Muswellbrook Solar Farm

Submissions Report

Prepared for ESCO

February 2024

Muswellbrook Solar Farm

Submissions Report

ESCO

E220005 RP13

February 2024

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Executive Summary

ES1 Background

ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (ESCO) 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 alternating current (MWac), and a battery energy storage system (BESS) with a capacity of approximately 135 MWac and up to two hours of storage. The project is within the Muswellbrook Local Government Area (LGA) in the Hunter-Central Coast Renewable Energy Zone (REZ).

The project is State significant development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, a development application (DA) and the Muswellbrook Solar Farm Environmental Impact Statement (EMM 2023a) (EIS) was submitted for the project to the NSW Department of Planning, Housing and Infrastructure (DPHI, formerly Department of Planning and Environment, DPE) under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The EIS for the project was publicly exhibited from 22 August 2023 to 18 September 2023.

Following public exhibition, 58 unique submissions were received by DPHI from the general public and special interest groups. In addition, 12 public agencies and one council gave advice. This Submissions Report is required to be submitted to DPHI in response to the matters raised in these submissions, in accordance with Section 59(2) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

ES2 Submissions received

The majority of submissions received by DPHI following public exhibition of the EIS were individual submissions from the general public.

The most common key matters raised by public submissions included:

- Impacts to biodiversity and threatened species
- Justification of renewable industry
- Impacts to agricultural land
- Visual impacts to properties, the neighbourhood, and the landscape
- Increased fire risk.

ES3 Actions taken since EIS exhibition

ES3.1 Project refinements

Since lodgement of the EIS, ongoing design optimisation has continued, taking into account the results of technical studies and consultation with stakeholders. The project has been refined to avoid an additional 5.5 ha of Box Gum Woodland to lessen the impacts on this community and to avoid a culturally modified tree.

ES3.2 Further engagement

Stakeholder engagement has continued with stakeholders such as local authorities, government agencies, the local community and neighbouring landowners.

ESCO has actively responded to community members who expressed concerns about the project in submissions offering to meet to discuss the project further. A community drop in session was also held during the exhibition period with 23 members of the community attending.

Engagement has continued with government agencies primarily focusing on the content of submissions provided following their review of the EIS. Specifically, there has been further engagement with the Biodiversity Conservation and Science Directorate (BCD), Transport for NSW (TfNSW), and Australian Trail Track Corporation (ARTC), as well as ongoing engagement with Muswellbrook Shire Council.

ES3.3 Further technical assessments

Further technical assessments have been undertaken in response to submissions received on the project after exhibition of the EIS. The additional assessments included:

- Biodiversity – additional targeted surveys have been completed, and the Biodiversity Development Assessment Report (BDAR) has been updated.
- Aboriginal cultural heritage – updated figures and clarification to matters raised by Heritage NSW. A culturally modified tree has been avoided as a result of the additional cultural heritage survey and project refinement.
- Traffic – additional traffic counts, SIDRA and turn warrant assessments have been completed for the New England Highway and Sandy Creek Road intersection.
- Visual – an additional viewpoint has been considered and a photomontage has been prepared in response to matters raised by the public. A glint and glare assessment from the proposed Muswellbrook Bypass has also been completed.

ES4 Evaluation and conclusion

Additional work has been undertaken to respond to submissions received on the EIS. Minor refinements have been made to the project for the purpose of reducing impacts to biodiversity values and avoiding an Aboriginal cultural heritage site. The description of the project and the project evaluation and justification, as presented in the EIS, remain a true and accurate reflection of the project for which approval is sought.

The potential impacts of the project have been comprehensively considered in the EIS and this Submissions Report. The assessments undertaken and the conclusions reached demonstrate that this project can be developed and operated within acceptable limits. The residual environmental and social impacts identified will be managed through the mitigation and management measures described such that the project will not result in significant impacts to the environment or the local community.

In terms of benefits, the project will contribute to energy security and reliability in NSW, helping to prepare for the retirement of large-scale coal-fired power generation. The project will also provide local economic stimulus and local employment opportunities during construction, which will have economic benefits for both the local economy within the Muswellbrook LGA and the regional economy more broadly.

It is considered that the environmental, social and economic benefits for the local, regional and NSW communities far outweigh the impacts that will result from the development and operation of the project and that the project should be approved.

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1 Introduction

1.1 Background

ESCO Solar Farm 9 Pty Ltd as trustee for the ESCO Solar Farm 9 Trust (ESCO) proposes to develop a large-scale photovoltaic (PV) generation facility and associated infrastructure, known as Muswellbrook Solar Farm (the project), comprising the following key elements:

- development of a large-scale solar farm with a generation capacity of approximately 135 megawatts alternating current (MWac)
- development of a utility scale battery energy storage system (BESS) with a capacity of approximately 135 MWac and up to two hours of storage
- grid connection and electricity transmission line infrastructure.

The project is a joint venture between OX2 Holdings Pty Ltd (OX2) (formerly ESCO Pacific Holdings Pty Ltd) and Idemitsu Renewable Developments Australia (Idemitsu).

The project is on Wonnarua Country, 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. The project location is shown in Figure 1.1. The project is located in the Hunter-Central Coast Renewable Energy Zone (REZ).

The project area has been selected to optimise the future land use of the Muswellbrook Coal Mine site for the generation of renewable energy and is ideally located adjacent to existing transmission infrastructure. The project area is traversed by existing 132 kilovolt (kV) and 330 kV transmission lines. It is an ideal site for increasing generation capacity to the NSW electricity grid with minimal requirements for additional transmission infrastructure.

The project is State significant development (SSD) pursuant to Schedule 1, Section 20 (electricity generating works and head or co-generation) of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, a development application (DA) and the Muswellbrook Solar Farm Environmental Impact Statement (EMM 2023a) (EIS) was submitted for the project to the NSW Department of Planning, Housing and Infrastructure (DPHI, formerly Department of Planning and Environment, DPE) under Part 4 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The EIS for the project was publicly exhibited from 22 August 2023 to 18 September 2023.

Following public exhibition, 61 submissions were received by DPHI from the general public and special interest groups (organisations). This Submissions Report is required to be submitted to DPHI in response to the matters raised in these submissions, in accordance with Section 59(2) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

1.2 Project overview

A detailed project description is provided in Chapter 3 of the EIS. An overview of the project is shown in Figure 1.2. The project will comprise the following key components:

- a network of approximately 300,000 solar PV panels and associated mounting infrastructure
- a BESS with a capacity of up to 135 MWac and a storage duration of up to 2 hours
- electrical collection systems (BESS collection station and solar farm collection station), transformer substation, and switchyard

- an operations and maintenance facility, including demountable offices, amenities, equipment sheds, storage and parking areas
- internal access roads
- a temporary construction compound/laydowns (during construction and decommissioning only)
- electricity transmission line infrastructure connecting to the grid and connecting the north and south areas of the solar farm.

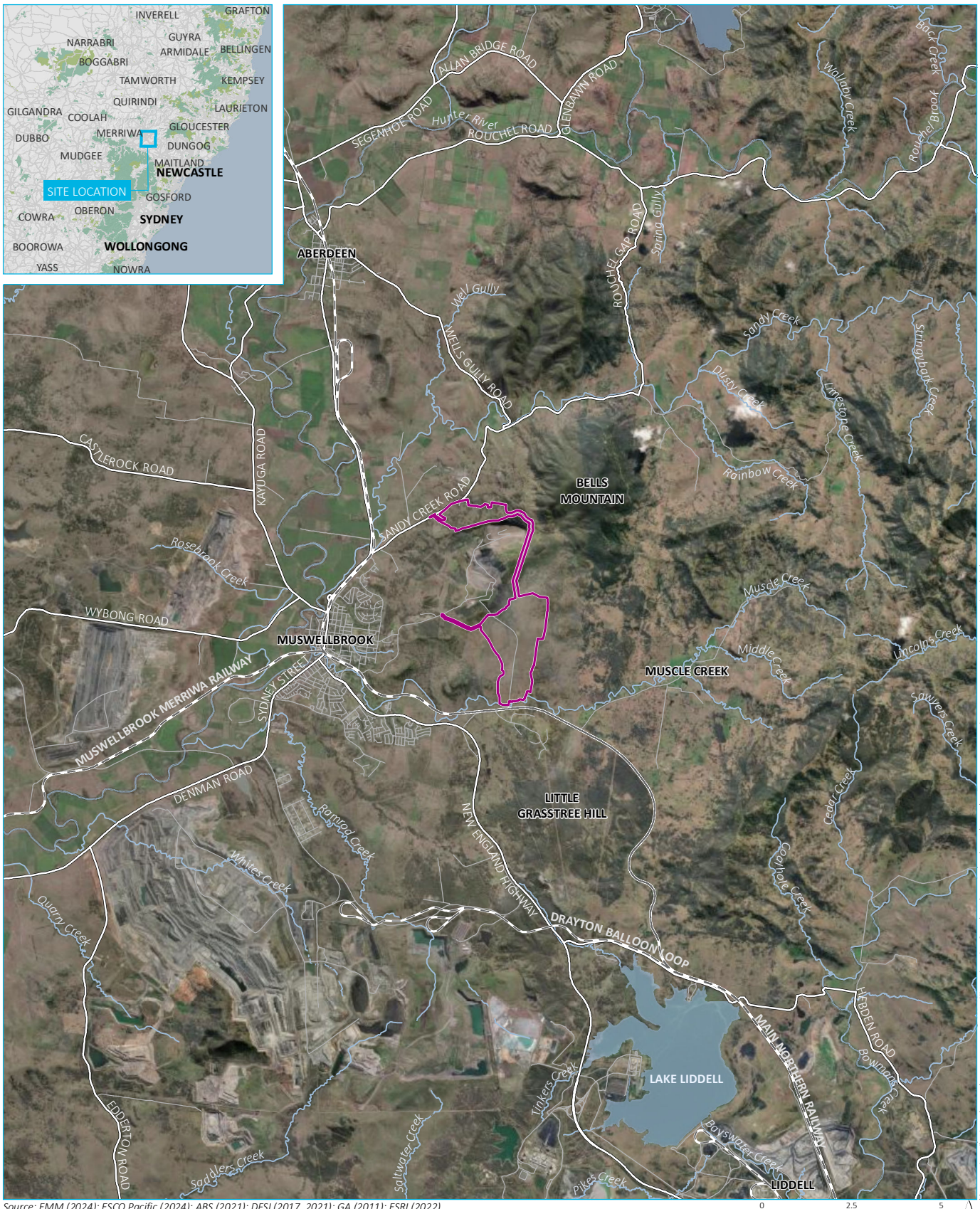
1.3 Purpose of this report

ESCO received correspondence from DPHI on 19 September 2023 requiring responses to the matters raised in the submissions to the EIS. Accordingly, this Submissions Report has been prepared by EMM Consulting Pty Limited (EMM) in accordance with the *State Significant Development Guidelines – Preparing a Submissions Report* (DPIE 2022a) (the Submissions Report Guidelines). The purpose of this report is to consider and respond to submissions made by various agencies, organisations, and the general public, in relation to the project.

This report also describes the additional stakeholder and community engagement activities that ESCO has carried out since EIS lodgement and continues to carry out. Following the ongoing engagement with the local community, government agencies and other stakeholders, ESCO has refined the proposed project design to respond to the key issues raised. Specifically, the layout of the project has been altered such that additional areas of Box Gum Woodland habitat have been avoided, and a culturally modified tree has been avoided.

Following lodgement of this Submissions Report, DPHI will prepare its assessment report, considering the submissions received, and the project's design response to these submissions. The NSW Independent Planning Commission is declared to be the consent authority for the project under Section 4.5(a) of the EP&A Act by operation of Section 2.7 of the State Environmental Planning Policy (Planning Systems) 2021 because:

- The project is SSD under Section 4.36 of the EP&A Act.
- At least unique 50 submissions have been made by way of objection (other than from a council).



Source: EMM (2024); ESCO Pacific (2024); ABS (2021); DFSI (2017, 2021); GA (2011); ESRI (2022)

0 2.5 5 km

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
Submissions Report
Figure 1.1

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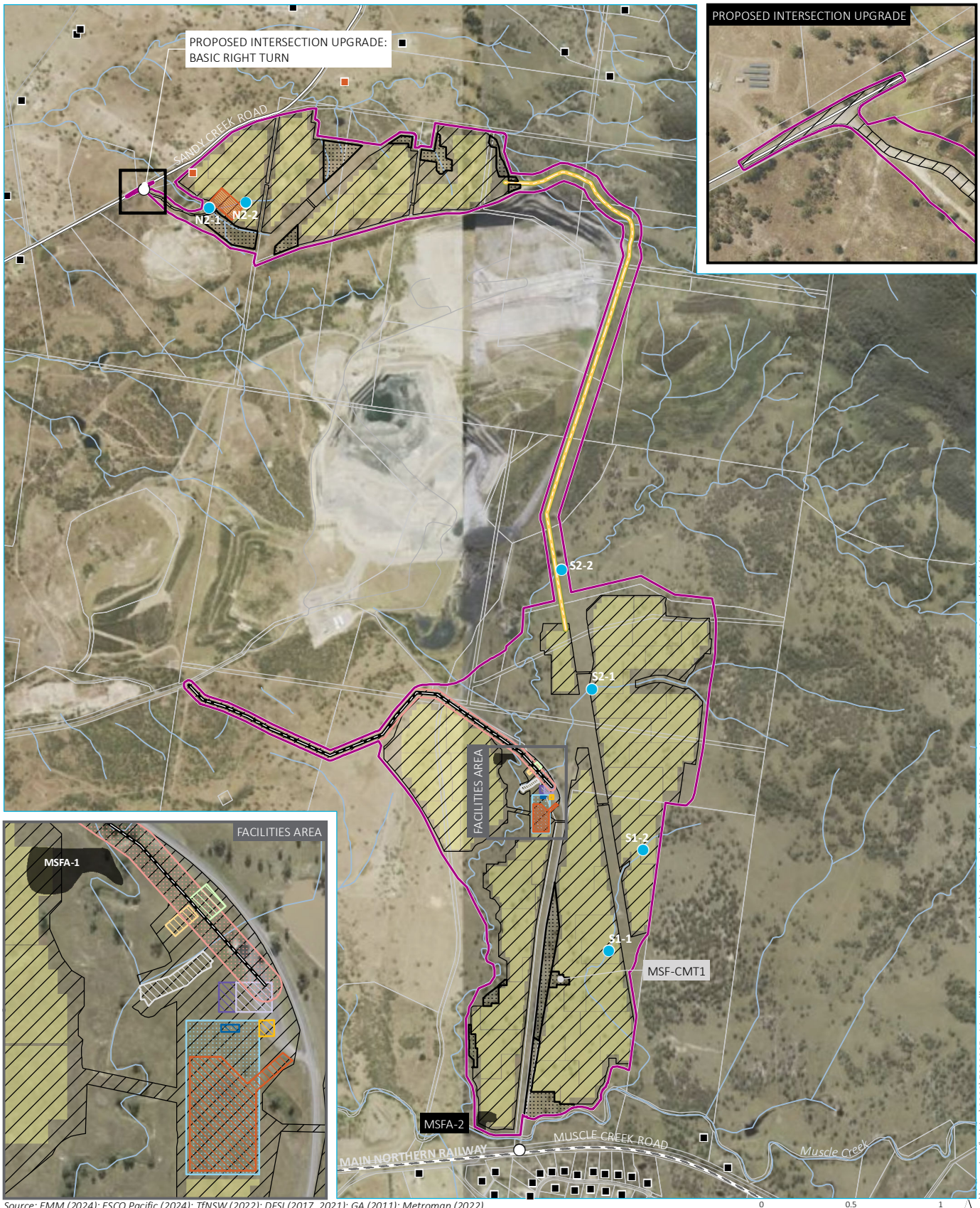

Source: EMM (2024); ESCO Pacific (2024); TfNSW (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

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GDA2020 MGA Zone 56

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KEY

- Project area
- Site access
- Potential watercourse crossing
- Associated dwellings
- Dwellings not associated with the project within 5 km
- Development footprint
- Indicative panel layout
- Biodiversity exclusion area

Connection route

- 132 kV connection to 95M
- Internal connection route (33 kV)

Site element

- BESS (Battery Energy Storage System)
- BESS Collection Station
- Car Park
- Connection internal north to south buffer
- 132 kV connection to 95M buffer
- Laydown
- O&M
- SF Collection Station
- Switchyard
- Transformer Substation
- Diversion channel

Aboriginal heritage site

- To be retained
- To be salvaged

Existing environment

- Rail line
- Major road
- Minor road
- Watercourse/drainage line
- Cadastral boundary

Overview of project

Muswellbrook Solar Farm
Submissions Report
Figure 1.2

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2 Analysis of submissions

2.1 Summary of submissions

Following the public exhibition of the EIS, 61 submissions were received by DPHI from the public and organisations. After review of these submissions, it was noted that one submitter made two submissions, and there were two instances of duplicate submissions from separate submitters. In addition, one submission was made outside of the exhibition period. The duplicate submissions and late submission are not included in the statistics below, however, the issues raised in the submissions have been considered throughout this report and these submitters are included in the submissions register (Appendix A). As such, there was a total of 58 unique submissions from the public and organisations.

In addition, 12 government agencies gave advice and one council provided comment on the EIS.

A summary of unique submissions, including the number of submissions who oppose, support or commented on the project, is provided in Table 2.1. No form letters or petitions were received.

Submissions are available to view on the NSW Government's Major projects website at: https://www.planningportal.nsw.gov.au/major-projects/projects/muswellbrook-solar-farm

A submissions register is provided in Appendix A of this report, which summarises all submissions received.

Table 2.1 Summary of submissions received

Source / type[1]	Object	Support	Comment / advice	Total
Government agency	-	-	12	**12**
Councils	-	-	1	**1**
Organisations	4	2	-	**6**
Public	49	3	-	**52[2]**
Total	**53**	**5**	**13**	**71**

Notes: 1. The type of submission has been categorised by DPHI on the major projects website (i.e. object, support and comment). Organisations are self-identified in the submission process.

2. This number excludes duplicate submissions/submitters.

2.1.1 State government agencies

The following State government agencies or other stakeholders relevant to the project provided a submission on the project offering advice:

1. Department of Planning, Housing, and Infrastructure – Hazards
2. Department of Primary Industries – Fisheries
3. Department of Primary Industries – Agriculture
4. Fire and Rescue NSW
5. Department of Climate Change, Energy, the Environment and Water (DCCEEW) – Heritage NSW
6. Regional NSW - Mining, Exploration & Geoscience

7. Resources Regulator

8. Subsidence Advisory NSW

9. Sydney Trains

10. TransGrid

11. Transport for NSW (TfNSW)

12. Department of Climate Change, Energy, the Environment and Water – Biodiversity and Conservation Division (BCD)

All government agency submissions provided comments and/or advice on the project, with no objections received.

2.1.2 Councils

The following councils provided a submission (comment) on the project:

1. Muswellbrook Shire Council (advice)

2.1.3 Organisations and special interest groups

The following organisations and special interest groups provided a submission on the project:

1. Responsible Energy Development for New England (object)

2. Climate Energy Realists Queensland (object)

3. Save Our Woodlands Inc. (object)

4. Save Our Surroundings (SOS) (object)

5. Idemitsu Australia – Muswellbrook Coal Company (support)

6. Backam Group (support).

Due to the overlap in key matters between the submissions made by organisations/special interest groups and the public, these matters have been addressed together in Section 5.

2.2 Response methodology

All submissions received were collated and categorised based on who they were from, in accordance with the following categories:

- State or Commonwealth government agencies and Council (Section 4)

- general public submissions (including organisations/special interest groups) (Section 5).

Matters raised in the submissions have been classified as one of the following five **broad categories** in accordance with the Submissions Report Guidelines:

1. The project (such as the project study area, the physical layout and design, key uses and activities, timing).

2. Procedural matters (such as the level or quality of engagement, compliance with the Secretary's Environmental Assessment Requirements (SEARs), identification of relevant statutory requirements).

3. The environmental, social or economic impacts of the project (such as amenity, air, biodiversity, heritage).

4. The justification and evaluation of the project as a whole (such as consistency of the project with Government plans, policies or guidelines).

5. Issues that are beyond the scope of the project assessment (such as broader policy issues) or not relevant to the project.

Each of these categories have been divided into **sub-categories**, such as biodiversity, air quality, bushfire, cumulative impacts etc., and then **key matters** raised as outlined in Table 2.2.

2.3 Submissions from the public and organisations

2.3.1 Origin of public and organisation submissions

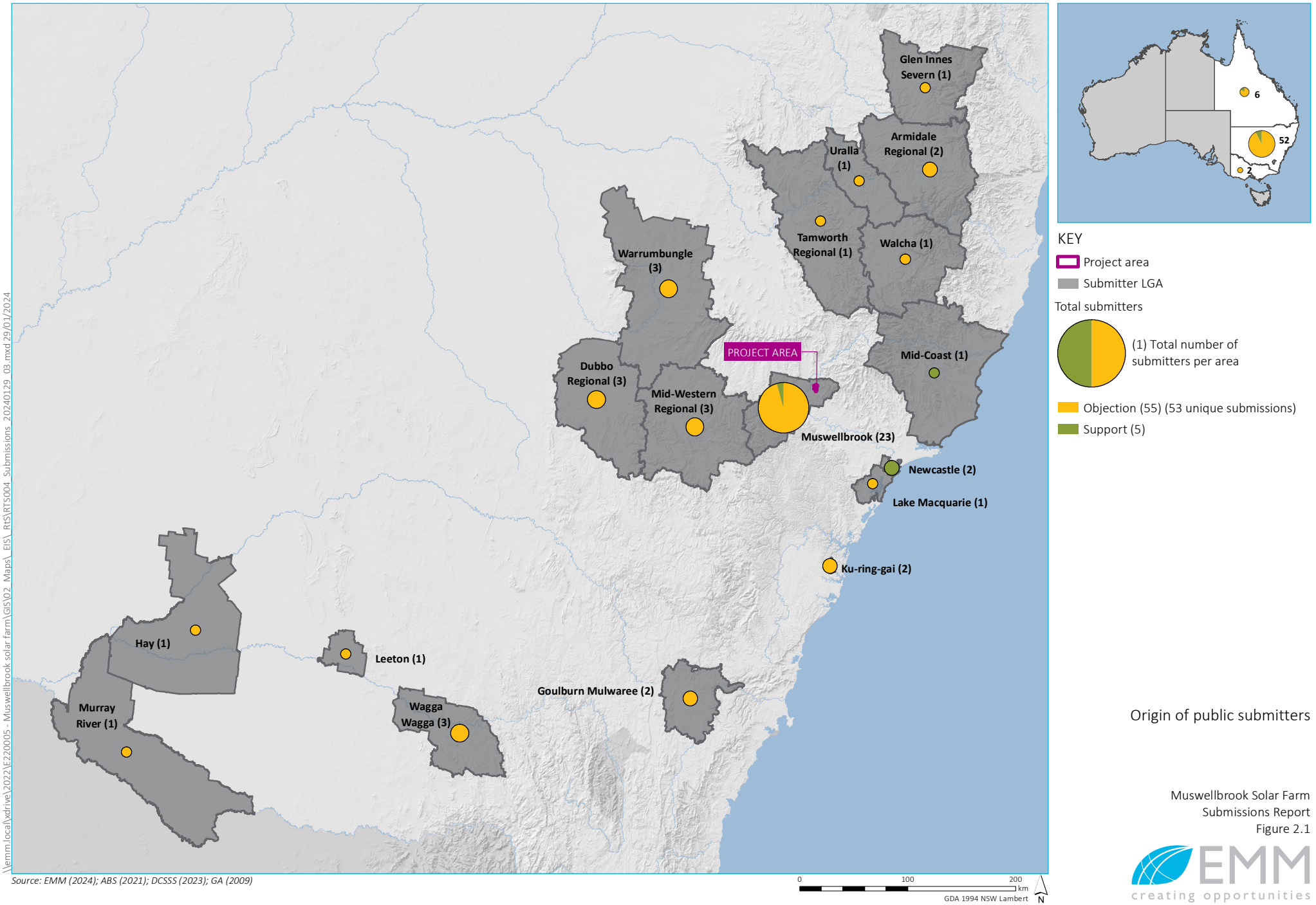
The number of community submitters were analysed by their locality of origin and distance from the project study area. Public submitters came from 33 different locations (suburbs). All of the public submitters disclosed their location of origin. Of the submitters:

1. 37% are from the local area (i.e. <5 km from the project study area)

2. 2% are from the regional area (5–100 km from the project area)

3. 60% comprise broader community interest (>100 km from the project study area).

