required to separate out the leasing requirement for the Capital Wind Farm, who occupy a lease on the proposed Lot 171.

BCSF will occupy a lease for the area of the proposed Lot 172 within the Development Site boundary, being 39.5 ha.

As detailed within the EIS, the minimum lot size for land zoned RU1 is 40 hectares under the *Palerang Local Environmental Plan 2014* (Palerang LEP).

The subdivision plan in Figure 1-3 and Figure 1-4 below shows Lot 17 DP 535180 to be subdivided into two lots, with the minimum lot size being greater than 40 hectares. As such, the subdivision is permitted with consent under the Palerang LEP. Pending approval of the Project, the subdivision would be administered through consultation with Queanbeyan-Palerang Regional Council

Table 1-4 Proposed subdivision and easements

Lot	DP	Subdivision	Easements and Rights of Way
Pt Lot 1	DP456698	Subdivision (approximately 1 ha) for new 'shared network assets' in order to allow the required rights for access and maintenance to be granted to the Transmission Network Services Provider (TransGrid) or other similarly empowered entity. The subdivided lot may be sold or otherwise provided to TransGrid or other similarly empowered entity. Refer to Figure 1-3	Easements and/or rights of way may be established for: Existing private road (i.e., the Project access route from Tarago Road) to be used to access the Development site and communications infrastructure; easements to BESS, substation, O&M and communications tower.
Lot 1	DP1154765		Right of way for the Project and network service provider via Project access route. Cable and communications easements to BESS, substation, O&M and communications tower. Refer to Figure 1-3
Lot 17	DP535180	The proposed subdivision on Lot 17 DP535180 is proposed to divide Lot 17 into two parcels: • Lot 171 being 40.1 ha, and • Lot 172 being 186.4 ha The subdivision is required to separate out the leasing requirement for the Capital Wind Farm, who occupy a lease on the proposed Lot 171. BCSF will occupy a lease for the area of the proposed Lot 172 within the Development Site boundary, being 39.5 ha.	Relevant lots to be burdened with access for new lot.

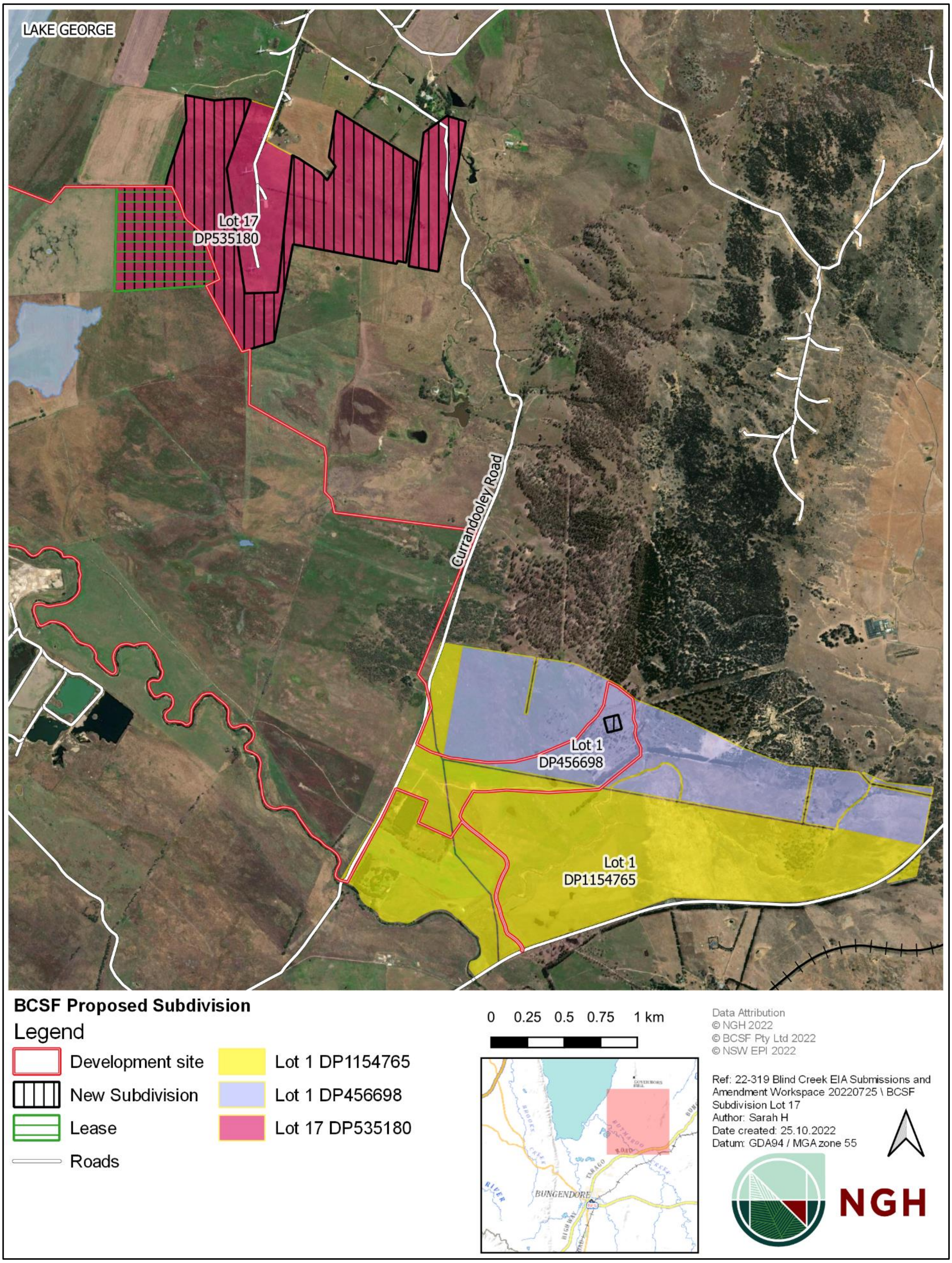

Figure 1-3 Revised Proposed Lot/DPs for subdivision

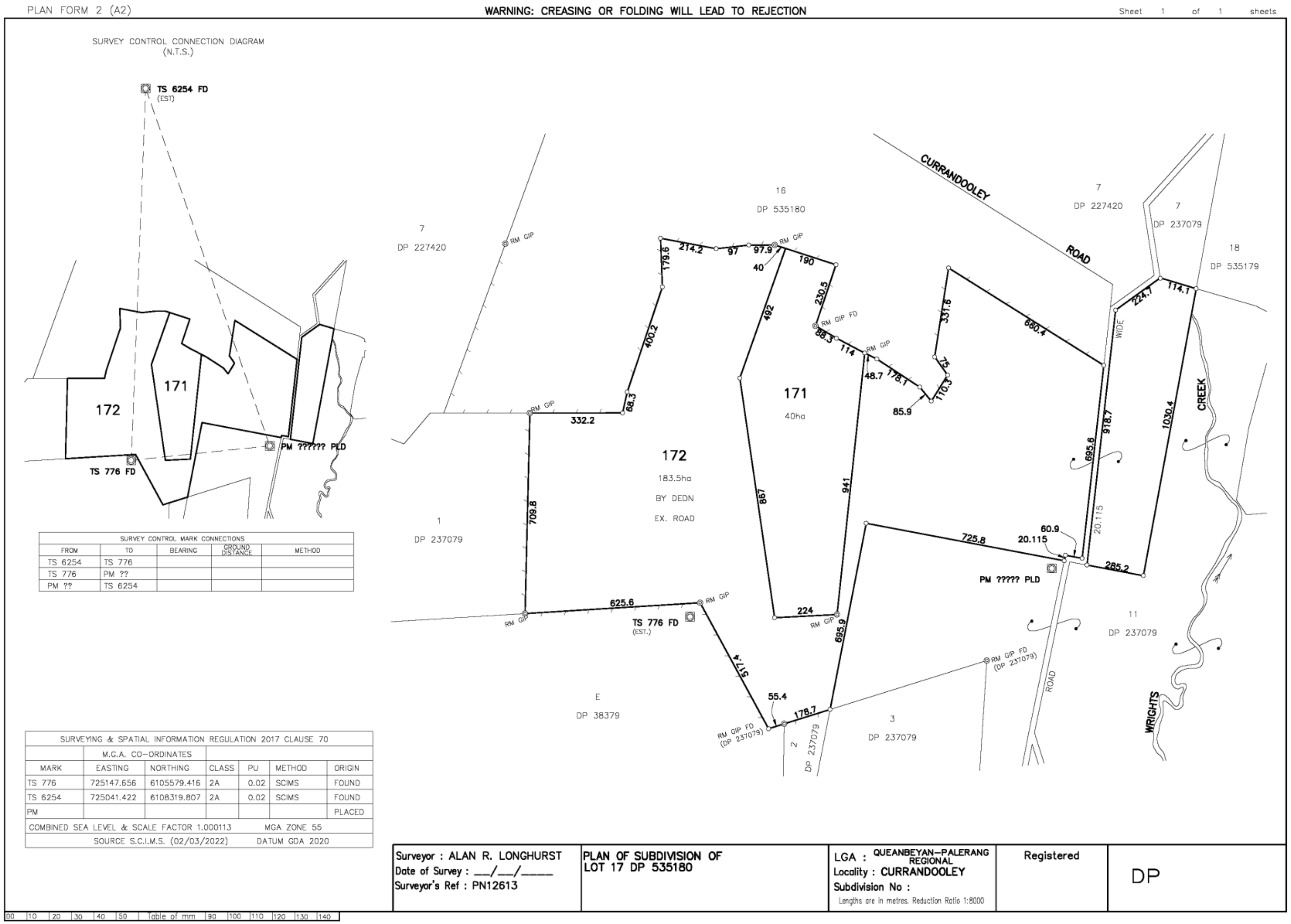

Figure 1-4 Proposed subdivision of Lot 17/ DP535180

1.3. Permanent infrastructure

1.3.1. Overview

The Project includes the following main infrastructure components:

- Approximately 850,000 PV single axis tracking solar modules (mounted on pile-driven foundations).
- Approximately 93 inverters and transformers.
- A BESS including nominally 300MW/600MWh of lithium-ion batteries with inverters.
- An onsite 330kV substation connected to the existing 330kV transmission line that passes through the site.
- Underground cabling to connect solar modules, combiner boxes, PCUs and batteries, data services and communications.
- Buildings to house a site office, switchgear, protection and control facilities, maintenance facilities, storage and staff amenities
- A communications tower for high reliability grid operations.
- Internal tracks, new and upgraded sections totalling approximately 27km.
- Perimeter security fencing (if required), closed-circuit television (CCTV) and security lighting at the switching station, BESS and O&M building area, only.
- Stock fencing and water.
- Visual amenity plantings in specific locations.
- Site access intersection upgrades off Tarago Road.

During construction phase, temporary facilities would include a laydown area with secure compound, construction site offices and amenities and car and bus parking areas for construction staff. The construction phase of the Project is expected to take approximately 12 to 18 months and the Project would have an operational life of nominally 35 years or more.

Each infrastructure component is detailed below.

1.3.2. Solar array

The Project's solar array would include approximately 850,000 PV solar modules, with a generating capacity of approximately 420MW DC (350MW AC). To support co-located grazing activities, spacing between trackers (known as 'pitch') will be optimised for solar farm capacity, taking into account agricultural production under the panels (refer to Figure 1-5 for indicative panel spacing).

The solar array placement would be designed to provide a flow path for Wrights Creek, through the solar arrays to the identified wetland and beyond, which does not contain solar panels. This flow path is to be based on hydrology assessments to ensure the natural flow path is maintained in accordance with the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018). The detailed design will take into consideration the Non-riparian corridor works and activities averaging rule, thereby 50% of the outer riparian zone would be used for development with an equivalent area connected to the riparian corridor fully offset. The inner 50% of the riparian zone will be offset.

The solar array would be split into many sub-arrays of roughly equal size. These sub-arrays would consist of grouped tables of PV modules with an azimuth orientation between -10° and + 10°. The modules would be mounted to a single-axis tracking system and would reach a height of approximately 5m above ground level when the tracking system is titled to its full extent. Each sub-array would be paired with an enclosed PCU (see Section 1.3.3). BESS devices may also be included within each sub-array (see Section 1.3.4). Underground cabling would be used for electrical connections between PV modules and PCUs, storage, and transmission infrastructure. All electrical devices would be accessible via internal access tracks.

The Solar panels will be excluded from elevated areas on and adjacent to Lot 17 DP535180 above the elevation of 691m and east of the established row of elm trees to reduce visual impacts to receivers on Lake road.

Steel piles would be used as foundations to support the solar modules and the mounting system. Each pile is a steel profile, such as an i-beam or channel, approximately 275mm wide and 100m deep. Each pile would be driven greater than 1m into the ground. The pile heights will vary according to topography and expected flood level. Where possible, driven-pile foundations would be used, as they minimise the soil disturbance and can be installed quickly. In locations where the soil is not compatible with driven-piles, helical or screw piles may be used. This may require additional processes such as pre-drilling and grouting if bedrock is encountered.

Two types of cable are necessary on the site: DC and AC. Competing requirements dictate whether they are installed above or below ground. While above-ground cabling would reduce ground disturbance, underground cabling improves the resilience, safety, agricultural access and visual impact of the site and is therefore the preferred option.

An illustration of the solar array is shown in Figure 1-5 and an indicative layout of a sub-array is shown in Figure 1-6.

During the detailed design the layout may vary in several ways, listed below:

1. The dimensions and aspect of the sub-array footprint, panel rows, and the pad for PCUs and energy storage infrastructure.
2. The azimuth-orientation of PV module rows, sub-array footprints, and access roads.
3. The relative placement of infrastructure within the sub-array footprint.
4. 1P/2P module format and number of trackers and modules.

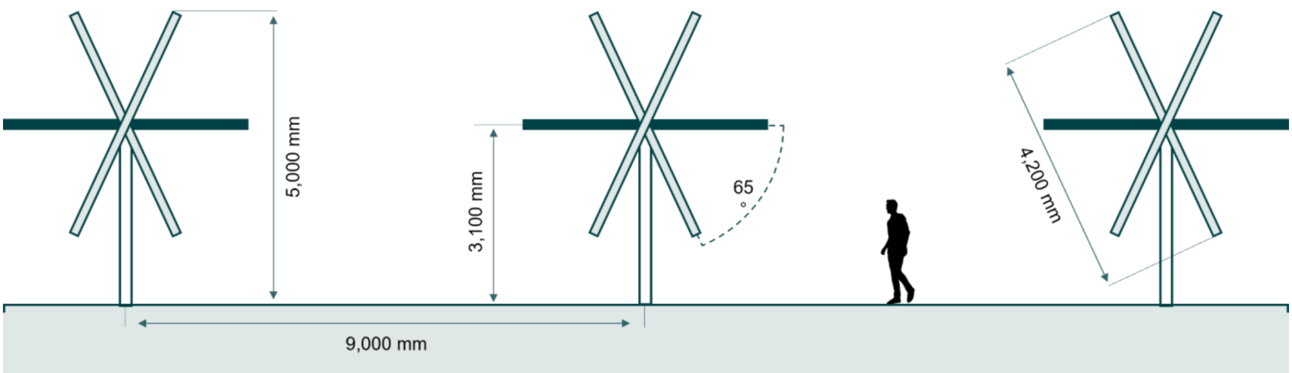

Figure 1-5 Schematic of a mounted PV module. Dimensions shown are indicative only and are for the larger 2P configuration

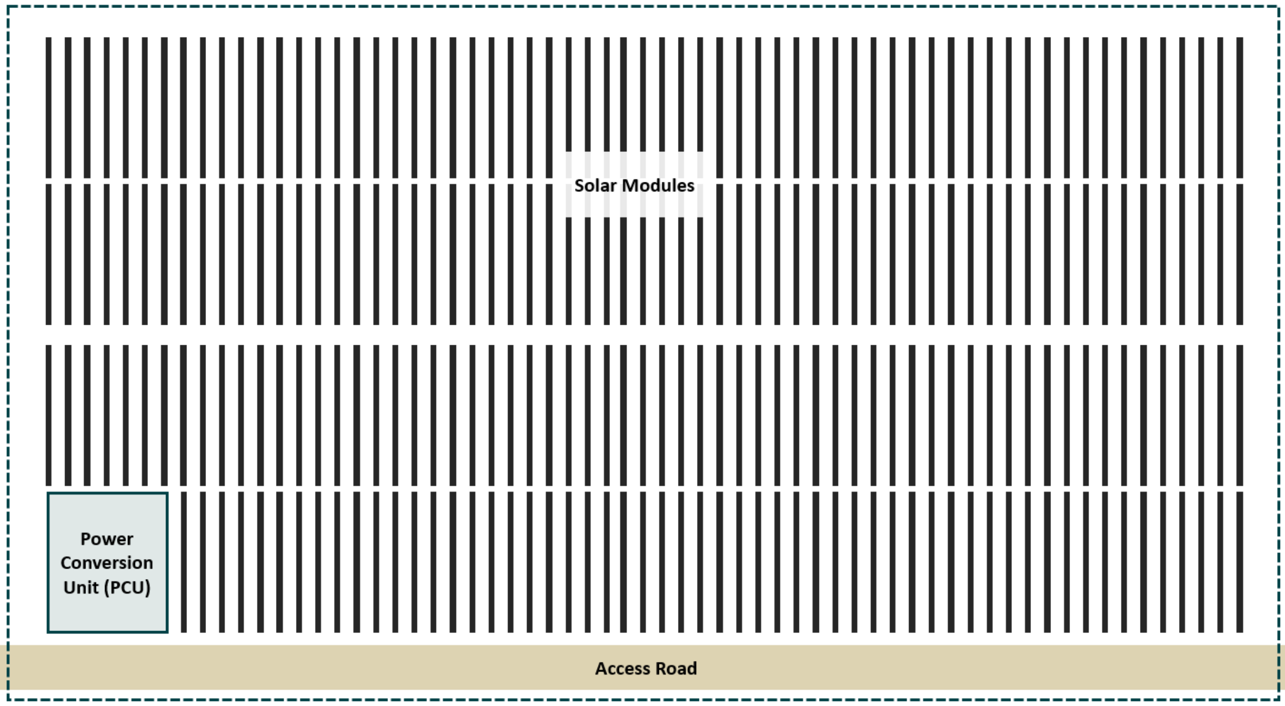

Figure 1-6 Typical sub-array schematic using single access tracking. The precise arrangement, orientation, and dimensions of components are subject to detailed design. Up to two containerised battery modules may be installed adjacent to the PCU (See Section 1.3.3)

