



PRELIMINARY ENVIRONMENTAL ASSESSMENT

TILBUSTER SOLAR FARM



SEPTEMBER 2018



Document Verification



Project Title:

TILBUSTER SOLAR FARM

Project Number: 18-300

Project File Name: 18-300 Tilbuster PEA final v1.1_JB

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Draft V1	20/07/18	Vitaly Kolin	Brooke Marshall	Brooke Marshall
Final V1	02/08/18	Vitaly Kolin	Brooke Marshall	Brooke Marshall
Final V1.2	11/09/18	Vitaly Kolin	Brooke Marshall	Brooke Marshall
Final V1.2	24/09/18	Louiza Romane	Minor changes	Minor changes

NGH Environmental prints all documents on environmentally sustainable paper including paper made from bagasse (a by-product of sugar production) or recycled paper.

NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622)

www.nghenvironmental.com.au

engh@nghenvironmental.com.au

Sydney Region
18/21 mary st
surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
8/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053)

Brisbane
suite 4, level 5, 87 wickham terrace
spring hill qld 4000 (t 07 3129 7633)

Newcastle - Hunter and North Coast
7/11 union st
newcastle west nsw 2302 (t 02 4929 2301)

Wagga Wagga - Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Bega - ACT and South East NSW
suite 1, 216 carp st (po box 470)
bega nsw 2550 (t 02 6492 8333)

CONTENTS

1	INTRODUCTION	1
1.1	PURPOSE OF THIS DOCUMENT	1
1.2	THE PROPONENT	1
2	SITE DESCRIPTION	1
2.1	SITE CONTEXT	1
2.2	THE SITE	2
3	THE PROPOSAL	5
3.1	PROPOSAL DESCRIPTION	5
4	PROPOSAL JUSTIFICATION AND ALTERNATIVES	6
4.1	PROPOSAL JUSTIFICATION	6
5	CONSULTATION	7
5.1	CONSULTATION TO DATE	7
6	PLANNING CONTEXT	8
6.1	KEY NSW LEGISLATIVE INSTRUMENTS	8
6.1.1	Environmental Planning and Assessment Act 1979	8
6.1.2	State Environmental Planning Policy (State and Regional Development) 2011	8
6.1.3	State Environmental Planning Policy (Infrastructure) 2007	8
6.1.4	Roads Act 1993	8
6.1.5	Biodiversity Conservation Act 2016	9
6.1.6	Heritage Act 1977	9
6.2	LOCAL INSTRUMENTS	9
6.2.1	Armidale Dumaresq Local Environmental Plan 2012 (Tilbuster)	9
6.3	COMMONWEALTH LEGISLATION	10
6.3.1	Environment Protection and Biodiversity Conservation Act 1999	10
7	PRELIMINARY ENVIRONMENTAL ASSESSMENT	11
7.1	ASSESSMENT OF KEY ISSUES	11
7.1.1	Watercourses and hydrology	11
7.1.2	Biodiversity	12
7.1.3	Aboriginal heritage	19
7.1.4	Non-indigenous heritage	19
7.1.5	Community impacts, social and economic impact	20
7.1.6	Visual amenity and landscape character	20

7.1.7	Noise	23
7.1.8	Land use	23
7.1.9	Soils	24
7.2	OTHER ENVIRONMENTAL ISSUES.....	25
8	PRELIMINARY CONSTRAINTS ASSESSMENT	26
8.1	METHODOLOGY.....	26
8.2	RESULTS.....	26
8.2.1	Low environmental constraints	26
8.2.2	Moderate environmental constraints	27
8.2.3	High environmental constraints.....	27
9	CONCLUSION	30
10	REFERENCES.....	31
APPENDIX A	PHOTOGRAPHS OF THE SITE.....	A-I
APPENDIX B	CONSULTATION STRATEGY	B-I
APPENDIX C	NEWSLETTER 1. AUGUST 2018	C-I

TABLES

Table 4-1	Site selection criteria: preferable site conditions.....	6
Table 4-2	Site selection criteria: Areas of constraint.	7
Table 5-1	Consultation to date (all of which will be ongoing).....	7
Table 7-1	Summary of vegetation and habitat across the proposal site	15

FIGURES

Figure 2-1	Proposal location (and proximity to nearest towns).	3
Figure 2-2	Subject land affected by the proposal.	4
Figure 7-1	Preliminary mapping of Plant Community Types (PCTs).	18
Figure 7-2	Mapping of involved and non-involved sensitive receivers within 2km of the proposal site.	22
Figure 8-1	Preliminary constraints map of Tilbuster solar farm proposal area.	29

ACRONYMS AND ABBREVIATIONS

ABS	Australian Bureau of Statistics
AHIMS	Aboriginal heritage information management system
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
Cwth	Commonwealth
DP&E	Department of Planning and Environment (NSW)
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Fields
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPA	Environment Protection Authority (NSW)
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwth)</i>
Ha	hectares
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ISEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
Km	kilometres
kV	kilovolts
LEP	Local Environment Plan
LGA	Local Government Area
M	Metres
MNES	Matters of National environmental significance under the EPBC Act (c.f.)
MW	Megawatt
NSW	New South Wales
OEH	Office of Environment and Heritage (NSW)
PCT	Plant Community Type
PEA	Preliminary Environmental Assessment
PV	Photovoltaic
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy (NSW)

1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This Preliminary Environmental Assessment (PEA) provides a description of the Tilbuster Solar Farm proposal, including the site and its surroundings, the statutory framework for approval and identification of key potential environmental issues that may be associated with the solar farm proposal. The report has been prepared to support a request to the Department of Planning and Environment (DP&E) for the Secretary's Environmental Assessment Requirements (SEARs) which would guide the preparation of an Environmental Impact Statement (EIS) for the proposal, under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 THE PROPONENT

Enerparc develop, engineer, build and operate utility-scale photovoltaic (PV) systems. Enerparc was founded in 2008 in Germany to design, build, and operate large PV systems in Europe. Since then, the group has installed more than 2,200 megawatts of solar power in 20 countries. They are one of the top global solar developers, with over 2,200 megawatts connected to electrical grids worldwide.

As a one-stop-shop independent power producer, they maintain mutually beneficial relationships with developers, financiers, equipment manufacturers, and contractors to bring best-in-class solar assets online. Enerparc have more than 300 systems in their portfolio with an installed capacity of 1,200 megawatts and growing.

Enerparc's primary focus is on distributed utility-scale projects from 5 to 300 megawatts with in part contracted offtake. They are actively exploring energy storage and other technological innovations to further lower the costs of solar energy while increasing its capacity factor and ability to provide ancillary grid services.

2 SITE DESCRIPTION

2.1 SITE CONTEXT

The Tilbuster solar farm proposal site is located on the western side of the New England Highway, approximately 6km north-west of the Tilbuster township; Tilbuster has a population of 62 people, a workforce of 29 people. It is comprised of large agricultural land holdings, including sparsely distributed dwellings. Agriculture and education are the primary employment industries in Tilbuster (ABS, 2016). The proposal site is located within the Armidale Regional Local Government Area (LGA).

Armidale is approximately 13km south east from the proposal area and is the closest regional centre. The population of Armidale is 23,352 (ABS, 2016) and it is the administrative centre for the northern tablelands region. The discovery of gold in the mid-19th century led to the towns establishment and rich history. Town facilities include a university, TAFE, schools, hospitals, airport and it is well known for its cathedral and heritage buildings. The primary employment industries in Armidale are education and healthcare. The surrounding land is primarily used for large lot agricultural enterprises (ABS, 2016).

The Armidale Regional LGA is located in northern New South Wales at an altitude >1000m. The region brings approximately 750,000 visitors annually to experience various events and natural attractions; areas of wilderness and wild rivers, granite boulder formations and waterfalls within world heritage listed national parks. The area holds significant Aboriginal heritage, including a rock art sites.

2.2 THE SITE

The proposed Tilbuster Solar Farm would be located on an agricultural property of approximately 150 ha. The relevant lots include Lot 1 of DP 225170, Lot 1 of DP 585523, Lot 3 of DP800611 and Lot 4 of DP800611 Figure 2-2. The current access to the proposal site is via an unnamed, unsealed road (Appendix C). It is located adjacent to the New England Highway; approximately 12km north of the intersection between the Puddledock Road, which joins Tilbuster to the New England Highway Figure 2-2.

Under the *Armidale Dumaresq Local Environmental Plan 2012*, the proposed solar farm is located on land zoned as RU1 Primary Production. Much of the proposal site has been extensively cleared of woody vegetation and has been highly modified by farming practices however, small fragmented areas of woodland still occur.

