SCOPING REPORT

Middlebrook Solar Farm

May 2020

Project Number: 19-790

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TABLE OF CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AHIMS	Aboriginal heritage information management system
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCD	(NSW) Biodiversity Conservation Division, formerly Office of Environment and Heritage and Department of Environment, Climate Change and Water
Cwth	Commonwealth
DECCW	Refer to BCD
Development footprint	The area of the land that is directly impacted by the proposal infrastructure (yet to be determined)
DAWE	(Cwth) Department of Agriculture, Water and Environment (formerly Department of Energy and Environment; DoEE)
DPIE	(NSW) Department of Planning, Industry and Environment formerly Department of Planning and Infrastructure (DP&I)
EIA / EIS	Environmental impact assessment / statement
EPBC Act	(Cwth) *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
Ha	Hectares
Heritage Act	(NSW) *Heritage Act 1977*
Km	Kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
M	Metres
MNES	Matters of National Environmental Significance under the EPBC Act (*c.f.*)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage. Refer BDC.
SEPP	(NSW) State Environmental Planning Policy
sp/spp	Species/multiple species
Subject land	All lots on which the proposal is to be located
TEC	Threatened ecological community – as defined under relevant law applying to the proposal

1. INTRODUCTION

1.1. PURPOSE OF THIS DOCUMENT

This Scoping Report has been prepared to support a request to the Department of Planning Infrastructure and Environment (DPIE) for the Secretary's Environmental Assessment Requirement (SEARs) for the proposed Middlebrook Solar Farm. The SEARs would guide the preparation of an Environmental Impact Statement (EIS) for the proposal, pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Scoping Report describes the Middlebrook Solar Farm proposal, including the site and its surroundings, the environmental planning pathway for approval and identifies key potential environmental issues that may be associated with the proposal.

1.2. THE PROPONENT

The Middlebrook Solar Farm is proposed by Total Eren, a subsidiary of Eren Groupe.

Globally, Total Eren has over 2,700 MW renewable energy generation in service or under construction, as well as over 2,000 MW of projects under development, spread over five continents.

Eren Groupe was founded in 2012 with the goal of making reliable and competitive technology accessible so that savings can be made on natural resources. In 2015, Total Eren (then called Eren Renewable Energy) was established as a subsidiary of Eren Groupe.

Total Eren Australia has already developed the 350MW_{ac} Kiamal Solar Farm at Ouyen in north-west Victoria. The 200MW_{ac} Stage 1 of Kiamal Solar Farm is currently under construction and is expected to be completed in Q2 of 2020. The first stage of the Kiamal Solar farm includes the construction of a new 33 kV / 220 kV Terminal Station that connects the solar farm to the existing 220 kV transmission line and also a synchronous condenser which provides system strength to the network in this area.

2. THE PROPOSAL

2.1. SITE CONTEXT

The proposed Middlebrook Solar Farm is located in the Tamworth Regional Local Government Area (LGA), which has a population of 59,663 people (ABS, 2016). Tamworth, located approximately 22 km north of the subject land, is the closest regional centre and provides services and recreational activities to the community and tourists. The region attracts around 1.1 million visitors each year.

The subject land is within the locality of Loomberah. Loomberah has a population of 509 people (ABS, 2016). The settlement of Loomberah is 12km north-east of the subject land and has a church and a public hall. The closest primary school is at Timbumburi,11 km north west of the subject land. The small town of Werris Creek, located approximately 31 km south west of the subject land has facilities including a hospital, banks, sporting facilities, a church and a public school. Quirindi, a small town with a population of 3,444 (ABS, 2016) is located 40 km south west.

2.2. SUBJECT LAND

The Middlebrook Solar Farm would be located on Lot 60 and 61 DP755343, Lot 14 and 15 DP37547, Lot 131 and 132 DP608498 and Lots 573 and 574 DP710493, totalling approximately 1,882 hectares (ha) (Figure 2-3). There are five involved landowners; all are aware that the SEARs request is being submitted. Total Eren has agreements in place to undertake the necessary surveys and exploration. Total Eren is in the process of negotiating long-term tenure, mainly in the form of long-term leases for the subject land.

There are seven existing residences within the subject land that are involved with the project. The current access to the subject land is from Middlebrook Road, which is located 3.9 km east of the New England Highway. The New England Highway provides a connection between Newcastle (around 180 km south west of the subject land) and Tamworth (Figure 2-1).

Under the *Tamworth Regional Local Environmental Plan 2010,* the subject land is located on land zoned as RU1 Primary Production (Figure 2-2). Much of the subject land has been extensively cleared of woody vegetation and has been highly modified by historical farming practices. Small remnants of woodland are still present along riparian corridors. The land in very close proximity to the creeks is generally unsuitable for solar farm development and impacts to these small remnants of woodland are not anticipated.

The main watercourse (Spring Creek) traverses the eastern section of the subject land flowing in a south-east to north-west direction. It borders the upper boundary of the subject land and is categorised as a 5th order stream. Banyandah Creek (a tributary of Spring Creek), categorised as 3rd order stream, traverses the western portion of the subject land. Algona Creek (a tributary of Spring Creek), categorised as a 4th order stream, traverses the eastern portion of the subject land. During a site visit conducted in November 2019, no flowing water was observed in any of the creeks. Thirty constructed dams occur within the subject land.

Two existing TransGrid 330 kV transmission lines traverse the subject land, one on Lot 61 DP755343 and Lot 573 DP710493 and the other one through Lot 60 and 61 DP755343. Both lines are currently being considered as the connection point for the proposed solar farm to the national electricity grid. Currently there are three potential sub-station sites that are included in this proposal. All three proposed sites are on cleared land away from neighbours and located directly adjacent to the 330 kV transmission lines. The solar farm would only need one sub-station to connect to the grid. The final decision on the sub-station's location would follow detailed grid connection studies and consultation.

The subject land showing proximity to closest towns, land zoning and affected lot boundaries are shown in Figure 2-1, Figure 2-2 and Figure 2-3. Photographs of the subject land are provided in Appendix A. At the time of the survey the site had been drought affected for almost three years. It has not been affected by recent fires.

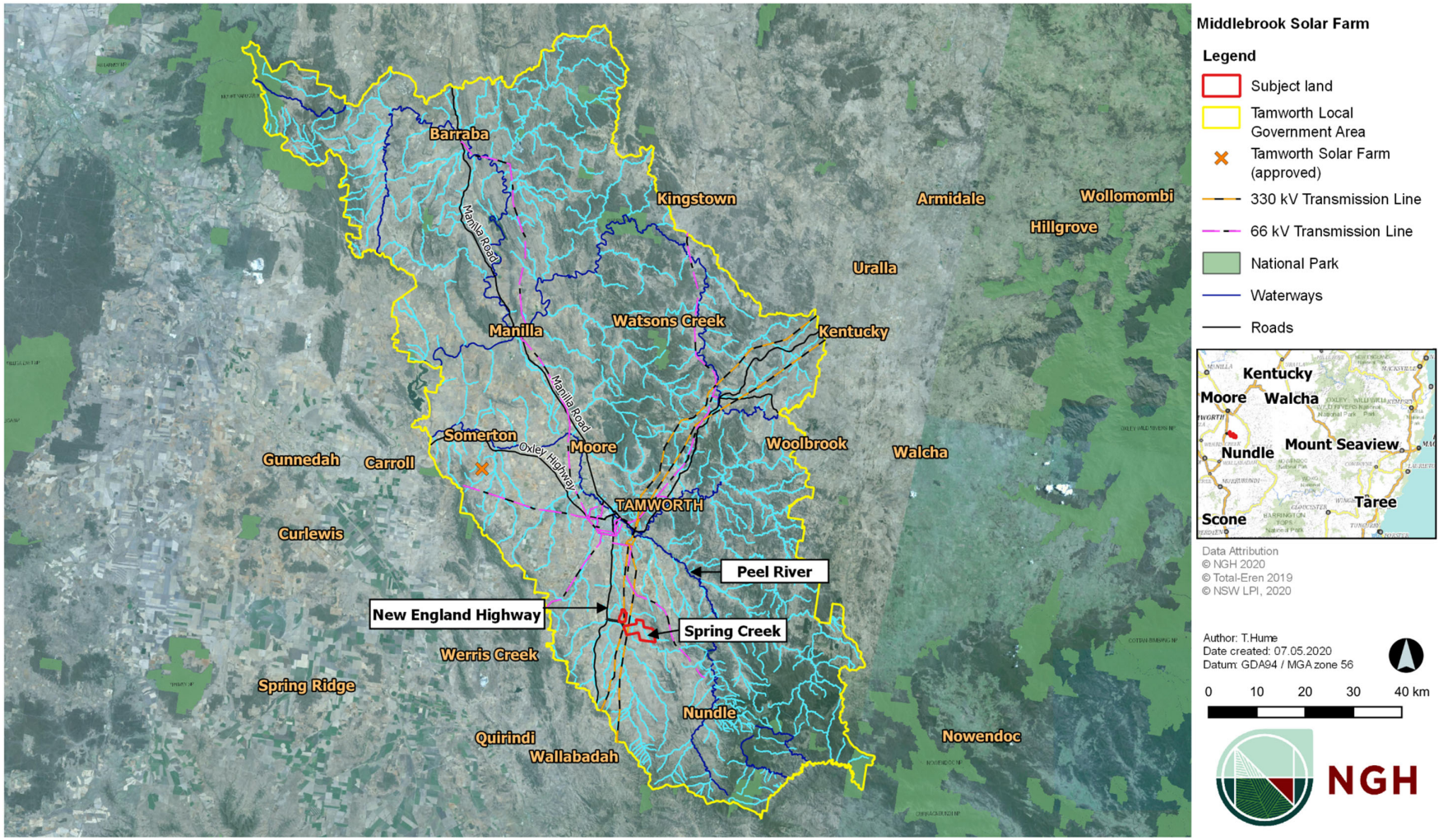

Figure 2-1 Location of subject land and proximity to closest towns.

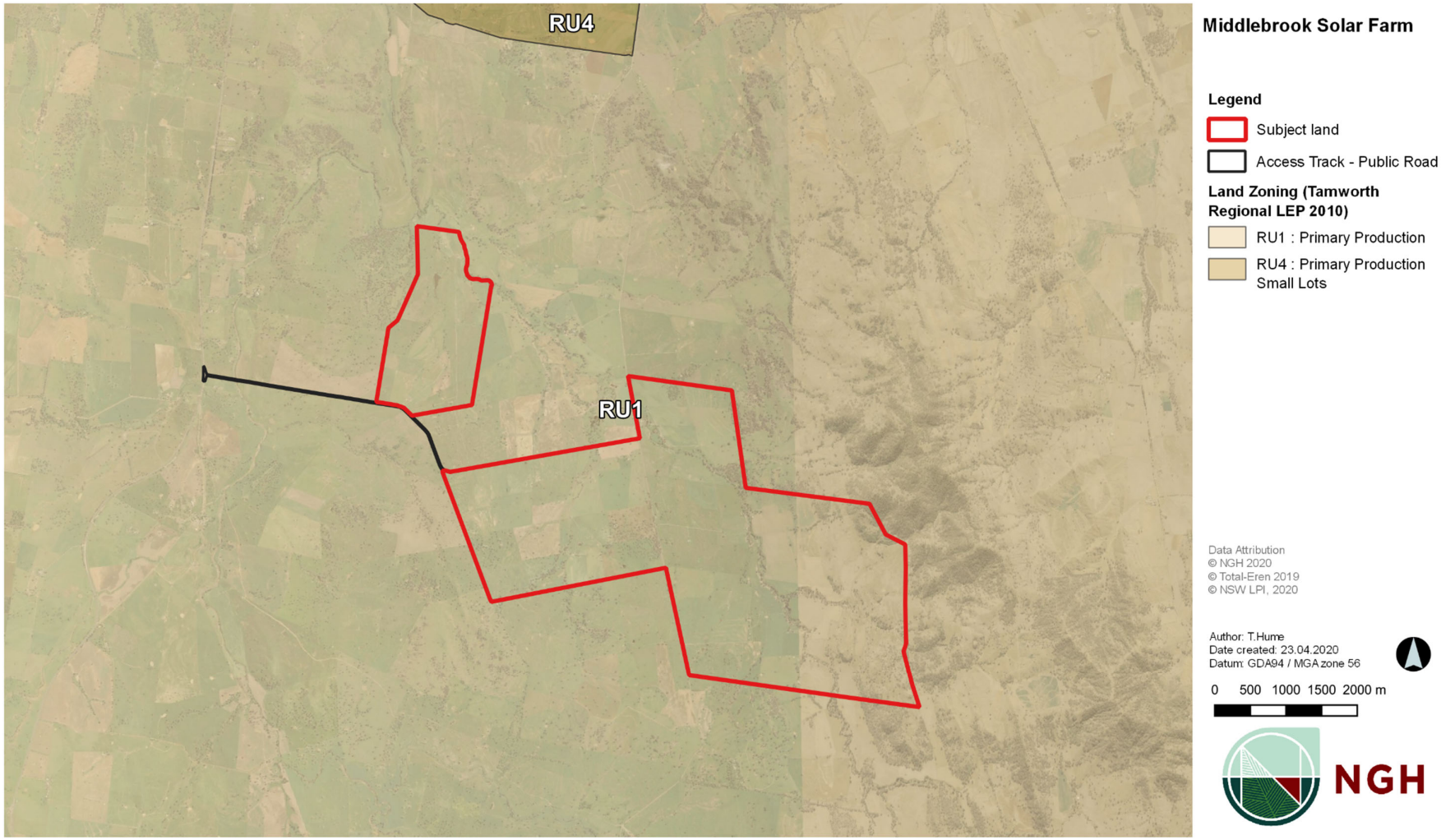

Figure 2-2 Land zoning of subject land and surrounding areas.

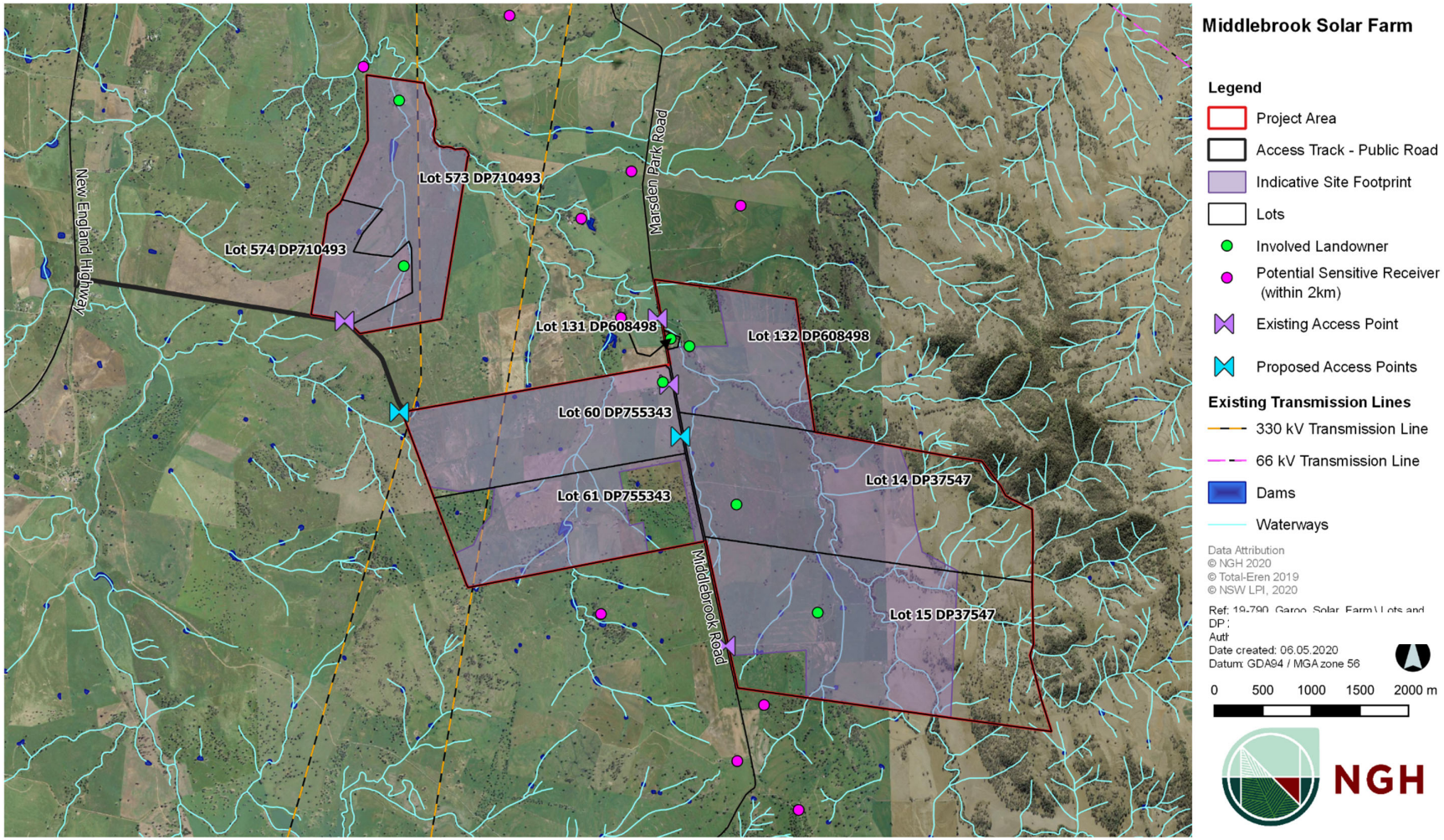

Figure 2-3 Lot and DPs located within the subject land.

