STATEMENT OF ENVIRONMENTAL EFFECTS

Lot 110 DP 1187931 - Mid Western Hwy, Hay, NSW

Proposed Hay 2A Solar Farm & two lot subdivision

Zenith

TOWN PLANNING

sustainable thinking

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TABLE OF CONTENTS

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1. INTRODUCTION

1.1 Overview

The purpose of this Statement of Environmental Effects is to support an application to Hay Shire Council to develop a solar farm at Lot 110 DP 1187931 Mid Western Highway, Hay, referred to as the Hay 2A Solar Farm and to subdivide the property so that 5MW solar farms are placed on separate lots. The application is for regionally significant development that needs consent and is to be determined by the Western Regional Planning Panel.

There are no other separate approvals required to be obtained under section 4.46 of the *Environmental Planning and Assessment Act 1979*. The application is not termed 'integrated development'.

This Statement has been prepared using information sourced from the Council's website, the NSW legislation website, SIX Maps, the website of the Office of Environment and Heritage, and the Department of Planning & Environment's Planning Portal.

All information referenced in this Statement has been sourced from publicly available documents or websites and from expert reports produced to support the application.

1.2 Scope of the report

The scope of this report is to describe the location and physical characteristics of the site on which the development is proposed, identify relevant provisions of plans and policies applying to the land, and to discuss any potential environmental impacts of the development and proposed servicing arrangements.

The purpose of this report is to assist Council's assessment of the proposal against the matters for consideration listed in section 4.15 of the *Environmental Planning and Assessment Act 1979*.

1.3 The proponent

ITP (Development) Pty Ltd is the proponent for the proposed Hay 2A solar farm. ITP (Development) is a private sector organization based in Canberra, which was established in 2003. It is part of the IT Power Group which was formed in 1981 in the UK to bring together specialists in renewable energy, energy efficiency and carbon markets. IT Power offers expertise in renewable energy and energy efficiency, including research, development and implementation, managing and reviewing government incentive programs, high level policy analysis (including carbon markets), engineering design and project

management. IT Power (Australia) has partnered with TEC-C Investments to develop the Hay 2A Solar Farm.

1.4 Justification

Solar energy is energy created by the heat and light of the sun. Solar power is produced when this energy is converted into electricity or used to heat air, water, or other substances. Australia has the highest average solar radiation per square metre of any continent in the world. Despite uncertainty regarding energy policy, the Commonwealth and NSW Governments have recognized the need to supplement energy derived from fossil fuels with energy generated from renewable sources. Alternative energy supply may be sourced from solar photovoltaic, geo-thermal, solar thermal, wave and tidal action, and wind.

The development of solar photovoltaic power is well underway in NSW and across Australia. This growth in the local solar PV sector continues to provide a significant boost for Australia's regional economy with renewable infrastructure development estimated to create upwards of 2,300 direct jobs plus indirect employment.

According to the Australian Renewable Energy Agency (ARENA), the deployment of household solar PV that generates about 5 kW is expected to continue and at the same time an increase in rooftop solar PV installations on commercial premises generating around (10-100 kW) is expected. Large scale solar PV is also rapidly expanding in Australia with several solar farms being constructed that will have the capacity to generate over 50MW. The proposed Hay 2A Solar Farm aims to fill the gap in the mid-sized plants. It will generate 5MW of power and contribute to renewable energy supply to supplement electricity generation from coal, oil and gas and assist to reduce reliance on these unsustainable means of supply.

The proposed development is in accordance with relevant objects of the *Environmental Planning and Assessment Act 1979* in that it will assist to generate power to be distributed to the residents of NSW thereby promoting the social and economic welfare of the community in a manner that manages and conserves natural resources.

The Hay 2A Solar Farm will further the goals of sustainability, and the orderly and economic use of land. The development will not detrimentally affect the environment, biodiversity or cultural heritage.

2. SITE DESCRIPTION AND CONTEXT

2.1 Description

The site of the proposed development is described as Lot 110 DP 1187931 Mid Western Highway, NSW. It is located approximately 1.6 kilometres north-east of the town centre of Hay and is a rhombus shape with an area of approximately 20.7 hectares.

The southern boundary fronts the Mid Western Highway and existing access to the site is located about 115 metres west of the south-east corner of the lot. An unformed road separates the site from farmland and an Essential Energy sub-station to the west and a disused rail line to the north. Land adjoining the eastern boundary is vegetated.

The location of the site is shown in Figure 1 below. The site is indicated by a red cross.

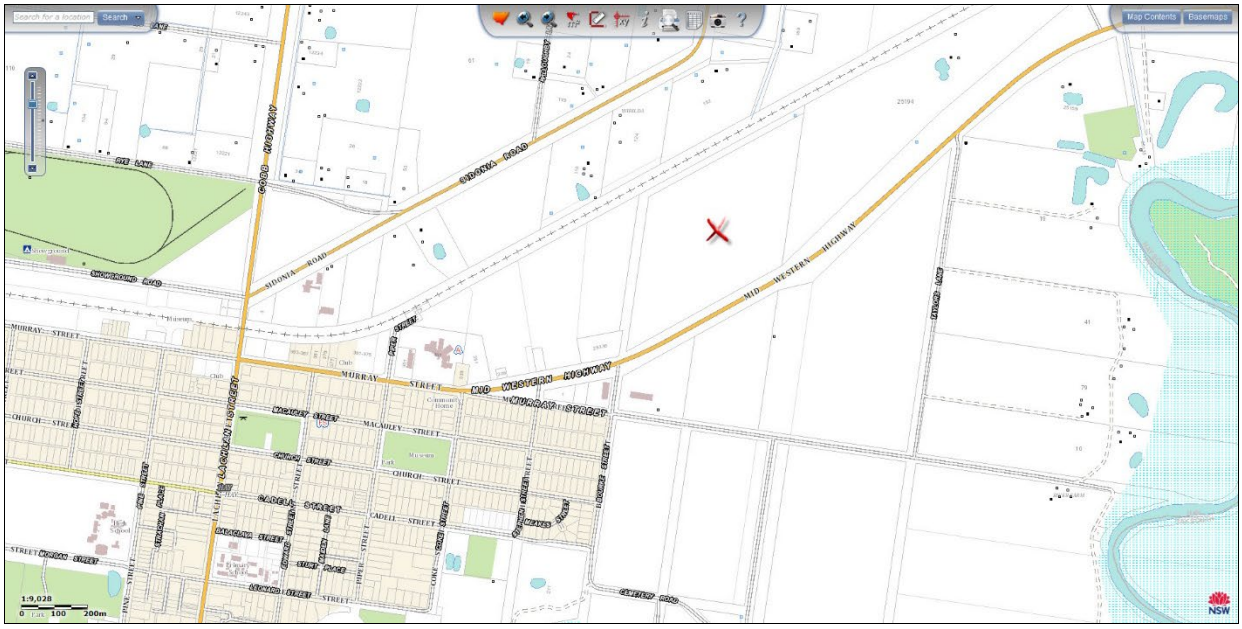

Figure 1: Locality map. Source: SIX Maps, 2018

The site has been fully cleared in the past for agricultural use. The topography is flat and there are no structures on the site. It is severely degraded due to past practices and current drought conditions.

The Hay 1A Solar Farm was approved by the Western Regional Planning Panel on 1 August 2019. This solar farm is located on the western portion of Lot 110 and will generate 5MW of AC power. Construction of the Hay 1A Solar Farm is due to commence in the first half of 2020.

2.2 Context

The site and surrounding countryside is flat and is partly mapped as being bushfire prone land. An abandoned rail line runs parallel to the northern boundary and Hay Shire Council have advised that Transport for NSW does not have plans to recommence rail operations.

Urban residential dwellings are located to the south-west of the site and a number of scattered rural residential dwellings are located north of the disused rail line. Land on the southern side of the Mid Western Highway comprises rural uses and industrial development. The Hay Hospital, a registered club and offices of the National Parks & Wildlife Service are located off the highway west of the site.

An aerial image of the site and surrounding land is shown in Figure 2 below. The site is edged red.

Figure 2: Aerial image dated October 2013. Source: SIX Maps, 2018

Below are photographs of the property that show land uses and existing development on the site and adjoining land. All photographs were taken in January 2019 by Zenith Town Planning Pty Ltd.

Plate 1: Looking towards the site from the south-western corner

Plate 2: The existing entry to the site off the Mid Western Highway

Plate 3: Vegetation on land to the east

Plate 4: The sub-station on land to the west

Plate 5: Industrial and commercial development to the south

Plate 6: Dwellings with the rail line in the foreground

2.3 Climate

Global solar exposure is described on the Bureau of Meteorology website as being the total amount of solar energy falling on a horizontal surface. The daily global solar exposure is the total solar energy for a day. Typical values for daily global solar exposure range from 1 to 35 MJ/m^2 (megajoules per square metre). The values are usually highest in clear sun conditions during the summer, and lowest during winter or very cloudy days.

Figure 3 below shows average daily solar exposure for the 12 month period 1 December 2019 to 30 November 2019. The Hay area has received an average of between 18 and 20 MJ/m^2 each day, placing it within the second highest area receiving solar radiation in Australia.

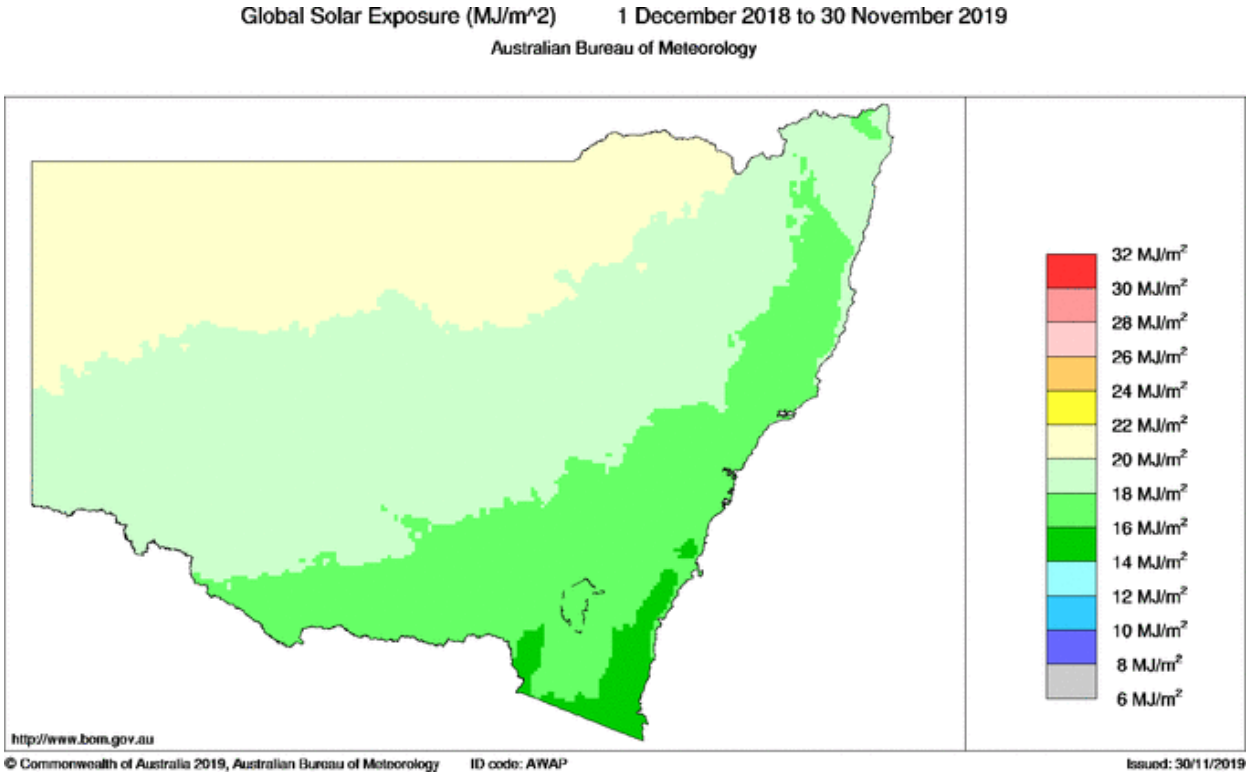

Figure 3: Average daily solar exposure. Source: Australian Bureau of Meteorology

The mean daily global solar exposure measured at Hay Airport, the closest measuring station to the Hay 2A solar farm site, for the period 1990-2019 is given in Table 1 below. The annual average for the 12 month period was 18.4MJ/m^2.

Table 1: Mean daily global solar exposure at Hay Airport, 1990-2019

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly mean	27.7	24.5	20.5	14.9	10.8	8.7	9.4	12.8	17.1	22.1	25.3	27.5

The map below (Figure 4) shows the average daily hours of sunshine across Australia. The Hay area receives and average of 7 to 8 hours of sunshine each day.

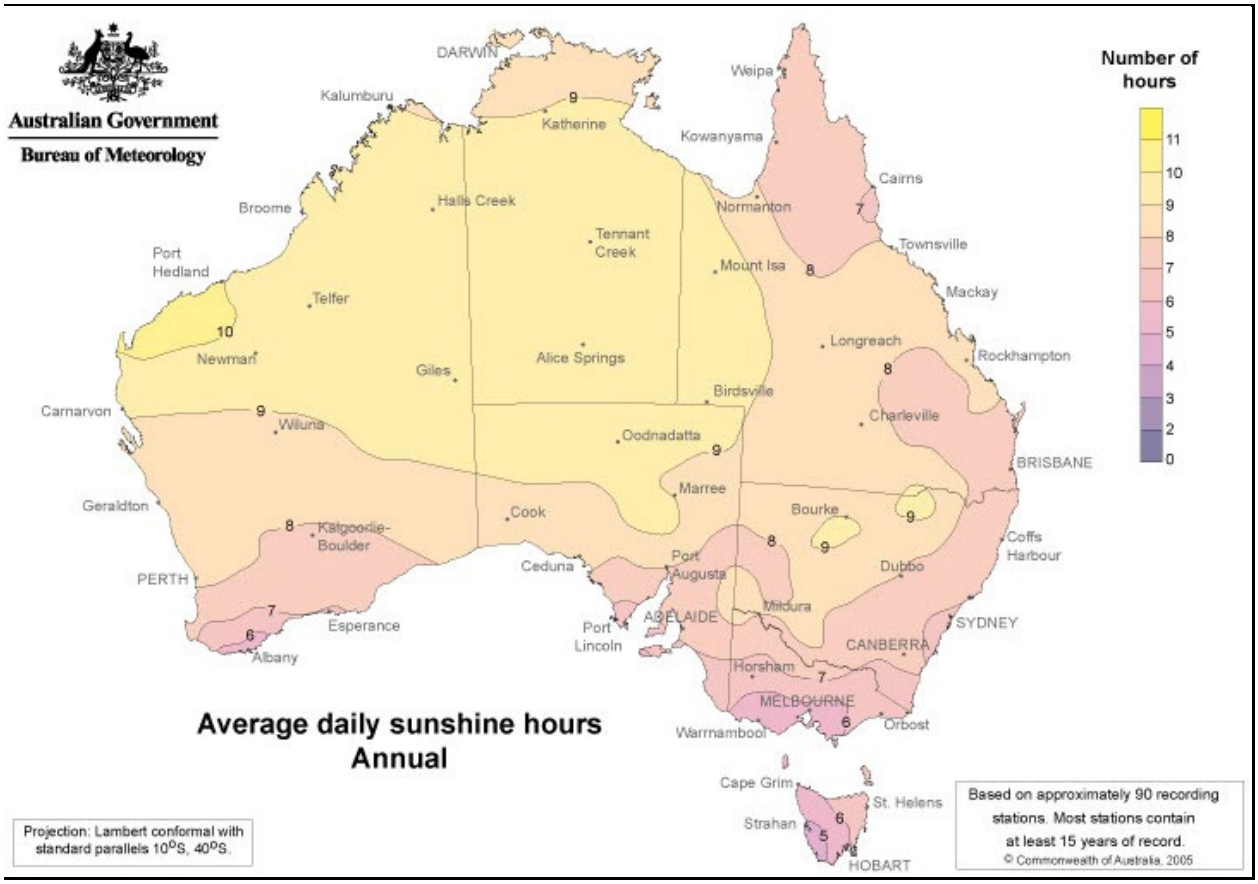

Figure 4: Average daily sunshine hours. Source: Australian Bureau of Meteorology

The global solar exposure coincides with seasons – the longer the daylight hours the greater the solar radiation due to the tilt of the earth during summer months. Rainfall is spread relatively evenly across the year and so does not appear to impact on the level of solar radiation.