The main waterway (Duval Creek) traverses the eastern portion of the proposed site. During a site visit conducted on 20/6/2018 and 22/6/2018, no flowing water, but small isolated pools of varying depths, were observed in the creek. Nineteen constructed dams can be observed based from aerial imagery.

Several unsealed, unnamed and gated roads occur adjacent to the proposal site; they are used to service the involved landowners' properties.

Two existing transmission lines transect the proposal site; a 132kV eastern line and a 330kV central line. Both lines are currently being considered for the connection for the proposed solar farm. Both the eastern and central line run south east to north west through the proposal site.

The proposal locality, subject land showing affected lot boundaries are shown in Figure 2-1 and Figure 2-2. Photographs of the proposal area are provided in Appendix A.

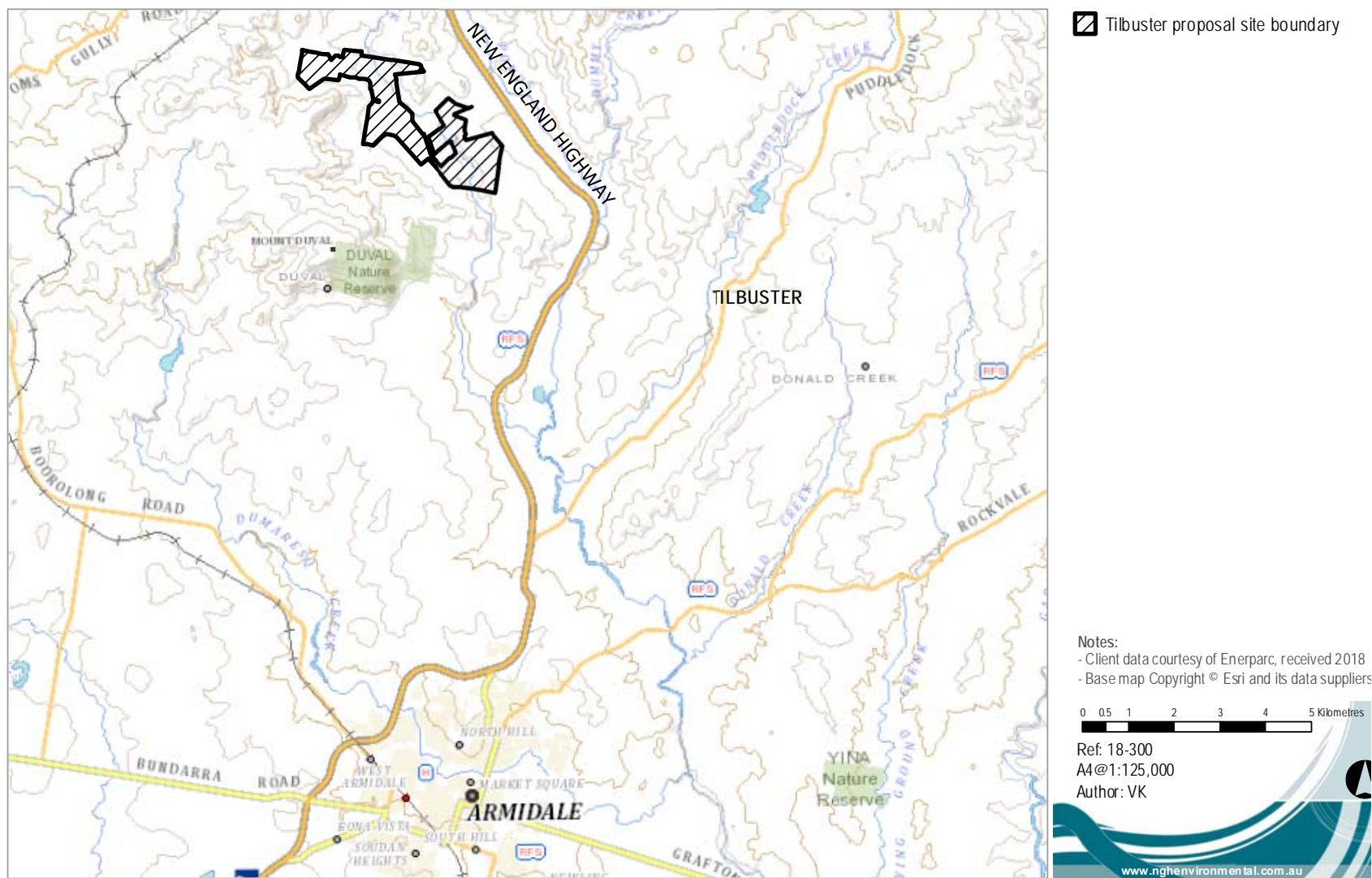


Figure 2-1 Proposal location (and proximity to nearest towns).

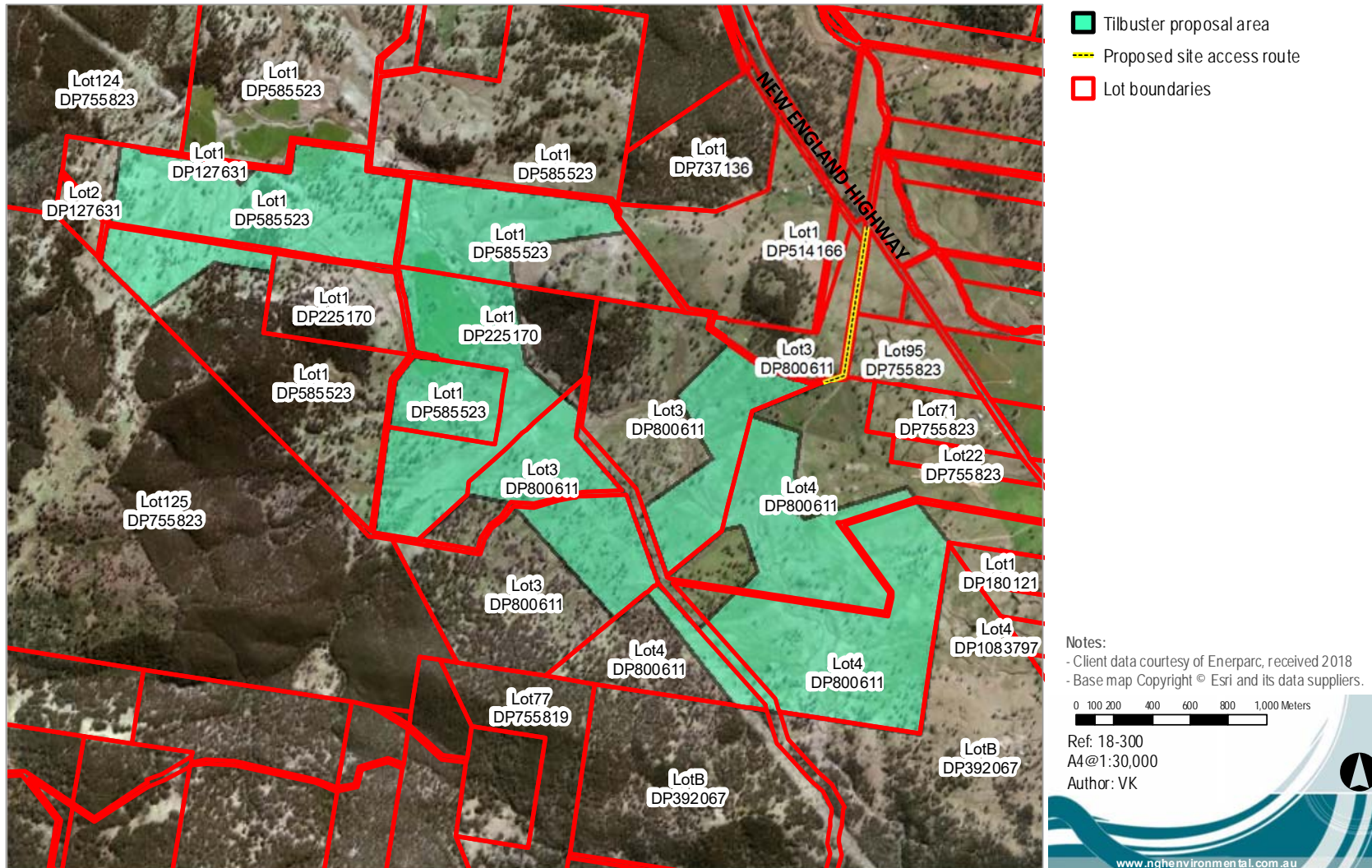


Figure 2-2 Subject land affected by the proposal.