2.3. PROPOSAL DESCRIPTION

The Middlebrook Solar Farm would involve the construction, operation and eventual decommissioning or reconditioning (subject to future approvals) of a photovoltaic (PV) solar facility and associated infrastructure with a capacity of up to 500 MW(AC), including an energy storage system of up to 100 MW(AC) and 150 MWh. It would supply electricity to the national electricity grid. The subject land is a maximum of about 1,882 ha with the area of solar panels and associated infrastructure anticipated to occupy approximately up to 1,000 ha (termed the development footprint). Solar farms typically have a Ground Cover Ratio (GCR) of between 30-50%. While the current development footprint indicated is larger than 1,000 ha, it would be refined during the EIS process. This would include one on-site sub-station, associated infrastructure and site facilities such as an operations building and storage yard.

The energy storage system is proposed in a secure compound next to the sub-station. The sub-station location, storage technology, rated capacity (MW) and storage (MWh) will be determined during detailed design. At this stage it is envisaged that the system will utilise lithium-ion batteries up to 100 MW(AC) and 150 MWh.

The proposal is likely to include the following infrastructure:

- Up to 315 inverters (typical inverter size is 2,500 kVa) and up to 100 inverter power stations
- Up to 18,000 single axis trackers (typical tracker accommodates approximately 84 PV modules)
- Up to 1,500,000 PV modules (typical PV module is 420 Wp)
- Up to 100 MW(AC) and 150 MWh energy storage system
- Sub-station, associated infrastructure, operations building and storage yard
- Internal access track 4 metres wide, with occasional 6-metre-wide passing bays
- Upgrade up to three existing watercourse crossings for internal access tracks
- An overhead or underground line of up to 132 kV within the road easement to connect the two main areas.

The subject land and indicative access tracks and access points are provided in Figure 7-1, overlaid on preliminary site constraints identified to date. Detailed site investigations during assessment, planning and design stages would inform an indicative layout.

The construction phase is expected to take approximately 12-24 months, with peak construction taking around 12 months. It is anticipated that the Middlebrook Solar Farm would operate for 30 years. After this the solar farm would be decommissioned if the power output is no longer required. After 30 years it may be deemed advantageous to undertake reconditioning of the solar farm. If the decision to recondition the solar farm was made, this would be subject to relevant government approvals and consents before the reconditioning was undertaken at the end of the initial solar farm's life.

When the site is to be decommissioned, it would involve removal of all above ground infrastructure except the sub-station and return of the site to its existing land capability. Total Eren's use of piles to support the solar arrays makes de-commissioning and land rehabilitation simple and complete.

The capital investment value (CIV) of the Middlebrook Solar Farm is approximately $600 million. A detailed CIV report would be prepared as part of the development application process.

3. PROPOSAL NEED AND ALTERNATIVES

3.1. PROPOSAL NEED

Renewable energy currently contributes to 21% of total electricity generation in Australia (0.8% of which is generated by large-scale solar PV), and represents the lowest-cost type of new energy generation that can be constructed (CEC, 2019). As of March 2019, 14,841 MW of renewable energy projects were under construction or financially committed, provided 13,233 jobs and $24.5 billion of investment in Australia.

The Middlebrook Solar Farm proposal would support long term and stable energy policies such as the Renewable Energy Target (RET). Additionally, large-scale solar farm proposals such as this provide an alternative power generation source resulting in the potential to benefit the Australian community by reducing average household electricity bills and power disruptions.

Specific to Australia's commitments, the Middlebrook Solar Farm proposal would provide the following benefits:

- Reduced greenhouse gas emissions, contributing to meeting our international climate commitments.
- Aid the transition towards cleaner electricity generation.
- Direct contribution to help in meeting the Renewable Energy Target (RET).

The proposal is also consistent with the current goals and targets for renewable energy generation in NSW. These include:

- Goal 22 of the NSW 2021: A plan to Make NSW Number One (NSW Government 2011):
    - *Contribute to the national renewable energy target [i.e. 20% renewable energy supply] by promoting energy security through a more diverse energy mix, reducing coal dependence, increasing energy efficiency and moving to lower emission energy sources.*
- Contributing to achieving the NSW target of zero net emissions by 2050.
- Contributing to the three goals of the NSW Renewable Energy Action Plan (NSW Government, 2013):
    - Attract renewable energy investment and projects.
    - Build community support for renewable energy.
    - Attract and grow expertise in renewable energy.

A legally binding and universal agreement on climate was reached at the 2015 Paris Climate Conference, with the aim of keeping global warming below 2°C, by reducing greenhouse gas emissions. Australia has committed to reducing greenhouse gas emissions by aiming for the following targets:

- 5% below 2000 levels by 2020.
- 26 to 28% below 2005 levels by 2030.
- Net zero emissions in the second half of this century.

The proposed Middlebrook Solar Farm would contribute to Australia's effort in helping meet these targets.

During construction, approximately 400 jobs would be created along with an additional 12 jobs during operation. The proposal would create local employment and economic stimulus at Loomberah and Tamworth. These areas would provide accommodation, food, fuel and trade equipment and services, mostly during the construction phase. During the 30-year operation of the solar farm, economic benefits would come from monitoring and inspections, maintenance, repair and upgrade of infrastructure.

The *Large-Scale Solar Energy Guidelines for State Significant Development 2018* notes the importance of demonstrating the suitability of the selected solar farm location and outlines key constraints that should be identified and considered. This process allows the opportunity to avoid or minimise negative impacts at the

outset. Design and assessment of the proposal can then be undertaken with a focus on mitigating and managing unavoidable impacts.

Total Eren assessed all areas of NSW near transmission lines for over a year before deciding to develop the project site. The Tamworth region was chosen due to its sunny location and the importance of available capacity in the existing transmission network. The stability and capacity of the grid across NSW is limited in places due to the size of the existing lines and existing and approved electrical generation projects.

The two 330kV lines that traverse through the region are part of the major network connection between NSW and Queensland. TransGrid is also planning to upgrade these lines in the future to increase their capacity even further. There are no other publicly known large-scale solar farms in the area south of Tamworth, the closest is Tamworth Solar Farm which is 30km west of Tamworth.

The two 330kV transmission lines also connect to the Liddell coal fired power station. This generation capacity will need to be replaced when the station starts closing in 2022. The proposed solar farm would help replace the capacity and result in substantial carbon emission reduction.

The Middlebrook site was chosen within the region by topography, land size, amenity and landowner interest. The land further south towards Liddell is confined by space and slope, while the land further north is closer to Tamworth. The Middlebrook site is tucked into a range of small hills with limited visibility from the east, or from major transport routes on the New England Highway, and a group of landowners that were open to exploring its potential. **Table 3-1** and **Table 3-2** outline the suitability of the subject land for the proposed solar farm, and summarise why the site was ultimately chosen..

Table 3-1 Site selection criteria: preferable site conditions.

Preferable site condition	Applicability to the proposal
Optimal solar resources	The Gowrie weather station (located approximately 9 km from the subject land) shows good solar irradiance of 18.3 MJ m^{-2} on an annual basis.
Suitable land	Low relief land containing modified exotic and cultivated areas.
Local impacts minimised	Early community engagement currently underway.
Capacity to rehabilitate	Pile driven array supports are proposed, resulting in minimal ground disturbance and full capacity for rehabilitation at the end of the project.
Proximity to electrical network	Two existing 330kV transmission lines have three potential connection options within the subject land. One connection would be built after studies identify the best option.
Connection capacity	Both 330kV powerlines currently have capacity, and TransGrid has plans to upgrade both lines to further increase capacity.

Table 3-2 Site selection criteria: areas of constraint.

Areas of constraint	Applicability to the proposal
Native vegetation	Much of the site has been extensively cleared of woody vegetation and has been highly modified by historical farming practices. Section 6.1.1 considers biodiversity of the subject land.
Potential residences	Moderate number of receivers within 2 km: 17 residences; 7 project-involved residences, 5 non-involved residences within 1km and an additional 5 within 2km of the project land boundary. Visual amenity is considered in Section 6.1.1 and noise and vibration are considered in Section 0.
Waterways	Few waterways and not within flood prone areas; three permanent named watercourses on subject land. Spring Creek, Banyanydah Creek and Algona Creek traverse the subject land. Hydrology, groundwater and water quality are considered in Section 0.
Aboriginal/Heritage significance	An extensive AHIMS search did not identify any Aboriginal items on the subject land. No non-indigenous heritage items have been recorded on site. Further investigation is required to determine Aboriginal/Heritage significance. Aboriginal heritage is considered in Section 0 and non-indigenous heritage is considered in Section 0.
Important agricultural land	A small proportion of the site is mapped as Biophysical Strategic Agricultural Land (BSAL; 332 ha, equating to 14% of the subject land). The majority is located within the eastern portion of the subject land (east of Spring Creek) and would likely remain in agricultural use. Where BSAL land is explored for development, Total Eren is investigating to enable grazing under panels so that agricultural land remains in use. Piling the arrays means recovery of full agricultural use at project's end. Land use compatibility is considered in Section 0.
Residential zones	No residential zones are associated with the subject land. The closest residential zone is located within

Areas of constraint	Applicability to the proposal
	Wallabadah, approximately 20 km south west of the subject land. Land zoning of the site is RU1 and considered compatible with solar development (refer Section 0).
Resource developments	No current resource leases or titles (coal, mineral or petroleum are associated with the subject land.

4. CONSULTATION

4.1. COMMUNITY AND STAKEHOLDER ENGAGEMENT STRATEGY

Preliminary engagement and consultation have started with key stakeholders in line with the *Large-Scale Solar Energy Guideline for State Significant Development* (DPIE, 2018). Many key stakeholders and interested parties have been informed that Total Eren is planning a solar farm in the area including:

- Involved residences
- Neighbouring residences
- Local communities
- Government regulatory agencies and authorities
- Local Aboriginal groups
- Local business groups.

Total Eren understands early consultation with a range of stakeholders is valuable for the project to identify and respond to any concerns in early scoping, and to create the environment for a responsive and transparent process with interested stakeholders. Total Eren have had face to face discussions the stakeholders and interested parties where possible. Due to the current travel restrictions and social distance requirements (due to COVID-19) other communication methods have also been used including telephone, email and post. Total Eren would progress with consultation ensuring it adheres to any government restrictions and advisories relating to travel and social distancing.

Generally, the stakeholders have been in support of renewable energy. Stakeholders within the local community have shown an interest in learning more about the proposal throughout the development. Input from the local community is encouraged and would help inform the final design that would be proposed.

The website www.middlebrooksolarfarm.com.au has been set up and would provide information and regular updates on the project development. The website would allow interested parties to provide comment on the proposal and local business can register their interest in providing services for development including during construction and operation.

A *Community and Stakeholder Engagement Plan* is currently being drafted in line with DPIE's *Draft Environmental Impact Assessment Guidelines Series – Community and Stakeholder Engagement (June 2017).* This Plan would further identify stakeholder groups, likely issues and concerns, approaches for engagement, and actions during the EIS preparation. Proposed engagement early in the project, during the EIS preparation, and throughout construction would allow stakeholders to become aware of the project, voice concerns or issues, and create opportunities for engagement with the project in a positive way.

4.2. KEY STAKEHOLDER GROUPS

Communication methods and engagement techniques vary across stakeholder groups and throughout the project phases. The identified key stakeholder groups, and proposed communication approaches are described below.

A Register of all communications has been established, and any concerns or questions would be answered verbally or in writing. Responses would be recorded in the Register.

4.2.1. Geographical neighbours

This group includes residents adjacent to the project site, those within 2 kilometres of the project site, and residents on Middlebrook Road between the New England Highway and the project site. Their key concerns and values so far have been:

- a desire to be informed about project activities and characteristics, and
- a desire to provide feedback to the project developer on matters of interest.

For these stakeholders, personal relationships are being developed with the project team, and direct communication would be established and maintained.

Initial contact has been and would continue to be made by phone call, door knocking and/or letter drop to introduce the project, the proponent, and invite these stakeholders to meet the project proponents. This would provide a direct, informal opportunity for residents to ask questions and make suggestions to the project team.

The site has been chosen over other options in part due to its low visibility and the small number of neighbours. Total Eren would investigate the visual impact on any impacted residences using a recognised industry standard method. Total Eren would consult with the owners to determine the amount of visual impact and work with the owners for any potential mitigation methods that may potentially be used.

The presence of a small amount of BSAL land within the investigation area may make land use relevant to some stakeholders. The proposal addresses this issue in two ways:

1) Mapping BSAL land

The project has avoided Biophysical Strategic Agricultural Land (BSAL) land where possible. **Figure 4-12** is the NSW Government's high-level mapping of BSAL in the region. It shows that most of the project is not on BSAL land. It is noted that the high-level BSAL mapping is coarse and generally based on creek lines, not soil tests.

BSAL land very close to creeks is considered unsuitable for solar and is not proposed to be developed. Further mapped BSAL areas may be ruled out by biodiversity, shading and flood constraints as investigations progress. Any remaining mapped BSAL areas would be soil tested to determine their actual BSAL status before development designs are refined. Base line soil testing is also a commitment of the project, to inform remediation strategies, after construction and as part of decommissioning.

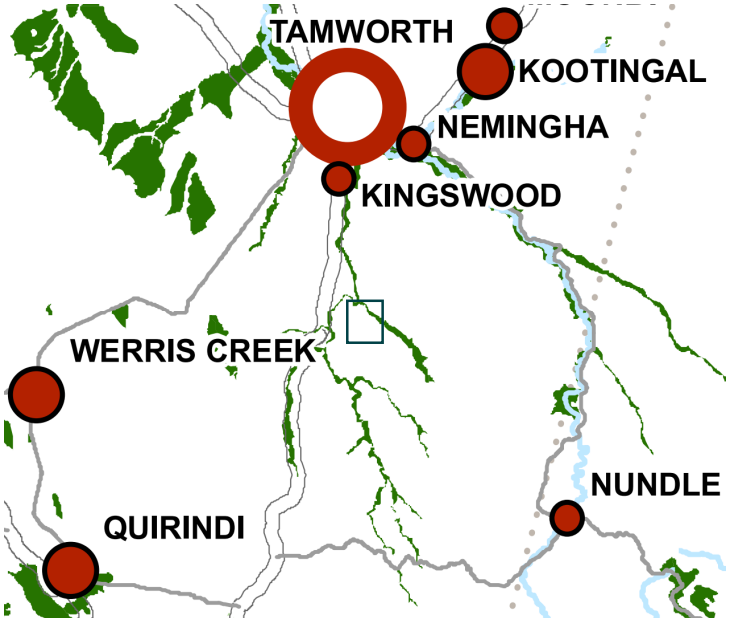

Figure 4-1: NSW Biophysically Strategic Agricultural Land (BSAL) in the Tamworth district (NSW Govt, 2012)

2) Combining traditional and solar farming

Should a small amount of BSAL land be included in the proposed development footprint, Total Eren is currently investigating potential co-existent grazing with solar panels so that agricultural land may continue agricultural use. Total Eren are in the early stages of exploring a research proposal for this site with local experts.

Overseas studies and anecdotal evidence in NSW show that solar panels actually increase soil moisture and grass growth by shading the fiercest sun and promoting condensation at night.

Most importantly, the main ground disturbance for the development is the installation of the foundation piles for the tracker systems. Generally, the piles are easily removed at the end of the development's life and the land can be used for agricultural purposes, or alternative land use once they have been removed.