1.3.3. Inverters/ Power Conversion Units

Each sub-array would be connected to a housed PCU. The purpose of the PCU is to convert direct current (DC) electricity, generated by the solar panels, to AC which is used by the national electricity grid. The conversion is performed by inverters, and the voltage is stepped up to the site's reticulation value (approximately 33kV) using transformers. The PCUs typically hold all power conversion devices, switchgear, communication devices, and ancillary equipment.

The precise layout of PCUs within the Project's solar array is subject to detailed design and technology selection. An indicative design includes a single PCU which includes one inverter and one transformer and is connected to 12,000 solar modules forming a subarray. Approximately 93 PCUs of this size would be needed for this configuration, with an indicative location in relation to the subarrays shown in Figure 1-6. The PCUs are likely be constructed on steel piles to elevate them above 1% AEP flood levels but a concrete foundation may be needed. This design is indicative only, as it is possible that an alternative architecture may be selected. An example of a PCU product that could be used in this configuration is shown in Figure 1-7. Ground disturbance associated with PCUs is to a large extent associated with the 'cable pit' below the PCU, which allows underground cabling to enter under the unit (Figure 1-8).

Figure 1-7 Typical housed power conversion units used within a commercial solar power plant (source SMA). The dimensions of this specific product are 6058mm (W) x 2896mm (H) x 2438mm (D)

Figure 1-8 PCU installed on pile foundation (Courtesy of Octopus Investments Australia)

1.3.4. Battery Energy Storage System (BESS)

The Project has been designed to include energy storage in the form of batteries to firm the generating capacity. Subject to detailed design, the Project is seeking approval for approximately 300 MW of storage using Lithium-ion batteries (LiBs). The LiBs would be constructed on concrete footings or driven piles, as required, to provide stable and resilient service.

Energy storage configuration

The physical layout of the batteries on the site would be specified during the detailed design phase with two possible configuration options identified below. These configurations are indicative only, and it is possible that a hybrid architecture may be selected with the BESS divided between the two.

Option 1 DC-coupled distributed BESS

- This configuration is shown schematically in Figure 1-9, with each battery sub-array containing at least one battery module and ancillary electrical equipment. The number of batteries would be selected to match the specifications of the devices in the PCUs.
- The batteries are likely to have similar dimensions to a half-sized shipping container. The ancillary electrical equipment would only occupy a small area; likely less than a half-sized shipping container (i.e., approximately 20ft long) per sub-array.
- The number of batteries contained within a DC-coupled BESS configuration would be approximately 435.
- In all, the impact of incorporating energy storage in this format would be equivalent to including an additional 3 half-sized containers per sub-array, or up to 300 half-sized containers across the entire solar array.

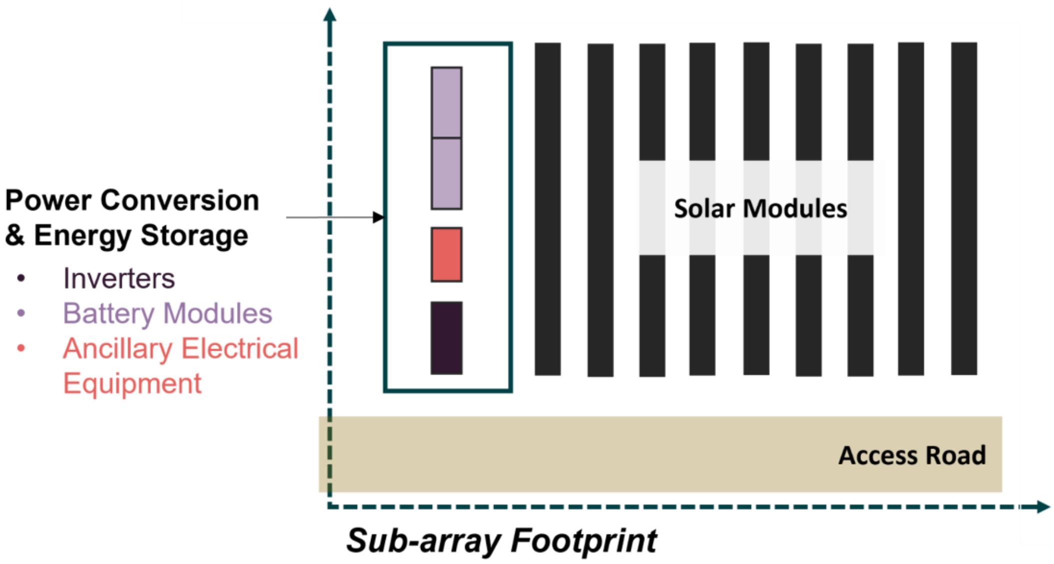

Figure 1-9 Indicative placement of all power conversion components and battery storage within the solar sub-arrays, for a DC-coupled configuration

Option 2. AC-coupled BESS

- The AC BESS option for battery storage is schematically represented in Figure 1-10 with the AC-coupled BESS located close to the substation (see Figure 1-11). The batteries and conversion equipment are grouped into BESS Units, with each unit including a transformer, multiple inverters, multiple batteries, and medium voltage switchgear. With appropriate spacing between all devices and equipment, a 5MW / 10MWh Unit would occupy approximately 300m^2. To meet the desired capacity of approximately 300MW, the AC-coupled BESS would have approximately 60 Units. The AC-coupled BESS would also include internal access roads, and buildings for additional low and medium voltage switchgear. These buildings would occupy a footprint of approximately 300m2. In total, the AC-coupled BESS would occupy approximately 3ha.
- The number of batteries within an AC-coupled BESS configuration would be approximately 512.

- Figure 1-10 shows an indicative layout of such a AC-coupled BESS, illustrating the Units and the other components that would be included. Figure 1-10 shows the indicative placement of this facility on the site. Figure 1-12 shows an example of an existing AC-couple storage facility.
- The energy storage configuration and the physical layout of the batteries would be specified during the detailed design phase. At this stage both options are considered viable and are assessed in this EIS.

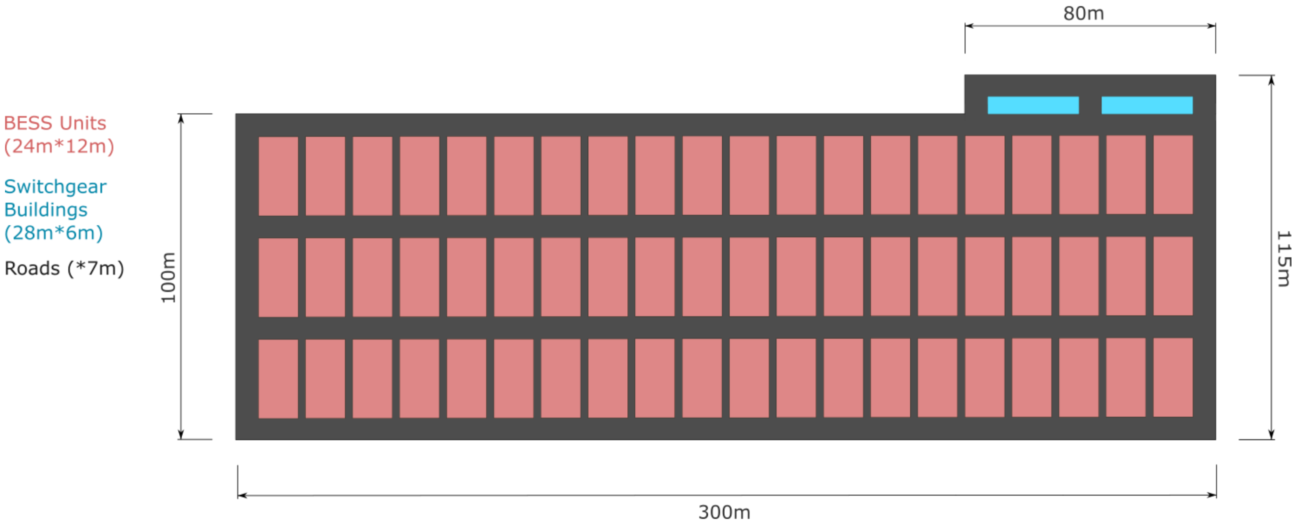

Figure 1-10 Indicative layout and size of the AC-coupled BESS Facility. Exact sizing, layout and capacity is subject to detailed design