Solar exposure estimates are important for a wide range of applications, including for agriculture, power generation and solar heating system design and use. This climatic information sourced from the Australian Bureau of Meteorology indicates that the global solar exposure, or solar radiation, is sufficient to support power generation in the proposed location which benefits from existing grid infrastructure such as the Essential Energy electrical sub-station on adjoining land.

3. DETAILS OF THE PROPOSED DEVELOPMENT

3.1 Hay 2A Solar Farm and subdivision

It is proposed to construct the Hay 2A Solar Farm on the eastern section of Lot 110 DP 1187931 Mid Western Highway, east of the town of Hay. The solar farm will have a DC array capacity of 8 MWp and an AC output of 5.0 MW. The layout of the facility is shown on the General Arrangement Plan Hay2A-G-210.

It is also proposed to subdivide Lot 110 into two new lots. Proposed Lot 1 will be 14.15 hectares and will be occupied by the approved Hay 1A Solar Farm. Lot 2 will accommodate the proposed Hay 2A Solar Farm and be 6.42 hectares in area. The proposed plan of subdivision is shown on Drawing No 6040 prepared by Price Merrett Consulting dated 1 November 2019.

3.2 Photovoltaic panels

There are proposed to be approximately 18,500 solar modules installed in 26 blocks of modules. Each block comprises rows of alternative facing modules fixed at 8 degrees from the horizontal. The modules have a maximum height of 1.1 metres above ground level.

3.3 Inverters and battery storage

Two 2.5 MW inverter stations will be installed at the solar farm. These inverters are to be located within the array and are each mounted on a 6 metre long skid. Each of these inverter stations incorporate high voltage switchgear and transformers. Each will connect by way of underground cables to connect to the Essential Energy 33kV feeder that runs parallel to the highway and then connects to the Hay 33 substation to inject power to the electricity grid.

Dial-before-you-dig investigations would be carried out prior to commencing all subsurface work.

3.4 Services

Reticulated water and sewer services are not required to be provided to the solar farm as there are no permanent offices or amenities proposed on site. Maintenance workers would not be required to remain on site. Cleaning of the PV panels would be carried out on an annual basis to maximise the performance of the system. This is done using water brought into the site and a sponge mop.

Vehicle access to the site would be off the new driveway entrance located adjacent the existing fenced substation compound off the Mid Western Highway that was approved for the Hay 1A Solar Farm. An easement will need to be created through proposed Lot 1 to provide legal and practical access to proposed

Lot 2. This easement will be 8 metres wide and run parallel to the Mid Western Highway along the southern boundary. The width of the internal access road will be 6 metres.

It is not proposed to use the existing access located further to the east off the highway although this access point will remain and provide alternative direct access into proposed Lot 2.

During the construction stage there would be approximately 160 semi-articulated trucks, with an expected daily maximum of 4 vehicles, accessing the site to deliver PV panels, mounting frame equipment and inverters plus construction machinery to grade the accessways and erect the mounting system. A site access road would run around the permitter and through the centre of the array.

In addition, it is expected that car parking for up to 40 small vehicles will be needed to cater to the 50 construction workers at the rate of 0.8 spaces per worker. A temporary car parking area and a materials laydown area is to be sited at the south-western corner of the array of panels within proposed Lot 2.

3.5 Construction

The module blocks are secured with piles that are driven into the ground. During construction there is expected to be 50 personnel on site working from 7 am – 4 pm Monday to Friday. The construction is expected to take approximately two and a half months. Should it be necessary to carry out work outside these hours then activities would be limited to those generating low noise emissions. Once operational the site will be unmanned. Maintenance is expected to be carried out quarterly by a crew of 2 to 3 people.

3.6 Landscaping

A condition was imposed on the consent for the Hay 1A Solar Farm that requires vegetative screening along the southern boundary to the Mid Western Highway. This screening will extend to the south-eastern corner of the property. Land that is disturbed during construction of the solar farm and not to be used for access or other maintenance purposes will be sown with native grasses endemic to the Hay area following completion of construction. It is proposed that sheep grazing be carried out amongst the panel array.

3.7 Security

The solar farm is to be enclosed within a 1.8 metre high security fence set within the boundaries and surrounding the array. The proposed fence is to be chain mesh steel topped with three rows of barbed wire giving a total height of 2.1 metres similar to that shown in Plate 7 below. The fenced area is to be 6.0 hectares within the 6.42 hectare new allotment. It will be setback 3 metres from the eastern boundary, a minimum of 7.4 metres from the northern boundary and 12 metres from the southern boundary. The eastern side of the security fence surrounding the Hay 1A Solar Farm is to be removed. The array is to be setback 5 metres from the security fence.

3.8 Decommisioning

The Hay 2A Solar Farm is intended to remain in operation indefinitely in order to contribute to the sustainable electricity power supply of the state of NSW. If, however, circumstances change and it is necessary to decommission the farm in around 20 to 25 years then all infrastructure, panels, mounting frames including footings, inverters, cabling and other sub-surface materials would be disassembled and removed from the site to enable the site to be re-cultivated for cropping or grazing purposes. All gravel surfacing of accessways would be removed unless required for a future use. If necessary, a condition of consent may be imposed that requires a decommissioning plan to be prepared and approved prior to the event.

Plate 7: Example of security fencing

4. STATUTORY FRAMEWORK

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment (EPA) Act 1979* is the principal piece of legislation governing the use and development of land in NSW. The objects of the Act are:

(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,
(c) to promote the orderly and economic use and development of land,
(d) to promote the delivery and maintenance of affordable housing,
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),
(g) to promote good design and amenity of the built environment,
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,
(j) to provide increased opportunity for community participation in environmental planning and assessment.

The objects of the EPA Act are intended to guide land planning and management. Section 4.15 of the Act lists matters for consideration when assessing and determining an application for development.

4.2 State Environmental Planning Policies

4.2.1 State Environmental Planning Policy No 55 – Remediation of Land

SEPP 55 requires Council to consider whether land is contaminated and to determine whether the proposed use is suitable with or without contamination. Council can require an applicant for development to conduct a preliminary investigation and a subsequent more detailed investigation if warranted. Where contamination exists and remediation is necessary, Council must be satisfied that the remediation will take place before the land is used for the proposed purpose. It is noted that should the preliminary investigation identify contamination on the site then the NSW *Contaminated Land Planning Guidelines* apply to subsequent investigations.

The property has been cleared and farmed for many years and is not known to be listed on a Council register of potentially contaminated land. There has been no known historical usage that would cause the land to be contaminated. The use of farm chemicals such as pesticides and fertilisers is not considered to contaminate soils to the extent that mediation is required. It is considered that a preliminary investigation is not required for the development of a solar farm.

4.2.2 State Environmental Planning Policy (Infrastructure) 2007

The aims of *SEPP (Infrastructure) 2007* are to ensure a consistent and flexible planning system to facilitate the delivery of services. The policy identifies environmental assessment categories for types of infrastructure, matters to consider when assessing development adjacent to infrastructure and provides for consultation with relevant public authorities. The policy applies to the whole of NSW. *SEPP (Infrastructure)* contains provisions relating to approval processes and assessment requirements for infrastructure proposals according to the type or sector of infrastructure. It outlines land use zones where types of infrastructure are permissible with or without consent and identifies certain works as exempt and complying development.

Part 3 Division 4 of the policy relates to electricity generating works or solar energy systems. Section 34 enables Development for the purpose of electricity generating works to be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Zone RU1 Primary Production is a prescribed rural zone. Similarly, development for the purpose of a solar energy system may be carried out by any person with consent on any land, although this is limited to no more than 100kW in a prescribed residential zone. The proposed development is located in zone RU1 Primary Production and is therefore permitted with consent by *SEPP (Infrastructure) 2007*.

4.2.3 State Environmental Planning Policy (Primary Production and Rural Development) 2019

This policy replaces four other SEPPs that apply to rural land including *SEPP (Rural Lands) 2008*. The aims of *SEPP (Primary Production and Rural Development) 2019* are:

(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.

The policy applies to *State significant agricultural land,* farm dams and other artificial waterbodies, livestock industries and aquaculture. There is no *State significant agricultural land* listed in the schedule to the policy. It is noted that, separately, the Department of Primary Industries are in the process of preparing mapping of *Important Agricultural Land* in NSW to assist decision-making.

4.2.4 State Environmental Planning Policy (State and Regional Development) 2011

Development that is state and regionally significant is identified in *SEPP (State and Regional Development) 2011*. Electricity generating works including solar farms which have a capital investment value of more than $30 million, or a capital investment value of more than $10 million and are located in an environmentally sensitive area of State significance, are declared state significant development. Private infrastructure, including electricity generating stations, that have a capital investment value of over $5 million are declared regionally significant. In this case the proposed development has a CIV of over $5 million and is regionally significant. The application will be determined by the Western Regional Planning Panel.

4.3 Local Environmental Plan

4.3.1 Hay Local Environmental Plan 2011

The property is zoned RU1 primary Production under *Hay LEP 2011*. The objectives of zone RU1 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 a range of activities that support the agricultural industries being conducted on the land and limit development that may reduce the agricultural production potential of the land.*
- *To permit tourist facilities that promote an appreciation of the rural environment and associated agricultural and horticultural activities, while ensuring the continued economic viability of the land.*

The development is defined as ***electricity generating works*** which means a building or place used for the purpose of making or generating electricity. This use is prohibited in zone RU1. However, *SEPP (Infrastructure) 2007* prevails over *Hay LEP 2011* to the extent of an inconsistency meaning that the use is permitted with consent in zone RU1 by way of *SEPP (Infrastructure).*

The site is not mapped as being environmentally sensitive on the *Groundwater Vulnerability Map*, the *Terrestrial Biodiversity Map*, the *Wetlands Map*, or the *Riparian Lands and Watercourses Map* that accompany *Hay LEP 2011.*

It is not a listed heritage item and is not in the vicinity of a heritage item or heritage conservation area listed in *Schedule 5 Environmental heritage* of *Hay LEP 2011*.

The site is not affected by land reservation acquisition or urban release area provisions of the LEP. Provisions relating to these matters in *Hay LEP 2011* therefore do not apply to the proposed solar farm.

The following clauses of *Hay LEP 2011* apply to the proposed development:

Clause 4.1 Minimum subdivision lot size

The site is affected by a development standard restricting subdivision for a dwelling to a minimum lot size of 90 hectares. Subdivision of Lot 110 into two lots less than 20 hectares under clause 4.2 of *Hay LEP 2011* is proposed as discussed below.

Clause 4.2 Rural subdivision

The objective of this clause is to provide flexibility in the application of standards for subdivision in rural zones, including RU1 Primary Production, to allow land owners a greater chance to achieve the objectives for development in the relevant zone. Clause 4.2 enables subdivision to less than 20 hectares where the subdivision is for the purpose of primary production.

It is proposed to subdivide the existing allotment which is 20.6 hectares into two allotments comprising proposed Lot 1 of 14.15 hectares and proposed Lot 2 of 6.42 hectares. Subdivision to a lot size less than 90 hectares can be justified on the following basis:

1. The existing allotment is considered to be of low agricultural value due to the isolation of the site and proximity to the urban area of Hay. The proposed subdivision will accommodate two solar farms on separate lots is not expected to impact on the quantum of agricultural output in the area and will not create conflicts with land uses on adjoining land which are occupied by the Essential Energy substation, a vegetated reserve and an unused rail line.

2. Essential energy only allows connection to a substation from a single property occupied by a solar photovoltaic facility up to a maximum of 5mw. To connect a 10mw system requires that two systems each of 5MW be located on separate lots. In this case, proposed Lot 1 will be occupied by the approved Hay 1A Solar Farm and Lot 2 by the proposed Hay 2A Solar Farm.

3. It is contended that energy production by way of solar photovoltaic panels is a type of primary production. Primary industries are those that harvest or extract raw material from nature. Various jurisdictions include oil and gas extraction and mining as well as agriculture as primary production. By extension this would include harnessing solar radiation for conversion to electricity. It cannot be classified as a secondary industry as there is no manufacturing or processing involved. The *Australian Energy Update 2018*, prepared by the Australian Government Department of Environment and Energy, makes reference to forms of renewable energy that produce electricity directly without a thermal component, such as wind, hydro and solar PV, primary energy production

4. Should there be any doubt that primary production includes electricity generation through the capture of solar radiation and refers only to agriculture, then livestock grazing with sheep is proposed to take place beneath and around the arrays to continue farming of the property.

In this case it is contended that, despite the fact that the use of the land for electricity generating works is prohibited in zone RU1 but permitted by *SEPP (Infrastructure) 2007*, power generation using solar photovoltaic panels is essentially a primary production use that meets the objectives of zone RU1 and that requires a rural location. The solar panels simply harvest sunlight (solar radiation) and convert that resource to electricity in the same way that farming harvests sunlight and water to grow crops. There is no secondary industry or manufacturing involved in the generation of power by sunlight. It is considered that the minimum lot size may be disregarded in this instance and subdivision to less than 90 hectares permitted.

Clause 7.1 Earthworks

The objective of this clause is to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. Development consent is required for earthworks unless the earthworks are ancillary to development for which development consent has been given. In deciding whether to grant development consent for development involving ancillary earthworks, the consent authority must consider:

(a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,
(b) the effect of the development on the likely future use or redevelopment of the land,
(c) the quality of the fill or the soil to be excavated, or both,
(d) the effect of the development on the existing and likely amenity of adjoining properties,
(e) the source of any fill material and the destination of any excavated material,
(f) the likelihood of disturbing relics,
(g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area,
(h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

Earthworks associated with the development comprise minor excavation to 150mm to install road base for accessways, 750mm footings for the inverters and security fence strainer posts, 1,000mm footings for the access gate and 1,500mm footings for the panel mounting frames. Cable trenching of 600mm for low voltage cables and 1,200mm deep trenching is also to be carried out. All of these earthworks are ancillary to the development of a solar farm and are not expected to impact adversely on drainage, future use of the land if the facility if decommissioned, relics, the natural environment or adjoining developments.

Clause 7.10 Essential services

This clause requires a consent authority to be satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required:

(a) the supply of water,
(b) the supply of electricity,
(c) the disposal and management of sewage,
(d) stormwater drainage or on-site conservation,
(e) suitable vehicular access.

The supply of water and sewerage services is not required for the proposed development. Electrical services are available to the site. Stormwater management is proposed to be addressed by controls recommended in this Statement with full details to be provided with the application for a construction certificate. Adequate vehicular access is proposed by way of a new entrance to the site off the Mid Western Highway adjacent the substation.

There are no draft environmental planning instruments that are on exhibition or have been exhibited but not yet published that apply to the site, or that relate to the proposed development of electricity generating works.

4.4 Development Control Plan

There is no development control plan that applies to Lot 110 DP 1187931.

4.5 Land use strategies

4.5.1 Hay LGA Community and Settlement Sustainability Strategy

The *Community and Settlement Sustainability Strategy* was adopted by Hay Shire Council in 2012. It is noted in the strategy that the town of Hay is surrounded by a grid of high voltage feeders and the capacity of the system is adequate to cater to growth.

The strategy contains mapping of sites across Hay LGA that may be contaminated due to chemical storage, buried putrescible waste, sewerage effluent, wool scouring waste, animal carcasses, or fuel and oil storage. Lot 110 is not mapped as being affected by potential contamination.

