S2-FGJV-ENV-PLN-0014

SNOWY 2.0 MAIN WORKS – HERITAGE MANAGEMENT PLAN

Approval Record			
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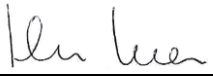
	Project Director	A. Betti	p.p 

Document Revision Table		
Rev.	Date	Description of modifications / revisions
A	29.11.2019	Initial draft for Snowy Hydro review
B	11.05.2020	Revised to include REMMs, draft conditions and merged with historic and natural heritage. Note that S2-FGJV-ENV-PLN-0017 (historic and natural heritage) will no longer be used.
C	28.05.2020	Revised to address the Infrastructure Approval and SHL comments. For consultation.
D	26.06.2020	Revised to address draft EPBC approval and stakeholder comments received on Revision C
E	28.07.2020	Revised to address DAWE and DPIE comments
F	12.08.2020	Revised to address DAWE and DPIE comments. Reissued to DPIE and DAWE
G	13.08.2020	Revised to address DPIE comments. Reissued to DPIE

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ABBREVIATIONS AND DEFINITIONS

Acronym	Definition
ACHAR	Aboriginal Cultural Heritage Assessment Report
AFL	Agreement for Lease
AHIMS	Aboriginal Heritage Information Management System
AHMP	Aboriginal Heritage Management Plan
BCD	Biodiversity Conservation Division, Department of Planning, Industry and Environment
EMS	Environmental Management Strategy
CHL	Commonwealth Heritage List
CoA	Conditions of Approval
Construction envelope	The maximum extent within which the disturbance area corridor can move to allow the final siting of infrastructure through the detailed design process
CSSI	Critical State significant infrastructure
DAWE	Department of Agriculture, Water and the Environment
DECCW	Department of Environment and Climate Change and Water (now part of Department of Planning, Industry and Environment)
Disturbance area	The corridor inside the construction envelope, where construction works required to build Snowy 2.0 can be carried out.
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
Main Works EIS	Snowy 2.0 Main Works - Environmental Impact Statement
EMS	Environmental Management Strategy
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPBC Regulations	*Environment Protection and Biodiversity Conservation Regulations 2000*
EPL	Environment Protection Licence
Future Generation	Future Generation Joint Venture
Future Generation-PMS	Project Management System
HCHAR	Historic Cultural Heritage Assessment Report
Heritage Act	*Heritage Act 1977*
Heritage Item	An item as defined under the *Heritage Act 1977* and/or an Aboriginal object or Aboriginal Place as defined under the *National Parks and Wildlife Act 1974*.
Heritage NSW	Heritage NSW, Department of Premier and Cabinet
Heritage Regulation	*Heritage Regulation 2012*
HHIMS	NSW Historic Heritage Information Management System
HMP	Heritage Management Plan
Hydro-electric	Generation of electricity using flowing water (typically from a reservoir held behind a dam or barrage) to drive a turbine which powers a generator

Acronym	Definition
Kosciuszko National Park	A National Park protected under the *National Parks and Wildlife Act 1974* (NSW) and managed by NSW National Parks and Wildlife Service. It covers an area of 673,543 hectares and forms part of Australia's only Alpine area
KNP	Kosciuszko National Park
KNP POM	Kosciuszko National Park Plan of Management
MNES	Matters of National Environmental Significance (MNES)
NPWS	National Parks and Wildlife Service
NPW Act	*National Parks and Wildlife Act 1974*
Pre-construction minor works	Includes the following activities for the Main Works: • building/road dilapidation studies; • survey works; • geotechnical investigation works and soil sampling; • installing groundwater bores in the Ravine beds on site for water supply; • establishing a temporary site office; • construction of minor access roads to facilitate the pre-construction minor works; • installation of environmental impact mitigation measures, including the installation of monitoring equipment, erosion and sediment controls, and fencing; • archaeological salvage, test excavations and investigation works; and • minor clearing or translocation of native vegetation within the disturbance area for the pre-construction minor works.
Project, the	Snowy 2.0 Main Works
Project area	The project area is the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated. The project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments.
RAPs	Registered Aboriginal Parties - Aboriginal stakeholders registered for cultural heritage consultation for the project
REMM	Revised environmental management measures
Submissions Report or RTS	*Main Works Preferred Infrastructure Report and Response to Submissions*
SHL or Snowy Hydro	Snowy Hydro Limited

1. INTRODUCTION

1.1. Project Description

1.1.1. Overview

Snowy Hydro Limited (Snowy Hydro) is constructing a pumped hydro-electric expansion of the Snowy Mountains Hydro-electric Scheme (Snowy Scheme), called Snowy 2.0. Snowy 2.0 will be built by the delivery of two projects: Exploratory Works (which has commenced) and Snowy 2.0 Main Works.

Snowy 2.0 is a pumped hydro-electric project that will link the existing Tantangara and Talbingo reservoirs through a series of new underground tunnels and a hydro-electric power station. Most of the project's facilities will be built underground, with approximately 27 kilometres of concrete-lined tunnels constructed to link the two reservoirs and a further 20 kilometres of tunnels required to support the facility. Intake and outlet structures will be built at both Tantangara and Talbingo Reservoirs.

Snowy 2.0 will increase the generation capacity of the Snowy Scheme by an additional 2,000 MW, and at full capacity will provide approximately 350,000 MWh of large-scale energy storage to the National Electricity Market (NEM). This will be enough to ensure the stability and reliability of the NEM, even during prolonged periods of adverse weather conditions.

Salini Impregilo, Clough and Lane have formed the Future Generation Joint Venture (Future Generation) and have been engaged to deliver both Stage 2 of Exploratory Works and Snowy 2.0 Main Works.

1.1.2. Construction Activities and Program

The Snowy 2.0 Main Works project includes, but is not limited to, construction of the following:

- pre-construction preparatory activities including dilapidation studies, survey, investigations, access etc;
- exploratory works including:
  - an exploratory tunnel to the site of the underground power station;
  - horizontal and test drilling;
  - a portal construction pad;
  - an accommodation camp;
  - barge access infrastructure;
- an underground pumped hydro-electric power station complex;
- water intake structures at Tantangara and Talbingo reservoirs;
- power waterway tunnels, chambers and shafts;
- access tunnels;
- new and upgraded roads to allow ongoing access and maintenance;
- power, water and communication infrastructure, including:
  - a cable yard to facilitate connection between the NEM electricity transmission network and Snowy 2.0;

- permanent auxiliary power connection;
- permanent communication cables;
- permanent water supply to the underground power station; and

- post-construction revegetation and rehabilitation.

The Snowy 2.0 construction program is summarised in Figure 1-1.

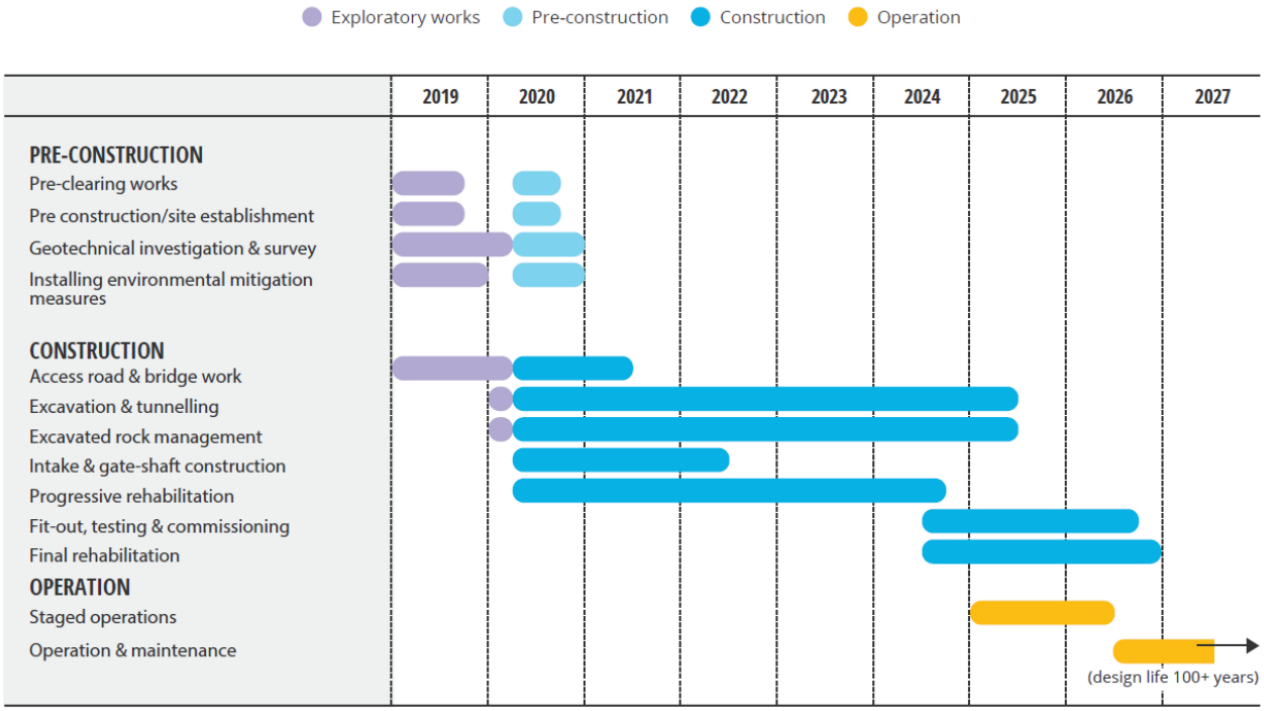


Figure 1-1: Timing of Snowy 2.0 Exploratory Works and Main Works

Snowy 2.0 Main Works includes numerous work sites as shown in Figure 1-2 (detailed site layouts are included in Appendix H). These work sites include:

- Lobs Hole Ravine Road;
- Lobs Hole;
- Marica;
- Plateau;
- Rock Forest;
- Talbingo; and
- Tantangara.

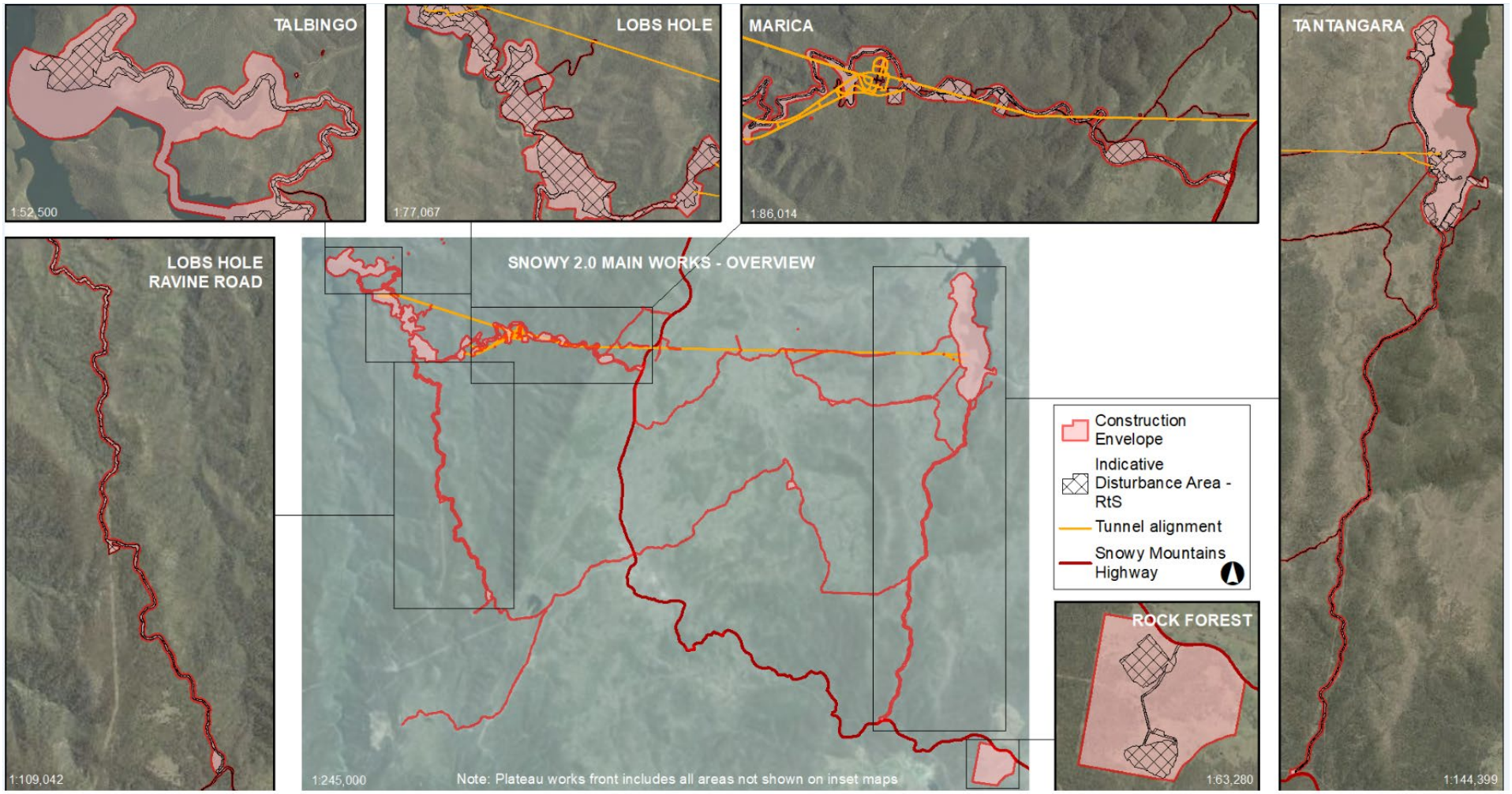


Figure 1-2: Snowy 2.0 Main Works work sites

1.2. Project Approval

On 7 March 2018 the NSW Minister for Planning declared Snowy 2.0 to be State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) on the basis that it is critical to the State for environmental, economic or social reasons.

An environmental impact statement for the first stage of Snowy 2.0, the *Environmental Impact Statement Exploratory Works for Snowy 2.0* (Exploratory Work EIS) was submitted to the then Department of Planning and Environment in July 2018 and publicly exhibited between 23 July 2018 and 20 August 2018. Approval for the first stage of Snowy 2.0 was granted for Exploratory Works by the Minister for Planning on 7 February 2019. In accordance with section 5.25 of the EP&A Act, the infrastructure approval for the Exploratory Works was modified on 2 December 2019 and on 27 March 2020.

An environmental impact statement for the second stage of Snowy 2.0, the *Snowy 2.0 Main Works - Environmental Impact Statement* (Main Work EIS) was submitted to Department of Planning, Industry and Environment (DPIE) in September 2019 and was publicly exhibited between 26 September 2019 and 7 November 2019. A total of 222 submissions were received during the public exhibition period, including 10 from government agencies, 30 from special interest groups and 182 from the general public. In February 2020, the response to submissions (RTS or Submissions Report) was issued to DPIE to address the public and agency submissions (*Snowy 2.0 Main Works - Preferred Infrastructure Report and Response to Submissions*, February 2020).

Following consideration of the Main Works EIS and RTS, approval was granted by the Minister for Planning and Public Spaces on 20 May 2020, through issue of Infrastructure Approval SSI 9687. Further to the Infrastructure Approval, the Main Works RTS includes revised environmental management measures (REMMs) within Appendix C which will also be implemented for the project.

In addition to the State approval, a referral (EPBC 2018/8322) was prepared and lodged with the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Commonwealth Minister's delegate determined on 5 December 2018 that Snowy 2.0 Main Works is a "controlled action" under the EPBC Act. The EPBC Act referral decision determined that the project will be assessed by accredited assessment under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979.*

1.3. Disturbance Area

A key refinement following public exhibition of the Main Works EIS was a change to and clarification of disturbance area terminology.

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.

Note that the approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for Main Works and the approved Exploratory Works project is therefore presented in the Appendix 2 of the Infrastructure Approval (included in Appendix A1 of this EMS).

The revised disturbance area terminology as defined within Infrastructure Approval and Submissions Report is detailed in Table 1-1, with an example shown at Lobs Hole Ravine Road in Figure 1-3.

Table 1-1: Disturbance area terminology

Term	Definition	Reasoning
Project area	The project area is the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated.	The project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments.
Construction envelope	The envelope within which the disturbance area of the development may be located.	As detailed design continues, final siting of the infrastructure (i.e. the disturbance area) can move within the assessed construction envelope subject to recommended environmental management measures and provided it does not exceed the limits defined by the construction envelope.
Disturbance area	The area within the construction envelope where development may be carried out; the precise location of the disturbance area will be fixed within the construction envelope following final design.	

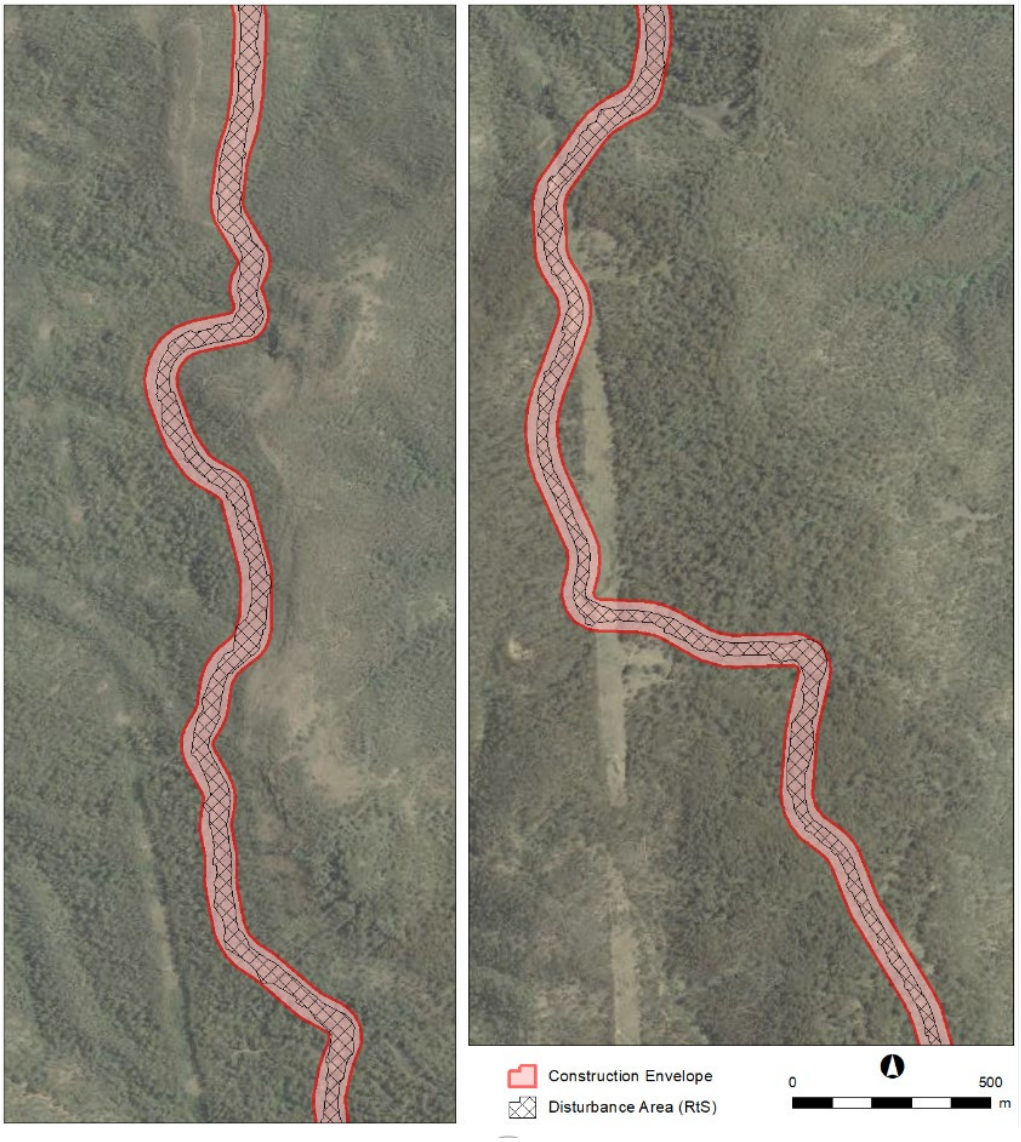


Figure 1-3: Disturbance area and construction envelope

1.4. Works within the Construction Envelope

Where project works are required to occur in locations outside of the disturbance boundary, Future Generation will review the proposed area of clearing against the limits included within condition 5 of schedule 2. The review will be undertaken to ensure that the maximum disturbance area and maximum native vegetation clearing remains within the total areas nominated within the condition. These area limits are included within Table 1-2.

All vegetation clearing which occurs on the project will be monitored regularly to record the extent of clearing which has occurred, and to ensure that the clearing limits are not exceeded.

Table 1-2: Maximum disturbance area and native vegetation clearing

Matter	Exploratory Works	Main Works	Total
Maximum Disturbance Area	126 ha	504 ha	630 ha
Maximum Native Vegetation Clearing	107 ha	425 ha	532 ha

1.5. Environmental Management System

The overall environmental management system for the project is described in the Environmental Management Strategy (EMS). The EMS forms part of the Project Management System (Future Generation-PMS) and will include any requirements specified in the contract documents, where appropriate. All Future Generation-PMS procedures will support, interface or directly relate to the development and execution of the plan.

The management plans and post-approval documents for the project include those listed within Figure 1-4.

This Heritage Management Plan (HMP or Plan) (S2-FGJV-ENV-PLN-0014) has been prepared for construction of the Snowy 2.0 Main Works project, and supersedes the existing Stage 1 and Stage 2 Exploratory Works Aboriginal Heritage Management Plan and existing Stage 1 and Stage 2 Historic and Natural Heritage Management Plan. It does not address the operational phase of the project.

This HMP forms part of Future Generation's environmental management framework. It has been prepared for the Snowy 2.0 Main Works project in accordance with condition 35 of the Infrastructure Approval, and incorporates the relevant aspects of the:

- Exploratory Works Aboriginal Heritage Management Plan; and
- Exploratory Works Historic and Natural Heritage Management Plan.

This Plan aims to transfer the relevant requirements of the Approval documents into a management plan which can be practically applied on the project site.

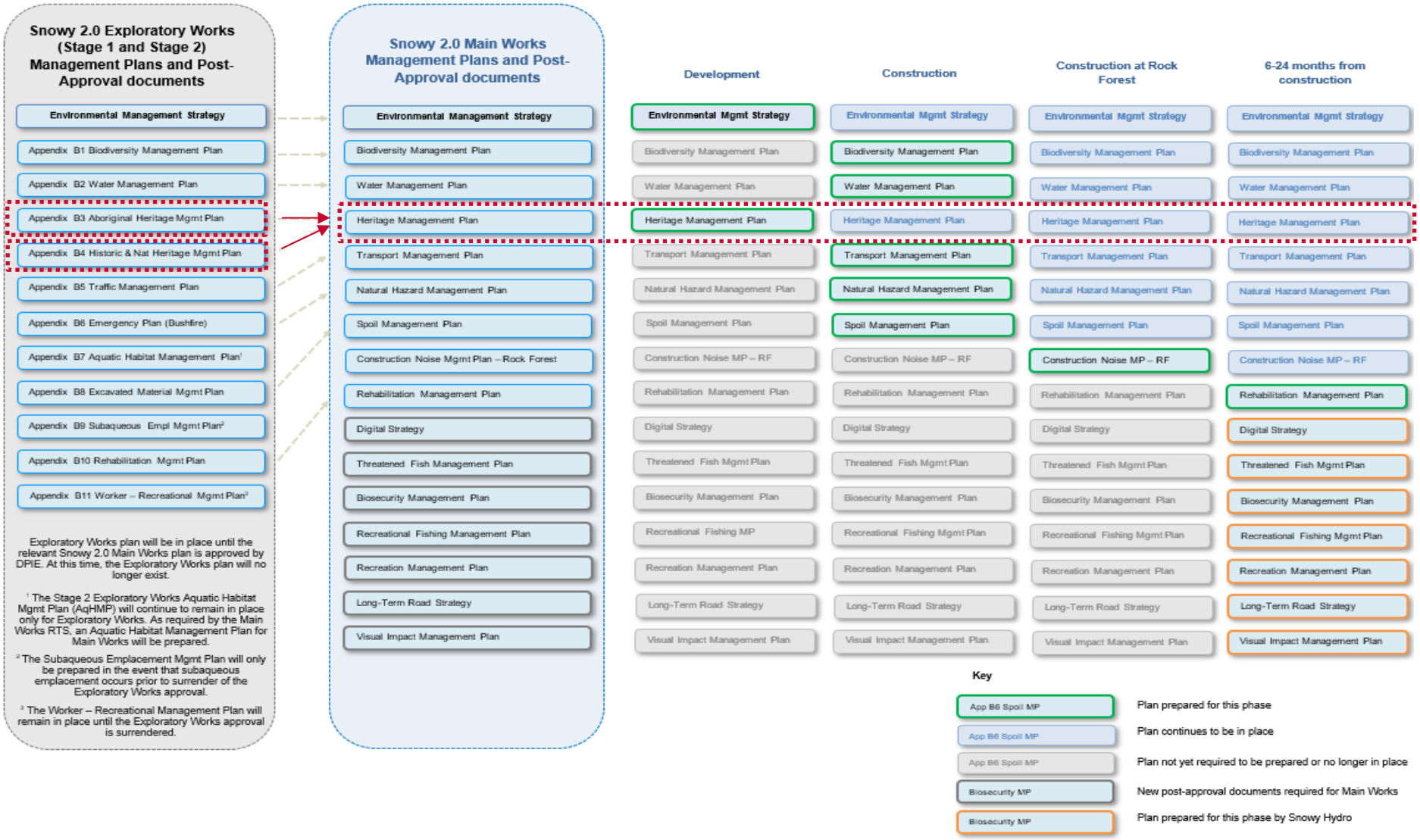


Figure 1-4: Management plans and post-approval documents with the HMP indicated

1.6. Pre-construction minor works

Pre-construction minor works will occur prior to Snowy 2.0 Main Works construction and is defined in the Infrastructure Approval. The following pre-construction minor work activities relevant to this Plan include:

- construction of minor access roads to facilitate the pre-construction minor works;
- installation of environmental impact mitigation measures, including the installation of monitoring
- equipment, erosion and sediment controls, and fencing;
- archaeological salvage, test excavations and investigation works; and
- minor clearing or translocation of native vegetation within the disturbance area for the preconstruction minor works.

The full definition of pre-construction minor works is provided in the glossary.

Pre-construction minor works will be undertaken in accordance with the Infrastructure Approval, Main Works EIS, Main Works RTS, the Environmental Management Strategy, Heritage Management Plan, and the Pre-construction Minor Works Management Plan.

1.7. Purpose and objective of this plan

The purpose of this Plan is to address the construction environmental management requirements detailed in the:

- Infrastructure Approval (SSI 9687) (Approval) issued for Snowy 2.0 Main Works on 20 May 2020;
- *Main Works Snowy 2.0 - Environmental Impact Statement*;
- revised environmental management measures (REMMs) within the Main Works RTS;
- Infrastructure Approval (SSI 9208) issued for Snowy 2.0 Exploratory Works on 7 February 2019 and modified on 2 December 2019 and 27 March 2020;
- *Exploratory Works for Snowy 2.0 - Environmental Impact Statement*;
- *Exploratory Works for Snowy 2.0 – Modification 1 Assessment Report*;
- *Exploratory Works for Snowy 2.0 – Modification 2 Assessment Report*; and
- the REMMs within the Exploratory Works RTS, Exploratory Works Modification 1 RTS, and Exploratory Works Modification 2 RTS.

The key objective of this Plan is to detail management measures and inform site procedures for implementation so that heritage impacts are minimised and within the scope permitted by the Infrastructure Approval. To achieve this objective, Snowy Hydro and Future Generation will:

- ensure appropriate measures are implemented to address relevant conditions of the approval and the REMMs listed within the Submissions Reports as detailed within Section 2 of this Plan;
- ensure appropriate measures are implemented during construction to minimise impact to ground surfaces which are known or predicted to contain heritage, if feasible;
- ensure that it is clear where and when unmitigated impacts to heritage (including geodiversity) can occur;
- ensure that it is clear when and where further archaeological assessment and salvage excavations, monitoring and inspections occur;

- ensure that it provides useable guidance and protocols for the management of unexpected heritage objects or values and human burials.

1.8. Plan Preparation

In accordance with CoA 35, this HMP has been prepared by suitably qualified and experienced personnel. This Plan was prepared by:

- Dr Julie Dibden, NSW Archaeology Pty Ltd;
- Dr Rebecca (Bec) Parkes, Lantern Heritage Pty Ltd;
- Dr Alistair Grinbergs, Lantern Heritage Pty Ltd; and
- Dr Leah Moore, University of Canberra

In accordance with EPBC condition of approval 23a (refer to Section 2.4), this Plan has been prepared in accordance with the National Heritage Management Principles, as identified in Table 1-3.

Table 1-3: National Heritage management principles (Schedule 5B of EPBC Regulations 2000)

Principle	Where addressed
The objective in managing National Heritage places is to identify, protect, conserve, present and transmit, to all generations, their National Heritage values.	This Plan
The management of National Heritage places should use the best available knowledge, skills and standards for those places, and include ongoing technical and community input to decisions and actions that may have a significant impact on their National Heritage values.	Snowy Hydro engaged with key stakeholders throughout development of the project, being governments, local community, local industry and business groups, environmental groups, the Aboriginal community and media. Engagement activities started early on during project development from 2017 onwards (refer to Section 5 of the Main Works EIS). The Main Works EIS was then publicly exhibited between 26 September 2019 and 7 November 2019. Community, agency, and technical input was reviewed and incorporated/ responded to in the RTS report. This HMP, in accordance with NSW condition of approval 35a has been prepared by suitably qualified and experienced personnel (Section 1.8) with consideration of best practice standards / guidelines (Section 2.8) and includes consultation with key stakeholders during development of this Plan and provisions for ongoing consultation during construction (Section 1.9).
The management of National Heritage places should respect all heritage values of the place and seek to integrate, where appropriate, any Commonwealth, State, Territory and local government responsibilities for those places.	This HMP, in accordance with condition 35a of the Infrastructure Approval, has been prepared by suitably qualified and experienced personnel (Section 1.8) with consideration of best practice standards / guidelines (Section 2.8) and includes consultation with key stakeholders during development of this Plan and provisions for ongoing consultation during construction (Section 1.9).
The management of National Heritage places should ensure that their use and presentation is consistent with the conservation of their National Heritage values.	This Plan

Principle	Where addressed
The management of National Heritage places should make timely and appropriate provision for community involvement, especially by people who: (a) have a particular interest in, or association with, the place; and (b) may be affected by the management of the place.	This HMP, in accordance with condition 35a of the Infrastructure Approval, has been prepared by suitably qualified and experienced personnel (Section 1.8) with consideration of best practice standards / guidelines (Section 2.8) and includes consultation with key stakeholders during development of this Plan and provisions for ongoing consultation during construction (Section 1.9).
Indigenous people are the primary source of information on the value of their heritage and the active participation of indigenous people in identification, assessment and management is integral to the effective protection of indigenous heritage values.	Consultation with indigenous people has occurred through development the project (refer to Section 5 of the Main Works EIS), during development of this Plan and will be ongoing during construction (Section 1.9).
The management of National Heritage places should provide for regular monitoring, review and reporting on the conservation of National Heritage values.	This HMP includes provisions for regular monitoring (Section 6.1), review (Section 6.4) and reporting (Section 6.5).

1.9. Consultation

In accordance with condition 35 of the Infrastructure Approval, the HMP is to be prepared in consultation with;

- National Parks and Wildlife Services (NPWS);
- Biodiversity Conservation Division (BCD) of DPIE (recently moved to Heritage NSW of Department of Premier and Cabinet);
- Heritage Council (part of Heritage NSW);
- Registered Aboriginal Parties (RAPs);
- Yala Ngurumbang Yindyamarra Expert Advisory Committee; and
- Southern Snowy Mountains Aboriginal Community MOU Group.

An overview of consultation undertaken to date is summarised in Table 1-4.

Table 1-4: Consultation undertaken for this Plan

Date	Consultation	Outcomes
24 April 2020	Agency briefing (Online presentation) of the Heritage Management Plan and approach with SHL, DPIE and BCD/Heritage NSW	Awaiting conditions of approval, HMP to be sent out for review and comment by stakeholders
29 May 2020	The Plan (rev C) was issued (electronically) to all state stakeholders for review and comment	-
10 June 2020	Rhonda Casey on behalf of Toomaroombah Kunama Namadgi Indigenous Corporation – response provided on HMP	Section 5.1.1 and Appendix G updated to identify memorial tree
11 June 2020	The Plan (rev C) was issued via post to Iris White on behalf of Ngarigo people	-
11 June 2020	Marilyn Carroll-Johnson on behalf of Corroboree Aboriginal Corporation – response provided on HMP	No comments on HMP. Agree with Project proposal.
12 June 2020	The Plan (rev C) was issued via post to Arnold Williams on behalf of the Ngunnawal Elders Corporation	-

Date	Consultation	Outcomes
12 June 2020	NPWS & BCD/Heritage NSW – combined response on HMP.	Plan has been updated in response to comments. Key sections include updates to ongoing consultation (Section 1.9.3), clarification to works at the block streams (Section 5.4.1), Aboriginal heritage further investigation (Section 5.2.1), monitoring (Section 6.1), reporting (Section 6.5), and unexpected finds procedure notification (Appendix E).
16 June 2020	John Dixon – response provided on HMP	No specific comments on HMP. Requested that ongoing consultation with RAPs occur (see 1.9.3). Requested RAP involvement with salvage works and that Aboriginal opportunities for training / jobs be maximised during the Project.
26 June 2020	This Plan (rev D) was issued to DAWE for review and comment	-
24 July 2020	DAWE – response provided on HMP	Plan has been updated to link the stated based data to the National Heritage listed values (see Appendix D) and to include statement of records regarding indigenous consultation (see Section 1.9)
10 August 2020	DAWE – two comments provided on Revision E.	Plan revised to include and therefore address both comments.

In accordance with EPBC 2018/8322 condition 23(b), records of consultation with indigenous stakeholders are being kept on file as evidence of continued consultation.

A separate document will be provided to DPIE and DAWE, upon request, which details the consultation process, along with Future Generation responses to stakeholder comments and how feedback has been implemented during the action.

1.9.1. Aboriginal Consultation

The Snowy Mountains is country to several groups and many Aboriginal people have cultural and spiritual associations that have long histories embodied in objects which can be seen on the ground and other intangible values related to the past and current concerns and aspirations. The project area itself is located within the lands of the Wolgalu people.

A formal process of Aboriginal community consultation has been conducted as a component of this assessment in accordance with the guidelines as set out in the NSW DPIE's Aboriginal cultural heritage consultation requirements for proponents 2010 (NSW DECCW 2010b).

The consultation process was initiated at the beginning of the Snowy 2.0 project during geotechnical works. It has continued throughout the Exploratory Works and Main Works projects and is described in the Appendix P.1 of the Main Works EIS.

Updated information about Snowy 2.0 and the cultural heritage assessment inclusive of additional areas in the project footprint was provided to Registered Aboriginal Parties (RAPS) on 13 May 2019. The draft ACHA for Main Works was provided to RAPS for review on 10 September 2019; no responses were received.

The RAPs for this project are:

- Iris White, on behalf of the Ngarigo people;
- Corroboree Aboriginal Corporation;
- Bega Local Aboriginal Land Council;

- Lindsay Connolly, Steve Connolly and Ramsey Freeman;
- Brungle-Tumut Local Aboriginal Land Council;
- Arnold Williams, on behalf of the Ngunnawal Elders Corporation;
- Ellen Mundy and Ngarigo people;
- John Dixon and Ngarigo people; and
- Toomaroombah Kunama Namadgi Indigenous Corporation.

In addition, Snowy Hydro has consulted independently with the Wagonga Local Aboriginal Land Council and the Northern and Southern Kosciuszko National Park Aboriginal Community Memorandum of Understanding Groups.

1.9.2. Historic and Natural Heritage Consultation

The NPWS have been the principal NSW agency engaged through the process of developing the Snowy 2.0 Main Works EIS. This has involved formal and numerous informal briefings and workshops with representatives from KNP.

The former Office of Environment and Heritage (OEH) (now BCD and Heritage NSW) has been engaged comprehensively regarding biodiversity and heritage issues since February 2019. In the first instance ensuring that biodiversity and heritage survey methodology and targets were identified with the best available knowledge in collaboration with OEH was the priority. Thereafter, OEH has been updated on both ecological and heritage findings as surveys progressed and feedback incorporated as work progressed.

To inform preparation of the SEARs, DPIE invited other government agencies to recommend matters to be addressed in the EIS. These matters were taken into account by the Secretary for DPIE when preparing the SEARs. Copies of government agency advice to DPIE were attached to the SEARs. The NSW Heritage Office provided advice that there were no heritage concerns identified for the project.

1.9.3. Ongoing Consultation

Consultation by Future Generation and SHL will be ongoing throughout construction with stakeholders identified in Section 1.9. Ongoing consultation will include consultation for, but not be limited to:

- consultation with key stakeholders during the implementation of the plan, such as
    - consultation in the event of any unexpected Aboriginal, historic or natural heritage being found during the construction of the project; and
    - consultation each calendar year regarding project progress, processes and strategies outlined in this Plan. This includes consultation with NPWS regarding the curation of moveable heritage items and assemblages of excavated finds and development and installation of any interpretation and signage
- consultation to allow Aboriginal stakeholders to visit significant cultural heritage sites on site, provided this can be carried out safely without compromising the construction of the development; and
- consultation with the Surveyor General to determine appropriate approval and management pathways for the removal of trigonometrical markers adjacent to existing roadways impacted by the project.

2. ENVIRONMENTAL REQUIREMENTS

2.1. Legislation

Legislation relevant to heritage includes:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act);
- *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act);
- *Heritage Act 1977* (NSW) (Heritage Act);
- *Heritage Regulation* 2012 (NSW) (Heritage Regulation);
- *Native Title Act 1993* (note there are no native title claims relevant to this area); and
- *National Parks and Wildlife Act 1974* (NSW) (NPW Act);

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the EMS.

2.2. Conditions of Approval

Table 2-1 details the conditions from the Infrastructure Approval which are relevant to heritage and demonstrates where these conditions are addressed.

Table 2-1: Conditions of approval relevant to heritage (CSSI 9687)

Condition	Requirement	Where addressed
Schedule 3, condition 33	**Protection of Heritage Items** The Proponent must ensure that the development does not affect:	Detailed maps are provided in Appendix G
	(a) any Aboriginal heritage items outside the construction envelope (see Appendix 3);	Section 5.1.1
	(b) the rock shelter (AHIMS 57-4-276) to the west of the Tantangara site (see Appendix 3);	Section 5.1.1
	(c) any of the historic heritage items outside the construction envelope (see Appendix 3);	Section 5.1.1
	(d) the heritage items listed in Table 4-2 and Table 4-4 in Appendix 4; and	Section 5.1.1 Section 5.3.2
	(e) the tufa deposits outside the construction envelope (see the figures in Appendix 3).	Section 5.4.2
Schedule 3, condition 34	**Heritage Mitigation Requirements** The Proponent must: (a) undertake archival recording, test excavation and/or salvage of the Aboriginal heritage items listed in Table 4-3 in Appendix 4 if these items will be affected by the development;	Section 5.2.2 Appendix A
	(b) undertake archival recording, test excavation and/or salvage of the historic items listed in Table 4-1 in Appendix 4 if these items will be affected by the development;	Section 5.3.5 Section 5.3.7 Appendix C
	(c) prepare a detailed archival record of the history of settlement and mining in the Lobs Hole Ravine area;	Section 5.3.6 Section 6.5.3

Condition	Requirement	Where addressed
	(d) minimise the impacts of the development on the boulder streams and fossiliferous beds along Lobs Hole Ravine Road (see the figures in Appendix 3).	Section 5.4.1 and Section 5.4.3 Note that the works to the Block Streams approved in Consolidated Exploratory Works approval for MOD 1, is the full extent of the works to the block streams.
Schedule 3, condition 35	**Heritage Management Plan** Prior to carrying out any development for the Main Works that could affect the heritage items listed in Appendix 3 and 4, the Proponent must prepare a Heritage Management Plan for the development to the satisfaction of the Planning Secretary. This plan must	This Plan
	(a) be prepared by a suitably qualified and experienced person in consultation with the NPWS, BCD, Heritage Council, RAPs, Yala Ngurumbang Yindyamarra Expert Advisory Committee;	Section 1.9
	(b) describe the measures that would be implemented to: • protect the heritage items identified in condition 33 above;	Section 5.1.1
	• comply with the heritage mitigation requirements in condition 34 above, including the display of removable heritage items in consultation with the NPWS and BCD;	Section 5 Section 1.9.3
	• relocate moveable historic heritage items within the disturbance area;	Section 5.3.8
	• manage the discovery of human remains or previously unidentified heritage items;	Appendix E
	• provide for ongoing consultation with key stakeholders during the implementation of the plan;	Section 1.9.3
	• involve key stakeholders in the management of heritage items on site;	Section 1.9.3
	• allow Aboriginal stakeholders to visit significant cultural heritage sites on site, provided this can be carried out safely without compromising the construction of the development; and	Section 1.9.3
	• ensure workers receive suitable training and inductions on the heritage management requirements on site;	Section 6.2
	(c) include a program to monitor and report on the effectiveness of these measures; and	Section 6.1
	(d) include a program to publish: • any detailed archival records required under the conditions of this approval; and	Section 6.5
	• the findings of any scientific research, excavations and salvage works.	Section 6.5
Schedule 3, condition 36	The Proponent must implement the approved Heritage Management Plan for the development.	This Heritage Management Plan will be implemented for the development.