The origin of public and organisations submitters is shown in Figure 2.1.



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Source: EMM (2024); ABS (2021); DCSSS (2023); GA (2009)

Origin of public submitters

Muswellbrook Solar Farm
Submissions Report
Figure 2.1

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2.3.2 Summary of matters raised by the public and organisations

The broad categories as defined by DPHI and the percentage of submissions received for each are illustrated in Figure 2.2 below. The economic, environmental and social impacts of the project was the dominant category of public submissions to the project.

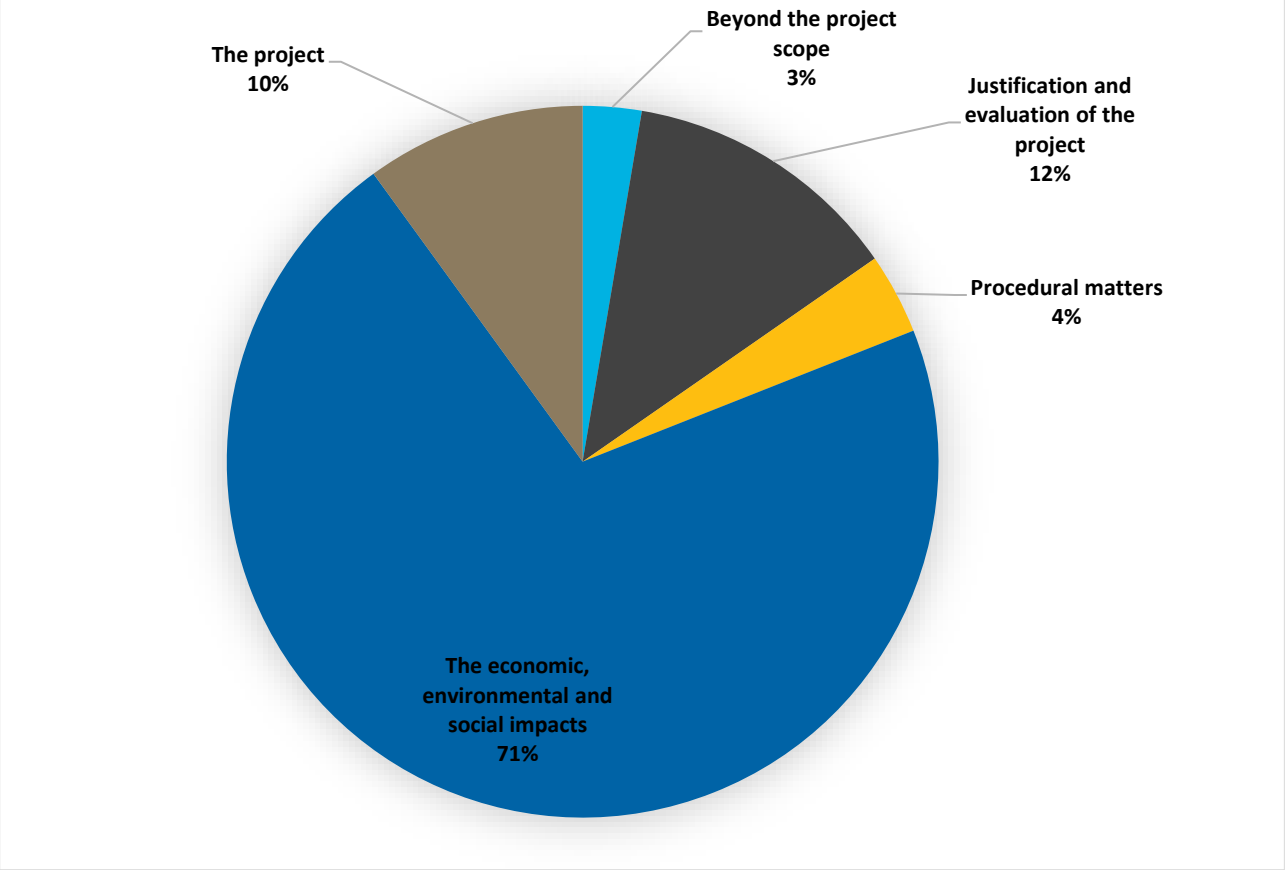


Figure 2.2 Broad category of public submissions to the project

The submissions within each category have been further divided into sub-categories, and then further into key matters. Figure 2.3 provides a graphical representation of sub-categories in public submissions. Table 2.2 provide a summary of the key matters raised by the submissions.

The most common key matters raised by the local community were:

- Visual impacts to properties, neighbourhood, and landscape
- Property values
- Impacts to biodiversity and threatened species
- Suitability of the site
- Increased fire risk.

The most common key matters raised by the broader community were:

- Impacts to agricultural land
- Justification of renewable industry

- Impacts to biodiversity and threatened species
- Waste disposal
- Increased fire risk
- Decommissioning.

Table 2.2 Summary of matters raised by the public and organisations

Key matter raised	Sub-category	Quantity	Relevant section where submission is addressed
The project			
Decommissioning	Decommissioning	12	5.1.1
Suitability of the site	Project location	10	5.1.2
Foreign ownership of the developer	The developer	4	5.1.3
General objection	Other matters	1	5.1.4
Industry terminology	Renewable energy industry	1	5.1.5
Landowner and neighbour agreements	Social	1	5.1.6
Transmission infrastructure connection unclear	Other matters	1	5.1.7
The justification and evaluation of the project as a whole			
Justification of renewable industry	Renewable energy industry	24 object 3 support	5.2.1
Life cycle analysis, greenhouse gases, and mining of rare earth minerals	Renewable energy industry	9	5.2.2
Principles of ecologically sustainable development	Ecologically sustainable development	1	5.2.3
Alternative uses for the project land	Project location	1	5.2.4
Procedural matters			
Quality of assessment and the assessment process	Assessment process	6	5.3.1
Adequacy of engagement	Engagement	5	5.3.2
The environmental, social, or economic impacts of the project			
Impacts to biodiversity and threatened species	Biodiversity	26	5.4.1
Impacts to agricultural land	Land and Soil / Economic	23	5.4.2
Visual impacts to properties, neighbourhood, and landscape	Visual	20	5.4.3
Fire risk	Hazards and risk	20	5.4.4
Human health impacts	Hazards and risk	17	5.4.5
Property values	Economic	16	5.4.6

Table 2.2 Summary of matters raised by the public and organisations

Key matter raised	Sub-category	Quantity	Relevant section where submission is addressed
Waste disposal and recycling of PV panels	Waste	15	5.4.7
Contamination to land and water	Land and Soil / Water	12	5.4.8
Ethical sourcing of materials	Renewable energy industry	11	5.4.9
Cumulative impacts	Cumulative impacts	8	5.4.10
Increased traffic and road damage	Traffic	5	5.4.11
Mental health and wellbeing	Social	5	5.4.12
Quality of life impacts	Social	4	5.4.13
Local economic impacts	Economic	4 object 5 support	5.4.14
Noise impacts	Noise	4	5.4.15
Glare impacts	Visual	3	5.4.16
Soil quality impacts	Land and Soil	2	5.4.17
Dust	Air quality	2	5.4.18
Insurance costs	Economic	1	5.4.19
Access to raw materials	Other matters	1	5.4.20
Property labels	Visual	1	5.4.21
Agrisolar	Land and Soil	1	5.4.22
Community benefit scheme	Social	1	5.4.23
Blasting impacts	Visual	1	5.4.24
Erosion and runoff	Water	1	5.4.25
Impacts on insects and agriculture	Biodiversity	1	5.4.26
Transmission line impacts	Biodiversity	1	5.4.27
Weed and pest invasion	Biodiversity	1	5.4.28
Woodland Ridge estate dwelling entitlements	Visual / Noise	1	5.4.29
Issues that are beyond the scope of the project assessment			
Cyber security, energy security and dependence on foreign countries	Renewable energy industry	4	5.5.1
Cost of electricity	Economic	2	5.5.2
Turbines	Renewable energy industry	2	5.5.3

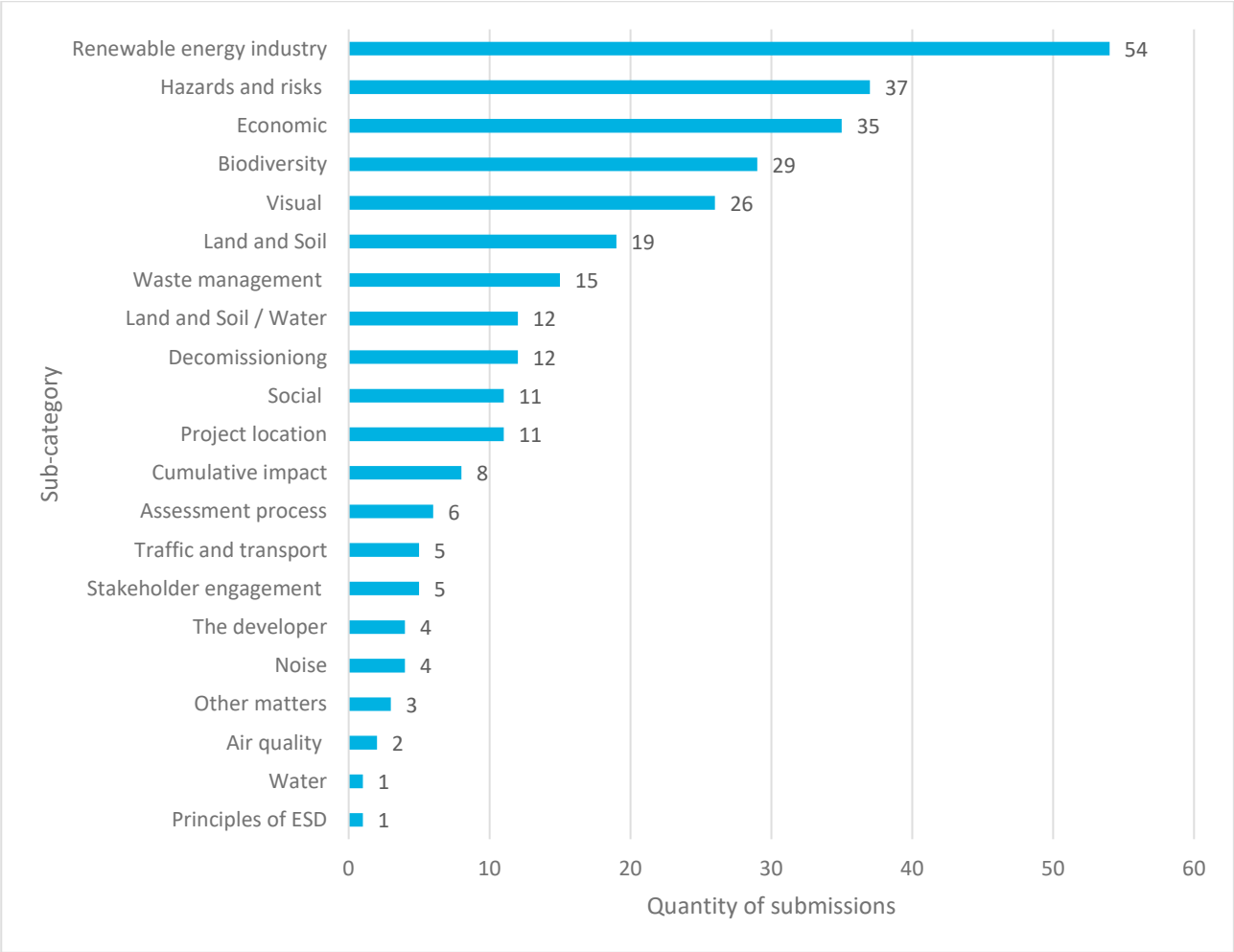


Figure 2.3 Sub-categorisation of public submissions

3 Actions taken since exhibition

3.1 Project refinements

As described in the EIS, the project design that was the subject of the development application was the result of an ongoing and responsive design process, which accounted for the results of technical studies and consultation with stakeholders.

Since lodgement of the EIS, this process has continued as part of ongoing design optimisation.

The change to the project involves avoiding a further 5.5 ha of Box Gum Woodland to lessen the impacts on this community and to avoid a culturally modified tree. The proposed change will reduce the development area from approximately and the revised BDAR has included this change in the revised assessment (refer Section 3.3.1). The ACHA addendum has included consideration of the avoidance of the culturally modified tree (refer Section 3.3.2) As such, no further impact assessment is required.

This proposed change can be considered to be a project refinement in accordance with the *State significant development guidelines – preparing an amendment report* (DPIE 2022b), as the change is consistent with the project description in the Environmental Impact Statement (EIS). Further, the results of the impact assessments undertaken for the project do not materially change as a result of the refinement.

3.2 Further engagement

Stakeholder engagement continues with stakeholders such as local authorities, government agencies, the local community and neighbouring landowners. An overview of engagement activities carried out during and after the public exhibition period of the EIS is provided in Section 3.2.1 and Section 3.2.2.

3.2.1 Engagement with the community

The following additional consultation was undertaken during the exhibition period and as part of the preparation of response to submissions with community members. Further details are provided in Table 3.1:

- A community drop-in information session was held during the exhibition period. This allowed members of the public to learn more about the project and the submission process and ask questions. Approximately 23 members of the community attended, 11 from Woodland Ridge Estate.
- A paid advertisement was placed in the Hunter River Times to advertise details on the community information session.
- Direct letters and emails were sent to a number of neighbours of the project addressing concerns and offering to meet to discuss the project further.
- Letters were provided to State Member for Upper Hunter and Federal Member for Hunter in late August to provide details on the project and to offer a briefing, if required.
- Consultation with the developer of Woodland Ridge Estate following his submission on the project.
- Further consultation with community members who reside in close proximity to the project who expressed concern in their submission on the project.
- Consultation with Black Rock Industries and Brightlands Living regarding employment opportunities and accommodation options.

Table 3.1 Summary of community engagement

Community member Group	Engagement Method and Date	Key Aspects Discussed	Response to key aspects and where this has been addressed in the submissions report
Muswellbrook Community	Newsletter Early September 2023	Invitation to the Community Dop-In Session and provision of information on the project and the planning application process	-
Muswellbrook Community	A paid advertisement was placed in the Hunter River Times 25 August 2023 and 1 September 2023	Invitation to the Community Dop-In Session and provision of information on the project and the planning application process	-
Muswellbrook Community	Information session 11 September 2023	Proximity to Woodland Ridge Estate, visual impacts, heat island effect, fire concerns, road use and maintenance, agricultural land degradation, health impacts, decommissioning and recycling, property devaluation.	5.4.3, 5.4.4, 5.4.5, 5.4.11, 5.4.2, 5.1.1, 5.4.7, 5.4.6
Near Neighbours	Further consultation with the identified community members in close proximity to the project who expressed concern relating to the project in their submission between September 2023 and January 2024	This consultation comprised providing additional information and responding to specific concerns relating to matters such as visual amenity, fire danger, road use and maintenance, health impacts, property devaluation, decommissioning and recycling.	5.4.3, 5.4.4, 5.4.11, 5.4.5, 5.4.6, 5.1.1, 5.4.7
Associated landowners	Regular emails and phone calls providing project updates	-	-
Woodland Ridge Estate Developer	Phone call 4 October 2023 Phone call 6 October 2023 Email 6 October 2023 Teams Meeting 21 November 2023 Email 21 November 2023	Discussion involved the projects proximity to the Woodland Ridge Estate and the impact on future subdivisions, visual impact on existing and future properties, fire risk, decommissioning, environmental impacts. Follow up emails provided information relating to the issues raised and a commitment to ongoing dialogue.	5.4.29, 5.4.3, 5.4.4, 5.1.1

Table 3.1 Summary of community engagement

Community member Group	Engagement Method and Date	Key Aspects Discussed	Response to key aspects and where this has been addressed in the submissions report
Black Rock Industries	Employment opportunities and accommodation Meeting 11 September 2023 Email 13 September 2023 Online meeting 7 December 2023	Accommodation opportunities	-
Brightlands Living	Accommodation opportunities Email 3, 12, 13 October 2023 Email 5 and 7 December 2023 Online meeting 7 December 2023 Email 8 and 13 December 2023	Accommodation opportunities	-

3.2.2 Engagement with government and other stakeholders

Engagement with key government and regulatory stakeholders continued during and post exhibition of the EIS and is summarised in Table 3.2 below.

Table 3.2 Summary of government and regulatory stakeholder engagement

Stakeholder	Engagement method	Key outcomes
Muswellbrook Shire Council	On Site briefing and tour -12 September 2023	Briefing to Council officers and Councillors on the project location and key information. Discussion regarding intersection of the New England Highway and Sandy Creek Road and Sandy Creek Road and the site entrance.
Muswellbrook Shire Council	VPA meeting – 5 December 2023	General terms provided to MSC on 10 January 2024.
DCCEEW Biodiversity Conservation and Science Directorate (BCD)	On Site Meeting – 11 September 2023	BCD representatives Giorginna Xu and Robert Gibson attended the site with ELA ecologists Lily Gorrell and Sophie Montgomery. The site inspection comprised of reviewing the following: • A sample of BAM plots from each vegetation zone • Inspecting locations of threatened flora species identified • Inspecting threatened faun species habitat, including dams and waterways.

Table 3.2 Summary of government and regulatory stakeholder engagement

Stakeholder	Engagement method	Key outcomes
BCD	Email correspondence	ELA provided proposed Common Planigale survey plan to BCD on 10 November 2023. Received email from BCD via DPE – Planning on 16/11 confirming BCD is supportive of survey methodology. On 8 November 2023, ESCO and ELA attempted to set up meeting with BCD to discuss items BCD raised in their submission. BCD advised they required a written request for further information before they could arrange a meeting. On 22 November 2023, ELA provided a Response to Submission Summary Report to BCD (Appendix B). The summary report was prepared as an initial response to the comments received from BCD in the Response to Submissions phase. The Proponent requested feedback (including a meeting with DPHI and BCD), prior to the submission of the formal Submissions Report and updated BDAR. At the time of lodgement of this Submissions Report, ESCO had not received a response from BCD.
BCD – Credit Supply Taskforce	Teams Meeting – 14 December 2023	ELA and ESCO consulted with the Credit Supply Taskforce regarding two proposed Biodiversity Stewardship Sites and generation of credits for use in offsetting the credit liability of the project. Credit offset liability relating to the *Delma vescolineata* was discussed should this species be listed in the future. Further details are provided in Section 4.10.2.2 of the BDAR.
Transport for New South Wales (TfNSW)	Teams Meeting – 8 November 2023 Email correspondence	A meeting was held between TfNSW, ESCO and EMM regarding TfNSW comments on the EIS. Minutes are provided in Appendix B. Additional traffic investigations were agreed to address TfNSW concerns regarding the intersection of New England Highway and Sandy Creek Road intersection. The results of these investigations are provided in the addendum traffic impact assessment (ATIA) in Appendix E. TfNSW also requested a glint and glare assessment for the proposed Muswellbrook Bypass. The results of this assessment are available in Appendix F.
State and Federal Members	Email correspondence – 23 August 2023	Letters and a newsletter were provided to State Member for Upper Hunter and Federal Member for Hunter in late August to provide details on the project and to offer a briefing, if required.
Australian Rail Track Corporation (ARTC)	Email correspondence	EMM contacted ARTC regarding the level crossing at Sandy Creek Road. It was identified that real-time tracking of trains cannot be relied upon for third parties and that drivers should use existing safety protocols and drivers duty of care when crossing a railway (Appendix B). In addition, ARTC confirmed that trains would only block the level crossing in an emergency situation and would be a rare occurrence.
Santos - Hunter Gas Pipeline project team	Meeting – 29 November 2023	EMM contacted Santos to confirm the estimated construction timing for the Hunter Gas Pipeline construction works near Muswellbrook. Santos were able to provide general information about the project timing, noting information specific to Muswellbrook is not known at this stage. Construction is estimated to start in 2025 with construction at any one location of the pipeline corridor occurring for a maximum of 3 months. Temporary accommodation camps would be used along the pipeline for all construction workers. Local access routes for traffic is unknown.

3.3 Further technical assessments and investigations

In response to submissions received from government agencies, further assessment of the impacts of the project including biodiversity, heritage, traffic, and visual were undertaken to address the following issues discussed below.

3.3.1 Biodiversity development assessment report

To address matters raised by BCD, the Biodiversity Development Assessment Report (BDAR) has been updated. Additional assessment has included:

- Targeted surveys for the BC Act Vulnerably listed Common Planigale (*Planigale maculata*) were conducted in accordance with a survey plan developed by ELA and approved by the BCD Accountable officer. This species was not detected during surveys.
- A GIS workshops has occurred between ELA and OX2 to look at additional avoid and minimise to Box Gum Woodland. Based on this, further avoidance has been demonstrated, which has included the following:
    - updated avoidance map showing areas of Box Gum Woodland now removed from the Development Footprint
    - updated impact area (ha) calculations for relevant vegetation zones
    - how this also addresses connectivity of Box Gum Woodland through the landscape.
- All other matters raised by BCD have been addressed in relevant sections of the BDAR. A table detailing how ELA has addressed comments received by BCD is provided in Appendix B of the BDAR. This table outlines how each item has been addressed and the locations in which updates have been made throughout the document.

The revised BDAR is included in Appendix C.

3.3.2 Aboriginal cultural heritage assessment

To address matters raised by Heritage NSW, the following additional investigations were undertaken:

- Culturally modified tree verification and management: there was one scarred tree (MSF-CMT1) that had ambiguous features and was assigned a tentative classification. Additional assessment was recommended for this tree. Further investigation of MSF-CMT1 was undertaken with the participation of several registered Aboriginal parties.

A response to Heritage NSW comments has been included as Appendix D.

3.3.3 Traffic impact assessment

To address matters raised by TfNSW and Council, the following additional investigations were undertaken:

- 24-hour traffic counts have been undertaken for the New England Highway and Sandy Creek Road intersection.
- Additional SIDRA analysis has been prepared for the New England Highway and Sandy Creek Road intersection, and the New England Highway and Muscle Creek Road intersection.

- A turn warrant assessment has been prepared for the New England Highway and Sandy Creek Road intersection.

An addendum traffic impact assessment (ATIA) has been included as Appendix E and responds to specific matters raised by TfNSW and Muswellbrook Council.

3.3.4 Visual impact assessment

In response to matters raised by members of the public regarding visual impacts to residences in Woodland Ridge, an additional viewpoint has been considered and a photomontage and associated impact assessment has been prepared. A glint and glare assessment from the proposed Muswellbrook Bypass has also been completed. The additional analysis is provided in Appendix F.

4 Response to agency and council submissions

4.1 Introduction

A submissions register is provided in Appendix A, which summarises all submissions received from government agencies, as well as the public and other organisations.

Twelve government agencies provided advice on the project, and one submission was raised by a council.

Each of the relevant matters raised by the agencies and Council have been addressed in the sections below. The submissions received from these agencies that required no further consideration are outlined in Table 4.1.

Comments from the other government agencies are summarised in the sub-sections below, with each respective comment followed directly with a response.

Table 4.1 Submissions that require no further response

Agency	Submission	Response
DPHI Hazards	DPHI Hazards noted that the proposed development meets the qualitative risk criteria in the Department's *Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning'.* Recommended conditions of approval were provided.	DPHI Hazards' submission did not contain any matters for further consideration in this report. ESCO has no objections to the recommended conditions.
DPI Fisheries	DPI Fisheries has no objections to the findings in the reports (EIS and BDAR). Due to the presence of an ephemeral fourth order waterway, recommended conditions of approval were provided.	DPI Fisheries' submission did not contain any matters for further consideration in this report. ESCO has no objections to the recommended conditions.
DPI Agriculture	DPI Agriculture considers that the matters raised in the Department of Planning issued SEARs and NSW DPI's submission to the SEARs, have been addressed.	DPI Agriculture's submission did not contain any matters for further consideration in this report.
Fire and Rescue NSW	Fire and Rescue NSW has recommended that a Fire Safety Study, an Emergency Plan, an Emergency Services Information Package, and an Emergency Responders Induction Package are prepared if the development is approved.	Fire and Rescue NSW's submission did not contain any matters for further consideration in this report. ESCO has no objections to the recommended conditions.
Regional NSW - Mining, Exploration & Geoscience	Regional NSW - Mining, Exploration & Geoscience has no concerns to raise regarding potential sterilisation or access to mineral or extractive resources.	Regional NSW - Mining, Exploration & Geoscience's submission did not contain any matters for further consideration in this report.
Resources Regulator	Resources Regulator has no specific comments regarding Mine Safety or Mine Rehabilitation matters in relation to the proposal.	The Resources Regulator's submission did not contain any matters for further consideration in this report.
Sydney Trains	Sydney Trains had no comment on the proposed development works.	Sydney Trains' submission did not contain any matters for further consideration in this report.

