Muswellbrook Solar Farm

Scoping report

Prepared for ESCO Pacific

July 2022

Muswellbrook Solar Farm

Scoping report

ESCO Pacific

E220005 RP1

July 2022

Version	Date	Prepared by	Approved by	Comments
V1	23 June 2022	Lawrence Wallis	Louisa Rebec	
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Executive Summary

ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (a wholly owned subsidiary of ESCO Pacific Holdings Pty Ltd (ESCO Pacific)) in partnership with Idemitsu Australia Limited (Idemitsu) proposes to develop a large-scale solar photovoltaic (PV) generation facility and associated infrastructure to be known as the Muswellbrook Solar Farm (the project). The proposed solar farm will have generation capacity of approximately 135 megawatts (MWac) and would produce around 347 Gigawatt hours (GWh) of energy annually which is enough to power approximately 79,000 homes annually. The proposed battery energy storage system (BESS) will also have a capacity of approximately 135MWac and up to two hours of storage. ESCO Pacific proposes to develop the project on a site approximately 2.5 kilometres (km) east of Muswellbrook within the Muswellbrook Shire local government area (LGA) in the Hunter Region of New South Wales (NSW). The site encompasses approximately 512 hectares (ha) and is sited adjacent to the Muswellbrook Coal Mine on land primarily owned by Idemitsu the mine operator.

Coal mining at Idemitsu's Muswellbrook Coal Company (MCC) site, is scheduled to be completed during the third quarter of 2022, after 115 years of operations. This is an exciting opportunity to redevelop the site for new purposes, which could see the site generate post-mine investment and employment in the region. Idemitsu has developed a Draft Master Plan and collaboration is underway with several industry partners, to investigate the viability of and, plan for a wide range of renewable energy and other projects, on and around the MCC site. The project would form part of the broader Muswellbrook Clean Industries Precinct (MCIP). This application relates only to the development of the Muswellbrook Solar Farm as described in Chapter 3 of this report.

The project is expected to support the development of Renewable Energy Zones in NSW and the Hunter Central Coast region. It will also provide significant economic stimulus to the region through construction jobs and associated flow-on benefits.

The project area has been selected to optimise the future land use of the Muswellbrook Coal Mine site for the generation of renewable energy. The project siting has been developed to ensure the project is viable as a solar and storage development and that it will result in maximum benefits for the locality and region in the long term, while minimising impacts to the environment. Key factors in selection of the project area include its position close to existing transmission infrastructure, access, previously disturbed land, and physical conditions suitable for large-scale solar energy generation. The project area has been refined following initial investigations of biodiversity values to minimise potential impacts of the project.

The project is State significant development pursuant to Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021*. Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements for the project. A preliminary environmental assessment has been carried out and is documented in this report to assist in the identification of matters that will require further assessment in the Environmental Impact Statement (EIS), and the level of assessment that should be carried out for each matter.

This Scoping Report has been prepared in accordance with the guidelines: State significant development guidelines - preparing a scoping report: Appendix A to the State significant development guidelines (DPIE 2021a). The aspects identified as requiring detailed assessment in the EIS include social, visual, biodiversity, and Aboriginal heritage. Aspects requiring standard assessment include hazards, traffic, water, land and noise and vibration.

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Definitions and abbreviations

Item	Definition
ABS	Australian Bureau of Statistics
AC	Alternating current
ACHA	Aboriginal cultural heritage assessment
AHIMS	Aboriginal Heritage Information Management System
BAM	Biodiversity Assessment Method
BC Act	*NSW Biodiversity Conservation Act 2016*
BESS	Battery energy storage system
CEEC	Critically endangered ecological community
DC	Direct current
DPI	Department of Primary Industries
DPE	Department of Planning and Environment
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EPA	NSW Environment Protection Authority (EPA)
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESCO Pacific	ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (a wholly owned subsidiary of ESCO Pacific Holdings Pty Ltd)
FTE	Full time equivalent
ha	hectares
km	kilometres
kV	Kilovolt
LEP	Local Environmental Plan
LGA	Local government area
MCC	Muswellbrook Coal Company
MCIP	Muswellbrook Clean Industries Precinct
MNES	Matters of national environmental significance
MW	Megawatts
MWac	Megawatts (alternating current)
NSW	New South Wales
PCTs	Plant community types

Item	Definition
PMST	Commonwealth Protected Matters Search Tool
PV	Photovoltaic
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA	Social impact assessment
SSD	State significant development
TECs	Threatened Ecological Communities
VI	Vegetation Integrity

1 Introduction

1.1 Project overview

ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (a wholly owned subsidiary of ESCO Pacific Holdings Pty Ltd (ESCO Pacific)) in partnership with Idemitsu Australia Limited (Idemitsu) proposes to develop a large-scale solar photovoltaic (PV) generation facility and associated infrastructure to be known as the Muswellbrook Solar Farm (the project). The proposed solar farm will have generation capacity of approximately 135 megawatts (Mwac) and would produce around 347 GWh of energy annually which is enough to power approximately 79,000 homes annually. The proposed battery energy storage system (BESS) will also have a capacity of approximately 135 Mwac and up to two hours of storage. The project is State significant development (SSD) pursuant to Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP). Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

ESCO Pacific proposes to develop the project at Muscle Creek Road, Muswellbrook NSW, approximately 2.5 kilometres (km) east of Muswellbrook within the Muswellbrook Shire local government area (LGA) in the Hunter Region of New South Wales (NSW). The site encompasses approximately 512 hectares (ha) and is located adjacent to the Muswellbrook Coal Mine on land primarily owned by Idemitsu the mine operator. The project area has been selected to optimise the future land use of the Muswellbrook Coal Mine site for the generation of renewable energy. The project location is shown in Figure 1.1.

The project comprises the following key components:

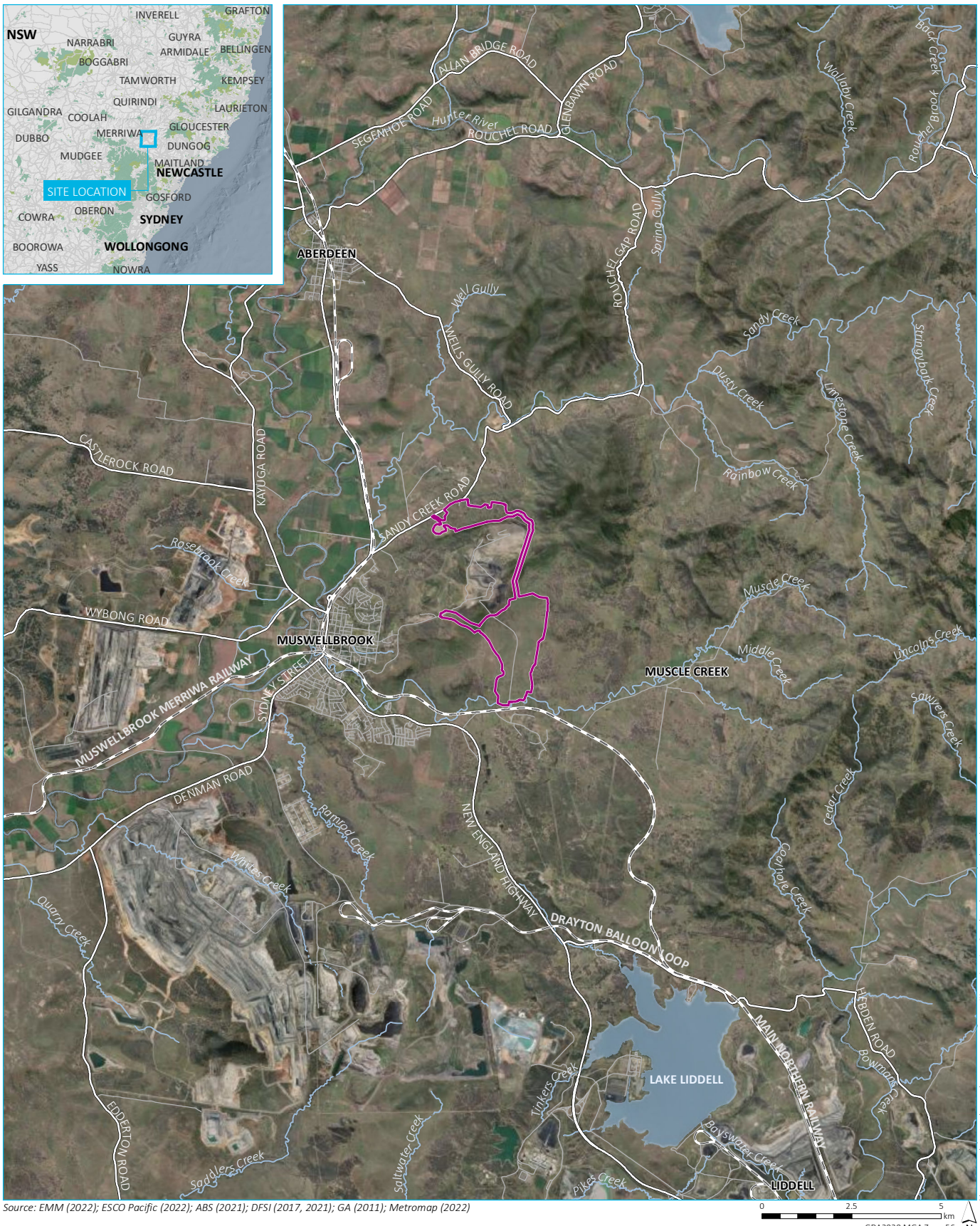
- development of a large-scale solar farm with a generation capacity of approximately 135 Mwac;
- development of a utility scale BESS with a capacity of approximately 135 Mwac; and
- grid connection and electricity transmission line infrastructure.

The project is consistent with NSW government policy for development of electricity infrastructure. It will contribute to the development of Renewable Energy Zones in NSW and the Hunter Central Coast region and assist in meeting NSW's energy generation and storage requirements, as well as the NSW and Australian Government emissions reduction targets.

1.2 Relationship to Muswellbrook Energy Training and Industry Precinct

Coal mining at Idemitsu's Muswellbrook Coal Company (MCC) site is scheduled to be completed during the third quarter of 2022, after 115 years of operations. This is an exciting opportunity to redevelop the site for new purposes, which could see the site generate post-mine investment and employment in the region. Idemitsu has developed a Draft Master Plan and collaboration is underway with several industry partners, to investigate the viability of and, plan for a wide range of renewable energy and other projects, on and around the MCC site.

The expanded plans for what has been dubbed the Muswellbrook Clean Industries Precinct (MCIP), build on the Bells Mountain pumped hydro energy storage project, which Idemitsu has been developing with AGL Energy. The MCIP project includes solar, battery storage, and green hydrogen — a total of four renewable energy projects with related training facilities. ESCO Pacific is only developing the solar farm and BESS component of the MCIP project and the development application will only relate to the solar farm and BESS.



Source: EMM (2022); ESCO Pacific (2022); ABS (2021); DFSI (2017, 2021); GA (2011); Metromap (2022)

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GDA2020 MGA Zone 56

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KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Muswellbrook Solar Farm
Scoping report
Figure 1.1

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1.3 The proponent

The Muswellbrook Solar Farm is being developed by ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (ACN 660 380 110), which is a wholly owned subsidiary of ESCO Pacific Holdings Pty Ltd (ESCO Pacific). ESCO Pacific is a leading Australian developer and asset manager of utility scale solar farms with a proven track record of developing projects from early-stage feasibility through to financial close and ultimately project commissioning. ESCO Pacific's team comprises highly qualified infrastructure, development and corporate finance professionals with experience delivering utility scale renewable energy projects to market.

ESCO Pacific has a proven track record, delivering to market over 493 MWdc of operational solar generation (Ross River Solar Farm, Childers Solar Farm and Susan River Solar Farm in QLD and Finley Solar Farm in NSW) with a further 310 MWdc currently under construction (Moura Solar Farm (QLD), Wyalong Solar Farm (NSW) and Glenrowan Solar Farm(VIC)). ESCO Pacific has a pipeline of projects approaching 2GW in advanced stages of development in VIC, NSW, QLD and SA.

1.4 Purpose of this report

The project is SSD pursuant to Schedule 1 of the Planning Systems SEPP. Accordingly, approval for the project is required under Part 4 of the NSW EP&A Act.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements (SEARs) for the project. The SEARs will identify the level of environmental assessment required to be carried out as part of the Environmental Impact Statement (EIS) for submission to the Department of Planning and Environment (DPE) as part of a development application under Division 4.1 Part 4 of the EP&A Act. This Scoping Report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of ESCO Pacific in accordance with the recently released guidelines: *State significant development guidelines - preparing a scoping report: Appendix A to the state significant development guidelines* (DPIE 2021a) (Scoping Report Guidelines).

2 Strategic context

2.1 Site and surrounds

2.1.1 Regional context

The project is within the localities of Muswellbrook and Muscle Creek in the Muswellbrook Shire Council Local Government Area (LGA), in the Hunter Region of NSW. The nearest population centre to the project is the township of Muswellbrook, approximately 2.5 km west of the project. Muswellbrook has a population of 12,075 (ABS 2016). Other nearby population centres in the vicinity of the project include Aberdeen (population 2,084), approximately 7.5 km north, Scone (population 5,624), approximately 20 km north, Denman (population 1,311), approximately 25 km south-west, and Singleton (population 22,987), approximately 40 km south-east of the project (ABS 2016).

Key land uses in the broader region include residential, industrial activities, coal mining, electricity generation and transmission as well as agriculture including livestock grazing, equine activities and viticulture. The region hosts a number of major developments including several operational coal mines, the former Liddell Power Station and the operational Bayswater Power Station. Renewable energy is a growing land use in the region with several projects in planning including the Bowmans Creek Windfarm, the Muswellbrook Battery Energy Storage project and the Maxwell and Hunter River Solar Farms. Major projects in the vicinity are shown in Figure 2.1.

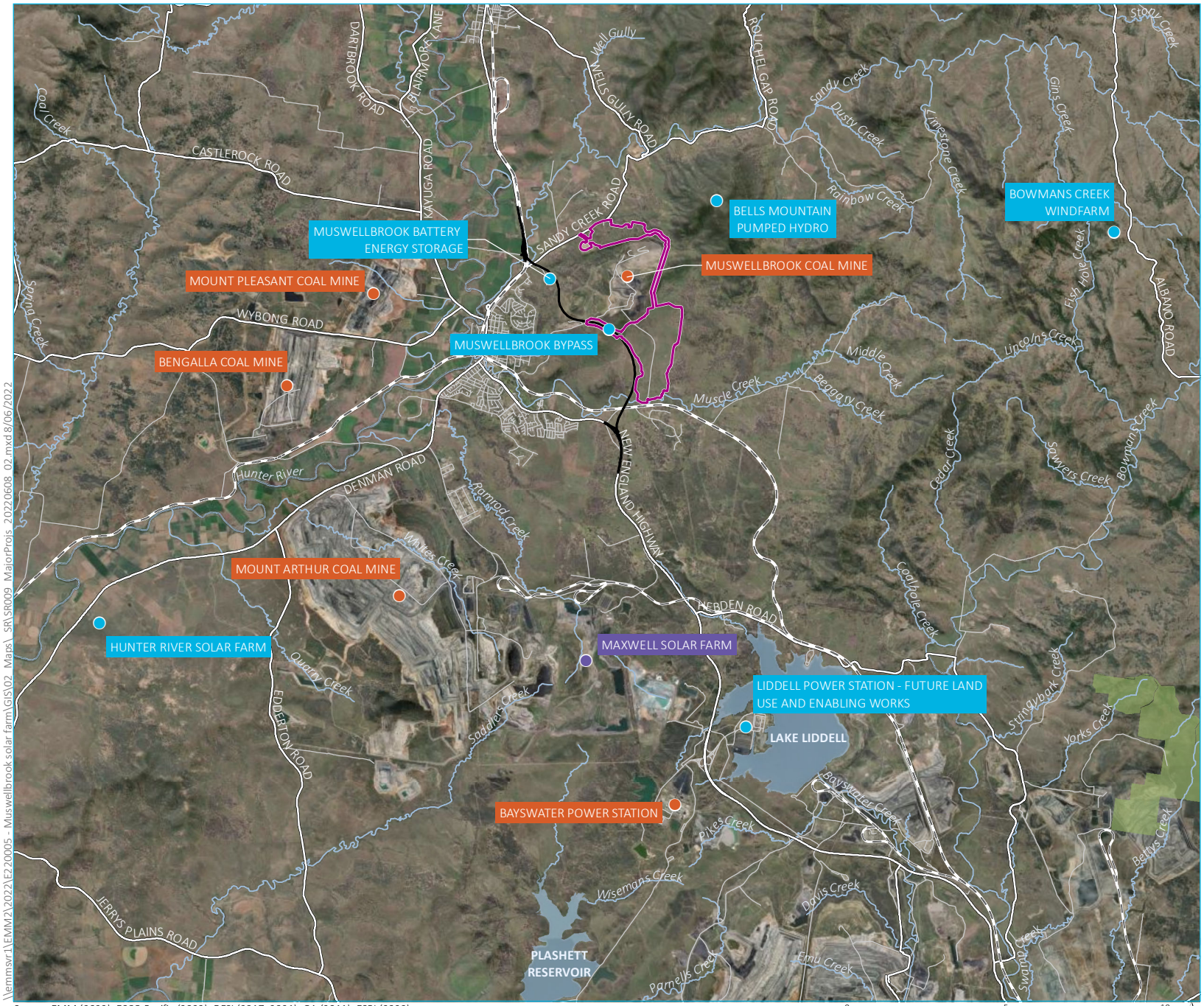
The nearest national parks to the project area are the Scone Mountain National Park, approximately 20 km north, the Mount Royal National Park, approximately 25 km east and the Goulburn River and Wollemi National Parks approximately 35 km south-west. Other areas of environmental conservation are located near the development including the Brushy Hill Nature Reserve about 20 km north of the site and Manobalai Nature Reserve approximately 30 km west.

2.1.2 Local context

The project is sited adjacent to the Muswellbrook Coal Mine on land primarily owned by Idemitsu the mine operator. The project would form part of the broader MCIP which is discussed further in Section 1.2. Muswellbrook is situated along the New England Highway between Singleton and Aberdeen. Land surrounding the project area contains infrastructure and landforms associated with the Muswellbrook Coal Mine. Muswellbrook township is approximately 2.5 km west of the project area and contains residential and industrial land use. The surrounding area also contains rural residences and properties used for grazing and environmental conservation.

Land immediately adjoining the project area is predominantly zoned RU1 – Primary Production and C3 – Environmental which currently host predominantly agricultural land uses such as cattle grazing. It is noted that land zoned C3 – Environmental within the project area is not currently a part of any protected area or reserve. Discussion with the current landowners and Council have identified that there are no planned future uses of these areas that require the land to be zoned environmental.

There is also a small area in the east of the site zoned SP2 Infrastructure associated with the Muswellbrook bypass road project. Beyond that there is land zoned R1 – General Residential to the south the project area near Muscle Creek Road and further west in Muswellbrook township. There are several high voltage electricity transmission lines within and near the project area. Two existing substations are located around one km north and one km east of the project respectively. Two major projects are planned immediately adjacent to the works. These are the Bells Mountain pumped hydro energy storage project that forms part of the MCIP and the Muswellbrook bypass project which is planned by Transport for NSW (TfNSW).



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Source: EMM (2022); ESCO Pacific (2022); DFSI (2017, 2021); GA (2011); ESRI (2022)

0 5 10 km

GDA2020 MGA Zone 56

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Major projects in surrounding region

Muswellbrook Solar Farm
Scoping report
Figure 2.1

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There are 104 residences within two kilometres of the development site which are shown in Figure 2.2. Of these residences, 49 are within one kilometre, and 13 are within 500 m from the project area. The project area and surrounds are subject to mining titles (CCL713, ML1562, ML1304 and ML1513) held by MCC. Other key features in the local surrounds include the Muswellbrook Waste and Recycling Facility to the west, Sandy Creek Road which borders the site to the north-west and the Main Northern Railway line to the south and the St Heliers correctional facility to the north of the site.

2.1.3 The project area

The site encompasses approximately 512 hectares (ha) and is located at Muscle Creek Rd, Muswellbrook, NSW. The project area encompasses 22 land parcels (provided in Appendix C), the majority of which are owned by MCC. The project area is split into two main areas of solar arrays to the north and south of the existing mine pit. These areas are connected by a linear corridor required for electricity transmission and access infrastructure. The southern area includes land owned by a private landowner. The site comprises land zoned RU1: Primary Production, SP2: Infrastructure and C3: Environmental Management.

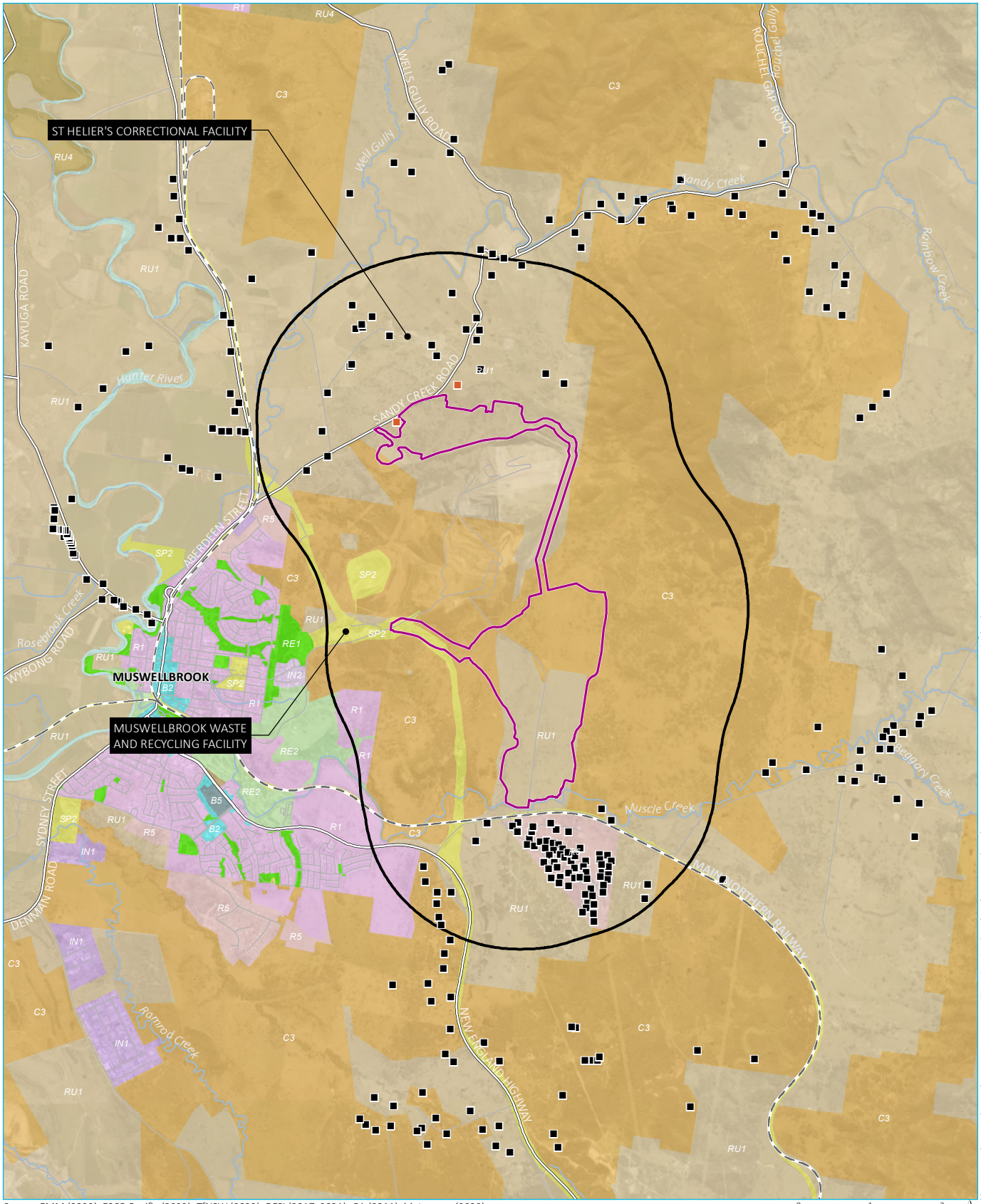
An overview of the project area and indicative site layout is provided in Figure 2.3 showing the project area boundaries, surrounding road network and potential access points. During the preparation of the EIS, the development footprint within the project area will be refined based on further stakeholder engagement, environmental assessment, and constraints identification.