2.3. Revised Environmental Management Measures

During preparation of the Exploratory Works and Main Works Submissions Reports, Revised Environmental Management Measures (REMMs) were developed and are included in Appendix C of the Main Works RTS and Section 8 of the Exploratory Works RTS.

The Main Works and Exploratory Works REMMs relevant to heritage are listed in Table 2-2 and Table 2-3. In accordance with CSSI 9687, schedule 2, condition 3, if there is any inconsistency between the Exploratory Works and Main Works documents, the most recent document will prevail to the extent of the inconsistency (i.e. Main Works).

Table 2-2: Main Works (CSSI 9687) revised environmental management measures relevant to heritage

Impact	Ref #	Revised environmental management measure	Where addressed
Aboriginal Heritage			
Impact to known heritage sites and items	HER01	An Aboriginal Heritage Management Plan (AHMP) will be prepared and implemented to guide the process for management and mitigation of impacts to Aboriginal objects. The AHMP will:	This Plan
		• be prepared in consultation with RAPs and DPIE;	Section 1.9
		• describe survey units in which impacts are allowable; and	Appendix A
		• include procedures relating to the conduct of additional archaeological assessment, if required.	Section 5.1.3 and Section 5.1.4
Loss of Aboriginal cultural heritage	HER02	Specific management and mitigation measures are listed for each individual survey unit and Aboriginal object locale in Appendix P.1 and will be included in the AHMP or salvage strategy. Management measures to be included in the AHMP are: • for survey units within the project disturbance footprint which are assessed to be of higher significance values, impact mitigation measures will be implemented. These would comprise salvage in the form of archaeological excavation and archaeological analysis prior to impacts. Salvage will be undertaken prior to impacts occurring to the relevant item and will be documented in a separate report; and	Section 5.2.2 and 5.2.3 Appendix A
		• the AHMP is to include measures for the management of any Aboriginal objects that may be found during construction.	Appendix E
		• Areas within the project disturbance footprint that warrant further field assessment will be managed under the AHMP or salvage strategy after project approval. These areas are documented in the heritage addendum report (Appendix M)	Section 5.2.1
Historic Heritage			
Loss of historic heritage	HER03	Salvage and/or archival recording of potential and known heritage items to be conducted in respect of certain items that warrant that level of impact mitigation.	Section 5.3.5 Section 5.3.7 Section 5.3.8 Appendix C
	HER04	Specific management and mitigation measures are listed for each individual heritage item in Appendix P.2 and will be included in a cultural heritage management plan (CHMP). A series of management recommendations will be presented. In some instances, no impact mitigation is required. For others a range of measures are recommended ranging from the establishment of no-go zones to ensure the protection of items, salvage of movable heritage to salvage excavation and archival recording. Salvage will be undertaken prior to impacts occurring and will be documented in a separate report.	Section 5.3 Appendix C

Impact	Ref #	Revised environmental management measure	Where addressed
		Appropriate avoidance measures will be taken for Washington Hotel (site R20) and Ravine Cemetery (R118).	Section 5.1.1 and Section 5.3.2
		A minimum 20 m project construction avoidance buffer will be applied to the Washington Hotel (site R20) structure.	Section 5.3.2
		No ground disturbance will occur within the cadastral boundary of Ravine Cemetery as shown on Figure 6.20 in the EIS. Some non-ground invasive vegetation clearance will be required at the western and northern boundaries of the cadastral boundary of Ravine Cemetery (refer to bush fire risk and hazard assessment, Appendix T).	Section 5.3.2
		Areas within the project disturbance footprint that warrant further field assessment will be managed under the HNHMP or salvage strategy after project approval. These areas are documented in the heritage addendum report (Appendix M).	Further field assessment has not been identified for historic heritage items in the heritage addendum report. Measures have been incorporated in Appendix C for historic items discussed in the heritage addendum report (CCSU20/H1 and NCTSU37/H1)
Natural Heritage			
Geodiversity – Ravine block streams	GE01	Design principles identified in the Cenozoic Geodiversity Report will be implemented to minimise impacts to the Ravine block streams during detailed design.	Section 5.4.1
Geodiversity – Ravine tufa	GE02	Design principles identified in the Cenozoic Geodiversity Report will be implemented to minimise impacts to the Ravine tufa during detailed design.	Section 5.4.2
Geodiversity – Lick Hole Formation fossil locality	GE03	Final road design will consider incorporating interpretive signage and safe stopping space within the proposed road and disturbance footprint where practical.	Section 5.4.3
Geodiversity – Kellys Plain Volcanics Type Locality	GE04	During construction, ensure that the former Traces Knob quarry is not in-filled.	Section 5.4.4
Geodiversity – Kellys Plain Volcanics agglomeratic porphyry	GE05	Identify outcrops of agglomeratic porphyry prior to construction at Tantangara portal. Excavated rock placement should leave some of the best examples of the agglomeratic porphyry uncovered where reasonable and feasible to do so	Section 5.4.5
Geodiversity	GE06	A management plan will be prepared that includes measures that minimise impacts to known geodiversity sites and potential undocumented geodiversity sites identified in accordance with the recommendation in the Cenozoic and Palaeozoic Geodiversity reports.	This Plan, Section 5.4

Impact	Ref #	Revised environmental management measure	Where addressed
	GE07	Consult with NPWS regarding opportunities to enhance the geotourism potential of impacted geodiversity sites through the development of the masterplan for recreational use.	Recreation Management Plan

Table 2-3: Exploratory Works (SSI-9208) revised environmental management measures

Impact	Ref #	Revised environmental management measure	Where addressed
Aboriginal heritage	HER01	An Aboriginal Heritage Management Plan (AHMP) will be prepared and implemented to guide the process for management and mitigation of impacts to Aboriginal cultural and heritage. The AHMP will:	This Plan
		• be prepared in consultation with RAPs, NPWS Tumut Brungle Gundagai Aboriginal Community Executive Advisory Committee and OEH;	Section 1.9
		• Set out guidelines for ongoing consultation and opportunities for cultural values assessment;	Section 1.9.3
		• include procedures relating to the conduct of additional archaeological assessment, including monitoring and salvage excavations after clearance, if required. Should the additional archaeological assessment be required to occur prior to finalisation of the AHMP, the archaeological assessment will be prepared as a separate document, with any recommendations for monitoring incorporated into the AHMP;	Further investigation relevant to exploratory works has been completed. Further investigation relevant to Main Works is discussed in Section 5.2.1. Appendix B includes the mitigated impacts salvage methodology.
		• set out a protocol for unexpected Aboriginal heritage values and human skeletal material	Appendix E
		A 50 m buffer zone from the bank of the Yarrangobilly River will be established to protect the likely presence of Aboriginal cultural items, except for those areas required for creek or river crossings and road construction.	Table 5-1
Loss of Aboriginal cultural heritage	HER02	Specific management and mitigation measures are listed for specific heritage item below: • monitoring after vegetation clearance and salvage excavation will occur for heritage sites – SU2, SU6, SU7 • salvage excavation will occur for heritage sites – SU10, SU12, SU25	This has been completed as part of exploratory works. Measures are incorporated in Appendix A for all survey units.
		Aboriginal cultural heritage management measures to be included in the AHMP and implemented during construction include:	This Plan
		• impacts to ground surfaces should be kept to an absolute minimum	Table 5-1
		• for Survey Units which are assessed to be of higher significance values, mitigated impacts in the form of partial impacts only (i.e. conservation of part of an Aboriginal site or Survey Unit) and/or salvage in the form of further research and archaeological analysis will occur prior to impacts. Should the additional archaeological analysis be required to occur prior to finalisation of the AHMP, the archaeological analysis will be prepared as a separate document, with any recommendations for monitoring incorporated into the AHMP;	This has been completed as part of exploratory works.

Impact	Ref #	Revised environmental management measure	Where addressed
		• salvage excavations in the Survey Units in order to mitigate impacts to the archaeological resource in the project area; and	This has been completed as part of exploratory works.
		• the AHMP is to include management measures of any further Aboriginal cultural heritage values which may be identified during construction.	Appendix E
Aboriginal heritage	M1.4	The Aboriginal heritage management plan (AHMP) will be updated to account for the additional areas assessed for the proposed modification.	This Plan includes areas assessed as part of exploratory works modifications.
Loss of historic heritage	HER03	A Historic and Natural Heritage Management Plan (HNHMP) will be prepared and implemented to guide the process for management and mitigation of impacts to historic cultural heritage. The HNHMP will:	This Plan
		• Set out procedures to manage impacts, avoidance of impacts and impact mitigation in accordance with the HCHAR recommendations;	Section 5.3
		• Set out an unexpected finds protocol and the procedure to be followed for monitoring to undertaken for the purposes of inspecting areas for unrecorded heritage, when preliminary clearance of vegetation is made;	Appendix E
		• Outline a protocol for the management of potential unmarked graves and other human skeletal material in the project area	Appendix E
		• Set out guidelines for the management of movable heritage located anywhere in or near the project areas, to ensure that it is not inadvertently impacted or removed.	Section 5.3.8
Loss of historic cultural heritage	HER04	The following will occur to confirm the mitigation measures provided for the individual heritage items listed below where applicable:	Section 5.3.6 Appendix D (Archaeological Research Design)
		1. Archival recording of the entire Lobs Hole historic landscape to capture the industrial, residential and agricultural features at the site. The recording would use photographic techniques and topographic survey. Orthographically corrected photographs would be the most effective way of doing this as it combines both techniques (the methods for archival recording will be developed in the HNHMP stage);	
		2. with the data obtained from '1' (above), an analysis of the site would be made of the areas of potential relics and determine what the research potential is and if test excavation is justified;	
		3. if the answer is yes for archaeological potential, a research design and excavation method would be prepared to support and guide archaeological test excavation; this will determine what and how much of the site can provide information that no other source can before it is removed by the project; and	
		4. ensuing from the above, a comprehensive historic document would be produced which would include, but not be limited to, the results of the archival recording and archaeological investigations, and the on-going oral and historical research.	

Impact	Ref #	Revised environmental management measure	Where addressed
		Specific management and mitigation measures are listed for each individual heritage items below. These shall be implemented prior to and during construction as applicable and include: • R1, R2 – archaeological research design, archival recording and archaeological test excavation within disturbance areas; • R3, R4, R5, R6, R7, R8, R10, R12, R13, R21, R23, R26, R30, R31, R33, R35, R36, R37, R43, R44, R46, R51, R52, R53, R54, R55, R56, R57, R58, R59, R62, R65, R67, R68, R70, R73, R75, R76, R77, R78, R79, R81, R82, R83, R84, R85, R86, R87, R94, R95, R97, R98, R101, R102, R103, R104, R105, R106, R107, R108, R110, R111, R112, R114, R115, R116, R117, R119, R120, R121– archival recording; • R9, R74, R88 – archival recording and no-go buffer to be provided to avoid inadvertent impacts; • R11, R14, R49, R50, R100 – archival recording and implement measures to protect moveable heritage; • R15, R17, R22 – archival recording and include in the archaeological research design for the Pinbeyan Station Homestead; • R16, R18 – archival recording, implement measures to protect moveable heritage and include in the archaeological research design for the Pinbeyan Station Homestead; • R19 – avoid impacts; • R20 – archival recording, implement measures to protect fabric and moveable heritage, ensure no inadvertent impacts, determine curtilage around the item and prepare and archaeological research design to ascertain what, if any parts of the hotel complex are in the disturbance area and reassess the significance of component parts; • R24, R25, R27, R28, R29, R34, R38, R39, R40, R41, R42, R61, R63, R66, R69, R80, R90, R91, R92, R93, R96, R99, R122 – archival recording. Test excavation may be warranted; • R45 – archival recording and limit impacts as much as possible; • R47 – archival recording. Test excavation may be warranted. Avoid impacts as much as possible; • R48, R60 – archival recording. Test excavation may be warranted. Implement measures to protect moveable heritage; • R64 – archival recording program. Test excavation may be warranted. Ensure no inadvertent impacts; • R71, R72 - archival recording. Test excavation may be warranted. Avoid disturbance to the site if feasible; • R109, R118 – archival recording, avoid disturbance, ensure no inadvertent impacts; • R113 - archival recording. Avoid disturbance to the site if feasible; and • R128 – test excavation may be warranted.	These measures have been undertaken as part of exploratory works.

Impact	Ref #	Revised environmental management measure	Where addressed
		A qualified heritage consultant is to undertake a pre-work condition assessment (including photographic records) for the Washington Hotel ruins. Following initial condition assessment, a monitoring regime is to be implemented to ensure vibration associated with the works avoid harm to pisé structure. Where possible, further avoidance is recommended for the Ravine cemetery.	A qualified heritage consultant has undertaken the pre-work condition assessment (including photographic records) for the Washington Hotel ruin. Monitoring of the Washington Hotel will continue in accordance with Section 6.1 (weekly inspections) and vibration monitoring (with alerts) will continue to occur. A minimum 20m buffer will also be applied to the Washington Hotel site (R20) (that Main Works REMM HER04)
		A comprehensive research project on the history and heritage of the area will be undertaken to fill in the gaps in the existing history of settlement and mining and the archival recording of heritage items in the Lobs Hole Ravine area.	Section 5.3.6
Historical heritage	M1.5	The historical heritage management plan (HHMP) will be updated to account for the additional areas assessed for the proposed modification.	This Plan includes areas assessed as part of exploratory works modifications.
Geodiversity and karst features	GEO01	Measures to avoid and minimise impacts to geodiversity features will be implemented as part of the EMS and include: • digging the road deeper into the rock stream should be avoided where practical, and excavations that take place to widen the road should be undertaken on the upslope side of the road; • appropriate drainage should be constructed under the road to ensure no build-up of water occurs above the road, within the rock stream, during heavy rain; • educational signage should be provided in a nearby suitably widened area to provide information on the periglacial rock stream geoheritage features; • if any works are required to stabilise upslope sections of rock stream it is recommended that open mesh wire fencing is used so the general public and scientists can see and appreciate the architecture of the deposit. Building a solid wall or spraying concrete on the upslope side should be avoided.	This has been undertaken as part of exploratory works.
	GEO02	Measures to avoid and minimise impacts to geodiversity features will be implemented as part of the CEMP and include: • representative excavated spoil is to be preserved off site so that palaeontologists (from various research organisations) can look through the fresh material and collect fossil specimens for scientific research and curation in their respective collections; and • depending on the option of road upgrades to be implemented, interpretive signs could be installed in an appropriate location near the cuttings to highlight features in the exposures, provided the fossils were protected from being easily collected.	Samples of fossiliferous material have been collected during exploratory works. Recreation Management Plan

2.4. EPBC Approval

The EPBC Act approval for Snowy 2.0 Main Works was granted by DAWE in 2020. This approval was provided for the impact of the Snowy 2.0 Main Works Project on national heritage values of a national heritage place (Sections 15B and 15C of the EPBC Act), listed threatened species and communities (Section 18, Section 18A of the EPBC Act) and listed migratory species (Section 20, Section 20A of the EPBC Act).

Table 2-4 details the EPBC Act Approval conditions which are relevant to heritage and demonstrates where these conditions are addressed.

Table 2-4: Commonwealth EPBC Act Approval conditions relevant to heritage

Condition	Requirement	Where addressed
Condition 22	To minimise impacts on heritage items and values, the approval holder must comply with conditions 33 – 36 of the NSW approval relating to the protection and management of heritage items.	Refer to Table 2-1.
Condition 23	The approval holder must prepare the Heritage Management Plan required by condition 35 of the NSW approval in consultation with the Department, before it is approved by the NSW Planning Secretary. The Heritage Management Plan must: (a) be prepared in accordance with the National Heritage Management Principles; and	Section 1.8
	(b) include a consultation plan that outlines key indigenous stakeholders and when they are to be consulted; and update the consultation plan to record consultation and how feedback has been implemented during the action.	Section 1.9
Condition 24	Once the Heritage Management Plan is approved by the NSW Planning Secretary, the approval holder must implement the plan for the duration of the approval, unless otherwise agreed by the Minister in writing.	This Heritage Management Plan will be implemented for the development.

2.5. Kosciuszko National Park Plan of Management

The Kosciuszko National Park Plan of Management (KNP POM) (DEC NSW 2006) has been prepared under the NPW Act to provide a framework of objectives, principles and policies to guide the long-term management of the broad range of natural, historic and Aboriginal heritage values present within the park. This framework is translated into a suite of specific actions to be undertaken by National Parks and Wildlife Service (NPWS) and other organisations.

The KNP POM contains a set of actions concerning management of the geodiversity of the park. Actions for managing geodiversity include developing a geodiversity conservation strategy aimed at protecting all rocks, landforms and soils at risk of disturbance. A number of these actions have since been implemented, including the preparation and implementation of the *Kosciusko National Park Geodiversity Action Plan 2012-2017* which came into effect in 2012.

Management objectives in the KNP POM relating to geodiversity have been developed for both 'Rocks and Landform' and 'Karst' categories. It is noted that in line with the management objectives of the KNP POM (section 6.3.1 of the KNP POM), the site location of assessed geodiversity features has not been published in this Plan.

Relevant objectives and their actions for natural and cultural heritage are listed in Table 2-5.

Table 2-5: KNP POM management objectives relevant to Snowy 2.0 Main Works

Management objective	Policies and actions
Rocks and Landform	
6.3.1 The rocks, landforms and geological processes of the park are protected and, where necessary, managed within the bounds of acceptable limits of disturbance.	1. Provide maximum protection to rocks, landforms and geological processes that are of national significance and sensitive to disturbance by current human activities. This will include items listed in Schedule 1. Such places will not be publicised or promoted unless management regimes are in place to protect them from likely damage associated with increased visitation.
6.3.2 Rehabilitation and construction works are undertaken in ways that protect significant rocks, landforms and geological processes.	1. Prohibit developments likely to significantly impact on the integrity of geodiversity features of national significance. 2. Assess potential impacts on geodiversity values as part of the approval process for proposed developments or activities, including restoration works. 3. Undertake the rehabilitation of disturbed sites in accordance with Section 11.2 (of the KNP POM).
Karst	
6.4.1 The quality and quantity of air and water movement through the surface and subterranean environments of karst areas are maintained within the bounds of natural variability.	1. Minimise the use of earth-moving machinery in karst catchments. 2. Minimise surface and groundwater pollution within karst catchments.
6.4.2 Impacts associated with visitation to karst areas and features are managed within acceptable limits of disturbance.	1. Minimise adverse impacts of road drainage structures and materials used for roadworks and car parks in karst areas.
Historic Heritage	
7.0.1 The cultural heritage values of the park are protected and managed in a strategic, comprehensive and integrated way.	1. Conserve the cultural values of the park in accordance with the Australia ICOMOS (International Council on Monuments and Sites) Charter for the Conservation of Places of Cultural Significance (Burra Charter) and its guidelines. 2. Ensure the relative levels of significance are the overriding consideration in the management of particular cultural landscapes, places or objects and in resolving conflicts between the protection of cultural, natural, recreational and other values. 3. Acknowledge the inseparability of natural and cultural values and recognise that landscapes have been influenced by human activities to varying degrees. 4. Ensure cultural heritage management in the park considers, and where relevant, is consistent with: • The provisions of relevant Commonwealth and State legislation; • The provisions of Service policies, guidelines and cultural heritage management strategies; • Conservation policies in approved conservation management plans, heritage action statements and related reports prepared for places and objects within the park; and • The protection of all significant cultural heritage features listed in Schedule 1. 5. Manage heritage places with shared histories across different phases of human land use and between different communities to ensure that: • All aspects of the history of a place are identified, recorded and assessed; • Both Aboriginal and non-Aboriginal cultural values are acknowledged at places where they co-exist; • Management of the remaining physical evidence of one historical theme or story is not at the expense of that of another; and • Visitor interpretation covers all aspects of the layered histories of such places.

Management objective	Policies and actions
	6. Lessees will be responsible for the assessment, management and maintenance of the cultural values located within their lease areas in accordance with the management strategies prescribed in this plan, the Snowy Management Plan (for Snowy Hydro Limited) and the Alpine Resorts Environmental Planning Instrument (for alpine resort areas)

2.6. Kosciuszko National Park Geodiversity Action Plan

The *Kosciuszko National Park Geodiversity Action Plan 2012-2017* (KGAP) was prepared in response to the issues and conservation strategies for geological and geomorphological features, as outlined in the KNP POM. The KGAP outlines the condition and threats to key landforms, karst areas, rocks, minerals, fossils and soils within KNP. The focus of the KGAP is to guide OEH on how to better protect, conserve and promote the key features in the park, and to identify a range of actions for protecting, conserving and promoting these features to park visitors.

2.7. Licences and Permits

There are no licences or permits directly relevant for the Snowy 2.0 Main Works project in respect to the management of Aboriginal, historic or natural heritage.

2.8. Guidelines

The guidelines, policies and standards relevant to this Plan include:

- Australian Heritage Commission 2002, *Australian Natural Heritage Charter for the conservation of places of natural heritage significance*, Australian Heritage Commission, Canberra;
- Australian Heritage Commission 2003, *Protecting natural heritage using the Australian Natural Heritage Charter*, Australian Heritage Commission, Canberra;
- Commonwealth of Australia 2015, *Australian Heritage Strategy*, Australian Heritage Commission, Canberra;
- Department of the *Environment 2013, Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia, Canberra;
- Commonwealth of Australia 2019, *Working Together: Managing Commonwealth Heritage Places*, Commonwealth of Australia, Canberra;
- Department of Environment, Climate Change and Water 2010, *Code of practice for archaeological investigation of Aboriginal objects in New South Wales*, DECCW NSW, Sydney;
- Department of Environment, Climate Change and Water 2010, *Aboriginal cultural heritage consultation requirements for proponents*, DECCW NSW, Sydney;
- Heritage Office and Department of Urban Affairs and Planning 1996, *Altering heritage assets*, Heritage Office and DUAP, Sydney;
- Heritage Branch, Department of Planning 2009, *Guidelines for the Preparation of Archaeological Management Plans*, Heritage Branch of the Department of Planning, Sydney.
- Heritage Council of NSW 2006, *Historical Archaeology Code of Practice*, Heritage Office of the Department of Planning, Sydney.
- NSW Heritage Office 2001, *Assessing heritage significance*, NSW Heritage Office, Sydney;
- Heritage Office and Department of Urban Affairs and Planning 1996, *Archaeological assessment guidelines*, Heritage Office and Department of Urban Affairs and Planning, Sydney;

- NSW Heritage Council 2009, *Assessing significance for historical archaeological sites and relics*, NSW Heritage Council, Sydney;
- NSW Heritage Council 2012, *Stabilising stuff: A guide for conserving archaeological finds in the field*, NSW Heritage Council, Sydney;
- Heritage Branch 1998, *How to prepare archival recording of heritage items*, Heritage Branch, Sydney;
- Heritage Branch 2006, *Photographic recording of heritage items using film or digital capture*, Heritage Branch, Sydney;
- NSW Department of Health 2008, *Exhumation of Human Remains*, NSW Department of Health, Sydney; and
- NSW Heritage Office 1998, *Skeletal remains – guidelines for the management of human skeletal remains under the Heritage Act 1977*, NSW Heritage Office, Sydney; and
- Office of Environment and Heritage 2011, *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*, OEH NSW, Sydney.

3. EXISTING ENVIRONMENT

3.1. January 2020 Bushfire

On January 4th, 2020, the Snowy 2.0 project site and overall northern section of Kosciuszko National Park was impacted by a significant bushfire. The project site at Lobs Hole was severely impacted with much of the groundcover and trees burned, leaving the catchment area with bare soil and no ground protection. Other parts of the Snowy 2.0 Main Works project area including the Plateau, Marica and Tantangara were also impacted by the bushfire to varying degrees. The post-bushfire recovery of the surrounding areas is of key concern to KNP stakeholders.

3.2. Aboriginal Heritage

Recent archaeological research has confirmed an Aboriginal presence in the Snowy Mountains since the early Holocene (from around 9,000 years ago) (Aplin et al. 2010, Theden-Ringl 2016).

The Project is within the Country of the Wolgalu people (Tindale 1974, Boot 2000). The Snowy Mountains is country to several groups and many Aboriginal people have cultural and spiritual associations that have long histories embodied in objects which can be seen on the ground and other intangible values related to the past and current concerns and aspirations (NSW DEC 2006).

Aboriginal heritage was recorded during the Main Works EIS as documented in the ACHAR. The Aboriginal heritage Survey Units (inclusive of all Aboriginal stone artefacts and archaeological deposits) recorded during the Main Works EIS are identified in Section 6.2.2.1 to Section 6.2.2.28 of the Main Works EIS Appendix P1 (Aboriginal Cultural Heritage Assessment Report), and the Main Works RTS Appendix M (Heritage Addendum Report).

Areas where Aboriginal sites were identified are generally disturbed by previous use and/or natural geomorphological process. The primary archaeological features across the survey area are Aboriginal stone artefacts and are mostly present in negligible, very low or low density distributions. However, several survey units or micro topographies within survey units have higher artefact densities.

At Lobs Hole higher artefact densities were recovered on favourable landforms such as flats and gentle gradient crests adjacent to the Yarrangobilly River and such areas are likely to have been used regularly and reasonably intensively by Aboriginal people.

Excavation results at Tantangara indicates widespread Aboriginal use but with highly variable occupation intensity. Although most areas featured low artefact densities, certain benched areas on hill slopes featured higher artefact densities. These areas were at the interface with woodland that occurs at higher elevations. Such areas are likely to have provided shelter from prevailing weather, frosts and cold air drainage and provided abundant firewood otherwise absent from open grasslands on valley floors. Conversely, areas closer to the Murrumbidgee River featured lower artefact densities which may have been because they were exposed to cold air drainage and winds that would have been a deterrent for occupation. Additional to the stone artefact sites identified, one rock shelter with stone artefacts and potential archaeological deposit was identified 200 m west of the project disturbance footprint at Tantangara Reservoir (site name TSU11/L16).

Other areas investigated including Talbingo Reservoir, Marica, Plateau and Rock Forest all featured results consistent with the predictive model for site types, their distribution and predicted artefact densities. The archaeological significance of these areas is accordingly most often negligible/low and infrequently of low/moderate significance. Overall, the most frequently occurring areas of moderate archaeological significance are distributed across favourable landforms at Tantangara Reservoir and Lobs Hole.

The Aboriginal heritage Survey Units (inclusive of all Aboriginal stone artefacts and archaeological deposits) recorded within and in proximity to the construction envelope during the Main Works EIS

and RTS are listed in Appendix A. The location of all the Survey Units and Aboriginal object locales are shown in Appendix G.

3.3. Historic Heritage

The alpine region and high country have a rich history beginning with the early explorer-settlers in the 1820s, the establishment of pastoralism and summer grazing in the 1830s, the gold rush at Kiandra in 1859-60 and early scientific exploration. Thereafter, throughout the twentieth century the Snowy Mountains Scheme was built, scientific research developed further, and tourism and recreation promoted. Other lesser known activities in the high country include timber harvesting and milling, and Eucalyptus oil distilling.

A more detailed history of the study area is presented in Appendix P of the EIS. The following information is a provided as a contextual overview only.

Lobs Hole (also known as Ravine) has been used since the early 1800s as a thoroughfare for the movement of stock, prospecting, grazing, horse breeding, settlement, refuge from the winters of Kiandra, horticulture, gardening and agriculture, copper mining and recreation. Lobs Hole was a popular recreational destination for Snowy Scheme workers, during and after the scheme's construction.

The Marica and Plateau zones are part of the Kiandra plateau which has been used since the early 1800s for summer grazing. From the late 1850s, the area underwent extensive gold mining activity, including various phases of reef and alluvial mining. Hydraulic sluicing from the 1880s and dredging from the early 1900s both had significant impacts on the form and character of the modern landscape. Kiandra was also the site of a substantial town and numerous satellite mining camps across the plateau. Kiandra is also renowned as the birthplace of Australian skiing and continues to this day as a popular recreational destination for hiking, fishing, and sight-seeing throughout the year. Similarly, Tantangara has been used for summer grazing, mining, forestry and more recently the construction of the dam and its associated infrastructure. Tantangara is now a popular fishing and camping spot.

An assessment of the impacts of the project on historical heritage items has been completed by NSW Archaeology and included within Appendix P of the Main Works EIS. As a result of desktop research, register searches and archaeological survey, a total of 568 historic items and potential historic items were recorded as part of the EIS assessment. These include items associated with the historical themes of pastoralism, mining, water management, forestry, agriculture, towns, dwellings/huts, transport, recreation and the Snowy Mountains Scheme.

3.3.1. Heritage Listings

There are no places within the project area that are listed on the World Heritage List (WHL) or Commonwealth Heritage List (CHL).

The Australian Alps National Parks and Reserves (Place ID 05891) and the Snowy Mountains Scheme (Place ID 105919) are listed on the National Heritage List (NHL) and are therefore, Matters of National Environmental Significance (MNES). The project has been assessed according to the National Heritage values associated with the two National Heritage places against the significant impact criteria. The assessment has concluded that the action would not have a significant impact on the historical cultural heritage or geodiversity heritage of either of the NHL places.

No items on the State Heritage Register are within the project area. Four items on the State Heritage Register are situated outside the project: Kiandra Courthouse Chalet, Matthews Cottage (Kiandra), the old Adaminaby township at Lake Eucumbene and the Currango Homestead complex.

The NSW NPWS Historic Heritage Information Management System (HHIMS) contains data and documents relating to heritage items on land managed by the NPWS. Of the 315 items on the HHIMS for KNP, nine are located within or very near the project area. Six items are located within the project footprint at Lobs Hole: Building Remains, Lobbs Hole Cemetery, Mine Shaft (Lobbs Hole), Powerhouse Site, Ravine Hotel Ruin (Washington Hotel), and Ravine – Lobbs Hole Village.

In addition to the items listed within KNP on the HHIMS, there are various other sites and potential sites that are listed on an informal NPWS database. Eight occur within the project area, seven of which are at Lobs Hole: Lick Hole Mine, Lick Hole Mine and Moden Hut, Lobbs Hole Cemetery Site, Lobbs Hole Cemetery, Powerhouse Site, Ravine Hotel Ruin (Washington Hotel), and Ravine – Lobbs Hole Village. The Six Mile Diggings at Gooandra File Trail are also listed on this database.

There are no heritage items listed on the National Trust Register in the project area.

Five historic sites listed in the Australian Heritage Database on the Register of the National Estate (non-statutory archive) are in the project area. These are:

- Washington Hotel Ruin (Figure 3-1);
- Lobs Hole Copper Mine;
- Kiandra Mining Area;
- Kosciuszko National Park; and
- Snowy Mountains Scheme.

Figure 3-1 Washington Hotel prior to Exploratory Works, looking west.

The Kosciuszko Huts Association (KHA) provides the most comprehensive mapping currently available for potential heritage items and places of heritage interest in KNP. A number of pastoral routes and other pastoral items intersect with the project disturbance footprint. The majority of

these are un-named tracks and routes that have been mapped from various sources including parish maps, topographic maps and aerial photographs (refer to Annexure 1 of Main Works Appendix P.2). There are no huts within the project disturbance footprint.

3.3.2. EIS field survey results

Field survey were undertaken across a broad area, larger than, but inclusive of all areas in which direct impacts would occur. The field survey aimed to be comprehensive, however in some instances (e.g. at Lobs Hole) places were vegetated and this hampered access. Accordingly, the survey could not claim to be complete and the management strategies take this into consideration.

A total of 568 items were recorded during the fieldwork and research for the project, inclusive of previously listed items. The historical heritage across the project area comprises a broad array of site types relating to themes such as pastoralism, towns, mining, transport, agriculture, recreation and the SMA. Site types identified within the project area include moveable heritage, building remains, fences, survey markers, mining features (e.g. quarries, shafts, adits, sluiced landscapes and water races), field systems, exotic tree plantings, roads, tracks, bridges, telegraph poles, camp sites and industrial infrastructure such as furnaces, kilns and ore processing equipment. The current condition of identified items across the project area is variable.

The historical complex relating to the Ravine Township settlement at Lobs Hole, including Struggle Street, was assessed to be of local heritage significance. Other areas such as Marica and Plateau feature items that have local contributory significance to historical themes of mining, pastoralism, transport and the Snowy Mountain Authority presence. Historical items at Tantangara include items of local and local contributory significance to pastoralism, mining and the Snowy Mountains Scheme, including survey camps, infrastructure, quarries, the Tantangara Works Centre and Gang Creek Camp. Historical items at Rock Forest include those relating to mining, agriculture and pastoralism and have limited local and local contributory significance.

Historic items located across the project area are identified in Appendix C and on maps in Appendix G.

3.4. Natural Heritage

A geodiversity (natural history) assessment is included in Appendices O.1 and O.2 of the Snowy 2.0 Main Works EIS. Appendix O.1 deals with the Palaeozoic geodiversity assessment and Appendix O.2 deals with the Cenozoic geodiversity assessment.

3.4.1. Geological Sites or Features

The KNP contains the highest mountains on the Australian continent, unique glacial landscapes, and unusual assemblages of plants and animals, a number of which are found nowhere else. The unique nature of the KNP Snowy Mountains alpine region leads to the existence of unique natural landforms typically found in alpine and glacial regions. They include alpine humus soils, bogs and fens that are recognised as features of ‘national significance’. The uplift of the Snowy Mountains has structurally juxtaposed rock types of different ages and origins creating the opportunity to observe a diverse range of geological features over relatively short distances.

3.4.2. Palaeozoic Geodiversity

The Palaeozoic Geodiversity Assessment in Appendix O.1 of the Main Works EIS confirmed that nine previously reported Palaeozoic geodiversity sites occur adjacent to the construction envelope and one site occurs within the construction envelope (Table 3.1 in EIS Appendix O.1).

3.4.2.1. Previously identified sites

The one site directly impacted by the project (fossiliferous strata of the Lower Devonian Lick Hole Formation) is located along the Lobs Hole Ravine Road (Figure 3-2). The Lick Hole Formation was

determined to be sufficiently laterally and vertically extensive to cope with the proposed Main Works road widening, which might also have positive outcomes in terms of exposure of fresh, relatively unweathered rock, potential discovery of additional fossil species, and possible opportunities for additional scientific research and public education.

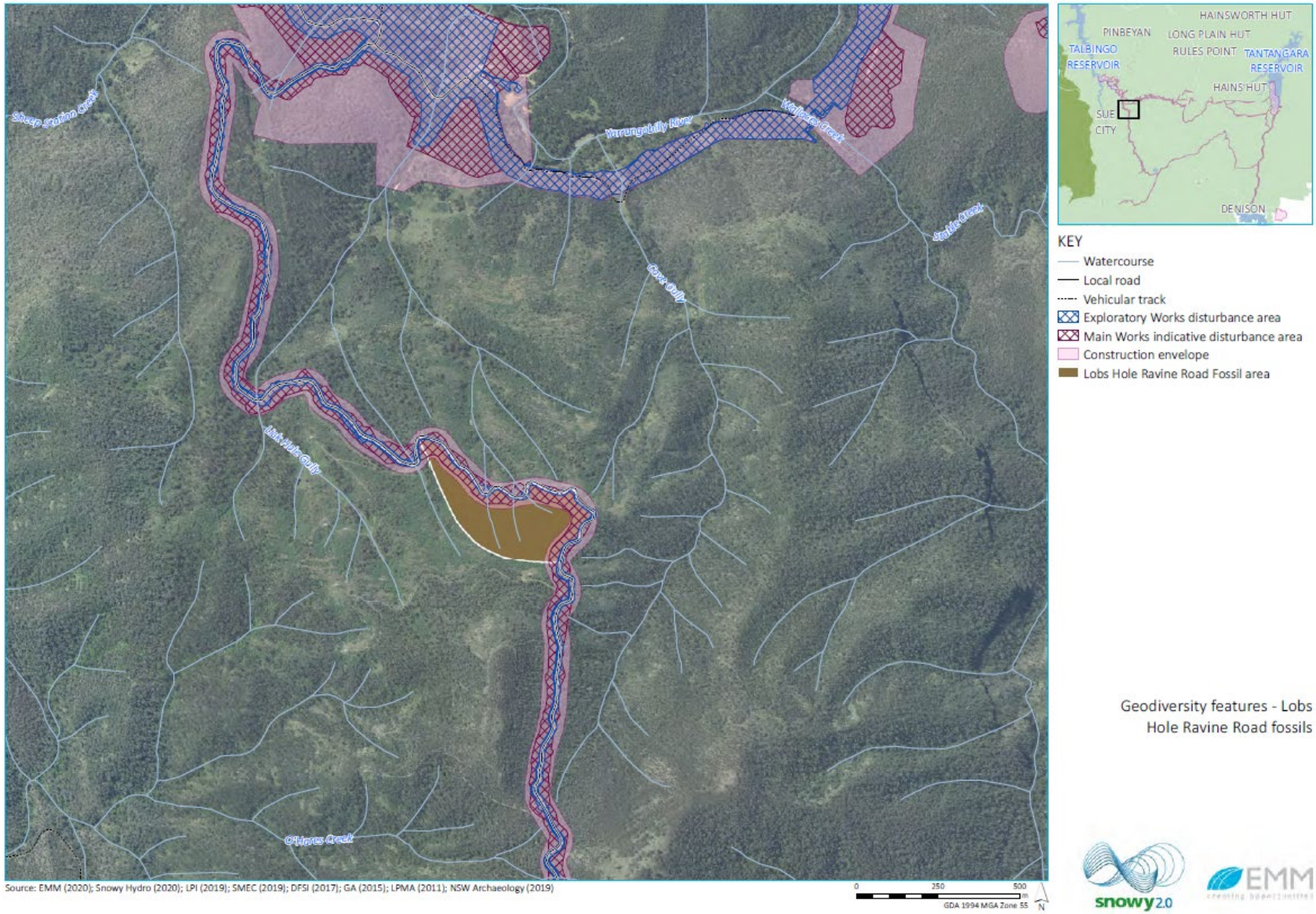


Figure 3-2: Indicative location of fossil area (Main Works EIS, EMM)

3.4.2.2. Further identified potential sites

A further 30 areas with potential for geodiversity significance were identified that are not currently recognised within the KNP POM or KGAP. Of these 30 newly identified sites, only two localities in the Kellys Plain Volcanics, in the vicinity of the Tantangara portal construction area, were found to be within the footprint of the Main Works disturbance area; they comprise the Kellys Plain Volcanics Type Locality and the Kellys Plain Volcanics agglomeratic porphyry.

In addition to the geodiversity sites identified above, there are several areas along roads that will be upgraded as part of Snowy 2.0 Main Works that may potentially provide significant new discoveries and increase knowledge of Palaeozoic geodiversity sites within the Snowy 2.0 Main Works project area. Two areas in particular have been identified as potential geodiversity sites:

- Tantangara Road, leading from the Snowy Mountains Highway north to Tantangara Dam; and
- Marica Road and Marica Road West, providing access from the Snowy Mountains Highway west to Lobs Hole, and Lobs Hole Road leading to Talbingo portal.

Detailed information is provided in the EIS (Appendix O.1).

3.4.3. Cenozoic Geodiversity

Two sets of Cenozoic geodiversity features identified as significant in KNP management documents (NPWS 2006, OEH 2012) occur within or close to the construction envelope. These are Pleistocene periglacial block streams and Quaternary tufa deposits, both of which occur in the vicinity of Lobs Hole Ravine Road, near Ravine.