3 THE PROPOSAL

3.1 PROPOSAL DESCRIPTION

It is anticipated that the proposed solar farm would include development of the following infrastructure:

- Construction facilities including laydown and parking areas.
- PV modules and inverter stations.
- Single axis tracker or fixed mounting systems on steel frames.
- An energy storage facility (NOTE 1).
- Site office and maintenance building including monitoring container.
- Internal access tracks.
- Transformers and substation, including ancillary equipment.
- Security fence and cameras.
- Electrical cabling including overhead lines and underground electrical conduits to connect the PV arrays onsite to the newly built substation.
- Access road upgrades.
- Construction of creek crossings where required.
- Visual screening, if required, for specific receivers.
- Subdivision (NOTE 2).

NOTE 1:

It is proposed that energy storage will occur on-site. Storage requirements will be 40Mw/h or less, battery technology is yet to be determined and subject to change based on detail design. Lithium-ion technology is considered the most likely. The proposed battery storage area is located at the centre of the solar farm proposal site and will occupy an area of 0.76 ha.

NOTE 2:

As the project life will exceed 25 years, multiple subdivisions are expected to be included as part of the project development, including:

- Subdivision of land for the location of assets which will become the property of TransGrid (switching station).
- Subdivision of land for the ongoing operation of residual agricultural areas and residential dwellings.

The lot boundaries have not yet been identified but will be investigated as part of ongoing assessment and consultation.

The capacity of the solar farm would be up to 300 MW. The capital investment value of the project is expected to be approximately \$300 million and is unlikely to exceed \$350 million.

4 PROPOSAL JUSTIFICATION AND ALTERNATIVES

4.1 PROPOSAL JUSTIFICATION

The growing recognition for the need to mitigate the adverse environmental effects associated with traditional methods of energy generation has supported the development of clean and sustainable energy projects globally. In particular, the NSW Government has recognized its excellent renewable energy resource potential and supports the national target in achieving 20% renewable energy by 2020 through the actioning of the NSW Renewable Energy Action Plan.

The proposed Tilbuster solar farm would add to secure, affordable and clean energy generation for the state of NSW whilst also contributing to the national Renewable Energy Target (RET) of 33,000 gigawatt hours by 2020. The New England region is considered an excellent province for solar energy generation due to its solar irradiance capabilities. Furthermore, the Australian Renewable Energy Agency (ARENA) and NSW Government have recently appointed funding to TransGrid - the proprietors of the high voltage electricity transmission network in NSW - in order to explore the possibility of developing a Renewable Energy Hub in the New England region to optimise the transmission network for renewable energy sources.

The Tilbuster proposal area features flat and unobstructed land which is considered highly suitable for the purpose of high-output solar energy generation. It has access to two existing transmission lines that transect the site and does not appear highly constrained by environmental factors.

The Draft Large Scale Solar Energy Guideline for State Significant Development (SSD) provides recommendations regarding selection of suitable solar farm sites and areas of constraint that should be identified. These are addressed in Table 4-1 and 4-2 for the site.

Table 4-1 Site selection criteria: preferable site conditions.

Preferable site condition	Site observation
Optimal solar resources	Good solar irradiance observed.
Suitable Land	Low relief land, close to major transport corridor and grid connection.
Local impacts minimised	Limited residents located within 2km of the site boundary, good topographic and vegetative screening around the proposal site.
Capacity to rehabilitate	Minimal site disturbance proposed, if using pile driven array mounts. Minimal long term impacts expected on agricultural capability (the existing land use).
Community support	Minimal visual impact and continuity in grazing use of the land should encourage community support.
Proximity to electrical network	Two existing Transgrid transmission lines transect the proposal area.
Connection capacity	Connection enquiry for 300 MW has confirmed capacity in the transmission network.

Table 4-2 Site selection criteria: Areas of constraint.

Areas of constraint	Site observation
Native vegetation	Much of the site is cleared of overstorey vegetation and has been subject to extensive past modification for agricultural use. Most vegetation is not considered of high conservation value.
Potential residences	Few residential receivers
Waterways	Several waterways cross the site. These require further investigation.
Aboriginal/Heritage significance	None recorded onsite to date; requires further investigation.
Important agricultural land	Very small proportion of the site mapped as Biophysical Strategic Agricultural Land (BSAL).
Residential zones	No residential zones would be impacted by the proposal
Resource developments	No current mineral leases (note: an application has however recently been lodged by Australian Precious Metals Corporation PTY LTD 10/07/2018, seeking approval for Group 1 mineral exploration lease).

5 CONSULTATION

5.1 CONSULTATION TO DATE

Consultation has so far been undertaken with Council, Trans Grid, near neighbours and the local community. This has included face to face consultation with the immediately adjacent landowner and potentially visually impacted resident as well as the distribution of 15 newsletters addressed to neighbouring residents within 2km (feedback form and paid return envelope included; refer to Appendix C). Key issues raised to date during consultation activities are identified below.

Table 5-1 Consultation to date (all of which will be ongoing)

Key stakeholder	Date	Key issues raised
Armidale Regional Council	27/6/18	<ul style="list-style-type: none"> Visual impact of the proposed solar farm . Potential for upgrades to access roads / intersections. Transfer of ownership of Crown roads. Cultural heritage assessment. Potential for continued utilisation of grazing land after completion of solar farm construction.
Trans Grid	18/05/18	<ul style="list-style-type: none"> Connection process. Suitability of transmission line options.
Immediate landowners	18/03/18	<ul style="list-style-type: none"> Lease of land. Suitability of land. Potential for continued utilisation of grazing land after completion of solar farm construction.

6 PLANNING CONTEXT

6.1 KEY NSW LEGISLATIVE INSTRUMENTS

6.1.1 *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 Tilbuster Solar Farm proposal would be assessed under Part 4 of the EP&A Act.

6.1.2 *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 Tilbuster 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 and Environment. While the Minister for Planning and Environment is the consent authority for State Significant Development, the Minister may delegate the consent authority function to the Planning Assessment Commission (PAC), the Secretary or to any other public authority.

An EIS is required to be prepared in accordance with the requirements of the Secretary's Environmental Assessment Requirements (SEARs) of Department of Planning 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.

6.1.3 *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.

6.1.4 *Roads Act 1993*

The *Roads Act 1993* (Roads Act) provides for the classification of roads and for the declaration of the Roads and Maritime Services (RMS) 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.

Intersection treatments and road upgrades between the proposed access track (Figure 2-2) and the New England Highway will be required to obtain site access. Final access will be determined by further traffic investigations. Additional approval from the roads authority (RMS and/or Armidale Regional Council; Section 138 permit) is expected to be required to carry out road upgrades.

6.1.5 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act* relates to the conservation of biodiversity. The Act repeals the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*.

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.

The new act brings in changes to biodiversity survey and assessment and offset methodologies. It also requires specific consideration of irreversible impacts. The proposal would impact on native vegetation and biodiversity values. Given the newness of this act, extensive consultation with OEH would be undertaken during the survey and assessment of the project.

6.1.6 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 89J 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 potential to impact environmental heritage is discussed in Section 7.1.5 of this report. Consultation would be undertaken with Armidale Regional Council and the assessment would be undertaken in accordance with OEH guidelines for *Assessing Heritage Significance* (Heritage Office (former), 2001).

Subdivision to allow for separation of Trans Grid assets, residual agricultural land and residential dwellings will be discussed with Council as part of the more detailed assessment phase of the project.

6.2 LOCAL INSTRUMENTS

6.2.1 Armidale Dumaresq Local Environmental Plan 2012 (Tilbuster)

The Tilbuster proposal area is located within the Armidale Regional LGA. Environmental provisions of the Former LGA (Armidale Dumaresq) are still applied under the *Armidale Dumaresq Local Environmental Plan 2012*. The proposed solar farm site and transmission line routes are zoned RU1 Primary Production.

Electricity generation is prohibited within this land zoning, however the ISEPP allows the development for the purpose of a solar energy system on any land with consent, which overrides the local provisions.

6.3 COMMONWEALTH LEGISLATION

6.3.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment and Energy (DoEE). 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 Minister.

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 10/04/2018) returned no World or National Heritage areas or items within the proposal site. No areas of Commonwealth land or Commonwealth heritage places were identified.

Search results returned four Wetlands of International Importance. Due to the distance approximately 200-300 km upstream of the proposal site, these have been confirmed as not being relevant to the proposal.

Three threatened ecological communities were identified from the search; New England Peppermint (*Eucalyptus nova-anglica*) Grassy woodlands (Critically Endangered), Upland Wetlands of the New England Tablelands (New England Tableland Bioregion) and the Monaro Plateau (South eastern Highlands Bioregion (Endangered), and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

Twenty-nine threatened species and twelve migratory species were returned from the Protected Matters Search. Due to extensive clearing at the proposal site, threatened flora is likely limited to Bluegrass; Threatened fauna habitat is limited to hollow bearing tree dependent species.