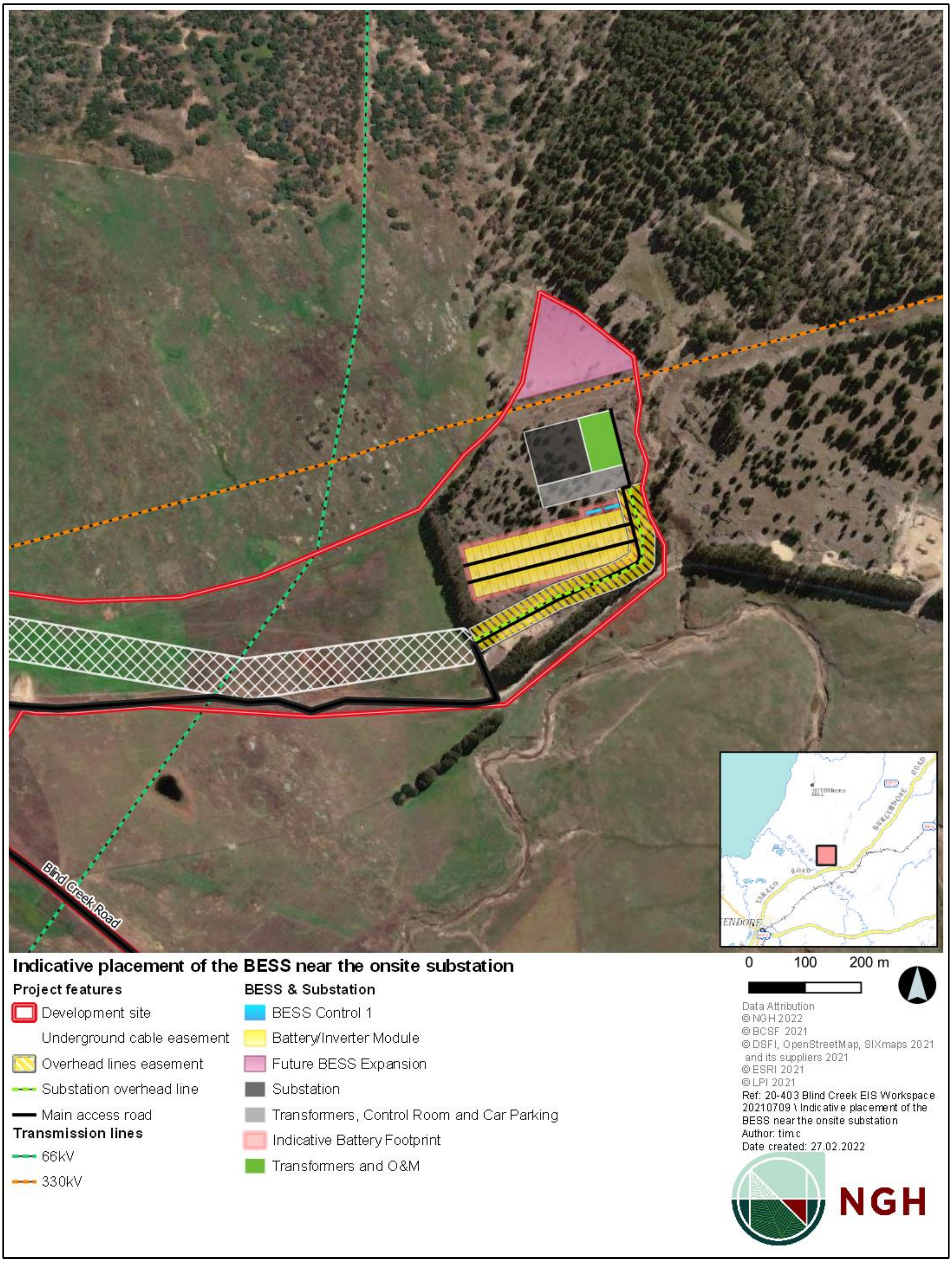

Figure 1-11 Indicative placement of the BESS near the onsite substation, for an AC-coupled configuration

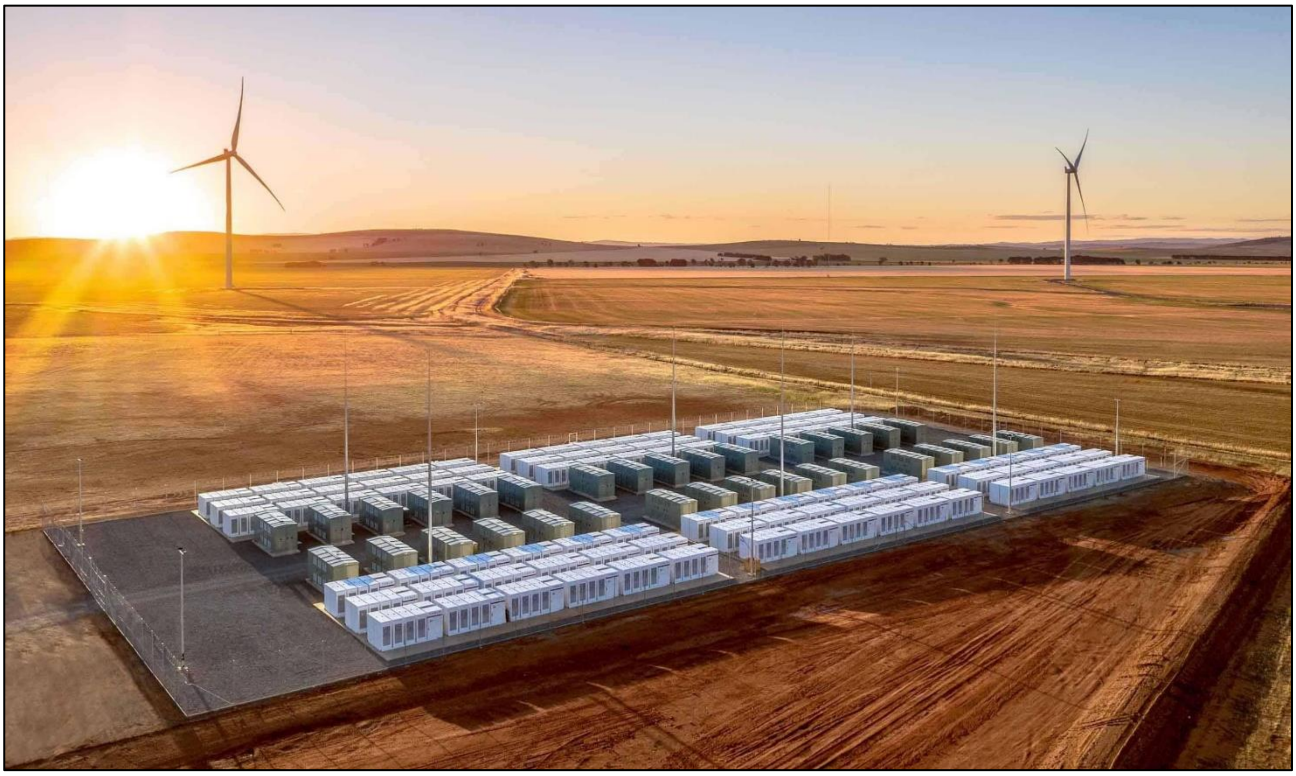

Figure 1-12 Example of an AC-coupled BESS. The Hornsdale Power Reserve is 100MW / 129MWh and has a footprint of less than one hectare (Source: Hornsdale Power Reserve)

Considerations for BESS risk mitigation

All energy storage systems carry risks associated with the uncontrolled release of energy. Lithium-ion batteries (LiBs) are commonly used in renewable energy generation facilities. While LiBs offer significant advantages over competing commercialised storage technologies in terms of energy density, efficiency and charging times, these advantages also elevate the risk of fire. Both options of the Lithium-ion based BESS (AC or DC configuration) would be designed with proper disconnects, relays, thermal management, enclosures, layout, monitoring and controls to mitigate the fire risk to the required level of safety.

Regardless of the configuration of battery system used (i.e., AC or DC-coupled, or a hybrid), it will include active monitoring of temperature and remote monitoring of temperature systems. The batteries may be actively cooled by internal systems. They would be temperature monitored, and the automated control system would stop their operation if required. Depending on the technology, suppression systems may be built in to mitigate the risk of extreme overheating. Further still, this equipment would be surrounded by an Asset Protection Zone (APZ) including gravel surfacing to minimise the risk of fire escaping from the project and the risk of external fire affecting the site. The BESS equipment will also be surrounded by an Asset Protection Zone (APZ) including gravel surfacing to minimise the risk of fire escaping from the development and the risk of external fire affecting the site.