The Ravine periglacial block streams comprise linear deposits of boulder to cobble-size basalt blocks occupying steep slopes. They range from around 6 m to 100 m wide, with the longest example around 370 m long (Figure 3-3). Deposit thicknesses are believed to typically be between 1-2 m, but may range up to 5 m. Age-dating of these deposits has confirmed that they formed approximately 23 to 17 thousand years ago during the Late Pleistocene (Barrows et al. 2004). The Ravine block streams are visible from numerous sites along Lobs Hole Ravine Road which crosses five block streams. The Ravine block streams are a very prominent example of these features due to their accessibility for future geotourism, scientific significance as a dated reference site and scenic landscape values, and are assessed to have geodiversity significance at regional to national level. Periglacial block streams are part of the listed values of the Australian Alps National Parks and Reserves National Heritage place.

The Ravine tufa comprises deposits of secondary limestone formed from precipitation of calcium carbonate minerals from spring or surface water. Spectacular cliff-edge tufa deposits occur at eight sites in Lick Hole Gully, Cave Gully, and Wallaces Creek where streamlines emerge at a prominent sandstone cliff-line, and pale ‘cascades’ of tufa have built out over the cliffs, in places forming deposits more than 100 m wide and extending tens of metres down and out from the cliff-face. This tufa exhibits a variety of forms including stalactites and constructional caverns. The upper age limit of the deposits is unknown but is likely to extend into thousands of years. Tufa deposits also line gullies upstream of the cliff-edge sites, extending hundreds of metres, but are mainly low grade. Lobs Hole Ravine Road bisects two of these tufa-lined gullies (Figure 3-4), one of which includes some modest higher-grade tufa (Tufa B). Tufa is not common in south-eastern Australia and the cliff-edge tufa sites are the largest known tufa deposits in the region. They are visually spectacular features with high potential for future geotourism, and have untested but strong potential for future scientific interest. They are assessed to have geodiversity significance at regional to national level.

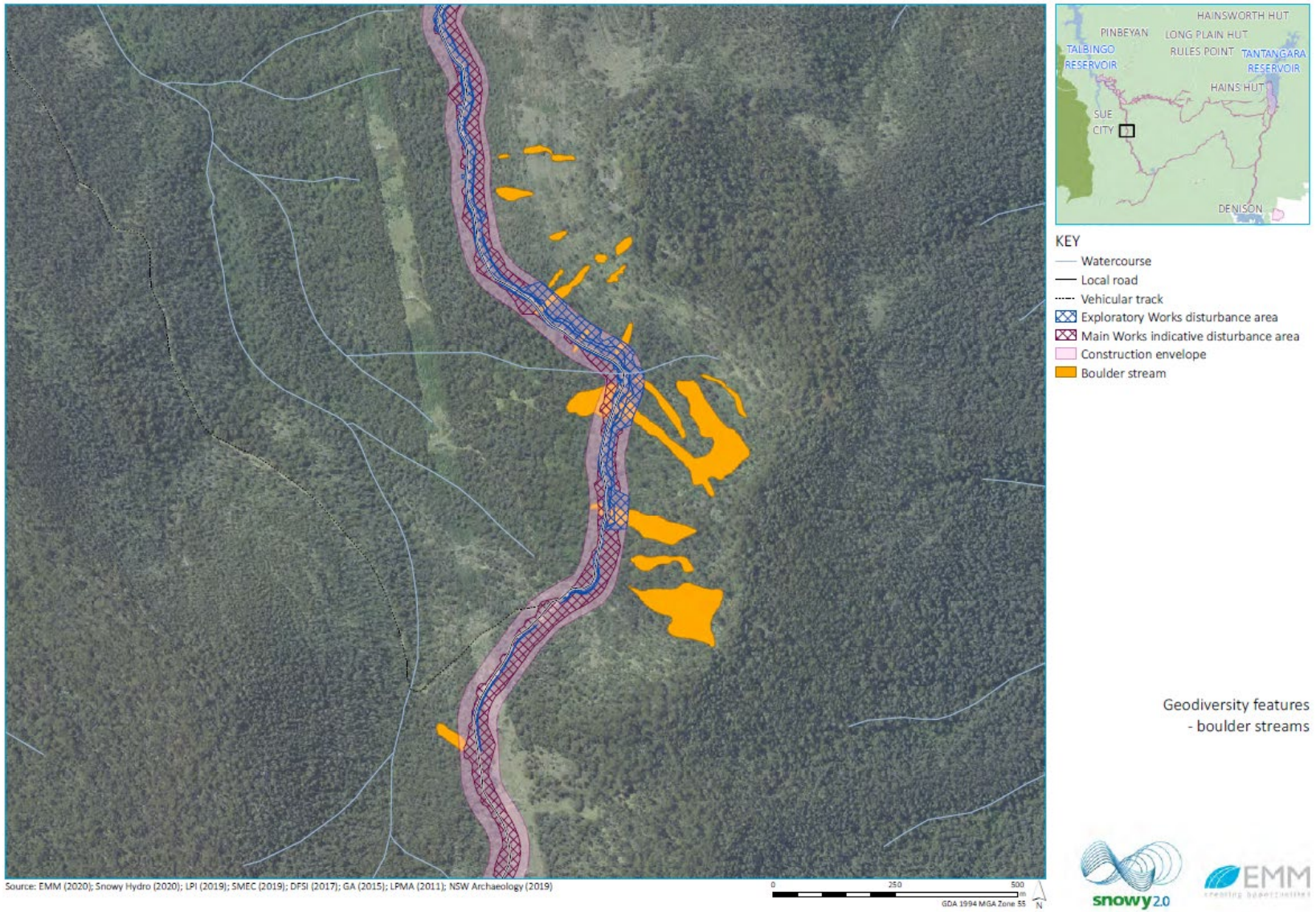
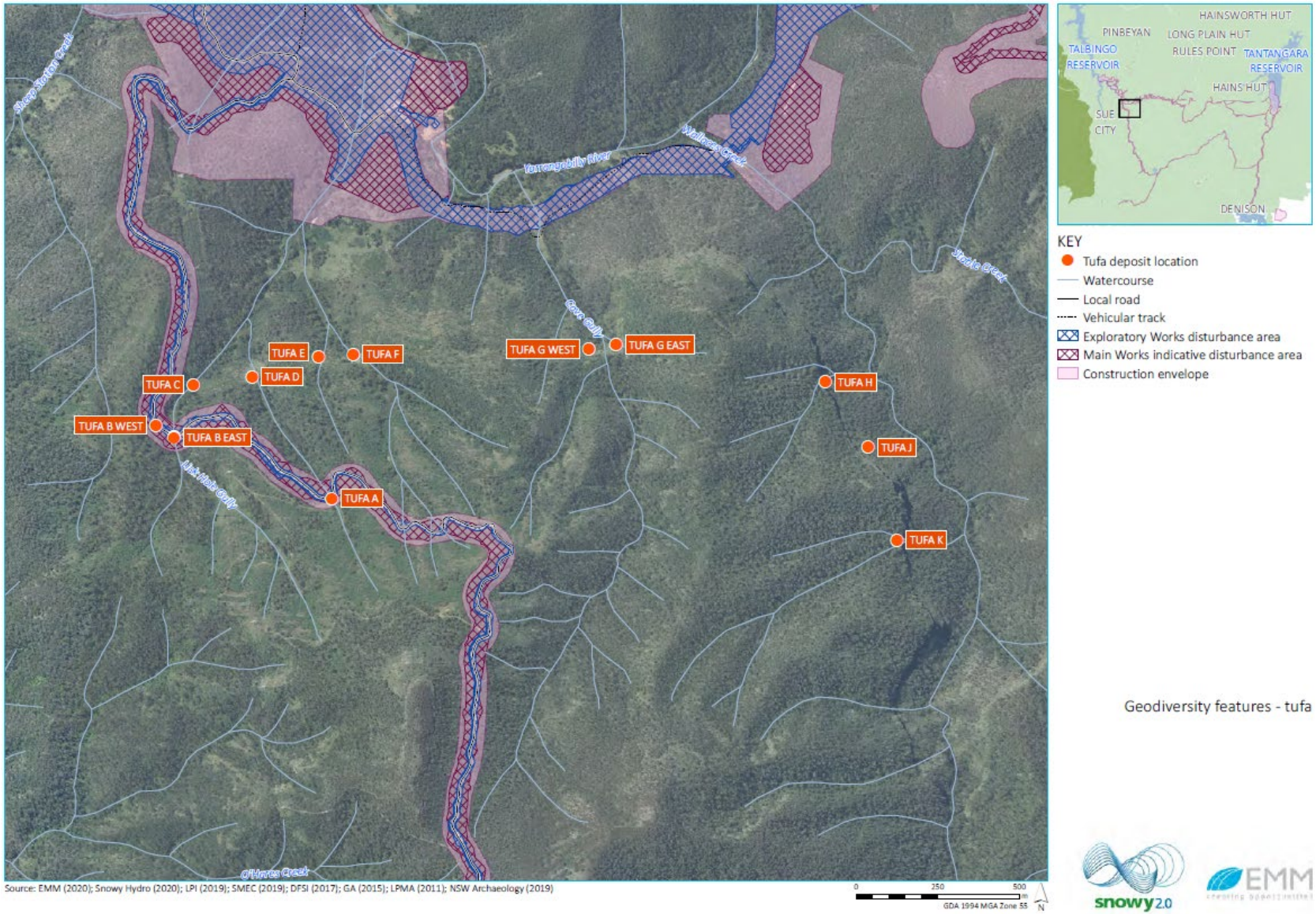


Figure 3-3: Inferred extents of periglacial block streams adjacent to Lobs Hole Ravine Road



KEY

- Tufa deposit location
- Watercourse
- Local road
- Vehicular track
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

Geodiversity features - tufa

snowy 2.0 EMM

Figure 3-4: Map of Ravine tufa locations as supplied by NPWS, overlaid on aerial imagery

4. ENVIRONMENTAL ASPECTS, IMPACTS AND RISKS

4.1. Environmental Aspects

An environmental aspect is an element of an organisation's activities, products, or services that has or may have an impact on the environment (ISO 14001 Environmental management systems). The relationship of aspects and impacts is one of cause and effect.

Key aspects of the Project that could result in heritage impacts are identified in Table 4-1. The extent of these impacts will depend on the nature, extent and magnitude of construction activities and their interaction with the natural environment (Column 2). This is further exacerbated by environmental factors (Column 3). This identification process has considered the proposed project activities and the types of potential impacts to heritage.

Table 4-1: Project aspects and impacts relevant to heritage

Aspects (Construction and human activities likely to cause damage to heritage items)	**Environmental Impacts**	**Environmental Factors** (Conditions)
• Vegetation clearing • Topsoil stripping • Bulk earthworks • Material stockpiles and emplacement areas • Soil movement and transfer • Blasting • Light and heavy vehicle movements • Increased visitation by workforce	• Physical disturbance and damage to heritage items • Inadvertent or deliberate damage/theft to heritage items • Soil disturbance through excessive erosion from surface water runoff • Interruptions to natural land forming processes • Impeded or lost access to significant/interesting sites • Damage to karst features during tunnel works • Increase/decrease in erosion	**Soil type** – more erodible soil types have an increased soil erosion potential. Presence of unknown heritage items **Rainfall** – heavy rainfall increases soil entrainment. **Bushfire** – loss of ground cover vegetation increases soil erosion risks; potential for direct damage to heritage. **Soil movement** – affecting karst features

4.2. Impacts

4.2.1. Aboriginal Heritage

4.2.1.1. Main Works EIS

The assessment of harm was conducted within the Main Works EIS and RTS.

A summary of impacts to Aboriginal heritage is provided in Appendix A. The summary lists the survey units in which impacts are allowable, and includes the type and degree of harm assessed. It is noted that not all areas within Survey Units would be impacted during the activity, and accordingly, impacts will be partial rather than comprehensive. It is noted that in particular, a riparian exclusion zone of 50 m in width adjacent to the Yarrangobilly River, will result in a conservation outcome of any Aboriginal object incidence within that zone.

The location of all Survey Units and Aboriginal object locales recorded are shown in Appendix G.

4.2.1.2. Exploratory Works EIS

The assessment of harm for the Exploratory Works scope of works was conducted within the Exploratory Works EIS and RTS, Modification 1 and Modification 2 assessment reports. The physical works associated with the Aboriginal salvage for Exploratory Works have been undertaken.

4.2.2. Historic Heritage

4.2.2.1. Main Works EIS

A summary of impacts to historic heritage items is provided in Appendix C for each item within 20m of the construction envelope. Heritage items are grouped by the respective Snowy 2.0 Main Works zones in which they occur. The locations of historical items are shown on maps in Appendix G.

4.2.2.2. Exploratory Works EIS

The assessment of harm for the Exploratory Works scope of works was conducted within the Exploratory Works EIS and RTS, Modification 1 and Modification 2 assessment reports. The physical works associated with the implementing historic heritage mitigation measures for Exploratory Works heritage items has commenced.

4.2.3. Natural Heritage

4.2.3.1. Main Works EIS

The EIS Appendix O.1 and O.2 identified the following impacts to natural heritage:

- There are no known geodiversity sites near the proposed works in the Talbingo, Marica, Plateau or Rock Forest areas.
- The road upgrades on Lobs Hole Ravine Road will impact on three known geodiversity features; the Cenozoic Ravine block streams, the Cenozoic Ravine tufa and the Devonian fossil beds. While the proposed works will impact the visible geodiversity features, they will remain largely intact. Access road works adjacent to the block streams and Devonian fossil beds provide an opportunity to enhance the geotourism potential of these features through the establishment of educational signage;
- The road upgrades on Lobs Hole Ravine Road will not impact any of the high value cliff edge tufa within Cave Gully or Lick Hole Gully. Similarly, vibration impacts to tufa deposits outside the existing roadway are expected to be negligible. Three small tufa outcrops within the existing Lobs Hole Ravine Road corridor will be directly impacted by the proposed road upgrades. These impacts are considered to be minor relative to the remaining areas of high value tufa in the vicinity;
- Two sites with geodiversity potential may be impacted in the Tantangara area. These sites are not listed in the KNP POM or Kosciuszko National Park Geodiversity Action Plan (KGAP) but were identified as having some geological values from a comprehensive review of existing literature and mapping. These sites are part of the Kellys Plains Volcanics formation and are the former quarry site at Traces Knob and an outcrop of agglomeratic porphyry.

In addition:

- Potential impact to the sensitive alpine humus soils - bogs and fens landscape features typically found in areas between 1500-1800m has been identified. These landscape features are named in the Australian Alps bioregion characterisation, that underpins the recognition of the Australian Alps as an area of ‘national significance’. The distribution and management of Alpine Sphagnum Bogs and Associated Fens is identified in the Biodiversity Management Plan (S2-FGJV-ENV-PLN-0008) and Groundwater Management Plan (S2-FGJV-ENV-PLN-0012).

4.2.3.2. Exploratory Works EIS

The assessment of harm for the Exploratory Works scope of works was conducted within the Exploratory Works EIS and RTS, Modification 1 and Modification 2 assessment reports. The physical works associated with the implementing natural heritage mitigation measures for Exploratory Works natural heritage items has commenced.

4.3. Environmental Risk Assessment

The environmental aspects and impacts are further considered within Appendix A3 of the EMS. This includes a risk assessment process. The risk assessment is based on (1) the likelihood of an impact occurring as a result of the aspect; and (2) the consequences of the impact if the event occurred.

5. ENVIRONMENTAL MANAGEMENT MEASURES

This section of the plan provides the management measures that will be used to manage and mitigate potential impacts of the project on heritage. This section aims to outline the appropriate actions that will be undertaken for the purposes of managing impacts to Aboriginal heritage, historic heritage and natural heritage to comply with the conditions of Infrastructure Approval.

In this section the following matters are addressed:

- management of known and predicted heritage objects within and in proximity to the disturbance area and construction envelope, including:
  - identifying where further archaeological assessment and salvage excavations are required;
  - identifying where and when unmitigated impacts to heritage can occur;
- the procedures to be followed if any unexpected heritage values, potential undocumented natural heritage values and/or human remains are found during construction;
- design principles to minimise impacts to natural heritage items; and
- the process that will be followed for continuing consultation.

The heritage measures are described in detail below and summarised in Table 5-1.

5.1. General Heritage Management Measures

5.1.1. Heritage outside construction envelope

All known heritage located outside the construction envelope will be protected from direct impact by project boundary delineation and site induction training in relation to heritage. Known heritage items will be marked on sensitive area plans. This includes:

- Aboriginal heritage items, including the rock shelter to the west of the construction envelope at the Tantangara site and a memorial tree identified through consultation south of the Tantangara dam;
- historic heritage items; and
- natural heritage items; including the tufa deposits at Lick Hole Gully and Cave Gully.

5.1.2. Heritage clearance certificate

Prior to undertaking construction works in an area, a heritage clearance certificate will be issued and signed off by heritage specialists. The heritage clearance certificate will be issued by the relevant heritage specialists to certify that heritage mitigation measures have been completed and impacts may proceed.

5.1.3. Unexpected Finds

In the event that any heritage items, or potential/suspected heritage items, are identified during the course of works, works in the immediate vicinity of the find will cease and project heritage specialist and environmental manager will be notified. Works will not recommence in that area until all necessary management measures are implemented, and a heritage clearance certificate is provided by the heritage specialist.

The procedure to be followed for unexpected finds is provided in Appendix E.

5.1.4. Discovery of Human Skeletal Remains

If a burial site or human skeletal material is exposed during works, all relevant procedures for excavation and removal will be undertaken in accordance with the Policy Directive –Exhumation of Human Remains (NSW Department of Health 2008); Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the *Heritage Act 1977* (NSW Heritage Office 1998) and the Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS 1997).

Human skeletal remains must be handled in accordance with the *Public Health Act 1991* (NSW). Management of the remains is to be determined through liaison with the appropriate stakeholders (NSW Police Force, forensic anthropologist, DPIE, Heritage NSW, registered Aboriginal parties, a suitably qualified archaeologist, etc.)

An overview of the procedure for unexpected finds is provided in Appendix E.

5.2. Aboriginal Heritage Management Measures

Management measures for Aboriginal heritage identified in Table 5-1 are discussed below. Detailed tables regarding the management of individual survey units are provided in Appendix A.

5.2.1. Further Investigation

In the Survey Unit, TSU14b, further investigation (test excavation) is required.

Test excavation was not undertaken during the assessment of the RTS (refer to RTS Appendix M Heritage Addendum Report). The test excavation is required in order to determine whether or not impact mitigation such as salvage excavations are required.

Test excavation will be conducted in accordance with Requirement 16a - Test excavations, Requirement 16b – Objects recovered during test excavations and Requirement 17 – When to stop test excavations, as outlined in the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (NSW DECCW 2010a).

The further investigations will need to be conducted as soon as practicable so as to ensure that an appropriate length of time is available to conduct the test excavation and, thereafter, to develop management and mitigation strategies, and implement these prior to construction. The assessment of the significance will be determined by a suitably qualified archaeologist. If archaeological deposits of high significance are found, consultation with DPIE will occur to confirm the management approach. It is noted that if archaeological deposits of moderate or high significance are found, salvage excavations are likely be required before construction.

In addition, if any part of the project is located in a Survey Unit which is not identified in Appendix A or Appendix G, an assessment by a suitably qualified archaeologist will be undertaken before that part of the project proceeds.

5.2.2. Mitigated Impacts to Known Aboriginal Heritage

Mitigated impact would entail salvage excavations in some Survey Units (see HER08 in Table 5-1 and Appendix A). This work shall be undertaken prior to construction works occurring in the specified Survey Unit. The Salvage would be designed to maximise the number of artefacts retrieved in order to conduct meaningful analyses of artefact technology and related factors, so as to provide a higher level of understanding of the nature of Aboriginal use and occupation of the local landscape. The methodology to be implemented is set out in Appendix B.

5.2.3. Unmitigated impact

Unmitigated impact (harm without salvage) to Aboriginal objects can be given consideration when they are assessed to be of low archaeological and cultural significance and otherwise in situations where conservation or limiting the extent of impacts is simply not feasible.

Most Aboriginal object sites identified in the project area have been assessed to be of low or low/moderate archaeological significance. Given the nature of these, and the proposed impacts, unmitigated impacts are considered appropriate.

5.3. Historic Heritage Management Measures

Management measures for historic heritage identified in Table 5-1 are discussed below. Detailed tables regarding the management of individual heritage items are provided in Appendix C.

5.3.1. Post Bushfire Inspections

The extent of impacts on historic heritage items from the recent bushfires in the Snowy Mountains is not yet fully determined. While there are clear examples of items that have been destroyed or damaged (e.g. buildings at Kiandra), it is unclear how many of the historical heritage items documented in this management plan (refer to Appendix C) have been directly affected. Furthermore, it is unclear how many additional items may now be identifiable as the result of the loss of vegetation cover. Nevertheless, it is recognised that the management of historical heritage during Snowy 2.0 Main Works will need to address everything from documenting heritage damage from the fires through to implementing appropriate management strategies for newly identified items.

The strategies outlined below have been developed on the basis of observations made during preliminary post-bushfire site inspections conducted by Excavation Director, Dr Rebecca Parkes on 13 March 2020, together with Dr Parkes' experiences in other similar post-bushfire surveys (e.g. at Kiandra following the 2003 bushfires in the Snowy Mountains and in the Blue Mountains in April 2020):

- review of site/item condition, extent and composition as a matter of priority for the purposes of confirming and mapping fencing requirements and updating management actions where necessary;
- use the exercise of site review as an opportunity to undertake base level archival recording of items where possible (e.g. moveable heritage and/or locations of any destroyed items) as well as broad level landscape archival recording, and identify any additional items and/or areas of sensitivity that may require further investigation; and
- update management plan tables and mapping as required.

5.3.2. Exclusion zones

Exclusion zones shall be installed:

- around the Washington Hotel ruin (R20) with a minimum 20m avoidance buffer;
- around the cadastral boundary of the Ravine town cemetery (R118); and
- for historical heritage items inside the disturbance area that require salvage or archival recording. Flagging will remain in place until such time as the relevant mitigation measures have been implemented and heritage clearance certificate issued. In the event that salvage works are only to be conducted across a portion of the site, and other sections are to be conserved, the relevant no-go areas will be flagged upon completion of salvage works and remain in place.

All construction plans will be marked with relevant heritage no-go areas and all contractors working in those areas will be informed of the no-go areas through inductions, toolbox talks and pre-start meetings.

5.3.3. Vegetation Clearance

Where vegetation clearance is proposed at:

- Lobs Hole within 100m of the former alignment of Struggle Street and / or within 30m of an identified Lobs Hole heritage item (locations identified in Appendix G); or
- within 30m of the location of a heritage item that requires further management (i.e. archival recording); then

the following vegetation clearance measures must be implemented:

- be undertaken under the supervision of a project archaeologist;
- be undertaken by cutting the plant at the base where it meets the ground surface;
- not involve removal by pulling roots out of the soil;
- can be undertaken through chemical spraying of exotic species; and
- not disturb the ground surface.

5.3.4. Ground Disturbance

Where ground disturbance is undertaken within 20m of an item with identified archaeological potential, clearance of the topsoil will be monitored/supervised by a qualified archaeologist. In the event that any heritage items, or suspected heritage items, are identified during such ground disturbance works, the item will then be handled in accordance with the procedures for unexpected finds.

5.3.5. Archival Recording

Archival recording will be conducted for specified heritage items identified in Appendix C.

Archival recording will be conducted in accordance with the *Photographic recording of heritage items using film or digital capture* (Heritage Branch 2006) and *How to prepare archival records of heritage items* (Heritage Branch 1998) guidelines.

Archival recording will comprise the use of a range of different survey and photography methods that will be tailored to the nature, scale and type of item/site, complex or place. The full suite of recording methods and rationale for their application is detailed in Appendix D.

5.3.6. Archaeological Research Design

The historical archaeological research design for Snowy 2.0 Main Works includes consideration of the respective contributions from both the survey components that will be undertaken as part of the archival recording program, and the investigations that will be conducted through test and salvage excavations. The archaeological research design is presented in full at Appendix D. The following is an overview of key components of the research design.

The aims of the historical heritage management program are to:

- minimise the potential loss of information associated with direct impacts to the fabric of heritage items and their associated archaeological deposits and/or setting;
- offset the loss of both tangible and intangible heritage values through archiving as much information as possible in relation to the various geographic areas, themes, site types, features

and objects/artefacts that relate to the history of human use and interaction with the alpine environment of the Snowy Mountains; and

- physical conservation of:
  - items, complexes and landscapes of cultural heritage significance; and
  - artefact assemblages and individual items of moveable heritage.

These aims are accompanied by a series of broad objectives that underpin the research design for the project. The key objectives are:

- to implement best practice recording and documentation at all levels (i.e. archival recording, salvage of moveable heritage, archaeological excavations, post excavation analysis and subsequent reporting and publication of results) of the historical heritage management program;
- integration of results from all levels of the historical heritage management program to maximise the potential to address research questions; and
- compare the results of the historical heritage management program with:
  - evidence available in relevant histories, both oral and documentary; and
  - comparable site, complexes and cultural landscapes across NSW and Australia as a whole.

Given that there will be a significant cumulative increase in heritage impacts resulting from Snowy 2.0 Main Works, it is important to ensure that the results of the associated archaeological investigations can be compared and contrasted with previous investigations, in particular the results from:

- Snowy 2.0 Early Works and other development related heritage management investigations across the Alps;
- regional historical archaeology research investigations (e.g. postgraduate research projects and ANU field schools at Kiandra); and
- comparative examples of both development related and research led investigations at similar sites and complexes across NSW and Australia as a whole.

Referring back to the KNP POM (2006), which identifies the key cultural heritage values of KNP (Table 2-5) and also outlines a register of required research for cultural heritage, it is clear that there are a number of topics and themes that the research design for this project should aim to address. It is incumbent upon this project to address, where possible, the following:

- adequate research and documentation of relevant oral histories relating to places and themes impacted by the project as well as associated people, flora and fauna.
- the relationship between oral histories and the history that is physically evidenced within and around the construction envelope;
- associations between the places investigated and places across the broader region, NSW and Australia as a whole;
- identification of evidence for historic routes and connections between these routes and the sites/places being investigated;
- adequate recording, documentation and investigation of clusters of cultural heritage items, particularly where such clusters form an identified heritage precinct (e.g. Lobs Hole) or part thereof and/or where those clusters are directly impacted by the project;
- conclusions and inferences that will inform better decision making for future management of conserved items, assemblages, places and landscapes.

Additional details of the research design, including a full list of research questions, are provided at Appendix D.

5.3.7. Archaeological Excavation

Archaeological excavation (test/salvage excavation) will be conducted for specified heritage items identified in Appendix C.

Archaeological excavation has principally been recommended at features interpreted as being directly associated with habitation (e.g. dwelling sites and associated pits) and at select mine workings (specifically water races). The potential value in archaeological investigation of subsurface deposits at other sites will be reviewed as part of the pre-clearance inspections.

Archaeological excavation will only be conducted within the disturbance area. Regardless of the site type or significance, excavation will be preceded by detailed archival recording of surface features. Vegetation clearance may also be undertaken where necessary to assist with site access and/or archival recording.

Given that test excavation has not previously been conducted at any of the sites, the nature and extent of archaeological deposits at each site is yet to be determined. As such, excavation will initially aim to establish the nature and extent of the archaeological resource. This may involve one or more of the following:

- clean up by hand of vegetation and/or overburden around suspected in situ features (e.g. stone or brickwork);
- mechanical stripping of topsoil and/or surface vegetation to remove overburden/confirm site extent/identify potential features; and/or
- excavation of a trench/sondage by machine or hand to expose a representative sample of the archaeological resource within the site.

Following recording and review of the features and deposits revealed by the above preliminary steps, a decision will be made regarding whether or not to continue excavation. Typically, excavation will continue where deposits/relics at the site display potential to address one or more of the research questions identified in Appendix D.

The methods implemented for any subsequent phases of excavation will depend upon the nature of the site being investigated, particularly the:

- integrity of archaeological deposits;
- heritage significance of the item/complex (NB heritage significance will be reviewed throughout the excavation process and may change from what is documented in the EIS); and
- the types of research questions that might be addressed through investigation of the site.

Typically, mechanical excavation will be implemented for the purposes of removing fill, overburden and disturbed deposits, or in order to undertake sondages across portions of the site. Hand excavation will be implemented where relatively intact occupation deposits are encountered, and/or where the use of a machine would potentially damage unexcavated components of the site.

All excavation contexts will be cleaned up by hand and photographed and recorded in detail before excavation continues into the next context. An in-field context log, context plan and Harris Matrix will be maintained for each site and updated accordingly as new contexts are identified and/or excavated.

As identified by the archaeologist, excavation will cease where the following criteria are met by the:

- the relevant research questions have been answered, or sufficient information has been collected to address those questions (i.e. a representative sample of features/artefacts);

- sterile deposits are encountered;
- the horizontal and vertical extent of features at the item/complex have been established; and/or
- the limits of anticipated impacts have been reached.

The final phase of excavation at any given item/complex will include the following:

- archival recording of excavated features;
- survey of final levels across the site;
- cross checks that all relics across the area of impacts have been investigated; and
- cross checks that all records are complete and correctly cross-referenced.

5.3.8. Salvage (Moveable heritage)

Salvage moveable heritage will be conducted for specified heritage items identified in Appendix C.

The original locations, context and condition of all items of moveable heritage will be recorded by the project archaeologist. All items of moveable heritage within areas of proposed works will be photographed in situ in accordance with standard procedures for archival recording. Each item of moveable heritage will be assigned a unique identifier code; a Tyvek/metal label with that code will be either tied to the item (e.g. for larger items that cannot be bagged) or placed in a suitable bag/box with the item. The item will then be transported to a Snowy Hydro temporary storage location for the duration of works. Upon completion of construction works, the item will be either:

- returned to its original location;
- returned to an alternate location within the project area (e.g. in instances where the original location is not viable/suitable); or
- incorporated into a curated collection/display managed by Snowy Hydro or NSW National Parks and Wildlife Service.

All items returned to the project area will again be photographed in situ upon their return, in accordance with standard procedures for archival recording and their tag/bag removed. Updates to their location, context and condition will be completed by the project archaeologist.

5.3.9. Unmitigated Impact

In some instances, no impact mitigation is required. Unmitigated impact (harm without management measure) to historic heritage is proposed in accordance with the Main Works EIS / RTS historic heritage assessment. These items have generally been assessed as having a negligible or little level of contributory heritage significance. A list of items where unmitigated impact can occur is provided in Appendix C.

5.4. Natural Heritage Management Measures

The specific management measures for natural heritage identified in Table 5-1 are discussed below.

5.4.1. Ravine Block Streams

Sections of Lobs Hole Ravine Road works intersect with block streams.

Prior to disturbing the block streams impacted on Lobs Hole Ravine Road for upgrade works detailed mapping of the block stream extents and morphology and a detailed archival record of the block streams will be undertaken.

The works to the block streams approved in Consolidated Exploratory Works approval for MOD 1, are the full extent of the works to the block streams. Detailed plans for upgrades to Lobs Hole Ravine road within block streams were submitted to DPIE on 24 January 2020, following consultation with NPWS.

The works will implement the Wide Cut Design Option (as per Exploratory Works CoA 37A) for any excavation required on the upside slope side into the block streams for upgrading Lobs Hole Ravine Road and have been designed (as per Exploratory Works CoA 37A) to:

- avoid impacts on the downslope section of block streams;
- minimise the extent of excavation into the upslope block streams;
- minimise moving or damaging blocks in areas beyond the excavation zone;
- ensure the remaining sections of the boulder streams are safe and stable, using stabilisation measures that would maintain the landscape values of the streams to the greatest extent practicable and maximise their visibility for future viewing;
- minimise the use of outside materials onto the block streams (such as soil or fill); and
- include suitable drainage controls to ensure water flow through the upslope block streams are not impeded.

Rocks and boulders that are removed from the block streams during the road widening works should be stockpiled separately from other surplus soil and rubble to enable their potential use at a later date by NPWS in off-site interpretations (e.g., displays at visitor information centres) or in the construction of park infrastructure as a feature, rather than being disposed of as land fill or in reservoirs.

During construction on the block streams, a program to monitor the implementation of the detailed plans and undertake corrective action (if necessary) to maintain the stability of block streams will be undertaken. Monitoring of the Ravine block streams will occur in accordance with Section 6.1.

5.4.2. Ravine tufa deposits

Sections of road works will impact directly on roadside tufa (Tufa A, Tufa B East and West) and could impact indirectly on cliff-edge tufa (Tufa C to Tufa K). The following design and construction principles have been considered to limit impacts and maintain integrity of the features as much as possible:

- limit direct impacts on roadside tufa features where possible, in particular those that display notable intact natural structures;
- limit vibration impacts on roadside tufa features where possible,
- maintain drainage in as natural state as possible where the road crosses tufa-lined gullies;
- implement water and sediment controls in accordance with the Surface Water Management Plan (S2-FGJV-ENV-PLN-0011) during roadworks within the upper Lick Hole Gully and Cave Gully catchments to avoid downstream release of unnatural water or sediment loads; and
- minimise vegetation clearing in accordance with Biodiversity Management Plan (S2-FGJV-ENV-PLN-0008) within the upper Lick Hole Gully and Cave Gully catchments

Monitoring of the Ravine tufa deposits will continue on from monitoring undertaken to date as part of exploratory works in accordance with Section 6.1.

5.4.3. Lick Hole Formation fossil beds

A section of road works on Lobs Hole Ravine Road will remove weathered face of cuttings containing fossils. The following design and construction principles have been considered to limit impacts and maintain integrity of the features as much as possible:

- minimise the road footprint through the fossil bed sections as far as practicable;
- utilise construction techniques which avoid or minimise impacts outside the road footprint in fossil bed sections;
- minimise vegetation clearing in accordance with Biodiversity Management Plan (S2-FGJV-ENV-PLN-0008) associated with roadworks in the fossil site sections;
- limit excavation into the fossil sites to the minimum required for road safety;
- avoid covering the upslope fossil sites with shotcrete or other materials that would permanently preclude viewing of the sites; and
- consider the visual impact of the road upgrade in the fossil beds sections and implement road design that will maintain landscape values.

The final road design will incorporate interpretive signage and safe stopping space within the proposed road and disturbance footprint where practical to benefit safety, research and public education about the site.

5.4.4. Kelly's Plains Volcanics – former Traces Quarry site

The disused Traces Knob quarry could potentially be directly impacted by construction works on Quarry Trail and near the Tantangara accommodation camp. The following measures will be implemented to prevent infilling:

- the area will be marked on sensitive area maps and included in work packs;
- no go fencing, flagging or makers will be installed;
- site induction with elements related to historic heritage management (Section 6.2); and
- targeted training in the form of toolbox talks or pre-start briefs will be conducted.

5.4.5. Kelly's Plains Volcanics – agglomerate porphyry unit

Agglomeratic porphyry outcrops are exposed on the western shore of Tantangara Reservoir due east of the confluence of Nungar Creek with the reservoir. The outcrops are adjacent to (and northwest and southwest of) the Tantangara excavated rock emplacement area.

Prior to construction, the geoheritage specialist will identify the outcrops and ensure that the best examples are not covered by the excavated rock emplacement. Following identification, the following measures will be implemented:

- the identified best examples shall be marked on sensitive area maps and included in work packs;
- no go fencing, flagging or markers will be installed as required at the location of best examples;
- site induction with elements related to historic heritage management (Section 6.2); and
- targeted training in the form of toolbox talks or pre-start briefs

5.4.6. Unexpected Finds – Natural Heritage

Unexpected heritage finds will be managed in accordance with Appendix E.

Two areas of higher probability of undercovering natural heritage in particular will be highlighted within construction work packs, pre-starts and / or inductions:

- Tantangara Road, leading from the Snowy Mountains Highway north to Tantangara Dam may reveal well preserved graptolites on bedding planes in black shale; and
- Marica Road and Marica Road West, providing access from the Snowy Mountains Highway west to Lobs Hole, and Lobs Hole Road leading to Talbingo portal may potentially reveal fresh exposures of rock.

Following construction of Tantangara Road and Marica Road, a geologist will investigate:

- any new exposures in cuttings made during the Marica road upgrade, with emphasis on finding fossils that would assist in age determination of the rock units; and
- new exposures of black shale along Tantangara Road for graptolite fossils.

Details of this monitoring is identified in Section 6.1.