4.5.2 Riverina Murray Regional Plan

The *Riverina Murray Regional Plan 2036* was released in March 2017. It establishes a framework for growth over the next 20 years for the Riverina Murray Region which includes Hay LGA.

The plan supports the protection of high-value environmental assets and aims to develop a strong and diverse economy with supportive communities. The plan contains the following four goals:

1. A growing and diverse economy
2. A healthy environment with pristine waterways
3. Efficient transport and infrastructure networks
4. Strong, connected and healthy communities

A series of directions and actions are to guide land use planning priorities and decisions. Direction 11 is to *promote the diversification of energy supplies through renewable energy generation*. Actions associated with this direction are:

11.1 Encourage renewable energy projects by identifying locations with renewable energy potential and ready access to connect with the electricity network.

11.2 Promote best practice community engagement and maximise community benefits from all utility-scale renewable energy projects.

11.3 Promote appropriate smaller-scale renewable energy projects using bioenergy, solar, wind, small-scale hydro, geothermal or other innovative storage technologies.

Direction 21 is to *align and protect utility infrastructure investment*. It is noted that there are opportunities to provide cost-effective extended and upgraded services for stand-alone alternative energy generation and the use of renewable options such as solar generation.

5. ENVIRONMENTAL EFFECTS

5.1 Biodiversity

5.1.1 Methodology

A desktop biodiversity assessment has been carried out to determine the impact of the Hay 2A Solar Farm on threatened species and endangered ecological communities. This was supported by a site inspection carried out on 31 January 2019.

The development site is located in the Riverina IBRA Region and is within a rural landscape that has been extensively cleared. It is devoid of any healthy native vegetation and is severely degraded. The site is located about 860 metres north of the Murrumbidgee River at the closest point. There are no watercourses or wetlands within the site. A photograph of the site that demonstrates its current poor condition is given below.

Plate 8: The current condition of the site

The following sources of information and data have been used to determine whether any threatened species or endangered ecological communities occur on or near the site:

- SIX Maps aerial imagery dated October 2013,
- Natural Resources – Biodiversity mapping of *Hay LEP 2011*,
- BioNet Atlas,
- Atlas of Living Australia,
- Mapping by the NSW Office of Environment and Heritage (IBRA regional vegetation mapping, Native Vegetation Regulatory Map, Biodiversity Values Map)
- Schedules to the *Biodiversity Conservation Act 2016,* and
- Protected Matters Report of the *Environment Protection and Biodiversity Act 1999*.

Information concerning the flora and fauna of the Riverina bioregion has been sourced directly from the Office of Environment and Heritage www.environment.nsw.gov.au. The Riverina bioregion includes Hay and surrounding rural land covering the site of the proposed solar farm. Information has also been sourced from the Bionet Atlas, the Biodiversity Values Map and the Native Vegetation Regulatory Map all maintained by OEH.

5.1.2 Hay LEP 2011

Lot 110 DP 1187931 is not shown as being affected by biodiversity on the Natural Resource – Biodiversitiy Map of *Hay LEP 2011* as shown in Figures 5 and 6 below.

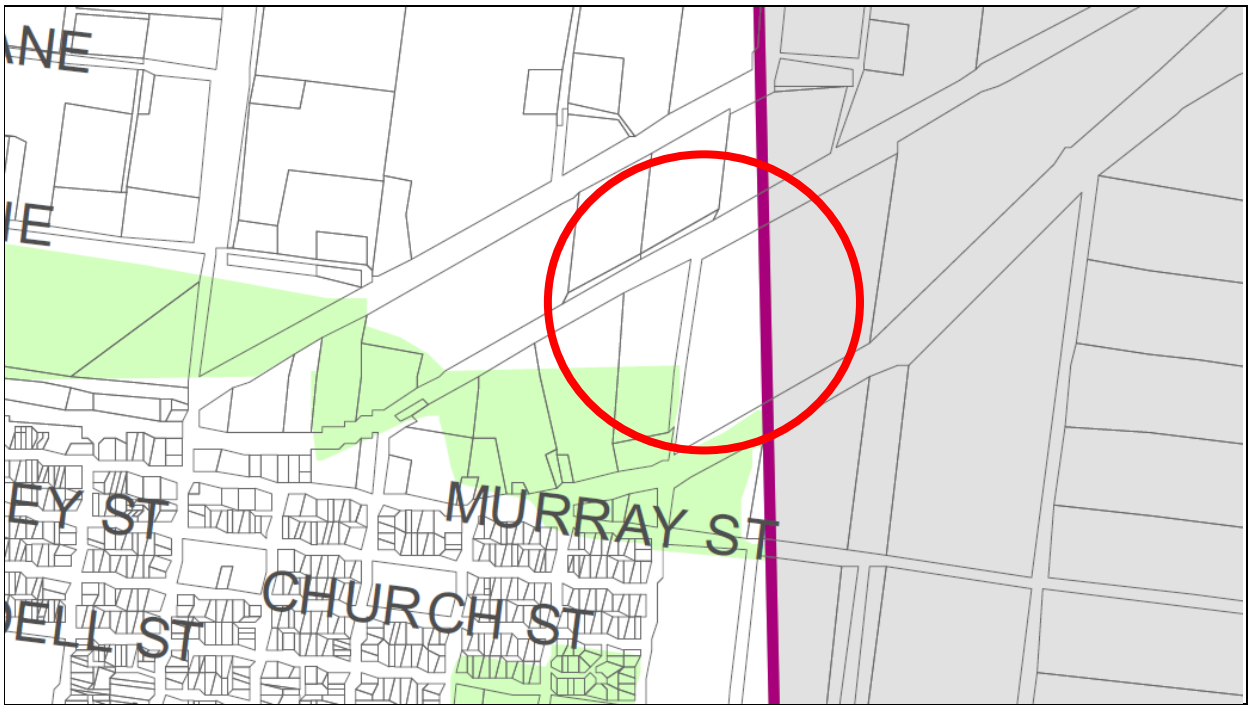

Figure 5: Extract from Hay LEP 2011 Natural Resource – Biodiversity Map Sheet NRB_005

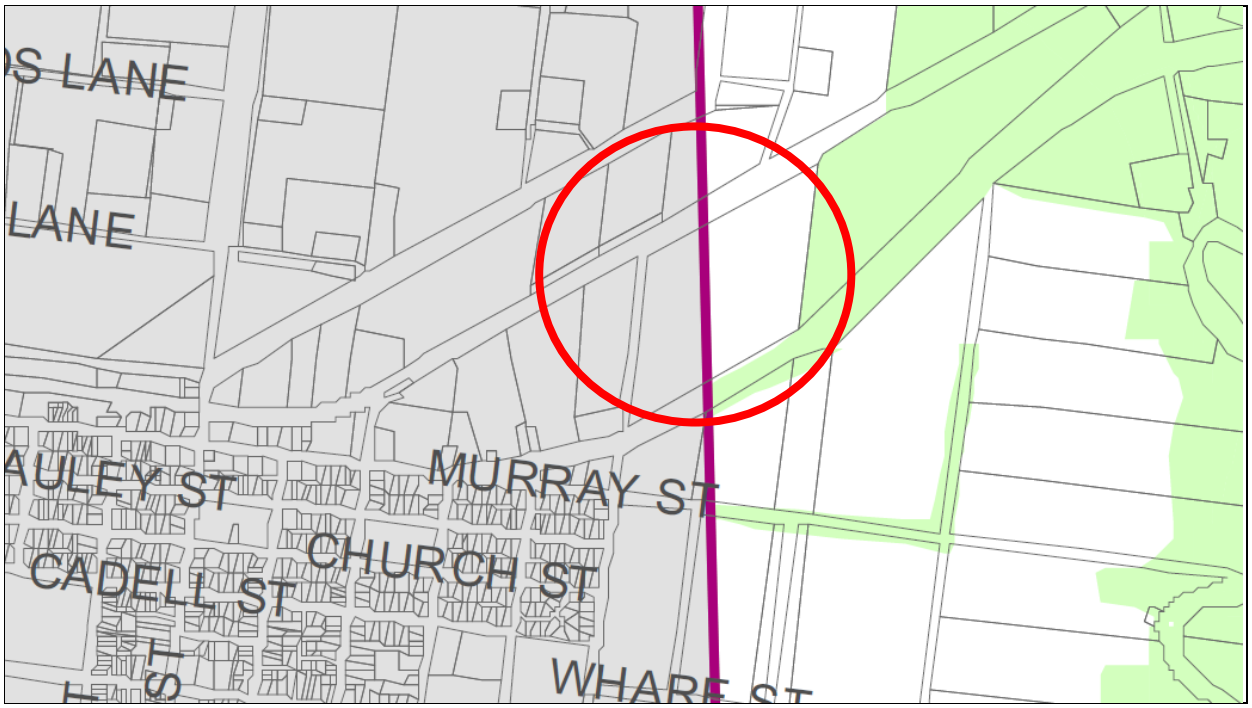

Figure 6: Extract from Hay LEP 2011 Natural Resource – Biodiversity Map Sheet NRB_009

5.1.3 Significant flora

There are 28 threatened flora species listed in the schedules of the *Biodiversity Conservation Act 2016* in the Riverina Bioregion. Of these, 12 are endangered, 15 are listed as vulnerable and one species is considered extinct in the bioregion.

A search of the Bionet Atlas listed six endangered ecological communities found in Hay LGA. These are:

- Acacia loderi shrublands
- Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions
- Allocasuarina luehmannii Woodland in the Riverina and Murray-Darling Depression Bioregions
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions

A search of datasets maintained by OEH was then carried out to produce a map of vegetation communities on land north-east of Hay. These are shown in Figure 7 below. Lot 110 is fully cleared and is not mapped as vegetated. The communities found on adjoining properties to the east and south are:

- Black Box – Lignum woodland wetland of the inner floodplains in the semi-arid (warm) climate zone of the Riverina Bioregion and Murray Darling Depression Bioregion (shaded brown)
- Cotton Bush open shrubland of the semi-arid (warm) zone (shaded purple)

Remnants of these communities are found on land adjoining the immediate area to be developed for the solar farm to the east and along the southern boundary the Mid Western Highway. The cotton bush community is also found along the road reserve of the Mid Western Highway. Neither of the vegetation communities located on adjoining and adjacent land are listed as an endangered ecological community in the *Biodiversity Conservation Act 2016*.

The mapping indicates that there are no remnant endangered ecological communities within the area to be developed for the solar farm which has been fully cleared and used for agriculture. This is supported by aerial imagery.

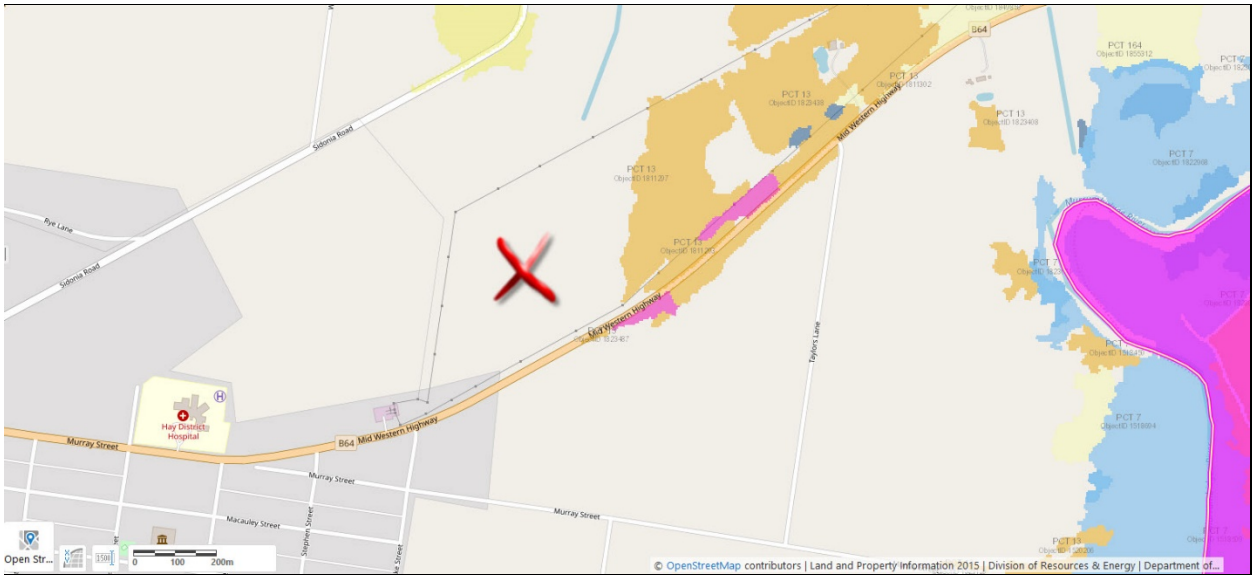

Figure 7: Vegetation communities of the area north-east of Hay. Source: OEH 2018

5.1.4 Significant fauna

Figure 8 below shows the search results from the Bionet Atlas maintained by OEH. Records of species are provided within a 100 square kilometre area surrounding Lot 110. The map indicates that no species have been recorded on the site.

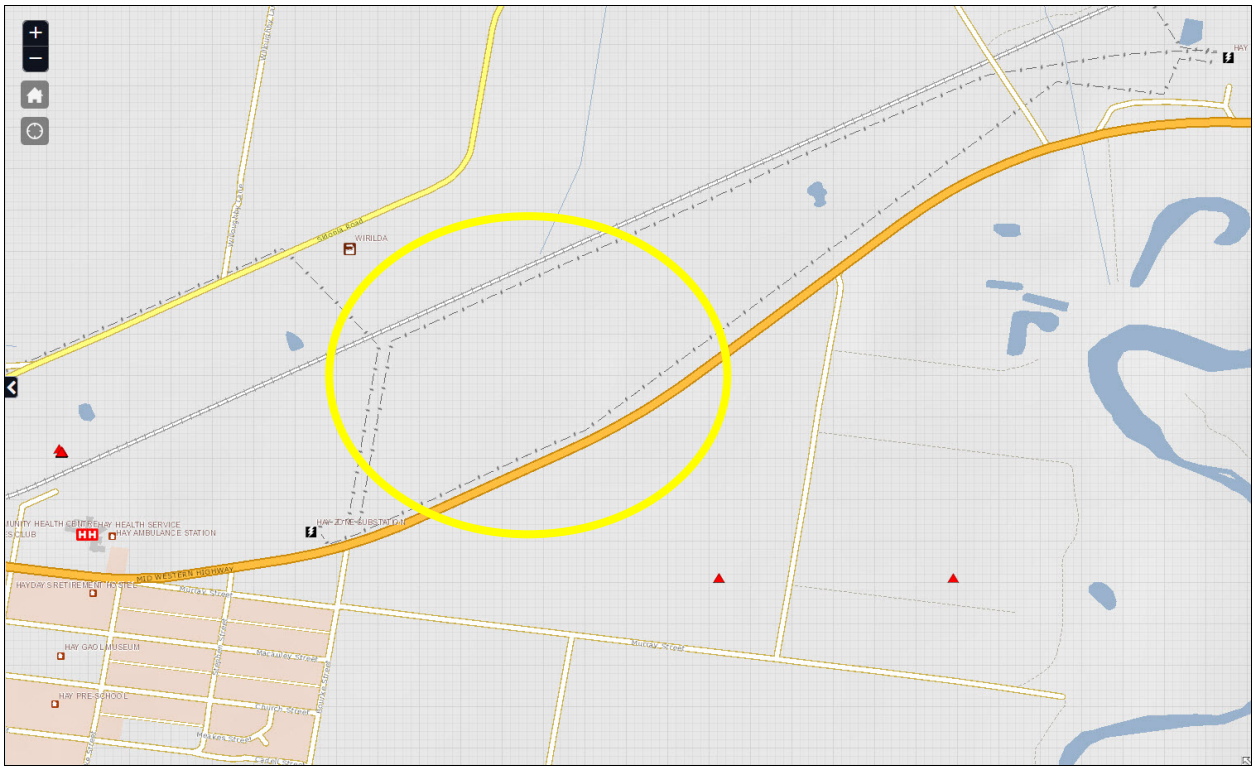

Figure 8: Bionet Atlas map. Source: OEH, 2019

There are 5 species listed as endangered and 11 listed as vulnerable that haves been recorded in the 100 square kilometre area surrounding the site. This is due to the extensive clearing and cultivation of crops that has fragmented the landscape. These species are listed in Table 2 below.