The project's Community Engagement Plan would provide more information regarding this issue. In summary:

- The area under investigation does not contain large areas of BSAL.
- Parts of the identified BSAL within the area are generally unsuitable for solar farm development because of water and shading constraints.
- The remaining identified BSAL land would be soil tested to confirm its actual capability.
- There is a potential that a small section of BSAL land would be included in the proposed development footprint. Total Eren is currently investigating potential mixed agricultural options.
- The tracker foundations are easily removed so the land can be fully rehabilitated and returned to its pre solar farm agricultural capability as part of decommissioning commitments.

4.2.2. Regulatory agencies and authorities

This group of stakeholders includes the Tamworth Regional Council, state and local regulators and agencies responsible for various aspects of the project, and utilities or authorities such as TransGrid and Transport for New South Wales (TfNSW) who are key players in specific aspects.

General key concerns / values are likely to include:

- a desire to fulfill their roles,
- ensure the project proceeds with full compliance with their regulatory responsibilities, and
- a positively enhanced reputation and experience through their links with the project.

Total Eren has started consultation with a number of parties and the specific areas of interest for each regulator so far have been:

NSW Department of Planning, Industry & Environment (DPIE)

- State Significant Development (SSD)
- Referrals of any federal assessment of ecological communities
- List of Registered Aboriginal Parties (RAPs) received from Biodiversity & Conservation Division (BCD)
- List of RAPs sent to Environment, Energy & Science Group

WaterNSW / Natural Resource Access Regulator (NRAR)

- Any improvements to existing creek crossings are assessed by DPIE in a State Significant Development (SSD) project.

NSW Roads and Maritime Services (now TfNSW)

- Existing intersection of New England Highway and Middlebrook Rd is already B-double truck and bus approved.

Department of Primary Industries, Tamworth

- Investigating coexistent solar farm and traditional farming

NSW Rural Fire Service

- Optimal design of solar farm for fire preparedness, including water storage and clearance zones.

Tamworth Regional Council

- Need for good community consultation
- Access site in north-west corner to reduce reliance on local roads.
- Need for traffic control during construction
- Permitting safe loads on Middlebrook Rd
- Truck and bus routes on Middlebrook Rd
- Agriculture and solar facilities working together

Communication for these stakeholders has been initiated by the proponent, and includes correspondence on regulatory matters, one-on-one phone calls and meetings.
Further agency consultation would also occur in accordance with any requirements of the SEARs.

4.2.3. Aboriginal stakeholders

This group of stakeholders includes state-wide Aboriginal bodies, the Tamworth and Nungaroo Local Aboriginal Land Councils and interested individuals. Consultation is guided by the Office of Environment and Heritage's *Aboriginal Cultural Heritage consultation requirements for proponents* (2010). Preliminary consultation has already begun.

The specific areas of interest in the proposal for these stakeholders are likely to be:

- AHIMS searches show that no Aboriginal places or sites have been recorded on site previously
- No impact on creeks or other probable areas for Aboriginal sites are expected

- All land is privately held freehold, there is no Crown land, and all local roads existed before 1996.

Communication with these stakeholders has been initiated by the proponent, and includes correspondence on regulatory matters, newspaper advertising, emails, one-on-one phone calls and meetings.

Further consultation would also occur in accordance with any requirements of the SEARs. Registered Aboriginal Parties (RAPs) have already been invited in writing and by advertising. Tamworth Local Aboriginal Land Council has registered its interest, and the Tamworth and Nungaroo Local Aboriginal Land Councils have been informed.

4.2.4. Businesses

This group of stakeholders includes suppliers, contractors and local businesses in the nearby towns which may interact with the project. Their key concern / value is the opportunity for positive business engagement and growth through association with the project. Total Eren have met with the Tamworth Business Chamber who have expressed an interest in working together to ensure local businesses are kept up to date.

Communication with these stakeholders would include an initial expression of interest through existing networks, the Tamworth Business Chamber and local media. A register of potential and interested local businesses and suppliers would be established on-line. Engagement with business stakeholders would be direct and one-on-one as suits their services.

Local business would be able to register their interest to supply goods and services on the project website (www.middlebrooksolarfarm.com.au). Total Eren would create a register of relevant suppliers that can be used internally and also supplied to the Engineering, Procurement and Construction (EPC) contractor that undertakes the construction. It is expected that a number of local businesses would be able to provide goods and services for the project during operations as well.

4.2.5. Community

Total Eren understands that it is important to keep the local community updated and engaged throughout the development. Total Eren has already started the engagement process with the local residences and would continue to provide regular updates and information to ensure that the concerns and issues raised by the local community can be taken into consideration during the design of the proposal.

It is important to Total Eren that the local community shares in the benefits of the project, so a Community Fund would be set up to further spread those benefits.

Given Total Eren would form part of the community for the development life Total Eren would encourage the local community to submit applications to make use of the Community Fund. Any person or group from the local community would be eligible to submit an application and each submission would be reviewed and projects that would be a positive addition to the local community would be viewed favourably.

Total Eren expects that local ecology groups, schools, business groups and community groups would have many different ideas about how the community fund would be able to enhance the local community.

If the MSF project is approved, an annual budget and application process for the Middlebrook Solar Farm Community Fund would be determined and the process would be advertised to the community.

4.2.6. External stakeholders

The external stakeholders are a diverse group, including the general public and communities of Loomberah, Timbumburi and Tamworth; schools and universities, especially Timbumburi Public School; Aboriginal and local interest groups; renewable energy groups; local, state and federal government agencies without direct regulatory roles; and media.

For these stakeholders a range of channels would provide relevant information about the project using the communications materials and processes outlined below. One-on-one communications would be made with particular stakeholder groups, and all communications would be recorded on the communications register. Channels and materials include:

Face to face discussions (where possible):

- Meeting with locals in familiar locations and providing information, responding to questions and providing a communication line throughout the development.
- Door knocking the residences in the local community.
- Depending on circumstances (due to COVID-19) it may be necessary to undertake some consultation via telephone, postal and electronic communication methods.

Information sessions (where possible):

- To be held during the development of the proposal at key stages.
- Would be held within the local area and would provide the local community with information about the proposal and allow people to provide feedback.

Display materials

- Two-page colour fact sheet supplied to local residents and businesses, tourism outlets and Tamworth Regional Council.
- Roll-up banners for use in council chambers or workshop spaces when required.
- Depending on circumstances (due to COVID-19) it may be necessary to undertake some consultation via telephone, postal and electronic communication methods.

Project website
Throughout development at different stages, the project website at www.middlebrooksolarfarm.com.au would provide:

- Facts about project, FAQ list.
- Register for local businesses to supply good and services.
- Information on Community Fund.
- Broad construction schedule.
- Downloadable newsletters, fact sheets.
- Events calendar.
- “Contact us” email which is monitored by Total Eren.
- Media releases and media enquiries section.
- Links to other relevant parties, as appropriate.

Newsletters / direct mailout
A scheduled tri-monthly newsletter would be dropped to geographic neighbours and outlets in the local towns, including schools and businesses. It would contain notifications about key activities, invite input and describe contact avenues.

Education program
An education plan can be developed in collaboration with local schools during the construction phase. It would aim to provide information about the project and raise awareness of solar energy and renewables in general. That program could potentially provide for site visits by local schools during appropriate stages of construction.

Media pack
If there is demand for it, the pack for media would contain the project fact sheet, project specifications, project schedule, footage / photos and contact information.

4.3. CONSULTATION TO DATE

Total Eren have been exploring the Project and its opportunities with the community since October 2019. A detailed consultation log has been kept. A summary of the consultation to date with various organisations, community groups and individuals is shown in **Table 4-1.**

Table 4-1 Consultation to date (all of which would be ongoing).

Key stakeholder	Date	Consultation undertaken (and responses where raised).
Tamworth Regional Council	24/01/2020	Roads section of TRC confirmed Middlebrook Rd is a B double designated route and a school bus route, and that Council's bridge on Middlebrook Rd can handle significant loads. Specific heavy vehicle permits would be required for unusual equipment deliveries to site.
	05/03/2020	Tamworth Airport was consulted about the proposal. The Airport has a large solar system directly next to the runway and is aware that reflection and glare is not an issue with modern solar panels. Planes fly over the Middlebrook site at an altitude of 7,000 feet, and again airport management is aware that reflection and glare from solar panels are not issues.
	06/03/2020	Invited all Tamworth Councillors to a briefing. Met with the Mayor who wants to see agriculture and solar working together, local roads looked after, and good communication with the community.
	06/03/2020	Met with Council's planning staff. They also want to see agriculture and solar working together, local roads looked after, and a Community Fund put in place. There are no conflicts with Council's planning blueprint which supports renewables.
	17/4/2020	Emailed Councillors to inform them of SEARs application.
Local Chamber of Commerce	06/03/2020	Met the Executive Officer of Tamworth Business Chamber (TBC). TBC can help advertise the Register for local businesses to supply the Farm and help provide advice for the Community Fund.
TransGrid	30/01/2020	A preliminary connection inquiry was made.

Key stakeholder	Date	Consultation undertaken (and responses where raised).
		Response indicates that both powerlines may not need augmenting to accommodate the connection of the development.
	10/03/2020	TransGrid has published its QNI plans to upgrade the transmission lines.
	30/4/2020	Discussions with TransGrid about formal connection inquiry.
Nearby landowners	October 2019 – March 2020	Most neighbours in close proximity have been met in person and given information. Those who could not be met in person due to COVID-19 virus have been contacted by phone where possible, and mail outs where it was not.
	04/03/2020	The two residences close to the main transport route have been visited in person and given information. The road is already sealed next to one of these residences and dust is not expected there.
	05/03/2020	Other neighbours within 2km have been met in person where possible and phoned and letter boxed with information where it was not.
	05/03/2020	Two uninvolved residences with views of the area of interest have been visited in person and given information. Photos have been taken for further visual assessment and planning.
DPIE	13/01/2020	Tamworth office of DPIE was briefed on the concept. Local offices generally provide advice once a project is lodged, officers were glad to see project early.
	10/02/2020	Pre-lodgement scoping meeting was held in Parramatta office of DPIE. DPIE officers wanted heritage consultation started earlier.
	20/03/2020	Clarified options for potential grid connection sites.
	01/04/2020	Clarified options for consultation during COVID-19 period.
	27/4/2020	Spoke with Biodiversity and Conservation Division. They provided a list of RAPs for Tamworth LGA.
	29/4/2020	A further 29 letters were sent to RAPs.
	1/5/2020	DPIE provided feedback on initial scoping report.
Local environmental groups	18/03/2020	Spoke with Tamworth Regional Landcare Association about their Grassy White Box committee, native nursery

Key stakeholder	Date	Consultation undertaken (and responses where raised).
		and re-generation activities. There are not any environment groups active specifically in the Garoo area.
	20/03/2020	'Tamworth Parents and Friends for Climate Action' were invited by letter to consult on the proposal. They accepted by email on April 15.
Other stakeholders	23/01/2020	Rural Fire Service (RFS) advised Total Eren by email and phone on clearance zones, water storage and water pipe fittings. Middlebrook's fire planning would be based on consultation with the RFS.
	28/01/2020	WaterNSW identified Natural Resource Access Regulator (NRAR) as the body responsible for creek crossings.
	28/01/2020	NRAR advised by email and phone that DPIE assesses creek crossings in State Significant Developments.
	29/01/2020	TfNSW desktop studied the intersection of Middlebrook Rd and New England Highway. It is already a B double designated route with room for long truck turning.
	27/02/2020	Registered Aboriginal stakeholders were invited by letter to consult on heritage aspects of the Proposal. No Aboriginal places or artefacts have been recorded on the site previously.
	03/03/2020	Tamworth Local Aboriginal Land Council accepted the offer to consult.
	20/03/2020	Aboriginal stakeholders in the Garoo area were invited to consult by newspaper advertisement in the 'Northern Leader
	21/03/2020	Tamworth Agricultural Institute was contacted to discuss Total Eren's investigations into stock and solar farming, with improved soil moisture and grass growth.
	8/4/2020	Contacted local state member and Innovation Minister Kevin Anderson's office to discuss Proposal. A phone call was arranged for 23/4/20.
	17/4/2020	Contacted local federal member Barnaby Joyce's office to discuss Proposal. A phone call was arranged for 28/4/20.
	17/4/2020	Letters were written to Environment, Energy & Science Group and Nungaroo Local Aboriginal Land Council advising of Tamworth Local Aboriginal Land Council's interest as a Registered Aboriginal Party (RAP).
	23/4/2020	Email to Tamworth Local Aboriginal Land Council advising of their interest as a RAP.
	23/4/2020	Spoke with Department of Primary Industries at Tamworth about investigations into solar farming with

Key stakeholder	Date	Consultation undertaken (and responses where raised).
		grazing. DPI is well placed to research productivity improvements.
	23/4/2020	Spoke with MP Kevin Anderson about proposal and SEARs application.
	28/4/2020	Spoke with MP Barnaby Joyce about proposal and SEARs application. MP emphasised the importance of storage.
	29/4/2020	Galamaay Cultural Consultants registered interest as a RAP.
	5/5/2020	Gunjeewong Cultural Heritage Corporation and Corroboree Aboriginal Corporation registered interest as RAPs.

5. PLANNING CONSIDERATIONS

5.1. KEY NSW ENVIRONMENTAL PLANNING INSTRUMENTS

5.1.1. Environmental Planning and Assessment Act 1979

Development in NSW is subject to the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and its associated regulations. Environmental planning instruments prepared pursuant to the Act set the framework for approvals under the Act. The Middlebrook Solar Farm proposal would be assessed under Part 4 of the EP&A Act.

5.1.2. State Environmental Planning Policy (State and Regional Development) 2011

Clause 20 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* states that the following is considered a State Significant Development:

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:

> *(a) has a capital investment value of more than $30 million, or*
>
> *(b) has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance.'*

The Middlebrook Solar Farm proposal would have a capital investment cost estimate of more than $30 million. Therefore, the proposal is classified as "State Significant Development" under Part 4 of the EP&A Act.

State Significant Developments are major projects which require approval from the NSW Minister for Planning, Industry and Environment. While the Minister for Planning, Industry and Environment is the consent authority for State Significant Development, the Minister may delegate the consent authority function to the Independent Planning Commission of NSW (IPC) in certain circumstances.

An EIS is required to be prepared in accordance with the requirements of the Secretary's Environmental Assessment Requirements (SEARs) of Department of Planning, Industry and Environment. In determining the SEARs, the Secretary must consult with relevant public authorities and would have regard to the need to assess key issues raised by those public authorities.

5.1.3. State Environmental Planning Policy (Infrastructure) 2007

Clause 34(7) of *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) provides that development for the purpose of a solar energy system may be carried out by any person with consent on any land (except land in a prescribed residential zone). A solar energy system includes a PV electricity generating system.

The proposal, being zoned as RU1 Primary Production is therefore permissible with consent.

5.1.4. Primary Production and Rural Development SEPP 2019

The Rural Lands SEPP 2008 has been repealed and replaced by the Primary Production and Rural Development SEPP 2019. The aims of this new Policy are as follows:

a) to facilitate the orderly economic use and development of lands for primary production,
b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,
c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,
d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts,
e) to encourage sustainable agriculture, including sustainable aquaculture,
f) to require consideration of the effects of all proposed development in the State on oyster aquaculture,
g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.

Specific to this proposal, it is anticipated that:

- For the operational life of the solar farm, the resting / shading impacts of the solar farm combined with operational management to protect groundcover may actually improve soil health and capability, in comparison to current agricultural activities, particularly in drought conditions[1].
- The land capability of the site would be retained, with reference to base line soil testing and rehabilitation commitments post decommissioning.
- The site is sufficiently small that it does not represent a significant proportion of the local agricultural economy and would therefore not affect harvest logistics in the locality.
- The economic benefits of the proposal would add to the current agricultural activities, in terms of employment during operation and other economic stimulus, occurring mostly during construction.

The proposal is considered compatible with the relevant aims of this policy.

[1] John Weaver, PV Magazine, November 2018, available at https://pv-magazine-usa.com/2018/11/12/solar-panel-increase-sheep-and-cow-grasses-by-90/

5.1.5. Roads Act 1993

The *Roads Act 1993* (Roads Act) provides for the classification of roads and for the declaration of TfNSW and other public authorities as road authorities for both classified and unclassified roads. It also regulates the carrying out of various activities in, on and over public roads.