Table 5-1: Heritage management measures

ID	Measure / Requirement	When to implement	Responsibility*	Source document
General				
HER01	Training will be provided to all project personnel, including relevant sub-contractors on heritage requirements from this HMP through inductions, toolboxes and targeted training. Training will describe the heritage values of the project area and the procedures to be followed in the event of the discovery of features, artefacts or bones (potential human remains), as well as procedures in the event of an incident (i.e. damage to a heritage item or geodiversity feature). Training will include details of the likely presence of unrecorded historical heritage (due to thick vegetation cover), historical unmarked graves and potential natural heritage along Tantangara Road, Marica Road and Marica Road West. Training will include reference to the protection of heritage located within and outside of the approved disturbance areas.	Pre-construction and construction	Contractor – EM, EC	MW CoA 35 EW CoA 15, 20(f)
HER02	All known heritage located outside the construction envelope will be protected from direct impact by project boundary delineation and site induction training in relation to heritage. Known heritage items will be marked on sensitive area plans.	Pre-construction and construction	Contractor – All	MW CoA 33, CoA 35 EW CoA 11, 14(d), 16(a)
HER03	The Unexpected Finds Procedure included within Appendix E will be followed in the event that any items of potential Aboriginal, historic, archaeological or natural (geodiversity) significance including human remains are discovered during construction.	Pre-construction and construction	Contractor – All	MW CoA 35 EW CoA 14(d), 20(f), 20(e) MW REMM HER01 MW REMM HER02 MW REMM GE06 EW REMM HER01
HER04	Impacts to ground surfaces should be kept to an absolute minimum, where feasible and reasonable	Pre-construction and construction	Contractor – DM, CM, S, SS	EW REMM HER02

ID	Measure / Requirement	When to implement	Responsibility*	Source document
Aboriginal Heritage				
HER05	A riparian exclusion zone adjacent to the Yarrangobilly River measuring 50 m wide (except for nominated river and creek crossings and areas approved as part of the Snowy2.0 Main Works Approval) will be established and appropriately demarcated prior to construction. The exclusion zone will be: • designated as an exclusion zone and identified on the Sensitive Area Plans; and • marked in the field with temporary barriers and signage denoting a “no-go” area.	Pre-construction and construction	Contractor – CM, EM, EC, S, SS	EW REMM HER01
HER06	If any part of the project is located in a survey area which is not identified in Appendix A of the HMP an assessment by a suitably qualified archaeologist will be undertaken before that part of the project proceeds.	Pre-construction and construction	Contractor – DM, CM, EM	MW REMM HER01
HER07	Further investigation (i.e. test excavation) is to be undertaken in Survey Unit TSU14b prior to construction activities in that Survey Unit. Test excavation shall be conducted in accordance with Requirement 16a - Test excavations, Requirement 16b – Objects recovered during test excavations and Requirement 17 – When to stop test excavations, as outlined in the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (NSW DECCW 2010a). The assessment of the significance will be determined by a suitably qualified archaeologist. If archaeological deposits of high significance are found, consultation with DPIE will occur to confirm the management approach. It is noted that if archaeological deposits of moderate or high significance are found, salvage excavations are likely be required before construction *Note: if archaeological deposits of moderate or high significance are found, salvage excavations would be required in accordance with salvage methodology included in Appendix A.*	Pre-construction	Snowy Hydro	MW REMM HER02
HER08	Salvage excavations are to be undertaken in the following Survey Units if in the disturbance area: • RSU2,RU5, RSU6, RSU7, RSU10, RSU12, RSU29 • MSU2, MSU4 • TSU2, TSU3, TSU4, TSU11, TSU14, TSU15 • CCSU17 Salvage excavations will be undertaken in accordance with the salvage methodology included in Appendix B.	Pre-construction**	Snowy Hydro	MW CoA 34(a) MW REMM HER02
HER09	The salvage excavation methodology within Appendix B includes both hand and mechanical excavation processes with supervision provided by an archaeologist. Prior to commencement of mechanical excavation, DPIE will be advised of the intent to commence this process. DPIE, NPWS and Heritage NSW will be invited to attend site during the mechanical excavation works. During the works an early progress report will be prepared in writing detailing the outcomes of this approach. The early progress report will be issued within one month of the commencement of mechanical excavation.	Pre-construction and construction	Snowy Hydro	DPIE comments

ID	Measure / Requirement	When to implement	Responsibility*	Source document
Historic Heritage				
HER10	Future Generation will consult with the Surveyor General to determine appropriate approval and management pathways for the removal of trigonometrical markers adjacent to existing roadways impacted by the Main Works project.	Pre-construction and construction	Contractor – EM	Identified in Main Works RTS
HER11	Exclusion zones will be installed: • around the Washington Hotel ruin (R20) with a minimum 20m avoidance buffer; • around the cadastral boundary of the Ravine town cemetery (R118); and • for heritage items inside the disturbance area that require salvage or archival recording. Flagging will remain in place until such time as the relevant mitigation measures have been implemented and heritage clearance certificate issued.	Pre-construction and construction	Contractor – CM, S, EM, EC	MW CoA 33(d) MW REMM HER04 EW REMM HER03
HER12	The historic heritage management measures identified in Appendix C for individual heritage items shall be implemented. Note; historic heritage management measures descriptions are discussed in Section 5.3 of this Plan.	Pre-construction**	Snowy Hydro	MW CoA 34(b) MW CoA 35 MW REMM HER04
HER13	All archival recording will be undertaken in accordance with the guideline *How to Prepare Archival Recording of Heritage* Items (Heritage Branch 1998) and *Photographic recording of heritage items using film or digital capture* (Heritage Branch 2006).	Pre-construction**	Snowy Hydro	MW REMM HER03 MW REMM HER04
HER14	Salvage excavation and/or systematic collection of artefacts which are required to undergo salvage excavation will be undertaken in accordance with the archaeological research design in Appendix D.	Pre-construction**	Snowy Hydro	MW CoA 34(b) MW CoA 35 MW REMM HER03 MW REMM HER04
HER15	The location of at least 16 graves of people listed as buried at Lobs Hole is unknown. Unexpected find of skeletal remains will be managed in accordance with Appendix E.	Pre-construction and construction	Contractor – All	MW REMM HER04 EW REMM HER03
HER16	Vegetation clearing will be supervised and monitored by the project archaeologist at Lobs Hole within 100m of the former alignment of Struggle Street and / or within 30m of an identified heritage item. If required, salvage excavations and/or archival recording shall be undertaken for any heritage items identified. Any archival recording and/or excavations will be undertaken in accordance with Appendix D.	Pre-construction and construction	Snowy Hydro	MW REMM HER03 MW REMM HER04
HER17	A detailed archival record of the history of settlement and mining in the lobs hole ravine area will be provided to Snowy Hydro, Department of Planning, Industry and Environment (DPIE), NPWS and Heritage NSW within two years of completion of the salvage	Post-construction	Snowy Hydro	MW CoA 34(c) MW REMM HER04

ID	Measure / Requirement	When to implement	Responsibility*	Source document
Natural Heritage				
HER18	Natural heritage monitoring will be undertaken in accordance with Section 6.1.	Pre-construction and construction	Contractor – CM, EM, EC	MW CoA 33(3) MW CoA 34(d)
HER19	Design principles will be implemented to minimise impacts to the Ravine block streams in accordance with Exploratory Works condition 37 and condition 37A.	Pre-construction and construction	Snowy Hydro	MW CoA 34 (d) MW REMM GE01 EW CoA 37, EW CoA 37(a)
HER20	Prior to disturbing the block streams impacted on Lobs Hole Ravine Road for upgrade works detailed mapping of the block stream extents and morphology and a detailed archival record of the block streams will be undertaken.	Pre-construction and construction	Snowy Hydro	EW CoA 19(c) EW CoA 20(e)
HER21	Rocks and boulders that are removed from the block streams during the road widening works should be stockpiled separately from other surplus soil and rubble to enable their potential use at a later date by NPWS in off-site interpretations (e.g., displays at visitor information centres) or in the construction of park infrastructure as a feature, rather than being disposed of as land fill or in reservoirs.	Construction	Snowy Hydro	DAWE consultation
HER22	Where practicable and in consultation with NPWS, educational signage should be provided in a nearby suitably widened area to provide information on the periglacial rock stream geoheritage features.	Post construction	Snowy Hydro	EW CoA 20(g) EW REMM GEO01 EW REMM GEO2
HER23	Design principles will be implemented to minimise impacts to the Ravine tufa deposits during construction.	Pre-construction and construction	Contractor – DM Snowy Hydro	MW CoA 33 (e) MW REMM GE02
HER24	Design principles will be implemented to minimise impacts to the Lick Hole Formation fossil sites during construction.	Pre-construction and construction	Contractor – DM Snowy Hydro	MW CoA 34 (d) MW REMM GE03
HER25	For the fossiliferous rock, a representative excavated spoil is to be preserved off site so that palaeontologists (from educational research bodies and institutions such as: Geoscience Australia in Canberra, ANU also in Canberra, the Geological Survey of NSW based in Sydney and Maitland, and the Australian Museum in Sydney) could look through the fresh material and collect fossil specimens for scientific research and curation in their respective collections. The methodology for engaging these institutions will be via letter informing them of the availability of the material from the Project. In case of no uptake from these letters, Snowy Hydro, in consultation with NPWS, will store the excavated material in a suitable container for 1 year after excavation to be made available for any institutions or research bodies or Agencies if required.	Pre-construction and construction	Snowy Hydro	EW CoA 19 (b) EW CoA 19 (e) EW REMM GEO2

ID	Measure / Requirement	When to implement	Responsibility*	Source document
Natural Heritage (continued)				
HER26	The following measures will be implemented to prevent infilling on the former Traces Quarry site: • the area will be marked on sensitive area maps and included in work packs; • no go fencing, flagging or makers will be installed; • site induction with elements related to historic heritage management; and • targeted training in the form of toolbox talks or pre-start briefs will be conducted.	Pre-construction and construction	Contractor – CM, S, EM, EC	MW REMM GE04
HER27	Prior to construction, the geoheritage specialist will identify the agglomeratic porphyry outcrops and ensure that the best examples are not covered by the excavated rock emplacement. Following identification, the following measures will be implemented: • the identified best examples shall be marked on sensitive area maps and included in work packs; • no go fencing, flagging or markers will be installed at the location of best examples; • site induction with elements related to historic heritage management; and • targeted training in the form of toolbox talks or pre-start briefs.	Pre-construction and construction	Contractor – EM, EC	MW REMM GE05

** Responsibility* — *Regardless of the allocation of responsibilities within this Plan, the responsible party is to be assigned in accordance with the Contract*

***When to implement* — *May be undertaken during construction in event the refinement of the detailed design identifies disturbance in survey unit not previously disturbed*

Responsibility abbreviations — *CM – Construction Manager, DM – Design Manager, EM – Environmental Manager, EC – Environmental Coordinator, S – Superintendent, SS – Supervisor, All – All personnel including subcontractors*

6. COMPLIANCE MANAGEMENT

6.1. Monitoring and Inspection

Weekly environmental inspections of the project will occur in accordance with Section 8 of the EMS. The inspections will review the heritage located in each area in which works are scheduled to occur, are occurring and have occurred, in order to ensure that appropriate management and mitigation strategies are implemented, in accordance with this HMP.

Once heritage salvage works are completed, weekly environmental inspections would focus on the protection of items retained and protected in situ. A suitably qualified heritage expert would then be required only in the instance of an unexpected find on site.

The natural heritage monitoring program is provided in Table 6-1.

Table 6-1: Natural heritage monitoring program

Activity	Geodiversity Feature	Frequency	Responsibility	Source
Rapid condition assessment	Ravine block streams	Prior to Main Works construction, then annually	Project geoheritage specialist	Main Works EIS Appendix O.2 (Cenozoic Geodiversity Assessment) – Table 5.1 (ID GEO2)
	Ravine tufa, including cliff edge tufa deposits (i.e. Lick Hole Gully and Cave Gully)	Prior to Main Works construction, then annually	Project geoheritage specialist	Main Works EIS Appendix O.2 (Cenozoic Geodiversity Assessment) – Table 5.1 (ID GEO4)
Geologist inspection	Fossils in new exposures of cuttings made during construction of Marica Road	Following construction and commissioning of Marica Road	Project geoheritage specialist	Main Works EIS Appendix O.1 (Palaeozoic Geodiversity Assessment) – Table 4.1
	Graptolite fossils in exposures of black shale made during construction of Tantangara Road	Following construction and commissioning of Tantangara Road	Project geoheritage specialist	Main Works EIS Appendix O.1 (Palaeozoic Geodiversity Assessment) – Table 4.1
	Tantangara Formation (Chert outcrop B)	Prior to construction in Tantangara if Chert outcrop B is identified to be within disturbance area.	Project geoheritage specialist	Main Works EIS Appendix O.1 (Palaeozoic Geodiversity Assessment) – Table 4.1
	Best examples of agglomeratic porphyry (Tantangara excavated rock emplacement area)	Prior to construction.	Project geoheritage specialist	Main Works EIS Appendix O.1 (Palaeozoic Geodiversity Assessment) – Table 4.1

Activity	Geodiversity Feature	Frequency	Responsibility	Source
Environmental site inspection	Disused Traces Knob quarry	Routinely during environmental inspections	Contractors Environmental Site Representative	Main Works EIS Appendix O.1 (Palaeozoic Geodiversity Assessment) – Table 4.1

Monitoring of Ravine block streams and Ravine tufa deposits will continue on from monitoring undertaken to date as part of exploratory works.

Annual monitoring of Ravine block streams will include observations of structure extents, integrity and aesthetics. Annual monitoring of Ravine tufa deposits will include observations of water flow, vegetation/ tufa interactions and evidence for recent tufa depositional activity and alluvial sedimentation on tufa deposits. Due to access and safety concerns, this monitoring may be undertaken with the use of a drone or other form of remote monitoring methodology.

Subsequent monitoring events will compare the observations made during prior to disturbance. The results will be used to identify potential or actual problems arising from construction processes. Where monitoring results are outside of the expected range, the process described in Section 8.2.2. of the EMS will be implemented, that is:

- the results will be analysed by the Future Generation Environmental Manager or Environmental Coordinator in consultation with the heritage specialist with the view of determining possible causes for the exceedance including a review of the potential construction activities impacting that site of the exceedance;
- a site inspection will be undertaken;
- relevant personnel will be contacted and advised of the problem;
- an agreed action will be identified; or
- action will be implemented to rectify the problem.

Any exceedances which may result in a non-compliance of the conditions, will be reported as required within Section 8.4 and 8.5 of the EMS.

6.2. Training

All site personnel will undergo site induction training in relation to Aboriginal heritage, historic heritage and natural heritage. The induction training will be developed by Future Generation with inputs from heritage specialists, to address elements including but not limited to:

- existence and requirements of this HNHMP;
- relevant legislation;
- the heritage environment in which the project is located;
- the management and mitigation of impacts to heritage;
- the unexpected finds procedures;
- roles and responsibilities for heritage management: and
- procedures in the event of an incident.

Targeted training in the form of toolbox talks or pre-start briefs will also be provided to personnel with a key role in construction activities which may impact on heritage features.

Further details regarding the staff induction and training are outlined in Section 5 of the EMS.

6.3. Incidents

Incidents will be managed in accordance with Section 7 of the EMS.

The Secretary and other relevant agencies will be notified of incidents as detailed within Section 7.2 of the EMS.

6.4. Auditing

Audits will be undertaken to assess the effectiveness of the management measures and overall compliance with this HMP. Audit requirements are detailed in Section 8.3 of the EMS.

6.5. Reporting

6.5.1. Compliance Reporting

Reporting requirements and responsibilities are documented in the Section 9.4 of the EMS.

6.5.2. Aboriginal Heritage Salvage

A combined Aboriginal heritage salvage report for Exploratory Works and Main Works will be produced to accompany the curated material obtained during Aboriginal heritage salvage works. The single salvage report is proposed due to synergies between the Exploratory Works and Main Works salvage and artefact analysis. The salvage report will be provided to DPIE, Heritage NSW and RAPs within twelve (12) months of the Main Works salvage and artefact analysis being completed. To provide progressive information to agencies an Interim Report will be provided outlining the status of salvage works undertaken to date and immediate findings from Exploratory Works. The Interim Report will be provided within 12 months of completion of Exploratory Works salvage.

6.5.3. Lobs Hole Ravine Area Archival Record

A detailed archival record of the history of settlement and mining in the lobs hole ravine area will be provided to Snowy Hydro, Department of Planning, Industry and Environment (DPIE), NPWS and Heritage NSW within two years of completion of the salvage.

6.5.4. Historic Archaeological Reporting

An excavation report for exploratory works will be provided by Snowy Hydro in electronic and hard copy to NSW Heritage Office, DPIE, NPWS and local libraries within one year of completion of exploratory works or will be combined for consistency with the Main Works historic heritage archaeological report (see below).

A detailed historic heritage archaeological report for Main Works will be compiled that includes the specific management actions and methodologies applied to each historic site, results of any additional research, as well as all archival recording, vegetation clearance monitoring, unexpected finds, test excavations, salvage excavations and interpretation plans. It will include detailed mapping for all sites comprising relevant plans, sections and elevations, together with an archival photography plan and photographic inventory for each archival record. Analysis of all excavated finds will be documented, including full catalogues, intra-site analysis and comparative analyses between sites. The analysis will address the identified research questions from the Archaeological Research Design (Appendix D).

Copies of the historic heritage archaeological excavation report will be provided to Snowy Hydro, Department of Planning, Industry and Environment (DPIE), NPWS, and Heritage NSW and to local libraries.

6.5.5. Public Interpretation

Snowy Hydro will prepare an interpretation plan in consultation with the National Parks and Wildlife Service, Heritage NSW and the Department of Planning and Environment.

The main purpose public interpretation is to inform the visiting public about the rich cultural history of the Snowy Mountains and Lobs Hole Ravine. An interpretive display can also be developed for online access and information about the heritage management activities can be provided as updates on the Snowy Hydro website as works progress.

The interpretive plan would be prepared within one year of completion of the Snowy 2.0 project.

6.5.6. Public Publishment of Heritage

Detailed archival recordings and the findings of any scientific research, excavation and salvage works undertaken as part of this Heritage Management plan will be published within one year of construction being completed.

APPENDIX A – INDIVIDUAL ABORIGINAL HERITAGE MANAGEMENT MEASURES

Aboriginal heritage management measures for each heritage Survey Unit

The assessment of harm was conducted within the Main Works EIS and RTS.

Table A 1 to Table A 13 summarise the type and degree of harm assessed for the Survey Units located within and in proximity to the construction envelope. It is noted that not all areas within Survey Units would be impacted during the activity, and accordingly, impacts will be partial rather than comprehensive. It is noted that in particular, a riparian exclusion zone of 50 m in width adjacent to the Yarrangobilly River, will result in a conservation outcome of any Aboriginal object incidence within that zone.

The location of all Survey Units and Aboriginal object locales recorded are shown in Appendix G.

Table A 1: Aboriginal heritage management measures for each heritage Survey Unit at Talbingo

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TMSU26	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	Unmitigated impact	No
TMSU27	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	Unmitigated impact	No

Table A 2: Aboriginal heritage management measures for each heritage Survey Unit at Lobs Hole Ravine

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
RSU1	Nil recorded	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU2	Nil recorded	Potentially moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes
RSU3	AHIMS #56-6-0009 RSU3/L1 RSU3/L2 RSU3/L3 Test Transect 1 – 4	Low/moderate local significance	Exploratory Works - direct	Partial	Unmitigated impact	No
RSU4	AHIMS #56-6-0045 RSU4/L1 RSU4/L2	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU5	RSU5/L1 RSU5/L2 Test Transect 1 - 5	Moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes
RSU6	RSU6/L1 RSU6/L2 RSU6/L3 RSU6/L4 Test Transect 1 and 2	Moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes. This survey unit was partially salvaged during EW mitigation measures. If no additional impacts are proposed, salvage would not be required.

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
RSU7	Nil recorded	Potentially moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes. This survey unit was partially salvaged during EW mitigation measures. If no additional impacts are proposed, salvage would not be required.
RSU8	AHIMS #56-6-0043 Test Transect 1 – 4	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU9	Nil recorded	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU10	RSU10/L1 RSU10/L2 RSU10/L3 Test Transect 1 and 2	Moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes. This survey unit was partially salvaged during EW mitigation measures. If no additional impacts are proposed, salvage would not be required.
RSU11	AHIMS #56-6-0041 AHIMS #56-6-0047 RSU11/L1 RSU11/L2 RSU11/L3 Test Transect 1 – 3	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU12	AHIMS #56-6-0042 AHIMS #56-6-0046 Test Transect 1 - 8	Moderate local significance	Exploratory Works - direct Main Works - direct	Partial	Salvage excavation	Yes
RSU13	RSU13/L1 RSU13/L2	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU14	Nil recorded	Low local significance	Main Works - direct	Partial	Unmitigated impact	No
RSU15	Nil recorded	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU16	RSU16/L1 RSU16/L2 RSU16/L3 RSU16/L4	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
RSU17	RSU17/L1	Low local significance	Main Works - direct	Partial	Unmitigated impact	No
RSU18	RSU18/L1	Low local significance	Main Works - direct	Partial	Unmitigated impact	No
RSU19	Nil recorded	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU20	RSU20/L1 RSU20/L2 RSU20/L3 RSU20/L4 RSU20/L5 RSU20/L6 RSU20/L7 RSU20/L8 RSU20/L9 RSU20/L10 RSU20/L12 RSU20/L12	Low local significance	Main Works - direct	Partial	Unmitigated impact	No
RSU21	Nil recorded	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU22	RSU22/L1 RSU22/L2 RSU22/L3	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU23	RSU23/L1 RSU23/L2 RSU23/L3	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU24	RSU24/L1	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU25	AHIMS #56-6-0038 AHIMS #56-6-0039 AHIMS #56-6-0040	Low local significance	Exploratory Works - direct Main Works - direct	Partial	Unmitigated impact	No
RSU26	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	Nil	No
RSU27	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
RSU28	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU29	RSU29/L1	Survey Unit generally of negligible significance	Main Works - direct	Not all of SU would be impacted	Mitigated Impact: salvage hatchet head	Yes
RSU30	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU31	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU32	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU33	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU34	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU35	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU36	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU37	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU38	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU38b	Nil	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU39	RSU39/L2 RSU39/L1	Survey Unit generally of negligible significance with the exception of certain micro topographies which may potentially be of low/moderate local significance	Main Works - direct	Partial	Unmitigated impact	No
RSU40	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU40b	Nil	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU41	Nil recorded	Survey Unit generally of negligible significance	Main Works - direct	Partial	Unmitigated impact	No
RSU42	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No
RSU43	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No
RSU44	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No
RSU45	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No
RSU46	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No
RSU47	Nil	Survey Unit generally of negligible potential	Main Works - direct	Partial	Unmitigated impact	No

Table A 3: Aboriginal heritage management measures for each heritage Survey Unit at Marica

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
MSU1	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
MSU2	*MSU2/L1* AHIMS #56-6-0501	Generally low significance in the Survey Unit with the exception of *MSU2/L1* which may potentially be of moderate local significance	Direct	Partial	Salvage excavation	Yes
MSU3	*MSU3/L1* AHIMS #56-6-535	Generally low significance in the Survey Unit with the exception of *MSU3/L1* which may potentially be of low/moderate local significance	Direct	Partial	Unmitigated impact	No
MSU4	*MSU4/L1* AHIMS #56-6-0500 *MSU4/L2* AHIMS #56-6-534	Generally low significance in the Survey Unit with the exception of *MSU4/L1 and MSU4/L2* which may potentially be of low/moderate local significance	Direct	Partial	Salvage excavation	Yes
MSU5	Nil recorded	Survey Unit generally of very low significance	Direct	Partial	Unmitigated impact	No
MSU6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
MSU7	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
MSU8	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
MSU9	Nil	Survey Unit generally of negligible potential	Direct	Partial	Unmitigated impact	No
MSU10	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No

Table A 4: Aboriginal heritage management measures for each heritage Survey Unit at Gooandra Hill

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
GHSU1	*Gooandra SU1/L1* AHIMS #57-4-0313 *Gooandra SU1/L2* AHIMS #57-4-0314 *Gooandra SU1/L3* AHIMS #57-4-0315 Gooandra SU1/L4 AHIMS #57-4-0316 *Gooandra SU1/L5* AHIMS #57-4-0317 *Gooandra SU1/L6* AHIMS #57-4-0326 *Gooandra SU1/L7* AHIMS #57-4-0325 *Gooandra SU1/L8* AHIMS #57-4-0323 *Gooandra SU1/L9* AHIMS #57-4-0324 *Gooandra SU1/L10* AHIMS #57-4-0405 *Gooandra SU1/L11* AHIMS #57-4-0408 *Gooandra SU1/L12* AHIMS #57-4-0404 Test Transect 1 - 13	Generally low significance in the Survey Unit with the exception of certain micro topographies which may potentially be of low/moderate local significance	Direct	Partial	Unmitigated impact	No
GHSU2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU3	*Gooandra SU3/L1* AHIMS #57-4-0322 *Gooandra SU3/L2* AHIMS #57-4-0321 *Gooandra SU3/L3* AHIMS #57-4-0320 *Gooandra SU3/L4* AHIMS #57-4-0319 *Gooandra SU3/L5* AHIMS #57-4-0318	Generally low significance in the Survey Unit with the exception of certain micro topographies which may potentially be of low/moderate local significance	Direct	Partial	Unmitigated impact	No
GHSU4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU5	Nil recorded	Survey Unit generally of very low significance	Direct	Partial	Unmitigated impact	No
GHSU6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU7	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU8	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU9	Nil recorded	Survey Unit generally of very low significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
GHSU10	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU11	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU12	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU13	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GHSU14	Nil	Survey Unit generally of negligible potential	Direct	Partial	Unmitigated impact	No
GHSU15	Nil	Survey Unit generally of negligible potential	Direct	Partial	Unmitigated impact	No

Table A 5: Aboriginal heritage management measures for each heritage Survey Unit at Kings Cross Road

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
KCSU1	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU3	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU5	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
KCSU7	*MS-ST-1* AHIMS #56-6-0131 (not in SU)	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

Table A 6: Aboriginal heritage management measures for each heritage Survey Unit at Link Road

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
LSU1	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
LSU2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
LSU3	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
LSU4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
LSU5	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

Table A 7: Aboriginal heritage management measures for each heritage Survey Unit at Gooandra Fire Trail

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
GSU1	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU3	Nil recorded	Survey Unit generally of negligible/low significance	Direct	Partial	Unmitigated impact	No
GSU4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU5	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU6M	Nil recorded	Survey Unit generally of negligible/low significance	Nil	Nil	N/A	No
GSU6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU7	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU8	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU9	Nil recorded	Survey Unit generally of very low significance	Direct	Partial	Unmitigated impact	No
GSU10	Nil recorded	Survey Unit generally of very low significance	Direct	Partial	Unmitigated impact	No
GSU11	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
GSU12	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU13	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
GSU14	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU15	*GSU15/L1* AHIMS #57-4-0409	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU16	Nil recorded	Survey Unit generally of negligible to very low significance	Direct	Partial	Unmitigated impact	No
GSU17	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU18	*GSU18/L1* AHIMS #57-4-0383	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU19	Nil recorded	Survey Unit generally of negligible to low significance	Direct	Partial	Unmitigated impact	No
GSU20	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
GSU21	Nil recorded	Survey Unit generally of negligible to low significance	Direct	Partial	Unmitigated impact	No
GSU22	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
GSU23	Nil	Survey Unit generally of negligible potential	Direct	Partial	Unmitigated impact	No

Table A 8: Aboriginal heritage management measures for each heritage Survey Unit at Nungar Creek Fire Trail

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
NSU1	*NSU1/L1* AHIMS #57-4-0344	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NSU2	*NSU2/L1* AHIMS #57-4-0390	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NSU3	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NSU4	*NSU4/L1* AHIMS #57-4-0343	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NSU5	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
NSU6	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No

Table A 9: Aboriginal heritage management measures for each heritage Survey Unit at Tantangara Dam Fire Trail

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TFTSU1	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
TFTSU2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TFTSU3	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
TFTSU4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
TFTSU5	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TFTSU6	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No

Table A 10: Aboriginal heritage management measures for each heritage Survey Unit at Tantangara Dam

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TSU1	*Quarry Rd 1* AHIMS #57-4-0127 *TSU1/L2* AHIMS #57-4-0310 *TSU1/L3* AHIMS #57-4-0311 *TSU1/L4* AHIMS #57-4-0287 *TSU1/L5* AHIMS #57-4-0290 *TSU1/L6* AHIMS #57-4-0289 *TSU1/L7* AHIMS #57-4-0288 Test Transect 1 - 15	Survey Unit very low significance	Direct	Partial	Unmitigated impact	No
TSU2	*Quarry Road 3* AHIMS #57-4-0126 *Quarry Road 4* AHIMS #57-4-0224 *Quarry Road 5* AHIMS #57-4-0125 *TSU2/L2* AHIMS #57-4-0265 *TSU2/L3* AHIMS #57-4-0266 *TSU2/L5* AHIMS #57-4-0267 *TSU2/L6* AHIMS #57-4-0263 *TSU2/L8* AHIMS #57-4-0264 *TSU2/L9* AHIMS #57-4-0255 Test Transect 1, 2, 3, 4, 5 and 6	Survey Unit generally of low/moderate significance	Direct	Partial	Salvage excavation	Yes

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TSU3	*Quarry road -1* AHIMS #57-4-0143 *Quarry Road 2* AHIMS #57-4-0128 *TSU3/L1* AHIMS #57-4-0293 *TSU3/L2* AHIMS #57-4-0292 *TSU3/L3* AHIMS #57-4-253 *TSU3/L4* AHIMS #57-4-0254 *TSU3/L5* AHIMS #57-4-0270 *TSU3/L6* AHIMS #57-4-0269 *TSU3/L7* AHIMS #57-4-0268 *TSU3/L8* AHIMS #57-4-0271 *TSU3/L11* AHIMS #57-4-0273 *TSU3/L12* AHIMS #57-4-0272 *TSU3/L13* AHIMS #57-4-0274 TSU3/L14 AHIMS #57-4-0275 *TSU3/L15* AHIMS #57-4-0262 Test Transect 1 - 7	Survey Unit generally of low/moderate significance	Direct	Partial	Salvage excavation	Yes
TSU4	*Quarry Road 2* AHIMS #57-4-0123 *Quarry Road 6* AHIMS #57-4-0124 *TSU4/L1* AHIMS #57-4-0252 *TSU4/L2* AHIMS #57-4-0260 *TSU4/L3* AHIMS #57-4-0257 *TSU4/L4* AHIMS #57-4-0258 *TSU4/L6* AHIMS #57-4-0261 Test Transect 1 - 6	Survey Unit generally of moderate significance	Direct	Partial	Salvage excavation	Yes
TSU5	*Quarry Road 7* AHIMS #57-4-122 *Quarry Road 8* AHIMS #57-4-121 *TSU5/L3* AHIMS #57-4-0259 *TSU5/L4* AHIMS #57-4-0294 *TSU5/L5* AHIMS #57-4-0251 Test Transect 1 - 8	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU6	*Tantangara Dam West* AHIMS #57-4-80 *TSU6/L1* AHIMS #57-4-0308	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TSU7	*TSU7/L1* AHIMS #57-4-0291 *TSU7/L2* AHIMS #57-4-0286 *TSU7/L3* AHIMS #57-4-0282 *TSU7/L4* AHIMS #57-4-0283 *TSU7/L5* AHIMS #57-4-0285 *TSU7/L6* AHIMS #57-4-0284 *TSU7/L7* AHIMS #57-4-0307 Test Transect 1 and 2	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU8	*TSU8/L1* AHIMS #57-4-0256 Test Transect 1 and 2	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU9	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU10	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TSU11	*TSU11/L1* AHIMS #57-4-0309 *TSU11/L2* AHIMS #57-4-0306 *TSU11/L3* AHIMS #57-4-0312 *TSU11/L4* AHIMS #57-4-0295 *TSU11/L5* AHIMS #57-4-0296 *TSU11/L6 AHIMS* #57-4-0299 TSU11/L7 AHIMS #57-4-0298 *TSU11/L8* AHIMS #57-4-0297 *TSU11/L9* AHIMS #57-4-0300 *TSU11/L10* AHIMS #57-4-0303 *SH218* AHIMS #57-4-237 *TSU11/L11* This is duplicate of AHIMS #57-4-0301 *SH227* AHIMS #57-4-235 *TSU11/L12* This is duplicate of AHIMS #57-4-0281 *SH219* AHIMS # 57-4-236 This is duplicate of *TSU11/L13* AHIMS #57-4-0302 *TSU11/L14* AHIMS #57-4-304 *TSU11/L15* AHIMS #57-4-0305 *TSU11/L16* AHIMS #57-4-0276 *TSU11/L17* AHIMS #57-4-0277	Survey Unit generally of low significance	Direct	Partial	Salvage excavation	Yes
TSU12	*TSU12/L1* AHIMS #57-4-0278 *TSU12/L2* AHIMS #57-4-0279 *TSU112/L3* AHIMS #57-4-0280	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU13	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU14	*TSU14/L1* AHIMS #57-4-416 *TSU14/L2* AHIMS #57-4-415 Test Transect 14 - 20	Survey Unit generally of low significance with low/moderate artefact densities in sheltered positions on east side of crest	Direct	Partial	Salvage excavation	Yes

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TSU14b	Nil	Survey Unit generally of potentially moderate significance with low/moderate artefact density	Direct	Partial	Field survey and potentially salvage excavation	Yes. Field survey to establish archaeological potential. Salvage excavation if survey results indicate it is required.
TSU15	*TSU15/L1* AHIMS #57-4-414 *TSU15/L2* AHIMS #57-4-413 *TSU15/L3* AHIMS #57-4-412 *TSU15/L4* AHIMS #57-4-411 *TSU15/L5* AHIMS #57-4-410 Test Transect 3 – 13	Survey Unit generally of moderate significance	Direct	Partial	Salvage excavation	Yes
TSU16	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU17	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU18	*TSU18/L1 AHIMS* #57-4-0436	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
TSU19	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TSU20	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TSU21	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TSU22	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TSU23	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
TSU24	Nil	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No

Table A 11: Aboriginal heritage management measures for each heritage Survey Unit at Tantangara Road

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
TRdSU1	Tantangara 1 AHIMS #57-4-0161 Gang Gang Creek AHIMS #57-4-0038 TRdSU1/L1 AHIMS #57-4-0327 TRdSU1/L2 AHIMS #57-4-0328 TRdSU1/L3 AHIMS #57-4-0329 TRdSU1/L4 AHIMS #57-4-0332 TRdSU1/L5 AHIMS #57-4-0330 TRdSU1/L6 AHIMS #57-4-0331	Survey Unit very low significance	Direct	Partial	Unmitigated impact	No

Table A 12: Aboriginal heritage management measures for each heritage Survey Unit at Nungar Creek Trail

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
NCTSU1	NCTSU1/L1 AHIMS #57-4-0434	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
NCTSU2	NCTSU2/L1 AHIMS #57-4-0417	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
NCTSU3	Nil recorded	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
NCTSU4	NCTSU4/L1 AHIMS #57-4-0433 NCTSU4/L2 AHIMS #57-4-0432 NCTSU4/L3 AHIMS #57-4-0431	Survey Unit generally of low potential	Direct	Partial	Unmitigated impact	No
NCTSU5	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
NCTSU6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU7	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU8	NCTSU8/L1 AHIMS #57-4-0430	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU9	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU10	NCTSU10/L1 AHIMS #57-4-0429 NCTSU10/L2 AHIMS #57-4-0428 NCTSU10/L3 AHIMS #57-4-0427 NCTSU10/L4 AHIMS #57-4-0426	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU11	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU12	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU13	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU14	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU15	NCTSU15/L1 AHIMS #57-4-0425	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU16	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU17	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU18	NCTSU18/L1 AHIMS #57-4-0424	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU19	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU20	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU21	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU22	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU23	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU24	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU25	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU26	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU27	NCTSU27/L1 AHIMS #57-4-0423	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU28	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU29	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management measure	Management Required: Yes/No
NCTSU30	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU31	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU32	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU33	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU34	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU35	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU36	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
NCTSU37	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No

Table A 13: Aboriginal heritage management measures for each heritage Survey Unit at Rock Forest

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management and mitigation	Management Required: Yes/No
CCUS1	CCSU1/L1 AHIMS #57-4-0418 CCSU1/L2 AHIMS #57-4-0419 CCSU1/L3 AHIMS #57-4-0420	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No
CCUS2	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS3	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS4	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS5	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS6	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS7	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS8	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS9	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS10	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS11	CCSU11/L1 AHIMS #57-4-0421	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS12	Nil recorded	Survey Unit generally of negligible significance	Nil	Nil	N/A	No
CCUS13	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No

ID	Aboriginal Objects	Significance	Type of harm	Degree of harm	Management and mitigation	Management Required: Yes/No
CCUS14	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS15	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS16	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS17	CCSU17/L1 AHIMS #57-4-422	Survey Unit generally of low significance with areas of greater potential	Direct	Partial	Salvage excavation	Yes
CCUS18	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS19	Nil recorded	Survey Unit generally of negligible significance	Direct	Partial	Unmitigated impact	No
CCUS20	Nil recorded	Survey Unit generally of low significance	Direct	Partial	Unmitigated impact	No

APPENDIX B – ABORIGINAL HERITAGE SALVAGE METHODOLOGY

Aboriginal Heritage Salvage Methodology

No culturally or spiritually significant places or locations have been identified during the formal Aboriginal consultation process and the field surveys of the project area. However, if such places are identified at any time during the Main Works project, an archival recording methodology will be implemented in accordance with the NSW OEH 2010 Code of Practice and the OEH 2011 Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW and include but not be limited to:

- the establishment of protocols to ensure the archival recording of the cultural features process will be conducted sensitively and appropriately;
- the collection of relevant knowledge, oral histories and further research (if relevant);
- recording methods such as photography, mapping and written documentation; and
- curation of the archival material in accordance with the instructions from the relevant Aboriginal stakeholders.

For certain known Aboriginal cultural features such as the stone artefact and archaeological deposit recordings, mitigated impact will entail salvage excavations in some Survey Units which are assessed to be of higher significance value (see Appendix A). An excavated area of between 50 and 100 square metres in each Survey Unit is suggested for the initial consideration of stakeholders (it is likely that a 50 sq m area will be adequate).

The salvage excavation is designed to maximise the number of artefacts retrieved in order to conduct meaningful analyses of artefact technology and related factors, so as to provide a higher level of understanding of the nature of Aboriginal use and occupation of the local landscape.

The key aspects of the proposed salvage excavation methodology to highlight are:

- the excavation methods would be supervised by the Snowy Hydro Project Manager so as to ensure consistency in the excavations with the works conducted during Exploratory Works impact mitigation.
- the approach will be conducted broadly consistent with the salvage methodology undertaken as part of Exploratory Works.
- the location of the excavations will be determined with reference to the results of the test excavations conducted for the Exploratory Works and Main Works projects.
- the excavations will be conducted over a one metre square grid network. Exploratory squares may be excavated at 5 or 10 metre intervals to identify artefact hotspots and geomorphological variability (if relevant). Where artefacts occur in relatively high densities, excavation of those squares may be extended into broad area excavations. Otherwise, a broad area of contiguous squares will be excavated (for example an area measuring 10m x 5m).
- the excavation will be conducted by machine (a small excavator) and by hand (using spades and trowels) in arbitrary 10cm units or stratigraphic units, if warranted. Otherwise, given the relatively shallow nature of deposits, the excavation will be conducted as a single, arbitrary stratigraphic unit; the later method is likely to be appropriate given that artefacts move up and down the soil profile and do not generally reside in temporally defined soil horizons in shallow, open contexts. The excavation process will be carefully supervised by an archaeologist. As part of this, the excavator operator will be directed by the archaeologist, with all movements kept to the minimum required and undertaken gently. The use of a small excavator and hand excavation will provide a comparable methodology to that conducted for Exploratory Works. It will ensure a careful and precise excavation methodology that will allow for a best practice approach.

- prior to commencement of mechanical excavation, DPIE will be advised of the intent to commence this process. DPIE, NPWS and Heritage NSW will be invited to attend site during the mechanical excavation works. During the works an early progress report will be prepared in writing detailing the outcomes of this approach. The early progress report will be issued within one month of the commencement of mechanical excavation.
- the one metre squares will be removed in shallow scraps measuring approximately 10 cm deep and these will be scrutinised to identity any features or anomalies that might require hand excavation. The one metres squares will be cleaned up by spade, trowel, and/or brush and pan, as required to ensure the spatial integrity of the excavation.
- following the excavation within the nominated survey unit, the archaeologist will review the excavation to ensure no significant features have been missed. It is noted that changes in artefact density across an excavation area are to be expected. A heritage clearance certificate will be issued (Section 5.1.2 of the HMP) to certify that heritage salvage measures have been completed and works may proceed within the nominated survey unit.
- all spoil recovered from individual squares and/or spits will be deposited into bulk bags (i.e single square will be placed in a single bulk bag) for transportation to a sieving station and into colour coded, labelled buckets prior to sieving. The sieving station will be setup where practicable and the spoil will be wet sieved (if at all possible, otherwise dry sieving will be used) through either 3 mm or 5mm sieves (sieve size will be dependent on sieving method).
- it is proposed to trial the use of mechanical sieving machines such as a trommel and a shaker table (vibrating trailer mounted sieve). These may be used if they are assessed to be practical, useful and non-destructive to artefactual material, Otherwise, and in any case, in addition, conventional hand wet or dry sieving will be used. If mechanical sieving is used, it is possible that final hand sieving may be required to ensure a complete clean wash is achieved.
- all material retrieved in sieves will be returned to colour coded and labelled buckets and, sorted by qualified personnel on a sorting table on site.. All stone known or suspected of being artefactual will be retained for later identification and inspection under low powered microscopy.
- the excavation stratigraphy will be recorded, and the excavated area will be mapped and surveyed. This will allow for a fine grained level of information to be produced in regard to the relationship between site location, Aboriginal activity areas and landforms. Recording will include detailed section drawing, photography and pH testing of units, and examination of sections and inclusions. Reference sediment sampling of drawn sections will be undertaken. The logs and descriptions of the salvage squares will provide an archival record of the stratigraphy observed.
- descriptive terminology will follow published standards and methodologies used internationally for archaeological soils and stratigraphy (see for example, Goldberg and Macphail 2006; Courty *et al*. 1989; Davidson and Simpson 2001) and for Quaternary sediments and soils (for example, Gale and Hoare 1991; Kemp 1985). Where conflicts exist with Australian soil systems and taxonomy, inclusive regolith methodology and terminology are preferred (see Ollier and Pain 1996) over other soil landscape approaches.
- description will focus on sedimentological trends through and between excavated units, and on the nature of the stratigraphic boundaries (interfaces) between units as aids to sequence or deposit unit interpretation, if relevant. Descriptive terminology will be kept distinct and separate from interpretation.
- stratigraphic descriptions will include visual estimates of particle size sorting, grading (i.e. vertical changes in the modal particle size up and down the profiles) and occasionally trends in grading are identified e.g. terms like ‘fining-upwards’ may be used. When the term massive is used it will mean an absence of stratification or structure within the deposit (Fritz and Moore

1988). Boundaries observed between visually or texturally different deposit units will be defined in terms of how sharp or gradual they were i.e. in terms of boundary distinctiveness (sharp, clear gradual) and also boundary form (wavy, undulating etc.) (see Courty *et al*. 1989). Evidence for mixing or movement of sediment across boundaries will be noted. Descriptions in the field will form the site archive.

- the stone artefacts will be described, analysed and bagged off-site and will be conducted by qualified archaeologists. The analysis will entail inspection under low powered stereoscopic magnification, measuring, and description according to technological attributes.

The excavation results would be written up in a single report which would include the results of the Exploratory Works salvage program so as to ensure consistency in the analysis and research.

The lithic analysis will focus on addressing the following issues:

- artefact density;
- the identification of knapping or part knapping events;
- variability across the landscape;
- technological and behavioural activities represented by the lithic material;
- raw material origins.

Aboriginal cultural material must be stored in a specified location (anticipated to be NSW Archaeology Pty Ltd laboratory) until it can be returned to country (Note. A Plan of Management for artefact storage would not be necessary). A salvage report will be produced to accompany the curated material. The salvage report will be provided to the relevant stakeholders identified in Section 1.9 of the HMP within twelve (12) months of the salvage and artefact analysis being completed.

If the material is to be buried on country, the archaeologist must complete and submit any related Aboriginal Site forms to NSW DPIE within 30 days of the reburial taking place. Specifically, Aboriginal Site Impact Forms will be completed and submitted to NSW DPIE in order for site status to be updated on the AHIMS database.