The project area is bounded by Muscle Creek to the South and Sandy Creek Road to the north. There will be two primary access points to the project area via Muscle Creek Road on the south side and Sandy Creek Road on the north side. The project area contains 330 kilovolt (kV) and 132 kV transmission lines which cross both the north and south portions of the project area as shown in Figure 2.3. There is existing access to the project area as part of the MCC operations via Muscle Creek Road and Sandy Creek Road.

The elevation of the project area is between 170 m at the southern boundary and around 250 m at the northern boundary. The land is characterised by a mix of relatively low slopes (<7.5°), plus areas of undulating terrain with slopes (within the areas identified as suitable for solar panels) generally not exceeding 10°. The project area includes some watercourses identified as strahler stream order of 1st, 2nd, 3rd and 4th. The largest nearby watercourse is Muscle Creek a 5th order stream that runs adjacent to the southernmost part of the project area.

The project area has been affected by past land use and agricultural activities for mining and agriculture. Preliminary ecological investigations identified that portions of the project area contain disturbed agricultural land while others contain native grassland and woodland areas.

Photographs showing the existing project area conditions are provided in Photograph 2.1 to Photograph 2.4 below.



Source: EMM (2022); ESCO Pacific (2022); TfNSW (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

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KEY

- Project area
- 2 km buffer
- Associated dwellings
- Dwellings not associated with the project within 5 km
- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

Muswellbrook Local Environmental Plan 2009

- B2 Local Centre
- B4 Mixed Use
- B5 Business Development
- C3 Environmental Management
- IN1 General Industrial
- IN2 Light Industrial
- R1 General Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU3 Forestry
- RU4 Primary Production Small Lots
- SP2 Infrastructure
- W1 Natural Waterways

Local context

Muswellbrook Solar Farm
Scoping report
Figure 2.2

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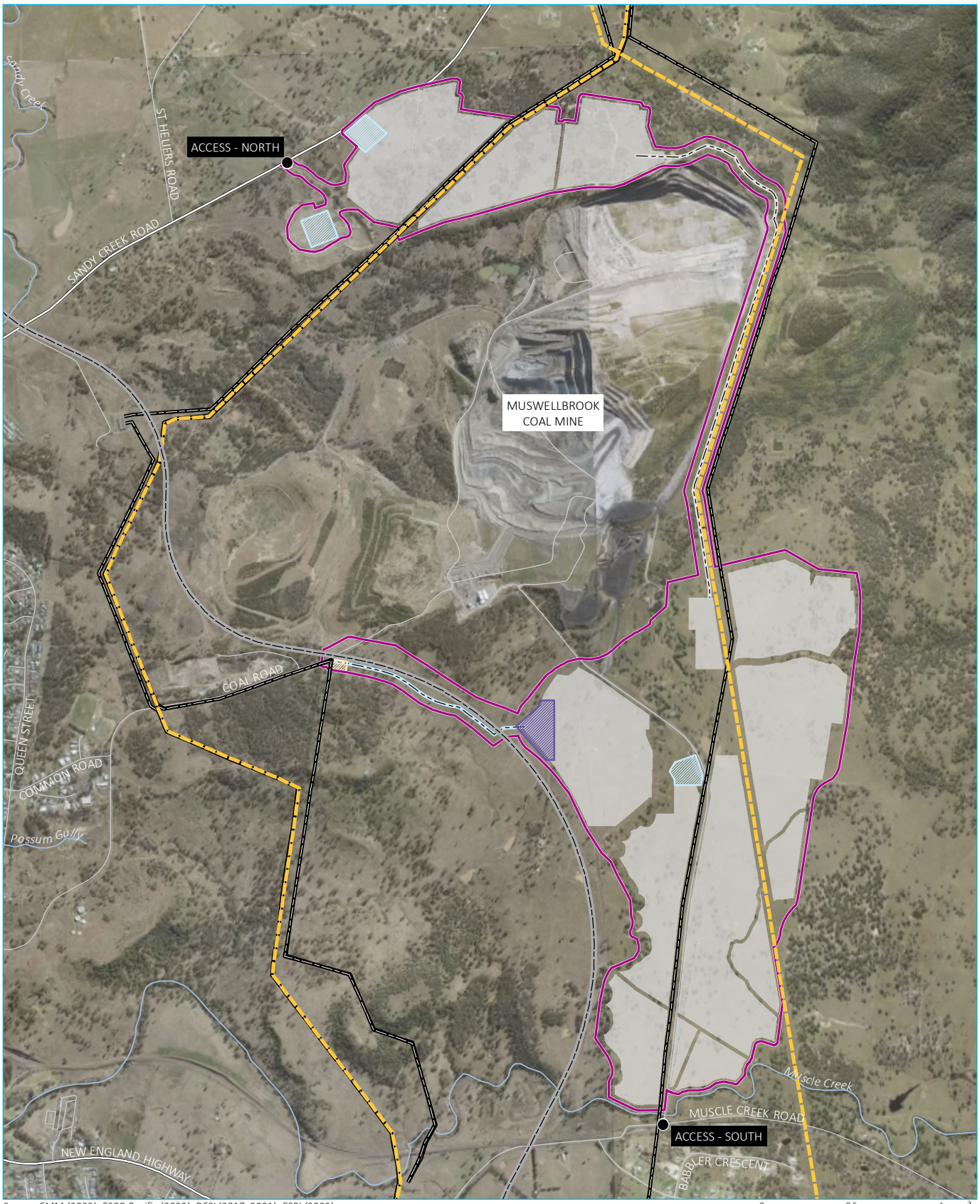

Source: EMM (2022); ESCO Pacific (2022); DFSI (2017, 2021); ESRI (2022)

0 0.5 1 km

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KEY

- Project area
- Existing 132kV transmission line
- Existing 330kV transmission line
- Site access
- Proposed 132kV connection to 95M
- Internal connection 33kV
- Solar panel footprint
- Potential laydown area
- Grid connection infrastructure
- Switchyard/BESS preferred location

Existing environment

- Major road
- Minor road
- Named watercourse
- Muswellbook Bypass Road Alignment

Indicative site layout

Muswellbrook Solar Farm
Scoping report
Figure 2.3

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Photograph 2.1 Project area – southern section – looking west

Photograph 2.2 Project area – electricity transmission corridor looking north

Photograph 2.3 **Existing Muswellbrook Coal Mine**

Photograph 2.4 **Project area northern section, looking north towards Bells Mountain**

2.2 Strategic planning framework

An overview of relevant key policies, plans and strategies, and how the project aligns with these, is provided in Table 2.1.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
International context		
The Paris Agreement	The Paris Agreement is a legally binding international treaty on climate change adopted by 196 parties in 2015. As a signatory to the agreement, the Australian Government has committed to reduce greenhouse gas emissions by 26%–28% percent on 2005 levels by 2030.	The project will contribute to meeting Australia's commitments under the Paris Agreement by reducing the NEM's annual greenhouse gas emissions.
National context		
Large-scale Renewable Energy Target	The Australian Government Clean Energy Regulator administers the Large-scale Renewable Energy Target which incentivises investment in renewable energy power stations such as wind and solar farms. The Large-scale Renewable Energy Target of 33,000 GW hours of additional renewable electricity generation was met at the end of January 2021 (Clean Energy Regulator 2021). The annual target will remain at 33,000 GW hours until the scheme ends in 2030.	Once operational, the solar project will generate the equivalent of up to approximately 347 GWh of electricity annually, which will contribute towards meeting the Large-scale Renewable Energy Target in future years. In addition, the BESS project will be able to store renewable energy to increase market efficiency and enable greater penetration of renewables in the electricity grid.
Integrated System Plan	The Integrated Systems Plan 2020 (ISP 2020) prepared by the Australia Energy Market Operator is an: "Actionable roadmap for eastern Australia's power system to optimise consumer benefits through a transition period of great complexity and uncertainty." The Integrated Systems Plan 2022 (ISP 2022) is currently under development.	Renewable Energy Zones (REZs) are identified in the ISP 2020 as areas where "clusters of large-scale renewable energy can be developed to promote economies of scale in high quality areas and capture geographical and technological diversity in renewable resources" (Australia Energy Market Operator 2020). The draft ISP 2022 identifies that significant investment in the NEM requiring a nine fold increase in utility-scale variable renewable energy (VRE) and that: "Much of this resource will be built in renewable energy zones (REZs) that coordinate network and renewable investment, and foster a more holistic approach to regional employment, economic opportunity and community participation." The project will contribute to the development of Renewable Energy Zones in NSW and the Hunter Central Coast region.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
State context		
NSW Electricity Strategy 2019	The NSW Electricity Strategy is the NSW Government's plan for a reliable, affordable, and sustainable electricity future that supports a growing economy. With four of NSW's five remaining coal-fired generators scheduled to close by 2035, the strategy outlines a reliable energy system which meets NSW's energy requirements and emission reduction targets. The strategy and its enabling legislation the *Electricity Infrastructure Investment Act 2020* supports the rolling out of REZs, commencing with the Central West Orana (CWO) REZ and the setting of a Renewable Energy Zone body, (Energy Corporation of NSW) that will bring together investors and carry out early planning so benefits to local communities are maximised.	The project will contribute to the development of Renewable Energy Zones in NSW and the Hunter Central Coast region and assist in meeting NSW's energy generation and storage requirements, as well as the NSW Government's emissions reduction targets.
Net Zero Plan Stage 1: 2020–2030	The Net Zero Plan Stage 1 2020–2030 (DPIE 2020) outlines the NSW Government's plan to grow the economy and create jobs while helping the state to deliver a 35% cut in emissions compared to 2005 levels.	The project contributes to Priority 1 of the Plan: "Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living."
NSW Electricity Infrastructure Investment Roadmap 2020	The Electricity Infrastructure Roadmap coordinates investment in transmission, generation, storage and firming infrastructure as ageing coal-fired generation plants retire. The roadmap includes actions that will deliver "whole-of system" benefits. The roadmap sets out a plan to deliver the state's first five Renewable Energy Zones (REZs) in the Central-West Orana, New England, South-West, Hunter-Central Coast, and Illawarra regions.	The project will contribute to the development of Renewable Energy Zones in NSW and the Hunter Central Coast region and is ideally placed to contribute to the success of the roadmap.
Large-Scale Solar Energy Guideline 2018	Large-Scale Solar Energy Guideline (Solar Guideline) (DPIE 2018) provides the community, industry, applicants, and regulators with guidance on the planning framework for the assessment of large-scale solar projects and identify the key planning considerations relevant to solar energy development in NSW.	Site selection and impact assessment considerations detailed in the guideline have been and will continue to be used to inform the project.
Draft Large-Scale Solar Energy Guideline 2021	It is noted that a draft guideline was publicly exhibited in February 2022 and is currently under review by NSW Government.	The project will consider the draft guideline in the EIS.
Local and regional context		
Hunter Regional Plan 2036	The Hunter Regional Plan 2036 (the Regional Plan) was released by the DPIE in 2016 to guide land use planning priorities and decision making in the Hunter region for the next two decades.	The project directly contributes to Goal 1 of the Regional Plan: to be the leading regional economy in Australia and specifically under that goal, Direction 12 to "diversify and grow the energy sector".

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
Muswellbrook Local Strategic Planning Statement (2020)	The Muswellbrook Local Strategic Planning Statement sets out the 20 year vision for land use planning in the Muswellbrook Shire Council LGA. The vision outlined in the statement is for: "A Community in Transition - Muswellbrook will have a more sustainable community, environment and economy through diversification." The vision will be achieved through eight key planning priorities including: "the Shire becoming the State's major innovative energy centre".	The project will contribute to planning priorities of the Local Strategic Planning Statement by contributing to the development of the energy industry in the region.

2.3 Project justification

2.3.1 Project benefits

The project aligns with the NSW and Commonwealth Government's objectives for energy security and reliability and emissions reductions and will contribute to the continued growth of renewable energy generation and storage capacity in NSW and the Hunter Central Coast region.

The Energy Corporation of NSW (EnergyCo) has identified that planning is underway for the Hunter-Central Coast Renewable Energy Zone. In February 2022 EnergyCo announced the outcomes of a registration of interest for projects in the Hunter-Central Coast Renewable Energy Zone stating that interest had been registered for projects with a combined generation capacity of 40 GW.

The Hunter Central Coast REZ is yet to be formally declared under the *Electricity Infrastructure Investment Act 2020* but is expected to be declared in 2022.

The project is highly aligned with the NSW Government's strategic policy direction for the electricity sector. In addition, it will result in a number of benefits including:

- support and contribution to Commonwealth and State climate change commitments such as the Paris Agreement, Renewable Energy Target (RET) Scheme, 2020 ISP and NSW Net Zero Plan Stage 1: 2020–2030;
- development of the Hunter-Central Coast REZ, supplying approximately 135 MWac of electricity generating capacity to the NEM, and significantly contributing to the Hunter Central Coast REZ;
- contribute to capacity gaps in the electricity market following the closure of more than 8,000 MW worth of coal-fired power generators within NSW by 2035 (NSW Electricity Strategy 2019). The project will provide a total annual generation capacity of around 347 GWh which is equivalent to powering the needs of approximately 79,000 homes, thereby enhancing reliability and security of electricity supply in NSW; and
- support the realisation of the Hunter Regional Plan's goal to be the leading regional economy in Australia by helping to diversify and grow the energy sector.

2.3.2 Site suitability

The project area has been selected to optimise the future land use of the MCC site. With mining at the site scheduled to be completed during the third quarter of 2022, after 115 years of operations this is an exciting opportunity to redevelop the site for new purposes, which could see the site generate post-mine investment and employment in the region.

Idemitsu has developed a Draft Master Plan in collaboration with several industry partners to realise this vision for productive post-mining use of the site. The project area has been integrated with nearby development through the draft Master Plan. The project will be co-located with the mine closure of the MCC site and the development of the Bells Mountain Pumped Hydro-electric project. The master plan prepared for the site will allow for these three key activities to maximise benefits of the post-mining land use of the site whilst ensuring works are carried out efficiently and with minimal impact to the community. The project will contribute to the legacy of the MCC site and seeks to build on MCC's existing relationships with the community and the capacity of the skilled local workforce.

The project area is also ideally located adjacent to existing transmission infrastructure. The project area is traversed by existing 132 kV and 330 kV transmission lines. The project area is an ideal site for increasing generation capacity on the NSW electricity grid with minimal requirements for additional transmission infrastructure.

The site location within the Hunter Region is ideally placed to contribute to the development of the Hunter-Central Coast REZ and assist in meeting NSW's energy generation and storage requirements. The project area presents optimal conditions for utility scale solar as it is relatively flat and predominantly cleared land.

Biodiversity values of the project area and surrounds have also been considered through the project scoping and preliminary ecological assessment. Areas of higher value native vegetation have been avoided where practical.

In summary the project area is considered highly suitable due to:

- its potential to maximise the benefits of post-mining land use at the MCC site;
- the location of the project being within the Hunter Region and its alignment with the region's strategic planning objectives and the NSW Government's plans for the Hunter-Central Coast REZ;
- its proximity to existing transmission infrastructure and future planned transmission infrastructure;
- the project area selection and layout has been amended to retain biodiversity values and no significant adverse biophysical, cultural, social, or economic impacts are anticipated.

3 Project description

3.1 Overview

The project comprises a large-scale solar PV generation facility and a BESS, which is supported by associated infrastructure. The solar project will have a generation capacity of approximately 135 MWac, which will generate the equivalent of approximately 347 GWh of energy annually. The BESS will have a capacity of up to 135 MWac and have provision for up to two hours of storage. Details on the project area, physical layout and design, activities and uses, timing and alternatives considered are provided in the following sections.

3.2 Physical layout and design

The project area is approximately 512 hectares (ha) and encompasses 22 land parcels (provided in **Appendix C**). Within the project area an indicative footprint for the solar panels is expected to be around 350 ha. The majority of site is located on land owned by MCC, a wholly owned subsidiary of Idemitsu. The southern area includes land owned by a 3rd party landowner. The solar farm is divided into two distinct areas, one to the north of the Muswellbrook Coal Mine and one to the south. It is proposed that the northern and southern areas are connected via an overhead line that will run adjacent to the existing 330kV transmission line to east of the mine pit.

The preferred point of connection to the Ausgrid network is via a tee connection into the 95M feeder, a 132kV overhead line to the west of the site. This will require construction of approximately 1.2 km of 132kV overhead line and a 132kV switching yard. The final layout and capacity of the solar farm will be selected on the basis of environmental constraints identification, further engineering assessment and design of project infrastructure.

The physical layout and design of the project will comprise the following key infrastructure elements:

- **Solar Farm** – to absorb and convert sunlight into electricity. Approximately 300,000 PV Solar Panels would be installed across the site. The solar farm will comprise solar modules, mounting structures, Power Conversion Units (PCUs), weather stations, internal access tracks and associated cabling.
- **Battery energy storage system** (BESS) – to store and discharge electricity when required with embedded storage capacity of approximately 135 Megawatt of AC Power (MWac)/2hr.
- **Electrical collection systems, substation, switchyard and control room** – a facility substation connected to the solar farm and BESS as well as a switchyard will be established to connect the project to the transmission network.
- **Operations and maintenance (O&M) facility** – including offices, amenities, equipment sheds, storage and parking areas.
- **Electricity Transmission Line (ETL) infrastructure** – connecting to the grid and connecting the north and south areas of the solar farm.
- **Site access** – including access to Sandy Creek Road to the north and Muscle Creek Road to the south of the site.

An indicative layout of the project is provided in Figure 2.3. The project area layout and design will be refined further through the preparation of an EIS for the project. The following sections describe the project design and layout considerations for the key infrastructure elements.

3.2.1 Solar farm

A solar farm is proposed with a generation capacity of approximately 135 MWac and is expected to generate approximately 347 GWh of energy annually. The project proposes the installation of PV panels mounted on single-axis-tracking structures that will be configured in rows positioned to maximise the use of the solar resource available at the site. Panels will be fixed to and supported by ground-mounted framing. The maximum height of the solar panels when fully tilted is expected to be 4 m. The mounting structure would be piled or screwed into the ground. An example of the type of similar Solar PV panels at the Ross River Solar Farm is provided in Photograph 3.1.

Initial investigations indicate approximately 300,000 PV panels could be installed for the project however the final design will depend on a range of factors including available technologies, available grid capacity, economies of scale, grid connection and environmental constraints. As shown in Figure 2.3 the site layout expects to see solar panels organised in two key areas – being a northern section and a southern section of solar panel arrays.

Photograph 3.1 Example of solar PV modules at Ross River Solar Farm (source: ESCO Pacific)

3.2.2 Electrical collection system and substation

Solar panels would be wired in a string array with each group feeding an inverter station. Inverter stations would convert DC current generated from the PV panels into AC current that can be stepped up to 132kV at the substation and subsequently exported to the national electricity grid. Power Conversion Units (PCUs) will contain the DC-AC inverters, medium-voltage transformers, switchgear, Supervisory Control and Data Acquisition (SCADA) and communications equipment. They are normally housed within shipping container-like open structures that measure approximately 6–12 m long x 2.5 m wide x 2.9 m high. PCUs may also be skid mounted open structures. An aerial photograph showing the arrangement of Solar Panel arrays and PCU's at Ross River Solar Farm is provided in Photograph 3.2 below.

Underground electrical cabling is proposed between the solar PV panels, PCUs and the onsite substation. Electricity generated by the project would be exported to the grid via an overhead line network connection which is discussed further in Section 3.2.4 below.

The northern and southern areas of solar panels arrays would be connected via a 33kV overhead line that will run adjacent to the existing 330kV transmission line to east of the existing MCC mine pit.

A substation will be constructed within the project area to convert the onsite AC reticulated 33 kV electricity to 132 kV for export to the grid. The electrical infrastructure components are generally expected to be between five metres to 10 m tall.

Photograph 3.2 Solar Panel arrays at Ross River Solar Farm (source: ESCO Pacific)

3.2.3 Battery energy storage system

The project includes a BESS which would provide the capacity to deliver electricity to the transmission network on demand and more closely follow demand fluctuations. Renewable energy generation is intermittent in nature and subject to fluctuations in solar and wind availability. Batteries mitigate these natural fluctuations through their ability to store and discharge electricity when required. The proposed BESS will have a capacity of up to 135 MWac and up to two hours of storage. The proposed BESS will provide both storage as well as firming capacity to the National Electricity Market (NEM) and assist in grid stability by providing frequency control ancillary services. The BESS will allow for the storage and export of renewable energy within the network so that it can be used during times of peak demand.

The BESS would comprise containerised lithium-ion batteries. Concrete footings would likely be laid to support the structures. The BESS would be located adjacent to the substation and would be connected via underground or overhead cables. The combined footprint of the BESS and substation is expected to be approximately 4.2 ha and its indicative location is shown in Figure 2.3.

3.2.4 Network connection

The preferred point of connection to the Ausgrid network is via a tee connection into the 95 M feeder, an existing 132 kV overhead line to the west of the site. This will require construction of a switchyard as well as approximately 1.2 km of 132 kV overhead line and point of connection infrastructure with a footprint of approximately 0.5 ha on the west side of the project's southern section.

3.2.5 Supporting infrastructure

An Operations and Maintenance (O&M) facility would be established including offices, amenities, equipment sheds, storage and parking areas. The project would also require the establishment of internal access roads as well as temporary construction compounds during the project construction phase.

Security fencing will also be installed around the perimeter of the solar farm and high voltage electrical equipment such as the BESS facilities, grid connection and switchyard. Signage will be clearly displayed identifying hazards present within the project. Lighting will be installed where necessary for safety, maintenance, and security purposes. Lightning protection is likely to be provided for in key locations of the administration and control area, BESS equipment, substation and building entrances, switchyard, and inverter stations.

3.2.6 Site access

Two main access points will be established for the project. Vehicles travelling to the northern section of the project will use an access point on Sandy Creek Road. Vehicles accessing the southern section of the project will use an access point on Muscle Creek Road. The site access locations are shown in Figure 2.3.

3.3 Activities and uses

3.3.1 Construction

Construction of the project is expected to be completed over approximately 18 months. Construction activities will be undertaken during standard day time construction hours.

Temporary infrastructure required during the construction phase of the project will include temporary construction compounds and temporary internal access tracks. Minor earthworks would be required for the preparation of the site, including minimal site levelling, laying of access tracks and drainage works. Most of the infrastructure would be pre-fabricated off-site, delivered and then assembled on-site.

Where required, additional or improved drainage channels, sediment control ponds and dust control measures will be implemented. Further, laydown areas and waste handling, fuel and chemical storage areas will be strategically placed to minimise potential environmental impacts during the construction phase of the project.

i Workforce

During the peak construction period, a workforce of approximately 200 personnel will be required on site for the solar farm and BESS.

Local council and business owners will be consulted through the development and assessment of the project regarding managing potential impacts and opportunities for accommodation of the construction workforce.

The construction workforce will be sourced from the local area as far as practicable. Accommodation for non-local construction staff is expected to be sourced through the use of available rental and motel accommodation in surrounding townships and regional centres. Potential cumulative impacts on accommodation, infrastructure, and services will be considered in the EIS as part of the social impact assessment.

3.3.2 Operation

The key activities during operation of the project will be energy generation and energy storage. Once operational, the solar farm will require up to six full-time employees. The primary activities conducted on site will include day-to-day routine operations, maintenance of infrastructure, and general site maintenance and security.

The operation of the solar farm will be supported by contractor roles for vegetation, weed and pest management, annual module cleaning and equipment calibration, internal road maintenance and facility cleaning.

The operational lifespan of the project is expected to be in excess of 35 years, depending on the nature of solar PV technology and energy markets. It is also expected that the operational solar farm will feature some co-location of livestock grazing on the site throughout the life of the project.