The Project will manage the fire risks associated with the BESS by:

- Maintaining an APZ around each BESS,
- Maintaining a crushed gravel surface for a 20m radius around the BESS and inverters,
- Locating the BESS as far as practicable from any sensitive receptors (residences) or large stands of vegetation,

- Installing reliable automated monitoring (voltage and temperature), alarm and shutdown response systems,
- Designing appropriate physical separation and isolation between individual BESS containers and between batteries and other infrastructure, including gravel surfacing around the facility,
- Compliance with all relevant guidelines and standards,
- Preparation of a specific Battery Fire Response Plan, under the general Fire Response Plan, in consultation with fire authorities, fire suppression experts, and in reference to relevant standards and guidelines,
- Facilitation (including funding) of first responder training in the management of LiB fires at the site for local brigades.

The Bushfire and Preliminary Hazard Assessment sections (Sections 9.7 and 9.8 of the EIS) provide further information on risks and mitigation strategies associated with BESS.

1.3.5. Onsite 330kV substation and connection to existing 330kV transmission line

Switching Station

To connect to the national electricity grid, the Project would make use of the existing 330kV transmission line that traverses the Development site, connecting Canberra to Kangaroo Valley. To facilitate this connection, a new transmission substation would be constructed as part of this Project.

The switching station would contain power transformers, high voltage switchgear and other equipment to achieve a transfer capacity of approximately 350MVA. It would be built on the eastern edge of the Development footprint and cover approximately 1ha. It would connect to the existing 330kV transmission lines onsite via an underground or overhead powerline. No buildings, arrays or roads would be constructed within the existing 330kV transmission line easement as shown in the Indicative infrastructure layout (**Error! Reference source not found.**).

The switching station will be accessed via the Blind Creek Solar Farm entrance to Currandooley Road and will primarily use existing access tracks during construction and operation, some of which may need to be upgraded and/or widened. An indicative location of the switching station in relation to the BESS is shown in Figure 1-10.

Communications tower

A communications tower would be installed within line-of-sight to TransGrid’s existing microwave network, most likely to TransGrid’s nearby Hammond’s Hill radio repeater. This is to provide secure operational control of the solar farm over the transmission network. To gain line of sight to this or another tower, it would be necessary to have the tower somewhat removed from the switching station and set back from vegetation and landscape features such as hills, connected by underground cabling. This tower would be monopole in design and approximately 25m tall. It would be connected underground with power and communication cables for most of its length but may change to overhead as it approaches the substation and operations buildings.

Transformers at Substation

The Project allows for up to four power transformers to be installed at the substation site. These transformers would be located at the substation shown in (Figure 1-11). The purpose of transformers is to 'step up' the voltage from the reticulation value to match that of the proposed switchyard and the existing transmission line that passes through the site. Specifically, the transformers would increase the voltage from the internal-to-site reticulation value (approximately 33kV) to 330kV.

The transformers will be oil-filled (either mineral or biodegradable oils) with bunds to capture any oil that escapes before it reaches the surrounding environment. The bunds will be adequately sized at 110% of the volume of the transformer, ensuring that they are effective even in the worst case where all oil is lost. Furthermore, to mitigate the impacts of any potential oil leak, the transformers will be located away from water courses.

The substation would also include switch gear and associate monitoring equipment. This would allow for the automatic and manual disconnection of all or part of the Project without interrupting service on the 330kV system.

Onsite buildings associated with Substation

For the ongoing operation of the solar farm, permanent buildings would be installed to house monitoring and control equipment, computers, communications equipment, supplies, spares, and crew facilities. It will be used during commissioning of the solar farm and as a maintenance facility during the operational phase. Indicative descriptions of these buildings are provided below, and the indicative location is given as the Operations and Maintenance (O&M) facility in Figure 1-10. Each building would contain essential fire safety equipment as required by the relevant standards.

Control room and site office

This facility would be a single storey building, up to approximately 14m x 5m and 5m high. It would contain an office and amenities for staff (toilet, kitchen, first aid, potable water supply, etc.) as required for the safe operation of the site.

The foundations, finishings, and other features would be designed as required by relevant standards. The colours would be chosen to be low contrast with the surroundings to reduce visual impact. Guttering and a water tank may be installed to collect rainwater.

The control room and site office facility would include water supply as required for the services installed (including a septic system). Fire detection and suppression will be installed as required by relevant standards. Permanent parking facilities will be provided adjacent to the control building to facilitate up to 10 cars and light vehicles on site. The parking ground cover would be formed of crushed rock or similar.

Adequate rubbish waste/facilities will be established, which will be emptied weekly or as required and defined in operational management plans. No permanent or long-term storage of rubbish or waste will be permitted on site.

Switch room

A building footprint of approximately 20m x 5m and approximately 5m high would be constructed for the HV switch room, with services, protection and control facilities. The building may be installed on stilts and will be designed and constructed to meet relevant standards.

Storage shed

A storage shed with footprint of approximately 20m x 15m and approximately 6m high would be constructed. The building will have appropriately designed foundations, finishings and other features as required by relevant standards. Guttering and a water tank would be installed to collect rainwater. Appropriate fire detection and suppression will be installed if required by relevant standards.

1.3.6. Underground cabling

Underground cabling on the Development site would be designed in accordance with Australian and International standards with the goal of minimising ground disturbance. Both AC and DC cables are required.

DC cabling may be installed either in cable trays above ground, or in trenches to Australian Standards.

AC underground cabling at the reticulation voltage would be installed at a depth of at least 500mm with the electrical reticulation typically buried to either 600mm (low voltage) or 800m (high voltage) depth, following the relevant Australian Standard. Underground cables and pipes would be buried to ensure agricultural land capabilities are not reduced if underground infrastructure is left in situ after decommissioning.

Prior to excavating the cable trench, the topsoil would be stripped and stockpiled for use in rehabilitating the trench line. Depending on the quality of the excavated material, sand may be used in the trench to create a cable bed (the site overlies a considerable sand deposit). If the natural sand is unsuitable, imported sand may be required. Once the cables are installed another layer of sand may be placed above the cable prior to covers and markers being installed. The trench would later be backfilled with excavated material. Finally, topsoil would be replaced and sown with perennial grasses to assist revegetation of the disturbed areas.

Cables would be protected in accordance with *Australian Standard (AS) 3000:2007 Electrical Installations*.

1.3.7. Internal access tracks

The site would use both existing access tracks (approximately 6.6km), upgraded where necessary, and new access tracks where none currently exist (approximately 20km). The access tracks within the solar array area could also form laneways for movement of sheep as part of the regenerative Agri-solar plan (see Section 3.6 of the EIS).

The final location and design for new access tracks and new parts of existing access tracks will not be completed until post approval, however an indicative access track network is shown is in Figure 1-13. Some or all of the internal access tracks would be constructed of local or engineered fill, crowned for run-off and topped with a gravel cap. In areas of the Wrights Creek riparian corridor and in sensitive archaeological areas, wherever possible native soil disturbance will be minimised and the access tracks will instead be installed on top of the existing soils using by laying imported fill and gravel over the native soil (i.e. the topsoil will not be removed).

The existing access tracks, which service the laydown compound and the substation would be approximately 4–6m wide (including shoulders and any required drainage), whilst other internal access tracks would be approximately 3.5–5m wide.

Access tracks would be clearly marked on the site environmental management plan and passing lanes and turning circles would be provided to internal tracks in line with the bushfire management plan.