APPENDIX C – INDIVIDUAL HISTORIC HERITAGE MANAGEMENT MEASURES

Historic heritage management measures for each historic heritage item

In accordance with schedule 3, condition 34(b) individual historic management measures to be implemented are identified in Appendix 4 of the Approval (CSSI 9687) and are shown in Table C 2 and Table C 3. These tables include the impact and management for sites inside or within 20m of the Main Works RTS construction envelope. The contributory significance for each item has been assessed during the Main Works EIS, as defined in Table C 1

In some instances, no impact mitigation is required (identified as 'NA'). Unmitigated impact (harm without management measure) to historic heritage is proposed in accordance with the Approval (CSSI 9687). These items have generally been assessed as having a negligible or little level of contributory heritage significance. In some instances, impact mitigation is required but has already been undertaken in exploratory works (identified as 'Yes, but addressed in EW'). These have been kept for completeness.

Table C 1: Contributory significance definition (Main Works EIS Appendix P.2, 2019)

Grading	Justification
Exceptional	Rare and/or highly representative example of its type that displays a high degree of integrity. Strong and/or important historical/ social/spiritual associations have been confirmed. The site is likely to be able to yield information that will address important research questions.
High	Site displays a high degree of integrity. Strong and/or important historical/social/spiritual associations are likely or have been confirmed. The site is likely to be able to yield information that will address important research questions.
Moderate	Site integrity is unclear and/or partially compromised. The extent to which the site is able to yield information that will address important research questions is unclear.
Little	Site displays low levels of integrity. Strong and/or important historical/social/spiritual associations are unlikely, or the site is otherwise unlikely to yield information that will address important research questions.
Negligible	Site displays little or no integrity. No identifiable strong and/or important historical/social/spiritual associations

Table C 2: Historic heritage avoidance – no impact permitted

Locale	Item	Contributory Significance	Management measure
Lobs Hole	R20 Washington Hotel	Exceptional	No impacts permitted. Archival recording, research and interpretation plan managed under Exploratory Works are complete. No-go fencing / delineation required. No further interpretation required.
	R118 Ravine Cemetery	High to Exceptional	No ground disturbance will occur within the cadastral boundary of Ravine Cemetery. Some non-ground invasive vegetation clearance will be required at the western and northern boundaries of the cadastral boundary of Ravine Cemetery. No-go fencing/delineation, archival research and interpretation plan required.

Table C 3: Historic heritage management

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
Rock Forest	CCSU1/H4	Little - Moderate	Yes	Archival recording
	CCSU1/H5	Little - Moderate	Yes	Archival recording and salvage moveable heritage, if warranted and impacts are expected
	CCSU3/H1	Little	Yes	Archival recording
	CCSU1/H6	Negligible	No	NA
	CCSU1/H7	Negligible	No	NA
	CCSU20/H1	Negligible	No	NA
Nungar Ck Trail	NCTSU2/H2	Little to Moderate	Yes	Archival recording
	NCTSU9/H1	Little	Yes	Archival recording
	NCTSU16/H2	Little - Moderate	Yes	Archival recording
	NCTSU23/H1	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	NCTSU23/H2	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	NCTSU23/H3	Little to Moderate	Yes	Archival recording, archival research
	NCTSU23/H5	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	NCTSU23/H6	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	NCTSU23/H7	Little - Moderate	Yes	Archival recording
	NCTSU24/H1	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	NCTSU16/H1	Little to Moderate -	No	NA
	NCTSU22/H1	Little to Moderate	No	NA
	NCTSU23/H4	Little to Moderate	No	NA
	NCTSU4/H1	Negligible	No	NA
	NCTSU24/H2	Negligible	No	NA

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	NCTSU37/H1	Moderate	Yes	Archival recording, archival research
Tantangara Rd	E29	Little	No	NA
	E30	Little	No	NA
	E36	Little	No	NA
	E39	Little	No	NA
	E47	Little	No	NA
	E48	Little	No	NA
	E53	Little to Moderate	No	NA
	E31	High	No	NA
	E37	Moderate	No	NA
	E38	Moderate	No	NA
	E40	Moderate	No	NA
	E41	Moderate	No	NA
	E42	Moderate to High	No	NA
	E43	Moderate to High	No	NA
	E44	Moderate	No	NA
	E45	High	No	NA
	E46	Moderate	No	NA
	E55	Moderate	No	NA
	E50	Little to Moderate	No	NA
	E22	Moderate	No	NA
	E23	Moderate	No	NA
	E24	Moderate	No	NA
	E25	Moderate	No	NA
	E26	Moderate	No	NA
	E27	Moderate	No	NA
	E28	Moderate	No	NA
	E32	Moderate	No	NA
	E33	Moderate	No	NA
	E34	Moderate	No	NA
	E35	Moderate	No	NA
	E49	Moderate	No	NA
	E51	Negligible	No	NA
Tantangara Dam	E2	Negligible	Yes	Archival recording
	E9	Negligible	Yes	Archival recording
	TSU14/H1	Moderate to High	Yes	Archival recording, archival research, Test/salvage excavation,

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
				if warranted and impacts are expected and interpretation plan
	TSU14/H3	Negligible	Yes	Archival recording
	TSU15/H1	Moderate	Yes	Archival recording, archival research, Test/salvage excavation, if warranted and impacts are expected and interpretation plan
	TSU15/H2	Little to Moderate	Yes	Archival recording
	E4	Little to Moderate	Yes	Archival recording, Test/salvage excavation, if warranted and impacts are expected
	E11	Little	Yes	Archival recording
	E13	Moderate	Yes	Archival recording
	Tantangara Dam Airstrip	Negligible	Yes	Archival recording
	Tantangara Intake Structure	Moderate	Yes	Archival recording
	Tantangara Dam House	Little to Moderate	Yes	Archival recording
	Tantangara Dam	High	Yes	Archival recording
	Weather Station	Moderate	Yes	Archival recording, Test/salvage excavation, if warranted and impacts are expected
	Quarry	Moderate to High	Yes	Archival recording
	E10	Little	Yes	Archival recording, Archival research, Interpretation plan
	E12	Little	Yes	Archival recording, Archival research, Interpretation plan
	E21	Little	Yes	Archival recording, Archival research, Interpretation plan
	TSU14/H2	Little to Moderate	Yes	Archival recording
	E1	Little	Yes	Archival recording
	E14	Little	No	NA
Nungar Creek Fire Trail	NSU3/H2	Little	Yes	Archival recording, Archival research
	NSU4/H1	Little	Yes	Archival recording, Archival research
Marica	MSU1/H6	Little	No	NA
	MSU4/H1	Little	Yes	Archival recording
	MSU1/H5	Little to Moderate	Yes	Archival recording, Archival research

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
Gooandra Hill	GHSU12/H1	Negligible	No	NA
	GHSU13/H1	Negligible	No	NA
Kings Cross Rd	KCSU7/H2	Little	No	NA
	KCSU7/H4	Little	Yes	Archival recording
	KCSU7/H5	Moderate	Yes	Archival recording
	KCSU7/H6	Little to Moderate	Yes	Archival recording
	KCSU7/H3	Negligible	No	NA
Gooandra FT	GSU15/H3	Little	Yes	Archival recording
	GSU22/H2	Little	Yes	Archival recording
	GSU4/H2	Moderate	Yes	Archival recording
	GSU7/H7	Moderate	Yes	Archival recording
	GSU7/H8	Moderate	Yes	Archival recording, Test/salvage excavation, if warranted and impacts are expected
	GSU20/H1	Moderate to High	Yes	Archival recording
	GSU22/H1	Moderate	Yes	Archival recording
	GSU6M	High to Exceptional	Yes	Archival recording, Test/salvage excavation, if warranted and impacts are expected
	GSU1/H3	Little to Moderate	Yes	Archival recording
	GSU9/H1	Little to Moderate	Yes	Archival recording
	GSU15/H1	Little to Moderate	Yes	Archival recording, Archival research
	GSU15/H2	Little to Moderate	Yes	Archival recording
	GSU15/H5	Little to Moderate	Yes	Archival recording, Archival research
	GSU16/H1	Little to Moderate	Yes	Archival recording
	GSU21/H2	Moderate	Yes	Archival recording, Archival research
	GSU3/H1	Negligible	No	NA
	GSU4/H1	Negligible	No	NA
Link Road	LSU4/H1	Moderate	Yes	Archival recording
	LSU5/H2	Little	Yes	Archival recording
	NC1	Little to Moderate	Yes	Archival recording
	NC3	Little to Moderate	Yes	Archival recording
	NC20	Little to Moderate	Yes	Archival recording
	NC17	Little	No	NA

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
Lobs Hole Ravine	R21	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R22	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R23	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R24	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R25	High	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R26	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R27	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R28	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R29	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R30	Negligible	Yes, but addressed in EW	Archival recording Test excavation Salvage if warranted
	R39	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R59	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R60	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R61	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R121	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R122	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R31	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R41	Little to Moderate	Yes, but addressed in EW	Archival recording Test excavation Salvage if warranted
	R42	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R47	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R63	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R64	Moderate	Yes	Archival research, Archival recording, Interpretation Plan
	R66	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R71	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted. Implement measures to protect moveable heritage
	R113	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R48	High	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R50	High	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R57	Moderate to High	Yes	Archival research, Archival recording, Interpretation Plan
	R76	Little to Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R106	Moderate	Yes	Archival research, Archival recording, Interpretation Plan
	R107	High	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R108	Moderate	Yes	Archival research, Archival recording, Interpretation Plan
	R109	High	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R110	High	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R111	Moderate to High	Yes	Archival research, Archival recording, Interpretation Plan
	R115	Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R1	Moderate - High	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R3	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R4	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R15	Little	No	NA
	R18	Little	No	NA
	R35	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R73	Little	No	NA
	R92	Little-Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R93	Little	No	NA
	R97	Little	No	NA
	R100	Negligible	No	NA
	R103	Little-Moderate	No	NA
	R129	Little	No	NA
	R2	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation. salvage if warranted Implement measures to protect moveable heritage
	R5	Little - Moderate	No	NA
	R9	Little - Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R10	Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R11	Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R12	Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R13	Little - Moderate	Yes	Archival research, Archival recording, Salvage moveable heritage, if warranted and impacts are expected, Test/salvage excavation, if warranted and impacts are expected, Interpretation Plan
	R14	Moderate	No	NA
	R45	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R46	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R69	Moderate	No	NA
	R72	Moderate	No	NA
	R74	Little - Moderate	No	NA
	R75	Little - Moderate	No	NA
	R81	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R90	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R91	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R96	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R99	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R114	Little-Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R117	Negligible	No	NA
	R53	Little - Moderate	Yes, but addressed in EW	Archival recording
	R84	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R85	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R86	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R94	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R95	Little - Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R132	Little - Moderate	No	NA
	R44	Little-Moderate	No	NA
	R52	Little	No	NA
	R54	Little to Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R77	Negligible	No	NA
	R83	Negligible	No	NA
	R102	Little	No	NA
	R119	Moderate	No	NA
	R6	Moderate	No	NA
	R17	Moderate	Yes, but addressed in EW	Archival recording
	R19	Moderate	No	NA
	R34	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R40	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted

Locale	Item	Contributory Significance	Mitigation, if in disturbance footprint	Management measure
	R101	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R116	Moderate	No	NA
	R128	Moderate	No	NA
	R133	Moderate	No	NA
	R7	Little	No	NA
	R8	Little	No	NA
	R16	Negligible	No	NA
	R33	Moderate	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R58	Negligible	No	NA
	R78	Little	No	NA
	R82	Negligible	Yes, but addressed in EW	Archival recording
	R88	Moderate	No	NA
	R98	Little	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R130	Negligible	No	NA
	R131	Negligible	No	NA
	R55	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted
	R70	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted and impacts are expected
	R89	Negligible	Yes, but addressed in EW	Archival recording Test excavation, salvage if warranted

APPENDIX D – HISTORIC HERITAGE ARCHAEOLOGICAL RESEARCH DESIGN AND METHODS

ARCHAEOLOGICAL RESEARCH DESIGN AND METHODS

Aims and Objectives

One of the primary aims of the historical heritage mitigation program is to minimise the potential loss of information associated with direct impacts to the fabric of heritage items and their associated archaeological deposits and/or setting. A secondary aim is to offset the loss of such tangible and other less tangible heritage values (e.g. aesthetic and social values) through archiving as much information as possible in relation to the various geographic areas, themes, site types, features and objects/artefacts that relate to the history of human use and interaction with the alpine environment of the Snowy Mountains. A third aim is the physical conservation of:

- items, complexes and landscapes of cultural heritage significance; and
- artefact assemblages and individual items of moveable heritage.

These aims are accompanied by a series of broad objectives that underpin the research design for the project. The research design objectives have also been developed with reference to the National Heritage management principles of the EPBC Regulations. Those management principles emphasise the importance of utilising the best available knowledge, skills and standards to identify, protect, conserve, present and transmit Natural Heritage values to all generations,

The key objectives of this archaeological research design are:

- to implement best practice recording and documentation at all levels (i.e. archival recording, salvage of moveable heritage, archaeological excavations, post excavation analysis and subsequent reporting and publication of results) of the historical heritage management program;
- integration of results from all levels of the historical heritage management program to maximise the potential to address research questions; and
- interpret and compare the results of the historical heritage management program with:
- evidence available in relevant histories, both oral and documentary; and
- comparable sites, complexes and cultural landscapes across NSW and Australia as a whole.

The archaeological research design for the Snowy 2.0 Main Works is in many ways an extension of the program developed for Early Works (Dibden and Parkes 2019). It also forms part of a broader research framework for Kosciuszko National Park and the Snowy Mountains as a whole. It will build on the results of investigations undertaken at Ravine (Lobs Hole), expanding the dataset in terms of both the number and types of sites investigated. More importantly, the historic heritage mitigation program for Main Works will also provide an opportunity to contextualise the results from Ravine through investigation of sites across the broader Kosciuszko National Park region. In this regard, the archaeological investigations for Main Works necessitate a greater emphasis on the relationship between the broader research framework for the region and the specifics of the research design for the project. Given that there will be a significant cumulative increase in heritage impacts resulting from Snowy 2.0 Main Works, it is important to ensure that the results of the associated archaeological investigations can be compared and contrasted with previous investigations, in particular the results from:

- Snowy 2.0 Early Works and other development related heritage management investigations across the Alps;
- regional historical archaeology research investigations (e.g. postgraduate research projects and ANU field schools at Kiandra); and
- comparative examples of both development related and research led investigations at similar sites and complexes across NSW and Australia as a whole.

KNP POM heritage values

In this context, it is useful to review the key cultural heritage values and associated 'Register of Required Research' identified in the KNP POM, as these assist in identifying key elements of the Snowy Mountains and Australian Alps cultural heritage research framework. Table 1 and Table 2 provide the relevant summaries of cultural heritage values and the 'Register of Required Research', both of which emphasise the importance of relationships between natural and cultural values.

Table 1: Definitions of identified cultural heritage values within the KNP POM (2006: 10)

Values	Description of Values
Aboriginal	The park is highly significant for descendants of Aboriginal people with traditional and historical links to the mountains. This is illustrated by their ongoing sense of belonging and identity, spiritual attachments, surviving traditional knowledge, and family stories and memories. Scientific evidence indicates a long history of Aboriginal use and occupation of the high country and demonstrates successful adaptations to extreme environmental conditions.
Pastoralism	The pastoral theme associated with the park represents a high country variation characterised by transhumance, unique within Australia to the Australian Alps and the Central Plateau of Tasmania. The stories and traditions of high country pastoralism have been commemorated by famous artists and writers and hold an important place in the consciousness of many Australians, albeit often in a romanticised way
Huts	The collection of huts in the park probably comprises the largest group of different types and purposes of huts in any comparable area in Australia. Individually, and as a group in their landscape setting, they have considerable historic, social and aesthetic significance.
Mining	The mining theme, as represented in the park, has national significance as part of a landmark period of Australian history. The complex of mine sites present, together with those in the Victorian Alps, illustrate adaptations to mining practices and living conditions necessitated by working in places seasonally covered by snow.
Water Harvesting	The water harvesting theme in the park spans more than a century and ranges from the various dams and racelines constructed for early mining operations to the Snowy Mountains Hydro-electric Scheme, the largest engineering project ever undertaken in Australia. At the time of construction, the Scheme took on national symbolic importance as a tangible example of Australian achievement. Migration associated with the Scheme changed the ethnic composition of Australian society.
Scientific Research	Scientific research work conducted in the park across a range of disciplines is regarded as highly significant. This encompasses pioneering research in anthropology, botany, ecology, geology, geomorphology, hydrology and meteorology.
Conservation	The efforts that culminated in the creation of Kosciuszko National Park are of national significance in that they mark the rise of the conservation movement at a nationwide level.
Recreation	Government-built infrastructure, such as Kosciuszko Road and the chalets at Charlotte Pass and Diggers Creek, reflect an early phase in mountain tourism. So too does the Yarrangobilly Caves complex. Kiandra has special significance as the first place in Australia where recreational skiing was undertaken, while elements of the existing skifields and ski resorts reflect important social and recreational movements.

Table 2: The KNP Plan of Management (2006: 283) Register of Required Research for cultural Heritage.

ID	Research Requirements
1	Undertake targeted heritage surveys and significance assessments.
2	Investigate the intangible cultural values of the park, including the undertaking of the "Memories" and "Traditional Knowledge" projects and investigations into the inspirational qualities of places and built structures.
3	Investigate and map links between heritage landscapes and places in the park and nearby areas.

ID	Research Requirements
4	Identify key historical travel routes in the park.
5	Identify areas containing concentrations of cultural heritage items as cultural heritage precincts.
6	Investigate the cultural values of exotic plant species found in the park.
7	Undertake the “Naming Project” to determine and record Aboriginal and non-Aboriginal names for landscape features, flora and fauna.
8	Undertake research that improves conservation management practices.
9	Investigate the following research themes: • Traditional Aboriginal lifestyle and its continuity and post-contact Aboriginal history; • Oral histories and knowledge (where appropriate) of members of the Aboriginal and non-Aboriginal communities; • The history of scientific investigations; • The history of the eucalyptus distilling industry; • The contribution of women to the history of the park; • The traditional pastoral lifestyle and its contribution to the Australian ethos and its manifestation today; • The role which efforts to protect the values of the area played in the development of a conservation ethic in Australia; • The history of recreation in the park; and • The history of park management.

National Heritage List values

The identified NHL values for the Australian Alps National Parks and Reserves are also of direct relevance to this archaeological research design, particular the values with respect to criteria “a” and “d”, which are summarised below in Table 3.

Table 3: NHL values of key relevance

Criterion	Relevant Values
(a) the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.	The Australian Alps National Parks and Reserves (AANP) are part of a unique Australian mountainous region. Human interaction with the region has been distinctive in its response to the challenges and opportunities presented by this unique environment. **Transhumant Grazing** The AANP has outstanding heritage value for its association with historic transhumant grazing that commenced in the 1830s. The practice of using alpine high plains to graze stock during the summer months was a significant pastoral activity of the nineteenth and twentieth centuries and was continuously practised for a period of over 150 years; making a considerable contribution to the early pastoral industry of south-east Australia. Transhumant grazing created and sustained a distinctive way of life that is valued as an important part of Australia's pioneering history and culture. Evidence of transhumant grazing includes huts, the former grazing landscapes, stock yards, and stock routes. **Water Harvesting** Water harvesting in the AANP has outstanding heritage value to the nation for its contribution to the social and economic development of Australia. Water harvested from headwaters in the AANP contributes to the water needs of Canberra and Melbourne. The Snowy Mountains Hydro-electric Scheme and the Kiewa Valley Hydro-electric Scheme also contributes to the electricity needs of south-eastern Australia. Both schemes were major post-war reconstruction projects, encouraging migration to Australia and employing over 60,000 displaced persons from post war Europe. Evidence of water harvesting in the AANP for power and irrigation includes the major

Criterion	Relevant Values
	pondages along with the numerous tunnels, aqueducts, power stations, huts, roads and former settlements, town and work camp sites.
(d) the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places; or (ii) a class of Australia's natural or cultural environments.	The landscape is outstanding for demonstrating the use of mountain resources, namely the summer grasses and herbfields. As a relict landscape of past grazing leases it conveys the principal characteristics of transhumance and permanent pastoralism in a remote environment, these being large areas of open grassy landscapes between timbered ridges and hills, stockman's huts, homestead complexes, stockyards and stockroutes. The grasslands with swathes of pioneer shrubs include the Kiandra landscape, Boggy Plain, Nungar Plain, Gulf Plain, Wild Horse Plain, Tantangara Plain, Dairymans Plain, Currango Plain, Long Plain, Cooleman Plain, Kellys Plain, Blanket Plain, Peppercorn and Pockets Saddle (KHA 2008). Homestead buildings include Cooinbil and Old Currango and the modest homestead complexes of Currango and Coolamine with additional features including exotic plantings, sheds, barns, and workers' accommodation. Former stock routes, now fire trails, include the Port Philip Fire and Murrays Gap Fire Trails. Located in the former grazing leases are stockman's huts, Bill Jones Hut, Circuits Hut, Gavels Hut, Hains Hut, Hainsworth Hut, Millers Hut, Oldfields Hut, Pedens Hut, Pockets Hut, Townsends Lodge, Gavels Hut, Long Plain Hut, Gooandra Hut, Schofields Hut, and Witzes Hut (KHA 2008), which in their use and re-use of available materials typify a lifestyle and vernacular bush building technology using hand tools. The array of characteristics relate to over a century of alpine grazing

Heritage values and archaeological research

The cultural heritage values of particular relevance to the items that are the subject of the Snowy 2.0 Main Works HMP are pastoralism/transhumance, huts, mining, water harvesting and scientific research. The latter being of particular relevance to the management of geodiversity items and natural heritage. For the purposes of this archaeological research design, it is useful to consider how these cultural heritage values relate to the identified research requirements.

It is clear from the register of required research that there are a number of topics and themes that the research design for this project should aim to address. In addition to the themes identified at 9 in Table 2 it is incumbent upon this project to address, where possible, the following:

- adequate research and documentation of relevant oral histories relating to places and themes impacted by the project as well as associated people, flora and fauna;
- the relationship between oral histories and the history that is physically evidenced within and around the EIS boundary;
- associations between the places investigated and places across the broader region, NSW and Australia as a whole;
- identification of evidence for historic routes and connections between these routes and the sites/places being investigated;
- adequate recording, documentation and investigation of clusters of cultural heritage items, particularly where such clusters form an identified heritage precinct (e.g. Lobs Hole) or part thereof and/or where those clusters are directly impacted by the project;
- conclusions and inferences that will inform better decision making for future management of conserved items, assemblages, places and landscapes.

Building on these foundational concepts and themes, a number of research questions have been formulated that are applicable to:

- KNP and/or the broader Snowy 2.0 Main Works project area; or

- individual sites and/or precincts.

Research questions applicable to KNP and/or the broader Snowy 2.0 project area

The following questions have been identified as topics and issues likely to be relevant to understanding the broader archaeology of KNP and the Snowy 2.0 Main Works project area.

- How are particular themes and/or values evidenced?
- What can be inferred with regard to the cultural and natural taphonomic processes evidenced at sites and the implications for future conservation of similar sites?
- What patterns can be identified with regard to site types, locations, periods of use and associations with relevant historic routes?
- What patterns exist in terms of technologies, materials and/or construction methods evidenced across sites of a particular theme or period?
- How do sites of a particular period, type or function compare with similar site across NSW and Australia as a whole?
- What evidence is there of gender at sites and/or items of moveable heritage of a particular period, type or function, and what can be inferred regarding the contribution of women?
- What can be inferred regarding patterns and/or phases of pastoral occupation, and in particular transhumance?
- How are the different types and phases of mining evidenced?
- How has water management changed through time, and what evidence is there of associated environmental impacts?
- What evidence is there of regional, national and/or international commerce?

Research questions applicable to individual sites and/or precincts

The following questions include those that were identified for Early Works as well as new questions that have been identified in the process of developing this research design.

- What features are present at the item/complex?
- What can be inferred regarding site formation processes?
- Are there relatively intact archaeological deposits present? If so, what are the horizontal and vertical extents of those deposits?
- What evidence is there of the function of the item/complex?
- Is there evidence of different activity areas within the item/complex?
- What evidence is there of the relationships between items/complexes?
- Are different phases of use evidenced? If so, how?
- Can the phase(s) of use be dated? – i.e. can the decade(s) of use be determined?
- What is the overall chronology of the item/complex?
- Is there evidence that links the item/complex to particular individuals or groups?
- Is there any evidence of environmental/landscape change? If so, is there evidence of cultural causes or responses?
- What evidence is there of how the item/complex was constructed/modified/abandoned?

- What can be inferred regarding age, gender, ethnicity and social status? Are there demographic patterns associated with particular areas, periods or site types?
- To what extent were goods and materials produced/resourced locally? Are there patterns in what was produced/resourced locally, and is there evidence of this changing over time?
- To what extent were goods and materials sourced externally? e.g. from elsewhere in Australia or internationally. Are there patterns in what was sourced externally, and is there evidence of this changing over time?
- How does the archaeological evidence compare with the known, albeit limited historical record?
- How do the locations and layouts of items/complexes compare with official records? e.g. Crown plans, mine records, parish maps?
- How do the chronology, locations and layouts of items/complexes compare with oral histories?
- What spatial patterns are there in terms of particular site types or chronological periods? What can be inferred from these?
- How do spatial patterns in sites of a particular type or period relate to known contemporary routes?
- How do spatial patterns in sites of a particular type or period relate to known contemporary cultural and/or natural water resources?
- What similarities and differences are there between sites of the same type, period or geographic location?
- What further information can be found about the interdependent relationship between the historic occupation of Kiandra and Lobs Hole? Was Lobs Hole integral to the occupation of Kiandra during the late 1800s/early 1900s, or incidental?
- How did people live, work and play at Lobs Hole during the heyday of copper mining, and what was the nature of transition in the twentieth century to the single family farming enterprise (the Yan farm) which lasted until the 1960s.
- What was the nature of the Yan farming? Was it largely a self-sufficient enterprise or was a surplus exported and sold outside Lobs Hole?

Methodology

Given that the current investigations are an extension to a program of works that has already been approved and completed under a separate EIS, the methodology will broadly follow the same toolbox approach. A revised and refined version of that toolbox is provided in Table 4 through to Table 18. Further details of key components of the on-site historical heritage management program are also outlined below.

Archival Recording Methodology

Wherever archival recording is required, either as a standalone mitigation measure, or as a component of archaeological excavations, the fieldwork will be preceded by a review of available mapping. This will include reviews of:

- modern mapping data (e.g. Lidar and aerial imagery);
- historical mapping (e.g. parish maps, Crown plans and other surveys); and
- previous field recordings (i.e. existing archival records and/or other heritage surveys).

This review of mapping will serve to ensure that the archival recording encompasses all potential features, builds on existing data and directs an appropriate level of detailed recording on those

aspects of the site that are not already adequately documented. In this way the review of mapping will help direct the focus of both the archival photography and the accompanying survey and measured drawings.

Depending upon the nature of the site, its location and the nature and extent of vegetation in and around the site, it may be necessary to undertake vegetation clearance prior to some aspects of the in-field archival recording. At a minimum, broad level landscape archival photography would be undertaken prior to any such clearance. All vegetation clearance undertaken to assist with archival recording would be done by hand (i.e. with use of hand held tools) and would be overseen by the project archaeologist.

Vegetation clearance would only be conducted at sites inside the disturbance boundary (i.e. where construction impacts are anticipated) and would be conducted in accordance with the relevant Conditions of Approval.

The archival recording of sites will be cross referenced to temporary bench marks (TBM) with a known Australian Height Datum (AHD) and associated grid references (e.g. GDA 94). This will enable the survey data to be tied into broader level mapping and ensure that all records are consistent in terms of spatial data.

Archival photography will be undertaken at a landscape level, and on a site by site basis, with a digital single lens reflex (DSLR) camera utilising RAW image format capture. At a landscape level, the archival photography will aim to document panoramas to and from heritage items as well as the broad landscape setting of individual items and complexes. At the individual site/complex level, the photographic record will document the item in terms of general views from different perspectives, through to capturing the contexts of, and relationships between, individual site elements/features, as well as the details specific to those intra-site components. In addition to the metadata recorded by the camera for each image, a record will be kept of the subject (e.g. heritage item ID/component), date, the location from which the photograph was taken and the direction in which the camera is facing. Where relevant, this will be cross referenced to site plans or other mapping. Typically, a minimum of two photographs at slightly different exposures will be captured for each image, so as to reduce the risk of a particular component of the archival recording being inadequately documented due to poor image quality, or other recording defects.

In addition to the RAW image format archival photography, a series of overlapping still images and/or video footage will be captured with a hand held camera, drone, or pole mounted camera for the purposes of photogrammetry. Photogrammetry will be undertaken in instances where rapid 3D data collection will assist in recording large/complex features and/or where it will assist in providing imagery for later analysis or interpretation of the site.

Wherever possible (i.e. where vegetation and topography allow), a total station and/or differential GPS with cm accuracy will be used to survey in site layout, components, contexts and topography in three dimensions. The survey will be linked in to TBMs and the number/frequency of points surveyed will depend upon whether the survey forms the primary recording method or an ancillary recording method. In instances where the survey is an ancillary mode of site recording, a minimum of three reference points will be recorded in addition to any TBMs. These reference points will then also be incorporated into the primary survey mode (e.g. photogrammetry or tape and compass survey).

Where necessary, a laser level, or dumpy level, will be used to assist in recording heights across a site, feature or excavation. This style of levelling device may be used in instances where time or access constraints make use of a total station impractical and/or where use of a second levelling instrument will assist with multitasking the recording of a complex item.

In instances where vegetation cover, or other access constraints, make the use of total station, differential GPS and/or photogrammetry impractical as the primary mode of survey, basic methods of tape and compass recording will be used to survey in site elements/complexes. In such

instances, the preference will be to incorporate TBMs into primary baselines and to situate baselines through the middle of a site or feature. Wherever possible, two or more points along each baseline will also be surveyed in with the use of a total station. Tape and compass survey methods are more likely to be required at sites outside the EIS boundary, where vegetation cannot be removed, and hybrid or improvised survey techniques are required to capture all of the necessary data to document a site/feature.

A minimum of one in-field site plan will be drawn up during archival recording. Site plans will be drawn up “to scale” at a scale appropriate to the size and complexity of the site. Site plans will be produced to: assist in surveying and documenting features; as a means of contextualising the location of, or relationship between, site components and phases; and document cross refencing details between different components of the archival record.

Typically, site plans will be drawn on A3 paper/film or larger at a scale of 1:10, 1:20 or 1:50. Site plans at scales of 1:100 or 1:200 will typically be supplemented by additional plans at a higher level of detail. All site plans will include cross referencing to relevant TBMs, baselines and survey stations. Additional details such as feature/deposit descriptions, interpretive notes, photo locations, and other data may be recorded either directly onto the site plan, or onto a transparency overlay. All plans and overlays will be labelled, numbered and include relevant dates of survey and the personnel involved.

Archaeological Excavation

Where archaeological excavation is required, either as a component of the EIS management recommendations, as the result of unexpected finds, or as part of a review of impacts or site significance, the following methods will be implemented:

- temporary benchmarks will be established across the site in order to facilitate the recording of features and bagging/labelling of finds relative to the GDA94 Zone 55 grid.
- pins/posts will be surveyed in at 10 to 20m intervals across the site to provide baseline reference points for recording. Additional pins/posts will be added as required at 1m, 2m, or 5m intervals across areas of interest where hand excavation is conducted.
- vegetation clearance and archival recording will be conducted prior to the commencement of excavation. Archival level recording will continue throughout the excavation and also be implemented across the entire area of investigation upon the completion of the excavation program at a given heritage item/complex/location.
- the site will be stripped of surface vegetation and topsoil (i.e. grass and associated rootzone) through a combination of mechanical (e.g. 5 tonne rubber tracked excavator) and hand (e.g. hoe, spade and trowel) excavation; all mechanical excavation will be monitored/supervised by a qualified archaeologist and.
- investigation of the site will continue through a combination of mechanical clearance following site stratigraphy, sondages (by hand or machine) to quickly ascertain site stratigraphy/formation/integrity, and hand excavation of individual contexts.
- decisions regarding the sequence of excavation, identification of contexts and implementation of different excavation methods will all be overseen by the Excavation Director and/or Site Supervisor.
- all areas of mechanical excavation will be supervised by a qualified archaeologist and will be cleaned up by hand. Excavation will not recommence until the area has been adequately recorded including mapping and photography.

- records including context logs, context recording forms, Harris matrices, section drawings, site plans, finds logs, photography logs and site diaries will be maintained across all excavation areas.
- a sample of all hand excavated spoil (e.g. 10 buckets or 10% of the spoil) will be sieved through a maximum mesh size of 5mm. Where the sieved sample, or other onsite conditions warrant (e.g. fill deposits with high integrity and/or numerous small diagnostic finds) the entirety of the spoil from that context will be sieved. In such instances, a sample of the spoil will be sieved through a minimum 2mm mesh in order to ascertain which sieve size should be applied to the deposit.
- finds will be logged and bagged by context including details of their location within the GDA94 Zone 55 grid.
- excavation within a given feature/item/complex will cease when a culturally sterile layer has been reached, and sufficient information has been recovered to characterise the nature, extent and phasing of site use, and all relevant lines of investigation relating to applicable research questions have been pursued. All such decisions will ultimately rest with the Excavation Director.
- post-excavation analysis, research and reporting commensurate with the significance of the sites and the results of the archaeological investigations.

Methodological Toolbox

As outlined above in the introduction to the research design, the archaeological investigations for Mains Works will implement a similar methodological toolbox approach to what was developed for Early Works. This will assist in ensuring consistency across the two phases of historical heritage management and mitigation, thus also facilitating subsequent phases of comparative analysis across sites.

There are several modifications to the toolboxes that were developed for Early Works. Most notably, the master sheet has been simplified in order to function as a means of documenting on-site compliance (i.e. the management actions that need to occur on-site, as opposed to follow-on components in the laboratory or office) in order to deliver a clearance form that can be signed off by relevant members of the project heritage team (e.g. Project/Excavation Director, Project Manager or Site Supervisor). Other changes include the addition of a matrix of:

- management actions that can serve as a guide for members of the environmental management team to assist in identifying likely management tasks in different scenarios; and
- actions for unexpected finds that indicates the instances in which different actions are likely to be required.

These two additional toolboxes (Table 4 and Table 5 provide an overview of scenarios in which particular actions and components will be necessary (✓), unnecessary (×), or implementation will depend upon the individual factors specific to a given heritage item (?). Decision making surrounding the implementation of actions and components marked with a “?” will be guided by the project heritage team.

Each toolbox outlines different components relating to particular tasks or aspects of the mitigation measures, analysis, research, reporting and data archiving. Notes are also provided on what individual components might entail and the situations in which they would be implemented in order to achieve the overall research design aims and objectives and/or address the research questions outlined above.

The heritage impact mitigation works will be project managed by Rebecca Parkes and Alistair Grinbergs, Lantern Heritage Pty Ltd. The Primary Excavation Director for the archaeological investigation will be Dr Rebecca Parkes.

Table 4: Matrix of management actions and individual components/applications

Management Action	Components and Application			
No-Go Fencing		**Temporary**	**Permanent**	**Beyond EIS Boundary**
	Confirm site extent	✓	✓	✓
	Erect fencing	✓	✓	?
	Modify fencing	?	?	?
	Remove fencing	✓	✓	?
Archival Recording		**Broad Level /Landscape**	**Complex/Site/Item**	**Test/Salvage Excavation**
	Review Mapping	×	✓	✓
	Vegetation Clearance	×	?	✓
	Temporary Bench Marks	×	✓	✓
	DSLR RAW format photography	✓	✓	✓
	Photogrammetry	?	?	?
	Total Station Survey	×	?	✓
	Dumpy Level Survey	×	?	?
	Tape and Compass Survey	×	?	?
	Site Plan/Measured Drawings	?	✓	✓
Test/Salvage Excavation		**Test Excavation**	**Broad Area Salvage**	
	Vegetation Clearance	✓	✓	
	Archival Recording	✓	✓	
	Excavation Grid	✓	✓	
	Surface Collection	?	?	
	Topsoil removal	?	✓	
	Mechanical Excavation	✓	✓	
	Hand Excavation	?	✓	
	Section/Sondage	✓	✓	
	Sieving - sample	✓	✓	
	Sieving of entire context	?	?	
	Photography	✓	✓	
	Record Keeping	✓	✓	
	Finds Collection	?	✓	
	Samples	?	?	
	Post Excavation Analysis	✓	✓	
	Materials Conservation	?	?	
	Research Questions	?	✓	
	Reporting	✓	✓	
Moveable Heritage		**Return to Site**	**Long-term curation off-site**	
	Initial Archival Recording	✓	✓	
	Tag/Move	✓	✓	
	Temporary storage	✓	✓	
	Move to long term curation site	✓	✓	
	Final Archival Recording	✓	×	
Archival Research		**Research by Theme**	**Research by Place(s)/People**	
	State/National archives and libraries	✓	✓	
	Local archives and libraries	✓	✓	
	Oral history	?	?	
	Title/survey/plan searches	×	✓	
Interpretation Plan		**Project**	**Place/Complex/Item**	
	Integrate Early Works Results	✓	✓	
	Integrate Main Works Results	✓	✓	
	Identify Key Themes	✓	?	
	Identify Key Research Outcomes	✓	?	
	Online Resources	✓	?	
	Publications	✓	?	
	Signage	✓	?	

Table 5: Matrix of actions for unexpected finds by scenario

Actions	Scenario			
	Site Review	Monitoring	Construction	Human Remains
Stop work	✗	✓	✓	✓
Establish temporary No-Go fencing	✗	✓	✓	✓
Notify Environmental Manager	✓	✓	✓	✓
Notify Police/Coroner	✗	✗	✗	✓
Establish nature and extent of find	✓	✓	✓	✓
Assess significance	✓	✓	✓	✓
Notify/consult with NPWS	✓	✓	✓	✓
Notify government agencies	✓	?	?	✓
Develop management recommendations	✓	?	?	✓
Implement management actions	?	?	?	✓

Table 6: Heritage Team Site Clearance Form

ID:	Complex/Type/Feature:	Location:	Impacts:
Conditions of Consent:		**Management Measures:**	

CODE	Action	Date Completed	Components undertaken										
			i	ii	iii	iv	v	vi	vii	viii	ix	x	xi
A	Pre-clearance inspection												
B	No-Go Fencing												
C	Archival recording												
D	Excavation: test/salvage												
E	Moveable heritage												
F	Unexpected finds												
G	Data checks and backups												

Signed by (print name)……Excavation Director/Project Manager/Site Supervisor (circle)

Signature:……Date:……

Pre-Clearance Inspection/Site Review

Pre-clearance site reviews are required:

- In response to changes in site condition following the recent bushfires; and/or
- To review potential impacts in light of detailed design.

Table 7: Pre-clearance site review toolbox

CODE	Component	Notes – decision making criteria for utilisation
A-i	Site visit	A visit will be made to the location of the recorded site in order to check the extent, composition and condition of the site against the EIS site descriptions.
A-ii	Update mapping	Where necessary, the mapping of the site will be updated and relevant point, line and polygon shapefiles will be provided to Future Gen and Snowy Hydro.
A-iii	Update management recommendations	Where the updated condition or extent of the item is found to differ substantially from the EIS site descriptions and/or detailed design indicates that changes in impacts are anticipated, the management actions will be reviewed and updated as appropriate.

No Go Fencing

No-Go fencing, flagging or markers will be installed to reduce the risk of inadvertent impacts to heritage items within the disturbance area, in proximity to the construction boundary (i.e. within 20m, this may in the form of delineation of the project boundary); and/or to unexpected finds encountered during construction.

Table 8: No-Go fencing toolbox

CODE	Component	Notes – decision making criteria for utilisation
B-i	Temporary fencing	Temporary No-Go fencing will be established around unexpected finds and heritage items that require on-site management and mitigation actions.
B-iii	Permanent fencing	Permanent No-Go fencing will be established around items, or parts thereof, that are to be conserved/avoided.

Archival Recording

Archival recording will be implemented either as a standalone mitigation measure or in combination with other mitigation measures such as excavation.

