Transgrid

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Amendment Report

Snowy 2.0 Transmission Connection Project

(March 2022)

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Project background

In 2020, Snowy Hydro Limited (Snowy Hydro) obtained approval to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme) by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0'). Snowy 2.0 is expected to increase the generation capacity of the Snowy Scheme by almost 50 percent, providing an additional 2,000 megawatts (MW) of generating capacity, and making approximately 350,000 megawatt hours (MWh) of large-scale storage available to the National Electricity Market (NEM).

To connect Snowy 2.0 to the NEM, a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid) is seeking approval under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of the Snowy 2.0 Transmission Connection Project (the project) to enable the grid connection of Snowy 2.0 to the NEM.

The project has been declared Critical State Significant Infrastructure (CSSI) under the *State Environmental Planning Policy (State and Regional Development) 2011* as part of the CSSI declaration for the Snowy 2.0 and Transmission Project in clause 9 of Schedule 5.

An Environmental Impact Statement (EIS) was prepared to support Transgrid's application for approval of the project in accordance with the requirements of Division 5.2 of the EP&A Act. The EIS was placed on public exhibition by the NSW Department of Planning and Environment (DPE) (former Department of Planning, Industry and Environment (DPIE)) for a period of 42 days, between 23 February 2021 and 5 April 2021. During the exhibition period, interested stakeholders and members of the community were able to review the EIS and make a written submission to the DPE for consideration in its assessment of the Project.

In accordance with clause 192(2) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), an application may, with the approval of the Secretary of DPE, be amended at any time before the application is determined.

Transgrid has amended the design of the project including changes as part of ongoing design development of the project and in response to community and stakeholder submissions received during the public exhibition of the EIS. Transgrid applied for and has obtained the Secretary's approval to amend the project in the manner described in this Amendment Report in accordance with clause 192(2) of the EP&A Regulation.

Purpose of this Amendment Report

This Amendment Report outlines the project design and construction changes, clarifies some matters in the EIS and assesses the environmental impacts of the project amendments (referred to as the 'amended project'). The Amendment Report is intended to assist the community, government agencies and the approval authority to understand the implications of the amendments to the project as described in the EIS.

The amendments have been made in response to both issues raised in community and stakeholder submissions received during the public exhibition of the EIS. Amendments have also been made by Transgrid as part of ongoing design development of the project with the preferred construction contractor. The

Amendment Report is to be read in conjunction with the *Snowy 2.0 Connection Project Submissions Report* (Transgrid, 2021a) (Submissions Report).

The amendments to the project since public exhibition are:

- A reduction to the disturbance area from approximately 143 hectares to approximately 125 hectares
- The inclusion of six distinct management zones within the reduced disturbance area
- Access track amendments including the introduction of an additional track and the realignment of another track to align with the positioning of the equipment laydown area adjacent to Transgrid's Ravine substation
- Increased substation footprint to accommodate a wider asset protection zone to meet compliance with *AS5339-2018 Construction of buildings in bushfire prone areas*
- Alternative spoil disposal within the approved Snowy 2.0 Main Works footprint to accommodate the disposal of spoil generated in project area east
- New water uptake sites to facilitate construction in project area west
- Removal of the helipad.

This Amendment Report also provides additional information and clarification about some design features, construction methodology and information presented in the EIS. It also provides a summary of the results of additional design work (project amendments) and investigations undertaken since EIS exhibition commenced, to further reduce potential impacts of the project and/or respond to issues raised.

The Amendment Report provides a final set of mitigation measures, which incorporates amendments made to respond to issues raised in submissions and/or take into account additional information and project amendments.

This Amendment Report has been prepared having regard to DPE's *State Significant Infrastructure Guidelines*, dated July 2021, and in particular Appendix D, relating to the preparation of an amendment report.

Engagement

Following exhibition of the EIS, there have been no further widespread engagement activities with the wider community. However, extensive direct engagement with all relevant government agencies, Snowy Valleys Council, Snowy Hydro and Aboriginal stakeholders has been carried out.

Transgrid has engaged a contractor to carry out the ongoing design and construction of the project. Both Transgrid and the contractor will be responsible for ongoing consultation with the community and key stakeholders during future stages of the project, should the project be approved.

Assessment of impacts

The relevant environmental impacts of the amended project have been assessed, including impacts to biodiversity, Aboriginal heritage, water, transport, visual impacts, and noise. Impacts associated with other environmental aspects would be unchanged from those assessed in the EIS and, therefore, are not required to be assessed further in this Amendment Report.

Biodiversity

As a result of the reduced disturbance area, the amended project would result in direct impact to 118.27 hectares of native vegetation. This would include complete clearing of about 71.03 hectares of native vegetation and partial clearing of about 47.24 hectares. This is a reduction of direct impacts to vegetation of about 13% from the impacts predicted in the BDAR submitted with the EIS.

Where impacts are unavoidable, they would be offset in accordance with the Biodiversity Offsets Strategy (BOS) to achieve long-term conservation outcomes in Kosciuszko National Park (KNP) and Bago State Forest. The conservation outcomes in KNP would be in line with the values and mitigation strategies outlines in the Kosciuszko National Park Plan of Management (KNP PoM) and as determined in consultation with National Parks and Wildlife Service (NPWS). A Biodiversity Offset Strategy (BOS) has been prepared for the project.

Aboriginal heritage

The whole of the reduced disturbance area has now been subject to archaeological surveys, with test excavations completed.

The amended project would result in direct impacts to three areas of potential archaeological deposit (PAD) (ST PAD 01, ST PAD 02, ST PAD 03), one artefact scatter (Str5 AS) and two Aboriginal heritage sites listed on Aboriginal Heritage Information Management System (AHIMS) (AHIMS# 56-6-0540 and AHIMS# 56-6-0048). The amended project would no longer impact AHIMS # 56-6-0041 and AHIMS# 56-6-0477.

Conclusions

This Amendment Report considers and documents the amendments and clarifications that have been identified in response to ongoing design development, submissions received and/or outstanding issues identified in the EIS.

Further consideration of the project has identified additional opportunities to reduce environmental impacts. In particular, the amended project has been designed to avoid and minimise impacts on biodiversity where possible. This has included reducing the disturbance area and the inclusion of the six distinct management zones, of which each would be subject to specific clearing requirements. The amended project would result in direct impact to 118.27 hectares of native vegetation. This would include complete clearing of about 71.03 hectares of native vegetation and partial clearing of about 47.24 hectares. This is a reduction of direct impacts to native vegetation of about 17.3 (13%) hectares from the project assessed in the EIS.

The environmental impacts of the amended project have been assessed, including impacts to biodiversity, Aboriginal heritage, water, transport, visual impacts, and noise. The remaining impacts would be generally consistent with those presented in the EIS. Consistent with the impact assessment presented in the EIS, the majority of the impacts would occur during construction of the project, with some impacts occurring during operation, such as to landscape character and visual amenity.

The merits of the project including the benefits of connecting Snowy 2.0 to the NEM are considered to outweigh any identified adverse impacts of this project. While some environmental impacts cannot be avoided, they would be minimised where possible through the implementation of mitigation measures and offsetting.

Not proceeding with the amended project would impact the ability of Snowy 2.0 to connect to the NEM. Snowy 2.0 is required to serve the market and consumers by providing dispatchable generation to address supply volatility, as well as fast-start capability and large-scale storage to address intermittency issues.

Next steps

The EIS, this Amendment Report and the Submissions Report would be reviewed by DPE, on behalf of the Minister for Planning and Public Spaces. DPE will then prepare a report to the Minister for Planning and Public Spaces who will subsequently decide whether to grant approval, or to refuse the proposal. Should the proposal be approved by the Minister for Planning and Public Spaces, Transgrid would continue to consult with the community, government agencies and other stakeholders during the pre-construction, construction, and commissioning phases.

A copy of this Amendment Report (and the Submissions Report) will be published on the DPE Major Projects website (www.planningportal.nsw.gov.au/major-projects) following submission to the DPE for assessment. Following assessment, the Minister for Planning and Public Spaces' determination will also be published on the DPE Major Projects website, along with any conditions of approval (CoA) (should the project be approved).

If the project is approved, it is expected that construction would commence in mid-2022.

Glossary of terms and abbreviations

Acronym	Definition
AACHAR	Addendum Aboriginal Cultural Heritage Assessment Report
ACHAR	Aboriginal Cultural Heritage Assessment Report
AEMO	Australian Energy Market Operator
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset protection zone
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ATZ	Asset track zone
BAM	Biodiversity Assessment Method
BCS	Biodiversity Conservation and Science within the Environment, Energy and Science Group (EESG) within Department of Planning and Environment (DPE).
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity management plan
BOS	Biodiversity Offsets Strategy
CEMP	Construction environmental management plan
CHMP	Cultural heritage management plan
CoA	Conditions of Approval
CSEP	Community and Stakeholder Engagement Plan
CSSI	Critical state significant infrastructure
CTMP	Construction traffic management plan
CWMP	Construction waste management plan
DAWE	Department of Agriculture, Water and the Environment
DBH	Diameter at breast height
DECC	Department of Environment and Climate Change
DPE	Department of Planning and Environment (formerly Department of Planning, Industry and Environment (DPIE))
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now DPE)
ECZ	Easement clearing zone
EESG	Environment, Energy and Science Group of the DPE
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and sediment control plan

Acronym	Definition
FCNSW	Forestry Corporation of NSW
FMP	Flood management plan
FSL	Full supply level
GPS	Global Positioning System
HNSW	Heritage NSW
HTZ	Hazard tree zone
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IMSTC	Indurated mudstone/silicified tuff/chert
ISP	Integrated System Plan 2020
IVM	Integrated Vegetation Management
KNP	Kosciuszko National Park
LALC	Local Aboriginal Land Council
MOU	Memorandum of Understanding
NEM	National Electricity Market
NOA	Naturally occurring asbestos
NPWS	National Parks and Wildlife Service
NRAR	Natural Resources Access Regulator (NSW)
NSW	New South Wales
OEH	Office of Environment and Heritage
OPGW	Optical Ground Wire
OSOM	Oversize overmass
PAD	Potential archaeological deposit
PCT	Plant Community Type
POEO Act	*Protection of the Environment Operations Act 1997*
RAP	Registered Aboriginal Party
RFS	Rural Fire Service (NSW)
SWMP	Soil and water management plan
TECs	Threatened ecological communities
TfNSW	Transport for NSW
TPZ	Tension and pulling zone
TSZ	Transmission structure zone
VCR	Vegetation clearance requirements
VENM	Virgin Excavated Natural Material

Acronym	Definition
WHS Act and Regulations	*Work Health and Safety Act 2011* *Work Health and Safety Regulation 2017*

1. Introduction

This chapter provides background to, and a description of the key features of the project as described in the *Snowy 2.0 Transmission Connection Project - Environmental Impact Statement* (Transgrid, 2021) (EIS), an overview of the amendments and outlines the purpose and structure of this Amendment Report.

1.1. Background

In 2020, Snowy Hydro Limited (Snowy Hydro) obtained approval to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme) by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0'). Snowy 2.0 is expected to increase the generation capacity of the Snowy Scheme by almost 50 percent, providing an additional 2,000 megawatts (MW) of generating capacity, and making approximately 350,000 megawatt hours (MWh) of large-scale storage available to the National Electricity Market (NEM).

To connect Snowy 2.0 to the NEM, a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid) is seeking approval under Part 5, Division 5.2 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of the project to enable the grid connection of Snowy 2.0 to the NEM.

The project has been declared Critical State Significant Infrastructure (CSSI) under clause 9 of Schedule 5 of the *State Environmental Planning Policy (State and Regional Development) 2011* as part of the CSSI declaration for the Snowy 2.0 and Transmission Project.

An EIS was prepared to support Transgrid's application for approval of the project in accordance with the requirements of Division 5.2 of the EP&A Act. The EIS was placed on public exhibition by the NSW Department of Planning and Environment (DPE) (former Department of Planning, Industry and Environment (DPIE)) for a period of 42 days, between 23 February 2021 and 5 April 2021. During the exhibition period, interested stakeholders and members of the community were able to review the EIS and make a written submission to the DPE for consideration in its assessment of the project.

1.2. Key features of the exhibited project

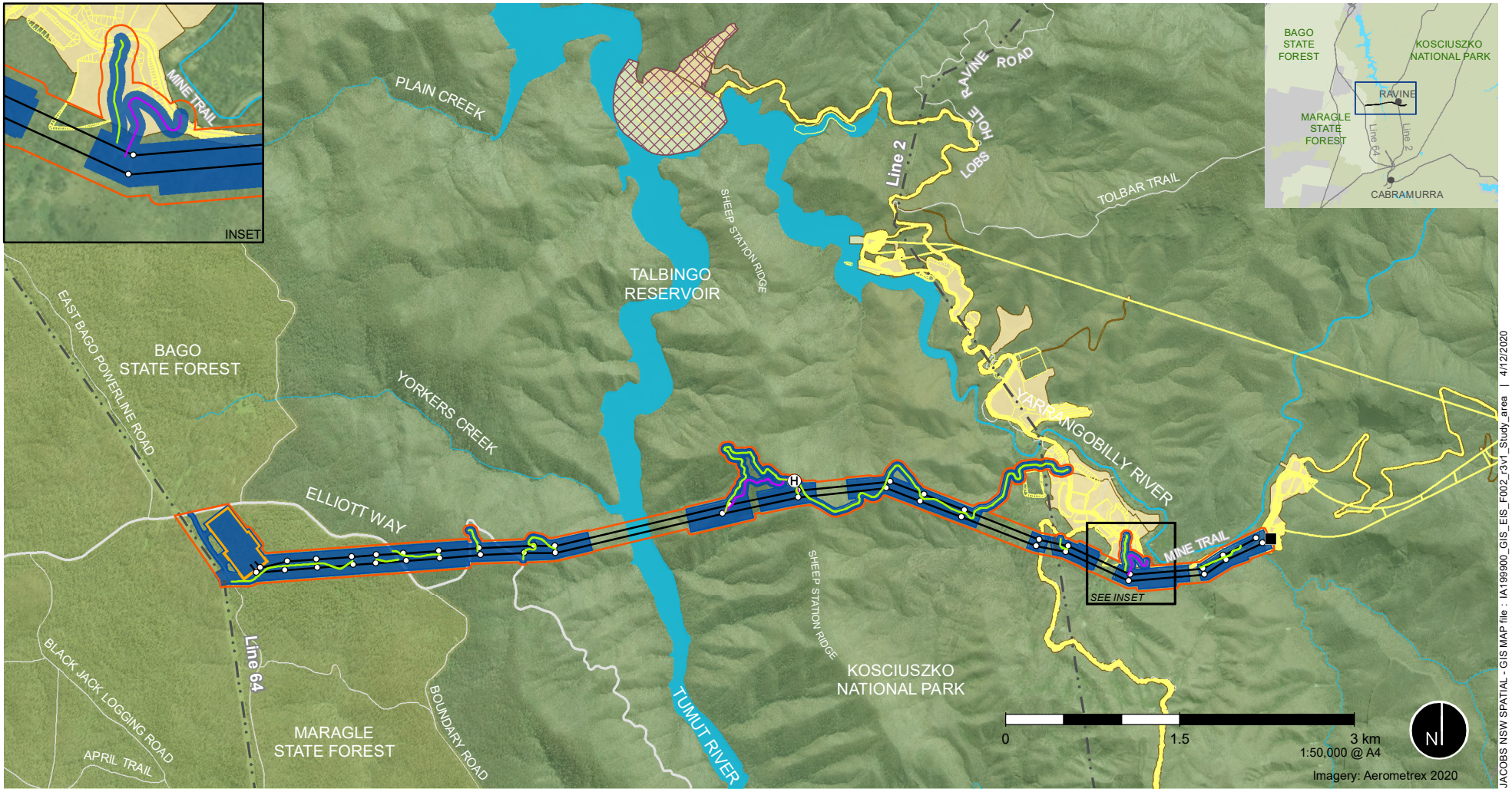
The key elements of the exhibited project needed to construct and operate the transmission connection are shown on **Figure 1-1** and include:

- A new substation located within Bago State Forest and adjacent to Transgrid's existing Line 64, which forms a 330 kilovolt (kV) connection between Upper Tumut and Lower Tumut switching stations. The substation would occupy a footprint of about 300 metres wide by 600 metres long inclusive of an approximate 25 metre to 45 metre wide cleared Asset Protection Zone (APZ) surrounding the switchyard
- Upgrade and widening of an existing access road off Elliott Way to the substation including the construction of new driveways into the 330 kV and 500 kV switchyards
- Two new 330 kV overhead double-circuit transmission lines from the Snowy 2.0 cable yard to the new substation:
    - Total length of each line is approximately nine kilometres
    - Located in a transmission corridor ranging in width from approximately 120 metres to 200 metres
    - Each line would comprise approximately 21 steel lattice structures up to 75 metres in height

- Short overhead 330 kV transmission line connection (approximately 300 metres in length) comprising both steel lattice structures and pole structures as required between the substation and Line 64
- Construction of up to 10 kilometres of new access tracks (Option A) or eight kilometres (Option B) to the transmission structures, and upgrade to existing access tracks where required. Option A minimises disturbance within a mapped high risk naturally occurring asbestos (NOA) zone. The access tracks would remain following the completion of construction to service ongoing maintenance activities along the transmission lines
- Establishment of a helipad (approximately 30 metres wide by 30 metres long) to support the transmission line construction activities carried out at higher elevations
- Ancillary construction activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds and equipment laydown areas, and the transport and haulage of equipment and waste to and from the project area
- The accommodation of up to 20 construction workers at the Snowy 2.0 works accommodation at Lobs Hole with the remainder of the construction workforce being accommodated as required in the nearby townships of Tumbarumba, Talbingo, Tumut, Adaminaby, Providence Portal and Cooma.

The eastern extent of the project is defined by the Snowy 2.0 cable yard location at Lobs Hole in Kosciuszko National Park (KNP), which has been approved separately as part of the Snowy 2.0 Main Works Infrastructure Approval (SSI-9867). The project then spans west across Talbingo Reservoir to Transgrid's existing Line 64 in Bago State Forest. Line 64 is the point of connection for the project to the NEM. The project would also provide a connection point into Transgrid's southern shared network reinforcement project (HumeLink), which when completed would strengthen the southern network, including reducing constraints on Line 64, and would allow the export of the full capacity of Snowy 2.0 across the broader transmission system. HumeLink is not the subject of this EIS or application.

Further information on the project's background, location, approval requirements, strategic need, options and alternatives are provided in Chapters 1 to 5 of the EIS. The assessment of potential impacts of the project during construction and operation are described in Chapter 7 of the EIS.



- Project area
- Disturbance area
- Proposed 500kV substation
- Potential helipad location
- Proposed structure
- Proposed transmission line
- Proposed access track - Option A
- Proposed access track - Option B
- Snowy 2.0 cable yard
- Snowy 2.0 element
- Ravine Bay Emplacement Area
- Snowy 2.0 Disturbance footprint
- Electricity transmission line
- Waterway
- Water body
- State forest
- NPWS estate

Figure 1-1 | The project overview as displayed in the EIS

Data source:
Jacobs 2020, TransGrid, EMM 2020,
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1.3. Approval process and next steps

In accordance with clause 192(2) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), an application may, with the approval of the Secretary of DPE, be amended at any time before the application is determined.

Transgrid has amended the design of the project including changes as part of ongoing design development of the project and in response to community and stakeholder submissions received during the public exhibition of the EIS. Transgrid provided a letter on the 20 October 2021 to notified DPE of these proposed amendments and apply for the Secretary's approval to amend the project in the manner described in this Amendment Report in accordance with clause 192(2) of the EP&A Regulation.

The EIS, this Amendment Report and the *Snowy 2.0 Transmission Connection Project Submissions Report* (Transgrid, 2021a) (Submissions Report) will be reviewed by DPE, on behalf of the Minister for Planning and Public Spaces. Once DPE has completed their review, a draft Environmental Assessment Report would be prepared for the Secretary of DPE, which may include recommended conditions of approval (CoA). A final assessment report will then be provided to the Minister for Planning and Public Spaces, who will subsequently decide whether to grant approval, or to refuse the project, under Section 5.19 of the EP&A Act to determine the project.

A copy of the Submissions Report and this Amendment Report would be made publicly available on the DPE Major Projects website (www.planningportal.nsw.gov.au/major-projects). The NSW Minister for Planning and Public Spaces determination, including any CoA and the Secretary of DPE's Environmental Assessment Report, would be also published on the DPE Major Projects website following determination.

As the project has been determined to be a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval from the Commonwealth Minister for the Environment would also be required.

Should the project be approved, Transgrid would continue to consult with the community, government agencies and other stakeholders during the pre-construction, construction and commissioning phases.

If the project is approved, it is expected that construction would commence in mid-2022.

1.4. Purpose of this document

This Amendment Report outlines the amendments which have been made to the design of the project following exhibition of the EIS (the amended project). This Amendment Report outlines the project design and construction changes, clarifies some matters in the EIS and assesses the environmental impacts of the amended project. Where required, the Amendment Report has included additional or revised environmental management measures to manage or minimise environmental impacts.

This Amendment Report is intended to assist the community, government agencies and the approval authority to understand the implications of the amended project. The Minister for Planning and Public Spaces will subsequently decide whether to grant approval, or to refuse the project, under the EP&A Act.

This Amendment Report is to be read in conjunction with the Submissions Report.

For the purposes of this Amendment Report, the project as described and assessed in the EIS is referred to as the '**project**' and the project including the amendments approved by the Secretary of DPE is referred to as the '**amended project'**.

This Amendment Report is structured as follows:

- **Chapter 1: Introduction**. This chapter provides an overview of the project as exhibited, a summary of the approval process and the purpose of this Amendment Report
- **Chapter 2: Strategic context**. This chapter identifies any changes to the strategic context of the project arising from the amended project
- **Chapter 3: Description of amendments**. This chapter describes the amended project and clarifies some matters in the EIS
- **Chapter 4: Statutory context**. This chapter provides an outline of any changes to the statutory requirements arising from the amended project
- **Chapter 5: Engagement**. This chapter summarises the stakeholder engagement that has been undertaken during the development of the amended project
- **Chapter 6: Assessment of impacts**. This chapter assesses the change in impacts associated with the amended project
- **Chapter 7: Evaluation of merits**. This chapter provides an evaluation of the merits and conclusions of the amended project
- **Chapter 8: References**
- **Appendices:**
    - **Appendix A** – Amended project description
    - **Appendix B** – Updated mitigation measures
    - **Appendix C** – *Revised Biodiversity Development Assessment Report* (Jacobs, 2021) (revised BDAR)
    - **Appendix D** – *Addendum Aboriginal and Aboriginal Cultural Heritage Assessment Report* (Jacobs, 2021a) (AACHAR)
    - **Appendix E** – Water quality monitoring strategy.

2. Strategic context

This chapter outlines the relationship of the amended project to the strategic planning framework.

2.1. The strategic justification

The strategic context and strategic justification for the project is detailed in Chapter 2 of the EIS. Section 2.1 of the EIS outlines the need for the project, which is driven by the fundamental requirement that new generation assets need to be connected to the transmission network to be able to operate within the NEM. Consequently, a new transmission connection is required for the transmission of electricity generated by Snowy 2.0 into the existing transmission network. Further details and justification for the project is provided in Section 4.4 of the Submissions Report.

Section 2.4 of the EIS outlines the strategic planning response to the identified challenges including consideration of the project against both NSW and Australian Government policy, plans and Acts including:

- *2020 Integrated System Plan* (Australian Energy Market Operator (AEMO), 2020) (ISP)
- *The NSW Transmission Infrastructure Strategy* (DPE, 2018)
- *NSW Electricity Strategy* (DPIE, 2019) as discussed in following sections
- *Renewable Energy (Electricity) Act 2000* (Commonwealth)
- *NSW Climate Change Policy Framework* (Office of Environment and Heritage (OEH), 2016a)
- *Department of Planning, Industry and Environment Net Zero Plan Stage 1: 2020-2030* (State of NSW, 2020).

Overall, the amendments to the project identified in this Amendment Report fall within the same strategic context as outlined in the EIS. The amended project would be consistent with achieving the overall benefits identified for the project.

3. Description of amendments

This chapter describes the amendments associated with the amended project. This chapter also clarifies certain matters in the EIS that was on exhibition. The consolidated amended project description is provided in **Appendix A**.

3.1. Overview of the project amendments

Following exhibition of the EIS, Transgrid identified amendments to the project that was presented in the EIS. These amendments provide functional improvements to the project design, confirm elements of the project that were highlighted as opportunities in the EIS and takes into account ongoing development of the construction methodology. The amendments also respond to issues raised in submissions.

The amendments to the project since public exhibition of the EIS are:

- A reduction to the disturbance area from approximately 143 hectares to approximately 125 hectares
- The inclusion of six distinct management zones within the reduced disturbance area adjacent to Transgrid's Ravine substation
- Access track amendments including the introduction of an additional track and the realignment of another track in project area east to align with the equipment storage and laydown area adjacent to Transgrid's Ravine substation
- Increased substation footprint to accommodate a wider asset protection zone to meet compliance with *AS5339-2018 Construction of buildings in bushfire prone areas*
- Alternative spoil disposal within the approved Snowy 2.0 Main Works footprint to accommodate the disposal of spoil generated in project area east
- New water uptake sites to facilitate construction in project area west
- Removal of the helipad.

A summary of the amendments and the comparison of the amended project to the project is provided in **Table 3-1** and shown on **Figure 3-1**. The project amendments are described in more detail in **Section 3.1.1** to **Section 3.1.5**. The amended project overview is provided in **Section 3.1.6** and the consolidated detailed amended project description is provided in **Appendix A**.

Table 3-1 summary of the project as exhibited in the EIS and the amendments described in this Amendment Report

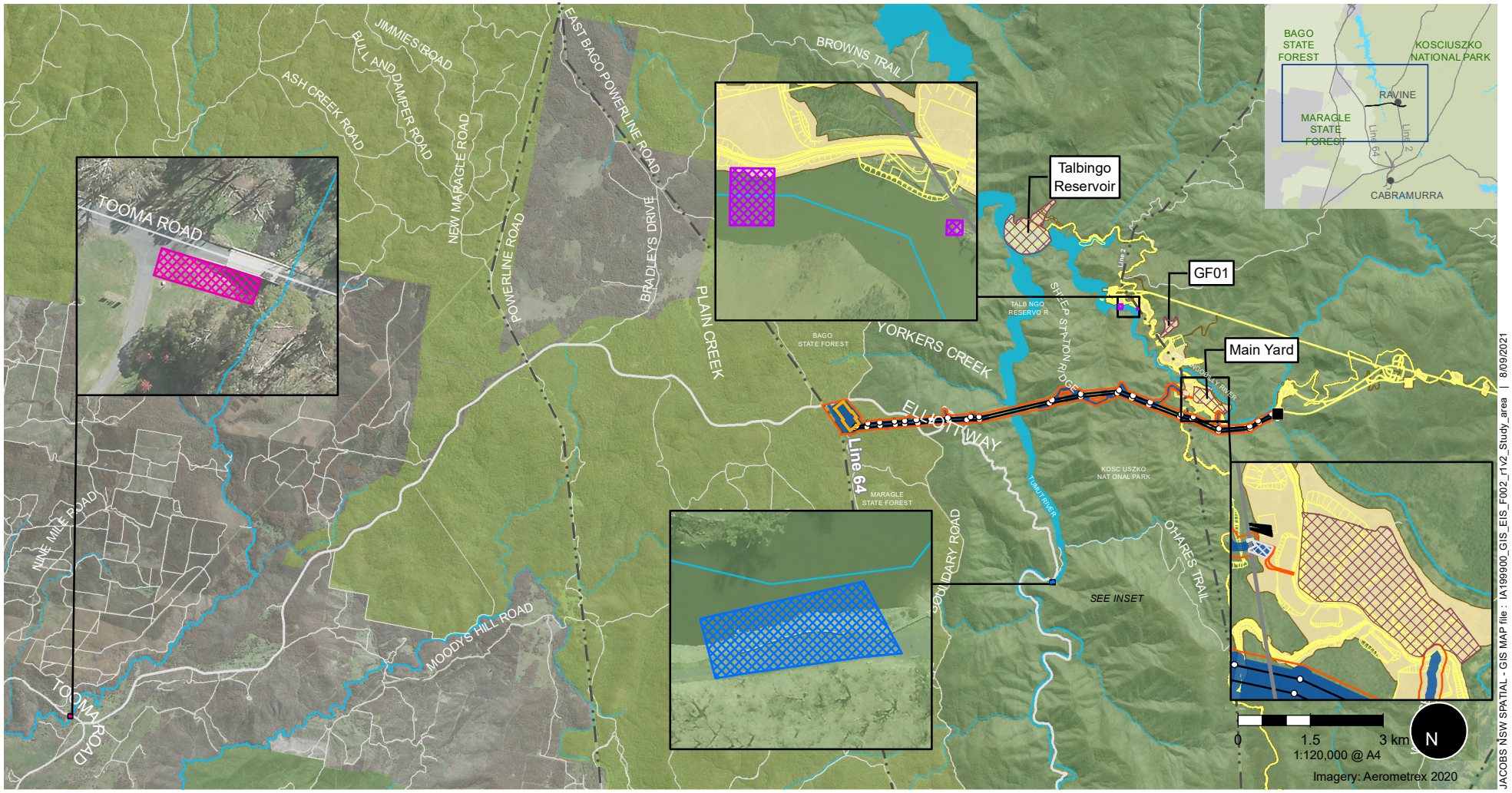
Project element	Summary of the project as exhibited	Summary of the amendments
Reduced disturbance area	The total disturbance area is about 143 hectares, this includes about 43 hectares in Bago State Forest and about 100 hectares in KNP.	The reduced disturbance area is approximately 125 hectares, this includes about 44 hectares in Bago State Forest and about 81 hectares in KNP. Some parts of the reduced disturbance area would not be fully cleared to ground level (refer to **Section 3.1.1**).
Six management zones	The EIS did not propose any management zones. The EIS assumed, for the purposes of the impact assessment, full clearing of the disturbance area.	The total reduced disturbance area is made up of six management zones which would be subject to specific clearing requirements, refer to **Section 3.1.2**.

Project element	Summary of the project as exhibited	Summary of the amendments
Access tracks and laydown area	• Construction compound and laydown area (approximately 100 metres by 100 metres) would be established within a cleared area at Lobs Hole provided by Snowy Hydro outside the project area • Two access track options were considered (Option A and Option B).	• The short access track (Option B) at Sheep Station Ridge is now the preferred option and therefore Option A has been removed • Defined construction compound and equipment laydown area (approximately 100 metres x 50 metres) to the immediate south of Transgrid's Ravine substation • One access track has been realigned to align with the positioning of the defined construction compound and laydown area • One additional access track has also been introduced to provide vehicle access between Structures 5 and Structure 6.
Increased substation footprint	In the EIS, the substation APZ was approximately 25 metres to 45 metres wide.	The APZ has been extended by approximately 50 metres in all directions surrounding the substation, refer to **Section 3.1.4**.
Alternative spoil disposal areas	For project area east, the EIS only considered disposal of excess spoil to the Ravine Bay emplacement area.	For project area east, the excess spoil could be disposed at Ravine Bay or the other emplacement areas at Ravine approved as part of the Snowy 2.0 Main Works approval (such as GF01 and Main Yard), refer to **Section 3.1.5**.
Water uptake	The EIS assumed that the water would be sourced from nearby towns such as Tumbarumba and Tumut and trucked in for works occurring in project area west.	Construction water supply would be sourced from a combination of the following locations: • Talbingo Reservoir at the existing Snowy Hydro's T2 Tailbay site, located off Elliott Way, approximately 300 metres south west of O'Hares Campground • Paddy's River at Paddy's River Flat Camp Ground. Water would only be sourced from town water supplies if this is authorised by Snowy Valleys Council. This is further explained in **Section 3.1.6**.
Removal of the helipad	The EIS assumed that a helipad (approximately 30 metres wide by 30 metres long) would established be required at the top of Sheep Station Ridge to support the transmission line construction activities carried out at higher elevations.	The construction methodology does not allow for the use of helicopters, hence the helipad has been removed, refer to **Section 3.1.7**.

3.1.1. Reduced disturbance area

Transgrid has reduced the project disturbance footprint from approximately 143 hectares to approximately 125 hectares. This approximate 12.6% reduction was achieved through refinement of the access tracks and transmission connection corridor by reducing the width of the cleared easement and hazard tree areas using Light Detection and Ranging (LiDAR) analysis. The refined project area and reduced disturbance is shown in **Figure 3-1**.

As a result of the reduced disturbance area, the amended project would directly impact about 118.27 hectares of native vegetation. This would include complete clearing of about 71.03 hectares of native vegetation and partial clearing of about 47.24 hectares.