3.3.3 Decommissioning

Once the project reaches the end of its operational life, a decision will be made to either decommission or re-power the facility, subject to approval requirements.

If the project is decommissioned, all above ground structures built as part of the project will be removed and site rehabilitated generally to its pre-existing land use, as far as practicable. The disposal and recycling of the project infrastructure will be done in accordance with current waste management legislation at the time of decommissioning. Whenever possible, efforts will be made to reduce the amount going to landfill in line with best-practice sustainability principles.

If re-powering is proposed, an appropriate stakeholder consultation process will be undertaken, and all necessary approvals will be sought.

3.4 Timing

Project construction is expected to commence around Q4 2023 and would take approximately 18 months to complete. The project is expected to be commissioned by 2025 and would have an operational life in excess of 35 years.

4 Statutory context

The key relevant statutory requirements for the project having regard to the EP&A Act, other NSW and Commonwealth legislation, and environmental planning instruments are summarised in Table 4.1. This table has been set out in accordance with the Scoping Report Guidelines and *State Significant development - preparing an environmental impact statement Appendix B to the state significant development guidelines* (DPIE 2021d) (EIS Guidelines), to cover the following:

- power to grant approval (ie approval pathway);
- permissibility;
- consistent approvals;
- Commonwealth approvals;
- approvals not required (pursuant to Section 4.41 of the EP&A Act); and
- mandatory matters for consideration.

Detailed consideration of relevant statutory requirements will be provided in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Power to grant approval	
EP&A Act and Planning Systems SEPP	Part 4 of the EP&A Act relates to development assessment and consent; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (or SSD). Section 4.36(2) of the EP&A Act states that a: *...State environmental planning policy may declare any development, or any class or description of development, to be State significant development.* The Planning Systems SEPP identifies development that is SSD. Section 2.6(1) of the Planning Systems SEPP states: *(1) Development is declared to be State significant development for the purposes of the Act if:* *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and* *(b) the development is specified in Schedule 1 and 2.* The project meets both these requirements; it requires development consent, and is a development specified in Schedule 1 of the Planning Systems SEPP. Schedule 1 of the Planning Systems SEPP defines the following as SSD: *Electricity generating works and heat or co-generation* *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million.* The project is development for the purpose of electricity generation and will have a capital investment value of more than $30 million. Consequently, the project is SSD.

Table 4.1 Statutory context

Approval	Requirement
Permissibility	
State Environmental Planning Policy (Transport and Infrastructure) 2021	Section 2.36(1) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* states that: *(1) Development for the purpose of electricity generating works may be carried out by any person with consent on the following land—* *(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land,* *(b) in any other case—any land in a prescribed rural, industrial or special use zone.* *…* The project area is on land predominantly zoned RU1 – Primary Production but also contains land zoned C3 – Environmental and SP2 Infrastructure. On this basis the development is partly prohibited by an environmental planning instrument. Section 4.38(3) of the EP&A Act addresses Consent for SSD and states that: *(3) Development consent may be granted despite the development being partly prohibited by an environmental planning instrument.* Therefore, development may be granted for the project despite it being partly prohibited by an environmental planning instrument.
Consistent approvals	
Overview	Section 4.42 of the EP&A Act outlines that the approvals listed below cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the development consent for the SSD.
An approval under Section 138 of the NSW *Roads Act 1993*	Under Section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either Transport for NSW or local council, depending upon the classification of the road. The interaction of the project with the local and regional road network will be addressed in the EIS.
Commonwealth approvals	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National heritage places within the vicinity of the project area (refer Appendix D). The preliminary biodiversity assessment has identified potential for listed threatened species to occur within the project area. The preliminary biodiversity assessment also found that portions of the study area comprise areas of listed Threatened Ecological Communities (TECs), including Box Gum Woodland. Further biodiversity assessment will be carried out through the preparation of the EIS and a referral under the EPBC Act will be submitted to the Commonwealth Department of Agriculture, Water and the Environment.

Table 4.1 Statutory context

Approval	Requirement
Native Title Act 1993	The Commonwealth *Native Title Act 1993* recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land. Claimants whose native title claims have been registered have the right to negotiate about some future acts, such as mining or granting of a lease over the land covered by their native title claim. Where a native title claim is not registered, a development can proceed through mediation and determination processes, though claimants will not be able to participate in future act negotiations. There are no current native title claims relevant to the project area.
Approvals not required	
Overview	Section 4.41 of the EP&A outlines the following approvals, permits etc are not required for an approved SSD.
Fisheries Management Act 1994	A permit under the *Fisheries Management Act 1994* to block fish passage or dredge or carry out reclamation work on water land will not be required pursuant to Section 4.41 of the EP&A Act. The project may require work in water land to facilitate the upgrade of road crossings or establish new crossings of mapped watercourses within the project area. These works will be undertaken in accordance with NSW DPI *Policies and Guidelines on Fish-Friendly Waterway Crossings* (undated), *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013), and NSW *Guidelines for Controlled Activities*.
Heritage Act 1977	An approval under Part 4, or an excavation permit under Section 139, of *the Heritage Act 1977* will not be required pursuant to Section 4.41 of the EP&A Act. Notwithstanding, there are no listed heritage items within the project area.
National Parks and Wildlife Act 1979	An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974* will not be required pursuant to Section 4.41 of the EP&A Act. There is potential for Aboriginal sites to occur within the project area. Any Aboriginal heritage sites identified within the project area will be avoided as far as practicable during the design process.
Rural Fires Act 1997	A bushfire safety authority under Section 100B of the *Rural Fires Act 1997* will not be required pursuant to Section 4.41 of the EP&A Act.
Water Management Act 2000	A water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000* will not be required pursuant to Section 4.41 of the EP&A Act. Construction work near or within watercourses within the project area may be required. These works will be carried out in accordance with DPIE's various guidelines for controlled activities.
Other NSW approvals	
Conveyancing Act 1919	An easement established under Section 88B of the *Conveyancing Act 1919* is likely to be required for the connection to the Ausgrid network.
Crown Land Management Act 2016	A Section 5.21 licence may be required to authorise the use or occupation of Crown Land.

Table 4.1 Statutory context

Approval	Requirement
Mandatory considerations - Considerations under EP&A Act and EP&A Regulation	
Section 1.3 of the EP&A Act	Relevant objectives of the EP&A 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,* *(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,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.* The above will all be considered in the EIS.
Section 4.15 of the EP&A Act	Pursuant to Section 4.15 of the EP&A Act the consent authority must consider the following relevant matters for consideration: • Relevant environmental planning instruments for the project including: – *State Environmental Planning Policy (Biodiversity and Conservation) 2021*; – *State Environmental Planning Policy (Resilience and Hazards) 2021*; – *State Environmental Planning Policy (Transport and Infrastructure) 2021*; and – *Mid-Western Regional Local Environmental Plan 2012* (Mid-Western Region LEP). • Relevant development control plans. • the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; • the suitability of the site for the development; and • the public interest. The above will all be considered in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Section 190 of the EP&A Regulation	Section 190 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provides requirements for the form of EIS: (1) An environmental impact statement must contain the following information— a) the name, address and professional qualifications of the person who prepared the statement, b) the name and address of the responsible person (the applicant), c) the address of the land: – to which the development application relates, or – on which the activity or infrastructure to which the statement relates will be carried out, d) a description of the development, activity or infrastructure, e) an assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division. (2) The person preparing the statement must have regard to— (a) for State significant development—the State Significant Development Guidelines, or (b) for State significant infrastructure—the State Significant Infrastructure Guidelines. (3) An environmental impact statement must also contain a declaration by the person who prepared the statement of the following— (a) the statement has been prepared in accordance with this Division, and (b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and (c) the information contained in the statement is not false or misleading.
Section 192 of the EP&A Regulation	Section 192 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provides requirements for the content of EIS: 1. (1) An environmental impact statement must contain the following— a) a summary of the EIS, b) a statement of the objectives of the development, activity or infrastructure, c) an analysis of feasible alternatives to the carrying out the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure, d) an analysis of the development, activity or infrastructure, including: i) a full description of the development, activity or infrastructure, and ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and iii) the likely impact on the environment of the development, activity or infrastructure, and iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out, e) a compilation, in a single section of the EIS, of the measures referred to in paragraph (d)(iv), f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in section 193.
Mandatory considerations - Considerations under other legislation	
Biodiversity Conservation Act 2016 (BC Act)	The likely impact of the project on biodiversity values will be assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the project on biodiversity values.

Table 4.1 Statutory context

Approval	Requirement
Mandatory considerations - Environmental planning instruments	
State Environmental Planning Policy (Resilience and Hazards) – Section 3.7	The EIS will consider the following relevant departmental guidelines: • Applying *State Environmental Planning Policy No. 33 Hazardous and Offensive Development*; • HIPAP No. 3 – Risk Assessment; and • HIPAP No. 12 – Hazards.
State Environmental Planning Policy (Resilience and Hazards) – Section 4.6	The EIS will consider the potential for the project to impact on contaminated land.
Muswellbrook LEP	The EIS will consider the relevant objectives and land uses for RU1, C3 and SP2 zones.
Mandatory considerations Development control plans	
In accordance with Section 2.10 of the NSW SEPP (Planning Systems) 2021, Development Control Plans do not apply to SSD and are not a relevant consideration for the project.	

5 Engagement

5.1 Scoping phase consultation

Stakeholder engagement has been a key part of the project scoping phase. Engagement with agencies and the community has been carried out over a long period particularly in relation to MCC's plans for the post mining land use of the Muswellbrook Coal Mine site and their vision for the MCIP. Engagement specific to the Muswellbrook Solar Farm has commenced recently and builds on previous discussion with the community and government held by MCC. The project is committed to proactive community engagement and continuing the positive relationships MCC has established with stakeholders and the community.

5.1.1 Government

Initial stakeholder engagement has been completed particularly in relation to the broader MCIP. A summary of stakeholder meetings held to date regarding the MCIP is provided in Table 5.1. To date all stakeholder engagement has been supportive towards Muswellbrook Coal's post mining land use masterplan, which includes the solar project. In particular, the creative concept of incorporating a green energy, training and industrial precinct together and the long-term regional legacy associated with this type of development has been well received.

Table 5.1 MCIP stakeholder engagement summary

Stakeholder	Engagement method and timing	Matters discussed and feedback
Department of Regional NSW	Meetings held January, April and September 2021	• Idemitsu met to discuss vision for post mining land use and discuss coordination of government resources.
Muswellbrook Shire Council	Meetings held February and April 2021	• Idemitsu provided briefing to Mayor, General Manager and Manager Planning, Environment and Regulatory Services on planned post mining land use and introduction of the energy hub. • Provided timeline and planned rehab targets for end of mine closure to Council's Industrial Closure Committee.
NSW Resources Regulator Department of Planning and Environment Muswellbrook Shire Council Department of Regional NSW	Meeting held April 2021	• Idemitsu hosted a State Government workshop to present plans for the post-mining land use.
The Energy Corporation of NSW	Monthly meetings since early 2021	• Established a monthly meeting with EnergyCo's Case Management team to discuss EnergyCo and NSW Government related activities and initiatives, Idemitsu related activities and initiatives, Hunter REZ progress and funding opportunities.
The Hon. Matt Kean and The Hon. Dave Layzell	December 2021	• MCC hosted the Hon. Matt Kean and the Hon. Dave Layzell at the MCC mine to discuss planning for the Hunter REZ.
Muswellbrook Coal Community Consultative Committee	Regular meeting held by Idemitsu	• Briefings on mine closure planning and MCIP.

Stakeholder engagement meetings specific to the Muswellbrook Solar Farm have been carried out in the first half of 2022. Table 5.2 provides a summary of government meetings held regarding the Muswellbrook Solar Farm.

Table 5.2 Muswellbrook Solar Farm stakeholder engagement summary

Stakeholder	Engagement method and timing	Matters discussed and feedback
Ausgrid	Meetings and discussions held between June 2021 and July 2022 and receipt of reports	• Preliminary Enquiry 5.4A Response (dated 9 June 2021); • System Planning Advice (dated 3 September 2021); • Preliminary Enquiry 5.4B Detailed Response (dated 4 March 2022); and • Preferred point of connection to Ausgrid network via a tee connection into the 95M feeder.
Transport for NSW	Meetings held February and March 2022	• Meetings to discuss and resolve potential overlap between Muswellbrook Solar Farm and the Muswellbrook Bypass project and discuss the siting of infrastructure (particularly transmission lines and substation).
Department of Planning and Environment	Scoping meeting held 2 May 2022	• Scoping meeting held to discuss the project planning application. Key matters discussed included: nature and scale of development, assessment pathway, engagement approach, level of assessment required and indicative project timing.
Muswellbrook Shire Council	9 May 2022	• ESCO Pacific and MCC met with Council to provide a briefing on the project and seek feedback. Key matters discussed included: – opportunities for co-location of grazing livestock within operational solar farm; – economic benefits and jobs arising from the project during construction and operation; – council identified the need to consider accommodation availability for the construction workforce as a key issue; – council identified visual impacts to nearby residents as a key issue; – need for and approach to community engagement activities; and – discussed potential for and approach to community benefit sharing including options such as voluntary planning agreements (VPA).
Department of Agriculture, Water and the Environment	Pre-referral meeting held 31 May 2022	• Pre-referral meeting held to discuss the EPBC referral. Key matters discussed included: nature and scale of development, MNES located on the project site, level of detail to be provided in the referral, assessment pathway under the bilateral agreement with NSW.
The Energy Corporation of NSW	1 June 2022	• ESCO Pacific attended a Idemitsu/EnergyCo monthly meeting to provide an overview of the Muswellbrook Solar Farm. EnergyCo offered to provide Case Management services to ESCO Pacific as part of the wider case management services it is currently providing to Idemitsu for the MCIP.

The matters raised through scoping phase stakeholder engagement will be considered further through the EIS technical assessments and will be addressed during subsequent rounds of community engagement.

5.1.2 Community engagement

Community engagement for the Muswellbrook Solar Farm commenced in May 2022. The following community engagement activities were completed:

- established project website;
- project information sheet delivered to 90 residences nearest to the project area;

- MCC annual newsletter issued to all residents of Muswellbrook and Muscle Creek localities including description of Muswellbrook Solar Project and link to project website; and
- phone interviews held with 4 nearby residents involved in the MCC community consultative committee (CCC) to discuss the project and seek feedback.

Issues and observations raised by the residents included:

- potential impact to visual amenity, including the placement, size and reflection of solar panels;
- potentially visibility of the solar farm at the property (noted as an observation, resident was not concerned);
- concern towards land clearing of the proposed project area;
- potential limitations of local contractor availability;
- observation that many coal mine workers may not live locally and it may be difficult for the project to secure local employment;
- interest in construction impacts, including traffic movements in the local area and particularly along Sandy Creek Road;
- potential cumulative social impacts related to increased traffic may arise due to the multiple development projects occurring in the area, although it was noted that the planned MCC mine closure in 2022 may provide mitigation by further reducing traffic volumes;
- location of the New England Highway Muswellbrook Bypass in relation to the solar farm; and
- interest was raised in relation to opportunities for agricultural activities to continue within the operational solar farm, with sheep grazing being a potential option for investigation due to its success on other solar farms.

It was also noted during consultation that there may be confusion amongst the community between the Muswellbrook Coal Mine Closure and Rehabilitation activities and the proposed Muswellbrook Solar Farm Project. Three residents sought additional information and clarifications regarding the proposal, its nature and location. Overall, the four stakeholders spoken to expressed positive support for the Project.

The matters raised through scoping phase community engagement have been identified as key issues for further consultation. The matters raised will be considered further through the EIS technical assessments and will be addressed where possible during subsequent rounds of community engagement.

5.2 EIS phase consultation

The following consultation activities are planned to inform the preparation of the EIS and its consideration of key issues.

- continued availability of project website and option to provide community feedback;
- local community drop-in information sessions;
- online community project information session;
- project updates to be distributed to the community at key stages of the EIS process (eg availability of scoping report, community drop-in sessions and EIS exhibition);
- direct engagement with specific neighbour issues and concerns; and
- targeted meetings with government agencies to address key issues identified in the EIS.

6 Proposed assessment of impacts

A preliminary environmental assessment has been carried out to identify matters requiring further assessment in the EIS and the level of assessment that should be carried out. In accordance with the Scoping Report Guidelines (DPIE 2021a), the following factors have been considered in the identification of matters needing further assessment for the project:

- the scale and nature of the likely impact of the project and the sensitivity of the receiving environment;
- whether the project is likely to generate cumulative impacts with other relevant future projects in the area; and
- the ability to avoid, minimise and/or offset the impacts of the project, to the extent known at the scoping phase.

The following sections of this chapter present the identified matters requiring further assessment and the proposed approach to the respective assessments. In addition to the preliminary environmental assessment presented herein preliminary technical studies have been carried out for the key issues of biodiversity, Aboriginal heritage and social impact assessment. These preliminary technical studies have been commenced to ensure that the values of the project area and surrounds are taken into consideration early in the planning and design of the project. Measures implemented through the scoping phase to avoid and minimise impacts are also described in the following sections for social, biodiversity, and Aboriginal heritage.

Matters have been categorised as per the categories identified in the Scoping Report Guidelines (DPIE 2021a). A scoping summary table in accordance with the Scoping Report Guideline is included in Appendix A. Also, in accordance with the Scoping Report Guideline, the level of assessment identified for each matter is as follows:

- Detailed:
  - biodiversity;
  - Aboriginal heritage;
  - visual; and
  - social.
- Standard:
  - historic heritage;
  - land;
  - traffic;
  - hazards;
  - water; and
  - noise and vibration.

6.1 Biodiversity

Biodiversity assessments have been undertaken for the project by Eco Logical Australia (ELA) to inform the scoping and design of the project. The assessment has included a desktop review of relevant databases, preliminary field assessment to inform threatened species habitat, vegetation plots and targeted flora and fauna surveys. Findings from the biodiversity assessment are summarised in this section; however, targeted surveys are ongoing from May–September 2022.

6.1.1 Existing environment

The project area has been modified by previous land use including agriculture. From the site assessment, the following trends in the landscape were identified:

- portions of the study area comprise disturbed agricultural land with little or no biodiversity value; and
- portions of the study area comprise areas of TECs which will require significant offsets and should be avoided where possible.

i Native vegetation

The field survey identified that there is a mix of modified woodlands and forests consistent with TECs listed under both the BC Act and the Commonwealth EPBC Act and large areas of historically modified grazing lands.

Vegetation Integrity (VI) plots compliant with the Biodiversity Assessment Method (BAM) have been undertaken and identified three broad Plant Community Types (PCTs) within the project area. These are:

- PCT 281: Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats;
- PCT 1691: Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter; and
- PCT 1603: Narrow-leaved Ironbark – Bull Oak – Grey Box shrub – grass open forest of the central and lower Hunter.

Portions of PCT 281 align with White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland), which are Critically Endangered Ecological Community (CEEC) under the BC Act and EPBC Act. Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions are classified as Endangered Ecological Community (EEC) under the BC Act. Central Hunter Valley Eucalypt Forest and Woodland is classified as CEEC under the EPBC Act.

PCT mapping is provided in Figure 6.1. and a summary of the vegetation types and condition within the project area is provided in Table 6.1.

Figure 6.1 - Preliminary native vegetation mapping

Project Area

Indicative Solar Panel Footprint

Plant Community Types

281, Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats, Low

281, Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats, DNG-Regeneration

281, Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats, DNG - Low

1603, Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter, Ironbark Dominated

1603, Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter, Low_Moderate

1603, Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter, Degraded Grassland

1691, Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter, Low

1691, Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter, Degraded Native Pasture

Planted Native

Exotic

Dam

Cleared

0 250 500 1,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

Project: 21NEW-19172 Date: 28/06/2022

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Table 6.1 Plant community types and condition in the project area

PCT	Condition	Dominant species	BC Act	EPBC Act
281: Rough-Barked Apple – red gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion.	Low (Scattered paddock trees)	*Angophora floribunda* *Eucalyptus melliodora* *Eucalyptus blakelyi*	CEEC	CEEC
	DNG (Derived Native Grassland) Regeneration	Mixed exotic and native grasses, exotic species, native forbs and eucalypt regeneration	CEEC	*
	DNG – low	Mixed exotic and native grasses, exotic species. minimal native forbs	CEEC	-
1691: Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter	Low (Scattered paddock trees)	*Eucalyptus crebra* *Eucalyptus moluccana*	EEC	CEEC
	Degraded native pasture	Mixed exotic and native grasses, exotic species and native forbs	-	-
1603: Narrow-leaved Ironbark – Bull Oak – Grey Box shrub – grass open forest of the central and lower Hunter	Ironbark dominated	*Eucalyptus crebra*	EEC	CEEC

*floristic data to validate condition has not yet been undertaken, this category has the potential to conform to the BC Act listing,

ii Threatened species

A preliminary field survey was conducted across the study area in June and August of 2021 by ELA ecologists. These surveys comprised of a hollow bearing tree survey targeting identification of large hollows suitable for Forest Owls (Barking Owl, Powerful Owl and Masked Owl), diurnal bird surveys targeting Glossy Black-Cockatoo and surveys for suitable sized Raptor nests (White-bellied Sea Eagle and Little Eagle).

The preliminary assessment found that there is potential for fauna species listed under the BC Act and/or EPBC Act to occur within the study area due to the presence of remnant paddock trees comprising hollows of varying sizes. These preliminary surveys identified potential habitat for the following threatened species:

- Koala and arboreal mammals (ie Squirrel Glider and Brush-tailed Phascogale);
- Microbats;
- Reptiles and Amphibians;
- breeding habitat for Forest Owls; and
- breeding habitat for Raptors, Glossy Black-Cockatoo and Gang-gang Cockatoo.

The desktop review identified threatened flora records of *Acacia pendula, Cymbidium canaliculatum* (endangered population), *Eucalyptus glaucina* and *Diuris tricolor* in proximity to the project area.

The habitat assessment undertaken in June and August 2021 identified hollow bearing trees in the project area considered suitable for Forest Owls such as Barking Owl, Masked Owl, and Powerful Owl (all listed as Vulnerable under BC Act). Initial targeted surveys, including stag watches, call playback and spotlighting were completed and did not identify any evidence of Forest Owls occurring across the project area and no signs of roosting (ie whitewash, casts, etc) were observed during these surveys.

A number of small stick nests were identified, however none were a suitable size or form to be considered White-bellied Sea Eagle or Little Eagle stick nests.

A minimal amount of *Casuarina* sp. feed trees were identified across the developable area for Glossy Black-Cockatoo. Diurnal surveys did not identify any evidence of these species, or breeding activity occurring across the project area.

Clifflines are important habitat features for many Microchiropteran bat (microbats), with several threatened species using cliffs and caves for roosting and breeding sites throughout NSW. No microbats cave or cliffline habitat, etc were observed within or in close proximity to the project area. There is potential that these species may utilise the habitat within the study area for foraging.

Based on the habitat values identified, and the preliminary surveys completed in Winter 2021, the following additional targeted flora and fauna surveys have been undertaken:

Threatened fauna surveys - summer (December 2021)

- diurnal bird surveys (Gang-Gang Cockatoo);
- call playback (Koala, Squirrel Glider, Bush-stone Curlew etc);
- spotlighting (Koala, Squirrel Glider, Bush-stone Curlew, Green and Golden Bell Frog);
- remote Camera Trapping (Arboreal mammals); and
- harp Trapping and Anabat (ultrasonic detectors) (Microbats).

Ongoing surveys are underway for a number of species including:

- Striped Legless Lizard (*Delmar impar*);
- Brush-tailed Phascogale (*Phascogale tapoatafa*); and
- Forest Owls (breeding habitat).

Threatened flora surveys

Targeted surveys for threatened flora have been undertaken in September/October (spring) and December (summer) 2021 in accordance with *Surveying threatened plants and their habitat, NSW survey guide for the Biodiversity Assessment Method* (DPIE, 2020). One threatened species, being *Diuris tricolor* (Pine Donkey Orchid) listed as Vulnerable under the BC Act, has been identified within the project area.