7 PRELIMINARY ENVIRONMENTAL ASSESSMENT

7.1 ASSESSMENT OF KEY ISSUES

A summary of the key environmental issues of relevance to the site and its development is provided in Section 7.1. They include:

- Biodiversity
- Visual amenity and landscape character
- Community and socio-economic impacts
- Aboriginal heritage
- Non-indigenous heritage
- Noise
- Land use
- Watercourses and hydrology
- Soils

7.1.1 Watercourses and hydrology

A 5th order stream (Duval Creek) traverses the site. Duval Creek is fed from Tilbuster Ponds, approximately 9 km south of the site. It is fed by several tributaries. Of these, several first order streams occur in the northwest corner of the site. Second and third order streams occur mostly in the central area of the site. Several first order streams occur in the eastern section of the site. First and second order streams occur in the south-east of the site. These tributaries feed 19 dams that are located on the site. Waterways onsite require further investigation to confirm potential to impact hydraulic function and flooding.

Although multiple first order streams exist within the proposal area, they have been excluded from constraints mapping as they are considered ephemeral, not well defined and unlikely to pose a constraint to infrastructure development. Second to fifth order streams have been mapped on the constraints mapping (Figure 8.1).

A coordinate search of the EPBC Protected Matters Search Tool (PMST) was undertaken on 10 April 2018 with a 10 km buffer of the site. It returned five Wetlands of International Importance, however the closest of these are located approximately 200-300 km upstream of the site. These are not relevant to the site.

Although site specific flooding information is not available for this site, the Armidale-Dumaresq Flood Plan (SES, 2013) states the following: *'Floods do not significantly affect the rural community of the Armidale Dumaresq Council'*.

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 river banks, 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 Water Management Act, permanent infrastructure may be considered.

Confirmation of the hydraulic function and ecological value of the waterways will be undertaken as part of the EIS. Those that qualify as 'water front land' will trigger best practice management with regard to impacts that cannot be avoided (crossings). Those that are more accurately defined as ephemeral waterways 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 possible¹.

7.1.2 Biodiversity

Approach

Ecological values of the proposal site 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 proposal site, 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 walk over, undertaken in June 2018 by an NGH Environmental ecologist.

Notes:

The rapid site inspection has not allowed for detailed vegetation mapping of all of the proposal area at this stage. It is considered to have focused on those areas likely to be of most conservation value. Further investigations may add additional areas of native vegetation and update constraints mapping.

The addition of Lot 4 of DP800611 to the Tilbuster proposal area occurred after the site visit was undertaken. For this reason, vegetation and constraints are currently unassessed in this area (Figure 8-1, 'unassessed area' designated in legend). These areas will be addressed as the site investigations progress.

Existing threatened species listings

The EPBC search (undertaken on 10 April 2018 with a 10 km buffer of the site) identified three threatened ecological communities, 29 threatened species and 12 migratory species of relevance to the site.

¹ Water front land is defined by the Water Management Act as land within 40m of the bank of incised channels. Works within water front land trigger Control Activity Approval, although SDD is exempt, best practice measures will be to reference the Controlled Activity Guidelines for any works in these areas (DPI 2012).

- 7 bird species
 - Regent Honeyeater (*Anthochaera Phrygia*)
 - Curlew Sandpiper (*Calidris ferruginea*)
 - Red goshawk (*Erthrotriorchis radiatus*)
 - Painted Honeyeater (*Grantiella picta*)
 - Swift Parrot (*Lathamus Discolor*)
 - Southern Black-Throated Finch (*Poephila cincta cincta*)
 - Australian Painted Snipe (*Rostratula australis*)
- 1 fish
 - Murray Cod (*Maccullochella peelii*)
- 2 amphibians
 - Booroolong Frog (*Litoria booroolongensis*)
 - Yellow-spotted Tree Frog, Yellow-spotted Bell Frog (*Litoria castanea*)
- 8 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*)
 - Long-nosed Potoroo (*Potorous tridactylus tridactylus*)
 - Grey-headed Flying fox (*Pteropus poliocephalus*)
- 9 plants
 - *Callistemon pungens*
 - Bluegrass (*Dichanthium setosum*)
 - Small Snake Orchid, Two-leaved Golden moths, Golden Moths, Cowslip Orchid, Snake Orchid (*Diuris pedunculata*)
 - Narrow-leaved Peppermint, Narrow-leaved Black Peppermint (*Eucalyptus Nicholii*)
 - *Euphrasia arguta*
 - Tall Velvet Sea-berry (*Haloragis exalata* subsp. *Velutina*)
 - Omeo Stork's-bill (*pelargonium* sp. *Striatellum*(G.W.Carr 10345))
 - A leek-orchid (*Prasophyllum* sp. *Wybong* (C.Phelps ORG 5269))
 - Austral Toadflax, Toadflax (*Thesium australe*)
- 2 reptiles
 - 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 for the coordinates North: -30.33, West: 151.60, East: 151.70, South: -30.43, identified 17 threatened fauna species and two threatened flora species that have been recorded within 10 km of the site:

- Little Eagle (*Hieraaetus morphnoides*)
- Little Lorikeet (*Glossopsitta pusilla*)
- Barking owl (*Ninox connivens*)
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)

- Speckled Warbler (*Chthonicola sagittata*)
- Painted Honeyeater (*Grantiella picta*)
- Varied Sitella (*Daphoenositta chrysoptera*)
- Scarlet Robin (*Petroica boodang*)
- Diamond Firetail (*Stagonopleura guttate*)
- Spotted-Tailed Quoll (*Dasyurus maculatus*)
- Koala (*Phascolarctos cinereus*)
- Greater Glider (*Petauroides Volans*)
- Rufous Bettong (*Aepyprymnus rufescens*)
- Hoary Wattled Bat (*Chalinolobus nigrogriseus*)
- Eastern False Pipistrelle (*Falsisrellus tasmaniensis*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Greater Broad-nosed Bat (*Scoteanax rueppellii*)
- Silky Swainson-pea (*Swainsona sericea*)
- Bluegrass (*Dichanthium setosum*)

None of these have been recorded within the proposal site.

Site inspection

A site inspection of the proposal site was undertaken by an ecologist on the 20th and 22th June 2018. The site inspection included the identification of potential biodiversity constraints and vegetation mapping within the proposal site. Plant community types (PCTs) were determined based on the presence of diagnostic species via rapid assessment and recording of dominant species within each stratum. No floristic plots were undertaken.

Vegetation and fauna habitat




Much of the proposal site has been extensively cleared of woody vegetation and has been highly modified by farming practices. However, small fragmented areas of woodland occur within the proposal site. These woodland patches largely extend from less disturbed higher remnants to lowland areas that have been subject to higher intensity grazing. The understorey comprises a mix of native and exotic pasture species with cleared areas generally having a higher exotic component including annual weeds such as Spear Thistle *Cirsium vulgare*.




The valley flats and lower slopes contain a combination of scattered trees and small remnant clumps of Box-Gum Grassy woodland dominated by Yellow Box *Eucalyptus melliodora* and Blakley's Red Gum *E. blakleyi* with occasional Ribbon Gum *E. viminalis* situated along Duval Creek. These areas grade into shrubby dry sclerophyll forest and on higher slopes and ridgelines that may still contain Yellow Box and Blakely's Red Gum but are dominated by New England Stringybark *E. calignosa* with other canopy species such as Apple Box *E. bridgesiana* also prominent. Paddock trees are scattered throughout the proposal site that are indicative of the surrounding vegetation types. Small rocky outcrops occur with the most significant located in the north-east of the proposal site.

Remnant areas have been highly disturbed and lack a diverse native understorey due to grazing and pasture improvement practices. The midstorey has been removed across the vast majority of the site save for the aforementioned outcroppings that are unlikely to be frequented by livestock. Native diversity in the understorey is generally low with a lack of forbs and scramblers. The most prevalent native shrub is regenerating Peach Heath *Lissanthe strigosa* which occurs across much of the proposal site in woodland areas.

No threatened fauna was observed during the initial site inspection, however most woodland areas contain hollow- bearing trees that would provide breeding and roosting habitat for hollow dependent species. Duval Creek, which runs northwest to southeast through the proposal site was not flowing at the time of inspection and contained only isolated pools of varying depth. Nineteen constructed dams are also present however no amphibians were heard calling during the site inspection. This is not an unexpected result given the time of year is outside the breeding season for most species.