- Project area
- Disturbance area
- Proposed 500kV substation
- Proposed structure
- Proposed transmission line
- Site compound and equipment laydown area
- Paddys river water extraction
- Ravine intake
- T2 Tailbay water extraction
- Snowy 2.0 cable yard
- Snowy 2.0 element
- Emplacement Area
- Snowy 2.0 Disturbance footprint
- Electricity transmission line
- Waterway
- Water body
- State forest
- NPWS estate

Figure 3-1 Overview of the amended project

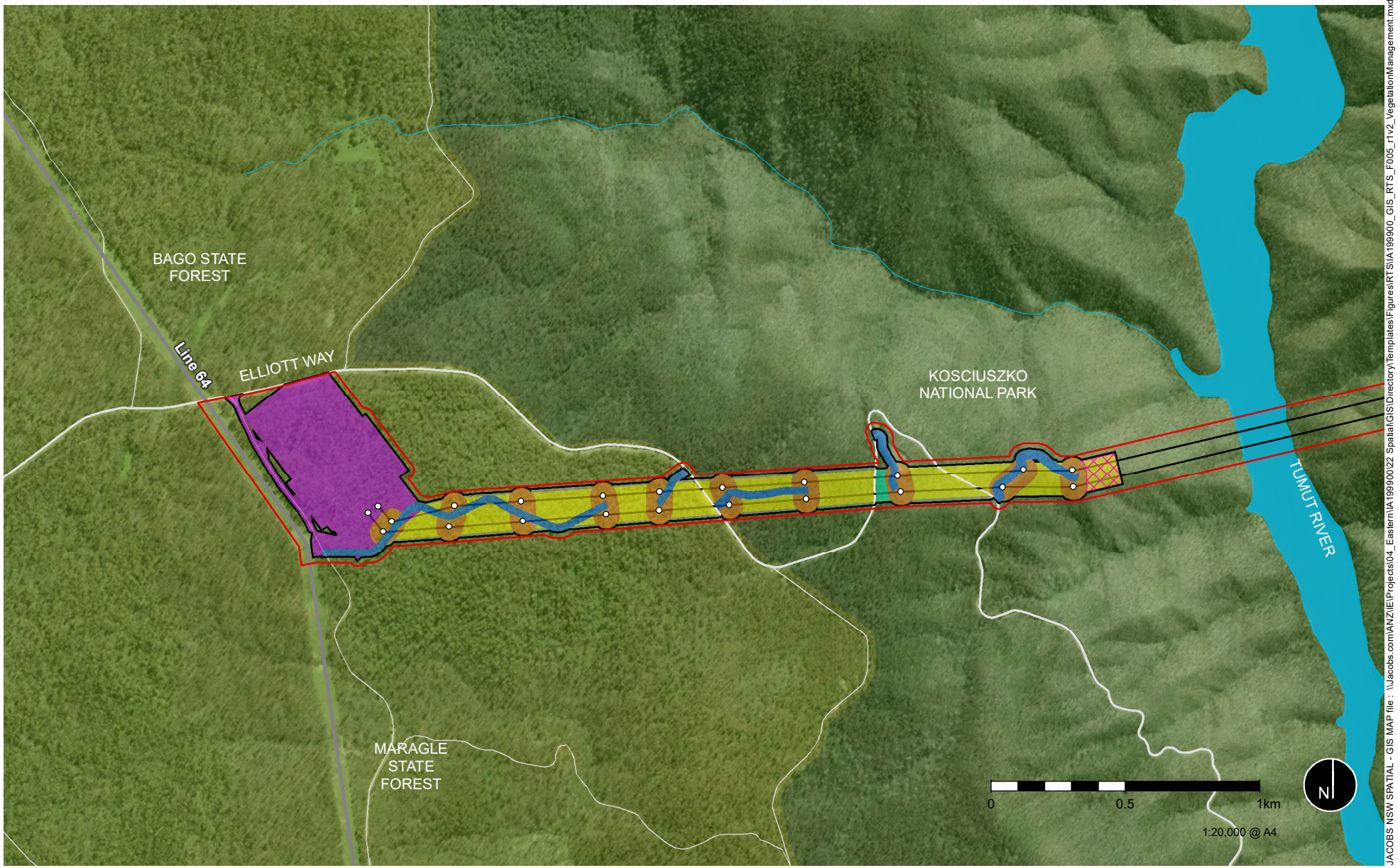
Data source:
Jacobs 2020, TransGrid, EMM 2020,
© Department Finance, Services and Innovation 2018

3.1.2. Inclusion of six management zones

The reduced disturbance area has been split into six management zones. Each of these management zones would be subject to specific clearing requirements as part of construction of and during ongoing operational maintenance of the project. The six management zones as shown on **Figure 3-2** are the:

- Transmission structure zone (TSZ): The majority of the TSZ would be completely cleared of vegetation (clearing to bare earth) to construct the structures and the construction benches required to safely build them. The TSZ includes a 50 metre radius surrounding each structure
- Tensioning and Pulling Zone (TPZ): The TPZ allows for additional area required outside of the TSZ to establish a level area for the operation of tensioning and pulling equipment which is needed for the stringing of the overhead conductors and earth wires. It is assumed that this zone would be cleared to bare earth for the purpose of construction and rehabilitated after construction
- Access track zone (ATZ): This is the area that would be impacted to construct the access tracks. The ATZ footprint is on average approximately 30 metres wide and would encompass an approximate four metre wide permanent access track. The ATZ allows for the worst case impact, including the required cuts/fill along the steep sections of the access tracks
- Substation zone (SZ): This is the area required for construction and installation of the substation. This zone includes the substation, access road and substation APZ
- Easement clearing zone (ECZ): This is the area along the transmission easement which would require the clearing and ongoing maintenance of tall growing vegetation which may intrude on the vegetation clearance requirements (VCR) at Maximum Line Operating Conditions (maximum conductor sag and maximum conductor blowout). To minimise impacts on biodiversity and ground stability within this zone, ground cover vegetation would be retained. However partial mid-storey and complete removal of the canopy layer would be required
- Off easement hazard tree zone (HTZ): This is the area external to the ECZ which contains trees of a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission structures (known as Hazard Trees). These trees pose a considerable bushfire risk and risk to the asset and require selective management/removal based on condition, as part of the initial construction of the transmission line and ongoing operation.

Four of the management zones (TSZ, TPZ, ATZ and SZ) would require full clearing of the zone, while two management zones (ECZ and HTZ) would require partial clearing. The clearing methodology for each of these management zones is discussed further in **Section 3.3.4**, with the biodiversity impact presented in the revised BDAR provided in **Appendix C** and summarised in **Section 6.2**.



Project area
Disturbance area

Management zones
Substation Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Access Track Zone
Tension and Pulling Zone

Area to be hand cleared

Proposed tower
Proposed transmission line

LGA boundaries (white line)
Electricity transmission line
Waterway
Water body

State forest
NPWS estate

Figure 3-2 | Management zones within the disturbance area

Data source:
Jacobs 2021, TransGrid, EMM 2021,
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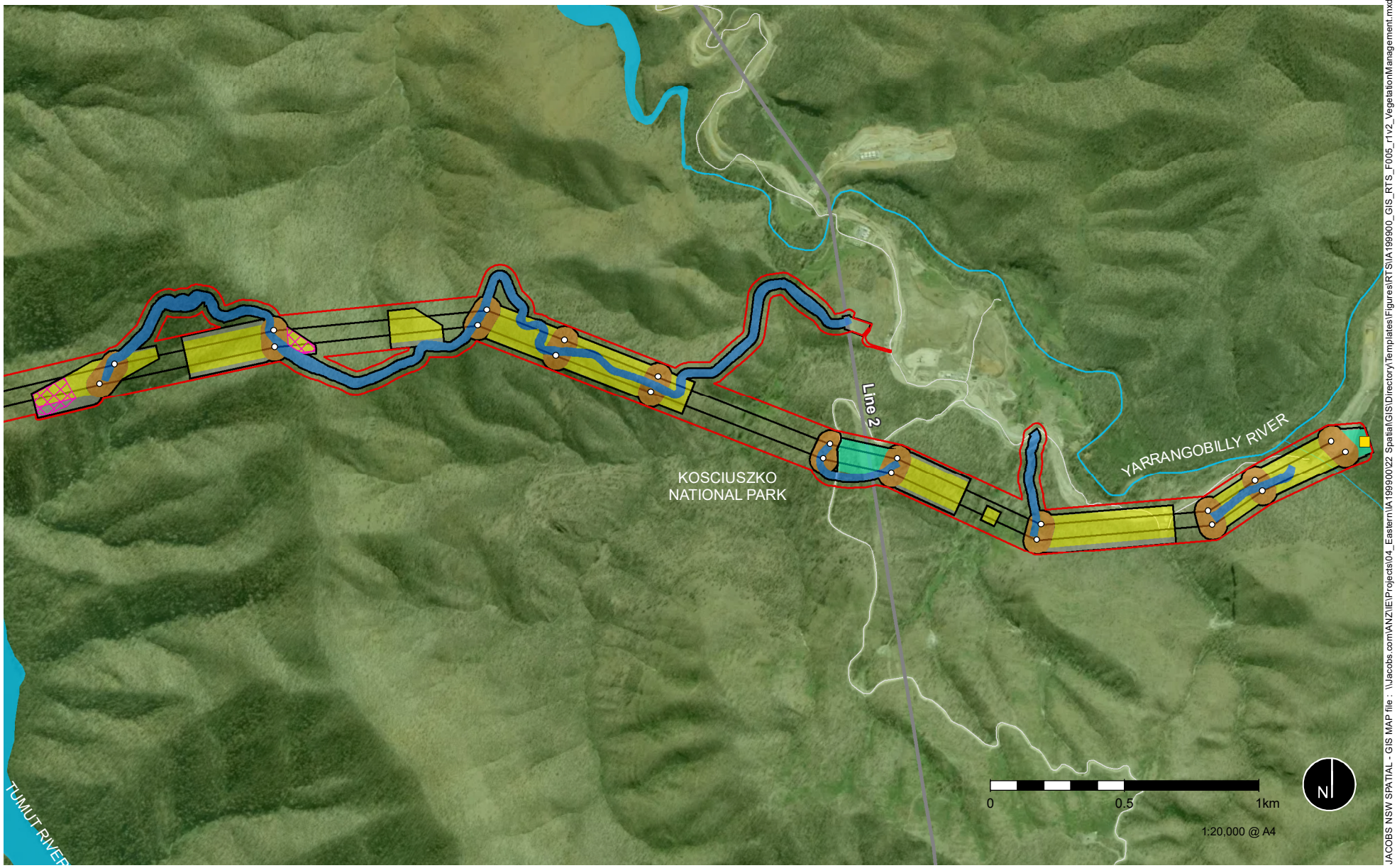

Figure 3-2 | Management zones within the disturbance area

Data source:
Jacobs 2021, TransGrid, EMM 2021,
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3.1.3. Access track amendments and laydown area

The EIS project description included the construction of up to 10 kilometres of new access tracks (Option A) or eight kilometres (Option B) to the transmission structures, and upgrade to existing access tracks where required as shown on Figure 1-2 in Section 1 of the EIS.

Ongoing project design development determined that the:

- Longer access track (Option A) at Sheep Station Ridge between structures 10 and 11 is no longer required. As such the short access track (Option B) is preferred as it requires less vegetation clearing
- An approximate 300 metres section of access track from the Ravine/Lobs Hole area towards Sheep Station Ridge would be realigned to link it with the construction compound and equipment laydown area. This area would be approximately 100 metres x 50 metres and sited within the existing cleared area partially within the Snowy 2.0 disturbance footprint adjacent to the newly built Ravine substation, refer to **Figure A-3** of **Appendix A**
- An additional access track approximately 410 m in length would be required to provide vehicle access between Structure 5 and Structure 6.

The project area and disturbance area have been updated to reflect this change. The access tracks required as part of the amended project are shown in **Figure 3-1**.

3.1.4. Increased substation footprint

Further review of the substation footprint determined the APZ needed to be widened to meet compliance with *AS5339-2018 Construction of buildings in bushfire prone areas*. This required an approximate 100 metre wide APZ extending beyond the north, east and south of the substation switchyard and 80 metres on the western side. Consequently, the APZ has been extended by approximately 50 metres surrounding the substation from what was initially outlined in the EIS. While the substation footprint has increased, it is captured in the overall reduced disturbance footprint. Further details on the substation are provide in **Section A.2.1** in **Appendix A**.

3.1.5. Alternative spoil disposal areas

Chapter 5 of the EIS discussed that excess spoil generated in project area east (approximately 327,000 cubic metres) would be transported by truck from the work locations via Lobs Hole to the Ravine Bay emplacement area. The EIS stated that no sub-aqueous disposal of spoil would occur as part of the project.

The estimated excess spoil for the amended project area east has been reduced to about 140,000 cubic metres this represents about a 57% reduction, refer to **Table A-4** in **Appendix A**.

While there is sufficient capacity for all the project's excess spoil to be placed in the Ravine Bay emplacement area, should this location not be available during any phase of the construction of the project, there is also sufficient approved capacity under the Snowy 2.0 approvals to accommodate the disposal of any balance of spoil at GF01, the Main Yard emplacement areas or other emplacement areas approved under the Snowy 2.0 Main Works approval. The use of the GF01 and Main Yard areas for spoil disposal was assessed as part of the *Snowy 2.0 Main Works EIS* (EMM, 2019).

As such, the amended project proposes that excess spoil would be transported by truck from the work locations via Lobs Hole to either the Ravine Bay, GF01, Main Yard or other approved emplacement areas where it would then be managed by Snowy Hydro in accordance with the Snowy 2.0 Main Works approval,

Snowy 2.0 Rehabilitation Plan and Snowy 2.0 Emplacement Management Plan. The location of the Ravine Bay, GF01 and Main Yard emplacement areas are shown in **Figure 3-1**.

Prior to transporting the excess spoil material, it would be assessed to ensure it is consistent with the relevant parameters for disposal within the given emplacement area it would be disposed to. No NOA material, if encountered, would be disposed of at the Ravine Bay, GF01 or Main Yard emplacement areas. If NOA is determined to be present, it would be managed and disposed of at a suitably licenced facility or a dedicated Snowy 2.0 approved NOA emplacement area and in accordance with a dedicated NOA management plan, refer to **Section A.4.7.5**.

No material would be transported and disposed of at the emplacement areas until Snowy Hydro has prepared the Emplacement Management Plan and the necessary approvals have been granted to facilitate emplacement.

A spoil management strategy would be prepared for the project, which would outline appropriate management procedures for the generation, storage and management of spoil. It would also include details on the disposal arrangement with Snowy Hydro specific to each emplacement area.

The management of excavated material including the emplacement locations is described further in **Section A.4.7** of **Appendix A**.

3.1.6. Water uptake

As stated in Section 5.4.6.2 of the EIS, approximately 60,000 kilolitres of water would be required over the duration of construction. The initial project assumed that all water required to facilitate construction in project area west (approximately 40,000 kilolitres) would be sourced from the non-potable local Tumbarumba water supply network. However, Snowy Valleys Council advised Transgrid in July 2021 that it could not meet the full estimated water demand requirements from the town water supply network without upgrades to the system being made therefore requiring an alternative water source for the project.

All water to be used during construction in project area east would be sourced from Talbingo Reservoir, either using the Snowy 2.0 supply outlet fitted with separate metering equipment or a new supply pipe and outlet collocated with the Snowy 2.0 water supply infrastructure.

Construction water for project area west is expected to be sourced a combination of the following locations:

- Snowy Hydro T2 Tailbay –– A temporary water extraction site would be established along the access road to the existing Snowy Hydro T2 Tailbay site, located off Elliott Way and approximately five kilometres south east of the project area
- Paddy's River Flat Campground –– Water trucks would access the Council owned campground, located off Tooma Road (near the intersection of Elliott Way) and extract water directly from Paddy's River
- Town water supply –– under consent from Snowy Valleys Council.

The location of the water supply locations for the project area east is shown on **Figure 3-1**. The use of this water supply infrastructure is not expected to contribute to additional impacts as previously assessed in the EIS.

A water extraction licence would be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River. Additionally, up to eight truck movements per day may be required to obtain water from the Snowy Hydro T2 Tailbay site or the Paddy's River Flat Campground.

To minimise truck movement along Elliott Way, water would only be sourced at the Snowy Hydro T2 Tailbay site in the event that water cannot be obtained from the other two water supply locations (Paddy's River Flat Campground and Tumbarumba Town Water Supply).

3.1.7. Removal of the helipad

The EIS assumed that a helipad (approximately 30 metres wide by 30 metres long) would be required at the top of Sheep Station Ridge to support the transmission line construction activities carried out at higher elevations. However, it was determined following the exhibition of the EIS that this would not be required, and a road access would be preferred.

In addition, the construction methodology to date does not allow for the use of helicopters for construction due to potential safety issues. As such, removal of the helipad from the project has assisted in reducing the project disturbance footprint.

3.2. Amended project overview

The key elements of the amended project are shown on **Figure 3-1**, and include:

- A new substation located within Bago State Forest and adjacent to Transgrid's existing Line 64, which forms a 330 kV connection between Upper Tumut and Lower Tumut switching stations. The substation would occupy a footprint of about 230 metres wide by 530 metres long, surrounded by an approximate 80 metre to 100 metre wide cleared APZ
- Upgrade and widening of an existing access road off Elliott Way to the substation including the construction of new driveways into the 330 kV and 500 kV switchyards
- Two new 330 kV overhead double-circuit transmission lines from the Snowy 2.0 cable yard to the new substation:
  - Total length of each line is approximately nine kilometres
  - Located in a transmission corridor ranging in width from approximately 120 metres to 150 metres, inclusive of the hazard tree zone
  - Each line would comprise approximately 21 steel lattice structures up to 75 metres in height
- Short overhead 330 kV transmission line connection (approximately 300 metres in length) comprising both steel lattice structures and pole structures as required between the substation and Line 64
- Construction of approximately eight kilometres of new access tracks to the transmission structures, and upgrade to existing access tracks where required. The access tracks would remain following the completion of construction to service ongoing maintenance activities along the transmission lines
- Ancillary construction activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds and equipment laydown areas, water extraction and the transport and haulage of equipment and waste to and from the project area
- The accommodation of approximately 20 construction workers at the Snowy 2.0 works accommodation at Lobs Hole with the remainder of the construction workforce being accommodated as required in the nearby townships of Tumbarumba, Talbingo, Tumut, Adaminaby, Providence Portal and Cooma.

A consolidated amended project description provided in **Appendix A**.

3.3. Project clarifications

This section identifies general clarifications, minor errors and discrepancies identified in the EIS for the project. These errors or discrepancies were identified through the submissions received or by the project team.

3.3.1. Stormwater and contamination management at the substation

The oil containment and stormwater management systems for the substation would be designed in accordance with *Transgrid's Substation Oil Containment Procedure* (Transgrid 2020) and *Substation Design Manual – Civil & Structures* (Transgrid 2020a) and are described below.

3.3.1.1. Spill containment system

An impervious surface and oil containment system would be installed as part of the substation development.

The substation would contain a range of oil filled equipment such as the transformers and reactors with varying degrees of potential to cause pollution to the environment in the event of loss of oil through failure or leakage. Transformers and other large volume oil fill equipment would be located in a leak-proof bunded (walled) compounds designed to capture oil and a prescribed volume of firefighting water (and rainwater) in the event of a tank or cooler failure. The bunded areas would be connected to the substation's spill oil containment system comprising primary and secondary oil/water separator tanks, which would have all-weather access and provision for staff and equipment to pump out the captured water oil/water mixture in the event of failure or leak of the oil filled equipment.

3.3.1.2. Stormwater and drainage system

The on-site stormwater drainage system would allow surface runoff from the site to be diverted appropriately away from the substation. The stormwater and drainage system would include a series of surface drains which would connect with a grid of stormwater pits within the substation site. The stormwater system would not include any stormwater retention, water discharge volume controls or water quality treatments.

The stormwater drains would incorporate features such as rip rap scour protection to control flow velocities at outlets to minimise the potential for erosion and scouring that would increase sediment load in the receiving environment.

The amended project description of the substation is provided in **Section A.2.1** of **Appendix A**.

3.3.2. Surface water quality monitoring program

The mitigation measures presented in the EIS commits to a soil and water management plan (SWMP) being prepared by the contractor and in consultation with government agencies, including the NSW Environment Protection Authority (EPA). This plan would detail proposed mitigation and management measures for construction water and include a surface water quality monitoring program. Further details on the SWMP are provided in **Section 3.3.3.2**.

The surface water quality monitoring program would be implemented to gain an appreciation of background water quality, to observe any changes in surface water quality that may be attributable to the amended project and inform appropriate management responses. The surface water quality monitoring strategy is provided in **Appendix E** and would form the basis of the surface water quality monitoring program.

The key objectives of water quality monitoring of surface waters are to:

- Protect downstream aquatic ecosystem
- Maintain visual amenity
- Maintain downstream water quality for primary and secondary contact recreation, water supply and consumption of aquatic foods (cooked).

The implementation of water quality monitoring will assist in ensuring both the construction and operation of the project will minimise potential negative impacts on sensitive receiving environments.

The surface water quality monitoring program will be carried out during the pre-construction, construction, and operation of the project.

3.3.3. Construction methodology

The updated construction methodology as part of the project description is provided in **Section A.4** of **Appendix A**. Further details on vegetation clearing and ongoing vegetation management is discussed in **Section 3.3.4**.

3.3.3.1. Works over Talbingo Reservoir

A temporary exclusion area for aquatic activities would be established during the overhead stringing of transmission lines across Talbingo Reservoir. The expected width of the exclusion zone over Talbingo Reservoir would be approximately 100 metres wide either side of the centreline of each transmission line. During this time, all water activity would be restricted within this exclusion zone. The exclusion zone would only be in place for a short duration (matter of hours) for each conductor and earth wire. In total, twelve conductors and four earth wires would need to be strung over a period of approximately six weeks

The temporary exclusion area would be enforced by a marine vessel. The vessel is expected to be launched from the boat ramp at O'Hares campground or the Talbingo Dam boat ramp.

General access and use of other sections of Talbingo Reservoir would be maintained for recreational boating and fishing, including areas south of Coonara Point.

3.3.3.2. Sediment and erosion control

There is potential for impacts to the water quality of local waterways during the initial phase of construction when the greatest area of disturbance would occur due to surface construction activities. In addition to Tumut River, the project area also contains five waterways or streams including Wallaces Creek, Yarrangobilly River, Sheep Station Creek, Cave Gully, and Lick Hole Gully and a number of unnamed gullies/drainage lines.

Suitable erosion and sediment controls would be implemented during construction to minimise this risk. These controls would be developed and documented in the SWMP.

The SWMP would include erosion and sediment control plans (ESCP) and would be developed in consultation with the EPA and implemented prior to and during construction.

Detailed ESCPs would be prepared for:

- Each section of access track
- Each TSZ
- The substation site.

The ESCP would provide details on the specific suite of control measures, their positioning within the worksite and necessary monitoring requirements of the measures to validate their effectiveness. The control measures specific to each site would give consideration to terrain and the presence of nearby surface water features.

The SWMP would include the development and implementation of adequate controls to manage risks combined with monitoring, maintenance and rehabilitation. The SWMP would also include measures for the management and discharge of groundwater if dewatering is required.

The erosion and sediment control measures to be implemented during the construction stage of the project would be based on five principles:

- Controlling the occurrence of erosion
- Controlling the movement of sediment
- Diverting offsite “clean” water away from construction areas
- Diverting onsite “dirty” water towards a sediment basin or sediment trap
- Capturing sediments that are transported through diversion drains in basins.

To achieve these principles, water quality during construction would be managed using the below measures which would be further detailed in a comprehensive ESCP and accompanying report that would be submitted to the EPA for approval before it is implemented:

- Procedural controls
- Site managed erosion controls measures
- Physical sediment control measures
- Treatment with sediment basins
- Monitoring and maintenance.

During the preparation of the water quality monitoring strategy, Transgrid has been working closely with the EPA in developing and designing key sediment and erosion controls to prevent any change to the existing baseline surface water quality within and adjoining the amended project area. Transgrid is committed to the following with regards to erosion and sedimentation control:

- Design and inclusion of best erosion and sedimentation management techniques specific to the project and its location. These would be developed in consultation with the EPA and to their satisfaction during the preparation of the SWMP
- Mechanisms to modify erosion and sedimentation controls with consideration to the sections of steep terrain within the amended project area and minimise vegetation clearing in these areas as far as practicable
- Implement enhanced controls to reduce the risk of erosion wherever possible. These would include but not limited to:
    - Staging construction activities to minimise land disturbance at any one time
    - Designing temporary drainage and sediment control measures to have non-erosive hydraulic capacity
    - Applying enhanced erosion controls where significant risks are identified
    - Directing runoff and seepage from stockpile or disturbed areas to sediment basins designed in accordance with the Blue Book
    - Consideration and application of appropriate practical temporary stabilisation methods
    - Retaining vegetation within flow lines for as long as possible
    - Retaining groundcover on soils to minimise the potential transportation of sediment

- Treating topsoils with a high level of care to enable reuse in the rehabilitation phases
- Using surface covers and binders to limit soil loss
- Installing clean water diversions early
- Ensuring prompt stabilisation and rehabilitation of the site
- Using sediment sumps at critical locations on the disturbed site in addition to the end of line sediment basins
- Using sediment fences along the contour lines at reduced spacing, with an 80 metre spacing in flat areas and down to 10 metres or 20 metres spacing in steeper areas depending on the length of the sloping area
- Using straw bales (weed and seed free) in conjunction with the sediment fences to reinforce the capture of sediments on site
- Consideration of alternative controls on steeper slopes maybe also be considered including:
    - > The use berms or swale drains placed across the access road or transmission corridor to divert water to vegetation or spoon drains
    - > Check dams (temporary, dam constructed across a swale, drainage ditch, or waterway to reducing water flow velocity) that could be installed along the length of the drainage lines to reduce velocity, decrease the potential for scour or erosion, and to increase the retention of sediments
    - > The use of deeper sediment traps could be installed as required.

- Should there be a possibility of sediment laden runoff after all reasonable and practicable measures have been investigated and implemented to avoid the discharge of such water, the use of super fine gypsum (naturally occurring) flocculation to improve the settlement of dispersible soil particles in the sediment basins will be considered. Application of gypsum will be in accordance with relevant guidelines and the pH and electrical conductivity will be monitored to ensure compliance with the ANZG (2018) prior to discharge to minimise any impact to aquatic organisms.

The SWMP would also consider the reuse of any water collected within sediment controls to avoid or minimise discharges to the receiving environment. Reuse options could include using the water (after primary treatment, i.e. settlement) during construction for dust suppression and rehabilitation irrigation.

Any stormwater runoff or water captured from the project is not expected to contain pollutants other than ‘clean’ sediment at non-trivial levels (e.g., oils and grease, metals), as such no additional treatment measures would be required.

The specifications and locations of these control and measures would be determined by the construction contractor or before construction commences.

The mitigation measures in **Appendix B** have been included/revised to reflect the above.

3.3.3.3. Waste

Spoil management

The strategy for the management of excavated material would aim to maximise the beneficial re-use of materials for construction activities, which may include the reuse of road base, construction benches at the transmission structure sites, landscaping or other uses as part of the substation build.

The strategy for the management and disposal of excavated material would be documented in the spoil management strategy and in agreement with National Parks and Wildlife Services (NPWS) and Forestry

Corporation of New South Wales (FCNSW). This strategy would also include details on the disposal arrangements with Snowy Hydro.

Excess spoil generated within the amended project area which cannot be reused, is expected to be disposed of via the following methods:

- Project area west: Excess spoil generated in project area west within Bago State Forest would be disposed of at the substation site and would be contoured to blend in with the natural landscape under consultation with FCNSW. Exposed areas would be stabilised and rehabilitated with low growing native grass species. Some stockpiling of excess spoil material may occur within a cleared section of the SZ. No excess spoil would be removed from Bago State Forest
- Project area east: Spoil would be transported by truck from the work locations via Lobs Hole to spoil emplacement locations approved as part of Snowy 2.0, such as Ravine Bay, GF01 and Main Yard emplacement areas with the locations shown in **Figure 3-1**. The haulage of this material would be confined to the newly formed access tracks and the established access tracks at Lobs Hole formed as part of Snowy 2.0. These areas would be closed to the public for the duration of construction. Once the material has been transported to the emplacement areas, it would be managed and disposed of in accordance with the Snowy 2.0 Main Works approval and the Snowy 2.0 Rehabilitation Plan.

The management of excavated material including the emplacement locations is described further in **Section A.4.7** of **Appendix A**.

Vegetation material

The management and disposal of timber and vegetation debris would be developed in consultation with NPWS and FCNSW and documented in the construction waste management plan (CWMP). No vegetation material would be removed from KNP, unless otherwise approved by NPWS.

Vegetation waste is expected to be managed through:

- Processing timber using a timber chipper/tub grinder followed by distributing the chips across bare, disturbed or exposed areas, including batters adjacent to the access tracks
- Relocation of felled timber containing hollows that could provide fauna habitat into the adjoining forested areas
- Removal of timber off-site and stockpiling at a suitable location for potential re-use as building material or firewood
- Inspection of felled timber by FCNSW within Bago State Forest. Any felled timber that FCNSW determine can be repurposed will be removed off-site by FCNSW.

3.3.3.4. Heavy vehicle transport routes

As detailed in Section 5.4.9 of the EIS, the anticipated haulage routes for heavy vehicles carrying materials and equipment to and from the project area are as follows:

- Project area west: It is expected that majority of materials and equipment would travel along Hume Highway, Snowy Mountains Highway, Batlow Road, Tooma Road and Elliott Way
- Project area east: It is expected that the majority of materials and equipment would travel along Snowy Mountains Highway (via both from Cooma and Tumut), Link Road and Lobs Hole Ravine Road.

These haulage routes would remain unchanged for the majority of heavy vehicles. In Section 5.4.9 of the EIS, it was assumed that oversize overmass (OSOM) vehicles carrying high mass substation equipment

(namely transformers and reactors) would travel from Port Kembla to the substation in project area west. It is now assumed that the Port of Newcastle could be the point of delivery of key OSOM substation equipment. As such a transport haulage route assessment for OSOM vehicles traveling from Newcastle was carried out. This is documented in the *Route Study - Newcastle Port to Maragle* (Rex J Andrews Engineered Transportation, 2021) (route assessment). The key outcomes of this assessment are summarised in **Section 6.5.2**.

3.3.4. Vegetation clearing and ongoing maintenance

3.3.4.1. Rationale for vegetation management methods

The removal and management of vegetation for the project is constrained and determined by a number of factors which include:

- Operational electrical clearances
- Vegetation community structure, ground cover/low growing vegetation conditions
- Landform constraints such as slope stability and steepness
- Construction and operational safety
- Suitable management of vegetation debris and soils
- Environmental aspects/constraints
- Habitat value of removed vegetation (where required/practicable).

As such, a variety of vegetation management approaches would be used for the project and include consideration of the six management zones within the reduced disturbance area as discussed in **Section 3.1.2**. The construction and operational clearing requirements and methodology for each management zone is discussed in the following sections.

Transmission Structure Zone

Establishment of the TSZ

For construction, the TSZs have been delineated from field inspection, analysis of ground conditions, design for transmission line structures and the required footprint for construction and operation.

TSZ Construction Clearing Methodology

Due to the variable terrain, the majority of TSZs would require complete removal of vegetation (including root balls) during construction to facilitate the formation of level crane/construction benches, machine/vehicle access and structure foundations (identified as **'civil works areas'**) to expedite the safe construction of the transmission structures. The trees in this zone would generally be either 'pushed' out or removed by forest harvester, with stumps grubbed out. Trees would only be pushed out where there would be negligible impacts to areas outside the TSZ civil works areas. Any areas in the TSZ civil works areas not required would be managed as ECZ.

In the TSZs outside of civil works areas (i.e. areas not impacted by construction/benching/access track construction), vegetation removal would be via a forest harvester or excavator-mulcher to minimise disturbance and root balls/stumps would be left in-situ. These areas would be cleared as for the ECZ.

Where vegetation is to be removed by an excavator-mulcher (outside civil works areas), mulched material would be evenly spread on bare, disturbed or exposed areas (to no greater than 50 millimetre in depth) to

assist in protection of the soil. Where low growing vegetation, grasses or ground cover exists, care would be taken to avoid excess debris build up/smothering.

Processing of vegetation debris in the TSZ would generally include tub grinding of removed trees and reuse of the material for erosion and sediment control and stabilisation of disturbed areas during rehabilitation.

Post construction, any salvaged topsoil that does not contain significant weed loads would be respread over disturbed areas and soil protected from erosion by installing mulch (stockpiled from tub grinding) and stabilised and revegetated in accordance with the approved rehabilitation plan.

Operational Maintenance

During operation, the TSZ would be maintained to provide safe access and set up for inspection and maintenance and prevent vegetation encroachment around the structures. Typically, these areas would be kept free of shrub and tree regrowth and would be slashed or mulched on a cyclic/routine basis. The benches are expected to remain in-situ to facilitate the safe operation of plant and equipment (e.g. cranes and elevated work platforms) during routine structure inspection and maintenance activities.

Generally, maintenance of the structure bases requires an area of approximately 30 metres around the structure would be required to be maintained as an '**operational TSZ'** as well as any safe work platforms/benches. Disturbed areas outside of this 30 metre buffer (operational TSZ') would be rehabilitated and managed as per the ECZ during operation.

Tensioning and Pulling Zone

Establishment of the TPZ

The TPZ was established with consideration to appropriate terrain and where tensioning and pulling sites could not be established within the TSZ. This occurred as part of further refinement of the project's concept design.

TPZ Construction Clearing Methodology

The TPZ would require complete clearing and earthworks to establish a level bench for the safe operation of the tension and pulling equipment. As such, areas subject to civil works would require the complete removal of the tree root balls. This would be carried out using the same methodology described for the TSZ. Any areas where civil works would not be required, vegetation removal would be carried out using a forest harvester or excavator-mulcher to minimise disturbance and root balls/stumps would be left in-situ.

Operational Maintenance

During operation, any areas of TPZ which are outside of the permanent footprint as defined in the Snowy 2.0 Main Works approval would be rehabilitated and managed in accordance with the procedure outlined below for the ECZ and HTZ.

Access Track Zone

Establishment of the ATZ

As part of construction, the ATZ would be subject to complete vegetation clearing on areas of cut/fill, which would be primarily carried out using an excavator, bulldozer and/or tree harvester. The access track corridors

would be established with consideration to terrain (e.g. using ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing.

ATZ Construction Clearing Methodology

Vegetation clearing for the access tracks would use similar methods as for the TSZ. Construction of the access tracks would be staged to progressively complete discrete sections of track, install erosion/sediment controls, use mulch to stabilise batter slopes and other non-operational areas pending permanent rehabilitation/revegetation of these areas. Manual felling of trees may be carried out in the steeper sections of the access track route where the use of machines would carry work health and safety risks.