6.1.2 Assessment approach

The biodiversity assessment, including surveys undertaken to date and subsequent results have been used to reduce the overall project area to avoid and minimise impacts to areas of higher biodiversity value. Significant areas of intact vegetation in proximity to the project area have been excluded in an effort to follow the BAM principles of avoid and minimise to reduce unnecessary impacts to biodiversity, to the greatest extent possible.

The potential biodiversity impacts of the project will be assessed in accordance with the Biodiversity Assessment Method (DPIE, 2020). This assessment will include preparation of a Biodiversity Development Assessment Report in accordance with the BAM. The Biodiversity Development Assessment Report will include assessment of biodiversity values, consideration of prescribed impacts (those not quantified by ecosystem or species credits), presentation of mitigation and avoidance measures, quantification of the offsetting requirements, assessment of any Matters of National Environmental Significance (MNES) in accordance with the EPBC Act, and will present a strategy for offset delivery if required.

6.2 Aboriginal heritage

6.2.1 Existing environment

The existing environment affects factors such as the spatial distribution, preservation, and likelihood of cultural materials being present. This is both in forming a constraint in the types of cultural materials (eg sites such as rockshelters only being possible with steep relief or rock outcropping), and the attractiveness and importance of a region to the past Aboriginal people both from a socio-economic and spiritual relationship (eg major river systems, prominent relief, etc). Additionally, natural and human-made site formation processes influence the present location, survivability and integrity of cultural materials where present.

The project area is situated in the Central Lowlands that are characterised by rolling and undulating hills, with weakly defined ridgelines and river valleys (Erskine & Fityus 1998). No prominent landforms are present within the project area, with Bells Mountain situated to the northeast and Skellatar Hill to the west, both some distance away (SLR Consulting Australia Pty Ltd. [SLR] 2016). The project area includes both natural and human made landforms, the site having been a former coal mine.

While the project area is situated on Permian sedimentary strata that includes sandstone, conglomerate and siltstone (Erskine & Fityus 1998), it is considered improbable that rockshelters (or associated features) or other steep relief are present. The potential for exposed sandstone in deeply incised creeklines may occur, and sites such as grinding grooves could be present. The soil profiles of the project area are dominated by the Roxburgh soil landscape, a texture contrast soil that constrains buried cultural material to the upper ≤50 cm. No deep alluvial or aeolian sand environments where older cultural material may occur have been documented on the site to date.

Of note is the presence of Muscle Creek, a tributary of the Hunter River, which runs along the southern border of the project area. Elsewhere in the Hunter Valley, comparable tributaries, such as Glennies Creek and Warkworth Creek, have all been shown to encompass significant, often buried, cultural materials. A number of other smaller tributaries occur across the project area, and may similarly have potential for cultural materials to be present.

The project area has, however, been subject to significant disturbance in the last 200 years. This initially included forest clearing and grazing in the woodlands around the Hunter River and its tributaries. The project area stretches over multiple land grants taken up during the early period of settlement in the Muswellbrook region. Early grants in the project area include the 1870 acres (756.8 ha) granted to Francis Forbes around 1826, forming part of his large *Skellatar* estate, and 837 acres (338.7 ha) granted to Henry Dumaresq around the same time. Following the discovery of coal in 1907, the MCC initiated a mine adjacent to the project area (HLA-Envirosciences Pty Limited 2002; Turner 1996). This continued throughout the 20th Century and parts remain in operation today. The north of the project area is dominated by working open cut mining areas, former underground mines, rehabilitated land, disused and grassed over open cuts, and only a small amount of land that has been avoided by major mining activities. The southern portion of the project area has not been subject to mining and is open paddock with areas of native vegetation. Grazing continues to occur in the paddocked area and fenced stockyards and sheds are present along with a sealed road, unsealed tracks, electrical pylons, and dams.

i Ethnography

The project area is the traditional country of the Wonnarua people (also Won:arua, Wonarua, alternative Wannerawa), which Tindale (1974) records covering the region from Maitland through the Upper Hunter to the Great Dividing Range in the west. Muswellbrook, however, is in the northern limits of *Wonnarua* land, and as such the project area may have also had connections to the Geawegal people to the north (Brayshaw 1987; AECOM 2010). Ethnographic accounts indicate both the Wonnarua and Geawegal had close trading and social connections with the Gamilaraay groups (also Kamilaroi, Kamillaroi) who inhabited the Liverpool Plains to the west with groups travelling between Country via Cassilis Gap (Brayshaw 1987). No native title claim has been finalized for the Hunter Valley, but today, there are over 100 Aboriginal individuals and/or organisations that identify as Wonnarua and/or from neighbouring groups that have contemporary connections to the Hunter Valley.

Little is documented about Wonnarua beliefs in ancestors and spirit beings, although there is both direct and evidence from neighbouring groups of the common belief in the central importance of Baiame (also Baiamai, Bayme) as a supreme creator (Miller 1887; Thomas 1900). An image of this individual is painted in a rockshelter in Milbrodale in the southwest of the valley. Aboriginal tradition holds that during the Creation (Dreamtime) a god-like male Ancestor, Baiame, created the rivers, mountains and forests on Earth (Greenway 1878; Mathews 1907; Ridley 1875), as well as giving their laws and practices. Baiame made the first initiation site, known as a *bora*, where teenage boys were made into men. A further documented story includes a version of the widespread Creation account of Tiddalik the Frog, whereby he drinks up all the water from Wollombi Brook, which is only released after the other ancestors had made him laugh (Schilling and Hinton-Bateup 2015). There is no documented stories or places documented within or near the project area, but it is acknowledged little anthropological investigation of this part of the valley has occurred to date.

The post-Contact period is characterised by frontier violence. With numerous well-documented violent interactions and massacres across the valley in the early to mid-19th Century. By 1826 violence in the Upper Hunter was at its peak, driven by the antagonistic acts of the Mounted Police and Governor Darling's statement that landholders of the Upper Hunter were to defend themselves, preferably through acts of humanity but by force if needed (Bramble 1981). These include the locally well-known Ravensworth massacre at Ravensworth and the Pocket massacre at Mount Arthur. The former is currently the subject of consideration for Commonwealth protection under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984.* A further massacre has more recently been documented as occurring some 16 km west of the project area on the 1st of September 1826 when 18 Wonnarua people were killed at The Bridgman Estate, Fal Brook, in a retaliation for the killing of two convict workers (University of Newcastle 2022). There is currently no evidence of previous frontier violence as having occurred in the project area. By 1830, disease and conflict had severely impacted the Wonnarua (Biosis 2011). Dunn (2015) suggests that Aboriginal populations as a result of these interactions may have been only 3-5,000 individuals, while Miller's (1887) "informant" recounts that the population of the Wonnarua numbered 500 in 1841.

By the late 19th Century, the Board for the Protection of Aborigines was established to provide recommendations concerning the welfare of Aboriginal people and to manage Aboriginal Reserves in New South Wales. This resulted in the establishment of the St Clair mission from which many contemporary Wonnarua people have ancestral connection. Other sites include St Heliers, on the outskirts of Muswellbrook, which housed Aboriginal children taken from their parents from 1945 until its closure in 1986 (Biosis 2011). None of these sites are within the study area.

ii Archaeological context

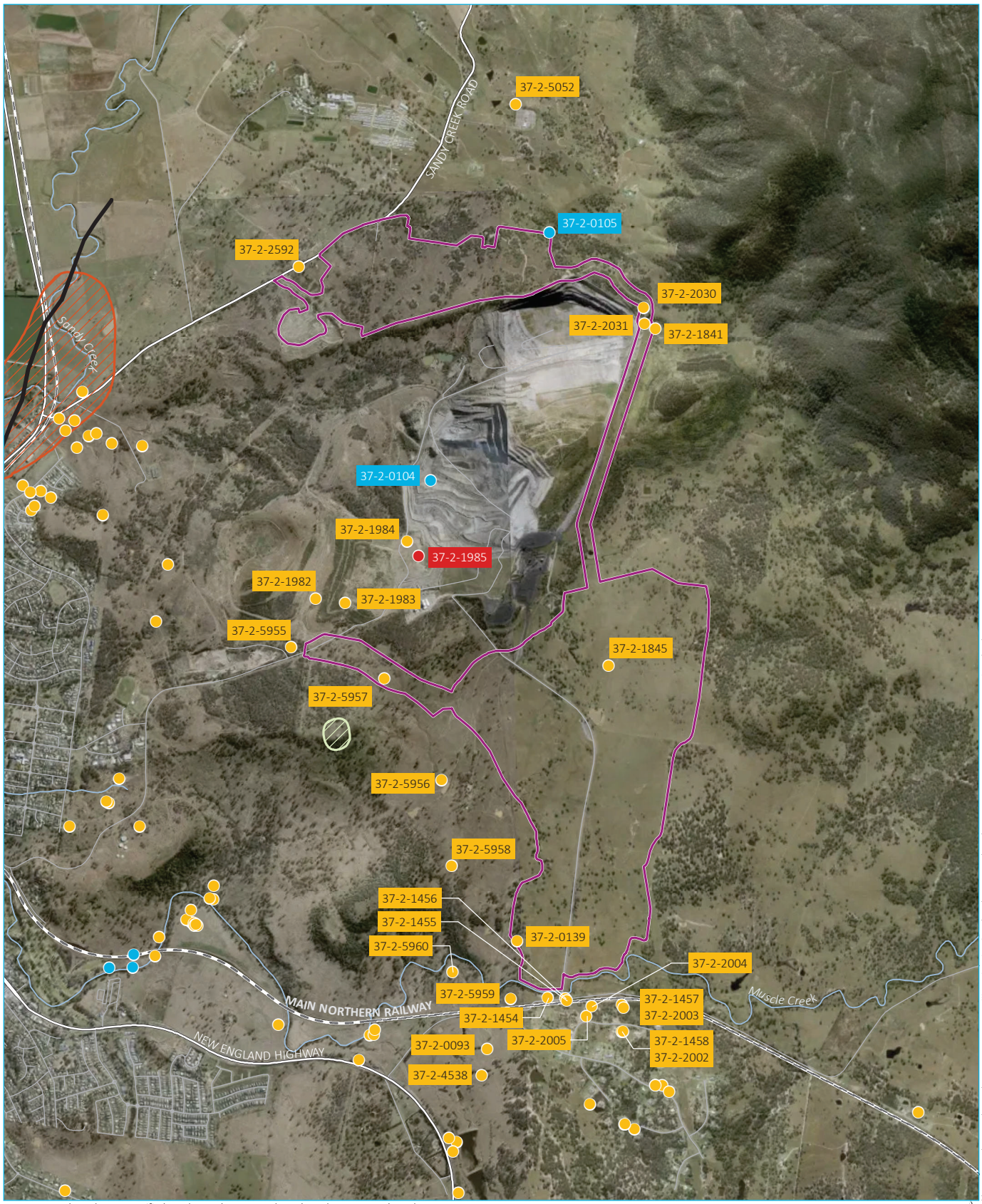
The Aboriginal material culture of the Upper Hunter was of interest to amateur Antiquarians and collectors through the early twentieth century (Moore 1969, p.167). The first archaeological studies in the region began in the 1930s with McCarthy and Davidson's (1943) investigations around Singleton for the Australian Museum. The surveys targeted terraces and slopes using lithic analysis to attempt to understand Aboriginal occupation of the Hunter Valley (McCarthy and Davidson 1943). The Australian Museum continued to fund archaeological studies in the Upper Hunter through the mid twentieth century. Between 1965 and 1967 sites around the Hunter–Goulburn Junction (Sandy Hollow) to Singleton and south to Bulga Creek were surveyed and excavated revealing the range of sites present in the region (Moore 1969, Moore 1970; Moore 1981). Excavated sites were subject to radiocarbon dating indicating occupation from ~7,000 years ago (Moore 1969, Moore 1970).

Since the 1980s cultural heritage management as part of extractive industry developments have increased exponentially throughout the Upper Hunter. The majority of these studies around Muswellbrook have been driven by the development of the coal and power industries (eg Biosis 2011; Brayshaw 1985, 1982, 1981; Dyall, 1980, 1981; ENSR Australia Pty Ltd 2008; Umwelt 2007a, 2007b; ERM 2007; McCardle Cultural Heritage Pty Ltd 2003; Griffiths 1994; Ross 1980). These investigations, which have typically been constrained to pedestrian survey, show that common site types include culturally modified (scarred) trees, stone artefact sites, axe grinding grooves and mythological and ceremonial sites (ERM 2007). By far the most common are open stone artefact sites frequently found on truncated soil profiles and/or surface exposure. (Baker 1992; Biosis2011; Insite 2005).

Archaeological excavations are less common, but a large-scale program was completed as part of the Narama Mine on Lower Bayswater Creek, southeast of the project area (Rich 1992). A total of 29,000 artefacts were recorded across 34 sites with the majority recovered along creeklines and protected hillslopes, and dating to the last thousand years (Rich 1992). Further afield, test excavations of nine sites along the Glennies Creek pipeline route, north of Singleton, produced some of the oldest evidence of activity in the valley, with a basal hearth dating to ~34,500 years ago (Koettig's 1986, 1987), although the provenance of the samples and associated cultural material remains disputed. More recent works of the Warkworth sandsheet on the banks of the Wollombi Brook suggest significant activity in this part of the valley by the terminal Pleistocene (<15,000 years ago) (Scarp Archaeology 2009). Overwhelmingly, however, sites across the region appear to reflect a significant population only in the last few thousand years.

Some 16 previous studies have been undertaken within or in close proximity to the project area since the 1980s. The findings of these studies are comparable with the archaeological record of the broader Hunter Valley outlined above, and include a range of stone artefact sites, as well as a moderate number of culturally modified trees. Of note has been recent works by AECOM (2021) in relation to a New England Highway bypass of Muswellbrook, west of the project area. These investigations included the field survey and test excavations, and recorded 12 sites of various surface and shallowly buried stone artefact materials. Importantly, the study also identified the cultural importance of Sandy Creek and Skellatar Hill and viewlines to/from this promontory, as well as a traditional pathway.

A search of the Heritage NSW Aboriginal heritage information management systems (AHIMS) database was undertaken for the project area and immediate environs. This revealed some 509 previously documented Aboriginal sites within 5 km of the project area. These correlate with the archaeological studies discussed above, with 96% of them reflecting stone artefact sites of various densities (of those documented, 25% were single stone artefacts of where <15 where encountered). This was followed by a small number of culturally modified trees (n=11), potential archaeological deposits (n=8), a ceremonial ring (n=1) and an art site (n=1). These were predominantly identified along the banks of Muscle Creek, Hunter River and development activities across the nearby Muswellbrook township. Seven of these sites are documented as being within the project area, including six undefined stone artefact sites and a culturally modified tree (37-2-0139; 37-2-1845; 37-2-1841; 37-2-2030; 37-2-2031; 37-2-0105; 37-2-5957) (Figure 6.2).



Source: EMM (2022); ESCO Pacific (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

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KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse

AHIMS (by site feature)

- Art (Pigment or Engraved)
- Artefact
- Modified Tree (Carved or Scarred)

Cultural area

- Pathway (indicative location)
- Sandy Creek resource area
- Skellatar Hill

Aboriginal heritage sites

Muswellbrook Solar Farm
Scoping report
Figure 6.2

EMM
creating opportunities

6.2.2 Assessment approach

i Issues for consideration

Based on the information above, the project area is within a region well-documented to contain substantive cultural materials. In the undulating hills and slopes of the Central Lowlands that characterise the project area and much of the Hunter Valley, cultural materials are overwhelmingly dominated by surface and/or shallowly buried stone artefacts of varying densities. They are often focussed on water courses of all sizes, although can be found in most landforms. Culturally modified trees are also commonly documented. While cultural materials of deep antiquity are known in the region, these appear to be constrained to deep sand bodies and/or alluvial deposits that to date are found only in the southwest of the Hunter Valley in the vicinity of Warkworth. No such sand bodies have been documented within the project area to date, and cultural material if found would be expected to reflect the last few thousand years of past occupation which dominates the regional archaeological record.

There have been several previous archaeological investigations that have encompassed portions of the project area, and these have identified cultural materials as being present. Currently, seven poorly documented stone artefact sites and a culturally modified tree are known to be present; and these have the potential to be adversely affected by the project. Further, the southern boundary of the site is bordered by Muscle Creek, one of the larger water-courses in this locale, and where cultural materials may be expected. This must, however, be considered in the context of the substantial impacts in at least part of the project area by coal mining that has been in operation in this locale since the early 20th Century. As such, there is a requirement to undertake a detailed investigation of the site to identify the presence, distribution and significance of cultural materials, as well as the current site conditions following previous disturbance.

In addition to tangible cultural remains, there is some indication of places of intangible value in the general vicinity of the project area. These include Sandy Creek to the northwest and Skellatar Hill to the west, and an undefined traditional track east of Muswellbrook. While not previously identified as having cultural importance, Bells Mountain is also a well-known landmark in the locale. There is therefore a need to consult with the local Aboriginal community to further understand the importance of these places and how the project may interact with them.

ii Recommendations

Based on the presence of cultural materials within the project area, and places of cultural value in the general locale, the following assessment will be prepared for the EIS:

- Development of an Aboriginal cultural heritage assessment (ACHA) in alignment with Heritage NSW guidelines to investigate, characterise, and assess the significance of cultural material and values within the project area, and provide guidance on its avoidance, management and mitigation should the project be approved. This should include a strong focus on consultation with the local Aboriginal community, and suitable on-site investigations given the types of cultural material and values identified as being in, or near the project area.

Consideration will also be given to a potential cultural values mapping study with key Aboriginal knowledge holders and Elders to explore and understand the intangible places and values within and/or in the general vicinity of the project area, and to understand how to manage any adverse effects to them should the project be approved. There is potential for this study to interact with other developments at the broader MCIP site and further consideration will be given to the preferred approach. The study should be undertaken by an experienced anthropologist and include on-site inspection and discussions with the identified Aboriginal representatives.

6.3 Historical heritage

6.3.1 Existing environment

A search of the available historical heritage inventories was carried out including:

- Muswellbrook LEP;
- Australian Heritage Database; and
- NSW State Heritage Register.

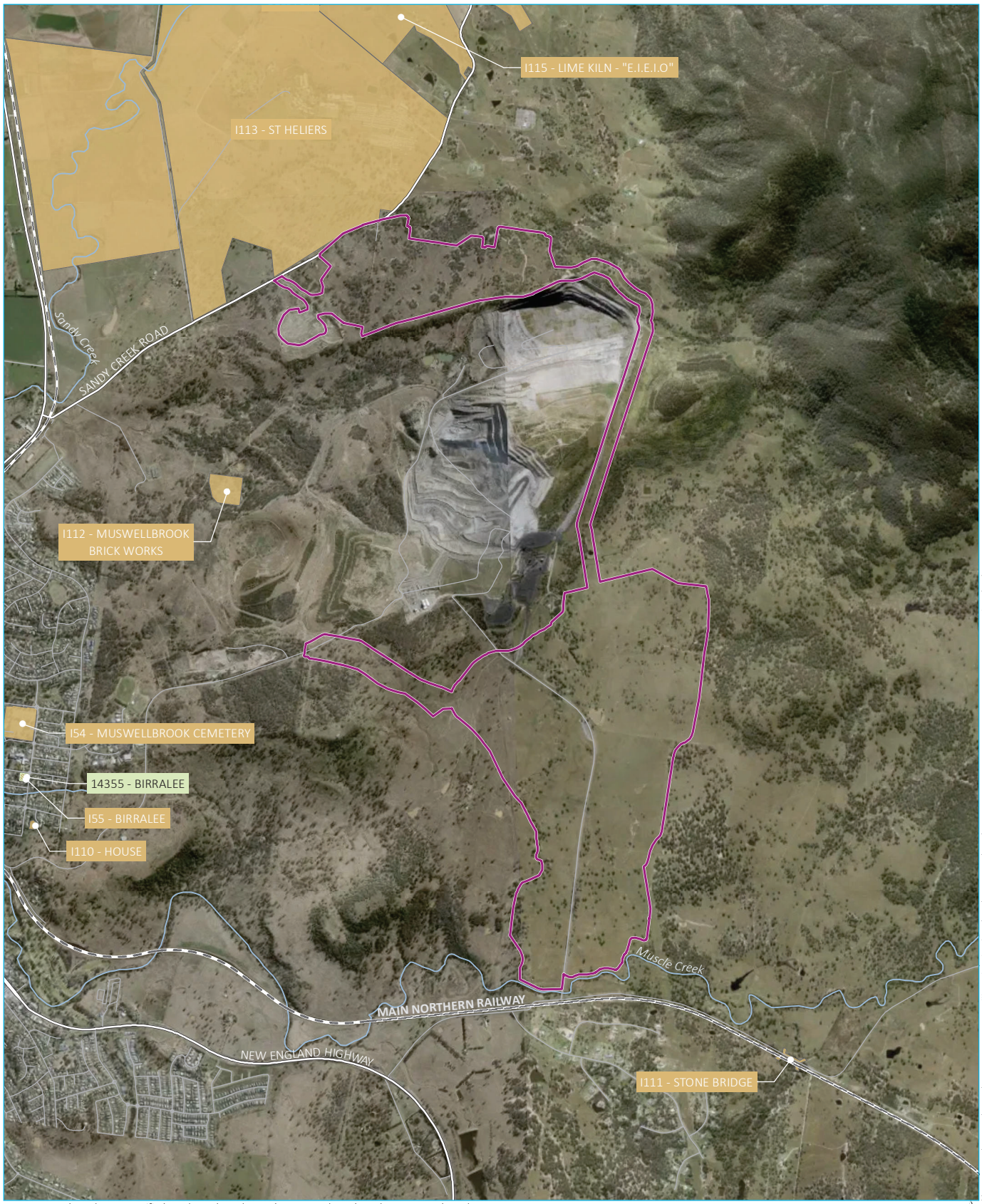
There are no National, State, or Local listed heritage items identified within the project area. Heritage items in the vicinity of the project are shown in Figure 6.3. The closest heritage item to the project area is the St Heliers property, which is listed under the Muswellbrook LEP, immediately north of the project area on the opposite side of Sandy Creek Road. There is also a Lime Kiln approximately 1.5 km north of the northern section of the project, the Muswellbrook Brickworks approximately 1.5 km north west of the grid connection infrastructure and several other listed heritage items further west in Muswellbrook township.

The St Heliers property is currently a correctional centre operated by Corrective Services NSW. It is a minimum-security institution for males located on the outskirts of Muswellbrook. The property heritage listing is associated with the St Heliers homestead building for its architectural, scientific and social heritage values. The homestead building is approximately 1.3 km from the site boundary to the north-west of the main correctional centre facilities. The potential for any visual impacts to this building will be considered in the EIS visual impact assessment, though it is considered unlikely given its location.

The project will have no direct impacts to listed heritage items. However, the potential for indirect impacts to listed heritage items will be assessed in the EIS including any potential visual impacts identified through the visual impact assessment. There is potential for previously unreported heritage items to be located within the project area associated with historical agricultural and mining land use.

6.3.2 Assessment approach

The EIS will consider the potential for direct and indirect impacts to listed heritage items and identify management measures to protect heritage values as required. The assessment proposed would be a chapter within the EIS and would include a desktop review of listed heritage items and previous investigations relevant to the project area.



Source: EMM (2022); ESCO Pacific (2022); DPI (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

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KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse

Non-statutory listing
- Register of the National Estate

LEP listing
- Item - General

Historic heritage listed sites

Muswellbrook Solar Farm
Scoping report
Figure 6.3

EMM
creating opportunities

6.4 Visual

6.4.1 Existing environment

A preliminary site inspection was completed to identify nearby receptors with potential to have views of the project area. The project area traverses an area with undulating hills and slopes shield views of Muswellbrook Mine from Muswellbrook township. Based on the site visit observations all residences west of the project area including Muswellbrook township would have no views of the proposed solar farm as they are separated from the project area by several hills and ridges.

The project area is likely to only be visible at some residences immediately to the south and north. To the south some residences on Woodland Ridge Road, Babbler Crescent and Top Knot Place currently have views of the project area. At the northern section of the project it is considered likely that only two to three residences on Sandy Creek Road have a view of the project area.