Table 4.1 Submissions that require no further response

Agency	Submission	Response
Transgrid	Transgrid can advise this is not a customer project and the connection does not appear to be with Transgrid. However, the project does illustrate a Transgrid 330KV Transmission Line corridor and Easement. Therefore, Transgrid will require detailed plans of any proposed works either immediately adjacent to Transgrid's Transmission Line and/or within the Easement corridor for further Technical review.	ESCO commits to providing detailed designs to Transgrid when available, prior to construction.

4.2 Muswellbrook Shire Council

Table 4.2 provides a response to matters raised by Muswellbrook Shire Council.

Table 4.2 Response to Muswellbrook Shire Council's submission

<table>
<tr><th>Submission matter</th><th>Response</th></tr>
<tr><td>1 Construction Period
Clarification is required on the length of the construction period:
a) The EIS states that the overall construction period is 31 months, while the Traffic Impact Assessment (TIA) states 28 months.
b) For Stage 1 - The Traffic Impact Assessment states 15 months and the Accommodation and Workforce Strategy states up to 18 months.</td><td>The construction of the project will be over a period of 31 months as set out in the table below.
Stage 1 solar farm construction will be over a period of 15-18 months. Initial design assumed a 15 month construction period for Stage 1 which was revised during design development to up to 18 months. To ensure traffic impacts were assessed on a worst case scenario basis, the 15 month construction window was applied for Stage 1 impact assessment.
<table>
<tr><th>Phase: Construction activities</th><th>Duration (months)</th></tr>
<tr><td>Stage 1 – Solar farm construction</td><td></td></tr>
<tr><td>1. Site establishment and mobilisation</td><td>1</td></tr>
<tr><td>2. Equipment procurement and installation of infrastructure</td><td>10–13</td></tr>
<tr><td>3. Testing and commissioning</td><td>4</td></tr>
<tr><td>Stage 2 – BESS construction</td><td></td></tr>
<tr><td>1. Site establishment and mobilisation</td><td>1</td></tr>
<tr><td>2. Equipment procurement and installation of infrastructure</td><td>9</td></tr>
<tr><td>3. Testing and commissioning</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>2 Construction Workforce
Clarification is required on the number of operational employees required for the Project. Some documents state there will be nine employees whereas others state there will be six employees.</td><td>A total of nine full time equivalent (FTE) will be required for the operation of the project:
• Six permanent full-time jobs will be required to ensure the effective operation of the solar farm (operation manager roles).
• Up to three FTE contractor roles for maintenance activities would also be required for vegetation, weed and pest management, module cleaning and facility cleaning, as well as equipment calibration.</td></tr>
</table>

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
3 Planning Agreement At this stage, Council's s7.12 Plan applies to Project and requires a contribution of 1% of Capital Investment Value (CIV) and an appropriate condition of consent should be included in this regard.	Subsequent discussions have taken place with MSC in regard to the mechanism by which the project will contribute to the Local Authority and community. MSC have indicated that a Voluntary Planning Agreement (VPA) is their preferred mechanism by which contributions should be made. A meeting was held on the 5 December 2023 with Theresa Follop and Sharon Pope of MSC to discuss the General Terms of a VPA. This discussion was framed in light of the publication of the proposed changes to the Large-scale Solar Energy Guideline set out in the draft Energy Policy Framework, November 2023 and the draft Benefit Sharing Guideline, November 2023. On the 10 January 2024, General Terms were proposed by OX2 to MSC which aim to achieve the required outcomes outlined in the draft Benefit Sharing Guideline. Discussions will continue to shape and finalise the VPA General Terms.
4 Council will not accept a Community Benefit Sharing Fund managed by, say, an e-grants platform. Council has found that these are not effective in the Muswellbrook LGA for the following reasons: • The management of community benefit funds by private companies is not well regulated or as transparent as when councils manage the funds; • There are only a limited number of people in the community who are willing to participate in being on a committee to allocate PA money to community projects; • With seven mines, a power station and now several renewable energy projects in the Shire, this would equate to more than ten committees if we continue with separate committees for each development; • The administrative burden, difficulty in gaining community representation on Committees, and the potential for funds to be used ineffectively on small scale, ad hoc projects, increases; and The larger community projects generally end up being funded from contributions made by several SSD projects' Planning Agreements, so the current approach of having a separate "funding" committee for each development, particularly when the same community members are on several of the committees, is a time burden on community representatives.	Noted. OX2 are happy to accept this request by MSC. A meeting was held on the 5 December 2023 with Theresa Follop and Sharon Pope of MSC to discuss the General Terms of a VPA. This discussion was framed in light of the publication of the proposed changes to the Large-scale Solar Energy Guideline set out in the draft Energy Policy Framework, November 2023 and the draft Benefit Sharing Guideline, November 2023. On the 10 January 2024, General Terms were proposed by OX2 to MSC which aim to achieve the required outcomes outlined in the draft Benefit Sharing Guideline. Discussions will continue to shape and finalise the VPA General Terms in accordance with this request.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
5 Social, Employment and Accommodation Council does not support the use of temporary, out-of-town camps to mitigate cumulative impacts to housing and accommodation and requests further consultation with the Proponent on this issue.	Noted. The Accommodation and Employment Strategy, Appendix P to the EIS outlines the methods by which sufficient accommodation can be obtained to meet the project requirements. A temporary out of town camp was included as one of a number of strategies to ensure sufficient accommodation could be provided. Further assessment would be undertaken closer to construction to determine the level of current workforce being accommodated in the region on projects which have already begun construction and how this is impacting occupancy rates. This will then allow a greater understanding of accommodation availability for the Muswellbrook Solar Farm. Based on the current assessment of accommodation availability, a temporary out of town camp is not required for this project. Discussions are currently underway with Brightlands Living, an accommodation provider in Muswellbrook to utilise a proposed facility close to town.
6 Any Accommodation Strategy is to include details in relation to the following: c) Demonstrates how accommodation demand will be managed during periods of high demand e.g during key regional events; d) Documents an approach to informing regional accommodation providers of project workforce accommodation demands including anticipated timing; e) Enables the coordinated placement of the workforce in short-term accommodation throughout the Shire; f) Keeps key stakeholders informed of predicted project accommodation demands with six-month lead times preferable; and g) Contains a monitoring framework incorporating 'triggers' in decisions about additional accommodation options.	Noted. Appendix P of the EIS provides an Accommodation and Employment Strategy. A detailed review of this strategy would be undertaken closer to construction to determine the level of current workforce being accommodated in the region on projects which have already begun construction and how this is impacting occupancy rates. This review will include consideration of seasonal demand. Council will be consulted during the preparation of the updated strategy.
7 The following projects will also need to be considered in the Accommodation Strategy: Liddell Battery & Bayswater Ancillary project, Hunter Gas Pipeline, Upper Hunter Battery and Energy Storage System, in addition to the transient workforces for the Australian Rail Track Corporation maintenance and mining shutdown / maintenance.	Noted. As per line 6 above, the Accommodation and Employment Strategy will be updated and include consideration of the project identified by Council. ESCO will engage with the relevant project teams to ensure these projects are captured in the Strategy. The project team has engaged with the Hunter Gas Pipeline (HGP) project team regarding construction timing, local access routes, and construction workforce. The timing of the construction and local access routes around Muswellbrook are unknown at this time. As such, ESCO will commit to engaging with the HGP during the update of the Accommodation and Employment Strategy.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
8 The impact of the cumulative construction labour force on social and community services has not been assessed. It is noted that Section 6.6.4 of the SIA states that the 'access fee for energy projects in the Hunter-Central Coast REZ could be used to provide additional capacity for social infrastructure and services'.	The Social Impact Assessment (SIA) (EMM 2023d) considered the direct and indirect impacts of the project on the regional area, and in particular the workforce requirements, which could lead to impacts on the use of local public amenities and services. The project construction workforce will likely consist of 46% non-local hires who will reside in the local area during the work week. The project's construction workers temporarily residing in Muswellbrook and nearby towns may increase demand for social and community services. Concurrent developments within the local study area may have begun their construction phase prior to or during the Project. Access to specialist health services was identified as a vulnerability by local stakeholders. As such, reduced access to services was a potential impact from the Project's workforce, particularly in Muswellbrook. The strain on accessing services depends on how many workers temporarily take up residence in the area. As the peak number of workers temporarily residing in local communities amounts to 87 workers for a relatively short duration of time (one month), the construction workforce is unlikely to generate substantial additional demand for services. ESCO has committed to engaging with Muswellbrook Shire Council to identify potential service limitations and implement measures such as provision of on-site first aid facilities to reduce competition for the GP services most proximal to the site. The provision of mental health services for the construction workforce would also be considered. ESCO has agreed to enter into a VPA prior to construction commencement with Muswellbrook Shire Council in line with the proposed changes to the Large-scale Solar Energy Guideline set out in the draft Energy Policy Framework, November 2023 and the draft Benefit Sharing Guideline, November 2023. ESCO notes that the Proposed General Terms of the VPA outline a contribution to the Muswellbrook Shire Council Community, Environment and Economic Development Fund to address this increased demand for social infrastructure and services. A potential cumulative benefit of the large number of local projects is related to significant combined community contribution (i.e. benefit sharing agreements and opportunities), procurement and local investment. It is noted that discussions are in progress with EnergyCo and local councils in other REZ's about how developers can effectively contribute to social services in the broader context of the REZ. It is anticipated that this engagement will also occur in the Hunter-Central Coast REZ as the REZ is developed further. The SIA inadvertently stated that the access fee for energy projects in the REZ would contribute to social infrastructure for this project, However, Muswellbrook Solar Farm is connecting into existing transmission infrastructure, and an access fee is not required. While this access fee is not applicable to his project, there will be broader benefits across the REZ as infrastructure continues to grow.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
9 The commitment from the Proponent in Section 6.3.1 of the SIA to 'partner with local organisations to implement a prison employment program for indigenous and non-indigenous men' is supported.	Noted.
10 The following commitments within the SIA relating to procurement, in addition to those listed in Table C.1 of the EIS, are supported: a) Consultation with local businesses and the Muswellbrook Chamber of Commerce; b) Assist with the diversification of local businesses to service the growing renewable energy sector in the region through targeted procurement strategies; c) Development of a local procurement strategy including engaging with local businesses; d) Encouraging the Project workforce, particularly during the construction phase, to support and contribute to the local and regional community through local spending; and. e) A target of X % of required goods and materials supplied by local businesses.	Noted.
11 Procurement of goods should include local indigenous businesses and / or services.	Noted. Mitigation measure SOC3 includes consideration of an indigenous employment program for the broader indigenous population as part of the local procurement strategy.
12 A Procurement Strategy should be prepared in consultation with Council to assist the Proponent to fulfill its procurement-related obligations, engage with the local community, and support local businesses.	Noted. ESCO will prepare a Procurement Strategy in consultation with Council.
13 It is Council's policy position that a minimum of 25% of operational staff on mining a renewable energy projects be required to permanently reside in the Muswellbrook Local Government Area. At least two of the nine operational employees must reside in the Muswellbrook LGA.	ESCO acknowledges Council's policy position. The six permanent full-time operation managers would reside locally. Most of the contractor roles for maintenance activities would also be sourced locally.
14 Traffic No heavy vehicles are permitted on Sandy Creek Road during school bus hours.	It was noted in the original TIA (EMM 2023b) that heavy vehicles are restricted from travelling on Sandy Creek Road during the AM peak hour (7:30 am to 8:30 am) and 3.45pm to 4:45 pm on NSW school terms. This is aligned with NSW heavy vehicle travel restriction along this route.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
15 There are weight restrictions on the Muscle Creek Road rail bridge so depending on the mass of the OSOM, it may or may not be approved by NHVR.	Once the transformer supplier and OSOM vehicle contractor are confirmed, a full bridge assessment will be performed by the appointed transport contractor, subject to National Heavy Vehicle Regulator (NHVR) requirements. Further detail is provided in Section 4.9 of the Addendum Traffic Impact Assessment (Appendix E). As identified in mitigation measure TT2 of the EIS, a permit from NHVR to allow OSOM vehicles to use the road network will be obtained prior to construction.
16 The proposed intersection upgrade at the Sandy Creek Road / Northern Site Access intersection which will be designed to accommodate the turning movement (swept path) of the largest vehicle, a 26 m B-double truck (see figure below) is supported. The intersection upgrade should be undertaken in accordance with AUSRoads standards.	A concept plan for the Sandy Creek Road / Northern Site Access intersection is included at Attachment C to the TIA (EMM 2023b). Relevant Austroads standards have been used to upgrade this intersection.
17 The road pavement at the upgraded intersection must be assessed for its ability to support all expected loads through a geotechnical assessment.	As part of the development consent, a geotechnical assessment will be performed for the upgraded intersection to support expected loads. The scope of the geotechnical assessment will be confirmed with Muswellbrook Shire Council.
18 There are safety concerns regarding the intersection from the New England Highway onto Sandy Creek Road, particularly for right hand turns. The existing condition of the intersection, the proposed upgrade from TfNSW (as part of the Muswellbrook Bypass), and potential delays/queuing associated with coal train movements closing the railway crossing, raises concerns about multiple vehicles, especially trucks, queuing on the Highway waiting to negotiate the turn. There is a high chance of rear end accidents occurring due to limited sight distances. Staff strongly recommend that the Proponent engage with TfNSW and the Australian Rail Track Corporation (ARTC) to explore potential solutions with this issue e.g. real-time monitoring of coal train movements to allow heavy vehicles to park up nearby to avoid the intersection while rail crossing is closed.	ESCO acknowledges Council's concerns regarding the New England Highway and Sandy Creek Road intersection. ESCO has engaged with Transport for NSW regarding the intersection and have completed additional assessment which is provided in Appendix E of this report. Turn treatment warrant analysis indicates that channelised right turn treatment is required on New England Highway for all cumulative construction scenarios. These scenarios were assessed based on the network peak, and the project traffic peak hours overlapping. To alleviate impacts, all construction traffic (heavy vehicles and light vehicles) to the northern site access will travel outside the morning network peak. TfNSW has advised that a concept plan to amend line markings at this intersection has been prepared associated with the Muswellbrook Bypass project. There may be an opportunity to provide a short right turn bay by amending the existing line marking. The intersection design will be subject to a broader discussion with TfNSW due to the potential impacts from other developments in the area and an existing heavy vehicle travel restriction along Sandy Creek Road during the peak traffic hours. ESCO has also been in contact with ARTC regarding real-time monitoring of train movements at the level crossing. ARTC has advised that real-time monitoring cannot be relied upon by third parties (refer correspondence in Appendix B).

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
19 In consultation with Council, and to Council's written satisfaction, the Proponent must: a) undertake an independent dilapidation survey to assess the: i) Existing condition of Sandy Creek Road and Muscle Creek Road on the transport route prior to construction, upgrading or decommissioning works; and ii) Condition of Sandy Creek Road and Muscle Creek Road on the transport route, following construction, upgrading or decommissioning works; b) Repair Sandy Creek Road and Muscle Creek Road on the transport route if dilapidation surveys identify development related damage to the road during construction, upgrading or decommissioning works. The dilapidation surveys will record the condition of the road pavement, drainage structures and other road related infrastructure.	An independent dilapidation survey will be performed on the affected local roads (e.g. Sandy Creek Road) prior to construction and post-construction. The scope of the dilapidation survey is to be agreed with Council. A road maintenance strategy will be developed with Council and any road infrastructure damage caused by this development is to be borne by the applicant. As there will be heavy vehicles along Sandy Creek Road for simultaneous multiple projects, the pavement damage for any specific project would need to be accurately calculated. As such, a proper methodology for pavement and road damage infrastructure contribution would need to be developed by Council.
20 The Proponent must repair and/or make good any development-related damage identified during: a) the carrying out of the relevant construction, upgrading and/or decommissioning works if it could endanger road safety, as soon as possible after the damage is identified but within 7 days at the latest; b) dilapidation surveys carried out following the completion of the relevant construction, upgrading and/or decommissioning works within 2 months of the completion of the survey, unless the relevant road authority agrees otherwise	Noted. This can be conditioned as part of the development consent.
21 Post-construction dilapidation surveys must be undertaken within one month after construction, upgrading or decommissioning works.	Noted.
22 The Proponent must develop a Maintenance Management Plan in respect of these roads, prepared in accordance with Transport for NSW M3 specifications for road maintenance, to the satisfaction of the relevant council.	Noted.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
23 Stormwater management and vegetation management within the road corridor must be addressed during detailed design of the intersection, prior to issuance of a S138 and prepared in consultation with Council.	Noted.
24 Any work undertaken in a public road reserve will require the Proponent to apply for a Section 138 permit under the Roads Act 1993. Any s138 must be always adhered to.	Noted. As identified in Section 4.5 of the EIS, a Section 138 permit under the Roads Act 1993 will be required for works in the public road reserve at the Sandy Creek Road / Northern Site Access intersection.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
25 The commitment that the Proponent will prepare a detailed construction Traffic Management Plan in consultation with Council prior to the commencement of works is supported. Any TMP should (at a minimum) include detail as outlined in other SSD consents in the shire, and also include: a) Identify the type and volume of vehicles anticipated to access the site during the carrying out of construction works. b) Where construction-related traffic movements overlap for multiple projects, a Construction Vehicle Movement Plan should be prepared that outlines: i) A timeline indicating construction periods for each project that may have overlapping construction periods; ii) Strategies for the coordination of construction vehicle movements to minimise traffic congestion, ensure safety and mitigate impacts on local road users; iii) The process for dilapidations surveys for each project and allocation of maintenance effort and cost; iv) Communication and notification protocols between project proponents and to the community to share information about construction schedules, traffic routes and potential disruptions; and v) A detailed monitoring and reporting process. c) Anticipated paths of travel for vehicles accessing and departing the site. d) Manage vehicles entering and exiting the site and the public using Sandy Creek Road and Muscle Creek Road. Traffic control measures along the Sandy Creek Road may be required. e) Manage vehicles turning off the New England Hwy to cross the railway, including avoidance of queuing on the New England Hwy when the crossing is closed for train movements, as there is no sheltered right turn bay on the Hwy.	In line with the request from Council, and mitigation measure TT1 in the EIS, prior to commencing construction, a detailed construction traffic management plan (CTMP) for the project will be prepared in consultation with TfNSW and Muswellbrook Shire Council.
26 The statement by the Proponent that no traffic mitigation will occur during the operational phase is noted.	Noted.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
27 The statement by the Proponent that mitigation measures during decommissioning will be similar to those during construction but may be subject to review and updates to reflect changes to road infrastructure and condition is noted.	Noted.
28 Mitigation measures Staff support the mitigation measures as outlined in Appendix C of the EIS.	Noted.
29 Landscape and Visual Although the LVIA has been prepared in accordance with the Solar Guidelines, Staff are surprised that there are no proposed mitigation measures, such as screening, to address visual impact. In the interest of maintaining a positive relationship with the community, it is recommended that the Proponent remains receptive to feedback and complaints. Should any concerns arise from the community, it is recommended that the Proponent conducts a review of impacts and, where applicable, provides suitable mitigation measures.	ESCO notes Council's recommendation. OX2 has reached out to a number of residents at Woodland Ridge to further discuss the visual impact of the project. This will continue as the project progresses. In addition to this, Benefit Sharing initiatives for the near neighbours to the project are being discussed with MSC as part of the VPA general terms. Following receipt of comments from members of the public and engagement with the Woodland Ridge developer, an additional viewpoint has been assessed to consider the potential views from houses that have been developed since the preparation of the EIS. A photomontage and impact assessment is provided in Appendix F.
30 Biodiversity Should the Proponent elect to offset the residual impact of the Project in the proposed areas shown in the Offset Investigation Areas (see figure below), it is crucial that they engage in a proactive and strategic approach to biodiversity enhancement. This should go beyond passive management techniques and encompass active measures such as targeted native vegetation planting, habitat restoration, and other conservation initiatives. The strategy should be developed in consultation with local environmental experts, Aboriginal representatives (to ensure a comprehensive species list) and authorities to ensure its effectiveness and alignment with the region's conservation goals and to avoid restricting logical urban expansion of Muswellbrook.	Should the Proponent elect to satisfy all, or a portion of their offset obligation through a credit transfer i.e. purchased credits from a seller of an approved Biodiversity Stewardship Agreement (BSA) Site, they have the option to do so. The generation of biodiversity credits will be managed under the Biodiversity Assessment Method (BAM) and all relevant guidelines for entering into a BSA. A critical component of establishing a BSA includes land management obligations, including weed management, feral animal control and other associate habitat restoration practises which are managed under the Management Action Plan and Total Fund Deposit and agreed to by the Credit Supply Taskforce prior to BSA finalisation.
31 Weed removal and rehabilitation plantings along the riparian corridors on the site should be a priority. Riparian areas should be fenced off to limit access by grazing animals to enable natural regeneration and reduce bank erosion.	Weed removal and land management within the Development footprint will be undertaken as part of the Biodiversity Management Plan (BMP). Riparian corridors have been avoided as far as practicable and will be fully fenced to limit access and minimise impacts to these areas during construction and operation of the Solar Farm.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
32 The old growth Hunter River Red Gums near Muscle Creek contain hollows and seedlings of the same species would take more than 100 years to grow to an equivalent tree of similar value. Redesign of the solar farm to avoid removal of these trees is requested.	*Eucalyptus camaldulensis* (River Red Gum) in the Hunter Catchment is listed as an endangered population under the NSW *Biodiversity Conservation Act 2016*. A number of individuals have been identified along Muscle Creek. No individuals have been identified within the Development footprint and all riparian corridors in the vicinity of these individuals have been avoided. No individuals of mature *E. camaldulensis* or seedlings of this species will be impacted.
33 Waste A WMP is required to be prepared in consultation with the relevant authority and Council's Waste Operations unit, and that a copy of the plan be provided to Council's Waste Operations unit to prepare for incoming waste volumes, types and disposal methods outlined in the plan. Council would prefer a condition that states that no solar panels are to be disposed of to landfill, instead all damaged or non-functioning solar panels be recycled or rehabilitated and reused.	A Waste Management Plan has been prepared and is attached as Appendix G. ESCO will commit to no panels going to landfill.
34 The commitment outlined in Section 6.13.3 of the EIS that "The WMP will include appropriate consultation frameworks with Muswellbrook Council, neighbouring councils and licensed waste management facilities to maintain communication and forward planning and provide a grievance mechanism through which any identified adverse impacts can be addressed" is supported.	Noted.
35 Council's waste facility does not recycle tree trunks and substantial branches as they are too big handle or to compost. Ideally, they should be used on site as "stag" trees with hollows in rehabilitation areas.	Noted. Tree trunks and substantial branches will be beneficially reused on site.
36 In relation to Table 6.5 – glass, plastic bottles and paper should be separated and recycled, either at the Muswellbrook Waste Facility or otherwise.	Noted. Glass, plastic bottles and paper will be separated and recycled.
37 In relation to high volumes of cardboard, Staff recommend that the Proponent engage directly with carrier that has a relationship with the paper recycler. There is only one paper/card recycler in Australia (VISY), who are selective of the paper and cardboard that they are willing to accept, and the market is currently saturated.	Noted.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
38 Council would prefer a condition that states that no solar panels are to be disposed of to landfill, instead all damaged or non-functioning solar panels be recycled or rehabilitated and reused.	ESCO acknowledges Council's preference that no solar panels are to be disposed of to landfill. As identified in the EIS, PV module recycling companies are emerging in Australia, and they are expected to be well established by the time the project is decommissioned as the industry develops. PV modules can be separated into component parts including metals (aluminium, copper, silver), glass, silicon and plastic for beneficial reuse. During the 35-year operational life of the project, recycling and reuse facilities for batteries and solar panels may advance in Australia allowing for beneficial reuse of parts of the project. An Operational Waste Management Plan would be updated periodically during the life of the project to capture technological updates. The disposal and recycling of the project infrastructure will be done in accordance with current waste management legislation at the time of decommissioning. Wherever possible, efforts will be made to reduce the amount of waste going to landfill in line with best-practice sustainability principles.
39 The commitment from the Proponent outlined in Table 6.51 of the EIS that "The waste management plan is being prepared in accordance with the Solar Guideline." Is supported. The Solar Guidelines reference the EPA's Circular Solar Fund. Staff are of the understanding that participants of the Circular Solar Fund have the capabilities to recycle solar components, and strongly encourage the Proponent to liaise directly with these companies so that no solar panel goes to landfill.	Noted. Refer to line 38.
40 Agriculture A post-decommissioning land use plan should be prepared a minimum of five years before the end of the approval, to determine the most appropriate mix of land uses for the site, including maintaining employment opportunities for a minimum of 9 staff. The plan should be prepared in consultation with Council, the local business community, local environmental experts and Aboriginal representatives.	ESCO acknowledges Council's request for a post-decommissioning land use plan 5 years prior to the end of the approval. Discussion with MSC indicated that ESCO could explore opportunities for the retraining of staff and to encourage local businesses to utilise the existing facilities once the solar farm is decommissioned. Mitigation measure AG02 in the EIS commits to re-establishing agricultural land use over the entire 482 ha project area at the time of decommissioning unless otherwise agreed with the landowner and/or regulatory authorities.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
41 The availability of top-soil is an issue for State Significant Developments (SSD) within the Shire. Staff are particularly keen to understand the Proponent's long-term storage plans for top-soil, aiming to ensure a reliable supply for rehabilitation works post closure.	Council's concern regarding topsoil is acknowledged and ESCO has included several commitments in the EIS to ensure that topsoil is retained and conserved as much as practicable, including: • Mitigation measure LS1 - Prepare and implement a soil stripping and management plan (SSMP) that includes an inventory of soils to be stripped and stockpiled, including soil types, stripping areas, depths and volumes, and includes a topsoil and subsoil stripping and stockpiling procedure. • Mitigation measure LS2 - Preserve as much topsoil and subsoil as practicable for in-situ replacement post-disturbance. • Mitigation measure LS3 - Segregate topsoil and subsoil as much as practicable. • Mitigation measure LS4 - Segregate soil types as much as practicable. • Mitigation measure LS5 - Protect stockpiles from erosion using polymers or cover crops etc. • Mitigation measure LS9 - Minimise the extent and duration of disturbed soil. Stabilise exposed soil with polymers, vegetation, gravel or similar as soon as practicable. • Mitigation measure LS10 - Avoid unnecessary soil compaction as much as practicable. • In addition, erosion and sediment controls will be implemented to reduce potential loss of topsoils during the life of the project. It is anticipated that there will be no permanent impacts on land and soil capability (LSC) in the project area as a result of the project. Following the end of life for the project, disturbance areas will be re-graded (where required) and stockpiled topsoil and subsoil be respread over disturbed areas and rehabilitated with either native vegetation or improved pastures depending on the intended final land use. This strategy, along with good soil management practices will facilitate the rehabilitation in returning the land to an equivalent LSC class.
42 Staff support the commitment contained within Section 6.4 of the AIS that the Proponent will "investigate the potential for integrating solar panel installation and agricultural use at Muswellbrook Solar Farm as a means of further mitigating the impacts to agriculture."	Noted.
43 If grazing is planned in conjunction with the Project, fencing should be established to restrict stock movement into riparian corridors.	If Agrisolar is pursued at the site, suitable fencing will be established to restrict stock movement into riparian corridors.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
44 Rehabilitation and Decommissioning With multiple renewable energy projects proposed within the Shire, Staff require confidence that the decommissioning and rehabilitation of the site is undertaken using an agreed approach. A Decommissioning Plan should be prepared that includes details in relation to the following: a) A program for the decommissioning of all Project elements, above and any below ground infrastructure, redundant buildings and other infrastructure related to the approved development. b) A strategy for the rehabilitation of the site to an agreed post-decommissioning land use plan. c) Establish a timeline for the completion of decommissioning and rehabilitation works within 12 months of the conclusion of the premises operational lifetime.	Consistent with contemporary consent conditions issued for large scale solar farm developments in NSW, it is anticipated that any consent for the project will include conditions requiring that the development be decommissioned, and site rehabilitated within a specific period and to the satisfaction of the Secretary of DPHI. If the project is approved, a project decommissioning and rehabilitation plan will be prepared prior to decommissioning, in accordance with any relevant conditions of consent. ESCO notes Council's recommendations for the development of the decommissioning and rehabilitation plan. The plan will outline the rehabilitation objectives and strategies for returning the development footprint to agricultural production (or as agreed with the landowner and/or regulatory authorities).
45 At the conclusion of the development's operational lifetime, decommissioning of the site should be carried out in accordance with the Decommissioning Plan. Documentary evidence should be provided to Council, from a suitably qualified persons, to confirm that the development has been successfully decommissioned and rehabilitated.	The decommissioning and rehabilitation plan will include a monitoring and evaluation framework to ensure the project area is successfully decommissioned and rehabilitated.
46 The commitment contained within the Rehabilitation Strategy that 'A key component will the placement of subsoil and topsoil layers at equivalent depths to that identified in Minesoils (2023)' is supported for areas proposed to be used for extensive agriculture post-decommissioning.	Noted.
47 Any post decommissioning vegetation establishment should be undertaken in consultation with local environmental experts and Aboriginal representatives (to ensure relevant species are re-established).	Noted.
48 Hazard The development of a Fire Safety Study as part of any development consent, for review and approval by Fire Rescue NSW is supported.	ESCO acknowledges Council's support and notes the recommended conditions outlined by Fire Rescue NSW in Table 4.1, to which ESCO has no objection.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
49 Noise The recommendation contained within the Noise Impact Assessment that 'Consultation between ESCO Pacific, Firm Power and Transport for NSW should be undertaken when necessary to manage potential construction noise impacts at nearby assessment locations in accordance with the ICNG' is supported.	Noted.
50 Water Section 6.2.2 of the Water Resources Assessment states that 'PV modules will shed runoff directly to the ground, which will be stabilised and vegetated to promote retention and infiltration similar to existing conditions'. Erosion resulting from water shedding to the ground can be difficult to predict. Regular inspections post rainfall should occur, and maintenance programmed. In areas exhibiting ongoing erosion issues, the Proponent should consider treatments including gravel, mulch or erosion control mats or blankets.	In line with the request from Council, ESCO has included the following commitments in the EIS: • Mitigation measure LS24 - Maintain groundcover (vegetation, gravel etc) around solar panels during operation, particularly on panel drip lines. • Mitigation measure LS28 - Ensure that the effectiveness of sediment and erosion control infrastructure and procedures are regularly monitored by a suitably trained person. • Mitigation measure SW1 - Prior to the commencement of construction, a Soil and Water Management Plan (SWMP) will be prepared, which will outline mitigation measures to be implemented during construction and operation of the project to address risks to surface water and groundwater. Mitigation measures will consist of appropriate siting of infrastructure, capture of stormwater runoff from buildings, erosion and sediment control (ESC) measures such as sediment fences and sediment basins, and continuation and maintenance of stabilised and vegetated surfaces, drainage and sediment and erosion control measures that will be retained for operations. • Mitigation measure ES1 - Implementation of erosion and sediment control measures and site rehabilitation and revegetation in accordance with best practice comprising *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom 2004) and Volume 2A (DECC 2008) and *Best Practice Erosion and Sediment Control* (IECA 2008). Proposed measures will be considered further and formalised as part of detailed design and will form part of the SWMP. Appropriate drainage, erosion and sediment control practices will be incorporated into the project environmental management plan (EMP) for the project. This will include regular monitoring and maintenance as required.
51 While Appendix B5 shows that the ACHA was provided to the Aboriginal representatives, it is unclear whether Aboriginal representatives approved the ACHA including the proposed mitigation measures to the impacted sites."	Registered Aboriginal parties (RAPs) were provided with a copy of the draft ACHA via email with an opportunity to provide input or comments on the report. This is the process whereby the RAPs can influence and inform the recommendations. No comments were received in response to this consultation. Several locally based and/or key Wonnarua traditional owners were also invited to attend a meeting in March 2023 in Muswellbrook to discuss the project and draft report. The key discussion points and outcomes of this meeting are available in Appendix B of the ACHA, and influenced the final recommendations and mitigation measures of the report.