While an average 30 metre wide fully cleared corridor has been assumed to encompass the worst-case disturbance to construct the tracks, the build access track width would generally be four metres to bare earth. The four metre width includes the trafficable surface and one to two metres either side to facilitate safe access/egress. The areas external to the operational access tracks including the batters would be stabilised and revegetated in accordance with the approved rehabilitation plan.

Operational Maintenance

During operation, routine vegetation maintenance would be carried out along the four metre wide access track. This would generally involve maintenance, repair or reinstatement of damaged/eroded track surfaces/drainage and slashing/mulching of the track sides (to one to two metres) and/or manual pruning of tree branches which encroach the access track and prevent safe vehicle passage.

Substation Zone

Establishment of the Substation Zone

Due to the civil construction requirements for the substation, total removal of vegetation (including root balls and root systems) would be required for the installation of the substation and associated sub-surface infrastructure.

Substation Zone Construction Clearing Methodology

Vegetation clearing within these areas would use similar methods as for the TSZ. That is, vegetation in the civil works area (i.e. switch yard) would generally be either ‘pushed’ out or removed by forest harvester, with stumps grubbed out. While vegetation removal outside of civil works areas (i.e. APZ) would be via a forest harvester or excavator-mulcher.

As for the TSZ, where vegetation is managed by an excavator-mulcher method (outside the civil works areas), or mulched material would be evenly spread on bare, disturbed or exposed areas (to no greater than 50 millimetres in depth) to assist in protection of the soil. Where low growing vegetation, grasses or ground cover exists, care would be taken to avoid excess debris build up/smothering.

It is noted that large trees or habitat trees suitable for re-use as habitat features would be placed outside the APZ.

Operational Maintenance

Operationally, the management of vegetation for the substation would be required on the substation access road and within the APZ. Other areas would be cleared for permanent infrastructure.

The substation access road would be predominantly constructed by cut/fill and vegetation outside the civil works areas and APZ would be retained. Operational maintenance would include slashing or mulching of the road verge and any road surface or drainage maintenance as required.

The vegetation in the APZ (where it falls outside civil works areas) would be managed so that maintenance can be carried out by either slashing or mulching. Any trees within the APZ would be removed to ground level retaining the root systems and the ground layer retained. Other vegetation would be managed to a height of approximately 100 millimetres.

Easement Clearing Zone

In accordance with Transgrid's *Maintenance Plan – Easement and Access Tracks* (December 2020b), the VCR for 330 kV transmission lines at maximum line operating conditions would involve the management of any tree within three metres of the overhead conductors plus a regrowth allowance over a given maintenance and inspection cycle.

With consideration to the plant community types (PCTs) within the amended project area and the worst-case growth rate used by Transgrid for the construction of new transmission lines, the regrowth rate of tall growing trees was estimated to be up to 1.5 metres per year. Furthermore, for all new transmission lines the maintenance and inspection period has been set at three years until such time where the vegetation growth rates can be more accurately defined. Given the above, the VCR in the ECZ is defined as:

VCR = 3 metres + Regrowth Allowance

= 3 metres + (3 x 1.5 metres)

= 7.5 metres.

The VCR is in place to ensure that all vegetation remains at least three metres from the overhead conductors modelled under Maximum Line Operating Conditions from the initial clearing of the ECZ to the next subsequent inspection/vegetation maintenance round. This is driven by the risk of flashover, which could result in the ignition of the underlying trees causing a bushfire.

Establishing the ECZ

LiDAR analysis was performed on the transmission connection concept design modelled under Maximum Line Operating Conditions to identify the zones which breached the VCR. This area was then buffered appropriately with consideration to terrain and construction requirements to establish the ECZ.

Construction Clearing Methodology

Vegetation in the ECZ would be removed/managed by a variety of methods that would be determined by:

- Vegetation type/structure
- Slope/terrain
- Environmental/ecological constraints.

In areas safely accessible to a machine, smaller trees (or other tall growing vegetation) less than 200 millimetres diameter at breast height (DBH) would be removed using an excavator-mulcher to mulch the aerial portion of the vegetation down to ground level.

Vegetation over 200 millimetres DBH would be removed using a forest harvester type machine, noting that tree branches/canopy may be mulched in-situ. The tree barrels (trunks) would either be:

- Tub ground to provide material for erosion/sediment control and rehabilitation
- Relocated to the edge of the easement and retained as habitat
- Re-used by FCNSW/NPWS.

The use of machine clearing would cause disturbance to shrubs and ground cover, however, careful management and supervision of these operations would be carried out to minimise impacts. It is noted that while some impacts to all vegetation strata may occur during clearing operations, natural regeneration coupled with rehabilitation of heavily impacted areas is expected to result in regeneration of the majority of the ECZ. This can be seen in **Photo 3-1** which shows Transgrid's Line 2 in the Lobs Hole Ravine area, located near the project.

It must be noted that areas accessible for machine clearing are generally located where transmission line conductors have the minimum clearance to ground and as such hand felling and leaving of timber debris is not optimal for the operational management of the transmission line due to the safety and bushfire risks.

In areas of the ECZ that are not safety or practicably accessible for machine clearing, removal/management of vegetation would be carried out by hand clearing/felling. Felled trees would remain in-situ with the crowns/heads being cut/docked and laid flat.

Photo 3-1 Line 2 easement in proximity to the project showing revegetation

Operational Vegetation Maintenance

Management of the ECZ, would be largely determined by the classification of the easement as per the vegetation risk model and operational VCR documented in Transgrid's *Maintenance Plan – Easement and Access Tracks* (Transgrid, 2020b), based on the expected yearly vegetation growth. The vegetation clearing requirements and methodology would be detailed in an operational vegetation management plan. The management of vegetation would occur on a cyclic basis, which would be determined by the vegetation response growth rate once this has been established. Based on Transgrid's existing transmission assets in the local region, the cyclic management period is expected to be four to six years.

Transgrid undertakes vegetation management of easements under its control in line with Integrated Vegetation Management (IVM) principles which entails the creation, promotion and conservation of sustainable plant communities that are compatible with the intended use of the site and manage incompatible plants and vegetation structural forms that may conflict with the intended use.

Typical integrated vegetation management methods used during vegetation management cycles for the project would potentially include:

- Selective removal of tall growing species by hand cutting and herbicide application
- Selective removal of tall growing species by herbicide application (foliar spraying)
- Pruning or removal of mature trees that encroach on safe electrical clearances

- Slashing / mulching in areas of low conductor to ground clearance to mitigate flashover and bushfire risks posed by tall growing and mid-storey vegetation
- Slashing / mulching limited areas to provide safe access and egress to works areas within the easement.

In terms of the use of mechanical management methods, within the ECZ there are areas which, over the operational life of the line, may develop, or have the potential to develop, vegetation structural forms that pose a significant risk to the integrity of the transmission line. Where dense vegetation, generally encompassing understory strata, develops there is a significant bushfire risk created especially in areas of the ECZ where conductor clearance to ground is low. These areas are referred to the wire / conductor zone. **Table 3-2** describes the operational vegetation management methods.

Figure 3-3 shows a cross section of a typical easement showing the relative areas of vegetation management.

Table 3-2 ECZ Operational Vegetation Management Methods

Method of vegetation management	Location in ECZ	Requirement	Impacts	Probable Cycle1
Selective removal of tall growing regrowth by hand cutting and herbicide application (cut stump method).	Whole	Manage tall growing vegetation with potential to infringe on safe electrical clearances.	Removal of tall growing regrowth with retention of understory and ground cover vegetation.	4-6 years.
Selective removal of tall growing regrowth by herbicide application (foliar spraying).	Whole	Manage tall growing vegetation with potential to infringe on safe electrical clearances.	Removal of tall growing regrowth with retention of understory and ground cover vegetation.	4-6 years.
Pruning or removal of mature trees that encroach on safe electrical clearances.	Whole	Manage tall growing vegetation with potential to infringe on safe electrical clearances.	Partial or whole removal of trees.	4-6 years.
Slashing2 / mulching3 of vegetation.	Areas of low conductor to ground clearance. Generally limited to the alignment of the overhead conductors (wire/conductor zone). Notwithstanding, Transgrid cannot discount the need for future potential slashing and mulching across	To mitigate flashover and bushfire risks posed by tall and/or dense growing and mid-story vegetation.	Removal of regrowth vegetation including mid story and understory shrubs to 100-200 mm.	Under the advice of Transgrid's Maintenance Team.

Method of vegetation management	Location in ECZ	Requirement	Impacts	Probable Cycle1
	all areas of the easement, aside from those areas on steep slopes where hand clearing is designated.			
Slashing / mulching of safe access work area and for narrow corridor to provide safe access for vegetation management.	Where required.	Under WHS Regulations Transgrid has an obligation to provide a safe work environment. To facilitate this the creation of safe access corridors/work zones may be required.	Removal of regrowth vegetation including mid story and understory shrubs to 100-200 mm.	No definitive cycle. Would be undertaken where required to facilitate safe access egress to work areas to facilitate vegetation management.
Management of vegetation to facilitate external requirements for Strategic Bushfire Management.	Whole.	External stakeholder requirements.	To be determined.	To be determined.

[1] Cycles for vegetation management will be determined using Transgrid's Vegetation Risk Model.

[2] Slashing is typically undertaken with a deck mounted slasher, set to 200 millimetres above the ground.

[3] Mulching is typically undertaken with a chipper/barrel mounted attachment set to 100 millimetres above the ground.

[4] Vegetation management required for the maintenance/repair of the transmission line outside the TSZ would generally only be required for emergency repairs

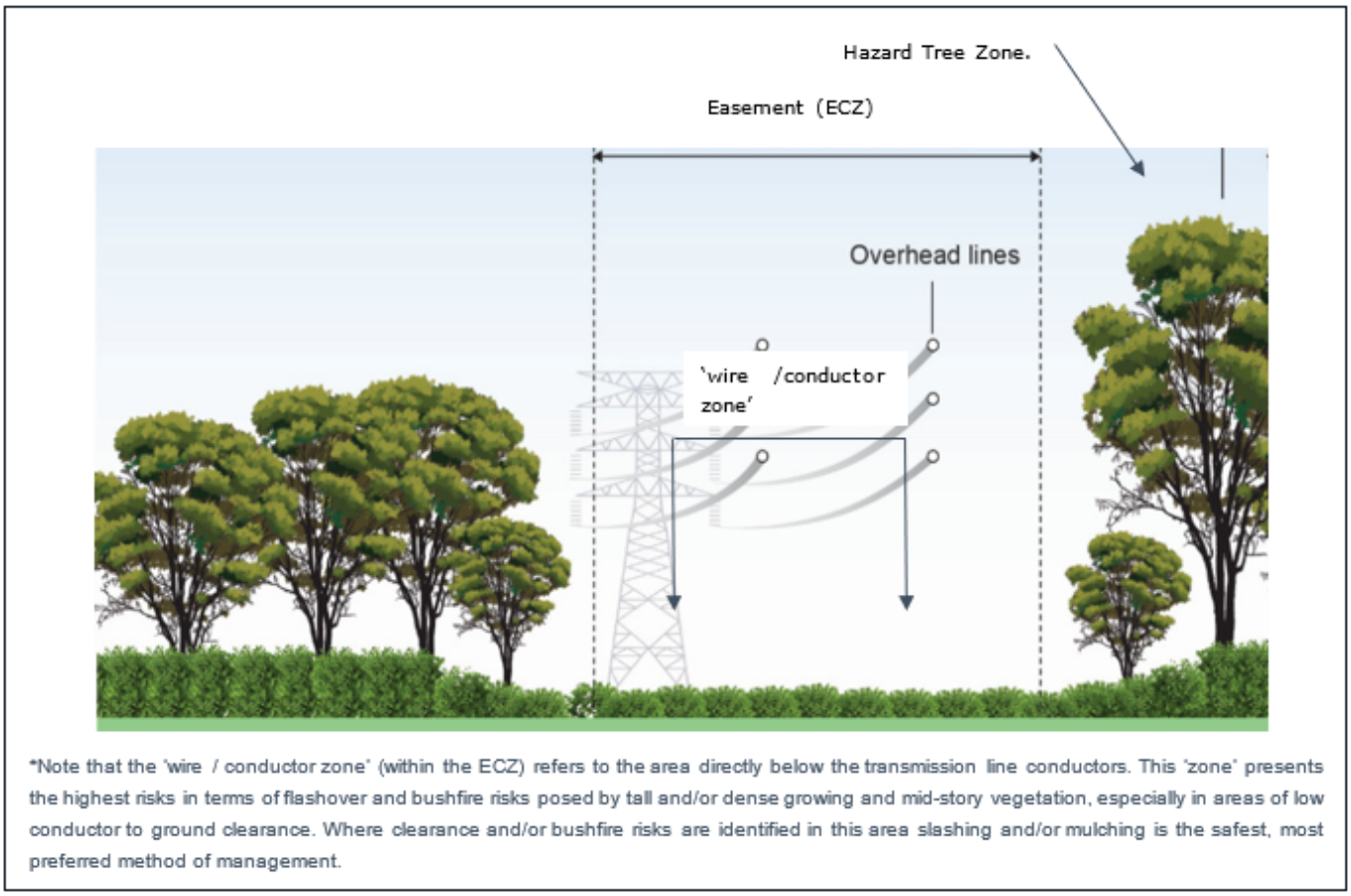


Figure 3-3 Operational Vegetation Management of a Typical Easement

Photo 3-1 shows Transgrid's Line 2 in the Lobs Hole Ravine area, which is located in close proximity to the project area. It shows a managed easement consisting of the shrub and grass layer void of the tall growth trees, which is considered to be representative of the proposed ECZ during operation.

In addition to the cyclic vegetation management within the ECZ, LiDAR inspection of the transmission line would be carried out once per year to identify potential vegetation intrusions. Any on-easement intrusion within the safe clearance limit (i.e. the VCR) would be managed in accordance with the methods outlined for off easement HTZ.

Off Easement Hazard Tree Zone

Establishing the HTZ

LiDAR analysis was performed on the project transmission connection concept design modelled under Maximum Line Operating Conditions to identify existing Hazard Trees. The outer boundary of the mapped hazard trees was then taken and buffered appropriately with consideration to terrain and potential mature tree heights within the PCTs across the project area in order to capture potential future hazard trees.

Construction Clearing Methodology

During construction, the identified hazard trees would be individually felled or pruned by hand as it is unlikely that terrain would facilitate mechanical clearing.

Operational Clearing Methodology

In accordance with Transgrid's *Maintenance Plan – Easement and Access Tracks* (Transgrid, 2020b) a LiDAR inspection of the transmission line would be carried out once per year for the life of the asset. As well as on vegetation easement intrusions, the LiDAR would also aim to identify off-easement vegetation intrusions. Any off-easement hazard trees identified as part of the annual LiDAR inspection would be individually inspected by a suitably qualified arborist to:

- Assess the health of the tree and identify any defects which may contribute to the potential failure of the tree
- Identify any habitat features associated with the identified tree (hollows / nests / occupancy etc).

Trees in poor health or that contain explicit defects would be removed or pruned.

Hazard trees may be felled, however, where constraints, such as significant damage to surrounding vegetation or potential impact to the asset, could occur hazard trees may be dismantled from the top down in a staged approach.

Where unsafe to leave tree debris in situ material may be mulched and either re-used, disposed of or respread on the easement in a manner that would not impact or smother the existing ground cover.

Where the arborist confirms that an identified hazard tree is in good health, it may be left, and no management action taken or be pruned to remove intrusions from individual branches or the crown of the tree. For tree pruning, identified elevated branches/crown are accessed by climbing or using an elevated work platform (where terrain allows). If a tree has multiple branches requiring removal a staged approach would be undertaken.

All tree pruning operations would be carried out in accordance with the Australian Standard *AS4373-2007 Pruning of Amenity Trees*.

3.3.5. Details on any upgrades to Elliott way

As identified in the route assessment, modification of the intersection of the substation site access road and Elliott Way are required to facilitate access to the substation and support the swept path of the OSOM vehicles, refer to **Section 6.5.2.2**. Potential works required along Elliott Way within the NPWS jurisdiction would be associated with the intersection of the new access track leading to Structures 12 and Structure 13 (first two structures on the western side of Talbingo Reservoir) with Elliott Way.

To make for a safer access and egress to and from Elliott Way and the access track to Structures 12 and Structure 13, measures would be incorporated into the final design under consultation with NPWS to enable vehicles to safely stop for personnel to open and close the access track gate. Such measures may include:

- The placement of the gate at a suitable distance along the track as to avoid vehicles parking on/adjacent to Elliott Way
- Incorporation of a pull over bay alongside the existing Elliott Way road surface.

In addition appropriate safety measures including the use of guard rails will be incorporated into the design where required

The final designs would be provided to NPWS for review and endorsement. Further details on the intersection of the access tracks to the structures from Elliott Way is discussed in Section 4.3.7 of Submissions Report.

3.3.6. Heavy movements along Elliott Way

Only light vehicles would travel between project area east and project area west with movements expected to be intermittent and low in frequency and limited to up to ten movements per day. The traffic movements would be associated with site inspections, minor deliveries or movements of construction personnel between the work areas. No heavy vehicle movements would occur between the project area east and project area west.

The extent of heavy vehicle movements along Elliott Way would be limited to heavy vehicles servicing the construction activities associated with the substation and the transmission connection west of Talbingo Reservoir. Additionally, as detailed in **Section 3.1.6**, water tankers may access the T2 Tailbay site to obtain water for construction purposes in project area west but only if water cannot be obtained from the other designated water supply locations such as the town water supply or Paddy's River Flat campground. Any truck movements for the purpose of obtaining construction from the T2 Tailbay site would be limited to up to eight movements per day.

3.3.7. Rehabilitation

A rehabilitation plan would be prepared to guide the long-term rehabilitation of applicable parts of the project area where permanent infrastructure and management (i.e. clearing under the transmission lines) is not required. The rehabilitation plan would be developed in consultation with NPWS and FCNSW prior to construction and would be consistent where relevant with the approved Snowy 2.0 Rehabilitation Management Plan.

All rehabilitation activities would be the responsibility of Transgrid and be carried out in accordance with the rehabilitation plan.

3.3.8. EIS

In addition to the detailed clarifications provided in **Sections 3.3.1** to **Section 3.3.5** above, some minor errors or discrepancies in the EIS were identified following public exhibition. **Table 3-3** lists the relevant section of the EIS chapter or appendix, states the error or discrepancy and provides relevant clarification.

Table 3-3 Clarifications of certain matters in the EIS

EIS Chapter / appendix reference	Error/discrepancy	Clarification
Section 4.1.2	Table 4-1 identifies that consent under Section 138 of the *Roads Act 1993* is not required for the section of Elliott Way managed by Snowy Valleys Council. However, it does not address the section of Elliott Way managed by NPWS.	Consent under Section 138 of the *Roads Act 1993* is not required for either section of Elliott Way managed by Snowy Valleys Council or the section managed by NPWS. Both sections are unclassified regional road, for which a *Roads Act 1993* approval is not required for the reasons set out in Table 4-1 of the EIS.
Appendix D and Section 7.6.2	The traffic and transport assessment and Section 76.2 of the EIS states that Elliott Way is an approved B-double route. This is not true east of the KNP boundary.	Elliott Way is not a B-double route east of the KNP boundary. This is not expected to have implications for the project as B-doubles would not use this section of Elliott Way.

3.4. Updated mitigation measures

The EIS identified the proposed approach to environmental management and the mitigation measures that would be adopted to avoid or reduce the potential impacts of the project. These measures were summarised in Section 8.2 of the EIS.

Following public exhibition of the EIS and after consideration of the issues raised in the submissions, revisions to the mitigation measures included in the EIS have been identified. Mitigation measures have been revised in order to further minimise environmental impacts and meet the expectations and requirements of stakeholders. The full list of mitigation measures including all revised environmental mitigation measures is provided in **Appendix B**.

The CoA would guide subsequent phases of the project. Some detailed design work and associated investigations are being undertaken separately from, and in parallel with, the EIS. Post approval design, as well as construction and operation, would be undertaken in accordance with these updated mitigation measures and CoA.

4. Statutory context

This chapter provides an overview of the statutory context for the project and provides a summary of the statutory requirement changes that would occur as a result of the amended project.

4.1. The assessment and approval process

In recognition of the critical role that Snowy 2.0 would play, the Minister for Planning and Public Spaces declared Snowy 2.0 and the project to be CSSI under the provisions of the EP&A Act on 7 March 2018. The declaration acknowledges that Snowy 2.0 and the project are critical to the State for environmental, economic or social reasons.

As a CSSI project, the project is subject to Part 5, Division 5.2 of the EP&A Act which requires the preparation of an EIS in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the NSW Minister for Planning and Public Spaces. In addition to requiring approval from the NSW Minister for Planning and Public Spaces, the project has been determined to be a controlled action under the EPBC Act and will require approval from the Commonwealth Minister for the Environment. The Minister for the Environment has accredited the NSW planning process for the assessment of the project, and it will be assessed under the Bilateral Agreement process between the Commonwealth and NSW Governments. Therefore, a single EIS was prepared to address the requirements set out by DPE and the Commonwealth Department of Agriculture, Water and the Environment (DAWE).

In accordance with the EP&A Act and EP&A Regulation, the EIS was placed on public exhibition for a period of 42 days, between 23 February 2021 and 5 April 2021. During the exhibition period, interested stakeholders and members of the community were able to review the EIS online or at display locations, participate in consultation and engagement activities, and make a written submission to the DPE for consideration in its assessment of the project.

In accordance with clause 192(2) of the EP&A Regulation, an application may, with the approval of the Secretary of DPE, be amended at any time before the application is determined. Transgrid has applied for the Secretary's approval to amend the project in the manner described in this Amendment Report in accordance with clause 192(2) of the EP&A Regulation.

This Amendment Report outlines the project design and construction changes to the project (the amended project) and assesses the associated environmental impacts.

5. Engagement

This chapter describes the stakeholder engagement and other consultation activities undertaken following the exhibition of the EIS and development of the amended project.

5.1. Consultation following the EIS exhibition

Chapter 6 of the EIS described the consultation that was carried out prior to the exhibition of the EIS and the consultation activities that were proposed as part of the exhibition of the EIS.

Following the exhibition of the EIS, there has been no further widespread engagement activities with the wider public. However, a number of consultation and engagement activities have been carried out with a range of stakeholders including relevant government agencies, Snowy Valleys Council, Snowy Hydro and Aboriginal stakeholders. Key consultation activities that have been undertaken are summarised in the following sections.

5.1.1. Government agencies

Engagement with government agencies in relation to key issues raised in the submissions, including further options assessment and analysis, acquisition, project amendments and construction methodologies has been undertaken. The consultation activities and key issues discussed with each government agency are summarised in the following sections.

5.1.1.1. DPE

A meeting was held between DPE and the project team on 6 May 2021 to discuss a number of the key issues raised by government agencies, organisations and the community in their submissions and brief DPE on the proposed strategy in addressing these issues.

Key issues included:

- The assessment of options and alternatives as described in Chapter 3 of the EIS. Due to the number of submissions relating to requests to underground the proposed transmission connection or assess other technical alternatives, Transgrid advised DPE that a more thorough assessment of connection options would be undertaken during the response to submission phase. Transgrid engaged extensively with DPE throughout the preparation of the detailed *Transmission Connection Project for Snowy 2.0 - Options Report* (EMM, 2021) (Options Report), providing a presentation for each key stage of the assessment process and responding to formal requests for information. This engagement is summarised in the section below and the Options Report is provided as Appendix D of the Submissions Report
- Requirement to refine/reduce the project footprint to better reflect the anticipated construction and operation footprints as a result of the further design works since the exhibition of the EIS. This refinement to the disturbance area is a key component of this Amendment Report
- The need to carry out further archaeological surveys in areas of Aboriginal archaeological potential that were not previously subject to test excavation works
- Preparation of a more thorough and detailed Biodiversity Offsets Strategy (BOS) and update the BDAR to address key issues raised by Biodiversity, Conservation & Science (BCS) within the Energy and Science Group (EESG) within DPE. DPE were further consulted as part of the preparation of the detailed BOS with the complete report provided in Appendix I of the revised BDAR provided in **Appendix C**

- Discussions with both DPE and NPWS regarding the development of the Options Report and the results of the options assessment and analysis. The engagement activities DPE and NPWS with regarding the preparation of the Options Report is summarised below.

Follow up meetings were held on 18 June 2021, 16 July 2021 and 24 September 2021 to inform DPE on the progress of addressing the issues previously discussed and obtain further feedback. Additionally, further engagement including formal meetings and response to information requests was carried out up until the lodgement of the Submissions Report and this Amendment Report.

Engagement regarding the further options assessment and analysis

On 18 June 2021, a meeting was held with DPE and NPWS to discuss the requirements of the Submissions Report, including the proposed scope of the Options Report. It was agreed at this meeting, a subsequent meeting would be held with DPE and NPWS to present the results of the initial screening assessment of options against the project objectives and evaluation criteria.

The results of the option screening assessment were presented to DPE and NPWS at a meeting on 16 July 2021. Following this meeting, correspondence was received from DPE dated 3 August 2021 requesting additional detailed information on three of the four options (Option 5, Option 6 and Option 8) that passed the initial screening assessment, plus further details on Option 3 which did not pass the screening assessment. This additional information was provided to the DPE via a memo dated 6 August 2021.

Subsequent meetings were held on 10 and 30 August 2021 and 3 October 2021. Following these meetings, additional detailed information was requested in correspondence from DPE received on 13 and 17 August 2021, and verbally at a meeting on 30 August 2021. The purpose of these additional information requests was to further understand the design considerations and significance of impacts associated with options that had been proposed to move forward to detailed analysis from the screening assessment and to further consider two options.

Three further detailed memos addressing the information requests were prepared by EMM, in collaboration with Snowy Hydro and Transgrid, and provided to DPE on 20 August 2021, 10 September 2021 and 1 October 2021.

Additional matters to be addressed in the Submissions Report

In a meeting between DPE, Transgrid and Snowy Hydro on 14 December 2021, DPE requested that the Submissions Report include further details on traffic and transport matters. This included a broader assessment and summary of:

- Transport haulage routes to both project area east and project area west
- Assessment of road upgrades required/not required including State roads, regional (Council) roads and road/access within the KNP
- The projects impact on roads within KNP as no upgrades have been identified
- Limited details on intersections to be updated
- Transgrid need to demonstrate an assessment of swept paths, identify any land required and proposed design of intersections
- Oversize vehicles using Elliott Way and Link Road.

Further details regarding these traffic and transport matters have been incorporated in this report and into the Submissions Report.

DPE have also raised concerns on several occasions regarding the potential visual impacts of the project and requested that further investigations are carried out to identify potential mitigation measures to reduce these impacts.

These further investigations into the potential migration measures are documented in the *Snowy 2.0 Transmission Connection Project - Supplementary Landscape and visual impact assessment* (Landform Architects, 2022) (Supplementary LCVIA). The Supplementary LCVIA is summarised in Section 4.3.8 of the Submissions Report and provided as Appendix E to this report.

5.1.1.2. DAWE

A meeting was held with DAWE on 17 June 2021 to provide a general project update in relation to matters of national environmental significance relevant to the project. Key outcomes of the meeting included:

- Transgrid advised that further assessment of impacts to Booroolong frog *(Litoria booroolongensis*), listed as Endangered under the EPBC Act would be carried out as part of the preparation of the revised BDAR. This included more detailed habitat mapping and development of more robust mitigation measures to further reduce potential impact to the species in the Ravine/Lobs Hole area
- DAWE advised that greater glider was recently included in the Biodiversity Assessment Method Calculator (BAM-C) and therefore the project would be subject to the calculation of offset credits for this species. Transgrid advised that the BDAR and BOS would be amended to reflect this change
- DAWE advised that the assessment of impacts on Commonwealth migratory species needed to be clearer in the BDAR. Transgrid advised that the BDAR would be revised to better clarify what the predicted impacts on migratory species are
- DAWE was accepting of the level of assessment and described impacts on Australian Alps National Parks and Reserves and the Snowy Mountain Scheme, which are listed on the Nationally Heritage List.

Further details about the above matters are detailed in the revised BDAR in **Appendix C**.

5.1.1.3. BCS

A number of briefings and discussions have been undertaken between the project team and BCS following exhibition of the EIS.

Formal briefings have been held on 14 May 2021, 16 June 2021 and 21 July 2021 to discuss matters raised in their submission, project amendments and further biodiversity survey requirements. In addition, numerous technical meetings were held with specialists to discuss specific aspects such as threatened species and survey methodologies.

Key issues/outcomes raised during these meetings included:

- Introduction of the six distinct management zones within the disturbance area, how they were derived and proposed methods of vegetation clearing within each zone during both construction and ongoing operation
- The application of partial vegetation loss within the ECZ and HTZ and how it applies to the assessment of biodiversity impacts and the reassessment of biodiversity credits within that zone
- Agreement on the further survey methodology for threatened species including assessing potential nest trees and incorporating the use of drone technology
- Further assessment of impacts to Booroolong frog with consideration to survey outcomes and mapped habitat carried out as part of the Snowy 2.0 Main Works. Additional technical meetings were held to discuss more robust mitigation measures and monitoring requirements for Booroolong frog.

Further details about the above matters are detailed in the revised BDAR in **Appendix C**.

5.1.1.4. Heritage NSW — Aboriginal cultural heritage

A meeting was held with the project team and Heritage NSW - Aboriginal cultural heritage (HNSW) on 20 May 2021 to discuss their submission on the EIS which raised that the assessment of the project area for Aboriginal cultural heritage purposes could be improved. During the meeting, Transgrid agreed with HNSW that further investigation of two areas of potential archaeological deposit (PAD) (PAD 01 and PAD 02) would be carried out to better understand the scale and nature of potential impacts on Aboriginal cultural heritage in project area east. It should be noted that these PADs are located within the existing EIS disturbance area and in areas not subject to any amendments.

Following a chance find in project area east during the response to submissions phase, Transgrid advised HNSW that further investigation and test excavation works at Str5 PAD would be included in conjunction with the test excavation works to be carried out for PAD 01 and PAD 02. Subsequently, the Aboriginal Cultural Heritage Assessment Test Excavation Methodology was provided to HNSW for review and comment on 14 July 2021. HNSW provided no further comments on this methodology.

HNSW was also contacted on 24 August 2021 to confirm if test excavations would be required at Str5 PAD after the further archaeological surveys concluded that it would be extremely unlikely for subsurface deposits to be present at this location. On 24 August 2021, HNSW provided written confirmation that test excavations would not be required at Str5 PAD.

The findings from the further investigations and test excavations are included in the Addendum Aboriginal Cultural Heritage Assessment Report (AACHAR) provided in **Appendix D** and summarised in **Section 6.3**.

5.1.1.5. Environment Protection Authority

Meetings were held with the Environment Protection Authority (EPA) on 21 July 2021 and 3 August 2021 to discuss the proposed water quality monitoring strategy and seek input in devising the strategy. This generally included consultation on:

- Transgrid's proposed water quality monitoring locations and frequency of monitoring events
- Proposed approach for baseline construction and operational water quality monitoring
- The adoption and agreement on the appropriate level of protection and associated water quality trigger levels for waterways relevant to the project
- Appropriate actions to be implemented in the event of water quality triggers being are exceeded
- The suite of mitigation measures proposed to manage potential impacts on surrounding water courses
- Review of Snowy 2.0 monitoring sites and background water quality data

The water quality monitoring strategy is provided in **Appendix E**.

5.1.1.6. Forestry Corporation of NSW (FCNSW)

A meeting between the project team and FCNSW was held on 16 July 2021 to discuss the issues raised in their submission pertaining to bushfire management, ecology and biosecurity, transport management, construction clearing and earthworks and post construction rehabilitation.

Key outcomes and issues raised in in the meeting included:

- FCNSW requested that the fire prevention control measures proposed for the project are consistent with those outlined in FCNSW's *Standard Operating Procedure (19/51) Plantation Harvesting, Haulage And Site Preparation Fire Restrictions*
- Transgrid and its contractor are committed to consulting with FCNSW during the preparation of the post approval biodiversity management plan, rehabilitation plan, traffic management plan, spoil management strategy and other relevant post approval plans, should the project be approved
- Further clarifications on the vegetation clearing methodology within each management zone was provided. Further details on the clearing methodology are captured in **Section 3.3.5** and **Section A.4** of the revised project description in **Appendix A**
- The use of mechanical tree pushers as noted in the FCNSW submission was not supported due to the increased risk of erosion caused from the complete removal of the tree root structures. It was clarified by Transgrid that tree pushers would be used for the complete removal of the root balls where civil works would be required.

5.1.1.7. Snowy Valleys Council

Snowy Valleys Council advised Transgrid in July 2021 that it could not meet the full estimated water demand requirements for project area west (approximately 40,000 kilolitres) from the town water supply network without upgrades to the system being made. As such, Transgrid has amended the project to include alternative construction water uptake areas at the existing Snowy Hydro T2 Tailbay site at Talbingo Reservoir and Paddy's River near Paddy's River Flat Campground (refer to **Section 3.1.6**).Snowy Valleys Council advised that they currently take water for construction and other purposes from Paddy's River near the entrance to the Paddy's River Flat camping area and advised Transgrid that this would be a suitable location for a water supply point.

Snowy Valleys Council were further consulted in January 2022 regarding the project traffic movements on the Council road network. This includes the provision of the estimated number and type of vehicle movements, in response to potential concerns the project may have on the condition of local road, particularly Elliott Way. Snowy Valleys Council responded on 2 February 2022 noting that they had no concerns regarding the number and type of vehicle movements on the local road network and potential risk of damage to roads such as Elliott Way. Notwithstanding this, Transgrid would commit to a road dilapidation survey of Elliott Way and other potential local roads (to be agreed to with NPWS and Council) utilised by the project being carried out prior to commencing construction.