6.4.2 Assessment approach

A detailed visual impact assessment would be undertaken for the EIS with reference to:

- *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013);
- *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018);
- *Guideline for landscape character and visual impact assessment Environmental impact assessment practice note EIA-N04* (Roads and Maritime Services, December 2018); and
- AS/NZS 4282:2019 – Control of the Obtrusive Effects of Outdoor Lighting.

The visual impact assessment will include an assessment of the likely visual and landscape impacts of the project (including any glare, reflectivity, and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain. A comprehensive viewshed analysis utilising digital terrain model, aerial imagery, and results from site inspections and stakeholder engagement will be performed to identify locations within a local setting (including public viewpoints) that may experience views of project infrastructure. Photomontages using photographs taken from the most impacted viewpoints will also be prepared.

Where relevant, the visual impact assessment and EIS will include mitigation measures to help reduce the project's impacts on visual amenity. The potential for any visual or landscape impacts to accumulate from other proposed, approved, under construction, and operational developments will also be considered. Cumulative impact assessment is described further in Section 6.12.

6.5 Land

6.5.1 Existing environment

Soils in the southern section of the project area are predominantly mapped as sodosols, while the north section is mapped as predominantly classified as kurosols under the Australian Soil Classification system. Sodosols have a strong texture contrast between surface horizons and subsoil horizons. Generally, sodosols have low agricultural potential, high erodibility, poor structure, and low permeability (Grey and Murphy 2002). Kurosols have strong texture contrast between the surface (A) horizons and the clay subsoil (B) horizons. They generally have very low agricultural potential with high acidity (pH < 5.5) and low chemical fertility.

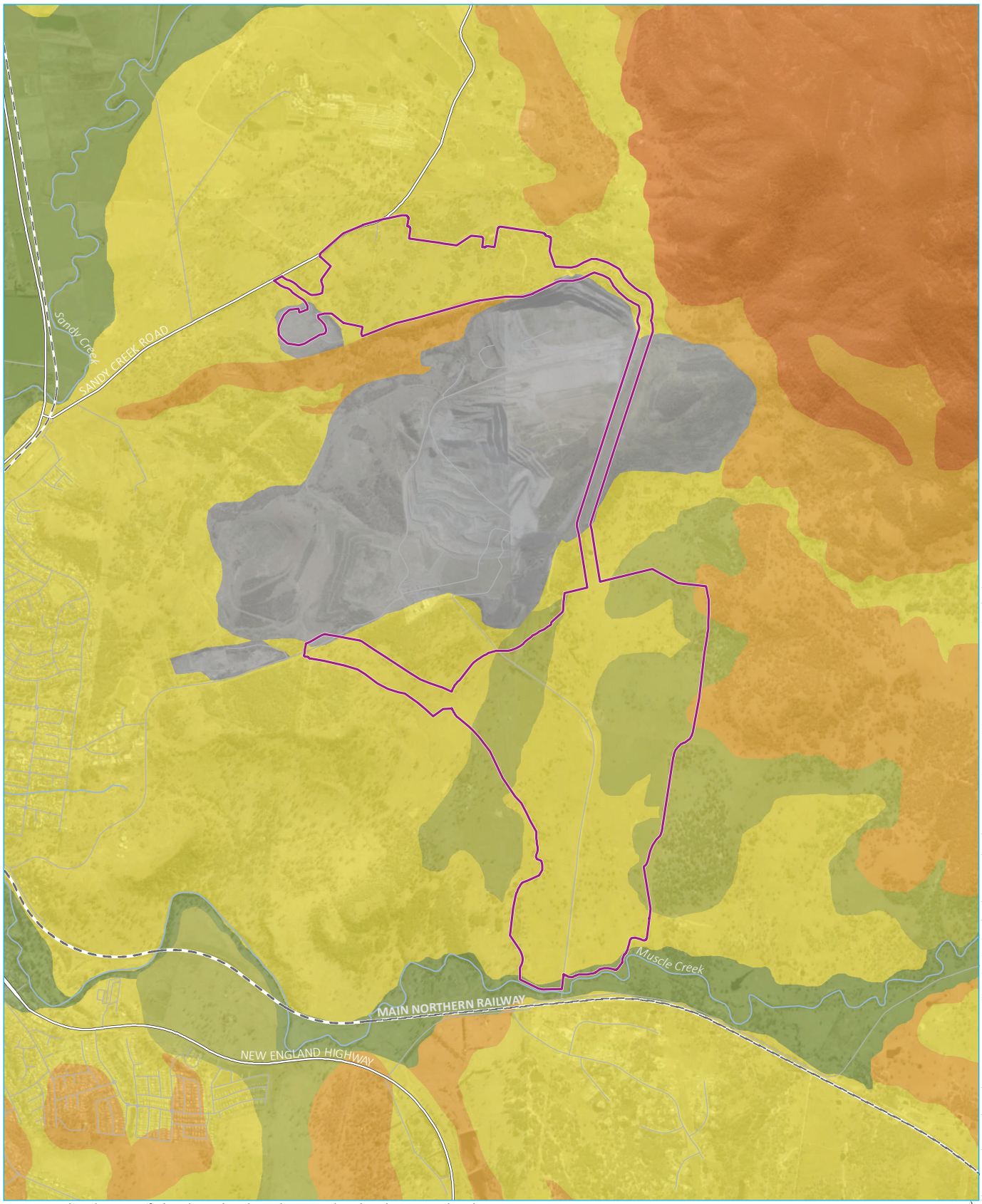
The project area has previously been used for grazing and mining activities. The project area is predominantly mapped as land soil capability Class 5, with a small section of Class 4 in the southern section of the project area. Mapping of land soil capability under the land and soil capability assessment scheme is shown in Figure 6.4. Class 5 is characterised as moderate to low capability land. Class 5 land has high limitations for high-impact land uses. The limitations will largely restrict land use to grazing, some horticulture, forestry, and nature conservation (OEH 2012). The portion of the project area mapped as Class 4 land and soil capability is considered to have moderate to severe limitations for some land uses that need to be consciously managed to prevent soil and land degradation. This land is generally used for grazing, and is suitable for pasture improvement.

Given the previous use of the site for mining and as livestock grazing is likely to continue within the operational solar farm, it is considered highly unlikely that the project will have any impact on the agricultural productivity of the land.

6.5.2 Assessment approach

The project has been designed to utilise previously disturbed land and avoids impacts to any highly productive agricultural land. As part of the EIS, a land use conflict risk assessment (LUCRA) will be undertaken in accordance with DPI's (2011) Land Use Conflict Risk Assessment Guideline and in consultation with neighbouring landholders. The LUCRA will assess the project's potential impacts on neighbouring agricultural operations. Should they be required, land management practices will be implemented to avoid or minimise potential impacts on neighbouring agricultural operations.

Consideration of impacts to soils and the potential for erosion and sedimentation issues will be included in the EIS. The soil assessment will focus on soil disturbance during construction, including erosion from construction work and rehabilitation where required.



Source: EMM (2022); ESCO Pacific (2022); DPIE (2020); DFSI (2017, 2021); GA (2011); Metromap (2022)

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KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse

Land and soil capability

- 3 - Moderate limitations
- 4 - Moderate to severe limitations
- 5 - Severe limitations
- 6 - Very severe limitations
- 7 - Extremely severe limitations
- Disturbed terrain

Land and soil capability

Muswellbrook Solar Farm
Scoping report
Figure 6.4

EMM
creating opportunities

6.6 Social and economic

A Social Impact Assessment (SIA) Scoping study has been prepared to support this Scoping Report. This report documents the process and outcomes of the scoping phase of the social impact assessment and has been prepared in consideration of the DPE Social Impact Assessment Guideline (2021) (refer to Appendix B). The below summarises the key findings of the scoping study.

6.6.1 Existing environment

The study area for the SIA scoping study comprises the State Suburbs (SSC) Muscle Creek and Muswellbrook. The study area sits within the broader regional area of the Muswellbrook LGA which has a total population of 16,086. The local population for the study area is 12,390 people, with the majority residing in Muswellbrook SSC.

The median age across the study area (lower than the NSW average) – combined with the higher proportion of people aged between 0–19 years – indicates that the area is home to a younger population. The local study area (9.1%) also hosts a larger proportion of Aboriginal and/or Torres Strait islander peoples than the average across the NSW state (2.9%).

The workforce participation rates also varied across the study area, with Muswellbrook SSC and the regional area more broadly experiencing slightly lower levels of workforce participation. However, Muscle Creek demonstrates that 79.5% of its population participate in the workforce. Muswellbrook SSC demonstrates high levels of unemployment among both adults and youth whereas Muscle Creek SSC demonstrates significantly lower rates of unemployment. For the population engaged in the workforce, the top industry of employment was mining across the local and regional study area. In addition, registered businesses in the regional area were primarily involved in the industries of agriculture, forestry and fishing (28.5%), construction (11.2%) and rental, hiring and real estate services (9%).

Socio-Economic Indexes for Areas (SEIFA) indexes demonstrate the disparities in the local area surrounding socio-economic advantage and disadvantage, with Muscle Creek ranking in the top 20% of suburbs across all indices, while Muswellbrook SSC ranked in the bottom 20% all multiple indices. Despite this, the rates of homelessness (per 10,000 people) were significantly lower in the study area than across NSW (50.4 per 10,000), with the regional area averaging at 29.2 per 10,000.

NSW Healthstats data revealed that the study area – located within the Hunter New England LHD – had higher rates of health-related indicators than across NSW. This data included indicators relating to alcohol consumption, smoking, obesity, and psychological distress. Prevalence of asthma (11.0%), however, was slightly lower than was evident across NSW (11.5%). The proportion of the population who identified as having a need for assistance remained slightly lower across the study area compared to the NSW proportion.

6.6.2 Assessment approach

The scoping phase has identified both positive and negative social impacts occurring during the project planning, construction and operational phases of the project – both project specific and cumulative. These likely social impacts have been categorised into key social impact themes that require further assessment as part of the EIS. These include social impacts relating to: surroundings, way of life, livelihood, access, community, health and wellbeing, decision making systems and culture.

The SIA will be led by a suitably qualified Social Scientist who will adopt the methodology illustrated in Figure 6.5 and will use social science methods and tools for the collection of qualitative and quantitative data.

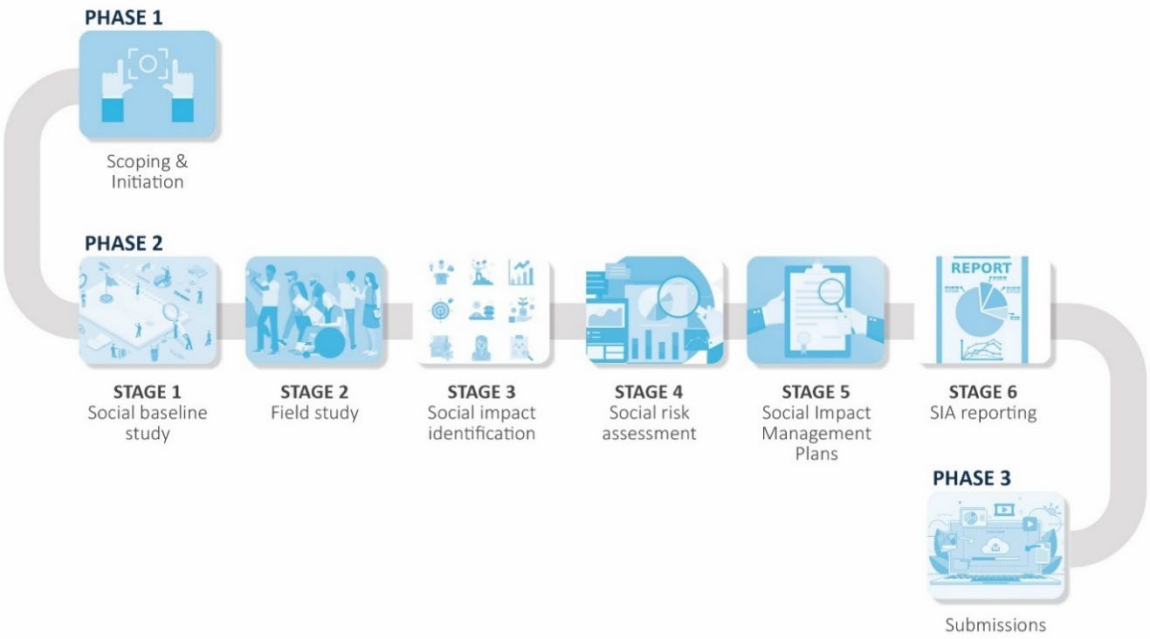


Figure 6.5 SIA Methodology

The identification of social impacts will be informed by community and stakeholder engagement activities and conducted in an integrated manner to ensure consistency, reduce duplication, and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs will inform the identification of the social impacts. Potential social impacts and benefits will then be assessed according to the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPE 2021).

6.7 Traffic

6.7.1 Existing environment

The project transport route is expected to comprise vehicle movements originating both north and south of the project area. Traffic accessing the north of the site would travel in either direction on the New England Highway and make a right or left turn onto Sandy Creek Road. Traffic accessing the south of the site would travel south along the New England Highway and make a left turn onto Muscle Creek Road. The New England Highway is an approved B-double transport route.

Primary access to the project area will be via Muscle Creek Road to the south of the project area as shown in Figure 2.3. Secondary access will be via Sandy Creek Road to the north of the project area.

Sandy Creek Road is a sealed local road that provides access to several residences east and north of Muswellbrook. Muscle Creek Road is a sealed local road that provides access to several residences including the Woodland Ridge area as well as the Muswellbrook Coal Mine main access road.

Site access will be investigated further through detailed design and any road upgrade requirements will be identified and outlined in the EIS.

6.7.2 Assessment approach

A traffic impact assessment will be carried out to investigate potential impacts associated with the project. The traffic impact assessment will include the following key elements:

- projections of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation;
- assessment of the potential traffic impacts of the project on road network function, including intersection performance, site access arrangements, and road safety, including school bus routes and cyclist safety;
- assessment of the capacity and condition of the existing road network to accommodate the type and volume of traffic generated by the project (including over size vehicles, over mass vehicles and escorted deliveries) during construction and operation, with any potential cumulative impacts from other projects in the area being taken into account; and
- provide details of measures to manage potential impacts, including a schedule of required road upgrades, road maintenance contributions, and other traffic control measures, developed in consultation with the relevant road authority.

6.8 Hazards and risk

Potential hazardous scenarios and risks associated with the project include bushfires, dangerous goods and hazardous substances, and exposure to electromagnetic fields. Accordingly, the EIS will include the following:

- An assessment of potential hazards and risks, including but not limited to bushfires and electromagnetic fields from proposed electrical infrastructure. The project will be assessed against the International Commission on Non-Ionizing Radiation Protection *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields*.
- A Preliminary Hazard Analysis prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (Department of Planning 2011a) and *Multi-Level Risk Assessment* (Department of Planning 2011b).

There is no evidence that exposure to electromagnetic fields generated by powerlines, substations, and other electrical sources can cause adverse health effects (ARPANSA 2018). Generally, distances beyond 50 m from a high voltage powerline are not expected to have higher than typical magnetic fields and for substations, magnetic field levels at distances of 5–10 m away are no higher than background levels in a typical home. Electromagnetic fields that are anticipated to be generated by the project are not expected to exceed guidelines for public exposure and will not cause adverse impacts for human health. The electromagnetic field levels of the project including solar farm, BESS, facility substation, and grid connection will be assessed as part of the EIS but are not anticipated to increase electromagnetic field levels above existing background environmental levels.

6.9 Water

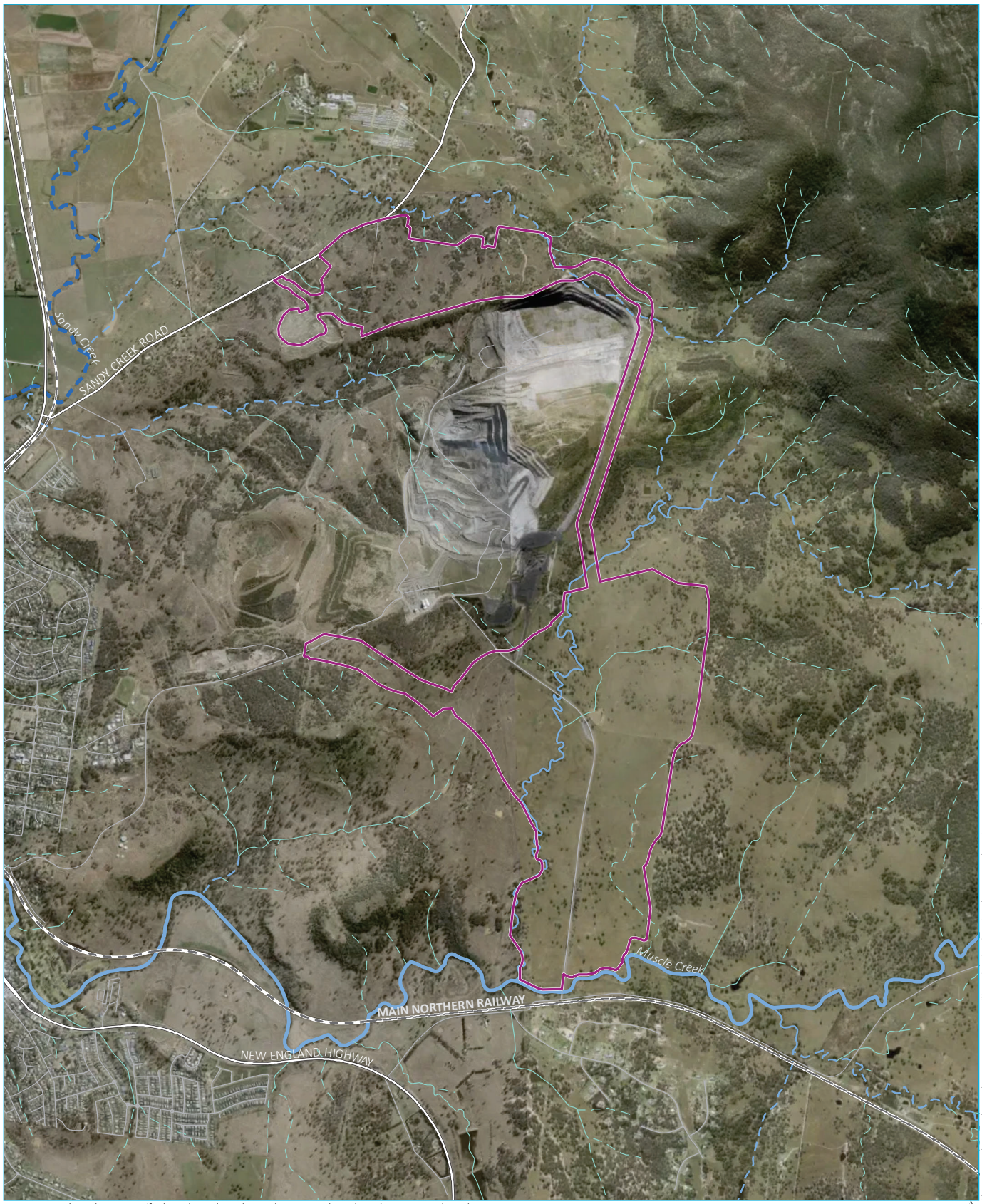
6.9.1 Existing environment

The project is within the Hunter Catchment. The Hunter catchment covers an area of about 21,500 square kilometres. The project area contains several watercourses as shown in Figure 6.6. Of the watercourses within the project area, eleven are first order streams, two are second order, one third order in the northern section of the project and one fourth order stream in the southern section of the project. A key watercourse in vicinity of the project is Muscle Creek which is a fifth order stream located just to the south of the project area.

6.9.2 Assessment approach

The watercourses within the project area will be considered further through the project detailed design. Specific design considerations and mitigation measures may be carried out to minimise potential impacts. In addition, roads and services that require watercourse crossings will be designed and constructed in accordance with relevant regulations and best practice design and construction methods.

Potential impacts to water resources from the project are expected to include demand for water during the construction of the project, as well as for land management during operations. The project is not likely to impact groundwater during construction, operation, or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure. Water used by the project during construction and operation is expected to be sourced off-site and delivered by truck. There is also potential for water to be sourced from the existing mine water supply, however, this would be subject to suitable water licencing arrangements being in place. If surface water or groundwater extraction is required to meet the project's demand for water, an assessment of impacts for these water sources will be included in the EIS.



Source: EMM (2022); ESCO Pacific (2022); DPI (2015); DFSI (2017, 2021); GA (2011); Metromap (2022)

0 0.5 1 km

GDA2020 MGA Zone 56

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KEY

- Project area
- Rail line
- Major road
- Minor road

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- 6th order

Watercourses

Muswellbrook Solar Farm
Scoping report
Figure 6.6

EMM
creating opportunities

6.10 Noise and vibration

6.10.1 Existing environment

Land use in the project area and surrounds includes mining, residential and agricultural activities. Given the project's rural setting, background noise at nearby sensitive receptors is likely to be low to moderate and characterised by intermittent mining and agricultural equipment and machinery associated with production activities. Vehicle movements along the local and regional road network and trains on the nearby railway are also key sources of background noise in the area.

6.10.2 Assessment approach

The construction of the project and its access roads have potential to create noise and vibration impacts for surrounding landholders adjacent to the project area. Noise generated by the project will include construction noise and noise generated by increased traffic along the local road network.

During the operational phase of the project, noise generated is anticipated to be minimal, consisting of noise associated with vehicle movements within the project area and electrical infrastructure such as the inverter stations, the BESS, substation and grid connection. It is unlikely that the operation of the project will produce any vibration impacts.

Noise and vibration will be assessed in the EIS in accordance with the:

- NSW Interim Construction Noise Guideline (DECC 2009);
- NSW Noise Policy for Industry (EPA 2017);
- NSW Road Noise Policy (DECCW 2011); and
- Assessing Vibration: A Technical Guideline (DECC 2006).

A road traffic noise assessment will also be included in the EIS to assess noise impacts associated with project related vehicle movements along the local road network during the construction phase of the project.

6.11 Air quality

6.11.1 Existing environment

Local and regional air quality relevant to the project area is influence by mining and agricultural land uses in the surrounding region. There are existing sources of air pollution within the local setting and include existing mine operations, agriculture, dust and vehicle and machinery exhaust emissions associated with production and freight transport along the New England Highway.

6.11.2 Assessment approach

The project is not anticipated to generate significant air quality impacts during construction or operations. Project related traffic on unsealed roads within the project area may contribute to localised dust generation primarily during the construction phase. Mitigation measures will be implemented to address these impacts. These measures will be discussed with Council and surrounding landholders as part of ongoing stakeholder engagement.

The implementation of mitigation measures will ensure that the project will not generate significant air quality impacts during construction, operation, or decommissioning. A detailed air quality assessment is not considered to be required as part of the EIS as potential impacts will be temporary in nature and will not extend beyond the construction or decommissioning phase of the project.

6.12 Cumulative impacts

The project will contribute to the overall development of renewable energy in the Hunter Region. There are a number of existing and future major projects in the vicinity which will be relevant to the assessment of the project's impact. A study area for relevant nearby major projects was identified based on stakeholder consultation and review of the NSW Planning Portal and is shown in Figure 2.1. Relevant projects in the vicinity include several existing mining operations, existing and planned renewable energy projects and road upgrade works. The existing Liddell and Bayswater Power Stations are also in the region and expected to undergo future changes of closure and decommissioning.

A scoping phase cumulative impact assessment was completed in accordance with the NSW *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPE 2021). The scoping phase cumulative impact assessment is provided in Table 6.2 below.

The assessment found that the following potential cumulative impact issues would require further analysis in the EIS:

- visual impacts of the Bowmans Creek Wind Farm and New England Highway Muswellbrook Bypass projects;
- social impacts of increased demand for services due to New England Highway Muswellbrook Bypass, Muswellbrook Battery Energy Storage, Bowmans Creek Wind Farm and Mount Pleasant Mine;
- biodiversity and heritage impacts of the New England Highway Muswellbrook Bypass and Muswellbrook Battery Energy Storage projects;
- noise, vibration and traffic impacts of the New England Highway Muswellbrook Bypass and Muswellbrook Battery Energy Storage projects;
- land and water impacts of the New England Highway Muswellbrook Bypass project; and
- opportunities for the Muswellbrook Coal Mine closure and rehabilitation to result in improvements to visual amenity and social outcomes.