Table 9: Archival recording toolbox

CODE	Component	Notes – decision making criteria for utilisation
C-i	Review mapping	A review of mapping will serve to ensure that archival recording encompasses all potential features, builds on existing data and directs an appropriate level of detailed recording on components that are not already adequately documented.
C-ii	Vegetation clearance	Depending upon the nature of the site, its location and the nature and extent and of vegetation in and around the site, it may be necessary to undertake vegetation clearance prior to some aspects of the in-field archival recording.
C-iii	Temporary bench marks	The archival recording of sites will be cross referenced to temporary bench marks (TBM) with a known Australian Height Datum (AHD) and associated grid references (e.g. GDA 94). This will enable the survey data to be tied into broader level mapping and ensure that all records are consistent in terms of spatial data.
C-iv	DSLR RAW format photography	Archival photography will be undertaken at a landscape level, and on a site by site basis, with a digital single lens reflex (DSLR) camera utilising RAW image format capture. Overall views and detailed views of all item/complex features will be collected in RAW format at all sites where archival recording is implemented. All photos will be entered in to a photography log recording subject, camera location and direction of view. Tripod and/or photographic board will be utilised as necessary.
C-v	Photogrammetry	In addition to the RAW image format archival photography, a series of overlapping still images and/or video footage will be captured with a hand held camera, drone, or pole mounted camera for the purposes of photogrammetry. Photogrammetry will be undertaken in instances where rapid 3D data collection will assist in recording large/complex features and/or where it will assist in providing imagery for later analysis or interpretation of the site.
C-vi	Total Station/Differential GPS Survey	Total station/Differential GPS (DGPS) survey will be used to map features, contexts and excavation grids in three dimensions. Depending upon the nature of the site and use/applicability of alternative survey techniques, total station/DGPS survey may comprise the primary means of site recording, be used to supplement other techniques, or may not be implemented (e.g. where vegetation makes survey impracticable).
C-vii	Dumpy/Laser Level Survey	Dumpy/laser level survey may be implemented in preference to total station survey where the focus is on recording levels for features that have been mapped by alternative means (e.g. tape and compass), across transects through features, and/or to supplement the recording of excavation levels.
C-viii	Tape and Compass Survey	Tape and compass style survey may be used to supplement or replace other survey techniques as required (e.g. spatially link items/features that cannot be comprehensively mapped via total station or drone).

CODE	Component	Notes – decision making criteria for utilisation
C-ix	Site Plan/Measured Drawings	A minimum of one in-field site plan will be drawn up during archival recording. Site plans will be drawn up "to scale" at a scale appropriate to the size and complexity of the site. Site plans will be produced to: assist in surveying and documenting features; as a means of contextualising the location of, or relationship between, site components and phases; and document cross refencing details between different components of the archival record.

Excavation

The scope of archaeological excavation will ultimately be determined by the nature and extent of archaeological remains, and the ability of those remains to address one or more the identified research questions. As such, the methodological approach to excavation includes components that will apply to all sites where excavation is conducted (e.g. establish site grid, removal of turf, bagging finds by context and grid square, record keeping etc), as well as notes on where specific techniques and approaches may be implemented.

Table 10: Excavation toolbox

CODE	Component	Notes – decision making criteria for utilisation
D-i	Excavation grid	Temporary benchmarks will be established across the site in order to facilitate the recording of features and bagging/labelling of finds relative to the GDA94 Zone 55 grid. Pins/posts will be surveyed in at 10 to 20m intervals across the site to provide baseline reference points for recording. Additional pins/posts will be added as required at 1m, 2m, or 5m intervals across areas of interest where hand excavation is conducted.
D-ii	Surface collection	Where artefacts are present at surface, and do not extend below surface, they will be collected and bagged/tagged.
D-iii	Vegetation/topsoil removal	The site will be stripped of surface vegetation and topsoil (i.e. grass and associated rootzone) through a combination of mechanical (e.g. 5 tonne rubber tracked excavator) and hand (e.g. hoe, spade and trowel) excavation; all mechanical excavation will be monitored/supervised by a qualified archaeologist.
D-iv	Mechanical excavation	Typically, mechanical excavation will be implemented for the purposes of removing fill, overburden and disturbed deposits, or in order to undertake sondages across portions of the site. All areas of mechanical excavation will be supervised by a qualified archaeologist and will be cleaned up by hand. Excavation will not recommence until the area has been adequately recorded including mapping and photography.
D-v	Hand Excavation	Hand excavation will be implemented where relatively intact occupation deposits are encountered, and/or where the use of a machine would potentially damage unexcavated components of the site.
D-vi	Section/Sondage	Excavation of a trench/sondage by machine or hand will be conducted to expose a representative sample of the archaeological resource within the site. Where this approach is used in a testing exploratory phase, open area salvage by stratigraphic context will commence if and when intact archaeological deposits are identified.

CODE	Component	Notes – decision making criteria for utilisation
D-vii	Sieving - Sample	A sample of all hand excavated spoil (e.g. 10 buckets or 10% of the spoil) will be sieved through a maximum mesh size of 5mm.
D-viii	Sieving of entire context	Where the sieved sample, or other onsite conditions warrant (e.g. fill deposits with high integrity and/or numerous small diagnostic finds) the entirety of the spoil from that context will be sieved. In such instances, a sample of the spoil will be sieved through a minimum 2mm mesh in order to ascertain which sieve size should be applied to the deposit.
D-ix	Photography	In addition to archival photography, photographic records will be kept of all excavated contexts and *in situ* special/diagnostic finds.
Dx	Finds Collection	All provenanced/diagnostic artefacts will be collected and bagged/labelled by material type (e.g. metal, ceramic, glass, bone). Bags/tags will be labelled with project name, item code/name, date, grid square(s), context and material. Where necessary/appropriate, additional inert materials/containers will be used to protect finds prior to bagging/tagging.

Moveable Heritage

Moveable heritage items within the Main Works footprint will be removed to ensure their long-term protection. They would be either returned to the area at the completion of the Snowy 2.0 project or incorporated into a curated collection/display.

Table 11: Moveable Heritage toolbox

CODE	Component	Notes – decision making criteria for utilisation
E-i	Initial archival recording	Each item subject to removal from the site will be archivally recorded in the first instance, as per the methodologies set out above. This would include at a minimum locational recording using GPS, photography and *in situ* site plan. Additional survey utilising other recording techniques will be implemented where additional levels of detail are required, or where the item is associated with other items/complexes. Digital and hard copies of the full catalogue records/inventory, site interpretation, storage requirements and any other necessary information for storage and display purposes will be provided to Snowy Hydro and NPWS.
E-ii	Tag/Move	Each item of moveable heritage will be assigned a unique identifier code; a Tyvek/metal label with that code will be either tied to the item (e.g. for larger items that cannot be bagged) or placed in a suitable bag/box with the item.
E-iii	Temporary Storage	Initially, the movable heritage will be stored at a Main Works compound. The item will then be transported to a Snowy Hydro temporary storage location (e.g. Lower Tumut works depot) for the duration of works.

E-iv	Move to long term curation site	Upon completion of construction works, the item will be either: • Returned to its original location; • Returned to an alternate location within the project area (e.g. in instances where the original location is not viable/suitable[1]); or • Incorporated into a curated collection/display managed by Snowy Hydro or NSW National Parks and Wildlife Service. All decisions regarding long term curation, inclusive of decisions regarding locations where items will be returned or stored, will be made by SHL in consultation with NPWS.
E-v	Final archival recording	All items returned to the project area will again be photographed *in situ* upon their return, in accordance with standard procedures for archival recording and their tag/bag removed. Updates to their location, context and condition will be completed by the project archaeologist.

Unexpected Finds

In the unlikely event that unexpected finds are revealed during construction and/or heritage impact mitigation works, the processes identified in Appendix E of the Heritage Management Plan will be followed.

[1] For example, if the original location has been modified such that the connection between the item and its surrounding landscape cannot readily be identified and interpreted, an alternative location will be sought that better respects the heritage significance of the item.

Data Checks and Backups

NB - Clearance notification to proceed with impacts/works will not be issued until these steps have been completed for a given item/complex.

Table 12: Data checks and backups toolbox

Code	Component	Notes on implementation
G-i	Check paper/digital records	All paper and digital records will be checked over at the end of the day and/or completion of work at a given item/complex. Where appropriate, they will be cross-checked with other relevant records (e.g. photo log against photos). Any identified errors or omissions will be addressed immediately, or at the next available opportunity to visit the site.
G-ii	Copy/scan paper records	All completed and cross-checked paper records will be copied or scanned daily. Both the hard copies and digital copies of the records will be filed by site and geographic zone.
G-iii	Create local backup	Local backups of all digital data will be made on multiple hard drives and updated on a daily basis.
G-iv	Create master backup	At a minimum, master backups (i.e. copies of files to Lantern Heritage office server/hard drive) will be made once a week.

Table 13: Sample Collection toolbox

CODE	Component	Notes – decision making criteria for utilisation
H-i	Geological samples	Geological samples (e.g. fossils, ore deposits or masonry) may be collected for future analysis and/or for the purposes of archiving samples. NB - The collection of samples does not necessarily imply that the sample will be analysed. Some samples may be later evaluated to be unsuitable in terms of the purposes for which they were collected, and/or samples may be archived for future analysis/research.
H-ii	Soil samples	Soil samples will be collected during excavations where the Project Director/Excavation Director/Geomorphologist deem that samples have the potential to address one or more of the identified research questions. It is anticipated that soil sample collection will be conducted as a matter of course during open area salvage excavation, and on a case by case basis where excavation does not proceed to open area salvage.
H-iii	Radiometric dating samples	It is anticipated that material culture finds (e.g. nails, glass, ceramics etc.) will be sufficient in most cases for determining site chronology. However, where alternative means of dating the site are unavailable **and** determining site age will assist in addressing one or more of the research questions, radiometric dating samples such as charcoal will be collected. Decisions regarding when and where to collect such samples will be made in consultation with the Project Director/Excavation Director/Geomorphologist.
H-iv	Material samples (e.g. brick, mortar, wood etc.)	Where possible/available, material samples, particularly samples of building materials, will be collected from all excavations.

Table 14: Materials Conservation toolbox

CODE	Component	Notes – decision making criteria for utilisation
I-i	Specialist Advice	Prior to commencement of excavation, advice will be sought from a specialist materials conservator regarding the equipment, storage facilities and standard procedures that might be anticipated on the basis of: features/materials known to be present, the environmental context of the item/complex, and potential/predicted finds. Any additional equipment that may be required will be planned/resourced as appropriate.
I-ii	In-field conservation	Where necessary, a specialist materials conservator will be contacted and/or brought into the field to assist with stabilising excavated finds and/or *in situ* remains. Removal of fragile items from an excavated context will not be conducted until all necessary equipment is at hand/specialist intervention organised/strategies are in place for stabilisation and storage of the item (e.g. fridge, freezer, drying facilities etc.).
I-iii	Post-excavation conservation	Prior to analysis of finds, advice will be sought from a specialist materials conservator regarding techniques for handling/cleaning/stabilising/storing fragile finds. Where necessary, the specialist will assess the assemblage and advise on appropriate conservation measures (preventive, stabilisation, storage etc).
I-iv	Long-term conservation	The archaeological team will liaise and work with a specialist materials conservator to develop any necessary long-term plans associated with curation and interpretation of the finds.
I-v	Monitoring	The condition of all collected/excavated finds will be monitored at regular intervals throughout the project to ensure that the implemented conservation strategies are functioning as intended. Advice will be sought from a specialist materials conservator for any issues/concerns identified regarding the stability of stored finds.

Table 15: Post fieldwork analysis of finds/samples toolbox

CODE	Component	Notes – decision making criteria for utilisation
J-i	Sorting	All artefacts will be sorted by material and according to type/function.
J-ii	Cleaning	Where necessary, artefacts will be cleaned prior to analysis and in accordance with appropriate conservation techniques/advice.
J-iii	Weighing	All artefacts/finds will be weighed. Diagnostic items will be weighed individually. Non-diagnostic items will be counted and weighed in bulk by material/type. NB – large items of moveable heritage will only be weighed where such data is relevant to their interpretation.
J-iv	Quantitative data	Other quantitative data regarding dimensions (e.g. length, breadth, thickness, diameter, cross section type etc) will be recorded and entered into the artefact catalogue.
J-v	Qualitative data	Descriptive data and notes will be recorded for all diagnostic finds and where appropriate for non-diagnostic finds.
J-vi	Photography	High quality digital images will be taken for representative diagnostic finds, either individually or as collections from a given square/context.
J-vii	3D scan/photogrammetry	3D scans/photogrammetry will be undertaken for diagnostic finds and/or items of moveable heritage where that level of recording will augment interpretation/curation of finds.
J-viii	Residue/pollen analysis	Samples/finds with potential for residue or pollen analysis will be assessed and analysed in accordance with their ability to answer identified research questions. Items not analysed will be curated appropriately in order to facilitate any future analysis.
J-ix	Radiometric dating	Samples collected for radiometric dating will be assessed and analysed in accordance with their ability to answer identified research questions.
J-x	Other specialist analysis	Other specialist analysis (e.g. analysis of composition/material/type for samples or finds) will be undertaken where such analysis will substantially assist with answering research questions.
J-xi	Conjoining	Conjoining of broken/damaged finds may be undertaken where it will assist with analysis or interpretation of finds. Specialist advice/assistance will be sought from a materials conservator prior to undertaking conjoining.
J-xii	Finds catalogue	All data collected during analysis will be entered into finds catalogue/database that will be appended to the final report and included in the digital archive.
J-xiii	Analysis	Broader analysis will include reviews of the horizontal and vertical distribution of finds/materials/types with reference to information regarding function/age/discard/context etc. The extent and direction of such analysis will be in accordance with the identified research questions and the ability of the assemblage(s) to address those questions. This level of analysis will include both intra and inter-site comparisons.

Table 16: Maps plans and other illustrations toolbox

CODE	Component	Notes – decision making criteria for utilisation
K-i	Shapefile of item/complex	Shapefile(s) will be generated for all items/complexes.
K-ii	Location overview map	Location overview maps will be generated for all items/complexes. These maps will typically show the locations of multiple items/complexes, together with their relationship to the project footprint.
K-iii	2D Site plan	Two-dimensional site plans will be prepared in digital format for all items/complexes where archival recording has been conducted. The scale and level of detail will be appropriate to the size, complexity and significance of the item/complex. Where excavation has been conducted, separate site plans will be produced for different stages of excavation (e.g. prior to turf removal, following turf removal, different stages of site use/occupation, and final excavation plans. The locations of all features, elevations and sections that appear in separate illustrations/plans will be indicated and cross referenced to the relevant plan.
K-iv	3D Site plan	Where three-dimensional data (e.g. Lidar, photogrammetry or total station survey) has been collected, additional 3D mapping will be prepared of relevant items/complexes.
K-v	Feature(s) detail plan	Where individual feature(s) have been recorded in detail within an item/complex, additional plans will be produced of those feature(s) and cross referenced to the relevant site plan.
K-vi	Elevation(s)	Where an item/complex, or components thereof, contains standing elements (e.g. walls), digital elevation drawings will be produced, and cross referenced to the relevant site plan.
K-vii	Section(s)	A minimum of one section drawing will be produced in digital format for all excavated sites. Where excavation has proceeded to broad area salvage, representative sections of all relevant components of the excavation will be produced. All section drawings will be cross referenced to the relevant site plan(s).
K-viii	Harris Matrix	A Harris Matrix will be prepared for each excavated item/complex that shows the relationships between all identified contexts in terms of their relevant phasing and periods.
K-ix	Archival photography plan	In addition to the abovementioned illustrations, a separate digital photography plan will be produced for all items/complexes where archival recording was conducted. The photography plan will show the location and direction of all DSLR RAW format photographs within the archival photography database. Where necessary, multiple archival photography plans will be produced for a given item/complex in order to map all relevant photographs.
K-x	Archival photography database	The RAW images from archival photography will be filed according to item/complex under their original image number/code. A database will be produced that includes details of the original image number/code, sequential item codes as shown in the archival photography plan, notes/descriptions and other relevant metadata. Hard copies of the database, thumbnail style images of all photographs, and representative full-sized images will also be included in the final report(s).

Table 17: Archival and historical research toolbox

CODE	Component	Notes – decision making criteria for utilisation
L-i	Oral history	A program of oral history recording has been ongoing throughout the development of the Snowy 2.0 project. This program will continue with a particular emphasis on documenting topics and themes relevant to the research questions and future interpretation of sites.
L-ii	Title searches/Crown plans	The review of title searches/Crown plans etc. will continue throughout the historical research program. Reviews of Crown plans and surveyors' notes will form an integral component of the review of mapping for archival recording.
L-iii	Trove/Online research	The Trove/online research will continue throughout the historical research program with a particular focus on the key values/themes identified in the KNP POM and the associated register of required research.
L-iv	Historical maps	The compilation and review of historical maps will continue with an emphasis on documenting historic routes and identifying connections between these routes and the sites that are the subject of this management plan.
L-v	Aerial images	The review of historic aerial imagery will continue throughout the historical research program. Historic aerial imagery has the potential to reveal further evidence of previous clearance, land use, historical track and other features.
L-vi	Historical photos	The compilation and review of historical photos will continue with an emphasis on identifying images that assist with interpretation and understanding of sites that are the subject of this management plan.
L-vii	Primary Sources	Further research of primary documents relating to the occupation and use of the Snowy Mountains will be conducted. In particular, research will focus on topics and themes relevant to the research questions and future interpretation of sites.
L-viii	Secondary Sources	Additional research into relevant secondary sources will be conducted where appropriate for the purposes of addressing research questions and future interpretation of sites.
L-ix	Comparative analysis	Additional research into archaeological investigations and heritage assessments of similar site types and complexes will be undertaken to assist with site interpretations and assessments.

Table 18: Reporting toolbox

CODE	Component	Notes – decision making criteria for utilisation
M-i	Aims/Objectives	The aims and objectives of the heritage mitigation works will be set out, including all research questions and any modifications to the aims and objectives that arose during fieldwork.
M-ii	Description/Inventory	An overview of all identified heritage items/complexes, including items identified during the EIS and any items identified in the course of Main Works and the associated mitigation program. Additional details/descriptions will be provided in the appendices.
M-iii	Methodology	The methodology section will detail all aspects of the field investigations and post-excavation analysis procedures that were undertaken.
M-iv	Maps/Plans/Sections/Photographs	All of the maps, plans, sections and representative photographs produced for each item/complex will be incorporated into the body/appendices of the report.
M-v	History	A revised and expanded history will be prepared that incorporates any additional information identified through further historical research. Any newly identified historical themes will be added to the historical themes overview.
M-vi	Results	All field results, including summaries of post-excavation analysis, will be documented. Where necessary, additional detail will be provided in the appendices.
M-vii	Discussion/Research questions	The field results and post-excavation analysis will be explored and discussed with reference to the identified research questions. Summaries of responses to all research questions will be documented, including explanations where particular questions could not be satisfactorily addressed.
M-viii	Significance assessments	The heritage significance of items/complexes will be reviewed and updated as appropriate in the light of the results of the heritage mitigation program.
M-ix	Interpretation Plan	Interpretation strategies will be developed with respect to particular themes, locations, chronological periods, site types etc.
M-x	Digital archive	Digital archives will be prepared of all data including plans, maps, photographs, artefact catalogues, historical documents/resources.
M-xi	Archival recordings – hard copies	Hard copies of all material produced for archival recordings will be prepared on appropriate archival quality paper.

APPENDIX E – UNEXPECTED FINDS PROCEDURE

Overview

In the event that any heritage objects/items, or potential/suspected heritage objects/items, are identified during the course of works, works in the immediate vicinity of the find will cease and the project archaeologist and Environmental Manager will be notified. The find will be inspected and assessed by the project heritage specialists. All construction that could potentially harm the objects or values will cease within 10 metres of the find.

Unexpected finds procedure - Aboriginal objects or values

Unmitigated impact (harm without salvage) to Aboriginal objects has been identified to occur at survey units listed in Appendix A. No further management is required.

In the unlikely event that unexpected Aboriginal objects or values are encountered during construction (such as very high artefact distributions in areas previously assessed to contain low densities), the following steps should be followed:

1. All construction that could potentially harm the Aboriginal objects or values must cease (within 10 metres of the find). Only construction that is required to comply with occupational and environmental health and safety standards and/or to protect the cultural heritage should occur.

2. The person who identified the Aboriginal objects or values must immediately notify the person in charge of the activity. The Project Superintendent or Foreman and the Future Generation Environmental Manager is to be notified.

3. The item is to be protected by the establishment of a no-go zone.

4. Future Generation's Environmental Manager (or their delegate) is to notify Snowy Hydro.

5. If the item is likely to be a human bone, follow the ancestral human remains process and notify the Police.

6. Works may continue outside of the minimum 10 metre barrier.

7. The project archaeologist is to be contacted and if required, conduct a preliminary assessment and recording of the item. The location and context of the Aboriginal object or value is to be recorded as determined by the project archaeologist.

8. Within five (5) days of the Aboriginal objects or values being discovered, the archaeologist or Future Generation Environmental Manager is to facilitate the involvement of any relevant RAPs and, in consultation, recommend the most appropriate course of action.

9. Where the item is an Aboriginal place or object as defined within the *National Parks and Wildlife Act 1974*, the discovery must be reported to Heritage NSW within a reasonable time of becoming aware of the location or discovery of the Aboriginal objects. This reporting is to occur in accordance with section 89A of the *National Parks and Wildlife Act 1974.*

10. The project archaeologist will assess the scientific significance of the Aboriginal objects or values. If the Aboriginal objects or values are assessed as being of:

    a) **Low scientific significance** (e.g. isolated artefacts or disperse/small artefact scatters less than three artefacts, eroding earth features) and where avoidance is impossible, no further work is required once the steps outlined above have been completed.

b) **Moderate or higher scientific significance**, it is preferable to avoid impact if possible. If avoidance is not possible, a salvage excavation should be undertaken, if relevant. The aims of the salvage excavation will be to obtain as much information as possible from the material and/or deposit.

- The archaeologist will facilitate the involvement of any relevant RAPs and develop a suitable methodology for salvage excavation in consultation with the RAPs. The location and context of the cultural heritage material is to be recorded in detail and an Aboriginal Site Impact Recording Form completed and submitted to Heritage NSW within four (4) months from the end of salvage excavations. A report detailing the excavation, analysis and results will be provided to Heritage NSW within twelve (12) months of completion of the salvage.
- In the event that Aboriginal objects are salvaged, regardless of significance, they must be curated in accordance with conventional archaeological practice, that is, the material must be identified, packaged, labelled with reference to provenance, appropriately catalogued and packed securely. The proponent must arrange for the secure storage of Aboriginal cultural material in a specified location until it can be transferred to the relevant RAPs or buried in country. A report will be produced to accompany the curated material.
- Curated Aboriginal objects together with the aforementioned report must be provided to the relevant RAPs within three (3) months of the salvage being completed.
- If reburial of any cultural material is to take place, it must be in accordance with the relevant RAPs requirements or to the satisfaction of the project archaeologist. The archaeologist must complete and submit any related Aboriginal Site forms to Heritage NSW within 30 days of the reburial taking place.

11. Work may commence within the area of exclusion when the project archaeologist, in consultation with Heritage NSW, confirms that:

    a) the appropriate protective measures have been undertaken;

    b) the relevant Aboriginal cultural heritage records have been updated and/or completed; and

    c) there is no other prudent or feasible course of action

Discovery of Human Skeletal Remains

If a burial site or human skeletal material is exposed during works, all relevant procedures for excavation and removal will be undertaken in accordance with the Policy Directive – Exhumation of Human Remains (NSW Department of Health 2008); Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977 (NSW Heritage Office 1998) and the Aboriginal Cultural Heritage Standards and Guidelines Kit (NPWS 1997).

Human skeletal remains must be handled in accordance with the *Public Health Act 1991* (NSW). Management of the remains is to be determined through liaison with the appropriate stakeholders (NSW Police Force, forensic anthropologist, DPIE, Heritage NSW, registered Aboriginal parties, a suitably qualified archaeologist, etc.)

The process below is to secure the skeletal remains until the remains are managed by the relevant authorities and stakeholders

The following process is to be followed:

- as soon as remains are exposed, work is to halt immediately, and the remains are not to be touched or interfered with in any way;
- establish an appropriate (minimum 10m) no go zone around the find;
- contact the Future Generation Environmental Manager, who will notify Snowy Hydro and local police;
- notify the project archaeologist and the NSW Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location;
- the local police may take control of the site or request photographs to determine whether the bones are human remains. Where this does not occur, a physical or forensic anthropologist should assess the remains, and make a determination of ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or forensic);
    - if the remains are identified as forensic the area is deemed as crime scene and will be handed over to police control; or
    - if the remains are considered to be Aboriginal, the discovery must be reported to Heritage NSW within a reasonable time of becoming aware of the location or discovery of the Aboriginal objects. This reporting is to occur in accordance with section 89A of the National Parks and Wildlife Act 1974. The discovery will also require reporting to DAWE (or the relevant Commonwealth government agency) in accordance with section 20 of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*. An Archaeological Management Plan will be prepared. An assessment will also occur to determine whether the impact is consistent with the Infrastructure Approval, or if modification is required; or
    - if the remains are non-Aboriginal (historical) remains (i.e. a 'relic' under the *Heritage Act 1977*), the site is to be secured and Heritage NSW is to be contacted and an Archaeological Management Plan will be prepared.

Where human skeletal remains uncovered during project activities are to be removed, this will be undertaken in a sensitive and dignified manner. Approval from NSW Health, under the *Public Health Act 1991* (NSW), will be required prior to removing/exhuming any skeletal remains. Controlled excavation and removal by the site archaeologists and other appropriate specialists (forensic anthropologist, registered Aboriginal parties, NSW Police Force, as appropriate) will be undertaken in accordance with relevant guidelines and any requirements of Heritage NSW, DPIE and NSW Health.

Unexpected finds procedure – Historic and Natural Heritage

In the event that any heritage items, or potential/suspected heritage items, are identified during the course of works, works in the immediate vicinity of the find will cease and the project archaeologist and environmental manager will be notified. The find will be inspected and assessed by the project heritage specialists.

Unexpected finds such as structural components (e.g. comprised of bricks, sandstone, timber, and/or metal), isolated objects and/or archaeological features (e.g. post holes or pits) that may or may not be associated with artefacts such as broken ceramic and glass need to be assesses to determine if they are relics.

A 'relic' under the Heritage Act is defined as any deposit, object or material evidence that:

- relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; and
- is of State or local heritage significance.

If relics or item suspected to be a relic are discovered during project activities the following steps will be taken:

- as soon as a relic is exposed, work within 10m of the find is to halt immediately;
- an appropriate (minimum 5m) no go zone will be established around the around the find;
- a suitably qualified archaeologist will be consulted. Photos may be sent to the archaeologist, or an inspection may occur, to assess the find;
- if the archaeologist determines that the find is a relic, Heritage NSW will be notified under Section 146 of the *Heritage Act 1977* within a reasonable timeframe. NPWS will also be notified;
- works will not recommence in that area until all necessary management measures are implemented, and a heritage clearance certificate provided by the heritage specialist.

Unexpected finds procedure – Karst Features

It is noted that no karst features are anticipated to be encountered during Snowy 2.0 Main Works. In the unlikely event that unexpected karst features are encountered during tunnelling works, the following steps will be followed:

- activities at the work face will cease. Only construction that is required to comply with work health and safety standards and/or to protect the karst feature will occur;
- the Project geotechnical engineer will immediately notify the Construction Manager and Blast Contractor (if and where blasting is occurring) of the find. The Environmental Manager is also to be notified;
- an initial assessment of the feature will be made by the Project geotechnical engineer. This will include the size of the feature and the level of intactness;
- the Environment Manager will notify Snowy Hydro and NPWS of the feature and the outcomes of the initial assessment;
- where a karst feature is identified, recording and assessment of the feature will be carried out immediately by the Project geotechnical engineer including photography, video and sampling (if indicated). Works may recommence following completion of the investigation and following confirmation of geotechnical stability of the work site;
- in the very unlikely event of a large karst feature being uncovered (e.g. larger than the diameter of the tunnel face) works would cease while additional geotechnical investigations are completed. This would include investigation of the feature along with work to ensure the structural integrity of the tunnel;
- a report would be written by the Project geotechnical engineer and provided to Future Generation within 4 weeks of the event. Following this the report will be provided Snowy Hydro and NPWS.

APPENDIX F – EXPLORATORY WORKS CONSOLIDATED CONDITIONS OF APPROVAL (SSI-9208)

Table F 1 details the conditions from the Exploratory Works Infrastructure Approval which are relevant to heritage and demonstrates where these conditions are addressed or are no longer relevant.

Table F 1: Exploratory Works conditions of approval relevant to heritage (SS9208)

Condition	Requirement	Where addressed
Aboriginal Heritage		
Sch 3, Cond 11	The Proponent must ensure that the development does not affect any Aboriginal heritage items outside the approved disturbance area (see Appendix 3).	The Main Works Infrastructure Approval identifies a consolidated construction envelope for both exploratory works and main works. The protection of Aboriginal Heritage items outside this area is discussed in Section 5.1.1
Sch 3, Cond 12	The Proponent must undertake archival recording, test excavation and/or salvage of the items listed in Table 3-1 in Appendix 3, in accordance with the approved program under the Aboriginal Heritage Management Plan.	Test excavation and/or salvage of the items listed in Table 3-1 in Appendix 3 has been undertaken for exploratory works. An Aboriginal heritage salvage report for exploratory works and main works (Section 6.5.2) will be provided by Snowy Hydro to the DPIE, Heritage Council and RAPs.
Sch 3, Cond 13	The Proponent may damage the Aboriginal heritage items listed in Table 3-2 of Appendix 3 without carrying out any further management or mitigation measures.	Impact to Aboriginal heritage items listed in Table 3-2 of Appendix 3 has occurred as part of exploratory works. Unmitigated impact for Main Works is identified in Appendix A.
Sch 3, Cond 14	Prior to carrying out any development that could affect the Aboriginal heritage items listed in Table 3-1 in Appendix 3, unless the Planning Secretary agrees otherwise, the Proponent must prepare an Aboriginal Heritage Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	An Aboriginal Heritage Management Plan was prepared for both Stage 1 and Stage 2 of Exploratory Works by Dr Julie Dibden in accordance with this condition prior to carrying out any development that could affect the Aboriginal heritage items listed in Table 3-1 in Appendix 3. This Main Works HMP has been prepared by Dr Julie Dibden (for the Aboriginal Heritage component) in accordance with Main Works CoA 35. Details of experienced person/s who have prepared the plan are identified in Section 1.8
	(b) be prepared in consultation with the NPWS, BCD, RAPs, NPWS Tumut Brungle Gundagai Aboriginal Community Executive Advisory Committee;	An Aboriginal Heritage Management Plan was prepared for both Stage 1 and Stage 2 of Exploratory Works by Dr Julie Dibden in consultation with NPWS, BCD, RAPs and NPWS and Tumut Brungle Gundagai Aboriginal Community Executive Advisory Committee. Details of

Condition	Requirement	Where addressed
		consultation for the plan are identified in Section 1.9.
	(c) include a description of the measures that would be implemented to mitigate the impacts of the development on the Aboriginal heritage items listed in Table 3-1, including: • test excavation and salvage of certain sites; and • archival recording of cultural features within the approved disturbance area shown in Appendix 3;	Test excavation and/or salvage of the items listed in Table 3-1 in Appendix 3 has been undertaken for exploratory works. An Aboriginal heritage salvage report for both exploratory works and main works (Section 6.5.2) will be provided by Snowy Hydro to the DPIE, Heritage Council and RAPs.
	(d) include a description of the measures that would be implemented to	
	• maintain reasonable access for Aboriginal stakeholders to cultural heritage sites on site;	Section 1.9.3
	• consult the RAPs on the conservation and management of Aboriginal cultural heritage onsite;	Section 1.9
	• protect and monitor the Aboriginal heritage sites outside the approved disturbance area;	The Main Works Infrastructure Approval identifies a consolidated construction envelope for both exploratory works and main works. The protection of Aboriginal Heritage items outside this area is discussed in Section 5.1.1
	• manage the discovery of human remains or previously unidentified Aboriginal artefacts;	Appendix E
	• store and manage any salvaged Aboriginal heritage items; and	Snowy Hydro to undertake consultation with NPWS, Section 1.9.3
	• ensure workers on site receive adequate training and inductions on Aboriginal heritage management.	Section 6.2
Sch 3, Cond 15	The Proponent must implement the approved Aboriginal Heritage Management Plan for the development.	This Plan
Historic and Natural Heritage		
Sch 3, Cond 16	The Proponent must ensure that the development does not affect:	
	(a) any historic heritage items outside the approved disturbance area (see Appendix 4 [of the Infrastructure Approval]); and *Note this condition should reference Appendix 3 of the Exploratory Works Infrastructure Approval.*	The Main Works Infrastructure Approval identifies a consolidated construction envelope for both exploratory works and main works. The protection of Aboriginal Heritage items outside this area is discussed in Section 5.1.1

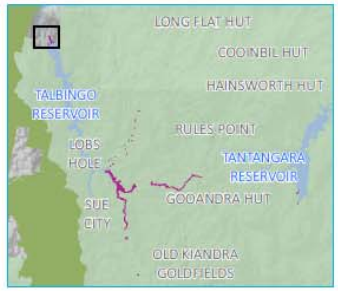
Condition	Requirement	Where addressed
	(b) the historic heritage items listed in Table 4-2 in Appendix 4 [of the Infrastructure Approval]. *Note this condition should reference Table 3-3 in Appendix 3 of the Exploratory Works Infrastructure Approval.*	The Main Works Infrastructure Approval (Appendix 4) supersedes the avoid impact mitigation for all items identified in Appendix 3 of the Exploratory Works Infrastructure Approval. Impacts will be avoided to R20 (Washington Hotel) and R118 (Ravine Cemetery). Refer to Section 5.3.2. Impacts are permissible with the proposed mitigation identified in Appendix C of this Plan to R9, R14, R48, R49, R50, R56, R57, R58, R74, R70 and R88.
Sch 3, Cond 17	The Proponent must undertake archival recording, test excavation and/or salvage of the items listed in Table 4-1 in Appendix 4 [of the Infrastructure Approval] in accordance with the approved program under the Historic and Natural Heritage Management Plan. *Note this condition should reference Table 3-4 in Appendix 3 of the Exploratory Works Infrastructure Approval.*	Archival recording, test excavation and/or salvage of the items listed in Table 3-4 in Appendix 3 has been undertaken for exploratory works. An excavation report for exploratory works will be provided by Snowy Hydro to the NSW Heritage Office, DPIE, NPWS and local libraries within one year of completion of exploratory works or will be combined for consistency with the Main Works historic heritage archaeological report (see Section 6.5.4).
Sch 3, Cond 18	Within one year of the completion of the archival recording, test excavation and salvage works required under this approval, unless the Planning Secretary agrees otherwise the proponent must:	
	(a) produce a detailed archival record, to publication standard, of the salvage, excavation and storage of heritage artefacts and history of settlement and mining in the Lobs Hole Ravine area; and	An excavation report for exploratory works will be provided by Snowy Hydro to the NSW Heritage Office, DPIE, NPWS and local libraries within one year of completion of exploratory works or will be combined for consistency with the Main Works historic heritage archaeological report (see Section 6.5.4).
	(b) provide a copy of this record to the Heritage Council, NPWS, Department, and relevant local libraries.	An excavation report for exploratory works will be provided by Snowy Hydro to the NSW Heritage Office, DPIE, NPWS and local libraries within one year of completion of exploratory works or will be combined for consistency with the Main Works historic heritage archaeological report (see Section 6.5.4).
Sch 3, Cond 19	The Proponent must: (a) minimise the impact of the development on the:	
	• fossiliferous beds and boulder streams on Lobs Hole Ravine Road;	Section 5.4.3 and Section 5.4.1

Condition	Requirement	Where addressed
	(b) for the fossiliferous beds disturbed by the Lobs Hole Ravine Road upgrade works:	Excavation of the representative sample(s) from the face of the existing cuttings has been undertaken and carefully controlled to ensure that fossils are relatively undamaged in the process.
	• retain a representative sample of spoil from the fossiliferous beds, and	
	• carry out scientific research on this sample of spoil;	
	(c) for the boulder streams disturbed by the Lobs Hole Ravine Road upgrade works: • undertake detailed mapping of the block stream extents and morphology; and • prepare a detailed archival record of the block streams, prior to disturbing the block streams;	Section 5.4.1
	(d) ensure the development does not adversely affect the tufa deposits at the former copper mine, Lick Hole Gully and Cave Gully and the Former Copper Mine shown in Appendix 4; and *Note this condition should reference Appendix 3 of the Exploratory Works Infrastructure Approval.*	Section 5.4.2 Sections of road works will impact directly on roadside tufa (Tufa A, Tufa B East and West) as identified in the Main Works EIS.
	(e) carry out a detailed investigation of any unidentified karst features intercepted during the tunnel works.	Appendix E
Sch 3, Cond 20	Prior to carrying out any development that could affect the historic or natural heritage items listed in Conditions 16, 17 and 19 above, unless the Planning Secretary agrees otherwise, the Proponent must prepare a Historic and Natural Heritage Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	A Historic and Natural Heritage Management Plan was prepared for both Stage 1 and Stage 2 of Exploratory Works in accordance with this condition prior to carrying out any development that could affect the historic or natural heritage items listed in condition 16,17 and 19. This Main Works HMP has been prepared by Rebecca Parkes and Leah Moore (for the Historic and Natural Heritage components) in accordance with Main Works CoA 35. Details of experienced person/s who have prepared the plan are identified in Section 1.8
	(b) be prepared in consultation with the BCD and NPWS;	A Historic and Natural Heritage Management Plan was prepared for both Stage 1 and Stage 2 of Exploratory Works by n in consultation with NPWS and BCD. Details of consultation for the plan are identified in Section 1.9.
	(c) describe the measures that would be implemented to:	The Main Works Infrastructure Approval identifies a consolidated construction envelope for both exploratory works and main works. The protection of Aboriginal Heritage items outside this area is discussed in Section 5.1.1
	• protect the historic heritage items outside the approved disturbance area;	

Condition	Requirement	Where addressed
	• mitigate the impacts of the development on the historic heritage items listed in Table 4-1, including a detailed archaeological research design and excavation program for the proposed test excavations;	Archival recording, test excavation and/or salvage of the items listed in Table 3-4 in Appendix 3 has been undertaken for exploratory works. An excavation report for exploratory works (Section 6.5.46.5.2) will be provided by SHL to the NSW Heritage Office, DPIE, NPWS and local libraries within one year of completion of exploratory works.
	• protect and minimise the impacts of the development on the natural heritage items referred to in condition 19 above;	Refer to condition 19 where addressed column
	(d) include a detailed program for the archival recording of the history of settlement and mining in the Lobs Hole Ravine area;	This detailed program was presented in Appendix B of the Historic and Natural Heritage Management Plan for Stage 1 Exploratory Works and has not been carried over, as it has been undertaken.
	(e) include a program to:	
	• carry out scientific research on the representative sample of spoil from the fossiliferous beds disturbed by the Lobs Hole Ravine Road upgrade works and publicly report on the findings of this research;	Excavation of the representative sample(s) from the face of the existing cuttings has been undertaken and carefully controlled to ensure that fossils are relatively undamaged in the process.
	• undertake field mapping and photographic recording of the block streams disturbed by the Lobs Hole Ravine Road upgrade works;	Section 5.4.1
	• carry out a detailed investigation of any unidentified karst features intercepted during the tunnel works and publicly report on the findings of this investigation; and	Appendix E
	• provide educational interpretative signage of the fossiliferous beds and boulder streams;	Section 1.9.3
	(f) describe the measures that would be implemented to:	
	• manage the discovery of human remains and previously unidentified heritage items;	Appendix E
	• relocate moveable historic heritage items within the disturbance area;	Section 1.9.3
	• store and manage any salvaged heritage items;	Section 1.9.3
	• investigate any unidentified karst features discovered during the tunnel works; and	Appendix E
	• ensure workers on site receive adequate training and inductions on historic and natural heritage management; and	Section 6.2
	(g) include a program to:	

Condition	Requirement	Where addressed
	• undertake baseline monitoring of the condition of the historic and natural heritage items that must be protected;	Section 6.1. This has been undertaken as part of exploratory works.
	• monitor the impacts of the development on the historic heritage items referred to in condition 16 above; and	Section 6.1. Refer to where addressed column in condition 16 above for further context.
	• monitor the impacts of the development on the natural heritage items referred to in condition 19 above.	Section 6.1. Refer to where addressed column in condition 19 above for further context.
21	The Proponent must implement the approved Historic and Natural Heritage Management Plan for the development.	This Plan
37	The Proponent must implement the Wide Cut Design Option for any excavation required on the upside slope side into the boulder streams for upgrading Lobs Hole Ravine Road. Note: The layout of upgrade is shown in Appendix 2.	Section 5.4.1
37A	Prior to carrying out the upgrades to Lobs Hole Ravine Road within the boulder streams, the Proponent must prepare detailed plans for the proposed upgrades in consultation with the NPWS, and to the satisfaction of the Secretary. These plans must: (a) avoid impacts on the downslope section of Block Stream B; (b) minimise the extent of excavation into the upslope block streams; (c) minimise moving or damaging blocks in areas beyond the excavation zone; (d) ensure the remaining sections of the boulder streams are safe and stable, using stabilization measures that would maintain the landscape values of the streams to the greatest extent practicable and maximise their visibility for future viewing; (e) minimise the use of outside materials onto the block streams (such as soil or fill); (f) include suitable drainage controls to ensure water flow through the upslope block streams are not impeded; and (g) include a program to monitor the implementation of the plans; and if necessary, undertake corrective action to maintain the stability of the block streams. The Proponent must implement the approved plans for these road upgrades.	Section 5.4.1
Note: All archival recording, test excavation and/or salvage of the items listed in Table 3-1 in Appendix 3 of the EIS were undertaken in Stage 1 in accordance with the approved Exploratory Works Stage 1 HNHMP		