5.1.1.8. Transport for NSW

Transgrid carried out further consultation with Transport for NSW (TfNSW) in January 2022 regarding heavy vehicle haulage, particularly transport on the classified road network. As part of the consultation, Transgrid confirmed the following:

- A transport haulage route assessment for OSOM vehicles was completed from both Port of Newcastle and Port Kembla for the delivery of high mass equipment (transformers and reactors) to the proposed substation site, refer to **Section 6.5.2.2**
- Two locations on the Snowy Valley Council road network were identified as requiring minor works, refer to **Section 6.5.2.2**
- No areas on the classified road network along the haulage route under the jurisdiction of TfNSW were identified as requiring modification or upgrade works
- Within six to 12 months prior to the delivery of the high mass substation equipment (transformers and reactors), the OSOM permit application process would be initiated.

TfNSW noted that providing the OSOM permits are obtained prior to the haulage of the high mass substation equipment and that they are made aware of any unforeseen impacts to classified roads as part of the application process, TfNSW had no further issues to raise regarding the project.

5.2. Aboriginal stakeholder consultation

As part of the ongoing development of the amended project, consultation has continued to be undertaken with representatives of the Aboriginal community in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2020* (Office of Environment and Heritage, 2020).

Following the completion of stakeholder consultation carried out to inform the development of the exhibited *Aboriginal and Aboriginal Cultural Heritage Assessment Report*) (Jacobs 2020) (ACHAR), a draft test excavation methodology was developed to guide the investigations of ST PAD 01, ST PAD 02, and Str5 PAD. The draft test excavation methodology was distributed to the RAPs on 14 July 2021 with a 28-day period for review and comment. Of the four groups that responded, three stated they agreed with the approach to the test excavations and one group responded that they had no comments at this stage. The methodology was finalised following receipt of comments and the end of the 28-day consultation period. Two RAPs were involved in the test excavations in August 2021.

The RAPs were provided with a draft copy of the AACHAR with an invitation to provide comment on the outcomes of the revised AACHAR for the amended project between 10 September and 11 October 2021. One response was received from a RAP, which indicated support for the project. Overall, the additional consultation did not raise any substantial issues from the RAPs. Further detail regarding the additional consultation and feedback received from RAPs as part of the amended project is provided in Section 2 of the AACHAR (**Appendix D**).

Transgrid will continue to consult with the Aboriginal community throughout the project, including (but not limited to) if any Aboriginal objects are unexpectedly found during construction.

5.3. Future consultation

Transgrid will continue to consult with the community, government agencies and other stakeholders during the pre-construction, construction and commissioning phases.

As part of the ongoing Community Engagement Plan, the Transgrid community information line and community email address will continue to be available during construction. Targeted consultation methods, such as letters, notifications, signage and face-to-face meetings, will also continue. Updates on progress of the amended project will be available on the Transgrid website and social media platforms.

6. Assessment of impacts

This chapter provides a summary of the additional assessments undertaken to assess the amended project. These assessments have been undertaken to identify and assess the potential construction, operational and cumulative impacts associated with the amended project as outlined in **Chapter 3**. Where required, additional or revised mitigation measures have been proposed.

6.1. Assessment approach

Chapter 7 of the EIS provided an assessment of the key environmental aspects for the project as identified in the SEARs.

On 6 July 2021, DPE confirmed that an amendment report was appropriate to describe the amendments and address the key environmental aspects associated with the amended project. This Amendment Report and its appendices have been prepared in consideration of the SEARs issued for the project.

Consideration of the potential environmental impacts was undertaken as part of the development of the amended project, and an assessment made of the potential changes compared to the environmental impacts described in the EIS. A summary of the environmental aspects potentially affected by the amended project is provided in **Table 6-1**. The environmental aspects considered to have a change in impact from those described in the EIS, included biodiversity, Aboriginal heritage, water, transport, visual impacts, and noise. Impacts associated with other environmental aspects would be unchanged from those assessed in the EIS and, therefore, are not required to be assessed further in this Amendment Report.

The revised biodiversity and Aboriginal heritage assessments were supported by further investigations and have been documented in **Appendix C** and **Appendix D**.

Table 6-1 Summary of environmental aspects considered to be potentially affected by the project amendments

Aspect	Project amendments						
	Reduced disturbance area	Six management zones	Access track amendments and laydown area	Increased substation footprint	Alternative spoil disposal areas*1	Water uptake in project area west	Removal of the helipad
Biodiversity	✓	✓	✓	✓	-	-	-
Aboriginal Heritage	✓	✓	✓	✓	-	-	-
Non-Aboriginal Heritage	-	-	-	-	-	-	-
Water	-	-	-	-	-	✓	-
Land	-	-	-	-	-	-	-
Transport	-	-	-	-	-	✓	-
Visual impact	-	-	-	✓	-	-	-
Noise and vibration	-	-	-	-	-	✓	-
Air Quality	-	-	-	-	-	-	-
Hazards and risks	-	-	-	-	-	-	-
Social and economic	-	-	-	-	-	-	-
Waste	-	-	-	-	-	-	-
Cumulative	-	-	-	-	-	-	-

*1 The emplacement areas were assessed as part of the *Snowy 2.0 Main Works EIS* (EMM, 2019).

6.2. Biodiversity

A revised BDAR was prepared following the exhibition of the EIS. The revised BDAR responds to the submissions from NPWS and BCS and assesses the impacts associated with the project amendments.

The revised BDAR is provided in **Appendix C**, with the updates are summarised below.

6.2.1. Assessment methodology

The methodology used for the assessment of biodiversity impacts for the amended project was consistent with the methodology presented in the exhibited BDAR. The revised BDAR included:

- New calculations of the reduced disturbance area. This included the assessment of the extent of direct and indirect impacts of six management zone areas, as well as updating offset calculations for ecosystem and species credits
- Results of the additional survey for threatened orchids (including *Caladenia montana*) carried out in October 2020
- Additional diurnal and nocturnal surveys in July / August 2021 for threatened forest owls and the Gang-gang Cockatoo (*Callocephalon fimbriatum*). The survey also identified potential nest trees suitable for these species
- A bird/bat collision risk assessment
- Identification of any additional mitigation measures.

The revised BDAR is consistent with the requirements of the Biodiversity Assessment Method (BAM) (DPIE, 2020).

6.2.2. Existing environment

The existing environment is described in Section 7.1.2 of the EIS and is still applicable to the amended project.

The results of additional surveys carried out in late 2020 and post EIS display are summarised below.

6.2.2.1. Threatened orchids

Caladenia montana

The surveys for *Caladenia montana* in October 2020 identified several club spider orchid species of the genus *Caladenia* (see **Photo 6-1** and **Photo 6-2**). The surveys identified 166 plant clusters, varying from 1 to 12 plants (clusters were recorded when plants were within one metre of one another).

Samples were sent to the Australian National Botanical Gardens in Canberra. Verbal communication (personal communication 15 January 2021) from the Australian National Botanical Gardens (Mark Clements) advised that the plants received consisted of at least two species:

- *Caladenia orestes*
- *Caladenia montana/fitzgeraldii.*

These species are difficult to distinguish from one another by morphology alone. *Caladenia montana* and *Caladenia fitzgeraldii* can only be distinguished by DNA analysis. For the revised BDAR, a conservative approach has been taken to assume that the orchid species of the genus *Caladenia* are all *Caladenia montana*.

Photo 6-1 Caladenia montana with dark red sepals identified in the disturbance area

Photo 6-2 Caladenia montana with greenish sepals identified in the disturbance area

Other threatened orchids

Surveys for the candidate threatened terrestrial orchid species were undertaken in suitable habitats throughout the 2018, 2019 and 2020 survey periods and targeted *Pterostylis alpine, Pterostylis foliate, Pterostylis oreophila, Thelymitra alpicola, and Thelymitra atronitida*. None of these species were identified within the project area during these surveys.

6.2.2.2. Additional surveys post EIS exhibition

Additional targeted surveys were carried out following the EIS exhibition and in response to submissions. The additional targeted surveys comprising of:

- Target Gang-gang Cockatoo (*Callocephalon fimbriatum*) survey, and targeted tree hollow survey and mapping between 9-14 July 2021
- Two nocturnal stag watching events between 2-9 August 2021 and 12-19 August 2021 to target mapped potential nest trees.

The findings from these surveys are summarised below and full details are provided in the revised BDAR provided in **Appendix C**.

Gang-gang Cockatoo

The targeted nest tree survey in July 2021 for Gang-gang Cockatoo (*Callocephalon fimbriatum*) was undertaken outside of the species breeding season. As such, the likelihood of breeding habitat being present was determined by the number of potential nest trees identified as meeting the habitat constraints criteria (trees containing equal to or greater than 100 millimetre (diameter of entrance) tree hollows at a height of equal to or greater than nine metres).

The Gang-gang Cockatoo (*Callocephalon fimbriatum*) was regularly seen flying over the project area in pairs or family groups that suggests some habitats are preferred within the project area as breeding habitat for the Gang-gang Cockatoo (*Callocephalon fimbriatum*). During surveys for the Snowy 2.0 Exploratory Works and Main Works BDARs (EMM Consulting, 2017 and 2020a), Gang-gang Cockatoo (*Callocephalon fimbriatum*) pairs were also observed investigating tree hollows in PCT 1196 and PCT 302.

A total of 212 potential nest/roost trees suitable for Gang-gang Cockatoo (*Callocephalon fimbriatum*) were recorded during the targeted nest tree survey in July 2021. Many of these hollow bearing trees with suitable nesting habitat were observed in PCT 300, PCT 1196 and PCT 302. Hollow tree density plots determined an average of between 2.4 to five hollow trees per hectare which demonstrates a high availability of important breeding habitat in project area west. There is approximately 56.97 hectares of potential breeding habitat in the disturbance area.

Nocturnal birds

Three additional surveys for threatened nocturnal birds that focused on forest owls (Barking Owl (*Ninox connivens*), Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*) were carried out in July and August 2021. These targeted surveys were carried out in the breeding season for these species.

The nest tree survey and mapping identified 60 hollow bearing trees considered suitable for forest owl breeding. Four trees were classed as very good, and 54 trees classed as good. Most of the suitable forest owl trees were concentrated in project area west with only six suitable trees within project area east.

No owl pellets, evidence of whitewash or other signs of animal activity was observed at any of the trees during surveys.

The findings from these surveys are as follows:

- Barking Owl (*Ninox connivens*) and Powerful Owl (*Ninox strenua*) were not recorded during the surveys. This is consistent with the results from the Snowy 2.0 Exploratory Works and Main Works BDARs (EMM Consulting, 2017 and 2020a) where these owls were not found despite targeted call playback surveys in areas of seemingly suitable habitat. Given the extent of recent survey for the Barking Owl (*Ninox connivens*) and Powerful Owl (*Ninox strenua*) and the failure to detect this species, it is considered unlikely to occur in the project area with breeding habitat not present
- Masked Owl (*Tyto novaehollandiae*) was recorded calling in the hour after sunset on three separate occasions during the August 2021 survey, within Bago State Forest. Of the three times a Masked Owl (*Tyto novaehollandiae*) was heard calling, two of these occasions were on the road edge of Elliott Way, and the edge of the Line 64 cleared easement. The third occasion with 15 minutes of sunset was from an area with a high density of large hollows and is considered likely that the bird was roosting at this location and present in the project area.

6.2.3. Assessment of potential impacts

6.2.3.1. Construction

Direct impacts

The direct impact associated with vegetation clearing has been calculated using the revised disturbance area for the amended project, for both full and partial clearing areas. The impact does not include land within the approved Snowy 2.0 disturbance footprint which partially overlaps with the project. The impact assessed is

based on vegetation clearing zones and comprise total clearing zones and partial clearing zones as discussed in **Section 3.3.4**.

The amended project would result in the direct impact to about 118.27 hectares of native vegetation. This includes full clearing of about 71.03 hectares of vegetation within four management zones (TSZ, TPZ, ATZ and SZ) and partial clearing of 47.24 hectares within two management zones (ECZ and HTZ) as summarised in **Table 6-2**.

There would be no direct impacts to any threatened ecological communities (TECs). The full clearing of native vegetation would result in the direct removal and permanent loss of habitat on threatened species habitat as outlined in **Table 6-3**.

Table 6-2 Summary of direct impacts to vegetation within the reduced disturbance area

PCT	PCT name	Impacted area (ha)		
		Amended project		Project as per the EIS
		Fully Cleared	Partial Cleared	
285	Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	2.2	0	1.77
300	Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	14.86	17.15	43.28
1196	Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	24.94	2.31	23.95
296	Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	8.25	10.77	21.15
302	Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	0.58	1.72	3.12
729	Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	14.07	12.81	34.72
999	Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	6.13	2.47	7.61
Sub total		71.03	47.24	135.60
Total impacted vegetation		**118.27**		**135.60**

Table 6-3 Summary of direct impacts on threatened species habitat (species credit species)

Species name	Common name	EPBC Act	BC & FM Act	Impacted habitat (ha)	
				Amended project	Project as per the EIS
Birds					
Callocephalon fimbriatum	Gang-gang Cockatoo (breeding)	-	V	89.2	69.60
Tyto novaehollandiae	Masked Owl (breeding)	-	V	10.86	3.12
Amphibians					
Litoria booroolongensis	Booroolong Frog	E	E	1.66	3.12
Mammals					
Cercartetus nanus	Eastern Pygmy-possum	-	V	110.8	133.06
Petaurus australis - endangered population	Yellow-bellied Glider Population on the Bago Plateau	-	EP	52.62	61.22
Flora					
Caladenia montana			-	V	9.34

Key: E = endangered, EP = endangered population, V = vulnerable

Over the operational life of the project within the partial clearing management zones (ECZ and HTZ), it is expected that these PCTs would continue to exist in the partially cleared areas with a modified forest structure and flora and fauna diversity. This vegetation would retain some biodiversity value, in particular serving to protect and prevent soil degradation and erosion, and provide shelter, food resources, cover and habitat connectivity for some fauna groups and species. The removal of habitat in the partially cleared areas would largely be associated with the clearing and ongoing suppression of trees and vegetation over 200 mm in height and old growth and hollow-bearing habitat trees in the HTZ. While there would be preservation of ground cover vegetation, it is assumed that the loss would have a complete impact on threatened species.

The change in the structure and floristics of the habitat is expected to directly remove the habitat of threatened species, including:

- *Caladenia montana:* This would include disturbance of habitat
- Gang-gang Cockatoo and Masked Owl (breeding habitat): This would be through the removal of potential and actual hollow nest sites and human activity within the buffer of nesting trees near the easement
- Booroolong Frog: This would be through removal and disturbance of a small area of potential dispersal and sheltering habitat along Sheep Station Creek, Wallaces Creek and close to Yarrangobilly River
- Arboreal mammals Eastern Pygmy-possum, and Yellow-bellied Glider: This would be through removal of the canopy and food and shelter resources.

Indirect impacts

Prescribed biodiversity impacts (as defined by the BAM) are in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. The amended project does have the potential to result in prescribed biodiversity impacts, namely impacts to connectivity and movement for gliding mammals (i.e. fragmentation by vegetation clearing and collision with fences), vehicle strikes, noise vibration, dust, light and contaminants, impacts on water quality for aquatic species and the Booroolong Frog. These impacts are considered to be consistent with the impacts discussed in Section 7.1.3.1 of the EIS.

6.2.3.2. Operational impacts

The operational impacts associated with the amended project such as habitat connectivity, collisions with transmission lines and substation lighting are considered to be consistent with the impacts discussed in Section 7.1.3.2 of the EIS.

Bird/Bat collision risk assessment

A bird/bat collision risk assessment was carried out as part of the revised BDAR. This assessment investigated the risks of collision and electrocution of birds and bats, assessment of the species that may be impacted, likelihood or extent of impact and recommended mitigation measures.

This assessment is provided as Appendix J of the revised BDAR, and the findings are summarised as follows.

There are three main risks to birds/bats associated with the overhead transmission lines (high-voltage transmission lines, as well as smaller distribution lines). These include:

- Mortality via collision with transmission line or the guy wires that support meteorological masts
- Mortality via electrocution from the transmission lines or supporting structures, e.g. perching or nesting on steel lattice structures, short circuit, touching two live wires or a live and earthed component simultaneously
- Displacement/habitat loss to accommodate the infrastructure.

The highest risks to birds and bats from the project are considered to be to species which are:

- Large bodied
- Have poor flying ability, or low agility
- Nocturnal, or disperse at dawn or dusk
- Likely to migrate into and out of the region from nearby wetlands / or water bodies with wetlands habitat features and are therefore required to cross the project
- Threatened or conservation significant species which have low population numbers
- Require a longer take off / landing distance (e.g. birds / bats with larger wing spans).

All the bat species identified within the project area have low potential for collision given they all fly within or below the canopy, and have smaller wing spans. The Grey-headed Flying-fox (*Pteropus poliocephalus*) may have potential to collide with transmission lines, given wing-span and habit of flying high above the canopy distant from camps sites. However, this species was considered to have a low likelihood for occurring in the project area, given the closest known camp is over 30 kilometres from the project, and no flying-foxes were recorded in any surveys.

The risk assessment determined that species with:

- A higher ‘likelihood’ of impacts include:
  - Larger to very large birds such as cormorants, egrets, Straw-necked Ibis, Black Swans and Pelicans
  - Smaller to moderate, but heavier bodied, flock forming species such as ducks and grebes
- Species with moderate ‘likelihood’ of impacts include:
  - Larger birds such as moderate to large raptors which have good eyesight, but may be ‘behaviourally distracted’ when swooping for or carrying prey, some are also fast fliers and have less time to change course (such as raptors and Grey-headed Flying-fox, if present)
  - Smaller to moderate night dispersing species or nocturnal predators such as forest owls.

- Species with elevated consequence of potential impacts include:
  - Species with smaller global or local populations such as the White-bellied Sea-eagle (*Haliaeetus leucogaster*) or species with decreasing populations (e.g. the Brown Goshawk (*Accipiter fasciatus*)
  - Species with conservation ratings such as threatened species (White-bellied Sea-eagle, Peregrine Falcon (*Falco peregrinus*), Little Eagle (*Hieraaetus morphnoides*), Masked Owl, Powerful Owl).

The bird/bat collision risk assessment concluded that with the implementation of effective mitigation measures, the likelihood of collision with transmission lines is considered to be relatively low. Regardless, collision remains a possibility, given that the project spans the Talbingo Reservoir which has some wetland habitat features which attracts some waterbird species at risk of collision. Raptors, owls and potentially cockatoos are considered to have an overall risk of collision. However, consequences to individual species are not considered to be significant when overall population numbers and conservation status are considered. There is minimal evidence of substantial mortality directly attributed to transmission lines (for birds and bats), rather, the data suggests a very low incidence of death over a long period of time (1995-2020). Species present within the project area are also present in relatively low numbers compared with regional, national and global populations estimates, and overall, the project is not expected to significantly impact any species as a result of electrocution.

6.2.3.3. Cumulative impacts

The cumulative impacts of the amended project and Snowy 2.0 would include the loss and fragmentation of vegetation and habitats, from the removal of about 437.29 hectares of native vegetation as outlined in **Table 6-4**. The cumulative direct impacts to threatened species from the project and Snowy 2.0 is outlined in **Table 6-5**.

Table 6-4 Cumulative impacts to native vegetation from the project and Snowy 2.0

PCT ID No	Direct impact from the project (ha)		Direct impact from Snowy 2.0 Exploratory Works (ha)*	Direct impact from Snowy 2.0 Main Works (ha)*	Cumulative impact (ha)
	Total	Partial			
285	2.2	-	5.54	6.85	14.59
296	8.25	10.77	48.37	25.60	92.99
300	14.86	17.15	10.52	34.74	77.27
302	0.58	1.72	12.00	2.83	17.13
729	14.07	12.88	24.1	21.40	72.45
999	6.13	2.47	1.28	12.40	22.28
1196	24.94	2.31	5.15	108.18	140.58
Total	**71.0**	**47.30**	**106.96**	**212.00**	**437.29**

* EMM Consulting 2017 and 2020a

Table 6-5 Cumulative impacts to threatened species from the project and Snowy 2.0 Exploratory Works and Main Works

Species name	Common name	Direct impact (ha) from:			Cumulative impact (ha)
		The project	Snowy 2.0 Exploratory Works	Snowy 2.0 Main Works*	
Callocephalon fimbriatum	Gang-gang Cockatoo (breeding)	89.2	0.91	2.08	92.19
Tyto novaehollandiae	Masked Owl (breeding)	10.86	0.91	-	11.77
Litoria booroolongensis	Booroolong Frog	1.66	2.49	1.33	5.48
Cercartetus nanus	Eastern Pygmy-possum	110.8	76.17	197.95	384.92
Petaurus australis - endangered population	Yellow-bellied Glider Population on the Bago Plateau	52.62	-	-	52.52

* EMM CONSULTING 2017 and 2020a

6.2.4. Mitigation measures

Biodiversity mitigation measures were identified for the project in Section 11 of the exhibited BDAR and summarised in Chapter 8 of the EIS. The full suite of proposed mitigation measures have been updated to respond to the submissions from NPWS/BCS and the amended project. The full suite of revised mitigation measures, for biodiversity includes:

- Detailed design of the project will focus on the retention of managed shrub and groundcover vegetation zones, within the ECZ, HCZ and HTZ to avoid and minimise the loss of vegetation and habitat and movements of fauna across the landscape and to minimise the impact of predation on displaced fauna.
  Final design for permanent creek crossing structures on access roads will implement a design option to ensure stream flow is unaffected (e.g. single span to minimise stream disturbance and flow).
  Design and micro-siting of access tracks will avoid and minimise impacts to rock outcrops, large boulders, piled rock, and rock features that provide potential sheltering and breeding habitat for fauna including threatened species and avoid mapped habitat trees. Access track corridors will be established with consideration to terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing
- A biodiversity management plan (BMP) will be prepared and approved prior to construction. The BMP will be prepared by a qualified ecologist in consultation with BCS and NPWS, and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the revised BDAR (**Appendix C**), but not be limited to these measures. The BMP will be based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and will focus on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action or additional offsets where further impacts are identified.
  The BMP will include a program to monitor, evaluate and publicly report on the outcomes of a biodiversity monitoring program (refer to Section 11.2 of the revised BDAR). The BMP must stipulate objectives for monitoring, and how baseline data will be captured and represented

- A Rehabilitation Plan will be prepared and approved prior to construction in consultation with BCS, NPWS and FCNSW. The Rehabilitation Plan will inform the implementation of rehabilitation within the lease/licence area. Such areas will be identified in the final detailed design and will also include areas disturbed during construction that are not required to be maintained or cleared for the operation of the project.
    - The plan will focus on the implementation of soil erosion prevention, re-establishment of local endemic plant species suitable to the vegetation formation and habitat and outline the details of rehabilitation objectives and how their outcomes for success will be measured, locations, target landforms and plant community types
    - Restoration of riparian vegetation (i.e. weed control) will be implemented to protect and improve key habitat areas of the Booroolong Frog
    - The plan will include a program for adaptive monitoring of specific success measures and reporting and include a Trigger Action Response Plan (TARP). The TARP will include notification to NPWS and BCS that remedial actions have been triggered and agreement about the response
    - Revegetation of slopes will be undertaken in accordance with the rehabilitation plan
    - Landscaping of pervious surfaces using native indigenous species only
    - Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder)
    - Ongoing maintenance of the rehabilitation work will be required, including management of weeds and pathogens
    - Topsoil and subsoil generated during construction will be stockpiled separately on-site to be used for rehabilitation. Stockpiles will be managed according to best management practices (Managing Urban Stormwater: Soils and Construction)
- The pre-clearing process will include two stages. Stage 1 will include survey and translocation of any fauna from the disturbance area into areas of retained vegetation prior to the development of the project. This may include detailed markup of threatened species locations and their translocation such as *Caladenia montana*. All work must be carried out by qualified ecologist. The next pre-clearing stage will include final inspections of the disturbance area immediately before the construction activity commences to check and physically mark any important habitat features that need to be considered when identifying exclusion zones and conducting the staged habitat removal process within the total and partial clearing zones. Document, mark and record the location of:
    - Large stick nests
    - Any rock features
    - Habitat/hollow-bearing trees
    - Threatened flora

    The outcomes of the pre-clearing inspections will be reported to BCS/NPWS prior to the commencement of vegetation clearing. The report will include any fauna relocated or euthanised, including name of qualified/licensed handler, species, location notes, and release location and method
- The boundary of the clearing limits for each disturbance zone will be clearly marked on site by a surveyor before vegetation clearing commences as follows:
    - Exclusion zones, or 'No-Go' zones, will be clearly marked at the edge of the total clearing zones and ECZ to protect the vegetation to be retained outside the project from inadvertent direct impacts
    - Exclusion zones and the edge of the clearing boundary will be marked with high visibility fencing and signage

- Booroolong Frog: A 50 metre exclusion zones will be marked and clearly delineated from other survey markers with signage place around the tributaries that flow downhill into the Yarrangobilly Creek, this includes the limits of clearing on the lower end of Sheep Station Creek, Cave Gully, Lick Hole Gully and Wallace Creek that are crossed by the project to protect the downstream habitat of Booroolong Frog
- Booroolong Frog: The 50 metre exclusion zone adopted for the Main Works project on Yarrangobilly Creek, will be retained for construction of the transmission line
- Hazard trees identified from the LiDAR assessment are to be flagged for removal, and any other adjacent and important habitat trees and features, also identified for retention and to avoid disturbance during the felling activity should also be clearly marked and included in maps within the CEMP

- A vegetation clearing methodology has been developed (provided as Appendix K of the revised BDAR), the methods described focus on the removal of vegetation in total and partial clearing zones. These methods will be incorporated as a vegetation clearing plan within the BMP designed to document the methods of vegetation and habitat clearing within each zone, including soil protection measures, mechanical and non-mechanical approaches, removal of habitat, protection of retained vegetation, and appropriate storage and re-use of mulch and timber to avoid disturbance of retained vegetation. Hollows logs and limbs encountered during clearing will be retained for placement within adjacent vegetation or on the maintained easement within shrub retention areas. The plan will include a requirement to prepare a post clearing report that records the final clearing extent using GPS to demonstrate whether clearing is within the approved disturbance area, and if exceeded, recalculate additional offset obligations.
- The vegetation clearing procedures will include provisions that any felled timber within Bargo State Forest that FCNSW determine can be repurposed will be removed off-site by FCNSW
- A staged habitat removal process will be required for removal of habitat (hollow-bearing trees, habitat trees, and bushrock) Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows and relocate naturally. The process includes:

  - If possible, avoid clearing during times when hollow-dependent fauna are breeding
  - Contact vets and wildlife carers before works commence
  - Ensure that licensed wildlife carers and/or ecologists are on site during habitat removal
  - Adopt two staged removal clearing non-habitat first (e.g. shrubs, regrowth, ground cover and non-habitat trees). Allow at least 24 hours for fauna to vacate habitat before removing habitat trees
  - Ensure wildlife carers and/or ecologists are present during removal of habitat trees, and that habitat trees are felled carefully, using equipment that allows habitat trees to be lowered to the ground with minimal impact
  - A procedure for the ethical handling of injured or displaced fauna is to be documented in the BMP
  - Record the effort and outcomes of the habitat removal process
  - Save and reuse cleared material for rehab and habitat
  - Preparation of an 'Unexpected threatened species finds procedure' to be implemented during construction and operation. Applies to all activities that have potential to impact upon threatened flora and fauna species which have not already been assessed and approved. Any threatened entities found in a location previously unknown during construction or operation must be immediately notified to NPWS
  - Preparation of a Fauna handling and rescue procedure to be implemented during construction and operation

- Clearance of construction areas prior to commencement of daily construction to ensure there is no wildlife present. This will involve drive through sweep of areas planned for construction, by the contractors environmental representatives. If an animal is located within the construction area during works, the Delivery Manager and Project Management Site Representative are to be notified immediately. All work must immediately cease within the immediate area of the find and a local wildlife rescue or an ecologist will be required for assistance where necessary
- An operational Vegetation Management Plan (VMP) will be prepared by an experienced ecologist prior to commencement of project operation. The plan will focus on vegetation management within the ECZ and HTZ with the aim of maintaining long-term Vegetation Integrity targets.

  The VMP will interpret the vegetation integrity scores into feasible actions to maintain vegetation condition, and outline project specific ongoing vegetation clearing requirements and methodology.

  The VMP will include a strategy for maintaining the expected vegetation outcomes for all partial impact zones assessed in the BDAR. The strategy will:

  - Translate the vegetation integrity (VI) scores into management actions to be applied during construction and operation of the project
  - Include triggers for corrective actions
  - Include details for review and reporting by a qualified ecologist in consultation with NPWS and BCS.
  - The VMP will be guided by Transgrid's vegetation risk model and operational vegetation clearance requirements, in addition to the principles for Integrated Vegetation Management (IVM) which will aim to preserve future Vegetation Integrity scores within the ECZ
  - Long-term monitoring will be conducted to measure the effectiveness of the VMP. The methods and timing of the monitoring will be documented in the VMP and will include a responsibility to report the results to BCS and NPWS
  - The VMP will detail methods for vegetation maintenance in the ECZ with a focus on retaining plant species diversity and cover of low understorey and groundcover plants <200mm, while tree and shrub regrowth will be suppressed for long-term easement management
  - The VMP will detail methods of maintenance in the HTZ with a focus on retaining all non-hazard trees, as well as shrubs, grasses, and forbs. Ongoing inspection (using Lidar, and follow-up on foot or drone) of hazard trees will occur and document the method of removal for each tree to ensure that non-hazard trees are not impacted during tree felling. Where threatened orchids are mapped (Caladenia montana), hazard trees will be sensitively removed to avoid impacting on the ground layer. This will include removing trees from the top down and cutting into small sections, transferring into the ECZ and mulching
  - The VMP will address measures required to minimise fire risk during operation of the project
- A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek
- An assessment of the current sediment basin design for the Main Works project will occur, to determine if the design specifications are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load

- Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include:
  - Erosion and sediment control plans for all stages of construction
  - The implementation of sediment control measures across the project area - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains
  - A schedule will be included for cleaning sediment basins with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours
  - Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at structures site and access roads on the slopes around Yarrangobilly Creek and associated tributaries
  - Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCS, which are downhill of the construction footprint and upstream of Booroolong Frog habitat. An adaptive monitoring plan will be developed to trigger a rapid response if sediment loads detrimental to Booroolong frog are detected
  - Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas
  - Accidental spills will be reported to the contractors environmental representative as soon as the incident is observed so that the site can be remediated rapidly
  - Implementation of tannin leachate management controls may be required as determined by the monitoring program
  - Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements
  - Other source controls, such as mulching, matting and sediment fences may be used in consultation with BCS and NPWS and need to be approved in the CEMP and any deviation from measures by DPE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate
  - Disturbed areas will be stabilised and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder)
  - Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material)
  - An induction protocol will be mandatory for all personnel involved in construction and operation works
  - There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with
- To prevent an increase in weeds and disease pathogens in adjacent vegetation the flowing will be carried out:
  - A Weed control and monitoring programs will be developed and documented in the BMP in consultation with BCS and NPWS and any deviation from measures approved by DPE are to be raised and approved. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will

be determined during the preparation of the BMP and follow the principles outlined in Section 11.2 of the revised BDAR (Appendix C)
- Identify all weed species in KNP in consultation with NPWS. Priority weeds species in Bago state forest are consistent with high threat weeds
- Identify, map, and remove all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs
- Prepare a vehicle and machinery hygiene strategy and implement during construction and operation. The strategy will include specific locations, timing and methods for removing soil and plant matter from vehicles and machinery. Ensure vehicle and machinery hygiene measures in the strategy are applied during construction and operation
- During the clearing works, weeds will be disposed and managed appropriately to stop the spread of weed species
- Wash down stations will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, Phytophthora cinnamomi and exotic rust fungi) and the introduction of new species
- During construction, any biosecurity issues identified are to be reported to FCNSW and NPWS immediately

- To prevent an increase in predatory and pest species the flowing will be carried out:
  - Personal waste / refuse generated during construction will be stored appropriately in inaccessible bins and disposed at appropriate waste disposal facilities off-site. Any personal waste generated during operation will be removed from the site (including substation) and disposed in an appropriate waste facility
  - A feral animal monitoring program will be developed and implemented as described in Section 11.2 of the revised BDAR (Appendix C)
  - based on performance triggers for adaptive management. It will be important to share data with NPWs and State Forests. Increased predator activity will trigger the need for predator control based on performance measures to be outlined in the BMP. Control will be done in consultation with NPWS and (DPE - State Forests)

- The extensive survey data for this project, and the Main Works EIS will be utilised to identify specific bird and bat populations that are at risk of collision and electrocution. E.g. For higher risk species deploy species specific bird divertors, with day/night reflectors within approved buffer distance, along key sections of transmission line. This will be appropriate for diurnal and nocturnal birds The BMP to include adaptive management for high risk bird and bat species as outlined below with intervals and strategies to be determined in consultation with NPWS:
  - Regular monitoring within the transmission line easements for evidence of bird / bat collision with transmission lines (intervals to be determined in consultation with NPWS)
  - Monitoring of taller structures for evidence of raptor nest building
  - Develop target trigger for number of high risk species incidents
  - Deploy species specific bird / bat divertors / reflectors in areas where a defined number of incidents have occurred

- To reduce light impacts the following will be implemented:
  - Directional lighting will be used for any permanent lighting required (i.e. substation) to minimise light spill
  - Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours

- The barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures installed, such as adding visible objects to the fence, for example tape, plastic flags, and metal tags
- The ECZ will be maintained as per the VMP, with the preservation of low ground cover vegetation to provide cover for small ground-dwelling fauna and birds to cross the easement
- Vehicle movements on newly formed access tracks will be limited to 20km/h speed limit implemented to reduce the risk of vehicle strike to fauna.