Table 4.2 Response to Muswellbrook Shire Council's submission

Submission matter	Response
52 Stakeholder Engagement The commitment within the EIS that the Proponent will develop a complaints investigation and response plan is supported.	Noted.

4.3 Department of Climate Change, Energy, the Environment and Water – Heritage NSW

Heritage NSW requested clarification on some matters and additional information to assist in their consideration of the project. The requests are summarised as follows:

- Request for landform mapping
- Request for a figure showing the sites identified for the Muswellbrook Bypass project with reference to the project area
- Clarification regarding survey restrictions
- Justification for the extrapolation of the test excavation results across the project area
- Additional information on the depth of test excavation within terrace landforms
- Additional assessment of site MSF-CMT1, a tentatively classified culturally modified tree
- Clarification on when consideration will be given to refining design to avoid potentially identified sites
- Justification for why a detailed methodology for salvage of identified sites has not been provided
- Additional information regarding Registered Aboriginal party consultation
- Additional information on the surface stone artefacts identified during the survey
- Clarification on the status of figures provided in the ACHA, and request for minor updates to some figures
- Request for detail on AHIMS sites requiring correction
- Confirmation of registration of newly identified AHIMS sites
- Clarification of typographical error
- Request for updated extensive AHIMS searches

An addendum report to the ACHA has been prepared to address the additional requests of Heritage NSW and is provided in Appendix D. The comments from Heritage NSW are provided in full in Table 1 of Appendix D.

4.4 Subsidence Advisory NSW

A geotechnical report should be commissioned in order to characterise the risk of mine subsidence to the proposed infrastructure. The report should also consider subsidence impacts of the project sourcing groundwater from underground mines. Geotechnical reports are to be prepared by a consultant with demonstrated experience in mine subsidence assessments. Subject to the outcomes of the geotechnical report, future infrastructure should be designed so that serviceability of the structures is not compromised if subsidence was to occur.

A geotechnical report has been prepared by SCT Operations to assess the subsidence risk and is provided as Appendix H. The report provides the following conclusions:

- Historic underground mining in the Lower Lewis and St Heliers Seams extends below the northern project area and there is no underground mining below the southern area.
- There is no significant risk of pillar instability in areas of historic mining below the proposed solar farm based on available mine plans.
- There is a low probability of further ground movement around the periphery of an area of full extraction.

The report recommends consideration is given to construction strategies, particularly around the periphery of an area of full extraction, that can accommodate ground movements and facilitate remediation in the unlikely event of further subsidence. It also recommends a monitoring program capable of confirming the magnitude and nature of any further subsidence movements. ESCO will implement these recommendations.

4.5 Transport for NSW

Transport for NSW requested clarification on some matters and additional information to assist in their consideration of the project. The requests are summarised as follows:

- Justification or amendment of light vehicle assumptions for analysis of key intersections.
- A meeting to discuss implications and mitigation measures to ensure Muswellbrook Solar Farm and Muswellbrook Bypass interactions are managed.
- Additional assessment of the New England Highway / Sandy Creek Road intersection and rail level crossing including a review of intersection treatments, inclusive of background, growth and cumulative project traffic, turn warrants assessments, and strategic design of the intersection.
- Confirmation of Sandy Creek Road access intersection design compliance.
- Oversize / Overmass route from Port to site with high level review of pinch points, pull over locations, laden dimensions of transformer, including review of the timing of works associated with the Muswellbrook Bypass.
- Review of traffic generation rates to ensure that heavy vehicles that require an NHVR permit but exempt from escort requirements have been captured.
- Confirmation that the transmission lines proposed to cross the Muswellbrook Bypass will form part of this scope of the EIS for the Muswellbrook Solar Farm.

As outlined in Section 3.2.2, a meeting was held between Transport for NSW, ESCO and EMM regarding Transport for NSW's comments on the EIS. Minutes from this meeting are available in Appendix B.

An addendum traffic impact assessment (ATIA) has been prepared to address the requests from Transport for NSW and is provided in Appendix E. The comments from Transport for NSW are provided in full in Table 2.1 of Appendix E.

Additional SIDRA analysis and turn warrant assessment has been completed for the New England Highway / Sandy Creek Road intersection.

It is noted that at the time of the meeting with Transport for NSW, the project team was informed that a Federal Infrastructure review was underway and the status of the status of the Muswellbrook Bypass was unknown. The results of the review were released in late 2023. Muswellbrook Bypass was identified as a project that would proceed through planning. The timing of the construction of the Muswellbrook Bypass remains uncertain.

4.6 Department of Climate Change, Energy, the Environment and Water – Biodiversity and Conservation Division

BCD requested clarification on some matters and additional information to assist in their consideration of the project. The requests are summarised as follows:

- Development of further measures to avoid and minimise impacts to Box Gum Woodland CEEC
- Amendment of the BAM-C to be consistent with section 3.7.3 of the BDAR and confirmation that some species were excluded from assessment
- Consideration of Hunter Valley Delma as striped legless lizard
- Update of assessment and species polygons for southern myotis
- Survey for common planigale
- Additional information regarding compliance of survey requirements for six species and GIS data
- Further consideration of habitat connectivity between vegetation east and south of the development footprint
- Consideration of additional mitigation measures
- Amendment of the BDAR to include limitations and risk of failure of proposed mitigation measures
- Provision of additional information regarding impacts not requiring offsets for three vegetation zones.

A revised BDAR has been prepared to address the additional requests of BCD and is provided in Appendix C.

A table detailing how BCD comments have been addressed is provided in Appendix B of the BDAR. This table outlines how the item has been addressed and all locations in which updates have been made within the BDAR.

5 Public submissions

5.1 The project

5.1.1 Decommissioning

Twelve submissions raised concerns about project decommissioning including who would have responsibility for decommissioning and lack of a decommissioning bond.

The project infrastructure will be decommissioned and the development footprint returned to its pre-existing land use in consultation with the land owner.

Consistent with contemporary consent conditions issued for large scale solar farm developments in NSW, it is anticipated that any consent for the project will include conditions requiring that the development be decommissioned, and site rehabilitated within a specific period and to the satisfaction of the Secretary of DPHI.

If the project is approved, a project decommissioning and rehabilitation plan will be prepared prior to decommissioning, in accordance with any relevant conditions of consent. The plan will outline the rehabilitation objectives and strategies for returning the development footprint to agricultural production or alternative uses as has been agreed with the land owner.

ESCO would be responsible for decommissioning and rehabilitating the land within the development footprint. No cost is expected to be borne by Council or rate payers. Decommissioning bonds are not part of contemporary consent conditions for large scale solar farm developments in NSW.

5.1.2 Suitability of the site

Ten submissions were concerned about the suitability of the site. Concerns included:

- proximity to residences
- preference for other sites (e.g. Liddell power station, areas not suitable to farming)
- that solar farms should be built in/near communities that would benefit from them
- the land was never mined (mine buffer area)
- should be near major cities to reduce transmission losses

The project is consistent with local, regional and state planning regimes as a suitable development for its location. The site is located within the Hunter-Central Coast REZ. The Hunter-Central Cost REZ has excellent renewable energy resources, rehabilitated mining land, electricity network infrastructure, port and transport infrastructure and a skilled workforce (EnergyCo 2023).

Site suitability and the rationale for choosing and the site are described in Section 2.2 of the EIS and summarised in this section. The site is favourable for the construction and operation of a solar and battery project due to the available solar resource and physical conditions (flat to gently undulating topography and predominantly cleared land). The site is also ideally located adjacent to existing transmission infrastructure. The project area is traversed by existing 132 kV and 330 kV transmission lines. Given this, it is an ideal site for increasing generation capacity on the NSW electricity grid with minimal requirements for additional transmission infrastructure.

The site was also selected due to the absence of biophysical strategic agricultural land and farming land with land and soil capability Class 1 to Class 3 (Class 1 represents land capable of sustaining most land uses including those that have a high impact on the soil), and the relatively low level of other environmental constraints.

The site is largely separated from the residential township of Muswellbrook with surrounding topography, vegetation and distance assisting in screening views of the project. It is acknowledged that some residences in Woodland Ridge estate and isolated residences to the north of the site will have some views of the solar farm. The visual assessment for the project has been prepared in accordance with the requirements of the Solar Guideline. Efforts to engage with multiple neighbours at Woodland Ridge Estate regarding visual impacts have been made during December 2023. Offers to meet with several neighbours have been made and ESCO will continue to liaise directly with those residents. ESCO note that the proposed General Terms of the VPA with MSC include a neighbour benefits contribution to align with the proposed changes to the Large-scale Solar Energy Guideline set out in the draft Energy Policy Framework, November 2023 and the draft Benefit Sharing Guideline, November 2023.

The majority of the site is located on land within the Muswellbrook Coal Lease boundary and on land owned by Muswellbrook Coal Company. The northern project area is located over historical underground workings. An additional property has been leased for part of the southern project area in order to develop a commercially viable project.

It is noted that several submitters indicated a preference for Liddell power station as a site for a solar farm / renewable energy infrastructure. The Liddell power station site will be repurposed as an industrial renewable energy hub, and the construction and operation of a battery energy storage system with capacity of 500 MW and 2 GWh has already been approved.

AEMO notes that coal fired generation capacity is withdrawing faster than previously announced with 60% of capacity likely to be withdrawn by 2030. Coal-fired generators are continuing to bring forward their withdrawal from the market – potentially by up to seven years to 2025 in the case of the Eraring Power Station (AEMO 2022). Without coal fired power, a nine-fold increase in utility-scale variable renewable capacity will be required to meet demand. Much of this resource will be built in REZs that coordinate network and renewable investment.

5.1.3 Foreign ownership of the developer

Four submissions were concerned about foreign ownership of the developer.

ESCO Pacific was acquired by OX2 in May 2023. OX2's mission is to accelerate access to renewable energy and become the leading provider of renewable energy solutions globally. OX2 have seven solar farms currently in operation in NSW and Queensland and Victoria. A further ten solar farms are under development (including Muswellbrook Solar Farm).

Idemitsu has been operating in Australia for more than 40 years. Idemitsu Australia is a subsidiary of Japanese company Idemitsu Kosan, which has a long history of with renewable energy projects in Japan. In 2021, Idemitsu Renewable Developments Australia was formed, to focus on innovation, including new solar hydro, wind and battery hybrid energy development projects and export opportunities.

5.1.4 General objection

One submission raised a general objection to the project.

A general objection to the project was raised with no further comment provided. The justification for the project is provided in Section 6 of the EIS and is summarised in Section 6 of this document.

5.1.5 Industry terminology

One submission object to the naming of the development as a "farm" (i.e. it is a "solar factory" or "electricity generating works").

The term "solar farm" is used Australia wide to describe a large-scale solar installation where solar panels harvest the sun's power. The term is accepted in this context. The project is defined as electricity generating works under the State Environmental Planning Policy (Transport and Infrastructure) 2021 and is permissible with consent under Part 4 of the EP&A Act.

5.1.6 Landowner and neighbour agreements

One submission raised concerns about the information provided to host landowners when signing agreements, and confidentiality clauses in neighbour agreements.

The private landowner that owns part of the southern portion of the project area is supportive of the project and has prepared a submission for the project indicating this.

There are no neighbour agreements for the project. This concern is not applicable to the project.

5.1.7 Transmission infrastructure connection unclear

One submission raised concerns that the project description is incomplete with no clear "vision for connectivity".

ESCO has engaged with Ausgrid regarding grid capacity and the connection point for the solar farm during the project refinement stage of the project (as outlined in Section 2.5.4 of the EIS). Ausgrid identified the available grid capacity as 135 MW with a preferred connection point as the 132 kV 95M transmission line to the west of the project area (as shown in Figure 1.2). The connection will be a tee connection into the 95M feeder.

As identified in Section 4.5 of the EIS, an easement established under Section 88B of the *Conveyancing Act 1919* is likely to be required for the connection to the Ausgrid network.

5.2 Justification and evaluation of the project as a whole

5.2.1 Justification of renewable industry

Three submitters commented positively on the benefits on renewable energy, stating that the move away from activities such as coal mining is important to support our power needs and ensure ongoing power supplies.

Twenty-four submissions indicated that they were not supportive of renewables. Matters raised included:

- concerns about the efficacy of solar energy
- a preference for other technologies including nuclear, coal and gas
- disagreement with government policy and the "rush" to renewables
- the project is "not fit for purpose"

The project is consistent with relevant Commonwealth, State, regional and local strategic plans and polices, and the NSW Electricity Infrastructure Roadmap, which sets out the plan to deliver REZs in NSW. The strategic context of the project is set out in Section 2 of the EIS and details the strategic plans and policies applicable to the project. The project will contribute to the energy generation and storage targets for the Hunter-Central Coast REZ, with an indicative capacity of around 135 MW and storage of up to 135 MW for a two hour duration. This would boost the NSW solar generation capacity by around 7.1%[1]. The development and operation of the project, in conjunction

[1] As per Energy NSW website statistics, https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/shift-renewables/renewable-energy-nsw

with other large-scale renewable energy projects, will contribute to filling the need for replacement power as ageing coal-fired generators close.

According to its base case (step change) scenario in the 2022 Integrated System Plan (2022 ISP) (AEMO 2022), the Australian Energy Market Operator (AEMO) expects all of NSW's coal fired generation capacity (approximately 8,000 MW) to retire by 2040 (AEMO 2022). AEMO notes that coal fired generation capacity is withdrawing faster than announced with 60% of capacity likely to be withdrawn by 2030. Coal-fired generators are continuing to bring forward their withdrawal from the market – potentially by up to seven years to 2025 in the case of the Eraring Power Station (AEMO 2022). Without coal fired power, a nine-fold increase in utility-scale variable renewable capacity will be required to meet demand.

Solar photovoltaic systems are a well-established technology with over 20 major large-scale solar farms in NSW. The *Integrated Systems Plan 2022* (ISP 2022) (AEMO 2022) states that a mix of solar and wind power is required across the NEM to reduce the need for firming and dispatchable resources and to reduce the volatility associated with a weather-powered energy system. It is acknowledged that solar power alone will not provide sufficient generating capacity for the NEM, hence the mix of renewables that are being explored across the state.

Nuclear power stations are prohibited in Australia by two pieces of Commonwealth legislation, the *Australian Radiation Protection and Nuclear Safety Act 1998* and the *Environment Protection and Biodiversity Conservation Act 1999.*

5.2.2 Life cycle analysis, greenhouse gas emissions, and mining of rare earth minerals

Nine submissions raised concerns about the life cycle analysis of solar panels and batteries such as the embedded cost of the manufacture, transport, decommissioning and disposal. Concerns were raised that the EIS does not adequately detail the greenhouse gas emissions (CO2 equivalent) through the lifetime of the project. Concerns were also raised about the mining required for the rare earth minerals and metals required for the manufacture of solar panels and batteries.

While all sources of electricity result in some greenhouse gas emissions over their lifetime, renewable energy sources have substantially fewer emissions than fossil fuel-fired power plants (World Resources Institute, 2020). Most of the lifecycle emissions from fossil generators occur from fuel combustion, which occurs at a high level throughout operations. Conversely, while the manufacture of solar panels requires substantial amounts of energy, studies have found that they offset the energy consumed in production within about two years of operation, depending on the module type (World Resources Institute, 2020). The World Nuclear Association conducted a comparison of lifecycle greenhouse gas emissions of various electricity generation sources (World Nuclear Association 2011), which included the review of a large number of studies conducted by government agencies, universities and industry associations. The key outcome of the study is shown graphically in Figure 5.1, which identifies that renewable energy generation (solar and wind) produced significantly lower lifecycle greenhouse gas emissions compared with alternatives such as coal, oil and natural gas.