APPENDIX G – COMBINED HERITAGE MAPS



KEY

- Historic site
- Heritage survey unit
- Exploratory Works disturbance footprint
- Waterbody
- Watercourse
- Main road
- Local road
- Vehicular track

Source: EMM (2019); Snowy Hydro (2019); LPI (2019); SMEC (2019); DFSI (2017); GA (2015); LPMA (2011); NSW Archaeology (2019)

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GDA 1994 MGA Zone 55

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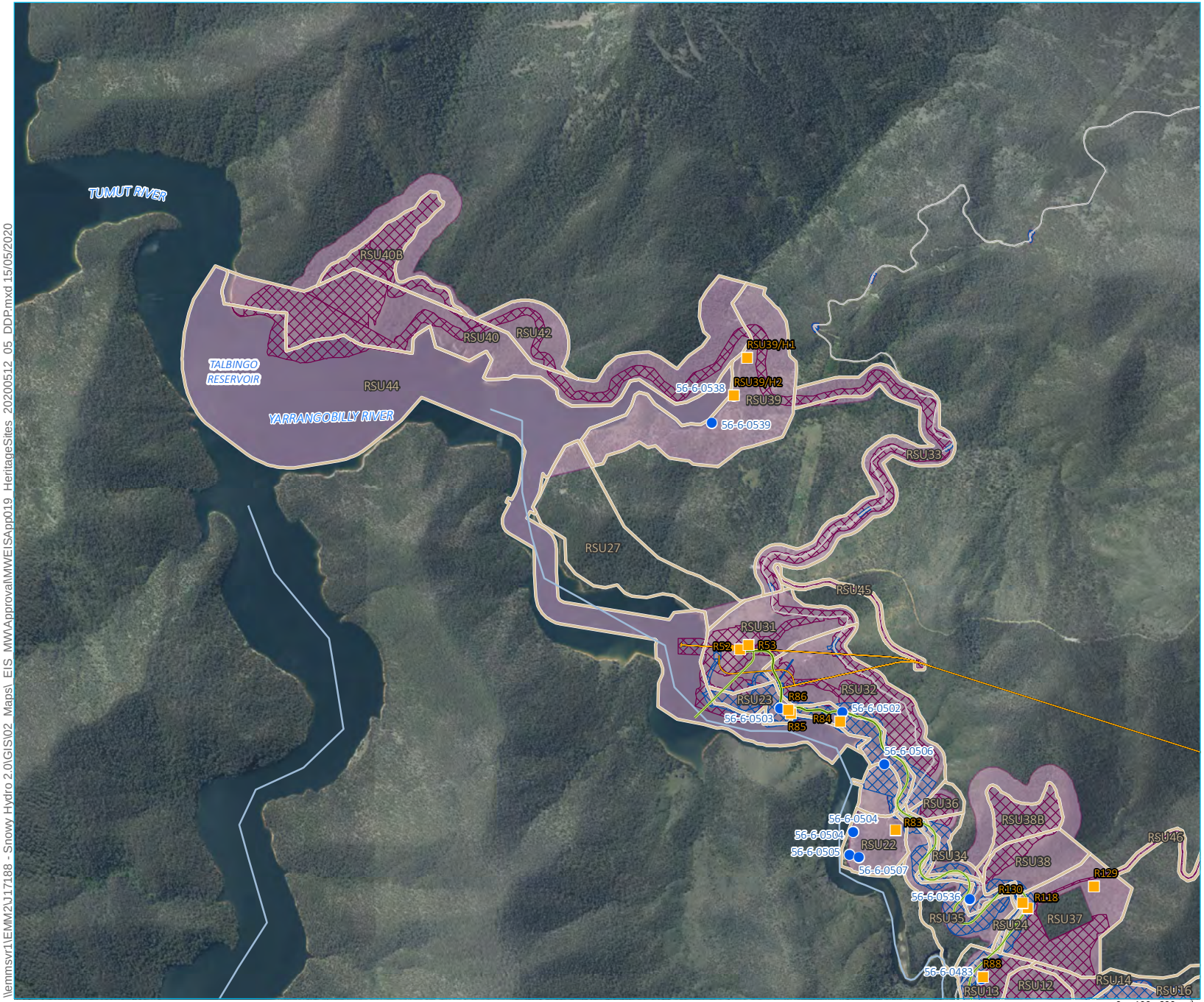
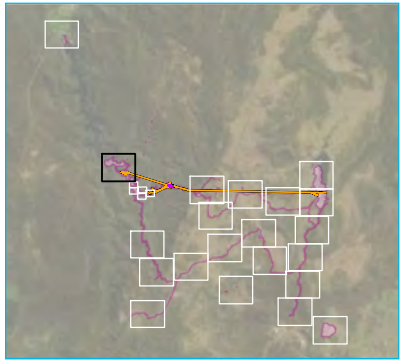
Aboriginal and historic heritage sites - Talbingo

Snowy 2.0
Exploratory Works EIS
Modification 1
Figure A 1

snowy2.0

EMM creating opportunities





KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.1

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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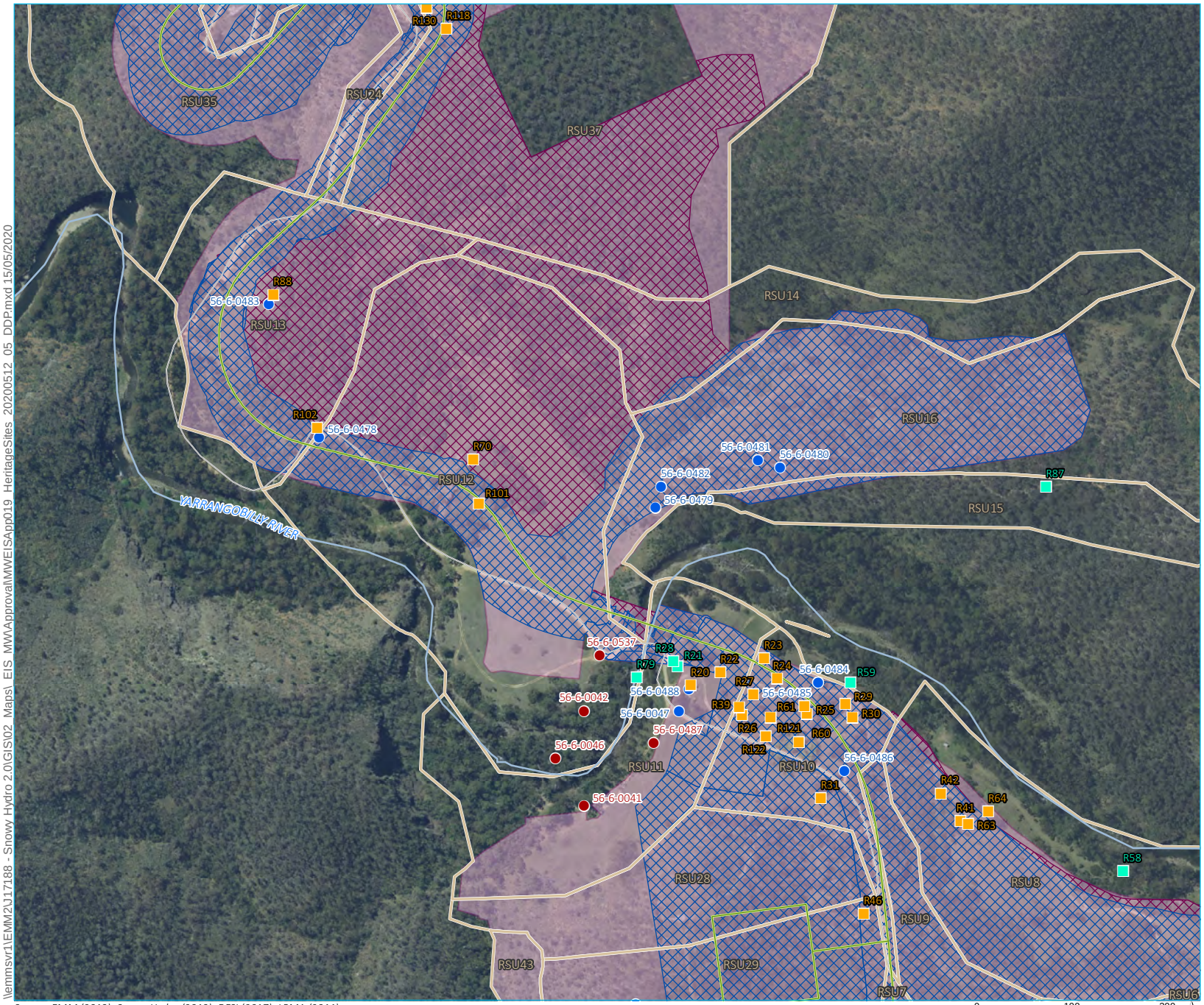

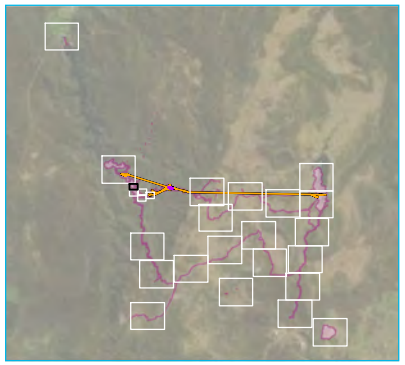

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.2

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Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

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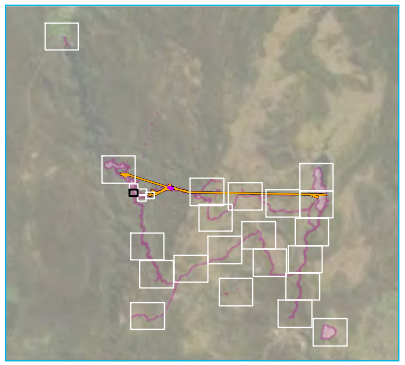
snowy 2.0

EMM creating opportunities



KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.3

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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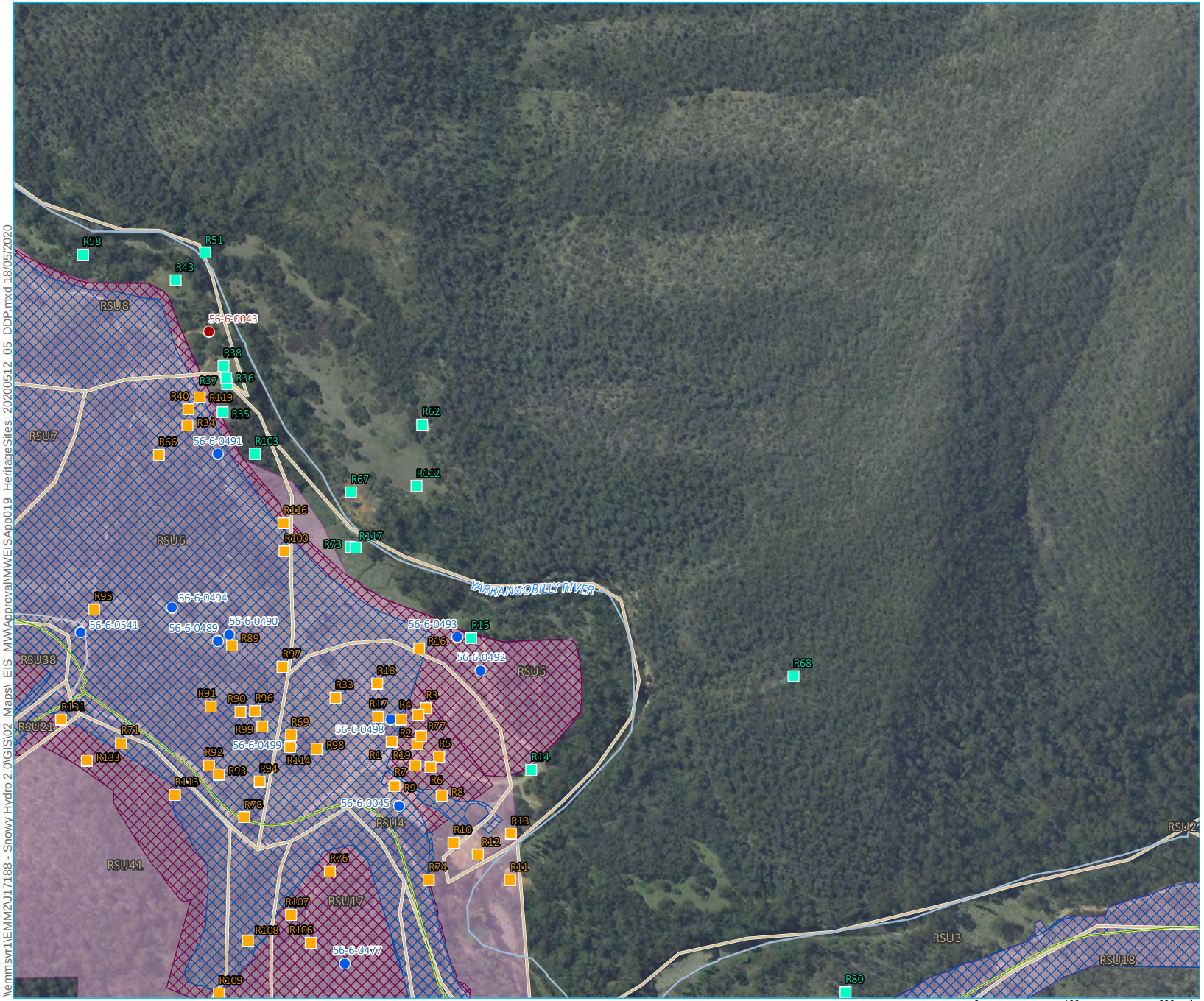

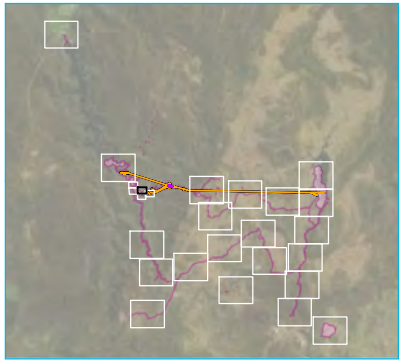

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

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Snowy 2.0
Main Works
Figure 3.1.4

snowy2.0

EMM creating opportunities

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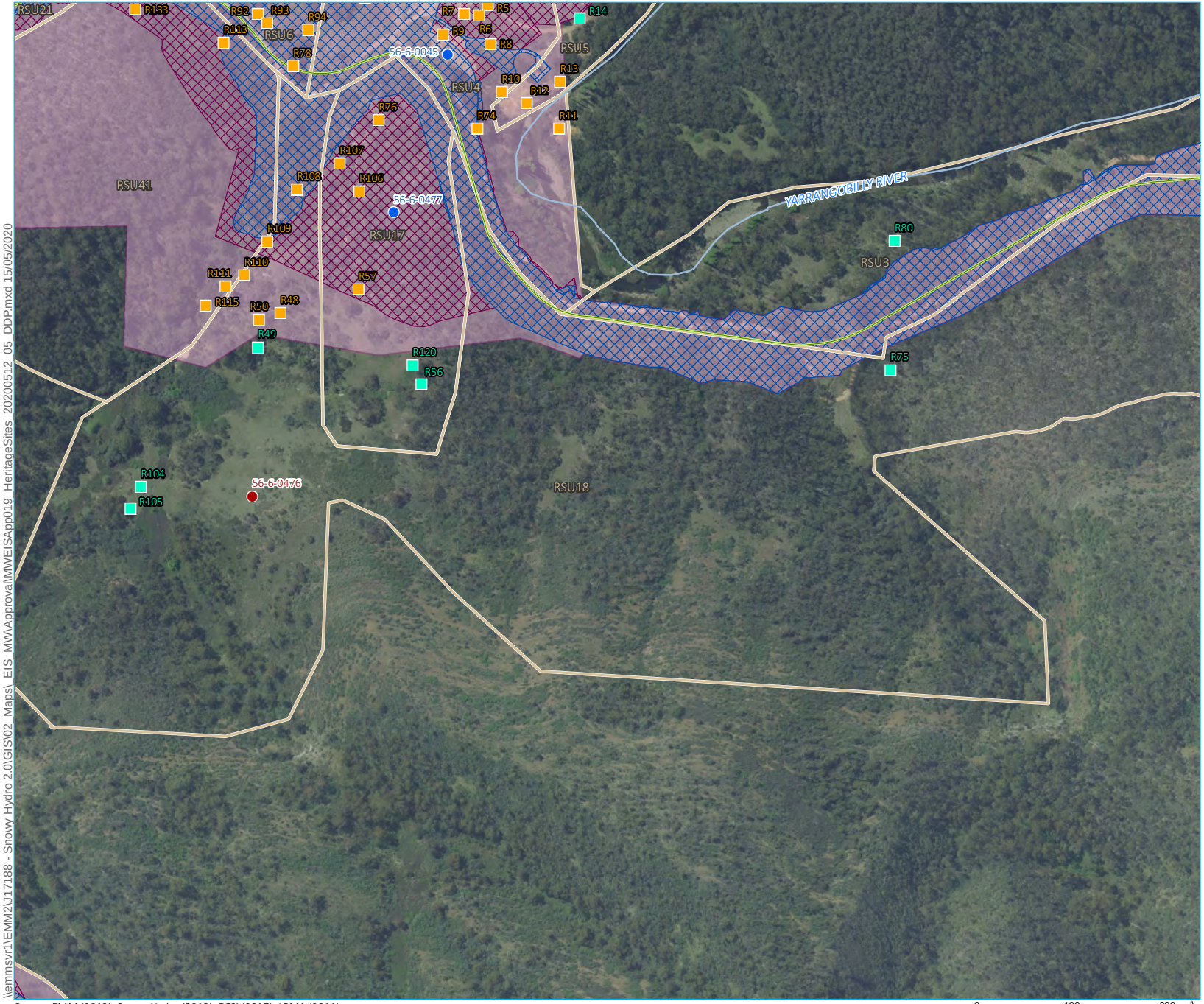

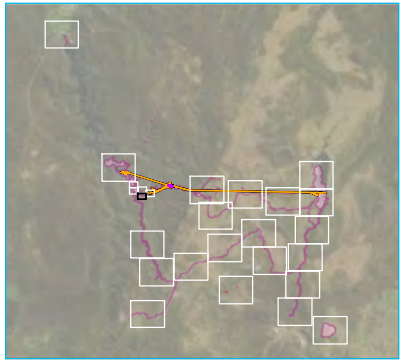

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.5

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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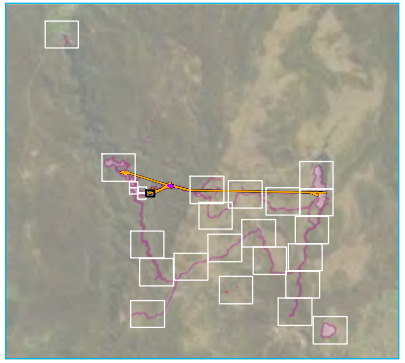

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.6

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

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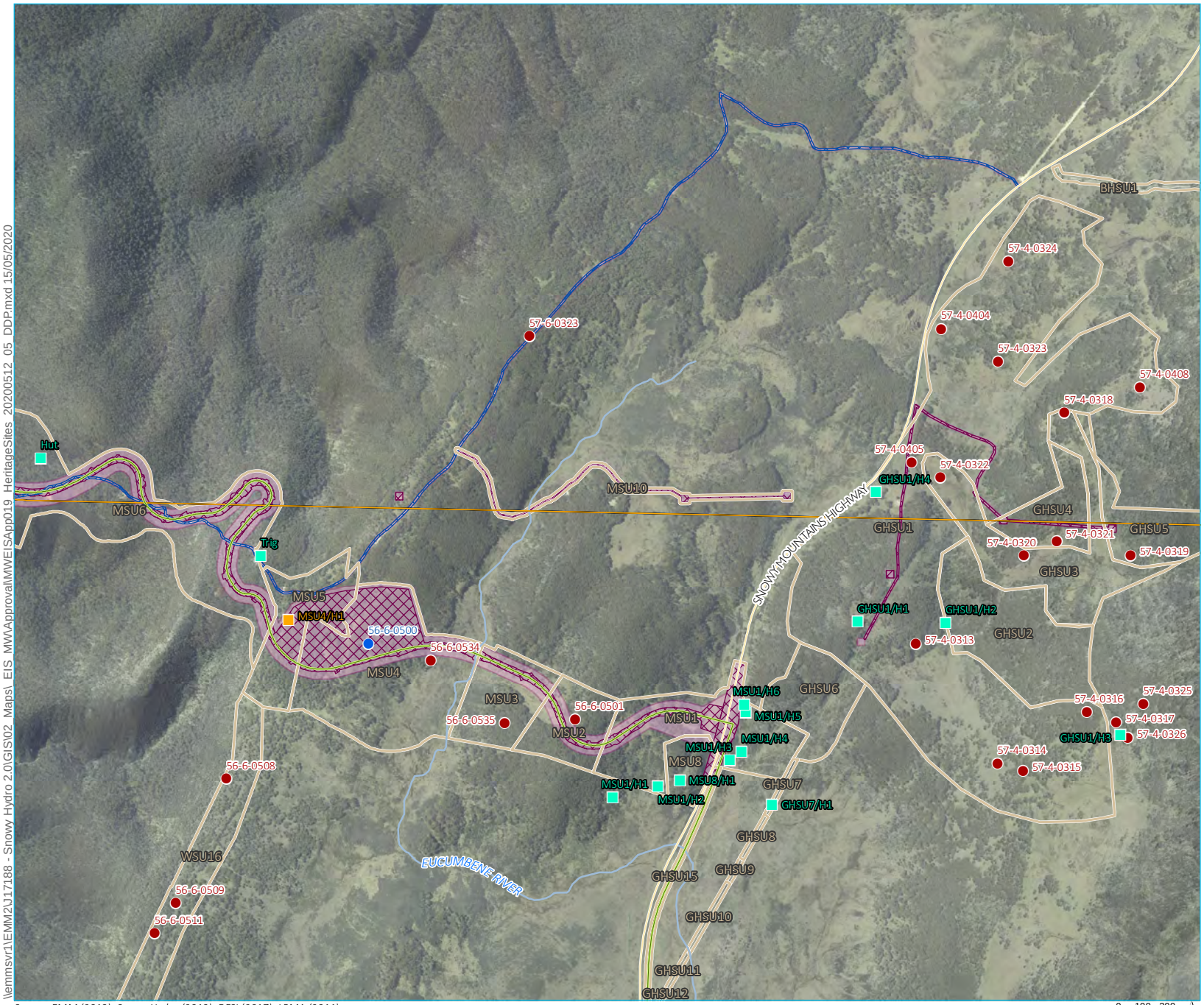

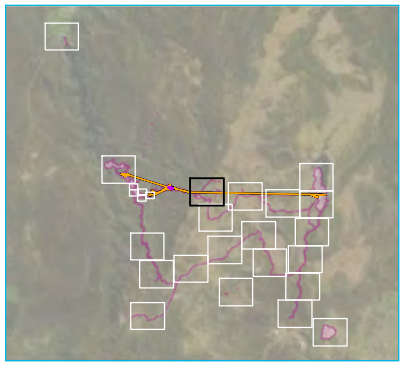

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.7

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

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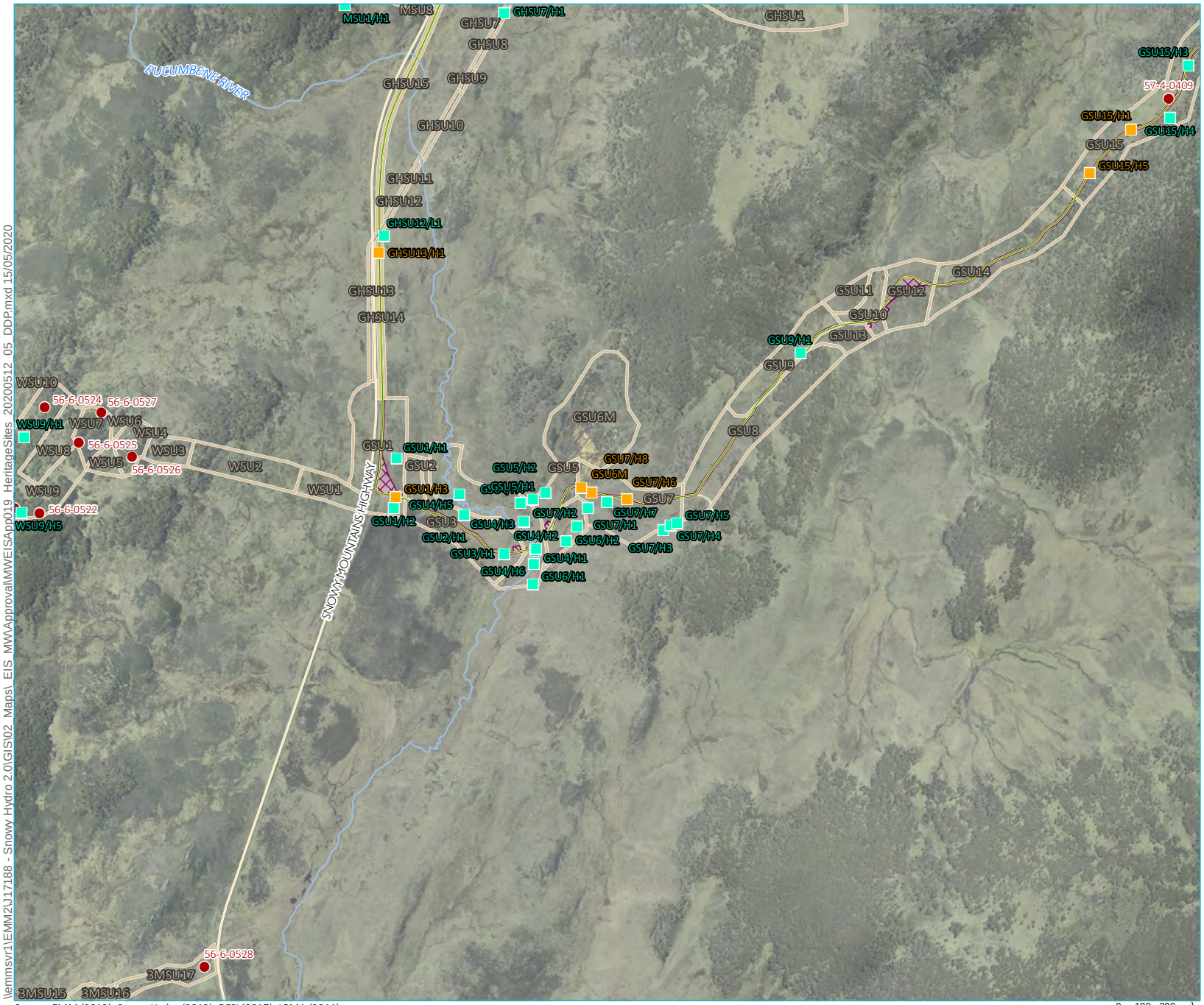
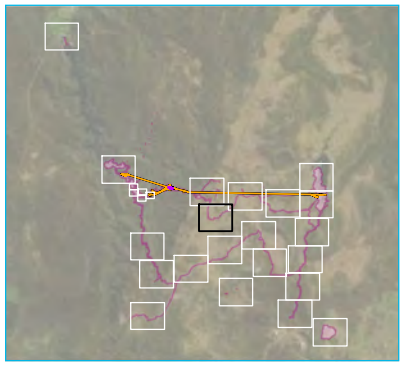




KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

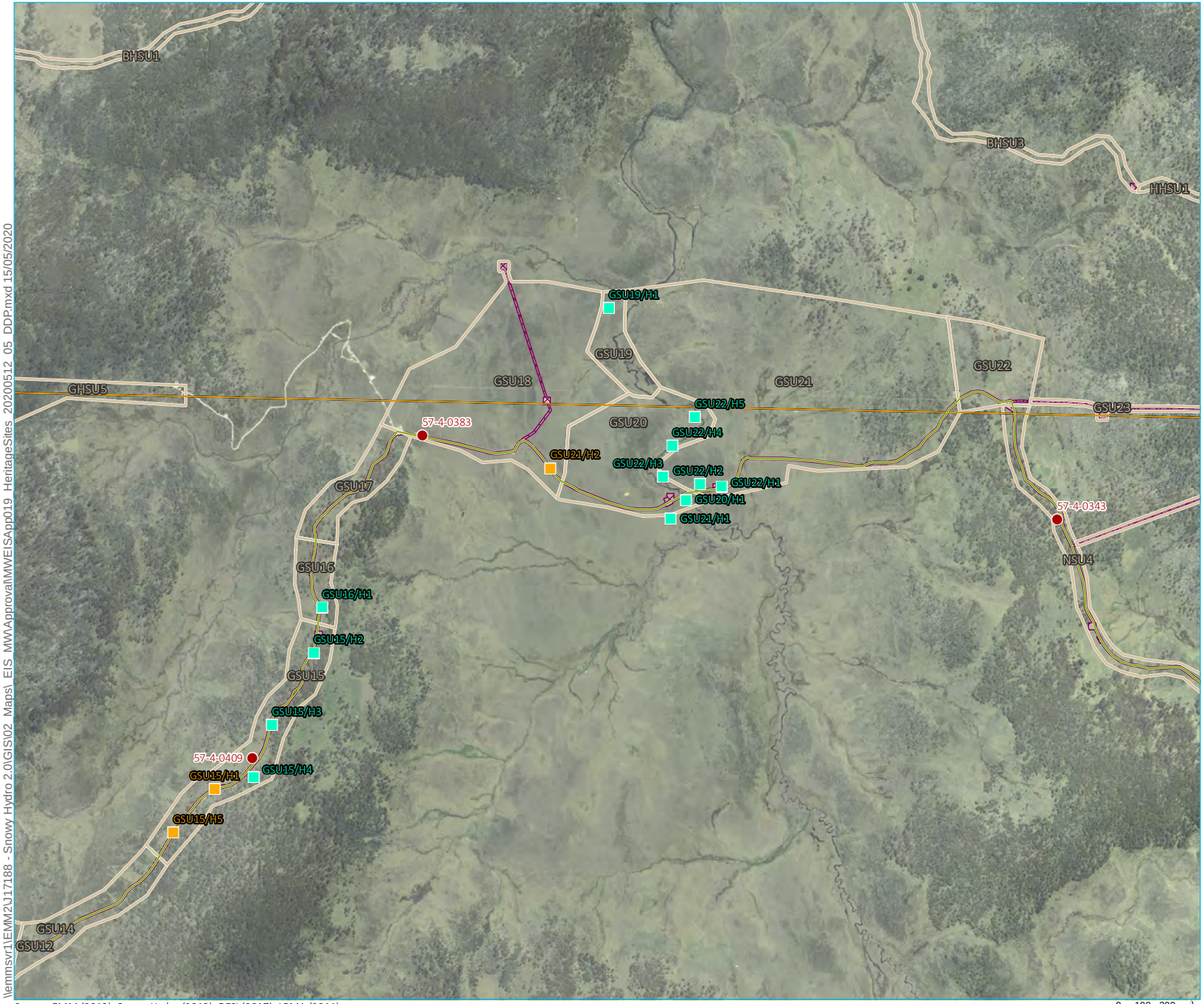
0 100 200 m

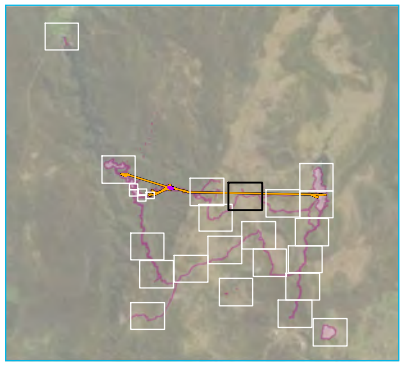
GDA 1994 MGA Zone 55

N

Snowy 2.0
Main Works
Figure 3.1.8

\\emmsvr1\EMM2\117188 - Snowy Hydro 2.0\GIS\02 Maps\ EIS MW\ApprovalMWEISApp019 HeritageSites 20200512 05 DDP.mxd 15/05/2020





KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

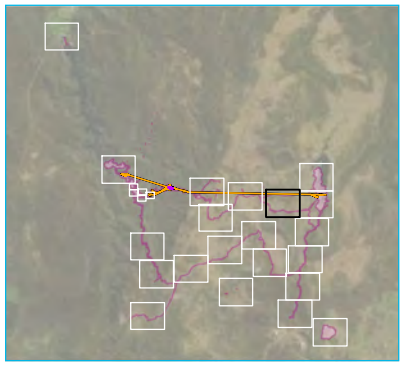
N

Snowy 2.0
Main Works
Figure 3.1.9

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\117188 - Snowy Hydro 2.0\GIS\02 Maps\ EIS MW\ApprovalMWEISApp019 HeritageSites 20200512 05 DDP.mxd 15/05/2020



KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

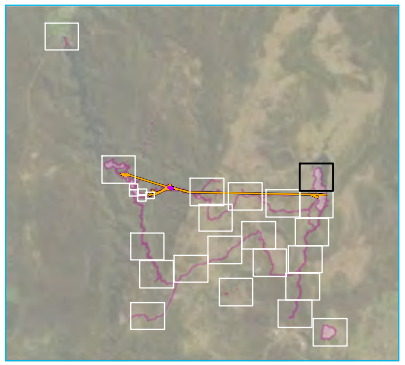
Snowy 2.0
Main Works
Figure 3.1.10

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\117188 - Snowy Hydro 2.0\GIS\02 Maps\ EIS MW\ApprovalMWEIS\App019 HeritageSites 20200512 05 DDP.mxd 15/05/2020



KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.11

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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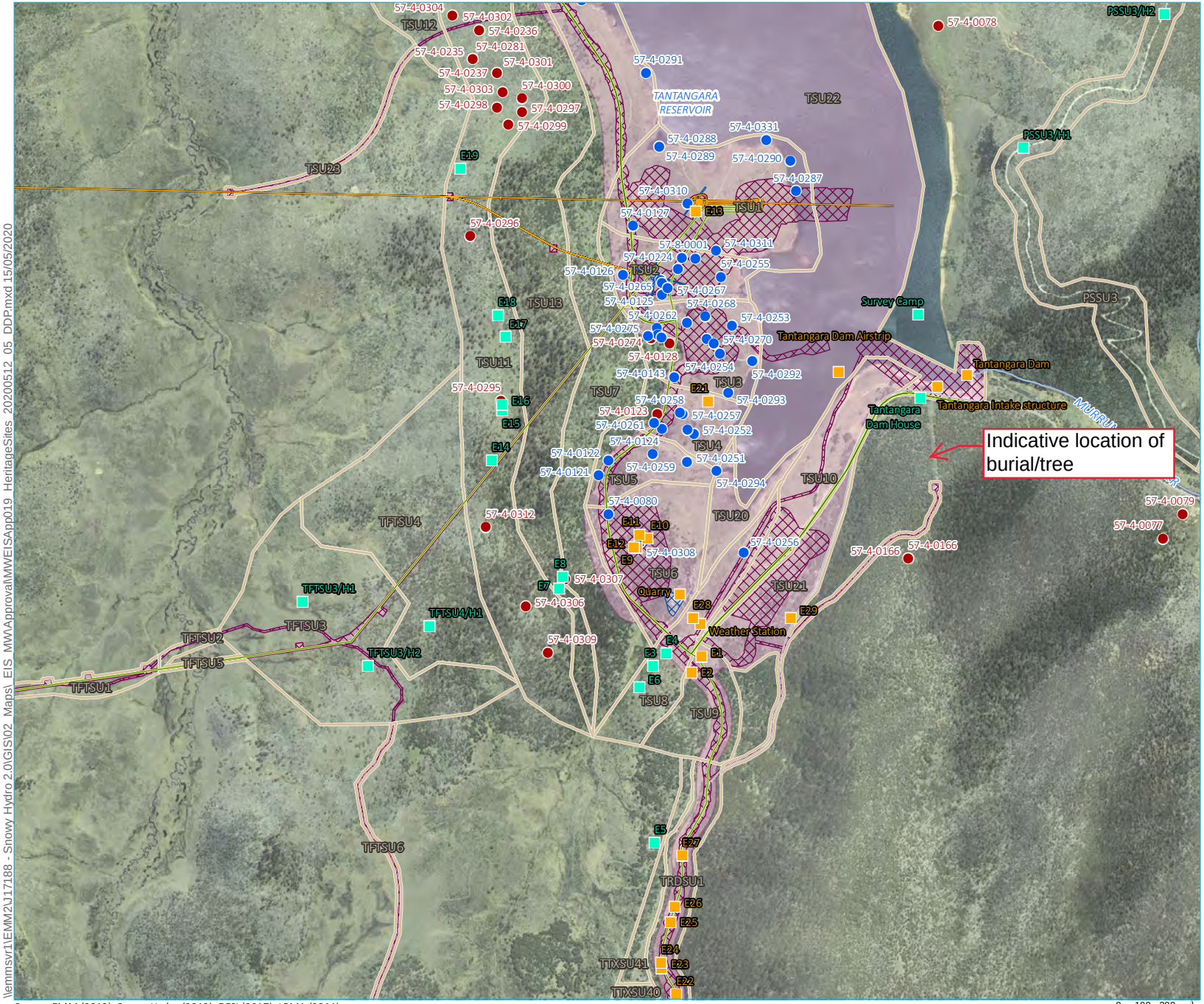

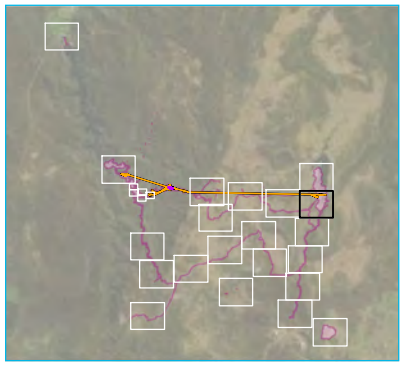

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.12

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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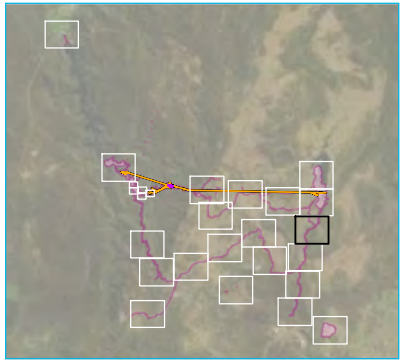

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.13

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

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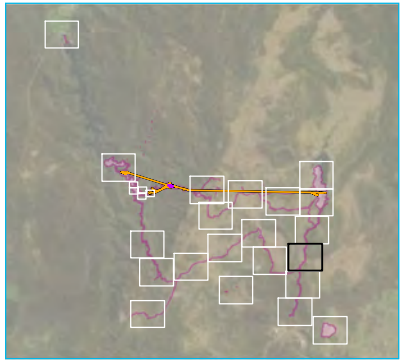