Table 2: Endangered and vulnerable species recorded near the site

Common name	Status
Southern Bell Frog	Endangered
Australian bustard	Endangered
Bush stone-curlew	Endangered
Plains wanderer	Endangered
Bilby	Endangered
Magpie Goose	Vulnerable
Blue-billed duck	Vulnerable
Freckled duck	Vulnerable
Spotted harrier	Vulnerable
Little eagle	Vulnerable
Black falcon	Vulnerable
Superb Parrot	Vulnerable
Brown treecreeper	Vulnerable
White-fronted chat	Vulnerable
Grey-crowned Babbler	Vulnerable
Diamond firetail	Vulnerable

Given that the part of the site to be developed as a solar farm has been fully cleared and used for the cultivation of crops for many years it is not likely that any endangered, vulnerable or threatened species occur on the site. As shown in Figure 9 the map of the Bionet Atlas search indicates that no endangered, vulnerable or threatened species have been recorded on the site.

5.1.5 Biodiversity Values Map

The Biodiversity Values Map is given in Figure 9 below. This map identifies land with high biodiversity value as defined by clause7.3(3) of the *Biodiversity Conservation Regulation 2017*. The Biodiversity Offsets Scheme applies to all clearing of native vegetation and other biodiversity impacts prescribed by the regulation on land identified on the map. The Biodiversity Offsets Scheme is used to determine whether the Biodiversity Assessment Method is to be used to assess the impacts of a development proposal and applies to local development.

The scheme is triggered based on threshold levels of clearing comprising the land area to be cleared and whether the area is mapped on the Biodiversity Values Map. In this case Lot 110 is not mapped as being of high biodiversity value. In this case a minimum lot size of 20 hectares applies to Lot 110. The threshold for clearing of native vegetation above which the Biodiversity Assessment Method applies is 0.5 hectares or more. It is not proposed to clear the land of any native vegetation other than is necessary to bore holes for the establishment of footings, therefore, it is not necessary to engage an accredited assessor to determine the offsets required to enable the project to proceed.

Figure 9: Biodiversity Values Map. Source: OEH, 2018

A test of significance under section 7.3 of the *Biodiversity Conservation Act 2016* is required to be carried out for local development proposals that do not exceed the Biodiversity Offsets Scheme threshold. This

test determines whether the potential impacts of development are likely to significant affect threatened species, ecological communities, and their habitats. Below are the results of the test of significance for the proposed solar farm.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The site has been cleared and farmed for many years and is not known to be inhabited by any threatened species. The Bionet Atlas does not contain any records of species on Lot 110. The development of a solar farm is not likely to adversely effect the lifecycle of any threatened species and pose a threat to the local population of any species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Mapping of vegetation communities indicates that there are no endangered ecological communities located within the site. The area of land to be developed as a solar farm is fully cleared and was formerly farmed.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

It is considered that the site would not act as habitat for any threatened species or ecological community as it has been cleared and was continually farmed for many years.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The site is not mapped as being of high biodiversity value on the Biodiversity Values Map. The development of a solar farm is not likely to have any adverse effect on areas of outstanding value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The development of a solar farm, including the installation of solar PV panels and ancillary facilities, is not listed as a key threatening process in Schedule 4 of the *Biodiversity Conservation Act 2016*.

As can be seen from Figure 10 below, all native vegetation on Lot 110 DP 1187931 has been cleared including the area for the proposed arrays of panels. There are not likely to be any threatened species or endangered ecological communities present on the site.

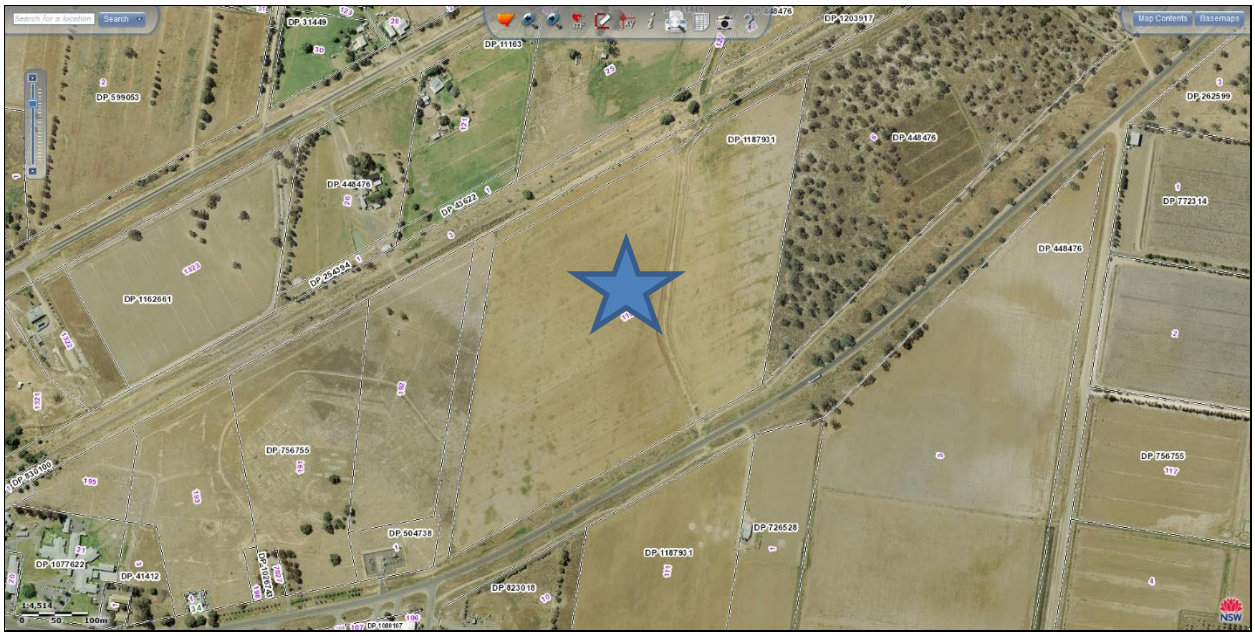

Figure 10: Aerial image of Lot 110. Source: SIX Maps

5.1.6 Native Vegetation Regulatory Map

The Native Vegetation Regulatory Map covers rural land in NSW and categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A Land Management (native vegetation) of the Local Land Services Act 2013. The categories are Category 1 (unrestricted management where clearing is exempt from the LLS Act 2013), Category 2 is regulated land where the LLS Act applies to clearing as either code based, vulnerable or sensitive, and Excluded Land which is not regulated by the LLS Act 2013. The Native Vegetation Regulatory Map for Lot 110 is given as Figure 11 below. This land is not mapped as *sensitive regulated land* (shown in pink) or *vulnerable regulated land* (shown in yellow).

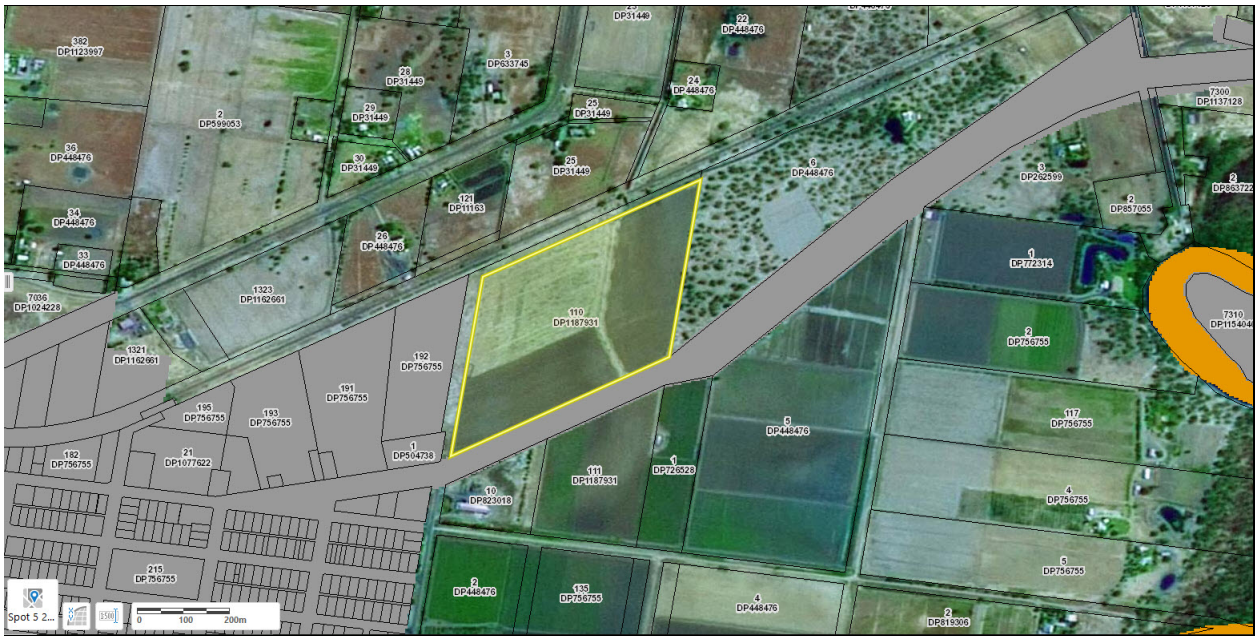

Figure 11: Native Vegetation Regulatory Map. Source: OEH, 2018

5.1.7 Environment Protection & Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* affords protection for seven matters of national environmental significance. These matters are world heritage properties, national heritage places, wetlands of national importance, listed threatened species and ecological communities, migratory species, commonwealth marine areas and nuclear actions including uranium mines. Actions that have, or are likely to have, a significant impact on a matter of national environmental significance require the approval of the Australian Government Minister for the Environment and Energy.

Actions include but are not limited to construction, expansion, alteration or demolition of buildings, structures, infrastructure or facilities; storage or transport of hazardous materials; waste disposal; earthworks; impoundment, extraction and diversion of water; research activities; vegetation clearance; military exercises and use of military equipment; and sale or lease of land.

It is the responsibility of the Minister to decide whether assessment and approval is required under the *EPBC Act*. Currently there are 4 wetlands of international importance, 3 listed threatened ecological communities, 25 listed threatened species of flora and fauna, and 10 listed migratory species of flora and fauna protected under the *EPBC Act* within Hay LGA. The provisions of the *Environment Protection and Biodiversity Conservation Act 1999* may apply to the development of a solar farm, however, the search of the Bionet Atlas indicates that there are no recorded threatened or migratory species, or threatened ecological communities on the site. The EPBC Protect Matters Report is appended as Attachment A.

The site to be developed as a solar farm is fully cleared and has been used for farming. There are no wetlands, threatened ecological communities or threatened species listed under the EPBC Act likely to occur on the site. There is no development proposed within 80 metres of the boundary to land occupied by a remnant vegetation community at the closest point and the development will not have a significant impact on a matter of national environmental significance. Referral to the Commonwealth Government is not necessary.

5.1.8 Mitigation measures

Land to the east and south of the subject site is mapped as Natural Resources – Biodiversity in *Hay LEP 2011*. A setback of the security fence of the solar farm of 3 metres to the boundary of adjoining land to the east is proposed at the closest point and a setback of 5 metres between the array and fence, giving a total setback to the eastern boundary of 8 metres. The highway separates sensitive land to the south. To avoid interference with the vegetation community located on the adjoining land it is recommended that any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area. Access to the site is to be limited to that point shown on development plans and within the development area. Storage of materials is to be carried out wholly within the development area.

5.2 Natural hazards

5.2.1 Flooding

The site is not mapped as being flood prone in *Hay LEP 2011*, however, aerial imagery indicates that there is the potential for limited localised flooding. Flood mitigation measures and stormwater management have been considered in section *4.3 Water resources* of this Statement.

The north-eastern corner of the site is potentially affected by localised flooding. This potential is not a threat to the development or ongoing operation of the solar farm and nor will the solar farm adversely affect the flow of waters to any significant degree. However, mitigation measures are proposed in the water assessment and will be included in an environmental management plan for the facility.

5.2.2 Bushfire

The site is mapped as being bushfire prone. The south-eastern corner of the site is a buffer to land mapped as bushfire category 1 to the south of the Mid Western Highway. Infrastructure comprising electricity generating works is not a habitable building and is not listed as a *special fire protection purpose* under section 100B of the *Rural Fires Act 1997*. Therefore, a bushfire assessment is not required to be prepared and submitted with the development application. The development of a solar farm would not affect the performance of the buffer to bushfire prone land to the south.

5.3 Water resources

5.3.1 Assessment of impacts

A desktop assessment of potential impacts on groundwater and surface water flows has been carried out for the Hay 2A Solar Farm by Golder Associates Pty Ltd. It examines:

- Local hydrology and catchment and water quality data,
- Surface and groundwater quality data,
- Flood-risk potential of the site,
- Impacts of the development against NSW policies and industry standards, and
- Management procedures and mitigation measures for construction and operation.

It is noted that the site is located within the Hay Private Irrigation District and the Murrumbidgee Valley district of the Murrumbidgee regulated river system. Funding has been secured to upgrade the irrigation delivery system for an open channel to a low pressure pipeline. Data for rainfall and stream monitoring are included in the assessment.

Potential adverse impacts to the site may be due to surface water conditions including impediments to site accessibility and managing downstream nuisance.

The site is not shown as groundwater vulnerable under clause 6.9 of *Hay LEP 2011*. Although within the broader Murrumbidgee River catchment area which has a history of rising groundwater levels over the longer term in certain areas, this is not expected to be a concern at the site.

Flooding associated with the Murrumbidgee is not expected to inundate the site as it is located north of a levee that protects the Hay township from flooding. The levee consists of a combination of embankments, elevated roadways and naturally high ground. However, localised flooding may disrupt construction and material storage on the site even when the site is not inundated. Monitoring of rainfall and stream gauges is recommended during construction.

There is the potential for increased runoff on site due to the solar arrays. This may cause erosion at the base of solar panels due to soil type and lack of ground cover. Noting that the site has been used for agriculture and there is very little groundcover, there is the potential for runoff containing sediments which could increase the turbidity and water quality in downstream waterways.

5.3.2 Mitigation measures

It is recommended that:

Table 3: Proposed mitigation measures to manage downstream sedimentation

Stage	Measure	Activities/approach
Design	Site drainage and water quality controls	Design Basis • Undertake hydrological assessment of the site's catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff • Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008). • Develop a site erosion and sediment control plan in accordance with the Blue Book. • Develop site drainage design incorporating detention basins and sedimentation management structures where relevant. • Permanent site drainage should coincide with temporary arrangements where possible
Construction and/or demolition	Site drainage and water quality controls	General site works: • Catch drains to be located downslope of any proposed road works. • Install location appropriate sediment fences or other applicable control measures depending on whether the feature is upstream or downstream of a disturbed part of the site or will need to be trafficable. • All stormwater collection points need to have appropriate sedimentation and erosion controls. • Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness. • Vibration grids or wash bays at all construction exits. • Level spreaders at locations where concentrated flow is discharged offsite to ensure sheet flow like conditions are maintained. • Flat land erosion control options include erosion control blankets, gravelling, mulching, soil binder, turfing and revegetation
Construction and/or Demolition	Stormwater point source control	In the event of concrete works: • Do not undertake works if chance of heavy rain. • Store rinsate water, if applicable, separately to other water on site and dispose of offsite as appropriate. • Block on site drains in the area of the works and remove any contaminated runoff. In the event that dewatering practices are required: • Elevate pump hose intakes for withdrawing water from excavations to minimise sediment pumping and direct hose to a containment area for settling prior to discharge of water. • Limit direct discharge off site (consistent with the design requirements for sediment pond discharge). • Stormwater collected on site should be reused where possible. Controls should be inspected and maintained on a regular basis. All water released from sediment basins should be clear or disposed of off site by vehicle.