All power generation technologies, regardless of whether they are renewable such as wind and solar, or fossil fuel based technologies such as coal plants and gas plants, require resources to be mined and extracted for the manufacture of the required equipment (e.g. steel for the boilers and concrete for the cooling towers in a coal plant). A full comparison of the lifecycle resource requirements of these different technologies is outside of the scope of the EIS and is not a planning consideration under the NSW planning framework.

With respect to climate change and greenhouse gas emissions, the project will contribute to the security of renewable energy supply in NSW, supporting the Commonwealth and State governments in achieving their respective renewable energy and greenhouse gas emissions reduction targets. Once operational, the project will avoid approximately 7.6 Mt (CO2e) of greenhouse gas emissions over its operational life.

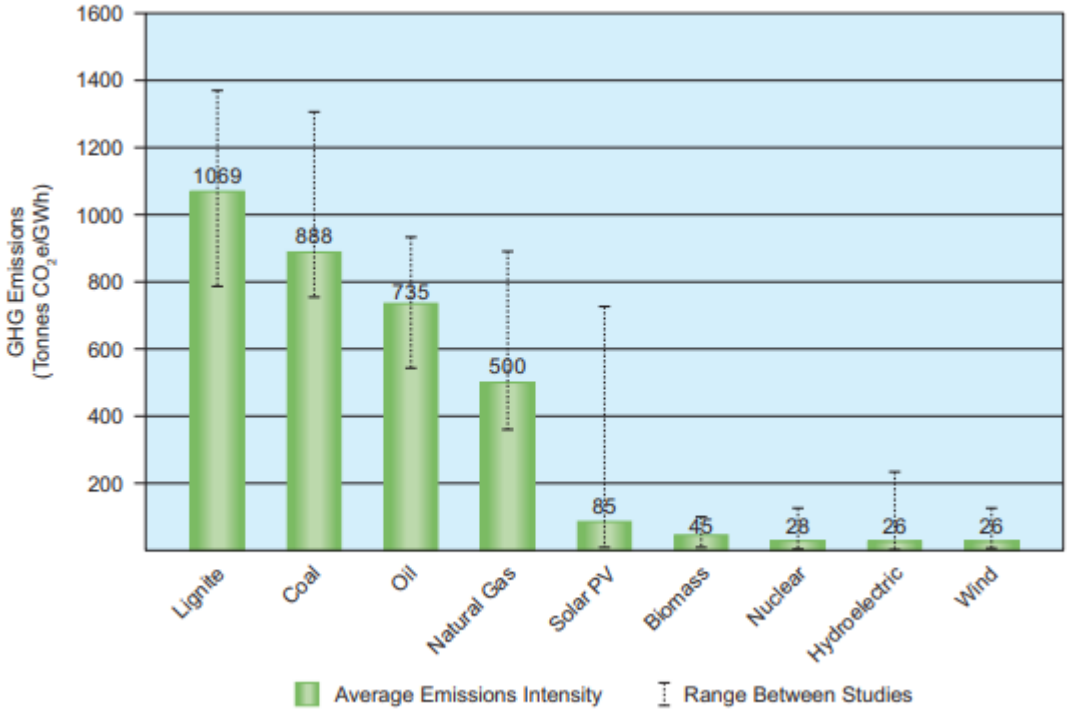


Figure 5.1 Life cycle greenhouse gas emissions comparison

Source: World Nuclear Association 2011

5.2.3 Principle of ecologically sustainable development

One submission raised concerns about the principles of ecologically sustainable development (ESD). In particular, the submitter raised concerns regarding the life cycle of PV panels and their disposal, decommissioning and rehabilitation, loss of agricultural land, local economic impacts, and erosion and runoff.

All SSD projects in NSW must consider the principle of ecologically sustainable development (ESD). The principles of ESD are outlined in part 8, division 5, Section 193 of the EP&A Regulation and are addressed in Section 7.7 of the EIS.

In relation to the specific concerns raised with respect to these principles, these have been addressed in the following sections:

- life cycle of PV panels – Section 5.2.2
- disposal of PV panels – Section 5.4.7
- decommissioning and rehabilitation – Section 5.1.1
- loss of agricultural land – Section 5.4.2
- local economic impacts – Section 5.4.14
- erosion and runoff – Section 5.4.25.

5.2.4 Alternative uses for the project land

One submission suggested that the land should be developed for residential purposes as a “higher and better use” of the land.

The current zoning and lot size restrictions on the project area does not allow for development of the project area into a residential estate. There are other areas in Muswellbrook already zoned for residential development that are yet to be developed. As detailed in Section 5.1.2 the land is highly suited to a solar farm.

5.3 Procedural matters

5.3.1 Quality of assessment and the assessment process

Six submissions were concerned about the quality of the assessments and the assessment process. Concerns included:

- the assessment process is not rigorous enough
- lack of independent assessment
- that the planning process blindly accepts EISs
- that DPHI should give more weight to the views of regional communities
- that project impacts are understated to achieve approval, or overstated and then reduced as a "goodwill gesture"
- assessments are 'out of date' as additional houses have been constructed since the assessments were completed.

The project is State significant development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, ESCO is seeking approval of the project through the required legal process, pursuant to the provisions under Part 4 of the EP&A Act and associated regulations and supporting guidelines.

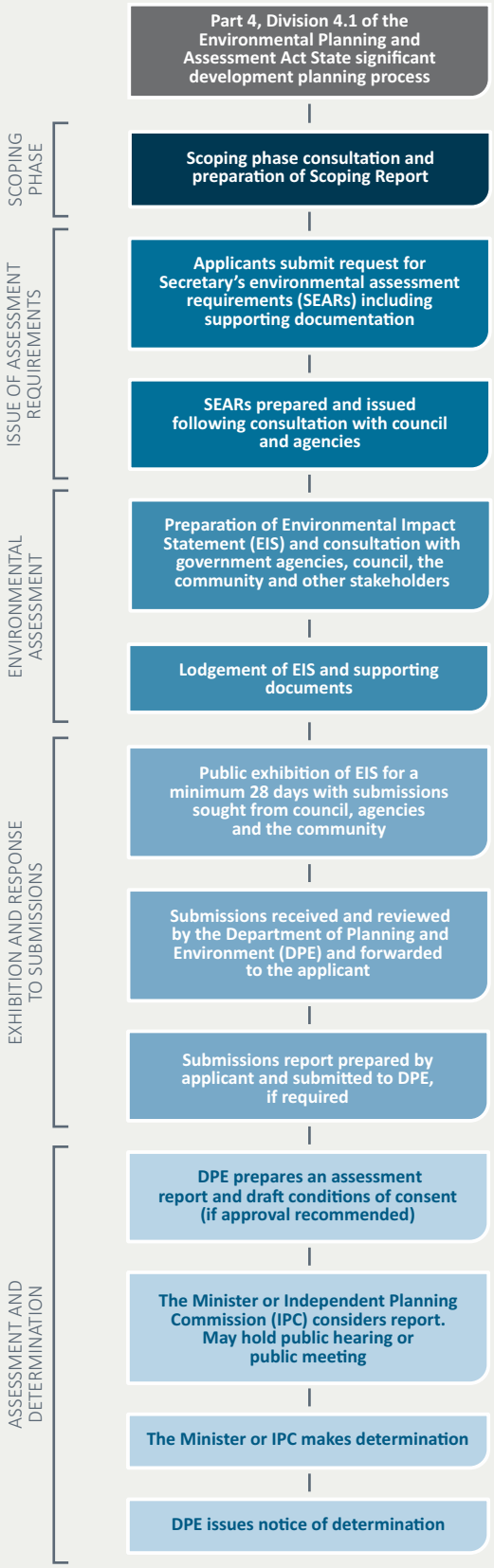
For State significant solar developments the planning process requires the applicant to prepare an Environmental Impact Statement (EIS) that details potential environment, social and economic impacts and proposed management and mitigation measures.

The EIS was prepared in general accordance with the *State significant development guidelines – preparing an environmental impact statement* (DPIE 2022c) and describes the project, the existing environment, planning considerations and the statutory context for the project, potential impacts (during construction and operation of the project), mitigation measures, residual impacts and a description of the community engagement undertaken and outcomes. It is informed by the technical assessments contained in the appendices and provides an overview of these assessments. It addresses the requirements of the SEARs issued by DPE (now DPHI) and the appended agency requirements. A summary of how the SEARs have been addressed is provided in Appendix A of the EIS. The EIS was accepted by DPE (now DPHI) as adequately addressing the SEARs.

The methodology for each of the technical assessments is provided in the corresponding reports (Appendix D to Appendix P of the EIS). In addition, consultation with key stakeholders was carried out throughout the development of the EIS, in accordance with the *Undertaking Engagement Guidelines for State Significant projects* (SSD Engagement Guidelines) (DPIE 2022d) so that stakeholders remained informed throughout the process.

It is noted that one submitter suggested that the assessments are out of date, as there are now additional houses on the street where they live. The assessment process can be a protracted process, and the local environment is constantly changing. While we do not consider that any of the assessments are out of date, additional visual assessment has been undertaken and is provided in Appendix F. An additional viewpoint has been prepared on Babbler Crescent where houses have recently been constructed and associated clearing has occurred since the initial assessment. A photomontage and assessment prepared in accordance with the Solar Guideline has concluded that the impact of the project is "low" at this viewpoint.

The project has received more than 50 objections and will now proceed to the Independent Planning Commission (IPC) for determination. The IPC is likely to hold a public meeting to hear the views of residents. The assessment process is detailed in below. Section 1.6 of the EIS outlines the purpose of the EIS document and Section 4 of the EIS describes the approval pathway.



Planning approval process for SSD

Muswellbrook Solar Farm – Approval Strategy

Figure 5.2

EMM creating opportunities

5.3.2 Adequacy of engagement

Five submissions were concerned about the engagement undertaken for the project. Concerns were raised that the engagement with neighbours was inadequate, and that engagement should be more collaborative. One submitter indicated that they were only made aware of the project in August 2023.

Idemitsu has a long-standing relationship with stakeholders and the local community from the operation of the Muswellbrook Coal Mine. Throughout the development of this project, ESCO have used a range of engagement mechanisms to consult with stakeholders including local landholders, neighbouring property owners, Muswellbrook Council, community groups and local service providers.

Engagement has been undertaken by ESCO in accordance with the requirements of the SSD Engagement Guidelines (DPE 2022c) and the project SEARs. In addition to the EIS consultation undertaken by ESCO, EMM has undertaken consultation specifically to inform the Aboriginal Cultural Heritage Assessment (ACHA) and the Social Impact Assessment (SIA). This is detailed in Section 5 of the EIS.

Idemitsu has been preparing for the closure of the Muswellbrook Coal Mine and engaging Council and regulatory stakeholders about the post mining land use since early 2021. News articles were published in October 2021 about the Muswellbrook Clean Industrial Precinct which included the solar farm.

Community engagement specific to this project commenced in May 2022 through face to face meetings, letters, website, social media, phone calls and follow up emails. This included the following main points of engagement as listed below. Numerous phone calls and emails to interested neighbours and community members has also taken place during the development of the EIS:

- A letterbox drop to 90 landowners closest to the project in May 2022.
- A project information sheet also included reference to the project website, contact details an overview of the project, the company and the development process. The key objectives were to introduce the project, introduce ESCO, and discuss any concerns.
- Phone interviews were held with four nearby residents involved in the MCC community consultative committee to further discuss the project and seek feedback.
- MCC newsletter distributed in May 2022 included information on the project.
- A letter posted to all residents within 2km in July 2022 advising Scoping Report was available on DPHI Major Projects Portal and inviting people to get in touch if they wanted to discuss the project.
- Interviews were conducted for the social impact assessment (SIA) between August and October 2022 with 15 stakeholders.
- A letter posted to all residents within 2km in February 2023 inviting them to attend the Community Session or get in touch for one on one discussions if they were unable to attend the session.
- In February 2023, a drop-in session for the project held at Muswellbrook RSL, approximately 25 people attended. The event was promoted through social media, newspapers, letters and emails.
- MCC newsletter distributed in May 2023 included information on the project.
- Photomontages were provided to a number of neighbours to the project as requested during a community drop-in session. An offer for a follow up meeting to discuss the photomontages and visual amenity in further detail was made.

Post the completion of the EIS and in preparation for lodgement of the Submissions Report, engagement has continued with the project team as detailed in Section 3.2.

5.4 The economic, environmental and social impacts of the project

5.4.1 Impacts to biodiversity and threatened species

Twenty-six submissions were concerned about habitat loss and loss of biodiversity as a result of the project. Concerns were raised about the loss of trees, loss of native habitat, disturbance to local wildlife, impacts to interconnectivity and wildlife corridors, and impacts to threatened and endangered species. One submission suggested that these impacts cannot be mitigated.

Several submissions requested an independent assessment and suggested that the assessment process failed to properly consider certain species, and inaccurate data was used in the assessment. Spotted tail quolls, koalas and regent honeyeaters were identified by several submitters as being spotted in the area, along with several other bird species.

The project area was selected in part due to its highly disturbed nature. The southern project area is characterised by degraded native grasslands and modified pasture. The northern project area has been historically disturbed and consists of regenerating even-aged regrowth. Preliminary biodiversity assessments were completed in early 2021 which identified areas of larger intact woodland which have been avoided.

While the project will result in the loss of some native vegetation and threatened species habitat, the impacts have been minimised through an avoid and minimise process which has been documented in the project BDAR (Appendix D of the EIS). Further avoidance of Box Gum Woodland has been identified to improve connectivity and this has been document in the updated BDAR (Appendix C of this report).

With respect to concerns about habitat connectivity and wildlife corridors, the development footprint has been centred around the area of least biodiversity impact with the aim to conserve connectivity values. In the southern portion of the project area, the best connectivity features within the landscape occur outside the project area along Muscle Creek and along the 4th order stream, as much of the vegetation within the project area occurs as widely scattered paddock trees with marginal connectivity. Connectivity across the landscape will still occur to the north and south of the project area. In the northern portion of the project area, connectivity will be reduced from east to west, however, connectivity corridors will still be retained on the periphery of the project area along the northern and southern boundaries.

The project will result in some unavoidable impacts to biodiversity values. The project will manage and mitigate impacts through the development of a biodiversity management plan, using measures recommended in the BDAR. Some impacts will require offsetting. The Biodiversity Offsets Scheme (BOS) was established under the *Biodiversity Conservation Act 2016* and is the framework for offsetting unavoidable impacts with biodiversity gains through landholder stewardship agreements.

A biodiversity offset strategy will be implemented for the project to ensure that all residual impacts on biodiversity of the project are appropriately offset. There are two parcels of land, adjacent to the southern portion of the development area that are currently being investigated for biodiversity stewardship agreements. The final ecosystem credit and species credit offset liability must generally be 'retired' prior to any impacts occurring.

Several submitters suggested that the BDAR failed to properly consider species and that an independent assessment is required. The BDAR was prepared in accordance with the Biodiversity Assessment Method (BAM) as required under the *NSW Biodiversity Conservation Act* 2016. The report was prepared by an accredited BAM assessor. The accreditation scheme is designed to ensure that the BAM is applied by people with appropriate ecological skills, knowledge and experience, and a demonstrated understanding of the method. The Department of Planning and Environment is responsible for accrediting assessors under the scheme. BCS has also reviewed and provided comment on the BDAR and recommendations will be made prior to the assessment of the project by the IPC.

Particular concerns were raised about the following species which several submitters identified as being present in the local area:

- Spotted-tail Quoll (*Dasyurus maculatus maculatus*, SE mainland population) – While this species was not identified by field survey, it is known to occur in the area. The project will remove up to 43.7 ha of potential habitat, however, this has been assessed as not a significant impact in accordance with the relevant guidelines (refer Section 9.2.1.7 of the BDAR).

- Koala (*Phascolarctos cinereus*) – This species was not identified by field survey, however, known 'feed' trees and 'use' trees were identified. The project will remove up to 43.7 ha of potential habitat, however, this has been assessed as not a significant impact in accordance with the relevant guidelines (refer Section 9.2.1.5 of the BDAR).

- Regent Honeyeater (*Anthochaera phrygia*) – The habitat constraints listed for Regent Honeyeater in the Threatened Biodiversity Data Collection refers to the Regent Honeyeater 'Important Area' mapping. The important area map identifies areas that are considered essential to support critical life stages such as breeding areas or locations important for foraging/over-wintering for migratory species. The development footprint is not mapped as an 'Important Area' for this species, therefore no further assessment as per BAM is required. Due to the presence of foraging habitat for the species, an assessment under the Significant Impact Criteria was undertaken and it concluded that the project is unlikely to have a significant impact on this species (refer to Section 9.2.1.3 of the BDAR).

- Brush tailed rock wallaby (*Petrogale penicillata*) – The habitat constraints listed in the Threatened Biodiversity Data Collection for this species are "Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or clifflines". None of these habitat features are present in the development footprint or within 1 km. Due to the lack of habitat features required by this species, the Brush-tailed Rock-wallaby was removed from further assessment. No Brush-tailed Rock-wallaby were observed during any of the targeted surveys completed to date.

- Brush-tailed Phascogale (*Phascogale tapoatafa*) – This species was identified by field survey in the southern portion of the development footprint. The project will remove up to 18.2 ha of potential habitat which will be offset, and additional mitigation measures have been included to limit impacts such as scheduling works to avoid critical life cycle events.

- Grey-headed Flying Fox (*Pteropus poliocephalus*) – This species was identified by observation. No breeding camps were identified within the development footprint during the habitat assessment. Due to the presence of foraging habitat for the species, and the observation of the species flying over the project area at dusk, an assessment under the Significant Impact Criteria was undertaken and it concluded that the project is unlikely to have a significant impact on this species (refer to Section 9.2.1.4 of the BDAR).

- Australian Black Swan (*Cygnus atratus*), Red-necked Wallaby (*Notamacropus rufogriseus*) and Little Grebe (*Tachybaptus ruficollis*) are not listed threatened species and have not been specifically assessed in accordance with the BAM. General avoidance and minimisation of impacts on biodiversity values has been a key part of the project design and this is discussed in Section 5 of the BDAR (Appendix C of this report).

5.4.2 Impacts to agricultural land

Twenty-three submissions were concerned about the loss agricultural land. Concerns were raised that solar farms take away prime or valuable agricultural land, that the loss of this land threatens livelihoods, and results in a loss to food security.

A land, soils, and erosion assessment (EMM 2023e) (Appendix H of the EIS), and an agricultural impact assessment (Minesoils 2023) (Appendix I of the EIS) were prepared for the project and are summarised in Section 6.5 of the EIS. These assessments were completed in accordance with the NSW *Large-Scale Solar Energy Guideline* (DPE 2022a) and determined that the project does not occupy land defined as 'prime agricultural land'. The NSW Solar Guidelines notes the following regarding renewable areas:

> The Australian Energy Market Operator estimates that NSW will need approximately 20,000 MW of large scale solar generation by 2050. This would require approximately 40,000 ha of land or only 0.06% of rural land in NSW. Even in the highly unlikely scenario that all of NSW's solar generation were located on important agricultural land (this land covers around 13.8% of the state and is 6 to 7 times more agriculturally productive than the remaining 86.2% of the state) only 0.4% of this land would be required.

The land occupied by the project is categorised as LSC Class 4, or moderate capability land, with small portions of LSC Class 5 (low-moderate capability land) and LSC Class 6 (low capability land), in accordance with the *Land and Soil Capability Assessment Scheme* (OEH 2012). The project is not located on biophysical strategic agricultural land (BSAL).

At the time of reporting, the southern area of the project area is primarily used for cattle grazing and is characterised by degraded native grasslands and modified pastures with widely scattered remnant paddock trees. Livestock are grazed on rotation for breeding and fattening and are watered through surface dams or pumped in water. No additional feeding is carried out.

The NSW Department of Primary Industries (2019) Gross Margin Budgets for Livestock was used to provide a broad estimation of the productivity of the land for cattle grazing within the project area. The impacts on agriculture as a result of the project are determined to be minimal, temporary, and limited to the project area. These impacts can be summarised as the following:

- temporary removal of 482 ha from agricultural land use within the project area
- temporary removal of potential agricultural primary productivity (feeder steers and growing-out steers) to the estimated value of $83,759 to $198,562 per annum per year of project life
- temporary removal of potential agricultural secondary productivity (for example, agronomy services, machine sales, grain and livestock transport, fencing and other contractors) to the estimated value of $182,494 to $432,627 per annum per year of project life
- temporary impacts on soil resources within the project area where surface disturbance occurs.

In addition to the agricultural impact assessment, an economic assessment was prepared for the project which included consideration of the employment from agriculture. The assessment concluded that there would be a temporary loss of employment in agriculture of 1-2.5 full time equivalent (FTE) jobs directly, with 2.2-5.4 FTE jobs lost across the supply chain. This would be mitigated by the 8.5 FTE local jobs required for the operation of the project.

The majority of the land within the development footprint is not suitable for high-impact land uses such as cultivated cropping or intensive grazing, and therefore the use of the land for a solar project (with or without co-existent grazing) would not remove significant amounts of land from intensive primary production. The impacts noted above have not considered the potential for the land to be used for Agrisolar.

A decommissioning and rehabilitation plan will ensure the land can be successfully returned to agricultural production following decommissioning.

5.4.3 Visual impacts to properties, neighbourhood, and landscape

Twenty submissions commented on the potential visual impact of the project to their properties and neighbourhood. Comments included:

- Concern around general visual amenity impact, "industrialisation" of a natural setting
- Concerns that neighbourhood aesthetics will be impacted
- Solar panels create unsightly views from homes, ruining the rural visual landscape
- Disputing the "low" visual impact ratings from the visual impact assessment.
- Comments that fencing and screening take years to be effective.

It is acknowledged that the project will introduce new infrastructure elements into the landscape. As detailed in the visual impact assessment (Appendix F of the EIS), the project design has responded to project impacts and been modified in several ways, including developing exclusion areas to preserve high quality vegetation, siting project transmission infrastructure in areas with existing infrastructure, including low lying areas with lower visibility in preference to areas higher on slopes, preserving vegetation along watercourses and higher slopes, and locating the BESS and substation infrastructure centrally to minimise visibility.

The visual impact assessment included a detailed assessment of the visual catchment, which identified areas where there is the potential for a direct line of sight to the project. The visual catchment was identified using two methods:

- a digital elevation model, to identify areas that would not be screened by existing landform
- a digital surface model, which includes landform and vegetation to show areas that would not be screened by landform or trees.

The visual catchment model identified that the topography of the region limits opportunities to see the project in its entirety, that views from the north to the project would have partial views, and that views from the south would likely include a larger number of project elements. The screening effect of the trees located along roads, along Muscle Creek and other waterways and along property boundary lines surrounding the site, would restrict and filter views.

With respect to the potential impacts to residences, the methodology supporting the selection of viewpoints and the assessment of the visual impact rating is described in Appendix F of the EIS. The methodology adheres to the NSW guidelines:

- *Large-Scale Solar Energy Guideline* (DPE 2022a) (Solar Guideline)
- *Technical Supplement – Landscape and Visual Impact Assessment* (DPE 2022b) (Technical Supplement).

Nine representative viewpoints were selected in the EIS phase of the project. An additional viewpoint has been assessed as part of this Submissions phase in response to comments and is available in Appendix F.

The visual impact assessment acknowledges that some infrastructure from the project may be visible to varying degrees from the viewpoints assessed, however, based on topography and the presence of vegetation and the size of the infrastructure, the assessment predicts:

- very low to low visual impact from all viewpoints (ten representative viewpoints selected)
- no impact to low visual impacts for all residences within 4 km
- no requirement for screening mitigation measures.

In accordance with the guidelines, screening or other mitigation is not required where a "low" visual impact rating is identified.

5.4.4 Fire risk

Twenty submissions were concerned that a solar farm and BESS would increase the risk of fire for the local area. Comments are summarised as follows:

- Concerns were raised that the project does not adequately address the fire risk
- Queries around what mitigation measures will be employed.
- Residents of Woodland Ridge raised concerns that there is only one access road to the estate.
- Concern that a bush fire risk assessment has not been done
- Concern that there are not enough local resources to fight fires

The project area is mapped as Vegetation Category 1 and Vegetation Category 2 bushfire prone vegetation and associated buffers. Much of the project area is cleared, partially cleared and managed, with remaining vegetation classified as a mix of grassy woodland and grassland. The Fire Danger Index for the region is 100.