The major site access (Middlebrook Road) is already a B-double designated road. Intersection treatments and road upgrades may be required to obtain site access. Final access would be determined by further traffic investigations. Additional approval from roads authorities (TfNSW and/or Tamworth Regional Council; Section 138 permit) is expected to be required to carry out road upgrades. Access and Traffic is further discussed in section 0.

5.1.6. Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* relates to the conservation of biodiversity.

The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community consistent with the principles of the ecological sustainable development (ESD).

The Act contains provisions relating to flora and fauna protection (repealing parts of the *National Parks and Wildlife Act 1974*), threatened species and ecological communities listing and assessment (repealing the *Threatened Species Conservation Act 1995* and section 5A of the EP&A Act), a Biodiversity Offsets Scheme (BOS), a single Biodiversity Assessment Method (BAM), calculation and retirement of biodiversity credits and biodiversity assessment and planning approvals. It also requires specific consideration of irreversible impacts.

The proposal would likely have a small impact on some native vegetation and biodiversity values. Consultation with DPIE - Biodiversity Conservation Division (formerly Office of Environment and Heritage OEH) would be undertaken as required during the assessment of the project.

5.1.7. National Parks and Wildlife Act 1974

The NPW Act establishes the fundamental functions of the NSW National Parks and Wildlife Service. These include the conservation of nature, objects, features, places and management of land reserved under the Act. Specifically, the conservation of nature includes:

- Landforms of significance, including geological features and processes, and
- Landscapes and natural features of significance including wilderness and wild rivers.

Animal and plant provisions of the *National Parks and Wildlife Act 1974* have been repealed and replaced by the *Biodiversity Conservation Act 2016* that commenced on the 25th of August 2017.

The NPW Act regulates access to National Parks.

There are no National Parks near the proposed project.

The NPW Act also protects and preserves Aboriginal heritage values. Part 6 of this Act refers to Aboriginal objects and places and prevents persons from impacting on an Aboriginal place or relic, without consent or a permit.

No Aboriginal sites or places have been identified on the project site.

Additional to the NPW Act, Environment, Energy & Science - Heritage Division codes set out required assessment and consultation protocols for Aboriginal heritage impact assessments.

5.1.8. Heritage Act 1977

This Act aims to conserve heritage values. The Act defines 'environmental heritage' as those places, buildings, works, relics, moveable objects and precincts listed in the Local or State Heritage Significance. A property is a heritage item if it is listed in the heritage schedule of the local Council's Local Environmental Plan or listed on the State Heritage Register, a register of places and items of particular importance to the people of NSW. Under Section 4.41 of the EP&A Act, an approval under Part 4 or a permit under Section 139 of the *Heritage Act 1977* would not be required for a State Significant Development.

The closest historical item is Goonoo Goonoo Homestead and Associated Outbuildings, over 4km to the west. The project is not visible from Goonoo Goonoo Homestead, and does not share road access with Goonoo Goonoo Homestead.

The potential to impact environmental heritage is discussed in Section 0 of this report. Consultation would be undertaken with Tamworth Regional Council and the assessment would be undertaken in accordance with OEH guidelines for *Assessing Heritage Significance (Heritage Office* (former), 2001).

5.2. LOCAL INSTRUMENTS

5.2.1. Tamworth Regional Local Environmental Plan 2010

The site is located within the Tamworth Regional LGA. The subject land is subject to the provisions of the *Tamworth Regional Local Environmental Plan 2010* (TRLEP). The solar farm subject land is zoned as RU1 Primary Production.

The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To permit subdivision only where it is considered by the Council to be necessary to maintain or increase agricultural production.
- To restrict the establishment of inappropriate traffic generating uses along main road frontages.
- To ensure sound management of land which has an extractive or mining industry potential and to ensure that development does not adversely affect the extractive industry.
- To permit development for purposes where it can be demonstrated that suitable land or premises are not available elsewhere.

Electricity generation is prohibited within this land zoning under the TRLEP, however clause 34(7) of the ISEPP allows the development for the purpose of a solar energy system on any land with consent, which prevails over the local provisions (Clause 8 ISEPP). Total Eren is also investigating the interaction of grazing activities with solar farming.

5.3. COMMONWEALTH LEGISLATION

5.3.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of Agriculture, Water and Environment (DAWE). Under the EPBC Act, if the Minister determines that an action is a 'controlled action' which would have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES) or Commonwealth land, then the action may not be undertaken without prior approval of the Minster.

The EPBC Act identifies the following nine MNES:

- World Heritage properties.
- National heritage places.
- Ramsar wetlands of international significance.
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- Water resources (in relation to coal seam gas development and large coal mining development).

Actions that adversely affect these matters may be deemed to be a 'controlled action' under the Act.

A search of the Commonwealth Protected Matters Search Tool (undertaken on 15/11/2019) identified no wetlands of international importance within 900km of the subject land.

Search results identified no World Heritage Properties or National Heritage Place within a 10 km radius of Garoo, NSW.

Four threatened ecological communities were identified from the desktop searches (using a search area of 10km radius from the site); Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (Critically Endangered), New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands (Critically Endangered), Weeping Myall Woodlands (Endangered), and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered). Only White Box-Yellow Box-Blakely's Red Gum Grassy Woodland may exist on part of the site itself.

27 threatened species and 13 migratory species were returned from the Protected Matters Search.

The potential for these entities to occur will be investigated as part of the detailed EIS and supporting studies. At this stage a significant impact on an MNES, and requirement to refer the proposal under the EPBC Act, is not considered likely.

5.3.2. Native Title Act 1993

The *Native Title Act 1993* provides a legislative framework for the recognition and protection of common law native title rights. Native title is the recognition by Australian law that Indigenous people had a system of law and ownership of their lands before European settlement. Where that traditional connection to land and waters has been maintained and where government acts have not removed it, the law recognises this as native title.

People who hold native title have a right to consult or continue to practise their law and customs over traditional lands and waters while respecting other Australian laws. This could include visiting to protect important places, making decisions about the future use of the land or waters, hunting, gathering and

collecting bush medicines. Further, when a native title claimant application is registered by the National Native Title Tribunal, the people seeking native title recognition gain a right to consult or negotiate with anyone who wants to undertake a project on the area claimed.

All land in the project is privately owned, and all public roads existed before 1996. However, despite those circumstances, if native title were to exist in relation to the subject land, Total-Eren would comply with the provisions of the *Native Title Act 1993*.

6. SCOPING ASSESSMENT

6.1. ASSESSMENT OF KEY ISSUES

Based on preliminary site assessment and desktop review, a summary of the key environmental issues of relevance to the site and its development is provided below. These include:

- Biodiversity
- Visual amenity
- Noise and vibration
- Land use compatibility and impacts to agricultural land
- Soil and landforms
- Access and traffic
- Hydrology, groundwater and water quality
- Social and economic impacts
- Non-Indigenous heritage

6.1.1 Biodiversity

Approach

Ecological values of the subject land were investigated at a high level. This has included the following information sources:

- Existing threatened species listings under the BC Act and EPBC Act.
- Existing records of threatened species sightings in the subject land, as recorded in the BioNet Database (OEH).
- Department of Environment Protected Matters Search Tool (nationally threatened species listed under the EPBC Act).
- Threatened species and communities identified as potentially occurring through the Biodiversity Assessment Methodology Calculator (OEH).
- Areas of outstanding biodiversity value declared under the BC Act 2016.
- A site inspection, undertaken on 6 November 2019 by NGH senior ecologist and again on the 14 and 15 January 2020.

Background searches

Existing threatened species listings

The EPBC search (undertaken on 22 April 2020 with a 10km buffer of the site) identified four threatened ecological communities, 28 threatened species and 13 migratory species of relevance to the site. Threatened species either known to occur or with the potential to occur include:

- 8 bird species
  - Regent Honeyeater (*Anthochaera Phrygia*)
  - Australasian Bittern (*Botaurus poiciloptilus*)
  - Curlew Sandpiper (*Calidris ferruginea*)
  - Red goshawk (*Erthrotriorchis radiatus*)
  - Painted Honeyeater (*Grantiella picta*)
  - White-throated Needletail (*Hirundapus caudactutus*)
  - Swift Parrot (*Lathamus Discolor*)
  - Australian Painted Snipe (*Rostratula australis*)
- 1 fish
  - Murray Cod (*Maccullochella peelii*)
- 2 amphibians
  - Booroolong Frog (*Litoria booroolongensis*)
- 7 mammals
  - Large-eared Pied Bat, Large Pied Bat (*Chalinolobus dwyeri*)
  - Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (*Dasyurus maculatus maculatus*)
  - Corben's Long-eared Bat, South-eastern Long-eared Bat (*Nyctophilus corbeni*)
  - Greater Glider (*Petauroides volans*)
  - Brush-tailed Rock-wallaby (*Petrogale penicillata*)
  - Koala (*Phascolarctos cinereus*)
  - Grey-headed Flying fox (*Pteropus poliocephalus*)
- 7 plants
  - Ooline (*Cadellia pentastylis*)
  - *Callistemon pungens*
  - Bluegrass (*Dichanthium setosum*)
  - E*uphrasia arguta*
  - a leek-orchid (P*rasophyllum* sp. Wybong)
  - Austral Toadflax, Toadflax (*Thesium australe*)
  - *Tylophora linearis*
- 3 reptiles
  - Pink-tailed Worm-lizard (*Aprasia parapulchella)*
  - Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko (*Uvidicolus sphyrurus*)
  - Bell's Turtle, Western Sawshelled Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle (*Wollumbinia belli)*

A search of the OEH Wildlife Atlas database identified seven threatened fauna species and one threatened flora species that have been recorded within 10 km of the site:

- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)
- Rainbow Bee-eater (*Merops ornatus*)
- Regent Honeyeater (*Anthochaera Phrygia*)
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)
- Spotted-Tailed Quoll (*Dasyurus maculatus*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Border Thick-tailed Gecko (*Uvidicolus sphyrurus*)
- Bluegrass (*Dichanthium setosum*)

Site inspections

Site inspections of the subject land were made by a senior ecologist on the 6th November 2019 and an ecologist on 14 and 15 January 2020.

The site inspections included identifying biodiversity constraints over the site and provided basic vegetation stratification within the subject land. Plant Community Types (PCTs) were determined based on the presence of diagnostic species via rapid assessment and recording of the top three dominant species of trees, shrubs and groundcovers (where present) within the zone. No floristic data was collected.

Vegetation and fauna habitat

The subject land occurs on the Liverpool plains and contains alluvial soils. Where active agriculture is present, there is a combination of scattered paddock trees remaining over the land with cultivated groundcover. The paddock trees are the remains of Grassy Box- Gum Grassy woodland. Much of the subject land has been extensively cleared of woody vegetation and has been highly modified by historical farming practices.

Remnant vegetation within the site (in general, where trees are less than 50 m apart) is highly modified with the best quality patches found along Spring Creek, Banyandah Creek and in the north-west of the subject land. These patches in creek beds are not anticipated to be developed. Isolated paddock trees occur within the subject land as well as small patches of native grasses located in narrow strips between cultivated paddocks where native species appear more abundant. Some paddock areas, particularly in the north-west, display higher native grass cover, foreseeably due to lighter grazing pressure and alteration of the groundcover. The majority of woodland patches (trees <50 m apart) have been subjected to cropping around trees or improved pasture practices. Grazing sheep are also present on some paddocks. Approximately two hectares of planted Old Man Saltbush (*Atriplex nummularia*) is established and growing well next to Spring Creek.

Dominant species within riparian areas includes White Box (*Eucalyptus albens*), followed by Rough-barked Apple (*Angophora floribunda*), Blakey's Red Gum (*Eucalyptus blakeyi*) and Yellow Box (*Eucalyptus melliodora*) with occasional White Cedar (*Melia azedarach*).

White Box (*Eucalyptus albens*) is the dominant canopy species observed in higher areas of the subject land. Lower lying areas, proximal to watercourses tend to have a higher proportion of the Yellow Box (*E. melliodora*) and occasional Blakely's Red Gum (*E. blakelyi*).

Small isolated areas of native groundcover were present. Drought was having a major impact making floristic identification of groundcover species difficult. Some native grasses persisted and included Purple Wire Grass (*Aristida personata*), Slender Bamboo Grass (*Austrostipa verticillata*) and less common Plains Grass (*Austrostipa aristiglumis*). Native forbs included occasional Yellow-burr Daisy (*Callotis lappulacea*) and Small-leaf Bluebush (*Maireana microphylla*). The majority of cultivated land consisted of exotic species including Lucerne (*Medicago sativa*), Wheat (*Triticum aestivum*), Oats (*Avina sativa*) and Barley (*Hordeum* spp.).

As most areas were highly modified, it was also difficult to collect extensive information on shrubs with only a few species noted along major watercourses including Western Silver Wattle (*Acacia decora*), Blackthorn (*Bursaria spinosa*) and Native Olive (*Notelaea microcarpa*). A Chenopod (*Sclerolaena* sp.) was noted growing along Middlebrook Road incidentally. Planted vegetation consisted of eucalypt saplings (species unknown) planted along access tracks in the western portion of the subject land and also along Middlebrook Road (**Figure 6-1**)

No threatened fauna was observed during the initial site inspection, however most woodland patches and paddock trees were of a size class to contain hollow- bearing trees that would provide important breeding and roosting habitat for hollow dependent species. A Nankeen kestrel was observed using a paddock tree close to Spring Creek and a pair of Wedge-tailed Eagles were observed. In general bird activity was low across all inspections consisting mainly of birds of prey.

Low-lying shallow drainage lines (first order watercourses) have been totally modified and do not appear visible in the landscape.

Plant Community Types (PCT's) and Threatened Ecological Communities (TEC's)

As the region was experiencing extreme drought conditions, the lack of floristics for groundcover species was apparent. There was a distinct lack of native forbs over all areas with only certain species of native grasses prevailing. The results of rapid survey are preliminary in nature and may change following more detailed vegetation survey of the site with reference to Floristic Plots in accordance with the Biodiversity Assessment Methodology (OEH, 2017).

PCTs, based on the preliminary inspection, include:

- PCT 84 – River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion.
- PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.
- PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

It is possible that areas identified as a low constraint currently due to dominance of improved pasture and annual weed species may have a higher abundance of perennial native cover that may be identified via more detailed survey. Further investigation is required to determine TEC extent onsite.

The preliminary vegetation mapping is provided in **Figure 6-1**.

Table 6-1 Summary of vegetation and habitat across the subject land.