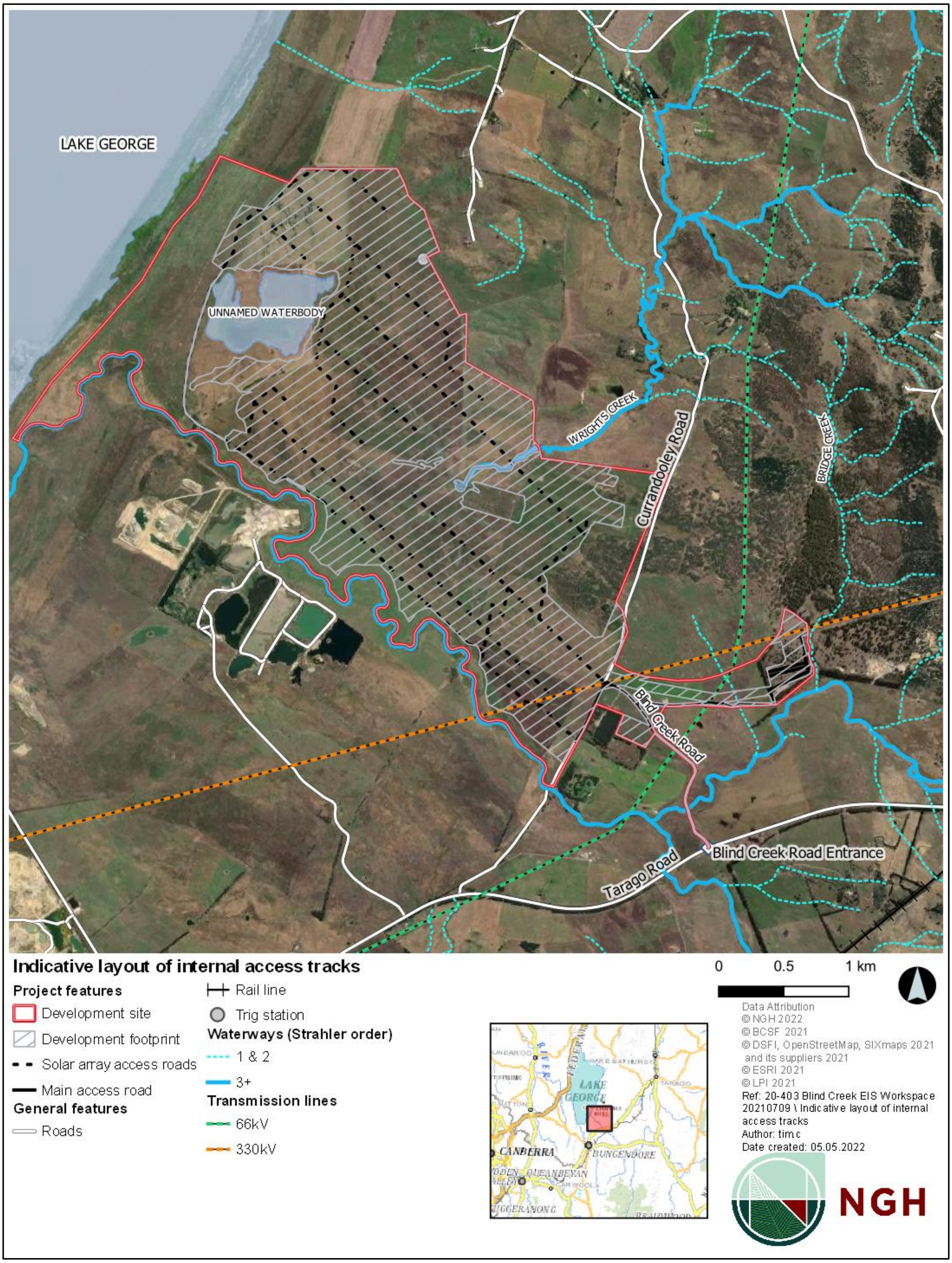

Figure 1-13 Indicative layout of internal access tracks

Creek crossings and all-weather access roads

Repairs to an existing crossing over Blind Creek and a new crossing over Wrights Creek are proposed. The crossing designs will be undertaken to recognised design standards during detailed design, therefore all technical specifications in this section are indicative only at this time. The repair works and new crossing works will avoid any sensitive cultural features and minimise environmental impact as discussed in Section 8.4 and 8.5 of the EIS.

The low-level crossing over Blind Creek has been in service for over 40 years and would require repair (Figure 1-14), including replacement of blocked culvert drains and resurfacing with concrete. The repaired crossing would be approximately 5-6m wide at the road level, with a flare outward by approximately 1 metre to the exposed bedrock of the creek, refer to Figure 1-14 and Figure 1-15. The pipes would be sized to facilitate crossings in normal flood conditions (1 in 5 year flood) and will act to preserve upstream and downstream flow connectivity. The battered sides and drains of the existing ramps in and out of the crossing may be reinforced with loose stone to stabilise them during flood conditions.

The new crossing over Wrights Creek would be a low level crossing, designed to overflow in floods. The crossing would be a smaller version of the Blind Creek crossing and would have a concrete deck, pipes, bevelled edges and rock stabilisation. Figure 1-17 provide an indicative design. The crossing would be sized to preserve upstream and downstream flow connectivity during rain events.

During emergency events such as flood or fire, the Blind Creek bridge on the main access road may occasionally be cut off. In such events, an alternative, “all weather” emergency access road can be used (refer to Figure 1-18), which is an unsurfaced road through Capital Wind Farm, primarily used for servicing the turbines. This route is approximately 15.17km from the site to Taylors Creek Road (compared to approximately 1.35km from Tarago Road to the entrance of the site on Blind Creek Road). During fire events the route is suitable as it runs to the North of the site in contrast to the regular site access in the southeast, allowing site staff emergency vehicles to use a different cardinal direction when the main access is blocked by fire. Furthermore, the emergency route reaches Taylors Creek Road, providing an alternative should Tarago Road become impassable. It exits onto Taylors Creek Road close to the Taylors Creek fire shed. During flood events the main access point may occasionally be cut by flooding on Bridge (Blind) Creek. Typically, these flood events have a short peak period, however, may delay egress and entry to the site.

The proposed emergency access route is used by local landholders and the Capital Wind Farm in flooding events. It does not cross any major creeks and has a bridge on the upper reaches of Wrights Creek. It therefore represents a safe all-weather means for vehicles to access the site. It should be noted that proposed upgrade of the Blind Creek culvert crossing will reduce the frequency of flooding cutting this access route, thus improving safety for existing users of Currandooley Road.

Comparison of distance and time of each route is detailed in Table 1-5below:

Table 1-5 Distance and time for each access route to emergency services

Location	Blind Creek Road access		Emergency Access (via Taylors Creek Road)	
Bungendore Medical Centre	12 minutes	9.9km	43 minutes	38km
Canberra Hospital Emergency Department	48 minutes	47.4km	77 minutes	76.5km
Bungendore Rural Fire Brigade	12 minutes	10.7km	44 minutes	38.8km

Details of the site access and emergency access and when they are to be used will be detailed within the Traffic Management Plan and the Emergency Response Plan.

Figure 1-14 Damaged low-level crossing over Blind Creek. This crossing would require repair