Table 6.2 Cumulative impact assessment scoping summary

Future projects	Approx distance from project area	Project status and timing	Potential cumulative impacts							
			Relevant assessment matters							
			Biodiversity	Heritage	Visual	Land	Social and economic	Traffic	Water	Noise and vibration
Muswellbrook Coal Mine Closure and Rehabilitation (MCC)	Adjacent to project area	Mine operations are winding down and scheduled for closure in the second half of 2022. Rehabilitation and monitoring will continue during Solar Farm construction and operation. The reduction in activities at the mine site are considered likely to reduce overall amenity related impacts in the project area below existing baseline levels. The mine closure is considered likely to result in overall benefits alongside the Muswellbrook Solar Farm project and may provide opportunities for improvements to visual amenity and social outcomes in conjunction with the project.	N/A	N/A	Standard assessment – opportunities for mitigation will be considered in the EIS.	N/A	Standard assessment – opportunities for mitigation will be considered in the EIS.	N/A	N/A	N/A
Bells Mountain Pumped Hydro (AGL)	Adjacent to project area	This project is in planning and application for SEARs is yet to be lodged. The project would establish a pumped hydro energy storage system at the Muswellbrook mine site. The project would use an existing mine pit as a reservoir and establish a new reservoir at the top of Bells Mountain which is located immediately northeast of the project area. Construction is anticipated to commence around 2025 if it proceeds. Construction of the Bells Mountain Pumped Hydro project is considered likely to occur after the Solar Farm construction (2023–2025) and as such would not result in any cumulative impacts due to simultaneous construction activities. The planned location of the Bells Mountain Pumped Hydro project has potential to result in cumulative impacts to visual amenity, biodiversity and heritage values relevant to the Muswellbrook Solar Farm. These potential cumulative impacts will need to be considered as part of the separate planning approval process for the Bells Mountain project should it proceed.	To be considered in Bells Mountain approval process	To be considered in Bells Mountain approval process	To be considered in Bells Mountain approval process	N/A	N/A	N/A	N/A	N/A

New England Highway – Muswellbrook Bypass (TfNSW)	Adjacent to project area	The Muswellbrook bypass project is a major road upgrade that travels immediately west of the Muswellbrook Solar Farm project area. The potential environmental impacts of the bypass project are well understood and have been documented in a review of environmental factors (REF) that was exhibited to the public. The location of the Muswellbrook bypass project in proximity to the Muswellbrook Solar Farm is shown in Figure 2.3. Consultation has been carried out with TfNSW to plan for the project interactions. Based on discussion with TfNSW it is understood that the Muswellbrook bypass would not affect access to the Muswellbrook Solar Farm and it is considered unlikely that the projects would result in significant cumulative impacts. Nevertheless, it is recognised that the potential for cumulative impacts to the transport route will require consideration in the EIS. Some construction traffic for the Muswellbrook Bypass will access the project via Muscle Creek and Sandy Creek roads which also form part of the transport route for the Muswellbrook Solar Farm. The Bypass project would not restrict use of these roads during construction but may have potential to result in concurrent generation of construction traffic. In addition the design of the transmission connection near Coal Road was refined based on feedback from TfNSW to fit alongside the planned construction of Muswellbrook bypass. Consultation with TfNSW also identified that the projects are unlikely to have coinciding peak construction periods. The construction of the Muswellbrook bypass is expected to occur between 2023–2026. The section of the bypass project adjacent to the Muswellbrook Solar Farm is scheduled to occur later in the construction program around 2025. The peak construction period of the Muswellbrook Solar Farm is expected to occur over a short period in 2024. As such the peak construction period for the projects is not expected to overlap. Nevertheless the EIS will consider the potential for concurrent construction to occur between the two projects and suitably conservative assumptions will be made with respect to predicting potential cumulative impacts. The close proximity of the project has potential to result in cumulative changes to water, visual amenity, socio-economic impacts, biodiversity and heritage values which	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment

Table 6.2 Cumulative impact assessment scoping summary

Future projects	Approx distance from project area	Project status and timing	Potential cumulative impacts							
			Relevant assessment matters							
			Biodiversity	Heritage	Visual	Land	Social and economic	Traffic	Water	Noise and vibration
		will be considered within the relevant technical assessments prepared for the EIS.								
Muswellbrook battery energy storage (Firm Power)	1.3 km west	This is an emerging project which has been issued SEARs. Construction is planned for 2023 if it proceeds. The project location and timing has potential to result in cumulative impacts related to simultaneous construction as well as nearby biodiversity and heritage values. Due to the nature and location of the project adjacent to existing electricity infrastructure it is unlikely that the project would have any cumulative impacts on visual amenity relevant to the project.	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	N/A	N/A	Standard assessment – in EIS technical assessment	Standard assessment – in EIS technical assessment	N/A	Standard assessment – in EIS technical assessment
Bowmans Creek Windfarm	10 km east	The distance to this project means it is unlikely to result in cumulative impacts to amenity due to simultaneous construction activities. Similarly there are unlikely to be cumulative biodiversity and heritage values due to interaction this project. The primary consideration for cumulative impacts with this development are any potential for visual amenity and social impacts. In particular, some residences in the Woodland Ridge area were identified as being visually impacted by the Bowmans Creek Windfarm in the project EIS (Epuron 2021). Due to the location and direction of the windfarm it is considered unlikely that there would be receptors with views of both the wind farm and solar farm, however this will be considered carefully as part of the visual impact assessment prepared for the EIS.	N/A	N/A	Detailed assessment – in EIS technical assessment	N/A	Standard assessment – in EIS technical assessment	N/A	N/A	N/A
Maxwell Solar Farm	9.5 km south	This project is approved and construction is scheduled from 2021–2023. It is expected that construction of this project would be complete prior to the construction of the	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 6.2 Cumulative impact assessment scoping summary

Future projects	Approx distance from project area	Project status and timing	Potential cumulative impacts							
			Relevant assessment matters							
			Biodiversity	Heritage	Visual	Land	Social and economic	Traffic	Water	Noise and vibration
		Muswellbrook Solar Farm. No interaction is expected with this project.								
Hunter River Solar Farm	18.5 km south-west	This is an emerging project that has been issued SEARs for a 60 MW Solar Farm. Given its distance from the project area it is considered unlikely to result in cumulative impacts.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Liddell Power Station – Future Land Use and Enabling Works	11 km south	The distance from the Solar Farm and the nature of the project mean that it is unlikely for any cumulative impacts to arise due to interaction with this project.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bayswater Power Station – operating	13 km south	This operating site is schedule for closure between 2030 and 2033. The distance from the Solar Farm and the nature of the project mean that it is unlikely for any cumulative impacts to arise due to interaction with this project.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mount Pleasant Mine	6 km west	This operational coal mine currently has a planning application under consideration by DPE for the Mount Pleasant Optimisation Project. The proposed optimisation would involve continued mining operations at the site and increased extraction from 10.5 million tonnes per annum (Mtpa) up to 21 Mtpa as well as an increase in the average operational workforce from 330 to 600 workers. The distance to and separation from this project by Muswellbrook township means that it is unlikely to result in cumulative impacts related to construction of the solar farm. The main potential cumulative impact requiring consideration is the potential for increased demand for accommodation and other services during the construction of the solar farm. This will be considered in the social impact assessment.	N/A	N/A	N/A	N/A	Standard assessment – in EIS technical assessment	N/A	N/A	N/A

Table 6.2 Cumulative impact assessment scoping summary

Future projects	Approx distance from project area	Project status and timing	Potential cumulative impacts							
			Relevant assessment matters							
			Biodiversity	Heritage	Visual	Land	Social and economic	Traffic	Water	Noise and vibration
Mount Arthur Mine	8 km south	This coal mine would be operational during the Solar Farm project construction. A planning application has been commenced for the continuation of mining at the site beyond its approved operation to 2026. As the Solar Farm construction would be completed prior to any planned changes no cumulative impacts are expected.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bengalla Mine	8.5 km west	This coal mine would be operational during the Solar Farm project construction. There is currently a modification under assessment for this project that would alter some aspects of the site's activities. There are however no applications that would increase the output of the mine or its workforce. Due to its distance from the solar farm and minor nature of planned changes, there are no cumulative impacts expected.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7 Conclusion

ESCO Pacific in partnership with Idemitsu proposes to develop a large-scale solar photovoltaic (PV) generation facility and associated infrastructure to be known as the Muswellbrook Solar Farm. The proposed solar farm will have generation capacity of approximately 135 MWac and would produce around 347 Gigawatt hours (GWh) of energy annually which is enough to power approximately 79,000 homes. The proposed BESS will also have a capacity of approximately 135 MWac and up to two hours of storage. ESCO Pacific proposes to develop the project on a site approximately 2.5 km east of Muswellbrook within the Muswellbrook Shire LGA in the Hunter Region of New South Wales (NSW). The site encompasses approximately 512 hectares (ha) and is sited adjacent to the Muswellbrook Coal Mine on land primarily owned by Idemitsu the mine operator.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements for the project. A preliminary environmental assessment has been carried out identify matters that will require further assessment in the EIS, and the level of assessment to be carried out for each matter. This Scoping Report has been prepared in accordance with the guidelines: *State significant development guidelines – preparing a scoping report: Appendix A to the State significant development guidelines* (DPIE 2021a). The aspects identified as requiring detailed assessment in the EIS include social, visual, biodiversity, and Aboriginal heritage. Aspects requiring standard assessment include hazards, traffic, water, land and noise and vibration.

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Appendix A
Scoping summary table

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A.1 Scoping summary table

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
Detailed	Biodiversity	Yes	General	• Biodiversity Assessment Method (DPIE 2020). • Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013). • Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or Impacting upon Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013). • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various).	Section 6.1
	Aboriginal heritage	Yes	Specific	• Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011). • Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010). • Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010).	Section 6.2
	Visual	Yes	Specific	• *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013). • *Wind Energy: Visual Assessment Bulletin AB 01 For State Significant Wind Energy Development* (DPE 2016). • *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018).	
	Social	Yes	Specific	• Social Impact Assessment Guideline for State Significant Projects 2021 (DPIE 2021).	Section 6.6
Standard	Land	No	General	• Land Use Conflict Risk Assessment Guideline (DPI 2011). • Managing Land Contamination: Planning Guidelines *State Environmental Planning Policy No 55 Remediation of land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998).	Section 6.5
	Traffic	Yes	Specific	• Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013).	Section 6.7

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Hazards and risk	No	Specific	• Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011a). • Multi-Level Risk Assessment (DoP, 2011b). • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP 2011).	Section 6.8
	Water	No	General	• Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004). • Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008). • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000). • Guidelines for instream works on waterfront land (NOW 2012). • Guidelines for riparian corridors on waterfront land (NOW 2012). • Guidelines for watercourse crossings on waterfront land (NOW 2012).	Section 6.9
	Noise and vibration	Yes	General	• NSW Interim Construction Noise Guideline (DECC 2009). • NSW Noise Policy for Industry (EPA 2017). • NSW Road Noise Policy (DECCW 2011). • Assessing Vibration: A Technical Guideline (DECC 2006).	Section 6.10
	Air quality	No	General	• N/A	Section 6.11
	Historical heritage	No	General	• N/A	Section 6.3

Appendix B
SIA scoping report

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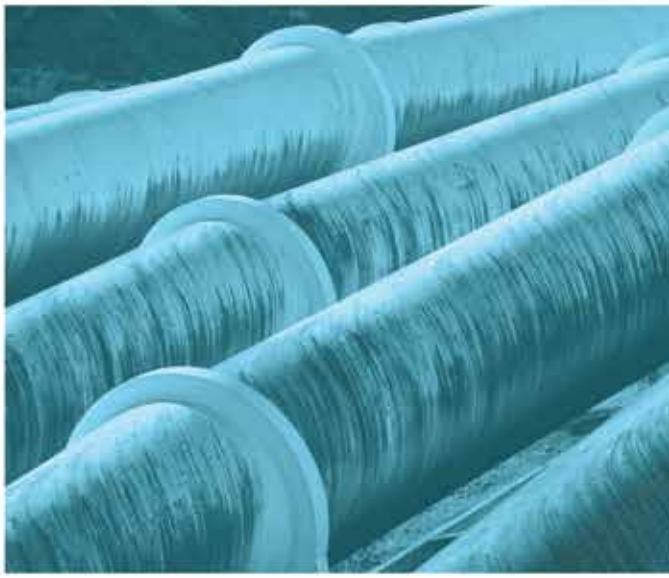
Social Impact Assessment Scoping Report

Muswellbrook Solar Farm

Prepared for ESCO Pacific
June 2022

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Social Impact Assessment Scoping Report

Report Number

E220005 RP1

Client

ESCO Pacific

Date

30 June 2022

Version

v2

Prepared by

Bronte Bratton
Undergraduate Social Planner
30 June 2022

Approved by

Caroline Wilkins
Associate Social Scientist
30 June 2022

Table of Contents

Attachments

Tables

Figures

1 Introduction

1.1 Background

ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (a wholly owned subsidiary of ESCO Pacific Holdings Pty Ltd (ESCO Pacific)) in partnership with Idemitsu Australia Limited (Idemitsu) proposes to develop a large-scale solar photovoltaic (PV) generation facility and associated infrastructure known as the Muswellbrook Solar Farm (the project). The project is sited adjacent to the Muswellbrook Coal Mine, on land primarily owned by Idemitsu, the mine operator.

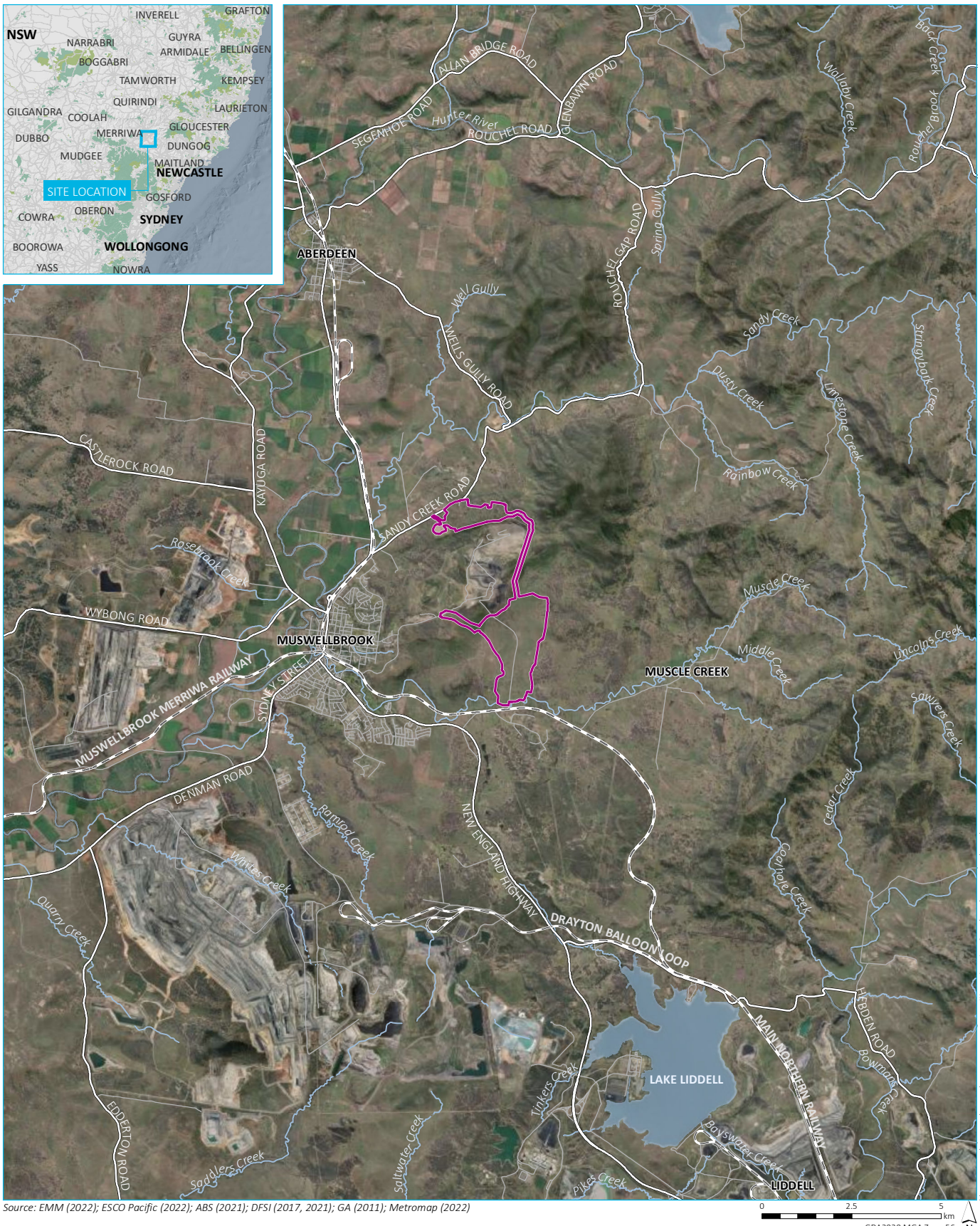
ESCO Pacific proposes to develop the project on a site approximately 2.5 kilometres (km) east of Muswellbrook within the Muswellbrook Shire local government area (LGA) in the Hunter Region of New South Wales (NSW). The site encompasses approximately 512 hectares (ha) and is adjacent to the Muswellbrook Coal Mine on land primarily owned by Idemitsu the mine operator. Mining is scheduled to be completed during the third quarter of 2022, after 115 years of operations. The project area has been selected to optimise the future land use of the Muswellbrook Coal Mine site for the generation of renewable energy. The project location is shown in Figure 1.1.

The proposed solar farm will have generation capacity of approximately 135 MWac and would produce around 347 GWh of energy annually which is enough to power approximately 79,000 homes annually. The proposed battery energy storage system (BESS) will also have a capacity of approximately 135MWac and up to two hours of storage. The project comprises the following key components:

- development of a large-scale solar farm with a generation capacity of approximately 135 MWac;
- development of a utility scale battery energy storage system (BESS) with a capacity of approximately 135 MWac; and
- grid connection and electricity transmission line infrastructure.

The Project will form part of the Muswellbrook Clean Industries Precinct (MCIP) at the Muswellbrook Coal Mine site which plans to include solar energy generation, battery energy storage system (BESS), green hydrogen and pumped hydro.

The project is State significant development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).



Source: EMM (2022); ESCO Pacific (2022); ABS (2021); DFSI (2017, 2021); GA (2011); Metromap (2022)

0 2.5 5 km

GDA2020 MGA Zone 56

N

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KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Muswellbrook Solar Farm
Scoping report
Figure 1.1

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1.2 Purpose of the social impact assessment scoping report

The purpose of this social impact assessment (SIA) scoping report is to accompany the main Scoping Report that requests and informs the content of the Secretary's Environmental Assessment Requirements (SEARs) for the Project. The SEARs will identify the requirements and level of environmental assessment required to accompany the SSD applications for the Project and associated environmental impact statement (EIS).

This SIA scoping study is an evaluative procedure, and its primary objective is to define the scope of the SIA for the Project by:

- identifying potentially affected people;
- identifying and understanding the area of social influence;
- identifying the potential, negative and positive, social impacts for further investigation; and
- determining the level of assessment required for each potential social impact.

This report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of ESCO Pacific in accordance with the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021a).

2 Scoping methodology

2.1 Baseline review

Project information, along with Australian Bureau of Statistic (ABS) demographic and economic data was used to inform the project area of social influence, and to identify potentially affected communities and key stakeholders.

It should be noted that demographic and economic data from the 2016 Census of Population and Housing was used to inform the identification of the SIA study area. The 2021 Census data will be used to prepare the social baseline for the Project. As a result, new considerations for the SIA study area may arise.

2.2 Identification of the SIA study area

The SIA study area was mapped to identify surrounding stakeholders who could potentially be directly or indirectly affected by the Project. This includes identifying landholders, businesses and social services who may have an interest in the Project and who could be impacted.

2.3 Stakeholder engagement activities

A wide range of identified stakeholders were consulted by ESCO Pacific as part of the scoping phase of the Project. COVID-19 safe environment practices were employed during the engagement program, which included the following activities:

- meetings with Transport for NSW to discuss and resolve potential overlap between Muswellbrook Solar Farm and the Muswellbrook Bypass project and discuss the siting of infrastructure (particularly transmission lines and substation);
- scoping meeting with NSW Department of Planning and Environment (DPE);
- pre-referral meeting with Commonwealth Department of Agriculture, Water and the Environment;
- project briefing held with the Energy Corporation of NSW;
- established project website;
- project information sheet delivered to 90 residences nearest to the project area;
- MCC annual newsletter issued to all residents of Muswellbrook and Muscle Creek localities including description of Muswellbrook Solar Project and link to project website; and

Engagement activities were undertaken during February to June 2022 with a range of key stakeholders. A detailed breakdown of consultation activities can be found in Section 6 of the Scoping Report.

ESCO Pacific and Muswellbrook Coal Company (MCC) representatives met with Muswellbrook Shire Council representatives on 9 May 2022 to advise of the Project, seek feedback on issues and concerns for consideration, and to provide a briefing on the preparation of the SIA.

Additionally, four phone interviews were conducted with four nearby residents involved in the MCC community consultative committee (CCC) to discuss the project and seek feedback.

3 SIA study area

3.1 Identification of the SIA study area

The SIA study area was mapped (refer to Figure 3.1) to identify surrounding stakeholders who would potentially be directly or indirectly affected by the project. This includes identifying landholders, businesses and social services who may have an interest in the project and who would potentially be impacted.

The SIA study area includes the following local communities within proximity to the project site and their related local government areas;

- local area;
    - Muscle Creek; and
    - Muswellbrook.
- regional area:
    - Muswellbrook Shire.

Each of the locations are mapped to their ABS data categories shown in Table 3.1 and will be used to develop the community profile and social baseline.

Table 3.1 Locations within the SIA study area mapped to ABS categories

SIA study area	Location	ABS Category
Local area	Muscle Creek	Muscle Creek SSC
	Muswellbrook	Muswellbrook SSC
Regional area	Muswellbrook Shire	Muswellbrook Shire LGA

Notes: SSC - State Suburb Code as defined by the Australian Bureau of Statistics

3.2 Geographical area

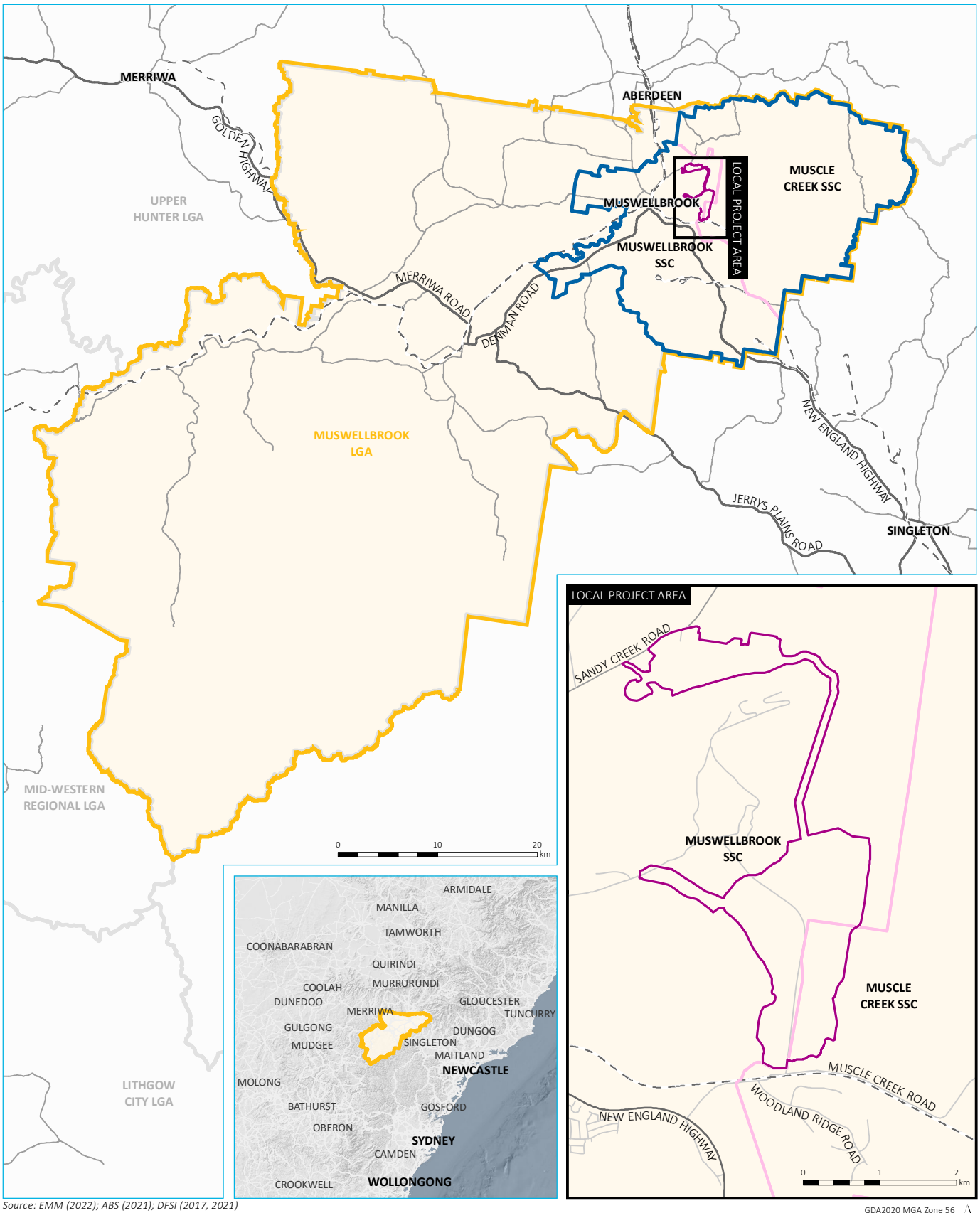
The suburbs of Muswellbrook and Muscle Creek are nearest to the Project area and are likely to be the communities with potential to be directly impacted by the Project.