All tree pruning operations will be carried out in accordance with the Australian Standard AS4373-2007 Pruning of Amenity Trees. The consolidated list of mitigation measures for the amended project is provided in **Appendix B**.

6.2.5. Biodiversity offset credit report

The project would have direct impacts on about 118.27 hectares of native vegetation within the disturbance area. Of this, about 71.03 hectares would be fully clearing of vegetation to ground level and a about a further 47.24 hectares maintained as a partially cleared vegetation. These impacts would need to be offset.

The offset credit requirement has been calculated using the BAM-C based on the amended project. The credit requirement generated by the BAM-C for the disturbance area for the two bioregions assessed:

- South Eastern Highlands (KNP):
  - 1,820 ecosystem credits
  - 4,947 species credits
- Australian Alps Bioregion (Bago State Forest):
  - 1,161 ecosystem credits
  - 4,503 species credits.

The project impacts and offset obligations have been calculated based on the amended project, as is normal for a major project at this stage of the process. Therefore, project impacts and offset obligations would be revised. The project impacts and offset obligations would be revised throughout the life of the project through the monitoring program. Where there is opportunity to modify the clearing extent and the potential biodiversity impact post-approval, this would be done as part of the detailed design and analysis of operational management requirements.

A BOS has been prepared for the project in consultation with NPWS and BSC for the project. The BOS is provided as Appendix L of the revised BDAR (**Appendix C**).

6.3. Aboriginal heritage

The AACHAR was prepared following the exhibition of the EIS. The AACHAR was prepared in response to the submission from HNSW and to assess the impacts associated with the project amendments. The AACHAR is provided in **Appendix D**, and a summary is provided below.

6.3.1. Assessment methodology

The methodology for the assessment of Aboriginal heritage impacts for the amended project was consistent with the methodology presented in the exhibited ACHAR. The AACHAR included:

- Additional archaeological survey on 25 May 2021, in response to the identification of a potential find of an unexpected Aboriginal object
- A test excavation program carried out across over four days from 17 August to 20 August 2021 at ST PAD 01 and ST PAD 02. The test excavation program was completed by two Jacobs archaeologists and two RAPs
- Assessment to determine the cultural significance of identified items
- Assessment of impacts on new Aboriginal items/sites identified
- Consideration of the need for further mitigation measures
- Additional consultation with RAPs including consultation on the draft AACHAR.

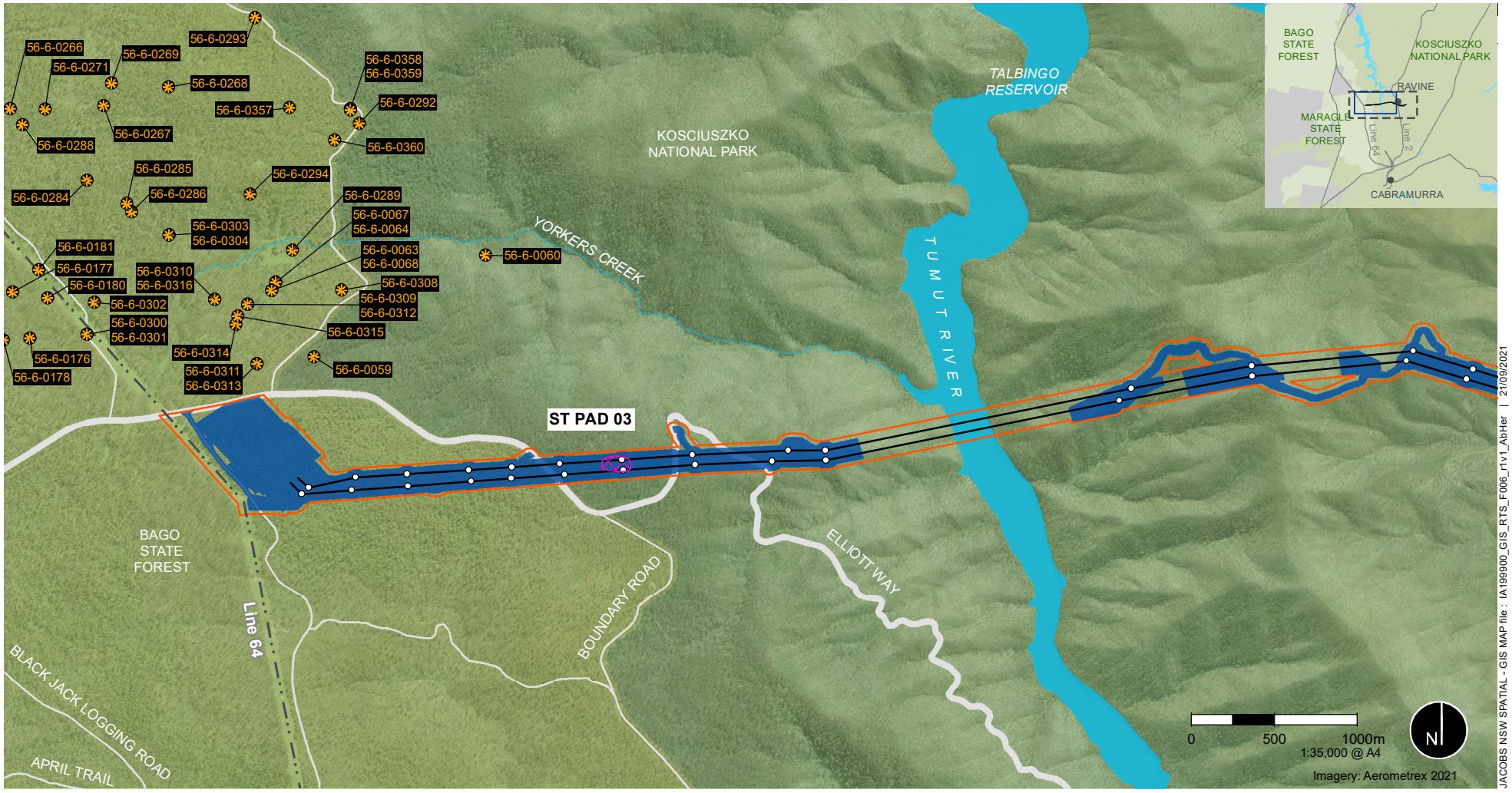
Surveys have now been completed across the whole disturbance area for the amended project and all required, and test excavations have been carried out in accordance with the HNSW submission on the EIS.

6.3.2. Existing environment

The existing environment in terms of cultural context, cultural values and desktop assess and previous investigations is consistent with the EIS and is described in Section 7.2.2 of the EIS.

Further archaeological survey

Unexpected Aboriginal artefacts were identified in the area of Structure 5 on 28 April 2021. On 25 May 2021, Jacobs completed an archaeological survey in response to this unexpected find. The archaeological survey found 15 surface artefacts which resulted in the identification of an additional area of PAD (Str5 PAD). The archaeological survey also found additional surface artefacts at ST PAD 01, ST PAD 02 and AHIMS# 56-6-0540 (located near Structure 7), refer to **Figure 6-1**.



Project area
Disturbance area
Proposed tower
Proposed transmission line
AHIMS
AHIMS search extent (see inset map)
ST Pad
Electricity transmission line
Minor road
Major road
Waterway
Water body
State forest
NPWS estate

Figure 6-1 | Aboriginal heritage

Data source:
Jacobs 2021, OEH 2021, Transgrid, EMM 2021

Figure 6-1 | Aboriginal heritage

Data source:
Jacobs 2021, OEH 2021, Transgrid, EMM 2021

Test excavation findings

An archaeological survey and program of test excavation was carried out over four days in August 2021. The objectives of the archaeological survey and test excavations were to:

- Determine whether any Aboriginal objects are present in subsurface deposits within ST PAD 01, ST PAD 02, and Str5 PAD
- Assess the scientific significance of any retrieved Aboriginal objects and context within ST PAD 01, ST PAD 02, and Str5 PAD
- Provide an opportunity for the RAPs to comment on the Aboriginal cultural heritage values of ST PAD 01, ST PAD 02, and Str5 PAD
- Determine recommendations on future requirements for the management of ST PAD 01, ST PAD 02, and Str5 PAD.

ST PAD 01 and ST PAD 02

A total of nine test pits were excavated at ST PAD 01 resulting in the identification of 20 artefacts, while 16 artefacts were identified at ST PAD 02.

Both ST PAD 01 and ST PAD 02 were situated on a sloping landform and their sub-surface deposits were identified as being the product of fluvial processes. As a result, it is likely that all artefacts retrieved from the test excavation program had been displaced from their original context. Therefore, both ST PAD 01 and ST PAD 02 are considered to have low archaeological integrity and are considered to be of low significance.

ST PAD 01 and ST PAD 02 are located in close proximity to each other, exhibited similar environmental features and were considered to have similar archaeological deposits. As a result, the artefacts have been considered as one assemblage.

The artefacts recovered during the test excavations comprised indurated mudstone/silicified tuff/chert (IMSTC) (80.56%), silcrete (8.33%), chert (8.33%), and quartz (2.78%). This differed from what had been identified on the surface during the archaeological survey, where quartz was the dominant raw material. Overall, the lithologies were predominantly comprised of sedimentary stone. All raw materials are ubiquitous in the local area, and it is likely that they were sourced locally.

The limited number of identified Aboriginal objects may be indicative of the transient usage of the area. The assemblage is small and not representative of intense reduction of stone and manufacture of tools. However, the objects are reflective of the enduring use of the landscape by Aboriginal people over millennia.

The artefact types were predominately complete flakes and flake fragments with a single core and a single angular fragment. No formal tools were identified within ST PAD 01, however two were identified in ST PAD 02 one scrapper and one burin (tool with a chisel like edge), refer to **Photo 6-3** and **Photo 6-4**. The presence of these artefacts indicates specialist activities. However, as the archaeological integrity of the site is low, it is considered unlikely that these activities took place within the site extent.

Photo 6-3 Scrapper from ST PAD 02

Photo 6-4 Burin from ST PAD 02

Str5 PAD

The archaeological survey in May 2021 resulted in recording fifteen stone artefacts which were identified on the ground surface. The assemblage mostly comprised unretouched flakes, with one core, one hammerstone, and one flaked piece. It was noted during this archaeological survey that soils on site were in situ and not transported from elsewhere, but that it was unlikely for sub-surface archaeological deposits to be found on site.

Although the area was identified as a PAD originally and it was intended to undertake test excavation to determine if sub-surface deposits were present, it was considered that it was extremely unlikely for subsurface deposits to be present because of erosion which had removed all deposit down to a sterile in situ soil. It was also assessed that test excavations would result in unnecessary harm to the identified surface artefacts. Therefore, test excavations did not take place at this site.

As a result, Str5 PAD was assessed as having no potential to contain subsurface artefacts, and no excavations were completed and subsequently reassessed as a surface artefact scatter, without an area of PAD. The site will henceforth be referred to as Str5 AS.

6.3.2.1. Significance assessment

The updated assessment of scientific significance for the project area including is provided in **Table 6-6**.

Based on research carried out and consultation with the RAPs, no specific historic or socio/cultural values associated with the project area were identified. The project area is considered to be of moderate aesthetic significance due to the presence of traditional landscape features. ST PAD 01, ST PAD 02, and Str5 AS are considered to be of low significance. Therefore, the sites have been assessed as being of low significance.

Table 6-6 Updated assessment of significance

Site name	Research potential	Representativeness	Rarity	Educational potential	Overall significance assessment
ST PAD 01	Low	Low	Low	Low	Low
ST PAD 02	Low	Low	Low	Low	Low
ST PAD 03	Low	Low	Low	Low	Low
Str5 AS	Low	Low	Low	Low	Low
AHIMS # 56-6-0540	Low	Low	Low	Low	Low
AHIMS # 56-6-0048	Low	Low	Low	Low	Low
AHIMS# 56-6-0477	Low	Low	Low	Low	Low

6.3.3. Assessment of potential impacts

The test excavation program and previous archaeological investigations have provided evidence for the presence of surface and subsurface Aboriginal objects within the disturbance area.

The amended project would result in direct impacts to ST PAD 01, ST PAD 02, ST PAD 03 and Str5 AS.

The amended project would no longer pose an impact to AHIMS# 56-6-0041. As outlined in the EIS, indirect impacts would remain possible to AHIMS# 56-6-0477. However, as a result of the design amendments, AHIMS# 56-6-0540 and AHIMS# 56-6-0048 would now be totally impacted by the amended project, resulting in a total loss of value. ST PAD 01, ST PAD 02, and Str5 AS would be partially impacted, resulting in a partial loss of value.

A summary of the impacts to sites identified during test excavation is provided in **Table 6-7**.

Table 6-7 Assessment of impacts

Site name	Type of harm	Degree of harm	Consequences of harm
ST PAD 01	Direct	Partial	Partial loss of value
ST PAD 02	Direct	Partial	Partial loss of value
ST PAD 03	Direct	Total	Total loss of value
Str5 AS	Direct	Partial	Partial loss of value
AHIMS# 56-6-0540	Direct	Total	Total loss of value
AHIMS# 56-6-0048	Direct	Total	Total loss of value
AHIMS# 56-6-0477	Indirect	Partial	Partial loss of value
AHIMS# 56-6-0041	None	None	No loss of value

6.3.4. Mitigation measures

Aboriginal heritage mitigation measures were identified for the project in Section 12 of exhibited ACHAR and summarised in Chapter 8 of the EIS.

A number of the previously proposed mitigation measures have been updated to respond to the submission from the HNSW and the amended project. These are detailed in Section 7 of the AACHAR provided in **Appendix D**. As part of the revised mitigation measures, the following additional measures were included:

- Where possible, impacts to identified Aboriginal sites will be avoided

  A Cultural heritage management plan (CHMP) and accompanying unexpected finds procedure will provide a method to manage potential heritage constraints and unexpected finds during construction. The long-term storage of any recovered Aboriginal objects will be developed during the completion of the CHMP, in consultation with the RAPs, but is likely to include (in preferential order):

  - Re-burial on site, in an appropriate location in the vicinity of the project
  - Lodged with a RAP under a Care and Control Agreement
  - Deposition with the Australian Museum

- Salvage collection of surface artefacts, and salvage excavations will be carried out prior to construction at ST PAD 01, ST PAD 02, ST PAD 03 and Str5 AS, AHIMS# 56-6-0540, AHIMS# 56-6-0048 and AHIMS# 56-6-0477 (if required) with the RAPs. Surface collection will be undertaken using the following method:

  - Artefact collection will be undertaken by a team comprising an archaeologist and RAP representatives
  - Artefact locations will be marked on the ground and recorded with a hand-held GPS (or equivalent) prior to collection
  - Collected artefacts will be catalogued on site by the team, with recorded attributes as listed for the test excavation analysis
  - Artefacts will be placed in individual bags, labelled with location information
  - Following the completion of the surface collection program, a brief report will be prepared which outlines the results of the program

- If changes are made to the project to include impacts outside the disturbance area, further archaeological investigation will be conducted**.**

AHIMS# 56-6-0041 would not be impacted by the amended project. As a result, no mitigation measure is now required for these sites.

These additional mitigation measures have been included in the consolidated list of mitigation measures for the amended project which are provided in **Appendix B**.

6.4. Water

6.4.1. Existing environment

The existing environment is described in Section 7.4.2 of the EIS and is still applicable to the amended project.

6.4.2. Assessment of potential impacts

During construction, the additional two water uptake locations in project area west would require up to eight water truck movements per day to collect construction water from either Talbingo Reservoir at the existing Snowy Hydro T2 Tailbay site or Paddy's River near the entrance to Paddy's River Flat Campground (refer to **Section 3.1.6**).

No vegetation clearing would be required as part of the establishment and operation of either of these sites.

For Snowy 2.0 T2 Tailbay site, the water extraction infrastructure (intake pipe, metering equipment etc.) would be established within the previously disturbed area by Snowy 2.0 on the northern side of the access road extending down the bank into Talbingo Reservoir. The existing Snowy 2.0 T2 Tailbay site would require ground disturbance to install a gate across the access road. Appropriate erosion and sediment controls would be installed for any ground disturbing works as documented in the SWMP.

No ground disturbance works would be required near the Paddy's River Flat Campground, however, the water truck would be required to be parked on the unsealed road verge while the extraction of water takes place. Rubber mats would be placed on the unsealed ground where the water trucks park prior to water extraction to prevent damage to the ground and mobilising sediments.

In addition to potential erosion and sedimentation risk, the use of water trucks has the potential to result in accidental spills and leaks as a consequence of vehicle malfunction. Risk of fuel spills and leaks is not expected as refuelling would occur in designated bunded areas within the disturbance area away from the water uptake locations.

The extraction of the water from Talbingo Reservoir and Paddy's River may have the potential to inadvertently pick up small aquatic fauna. To reduce the potential of this occurring, slow velocities of water pumping and screens on the hoses would be used.

Snowy Valleys Council has advised that they currently use Paddy's River to obtain water for Council purposes and there are sufficient volumes of water year round to support construction activities for the amended project.

The amended project is not expected to have any further impacts on water quality, hydrology, groundwater and flooding than those described in the EIS. The use of this water supply infrastructure is not expected to contribute to additional impacts than previously assessed in the EIS.

A water extraction licence would be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River.

6.4.3. Mitigation measures

Water impact mitigation measures were identified for the project as summarised in Chapter 8 of the EIS.

A number of the previously proposed mitigation measures have been updated to respond to submissions and the amended project as shown in **Appendix B**. The following additional measures have been recommended in response to the amended project:

- A water extraction licence will be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River
- Prior to extraction of water near Paddy's River Flat Campground, rubber mats will be placed on the ground under the water trucks on the southern site of the bridge and just inside the entrance to the camping area to prevent erosion and sediments entering the waterway
- During water extraction from Talbingo Reservoir and Paddy's River, slow velocities of water pumping and screens on the hoses will be used to minimise small aquatic fauna been inadvertently picked up.

These additional mitigation measures have been included in the consolidated list of mitigation measures for the amended project which are provided in **Appendix B**.

6.5. Transport

6.5.1. Existing environment

The existing environment is described in Section 7.6.2 of the EIS and is still generally applicable to the amended project.

6.5.2. Assessment of potential impacts

6.5.2.1. Additional water uptake locations

During construction, the additional water uptake locations in project area west would require up to eight water truck movements per day to collect water to service construction from either the Snowy Hydro T2 Tailbay site or near the Paddy's River Flat Campground as shown on **Figure 3-1**.These additional water truck moments are not expected to have a substantial impact on the local road network. However the water truck parked on the road verge on Tooma Road (near the intersection of Elliott Way) to extract water directly from Paddy's River may cause minor impacts on vehicles access the Paddy's River Flat Campground. These impacts may include sight restrictions for vehicles turning out in and out of the Paddy's River Flat Campground. Access to the camping area would not be affected. Any impacts would be minor, temporary and very short term in nature.

To minimise truck movement along Elliott Way, water would only be sourced at the Snowy Hydro T2 Tailbay site in the event that water cannot be obtained from the other two water supply locations (Paddy's River Flat Campground and Town Water Supply).

The construction traffic management plan (CTMP) that would be developed would consider these additional water truck moments, impacts and routes.

6.5.2.2. Heavy vehicle transport routes

As the Port of Newcastle could be the point of delivery of key high mass substation equipment a transport haulage route assessment for OSOM vehicles traveling from Newcastle has been carried out. This assessment was carried out to:

- Define the anticipated OSOM vehicle route from both Port Kembla and Port of Newcastle to the substation site in project area west
- Identify locations along the route, which may require upgrades to the road to support heavy haulage. This includes consideration to both the swept path of turning OSOM vehicles and bridge loading.

The findings of this assessment are documented in the route assessment and summarised below.

Transport route

It is anticipated that OSOM vehicles travelling from Port of Newcastle to the substation site would utilise the following route: Selwyn Street, George Street, Industrial Drive, Maitland Road, (U-Turn Maitland Road at Sandgate), Maitland Road, Newcastle Inner City Bypass, Newcastle Road, Thomas Street, Newcastle Link Road, M1, Pennant Hills Road, M2, M7, M5, Hume Highway, Little Billabong Road, Tumbarumba Road, Wagga Road, Masons Hill Road, Albury Street, The Parade, Bridge Street, Winton Street, Regent Street, William Street, Tooma Road, Elliott Way.

Route assessment

The route assessment determined that no areas of the classified road network along the haulage route under the jurisdiction of TfNSW were identified as requiring modification or upgrade works. However, the route assessment did identify the following road modification works that would be required on Council roads (non-classified roads) along the preferred route from Port of Newcastle to the proposed substation site:

- Lowering of sections of the median strip on Albury Street and Bridge Street in Tumbarumba and signage to be made removable to support the passing of the OSOM vehicles through the township. Albury Street and Bridge Street are Council own roads. Therefore, the modification would be carried out under consultation with Snowy Valley Council under the relevant permits
- Modification of the intersection works the interface of the substation site access road and Elliott Way to facilitate access to the substation. This is required to support the swept path of the OSOM vehicles entering the substation access road off Elliott Way.

The route assessment also outlined that the section of the haulage route from the Hume Highway to the proposed substation site along Elliott Way traverses a number of bridges that would require load assessments. Additionally, a number of rail over-bridges and level crossings along the haulage route would also require approval from the relevant rail authority prior to the transport of the high mass substation equipment.

Given the delivery of the substation equipment is not anticipated until 2025 with the condition of the bridges subject to change or improvement, all bridges load assessments would be carried out in conjunction with the OSOM permit application process. These requirements would be stipulated in the CTMP.

6.5.3. Mitigation measures

Transport mitigation measures were identified for the project as summarised in Chapter 8 of the EIS. As stated in Section 7.6.3 of the EIS, a CTMP will be developed, and any disruptions will be managed in accordance with the CTMP. The CTMP will consider the additional water truck moments, routes and impacts. The CTMP would also stipulate bridge load assessments will be carried out in conjunction with the OSOM permit application process.

The consolidated list of mitigation measures for the amended project are provided in **Appendix B**.

6.6. Visual impact

6.6.1. Existing environment

The existing environment is described in Section 7.7.2 of the EIS and remains applicable to the amended project.

6.6.2. Assessment of potential impacts

The substation footprint has been increased for the APZ to meet compliance with *AS5339-2018 Construction of buildings in bushfire prone areas*. As such, the substation footprint would be about 230 metres wide by 530 metres long, surrounded by an approximate 80 metre to 100 metre wide APZ. The indicative substation layout is shown on **Figure A-1**. The increased substation footprint has been captured in the overall reduced disturbance footprint as shown on **Figure 3-1**.

The increased substation footprint would require additional vegetation clearing within this area and the boundary of the APZ would extend to the road corridor of Elliott Way on the northeast side, the stand of trees

along the road verge of Elliott Way would be retained to screen views of the substation from the road. As such, the views toward the substation would still be filtered through the existing stands of trees to the south of Elliott Way.

While there is an increase in the amount of vegetation clearing required within this area, the overall vegetation clearing required for the amended project has been minimised with the reduced disturbance area.

The visual impacts from the increased substation footprint are considered to be consistent with EIS which found that the impacts in this location were considered negligible due to the substation being located behind existing vegetation, and not being in proximity to sensitive receivers.

During construction, water would be extracted near the Paddy's River Flat Campground as shown on **Figure 3-1**. This activity has the potential to generate temporary visual amenity impacts on the Paddy's River Flat Campground.

6.6.3. Mitigation measures

No additional mitigation measures are recommended for the increased substation footprint.

6.7. Noise

6.7.1. Existing environment

The existing environment is described in Section 7.8.2 of the EIS and is still applicable to the amended project.

6.7.2. Assessment of potential impacts

During construction, the additional water uptake locations in project area west would require up to eight water truck movements per days to collect water to service construction from either the Snowy Hydro T2 Tailbay site or near the Paddy's River Flat Campground as shown on **Figure 3-1**.

These vehicle movements have the potential to generate temporary adverse noise impacts along the local road network as well as impacts to sensitive receivers at the Paddy's River Flat Campground. The extraction of water near Paddy's River Flat Campground would be carried out during standard construction hours. As such, the impacts are expected to be minor, temporary and very short term in nature.

6.7.3. Mitigation measures

No additional mitigation measures are recommended.

7. Evaluation of merits

This section provides an evaluation of the merits and conclusions of the amended project. It includes the project justification and conclusion of the environmental impact assessment process. The project justification as set out in this section has considered the revised BDAR and AACHAR.

7.1. Evaluation of merits

The project, including the amendments identified in this Amendment Report, has been designed, to the greatest extent possible, to avoid and minimise impacts, and to respond to the issues raised by the community and stakeholders. The detailed design and construction methodology for the amended project would be further developed with the objective of further avoiding and minimising potential impacts on the local and regional environment, and the local community.

Further consideration of the amended project has identified additional opportunities to reduce impacts. In particular, the project has been refined to further avoid and minimise impacts on biodiversity where possible. This has included the reduction of the disturbance area and the inclusion of six distinct management zones, of which each would be subject to specific clearing requirements. The disturbance area needed for construction has been reduced by 12.6% from 143 hectares to approximately 125 hectares

The environmental impacts of the amended project have been assessed, including impacts to biodiversity, Aboriginal heritage, water, transport and amenity (noise and visual impacts). The amended project would:

- Result in direct impacts to about 118.27 hectares of native vegetation which is a reduction of about 17.30 hectares (13%) from the project as assessed in the EIS.
- No longer impact AHIMS# 56-6-0041
- Result in some additional impacts including:
    - Direct impacts to two AHIMS sites which were previously outside the disturbance area (AHIMS# 56-6-0540 and AHIMS# 56-6-0048), refer to **Section 6.3**
    - Potential visual amenity and noise impacts to Paddy's River Flat Campground, refer to **Section 6.6** and **Section 6.7**
    - Potential impact on Paddy's River from water extraction and mobilisation of sediments, refer to **Section 6.4**
    - Introduction of truck movements into areas not previously assessed in the EIS, refer to **Section 6.5**.

The remaining impacts have been concluded as being generally consistent with those presented in the EIS. Consistent with the impact assessment presented in the EIS, the majority of the impacts would occur during construction, with some impacts occurring during operation, such as to landscape character and visual amenity.

The merits of the project including the benefits of connecting Snowy 2.0 to the NEM are considered to outweigh any identified adverse impacts of this project. While some environmental impacts cannot be avoided, they would be minimised where possible through the implementation of mitigation measures and offsetting.

To avoid, minimise or manage the potential impacts identified as a result of the amended project, a suite of revised mitigation measures has been identified to guide detailed design, and to manage the construction and operational phases of the project (refer to **Appendix B**).

On the basis of the findings detailed in the EIS, Submissions Report and this Amendment Report and with the implementation of the updated management measures, the project could be carried out without any significant long term impacts on the local environment and as such is considered justified.

7.2. Concluding statement

The project has been declared CSSI and is essential to connect Snowy 2.0 to the NEM. The project would also provide a connection point into the future southern network reinforcement project (HumeLink) which, when completed, would strengthen the southern transmission network. This includes reducing constraints on Line 64 and would allow the export of the full capacity of Snowy 2.0 across the broader transmission system.

Not proceeding with the amended project would impact the ability of Snowy 2.0 connect to the NEM. Snowy 2.0 is required to serve the market and consumers by providing dispatchable generation to address supply volatility, as well as fast-start capability and large-scale storage to address intermittency issues.

8. References

Australian Standard, 2007. *AS4373-2007 Pruning of Amenity Trees*

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Appendix A Amended project description

A consolidated updated project overview and elements is provided below. This revised description supersedes the description provided in the EIS.

A.1 Project overview

The project would connect Snowy 2.0 to the NEM as described in **Section 1.1** and further described in Section 2 of the EIS.

The key elements of the amended project are shown on **Figure 3-1** and include:

- A new substation located within Bago State Forest and adjacent to Transgrid's existing Line 64, which forms a 330 kV connection between Upper Tumut and Lower Tumut switching stations. The substation would occupy a footprint of about 230 metres wide by 530 metres long, surrounded by an approximate 80 metre to 100 metre wide cleared APZ
- Upgrade and widening of an existing access road off Elliott Way to the substation including the construction of new driveways into the 330 kV and 500 kV switchyards
- Two new 330 kV overhead double-circuit transmission lines from the Snowy 2.0 cable yard to the new substation:
    - Total length of each line is approximately nine kilometres
    - Located in a transmission corridor ranging in width from approximately 120 metres to 150 metres, inclusive of the hazard tree zone
    - Each line would comprise approximately 21 steel lattice structures up to 75 metres in height
- Short overhead 330 kV transmission line connection (approximately 300 metres in length) comprising both steel lattice structures and pole structures as required between the substation and Line 64
- Construction of approximately eight kilometres of new access tracks to the transmission structures, and upgrade to existing access tracks where required. The access tracks would remain following the completion of construction to service ongoing maintenance activities along the transmission lines
- Ancillary construction activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds and equipment laydown areas, water extraction and the transport and haulage of equipment and waste to and from the project area
- The accommodation of approximately 20 construction workers at the Snowy 2.0 works accommodation at Lobs Hole with the remainder of the construction workforce being accommodated as required in the nearby townships of Tumbarumba, Talbingo, Tumut, Adaminaby, Providence Portal and Cooma.

A.2 Project elements

A.2.1 Substation

The land where the substation is located would be acquired from FCNSW by freehold acquisition.

The substation is expected to occupy an area of about 230 metres wide by 530 metres long, surrounded by an approximate 80 metre to 100 metre wide APZ.

The substation would generally be orientated in a north-south direction and would be set back approximately 70 metres from Elliott Way. The boundary of the APZ would extend to the road corridor of Elliott Way on the north side, however the stand of trees along the road verge would be retained to screen views of the substation from the road.

The substation switchyard would comprise a level benched area on which all high voltage and ancillary substation equipment and buildings would be located. This would generally include (but not be limited to):

- Up to three 500/330 kV three-phase or up to nine single-phase transformers to convert the voltage from 330 kV to 550 kV to support future 500 kV transmission line augmentations to Transgrid's network
- Approximately three ancillary transformers to provide low voltage supplies
- Two 500 kV reactors
- 330 kV and 500 kV switchbays
- Onsite buildings to house substation controls, secondary systems equipment and amenities
- Oil containment and stormwater system (including bunding and containment tank(s) or a dam)
- Lightning masts
- Steel gantries
- Security fencing.

The indicative substation layout is shown on **Figure A-1**.

The transmission connection would connect to Line 64 via the 330 kV switchyard. While not required for the grid connection of Snowy 2.0, the 500 kV yard (as shown in **Figure A-1**), which includes the transformers and other equipment, is required to provide the connection point of the southern network reinforcement project (HumeLink). In readiness to support the connection of HumeLink, the 500 kV component of the substation has been included in this CSSI application.

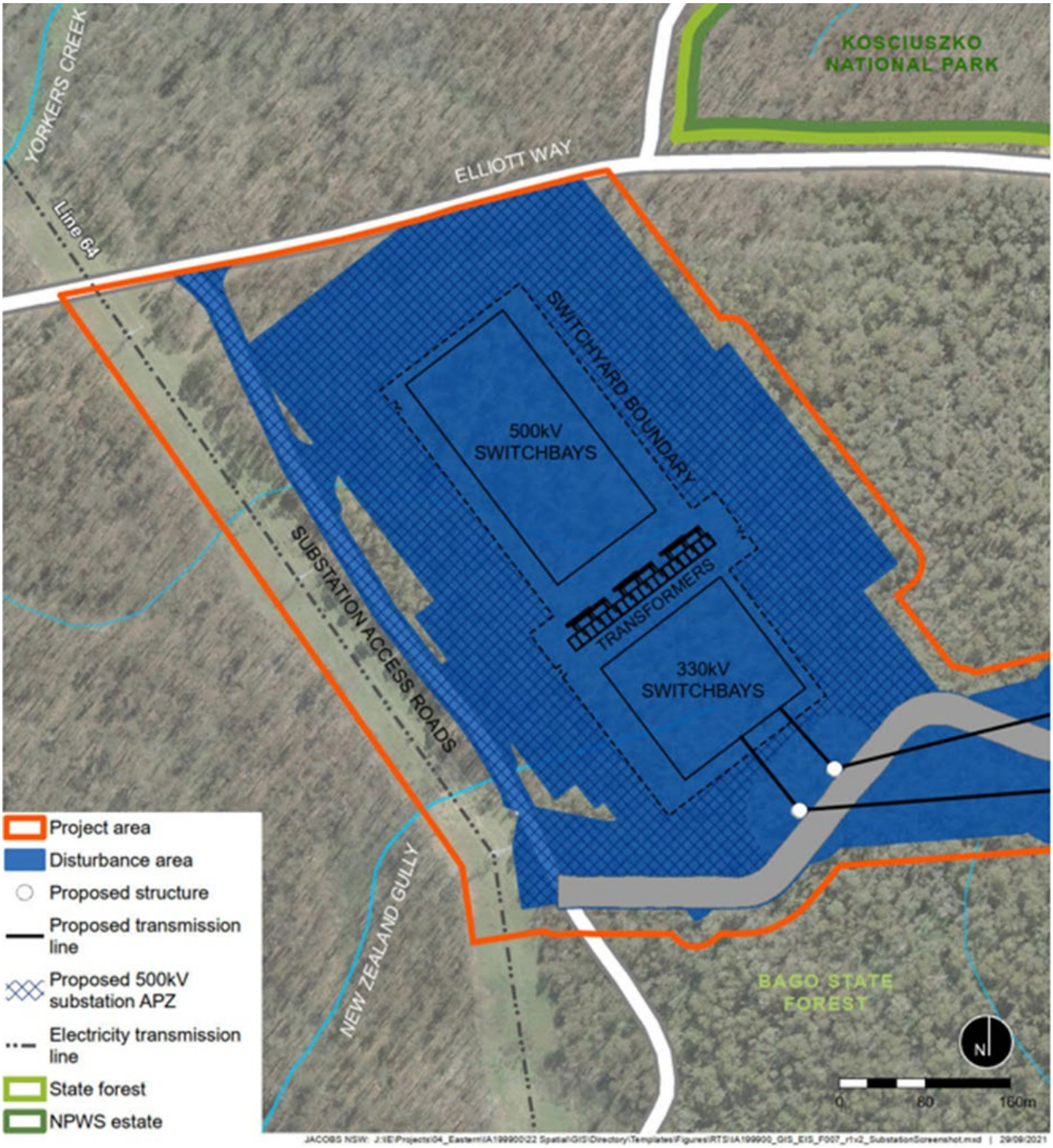

Figure A-1 Indicative substation layout

A.2.1.1 Safety and security

Security fencing compliant with current Transgrid standards for substation fencing would be installed. This would include generally three metre high palisade security fencing on all sides of the substation. The security fence would be comprised of a galvanised steel (or similar) material and topped with barbed or razor wire.