Table 7-1 Summary of vegetation and habitat across the proposal site

Comment	Image
<p>Cleared area</p> <p>Degraded paddock that has been consistently grazed</p>	
<p>Native pasture</p> <p>High cover but low diversity of native species</p>	
<p>Box gum grassy woodland with varying degrees of grazed understorey</p>	

Comment	Image
Box gum grassy woodland on an outcropping with regenerating midstorey	 A photograph showing a grassy outcropping with several box gum trees and regenerating midstorey vegetation under a clear blue sky.
Box gum grassy woodland in lowland areas	 A photograph showing a dense stand of box gum trees in a lowland area with dry grass.
Hollow-bearing trees, be they stags or alive, occur consistently across the proposal site.	 A photograph showing a large, hollow-bearing tree in a grassy area, with other trees visible in the background.

PLANT COMMUNITY TYPES AND THREATENED ECOLOGICAL COMMUNITIES

Based on existing vegetation mapping and the initial site inspection, vegetation within the proposal area were assigned to Plant Community Types (PCTs) in accordance with the Vegetation Information System Classification Database (OEH). PCTs were determined based on the presence of diagnostic species identified within the site survey. The results are preliminary in nature and will be refined following detailed

vegetation survey of the site, and with reference to Floristic Plots in accordance with the Biodiversity Assessment Methodology (OEH, 2017).

PCTs, based on the preliminary inspection, include;

- PCT 567 – Broad-leaved Stringybark - Yellow Box shrub/grass open forest of the New England Tableland Bioregion
- PCT 704 – Blakely's Red Gum - Yellow Box grassy open forest or woodland of the New England Tableland Bioregion

Subject to further assessment, the vegetation communities may be consistent with the following threatened ecological communities (TEC):

- White Box – Yellow Box – Blakely's Red Gum Woodland (NSW BC Act, Endangered Ecological Community).
- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived native grassland (EPBC Act, Endangered).

The preliminary vegetation mapping is provided below (Figure 7-1). Note, Lot 4 of DP800611 is currently unassessed, as designated in the legend.

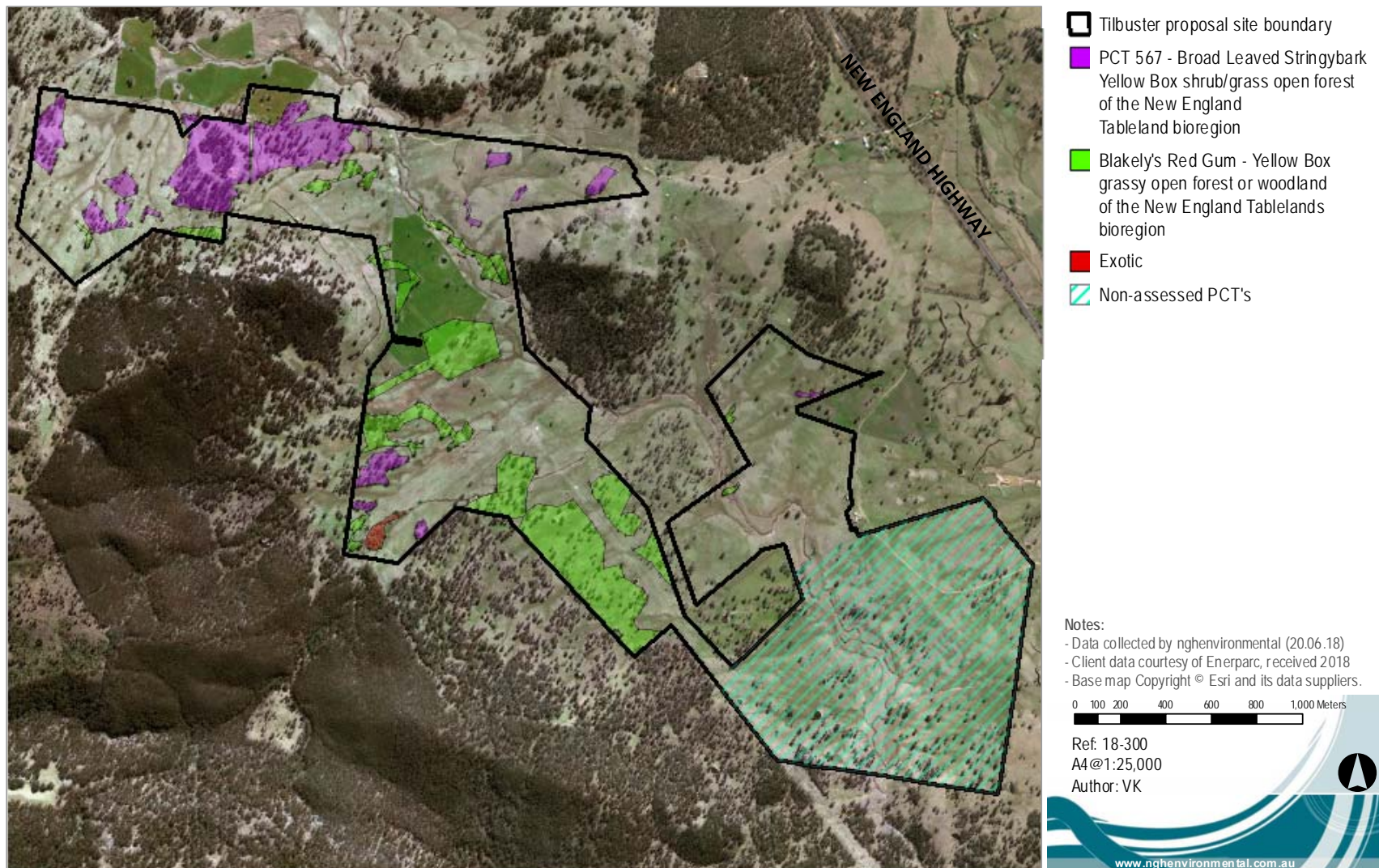


Figure 7-1 Preliminary mapping of Plant Community Types (PCTs).

Constraints and need for further assessment

To inform the early project planning process and investigation strategies, biodiversity features within the proposal site have been mapped to areas of High, Moderate, or Low constraints (Figure 7-1,8-1). For detailed constraints analysis, refer to the constraints assessment in Section 8.

As part of the EIS, the detailed ecological surveys and further investigation and assessment will be undertaken in the format of the Biodiversity Development Assessment Report (BDAR) in consultation with OEH. If calculations determine that offset credits are required to offset impacts, then an offset strategy may be required to be developed.

7.1.3 Aboriginal heritage

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) was carried out on 10 April 2018, centred on the proposal site and with a buffer of approximately 1km. Seventeen Aboriginal sites were identified near the site. There have been no items recorded on the site, however one item has been recorded approximately 230 m north of the site. Two additional sites are within 2km, south-east of the site. No Aboriginal places were recorded in the search area. Waterways can be important landscape features and indicate greater potential for significant sites. Several waterways cross the proposal site.

Conclusions and need for further assessment

Risk in relation to Aboriginal and historic heritage would need to be confirmed based on an onsite assessment. Consultation with registered stakeholders is an important part of the assessment process.

An Aboriginal Cultural Heritage Assessment Report and associated stakeholder consultation process would be completed as part of the EIS. This would include consultation with the Armidale Local Aboriginal Land Council. If any Aboriginal Heritage sites are identified that may be potentially affected by the proposal site, mitigation measures would be determined in accordance with the *Guide to Investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

7.1.4 Non-indigenous heritage

Non-indigenous heritage database searches were conducted on 10 April 2018 and included:

- A search of the NSW OEH Heritage Register (NSW Government, 2018c) located 357 listed items of significance. One item of state heritage significance (Homestead complex) is located approximately 2km from the north-eastern boundary of the site.
- A search of the Australian Heritage Database (Australian Government, 2018) located 95 items of significance, none of which are located on or within 2km of the site.
- A coordinate search of the EPBC PMST was undertaken with a 10km 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. No unlisted items are considered likely to occur onsite. Consideration of potential dust and vibration impacts on items near to the haulage route should be investigated in more detail as part of the environmental assessment. 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.

7.1.5 Community impacts, social and economic impact

The proposal site is located within the Armidale Regional Local Government Area (LGA), which covers an area of 8,621 km². The area was formed in 2016 after the merger of the former Armidale Dumaresq Shire with the surrounding Guyra Shire. The 2016 Census indicates that the Armidale Regional LGA had a population of 29,449, which is a 22% increase since 2011, the median age is 36 (ABS, 2011).