More broadly, Muswellbrook LGA may also experience some direct and indirect impacts, with these likely to be limited and mostly related to local procurement opportunities and employment.

3.3 Potentially directly affected people

Potentially directly impacted people include:

- Residents and service providers of Muswellbrook and Muscle Creek;
- Landowners/residents of Woodland Ridge Road estate;
- Landowners/residents to the north of Muscle Creek Road;
- The Wonnarua peoples;
- Aboriginal and/or Torres Strait Islander community members; and
- Local business community.



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Source: EMM (2022); ABS (2021); DFSI (2017, 2021)

GDA2020 MGA Zone 56

N

SIA study area

KEY

- Project boundary
- Regional study area
- State suburb boundary
- Local area
- Local government area
- Rail line
- Arterial road
- Major road
- Minor road

Muswellbrook Solar Farm
Social impact assessment
Figure 3.1

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4 Community profile

4.1 Overview

This section provides a brief snapshot of the social conditions of the suburbs and broader region in which the Project will operate. The study area for the Project has been identified as the suburbs of Muscle Creek SSC and Muswellbrook SSC locally, and Muswellbrook LGA regionally, as shown in Table 3.1 and Figure 3.1.

4.1.1 Limitations

This community profile is based on 2016 data from the ABS Census of Population and Housing and therefore, may not reflect current baseline conditions of the local and regional area. At the time of writing the 2021 ABS Census data has not yet been released. The SIA following this scoping assessment will use 2021 data from the ABS Census of Population and Housing.

4.2 Demographic profile

At the time of the ABS 2016 Census of Population and Housing, Muswellbrook SSC had a total population of 12,075 and Muscle Creek SSC had a population of 315 people. These comprise a total population of 12,390 in the local area, with majority residing in Muswellbrook SSC. Consisting of Muswellbrook LGA, the total population in the regional area is 16,086. In both the local and regional area, the percentage of males is slightly higher, and the percentage of females is slightly lower compared to proportions across NSW. Both locally and regionally, the median age is lower than the NSW median. Population data for the local and regional area is presented in Table 4.1.

Table 4.1 Population 2016

Area	Population	Male (%)	Female (%)	Median age
Local area				
Muscle Creek SSC	315	52.7%	47.3%	34
Muswellbrook SSC	12,075	51.2%	48.8%	34
Local area total	**12,390**	**51.3%**	**48.7%**	**NA**
Regional area				
Muswellbrook LGA	16,086	51.3%	48.7%	35
NSW	**7,480,228**	**49.3%**	**50.7%**	**38**

Source: ABS 2016, Census of Population and Housing: General Community Profiles[1]

[1] There are small random adjustments made to all cell values to protect the confidentiality of data. These adjustments may cause age group distributions to differ by small amounts from actual totals which may result in more extreme population distributions in areas with small populations, such as those amongst the Aboriginal and/or Torres Strait Islander populations within the suburbs that comprise the local area.

Due to the smaller population in Muscle Creek SSC, there is substantial variations across age distributions. However, Muscle Creek has a significantly higher proportion of young persons with 35.6% of persons being between the ages of 0–19 years and only 3.2% of persons being 65 years and older. However, more generally, the local area demonstrates a relatively younger population compared to NSW however local age distributions follow trends evident across the regional area. In the local area, there is a notably greater percentage of persons within the 0-14 years age bracket (23%) and notably lower proportion of persons 65 years and older (11.9%) compared to NSW (15.6% and 16.3%). A breakdown of the aged group distribution is presented in Table 4.2.

Table 4.2 Age group distribution, 2016

Area	0 – 4 years	5 – 14 years	15 – 19 years	20 – 24 years	25 – 34 years	35 – 44 years	45 – 54 years	55 – 64 years	65 – 74 years	75 – 84 years	85 years and older
Local area											
Muscle Creek SSC	8.6%	19.7%	7.3%	5.1%	7.6%	19.0%	19.0%	8.3%	3.2%	0.0%	0.0%
Muswellbrook SSC	8.1%	14.7%	5.9%	6.3%	15.6%	12.7%	13.8%	10.9%	7.3%	3.7%	1.1%
Local area total	**8.2%**	**14.8%**	**5.9%**	**6.3%**	**15.4%**	**12.9%**	**14.0%**	**10.8%**	**7.2%**	**3.6%**	**1.1%**
Regional area											
Muswellbrook LGA	7.7%	14.8%	6.1%	6.0%	14.1%	12.9%	14.1%	11.2%	7.9%	3.8%	1.2%
NSW	**3.3%**	**12.3%**	**6.0%**	**6.5%**	**14.3%**	**13.4%**	**13.1%**	**11.9%**	**9.1%**	**5.0%**	**2.2%**

Source: Source: ABS 2016, Census of Population and Housing: General Community Profiles

4.2.1 Aboriginal and/or Torres Strait Islander peoples

There is significant variation throughout the study area in the proportion of persons who identify as Aboriginal and/or Torres Strait Islander. While Muscle Creek SSC has an Aboriginal and/or Torres Strait Islander population of six (1.9% of its population), Muswellbrook has an Aboriginal and/or Torres Strait Islander population of 1,122 (9.3% of its population). Muswellbrook SSC (9.3%) has a much high proportion of Aboriginal and/or Torres Strait Islander people compared to NSW (2.9%). The median age of the Aboriginal and/or Torres Strait Islander population across the local and regional area is between 17-20, which is lower than the NSW median Aboriginal and/or Torres Strait Islander population age of 22. The Indigenous population's smaller median age, which indicates a smaller proportion of the population (both males and females) living beyond 65 years, aligns with the lower life expectancy among Indigenous Australians nationally. A demographic summary of the Aboriginal and/or Torres Strait Islander population is presented in Table 4.3.

Table 4.3 Summary of Aboriginal and/or Torres Strait Islander population

Area	Aboriginal and/or Torres Strait Islander population	Aboriginal and/or Torres Strait Islander population % total	Male (%)	Female (%)	Median age
Local area					
Muscle Creek SSC	6	1.9%	42.9%	57.1%	17
Muswellbrook SSC	1,122	9.3%	50.9%	49.1%	20
Local area total	**1,128**	**9.1%**	**50.7%**	**48.0%**	**NA**
Regional area					
Muswellbrook LGA	1,342	8.3%	50.8%	49.2%	20
NSW	**216,176**	**2.9%**	**49.7%**	**50.3%**	**22**

Source: ABS 2016, Census of Population and Housing: General Community Profiles

4.2.2 Employment

The unemployment rate and youth unemployment rate in Muswellbrook SSC (9.6% and 19.3% respectively) and Muswellbrook LGA (8.2% and 17.3% respectively) is higher compared to levels across NSW (6.3% and 13.6% respectively). Labour force participation rates in Muswellbrook SSC and Muswellbrook LGA (57.9% and 58.9% respectively) is only slightly lower than NSW. However, unemployment and youth unemployment within Muscle Creek is significantly lower than the regional area and the state. The labour force participation rate in Muscle Creek is also approximate 20% higher than NSW. The unemployment and labour force participation rates are presented in Table 4.4.

Table 4.4 Unemployment and labour force participation rates, 2016

Area	Unemployment rate	Youth unemployment rate	Labour force participation rate (15 years and older)
Local area			
Muscle Creek SSC	2.2%	7.9%	79.5%
Muswellbrook SSC	9.6%	19.3%	57.9%
Local area total	**9.4%**	**18.8%**	**58.4%**
Regional area			
Muswellbrook LGA	8.2%	17.3%	58.9%
NSW	**6.3%**	**13.6%**	**59.2%**

Source: ABS 2016, Census of Population and Housing: General Community Profiles

The top industry of employment across both the local and regional area is mining. In Muswellbrook SSC and Muswellbrook LGA, the second and third top industries of employment are retail trade and, health care and social assistance respectively. For Muscle Creek, the second and third top industries of employment consist of electricity, gas, water and waste services, and education and training, respectively. The top industries of employment in the local and regional area are summarised in Table 4.5.

Table 4.5 Top three industries of employment 2016

Area	Top Industries					
	First		Second		Third	
Local area						
Muscle Creek SSC	Mining	26.4%	Electricity, gas, water and waste services	10.9%	Education and training	9.2%
Muswellbrook SSC	Mining	23.2%	Retail trade	9.9%	Health care and social assistance	8.9%
Regional area						
Muswellbrook LGA	Mining	21.9%	Retail trade	8.8%	Health care and social assistance	8.2%
NSW	**Health care and social assistance**	**11.7%**	**Retail trade**	**9.1%**	**Education and training**	**7.8%**

Source: ABS 2016, Census of Population and Housing: General Community Profiles

4.2.3 Local business

In 2021, there were 1,046 registered businesses in Muswellbrook LGA. Of these, 595 businesses (56.9%) were non employing, with a further 417 businesses (39.9%) employing fewer than 20 people. Only 33 businesses (3.2%) employed between 20–199 people.

The largest percentage of registered businesses in Muswellbrook LGA was in agriculture, forestry and fishing (28.5%). The second and third highest percentage of registered businesses was in construction (11.2%) and rental, hiring and real estate services (9%) respectively.

4.2.4 Vulnerable groups

To determine the potential vulnerable groups in the area of social influence (ie the study area), the Socio-Economic Indexes for Areas (SEIFA), rates of homelessness, and persons with a disability is considered throughout the study area.

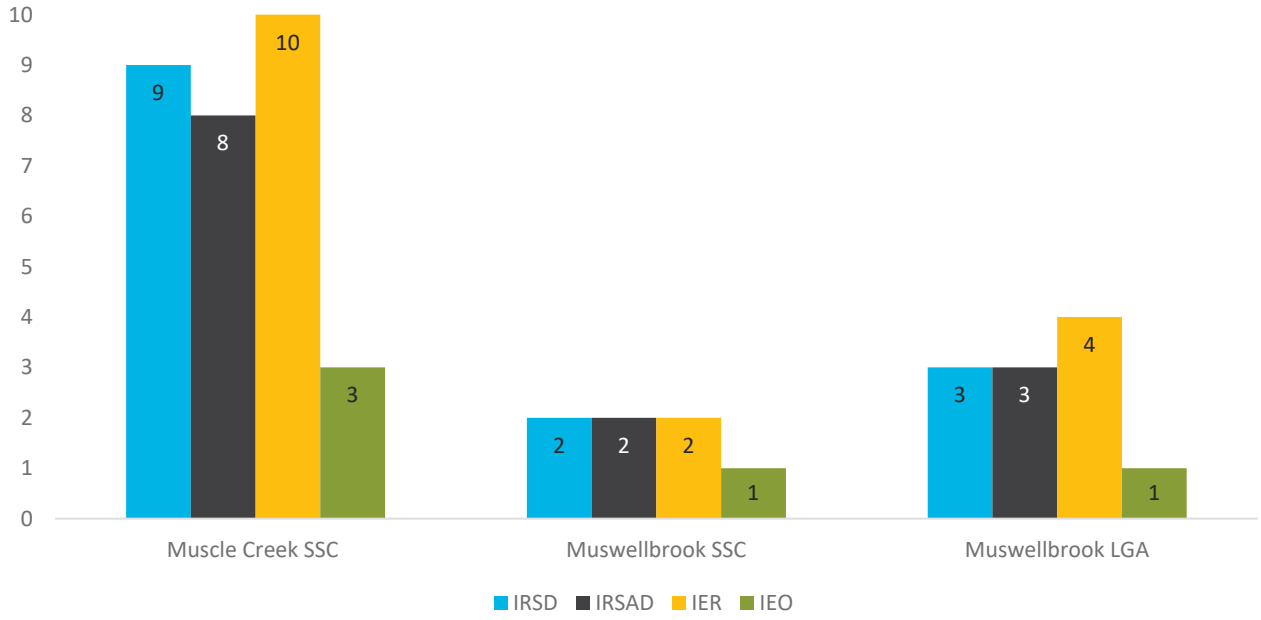
i Socio-economic Indexes for Areas

The level of disadvantage or advantage in the population is indicated in the SEIFA, which focuses on low-income earners, relatively lower education attainment, high unemployment and dwellings without motor vehicles. SEIFA is a suite of four summary measures created from Census data, including:

- the Index of Relative Socio-Economic Disadvantage (IRSD);
- the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD);
- the Index of Education and Occupation (IEO); and
- the Index of Economic Resources (IER).

Figure 4.1 demonstrates the rankings of the communities within the study area for each of the four summary measures.

According to the 2016 SEIFA, Muswellbrook SSC experiences the highest levels of disadvantage in the study area, with all of its indexes ranking at 2 or below, indicating that it is in the bottom 20% of suburbs included in the index. This may indicate that Muswellbrook SSC has many households with low income, many people with no qualifications or many people in low skilled occupations. SEIFA rankings also indicate that Muswellbrook SSC has a relative lack of access to economic resources with few households with high income or many households paying low rent. In addition, there is a relatively lower education and occupation status of people within Muswellbrook SSC which may indicate few people with high level qualifications, high unemployment, and low levels of qualifications in the area. These lower indicators of socio-economic advantage and disadvantage in Muswellbrook reflect the broader indices of Muswellbrook LGA, with its highest ranking a 4 in the Index of Education and Occupation. Comparatively, Muscle Creek experiences the highest levels of socioeconomic advantage in the study area, with all of its indexes ranking at 8 or higher, meaning it is within the top 20% of suburbs included in the index. Muscle Creek SSC has a highest indicator (10) in the Index of Economic Resources, meaning it is amongst the suburbs with the greatest access to economic resources (such as households with high incomes or home ownership).

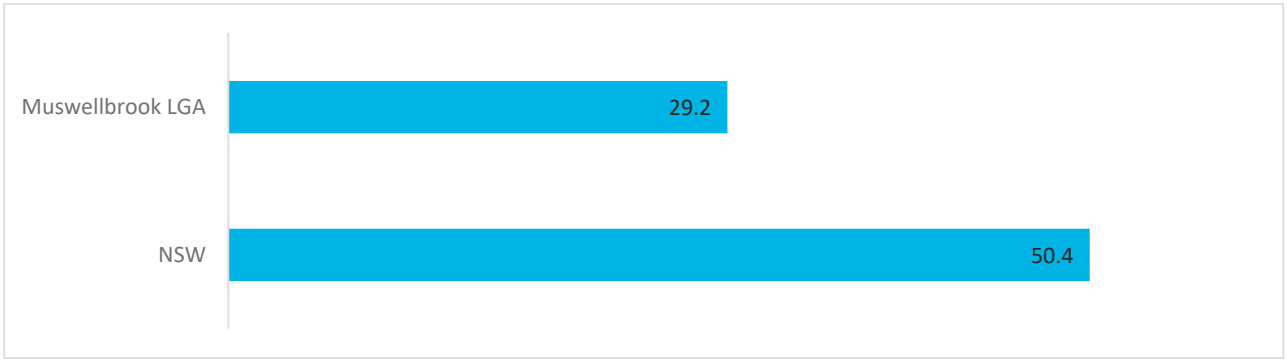


Source: ABS 2016, 2033.0.55.001 – Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA)
Each index is a summary of a different subset of Census variables and focuses on a different aspect of socio-economic advantage and disadvantage. Low rankings are deemed most disadvantaged and high rankings least disadvantaged within a decile ranking system where the lowest 10% of areas are given a decile number of 1 and the highest 10% of areas are given a decile number of 10.

Figure 4.1 SEIFA deciles in the SIA study area, 2016

ii Homelessness

Rates of homelessness according to the 2016 Census are not available at the SSC level but are available at the LGA level (Muswellbrook LGA). ABS data indicates a smaller homeless population present in the regional area compared to the state, with a homelessness rate of 29.2 per 10,000 people in Muswellbrook LGA which is lower compared to 50.4 per 10,000 across NSW. Homelessness rates (per 10,000 persons) in the regional area of social influence and NSW are presented in Figure 4.2.



Source: ABS 2016, 2049.0 – Census of Population and Housing: Estimating Homelessness

Figure 4.2 Rates of homelessness per 10,000 persons, 2016

iii Disability

Within the study area, the proportion of the population that identify as having a need for assistance is 1.6% in Muscle Creek SSC, 4.9% in Muswellbrook SSC and 4.9% in Muswellbrook LGA. Across the local and regional area, there is an overall lower level of persons requiring assistance compared to the NSW average of 5.4%.

4.2.5 Health

Muswellbrook LGA is serviced by the Hunter New England Local Health District (LHD). From 2019–2020, alcohol consumption as a long-term risk in adults was higher in Hunter New England LHD (43.6%) compared to NSW (32.5%). The proportion of adults partaking in daily smoking in Hunter New England LHD (10.4%) was slightly higher than NSW (9.2%), as were the proportions for overweight and obesity in adults (67.7% compared with NSW at 56.8%), and high or very high psychological distress in adults (18.5% compared with NSW at 16.7%). However, the level of asthma prevalence in adults in Hunter New England was 11%, which is slightly lower than the NSW proportion of 11.5%. The rates of various health indicators in the regional area are presented in Table 4.6.

Table 4.6 Health indicators summary, percentage, 2019 – 2020

	Hunter New England LHD	NSW
Alcohol drinking, long-term risk in adults	43.6%	32.5%
Daily smoking in adults	10.4%	9.2%
Overweight or obesity in adults	67.7%	56.8%
Asthma prevalence in adults[1]	11.0%	11.5%
High or very high psychological distress in adults	18.5%	16.7%

Source: NSW Ministry of Health 2019, *HealthStats NSW*

Notes: [1]Data for 2020 is not available therefore 2019 data has been used.

4.3 Community profile summary

The study area for this project is comprised of Muscle Creek SSC and Muswellbrook SSC (local study area), with a combined local population of 12,390 people, majority residing in Muswellbrook SSC, as well as Muswellbrook LGA (regional study area) which accounts for a total population of 16,086. The median age across the study area (lower than the NSW average) – combined with the higher proportion of people aged between 0-19 years – indicates that the area is home to a younger population. The local study area (9.1%) also hosts a larger proportion of Aboriginal and/or Torres Strait islander peoples than the average across the NSW state (2.9%).

The workforce participation rates also varied across the study area, with Muswellbrook SSC and the regional area more broadly experiencing slightly lower levels of workforce participation. However, Muscle Creek demonstrates that 79.5% of its population participate in the workforce. Muswellbrook SSC demonstrates high levels of unemployment among both adults and youth whereas Muscle Creek SSC demonstrates significantly lower rates of unemployment. For the population engaged in the workforce, the top industry of employment was mining across the local and regional study area. In addition, registered businesses in the regional area were primarily involved in the industries of agriculture, forestry and fishing (28.5%), construction (11.2%) and rental, hiring and real estate services (9%).

SEIFA indexes demonstrate the disparities in the local area surrounding socio-economic advantage and disadvantage, with Muscle Creek ranking in the **top** 20% of suburbs across all indices, while Muswellbrook SSC ranked in the **bottom** 20% all multiple indices. Despite this, the rates of homelessness (per 10,000 people) were significantly lower in the study area than across NSW (50.4 per 10,000), with the regional area averaging at 29.2 per 10,000.

NSW Healthstats data revealed that the study area – located within the Hunter New England LHD – had higher rates of health-related indicators than across NSW. This data included indicators relating to alcohol consumption, smoking, obesity, and psychological distress. Prevalence of asthma (11.0%), however, was slightly lower than was evident across NSW (11.5%). The proportion of the population who identified as having a need for assistance remained slightly lower across the study area compared to the NSW proportion.

5 Outcomes of SIA engagement and issue identification

This section summarises the findings of the engagement activities. The consultation had two objectives:

1. provision of information about:
    - the Project;
    - the EIS process; and
    - opportunities for the community/stakeholders to provide feedback on the Project and the EIS;
2. identification of community and stakeholder concerns for the Project.

5.1 Summary of SIA scoping engagement

5.1.1 Project briefing with Muswellbrook Shire Council

ESCO Pacific, Idemitsu and EMM met with Muswellbrook Shire Council to provide a briefing on the Project, including indicative development footprint, timeframes, issues to be assessed in the EIS, community engagement, and next steps. Some key aspects raised by Muswellbrook Shire Council included:

- opportunities for location of sheep grazing within the operational solar farm;
- economic benefits and jobs arising from the project construction and operation;
- cumulative impacts with nearby projects were raised as a key risk for the proposed project, and in particular council identified the need to consider accommodation availability for the construction workforce as a key issue;
- cumulative impacts to community's way of life could arise due to the scale of change in the area;
- council identified visual impacts to nearby residents as an issue;
- the need for and approach to community engagement activities; and
- potential for and approach to community benefits.

5.1.2 Community consultation

Community engagement for the Muswellbrook Solar Farm commenced in May 2022. The following community engagement activities were completed:

- established project website;
- project information sheet delivered to 90 residences nearest to the project area;
- MCC annual newsletter issued to all residents of Muswellbrook and Muscle Creek localities including description of Muswellbrook Solar Project and link to project website; and
- phone interviews held with 4 nearby residents involved in the MCC community consultative committee (CCC) to discuss the project and seek feedback.

The potential impacts to visual amenity was an issue discussed through community engagement, including the placement, size and reflection of solar panels. One resident noted the solar farm would be potentially visible at their property, but was not concerned. Another resident expressed concern towards land clearing of the proposed Project site.

One stakeholder raised the potential limitations of local contractor availability. Subsequently, it was noted by the stakeholders that many coal mine workers may not live locally and therefore it may be difficult for the project to secure local employment. One stakeholder raised construction impacts, including traffic movements in the local area and particularly along Sandy Creek Road. Potential cumulative social impacts related to increased traffic may arise due to the multiple development projects occurring in the area, although it is noted that the planned MCC mine closure in 2022 may provide mitigation by further reducing traffic volumes. The location of the New England Highway Muswellbrook Bypass in relation to the solar farm was also raised during consultation.

Interest was also raised in relation to opportunities for agricultural activities to continue within the operational solar farm, with sheep grazing being a potential option for investigation due to its success on other solar farms. It was also noted during consultation that there may be confusion amongst the community between the Muswellbrook Coal Mine Closure and Rehabilitation activities and the proposed Muswellbrook Solar Farm Project. Three residents sought additional information and clarifications regarding the proposal, its nature and location.