Figure 1-15 Proposed crossing repairs over Blind Creek

Figure 1-16 The repaired crossing would be similar to the one depicted here

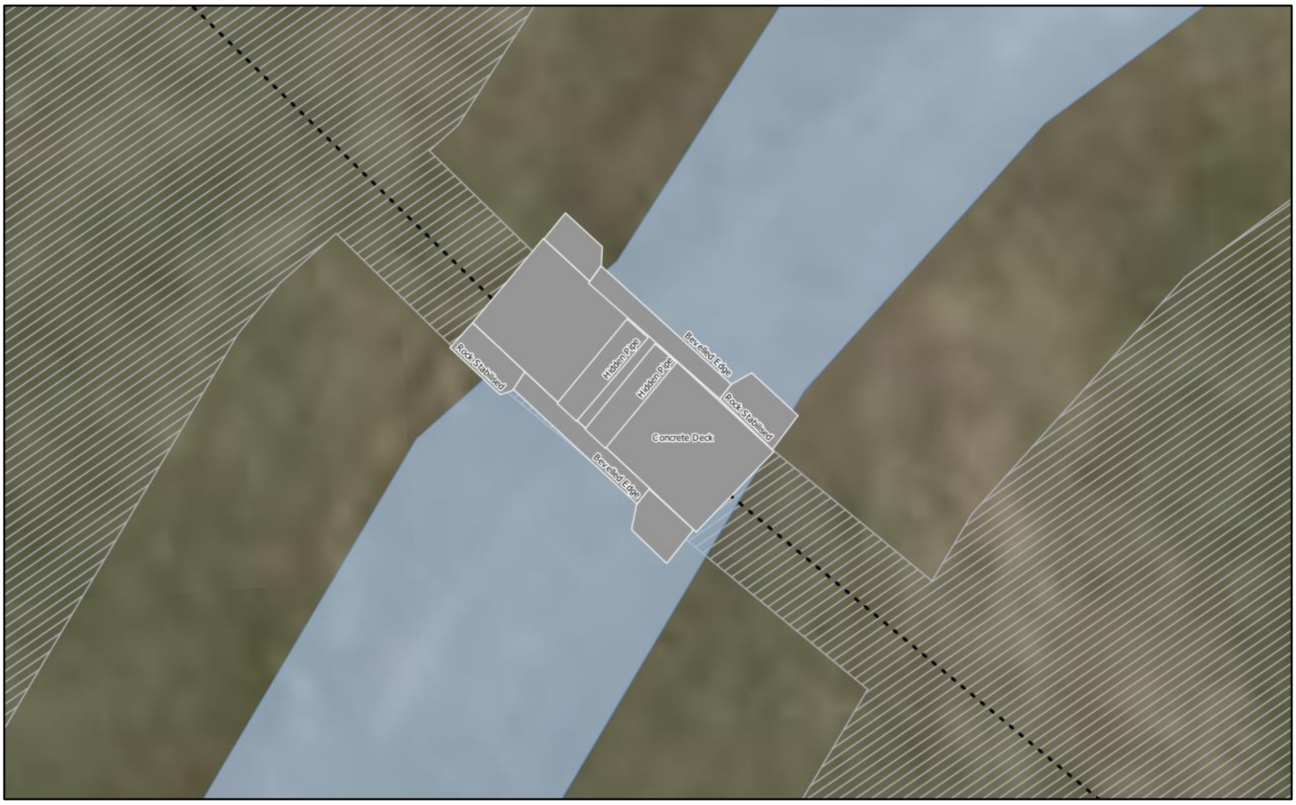

Figure 1-17 Proposed new crossing over Wrights Creek

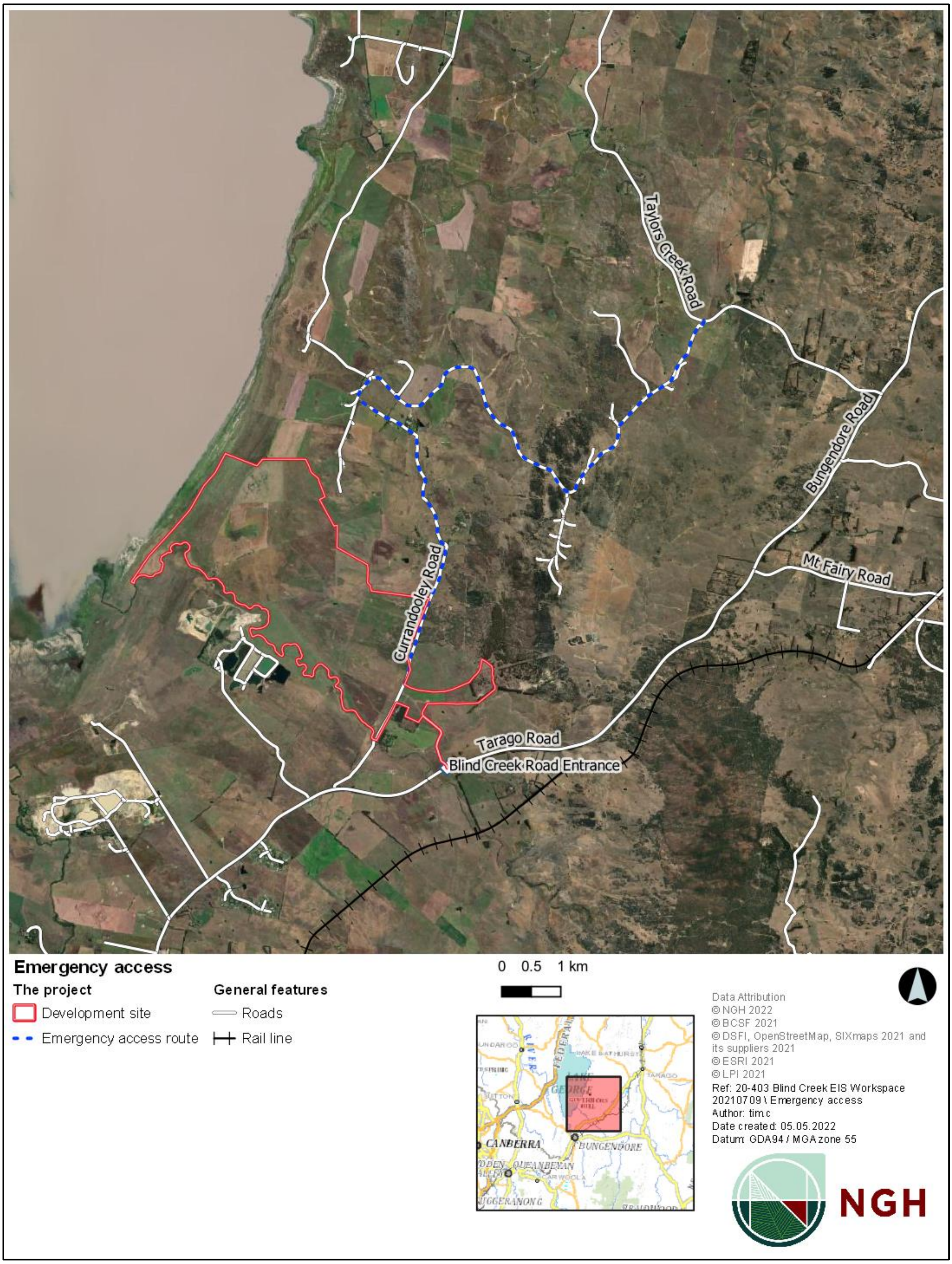

Figure 1-18 All-weather access point and track for emergency access to the Development site

1.3.8. Fencing, closed-circuit television (CCTV) and lighting

Fencing the solar panel array area

The solar array would be located on private land with no public right of access. For this reason, it is intended to fence the solar panel array area with typical livestock fencing and not include more robust 'security' fencing. It is hoped that this option would provide sufficient security, whilst having the least impact on visual amenity. However, if security breaches or vandalism occur, then the Project would retain the right to install more robust 'security' fencing if it deems it necessary.

At the entrance points to the site, signage would be installed indicating "no entry without authorisation". Entry to the site would be by invitation from authorised personnel only (and would be given for several residents who use the entrance for access to their property). Contact details for the site office would be provided on the signage.

Fencing the substation / battery area

The substation area would be enclosed by a security fence in accordance with TransGrid's (or other empowered entity's) requirements. This is expected to be a steel security fence approximately 2.3m high with barbed wire topping, or similar.

CCTV

CCTV cameras would be installed at each entrance and throughout the solar array area for continuous monitoring by site staff. A security company would be contracted for monitoring outside of business hours. The CCTV cameras would be solar/battery powered with a wireless communication connection and would be mounted on up to 4.5m poles complete with sensors or infrared security lighting. The number of cameras installed would be sufficient for coverage of site entrances, access roads and building areas.

Lighting

There would be no permanently lit night lighting within the solar array. Lighting would be included in each PCU for night-time maintenance or emergency purposes only. Lighting would be installed around the substation, battery storage facility and O&M facilities to be used in case of night works or an emergency only.

Motion sensor or infrared security lighting (and CCTV cameras) would be installed at sensitive boundary locations and around the substation, battery storage facility, O&M facilities, and office areas.

All external operational lighting would be designed to reduce disturbance to neighbouring properties, as such it would be low intensity lighting (except where required for safety or emergency purposes) and would not shine above the horizontal. The external operational lighting would be used only when there are staff on site, as part of night works (where required), site security or during emergency situations including through remote operation to allow improved camera visibility.

External lighting would be installed to comply with Australian/New Zealand Standard *AS/NZS 4282:2019 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version.

1.3.9. Site access intersection upgrades

The Development site would be accessible via Tarago Road and along an unsealed private road, known by the landowners as Blind Creek Road. This point of entry to the site is referred to as the Blind Creek Road Entrance (refer to Figure 1-19). The privately owned portion of Currandooley Road would also form part of the internal access road network and is located along the southern section of the Project boundary.

Tarago Road links to both Bungendore Road and Braidwood Road, which provide access to Canberra and Sydney via the Federal Highway and Hume Highway. The Tarago Road is currently used for a variety of purposes and already carries heavy vehicles for local sand mines, waste to Veolia's Woodlawn landfill site, agricultural transport, and coastal traffic via Nerriga. There are various connections between the Tarago Road and major highways in the area (Hume, Federal and Barton Highways).

The Proponent engaged Amber Organisation Pty Ltd to prepare a Traffic Impact assessment (TIA) considering site access location. While the Traffic Impact Assessment (TIA) has determined the level of service is sufficient, in response to agency and community concerns regarding traffic, the Applicant commits to providing a royalty payment based on construction traffic volumes on Tarago Road to address road pavement issues specifically. The final payment agreement will be developed in consultation with QPRC and GMC.

The intersection design at Tarago Road has been amended. TfNSW noted that the length of the BAR treatment should be extended to comply with Figure A 28 of Austroads Guide to Road Design Part 4. The length for the turning path (X) should be added and the tapers should be designed for a design speed of 110kph. In addition, the table drains on both sides of Tarago Road will need to be reinstated.

The plan has been updated according to Figure A 28 of Austroads Guide to Road Design Part 4 for a design speed of 110kph. The updated intersection design has been completed by PHL surveyors and included in Appendix **Error! Reference source not found.**.