The construction of the Tilbuster Solar Farm would be expected to generate economic benefits during construction and operation; including local employment opportunities and economic stimulus. The construction period isn't expected to place strain on local services; the Armidale city centre and services are expected to be equipped to handle the additional traffic generated during construction.

The New England Highway is considered a major transport corridor. Access to the site may require upgrade works and intersection treatments to the proposed access road. Interruptions associated with these works and during construction may be expected at the New England Highway, where it meets the proposed access road. The amount of traffic generated by the development of the Tilbuster solar farm will be negligible relative to the amount of daily traffic along New England Highway during operation.

Several other local access tracks are present adjacent to the proposed site access route (Figure 8.1). These tracks are unsealed, unnamed and gated. These tracks are used to service the landowner's property and are not local through-roads.

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. It would investigate ways to spread the benefits of the project into operation. Consultation to date is summarised in Section 5 of this report and would continue into the detailed investigation stage.

7.1.6 Visual amenity and landscape character

The town of Tilbuster is approximately 7 km south-east of the proposal site. Nineteen potential residences are located within 2km of the site. The closest potential residence is approximately 660m north-east of the site. Some screening is provided by the existing trees surrounding the proposal site. Additionally, the mountain range surrounding the site provides good screening from potential sensitive receivers to the north, west and south (Figure 7-2).

An assessment of the level of visual impact would be undertaken as part of the EIS process. The EIS would also consider the potential for the solar farm to affect local landscape character. Consultation will be undertaken broadly to understand the local values of the area, including visual characteristics valued by the community. Additional consultation with specific affected residences would be undertaken to identify the nature and significance of impacts and the need for mitigation measures.

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. They therefore reflect a very low percentage of light and are generally not considered likely to result in glare or reflections that would affect traffic or nearby receivers. However, it is understood that this has been raised for other solar projects as an issue of interest to neighbours.

Constraints and need for further assessment

The location of nearby receivers have been mapped in Figure 7-1. Aerial imagery and desktop analysis indicates no uninvolvement residences are expected to have a direct view of solar farm infrastructure (this will be subject to further investigation). Assessment on landscape character and public vantage points would be the focus of a Visual Impact Assessment (VIA) in the EIS.

The VIA would also include view shed analysis and community consultation, would be prepared as part of the EIS to investigate visual impacts and mitigation options. Mitigation measures would become part of the project description, as required, i.e. vegetation screens if required.

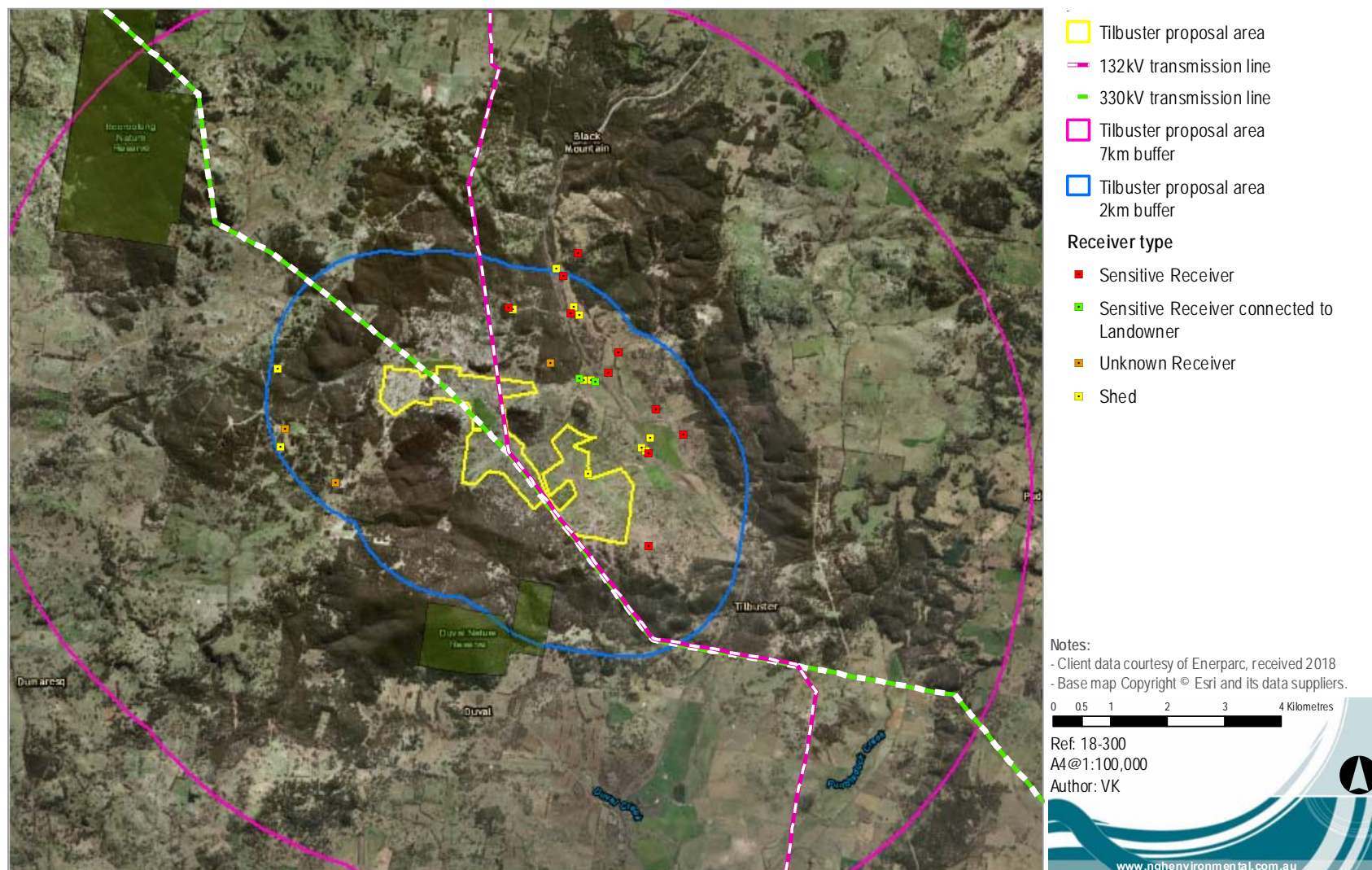


Figure 7-2 Mapping of involved and non-involved sensitive receivers within 2km of the proposal site.

7.1.7 Noise

Aerial imagery identifies four dwellings along the unsealed access track to the site, as well as nineteen potential residences within 2km of the site (Figure 7-2), introducing the potential for noise impacts.

Noise impacts would be most relevant during construction (generated by construction vehicles and machinery). During the operation of the solar farm, noise levels would be much less. Noise would be generated from the solar tracking system (if a tracking system is decided upon), the substation and switchgear and any maintenance works undertaken at the site.

Existing background noise would include traffic noise from the New England Highway and routine agricultural machinery operation. These will likely increase existing noise background levels which may reduce the relative impact of the proposal.

Constraints and need for further assessment

A construction and operational noise and vibration assessment will be undertaken as part of the EIS to assess potential noise impacts for affected residents. The assessment will be undertaken in accordance with the *Interim Construction Noise Guideline* (DECC, 2009), *NSW Industrial Noise Policy* (EPA, 2017), *Assessing Vibration: A Technical Guideline* (DECC, 2006) and NSW 'Road Noise Policy' (DECCW, 2011). Given the low number of nearby receivers, mitigation strategies to manage noise impacts acceptably are considered highly feasible. Refer to the constraints assessment in Section 8.

7.1.8 Land use

Land uses on and surrounding the site include:

- Agricultural production
- Crown land (paper road easements)
- Electricity assets and easements

The proposal site is located in an agricultural area and is used for grazing of sheep.

Crown roads traverse the site in an east-west direction in the western portion of the site, and in a north-south direction through the centre of the site. This would potentially require consultation or permits from Crown Lands or Council (Figure 8-1).

Two existing transmission lines transect the proposal site. The lines transect the central and eastern portion of the site and run south east to north west (Figure 8-1).

Subdivision will be required to allow for ongoing agricultural land uses in residual land, residential dwellings and new electricity assets.

The closest airport is the Armidale Regional Airport located approximately 20 km south in Armidale.

A search of the Department of Planning and Environment MinView on 19 July 2018 found the site to have no current mineral titles. A mineral exploration license application (ELA5706) was lodged however, on the 10/07/2018 by Australian Precious Metals Corporation PTY LTD for Group 1 Minerals.

Multiple subdivisions are required within the proposal site, including:

- Subdivision of land for the TransGrid substation or switching station to a State-owned entity to be leased back to TransGrid.
- The proposal site lease period of 25 years requires subdivision of the solar farm lots

- Subdivision of land in order to separate dwellings.