Stage	Measure	Activities/approach
		• Material and waste storage areas should be designed and operated to minimise interaction with surface waters. • Vehicle washdown areas should be located away from water courses

5.4 Air quality

5.4.1 Assessment of impacts

The Office of Environment and Heritage maintain an air quality monitoring station in Hay at the Bureau of Meteorology airport site. The instruments used at most rural network sites are low cost indicative particulate monitors that respond to all aerosols including smoke and fog.

Total Suspended Particles (TSP) are measured at this station. Data is collected in 15 minute intervals and reported hourly on the OEH website. Total suspended particulates are solid particles and liquid droplets 100 micrometres or less in diameter. They come from natural and human-made sources, such as pollen, bushfires and motor vehicle emissions. Dust emissions are also a source of air pollution in the hot, dry climate of Hay and can cause poor air quality.

Particles are measured as PM_{10} and $PM_{2.5}$. PM_{10} are particles less than 10 micrometres in diameter. Sources include crushing or grinding operations and dust stirred up by vehicles on roads. Particles less than 10 micrometres in diameter are measured as an hourly average reading of 7 at Hay in the morning on Thursday 12 December 2019. $PM_{2.5}$ are fine particles less than 2.5 micrometres in diameter. Sources include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. Particles less than 2.5 micrometres in diameter are measured as an hourly average reading of 2 at Hay in the morning on Thursday 12 December 2019. Total suspended particles have an average hourly reading of 8 on Thursday 12 December 2019.

Activities that disturb the earth's surface and that is carried out with the use of machinery have the potential to generate dust emissions. This may be exacerbated by wind exposure to an exposed ground surface.

The previous use of the land for farming may have involved regular tilling, sowing and harvesting that may create dust and impact on air quality. The current condition of the land is poor due to the loss of vegetation leading to exposed soil surfaces. The construction of the solar farm will not involve extensive earthworks and only excavation for footings for the array framework and ancillary structures will be carried out. Along with the delivery of materials using heavy vehicles, these construction works may generate dust, however, once operational the change of use of the land from agricultural to solar photovoltaic electricity generation is expected to reduce particulate emissions and lead to an improvement in local air quality. Vehicle movements would be restricted to internal access roads and the majority of the site would be revegetated with pasture grasses.

5.4.2 Mitigation measures

To minimize dust generation during the construction and operational phases the following mitigation measures are proposed:

During construction:

- Limit vehicle movements to areas necessary to deliver panels, ancillary structures and equipment
- Suppress dust emissions using watering and cease works during dry and windy conditions
- Ensure ground disturbance is limited to areas necessary to place footings or to be used for access
- Ensure minimal handling of excavated materials
- Ensure stockpiles of excavated material is bunded and protected from wind and vehicle movements

During operation:

- Grade and add road base to internal accessways
- Revegetate the site with suitable endemic native groundcover immediately construction works are completed
- Ensure all plant and equipment operates in accordance with specifications

5.5 Noise

5.5.1 Assessment of impacts

An assessment of the impacts of noise emissions was carried out for the approved Hay 2A Solar Farm by Muller Acoustic Consulting. The purpose of the noise assessment is to quantify potential environmental noise emissions associated with the construction and operation of the project. Where impacts are identified, recommendations are made to mitigate and manage noise.

The assessment includes the following key tasks:

- review construction and operating activities to identify key noise generating plant, equipment, machinery or activities proposed to be undertaken as part of the project;
- identify the closest and/or potentially most affected receptors situated within the area of influence to the project;
- establish existing noise levels to determine project-specific construction Noise Management Levels (NMLs), and operational noise criteria;
- undertake 3D noise modelling to predict levels that may occur as a result of the construction and operation of the project at the closest and/or potentially most affected receptors;
- provide a comparison of predicted noise levels against relevant construction NMLs and operational criteria;

- assess the potential noise impacts associated with construction and operational aspects of the project; and
- provide feasible and reasonable noise mitigation and management measures, and monitoring options, where NMLs or operational criteria may be exceeded.

The assessment has been conducted in accordance with the following key policy and guidelines where relevant:

- NSW Department of Environment and Climate Change, NSW Interim Construction Noise Guideline (ICNG), 2009,
- Environment Protection Authority's (EPA's), Noise Policy for Industry (NPI), 2017,
- NSW Department of Environment, Climate Change and Water (DECCW), NSW Road Noise Policy (RNP), 2011.
- Australian Standard AS 2436–2010 (R2016) (AS 2436) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance sites,
- Australian Standard AS 1055:2018 – Description and Measurement of Environmental Noise,
- Australian Standard AS IEC 61672.1–2004 (AS 61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring, and
- Australian Standard AS IEC 60942-2004 (AS 60942) – Electroacoustics – Sound Calibrators.

A number of potential noise sensitive receptors were identified as listed in Table 4 and shown in Figure 12 below. These receptors comprise residential and commercial properties.

Table 4: Noise sensitive receptors

ID	Description/address	Coordinates (MGA55)	
		Easting	Northing
R1	Rural Receiver Mid Western Highway	303796	6180333
R2	Suburban Receiver Murray Street & Bourke Street	303284	6180070
R3	Suburban Receiver Bourke St	303262	6179936
R4	Suburban Receiver Murray Street & Stephen Street	303065	6180094
R5	Suburban Receiver Mid Western Highway (House)	302984	6180214
R6	Rural Receiver Sidonia Road	303235	6180817
R7	Rural Receiver Sidonia Road	303324	6180982
R8	Rural Receiver Sidonia Road	303605	6181131
R9	Rural Receiver Piper Street	303833	6181210
R10	Rural Receiver Between Piper Street & Mid Western Highway	304319	6181165
R11	Rural Receiver Mid Western Highway	304655	6181107
R12	Rural Receiver Taylors Lane	304786	618075
R13	Rural Receiver Taylors Lane	304878	6180320
R14	Rural Receiver Taylors Lane	304767	6180127

ID	Description/address	Coordinates (MGA55)	
		Easting	Northing
C1	Commercial Receiver Bourke Street	303300	6180165
C2	Commercial Receiver Bourke Street	303380	6180147
H1	Hay Hospital	302814	6180249

Figure 12: Location of noise sensitive receptors

Construction and operational noise levels were predicted to each assessed receptor assuming receiver heights of 1.5m above ground level for typical construction activities and allowing for road traffic noise.

The findings of the assessment are that construction noise levels satisfy the relevant construction NMLs at all receiver locations. Operational noise levels also satisfy the criteria for assessed receptors.

There are no noise related issues which would prevent the approval of the project. The results of the assessment shows compliance with the relevant operational and road noise criteria, accordingly, no ameliorative measures will be required.

5.5.2 Mitigation measures

The following mitigation measures are recommended to address noise emissions during the construction phase:

- a construction noise management protocol to minimise noise emissions, manage out of hours (minor) works to be inaudible, and to respond to potential concerns from the community,
- where possible use localised mobile screens or construction hoarding around plant to act as barriers between construction works and receivers, particularly where equipment is near the site boundary and/or a residential receiver including areas in constant or regular use (e.g. unloading and laydown areas),
- operating plant in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations,
- selection of the quietest suitable machinery available for each activity,
- avoidance of noisy plant/machinery working simultaneously where practicable,
- minimise impact noise wherever possible,
- utilise a broadband reverse alarm in lieu of the traditional high frequency type reverse alarm,
- provide toolbox meetings, training and education to drivers and contractors visiting the site during construction so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities,
- signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site, and
- utilise project related community consultation forums to notify residences within close proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.

It is recommended that noise emissions from the solar farm be minimised when operational. To assist in noise management, it is recommended that a one-off noise validation monitoring assessment be completed to quantify emissions from the site and to confirm that relevant criteria are satisfied.

5.6 Electromagnetic radiation

5.6.1 Potential radiation sources

The information presented in this section has been sourced from the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). It includes a description of the type of electromagnetic radiation that may be produced by the generation and distribution of electricity.

The generation, distribution and use of electricity can produce extremely low frequency (ELF) electric and magnetic fields (EMF) from electrically charged particles. The electric field is produced by the voltage whereas the magnetic field is produced by the current. The strength of the electric field is measured in units of volts per metre whilst the strength of the magnetic field is expressed in units of tesla (T), microtesla (μT), gauss (G) or milligauss (mG).

ELF EMF is produced by both natural and artificial sources. Naturally occurring ELF EMF is associated with atmospheric processes such as ionospheric currents, thunderstorms and lightning. Artificial sources are the dominant sources of ELF EMF and are usually associated with the generation, distribution and use of electricity at the frequency of 50 or 60 Hz. The widespread use of electricity means that people are exposed to ELF electric and magnetic fields in the home, in the environment and in the workplace.

According to the Australian Radiation Protection and Nuclear Safety Agency, which maintains continual oversight of emerging research into the potential health effects of the EMF exposure, there is no established evidence of health effects from exposure to electric and magnetic fields from powerlines, substations, transformers or other electrical sources, regardless of the proximity, causes any health effects.

5.6.2 Mitigation measures

The location of the solar farm and the distance separation between nearby dwellings and the site mean that any impacts on health are mitigated. No additional mitigation measures are proposed.

5.7 Traffic and access

5.7.1 Existing access arrangements and proposed movements

An assessment of the impacts on traffic and the adequacy of access arrangements was carried out for the Hay 2A Solar Farm by Price Merrett Consulting. The assessment includes a description of the existing road network and notes that the Mid Western Highway is a NSW State Highway servicing the Central West and Riverina regions and is part of the most direct route between Sydney and Adelaide. Lane widths near the western boundary of Lot 110 are approximately 3.5 metres wide with 0.8 metres of sealed shoulders and 0.6 metres of unsealed shoulder. The speed limit ranges from 50 km/hr at the western boundary to 110km/h approximately 165 metres from that point.

Existing access to the development site is via the Mid Western Highway at a point approximately 115 metres west of the eastern boundary. However, a new access point sufficient to accommodate a 19 metre long vehicle was approved with the Hay 1A Solar Farm at the south-western corner of Lot 110 adjacent the Essential Energy sub-station and within the 50 km/hr speed zone.

Proposed traffic generation for the Hay 2A solar farms is estimated based on 48 semi-articulated trucks and 20 B-Doubles accessing the site during the establishment and construction phases with an expected daily maximum of 4 construction vehicles accessing the site during peak construction periods. The assessment also allows for up to 50 personnel accessing the site each day during the construction period by 20 to 30 small motor vehicles and/or a shuttle bus service.

The approved entry point for the Hay 1A Solar Farm is adequate to accommodate the heavy vehicles and small vehicles that will be accessing the site during construction of the Hay 2A Solar Farm. Sight lines at this access point are adequate and there are no major geometry issues. An easement will be required to enable vehicles to utilise the internal access way through proposed Lot 1 to access proposed Lot 2.

5.7.2 Mitigation measures

The following mitigation measures are recommended:

- install a new culvert under the proposed new access,
- the new access point is to be designed and constructed to a standard to accommodate the initial construction phase, and
- construction vehicle signs should be erected during the construction phase to notify motorists travelling along the Mid Western Highway.

5.8 The community and economy

5.8.1 The population

The population of Hay state suburb in 2016, as defined by the Australian Bureau of Statistics and which includes the development site and rural land surrounding the settlement of Hay, was 2,406 persons of which almost 80% were born in Australia. The total population of Hay local government area in 2016 was 2,946 persons.

Occupied private dwellings accounted for 79.7% of dwellings in Hay state suburb and 20.3% were unoccupied. Over 90% of dwellings were separate houses and 7% were medium density dwellings.

Unemployment at the time of the 2016 Census of Population and Housing was 4.9% of the labour force comprising persons aged 15 years and over in Hay state suburb. The highest property of employed people were labourers with significant proportions employed as technicians and trade workers, managers, and machinery operators and drivers. The top industries of employment were supermarket and grocery stores, local government administration, accommodation and sheep farming. Employment in these sectors accounted for 17.4% of the labour force in Hay state suburb.

5.8.2 Change of use of agricultural land

The development site is categorized as class 5 on Land Capability Mapping maintained by the former Office of Environment & Heritage. Class 5 is moderate–low capability land which has high limitations for high-impact land uses. Uses are largely restricted to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation (*The land and*

soil capability assessment scheme – A general rural land evaluation scheme for NSW, 2nd Approximation, OEH).

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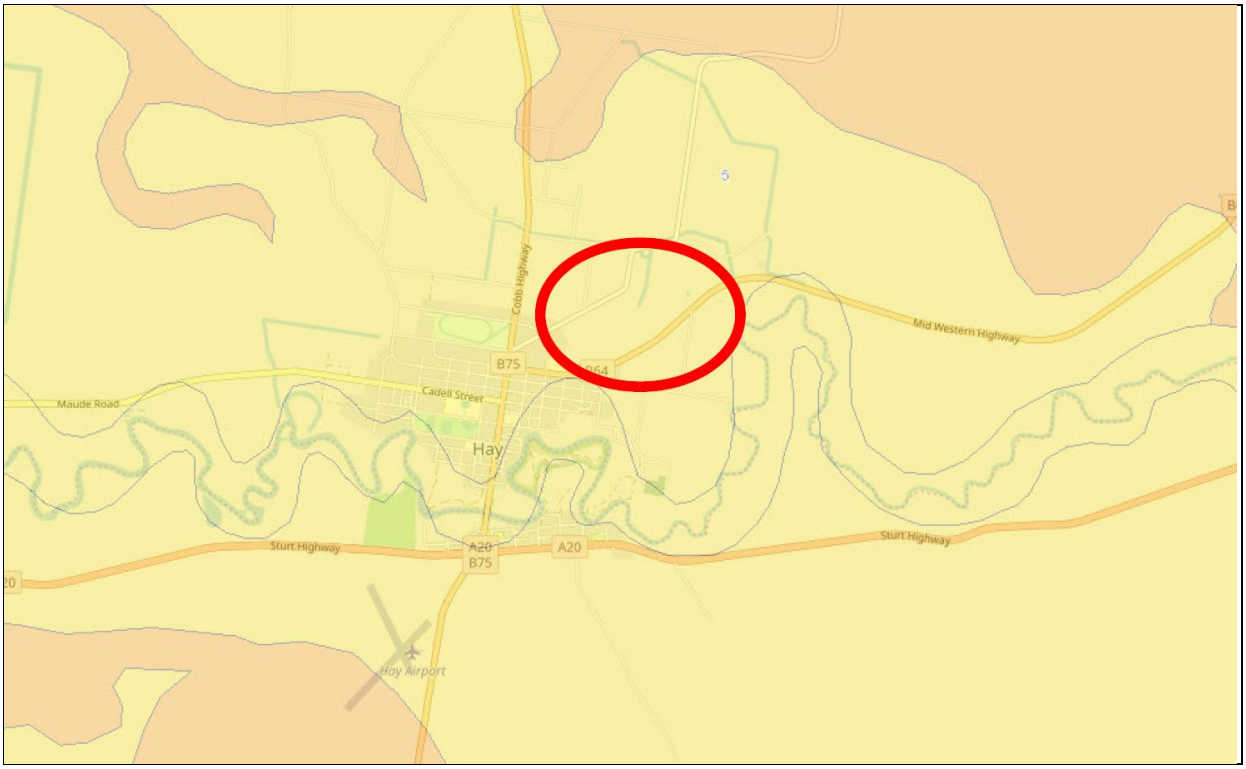


Figure 13: Land capability map. Source: OEH

The development site is currently unused. The loss of agricultural land due to the development of the Hay 2A Solar Farm would be minimal and temporary. It would be offset by the contribution that the solar farm will make to the local economy through direct and indirect employment and expenditure over the short term and through the benefits that renewable energy power supply will bring to the region. The land area to be occupied by the solar farm represents a fraction of the total agricultural land in the Hay district.