A bushfire strategic study was conducted for the project by Cool Burn Pty Ltd (Appendix N of the EIS). The guideline *Planning for Bush Fire Protection 2019* (NSW Rural Fire Service 2019) was considered in the preparation of the bushfire assessment. Mitigation measures have been identified to minimise the chance of bushfire ignition due to the project, and to reduce the severity of potential impacts if a bushfire occurs within the site. With the application of these mitigation measures, bushfire risk will be reduced to an acceptable level and comply with the aims, objectives and specific performance criteria of the Rural Fire Service's *Planning for Bushfire Protection 2019*.

With regards to fire risk from the project infrastructure, a preliminary hazard analysis was conducted for the project by Sherpa Consulting (Appendix M of the EIS), which included an analysis of the severity of the consequences for fire in accordance with the following guidelines:

- *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DoP 2011a) (Hazardous and Offensive Development Guideline)
- *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 Hazard Analysis and Multi-Level Risk Assessment* (DoP 2011b)
- *HIPAP No. 4 Risk Criteria for Land Use Safety Planning* (DoP 2011c).

The hazards risk assessment identified that fire hazards are unlikely to have a significant offsite impact. The detailed design for the project will be conducted in accordance with the relevant standards and guidelines for hazardous industry, which specify strict separation distances to onsite and off-site receptors to prevent fire propagation.

Notwithstanding this, ESCO has committed to preparing a comprehensive Fire Safety Study, an Emergency Plan, an Emergency Services Information Package, and an Emergency Responders Induction Package, which would meet the operational requirements of Fire and Rescue NSW (see Section 4.1 of this report). It is envisaged that the requirement for a fire safety study and fire management plan would comprise conditions of consent for the project and therefore the project would not proceed without endorsement of these documents from Fire and Rescue NSW.

ESCO would be required to hold third party liability insurance throughout operation of the project.

5.4.5 Human health impacts

Seventeen submissions were concerned about the projects impacts to human health:

- Low frequency electromagnetic frequency (EMF)
- Heavy metals
- Toxic fumes from fire, chemical leaks
- Herbicides and pesticides
- Heat transmission from solar panels

Note: contamination of land and water is addressed in Section 5.4.8.

i EMF

A Preliminary Hazard Assessment (PHA) was prepared for the project (Appendix M) and summarised in Section 6.9 of the EIS. The PHA identified a range of potential hazards and risks, their likelihood of occurrence and potential severity, as well as measures to mitigate risk.

The assessment concluded that EMFs created from the project will not exceed the International Commission on Non-Ionising Radiation Protection (ICNIRP) reference level for exposure to the general public, and that the impact to the general public in surrounding areas will be negligible.

The design and typical exposure levels to EMFs for the proposed project infrastructure has been assessed against the ICNIRP's (1998) *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields*. Several controls to reduce the potential for EMFs have been identified and implemented in the project design, including standard solar PV plant characteristics such as inverters housed in shipping containers or steel cabinets.

ii Heavy metals, toxic fumes and chemical leaks

The PV modules will most likely use polycrystalline or monocrystalline wafer technology. Modern crystalline solar panels of the type that will be used for the project do not contain heavy metals.

The monocrystalline or polycrystalline PV panels will meet all the relevant international and domestic standards. Solar panel production, installation and performance will be closely monitored. The modules are not anticipated to physically degrade over the project's lifetime and are accompanied with a manufacturer warranty. There is a negligible likelihood of the photovoltaic modules releasing any toxic material.

The grid connection and array collector substations and batteries within the BESS may contain some heavy metals or other potential contaminants (e.g. nickel, manganese, cobalt, iron, copper). Similar to the PV panels, this equipment will be manufactured by reputable manufacturers meeting all relevant international and domestic standards. The substation and BESS facilities will be designed and constructed to incorporate sufficient bunding/storage capacity to contain spills.

In relation to the BESS, there are appropriate measures in place to ensure the chemicals within the battery cells are contained and will not contaminate the surrounding environment. These measures include:

- An energy management system, which monitors the health of the BESS down to a cell level, ensuring the system is operated in a safe manner.
- Gas and temperature sensors, which monitor the enclosures and will detect any abnormalities.
- Fire suppression systems as part of the enclosures.
- Multiple levels of physical separation between chemicals within the cells and the environment (i.e. the cells will be housed within a module, which will likely be stacked in an enclosure).

Appropriate spill prevention and management measures will be developed as part of the project's construction environmental management plan (CEMP), which will include spill clean-up procedures which would be implemented during construction and throughout the project's operations.

The PHA also considered an assessment of toxic combustion products resulting from BESS or other infrastructure fires, as well as chemical leaks. The PHA outlines the mitigation and control measures that will mitigate risks of such events including uses of equipment and systems that are designed and tested to Australian standards and guidelines, preventative maintenance, fault detection and shut-off systems, and management plans. The controls of the PHA are included as a mitigation measure and commitment of the project.

iii Herbicides and pesticides

Use of herbicides and pesticides may occur during routine maintenance in the operational phase of the project. These chemicals will only be used in accordance with the manufacturers guidelines and use will be localised. No offsite impacts expected.

iv Heat transmission

Solar PV panels are designed to capture the energy of sunlight and transform it into electricity, however, there is potential for heat island impacts, or 'micro-climate' impacts, whereby the installation of solar farms potentially alter the solar reflectivity (albedo) of the ground surface and heat up an area.

Barron-Gafford (2018) provided a Statement of Evidence to the Victorian Planning Panel on solar heat islanding issues. The statement provided a review of literature regarding solar heat island effects and concluded that while solar farms can create a heat island effect, the spatial extent of the effect is constrained (Yang et al. 2017, Fthenakis and Yu 2013, Barron-Gafford et al. 2016).

The heat island effect is largely driven by the absence of vegetation, and colocation of vegetative grasses within a solar array reduces the heat island effect. The statement identified that heat island effect was indistinguishable from air temperatures over native vegetation when measured at a distance of 30 m from the edge of the solar panel array.

While there will be bulk earthworks across the development footprint during the construction phase of the project, the areas beneath the solar panels would be revegetated which has been shown to reduce heat island effects. In addition, vegetation will be retained around the solar farm along waterways and roads which will also mitigate heat island effects. The closest residences to the project are at least 230 m from the project boundary. As such, heat island impacts are not expected to impact nearby residences or their gardens.

5.4.6 Property values

Sixteen submissions were concerned that the proximity of a solar farm to their property would decrease their property values.

A wide range of factors affect property values over time, including factors at an individual property, local, regional and macroeconomic level. There is no significant research on the impact of renewable energy infrastructure on neighbouring property values in an Australian setting. The most relevant research available demonstrates that renewable energy facilities, such as wind farms and solar farms, have a negligible impact on property prices.

Research has been undertaken in the USA and Canada on the impact of solar farms (Al-Hamoodah et al. 2018; CohnReznick 2018) and wind farms (Hoen et al. 2009; Hoen et al. 2013; Vyn and McCullough 2014). Al-Hamoodah et al. (2018) researched the impact of utility-scale solar installations on the value of nearby homes in the USA. They surveyed 37 property assessors in relevant locations on the potential impacts of utility-scale solar farms on property values within 3 miles (4.8 km) of the installation. The survey considered installation size, distance from the solar installation, size and height of the photovoltaic modules and presence of fencing or visual barriers. The

research indicated that proximity to a utility-scale solar installation had no impact on home values (Al-Hamoodah et al. 2018).

CohnReznick (2018), a valuation advisory service, undertook a property value impact study in the USA. This study analysed the impact of eight solar farms in Illinois, Indiana and Minnesota on the sales of adjoining properties, compared to the sales of comparable properties not located near a solar farm. This study found that there was little to no measurable and consistent difference in property values between those located adjacent to a solar farm and those not located near a solar farm. The study concluded that property values were not adversely affected by their proximity to a solar farm (CohnReznick 2018).

In addition, the project is within the REZ, which has a potential to attract new residents as the workforce grows with the development of renewable energy projects, which may in turn increase values of properties in the region.

5.4.7 Waste disposal and recycling

Fifteen submissions were concerned about waste disposal and the recycling of PV panels. There was concern about the panels ending up in landfill, that panels contain hazardous substances, and that panels cannot be recycled.

Solar panels are made primarily from glass, silicon, and various metals. The vast majority of materials in a solar panel can be recycled. As stated in the EIS, wherever possible, efforts will be made to recycle project infrastructure and reduce the amount going to landfill in line with best-practice sustainability principles. It is anticipated that at the time of decommissioning, there will be significantly more recycling options available within Australia as more solar farms near the end of their life.

A waste management plan (Appendix G) has been prepared for the project in accordance with the Solar Guideline, and this will be updated prior to construction and decommissioning to ensure that best practice principles are followed.

The Clean Energy Council has noted the following national solar PV recycling research projects/funding taking place (CEC 2020):

- The NSW Government has committed $10M to boost solar panel recycling.
- Researchers at Deakin University are working to develop a solar panel recycling solution to recycle silicon.
- A total of $15.14 million has been awarded through the Australian Renewable Energy Agency (ARENA) to support research teams at six Australian universities. The two-year R&D projects will support solar PV in the following areas:
    - Improvements to cost-effectiveness of silicon-based panels
    - Increasing cost-effectiveness of silicon-based solar PV through use of tandem materials
    - Development of new materials for cost-efficiency purposes or new deployment applications
    - New solutions, including upfront solar PV panel designs and end of life processing, that increase the cost-effectiveness of sustainable end-of-life management of solar PV panels.

5.4.8 Contamination

Twelve submissions raised concerned about contamination of land and/or water. Concerns were raised about chemical leaching, and heavy metal contamination into soils and water, over the long term or after damage to panels from hail or fire. Leaks from the substation and power transformers was also raised as a concern.

As identified in Section 5.4.5, modern crystalline solar panels of the type that will be used for the project do not contain heavy metals. The modules are not anticipated to physically degrade over the project's lifetime and are accompanied with a manufacturer's warranty. There is a negligible likelihood of the photovoltaic modules releasing any toxic material.

The substation and BESS facilities will be designed and constructed to incorporate sufficient bunding/storage capacity to contain spills and will be elevated above surface level on concrete pads. As such, the infrastructure will not come into direct contact with soils and contamination is not anticipated.

The construction environmental management plan (CEMP) and operational environmental management plan (OEMP) for the project will include procedures for the storage and handling of fuels and waste, as well as a spill management procedure. A project decommissioning and rehabilitation plan will be prepared prior to the end of the project's operational life and will include rehabilitation objectives and strategies for returning the development footprint to agricultural production.

5.4.9 Ethical sourcing of materials

Eleven submissions raised concerned about the ethical sourcing of materials for the project, noting that panels may be made with forced or slave labour, or child labour.

OX2 is committed to environmental social governance and ethical business conduct, which is demonstrated by the following:

- OX2 is a committed participant in the United Nations Global Compact, a strategic policy initiative with principles focussed on human rights, labour, environmental and anti-corruption. These principles are incorporated in OX2's Sustainability Governance Policy and Code of Conduct seeking to prohibit direct or indirect involvement in activities involving exploitative, forced, or child labour, and human rights violations.
- OX2 have zero tolerance for child labour, forced labour and human trafficking and our Supplier Code of Conduct supports recognized global guidelines. The purpose of the Code is to define the basic sustainability requirements placed on OX2's Suppliers. The requirements are based on the UN Global Compact, the UN Guiding Principles for Business and Human Rights and the OECD Guidelines for Multinational Enterprises. The Code also reflects OX2's Values and Code of Conduct.
- OX2 has a zero-tolerance approach towards corruption as outlined in the Policy Against Corruption. We are committed to act professionally, fairly and with integrity in all our business dealings and relationships wherever we operate. We are committed to implement and enforce effective systems to counter corruption.
- OX2 is a member of the Clean Energy Council, a consortium of renewable energy industry leaders in Australia.

The Commonwealth Modern Slavey Act 2018 requires entities based, or operating in, Australia, which have an annual consolidated revenue of more than $100 million, to report annually on the risks of modern slavey in their operations and supply chains, and actions to address those risks. Other entities based, or operating, in Australia may report voluntarily.

5.4.10 Cumulative impacts

Eight submissions raised concerned about the cumulative impact the project will contribute to in the local area. The concerns raised regarding cumulative impacts included:

- landscape character and visual impact
- amenity impact – noise, dust, traffic congestion
- water usage
- duration of construction for all projects and continued developed in the REZ
- social impacts (community and mental wellbeing)
- loss of prime agricultural land
- demands on accommodation and services
- impact on tourism.

As part of the EIS for this project, a cumulative impact assessment was undertaken with reference to the *Cumulative Impact Assessment Guidelines for State Significant Projects (DPE 2022e)*. Future projects (proposed, approved, under construction and operational) which may plausibly contribute to cumulative impacts alongside the project were identified through a screening process, the results of which are included in Section 6.13 of the EIS. Like many of the future renewable energy projects in the Hunter-Central Coast REZ, the ongoing impacts from operation of the project are expected to be minimal in comparison to construction impacts. Therefore, cumulative impacts have been considered primarily in relation to potential overlaps in construction phases.

The likely cumulative impacts between the project and each of the identified developments with potential construction phase overlap was assessed for four key aspects, which are considered to be the most susceptible to cumulative impacts - namely workforce demand and supply, housing and short term accommodation, traffic and transport, and amenity (including visual and noise).

The closest potential developments to the project include:

- the proposed Muswellbrook Pumped Hydro project, located adjacent to the project area
- the approved Muswellbrook Bypass, located adjacent to the project area
- the approved Hunter Gas Pipeline, located adjacent to the project area
- the approved Muswellbrook Battery Energy Storage Project, located 1.5 km to the west of the project area
- the proposed Liddell Battery and Bayswater Ancillary Works Project, located 10 km south of the project area
- the proposed Bowmans Creek Windfarm, located 14 km west of the project area
- the proposed Focono Quarry, located 15 km south-east of the project area
- operational coal mines in the local area.

An overview of the key findings for each of the assessed matters is as follows:

- **Visual amenity** – Visual impacts from the development of multiple projects that may have a low impact individually, but when viewed together, can have an increased visual impact on the landscape. The Landscape and Visual Impact Assessment (Appendix F of the EIS) has considered the potential for cumulative visual impacts. The Muswellbrook Pumped Hydro project has the potential to introduce increased visible infrastructure for residents north of the project. The visual impacts from the project, including the cumulative impacts, and associated mitigation measures will be assessed as part of the

Muswellbrook Pumped Hydro EIS. The Muswellbrook Bypass construction may coincide with the construction of the solar farm, and there is likely to be increased visual impacts for residents surrounding the southern array. Transport for NSW has advised that there is uncertainty around timing of the construction of the Bypass. The Bypass is likely to screen the solar infrastructure from the west and increase the total visual impact from areas to the east and south of the southern solar array. The Muswellbrook Bypass project has included vegetative screening to mitigate visual impacts. No cumulative visual impacts are anticipated from the Muswellbrook BESS and Bowmans Creek Wind Farm.

- **Traffic and transport** – Development in vicinity of the project has the potential to generate cumulative traffic impacts with the project. The greatest potential for cumulative impacts with the proposal are associated with construction of the Muswellbrook Bypass and the Muswellbrook BESS. These projects are expected to require heavy vehicle movements during construction and would use the New England Highway, Muscle Creek Road and Sandy Creek Road. Since the submission of the EIS, Transport for NSW has advised that there is uncertainty as to the timing of the construction of the Bypass. An addendum Traffic Impact Assessment (Appendix E) has been prepared and considers the potential impacts with and without the Muswellbrook Bypass. The intersection analysis of key intersections in Muswellbrook and the midblock capacity of Muscle Creek Road and Sandy Creek Road indicate that there will not be significant impacts to these intersections and roads as a result of construction traffic. Scheduling construction traffic peak times outside of the network peak times will reduce impacts to the road network. Engagement with the Hunter Gas Pipeline project team has identified that local road access and vehicle numbers are not known at the time of reporting. No published information is available for the Muswellbrook Pumped Hydro Project which will conduct its own cumulative impact assessment with consideration of these projects.

- **Noise and vibration** - Cumulative noise modelling was undertaken as part of the Noise and Vibration Impact Assessment (Appendix L of the EIS) and considered the Muswellbrook Bypass and Muswellbrook BESS projects which may have overlapping construction timeframes for which there is published noise assessments. The cumulative noise assessment concluded that there would be no exceedances of the ICNG affected or highly affected NML. Consultation between ESCO, Firm Power (the owner of the Muswellbrook BESS) and Transport for NSW (the owner of Muswellbrook Bypass) will be undertaken when necessary to manage potential noise impacts at nearby assessment locations in accordance with the *Interim Construction Noise Guideline* (Department of Environment and Climate Change 2009).

- **Workforce demand and supply** – The employment demands for the future projects identified may cause potential impacts on the availability of skilled workforce in the local area, should construction periods overlap substantially. This may require additional workers to be sourced from outside the local and regional areas. The potential of a non-resident and relocating workforce to service the concurrent developments may contribute to the cumulative impacts in the local area. This may result in impacts on the capacity and availability of local service providers, accommodation providers and increased traffic. However, potential cumulative benefits may also be associated with the high number of SSD projects in the local area, such as increased employment and economic opportunities for local businesses and suppliers. ESCO has prepared an Accommodation and Employment Strategy (Appendix P of the EIS) which will be updated with contemporary information closer to the construction phase of the project, to ensure that it remains relevant. The Strategy provides a commitment to local hiring and provision of training and apprenticeship opportunities with the aim of reducing the need for outsourcing of workers. Local employment strategies have been developed with an evaluation and monitoring framework with key performance indicators/targets.

Housing and short term accommodation – The availability of rental and short-term accommodation in the local and regional study areas is constrained. The demand for temporary accommodation in the regional area has been highlighted by both Singleton and Muswellbrook Council and the local area has limited capacity to absorb the housing demand generated by construction projects of multiple SSD projects. The Accommodation and Employment Strategy includes an analysis of available housing and short-term accommodation in Muswellbrook and surrounding towns. A detailed review would be undertaken closer to construction to determine the level of current workforce being accommodated in the region on projects which have already begun construction and how this is impacting occupancy rates. The strategy will also consider seasonal tourism demands and seek to minimise impacts on the tourism industry. Discussions are currently underway with Brightlands Living, an accommodation provider in Muswellbrook to utilise a proposed facility close to town.

Other issues raised by submitters in relation to cumulative impact concerns are addressed as follows:

- **Social** - The large-scale and expansive nature of the Hunter-Central Coast REZ will mean that cumulative social impacts are unavoidable to some extent and should be combatted at a policy level. The NSW Government and EnergyCo have an important role to play in terms of ensuring a coordinated and strategic approach is taken to addressing many of the cumulative impacts. ESCO will address the potential cumulative impacts of the project through the implementation of a variety of measures, such as compliance with its accommodation plan as developed in consultation with Muswellbrook Shire Council.

- **Prime agricultural land** - As stated in Section 5.4.2, the project does not occupy prime agricultural land and the project area may continue to be utilised for agriculture (grazing) per its capability. Therefore, the project is not expected to contribute to cumulative impacts with respect to agriculture.

- **Water demands and impacts** – Section 3.3.3 of the EIS outlines the water requirements and proposed water sources for the project. Non-potable water demands for the project during both construction and operation will be sourced from existing water access licences currently owned by MCC. During operations, approximately 18 kL of water per day, or around 6.6 ML per year will be required for ongoing maintenance, cleaning of the PV modules, vegetation management, amenities and fire protection. Operational water use will be serviced by a combination of potable water and/or rainwater and licenced groundwater take. Potable water would be sourced from an appropriately licensed facility, trucked in and stored in tanks.

- **Ongoing development in the REZ** – It is acknowledged that the project is situated near other proposed developments such as the Muswellbrook Bypass, Muswellbrook BESS, the Hunter Gas Pipeline, and the Muswellbrook Pumped Hydro project. Bowmans Creek Windfarm was also mentioned in one submission, however this is over 14 km from the project area. As the wider area is now a designated REZ, additional renewable developments are considered likely. As the infrastructure planner for the Hunter-Central Coast REZ, EnergyCo is responsible for coordinating private sector investment from solar, wind and storage projects as well as planning new transmission infrastructure in the REZ. EnergyCo will continue to engage closely with the local community, industry, local government and other stakeholders as the design and delivery of the REZ progresses.

5.4.11 Increased traffic and road damage

Five submissions raised concerned about the increased traffic causing congestion, heavy vehicles on local roads causing damage to roads, interactions with school buses, and increased risk of accidents.

Impacts on road infrastructure are described in Section 6.7 of the EIS and Appendix K of the EIS.

i Increased traffic

Intersection performance analyses was completed for five major intersections in Muswellbrook along the New England Highway. The assessment included a baseline assessment, consideration of future background traffic growth plus project construction traffic, and a cumulative assessment including construction traffic from nearby developments. For all intersections and all scenarios, the worst level of service (LOS) is a B (good operation with acceptable delays and some spare capacity).

The mid-block analyses were completed for Muscle Creek Road and Sandy Creek Road for baseline and cumulative scenarios. A mid-block analyses assesses the capacity of a road based on a vehicles average travel speed. Muscle Creek Road is expected to operate at LOS A in the baseline traffic scenario and at LOS C in the cumulative traffic scenario. Sandy Creek Road is expected to operate at LOS A in the baseline traffic scenario and at LOS B in the cumulative traffic scenario. The LOS C is considered to be a satisfactory condition for traffic flow but is only expected to be experienced in the AM and PM peak hours during the construction period. At other times of the day, the LOS would be better than C. The reduction in the LOS (by one or two levels) is only for the duration of the period of peak construction activity. When the project construction work has been completed, the LOS will return to the baseline traffic conditions.

The construction traffic for the project is not expected to adversely affect the intersection and mid-block performance of the surrounding road network.

ii Road damage

Impacts on road infrastructure are predominantly expected to be limited to construction and are not expected to be significant following the implementation of the intersection upgrade and mitigation measures detailed in Section 6.7 of the EIS.

ESCO has committed to ensuring that its contractors for the construction of the project prepare and implement a construction traffic management plan (CTMP) and Driver Code of Conduct. ESCO or its contractors will undertake dilapidation surveys of the proposed vehicle routes to assess the condition of the roads so that they are not left in a worse condition as a result of the project.

The lead EPC contractor(s) appointed by ESCO will also implement a road maintenance program for the affected local roads during construction of the project. The program will be based around regular inspections of Sandy Creek Road and Muscle Creek Road and may include items such as:

- regrading of the road surface to repair potholes and road corrugations at regular intervals and in response to identified serviceability and safety concerns; and
- a commitment by ESCO or its contractors to restore the road surfaces to their pre-construction condition at the completion of construction.

The road maintenance program will be prepared in consultation with Muswellbrook Shire Council and its effectiveness will be reviewed during the construction period.

iii Road safety

Implementation of the mitigation measures described in the EIS will reduce potential impacts to road safety. These may include traffic management on Muscle Creek Road and Sandy Creek Road, and development of a TMP and Driver Code of Conduct in consultation with Transport for NSW and Muswellbrook Shire Council.

The TMP will include specific safety initiatives for transport through residential areas and the scheduling of project deliveries to avoid peak hours and school bus times. The Driver Code of Conduct will also include safety-specific tips and guidelines.

There are school bus routes passing along Muscle Creek Road and Sandy Creek Road. School buses will be avoided on Sandy Creek Road as there is a timing restriction on the road for the use of heavy vehicles during school bus operating hours. For both roads, light vehicles will avoid school buses as they are expected to arrive and depart outside of school bus operating hours. Some heavy vehicles may use Muscle Creek Road during school bus operating hours. The CTMP will include specific safety initiatives for transport through residential areas and the scheduling of project deliveries to avoid peak hours and school bus times, as far as practicable. The Driver Code of Conduct will also include safety-specific tips and guidelines.

5.4.12 Mental health and wellbeing

Five submissions raised concerned about the mental health and wellbeing of the community, particularly related to the stress and anxiety caused by a new development.

ESCO acknowledges that the planning and development stage of any major project can cause stress for local communities and landholders, especially associated with uncertainty over the project's potential impacts.