To comply with Transgrid's safety requirements, additional security measures at the substation would include:

- Security cameras within the switchyard
- Safety and public information signage on both the substation and surrounding transmission line structures
- APZ extending between approximately 80 metres and 100 metres from the substation boundary, which would be cleared of vegetation and maintained to address bushfire risk.

A.2.1.2 Lighting

Interior and exterior lighting would be installed at the substation. The external lighting would be installed in a manner that aims to minimise light spill to areas beyond the substation boundary fence.

The onsite buildings would be fitted with lighting, general power outlets, exit signs and smoke detectors.

A.2.1.3 Access and parking

A permanent access driveway would be established to the substation off Elliott Way, refer to **Figure A-1**. The access driveway would be designed to allow passenger vehicle access for employees undertaking maintenance operations, and would also be suitable to allow larger vehicles access as required (such as for equipment replacement).

Given the limited operational requirements for the substation, it is unlikely that any formal or dedicated parking facilities would be provided within the substation. However, sufficient cleared hardstand areas within the site, would be available for any vehicles that visit the substation during operation (such as for routine maintenance or inspections).

A.2.1.4 Stormwater and drainage

The on-site stormwater drainage system would be developed to allow surface runoff from the site to be diverted appropriately away from the substation. The stormwater and drainage system would include a series of surface drains which would connect with a grid of stormwater pits within the substation site. The stormwater system would not include any stormwater retention, water discharge volume controls or water quality treatments. The stormwater drains would incorporate features such as rip rap scour protection to control flow velocities at outlets to minimise the potential for erosion and scouring, which could increase sediment load in the receiving environment.

A.2.1.5 Spill oil containment system

An impervious surface and oil containment system would be installed as part of the substation development.

The substation would contain a range of oil filled equipment such as the transformers and reactors with varying degrees of potential to cause pollution to the environment in the event of loss of oil through failure or leakage. Transformers and other large volume oil filled equipment would be located in a leak-proof bunded

(walled) compounds designed to capture oil and a prescribed volume of firefighting water (and rainwater) in the event of a tank or cooler failure. The bunded areas would be connected to the substation's spill oil containment system comprising primary and secondary oil/water separator tanks, which would have all-weather access and provision for staff and equipment to pump out the captured water oil/water mixture in the event or failure or leak of the oil filled equipment.

A.2.1.6 Landscaping

Landscaping of the substation site would be undertaken in consultation with FCNSW, however is expected to involve the planting of groundcover native species to stabilise disturbed areas within the cleared APZ. Existing trees along Elliott Way would be retained to screen views of the substation from the road.

A.2.1.7 Utility connections

Given the remoteness of the substation site, it is expected that existing water supplies and sewage connections are not available to service the on-site buildings. As such, it is expected that a rainwater tank would be installed at the substation for the provision of freshwater and a wastewater septic system with pump out sewer would be incorporated into the amenities design.

Low voltage electricity supplies to the on-site buildings (for elements such as lighting and control room operations) would be provided via the auxiliary transformers at a lower voltage.

A.2.2 Transmission line connection

A.2.2.1 Transmission line structures

Two 330 kV double-circuit transmission lines would be constructed from the Snowy 2.0 cable yard to the substation and would be located side-by-side. The cable yard is the distribution and transition point from where electricity generated from the Snowy 2.0 underground power station complex would transition from underground to overhead.

Each transmission line would comprise approximately 21 steel lattice structures (approximately 42 in total combined). To help reduce the visual impacts of the project, the new structures would undergo accelerated ageing of the zinc galvanised coatings prior to erection and five structure pairs in the Lobs Hole Ravine area would be painted olive green.

Each structure would be up to 75 metres in height supporting two circuits comprising up to twelve conductors and a two overhead earth wires and/or optical ground wires. The transmission structures supporting each double-circuit transmission line would generally be located adjacent to each other and supported at ground level on a combination of concrete pile, rock anchor and mass concrete style foundations.

Geotechnical investigation works would be carried out at each structure location to verify the type of foundation that would be required. From the last structures at the western extent, the overhead conductors would enter the substation and connect to the substation gantry, which would then connect into the relevant 330 kV switchbays.

From the substation, an approximate 300 metre long 330 kV double circuit overhead connection would be constructed to cut into Line 64. This short connection would comprise both steel lattice structures and concrete or steel pole structures as required.

Due to the location of the transmission lines in an alpine area, the structures would be designed to handle ice and snow loads in addition to conventional structure loading requirements. The distance between structures would be designed to manage the sag and swing movement of suspended conductors.

A concept image of a steel lattice structure is shown on **Figure A-2**.

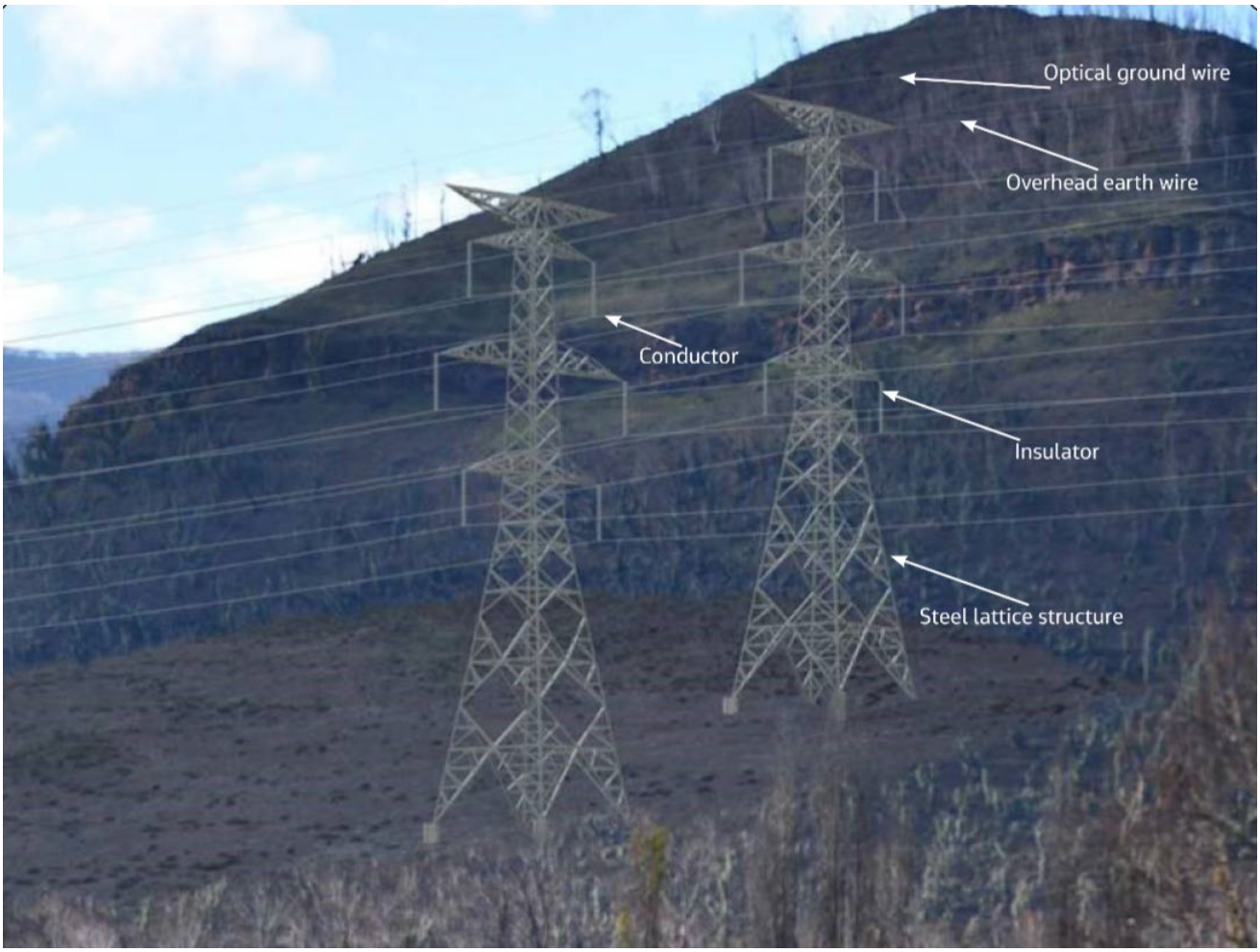

Figure A-2 Indicative concept design for the transmission structures

To protect the transmission lines in the event of a lightning strike, adequate earthing controls would be installed as outlined in **Table A-1**.

Table A-1 Transmission line earthing

Earthing Component	Description
Earthing	Each structure would require earthing connections to 'ground' the structure in the event of a lightning strike. The fixtures would consist of earthing strips and earthing stakes consisting of galvanized steel or copper depending on the soil conditions. The earthing strips would be buried horizontally, just below the ground surface while earthing stakes would extend down vertically into the soil. Each structure would have one earthing fixture per leg (four in total).

Earthing Component	Description
Overhead earth wires	Each transmission line would have two earth wires strung along the top of each structure to provide protection to the conductors in the event of a lightning strike. The earth wires would consist of one standard ground wire and one Optical Ground Wire (OPGW). The OPGW would serve the dual purpose of protecting the line in the event of a lightning strike, while also providing a communications link between the Snowy 2.0 cable yard and the substation to aid in the monitoring and protection of the line. The earth wires would consist of an aluminium conductor steel reinforced line with a diameter of about 16 to 18 millimetres.

A.2.2.2 Construction corridor and easement

The transmission lines would be located within an easement which would provide a right of access for Transgrid to construct, operate and maintain the transmission lines. The terms of the easements would be negotiated with NPWS and FCNSW as part of the property acquisition process as discussed in **Section A.4.1.1**. The final easement would be surveyed following the completion of construction.

Easements are sized to ensure standard safety clearances under high wind conditions, provide an area where vegetation heights can be controlled and provide ease of access for ongoing maintenance and repairs. For a 330 kV easement, the standard easement width is 60 metres. Given the project would involve two 330 kV transmission lines located side-by-side, the minimum easement width along the transmission line extent is 120 metres, however it does vary up to a limit of approximately 135 metres due to the alteration in the spacing of transmission structures driven by favourable level terrain. Additional areas of easement may be sought to include the hazard tree areas, As such, the total easement width in some sections of the transmission connection corridor may be up to 150 metres.

A.2.2.3 Easement Clearing Zones

To minimise impacts on biodiversity and ground stability within the ECZ, ground cover vegetation would be retained, with partial midstorey removal required along with complete removal of the canopy layer. The VCR in the ECZ would be to ensure that all vegetation remains at least three metres from the overhead conductors from the initial clearing of the ECZ to the next subsequent inspection/vegetation maintenance round.

During operation, there may be a future requirement to carry out slashing and mulching to manage dense regrowth or to establish access during maintenance. Further details on the operational maintenance of the ECZ are provided in **Section 3.3.4.1**.

Ensuring the clearances are achieved is critical in managing the risk of bushfire, ensuring public safety and maintaining system reliability.

A.2.2.4 Off-Easement Hazard Trees

Hazard trees pose a considerable bushfire risk and risk to the asset and require management/removed as part of the initial construction of the line and during ongoing operation. These trees are within the HTZ. The tree removal methodology is provided in **Section 3.3.3**.

A.2.2.5 Access tracks and roads

Project area east would be accessed via Lobs Hole Ravine Road and Mine Trail Road. These roads have been upgraded as part of Snowy 2.0 and do not form part of this project.

Elliott Way, which is a sealed road, would provide the primary transport route to the western extent of the project area including the substation. A new access road would be established from Elliott Way to the substation to facilitate construction and would remain in place throughout its operation.

New access roads and tracks would be required to allow for vehicles, plant, machinery and equipment to be transported to the work locations, including all transmission structures during the construction phase. The access tracks would be approximately five metres wide and would be retained to facilitate ongoing maintenance activities of the transmission lines and provide access during emergency events such as bushfire.

The access tracks would be within the ATZ and would be subject to vegetation clearing as described in **Section 3.3.4**.

The new access tracks and roads would be of suitable grade to allow deliveries of large equipment and plant (such as transmission structures, transformers, concrete trucks, cranes, elevated work platforms etc) and allow for the turning radius of the vehicles. Where required and suitable adequate sediment retention basins would be included in the access track design to manage erosion sedimentation and associated impacts on receiving waters.

The indicative layout of the access tracks to be established including the existing road network to be used is shown on **Figure 3-1**. Given the complex terrain and steep gradients, the establishment of linear access tracks was not feasible at some locations. Consequently, their design and location were primarily driven by the existing terrain. The final layout of access tracks would be established as part of the detailed design process.

A new waterway crossing would be required at Sheep Station Creek for the access track in this location. This crossing is expected to be either a small bridge or a large culvert.

A.3 Project staging and timing

Construction of the project is anticipated to commence in mid-2022 and take approximately 55 months to complete. Notwithstanding, the commissioning of the grid connection of Snowy 2.0 is expected to occur approximately 30 months from the commencement of construction with the balance of the project staging (approximately 25 months) being associated with the construction and commissioning of the 500 kV switchyard to support the future HumeLink connection. Estimated timing and staging of the main project activities is set out in **Table A-2**.

Table A-2 Indicative timing for the construction of key project elements

Activity	2022				2023				2024				2025				2026				2027
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
330 kV switchyard																					
Site mobilisation			C	C																	
Site access road			C	C																	
Site establishment clearing and earthworks			C	C																	
Construction					C	C	C	C	C	C											
Commissioning											C	C									
Rehabilitation and demobilisation											C	C									
500 kV substation																					
Site mobilisation											C										
Site access road											C										
Site establishment, clearing and earthworks											C										
Construction												C	C	C	C	C	C	C	C	C	
Rehabilitation and demobilisation																					
Transmission line connection and cut-in																					
Site mobilisation			C																		
Access track construction			C																		
Vegetation clearing along the corridor			C																		
Construction			C	C	C	C	C	C	C												
Commissioning									C	C	C										
Rehabilitation and demobilisation											C	C									

Note: C and yellow indicates construction

The commissioning of the 500 kV component of the substation has not been included as its commissioning timeframe is dependent on the future completion of HumeLink.

The construction program is indicative only and may change based on potential factors including but not limited to:

- Additional works carried out as part of detailed design which may delay construction commencement
- Unseasonal weather conditions delaying construction works
- Unexpected discovery of threatened biodiversity or cultural heritage items resulting in works ceasing in a given location until the matter is investigated and rectified

- Completion of equipment installation at the substation may be affected by operational timing changes of Snowy 2.0.

A.4 Construction activities

The construction methodology outlined in the subsequent sections would be subject to confirmation by the construction contractor.

Approved construction works would commence firstly with the construction of the access tracks to the substation and transmission structure locations. Once suitable access has been established, construction of the substation and transmission lines would commence and occur concurrently as detailed in **Section A.3**.

A.4.1 Site Preparation and pre-construction activities

Pre-construction activities would typically include:

- Site mobilisation once relevant approvals have been granted, property access arrangements are in place between FCNSW and NPWS, and agreements with construction contractors has been achieved
- Surveying and clearly marking out the approved disturbance area and any environmental avoidance areas
- Installation of appropriate stormwater and diversion drainage and erosion and sedimentation control works prior to ground disturbance and vegetation clearing
- Informing recreational users of KNP, Bago State Forest and Talbingo Reservoir of the construction activities, the extent of work areas and the locations of environmental exclusion areas with project notifications, including warning signs of construction activities and notifications of access restrictions
- Establishment of the construction compound and equipment laydown areas at the substation site and at Lobs Hole. The compound at Lobs Hole would be located partially within the approved Snowy 2.0 disturbance footprint.

A.4.1.1 Property acquisition

The project would not require the acquisition of privately owned land, however would involve the acquisition of land from FCNSW and NPWS. The substation site is expected to be acquired from FCNSW as freehold land while the land subject to transmission connection corridor would be acquired in the form of easements with NPWS and FCNSW. The easements would provide Transgrid the necessary access rights to operate and maintain the transmission lines and to ensure that the necessary development setbacks are in place. The acquisition of land associated with the project:

- Is not expected to affect forestry operations carried out by FCNSW as the area is not actively forested given its low commercial value
- Would not restrict pedestrian access by recreational users of KNP and Bago State Forest, however would restrict future developments along the transmission corridor. This includes any development associated with potential future recreational activities such as future camping provisions at Lobs Hole, which may encroach on the easement.

A.4.2 Substation construction methodology

A.4.2.1 Site establishment and vegetation clearance

The main site establishment activities at the substation would include:

- Vegetation clearing across the substation site and APZ within the SZ. This would also involve the stripping and stockpiling of topsoil for later use. In the civil works area (i.e. the substation switchyard), vegetation clearing (including root balls) is expected to be carried out utilising a bulldozer equipped with a tree pusher or by forest harvester, with stumps grubbed out. In the areas where civil works would not be required (i.e. the APZ), vegetation clearing is expected to be carried out using a forest harvester or excavator-mulcher with the root balls/stumps to be left in-situ to minimise soil disturbance and retain ground stability.
- Establishment of a site compound and laydown area within the disturbance areas associated with the substation and APZ. The site compound would be in place throughout the construction period and is expected to contain a demountable office, meal room, and toilet/shower facilities, equipment laydown areas, vehicle and equipment storage, maintenance sheds, first aid rooms, chemical/fuel stores and stockpile areas
- Minor earthworks to establish the site amenities, which would include cut and fill to establish a level area for the site facilities and temporary storage areas and establishment of the permanent site access road.

A.4.2.2 Earthworks

Excavation works would be carried out to remove excess material, provide a level surface, and create the required trenches for drainage, earthing, and electrical conduits. Some spoil from the excavation may be reused on site for filling and compaction (including benching areas of the site where required). Excavation works would be carried out using equipment such as excavators, dozers and crushing plant. Furthermore, depending on the underlying geology, blasting may be required to facilitate the break-up of rock, should it be present. Bulk earthworks would also be required to establish the level surface for the substation bench.

Based on the substation design it is estimated that limited excess spoil would be generated from the levelling of the substation site and construction of the access road. Any soil which cannot be reused onsite as fill material, landscaping or other means would be spread out within the APZ and the area to be rehabilitated. No excess spoil would be removed from Bago State Forest.

Where excavated spoil is not appropriate for reuse on site, it may be necessary to import additional spoil to site. Where this is required, this would be sourced from suitably licenced quarry and certified as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM).

A.4.2.3 Civil and building works

Civil works would generally involve the establishment of concrete foundations for the high voltage equipment and buildings within the switchyard, construction of stormwater drainage and oil containment infrastructure and establishment of cable trenches and installation of subsurface cables. Installation of electrical equipment for the substation would be undertaken using cranes to lift in the required equipment.

Following establishment of the foundations, onsite buildings would be constructed, and services installed including general lighting, power and ventilation.

Additional elements such as security fencing would also be installed.

A.4.3 Transmission line construction methodology

A.4.3.1 Site establishment

A construction compound and laydown area would be established within the cleared area adjacent to the southern boundary of Transgrid's Ravine substation at Lobs Hole (refer to **Figure 3-1**). This area is partially of the approved Snowy 2.0 disturbance footprint. A second site compound (approximately 100 metres by 100 metres) would be established within the disturbance area reserved for the substation to service construction activities in project area west.

The site compounds would be in place throughout the construction period and are expected to contain demountable offices, equipment laydown areas, vehicle and equipment storage, maintenance sheds, chemical/fuel stores and stockpile areas.

A.4.3.2 Access track construction and upgrades

To facilitate the construction of each transmission structure, access tracks would be established with in the ATZ. Access track construction works would utilise a minimum disturbance approach and would be unsealed. Access track construction works would include the following key activities:

- Erosion hazard assessment and the implementation of necessary erosion and sediment controls (including sediment retention basins as required) prior to or immediately after vegetation clearing and before ground disturbance works commence
- Vegetation clearing within the approved corridor
- Grubbing and bulk earthworks (cut and fill) using an excavator
- Stockpiling topsoil and subsoil resources for re-use in rehabilitation
- Laying and compaction of a suitable rock aggregate/road base
- Placing material at the approaches, and on the bed and banks of the waterway to be crossed to enable access of heavy vehicles hauling plant and equipment between the structures
- Grading and/or reshaping of existing tracks where required, within the existing access track width (no road widening)
- Minor excavations followed by laying and compaction of crushed rock or gravel, to improve the existing track surface and drainage.

As part of construction, it is assumed the ATZ would be subject to complete vegetation clearing, which would be primarily undertaken using an excavator, bulldozer and/or tree harvester, refer to **Section 3.3.3**. The access track corridor was established with consideration to terrain (e.g. utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing.

Construction of the access tracks would be staged to progressively complete discrete sections of track and install erosion/sediment controls and utilise mulch to stabilise batter slopes and other non-operational areas, pending permanent rehabilitation/revegetation of these areas. Manual felling of trees may be carried out in the steeper sections of the access track route where the use of machines would carry work health and safety risks.

While a 30 metre wide fully cleared corridor has been assumed to encompass the worst-case disturbance to construct the tracks, the 'as built' access track width would be four metres to mineral earth i.e. trafficable

surface (minimum) with 1-2 metres either side cleared to facilitated safe access /egress. As such, the areas external to the operational access tracks including the batters would be stabilised and revegetated in accordance with an approved rehabilitation plan.

Construction in project area east would utilise Lobs Hole Ravine Road and Mine Trail Road which has been upgraded and extended as part of Snowy 2.0. Depending on the conditions of these roads prior to the commencement of construction, some upgrades may be required. The repair and upgrade to existing access tracks would involve:

- Grading and/or reshaping of existing tracks, within the existing access track width (no road widening)
- Minor excavations followed by laying and compaction of crushed rock or gravel, to improve the track surface and drainage.

A.4.3.3 Easement Clearing

Prior to clearing occurring, management zones within the easement would be marked-out (using high visibility taping or similar) within the defined surveyed easement corridor.

Vegetation within the ECZ would be removed/managed by a variety of methods, which would primarily be determined by:

- Vegetation type/structure
- Slope/terrain
- Environmental/ecological constraints.

In areas safely accessible to a machine, smaller trees (or other tall growing vegetation) below 200 millimetres DBH would be removed using an excavator-mulcher to mulch the aerial portion of the vegetation down to ground level.

Vegetation over 200 millimetres DBH would be removed using a forest harvester type machine, noting that tree branches/canopy may be mulched in-situ. The tree barrels would either be:

- Tub Ground to provide material for erosion/sediment control and rehabilitation
- Relocated to the edge of the easement and retained as habitat
- Re-used by FCNSW/NPWS (pending negotiations).

The use of machine clearing would cause disturbance to shrubs and ground cover, however, careful management and supervision of these operations would be carried out to minimise impacts. It is noted that while some impacts to all vegetation strata may occur during clearing operations, natural regeneration coupled with rehabilitation of heavily impacted areas would result in regeneration of the majority of the easement clearing zone.

A.4.3.4 Transmission structures

A.4.3.4.1 Establishment of works sites

Complete vegetation clearing of an area up to 50 metres surrounding each transmission structure would be required to allow for the laydown of materials and equipment and facilitate access for vehicles, plant and machinery during structure construction. This would be within the TSZ as discussed in **Section 3.3.4**.

Given the steep terrain traversed by the transmission connection, level construction benches would be established within cleared worksite at the majority of the transmission structure locations to allow for the safe operation of plant and equipment (namely elevated work platforms and cranes) during structure construction and maintenance.

The actual size and number of benches required at each structure location would be determined during detailed design, however it is expected that up to two level benches would be required at the base of each structure with each bench being up to 20 metres x 20 metres in size. Construction benches would be constructed using an excavator utilising a cut-and-fill approach to establish the levelled area. The amount of bulk earthworks required to form the level bench would be dependent on the slope of the terrain at the bench location.

A.4.3.4.2 Structure foundations

Geotechnical investigation works using a mobile drill rig would be carried out at each structure location once the access tracks have been established. This would be required to determine the most appropriate foundation design for each structure including the required depth of excavation required for each foundation.

It is expected that a combination of concrete pile, rock anchor and mass concrete style foundations would be used at structure locations along the transmission connection corridor. Given the uncertainty surrounding geological conditions at the structure sites, it is anticipated that the depth of the foundation may be in the order of approximately 10 to 20 metres below the ground surface (mbgs) in good material. Foundation depths at some structure locations may exceed this should they occur in unstable soil. Mass concrete type foundations would generally involve establishing an open excavation, followed by the installation of steel framework and backfilling with concrete, while pile type foundations would involve boring four boreholes at each structure leg location, followed by backfilling with concrete. Rock anchors are high tensile steel rods which would be grouted into pre-drilled holes at each structure leg location to provide the anchor point for each leg. Blasting may be required should rock be encountered.

A.4.3.4.3 Structure assembly

The steel lattice structures would be transported to each structure location via heavy vehicle in parts and assembled on-site. Mobile cranes would be used to move steel members and structure sections around the worksite and position the structure section to allow work crews to manually bolt the sections together. The base of each structure would be secured to the foundations via holding down bolts at each structure leg. The general method of structure assembly is shown on **Photo A-1**.

Photo A-1 Structure assembly using cranes

A.4.3.5 Stringing of conductors and earth wire

A process called ‘tension stringing’ would be used to string the conductors and overhead earthwires between the transmission line structures using hydraulic tensioning and pulling equipment. This process would ensure that the conductors and earthwires would remain above the ground during the stringing of each section.

Tensioning and pulling sites would be set up within the 50 metre x 50 metre area around the structure and at suitable locations within the TPZ where tensioning and pulling equipment needs to occur outside of the transmission structure areas. The extent of earthworks carried out within the TPZ would be determined by the terrain and would require complete clearing and earthworks to establish a level bench for the safe operation of the tension and pulling equipment.

Sheaves (or pulleys) would be attached to the top of the structures in readiness for stringing work using an elevated work platform. The stringing process would commence with the pulling out of a light weight draw wire or rope across the extent of the transmission line section being strung. This draw wire or rope would either be pulled and dropped into the sheaves using a drone or pulled out across the transmission corridor by a vehicle or machine (such as a dozer) then lifted by winch or crane and manually placed in sheaves by work crews climbing the structure or via an elevated work platform.

The draw wire or rope would then be attached to the earth wire or conductor drum (depending on which is being strung) and would be pulled through the sheaves under tension using specialised tensioning and pulling equipment. Once the intended section has been strung and the correct tension has been established, the conductor/earth wire would be terminated at each end, clipped into position and the sheaves removed.

The conductor and earth wire stringing process are shown on **Figure A-3**.

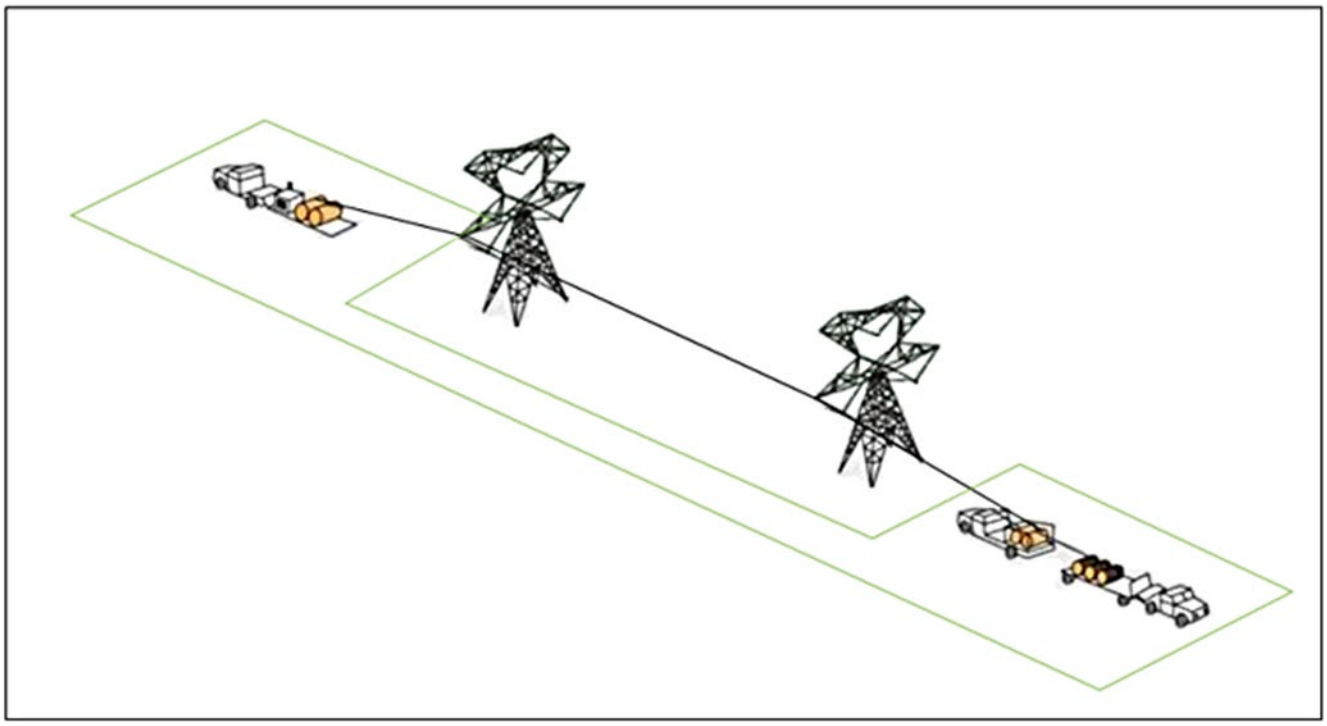

Figure A-3 Conductor and earth wire stringing process

A.4.4 Commissioning

Following construction of the 330 kV switchyard component of the substation and the transmission connection, commissioning works would be carried out which would generally include testing of all high voltage equipment and ensuring all protection, control and metering equipment is operating correctly. Additionally, all necessary cut-in works to Line 64 would be completed and relevant testing undertaken.

The new transmission lines and substation would then be placed into standby in readiness for Snowy 2.0 to be completed. Once Snowy 2.0 becomes operational, the high voltage equipment would be energised, and the project placed into service.

A.4.5 Plant and equipment

The indicative plant and equipment used for the key elements during construction is outlined in **Table A-3**.

Table A-3 Indicative equipment

Works element	Type of equipment
Substation	Excavator, dump truck, bulldozer, tree pusher, roller, grader, truck and dog, drilling rigs, concrete truck and pump, backhoe, semi-trailers, trencher, water truck, light vehicles, compressor, generator, drills, mobile cranes, whacker rammers, bobcat, elevated work platforms, flatbed hiab truck, tilt tray truck, drill rig and hand tools.
Access tracks and roads	Excavator, dump truck, bulldozer, grader, truck and dog, water cart, light vehicle, compressor, piling rig, agitator truck, concrete truck, semi-trailer and roller.
Transmission line construction and stringing	Bulldozer, tree pusher, mulcher, excavator, roller, chainsaws, piling rig, drill rig, truck and dog, concrete truck and pumps, semi-trailers, mobile cranes, bobcat, tensioning and winch equipment, elevated work platform, helicopter and drone.

A.4.6 Construction resources

A.4.6.1 Materials

Indicative construction materials would include fuel, pre-fabricated transmission structure sections, transmission structure fittings, overhead earthwire, electrical conductor, timber, scaffolding, explosives (potentially), steel, concrete, electrical equipment, geotextiles, aggregate/road base and cement. The sources of construction materials are yet to be determined. It is expected that construction materials would be sourced from several different locations including nearby towns such as Tumbarumba and Tumut with some items and specialised equipment being sourced from major cities such as Canberra, Sydney and Melbourne.

A.4.6.2 Water

Approximately 60,000 kilolitres of water is expected to be required over the duration of construction works. The water would be required for:

- Amenities at the substation site
- Dust suppression during excavation works and for stockpiles
- Civil construction (access tracks, substation, footings etc)
- Testing of the spill oil containment system following construction of the substation.

All water to be used during construction in project area east would be sourced from Talbingo Reservoir either using the Snowy 2.0 supply outlet fitted with separate metering equipment or a new supply pipe and outlet collocated with the Snowy 2.0 water supply infrastructure.

Construction water for project area west is expected to be sourced via a combination of methods including:

- **Snowy Hydro T2 Tailbay** – A temporary water extraction site would be established along the access road to the existing Snowy Hydro T2 Tailbay site, located off Elliott Way and approximately five kilometres south east of the project area. Water extraction infrastructure (intake pipe, metering equipment etc.) would be established within the previously disturbed area on the northern side of the access road extending down the bank into Talbingo Reservoir. A new gate would also be installed across the access road between the water extraction site and the T2 Tailbay compound to separate the two work areas and prevent access by the construction workforce to the T2 Tailbay compound. No vegetation clearing would be required as part of the establishment and operation of this site.