If necessary and practical in terms of security, the land surrounding panel arrays can continue to be used for livestock grazing during the operation of the solar farm. The arrays of panels can be removed once the facility is decommissioned and the land can be returned to agricultural use. It is considered that the impact in terms of loss of productive agricultural land should be seen in the context of the impacts on farmland of other forms of power generation, for example, fracking for coal seam gas, and mining for coal and uranium as well as the infrastructure to support the processing of coal and gas.

5.8.3 Employment

The solar PV system is designed to generate approximately 9.3 GWh of energy annually with the system offsetting around 8,000 tonnes of CO^2 equivalent emissions (Sources: *National Greenhouse and Energy*

Reporting (Measurement) Determination 2008 (Schedule 1) and Department of the Environment and Energy) and providing enough energy to power about 1,400 NSW homes.

Although power will be transmitted to the grid, the benefit to the community will be through an understanding of sustainable development and by gaining a commitment to greater reliance on renewable energy. Similarly, the clustering of solar power generation would bring regional economic development benefits as the Riverina area gains a reputation as a suitable location for renewable energy and linked industries.

It is anticipated that there will be 50 personnel directly involved in construction on site which is expected to take approximately two and a half months. Varying levels of expertise will be required ranging from labourers to qualified electricians and project managers.

In addition, personnel would be involved in transport and delivery of materials to the site. Some of this employment is to be sourced locally. This will bring direct economic benefits to the local economy through wages and salaries and indirect benefits through the need for accommodation and sustenance in the area for non-local employees.

Once operational the site will be unmanned, however, two to three personnel will be necessary to carry out maintenance every quarter or as required.

The skills required to be involved in the construction and ongoing maintenance of Hay 2A Solar Farm may require some personnel to undergo further training and education, leading to an upskilling of the local workforce and enhanced employment opportunities generally.

A search of visitor accommodation in Hay using www.visithay.com indicates that visitor accommodation in Hay comprises four caravan parks and 21 hotels, motels, farmstays and guesthouses. In addition to these establishments there are short term rentals, unoccupied private dwellings and unregulated accommodation places. There were 225 unoccupied private dwellings in Hay state suburb and a total of 294 across Hay LGA at the time of the 2016 census. It is considered that there is adequate accommodation available to cater to the expected number of construction workers even if all are sourced from outside the Hay area and require temporary local accommodation.

5.8.4 Summary and mitigation measures

In summary:

- The development of a 5MW solar farm will contribute to the electricity grid in a sustainable manner that reduces greenhouse gas emissions and will assist the transition of our economy from reliance on fossil fuels to renewable sources to decarbonise electricity production

- The solar farm will assist Commonwealth and NSW Governments to achieve targets and objectives relating to emissions and addressing climate change
- The solar farm will generate community economic benefits through local employment opportunities during the planning and construction phases as well as limited maintenance and inspection jobs once operational. The development of a solar farm will create a new market for local contractors and expand diversity of income for the land holder
- The loss of productive agricultural land is minimal and temporary. The arrays of panels can be removed once the facility is decommissioned and the land can be returned to agricultural use
- The land surrounding panel arrays can continue to be used for farming purposes such as the the grazing of sheep during the operation of the solar farm
- Any impacts on the natural environment including the scenic quality of the rural landscape are minimal and can be mitigated. Alternatively, the natural environment may benefit such as through the restoration of native grasses in and around panel arrays

It is recommended that labour to construct the solar farm and for ongoing maintenance be sourced from within Hay LGA wherever possible. Where labour needs to be brought into the Hay area, it is considered that there would be sufficient accommodation options for employees in the LGA for the estimated 50 workers engaged during the construction phase. The level of visitor accommodation available in the local government area suggests that there is adequate accommodation to cater to the volume of workers during the construction period.

There is likely to be negligible effects on the availability of affordable rental over the short construction period as it is not expected that landlords would evict long-term tenants in preference of short term workers. Workers coming to the area would be likely to take up tourist accommodation similar to mine workers across country NSW, however, construction may be limited to the off-peak tourist season if necessary.

It is recommended that advertising be placed in local media and to approach local businesses to determine whether there is the capacity and expertise available in Hay and surrounding districts to participate in the construction and ongoing maintenance activities.

5.9 Heritage

5.9.1 Indigenous heritage

The following information concerning the history of Aboriginal community in the Riverina bioregion has been sourced directly from the Office of Environment and Heritage www.environment.nsw.gov.au.

Aboriginal people have been present in the Murray-Darling Basin for at least 40,000 years. The Riverina Bioregion was the original homeland for many large Aboriginal communities that lived on the Hay Plain and around the rivers. This included the Wiradjuri people that inhabited a vast area straddling the

Murrumbidgee River including the Hay area. Relics of Aboriginal presence are common along the river systems, including scar trees used to cut bark for canoes, human burial sites, camping sites and middens.

The generic due diligence process outlined in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* was implemented to ensure that an adequate due diligence process that addresses Aboriginal cultural heritage issues has been carried out. This process follows the following five steps:

1. Will the activity disturb the ground surface?

Earthworks will involve trenching which is required for cabling of each PV array/module to inverters and a substation. Other earthworks would be pile-driving to support module frames, and to enable the placement of concrete slabs and gravel accessways. Most of the infrastructure would be pre-fabricated off-site, delivered and assembled on-site.

2a. Search the AHIMS database

In accordance with the code, an on-line search was carried out of the *Aboriginal Heritage Information Management Service (AHIMS)* that is maintained by the Office of Environment and Heritage. The search is part of the due diligence process and remains valid for 12 months. The search results are appended as Attachment B.

A search of Lot 110 DP 1187931 was performed on 6 February 2019. The search results are:

- There are no Aboriginal sites recorded in or near the selected location, and
- There are no Aboriginal places that have been declared in or near the selected location.

It is noted that surveys for Aboriginal objects have not been carried out in all parts of NSW and Aboriginal objects may exist on a parcel of land even though they have not been recorded in *AHIMS*.
Further, not all known Aboriginal sites are registered on the *AHIMS* database and not all sites consist of physical evidence or remains, e.g. dreaming and ceremonial sites.

2b. Activities in areas where landscape features indicate the presence of Aboriginal objects

The site does not possess landscape features that indicate the presence of Aboriginal objects.

3. Can you avoid harm to the object or disturbance of the landscape features

Not applicable as the site has been disturbed and farmed, does not possess significant landscape features and no known Aboriginal objects are listed in *AHIMS*.

4. Desktop assessment and visual inspection

Not applicable as the site has been disturbed and no known Aboriginal objects are listed in *AHIMS*.

5. Further investigations and impact assessment

An extensive search of *AHIMS* records, is not necessary given that there are no recorded sites or places at Lot 110 DP 1187931 Mid Western Highway, Hay.

However, contact has been made with a representative of Hay Local Aboriginal Lands Council who advised that there may be relics such as artifacts in the area and it would be appropriate for a representative of the LALC to be on site during works that require ground disturbance. Hay Shire Council may recommend a condition to this effect.

Council may also impose a condition of consent to comply with provisions of the *National Parks and Wildlife Act 1974* should any evidence of Aboriginal occupation be found during site works. An *Aboriginal Heritage Impact Permit* may be required to be obtained if indigenous heritage objects are found.

5.9.2 Non-indigenous heritage

The following information about the European settlement of the Hay are has been sourced from the Hay Historical Society website http://users.tpg.com.au/hayhist/.

Hay is located in the western Riverina region of New South Wales. The township began as a crossing-place on the Murrumbidgee River, for stock being driven south to markets in Victoria during the gold-rushes of the 1850s. The site was eventually surveyed in 1859 and Hay quickly developed as an important hub for the surrounding pastoral holdings, with their fat-stock and wool production.

During its earliest days Hay's economy was linked to the navigation by steam-boats of the Murrumbidgee, and it became an important port. The town and district was also extensively serviced by horse- and bullock-driven wagons. In 1882 the railway was extended to Hay, linking the town directly with regions to the east, including Sydney.

There are 19 heritage properties in Hay that are listed in *Schedule 5 Environmental heritage* of *Hay LEP 2011.* These are given in Table 5 below. All of these properties have been assessed to be of local heritage significance other than the former Hay gaol, the post office and the Hay railway station and yard group which are of state significance.

Table 5: Extract from Schedule 5 Environmental heritage of Hay LEP 2011

Property	Address
Lake Merrimajeel	As defined on the LEP Heritage Map
Murrumbisdgil Swamp	As defined on the LEP Heritage Map
St Andrew's Presbyterian Church	Bank Street
Former Sewer Treatment Works	Brunker Street
Former Hay Gaol	355 Church Street
John Witcombe Memorial Drinking Fountain	Cnr Lachlan and Moppett Streets,
Westpac Bank	112 Lachlan Street
Post Office	120 Lachlan Street
Lands Board Office	126 Lachlan Street
Hay Shire Council Chambers	134 Lachlan Street
Commercial Hotel	195–199 Lachlan Street
Gatekeepers' Cottages	262–264 Lachlan Street
Sturt's Marked Tree	Mid Western Highway Road Reserve
Hay Courthouse	416–420 Moppett Street
St Fergal's Roman Catholic Presbytery	429 Moppett Street
Hay Railway Station and yard group including Hay Railway Station, Station Master's House, Water Tower and Railway Porters' Cottages	Narrandera– Hay Railway
Presentation Convent	Cnr Pine and Orson Streets
St Paul's Pro-Cathedral	185 Pine Street
Former Terminus Hotel	260 Pine Street

Lot 110 DP 1187931 is not listed as an item of environmental heritage in *Schedule 5 Environmental heritage* of *Hay LEP 2011* and there are no listed heritage items in the vicinity of the site. The closest item to the site, the former goal, is located within the urban area of Hay which is some 600 metres to the south-west at the nearest point to the site.

5.9.3 Mitigation measures

No mitigation measures are necessary in relation to non-indigenous heritage.

In relation to indigenous heritage, further consultation should be carried out with the Hay Local Aboriginal Lands Council prior to commencing site works and construction to determine whether it is necessary for members of the local indigenous community to be present on site during ground-disturbing works.

5.10 Glare and glint

5.10.1 Potential glare and glint

Glare is defined as a continuous source of excessive brightness relative to ambient lighting. Glint is defined as a momentary flash of bright light. Solar photovoltaic (PV) panels are constructed of dark, light-absorbing material and covered with anti-reflective coating. In order to maximise the efficiency, the panels are designed to limit reflection and to absorb around 98% of the light received. The glare generated from solar panels is significantly lower than many other surfaces, including water, however, the glass panels and metal frames have the potential to generate glare and glint. An assessment of the potential glare and glint generated by the proposed solar farm is necessary to ensure visual receptors such as road users, air traffic control towers and pilots are not impacted by the development of solar farms.

In a fixed PV solar array, the angle of incidence varies as the sun moves across the sky, that is, the angle of incidence is at its lowest around noon where the sun is directly overhead and increases in the early mornings and late evenings as the incidence angles increase. The variation of the angle is reduced where the PV array is mounted on a single axis tracking system whereby the panels rotate to remain perpendicular to the sun as proposed in the Hay 2A Solar Farm. Therefore, an array mounted on a tracking system has less potential to cause glare whilst it tracks the sun.

A desktop assessment has been carried out by ITP Renewables using the Solar Glare Hazard Analysis Tool. The assessment is based on identifying the potential sensitive receptors and then assessing the potential glare and glint hazard and impacts on those receptors using the tool. Glare resulting from PV solar farms is analysed at different viewpoints based on the location, orientation and specifications of the solar panels. Mitigation measure are recommended to reduce potential impacts to an acceptable level. This tool is used by the United States Federal Aviation Administration for glare hazard analysis near airports and is also recognised by the Australian Government Civil Aviation Safety Authority (CASA).

The analysis estimates green glare and yellow glare received at each identified potential receptor. Green glare is glare with low potential to cause an after-image when observed prior to typical blink response time, and yellow glare has a higher potential to cause an after-image when observed prior to a typical blink response time. The analysis is on a minute-by-minute basis because sun reflections from solar panels are likely to last at least one minute. Glint is a short-term flash which lasts for less than a minute is therefore unlikely to occur from the sun, due to the pace at which the sun and panels move. Glint is not considered to be a factor affecting motorists or pilots and is not considered further in this assessment.

The heights of the observation points were assumed to be 1.5 m for a motorist and 1.65 m for a standing person. Existing vegetation or structures can affect visual connectivity with solar panels. Similarly, atmospheric conditions such as cloud cover can influence light reflection and the resulting impact on visual receptors. Varying atmospheric conditions have not been accounted for in the analysis and there are no

structures or vegetation either in the road reserve adjoining Lot 110 or on the site itself that would impede visual connectivity.

Potential sensitive receptors, called observation points, include four road observation routes and 47 residential observation points were identified as potential visual receptors. These were identified as follows:

- Considering the elevation of the site relative to surrounding land to determine land potentially affected. The blue shaded area in Figure 15 indicates areas of possible visual impact,
- Including residential and commercial properties and public roads within a 2 km radius of the site. Properties located at greater distances are unlikely to be affected, and
- Excluding properties where existing structures will act as visual barriers, for example, to the south-west of the site.

Four runways at Hay Airport, which is located approximately 4 kilometres south-west of the site, were also considered potential visual receptors of the site due to relative elevation and distance. Potential visual receptors are shown in Figure 14 below.

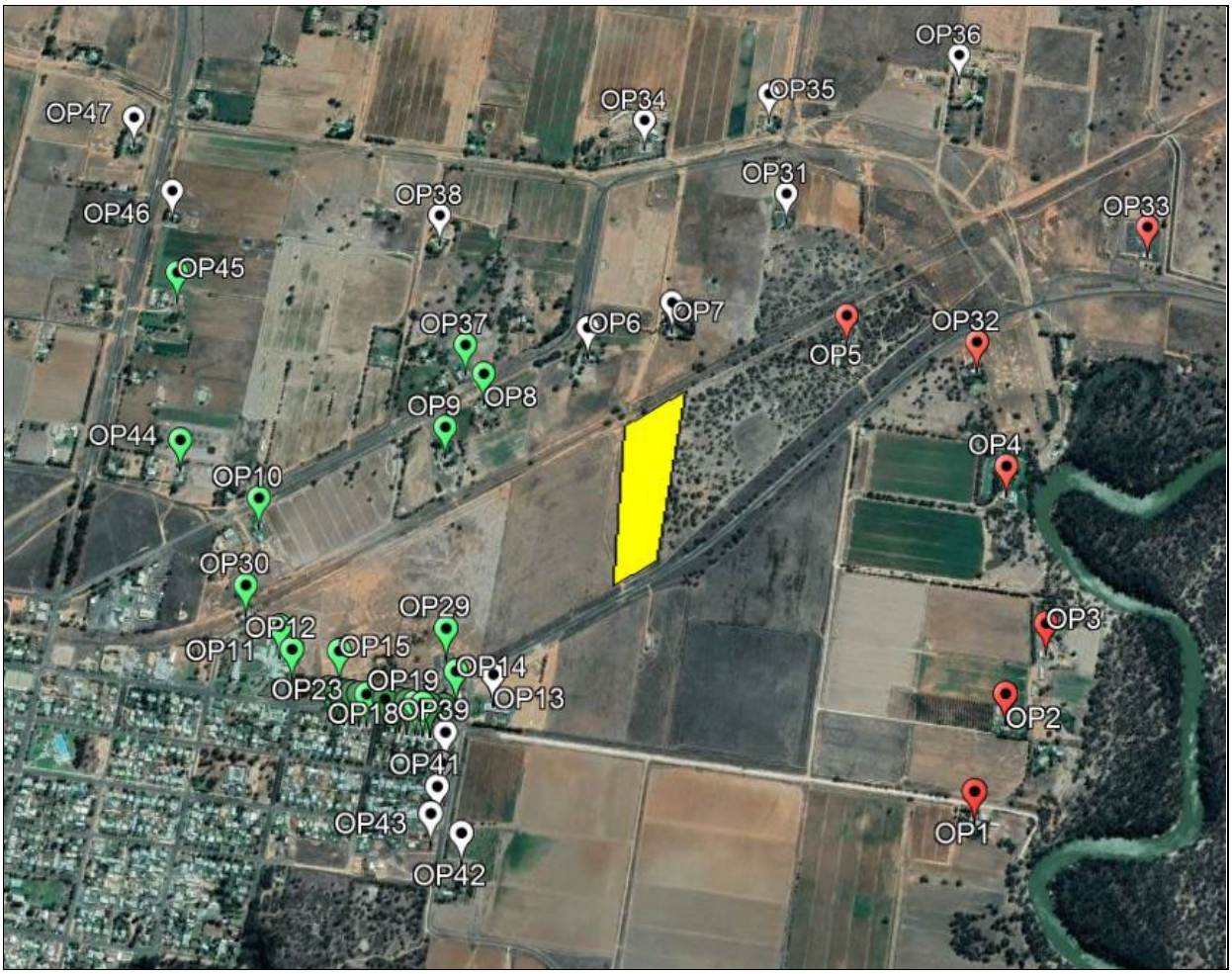


Figure 14: Potential visual receptors for glare and glint

The results of the analysis indicate that observation points to the east of the solar farm may receive glare in the late afternoon or evening, while observation points to the west may receive glare in the early morning.