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
1	Exotic/cropped /cultivated	(top photo) 306271 (bottom) 308200	(top photo) 6534941 (bottom) 6534698	Cleared areas. Paddocks with evidence of ploughed crops including Lucerne, Saltbush, Wheat and other exotic species. Some areas currently being grazed by sheep. Paddock trees scattered throughout (>50m away from each other). This zone is unlikely to generate ecosystem credits where trees are avoided. **PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion** **The condition thresholds of this zone are unlikely to classify as state or federally listed TEC.** Trees – *Eucalyptus albens* Shrubs –None Groundcovers -None Constraint = LOW RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
					

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
2	Predominantly exotic pasture	307155	6534797	Proportion of existing groundcover is 5-50% native but lacking diversity. Sparse paddock trees generally >50m apart may be present throughout which would generate offsets if cleared under BAM. This zone is highly degraded and subjected to modification historically through the application of agricultural practises including fertilizer and stock grazing. This zone is unlikely to generate ecosystem credits where trees are avoided. **PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.** **The condition thresholds of this zone unlikely to classify as state or federally listed TEC.** Trees – *Eucalyptus albens* Shrub – None Groundcovers – *Austrostipa verticillata, Aristida* spp. Constraint = LOW RISK (where riparian buffers are avoided)	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
3	Predominantly native pasture	308089	6534430	Existing groundcover 50-100% native and areas which may contain sparse paddock trees generally >50m apart. Moderately degraded. This zone may generate ecosystem credits. **PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.** **The condition thresholds of this zone may or may not classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus albens* Shrubs – None Groundcovers – *Austrostipa verticillata, Aristita spp.* Constraint = MODERATE RISK if developed	
4	Intact treed WL With exotic cultivated ground cover.	306914	6534619	Trees <50m apart with exotic/cropped/cultivated ground cover. There would be costs involved in ecosystem credits under BAM and possibly generation of species credits if trees are removed. **PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.** **The condition thresholds of this zone may or may not classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus albens* Shrub – None Groundcovers – None Constraint = HIGH RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
5	Riparian WL	304138	6537322	Trees <50m apart with predominantly native ground cover. There would be costs involved in ecosystem credits under BAM and possibly generation of species credits if trees are removed. **PCT 433 – White Box grassy woodland to open woodland on basalt flats and rises in the Liverpool Plains sub-region, BBS Bioregion.** **The condition thresholds of this zone are likely to classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus albens* Shrub – None Groundcovers – *Austrostipa verticillata, Aristida spp* Constraint = HIGH RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
6	Riparian WL	(Top photo) 308443 (Bottom) 305733	(Top photo) 6534645 (Bottom) 6534217	Treed watercourses over property containing deeply incised gullies and timbered habitat. Variety of native species showing some level of complexity. This zone would generate ecosystem credits and potentially species credits. **PCT 84 River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion.** **This PCT is not a state or federally listed TEC.** Trees – *Eucalyptus albens, E. blakelyi, Angophora floribunda, E. melliodora.* Shrubs – *Notelaea microcarpa var. microcarpa, Acacia decora, Hibbertia obtusifolia* Groundcovers – *Themeda triandra, Einardia nutans, Aristita Spp.* Constraint = HIGH RISK (where riparian buffers are not avoided)	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
					

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
7	Exotic/Cropped/Cultivated	307846	6535921	Cleared areas. Paddocks with evidence of ploughed crops including Lucerne, Saltbush, Wheat and other exotic species. Some areas currently being grazed by sheep. Paddock trees scattered throughout (>50m away from each other). This zone is unlikely to generate ecosystem credits where trees are avoided. **PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion** **The condition thresholds of this zone are unlikely to classify as state or federally listed TEC**. Trees – *Eucalyptus melliodora*, *Eucalyptus blakelyi*, Shrubs –None Groundcovers -None Constraint = LOW RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
8	Predominantly Exotic pasture	309190	6533486	Proportion of existing groundcover is 5-50% native but lacking diversity. Sparse paddock trees generally >50m apart may be present throughout which would generate offsets if cleared under BAM. This zone is highly degraded and subjected to modification historically through the application of agricultural practises including fertilizer and stock grazing. This zone is unlikely to generate ecosystem credits provided trees are avoided. **PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion** **The condition thresholds of this zone are unlikely to classify as state or federally listed TEC**. Trees – *Eucalyptus melliodora*, *Eucalyptus blakelyi*, Groundcovers – *Austrostipa verticillata, Aristida* spp. Constraint = LOW RISK (where riparian buffers are avoided)	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
9	Predominantly Native pasture	308846	6535003	Existing groundcover 50-100% native and areas which may contain sparse paddock trees generally >50m apart. Moderately degraded. This zone may generate ecosystem credits. **PCT 599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion** **The condition thresholds of this zone may or may not classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus melliodora, Eucalyptus blakelyi,* Shrubs – None Groundcovers – *Austrostipa verticillata*, *Aristida* spp. Constraint = MODERATE RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
10	Intact treed WL With exotic cultivated ground cover.	303626	6538218	Trees <50m apart with exotic/cropped/cultivated ground cover. There would be costs involved in ecosystem credits under BAM and possibly generation of species credits if trees removed. **PCT 599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion** **The condition thresholds of this zone may or may not classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus melliodora, Eucalyptus blakelyi, Angophora floribunda* Shrub – None Groundcovers – None Constraint = HIGH RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
11	Intact treed WL With native ground cover.	307343	6536439	Trees <50m apart with predominantly native ground cover. There would be costs involved in ecosystem credits under BAM and possibly generation of species credits if trees removed. **PCT 599 – Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion** **The condition thresholds of this zone may or may not classify as state or federally listed TEC. Further investigation would be required.** Trees – *Eucalyptus melliodora, Eucalyptus blakelyi, Angophora floribunda* Shrub – None Groundcovers – *Austrostipa verticillata*, *Aristida* spp Constraint = HIGH RISK	

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
12	Planted vegetation	(Top photo) 306666 (Bottom) 308063	(Top photo) 6535854 (Bottom) 6534565	Planted trees along access tracks and Middlebrook Road containing a combination of native tube stock and established exotic trees. This zone may generate ecosystem credits depending on habitat values. Species – *Schinus molle*, *Cypress* and various young eucalypts. **This vegetation is not able to be classed as a native PCT and is not a state or federally listed TEC.** Constraint = MODERATE RISK	 

Zone ID	Condition	Easting	Northing	Description & dominant native species onsite	Image
H1	HBTs	306741	6534803	Scattered hollow-bearing trees usually occurring as paddock trees across most parts of the subject land. Hollow-bearing trees would require assessment and offsets under NSW BAM. Constraint = MODERATE TO HIGH RISK**,** depending on their location.	

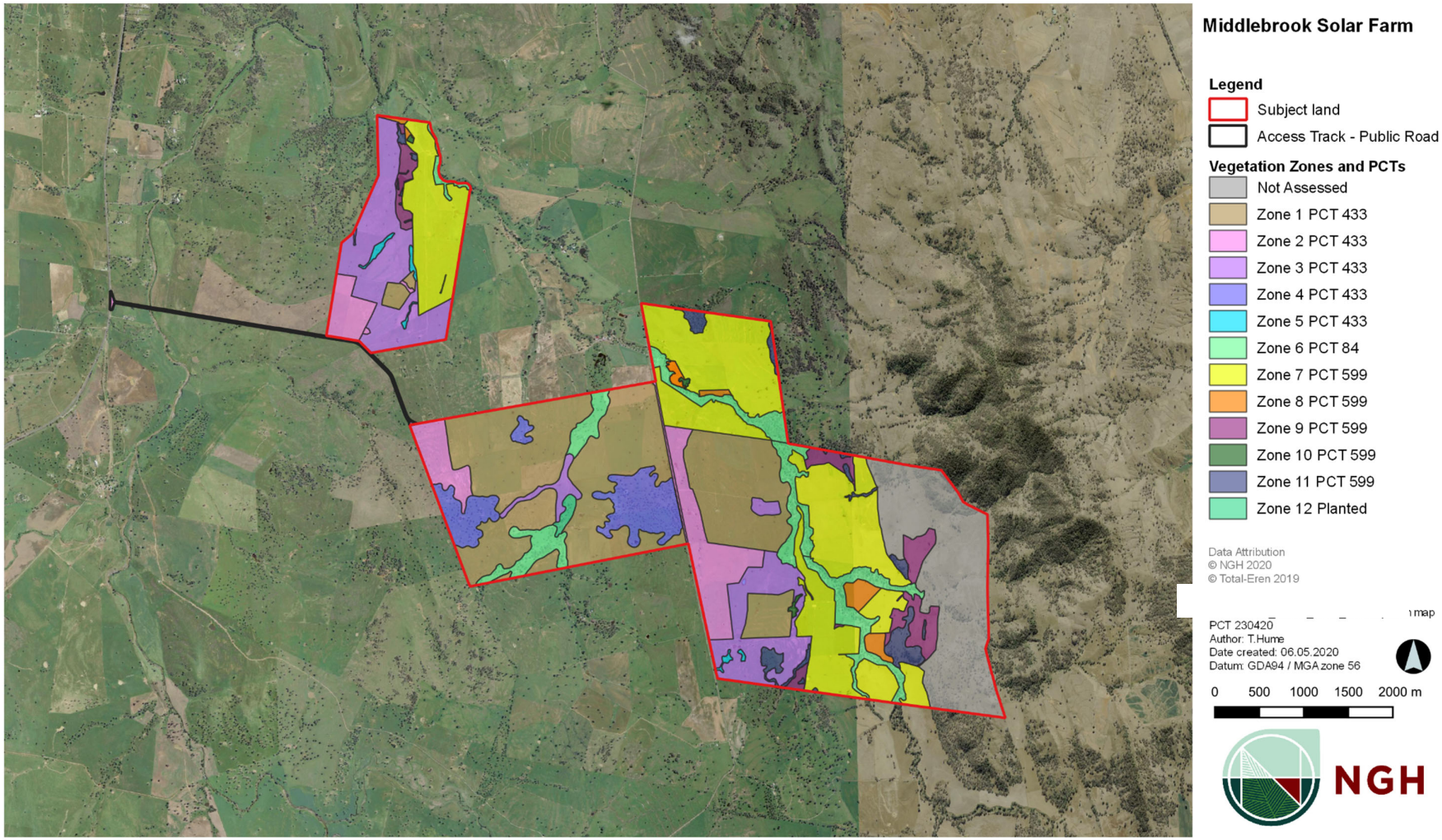

Figure 6-1 Preliminary mapping of Plant Community Types (PCTs)

Land Category Assessment

To inform this scoping report and guide further assessment, a preliminary Land Category Assessment has been made. The aim of this assessment is to determine the distribution of Category 1 – Exempt Land (Category 1 Land) and Category 2 – Regulated Land (Category 2 Land) across the development site. Category 1 Land is land that has been subject to extensive clearing and modification at 1 January 1990 or lawfully since. Category 1 Land is not required to be assessed under the BAM other than for prescribed impacts. This means that development on Category 1 Land cannot generate a credit obligation as it is exempt. Category 1 Land has been assessed as being present across significant portions of the site where a significant history of disturbance is evident.

All other areas of the development site contain Category 2 Land that if impacted are required to be assessed under the BAM. This includes paddock trees (as defined by the BAM) contained within Zones 1 – 3 and 8 – 10. Paddock trees with a diameter at breast height (DBH) < 20 cm do not requiring offsetting. Paddock trees with a DBH > 20 cm would generate ecosystem credits. Credits generated increase if a paddock tree requiring offset is also a hollow-bearing tree.

As the Land Category Assessment is preliminary and would need to be approved by DPIE, the results have not been incorporated into the constraints mapping for the project.

Constraints and need for further assessment

To inform the early proposal planning process and investigation strategies, biodiversity features within the subject land have been mapped to areas of High, Moderate, or Low constraints (**Figure 7-1** and are detailed in the constraints assessment in Section 7.

As part of the EIS, the detailed ecological surveys, investigation and assessment would be undertaken in the format of the Biodiversity Development Assessment Report (BDAR) in consultation with the Biodiversity Conservation Division (BCD) of the Department of Planning, Industry and Environment. The assessment would be undertaken in accordance with the NSW Biodiversity Assessment Methodology (BAM). An in perpetuity offset requirement is anticipated to be generated, which may be retired through several options including onsite offsets or purchase of requisite credits from the credit market.6.1.2 Visual Amenity

The town of Timbumburi is located 11 km north west of the subject land.

There are 17 residences within 2 km of the subject land: 7 project-involved residences, 5 non-involved residences within 1km and an additional 5 within 2km of the project land boundary[2]. These receivers have been confirmed by ground validating existing mapping layers from public access ways. The closest non-involved receiver is R10; 467 m from the likely development footprint. This property has some trees / vegetation that may provide a small amount of visual screening.

Aerial imagery and site observations shows there is some existing vegetation screening for receivers including those north of the site along Marsden Park Road. Gaps in existing vegetation screening, and the higher altitude of land located within 2 km south of the subject land along Middlebrook Road means that two receivers in this area are likely to have views of solar farm infrastructure. The location of nearby receivers has been mapped in Figure 6-2.

Table 6-2 below shows the number of potential sensitive receivers within 2 km of the subject land and the likelihood that they would have a view of solar farm infrastructure if left unmitigated.

[2] As the solar farm infrastructure would generally not be to the edge of the property boundary, R12,14,16 and 17 are expected to be further than 2km from the solar farm infrastructure. Refer to **Figure 6-2**.

There are up to 154 potential residences are located within 7 km, based on non-ground validated mapping layers[3]. Views at this distance would be negligible, dependant on elevation. The location of nearby receivers has been mapped in Figure 6-2.

Table 6-2 Distance between likely development and sensitive receivers within 2 km.

Receiver ID	Distance from likely development[4] (m)	Potential for view of solar farm infrastructure
Involved landowners		
R1	0	NA
R2	0	NA
R3	0	Unlikely. Screened by topography and existing vegetation screening along Goonoo Goonoo Creek.
R4	0	Unlikely. Screened by existing vegetation.
R6	0	Unlikely. Screened by existing vegetation.
R7	0	Unlikely. Screened by existing vegetation.
R8	0	Unlikely. Screened by existing vegetation.
Non-involved landowners		
R5	504	Unlikely. Screened by existing vegetation.
R9	620	Likely. Limited screening from existing vegetation and topography.
R10	467	Unlikely. Screened by existing vegetation.
R11	551	Unlikely. House is empty and screened by existing topography & vegetation.
R12	1005	Unlikely. Screened by existing vegetation.
R13	1010	Likely. Limited screening from existing vegetation and topography.
R14	1165	Unlikely. House is empty and screened by existing vegetation.
R15	1436	Unlikely. Screened by existing vegetation.
R16	1337	Unlikely. Screened by existing vegetation.
R17	1243	Unlikely. Screened by existing vegetation and topography.

[3] This number is likely to include sheds and other structures and is considered an overestimate.
[4] The likely development footprint will not generally extend all the way to the Subject Land boundary.

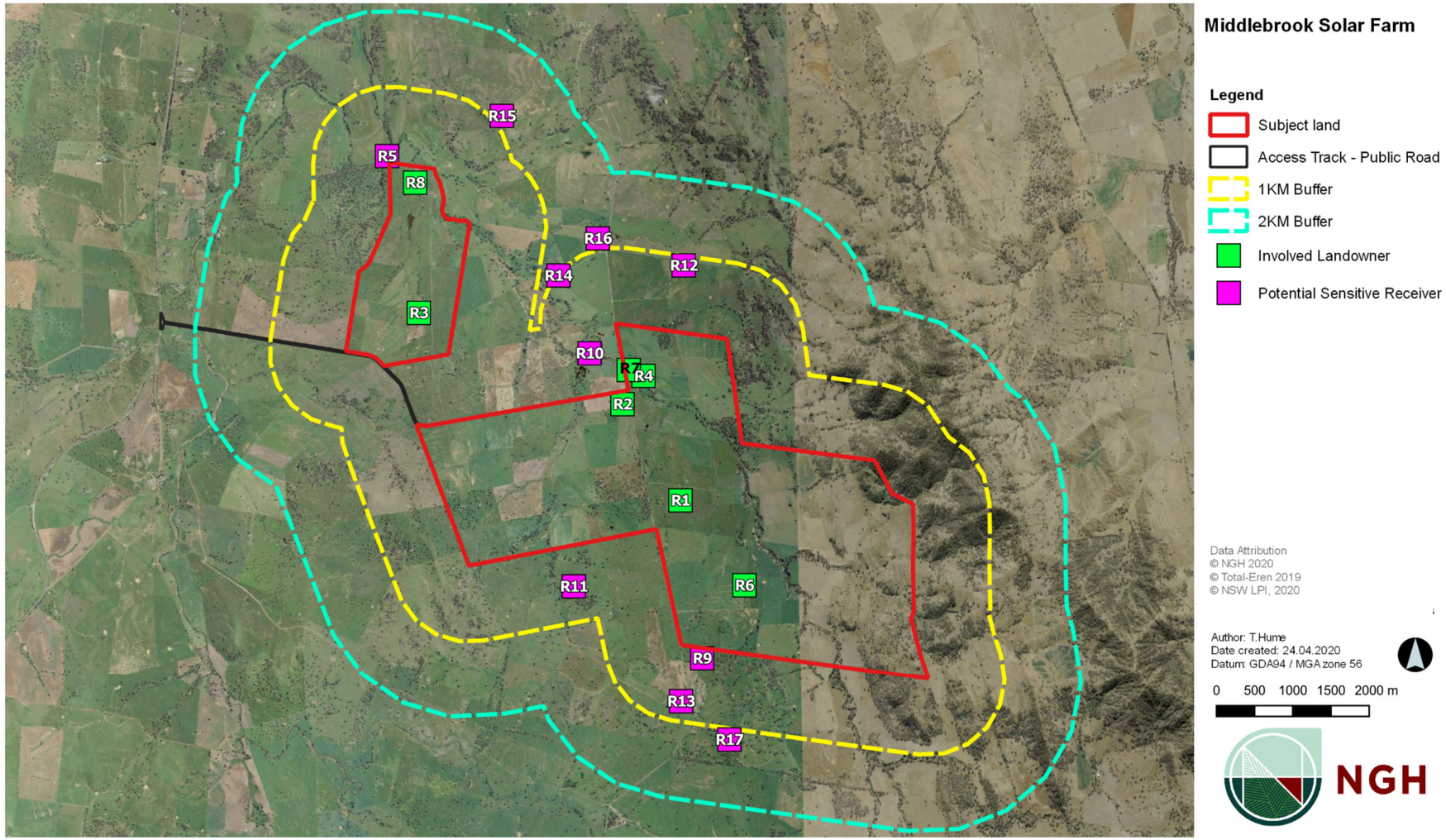

Figure 6-2 Involved and non-involved sensitive receivers within 2 km of the subject land.