Overall, the four stakeholders spoken to expressed positive support for the Project.

6 Proposed SIA scope

This section proposes the scope of the SIA as part of the EIS for the Project.

6.1 Potential social impacts

A preliminary set of potential impacts and benefits of the project has been identified based on the scoping assessment, including the outcomes of the early stage community and stakeholder engagement, and completion of the SIA scoping worksheet including consideration of previous relevant SIAs and EMM Social Scientist's professional judgement. The purpose of identifying potential impacts and benefits at this preliminary stage is to ensure the EIS preparation focuses on:

- the potential social impacts identified by, and of greatest concern, to the community; and
- an appropriate range of stakeholders, and that affected groups or individuals are included in the SIA engagement activities.

Potential negative impacts that have been identified requiring further assessment and likelihood of potential positive social impacts are detailed in Table 6.1 below and a full risk assessment is provided in Attachment A.

Table 6.1 Identified potential social impact mapped to matters, positive and negative

Potential social impacts	Matter - negative related to:	Matter - positive related to:
Surroundings	• Changed sense of place (character) due to changed visual amenity in the local area. • During both the construction and operation phase, there is the potential for visual and landscape character impacts for landowners/neighbours near to the Project site as well as residents within Woodland Ridge Estate. • During operation, potential for nearby residents to experience glare from the solar panels. • Adverse amenity impacts relating to noise or dust disruption during construction for landholders/neighbours near to the Project site.	• Maintain sense of place through continued productive land use. • Potential for long term cumulative improvements to amenity (noise, dust, traffic) when taken together with mine closure.
Way of life	• Increased traffic during project construction	• Potential for cumulative reduction in traffic volumes in the long term when considered alongside mine closure.
Livelihood		• Employment opportunities for local and regional workforce thus providing economic benefits. • Diversification of local economy through direct and indirect economic benefits (including local spending and/or community benefit programs). • Diversification of landholder income due to rent received through use of land for the solar farm (applies to one third party landowner). In consultation with the third-party landowner, there is the potential opportunity for sheep grazing to occur on the operational solar farm.

Table 6.1 Identified potential social impact mapped to matters, positive and negative

Potential social impacts	Matter - negative related to:	Matter - positive related to:
Access	• An influx of construction workers staying in the nearby township may increase demand for local social and community infrastructure (ie health and community services). • Construction workers moving to the area could decrease availability of housing and accommodation as well as lead to an increase in rental housing prices. An influx of construction workers may also constrain the availability of accommodation for tourism.	• Potential development of improved access to and within the project area. Improved access to properties and services in the vicinity.
Community	• Proposed development projects can be grounds for contestation within local communities, which can negatively impact on community cohesion.	• Social cohesion and resilience arising from community benefit and investment
Health and well-being	Increased traffic during construction may impact public safety (in current conditions).	• Potential for reduced cumulative traffic impacts in the long term when considered alongside mine closure.
Decision-making systems	• Real or perceived lack of knowledge and inclusion in the planning, assessment and consultation process. Translates into real or perceived inability to make informed decisions, and/or inability to influence project decisions, including elements of project design.	
Culture	• Need to identify and protect items or sites of Aboriginal heritage	

The main issues discussed in community consultation include potential impacts to the visual amenity of the area, as well as the availability of housing and accommodation in the local and regional area during construction. Both issues have the potential to develop into cumulatively experienced social impacts. Muswellbrook Shire Council have expressed that if the construction of multiple developments in the area occur at a similar time it may present a risk of lack of housing and accommodation for construction workers. The potential for co-locating grazing with the solar farm was also raised as an item of interest.

Potential benefits include increased social cohesion and resilience arising from community benefits and investment as well as employment opportunities for workers. There are several mitigation measures which may be considered to minimise negative impacts (eg conversion from cattle to sheep grazing to allow coexistence of solar and farming, robust community and stakeholder engagement, workforce accommodation camps etc) and to improve communication between ESCO Pacific and key stakeholders.

Potential impacts that should also be considered at the cumulative level include:

- Multiple developments being constructed in the area could further decrease availability of housing and accommodation as well as lead to an increase in rental housing prices.
- Potential for the project to generate noise during construction that coincides with construction noise of other developments nearby.
- New workers moving to the local area due to multiple developments in the area may change the composition of the local population, and cause impacts to community identity/character.
- Increased traffic arising from the construction of multiple developments in the area may require upgrades to local roads, which would also benefit local users.
- Changed sense of place (character) due to changed visual amenity in the regional area.
- Increased workforce in the regional area may increase demand for social and community infrastructure beyond capacity (eg health and community services).
- Way of life related to land use tensions. A broad regional shift towards prioritising land use for renewable energy projects may impact the agricultural way of life as well as how communities use land for agricultural activities. Noting that the project seeks to avoid conflict with agricultural land uses by utilising an area with low land and soil capability that is currently used for mining.

6.2 Proposed methodology

The SIA will be led by a suitably qualified Social Scientist who will adopt the methodology illustrated in Figure 6.1 and will use social science methods and tools for the collection of qualitative and quantitative data.

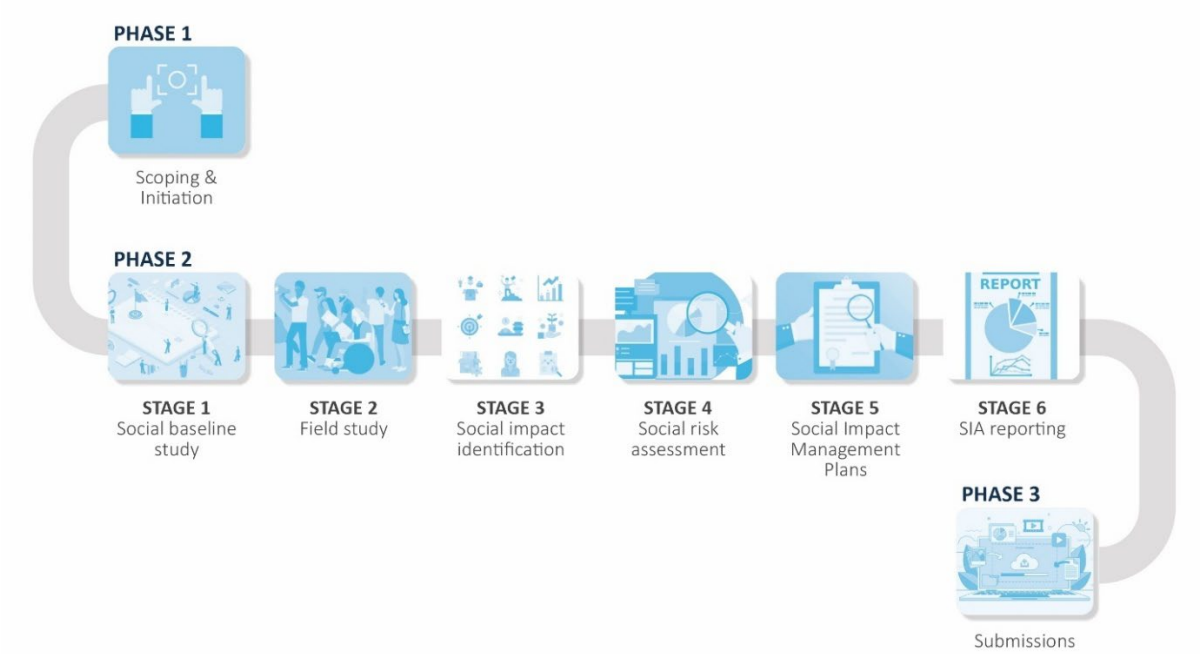


Figure 6.1 SIA Methodology

The identification of social impacts will be informed by community and stakeholder engagement activities and conducted in an integrated manner to ensure consistency, reduce duplication, and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs will inform the identification of the social impacts. Potential social impacts and benefits will then be assessed according to the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021a) and will use the risk matrix presented in the *Technical Supplement* (DPIE 2021b) (see Figure 6.2).

		Magnitude level				
		1	2	3	4	5
Likelihood level		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very high	Very high
B	Likely	Low	Medium	High	High	Very high
C	Possible	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	Medium	High
E	Very unlikely	Low	Low	Low	Medium	Medium

Source: DPIE 2021b

Figure 6.2 Social impact significance matrix

7 References

ABS 2016a, Census of Population and Housing: General Community Profiles, Australian Bureau of Statistics.

ABS 2016b, Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2016, Australian Bureau of Statistics.

ABS 2016c, Census of Population and Housing: Estimating homelessness, 2016, Australian Bureau of Statistics.

DPE 2021a, Social Impact Assessment Guideline for State Significant Projects, NSW Department of Planning, Industry and Environment.

- 2021b, Technical Supplement: Social Impact Assessment Guideline for State Significant Projects, NSW Department of Planning, Industry and Environment.

NSW Health 2021, *HealthStats NSW*, NSW Ministry of Health, http://www.healthstats.nsw.gov.au/

Appendix A

Scoping risk assessment

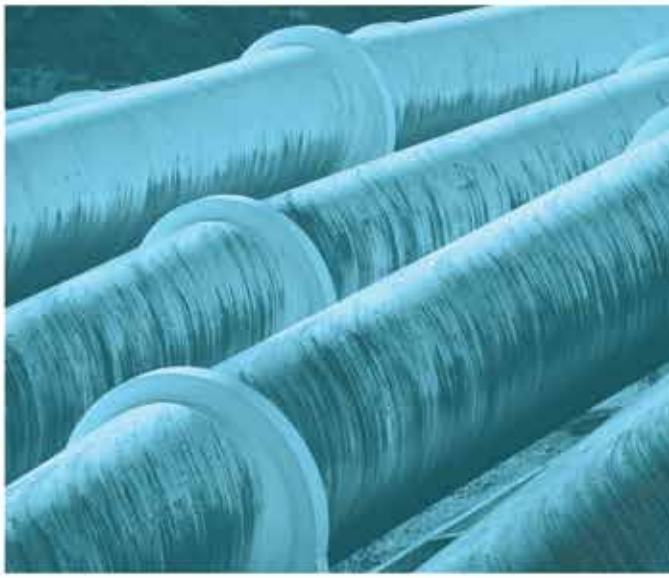
Social Impact Assessment (SIA) Worksheet

Project name: Muswellbrook Solar Farm

Date: 11 May 2022

CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS		ELEMENTS OF IMPACTS - Based on preliminary investigation					ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. **NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.**	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics — **extent** i.e. number of people potentially affected?	**duration** of expected impacts? (i.e. construction vs operational phase)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact? — Secondary data	Primary Data - Consultation	Primary Data - Research	Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
community	Proposed development projects can be grounds for contestation within local communities, which can negatively impact on community cohesion.	Negative	Yes - other project	Maxwell Solar Farm Bowmans Creek Wind Farm	Yes	Wind farm and other solar farms being constructed in the area	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Robust community and stakeholder engagement being delivered and to be further determined in the social assessment. In consultation with a diverse range of key local stakeholders, a Community Grant Fund will be established to support local programs.
decision-making systems	Real or perceived lack of knowledge and inclusion in the planning, assessment and consultation process. Translates into real or perceived inability to make informed decisions, and/or inability to influence project decisions, including elements of project design.	Negative	Yes - other project	Hunter River Solar Farm Bowmans Creek Solar Farm	Yes	Wind farm and other solar farms being constructed in the area	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Robust community and stakeholder engagement being delivered and to be further determined in the social assessment.
surroundings	Potential air quality impacts for landholders/neighbours near to the Project site as well as along proposed haulage routes due to dust from construction activities and ground disturbance from traffic on unsealed roads within the Project area.	Negative	Yes - other project	Maxwell Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and be informed by an air quality assessment.
surroundings	Potential for adverse noise impacts for landholders/neighbours near to the Project site as well as along proposed haulage routes.	Negative	Yes - other project	Muswellbrook Battery Energy Storage	Yes	New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Yes	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and be informed by a noise and vibration impact assessment
way of life	Increased traffic due to trucks and construction vehicles in the local area	Negative	Yes - other project	Maxwell Solar Farm Muswellbrook Battery Energy Storage Bowmans Creek Wind Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and be informed by a traffic impact assessment
livelihoods	Employment opportunities for local and regional workforce. Project may provide employment for former mine workers providing economic benefits	Positive	Unknown		Yes	Wind farm and other solar farms being constructed in the area	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	A strategy will be put in place to prioritise the skills and capabilities of the workforce in the local area and to be further determined by the social assessment.
livelihoods	Diversification of local economy through direct and indirect economic benefits (including local spending)	Positive	Yes - other project	Maxwell Solar Farm	Unknown	Wind farm and other solar farms being constructed in the area	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment - a strategy could be recommended to prioritise local contracting
access	Construction workers moving to the area could decrease availability of housing and accommodation as well as lead to an increase in rental housing prices. An influx of construction workers may also constrain the availability of accommodation for tourism.	Negative	Yes - other project	Maxwell Solar Farm Bowmans Creek Wind Farm Hunter River Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System Mount Pleasant Mine	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment - it could be reccommended to have workforce accommdation camp for the Muswellbrook Energy, Training and Industry Precinct of which the Project is a part of.
health and wellbeing	Increaded traffic may also cause percieved road safety risks	Negative	Yes - other project	Maxwell Solar Farm Hunter River Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	'To be determined from the social assessment and be informed by a traffic impact assessment and a hazard and risk assessment.
access	An influx of construction workers staying the nearby township may increase demand for local social and community infrastructure (eg health and community services)	Negative	Yes - other project	Hunter River Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Unknown	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment - a reccomendation could be made to extend the proposed Community Grant Fund to support social and community infrastructure.
community	Social cohesion and resilience arising from community benefit and investment	Positive	Unknown		Unknown		Unknown	Yes	Yes	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	Community Grant Fund will be established to support local programs and to be further determined by the social assessment.
culture	Potential for impacts to unknown items or sites of Aboriginal heritage	Negative	Yes - other project	Muswellbrook Battery Energy Storage	Yes	New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage	Unknown	Unknown	Unknown	Yes	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	"To be determined from the social assessment and be informed by an Aboriginal heritage assessment
livelihoods	Diversification of landholder income due to rent receieved through use of land for the solar farm (applies to one third party landowner)	Positive	Unknown		No	Not required	Yes	Yes	Yes	Yes	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	Yes	In negotiation with impacted landholders, it is proposed that graziers move from raising cattle to grazing sheep on operational solar farm.
surroundings	During both the construction and operation phase, there is the potential for visual and landscape character impacts for landowners/neighbours near to the Project site as well as residents on Woodland Ridge Road. During operation, nearby residents may experience glare from the solar panels.	Negative	Yes - other project	Hunter River Solar Farm Maxwell Solar Farm	Yes	Bowmans Creek Wind Farm and New England Highway Muswellbrook Bypass	Yes	Yes	Unknown	Unknown	Unknown	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and the visual impact asessment
access	Multiple developments being constructed in the area could further decrease availability of housing and accommodation as well as lead to an increase in rental housing prices.	Negative	Yes - other project	Maxwell Solar Farm Hunter River Solar Farm	Yes	Mount Pleasant Mine New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage Bowmans Creek Wind Farm	Yes	Yes	Unknown	Unknown	Yes	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	'To be determined from the social assessment - it could be reccommended to have workforce accommdation camp for the Muswellbrook Energy, Training and Industry Precinct of which the Project is a part of.

CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS		ELEMENTS OF IMPACTS - Based on preliminary investigation					ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. **NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.**	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics					Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
							extent i.e. number of people potentially affected?	**duration** of expected impacts? **(i.e. construction vs operational phase)**	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?		Secondary data	Primary Data - Consultation	Primary Data - Research		
surroundings	Potential for noise impacts from the Project to be compounded by the coinciding construction of other developments in close proximity.	Negative	**Yes - other project**	Maxwell Solar Farm Bowmans Creek Wind Farm New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage	Yes	New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage	Yes	Yes	Unknown	**Unknown**	**Yes**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	'To be determined from the social assessment and be informed by a noise and vibration impact assessment
community	New workers moving to the local area due to multiple developments in the area may change the composition of the local population, and cause impacts to community identity/character	Negative	**Yes - other project**	Hunter River Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Unknown	Yes	Unknown	**Unknown**	**Unknown**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment
access	Increased traffic arising from the construction of multiple developments in the area may require upgrades to local roads, which would also benefit local users	Positive	**Unknown**		Yes	New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Yes	Yes	Unknown	**Unknown**	**Unknown**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and be informed by a traffic impact assessment
surroundings	Changed sense of place (character) due to changed visual amenity	Negative	**Yes - other project**	Bowmans Creek Windfarm	Yes	A number of residences, particularly in the Woodland Ridge area, were identified as being visually impacted by the Bowmans Creek Windfarm in the project EIS. It is anticipated that residences from the Woodland Ridge area will have views towards the Muswellbrook Solar Farm.	Unknown	Yes	Unknown	**Unknown**	**Unknown**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment and the visual impact asessment
access	Increased workforce in the regional area may increase demand for social and community infrastructure beyond capacity (eg health and community services)	Negative	**Yes - other project**	Hunter River Solar Farm	Yes	Wind farm and other solar farms being constructed in the area New England Highway Muswellbrook Bypass Muswellbrook Battery Energy Storage System	Unknown	Yes	Unknown	**Unknown**	**Unknown**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined from the social assessment - a reccomendation could be made to extend the proposed Community Grant Fund to support social and community infrastructure.
way of life	Way of life related to land use tensions. A broad regional shift towards prioritising land use for renewable energy projects may impact the agricultural way of life in these areas as well as how communities use land for agricultural activities.	Negative	**Unknown**		Yes	Wind farm and other solar farms being constructed in the area	Unknown	Unknown	Unknown	**Unknown**	**Unknown**	Detailed assessment of the impact	Required	Broad consultation	Targeted research	No	To be determined by the social assessment.



Appendix C
Schedule of lands

EMM
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C.1 Schedule of lands

Table C.1 Schedule of lands

Titles	Lot 19 DP16352
	Lot 57 DP752484
	Lot 58 DP752484
	Lot 59 DP752484
	Lot 60 DP752484
	Lot 61 DP1113302
	Lot 1 DP184481
	Lot 1 DP723294
	Lot 97 DP752484
	Lot 3 DP571355
	Lot 71 DP629631
	Lot 1 DP571355
	Lot 682 DP611756
	Lot 1 DP614842
	Lot 2 DP614842
	Lot 39 DP793463
	Lot 101 DP629631
	Lot 6 DP26760
	Lot 2 DP26760
	Lot 40 DP793463
	Lot 101 DP1148216
	Lot 5 DP26760

Appendix D
Protected Matters Search

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Australian Government
Department of Agriculture, Water and the Environment

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. Please see the caveat for interpretation of information provided here.

Report created: 06-May-2022

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.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	38
Listed Migratory Species:	14

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

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.

Commonwealth Lands:	11
Commonwealth Heritage Places:	1
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	31
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Hunter estuary wetlands	50 - 100km upstream from Ramsar site	In feature area

Listed 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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Hunter Valley Weeping Myall (Acacia pendula) Woodland	Critically Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FROG			
[Litoria aurea](#) Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Litoria booroolongensis](#) Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
[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	In feature area
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Petauroides volans](#) Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Petaurus australis australis](#) Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Petrogale penicillata](#) Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area	In feature 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]	Endangered	Species or species habitat known to occur within area	In feature area
[Potorous tridactylus tridactylus](#) Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pseudomys novaehollandiae](#) New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
[Androcalva procumbens](#) [87153]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Cynanchum elegans](#) White-flowered Wax Plant [12533]	Endangered	Species or species habitat may occur within area	In feature area
[Dichanthium setosum](#) bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Eucalyptus glaucina](#) Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Euphrasia arguta](#) [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Lepidium aschersonii](#) Spiny Pepper-cress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
[Pomaderris brunnea](#) Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area	In feature area
[Prasophyllum sp. Wybong (C.Phelps ORG 5269)](#) a leek-orchid [81964]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pterostylis gibbosa](#) Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhodamnia rubescens			
Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Thesium australe			
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis			
[92384]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Aprasia parapulchella			
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma impar			
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis			
Black-faced Monarch [609]		Species or species habitat likely to occur within area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area	In buffer area only

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.

Commonwealth Land Name	State	Buffer Status
Commonwealth Bank of Australia		

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Commonwealth Bank of Australia [12536]	NSW	In feature area
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [12533]	NSW	In feature area
Commonwealth Land - Commonwealth Trading Bank of Australia [12530]	NSW	In feature area
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [12532]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [12534]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12531]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [12535]	NSW	In feature area
Commonwealth Land - Australian Telecommunications Commission [12537]	NSW	In feature area
Defence		
Defence - MUSWELLBROOK GRES DEPOT [11194]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [15955]	NSW	In feature area
Unknown		
Commonwealth Land - [14106]	NSW	In buffer area only

Commonwealth Heritage Places			[Resource Information]
Name	State	Status	Buffer Status
Historic			
Muswellbrook Post Office	NSW	Listed place	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
[Neophema chrysostoma](#) Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat may occur within area overfly marine area	In buffer area only

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Bayswater Power Station Water Infrastructure Upgrade	2020/8623	Controlled Action	Proposed Decision	In buffer area only
Bowmans Creek Wind Farm	2020/8631	Controlled Action	Assessment Approach	In buffer area only
Continuation of Bengalla Mine	2012/6378	Controlled Action	Post-Approval	In buffer area only
Drayton South Coal Project	2011/5911	Controlled Action	Completed	In buffer area only
Drayton South Coal Project, NSW	2014/7402	Controlled Action	Completed	In buffer area only
Hunter Valley Coal Mining Operations North - State approved mining, NSW	2016/7640	Controlled Action	Post-Approval	In buffer area only
Maxwell Coal Mine, Hunter Valley, NSW	2018/8287	Controlled Action	Post-Approval	In buffer area only
Mount Pleasant Optimisation Project	2020/8735	Controlled Action	Assessment Approach	In buffer area only
Mount Pleasant Project	2011/5795	Controlled Action	Post-Approval	In buffer area only
Mt Arthur Coal Extension Project Hunter Valley NSW	2011/5866	Controlled Action	Post-Approval	In buffer area only
Mt Arthur Coal open cut mine modification, Muswellbrook, NSW	2014/7377	Controlled Action	Post-Approval	In buffer area only
Queensland Hunter Gas Pipeline, approximately 825 km in length	2008/4483	Controlled Action	Completed	In feature area
Thomas Mitchell Drive Upgrade, Muswellbrook, NSW	2012/6533	Controlled Action	Completed	In buffer area only
Not controlled action				
Clearance of 35 ha in Ravensworth State Forest for extension of Mt Owen coal mining operations	2004/1369	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
clearing of GWB Woodland for residential development	2004/1771	Not Controlled Action	Completed	In feature area
Construction of a new power line	2011/5930	Not Controlled Action	Completed	In feature area
Dartbrook Mine Bord and Pillar Mining, Hunter Valley, NSW	2018/8295	Not Controlled Action	Completed	In buffer area only
Extension of operations to existing Muswellbrook No 1 Open Cut mine	2002/614	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Industrial Subdivision, Thomas Mitchell Drive	2006/3097	Not Controlled Action	Completed	In buffer area only
Ironbark Ridge Rural Residential Development	2009/5116	Not Controlled Action	Completed	In feature area
Kyoto Alternative Energy Farm	2008/3979	Not Controlled Action	Completed	In feature area
Liddell Battery, Decoupling and Bayswater Ancillary Works	2020/8844	Not Controlled Action	Completed	In buffer area only
Production specialty steels for aerospace and machinery industry	2002/554	Not Controlled Action	Completed	In buffer area only
Queensland Hunter Gas Pipeline, approximately 833 km in length	2008/4620	Not Controlled Action	Completed	In feature area
Sodium Chlorate Plant	2001/258	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
N40-Ulan line underbridge replacement, Muswellbrook, NSW	2019/8507	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Bayswater B 2000 MW Power Station	2009/5201	Referral Decision	Completed	In buffer area only
Clearing for development of rural subdivision	2009/4931	Referral Decision	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
Mount Pleasant Project	2010/5529	Referral Decision	Completed	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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 Environmental 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
-Geoscience Australia
-CSIRO
-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.

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