Visual obstructions such as vegetation, buildings, road verges, and the adjacent solar farm are expected to prevent other observation points from receiving glare. The viewshed analysis also demonstrates that many of these potential observation points will not have direct line of sight of the solar farm, so will not be impacted by glint or glare.

5.10.2 Mitigation measures

Vegetation screening could be considered around the perimeter of the solar farm to mitigate any impacts to visual amenity.

5.11 Visual and scenic amenity

5.11.1 Methodology

Impacts on the visual and scenic amenity of the proposed Hay 2A Solar Farm have been assessed using the RMS guideline *Environmental Impact Assessment Practice Note – Guideline for Landscape Character and Visual Impact Assessment* (EIA-N04 Version 2-0 released on 28 March 2013). Details of methodology are given below.

A site inspection of the location of the proposed works and the surrounding area took place on Thursday 31 January 2019. The visual catchment, the context of the site of the proposed works and viewpoints were identified at this time.

Land uses and characteristics of the environment such as topography, vegetation, architecture of neighbouring buildings and any heritage values of any significant sites in the vicinity of the proposed solar farm were noted and the capacity of the area to absorb physical change is assessed. Development plans for the solar farm have been reviewed and the likely impacts on landscape character identified. This is determined by the sensitivity of the landscape to physical change and the magnitude, or relative size and scale, of the works.

The visual significance of the site to viewpoints and receivers within the visual catchment is described in terms of proximity to the site, landscape character, the composition of views and the sensitivity to change that will affect scenic values. The visual impacts that will be experienced by each receiver are identified and evaluated in terms of the sensitivity of each receiver to change and the magnitude of that change in terms of the proposed works. The impacts are calculated and ranked according to negligible, low, moderate or high impact based on the following matrix (sourced from the RMS *Guideline for Landscape Character and Visual Impact Assessment).*

Table 6: Landscape character and visual impact grading matrix. Source: RMS Guideline for Landscape Character and Visual Impact Assessment, 2013

Landscape character and visual impact grading matrix					
	Magnitude				
Sensitivity		High	Moderate	Low	Negligible
	High	High impact	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

The findings of the landscape character and visual impact assessments are summarised in the conclusion. Recommendations as to refinements of the development plans to avoid or mitigate significant landscape and visual impacts are made if necessary.

5.11.2 Description of the landscape

The character of the landscape near Hay is predominantly an open modified agricultural landscape that has been shaped by farming. It is generally flat land with little remnant vegetation. The site itself is peri-urban being on the eastern edge of the township of Hay. Structures within the vicinity of the site comprise an electrical sub-station, a disused rail line, urban and rural living dwellings, industrial and commercial uses, institutional facilities such as Hay Hospital, bushland and rural farmland. Photographs taken during the site visit and provided in section *2. Site location, description and context* of this Statement illustrate the site and surrounding area. The landscape is assessed to have low sensitivity to change.

5.11.3 Assessment of impacts on landscape character

The proposed Hay 2A Solar Farm will comprise 18,500 solar modules installed in 26 blocks. These are to be placed within a confined area of 6.4 hectares of the property. The internal site access road that surrounds the perimeter of the solar farm on three sides is to be setback 23 metres from the northern boundary, 14.4 metres from the southern boundary, and is variable from the western boundary with a minimum of 10 metres. The nearest component of the solar farm to the eastern boundary is the security fence which would be approximately 3 metres. The panels are setback a further 5 metres giving a total of 8 metres from the boundary.

The sensitivity of private property and public roads to landscape change would be low and decreasing over time given the mix of uses and spread of the urban area outwards along the Mid Western Highway. Private dwellings and occupants of Hay Hospital are likely to be impacted by a change in views on neighbouring land and would feel a low impact on character. The panels are likely to be of interest to occupants of the hospital. The presence of the electrical substation to the west and commercial/industrial uses to the south

of the highway capture motorists attention on approach to the township. The magnitude of the project and impact on landscape character is therefore considered to be low for private property and public roads.

5.11.4 The visual catchment

The visual catchment of the site of the proposed solar farm is defined by the area within which the works will be partially visible as shown inside blue edging on the visual envelope map below. Topography and vegetation have an influence on the visual catchment. As the land is flat it is unlikely that the site will be visible from adjoining private properties and public roads beyond one kilometre. This area is less than has been considered in the glare and glint analysis as the greater the distance from the development site the less clear is the view of the solar farm. The ability to distinguish the type of land use and the actual composition of materials diminishes with distance.

The visual impact of solar farms depends on the scale and type of infrastructure, the prominence and topography of the site relative to the surrounding environment; and any proposed screening measures to reduce visibility of the site. Some potential viewpoints were therefore discounted because of significant existing features such as built structures. The site itself is fully cleared and there are no structures or vegetation in the road reserve adjoining Lot 110.

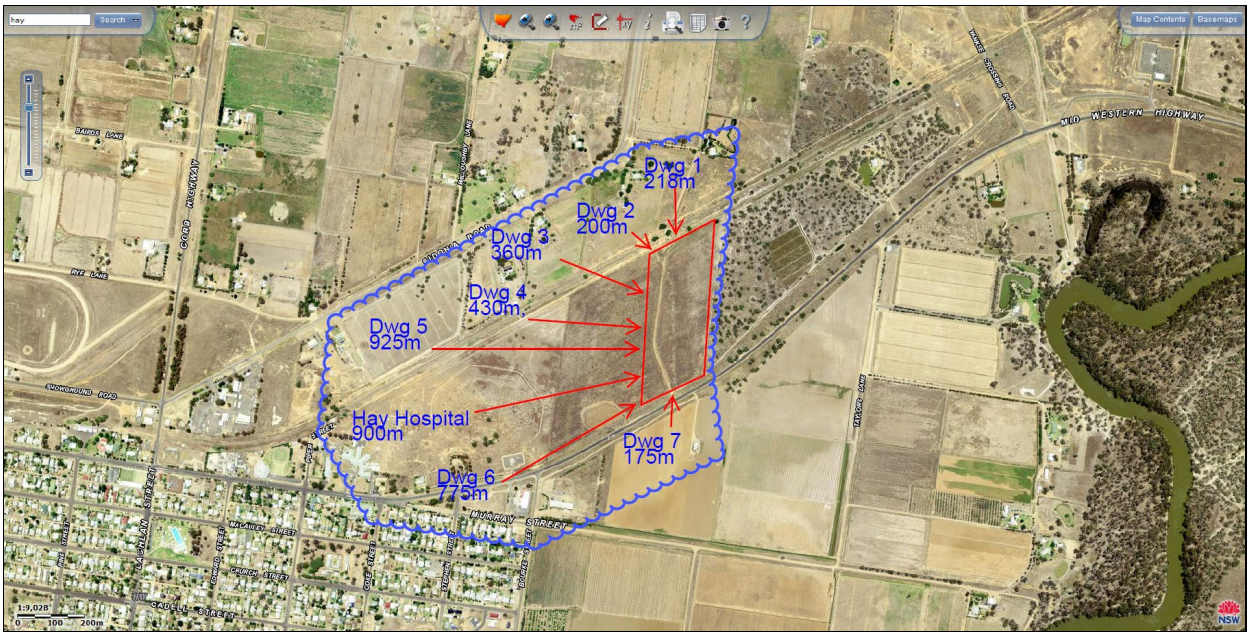


Figure 15: Approximate visual catchment and nearest dwellings. Source: SIX Maps

There are several dwellings within one kilometre of the site. The distance from seven locations are shown in Figure 13 with the separation distance from each dwelling to the site at the nearest point. It would be visible from public roads such as the Mid Western Highway from approximately 100 metres on approach from the east and 150 metres on approach from the west. Given that the panels would be oriented north

and rotating east to west, only the rear of the panels and supporting frames would be visible from the highway.

The sensitivity of the neighbouring farmhouses to landscape change varies from low to moderate (dwellings 3 and 4) given the existing open landscape of the site though tempered by proximity to urban development and peri-urban location. The sensitivity would decrease with distance so that visibility of the solar farm to dwellings and other structures beyond 200 metres would be low and outside the visual catchment would be negligible. Dwelling 7 would be low sensitivity due to the slight incline towards the solar farm site and the highway on intervening land.

There are no structures that would screen the development from neighbouring residential properties to the north, however, the disused rail line is within a raised embankment which provides some screening to these properties. Vegetation within the private property boundaries would also serve to screen the solar farm. South of the site, a gentle incline of the land sloping towards the Murrumbidgee River and commercial and industrial development on intervening land reduces visibility of the site from residential properties to the south. (Commercial and industrial development are not considered sensitive receivers in terms of visual impact). Similarly, structures to the west including the Essential Energy substation and Hay Hospital interfere with views towards Lot 110. The rear of panels will be visible to motorists travelling along the Mid Western Highway, however, as they will be set within an increasingly industrial landscape on the edge of the urban area sensitivity is low.

5.11.5 Assessment of visual impacts

Table 7 below indicates the magnitude of the proposed solar farm in terms of the visual change in the landscape and proximity to the viewpoint, and the degree of sensitivity based on the quality of the view, whether the site is clearly visible or obscured by landform or vegetation, the direction and composition of the view, and how sensitive the view is to changes in the landscape that will result from the proposed development.

A rating is then given based on magnitude and sensitivity using the landscape character and visual impact grading matrix.

Table 7: Viewpoint impacts

Viewpoint	Magnitude	Sensitivity	Rating
Mid Western Highway	Low	Low	Low
Dwelling 1	Low	Low	Low
Dwelling 2	Low	Low	Low
Dwelling 3	Low	Moderate	Low-moderate
Dwelling 4	Low	Moderate	Low-moderate
Dwelling 5	Low	Low	Low

Viewpoint	Magnitude	Sensitivity	Rating
Mid Western Highway	Low	Low	Low
Dwelling 1	Low	Low	Low
Dwelling 2	Low	Low	Low
Dwelling 6	Low	Low	Low
Dwelling 7	Low	Low	Low
Hay Hospital	Low	Low	Low

5.11.6 Summary of impacts

The landscape on the urban edge of Hay is one that has been modified by human activity associated with the agricultural industry. It is characterised by a mix of urban and rural uses and utilities including the 33kV substation.

The impact of the proposed Hay 2A Solar Farm on landscape character has been assessed to be low based on magnitude of works and the sensitivity to change of surrounding properties. The works would be visible to motorists travelling along the Mid Western Highway, however, given the character of the proximity to the urban area and the commercial and industrial uses visible on the approach to town it is expected that acceptance of and adaptation to change will occur within a relatively short space of time following completion of works.

The visual impact of the proposed works is assessed to be low to moderate for the viewpoints identified in this assessment. Uses on land located between residential dwellings such as the substation, the disused rail line and commercial/industrial buildings would serve to screen and distract visual interest in the array of panels. The impacts are considered acceptable given the nature of the proposed development and that it will contribute to renewable energy generation.

5.11.7 Mitigation measures

Given that the Western Regional Planning Panel imposed a condition on the Hay 1A solar farm requiring that vegetative screening be planted along the Mid Western Highway boundary, it is recommended that this vegetated buffer be extended to the south-eastern corner of Lot 110 (proposed Lot 2) to screen the Hay 2A Solar Farm for motorists and passengers.

5.12 Waste management

5.12.1 Waste materials and management

A desktop assessment of the waste generated during construction and operation of the solar farm has been carried out by ITP Renewables to determine the appropriate means of waste disposal and recycling for the Hay 2A Solar Farm. The assessment takes into account the requirements of relevant legislation and policy

including the Protection of the Environment Operations (POEO) Act 1997, POEO (Waste) Regulation 2014 and the Waste Avoidance and Resource Recovery Act 2001.

The largest amount of waste will be generated during the construction phase. Wastes would include wooden pallets, cardboard and plastics. Construction of a solar farm would not generate any putrescible waste products. Minimal waste would be generated when the farm is operational other than small amounts of replacement parts and packaging required for maintenance and repair works.

It is expected that the solar farm will be operational for at least 20 to 25 years. Upon decommissioning all infrastructure, panels and mounting frames including footings and inverters would be disassembled and removed from the site. There are currently limited opportunities to recycle the components of solar panels, however, it is anticipated that the waste recycling industry will expand and develop new technologies and uses for those components by the time decommissioning occurs.

Estimates of waste materials and proposed management arrangements for each phase of the development project are provided in Table 6 below.

The proposed waste management measures support Hay Shire Council initiatives to encourage all residents to consider how to minimise waste and reduce the impact on the environment by maintaining the philosophy to minimising waste as *'Reduce, Re-Use, Recycle'.*

Council's waste management facility comprises general landfill and green waste, a waste transfer station and a community recycling centre located in Thelangerin Road, Hay. The community recycling centre supports recycling of domestic paint, motor oils, batteries and fluorescent lights.

There is also a facility to drop off recycling waste at Dunera Way in northwest Hay. Firms based in neighbouring regional centres such as Deniliquin, Griffith and Echuca collect scrap metal for re-use.

Table 8: Estimated waste materials and waste management arrangements

Phase	Waste material	Proposed management
Construction	• Packaging waste such as cardboard, wood pallets, plastic wrap, scrap metal, general waste including approximately 830 wooden pallets and carboard packing boxes • Concrete waste during setting of footings and mounts • Electric cable waste and cable reels • Plastic pipe offcuts/scrap • Empty drums and containers (minimal quantities) • Lubricating oil and filters • Unused chemicals	Waste products will be sorted and stored separately in skip bins located in the materials laydown area in accordance with EPA Waste Classification Guidelines. This will facilitate disposal through appropriate waste streams as follows: Recycling: • Steel and scrap metal (recycled) • Timber/cardboard (recycled) • Recyclable plastics • Recyclable fluids Landfill: • General wastes, oils, chemcials and plastic (other than where recyclable) All recycling would be taken to the Waste Transfer Station and the Community Recycling Centre located on Thelangerin Road, Hay. All non-recyclable materials would be taken to the waste Depot at Thelangerin Road, Hay.
Operational	Maintenance and repair waste, e.g. Electric cable waste and cable reels, plastic pipe offcuts, lubricating oils and filters	These waste products would be sorted on site into recyclable and general waste streams and taken to the Waste Management Facility in Thelangerin Road, Hay.
Decommissioning	• PV panels (18,500 panels) and supporting poles and mounts • Glass for panels (260 tonnes) • Silicon for wafers (40 tonnes) • Inverters / transformers / batteries • PV boxes, skids, scrap metal (830 tonnes) • Electrical cables • Fencing • Storage containers (two 40-foot containers)	The solar farm infrastructure would be dismantled into separate waste products such as metals, glass, plastics and concrete. All products would be sorted on site into recyclable and general waste streams in accordance with the EPA Waste Classification Guidelines and taken to the Waste Management Facility in Thelangerin Road, Hay or to an alternative specialised recycling facility.