Constraints and need for further assessment

Aerial imagery, desktop analysis and site visits at this stage indicate two uninvolved residences may have some direct view of solar farm infrastructure if left unmitigated. This would be subject to further investigation and ground truthing. An assessment of the level of visual impact would be undertaken as part of the EIS process and would include view shed analysis.

The EIS would also consider the potential for the solar farm to affect local landscape character. Consultation would be undertaken broadly to understand the local values of the area, including visual characteristics valued by the community. Additional engagement with specific affected residences identified as likely to have a view of solar farm infrastructure would be undertaken to identify the nature and significance of impacts and the need for mitigation measures. There is no requirement in NSW to screen views from roads.

Mitigation of low-profile solar farm infrastructure in low relief landscapes is highly feasible. Visual impacts attenuate rapidly with distance in these cases. The focus of the mitigation would be on the two higher elevation, closer-proximity residences.

6.1.3 Noise and vibration

The subject land is located on rural land. The main sources of background noise would include traffic noise from Middlebrook Road and routine agricultural machinery operation. The land surrounding the subject land is used for cultivation and cropping which would contribute to the generation of noise and dust in the vicinity of the proposal. Seven involved dwellings (R1, R2, R3, R4, R6, R7 and R8) are present within the subject land and 10 non - involved residences are within 1 km of the subject land **(The** location of nearby receivers has been mapped in Figure 6-2.

Table 6-2**).** These receivers could be sensitive to increased noise and vibration depending on the final design.

Construction vehicles and machinery during the construction phase would be most relevant in contributing to noise and vibration impacts. During the operation of the solar farm, noise levels would be likely be reduced, as agricultural machinery would largely cease. Noise would be generated from the solar tracking system (if a tracking system is decided upon) as well as the sub-station and switchgear and any maintenance works undertaken at the site.

Constraints and need for further assessment

A construction and operational noise and vibration assessment would be undertaken as part of the EIS to assess potential noise impacts for affected residents. The report would include an assessment of road traffic noise and onsite monitoring to establish baseline noise levels. The assessment would be undertaken in accordance with the Interim Construction Noise Guideline (DECC, 2009), NSW Noise Policy for Industry (EPA, 2017), Assessing Vibration: A Technical Guideline (DECC, 2006) and NSW ‘Road Noise Policy’ (DECCW, 2011).

6.1.4 Land use compatibility and impacts to agricultural land

The land use surrounding the subject land includes:

- Large lot primary production (including grazing and dryland cropping)
- Electricity assets and easements
- Aeronautical

Agricultural production within the Tamworth Regional LGA contributes 2% of Australia's total agricultural production. Livestock and crop production for hay represent the largest land use by percentage (4.6% and 4.3% respectively) of the Tamworth Regional LGA.

Land use categories and areas within the subject land are identified in **Table 6-3** and **Figure 6-3** below.

Table 6-3 Land use categories within the subject land (DPIE dataset, 2017).

Land use category	Area (ha)
1.3.3 Residual native cover	5.59
2.1.0 Grazing native vegetation	379.74
3.2.0 Grazing modified pastures	1152.32
3.2.5 Sown grasses	0.01
3.3.0 Cropping	654.67
5.2.0 Intensive animal production	2.85
5.4.0 Residential and farm infrastructure	2.16
5.4.2 Rural residential with agriculture	2.97
5.4.5 Farm buildings/infrastructure	1.98
5.7.2 Roads	0.49
6.3.0 River/creek	6.91

The subject land is currently used for cattle and sheep grazing, and cropping. Crops include Sorghum, Wheat, Oats, Barley and irrigated Lucerne for feed. Current investigations into managed grazing are investigating options to determine if it may be possible to continue it throughout the operation of the solar farm to reduce biomass and associated risk of fire. The current land use would be extended to include electricity generation.

The proposal would capture and use a natural resource (solar energy) for the life of the solar farm (anticipated to be at least 30 years). Although cropping would no longer be possible throughout the construction, operation and decommissioning of the solar farm, the current investigations into grazing could potentially open more economic avenues for the land. It is expected that the economic benefit of the proposed solar farm would be more consistent year to year when compared to the current land use.

The foundations / piling of array supports means the land can be returned to its pre-solar capability allowing for continued agricultural production once the solar farm has been decommissioned. The soil structure is not significantly added to or damaged, and full capacity returns once piles / foundations are removed.

The closest airstrip to the subject land is approximately 2.2 km west, however the existing landholder notes that aerial spraying has not been undertaken for at least 20 years. The last known spraying was approximately 30 years ago for Barley crops. The Tamworth Regional Airport is located approximately 26 km north west of the subject land. A flying school also operates out of the Tamworth Regional Airport, and according to the involved landowner, flights occasionally travel in the airspace above the subject land.

Management of Tamworth Airport was consulted about the proposal. The Airport has a large solar system next to the runway. Planes fly over the Middlebrook site at an altitude of 7,000 feet. Airport management is aware that reflection and glare from solar panels are not issues for planes. This would be confirmed with further consultation.

There is no Crown Land associated with the subject land. All public roads in the area existed before 1996.

A search of MinView (DPIE, 2019) on 12 January 2020 did not identify any mineral, petroleum or exploitation licences or titles over the subject land.

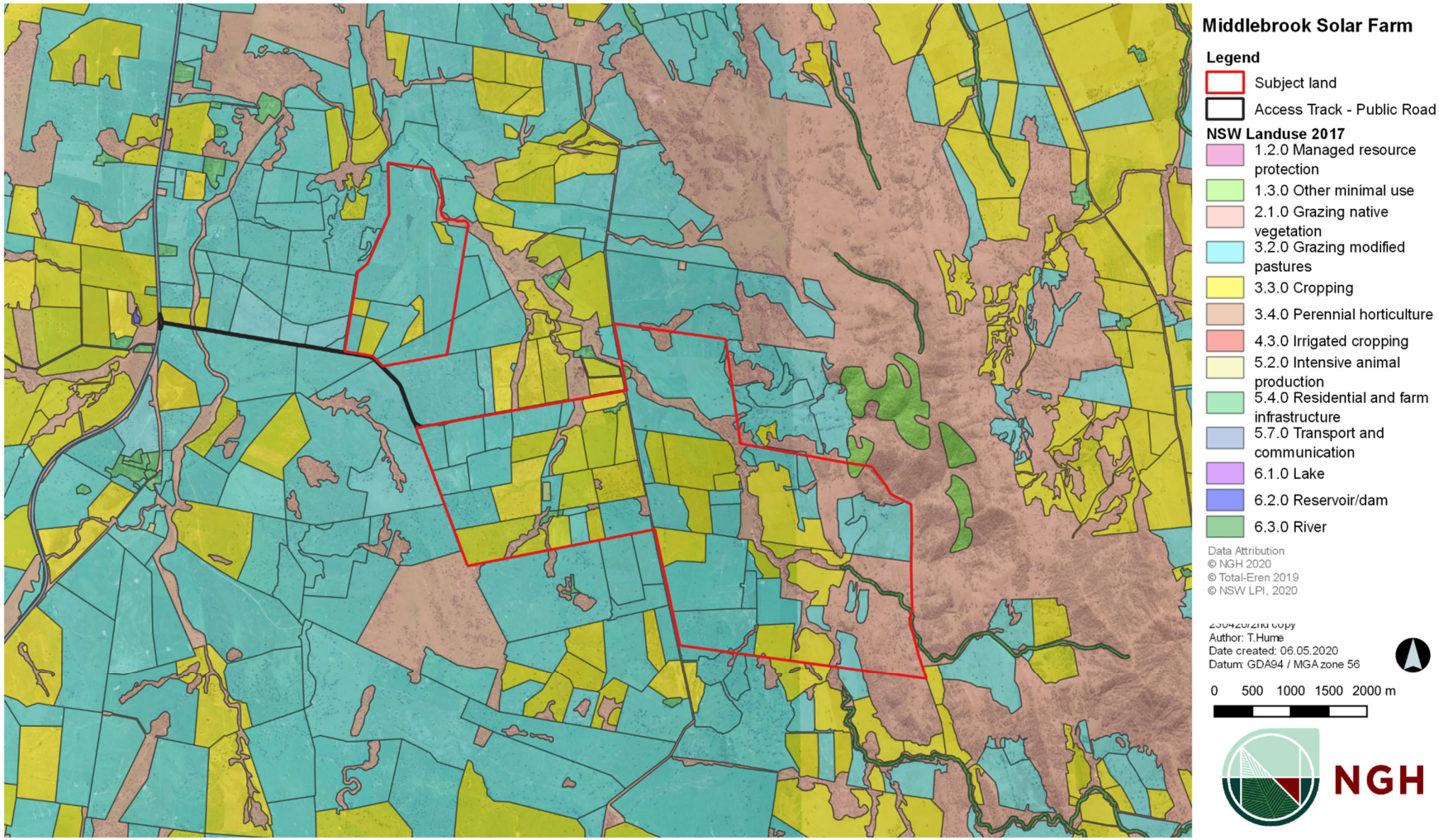

Figure 6-3 Land use within the subject land and surrounds

Constraints and need for further assessment

The proposal relies on pile driving being preferred to install array mounts, not concreting. This limits soil disturbance and makes the proposal reversible for future agricultural production. Excavation and footings are generally limited to discrete footings for inverters, switch station and office buildings. Building-in strategies to retain land use options post-decommissioning would be part of the assessment and mitigation process.

The impact on agricultural production and electricity assets in the locality and region would be assessed in detail in the EIS and Land Use Conflict Risk Assessment (LUCRA).

6.1.5 Soil and landforms

The subject land occurs on the Liverpool plains and contains alluvial soils. Four soil types occur across the subject land. Soil types are described in Table 6-4 and shown in Figure 6-5.

Table 6-4 Australian Soil Classification (ASC) relevant to the subject land.

Soil type	Characteristics
Vertosols **17%**	• Well – structured surface with a surface condition that is self-mulching, cracking, firm and sometimes crusting. • High shrink-swell properties. • Dispersive subsoils (unless formed on dolomite or limestone) • Potential for high salt levels in subsoils. • Often very fertile
Sodosols **1.5%**	• Generally have weak structure in the surface with a firm to hard setting surface condition. • Subsoils often dispersive and/or salty • Contain dense sodic, alkaline clay subsoils • Potential for high salt levels in subsoils. • Generally low to moderate fertility • Poorly to imperfectly drained.
Ferrosols **6.9%**	• moderate to high chemical fertility • moderate to high water holding capacity • Potential for acidification and nutrient leaching • Generally good drainage • Generally high fertility
Chromosols **74.4%**	• Generally have a weak structure in the surface with a firm to hard setting surface condition • Contain non sodic, slightly acidic to slightly alkaline subsoils • Generally non-dispersive • Potential for high salt levels and acidification • Generally low to moderate fertility • Poorly to imperfectly drained.

An area of 332.7 ha within the eastern portion of the subject land surrounding Spring Creek has been mapped as Biophysical Strategic Agricultural Land (BSAL), which is land identified to have high quality soil and water resources capable of sustaining high levels of productivity. Land within Spring Creek would not be

developed, while Total Eren is investigating the option to maintain grazing on other identified BSAL areas. The BSAL mapping is broadscale and further analysis (i.e. baseline soil surveys) would be required to confirm the presence and amount of BSAL land.

The subject land is mapped within the Land and Soil Capability Assessment Scheme state-wide mapping as having low (Class 6) to high (Class 3) capability land. The majority is moderate to low capability land. Class 3 is capable of sustaining high impact land uses such as cropping and cultivation with careful management to avoid land and environmental degradation. Class 3 is mapped within the area of BSAL within the subject land. Class 4, Class 5 and Class 6 have moderate to very high limitations for high impact uses and require specialised management practices to manage the limitations. If investigations enable grazing, it is anticipated that experienced farmers would oversee it throughout operation of the solar farm. Land use capability classes are shown in **Figure 6-6**.

A search of the NSW OEH Contaminated Sites Register (NSW Government, 2019a) on 12 February 2020 identified two sites within the Tamworth LGA, neither of which are in the vicinity of the subject land. The subject land does not appear on the List of NSW Contaminated Sites notified to the EPA (NSW Government, 2019b) as at 12 February 2020. It is noted that agricultural sites may contain buried rubbish including contaminants such as herbicides that may be encountered during excavation.

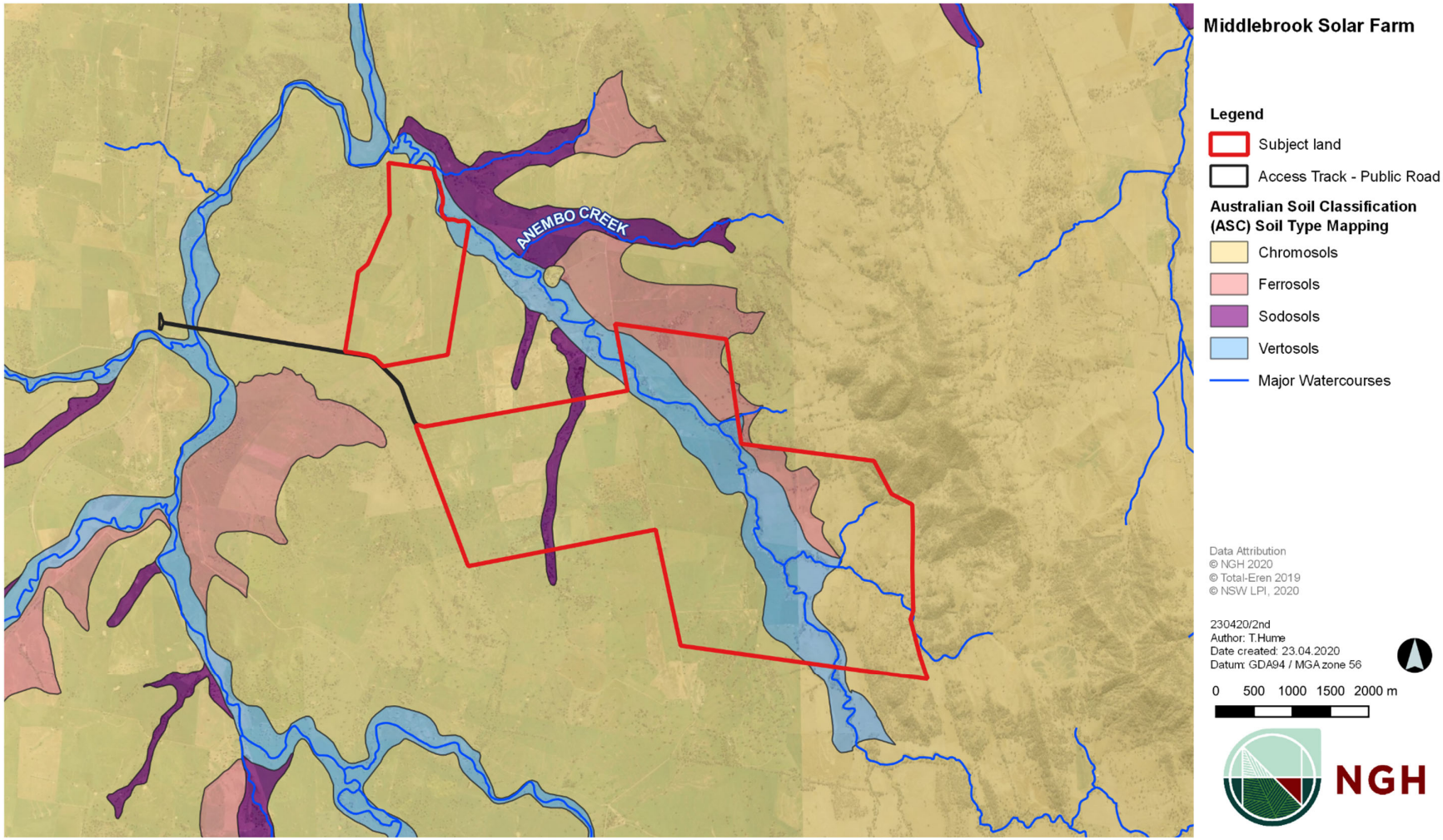

Figure 6-4 Australian Soil Classification (ASC) associated with the subject land.