- **Paddy's River Flat Campground** – Water trucks would access the Council owned campground, located off Tooma Road (near the intersection of Elliott Way) and extract water directly from Paddy's River. Water would be extracted on the southern side of the bridge, just off the campground access road. No vegetation clearing, excavation or ground disturbance would be required, however rubber bog mats would be utilised to protect the ground integrity where the water truck passes over grassed areas. Council has advised that they currently use this area to obtain water for Council purposes and there is sufficient volumes of water year round to support construction activities for the project.
- **Town water supply** – under consent from Snowy Valleys Council, water would be sourced from the existing town supply in Tumbarumba. Council advised they could not meet the full water demand for project area west (40,000 kilolitres). As such, the town supply option would only be used as a backup for smaller volumes that may be required during construction, in the event that the other methods could not be utilised.

The locations of the two new extraction points are shown on **Figure 3-1**.

A water extraction licence would be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River. Additionally, it can be expected that up to eight truck movements per day may be required to obtain water from the Snowy Hydro T2 Tailbay site or the Paddy's River Flat Campground.

A.4.6.3 Energy use

Power to support construction equipment is expected to be sourced from mobile diesel generators.

A.4.6.4 Waste

The management of waste would be detailed in a CWMP and a spoil management strategy which would be developed during detailed design and construction planning.

A.4.6.4.1 Excavated material

Large volumes of excess excavated material would be generated as part of bulk earthworks during the construction of the substation, access tracks and the transmission structures. The excavated material is expected to contain a mixture of rock of varying diameter and finer grade soil. The management of excavated material and spoil would be defined by the spoil management strategy and is expected to be managed as outlined in **Section A.4.4.7**.

An estimated breakdown of excess excavated material (material which cannot be reused as fill material) anticipated during bulk earthworks is provided in **Table A-4**.

Table A-4 Estimated spoil volumes

Component	Project area west (cubic metres)	Project area east (cubic metres)
Substation and access road	N/A	-
Access tracks	30,000	120,000
Structure foundations and benches	10, 000	20,000
Total	**40,000**	**140,000**
*The spoil volumes are estimates only and may be subject to change upon completion of detailed design		

A.4.6.4.2 Vegetation

The management and disposal of timber and vegetation debris would be developed in consultation with NPWS and FCNSW and documented in the CWMP. Vegetation wastes is expected to be managed by a combination of:

- Processing timber through a timber chipper/tub grinder followed by distributing the chips across bare, disturbed or exposed areas, including batters adjacent to the access tracks
- Relocation of felled timber containing hollows that could provide fauna habitat into the adjoining forested areas
- Removal of timber off-site and stockpiling at a suitable location for potential re-use as building material or firewood
- Inspection of felled timber by FCNSW within Bago State Forest. Any felled timber that FCNSW determine can be repurposed will be removed off-site by FCNSW.

A.4.6.4.3 General construction waste

Construction waste such as used materials and packaging would be placed in dedicated waste containers at the work sites and the construction compounds at Lobs Hole and the substation site. Construction waste would be removed from the project area by truck and disposed of at a suitably licensed facility. Waste facilities that would likely be used would include Tumut waste and recycling centre, Talbingo waste depot and Tumbarumba landfill. Waste generated during construction in project area east may also utilise Cooma landfill and Adaminaby waste transfer station.

A.4.7 Management of excavated material

The strategy for the management of excavated material would aim to maximise the beneficial re-use of materials for construction activities, which may include the reuse of road base, construction benches at the transmission structure sites, landscaping or other uses as part of the substation build, with the excess spoil to be suitably managed and disposed of. The strategy for the management and disposal of excavated material in project area west and project area east would be documented in the spoil management strategy and is expected to be managed as outlined below.

A.4.7.1 Project area west

Excess spoil generated in project area west (approximately 40,000 cubic metres), which cannot be reused is expected to be disposed of within the SZ. Disposed material would be spread out in disturbed and exposed areas and appropriately contoured prior to being stabilised and rehabilitated with low growing native grass species.

A.4.7.2 Project area east

Excess spoil generated in project area east (approximately 140,000 cubic metres) would be transported by truck from the work locations via Lobs Hole to spoil emplacement locations approved as part of Snowy 2.0, such as the approved Ravine Bay, GF01 and Main Yard emplacement areas with the locations shown in **Figure 3-1**. The haulage of this material would be confined to the newly formed access tracks and the established access tracks at Lobs Hole formed as part of Snowy 2.0. These areas would be closed to the public for the duration of construction. Once the material has been transported to the emplacement areas, it

would be managed and disposed of in accordance with the Snowy 2.0 Main Works approval. No sub-aqueous disposal of spoil would occur.

Ravine Bay

The extent of the Ravine Bay emplacement area and total approved volume of spoil to be disposed is 4,500,000 cubic metres, of which 2,800,000 cubic metres is expected to be used for Snowy 2.0. While there is sufficient capacity for all of the project's excess spoil to be placed in the Ravine Bay emplacement area, there is also sufficient approved capacity under Snowy 2.0 to accommodate the disposal of any balance of spoil at GF01 and the Main Yard emplacement areas.

At Ravine Bay, material generated during drilling and blasting carried out as part of Snowy 2.0 would be placed within Talbingo Reservoir up to the full supply level (FSL) to establish the pad extending out into the bay, material would then be placed above FSL on-land in a new constructed landform. Excess excavated material generated in project area east would then be combined with the Snowy 2.0 Main Works material at this site. The material would be placed on the pad and the existing landform would be sculpted to establish a natural landform consistent with the surrounding environment and future recreational plan for the area under consultation with NPWS. Disposal of spoil at Ravine Bay would only occur once the established pad is above the FSL meaning that no sub-aqueous disposal of spoil would occur as part of the project.

The final agreed landform and its rehabilitation is documented in the Snowy 2.0 Main Works Detailed rehabilitation plan prepared by Snowy Hydro. An indicative artist impression of the Ravine Bay emplacement area following its rehabilitation is shown on **Figure A-4**.

GF01 and Main Yard

GF01 is an all-to-land location between the Main Yard (Lobs Hole) and Ravine Bay, refer to **Figure 3-1**. The concept geomorphic excavated material design for GF01 has a capacity to accommodate approximately 1,000,000 cubic metres of excavated rock including excess spoil generated by the project.

During the construction phase of the Snowy 2.0 Main Works, construction pads are required to house workshops, sheds, machinery, offices and other project related infrastructure. In order to get level platforms on which the necessary infrastructure can be constructed, excavated material would be emplaced and compacted into pads within Lobs Hole. While it is expected that these level construction pads would have been well progressed prior to the commencement of this project, disposal of spoil material at this location may occur during the initial phases of the project.

At the completion of construction of the Snowy 2.0 Main Works and the project, the Main Yard construction pads would be shaped using a geomorphic landform method and then rehabilitated. It is envisaged that in consultation between Snowy Hydro and NPWS, the final landform would be developed and optimised to facilitate recreational use in Lobs Hole area.

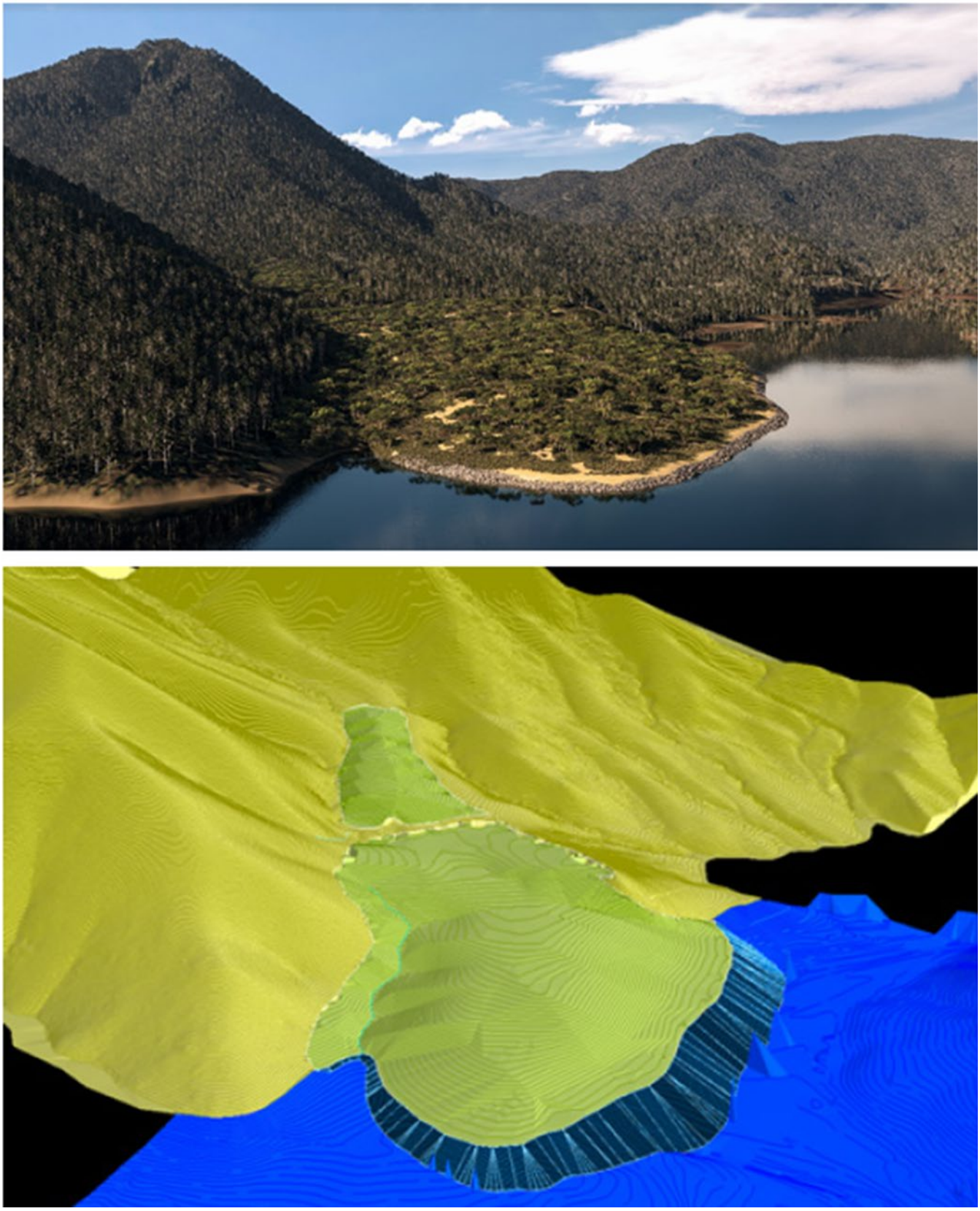

Figure A-4 Ravine Bay emplacement area visualisation

(Source: Snowy 2.0 Main Works Preferred Infrastructure Report and Response to Submissions, EMM 2020)

A.4.7.3 Naturally occurring asbestos

The project traverses areas in the central portion of the project area which are mapped as ranging from low to high risk of containing NOA. These areas were visually investigated and re-classified as having very low potential to contain NOA. Notwithstanding this, further geotechnical investigations would be carried out once access is established to these locations to verify presence or absence of NOA within the areas of vegetation clearing and ground disturbance. If NOA is determined to be present, it would be managed and disposed of at a suitably licenced facility or a dedicated Snowy 2.0 approved NOA emplacement area and in accordance with a dedicated NOA management plan. No NOA material if encountered would be disposed of at the Ravine Bay, GF01 or Main emplacement areas. The implications and management of NOA are discussed further in Section 7.5.3.1 of the EIS.

Geotechnical investigations would assist in closing out uncertainties associated with NOA in this assessment.

A.4.8 Construction workforce and working hours

A.4.8.1 Workforce

The construction workforce would vary depending on the stage of construction and associated activities. During peak construction activities, the project would employ up to 140 workers, with an average workforce anticipated to be around 75 workers (depending on the stage of construction works). During peak construction about 50 workers would be within the project area east and about 90 workers would be within project area west.

A.4.8.2 Construction Working hours

Given the isolated location of the project with no residential dwellings potentially affected by noise generating works and the construction of Snowy 2.0 occurring in parallel, construction works are expected to be carried out 12 hours per day, seven days per week between the hours of 6 am and 6 pm. Traffic movements to and from the project area would occur approximately one hour either side of the construction working hours and would continue throughout the hours of construction (i.e. traffic movements would occur between the hours of 5 am to 7 pm).

A.4.8.4.1 Out of hours works

A series of works outside the proposed construction hours are anticipated including (but not limited to) the following:

- Cut-over and commissioning of the transmission connection
- The delivery of equipment or materials as requested by police or other authorities for safety reasons
- Substation assembly (such as the oil filling of substation equipment)
- Emergency work to avoid the loss of lives and/or property and/or to prevent environmental harm
- Work timed to correlate with system planning outages.

A.4.8.3 Workforce accommodation

By motor vehicle, the travel distance between the substation site and the eastern extent of the project area at Lobs Hole is approximately 50 kilometres with a travel time of approximately one hour. To avoid excessive

travel time and manage worker safety (particularly fatigue), approximately 20 construction personnel working in project area east are expected to be housed in Snowy 2.0 works accommodation. These workers are expected to be transported to the accommodation by bus at the commencement of their working roster. The balance of construction staff (approximately 30) during the peak periods of construction are anticipated to access the project area each day from surrounding townships of Talbingo, Tumut, Adaminaby, Providence Portal and Cooma.

Construction personnel working in project area west are expected to be accommodated in Tumbarumba, which is located approximately 40 kilometres (approximately 30 minutes' drive) from the substation site. Consultation undertaken with Snowy Valleys Council has confirmed that Tumbarumba has sufficient capacity to support the workforce in project area west.

A.4.9 Traffic movements

Construction vehicle movements would comprise vehicles transporting equipment, waste, materials and spoil, as well as vehicles driven by the construction workforce accessing the project area.

Estimated light and heavy vehicle movements on a typical day and during the peak construction period is outlined in **Table A-5**.

Table A-5 Estimated vehicle movements

Vehicles	Movement type	Estimated movement
Substation		
Light vehicles	Indicative daily movements (typical day)	50
	Maximum daily movements (peak construction period)	80
Heavy vehicles	Indicative daily movements (typical day)	30
	Maximum daily movements (peak construction period)	75
Transmission lines and access tracks		
Light vehicles	Indicative daily movements (typical day)	40
	Maximum daily movements (peak construction period)	70
Heavy vehicles	Indicative daily movements (typical day)	50
	Maximum daily movements (peak construction period)	75

* Indicative daily movements are based on current program of work and may change as a result of detailed construction planning

*One vehicle movement refers to one inbound and outbound trip.

It is anticipated that the maximum predicted daily heavy vehicle movements would occur during:

- Bulk earthworks and civil works during the substation construction
- Bulk earthworks and civil works during access track construction and establishment of the transmission structure foundation
- Transmission connection corridor vegetation clearing works.

The high volume of heavy vehicle movements during the above activities is attributed to heavy vehicles transporting large volumes of spoil, vegetative matter and debris from the project area.

Light personnel vehicle movements would be generally attributed to the construction workforce accessing the project area for work each day and accessing the work locations along the transmission connection corridor.

Under the single-phase transformer option, each of the nine single-phase transformers would be transported separately to the substation site on an OSOM vehicle. Other OSOM vehicles may also be required for the delivery of equipment but the total number of OSOM movements is expected to be low. These OSOM vehicles are anticipated to travel from either Port Kembla or Port of Newcastle to the substation in project area west.

A.4.9.1 Parking

Construction vehicles in the project area east are expected to consist of light utility and heavy vehicles required to facilitate construction (no personal vehicles). It is anticipated that these vehicles, when not in use, would be parked within the designated site compound area at Lobs Hole or at other designated areas as agreed with Snowy Hydro and NPWS.

Construction personnel working in project area west are expected to park within a designated construction workforce parking area, which would be established within the site compound area at the substation site. The compound would also have sufficient capacity to support the parking of utility and heavy vehicles required to facilitate construction in the western portion of the project area.

A.4.9.2 Primary transport routes

The anticipated haulage routes for heavy vehicles carrying materials and equipment to and from the project area are outlined below.

- Project area west: It is expected that majority of materials and equipment would travel along Hume Highway, Snowy Mountains Highway, Batlow Road, Tooma Road and Elliott Way
- Project area east: It is expected that the majority of materials and equipment would travel along Snowy Mountains Highway (via both from Cooma and Tumut), Link Road and Lobs Hole Ravine Road.

Once repairs to Link Road and Goat Ridge Road are complete following the damage from the Dunns Road bushfire, some traffic movements would occur along these roads for access to project area east and project area west.

It is expected that all heavy transport on the surrounding road network would occur between 5am to 7pm to limit noise impacts. The transport routes are shown on Figure 5-6 of the EIS.

A.4.10 Rehabilitation and demobilisation

Following construction, all non-permanent infrastructure such as equipment laydown areas and site compounds would be decommissioned and removed from site. The rehabilitation activities would consider the overarching phases with key activities to be carried out both during and post construction as outlined in the rehabilitation strategy provided in **Table A-6**. The rehabilitation strategy would form the basis of the rehabilitation plan which would be prepared to guide the long term rehabilitation of applicable parts of the project area where permanent infrastructure and management (i.e. clearing under the transmission lines) is not required. The rehabilitation plan would be developed in consultation with NPWS and FCNSW prior to

construction and would be consistent where relevant with the approved Snowy 2.0 Rehabilitation Management Plan.

All rehabilitation activities would be accordance with the rehabilitation plan for the project.

Table A-6 Rehabilitation strategy

Vehicles	Movement type
Site preparation	During the preparation of the worksites including the substation, access tracks and transmission structure sites, the following activities would be carried out: Collection and stockpiling of organic matter from removal of vegetation during construction, including topsoil, woodchip and organic matter for use in rehabilitation.
Site stabilisation and landscaping	Site stabilisation activities would be carried out both during and post construction and would include the following: • Stabilisation of exposed areas and slopes and prepare the sites for revegetation • Installation of erosion and sediment controls at the work sites to manage impacts both during and post construction • Seeding soil slopes to assist in stabilisation • Planting vegetation on any higher risk slopes • Mulching of stabilised and revegetated areas where required.
Maintenance and monitoring	Ongoing maintenance and monitoring of rehabilitation works would include: • Monitoring of stabilised slopes and revegetated areas • Monitoring on the performance of erosion and sediment controls • Weed control and monitoring • Maintaining any fencing placed around rehabilitation areas • Re-mulching of stabilised and revegetated areas where required.
Demobilisation	Following the completion of construction, demobilisation activities would be carried out and would likely include: • Removal of any temporary fencing around the works sites and site compound areas • Disassembling and removal on any temporary on-site infrastructure including site offices, amenities, equipment storage, and maintenance sheds within the site compound areas • Removal of all construction equipment and machinery from the site compound areas and work sites • Removal and disposal of any remaining stockpiles and other waste materials from the site compounds and other laydown areas • Removal of any temporary environmental controls (e.g. erosion and sediment controls) which are no longer required. The rehabilitation phases described above would coincide with the work site demobilisation activities.
Project decommissioning	• Removal all project infrastructure • Rehabilitating and revegetating of the project site.

A.5 Operation and maintenance

The substation and transmission connection would be inspected by field staff on a regular basis. Key activities undertaken during operation would include:

- Regular inspection and maintenance of electrical equipment at the substation including structural integrity of all foundation and support structures

- General inspection and maintenance of other components within the substation including the stormwater management system, fire detection system, onsite buildings and drainage infrastructure
- Regular inspection and maintenance of the transmission structures, foundation, fittings, conductors and overhead earth wires
- Vegetation removal and trimming along the transmission line easement and APZ surrounding the substation to maintain appropriate clearances between ground vegetation and the overhead transmission connection and around the substation to manage bushfire risk
- Removal of trees which have the potential to strike the overhead conductors if they were to fall (referred to as hazard trees) as required.

It is expected that only light vehicles and small to medium plant would need to access the substation site and the transmission line easement for these activities. The substation would not accommodate full-time staff or contractors, and the regular collection of waste would not be required. Any waste generated during operation of the substation would be minimal and disposed of on an 'as need' basis.

A.6 Project decommissioning

The project would remain in service for the operational life-span of Snowy 2.0, which is anticipated to be 100 years. Prior to carrying out any decommissioning activities, a decommissioning plan would be prepared in consultation with NPWS and FCNSW. The decommissioning works are expected to involve:

- Removal of the overhead conductors and earth wires
- Dismantling of the transmission structures and earthing strips
- Decommissioning of the Snowy 2.0 switchbays and the substation
- Rehabilitating and revegetating the easement.

Access tracks may be left in-situ for future use by NPWS and FCNSW. This would be confirmed in consultation with NPWS and FCNSW during the preparation of the decommissioning plan.

Depending on the presence of future transmission lines connecting to the substation and electricity demand and grid requirements at the time of decommissioning, the substation may continue to remain in operation. If the substation would no longer be required, decommissioning would generally involve the following:

- Removal and disposal of all electrical infrastructure with considerations for potential re-use at other substation sites
- Removal of all structural supports and perimeter fencing
- Demolition of onsite buildings
- Rehabilitating and revegetating the substation site.

A.7 Ongoing design process

Full details of the design for the project are yet to be completed. The EIS, Submissions Report and this Amendment Report are based on a current design status for each project element which may be refined through the detailed design process.

Further geotechnical investigations are required to finalise the detailed design and help address uncertainties associated with this assessment. Due to the inaccessible terrain, geotechnical investigations would be carried out as access tracks are constructed for the project. As such, detailed design would progress in parallel with initial construction activities. The design would continue to seek to minimise the final permanent disturbance area as much as possible.

Construction methods and how the project would be constructed may also vary subject to design refinements and the selection of the construction contractor. These details would be resolved as the design of the project progresses. As a result, the final design may vary from the design described in this Amendment Report and EIS.

The assessment of the project within the EIS and this Amendment Report is based on consideration of reasonable worse case environmental impacts to allow flexibility in the design and construction methodology. The ongoing design of project elements would adopt the identified performance outcomes for the project as identified in the EIS.

The disturbance area is as small as possible to minimise environment impacts as far as practical. The alignment of the transmission line follows the shortest practical route linking Snowy 2.0 with the nearest existing transmission line outside of KNP. Similarly, the placement of access tracks has focused on selecting the shortest possible routes (based on topography) and avoiding sensitive areas where possible. The project's design consequently minimises, as far as practical, the overall area being impacted.

Any proposed variations that fall outside the reduced disturbance area would be reviewed for consistency with the assessment contained in this EIS and this Amendment Report, including relevant mitigation measures and any future CoA. If any proposed variations are not consistent with the approvals, appropriate modifications to the project approval would be sought in accordance with the requirements of the EP&A Act.

A.8 Interactions with Snowy 2.0

As detailed in this chapter, where the project interacts with aspects of Snowy 2.0, Transgrid is seeking consent for the following:

- Intermittent shared use of Snowy 2.0 laydown areas within the approved Snowy 2.0 disturbance area
- The establishment and operation of a site compound, occupying an area of approximately 100 metres x 50 metres partially within the approved Snowy 2.0 disturbance area adjacent to the Ravine substation.
- Co-location of the water supply within the extraction facilities from Snowy 2.0 operations at Lobs Hole for dust suppression and other construction activities in project area east
- Use of concrete supplied by Snowy 2.0 batching facilities for the construction of the transmission connection and ancillary infrastructure as required in project area east
- Disposal of approximately 140,000 cubic metres of excess spoil at the Ravine Bay emplacement or other approved emplacement areas under the Snowy 2.0 Main works, where It would be managed in accordance with the Snowy 2.0 Main Works approval
- Use of beds at the Snowy 2.0 works accommodation by the construction workforce working in project area east.

Appendix B Updated mitigation measures

Following public exhibition of the EIS and after consideration of the issues raised in the submissions, and further environmental assessment for the amended project, revisions to the mitigation measures included in the EIS have been identified.

Where new commitments have been added or new text has been added to an existing measure, it appears as **bold text**. Where a commitment has been deleted or text from the commitment deleted, it appears as ~~strikethrough~~ text.

As a number of new mitigation measures has been included and some mitigation measures have been removed, the mitigation measures IDs have been renumbered as outlined in **Table B-1**.

This table supersedes the mitigation measures presented in the EIS. These revised mitigation measures represent the commitments of the amended project through delivery and operation.

Table B-1 Updated environmental management and mitigation measures

Mitigation Measures	
Biodiversity	
B1	**Detailed design of the project will focus on the retention of managed shrub and groundcover vegetation zones, within the ECZ, HCZ and HTZ to avoid and minimise the loss of vegetation and habitat and movements of fauna across the landscape and to minimise the impact of predation on displaced fauna.** **Final design for permanent creek crossing structures on access roads will implement a design option to ensure stream flow is unaffected (e.g. single span to minimise stream disturbance and flow).** **Design and micro-siting of access tracks will avoid and minimise impacts to rock outcrops, large boulders, piled rock, and rock features that provide potential sheltering and breeding habitat for fauna including threatened species and avoid mapped habitat trees. Access track corridors will be established with consideration to terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing.**
B2	A ~~biodiversity management plan~~ BMP will be prepared and **approved prior to construction. The BMP will be prepared by a qualified ecologist in consultation with BCS and NPWS, and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the revised BDAR (Appendix C), but not be limited to these measures. The BMP will be based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and will focus on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action or additional offsets where further impacts are identified.** **The BMP will include a program to monitor, evaluate and publicly report on the outcomes of a biodiversity monitoring program (refer Section 11.2 of the revised BDAR). The BMP must stipulate objectives for monitoring, and how baseline data will be captured and represented.** ~~implemented during construction. It will include the following measures:~~ • ~~The boundary of the clearing limits for the transmission corridor will be clearly marked on site by a surveyor before construction commences. Exclusion zones, or 'No-Go' zones, will be clearly marked at the edge of the final disturbance boundary to protect the vegetation to be retained from inadvertent direct impacts. Exclusion zones and the edge of the clearing boundary will be marked with high visibility fencing and signage~~ • ~~Where possible, within areas of retained vegetation that are not impacted by Snowy 2.0, a 50 metre exclusion zone (buffer) around Booroolong frog habitat will be clearly demarcated by fencing and signage and identified on maps for construction personnel. This buffer is separate to the Snowy 2.0 exclusion area around breeding habitat which has its own restriction. The habitat buffer is particularly important for the proposed crossing of Sheep Station Creek. The demarcation will serve to identify the ecological sensitivity of the land and only approved works with adequate controls in place will be permitted to be undertaken~~ • ~~Where works will be undertaken within the 50 metre riparian buffer zone for the Booroolong frog, an ecologist will inspect all vegetation, rocks, logs and other shelter sites to locate any frogs. Frogs will be relocated to the designated relocation site. If works are undertaken outside of the active period (April to September) frogs will~~

Mitigation Measures	
	~~be taken into the care of an appropriately qualified and licensed carer (this will require an agreement to be reached with a carer before works commence)~~ • ~~Pre-clearing surveys will be conducted prior to clearing, including translocation of fauna into areas of retained vegetation. Refinement of the clearing extent required for the transmission corridor will be undertaken as necessary. The final clearing extent will be documented. This information will be used to inform and refine the Biodiversity Offset Strategy and offset requirements for the project. This process involves the preparation of a pre-clearing report~~ • ~~All areas not retained for permanent infrastructure within the project area will be rehabilitated in accordance with a rehabilitation plan to be developed in consultation with NPWS and FCNSW~~ • ~~Cleared native vegetation will be mulched and stockpiled for use during rehabilitation~~ • ~~Hollows logs and limbs will be retained for placement within retained vegetation and reuse during rehabilitation~~
B3	**A Rehabilitation Plan will be prepared and approved prior to construction in consultation with BCS, NPWS and FCNSW. The Rehabilitation Plan will inform the implementation of rehabilitation within the lease/licence area. Such areas will be identified in the final detailed design and will also include areas disturbed during construction that are not required to be maintained or cleared for the operation of the project.** • **The plan will focus on the implementation of soil erosion prevention, re-establishment of local endemic plant species suitable to the vegetation formation and habitat and outline the details of rehabilitation objectives and how their outcomes for success will be measured, locations, target landforms and plant community types** • **Restoration of riparian vegetation (i.e. weed control) will be implemented to protect and improve key habitat areas of the Booroolong Frog** • **The plan will include a program for adaptive monitoring of specific success measures and reporting and include a Trigger Action Response Plan (TARP). The TARP will include notification to NPWS and BCS that remedial actions have been triggered and agreement about the response** • **Revegetation of slopes will be undertaken in accordance with the rehabilitation plan** • **Landscaping of pervious surfaces using native indigenous species only** • **Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder)** • **Ongoing maintenance of the rehabilitation work will be required, including management of weeds and pathogens** • **Topsoil and subsoil generated during construction will be stockpiled separately on-site to be used for rehabilitation. Stockpiles will be managed according to best management practices (Managing Urban Stormwater: Soils and Construction).**
B4	**Pre-clearing Process: the pre-clearing process will include two stages. Stage 1 will include survey and translocation of any fauna from the disturbance area into areas of retained vegetation prior to the development of the project. This may include detailed markup of threatened species locations and their translocation such as Caladenia montana. All work must be carried out by qualified ecologist. The next pre-clearing stage will include final inspections of the disturbance area immediately before the construction activity commences to check and physically mark any important habitat features that need to be considered when identifying exclusion zones and conducting the staged habitat removal process within the total and partial clearing zones. Document, mark and record the location of:** • **Large stick nests** • **Any rock features** • **Habitat/hollow-bearing trees** • **Threatened flora.** **The outcomes of the pre-clearing inspections will be reported to BCS/NPWS prior to the commencement of vegetation clearing. The report will include any fauna relocated or euthanised, including name of qualified/licensed handler, species, location notes, and release location and method.**

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B5	**The boundary of the clearing limits for each disturbance zone will be clearly marked on site by a surveyor before vegetation clearing commences.** • **Exclusion zones, or 'No-Go' zones, will be clearly marked at the edge of the total clearing zones and ECZ to protect the vegetation to be retained outside the project from inadvertent direct impacts** • **Exclusion zones and the edge of the clearing boundary will be marked with high visibility fencing and signage** • **Booroolong Frog: A 50 metre exclusion zones will be marked and clearly delineated from other survey markers with signage place around the tributaries that flow downhill into the Yarrangobilly Creek, this includes the limits of clearing on the lower end of Sheep Station Creek, Cave Gully, Lick Hole Gully and Wallace Creek that are crossed by the project to protect the downstream habitat of Booroolong Frog** • **Booroolong Frog: The 50 metre exclusion zone adopted for the Main Works project on Yarrangobilly Creek, will be retained for construction of the transmission line** **Hazard trees identified from the LiDAR assessment are to be flagged for removal, and any other adjacent and important habitat trees and features, also identified for retention and to avoid disturbance during the felling activity should also be clearly marked and included in maps within the CEMP.**
B6	**A vegetation clearing methodology has been developed (provided as Appendix K of the revised BDAR), the methods described focus on the removal of vegetation in total and partial clearing zones. These methods will be incorporated as a vegetation clearing plan within the BMP designed to document the methods of vegetation and habitat clearing within each zone, including soil protection measures, mechanical and non-mechanical approaches, removal of habitat, protection of retained vegetation, and appropriate storage and re-use of mulch and timber to avoid disturbance of retained vegetation. Hollows logs and limbs encountered during clearing will be retained for placement within adjacent vegetation or on the maintained easement within shrub retention areas. The plan will include a requirement to prepare a post clearing report that records the final clearing extent using GPS to demonstrate whether clearing is within the approved disturbance area, and if exceeded, recalculate additional offset obligations.**
B7	**The vegetation clearing procedures will include provisions that any felled timber within Bargo State Forest that FCNSW determine can be repurposed will be removed off-site by FCNSW.**
B8	**A staged habitat removal process will be required for removal of habitat (hollow-bearing trees, habitat trees, and bushrock) Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows and relocate naturally. The process includes:** • **If possible, avoid clearing during times when hollow-dependent fauna are breeding** • **Contact vets and wildlife carers before works commence** • **Ensure that licensed wildlife carers and/or ecologists are on site during habitat removal** • **Adopt two staged removal clearing non-habitat first (e.g. shrubs, regrowth, ground cover and non-habitat trees). Allow at least 24 hours for fauna to vacate habitat before removing habitat trees** • **Ensure wildlife carers and/or ecologists are present during removal of habitat trees, and that habitat trees are felled carefully, using equipment that allows habitat trees to be lowered to the ground with minimal impact** • **A procedure for the ethical handling of injured or displaced fauna is to be documented in the BMP** • **Record the effort and outcomes of the habitat removal process** • **Save and reuse cleared material for rehab and habitat** • **Preparation of an 'Unexpected threatened species finds procedure' to be implemented during construction and operation. Applies to all activities that have potential to impact upon threatened flora and fauna species which have not already been assessed and approved. Any threatened entities found in a location previously unknown during construction or operation must be immediately notified to NPWS** • **Preparation of a Fauna handling and rescue procedure to be implemented during construction and operation.**
B9	**Clearance of construction areas prior to commencement of daily construction to ensure there is no wildlife present. This will involve drive through sweep of areas planned for construction, by the contractors environmental representatives. If an animal is located within the construction area during works, the Delivery Manager and Project Management Site Representative are to be notified immediately. All work must immediately cease within the immediate area of the find and a local wildlife rescue or an ecologist will be required for assistance where necessary.**