Studies have been undertaken relating to the stress and anxiety of major developments, especially coal mining and coal seam gas. These studies recognise that health and well-being impacts need to be considered at a community level. In a study of the health of Hunter Valley communities close to coal mining and power generation, where there is a significant concentration of such activities, Merritt et al. (2013) found that:

> There were no significant differences in management rates of mental health conditions in the Hunter Valley region compared with the rest of rural NSW. Management rates of depression and anxiety were not higher, nor were prescription rates of antidepressants.

This indicates similar levels of anxiety are experienced in the Hunter Valley region compared to rural NSW as a whole, although the causes of anxiety may vary between regions.

Section 5.12 of the EIS and Appendix N include discussion of both the negative impacts of the project as well as its positive benefits. This Submissions Report document also addresses several issues related to the project, which should reduce uncertainty, and consequently, mental health and/or stress associated with the project.

ESCO is committed to listening to the community and responding to their concerns. ESCO has undertaken ongoing engagement with the community through newsletters, community drop in sessions, and phone calls to encourage the community to participate throughout the development of the project. The project team will continue to engage with the community to answer any questions or concerns in an effort to alleviate stress and make clear the local benefits of the project.

The positive benefits of the project, including diversification of income streams, will help to reduce mental health stress on some members of the community by improving its resilience in times of climatic or economic uncertainty.

5.4.13 Quality of life impacts

Four submissions raised concerned about quality of life impacts arising from the project, specifically regarding the rural outlook and quality of life enjoyed by residents at Woodland Ridge. There was a concern that families will be deterred from moving there.

ESCO recognises that the community is concerned about loss of amenity due to the project's construction and ongoing operation, and how this will affect their rural lifestyle.

The traffic, noise and air quality impacts of the project will be temporary in nature as they will primarily occur during construction. The visual landscape will be altered from its current state for the duration of the operational stage of the project; however, no significant adverse visual impacts on the locality are predicted. The visual assessment (Section 6.3 and Appendix F of the EIS) assessed the visual impact to all residences within 4 km of the project as per the requirements of the Solar Guideline and were rated as having no impact to low visual impact.

The results of the visual impact indicate that project infrastructure may be visible to varying degrees from the local or regional road network. However, based on variable elevation and undulation in the landscape, the presence of vegetation and the size of the power generation infrastructure, the visual impacts will be low or very low. Therefore, any loss of amenity during operations is considered to be low.

The social impact assessment (SIA) of the project is summarised in Section 6.4 of the EIS and in Appendix G. The SIA found that expected impacts and benefits for the local and regional area fall within the themes of transition, locality impacts, local employment and procurement, housing and services, and environmental and cultural values. The project will result in various social benefits for the local community. By comparison, the project impacts are relatively few and can generally be managed through mitigation recommended in other reports supporting the EIS.

The project will provide benefits to member of the Muswellbrook community, through local employment and training opportunities, local procurement opportunities, improved confidence in sustained economic opportunities, and a contribution to improving intergenerational equity by transitioning to renewable energy. The project would also make a positive contribution to economic diversification, sustainable employment and social stability benefiting the current and future generations through re-training and supporting the establishment of a new industry in the region.

5.4.14 Local economic impacts

Five submissions commented positively on the benefits that the project can bring to the local economy, including provision of local jobs, and partnerships with local businesses and contractors.

Four submissions raised concerned about the local economic impacts of the project. Concerns included:

- Construction jobs would not be local jobs
- Project would not provide meaningful ongoing benefits
- Rental and accommodation shortages
- Loss of agricultural land resulting in loss of agricultural employment / community decline

The project will provide up to 200 FTE jobs at peak construction of the solar farm. The construction workforce will be sourced from the local area as far as practicable with an estimated 54% of the workface able to be sourced from the local and regional area. The economic assessment for the project (Section 6.14 of the EIS) identified that the project should not present a constraint to labour supply in the local economy with the projects labour requirement representing less than 1% of the local construction-related workforce.

ESCO has prepared an Accommodation and Employment Strategy (Appendix P of the EIS) to identify opportunities for maximising local employment, identify suitable accommodation options, and establish a framework for engaging with key stakeholders regarding employment. ESCO has committed to updating this Strategy in consultation with Muswellbrook Shire Council prior to the commencement of construction.

Construction phase project procurement activities have the potential to deliver economic benefits to businesses within the local and regional area. Local procurement may also enable flow-on economic impacts, which would be realised in the regional area. To maximise local procurement benefits derived from the project ESCO will engage with the business community in Muswellbrook LGA and the Hunter region to establish relationships and ensure the distribution of relevant information regarding project timing, procurement processes and the required goods and services. Wherever possible and practical, it is recommended that ESCO encourages their construction contractors to prioritise the use of local goods and services and encourage local spending.

Further, the project will improve confidence in economic opportunities through economic diversification. Economic diversification allows for a more stable economy that can absorb shocks and changes to the market. The project would contribute to regional economic diversity, providing additional benefits including construction employment, upskilling and reskilling of local and regional workers, purchase of goods and materials required for construction and the generation of indirect jobs. By contributing to the diversity of revenue streams, the project will have a positive effect on the resilience of the local economy and its ability to absorb shocks and stresses.

The number of projects in the regional area suggests a long-term pipeline (possibly upwards of 10 years) of construction work. With industry collaboration there is an opportunity to draw a permanent resident construction workforce to the regional area. This would have a positive effect on accommodation demand as workers may seek to buy in the regional area and relocate permanently if there is a clear pathway for long-term employment. Encouraging a permanent construction workforce in the regional area would benefit long term sustainability of these communities and the services and facilities they provide, as well as supporting long term economic benefits for business operators.

With respect to the loss of agricultural jobs, an economic assessment was completed for the project (Section 6.14 of the EIS). The assessment identified that 1-2.5 FTE jobs would be supported by the agricultural activities currently undertaken on the project land. However, the reduction in employment is likely to be less than this if grazing (agrisolar) is supported by the site. Upon construction completion, the land may benefit from dual economic revenue streams from both grazing and the solar farm. During operation of the solar farm, the project would support up to 9 FTE jobs.

In addition to employment benefits, a Community Benefits Fund will be provided during the operational phase of the facility. At this stage a decision regarding the structure of the Community Benefits Fund has not been finalised. However, this is likely to involve annual payments to the Fund over the life of the solar farm (likely managed through a Voluntary Planning Agreement with Muswellbrook Shire Council). Community Benefits Fund payments can be used to support local projects and programs, which may include community, educational and environmental initiatives.

5.4.15 Noise

Four submissions raised concerned about increased noise from the project, with comments about construction and operational noise, noise from transmission lines and infrasound.

The noise and vibration impact assessment (Appendix L of the EIS) for the project included an assessment of construction noise, construction vibration, road traffic noise and operational noise in accordance with relevant guidelines and policies. The outcome of the assessment is that:

- short term construction noise impacts are expected at 29 assessment locations. One residence may experience moderately intrusive noise (NML+10dB) and the project may be audible at 28 other residences during site preparation works. No exceedance of the Interim Construction Noise Guideline (DECC 2009) highly affected noise level is expected.
- road traffic noise is predicted to satisfy the NSW Road Noise Policy (DECCW 2011) relative increase criterion of less than two decibels
- operational noise is predicted to satisfy the Noise Policy for Industry (EPA 2017) project noise trigger levels for all non-associated assessment locations.

Noise management measures are proposed to further minimise the potential for noise impact from the project and ESCO will establish a community information line so that members of the community can lodge a complaint in the event of noise impacts. Complaints will be investigated by ESCO and/or its appointed engineering, procurement and construction contractor, and the appropriate actions will be implemented in response based on the nature of the complaint.

Notification will be provided prior to the commencement of works at the residence that may receive moderately intrusive noise. In addition, verification of construction noise will take place to ensure that noise levels are within predicted ranges.

The project area is traversed by existing 132 kilovolt (kV) and 330 kV transmission lines. The project includes the construction of a transmission line from the switchyard connecting into the 95M transmission line located to the west of the solar arrays. The transmission line was modelled as part of the operational noise assessment and no exceedances of the noise assessment guidelines are predicted.

Infrasound is low frequency noise below the limit of human audibility. Solar farm and battery noise sources do not typically exhibit infrasound characteristics, especially not at levels that would impact distant noise assessment locations. Infrasound is unlikely to be emitted by the Muswellbrook Solar Farm or measured at its assessment locations.

5.4.16 Glare

Three submissions raised concerned about glare impacts to motorists causing crashes, and to houses and the associated impact on shift workers, and health impacts (retinal damage). One submission was concerned that their property was incorrectly labelled in the glare assessment.

i Impacts to motorists and residences

Solar panels are designed to absorb light and as such, do not reflect significant levels of sunlight – the cause of glint or glare. The visual assessment (Appendix F of the EIS) for the project included an assessment of glint and glare impacts. The glint and glare analysis was performed using specialised software (ForgeSolar) to measure the possibility of glare from the solar arrays and the project infrastructure.

The software calculates the minutes of potential glare predicted at each location every day through the course of a year. The results indicate the number of minutes predicted at each location along with the type of glare expected. The classifications of glare from the software are:

- Green glare – glare is present with only a low potential for temporary after-image or flash blindness.
- Yellow glare – glare has a moderate potential for temporary after-image or flash blindness.
- Red glare – glare with high potential for permanent eye damage.

The glare analysis produced by the software does not account for physical obstructions between the solar arrays and the residences and motorists. This includes the presence of buildings, trees and other structures. It also assumes the weather is sunny each day for the duration of daylight hours. Therefore, a worst-case scenario is calculated.

Based on the glare analysis, there is potential for glint and glare related impacts at 16 residences and along the roads and rails adjacent to the project. While glare is predicted along Muscle Creek Road and the railway adjacent to the southern boundary of the project, this will be mitigated by the trees that exist between the proposed solar arrays and the road and railway. There are trees along Muscle Creek and along the roadway, and between the railway and roadway that form a significant screen. This glare is predicted to be within acceptable limits and no mitigation is required.

The glare analysis identified that 16 residences may be affected by green glare, and one residence may be affected by yellow glare. As identified above, green glare has low potential for temporary after-image or flash blindness. Green glare is expected in the morning or evening as the sun rises or sets with duration lasting between 5-25 minutes. Shift workers would not be affected by glare in the middle of the day.

For the one residence affected by yellow glare, this residence is located to the north of the solar arrays and a forested valley is located between the arrays and the residence. As noted above, trees are not accounted for in the glare software and therefore, the results are a worst case scenario and do not show the mitigative affects of trees screening glare from the arrays.

The glare analysis shows no instances of red glare, and serious health impacts (retinal damage) are not expected.

Based on the glint and glare analysis, the glare resulting from the project is predicted to be within acceptable limits, and no mitigation is required.

ii Labelling of residences

One submission was concerned that their property was incorrectly labelled. The coordinates of the glare analysis were reviewed and it is confirmed that R40 is OP25 in the ForgeGlare Analysis and receives less intense glare than R41 (OP26).

R41 (OP26) is further south than R40 (OP25), and there is a slight valley leading from the solar arrays to R41. This valley is forested with trees, which is not accounted for in the glare analysis, hence the higher predicted glare impact.

5.4.17 Soil quality

Two submissions raised concerns about impacts to soil quality, including compaction, changes to micro-climate under panels resulting in changes to soils productivity, and contamination.

Soil productivity and agricultural impacts of the project are assessed in the land, soils and erosion assessment (Appendix H of the EIS) and agricultural impact assessment (Appendix I of the EIS), and are summarised in Section 6.5 of the EIS.

While some compaction will occur from the construction and operation of the project, unnecessary compaction will be avoided as much as practicable (mitigation measure LS10) and cleared areas will be revegetated (mitigation measure LS23).

The long term productivity of the soils is not expected to be impacted by the proposed works. Following the end of life for the project, disturbance areas will be re-graded (where required) and stockpiled topsoil and subsoil will be respread over disturbed areas and rehabilitated with either native vegetation or improved pastures depending on the intended final land use. This strategy, along with good soil management practices will facilitate the rehabilitation in returning the land to an equivalent land and soil capability (LSC) class. Therefore, it is anticipated there will be no permanent impacts on LSC classes within the project area as a result of the project.

The impacts on agriculture as a result of the project are determined to be minimal, temporary, and limited to the project area. It is anticipated that by implementing effective land management procedures during construction and operation and implementing effective decommissioning and rehabilitation at the end of project life, the project will have no permanent negative impacts on agricultural resources or enterprises.

Contamination has been addressed in Section 5.4.8.

5.4.18 Dust

Two submissions raised concerns about dust. Two submitters suggested that vegetation would be difficult to maintain under panels and dust would be an ongoing problem. One submitter noted the area is dusty and rain would be insufficient to clean the panels.

Vehicle movements on unsealed roads are expected to generate dust impacts; however, these impacts will typically be limited to the construction phase of the project and will be short-term. Mitigation measures to limit potential dust generation from project-related vehicle movements are described in Section 6.5.4 and 6.12.3 of the EIS and are likely to include speed reduction along unsealed roads, use of water trucks for dust suppression and regular maintenance of unsealed road surfaces.

Dust will be limited during the operational phase of the project. Revegetation will also be commenced as soon as practicable to minimise areas likely to create dust. Suitable species will be used as ground cover species in any revegetation areas. Vegetation is able to be grown under solar panels and suitable species would be used.

It is not proposed that the solar panels would be self-cleaning. Ongoing maintenance, including cleaning of the PV panels, will be required throughout the life of the operation as detailed in Sections 3.3.3 and 3.4.2 of the EIS.

5.4.19 Insurance

One submission raised concerns that the cost of their insurance policies would increase due to the project.

The Jindera Solar Farm Response to Submissions (NGH 2020) sought feedback from the Insurance Council of Australia on concerns regarding an increase on insurance premiums for neighbouring properties to the Jindera Solar Farm. The response from the Insurance Council of Australia confirmed that the majority of underwriters signalled that the proximity of the solar farm would, on present understanding, not influence a decision to underwrite, nor would it impact the quantum of the risk premium (NGH 2020).

The Insurance Council further noted that they were unaware of any mandated requirement for a rural policyholder to increase liability coverage. Given this, it is anticipated that there would not be any effect on the ability of neighbouring properties to obtain cost effective insurance premiums (NGH 2020).

Large scale solar farms have been operational in Australia since 2012 and since then there have been hundreds of solar farms constructed. There is no evidence from these projects to suggest that there has been any increase of neighbouring landowners' insurance premiums due to the operation of these assets.

5.4.20 Access to raw materials

One submission raised a concern that the project would result in a lack of raw materials (gravel, sand, water) for the community

Much like any construction project, construction material (including gravel and sand) would be sourced from reputable facilities to be confirmed during detailed design. The project is not expected to result in a shortage of materials for the local community.

Section 3.3.3 of the EIS outlines the water requirements and proposed water sources for the project. Non-potable water demands for the project during both construction and operation will be sourced from existing water access licences currently owned by MCC. During operations, approximately 18 kL of water per day, or around 6.6 ML per year will be required for ongoing maintenance, cleaning of the PV modules, vegetation management, amenities and fire protection. Operational water use will be serviced by a combination of potable water and/or rainwater and licenced groundwater take. Potable water would be sourced from an appropriately licensed facility, trucked in and stored in tanks. The project is not expected to impact local water supply.

5.4.21 Property labels

One submission raised a concern that their neighbour was omitted from the EIS.

ESCO acknowledges that one property to the north of the project was not labelled as a non-associated residence and not identified in the visual impact assessment or noise impact assessment.

This property is now labelled as R295 and an updated figure showing the associated and non-associated residences is provided in Appendix I. The amenity impacts to the property have been considered and impacts are expected to be as follows:

- Visual: R295 is covered by the representative viewpoint VP-3. The impacts from this viewpoint are considered to be "low". The residence itself is located behind the ridgeline to the north of R40 and R41, and the visual impact is expected to be lower than experienced by these two properties. Similarly, glare will be less than that experienced at R40 and R41 and not mitigation is required.

- Noise: R295 is to the north of R40 and R41, behind the ridgeline. Noise impacts experienced at this property will be lower than R40 and R41 due to the increased distance from the project. The noise assessment identified no exceedances at R41 and a +1dB $L_{Aeq,15min}$ exceedance at R40 for one construction scenario (site preparation and clearing at the north and south extent of the site). As such, no noise exceedances are expected at R295 for construction or operation.

5.4.22 Agrisolar

One submission raised a concern that agrisolar is not a proven science.

The Clean Energy Council has produced the *Australian Guide to Agrisolar for Large-Scale Solar* (CEC 2021). The document notes the following regarding solar grazing:

> In a livestock grazing context, solar panels and solar farm fences improve the sheep's welfare by providing protection from the elements and predators. While these results are generally anecdotal in Australia (see the case studies in Section 2), research conducted by Oregon State University in the USA has made similar observations. Another benefit is that moisture from condensation or light rainfall events collects on the panels and drips down to water the pasture directly below, supporting concentrated pasture growth even during drought.
>
> In Australia, the earliest-known trial of grazing on a large-scale solar farm was at the Royalla Solar Farm in 2015. By 2020, there were at least 13 large-scale solar farms grazing sheep in Australia.

ESCO developed the Finley Solar Farm in NSW which was commissioned in 2019 and successfully grazes sheep under the solar panels.

ESCO is investigating the use of Agrisolar at Muswellbrook Solar Farm and will consider the extent to which it can be used.

5.4.23 Community benefit scheme

One submission raised a concern that community benefit schemes do not benefit those that are impacted by the project.

ESCO will provide ongoing financial assistance to the local community as part of a community benefit scheme to ensure there is a direct benefit from the project to the community as identified in Section 5.4.1 of the EIS. ESCO is engaging with Muswellbrook Shire Council regarding community benefits and the terms of a Voluntary Planning Agreement. Contributing funds through a Planning Agreement allows for the investments and economic benefits to be directed by the local community based on their priorities and needs. The VPA general terms will be in accordance with the proposed changes to the Large-scale Solar Energy Guideline set out in the draft Energy Policy Framework, November 2023 and the draft Benefit Sharing Guideline, November 2023.

5.4.24 Blasting

One submission raised a concern that blasting will destroy the natural landscape.

The project does not include any blasting.

5.4.25 Erosion and runoff

One submission raised a concern that the project will result in significant uncontrolled rainwater runoff from denuded land that will impact neighbouring properties.

ESCO has committed to the development and implementation of a Soil and Water Management Plan for the project, which will outline the erosion and sediment controls to be implemented during construction and operation to effectively avoid and mitigate potential impacts on soil resources.

These measures include:

- Minimising disturbance and maintaining topsoil and vegetative cover over dispersive subsoils.
- Adopting a drainage design that maintains sheet flow conditions and minimises concentration of flow.
- Installing solar arrays at a height that maintains adequate vegetative soil surface cover.
- Utilising the natural landform topography and minimising cut and fill where practicable.
- Ensuring pipeline and cable trenches are located on the contour where feasible and using trench breakers that extend outside the trenches into in-situ soils.
- Treating disturbed dispersive soils with gypsum.
- Locating sediment basins downstream of disturbed areas to capture eroded sediments and treat turbid runoff.
- Progressively stabilising and revegetating disturbed areas.

5.4.26 Impacts to insects and agriculture

One submission raised a concern that the project will result threaten insect populations that act as pollinators and have an associated impact on agricultural production.

The Clean Energy Council has produced the *Australian Guide to Agrisolar for Large-Scale Solar* (CEC 2021). The document notes the following regarding solar, insects and biodiversity:

> Recent research indicates that biodiversity gains on solar farms can be significant. These pollinator insects benefit the surrounding farms and pollinator-dependent crops (e.g. soybean) as they transport pollen from one flower to another. For instance, in the USA, it is estimated that approximately 350,000 hectares of agricultural land near existing and planned large-scale solar facilities may benefit from increased pollination services if pollinator habitat was established on the solar farms.
>
> Sheep grazing can be implemented on the same land as beekeeping and native flora as it has a lower impact than mowing. Preliminary findings suggest that the movement of the sheep also stimulates vegetation growth by carrying and spreading seeds from plants around the landscape.

Disturbed areas of the project site will be progressively revegetated. Suitable species will be used as ground cover species in any revegetation areas.

5.4.27 Transmission line impacts

One submission raised a concern about the negative impacts of transmission lines.

Transmission lines are required for the distribution of electricity across the country. The project area has been selected as it is ideally located adjacent to existing transmission infrastructure, including existing 132 kilovolt (kV) and 330 kV transmission lines. It is an ideal site for increasing generation capacity to the NSW electricity grid with minimal requirements for additional transmission infrastructure. The impacts of the transmission infrastructure required for the project have been assessed in the EIS in accordance with applicable guidelines and standards.

5.4.28 Weed and pest invasion

One submission was concerned that the project would promote weeds and pests.

Weed hygiene protocols will be put in in place prior to entering the site including wash-down procedures to all plant and machinery (as per management measure BIO14 identified in Section 6.1.6 of the EIS). This will avoid weed introduction from outside of the site. Dependent on the weed species and cover in the construction area, weeds will be removed prior to clearing. Weeds will be stockpiled appropriately prior to removal from the study area to avoid the spread/introduction of seed and other propagules.

During construction and operations, land management and mitigation measures will be implemented to reduce the impact of the project on local and regional biosecurity. These will include measures such as restricting vehicle movements to formed access tracks and use of wash-down procedures.

Once the project is operational, weed and pest management will be a routine part of operations. Management measures for the identification, management and ongoing monitoring of weeds and pests will be included in the project's biodiversity management plan (as per mitigation measure BIO1 identified in Section 6.1.6 of the EIS, and mitigation measure AG04 identified in Section 6.5.4 of the EIS).

5.4.29 Woodland Ridge estate dwelling entitlements

One submission raised a concern that several dwellings in Woodland Ridge were not constructed at the time of the assessments. In addition, one late submission was concerned that several dwelling entitlements were not considered in the visual impact assessment.

An updated figure of associated and non-associated residences and dwelling entitlements is provided in Appendix I. As identified in Section 1.1, additional visual assessment has been undertaken and is provided in Appendix F. An additional viewpoint, Viewpoint 10, along Babbler Crescent has been assessed in accordance with the Solar Guidelines. This viewpoint is representative of residences and dwelling entitlements along Babbler Crescent in the Woodland Ridge estate. The assessment concluded that the visual impact rating from the project will be "low", and no mitigation is required.

EMM has assessed that the viewpoint at Top Knot Place, Viewpoint 8, provides a representative view of the Stage 5 Woodland Ridge development dwelling entitlements. Viewpoint 8 is higher on the hill with no trees in front of it. Moving lower down the slope, less of the solar farm would be visible, especially with the stands of trees along the lower slopes and rail line. The visual impact rating of Viewpoint 8 is "low", and no mitigation is required.

5.5 Matters beyond the scope of the project

5.5.1 Cyber security, energy security and dependence on foreign countries

Four submissions were concerned about cyber security and energy security (e.g. “hacking” control systems, dependency on foreign countries for critical components).

The Australian Energy Market Commission (AEMC) is an independent statutory body and is the expert energy policy adviser to Australian governments. The Reliability Panel forms part of the AEMC’s institutional arrangements and has detailed functions and powers conferred on it. It is the responsibility of the Reliability Panel to monitor, review and report on the safety, security and reliability of the national electricity system.

OX2 must adhere to the General Data Protection Regulation, GDPR. This is an EU-wide regulation on all companies that handles personal data on EU citizens, with the purpose of individual integrity and control. This includes a Data Security Policy. The purpose of this policy is to describe how OX2 handles data in a secure way, considering business integrity, personal integrity and according to the OX2 Code. The OX2 interpretation of GDPR (General Data Protection Regulation), is the basis of this policy which outlines the handling of personal data that OX2 is accountable for.

5.5.2 Cost of electricity

Two submissions raised concerns that the project would not decrease the price of electricity.

According to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Australian Energy Market Operator’s (AEMO) GenCost, 2022-23 report, wind and solar are the cheapest electricity generation and storage sources in Australia and will continue to get cheaper () (Graham *et al.* 2023). Once operational, the project will dispatch low-cost electricity into the NEM. The development of the Hunter-Central Coast REZ and the construction of renewable electricity generating works, of which this project is a part, is part of the transformation of the NEM, which seeks to provide reliable, secure and affordable electricity to consumers (ISP 2022).