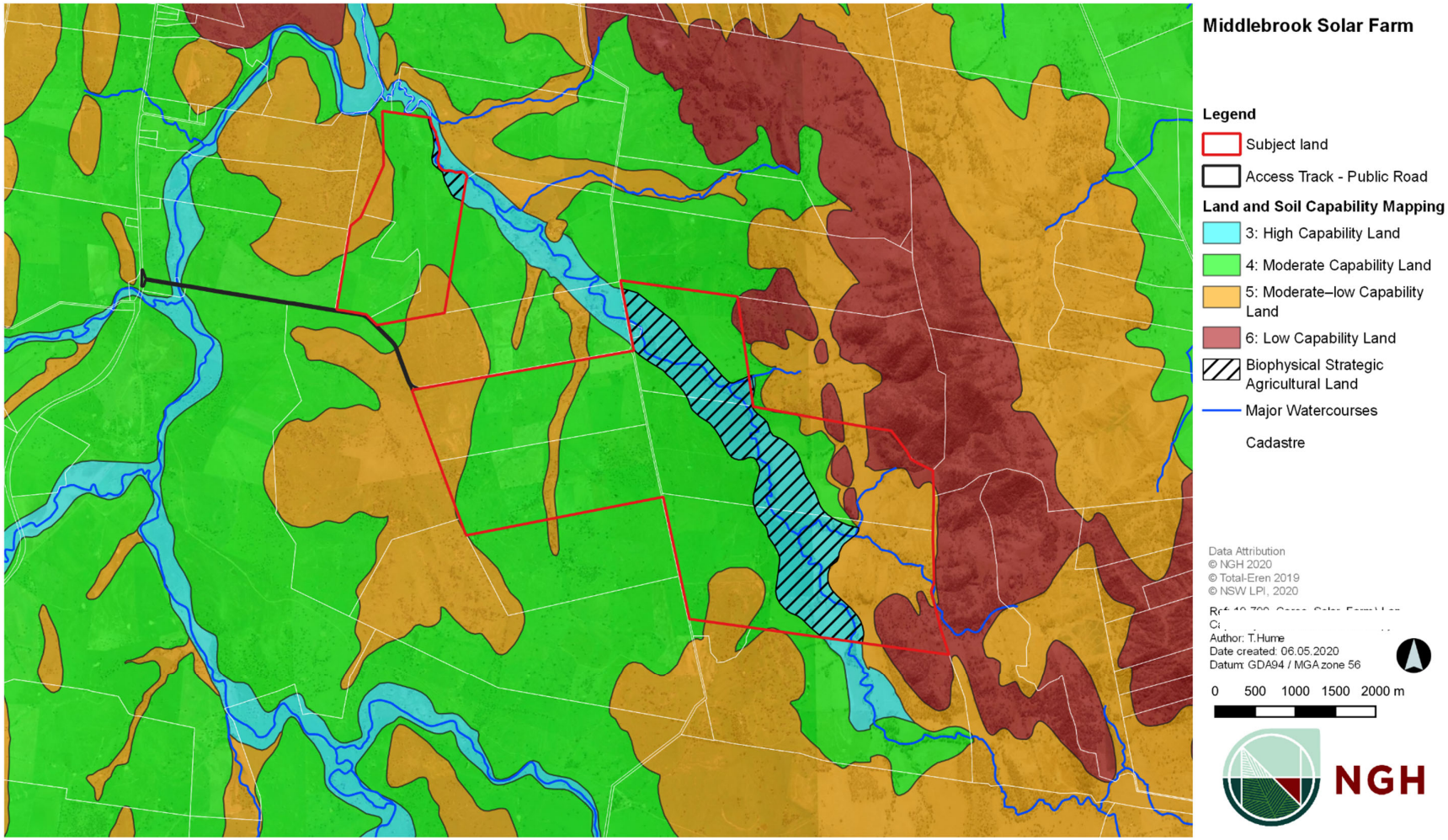

Figure 6-5 Land capability classes associated with the subject land.

Constraints and need for further assessment

Total Eren is currently investigating to enable grazing to be maintained under the solar panels. Only land under the sub-station and site buildings (typically less than 4-8 hectares) would be removed from potential agricultural use for the life of the project. The sub-station and site buildings are not proposed on BSAL land. Clear justification for the temporary loss of less than 4 hectares of moderate capability agricultural land for the regional economy would be required. The feasibility of rehabilitation to ensure the retention or improvement of soil capability would be required to be demonstrated.

Consideration of soil and erosion impacts, and proposed mitigation measures for the construction, operation and decommissioning of the solar farm would be included within the EIS.

Presence of substantiative contamination within the subject land is considered unlikely. As such, it is anticipated that a detailed investigation of contamination would not be required within the EIS.

Management of ground cover during operation and restoration of the land capability of the subject land would be recommended by EIS and is considered highly feasible. Rehabilitation would be with reference to base line soil testing to guide any remedial management actions that may affect maintaining groundcover during operation or rehabilitation disturbed areas during decommissioning.

6.1.6 Aboriginal Heritage

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) on 18 November 2019 identified two Aboriginal sites between -31.3586, 150.8792 and -31.2497, 151.0518 with a 1 km buffer of the site. The two identified sites are artefacts and are located 65 m west and 5 km north west of the subject land. There have been no items recorded to date within the subject land. No Aboriginal places were recorded in the search area.

Waterways can be important landscape features and indicate greater potential for significant sites. Two named watercourses and 32 unnamed tributaries traverse the subject land. With the exception of improving three existing water crossings, development is not proposed within any watercourses. Any cabling crossing named waterways would be installed to minimise any potential impact on watercourses.

Constraints and need for further assessment

No Aboriginal places or items have been recorded to date within the subject land. Risk in relation to Aboriginal heritage would need to be confirmed based on an onsite assessment. Consultation with registered stakeholders in an important part of the assessment process.

An Aboriginal Cultural Heritage Assessment (ACHA) Report and associated stakeholder consultation process would be completed as part of the EIS. This would include consultation with the Tamworth Local Aboriginal Land Council and Nungaroo Local Aboriginal Land Council should they elect to. Tamworth LALC has registered already. If any Aboriginal heritage sites are identified that may be potentially affected by the subject land, mitigation measures would be determined in accordance with the *Guide to Investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

6.1.7 Access and traffic

By road, the subject land is approximately 389 km north of Sydney via the Pacific Highway and the New England Highway, and 265 km north of Newcastle via the New England Highway. Both the Pacific Highway and the New England Highway are classified as state Highways (HW) within the TfNSW Road Classification hierarchy.

Construction and operational access would be off the New England Highway and Middlebrook Road that runs along the northern side of the subject land and continues to travel south through the centre of the site providing access from either side of the road. This intersection has been recently improved to add designated turning lanes. Middlebrook Road is unclassified within the Transport for New South Wales (TfNSW) Road Classification hierarchy and is a local council road. Middlebrook Road is an unsealed road that appears to be in good condition and is approximately 6 m to 8 m in width.

The access route along New England Highway and Middlebrook Road is mapped as an TfNSW approved Restricted Access Vehicle (RAV) route. It should be noted that travel conditions exist in relation to the use of Middlebrook Road by RAVs.

Heavy vehicles would be required for transportation of solar farm infrastructure. Construction staff would be accessing the site via light vehicles and shuttle buses. There are up to 400 staff expected to be working on the construction of the solar farm at peak construction periods and it is expected that shuttle buses would move the majority of staff members in the morning between 8am and 8:30am, and 5:30pm and 6:00pm at night. The proposed route from the New England Highway to the subject land is shown in Figure 7-1.

Constraints and need for further assessment

Middlebrook Road is a designated B double truck route, and large vehicles use it now. Intersection works and road upgrades have recently been completed. Some further work compliant with Council and TfNSW requirements may to be required for access to the site via New England Highway and Middlebrook Road. This has the potential to benefit local traffic.

A section of Middlebrook Road between the Highway and site access may need to be upgraded to service the increased volume of heavy vehicles used during construction. The road currently provides access to residences that reside on the subject land as well as neighbouring residences and farms. Project traffic would access land east of the powerline via internal roads, reducing effects on public roads.

Management of traffic for safety as well as road pavement conditions would be required.

The access options would be further investigated during the preparation of the EIS. Construction traffic impacts would be considered in the EIS and take into consideration existing traffic volumes and any requirements from roads authorities.

The mitigation measures would require a Traffic Management Plan including haulage routes be prepared.

6.1.8 Hydrology, groundwater and water quality

The Peel River is located approximately 16 km east of subject land. The Tamworth Regional LEP 2010 does not identify the subject land as flood prone. Thirty dams occur within the subject land: 15 within the eastern portion and 15 in the western portion of the subject land. Some, but not all contained water at the time of survey.

Three named watercourses traverse the site:

- Spring Creek categorised as 5th order under the Strahler Stream classification;
- Banyandah Creek (a tributary of Spring Creek) categorised as 3rd order under the Strahler Stream Classification; and
- Algona Creek (a tributary of Spring Creek) categorised as 4th order under the Strahler Stream Classification

A number of 1st, 2nd and 3rd order tributaries of Spring Creek and Banyandah Creek also traverse the subject land (32 in total). Spring Creek traverses the eastern portion of the subject land flowing in a south-east to north-west direction, and is a tributary of Goonoo Goonoo Creek, which feeds into the Peel River.

Dams and watercourses are shown in Figure 6-4.

During the site inspection undertaken on 6 November 2019, flowing water was not observed in any watercourses. Minor ponding was only observed in Spring Creek and Banyandah Creek, which have stable banks with moderate vegetation cover. The remaining tributaries are either areas of overland flow that would only contain water during storm events or have been modified to an extent that they do not appear in the landscape. The involved landowner does not recall any flooding events since 1979.

Watercourses and dams can currently be accessed by stock (sheep and cattle) and would receive runoff from surrounding cultivated land. Spring Creek and Bunyandah Creek has riparian vegetation in the form of treed woodland, providing important breeding and roosting habitat for hollow dependent species.

Twelve bores are located on the subject land. GW050163 is located on Spring Creek and is the only bore currently used to access water.

Where possible watercourse crossings would be avoided, however this would require further investigation and detailed design.

A coordinate search of the EPBC Protected Matters Search Tool (PMST) was undertaken on 15 November 2019 with a 10km buffer of the site. It returned three Wetlands of International Importance, the closest of which is approximately 1000km upstream.

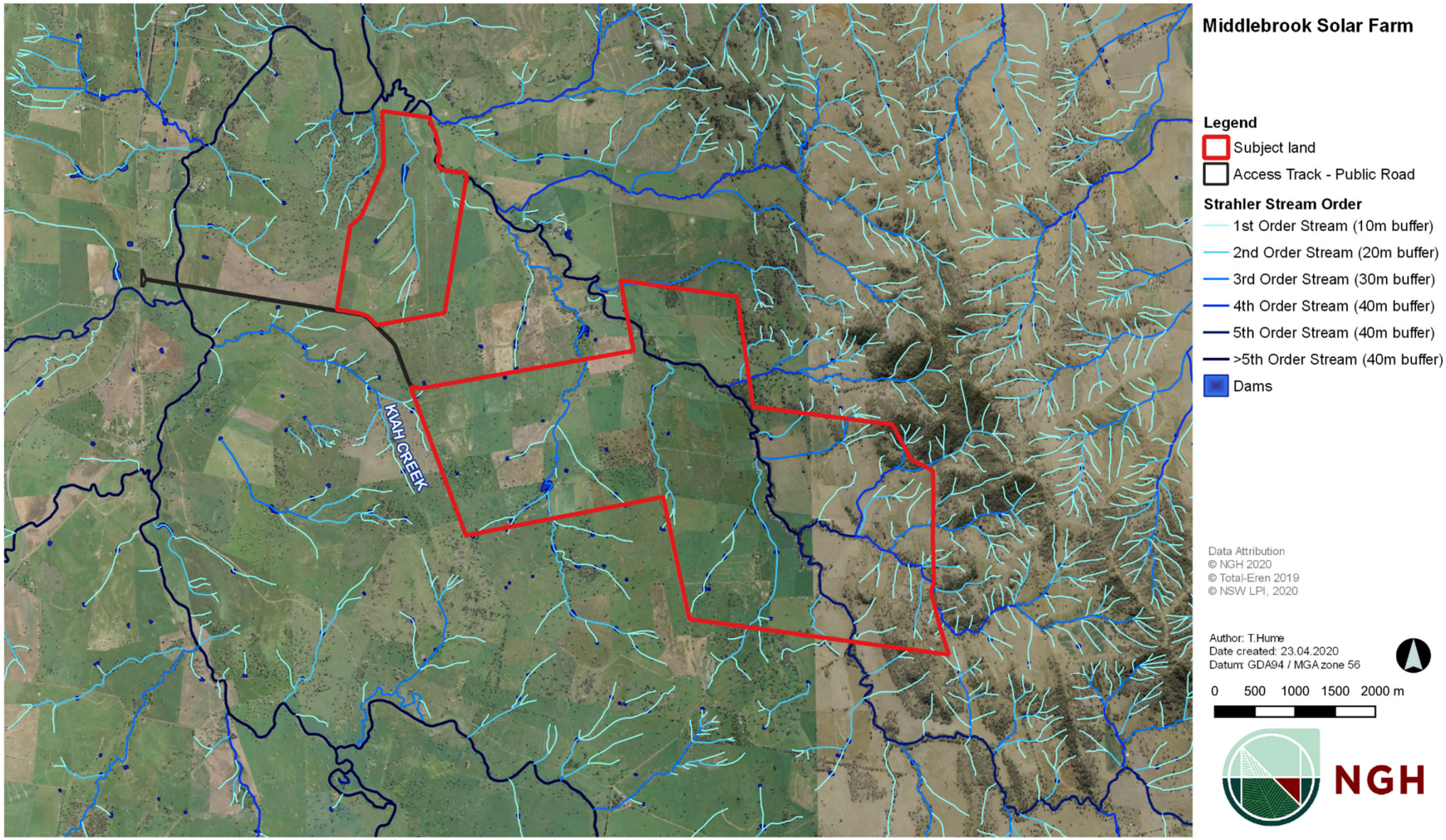

Figure 6-6 Dams and watercourses (including Strahler stream order) present on the subject land.

Constraints and need for further assessment

Under section 4.41 of the EP&A Act, SSD developments do not require a controlled activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000*. However, best practice measures are being used to inform site development in accordance with this Act. The WM Act defines waterfront land as the bed of any river, lake or estuary and any land within 10, 20, 30 and 40 metres of the riverbanks, lake shore or estuary mean high water mark, in accordance with best practice guidelines. In these areas, permanent infrastructure would be avoided or minimised, as informed by further hydrological studies. In overland flow areas, which do not meet the definition of waterfront land under the WM Act, permanent infrastructure may be considered.

Water quantities and sources required for construction and operation would be required to be detailed in the environmental assessment as part of the project description.

Confirmation of the hydraulic function and ecological value of the waterways would be undertaken as part of the EIS, including a specialist hydraulic and hydrological analysis to address potential flood risks. Best practice management is recommended with regard to impacts that cannot be avoided (i.e. vehicle crossings) for waterways that qualify as 'water front land' Those that are more accurately defined as ephemeral waterways or areas of overland flow with moderate constraint may have PV arrays constructed over provided that potential impacts have been determined and mitigation strategies prepared as part of the EIS.

The EIS would assess the impacts to waterways and include appropriate mitigation measures, such as buffering these areas for avoidance, where possible, and adherence to best practice guidelines (Guidelines for Controlled Activities on Waterfront Land; DPI 2012) where avoidance is not possible.

6.1.9 Social and economic impacts

The subject land is located within the Tamworth LGA which had a population of 59,663 people in 2016; a 6% increase since 2011 when the population was 56,292. The median age within the LGA in 2016 was 40 and the unemployment rate is 5.8%.

It should be noted that the Tamworth area has been in drought for most of the last three years, which has meant that the economic activity has been at lower level.

Economic benefits are expected to be generated by the construction, and to a lesser extent operation of the Middlebrook Solar Farm. Benefits would include local employment opportunities and stimulus to the local economy through use by construction staff of local accommodation and recreational facilities.

Access to the site may require road upgrades and intersection treatments. Interruptions associated with these works and during construction may be expected at New England Highway, where it meets Middlebrook Road. Traffic volumes during the construction of the solar farm would increase the volume of daily traffic along the New England Highway and Middlebrook Road. During operation of the solar farm, increases in traffic volumes are anticipated to be negligible.