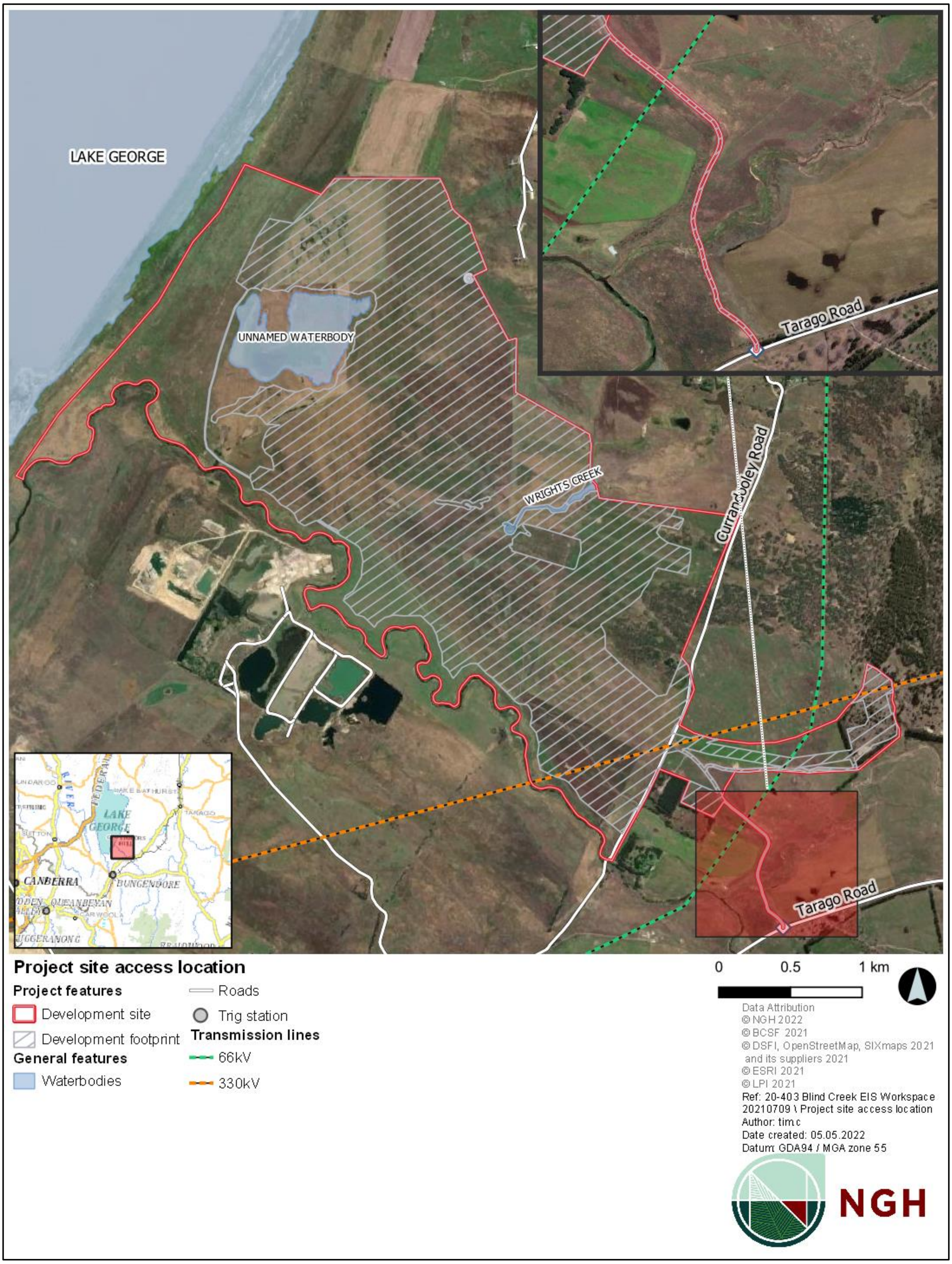

Figure 1-19 Development site access

Visual impact mitigation planting

Landscaping and screen planting would be undertaken in some sections of the perimeter of the Development site to minimise visual impacts from outside the Project. The proposed locations for screening planting is shown in **Error! Reference source not found.**. Tree and shrub species suited to site conditions would be used, placed and selected to avoid shading impacts on the solar array and to achieve effective screening of the solar farm infrastructure (refer to measures described in the VIA and draft Landscaping Plan). Screening planting has already been undertaken along Blind Creek (approximately 5,000 trees between 2013-2020), refer to **Error! Reference source not found.**, the VIA and the draft Landscaping Plan, and this vegetation would not be disturbed during construction and operation.

1.4. Temporary construction facilities

Approximately 10 transportable offices are expected to be required for the duration of the construction phase, with associated amenities (i.e., portaloos/toilets, lunchroom etc.) refer to Figure 1-20. These would be removed at the conclusion of construction. The offices may be powered with either an off-grid solar-based solution or through a connection to the nearby 11kV network.

A construction laydown area would be established adjacent to the site offices. This area would include a cleared gravel pad and would be used to unload vehicles, store materials and vehicles. It may be monitored with CCTV and have a temporary security fence.

Post construction, the laydown area may be used by the landholder as a site for livestock yards and handling (not part of this approval). If the landholder does not proceed with this plan or it proves unviable, then the pad would be removed and the site re-sown (presently sown to perennial exotic pasture).

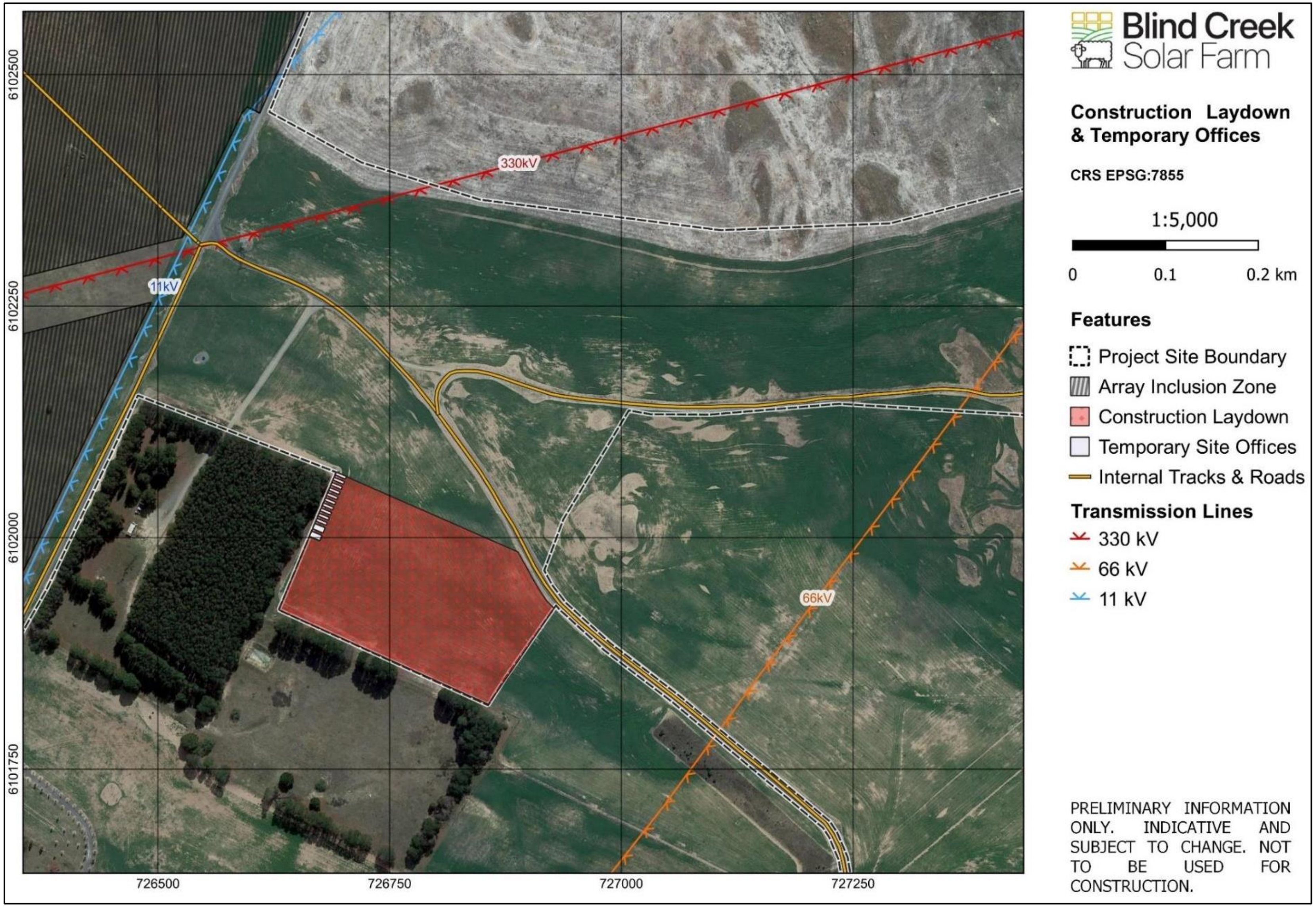

Figure 1-20 Indicative placement of the construction laydown area and temporary site offices