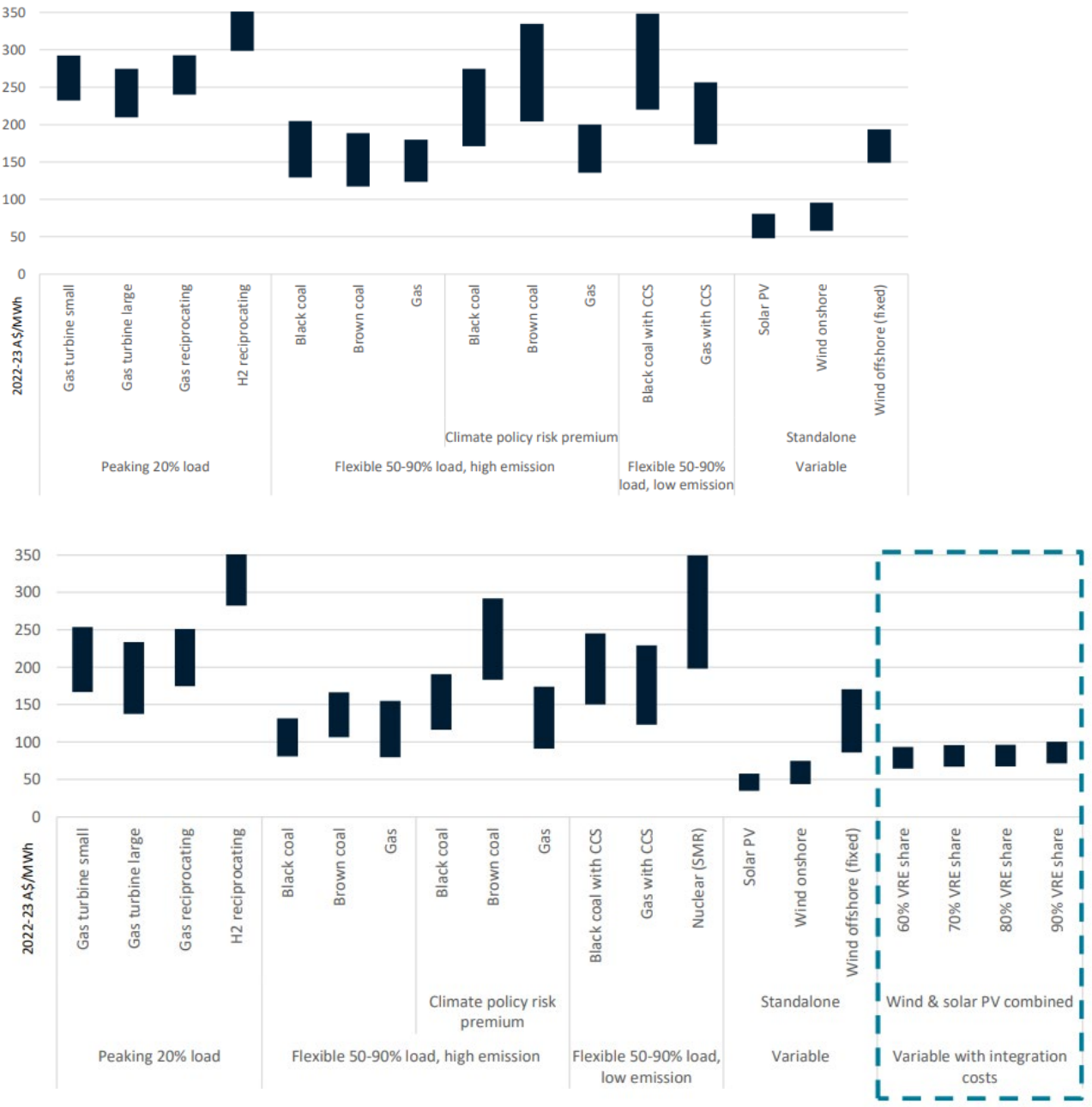


Figure 5.3 Calculated levelized cost of electricity by technology and category for 2022 (top) and 2030 (bottom).

Source: Graham *et al.* 2023

VRE: variable renewable energy (i.e. wind and solar energy)

5.5.3 Turbines

Two submissions raised concerns about the impacts of turbines.

The Muswellbrook Solar Farm project is a solar farm and battery project. No turbines will be constructed as part of the project.

6 Updated project justification

6.1 Strategic context

The project is supported by Commonwealth, State, regional and local plans and policies and will support the Commonwealth and State governments to achieve their respective renewable energy and GHG emission reduction targets. The project will also contribute to the continued growth of renewable energy generation and storage capacity in the Hunter-Central Coast REZ.

6.2 Need for the project

The project will contribute to the energy generation and storage targets for the Hunter-Central Coast REZ, with an indicative capacity of around 135 MW and storage of up to 135 MW for a 2 hour duration (270MWh). To ensure that renewable energy generation needs are met it is crucial that renewable energy projects are operational prior to the retirement of the coal plants, which means that there is an urgent need for this development in the coming two to five years.

The project will provide a valuable contribution to the energy security of NSW and the east coast of Australia for the following reasons:

- It will contribute to energy security and reliability in NSW by diversifying the State's energy mix and helping prepare for the retirement of large-scale-coal fired power generation, and provide dispatchable capacity to support renewable energy generation in the NEM.
- It is consistent with the objectives of the *Energy Infrastructure Investment Act 2020,* and likely to facilitate the achievement of them.
- It will provide ongoing economic benefits for the local economy in Muswellbrook LGA and more broadly for the regional economy in the Hunter.
- It is located within the Hunter-Central Coast REZ for which suitable infrastructure is being planned in the distribution of renewable energy generation to the NEM. The project's proximity to existing electrical transmission infrastructure will also allow benefits from the project to be realised immediately, given it is not dependent on the completion of other new transmission infrastructure.

The development and operation of the project, in conjunction with other large-scale renewable energy storage projects in NSW, has potential to fill the need for replacement power as ageing coal-fired generators face closure.

If this project was not developed, its benefits, which include storage of renewable energy and increased energy security and economic input in the region, will not be realised.

The project will result in environmental impacts and social benefits to the surrounding natural and built environments. The impacts have been comprehensively assessed, are not predicted to be significant and can be adequately managed through appropriate design, mitigation and management during construction and operation. On balance, it is therefore considered that the project is in the public interest.

6.3 Site suitability

The site is favourable for the construction and operation of a solar and battery project due to the available solar resource and physical conditions (flat to gently undulating topography and predominantly cleared land). The site is also ideally located adjacent to existing transmission infrastructure. The project area is traversed by existing 132 kV and 330 kV transmission lines. Given this, it is an ideal site for increasing generation capacity on the NSW electricity grid with minimal requirements for additional transmission infrastructure.

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

- Its potential to maximise the benefits of post-mining land use at the Muswellbrook Coal mine site.
- The location of the project being within the Hunter-Central Coast REZ.
- Its proximity to existing transmission infrastructure minimising the need for significant transmission infrastructure.
- The absence of biophysical strategic agricultural land and farming land with highly capable land and soil capability, and the relatively low level of other environmental constraints.
- 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.

6.4 Conclusion

Additional work has been undertaken to respond to submissions received on the EIS. Minor refinements have been made to the project for the purpose of reducing impacts to biodiversity values and avoiding an Aboriginal cultural heritage site. The description of the project and the project evaluation and justification, as presented in the EIS, remain a true and accurate reflection of the project for which approval is sought.

The potential impacts of the project have been comprehensively considered in the EIS and this Submissions Report. The assessments undertaken and the conclusions reached demonstrate that this project can be developed and operated within acceptable limits. The residual environmental and social impacts identified will be managed through the mitigation and management measures described such that the project will not result in significant impacts to the environment or the local community.

In terms of benefits, the project will contribute to energy security and reliability in NSW, helping to prepare for the retirement of large-scale coal-fired power generation. The project will also provide local economic stimulus and local employment opportunities during construction, which will have economic benefits for both the local economy within the Muswellbrook LGA and the regional economy more broadly.

It is considered that the environmental, social and economic benefits for the local, regional and NSW communities far outweigh the impacts that will result from the development and operation of the project and that the project should be approved.

7 References

AEMO 2022. *2022 Integrated System Plan (ISP).* Australian Energy Market Operator.

Al-Hamoodah, L, Koppa, K, Schieve, E, Reeves, C, Hoen, B, Seel, J and Rai, V 2018, An exploration of property-value impacts near utility-scale solar installations, LBJ School of Public Affairs, University of Texas, retrieved November 2023 from https://emp.lbl.gov/sites/default/files/property-value_impacts_near_utility-scale_solar_installations.pdf.

Austroads 2017. *Guide to Road Design Part 4A: Unsignalised & Signalised Intersections.*

Barron-Gafford, G., Minor, R., Allen, N. et al. The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures. Sci Rep 6, 35070 (2016). https://doi.org/10.1038/srep35070

Barron-Gafford G., 2018. Statement of Evidence by Greg Barron-Gafford on Solar Heat Islanding Issues. Prepared for Neoen Australia Pty Ltd. Accessed November 2023, https://greatershepparton.com.au/assets/files/documents/planning/solar/Barron-Gafford_Research_Group_Report.pdf

CEC 2020. Public Hearing Invitation - Inquiry into Waste Management and Recycling. Accessed November 2023, https://assets.cleanenergycouncil.org.au/documents/advocacy-initiatives/submissions/submission-inquiry-waste-management-recycling-wind-turbines-solar-pv-panels.pdf

CEC 2021. *Australian Guide to Agrisolar for Large-Scale Solar. For proponents and farmers*. Accessed December 2023, https://assets.cleanenergycouncil.org.au/documents/resources/reports/agrisolar-guide/Australian-guide-to-agrisolar-for-large-scale-solar.pdf

CohnReznick 2018, Adjacent property values solar farm impact study: A study of nine existing solar farms. Report prepared by CohnReznick on behalf of Sunvest Solar Inc, retrieved November 2023 from http://www.oglecounty.org/document_center/planning%20&%20zoning/Solar%20Ad%20Hoc%20Committee/PV%20Impact%20Studies/CR%20-%20SunVest%20Solar%20-%20Solar%20Farm%20Impact%20Study%20(Report%20Date%205-30-2018).pdf

Department of Environment and Climate Change 2009. *Interim Construction Noise Guideline.*

DECCW 2011. *NSW Road Noise Policy*

DoP 2011a. *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*

DoP 2011b. *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 Hazard Analysis and Multi-Level Risk Assessment*

DoP2011c. *IPAP No. 4 Risk Criteria for Land Use Safety Planning*

DPE 2022a. *Large-Scale Solar Energy Guideline.*

DPE 2022b. *Technical Supplement – Landscape and Visual Impact Assessment*

DPE 2022c. *Undertaking Engagement Guidelines for State Significant Projects*

DPIE 2022a. *State Significant Development Guidelines – Preparing a Submissions Report*

DPIE 2022b. State Significant Development Guidelines – *Preparing an Amendment Report*

DPIE 2022c. *State significant Development Guidelines – Preparing an Environmental Impact Statement*

DPIE 2022d. *Undertaking Engagement Guidelines for State Significant projects*

EMM 2023a. *Muswellbrook Solar Farm Environmental Impact Statement*. Prepared for ESCO.

EMM 2023b. *Muswellbrook Solar Farm Traffic Impact Assessment*. Prepared for ESCO.

EMM 2023c. *Muswellbrook Solar Farm Landscape and Visual Impact Assessment*. Prepared for ESCO.

EMM 2023d. *Muswellbrook Solar Farm Social Impact Assessment*. Prepared for ESCO.

EMM 2023e. *Muswellbrook Solar Farm Land, Soils and Erosion Assessment*. Prepared for ESCO.

EnergyCo 2023. *Hunter-Central Coast Renewable Energy Zone*. Available online: https://www.energyco.nsw.gov.au/hcc-rez. Accessed 23 October 2023.

EPA 2017. *NSW Noise Policy for Industry*

Fthenakis, V. and Yu, Y., "Analysis of the potential for a heat island effect in large solar farms," 2013 IEEE 39th Photovoltaic Specialists Conference (PVSC), Tampa, FL, USA, 2013, pp. 3362-3366, doi: 10.1109/PVSC.2013.6745171.

Graham, P., Hayward, J., Foster J. and Havas, L. 2023, GenCost 2022-23: Final report, CSIRO, Australia. Available for download from https://www.csiro.au/en/research/technology-space/energy/energy-data-modelling/gencost. Accessed 23 October 2023.

Hoen, B, Wiser, R, Cappers, P, Thayer, M & Sethi, G 2009, The impact of wind power projects on residential property values in the United States: A multi-site hedonic analysis, Berkeley Lab, viewed November 2023, https://emp.lbl.gov/publications/impact-wind-power-projects.

Hoen, B, Brown, JP, Jackson, T, Wiser, R, Thayer, M & Cappers, P 2013, A spatial hedonic analysis of the effects of wind energy facilities on surrounding property values in the United States, Ernest Orlando Lawrence Berkeley National Laboratory, retrieved November 2023 from https://www.energy.gov/sites/prod/files/2013/12/f5/2013_wind_property_values.pdf

International Commission on Non-Ionising Radiation Protection (ICNIRP), 1998. *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields*.

Jiang J, Gao X, Lv Q, Li Z, Li P, 2021. Observed impacts of utility-scale photovoltaic plant on local air temperature and energy partitioning in the barren areas, Renewable Energy, Volume 174, 2021, Pages 157-169, ISSN 0960-1481, https://doi.org/10.1016/j.renene.2021.03.148.

NGH 2020. *Jindera Solar Farm Submissions Report*

OEH 2012. *Land and Soil Capability Assessment Scheme*

Rural Fire Service 2019. *Planning for Bushfire Protection 2019*

Vyn, RJ and McCullough, RM 2014. The Effects of Wind Turbines on Property Values in Ontario: Does Public Perception Match Empirical Evidence? https://doi.org/10.1111/cjag.12030

World Resources Institute 2020, Setting the Record Straight About Renewable Energy, viewed November 2023 from https://www.wri.org/insights/setting-record-straight-about-renewable-energy#:~:text=One%20study%20estimates%20that%20renewable,CO2%2FkWh%20for%20natural%20gas

Yang L, Gao X, Lv F, Hui X, Ma L, Hou X, 2017. Study on the local climatic effects of large photovoltaic solar farms in desert areas, Solar Energy, Volume 144, 2017, Pages 244-253, ISSN 0038-092X, https://doi.org/10.1016/j.solener.2017.01.015.

Appendix A
Submissions register

EMM
creating opportunities

Table A.1 Submission register

Name	Submission ID	Location	Section where comments are addressed
Public authorities			
Department of Planning and Environment – Hazards	-	-	4.1
Department of Primary Industries – Fisheries	-	-	4.1
Department of Primary Industries – Agriculture	-	-	4.1
Fire and Rescue NSW	-	-	4.1
Regional NSW - Mining, Exploration & Geoscience	-	-	4.1
Resources Regulator	-	-	4.1
TransGrid	-	-	4.1
Sydney Trains	-	-	4.1
Department of Planning and Environment – Heritage NSW	-	-	4.3
Subsidence Advisory NSW	-	-	4.4
Transport for NSW (TfNSW)	-	-	4.5
Department of Planning and Environment – Biodiversity and Conservation Division	-	-	4.6

Table A.1 Submission register

Name	Submission ID	Location	Section where comments are addressed
Council			
Muswellbrook Shire Council	-	-	4.2
Special interest groups			
Responsible Energy Development for New England	SE-62437976	Ben Lomond, NSW	5.1.7, 5.3.1, 5.4.1, 5.4.2, 5.4.4, 5.4.5, 5.4.8, 5.4.28
Climate Energy Realists Queensland	SE-62404707	Bundall, QLD	5.2.1, 5.4.1, 5.4.5, 5.4.7
Save Our Woodlands Inc.	SE-62381974	Yarrowyck, NSW	5.1.1, 5.2.1, 5.4.1, 5.4.7, 5.4.9
Save Our Surroundings (SOS)	SE-62377475	Gulgong, NSW	5.1.1, 5.2.1, 5.2.2, 5.4.1, 5.4.2, 5.4.4, 5.4.7, 5.4.9, 5.4.10, 5.5.1, 5.5.2
Idemitsu Australia – Muswellbrook Coal Company	SE-62356709	Brisbane, QLD	5.2.1, 5.4.14
Backam Group	SE-62233457	Hamilton, NSW	5.4.14
Public			
Andrew Forbes	SE-61516223	Cooks Hill, NSW	5.2.1, 5.4.14
Adenike Adeyemi	SE-61537505	Muswellbrook, NSW	5.4.5, 5.4.6, 5.4.7
Benjamin Simpson	SE-61553457	Darawank, NSW	5.4.14
Bob Leffler	SE-61583731	Killara, NSW	5.2.1, 5.4.2, 5.4.3, 5.4.4, 5.4.7
Withheld	SE-61632986	Coolah, NSW	5.4.2
Ian McDonald	SE-61916713	Walcha, NSW	5.4.7, 5.4.8
Withheld	SE-61932476	Gollan, NSW	5.4.4
Withheld	SE-61932478	Gollan, NSW	5.4.2, 5.4.4
LeRoy Currie	SE-62137468	Leeton, NSW	5.1.1, 5.2.1, 5.3.1, 5.4.2, 5.4.3, 5.4.5, 5.4.7, 5.4.8, 5.4.9, 5.4.12, 5.4.14, 5.4.27, 5.5.1

Table A.1 Submission register

Name	Submission ID	Location	Section where comments are addressed
Gary Mather	SE-62209210	Muscle Creek, NSW	5.1.1, 5.1.2, 5.1.3, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.11, 5.4.15, 5.4.17, 5.4.18, 5.4.19
Richard Darby	SE-62225710	Muscle Creek, NSW	5.3.2, 5.4.3, 5.4.5, 5.4.6, 5.4.10
Richard Darby	SE-62228708	Muscle Creek, NSW	5.1.3, 5.3.2, 5.4.1, 5.4.3, 5.4.5, 5.4.6, 5.4.10, 5.4.13, 5.4.17
Jacinta Evans	SE-62239278	Maxwell, NSW	5.4.2
Mark Fraser	SE-62276741	Muscle Creek, NSW	5.1.1, 5.1.2, 5.1.3, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.11, 5.4.15, 5.4.17, 5.4.18, 5.4.19
Suzanne Garbyal	SE-62369725	Muscle Creek, NSW	5.3.2, 5.4.1, 5.4.3, 5.4.5, 5.4.6, 5.4.12, 5.4.15, 5.4.16
Nat Barton	SE-62372459	Wellington, NSW	5.2.1, 5.4.2, 5.4.4, 5.4.5
Withheld	SE-62377477	Gulgong, NSW	5.4.2, 5.4.4, 5.4.7, 5.4.9, 5.5.2
David Goodhew	SE-62377965	Muswellbrook, NSW	5.4.3, 5.4.6, 5.4.10, 5.4.13, 5.4.16, 5.4.21
Withheld	SE-62380207	Gulgong, NSW	5.1.1, 5.2.1, 5.3.1, 5.4.10
Jeanette Shirley	SE-62380215	Gundary, NSW	5.1.1, 5.2.1, 5.2.2, 5.4.1, 5.4.2, 5.4.4, 5.4.5, 5.4.7, 5.4.8, 5.4.9, 5.4.22, 5.5.1
Jan Kamstra	SE-62380218	Muscle Creek, NSW	5.1.3, 5.2.1, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.6, 5.4.8, 5.4.11, 5.4.15, 5.4.18
Annette Piper	SE-62380982	Coolah, NSW	5.2.1, 5.4.2, 5.4.6, 5.4.7, 5.4.8
Natasha Cotter	SE-62381744	Muscle Creek, NSW	5.4.1, 5.4.4, 5.4.5, 5.4.6,
Marcia McIntyre	SE-62382038	Kanya, VIC	5.4.1, 5.4.2
Ross Peasley	SE-62390722	Muscle Creek, NSW	5.2.1, 5.2.4, 5.4.6, 5.4.11, 5.4.14
Ann Moore	SE-62390745	Gundary, NSW	5.4.1, 5.4.4, 5.4.12

Table A.1 Submission register

Name	Submission ID	Location	Section where comments are addressed
Carolyn Emms	SE-62391758	Lake Barrine, QLD	5.1.1, 5.2.1, 5.4.1, 5.4.4, 5.4.7, 5.4.9, 5.4.26
Withheld	SE-62391764	Ben Lomond, NSW	5.1.1, 5.1.5, 5.2.1, 5.2.2, 5.3.1, 5.4.1, 5.4.2, 5.4.5, 5.4.8, 5.4.11
Grant Piper	SE-62394967	Coolah, NSW	5.2.1, 5.4.2
Withheld	SE-62406716	Warrawee, NSW	5.1.1, 5.2.1, 5.2.2, 5.2.3, 5.4.2, 5.4.7, 5.4.9, 5.4.14, 5.4.25
Cedric Creed	SE-62418961	Goovigen, QLD	5.4.5, 5.4.6, 5.4.8, 5.4.9
Stacey Miller	SE-62421208	Muscle Creek, NSW	5.1.2, 5.4.1, 5.4.3, 5.4.4, 5.4.6
Withheld	SE-62427211	Glencoe, NSW	5.1.1, 5.1.3, 5.1.6, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.8, 5.4.10, 5.4.20, 5.4.23, 5.4.24
Withheld	SE-62430469	Macquarie Hills, NSW	5.2.1, 5.2.2, 5.4.1, 5.4.2, 5.4.5, 5.4.7, 5.4.9
Jocelyn guy	SE-62432983	Manilla, NSW	5.2.1, 5.2.2, 5.4.1
Tanya Nichols	SE-62435958	Muscle Creek, NSW	5.1.2, 5.2.1, 5.3.2, 5.4.1, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.8, 5.4.12, 5.4.13, 5.4.14, 5.4.16
Withheld	SE-62436246	Muscle Creek, NSW	5.1.2, 5.2.1, 5.4.1, 5.4.3, 5.4.4
Withheld	SE-62436249	Muscle Creek, NSW	5.4.3, 5.4.4, 5.4.6, 5.4.11
Guy Nichols	SE-62436707	Muscle Creek, NSW	5.1.2, 5.2.1, 5.3.2, 5.4.1, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.8, 5.4.12, 5.4.13, 5.4.14, 5.4.16
Melanie Schafer	SE-62436738	Muscle Creek, NSW	5.4.13
Withheld	SE-62436754	Muswellbrook, NSW	5.1.4
Withheld	SE-62436763	Muscle Creek, NSW	5.1.2, 5.4.1, 5.4.3, 5.4.6, 5.4.12
Belinda Walsh	SE-62436960	Muscle Creek, NSW	5.1.2, 5.3.1, 5.4.3, 5.4.6, 5.4.29
Ryan Garbyal	SE-62437737	Mussel Creek, NSW	5.3.2, 5.4.3, 5.4.6

Table A.1 Submission register

Name	Submission ID	Location	Section where comments are addressed
Lyndall Shoobridge	SE-62437753	Muscle Creek, NSW	5.1.2, 5.4.1, 5.4.3, 5.4.4
Ben Shoobridge	SE-62437761	Muscle Creek, NSW	5.1.2
Withheld	SE-62437964	Muscle Creek, NSW	5.1.2, 5.3.2, 5.4.3
Withheld	SE-62469989	Aderley, QLD	5.2.1, 5.4.1, 5.4.2, 5.4.7
Withheld	SE-62470003	Hay, NSW	5.2.1, 5.4.2
Withheld	SE-62470025	Barham, NSW	5.1.1, 5.2.1, 5.2.2, 5.4.1, 5.4.8, 5.4.10, 5.5.3
John McBratney	SE-62475721	Lancefield, VIC	5.2.1, 5.2.2
Withheld	SE-62475749	Lake Albert, NSW	5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.4.1, 5.4.2, 5.4.3, 5.4.5, 5.4.7, 5.4.9, 5.4.10, 5.4.15, 5.5.1
Withheld	SE-62475752	Dalby, QLD	5.4.1, 5.4.3, 5.4.9, 5.5.3
Withheld	SE-62475964	Kooringal, NSW	5.4.2, 5.4.3, 5.4.4, 5.4.8
Withheld	SE-62475981	Denman, NSW	5.2.1, 5.4.14
David Yore	Via email	Muscle Creek, NSW	5.1.2, 5.4.1, 5.4.3, 5.4.4, 5.4.6, 5.4.13, 5.4.22, 5.4.29

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