It is recommended that a waste management plan be prepared following approval to specify precise volumes of each waste material, classify that waste material and identify appropriate management procedures including means of transport and the destination.

Hay Shire Council is part of the RAMROC Riverina Waste Group which adheres to national and international hierarchy of waste management to avoid/reduce, reuse, recycle, recover, treat and dispose of waste products. Waste management of the Hay 2A Solar Farm should be predicated on these standards by seeking to avoid or reduce waste materials where possible, and to re-use, recycle and recover the majority of waste materials generated during each of the construction, operational and decommissioning phases.

5.12.2 Mitigation measures

It is recommended that a waste management plan be developed to provide detailed procedures to manage the waste stream. The plan should contain:

- Strategies to reduce waste during all project phases,
- Recycling, re-use and recovery strategies and opportunities,
- Classification of all waste streams,
- Tracking register and details,
- On site recycling management,
- Allocation of responsibilities for recycling, re-use and disposal,
- Reporting and notification procedures if a waste incident occur.

If vegetation clearance is required during preparation of the site prior to and/or during the construction phase, that vegetation should be re-used for mulch and on-site soil erosion control where possible.

6. CONCLUSION

The site is considered suitable for the proposed development of the Hay 2A Solar Farm and subdivision of Lot 110 into two lots to separately accommodate the approved Hay 1A Solar Farm and the proposed Hay 2A Solar Farm. It is located adjacent a 33kV sub-station enabling efficient connections to transfer power generated by the solar PV panels to the grid and adjacent the approved 5MW Hay 1A Solar Farm. The site is flat, is free of constraints and, owing to its location on a classified road, is accessible to large delivery vehicles during the construction phase and utility vehicles for ongoing maintenance.

According to the Australian Radiation Protection and Nuclear Safety Agency, which maintains continual oversight of emerging research into the potential health effects of the EMF exposure, there is no established evidence of health effects from exposure to electric and magnetic fields from powerlines, substations, transformers or other electrical sources, regardless of the proximity, causes any health effects. The location of the solar farm and the distance separation between nearby dwellings and the site mean that any impacts on health are mitigated.

The likely impacts of the development have been considered in this Statement and supporting documents. Considerations include impacts on biodiversity, natural hazards, visual and scenic amenity, glare and glint, traffic, noise, air quality, waste management, water resources, indigenous and non-indigenous heritage, the community and the local economy. Any impacts on these interests have been found to be acceptable and mitigation measures have been recommended where necessary.

There will be no net loss of agricultural land as it is proposed to graze sheep amongst the panels. Any loss in the production value of crops would be offset by the contribution that the solar farm will make to the local economy through direct and indirect employment and expenditure over the short term and through the benefits that renewable energy power supply will bring to the nation.

Below is a summary of mitigation measures. It is recommended that an environmental management plan be prepared to cover the construction and operational phases. Where necessary Table 9 includes a recommendation as to whether the mitigation measure should be included in the management plan. It is also recommended that an emergency management plan be prepared as required for the Hay 1A Solar Farm.

Table 9: Summary of mitigation measures

Consideration	**Mitigation measures**	**Environmental Management Plan**
Biodiversity	Land to the east and south of the subject site mapped as Natural Resources – Biodiversity in *Hay LEP 2011*. A setback of the solar farm security fence of 3 metres to the boundary of adjoining land to the east is proposed with a further setback of	Yes, with reference to ongoing site access during both construction and operational phases

	5 metres to panels. To avoid interference with the vegetation community located on the adjoining land it is recommended that any vegetation planted to screen the development and any grasses planted to bind the soil following construction of the solar farm be native species endemic to the area. Access to the site is to be limited to that point shown on development plans and within the development area. Storage of materials is to be carried out wholly within the development area.	
Natural hazards	None recommended	n/a
Water resources	Design – site drainage and water quality controls: • Undertake hydrological assessment of the sites catchment in accordance with relevant methods outlined in Australian Rainfall and Runoff. • Determine sediment management targets and drainage control standards in accordance with Managing Urban Stormwater: Soils and Construction Vol 1 (Blue Book) (DECC, 2008). • Develop a site erosion and sediment control plan in accordance with the Blue Book. • Develop site drainage design incorporating detention basins and sedimentation management structures where relevant. • Permanent site drainage should coincide with temporary arrangements where possible	Yes, for construction and operational phases. Include an erosion & sediment control plan or soil and water management plan
	Construction and/or demolition – site drainage and water quality controls: • Catch drains to be located downslope of any proposed road works. • Install location appropriate sediment fences or other applicable control measures depending on whether the feature is upstream or downstream of a disturbed part of the site or will need to be trafficable. • All stormwater collection points need to have appropriate sedimentation and erosion controls. • Undertake ongoing inspections of stormwater facilities and water control measures to assess their effectiveness. • Vibration grids or wash bays at all construction exits. • Level spreaders at locations where concentrated flow is discharged offsite to ensure sheet flow like conditions are maintained. • Flat land erosion control options include erosion control blankets, gravelling, mulching, soil binder, turfing and revegetation	
	Construction and/or demolition – stormwater point source control: In the event of concrete works: • Do not undertake works if chance of heavy rain. • Store rinsate5 water, if applicable, separately to other water on site and dispose of offsite as appropriate. • Block on site drains in the area of the works and remove any contaminated runoff. In the event that dewatering practices are required:	

	• Pump hose intakes for withdrawing water from excavations will be elevated to minimise sediment pumping and directed to a containment area for settling prior to discharge. • Limit direct discharge off site (consistent with the design requirements for sediment pond discharge). • Stormwater collected on site should be reused where possible. Controls should be inspected and maintained on a regular basis. All water released from sediment basins should be clear or disposed off site by vehicle. • Material and waste storage areas should be designed and operated to minimise interaction with surface waters. • Vehicle washdown areas should be located away from water courses	
Air quality	During construction: • Limit vehicle movements to areas necessary to deliver panels, ancillary structures and equipment • Suppress dust emissions using watering and cease works during dry and windy conditions • Ensure ground disturbance is limited to areas necessary to place footings or to be used for access • Ensure minimal handling of excavated materials • Ensure stockpiles of excavated material is bunded and protected from wind and vehicle movements During operation: • Grade and add road base to internal accessways • Revegetate the site with suitable groundcover immediately construction works are completed • Ensure all plant and equipment operates in accordance with specifications	Yes, for construction and operational phases
Noise	The following mitigation measures are recommended to address noise emissions during the construction phase: • a construction noise management protocol to minimise noise emissions, manage out of hours (minor) works to be inaudible, and to respond to potential concerns from the community, • where possible use localised mobile screens or construction hoarding around plant to act as barriers between construction works and receivers, particularly where equipment is near the site boundary and/or a residential receiver including areas in constant or regular use (e.g. unloading and laydown areas), • operating plant in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations,	Yes, for construction and operational phases

	• selection of the quietest suitable machinery available for each activity, • avoidance of noisy plant/machinery working simultaneously where practicable, • minimise impact noise wherever possible, • utilise a broadband reverse alarm in lieu of the traditional high frequency type reverse alarm, • provide toolbox meetings, training and education to drivers and contractors visiting the site during construction so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities, • signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site, and • utilise project related community consultation forums to notify residences within close proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure. It is recommended that the noise emissions from the solar farm be minimised when operational. To assist in noise management, it is recommended that a one-off noise validation monitoring assessment be completed to quantify emissions from site and to confirm emissions relevant criteria are satisfied.	
Electromagnetic radiation	No mitigation measures are proposed.	n/a
Traffic	• install a new culvert under the proposed new access • the new access point is to be designed and constructed to a standard to accommodate the initial construction phase • construction vehicle signs should be erected during the construction phase to notify motorists travelling along the Mid Western Highway	Yes, with reference to site access during the establishment and construction phases
The community & local economy	It is recommended that advertising be placed in local media and to approach local businesses to determine whether there is the capacity and expertise available in Hay and surrounding districts to participate in the construction and ongoing maintenance activities	n/a
Heritage	Consult with the Hay Local Aboriginal Lands Council prior to commencing site works and construction to determine whether it is necessary for members of the local indigenous community to be present on site during ground-disturbing works.	Yes, for construction phase

Glare and glint	Vegetation screening could be considered around the perimeter of the solar farm to mitigate any impacts to visual amenity	n/a
Visual & scenic amenity	Vegetative screening along the Mid Western Highway boundary be extended to the south-eastern corner of the property	No
Waste management	It is recommended that a waste management plan be developed to provide detailed procedures to manage the waste stream. The plan should contain: • Strategies to reduce waste during all project phases, • Recycling, re-use and recovery strategies and opportunities, • Classification of all waste streams, • Tracking register and details, • On site recycling management, • Allocation of responsibilities for recycling, re-use and disposal, • Reporting and notification procedures if a waste incident occur. If vegetation clearance is required during preparation of the site prior to and/or during the construction phase, that vegetation should be re-used for mulch and on-site soil erosion control where possible.	Yes, for construction phase

The proposed development of the Hay 2A Solar Farm is permissible under provisions of *SEPP (Infrastructure) 2007* and would assist to generate electricity and at the same time contribute to reducing greenhouse gas emissions and achieving the national targets. Subdivision of Lot 110 into two separate allotments each accommodating a 5MW solar farm is considered feasible and permissible under Clause 4.2 of *Hay LEP 2011* for the following reasons:

- Subdivision will not affect agricultural output or result in land use conflict with development and activities taking place on adjoining land,
- The purpose of the subdivision is to facilitate primary production and to meet Essential Energy requirements that separate solar facilities be located on separate allotments to connect to the Hay zone substation,
- Solar photovoltaic energy production is a primary industry. The harnessing of solar radiation for the purposes of generating electricity is considered primary production in the same way as oil and gas extraction and mining are classified as primary production, and
- Sheep grazing is proposed to continue on the land beneath and around the solar arrays.

Any potential impacts of the development may be avoided, minimized or mitigated. The development is considered to be in the public interest.

EPBC Act Protected Matters Report

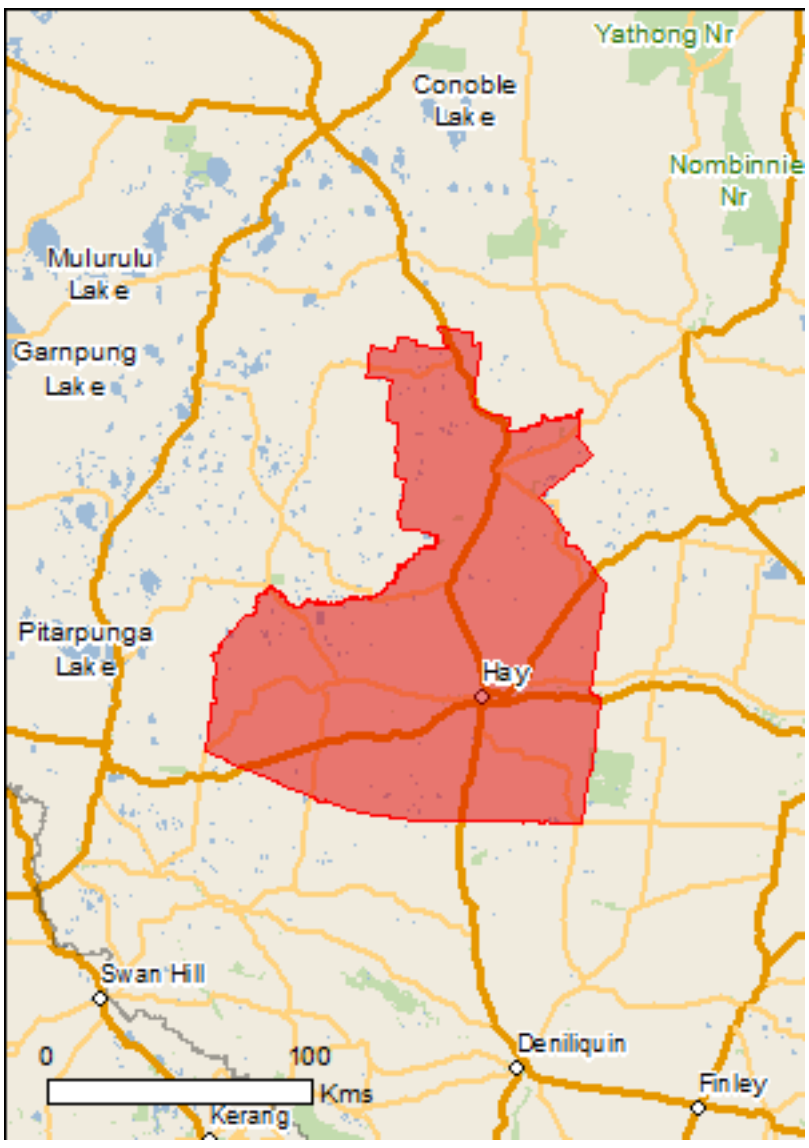
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

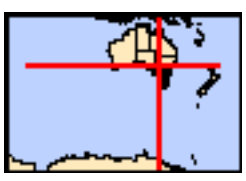
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

LGA HAY SHIRE COUNCIL, NSW

Report created: 08/02/19 13:02:07





Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://environment.gov.au/protection/environment-assessments

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Threatened Ecological Communities:	3
Threatened Species:	25
Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits-and-application-forms

Commonwealth Lands:	7
Commonwealth Heritage Places:	1
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	9
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	5

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	300 - 400km upstream
Hattah-kulkyne lakes	100 - 150km upstream
Riverland	200 - 300km upstream
The coorong, and lakes alexandrina and albert wetland	400 - 500km upstream

Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Threatened Species [Resource Information]

Name	Status	Type of Presence
BIRDS		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
FISH		

Name	Status	Type of Presence
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROGS		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat known to occur within area
MAMMALS		
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
PLANTS		
Austrostipa metatoris		
[66704]	Vulnerable	Species or species habitat may occur within area
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa		
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat known to occur within area
Eleocharis obicis		
a spike rush [15320]	Vulnerable	Species or species habitat likely to occur within area
Lepidium monoplocoides		
Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area
Maireana cheelii		
Chariot Wheels [8008]	Vulnerable	Species or species habitat likely to occur within area
Solanum karsense		
Menindee Nightshade [7776]	Vulnerable	Species or species habitat known to occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area

Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Telstra Corporation Limited

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Hay Post Office	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
[Ardea alba](#) Great Egret, White Egret [59541]		Breeding known to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
[Chrysococcyx osculans](#) Black-eared Cuckoo [705]		Species or species habitat known to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat may occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Rostratula benghalensis (sensu lato)](#) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Kalyarr	NSW
Lachlan Valley	NSW
Lachlan Valley	NSW
Lachlan Valley	NSW
Murrumbidgee Valley	NSW
Murrumbidgee Valley	NSW
Oolambeyan	NSW
Thelangerin	NSW
Toogimbie	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Booligal Wetlands	NSW
Great Cumbungi Swamp	NSW
Lachlan Swamp (Part of mid Lachlan Wetlands)	NSW
Lake Merrimajeel/Murrumbidgil Swamp	NSW
Lowbidgee Floodplain	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining oigations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environment and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-Forestry Corporation, NSW
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
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Canberra ACT 2601 Australia
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ATTACHMENT B

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 0119

Client Service ID : 396964

Zenith Town Planning

P O Box 591
Moruya New South Wales 2537

Attention: Allen Grimwood

Email: zenithplan@bigpond.com

Date: 06 February 2019

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 110, DP:DP1187931 with a Buffer of 0 meters, conducted by Allen Grimwood on 06 February 2019.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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