Conclusions and need for further assessment

It is noted that, where pile driving is used to install PV array mounts on land of relatively low relief, the soil disturbance and therefore reversibility of the project, with regard to future land uses, such as agricultural production is very high. Excavation and footings is generally limited to discrete footings for inverters, switch station and office buildings. Building-in strategies to retain land use options post-decommissioning, will be part of the assessment and mitigation process.

The impact on agricultural production, electricity assets and crown roads in the locality and region would be assessed in detail in the EIS and Land Use Conflict Risk Assessment (LUCRA). Subdivision would be part of the project and assessed within the EIS, in consultation with Council.

7.1.9 Soils

Soil type and capability

The Soil type at the site is Chromosol (ASC) and Yellow Podzolic Soil (GSG), which are not sodic or acidic (eSPADE, 2018). These soils are considered to have low-moderate agricultural potential, chemical fertility and water-holding capacity. These soil types have slight to moderate dispersion risk, which may present a risk of erosion and loss of soil structure when disturbed.

Statewide soil and land mapping does not extend to the proposal site; soil landscapes are not available.

Contamination

A search of the NSW OEH Contaminated Sites Register (NSW Government, 2018a) on 10 April 2018 located six contamination records for the LGA. These records are not near the site. The proposal site also does not appear on the list of NSW Contaminated Sites notified to the EPA (NSW Government 2018b). A search of the NSW OEH Contaminated Sites Register (NSW Government, 2018a) on 10 April 2018 located six contamination records for the LGA. These records are not near the site. The proposal site also does not appear on the list of NSW Contaminated Sites notified to the EPA (NSW Government 2018b). It is noted that the site has a history of agricultural land use and as such, agricultural sites may contain buried rubbish including contaminants such as herbicides that may be encountered during excavation.

Constraints and need for further assessment

The EIS would provide thorough consideration of soil and erosion impacts and proposed mitigation measures for construction, operation and decommissioning, as required.

It is considered unlikely that substantive contamination is present at the site and therefore no detailed investigation is likely to be required within the EIS. Mitigation would be applied for unexpected finds. Management of ground cover during operation and restoration of the site's land capability would be recommended by EIS. These plans may benefit from base line soil mapping.

7.2 OTHER ENVIRONMENTAL ISSUES

Issue	Existing environment	Potential Impacts	Investigation strategies
Access and traffic	<p>The site has good access via the New England Highway which is sealed. The New England Highway intersects with an unsealed access track to the site.</p> <p>Intersection works compliant with Council and RMS requirements are likely to be required for access to the site via the existing unsealed access track.</p>	<p>Establishing access to the site may require construction of access tracks, upgrades and intersection treatments. Management of traffic, for safety as well as road pavement conditions will be required.</p> <p>The access option under consideration is the unsealed road on the eastern side of the proposal site, which joins the New England Highway.</p> <p>During construction, there may be associated impacts to nearby receivers such as dust, vibration and noise generation.</p>	<p>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 the roads authority.</p> <p>The mitigation measures would require a Traffic Management Plan including haulage routes be prepared.</p>
Hazards and risks – Electric and Magnetic Fields (EMF)	<p>Existing powerlines produce EMF within their vicinity. Additional infrastructure which form part of the proposal such as inverters, connecting powerlines and the substation would produce EMF within the site.</p>	<p>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 impact for any nearby residents.</p>	<p>The EMF levels of the proposal infrastructure would be assessed as part of the EIS. Standard design provisions are expected to ensure impacts comply with relevant guidelines together with communication of the issue as required.</p>
Hazards and risks – Bushfire	<p>The proposal site has been predominantly cleared for agricultural purposes.</p> <p>The proposal site is not mapped as bushfire prone.</p>	<p>Emergency response protocols will however be required in the event of a bushfire. Battery storage has specific risks and mitigation strategies.</p>	<p>The potential to increase risk of bushfire would be assessed in the EIS. Emergency protocols would reflect advice from relevant agencies.</p>
Hazards and risks – battery storage	<p>The surrounding site does not present a high fire danger and is not located in a densely populated area.</p>	<p>Battery storage can elevate fire ignition risks. Storage, transport and handling must be considered.</p>	<p>A risk assessment of the hazard proposed by onsite battery storage would be undertaken within the EIS.</p>

8 PRELIMINARY CONSTRAINTS ASSESSMENT

8.1 METHODOLOGY

Preliminary constraints advice has been informed by a desktop review and confirmed by site inspection (ecologist, June 2018). The inspection allowed for full traverses of the site and vehicle-based surveys in the locality. As such, 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 are defined in Table 8-1 and may be viewed in Figure 8-1, with reference to the 'developability' of the site. Where uncertainty exists, a higher constraint rating has been applied. Further investigation may reduce the constraint level. Environmental constraints were mapped for the site and are provided as Appendix B and discussed in Section 8.2.

Table 8-1. Environmental constraints

Constraint	Definition
Low	Minimal impacts anticipated. Most suitable for development. Standard management protocols would be sufficient to manage any impacts. Least cost for assessment and management of constraints.
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	Avoid if possible. These areas will be difficult, expensive or may not be possible to obtain approval to develop. They may require costly additional surveys to understand and manage impacts. They may be costly to offset. They may impact the ability to obtain a timely approval.

8.2 RESULTS

8.2.1 Low environmental constraints

In low constraint areas, minimal impacts are anticipated. They contain no sensitive features (waterways, high risk soils, receivers, ecological values) and are most suitable for development.

The inspection has confirmed that these areas are unlikely to generate biodiversity credits or may have very low biodiversity credit requirements if they do. These include areas of:

- Ephemeral waterways with little if any hydraulic function
- PCTs in low or poor condition, containing few habitat resources
- Non-native vegetation (exotic vegetation)

Regarding cropped and exotic areas, it is noted that even in low constraint areas, these may need to be replaced by a more perennial ground cover prior to construction, to reduce erosion and dust issues once the panels are installed. These issues will require a mitigation strategy and may require specialist input.

8.2.2 Moderate environmental constraints

These include:

- **Waterways:** While development over ephemeral first order waterways is likely to pose low constraint to infrastructure placement, impacts on higher stream orders may affect hydraulic function and increase erosion. Specialist input would inform development in proximity to mapped waterways.
- **Native vegetation** with moderate biodiversity value areas. These areas do not necessarily need to be avoided but are likely to generate biodiversity credits that require offsetting. These include areas of;
 - Degraded TEC
 - Non-TEC PCTs in moderate condition
 - Areas of significant canopy cover with highly disturbed understorey.
- **Crown land** and Crown land easements occur within the proposal site. Consultation and approvals would be required if impacts on crown lands are required. These should be sought concurrent with the EIS, in consultation with DPI lands, as required.

8.2.3 High environmental constraints

These include:

- **Native vegetation** with high biodiversity value. If these areas cannot be avoided, they will require careful justification in the Biodiversity Development Assessment Report (BDAR) and will generate high biodiversity credit requirements that require offsetting. It is noted that higher value vegetation will generate greater offset requirements. These include areas of:
 - TEC with an intact overstorey and/or native dominated understorey
 - Non-TEC Plant Community Types (PCTs) in good condition (good ecosystem credit species habitat)
 - Potential candidate species credits habitat.
 - Areas (including paddock trees and small clumps) that contain hollow bearing trees
 - Areas containing rocky outcrops
- **Potential residences** in close proximity of the site (requires ground validation). Nearby receivers may be affected by visual impact, traffic noise and vibration and dust. Verification of impacts and consultation will be undertaken to ensure all impacts are acceptably mitigated.
- **Aboriginal Heritage:** No survey has been undertaken of the site, but an artefact is recorded north of the site. Any Aboriginal heritage sites/items/etc. identified would be a moderate to high constraint; impacts on sites will require approval. Mitigation strategies can range from avoidance, to salvage programs to more intensive survey including test pits.