Constraints and need for further assessment

The EIS would assess potential social and economic impacts of the proposal, including issues perceived by the community to be of concern and cumulative impacts of other proposed developments in the region. An investigation of ways to fairly spread the benefits of the solar farm in the local community would also be included within the EIS. Consultation to date is summarised in Section 4.3 of this report and would continue into the detailed investigation stage.

6.1.10 Non-Indigenous heritage

Non-indigenous heritage database searches were conducted on 24 April 2020 and included:

- A search of the NSW OEH Heritage Register (NSW Government, 2018a) identified nine items listed under the NSW Heritage Act and 547 items listed by local government and state agencies. The closest listed heritage item is located approximately 4 km west of the subject land within the adjoining Lot 64 DP 755343 and is identified in the Tamworth Regional LEP 2010 as an item of Environmental Heritage known as Goonoo Goonoo Homestead and Associated Outbuildings (Goonoo Goonoo Station). Goonoo Goonoo Homestead has no view of the potential solar farm sites under investigation and would not share access roads with construction traffic. Goonoo Goonoo Homestead has its own access off the New England Highway, separate to Middlebrook Rd.
- A search of the Australian Heritage Database (Australian Government, 2018) located 56 items of significance, none of which are located on or within 2 km of the site.
- A coordinate search of the EPBC PMST was undertaken with a 10 km buffer of the site. The search indicates that there are no World Heritage or National Heritage areas or items within the site. Additionally, no areas of Commonwealth land or heritage places were identified.

Constraints and need for further assessment

No impacts are considered likely for listed heritage items. Unlisted items are not anticipated to occur within the subject land. Consideration of potential visual, dust and vibration impacts on items near to the haulage route should be investigated in more detail as part of the EIS. The potential to impact non-listed heritage items would also be investigated by site inspection; old land holdings can contain buildings or structures of significance. Protections for such features would be commitments of the EIS, as required.

6.2 OTHER ENVIRONMENTAL ISSUES

Issue	Existing environment	Potential impacts	Constraints and need for further assessment
Hazards and risks – Bushfire and battery energy storage system.	The subject land has been mostly cleared for agricultural purposes. A small area of the subject land located east of Spring Creek is mapped as bushfire prone. Treed ridges to the east of the subject land are also mapped as bushfire prone. A large area of the north western portion of the subject land is mapped as bushfire prone land. The sub-station and energy storage system site would be located after considering bush-fire risks.	**Bushfire** Emergency response protocols would be required in the event of a bushfire. **Battery storage** Incorrect battery storage can elevate fire ignition risks. Storage, transport and handling must be considered.	**Bushfire** Solar farms require fire-fighting equipment, plans and training. The potential to increase and even decrease the risk of bushfire through improved fire-fighting facilities would be assessed in the EIS. Emergency protocols would reflect advice from relevant agencies. **Battery Storage** The energy storage system would be installed close to the powerlines on the west of the site. This is not bushfire prone land. A preliminary risk screening in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011)* would be undertaken. Should the preliminary risk screening determine the development as 'potentially hazardous', a Preliminary Hazard Analysis (PHA) would be undertaken in accordance

Issue	Existing environment	Potential impacts	Constraints and need for further assessment
			with *Hazard Industry Planning Advisory Paper No.6 – Guidelines for Hazardous Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).*
Hazards and risks – Electric and magnetic fields (EMF)	EMFs are produced within the vicinity of existing 330kV powerlines. Additional infrastructure proposed within the subject land such as inverters, connecting powerlines and the sub-station would produce additional EMF within their vicinity.	The EMF levels associated with solar infrastructure are well below the guideline for public exposure and would not be expected to have any adverse impact on human health. There can, however, be perceived impacts for nearby residents.	The EMF levels of the proposal infrastructure would be assessed as part of the EIS. Standard design provisions are expected to ensure any effects comply with relevant guidelines together with communication of the issue as required.
Hazards and risks – glint and glare	The closest airstrip to the subject land is approximately 2.2 km west, and the closest airport is the Tamworth Regional Airport. It is located approximately 26 km north west of the subject land. Tamworth Airport has a large solar system on its roof next to the runway.	PV panels are designed to capture not reflect light. It is understood that concerns relating to glare have been raised for other solar proposals as an issue of interest to neighbours. This is a perceived issue but requires consideration. Other infrastructure, such as sheds and panel mounts have greater potential for glare and generating reflections.	Glare and reflections from solar farm infrastructure would be investigated. It is noted that solar panels are designed to absorb as much sunlight as possible. As such, they reflect a very low percentage of light and are generally not considered likely to result in glare or reflections that would adversely impact traffic or nearby receivers
Cumulative impacts	Cumulative impacts refer to the combined effect of impacts from several activities on a particular value or receiver. They may occur concurrently or sequentially.	Specific details in relation to the timing of proposed construction of the Tamworth Solar Farm and Hills of Gold Wind Farm are not available within the documentation	Potential cumulative impacts would be assessed within the EIS. The timing of works associated with the proposed developments would be

Issue	Existing environment	Potential impacts	Constraints and need for further assessment
	The relevant cumulative impacts are those associated with other known or foreseeable developments occurring in proximity to the proposal. Major projects listed on the Major Projects Register within the Tamworth region (and their current status) are: • Tamworth Hospital -Cancer Centre (determined, 2013) • Tamworth Hospital Redevelopment (determined, 2013) • Tamworth Solar Farm (prepare EIS, June 2019) • Hills of Gold Wind Farm (Prepare EIS, November 2018)	available on the Major Projects website. As such, a worst-case assumption that construction of the developments could occur at the same time as the proposed Middlebrook Solar Farm has been made. Potential cumulative impacts of overlapping construction periods are primarily associated with traffic impacts, pressures on local facilities, goods and services and vegetation clearing.	monitored throughout the EIS stage to ensure appropriate mitigation measures are implemented, particularly in relation to construction traffic on New England Highway and pressure on local services and facilities within Tamworth.

7. CONSTRAINTS ASSESSMENT

7.1. METHODOLOGY

Preliminary constraints advice has been informed by a desktop review and confirmed by site inspection (Senior ecologist, November 2019). The inspection allowed for full traverses of the site and addition vehicle-based surveys. They are considered sufficient to provide preliminary constraints advice to inform development of the concept design and investigation strategies.

Low, moderate and high environmental constraints on site development are defined in **Table 7-1**. Where uncertainty exists, a higher constraint rating has been applied. Further investigation may reduce the constraint level. Mapping of the identified environmental constraints across all involved landowner's sites are provided in **Figure 7-2**. It should be noted that **Figure 7-2** shows the maximum area under investigation. The development footprint would be proposed in an EIS after further investigations are made and feedback is received.

Table 7-1 Environmental constraints

Constraint	Definition
Low	Minimal impacts anticipated. Most suitable for development. Standard management protocols would be sufficient to manage any impacts.
Moderate	Impacts should be minimised, where possible. These areas may require specific management protocols and may add some cost and time to the assessment and approval process.
High	Priority for further investigation. These areas may be difficult, expensive or may not be possible to obtain approval to develop. They may require costly additional surveys to understand and manage or offset impacts.

7.2. RESULTS

7.2.1. Low environmental constraints

Minimal impacts are anticipated within low constraint areas. These areas are the most suitable for development as they do not contain sensitive features such as waterways, high risk soils, receivers and high ecological values.

Biodiversity credits are unlikely to be generated within these areas or may have very low biodiversity credit requirements if they do. Low environmental constraint areas include:

- **Water:** Ephemeral waterways/overland flow areas with little if any hydraulic function
- **Vegetation:** Non-TEC PCTs in low or poor condition, containing few habitat resources and Cultivated and Non-native vegetation (exotic vegetation).

7.2.2. Moderate environmental constraints

Impacts should be minimised where possible in areas categorised as having moderate environmental constraints. These areas include:

- **Potential residences** in close proximity (within 1 km – 2 km) of the subject land, who could be affected visually and by traffic noise, vibration and dust during construction and operation.
- **Biophysical Strategic Agricultural Land (BSAL)** is mapped over a portion of the subject land. Soil testing is a likely requirement to confirm this base line condition. Investigations for grazing under panels are being made to enable agricultural land to remain in production during the project. Piling for solar arrays allows full restoration of the land capability afterwards. Sub-stations, buildings and energy storage system are not proposed for BSAL areas. Consideration to maximising the reversibility of the proposal is required (i.e. location and depth of cabling, location of any concrete footings).
- **Native vegetation** comprised of moderately degraded native vegetation (Zone 3 and 9) and planted vegetation (Zone 12). These are likely to require offsets and further investigation for biodiversity impacts.

7.2.3. High environmental constraints

Areas of high environmental constraints may be difficult or expensive or may preclude development. These areas include:

- **Biodiversity:** Intact treed native vegetation with exotic cultivated groundcover, predominantly native groundcover and riparian woodland (Zone 4, 5, 6, 10 and 11). These areas may also provide threatened species habitat and require targeted surveys, impact assessment and would generally require strong justification for impacts and offsets under the NSW BAM. Higher value vegetation would generate greater offset requirements. Works are planned for largely cleared paddocks, in preference to woodland areas and remnants.
- **Water**: Works in or that significantly affect waterways may require additional assessment, justification and management. Permits may apply for works in waterways and construction practices would be subject to best practice methodologies and rehabilitation requirements. Works that may affect local hydrology are likely to require specialist input from a hydrologist. This may include modelling to assess impacts in relation to placement of infrastructure in order to protect hydrological function of waterways and protect soils from erosion. No major works are planned in waterways, and DPIE assumes permit responsibility from NRAR for any waterway works in state significant developments. Best practice guidelines would be followed in these areas.
- **Potential residences** in close proximity (within 0 km - 1 km) of the subject land, who could be affected visually before screening, by traffic noise and vibration, and dust during construction and operation. These constraints may be overcome through agreement or mitigation.
- **Aboriginal heritage**: While none have been found so far, areas near water bodies, such as the Spring Creek and Banyandah Creek have higher potential for Aboriginal heritage sites of significance. This must be confirmed by onsite surveys. Any Aboriginal heritage sites/items/etc. identified would be a moderate to high constraint and impacts on sites would require approval. Mitigation strategies can range from avoidance, to salvage programs to more intensive survey including test pits. These add to the expense of the assessment and mitigation but are unlikely to preclude significant areas of the site from development.

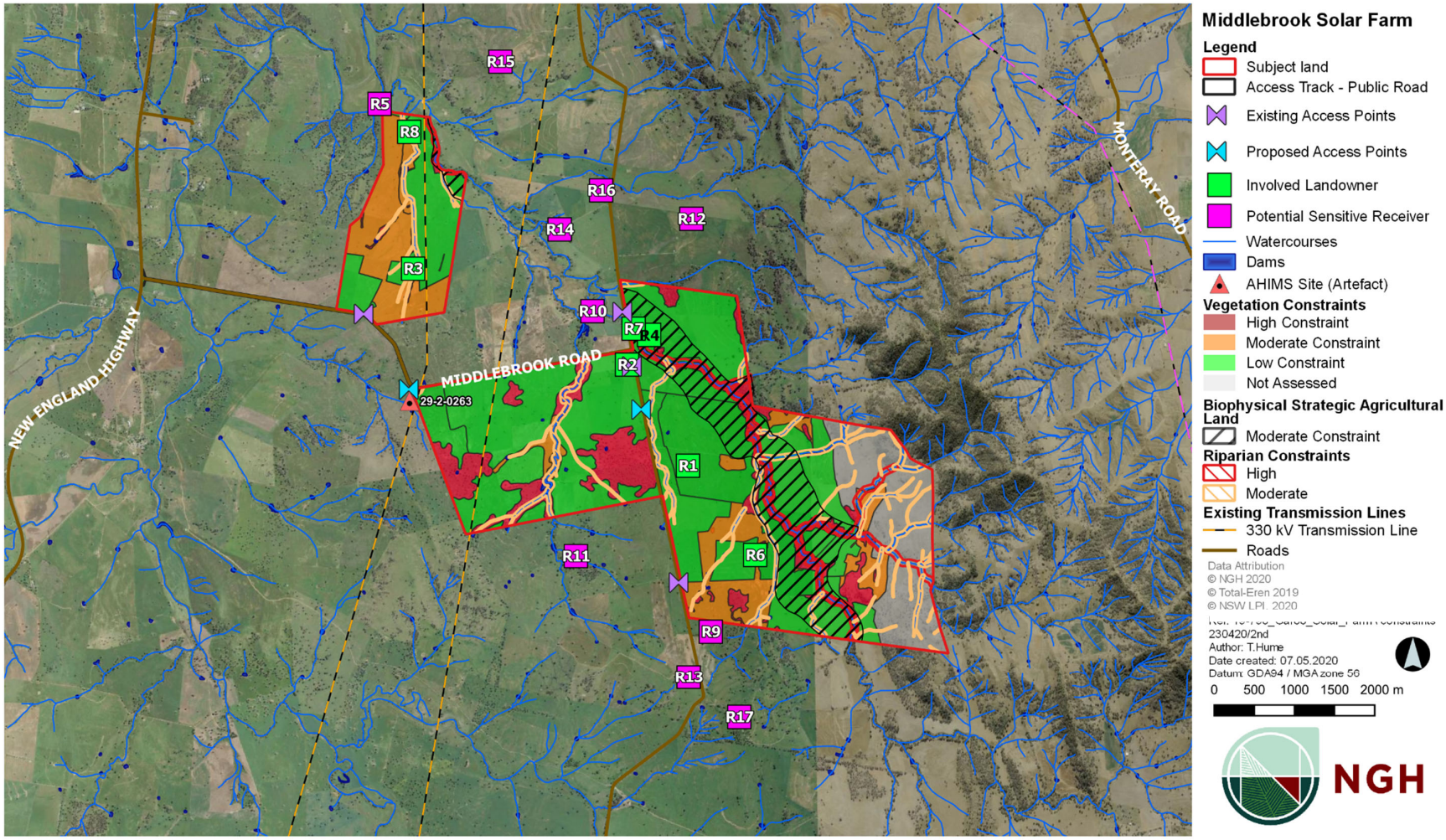

Figure 7-1 Initially identified potential constraints in the areas under investigation for Middlebrook Solar Farm scoping report

8. CONCLUSION AND RECOMMENDATIONS

The Middlebrook Solar Farm site is considered to be a good location for a solar farm. The proposal deserves detailed investigation due to its potential to create local jobs and investment while also cutting carbon emissions. The location lends itself to a solar farm as the site is on largely cleared land and is under two high capacity transmission lines. TransGrid has noted their importance by planning to upgrade these lines in the Queensland - New South Wales Interconnector (QNI) project as its highest priority[5]. The transmission lines connect to a coal fired power station that starts to power down in 2022[6]. The proposed Middlebrook Solar Farm would help replace the capacity and result in substantial carbon emission reduction.

The Middlebrook Solar Farm proposal is currently in the early investigation and planning phase to maximise potential, minimise constraints and mitigate and manage potential impacts. This report has outlined and established the planning and general environmental context of the proposal. If it proceeds, the proposal would be assessed under Part 4 of the EP&A Act and classed as State Significant Development under *State Environmental Planning Policy (State and Regional Development) 2011*.

The Scoping Report has categorised the potential environmental impacts of the proposal as key issues or other issues. Based on this Scoping Report, an indicative scope for the EIS has been developed, focusing on the key issues:

- Biodiversity
- Visual amenity
- Noise and vibration
- Land use compatibility and effects on agricultural land
- Soils and landforms
- Aboriginal heritage
- Access and traffic
- Watercourses and hydrology
- Social and economic impacts
- Non-indigenous heritage

Secondary issues would also be investigated, commensurate with risk, through desktop investigation.

The EIS would be prepared in accordance with the proposal-specific SEARs. Mitigation measures would be developed for inclusion in the EIS and would address the management of key issues and other issues identified in the assessment and community and stakeholder engagement process.

[5] Transgrid, October 2019, available at https://www.transgrid.com.au/news-views/news/2019/Pages/governments-support-for-QNI-upgrade.aspx
[6] ABC News, August 2019, available at https://www.abc.net.au/news/2019-08-02/agl-delays-defers-power-plant-closures-to-avoid-summer-blackouts/11377876

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APPENDIX A SITE PHOTOGRAPHS

Middlebrook Road

Spring Creek

Bunyundah Creek

North east portion of subject land

North west portion of site

North west portion of site