Mitigation Measures	
B10	**An operational Vegetation Management Plan (VMP) will be prepared by an experienced ecologist prior to commencement of project operation. The plan will focus on vegetation management within the ECZ and HTZ with the aim of maintaining long-term Vegetation Integrity targets.** **The VMP will interpret the vegetation integrity scores into feasible actions to maintain vegetation condition, and outline project specific ongoing vegetation clearing requirements and methodology.** **The VMP will include a strategy for maintaining the expected vegetation outcomes for all partial impact zones assessed in the revised BDAR. The strategy will:** • **Translate the vegetation integrity (VI) scores into management actions to be applied during construction and operation of the project** • **Include triggers for corrective actions** • **Include details for review and reporting by a qualified ecologist in consultation with NPWS and BCS** • **The VMP will be guided by Transgrid's vegetation risk model and operational vegetation clearance requirements, in addition to the principles for Integrated Vegetation Management (IVM) which will aim to preserve future Vegetation Integrity scores within the ECZ** • **Long-term monitoring will be conducted to measure the effectiveness of the VMP. The methods and timing of the monitoring will be documented in the VMP and will include a responsibility to report the results to BCS and NPWS** • **The VMP will detail methods for vegetation maintenance in the ECZ with a focus on retaining plant species diversity and cover of low understorey and groundcover plants <200mm, while tree and shrub regrowth will be suppressed for long-term easement management** • **The VMP will detail methods of maintenance in the HTZ with a focus on retaining all non-hazard trees, as well as shrubs, grasses, and forbs. Ongoing inspection (using Lidar, and follow-up on foot or drone) of hazard trees will occur and document the method of removal for each tree to ensure that non-hazard trees are not impacted during tree felling. Where threatened orchids are mapped (Caladenia montana), hazard trees will be sensitively removed to avoid impacting on the ground layer. This will include removing trees from the top down and cutting into small sections, transferring into the ECZ and mulching** • **The VMP will address measures required to minimise fire risk during operation of the project.**
B11	**A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek.** **An assessment of the current sediment basin design for the Main Works project will occur, to determine if the design specifications are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load.** **Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include:** • **Erosion and sediment control plans for all stages of construction** • **The implementation of sediment control measures across the project area - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains** • **A schedule will be included for cleaning sediment basins with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours** • **Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at structures sites and access roads on the slopes around Yarrangobilly Creek and associated tributaries** • **Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCS, which are downhill of the construction footprint and upstream of Booroolong Frog**

Mitigation Measures	
	habitat. An adaptive monitoring plan will be developed to trigger a rapid response if sediment loads detrimental to Booroolong frog are detected • **Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas** • **Accidental spills will be reported to the contractors environmental representative as soon as the incident is observed so that the site can be remediated rapidly** • **Implementation of tannin leachate management controls may be required as determined by the monitoring program** • **Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements** • **Other source controls, such as mulching, matting and sediment fences may be used in consultation with BCS and NPWS and need to be approved in the CEMP and any deviation from measures by DPE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate** • **Disturbed areas will be stabilised and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder)** • **Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material)** • **An induction protocol will be mandatory for all personnel involved in construction and operation works** • **There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with.**
B12	**To prevent an increase in weeds and disease pathogens in adjacent vegetation the flowing will be carried out:** • **A Weed control and monitoring programs will be developed and documented in the BMP in consultation with BCS and NPWS and any deviation from measures approved by DPE are to be raised and approved. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will be determined during the preparation of the BMP and follow the principles outlined in Section 11.2 of the revised BDAR (Appendix C)** • **Identify all weed species in KNP in consultation with NPWS. Priority weeds species in Bago State Forest are consistent with high threat weeds.** • **Identify, map, and remove all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs.** • **Prepare a vehicle and machinery hygiene strategy and implement during construction and operation. The strategy will include specific locations, timing and methods for removing soil and plant matter from vehicles and machinery. Ensure vehicle and machinery hygiene measures in the strategy are applied during construction and operation** • **During the clearing works, weeds will be disposed and managed appropriately to stop the spread of weed species** • **Wash down stations will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, Phytophthora cinnamomi and exotic rust fungi) and the introduction of new species** • **During construction, any biosecurity issues identified are to be reported to FCNSW and NPWS immediately.**
B13	• **To prevent an increase in predatory and pest species the flowing will be carried out:** • **Personal waste / refuse generated during construction will be stored appropriately in inaccessible bins and disposed at appropriate waste disposal facilities off-site. Any personal waste generated during operation will be removed from the site (including substation) and disposed in an appropriate waste facility.** • **A feral animal monitoring program will be developed and implemented as described in Section 11.2 of the revised BDAR (Appendix C)**

Mitigation Measures	
	• **Based on performance triggers for adaptive management. It will be important to share data with NPWs and State Forests. Increased predator activity will trigger the need for predator control based on performance measures to be outlined in the BMP. Control will be done in consultation with NPWS and DPE - State Forests.**
B14	**The extensive survey data for this project, and the Main Works EIS will be utilised to identify specific bird and bat populations that are at risk of collision and electrocution. E.g. For higher risk species deploy species specific bird divertors, with day/night reflectors within approved buffer distance, along key sections of transmission line. This will be appropriate for diurnal and nocturnal birds The BMP to include adaptive management for high risk bird and bat species as outlined below with intervals and strategies to be determined in consultation with NPWS:** • **Regular monitoring within the transmission line easements for evidence of bird / bat collision with transmission lines (intervals to be determined in consultation with NPWS)** • **Monitoring of taller structures for evidence of raptor nest building** • **Develop target trigger for number of high risk species incidents** • **Deploy species specific bird / bat divertors / reflectors in areas where a defined number of incidents have occurred.**
B14	**To reduce light impacts the following will be implemented:** • **Directional lighting will be used for any permanent lighting required (i.e. substation) to minimise light spill** • **Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours.**
B16	**The barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures installed, such as adding visible objects to the fence, for example tape, plastic flags, and metal tags.**
B17	**The ECZ will be maintained as per the VMP, with the preservation of low ground cover vegetation to provide cover for small ground-dwelling fauna and birds to cross the easement**
B18	**Vehicle movements on newly formed access tracks will be limited to 20km/h speed limit implemented to reduce the risk of vehicle strike to fauna.**
~~B2~~	~~• Erosion and sedimentation will be managed through implementation of effective sediment control measures as outlined in the soil and water management plan SWMP, which will be prepared~~ ~~• Revegetation of slopes will be undertaken as soon as possible in line with the rehabilitation plan.~~
~~B3~~	~~Where possible the barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures installed, such as adding visible (and often audible) objects to the fence, for example tape, plastic flags and metal tags.~~
~~B4~~	~~Vehicle movements on newly formed access tracks will be limited to a 20 km/h speed limit implemented to reduce the risk of vehicle strike to fauna.~~
~~B5~~	~~• A weed and pathogen monitoring program will be implemented during construction and operation, with weed control to occur if new weed outbreaks are identified within the construction footprint~~ ~~• During the clearing works, weeds will be disposed and managed appropriately to stop the spread of existing weed species~~ ~~• Wash down stations will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, Phytophthora cinnamomi and exotic rust fungi) and the introduction of new species~~ ~~• A pest and predator monitoring program will be implemented to ensure the works do not result in a significant increase in numbers of pest and predatory species~~ ~~• > Waste will be stored appropriately in inaccessible bins and disposed off-site~~ ~~• The details of the monitoring program will be determined during the preparation of the Biodiversity management plan.~~
~~B6~~	~~Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours.~~

Mitigation Measures	
~~B7~~	~~Monitoring of threatened species to ensure impacts arising from the project are within predicted levels. The details of the monitoring program will be determined during the preparation of the Biodiversity management plan.~~
~~B8~~	~~Directional lighting will be used for any permanent lighting required (i.e. substation) to minimise light spill as much as possible.~~
B19	**All tree pruning operations will be carried out in accordance with the Australian Standard AS4373-2007 Pruning of Amenity Trees.**
Aboriginal heritage	
~~AH1~~	~~During detailed design, if the disturbance area changes but is still within the project area, a consistency assessment will be prepared to confirm if impacts are consistent with the EIS.~~
~~AH2~~	~~The area of access track atop Sheep Station Ridge which has not been surveyed will be surveyed in consultation with the RAPs once suitable access to the area has been established. Any areas or items of Aboriginal cultural heritage significance identified as part of this additional investigation will be managed in accordance with measures developed in consultation with RAPs. These measures will be included in the CHMP prepared for the project.~~
AH1	**Where possible, impacts to identified Aboriginal sites will be avoided.**
AH2	**A CHMP and accompanying unexpected finds procedure will be prepared, to guard against inadvertent impacts to Aboriginal objects during construction. The CHMP will specify that project works will be restricted to the disturbance area. It will include provisions to ensure workers are made aware of cultural heritage places and their value, for example through project inductions. The CHMP will include provisions to guard against indirect impact to AHIMS# 56-6-0477 and provide a method to manage potential heritage constraints and unexpected finds during construction.** **The long-term storage of any recovered Aboriginal objects will be developed during the completion of the CHMP, in consultation with the RAPs, but is likely to include (in preferential order):** • **Re-burial on site, in an appropriate location in the vicinity of the project** • **Lodged with a RAP under a Care and Control Agreement** • **Deposition with the Australian Museum.**
~~AH4~~	~~A Salvage Excavation Method Document will be prepared prior to carrying out the salvage excavation works at the four impacted items (ST PAD 01, ST PAD 02, PAD 03 and AHIMS# 56-6-0477). This document will be provided to RAPs, who will be given a 28 day period to review the document and provide feedback. An indicative method to be followed during salvage excavations is provided in Section 12.1 of the ACHAR.~~
~~AH5~~	~~Salvage collection of surface artefacts will be carried out, prior to project construction, at ST PAD 03 and AHIMS# 56-6-0477.~~
AH3	Salvage collection of surface artefacts, ~~and salvage excavations~~ will be carried out **prior to construction**, at ST PAD 01 and ST PAD 02, **ST PAD 03, Str5 AS, AHIMS# 56-6-0540, and AHIMS# 56-6-0048** and AHIMS# 56-6—0477 **(if required) with the RAPs. Surface collection will be undertaken using the following method:** • **Artefact collection will be undertaken by a team comprising an archaeologist and RAP representatives** • **Artefact locations will be marked on the ground and recorded with a hand-held GPS (or equivalent) prior to collection** • **Collected artefacts will be catalogued on site by the team, with recorded attributes as listed for the test excavation analysis** • **Artefacts will be placed in individual bags, labelled with location information** • **Following the completion of the surface collection program, a brief report will be prepared which outlines the results of the program.** ~~Collection of surface artefacts at ST PAD 01 will also salvage any artefacts from the previously recorded surface sites within this PAD's boundaries, these sites being AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497.~~ ~~It is assumed that ST PAD 01, ST PAD 02, AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, AHIMS# 56-6-0497 and AHIMS# 56-6-0477 are intact and have not been either destroyed through activities of Snowy 2.0 or salvaged by the Snowy 2.0 archaeological team. If these sites have been entirely salvaged or destroyed by the Snowy 2.0, then the mitigation measures relating to salvage collection and excavation at these sites will not apply~~
AH4	In the event that a site or artefact (as defined by the NPW Act or Heritage Act) is identified during construction works, works will cease at the location and no further harm to the object will occur. The find will be immediately reported to Transgrid, and the regulator in accordance with legislation. No work will commence in the vicinity of the

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	find until any required approvals have been given by the regulator. In the event that skeletal remains are encountered during the activity, works must stop immediately, the area secured to prevent unauthorised access and Transgrid, NSW Police and HNSW contacted.
AH5	**If changes are made to the project to include impacts outside the disturbance area, further archaeological investigation will must be conducted.**
Non-Aboriginal heritage	
NH1	During detailed design, if the disturbance area changes but is still within the project area, a consistency assessment will be prepared to confirm if impacts are consistent with the EIS.
NH2	A historic and natural heritage management plan will be prepared for the project, which clearly outlines the extent of impact to each recorded historic heritage item within the disturbance area and potential impacts to those sites located within the broader project area. The plan should clearly outline measures for their protection (where applicable) and details of further investigation and archaeological archival recording where appropriate.
NH3	**If archaeological excavations are required:** • **Transgrid will nominate a suitably qualified and experienced historical archaeologist to manage the historical archaeological program. This person must fulfil the Heritage Council's *Excavation Director Criteria* 2019 for the excavation of locally significant archaeological sites** • **Archaeological Research Design and Excavation Methodology will be prepared to guide the archaeological program. It will be prepared according to Heritage Council of NSW guidelines. The methodology will be submitted for comments to the Heritage Council of NSW (or its delegate) and approval by DPE prior to the commencement of archaeological excavation** • **A final archaeological excavation report will be prepared within 12 months of the completion of archaeological excavation. It will include details of any significant artefacts recovered, where they are located and details of their ongoing conservation and protection in perpetuity by the land owner. Copies of the final excavation report will be provided to DPE, the Heritage Council of NSW and to the local Council's local studies unit.**
NH4	All heritage items within the disturbance area that are to be impacted by the project will be subject to archival recording and archaeological excavations prior to the commencement of works. If these sites have been entirely destroyed by the Snowy 2.0, then the mitigation measures relating to archival recording and archaeological excavations will not apply.
NH5	If the construction of the project will destroy or directly impact the R45 (Lobs Hole Copper Mine Water Race), archival recording and archaeological excavation must occur prior to the commencement of construction. ~~An archaeological research design and methodology must be produced in keeping with the *Historical Archaeology Code of Practice* (Heritage Council of NSW, 2006).~~
NH6	In the event that a site or artefact (as defined by the NPW Act or Heritage Act) is identified during construction works, works will cease at the location and no further harm to the object will occur. The find will be immediately reported to Transgrid, and the regulator in accordance with legislation. No work will commence in the vicinity of the find until any required approvals have been given by the regulator. In the event that skeletal remains are encountered during the activity, works must stop immediately, the area secured to prevent unauthorised access and Transgrid, NSW Police and DPE contacted.
Water	
W1	The waterway crossing over flood impacted waterways such as Sheep Station Creek will be designed and constructed in a way that minimises flood risk and minimise upstream and downstream impacts. The waterway crossing will be designed to ensure flow and drainage is maintained in waterways where construction works are taking place or where the permeant waterway crossing will be. The waterway crossing will be constructed in accordance with minimum design criteria for waterway crossings outlined in *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull and Witheridge, 2003). **The design of waterway crossing will also consider the appropriate measures are outlined in:** • ***Forest Soil and Water Protection – A Guide for Operators* (State Forests of NSW, 2000)** • ***Fire Trail Design, Construction and Maintenance Manual* (RFS, 2017).** **All new waterway crossings, construction and rehabilitation of works near or within watercourses be accordance with the requirements of the *Guidelines for Controlled Activities on Waterfront Land* (NRAR 2018).**

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W2	• Flood modelling will be undertaken at the detailed design stage to define flood behaviour for the existing conditions due to mainstream and overland flooding. The flood models will be utilised to identify and address potential impacts of the proposed works for construction and operation of the project on flooding • Overland flooding impacts will be considered during detailed design, to ensure that the substation's drainage and stormwater system is adequate, and the substation's platforms are above the required flood immunity • Structures within the flood extent will be designed with appropriate foundation to ensure stability against hydrostatic pressure and debris load.
W3	A SWMP will be prepared and implemented prior to and during construction. **During the preparation of SWMP, Transgrid will working closely with the EPA in developing and designing key sediment and erosion controls as to prevent any change to the existing baseline surface water quality within and adjoining the project area.** The SWMP will include: • Erosion and sediment control plans for all stages of construction **that will be submitted for approval prior to its implementation. Initially the principal SWMP will be prepared, and it will be followed by the Progressive SWMP that will be regularly updated during the construction phase to take into consideration changes that may occur that require revised erosion and sediment controls** • A water quality monitoring program • Details on the construction and management of sediment basin if determined to be required • Protection of waterways such as scour protection, stabilisation and revegetation • Any imported fill will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) • Management of stockpiles and spoil • Tannin leachate management controls • Management of accidental spills, response and reporting • An induction protocols • Responsibilities for all management measures. All erosion and sediment control measures will be designed, implemented, progressively rehabilitated and maintained in accordance with relevant sections of *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom, 2004) ('the Blue Book') (particularly Section 2.2) and *Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services* (DECC, 2008).
W4	**A water quality monitoring program will be developed as part of the SWMP as described in Appendix E. It will be developed and implemented to gain an appreciation of background water quality, to observe any changes in surface water quality that may be attributable to the project and inform appropriate management responses.** **The surface water quality monitoring program will be carried out during the pre-construction, construction, and operational stages of the project.**
W5	• All chemicals or other hazardous substances will be stored in a bunded area and away from any drainage lines/pits. The capacity of the bunded area will be at least 130% of the largest chemical volume contained within the bunded area • No refuelling or bulk herbicide preparation will occur within 40 metres of natural drainage lines • Environmental spill kits containing spill response materials suitable for the works being undertaken will be kept on site at all times and be used in the event of a spill • Any spills will be contained, cleaned up promptly and immediately reported to the relevant site representative.
W6	• The SWMP will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather • Where required, adequate sediment controls (including the consideration of sediment basins) will be included in the access track design to manage erosion and sedimentation and associated impacts on receiving waters.
W7	**For the Snowy 2.0 T2 Tailbay site and Paddys River water uptake site:** • **A water extraction licence will be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River**

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	• **Prior to extraction of water near Paddy's River Flat Campground, rubber mats will be placed on the ground under the water trucks to prevent erosion and sediments entering the waterway** • **During water extraction from Talbingo Reservoir and Paddy's River, slow velocities of water pumping and screens on the hoses will be used to minimise small aquatic fauna been inadvertently picked up.**
W8	Temporary dewatering for construction is not anticipated. In the event that dewatering is required then the following management measures will apply: • Confirmation of whether or not a licence under the WM Act as defined under the NSW Aquifer Interference Policy (DPI Water, 2012) is required prior to any dewatering activity commencing • **Should the amount of water extracted be more than 3 ML/year, a water access licence will be obtained** • If dewatering is required, the management of discharge water will be documented in the SWMP • Discharge water will be limited to vegetated, grassed areas, away from waterways, and within the construction footprint. If the discharge water is highly turbid, dewatering through a filter sock (or similar), or via transportable sedimentation tanks will be considered, where appropriate, to minimise sedimentation.
W9	A flood management plan (FMP) will be prepared for the project and will detail the processes for flood preparedness, materials management, weather monitoring, site management and flood incident management. The FMP will also address procedures and responsibilities for flood response (preparation of site upon receipt of flood warning, evacuation of site personnel) during and recovery following a flood event.
W10	Waterway crossing and access tracks will be inspected as part of the maintenance inspections to ensure all crossings remain in good condition.
Land	
L1	Targeted geological investigations will be undertaken in areas of surface disturbance using a risk based approach. Results from these investigations will determine the level of management to be implemented for soils and contamination (including NOA).
L2	A contaminated land management plan will be prepared prior to construction works commencing. It will include management measures to: • Manage areas of known or potential contamination that will be impacted during construction • Manage unexpected finds in the event that unexpected contamination sources are identified (including NOA). This will include guidance on identifying potential contaminated land characteristics (visual, odours, etc), steps to cease works in the affected area, further investigation to assess the extent, magnitude and type of contaminants and appropriate remedial actions.
L3	• Further assessment will be carried out during the geotechnical investigation for the project to verify the presence/absence of NOA within the NOA risk zones. Should NOA be detected, a NOA management plan will be prepared and implemented to guide the handling, transport and disposal of the material • NOA awareness training will be provided to all staff and contractors working in areas with NOA risk • If asbestiform and/or indicator minerals and/or textures are encountered or suspected during excavation works, work is to stop in the area and management be alerted. The area will be isolated with a 10 metre exclusion zone and sign posted, access will be restricted and specialist geological and occupational hygiene advice will be sought prior to further progressing work in that area.
L4	A spoil management strategy will be prepared for the project. The spoil management strategy plan will outline appropriate management procedures for the generation, management and importation (if required) of spoil. It will include, but not be limited to: • Confirming spoil quantities • Carrying out appropriate assessments, including geotechnical investigations • Procedures for classification of spoil • Identification of spoil reuse measures, including segregation of soils as subsoils and topsoils • Spoil stockpile management procedures including minimising the number of stockpiles, area and time they are exposed, and locating stockpiles away from drainage likes and natural waterways and from where they will be susceptible to erosion • Spoil haulage routes • Spoil disposal and reuse locations • Imported spoil sources and volumes.

Mitigation Measures	
L5	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: • Minimising the number of stockpiles, area and time they are exposed • Locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion • Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) *Managing Urban Stormwater – Soils and Construction*, Volume 1, 4th Edition) • Stabilise stockpiles, establish sediment controls and suppress dust as required.
L6	• Excavated material will be managed in accordance with the spoil management strategy. • Where applicable, excess spoil will be re-used for other elements of the project such as access track construction. Where spoil cannot be reused it will be managed as per the SWMP. Alternatively, excess material will be disposed of at other suitable locations (including at Ravine Bay, **GF01, Main Yard or other Snowy 2.0 approved emplacement areas)** as agreed to with NPWS and FCNSW. ~~or at a suitable and licenced waste facility as documented in the spoil management strategy~~ • Material which has been assessed as not suitable for reuse on land or for subaqueous disposal at the Ravine Bay, **GF01, Main Yard or other Snowy 2.0 approved emplacement areas** (as part of the Snowy 2.0 management procedure) or cannot be reused will be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014). Excavated material will be transported to an appropriate excavated material disposal area. Approval will be obtained prior to transport and will require an estimate of the likely volume of excavated material to be disposed.
L7	Excavated material to be disposed of in the **spoil emplacement locations (including Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas** will be transported to the emplacement area by Transgrid and/or contractor and then managed by Snowy Hydro in accordance with the relevant approved Snowy 2.0 Rehabilitation Plan prepared by Snowy Hydro.
L8	The CEMP will include measures to identify and report any newly identified geodiversity sites. It will also include measures to minimise impacts to known geodiversity sites.
L9	A rehabilitation plan will be prepared in consultation with NPWS and FCNSW to guide the long term rehabilitation of the project. The rehabilitation plan will be based on the rehabilitation strategy outlined in Section 5.4.10 of the EIS and will: • Include a detailed plan for rehabilitation of the site • Characterise the soil types within the disturbance area • Include details of soil management measures, including: - Topsoil stripping and stockpiling procedure - Subsoil management measures - Soil reinstatement methodology which includes a topsoil application procedure • Include measures to minimise: - Loss of soil - Loss of organic matter, nutrient and soil decline - Compaction • Consideration of how rehabilitation will be carried out where soils are unable be recovered, or soils are poor/unfit for re-use • Include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the sites, and triggering any remedial action (if necessary) • Describe the measures that will be implemented to: - Comply with the rehabilitation objectives and associated performance and completion criteria - Progressively rehabilitate the site • Include a program to monitor and report the effectiveness of these measures.

Mitigation Measures	
Transport	
T1	A CTMP will be prepared and implemented and will include: • Confirmation of haulage routes including the water truck moments for the project area west • Measures to maintain access to local roads, and maintain the capacity of existing roads where possible • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Requirements and methods to consult and inform the local community of impacts on the local road network due to the development-related activities • Consultation with TfNSW, and Snowy Valleys Council, NPWS, FCNSW and Snowy Hydro's contractors • **The investigation of alternative routes to avoid transport through Batlow through the use of roads owned by FCNSW** • Consultation with the emergency services to ensure that procedures are in place to maintain safe, priority access for emergency vehicles and emergency management activities • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on Elliott Way • A response plan for any construction related traffic incident • Monitoring, review and amendment mechanisms • Individual traffic management requirements at each phase of construction • Measures to minimise the number of workers using private vehicles travelling to and from project area west • Employment of standard traffic management measures to minimise short-term traffic impacts expected during construction • Management of oversized vehicles • Relevant traffic safety measures, including appropriate signage, driver conduct and safety protocols • Identify requirements for, and placement of, traffic barriers • **A fatigue and weather condition management plan for both light and heavy vehicles that details driver protocols for both driver fatigue and adverse weather** • **Bridge load assessments will be carried out in conjunction with the OSOM permit application process.** The CTMP will also consider the following strategies to maintain access for regular and emergency management activities: • Staging of construction works to avoid the need for roads to be fully closed for any extended period of time • Development of alternative access routes in consultation with NPWS and emergency services if any closures are required • Provision of sufficient shoulder width or regular stopping bays to allow regular and emergency vehicles to pass or stop.
T2	**Should the construction planning require that heavy vehicles to use the route via Elliot Way, Link Road and Goat Ridge Road between the project area east and project area west, the details will be included in the CTMP and a road safety audit and risk assessment will be carried out.**
T3	If works will affect the free flow of traffic a Traffic Control Plan will be prepared, and a Road Occupancy Licence will be obtained from TfNSW.
T4	Road maintenance will be managed through the following measures: • ~~A Road Dilapidation Report will be prepared prior to and following construction of the project~~ **A road dilapidation survey of Elliott Way and other potential local roads utilised by the project will be carried out prior to commencing construction as agreed to with Snowy Valleys Council and NPWS.** Any impacts identified as caused by the project will be rectified as specified with any road maintenance agreements • Routine defect identification and rectification of the access roads and tracks will be managed as part of the project maintenance procedure • Access roads and tracks will be designed in accordance with the relevant vehicle loading requirements.
T5	Affected communities, visitors, FCNSW, NPWS and emergency services will be notified in advance of any disruptions to traffic and restriction of access impacted by project activities.

Mitigation Measures	
T6	Access protocols within KNP will be undertaken in accordance with the MOU between Transgrid and NPWS for the Procedure for the Undertaking of Inspection, Maintenance and Emergency Works of Transgrid Network Assets and Associated Infrastructure.
T7	**For the access track to structures 12 and 13 (first two structures on the western side of Talbingo Reservoir), measures will be incorporated into the final design under consultation with NPWS to enable vehicles to safely stop for personnel to open and close the access track gate. Such measures may include:** • **The placement of the gate at a suitable distance along the track as to avoid vehicles parking on/adjacent to Elliott Way** • **Incorporation of a pull over bay alongside the existing Elliott Way road surface.** • **Appropriate safety measures including the use of guard rails will be incorporated into the design where required.**
Landscape character and visual impact	
VIA1	Detailed design will consider the retention of existing vegetation to the greatest extent practicable south of Elliott Way and around the substation to ensure that potential visual impacts from Elliott Way are minimised.
VIA2	• All construction plant, equipment, waste and excess materials will be contained within the designated boundaries of the work site and will be removed from the site following the completion of construction • Stockpiles will be stabilised to prevent erosion by wind and water and avoid the development of dust plumes adversely impacting air and visual quality • On completion of the work disturbed areas will be stabilised and returned to as close to original condition.
VIA3	• **The new structures will undergo accelerated ageing of the zinc galvanised coatings prior to erection to help reduced the visual impacts of the project** • **To assist with reducing the visual obviousness of the structures through Lobs Hole Ravine, five structure pairs (Structure pairs 1, 2, 3, 7 and 8) will be painted olive green.**
Noise and vibration	
NV1	The standard techniques for controlling noise impacts during construction are presented in the ICNG. During construction relevant standard measures as outlined in Section 6 of the ICNG will be implemented.
NV2	Do not conduct vibration intensive works within the recommended safe setback distances. Avoid the use of vibration intensive plant within the nominated human comfort distances.
NV3	Care will be taken when carrying out vibration-intensive activities (e.g. use of hydraulic rock breakers and vibratory rollers, and blasting) within distances approaching the recommended safe setback distances around heritage items R45 and R49. Where maintaining of these setback distances isn't possible a suitably qualified person will be present or monitoring will be undertaken during the works to suspend activities in the instance of any issues.
NV4	A detailed blast plan will be prepared by the blasting contractor prior to each blast to mitigate the potential for the recommended safe setback distances being encroached.
Air quality	
AQ1	Air quality mitigation measures will include, but not be limited to: • Identifying potential sources of air pollution • Dust mitigation and suppression measures to be implemented • Plant and equipment will be switched off when not in use • Vehicles, plant and construction equipment will be appropriately sized for the task and properly maintained so as to achieve optimum fuel efficiency • Materials will be delivered with full loads and will come from local suppliers, where possible • Methods to manage work during strong winds or other adverse weather conditions • A progressive rehabilitation of disturbed areas.
Hazards and risks	
HAZ1	All designs will be in accordance with the ICNIRP *Guidelines for limiting exposure to time varying Electric and Magnetic Fields (1Hz – 100Hz)* (ARPANSA, 2010) with consideration to the public and on-site workers.
HAZ2	The following lightning protection measures will be included in the detailed design:

Mitigation Measures	
	• Each structure will be equipped with earthing fixtures • Each transmission line will have two earthing lines at the top of each structure to provide protection to the conductors from lightning strike • Lightning masts will be installed at the substation.
HAZ3	A Prepare-Act-Survive bushfire response plan will be prepared for the project. The plan will be prepared according to *Planning for Bush Fire Protection* (RFS, 2019) **and in consultation with NPWS, FCNSW and Snowy Valleys Bush Fire Management Committee**. **The fire prevention/mitigation strategies within Bago State Forest will be generally in accordance with Forest Practices Codes including the *Standard Operating Procedure -Plantation Harvesting, Haulage and Site Preparation Fire Restrictions (Fire Prevention 19/51).*** The plan will include responsibilities associated with and details of: • Site specific hazards and risks for the project area • Procedures to maintain bushfire awareness • Bushfire mitigation measures • Fire preparedness actions including: - Evacuation triggers - Evacuation routes - Mustering points - Neighbourhood safer places and refuges of last resort - Instructions for sheltering in-vehicle if there are no other options.
HAZ4	• For the main construction compounds, a minimum of 40 metres clearance is required between fuel/chemical storage points and woody vegetation. The construction compound buildings will have at least 20 metres clearance to the vegetation. • Firefighting equipment will be maintained at and/or accessible to all active construction sites during the declared bushfire danger season, and site personnel trained in its use. Equipment will be appropriate to the activities being conducted and the fire danger at the time of works, but as a minimum must include: - 4WD Striker with slip-on water unit, equipped with diesel pump and hoses - Extinguishers - Knap sacks - Hand tools (e.g. fire rakes). • Any vegetation cleared as part of these works will be removed from site (as much as reasonably practicable), or otherwise processed to avoid excessive bushfire fuel accumulation as agreed with FCNSW and NPWS.
HAZ5	• All chemicals or other hazardous substances will be stored in a bunded area and away from any natural drainage lines. The capacity of the bunded area will be at least 130% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s will be shown on Site Plans. • The storage, handling and use of dangerous goods and hazardous substances will be carried out in accordance with the WHS Act and Regulations, the Storage and *Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and relevant Australian Standards.
HAZ6	• Routine condition monitoring and risk-based maintenance of project elements to minimise the incidence of ignitions from asset failures • Ongoing vegetation management will be in accordance with Transgrid's operational vegetation monitoring and management procedures. This will include regular inspection and maintenance of trees and woody vegetation within the transmission corridor to provide safe clearance distance to the overhead conductors, and maintenance of the substation APZ • **The APZ surrounding the substation will be completely cleared with vegetation managed to approximately 100 mm in height** • Ongoing risk management of trees located outside the easement that have potential to strike the conductor if they were to fall • Access tracks will be maintained to facilitate ongoing access to transmission structures for maintenance. It is recommended that these tracks are to be maintained to the standards of a Category 9 fire trail (RFS, 2016) to allow fire response in the area.

Mitigation Measures	
HAZ7	Hot work (activities involving high temperatures) and fire risk work (activities involving heat or with the potential to generate sparks) will be managed under Transgrid procedures~~, with measures including suspension of activities on days of elevated fire danger~~.

Mitigation Measures	
Social and Economic	
SE1	A CSEP will be prepared and implemented to help provide timely and accurate information to the community during construction. The plan will include (as a minimum): • Mechanisms to provide details and timing of proposed activities to key stakeholders including residents, business owners, NPWS, FCNSW, emergency service, health and medical facilities, visitors, accommodation providers and annual event organisers, recreational users and motorists including changed traffic and access conditions and amenity impacts • Process for receiving and responding to queries and complaints regarding the project's construction.
SE2	• A worker accommodation strategy will be prepared for the project to manage demand for tourist accommodation from the construction workforce during the construction phase and post-construction • Maximise the use of the Snowy 2.0 works accommodation where possible to minimise demand for local accommodation • Consider local business opportunities in project procurement practices, including encouraging contractors to source local goods and services, where possible • Identify and communicate to local communities (prior to and during construction) opportunities and requirements for work on the project.
SE3	• Development, monitoring and review of project incident response plans, including ongoing consultation with emergency service providers about changes to local access and potential delays and disruptions • Preparation of a workforce health and safety plan that includes measures for responding to health, medical and safety incidents during construction.
SE4	The operation and maintenance of the portion of the project in KNP will be carried out in accordance with any access and operational protocols established between Transgrid and NPWS.
Waste	
WR1	Further consultation with local waste facilities will be carried out during detailed design to further determine potential disposal locations.
WR2	A construction waste management plan (CWMP) will be prepared for the project and outline appropriate management procedures. It will include, but not be limited to: • Identification of the waste types and volumes that are likely to be generated by the project • Adherence to the waste minimisation hierarchy principles of avoid/reduce/ reuse/recycle/dispose • Waste management procedures to manage the handling and disposal of waste, including vegetation, spoil, unsuitable material or unexpected waste volumes • Identification of reporting requirements and procedures for tracking of waste types and quantities A resource management strategy detailing the process to identify reuse options for surplus materials.
WR3	Excess spoil generated in project area east will be transported by truck to Lobs Hole where it will be managed and disposed of by Snowy Hydro (in accordance with the methods described in the Snowy 2.0 Major Works EIS and any conditions of their approval).
WR4	All waste, including surplus soils, which cannot be reused will be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.
WR56	Operational waste will be managed in accordance with Transgrid waste management procedures and associated work instructions.
Cumulative impacts	
CI1	• Regular consultation will be carried out with nearby/adjoining projects and key stakeholders during the detailed design and construction phase to review potential cumulative impacts and timing of activities that have potential cumulative impacts • As far as practical construction activities will be coordinated and staggered with Snowy Hydro to minimise cumulative impacts in the project area west • Engagement with Snowy Valleys Council and Snowy Monaro Regional Council will be ongoing regarding impacts on local infrastructure (including accommodation, services).

Appendix C Revised Biodiversity Development Assessment Report

Appendix D Addendum Non-aboriginal and aboriginal Cultural Heritage Assessment Report

Appendix E Water quality monitoring strategy