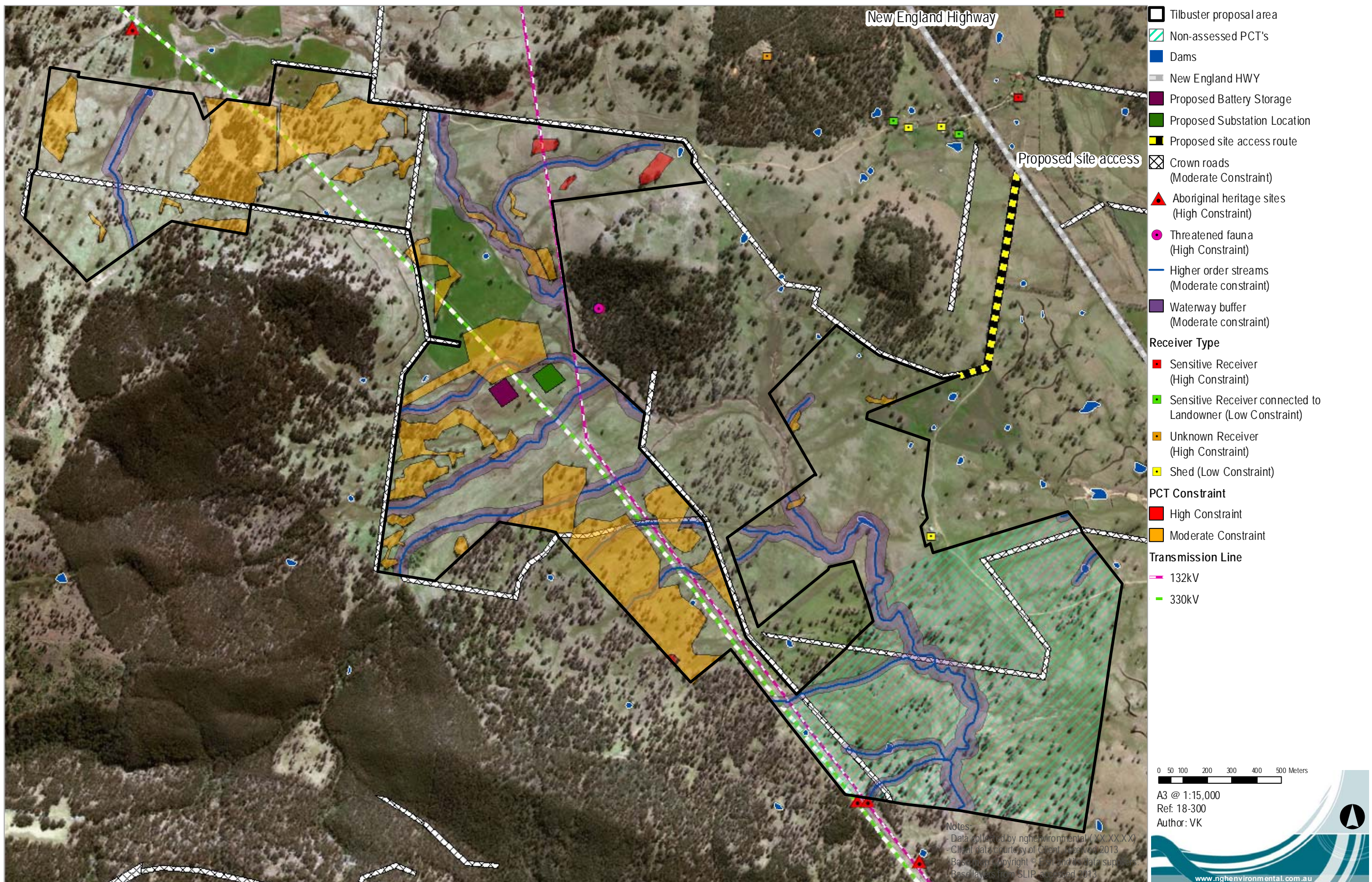


Figure 8-1 Preliminary constraints map of Tilbuster solar farm proposal area.

9 CONCLUSION

This report has outlined the Tilbuster Solar Farm proposal and established the planning context of the proposal, currently in the early planning stage. 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 proposal has the potential to result in a number of local and broader benefits including:

- Local employment opportunities
- Contribution to state and federal renewable energy targets of 33,000 gigawatt hours by 2020

Preliminary consultation with Armidale Regional Council, involved landowners and local stakeholders has identified a positive outlook of the proposed solar farm.

Based on this Preliminary Environmental Assessment, an indicative scope for the EIS has been developed, focusing on the key issues:

- Watercourses and hydrology
- Biodiversity
- Aboriginal heritage
- Community and socio-economic impacts
- Visual amenity and landscape character
- Noise
- Soils

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

Once received, the EIS would be prepared in accordance with the project-specific SEARs. Mitigation measures will be developed for inclusion in the EIS and will address the management of key issues and other issues identified in the assessment process.

10 REFERENCES

- Australian Bureau of Statistics, 2016, *Armidale local government area 2016 Census QuickStats*, accessed 22 June from
http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA10130?opendocument
- Australian Bureau of Statistics, 2011, *Armidale Dumaresq local government area 2011 Census Quick Stats*, accessed 22 June 2018 from
http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/LGA10110?opendocument
- Australian Bureau of Statistics, 2016, *Tilbuster 2016 Census QuickStats*, accessed 22 June 2018 from
http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC13865?opendocument
- Australian Bureau of Statistics, 2016, *Armidale Local government area 2016 Census Community Profile*, accessed 23 June 2018
http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/communityprofile/LGA10130?opendocument
- Armidale Regional Council, 2016, Bush fire safety and Management accessed 29 June 2018 from
<http://www.armidaleregional.nsw.gov.au/living-here/your-neighbourhood/floods-fires>
- Armidale Regional Council, 2016, Our Region, accessed 28 June 2018 from
<http://www.armidaleregional.nsw.gov.au/our-region/tourism/our-region>
- Armidale Regional Council, 2016, Things to do, accessed 28 June 2018 from
<http://www.armidaleregional.nsw.gov.au/our-region/tourism/things-to-do>
- Demographic Resources, 2018, Armidale Regional Council economic profile 2015/2016 accessed 28 June 2018 From
<https://economy.id.com.au/armidale/tourism-visitor-summary>
- ARENA (n.d). *Establishing the social licence to operate large scale solar facilities in Australia: Insights from social research for industry*, Australian Renewable Energy Agency (ARENA).
- Clean Energy Council, 2016, *Clean Energy Australia Report 2016*.
- Clean Energy Council, 2018, *Clean Energy Council News*, accessed 23 June 2018
<https://www.cleanenergycouncil.org.au/news/2018/February/reflecting-record-year-renewables.html>
- Department of Primary Industries: Office of Water, 2012. Controlled Activities on Waterfront Land. NSW Office of Water, July 2012.
- Department of Environment and Climate Change, 2006, *Assessing Vibration: A technical Guideline*, Sydney.
- Department of Environment and Climate Change, 2009, *Interim Construction Noise Guideline*, Sydney.
- Department of Environment, Climate Change & Water, 2010, Aboriginal cultural heritage consultation requirements for proponent, accessed 10 April 2018,
<http://www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/2010069ACHCRSummaryIssues.pdf>

- Department of Environment, Climate Change and Water, 2011, *NSW Road Noise Policy*. DECCW, Sydney.
- NSW Government, 2017, Large-Scale Solar Energy Guideline Draft for State Significant Development, accessed 22 June 2018 from <http://www.planning.nsw.gov.au/~media/Files/DPE/Guidelines/draft-large-scale-solar-energy-guideline-2017-11.ashx>
- NSW Department Planning and Environment, 2018, *MinView*, accessed 26 June 2018, from <https://minview.geoscience.nsw.gov.au/#/?bm=bm1&z=15&lat=151.65294885635393&lon=-30.38425364942791&l=ad1:y:100>
- NSW Environment Protection Authority, 2000, *Industrial Noise Policy*, Sydney
- NSW Government, 2017a, *Contaminated sites notified to EPA*, accessed 10 April 2018, from <http://www.epa.nsw.gov.au/clm/publiclist.htm>
- NSW Government, 2017b, *NSW OEH contaminated site register*, accessed 10 April 2018, from <http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx>
- OEH, 2018, *The Biodiversity Assessment Methodology*.

APPENDIX A PHOTOGRAPHS OF THE SITE

	
Proposal site central photo location	Proposal site central photo location
	
Proposal site north eastern photo location	Proposal site north eastern photo location
	
Proposal site north eastern photo location	Proposal site north eastern photo location



Proposal site north eastern photo location



Proposal site north eastern photo location



Proposal site eastern photo location



Proposal site eastern photo location



Proposal site south eastern photo location



Proposal site south eastern photo location

	
Proposal site south eastern photo location	Proposal site south eastern photo location
	
Proposal site western photo location	Proposal site western photo location
	
Proposal site western photo location	Proposal site western photo location



Proposed site access track where it meets the New England Highway



Proposed site access track where it meets the New England Highway



Proposed site access track where it meets the New England Highway



Proposed site access track where it meets the New England Highway

APPENDIX B CONSULTATION STRATEGY

APPENDIX C NEWSLETTER 1. AUGUST 2018