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.14

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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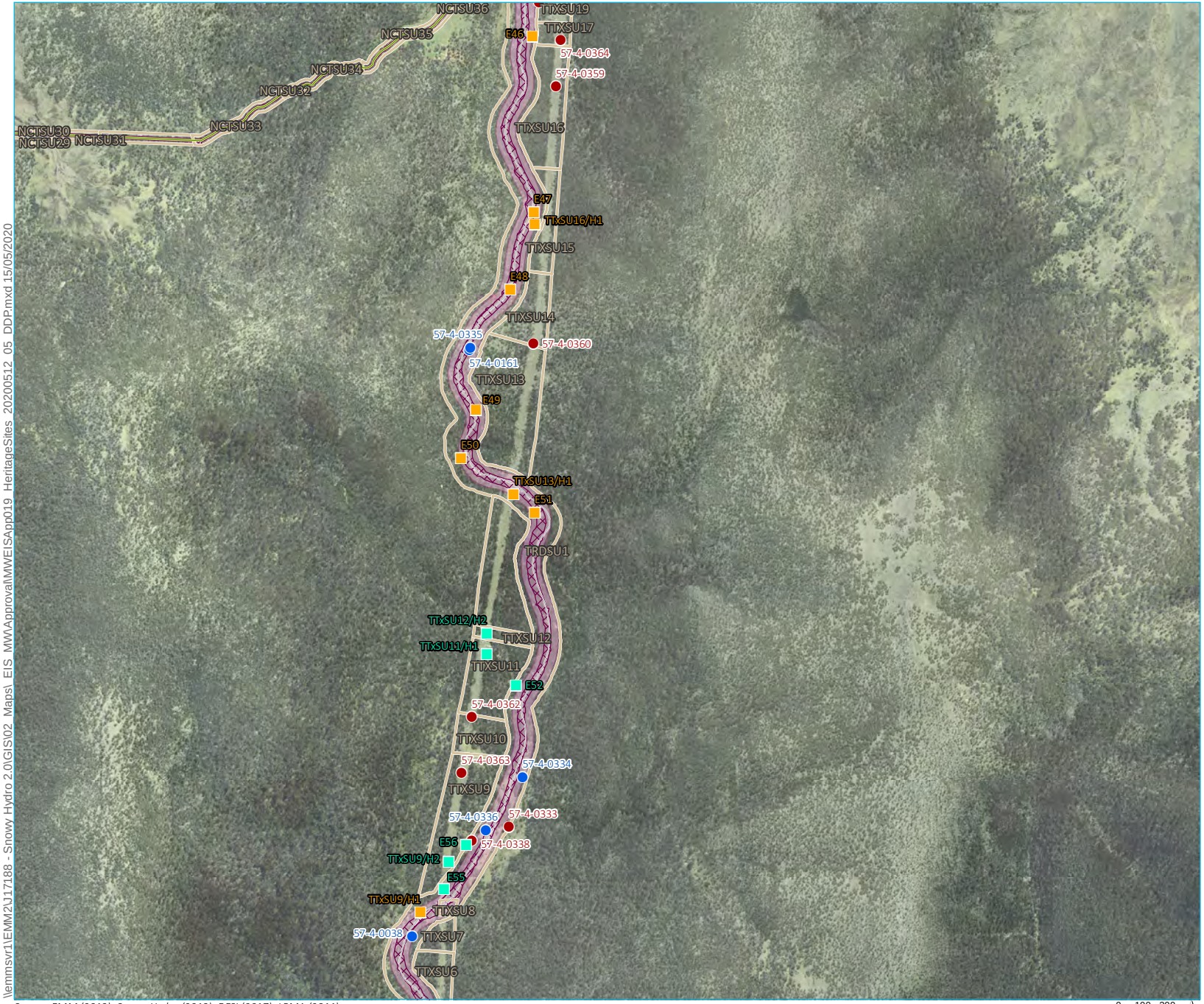

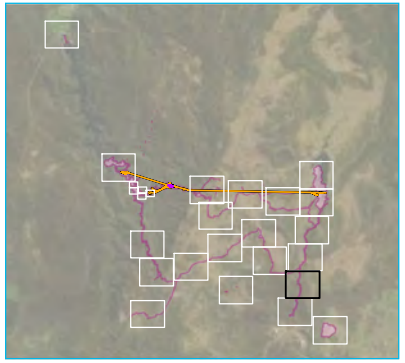

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.15

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55
N

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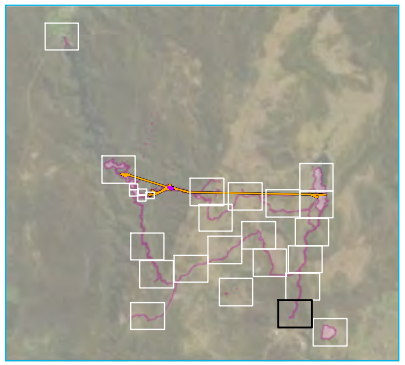

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

Snowy 2.0
Main Works
Figure 3.1.16

snowy 2.0

EMM creating opportunities

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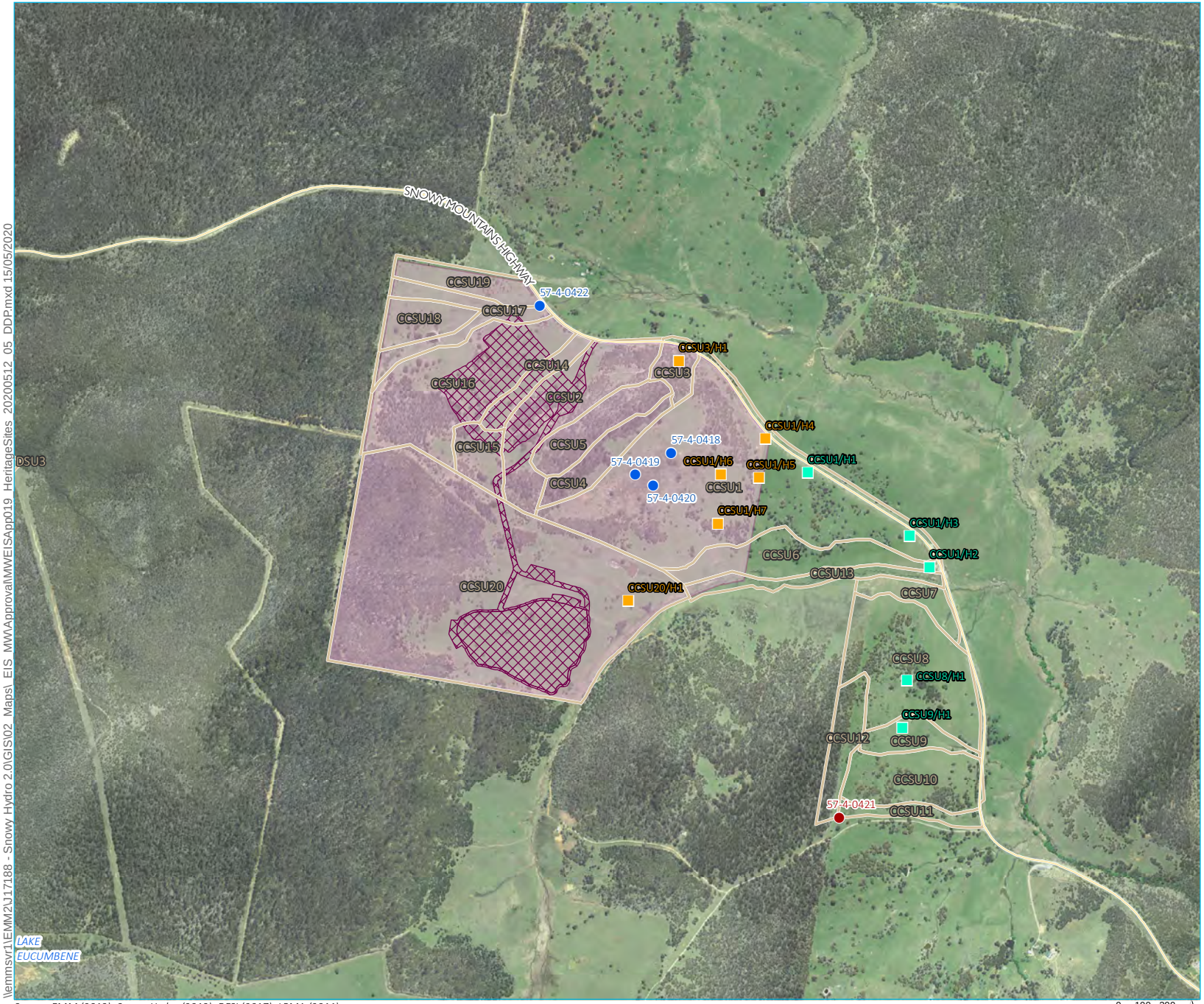

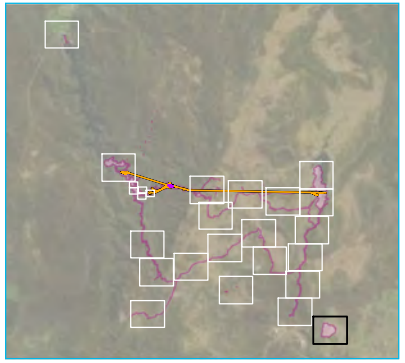

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

Snowy 2.0
Main Works
Figure 3.1.17

snowy 2.0

EMM creating opportunities

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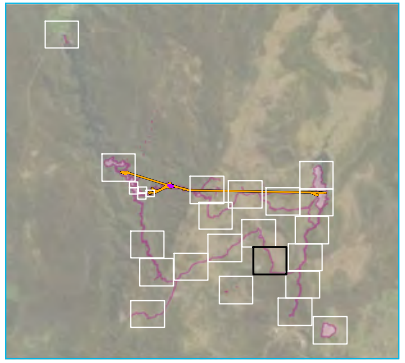

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.18

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

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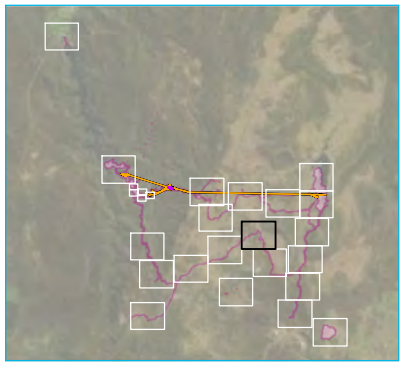

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.19

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

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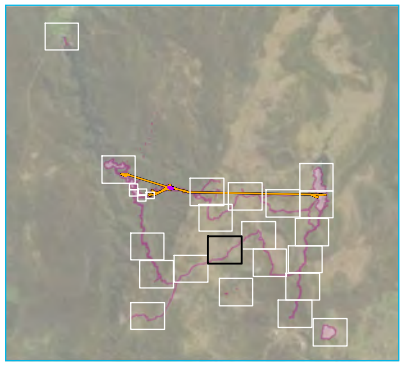

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

Snowy 2.0
Main Works
Figure 3.1.20

snowy 2.0

EMM creating opportunities

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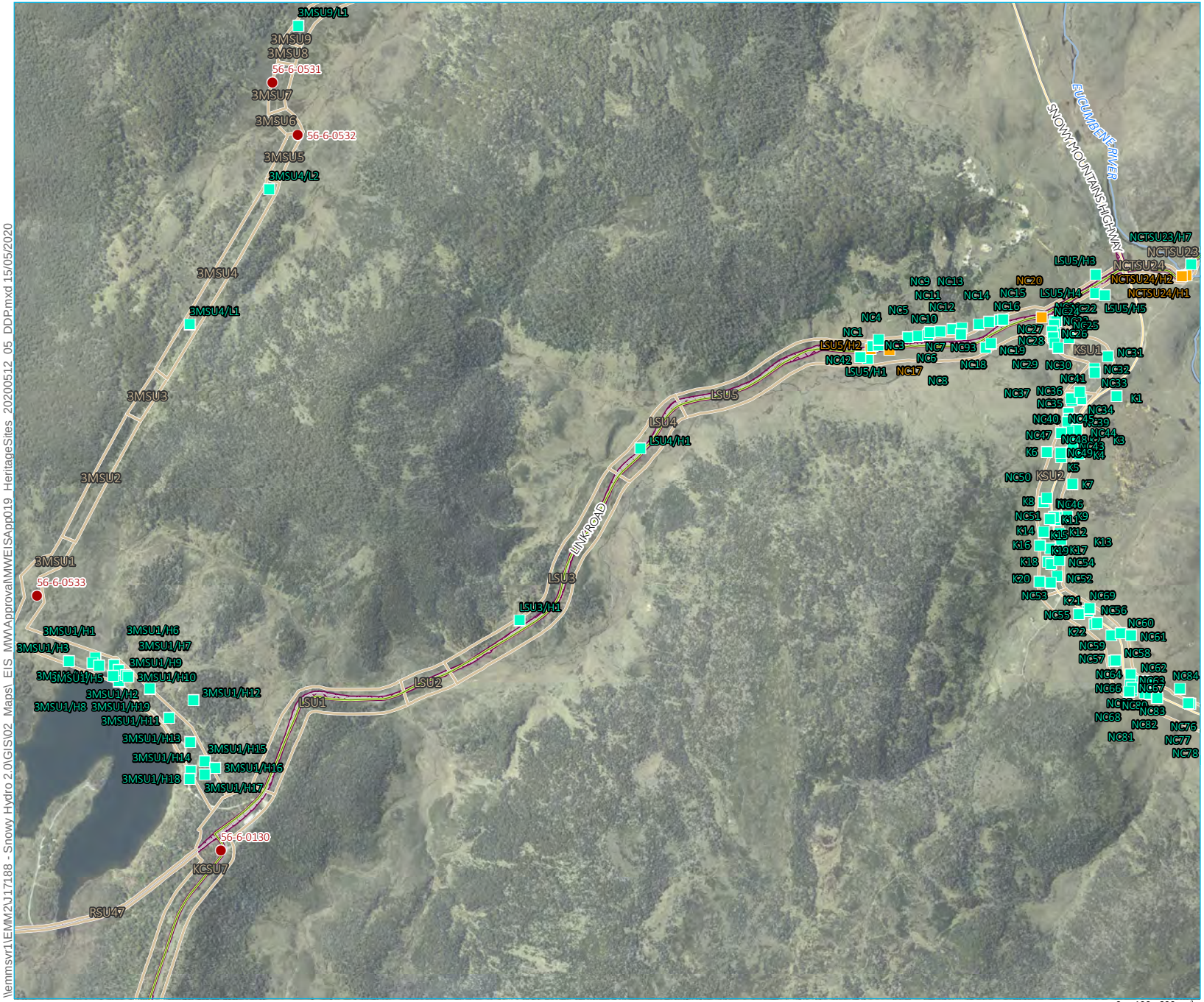
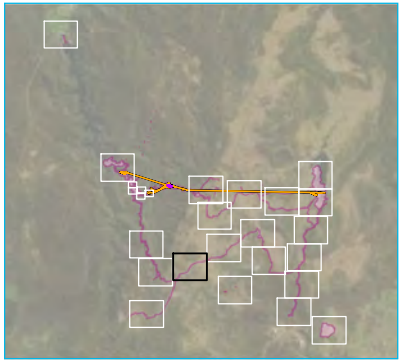




KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

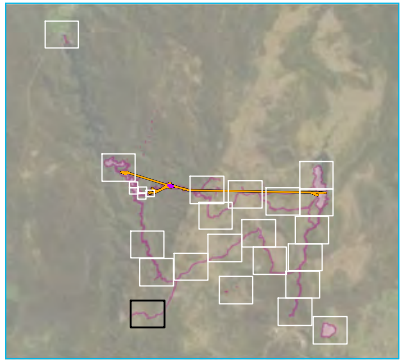
Snowy 2.0
Main Works
Figure 3.1.21

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\117188 - Snowy Hydro 2.0\GIS\02 Maps\ EIS MW\ApprovalMWEIS\App019 HeritageSites 20200512 05 DDP.mxd 15/05/2020



KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.22

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

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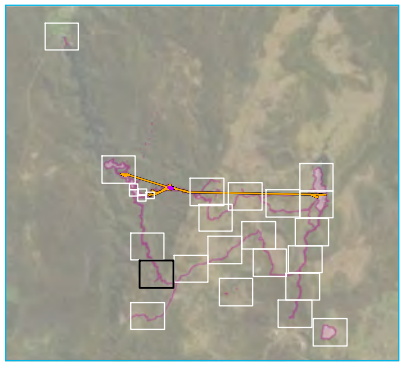

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.23

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55

N

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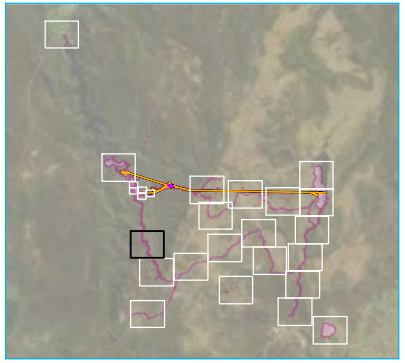

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.24

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55
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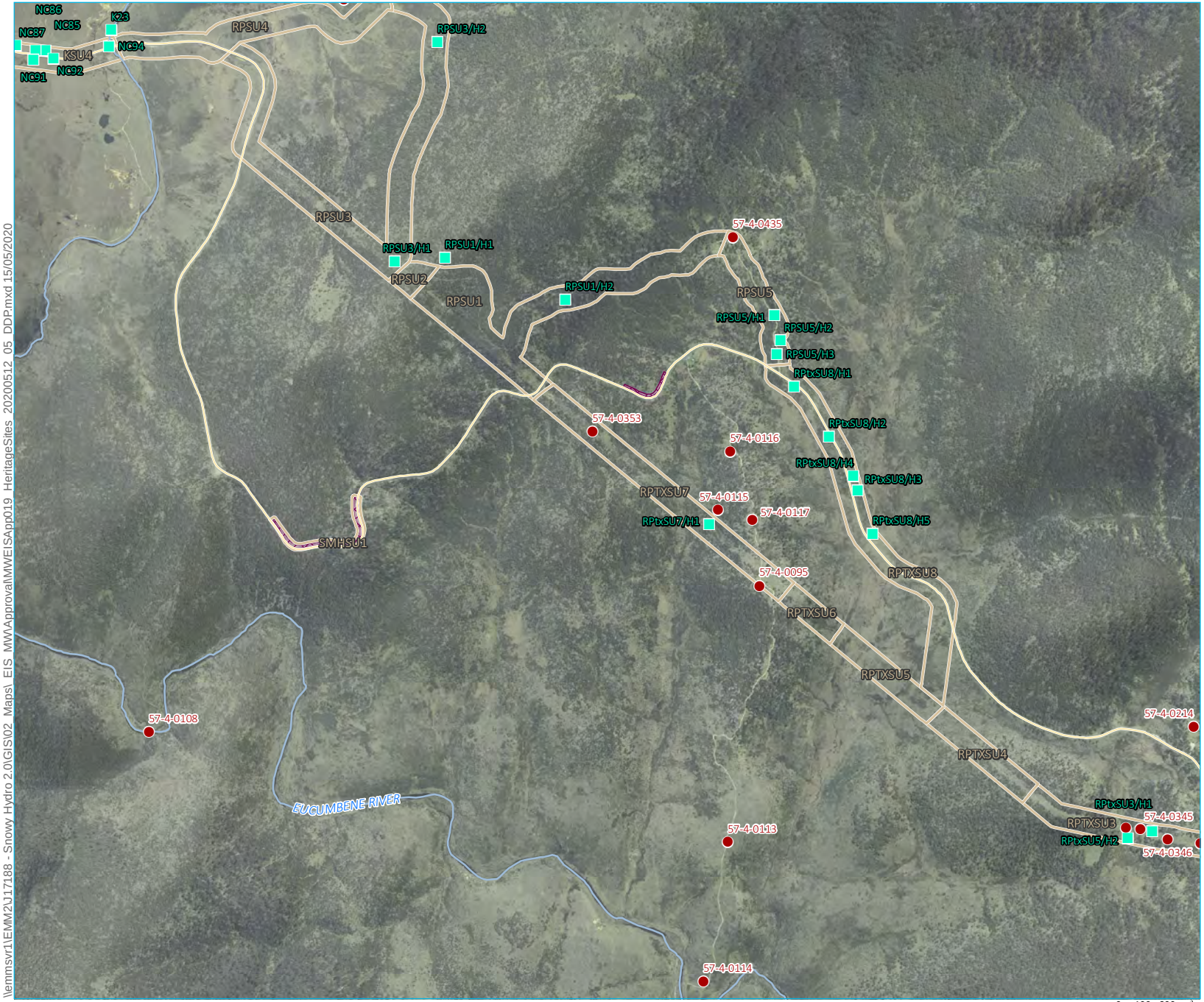

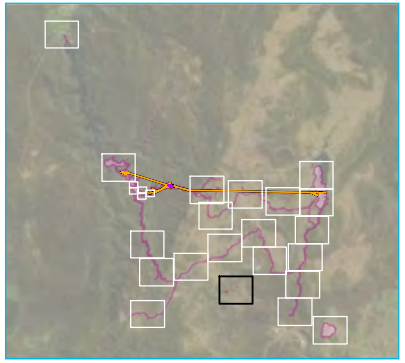

KEY

- Historic site within construction envelope
- Historic site outside construction envelope
- AHIMS within construction envelope
- AHIMS outside construction envelope
- Heritage survey unit

Snowy 2.0 operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities

Existing environment

- Main road
- Local road
- Watercourse
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Aboriginal and historic heritage sites

Snowy 2.0
Main Works
Figure 3.1.25

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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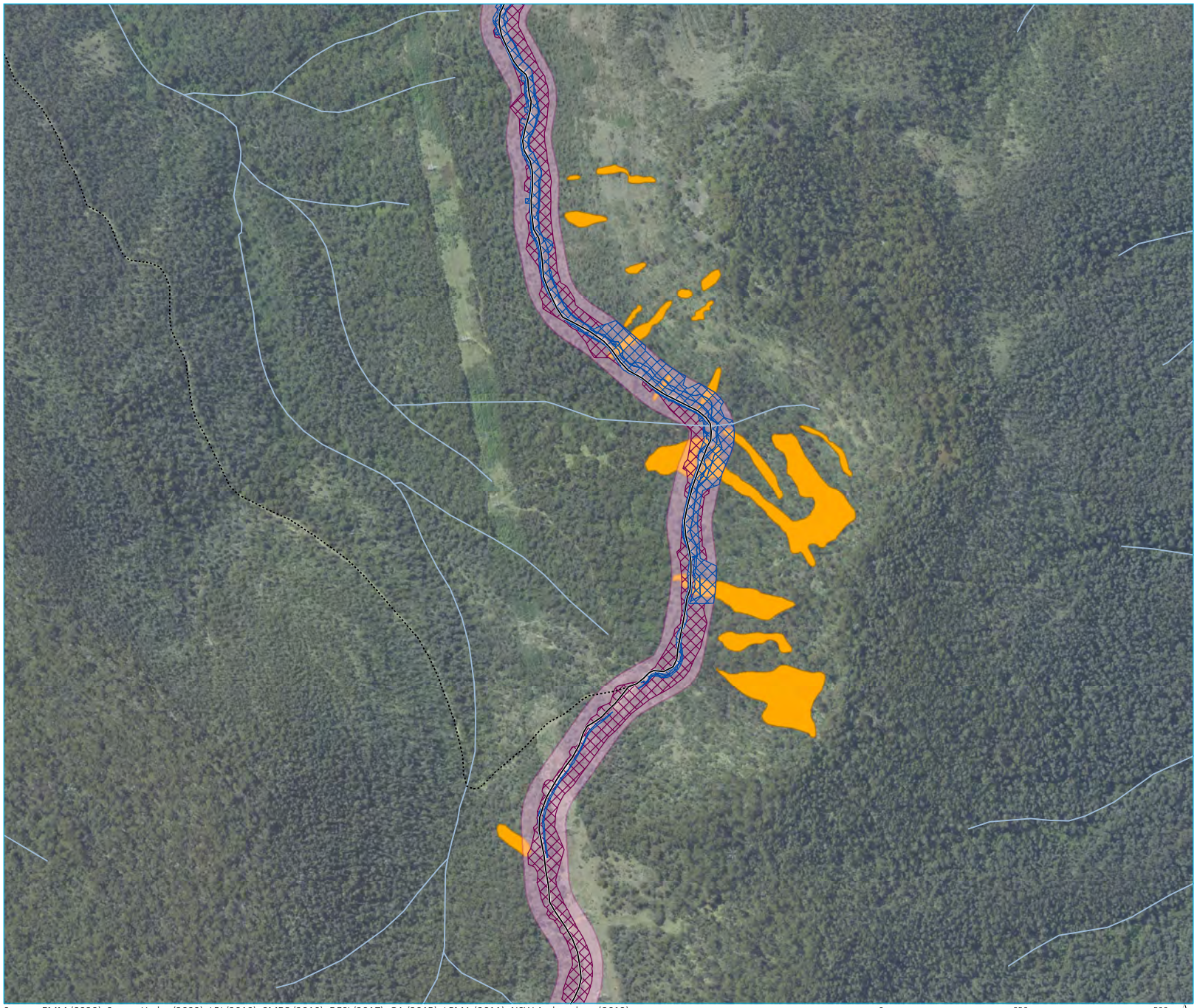

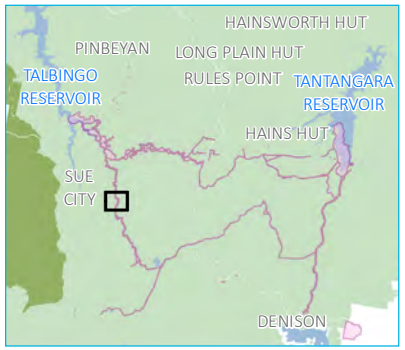

KEY

- Watercourse
- Local road
- Vehicular track
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope
- Boulder stream

Geodiversity features
- boulder streams

Snowy 2.0
Main Works
Figure 3.4

Source: EMM (2020); Snowy Hydro (2020); LPI (2019); SMEC (2019); DFSI (2017); GA (2015); LPMA (2011); NSW Archaeology (2019)

0 250 500 m

GDA 1994 MGA Zone 55

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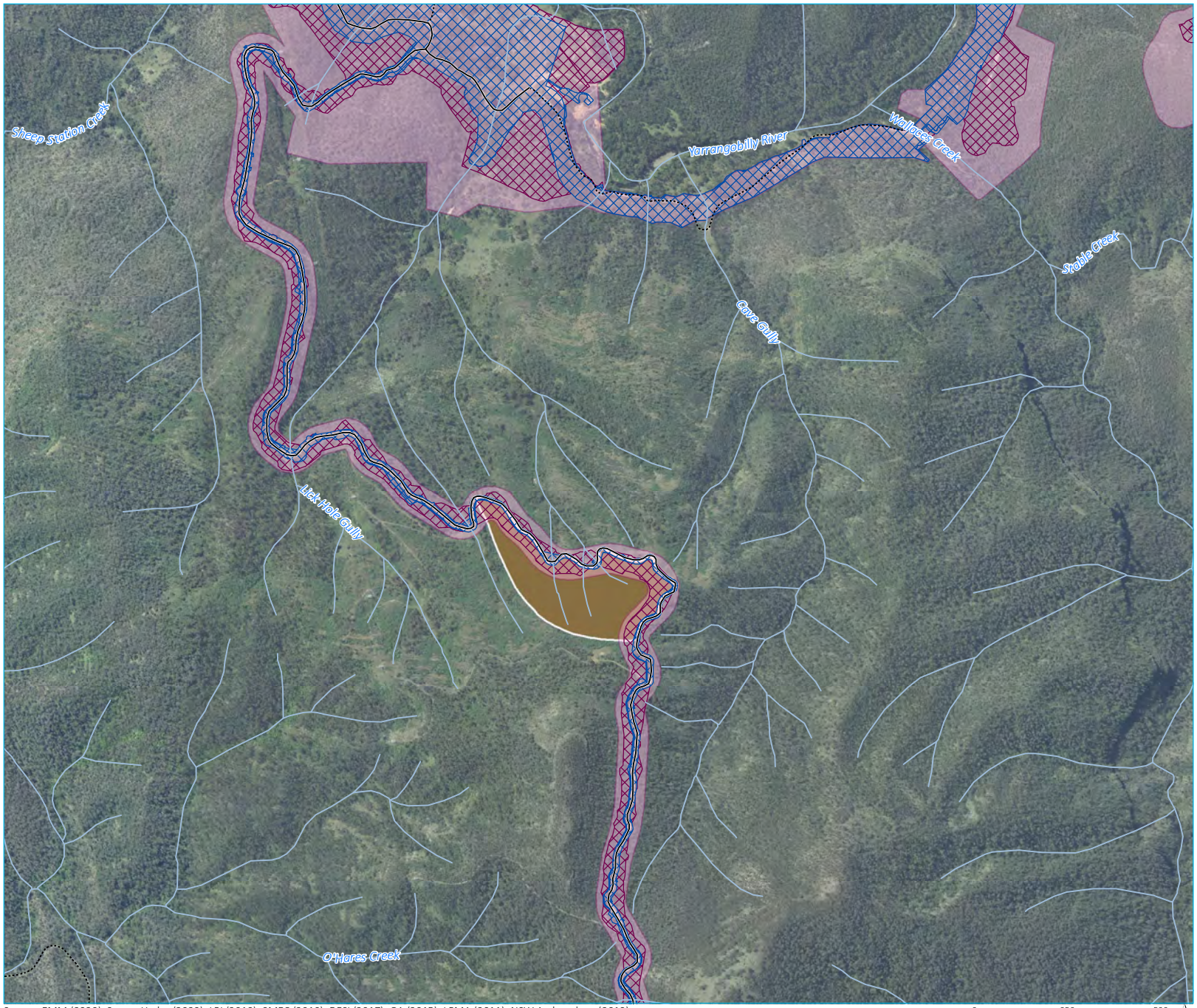

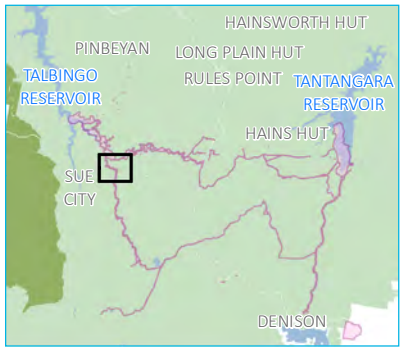

KEY

- Watercourse
- Local road
- Vehicular track
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope
- Lobs Hole Ravine Road Fossil area

Source: EMM (2020); Snowy Hydro (2020); LPI (2019); SMEC (2019); DFSI (2017); GA (2015); LPMA (2011); NSW Archaeology (2019)

0 250 500 m

GDA 1994 MGA Zone 55

N

Geodiversity features - Lobs Hole Ravine Road fossils

Snowy 2.0
Main Works
Figure 3.3

snowy 2.0

EMM

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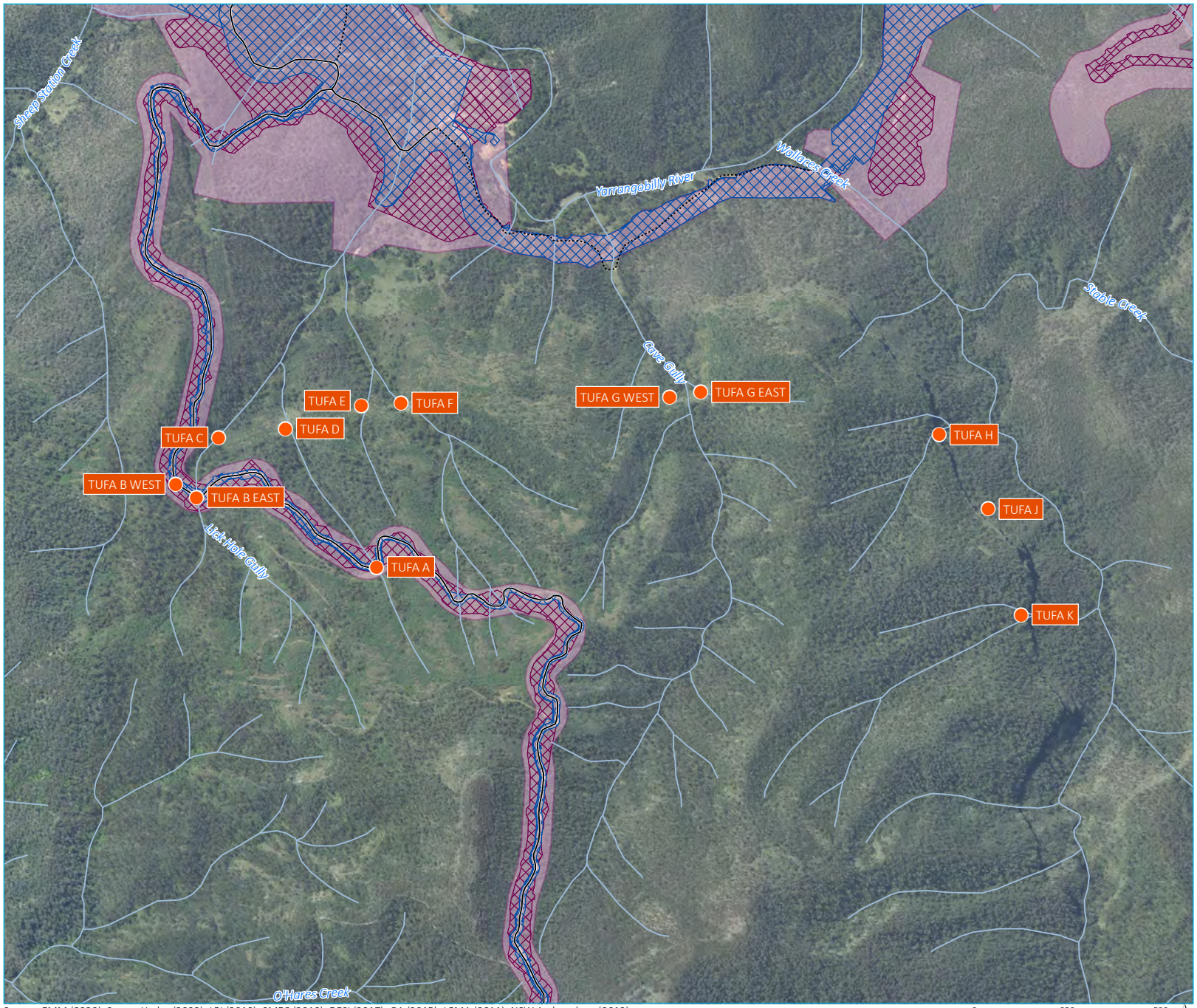

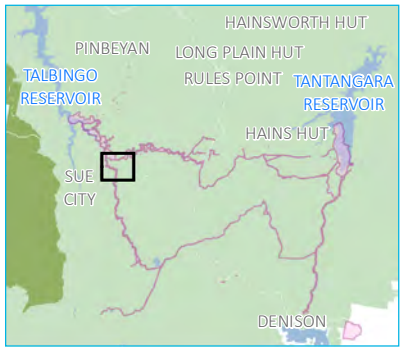

KEY

- Tufa deposit location
- Watercourse
- Local road
- Vehicular track
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

Source: EMM (2020); Snowy Hydro (2020); LPI (2019); SMEC (2019); DFSI (2017); GA (2015); LPMA (2011); NSW Archaeology (2019)

0 250 500 m

GDA 1994 MGA Zone 55

N

Geodiversity features - tufa

Snowy 2.0
Main Works
Figure 3.2

snowy 2.0

EMM

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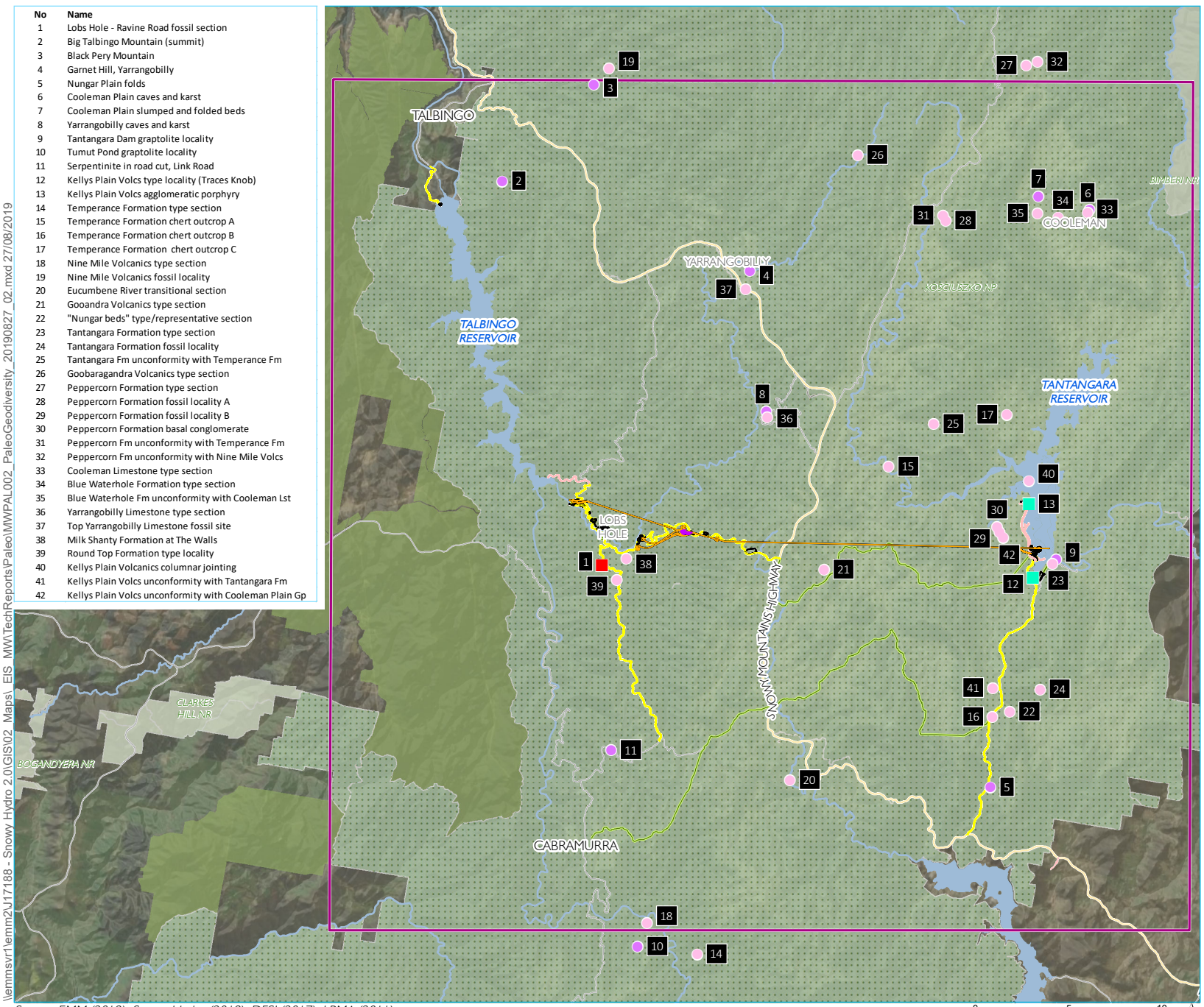
No	Name
1	Lobs Hole - Ravine Road fossil section
2	Big Talbingo Mountain (summit)
3	Black Pery Mountain
4	Garnet Hill, Yarrangobilly
5	Nungar Plain folds
6	Cooleman Plain caves and karst
7	Cooleman Plain slumped and folded beds
8	Yarrangobilly caves and karst
9	Tantangara Dam graptolite locality
10	Tumut Pond graptolite locality
11	Serpentinite in road cut, Link Road
12	Kellys Plain Volcs type locality (Traces Knob)
13	Kellys Plain Volcs agglomeratic porphyry
14	Temperance Formation type section
15	Temperance Formation chert outcrop A
16	Temperance Formation chert outcrop B
17	Temperance Formation chert outcrop C
18	Nine Mile Volcanics type section
19	Nine Mile Volcanics fossil locality
20	Eucumbene River transitional section
21	Gooandra Volcanics type section
22	"Nungar beds" type/representative section
23	Tantangara Formation type section
24	Tantangara Formation fossil locality
25	Tantangara Fm unconformity with Temperance Fm
26	Goobaragandra Volcanics type section
27	Peppercorn Formation type section
28	Peppercorn Formation fossil locality A
29	Peppercorn Formation fossil locality B
30	Peppercorn Formation basal conglomerate
31	Peppercorn Fm unconformity with Temperance Fm
32	Peppercorn Fm unconformity with Nine Mile Volcs
33	Cooleman Limestone type section
34	Blue Waterhole Formation type section
35	Blue Waterhole Fm unconformity with Cooleman Lst
36	Yarrangobilly Limestone type section
37	Top Yarrangobilly Limestone fossil site
38	Milk Shanty Formation at The Walls
39	Round Top Formation type locality
40	Kellys Plain Volcanics columnar jointing
41	Kellys Plain Volcs unconformity with Tantangara Fm
42	Kellys Plain Volcs unconformity with Cooleman Plain Gp



KEY

- Project area

Geodiversity sites

- Known site likely to be impacted
- New sites likely to be impacted
- Known sites
- New sites not likely to be impacted

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Permanent road

Snowy 2.0 Main Works construction elements

- Temporary construction compounds and surface works
- Temporary access road

Existing environment

- Main road
- Local road
- Watercourse
- Waterbodies
- Kosciuszko National Park
- NPWS reserve
- State forest
- State boundary

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

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Overview of Paleozoic geodiversity sites

Snowy 2.0
Paleozoic geodiversity report
Main Works
Figure 3.1

snowy 2.0

EMM creating opportunities

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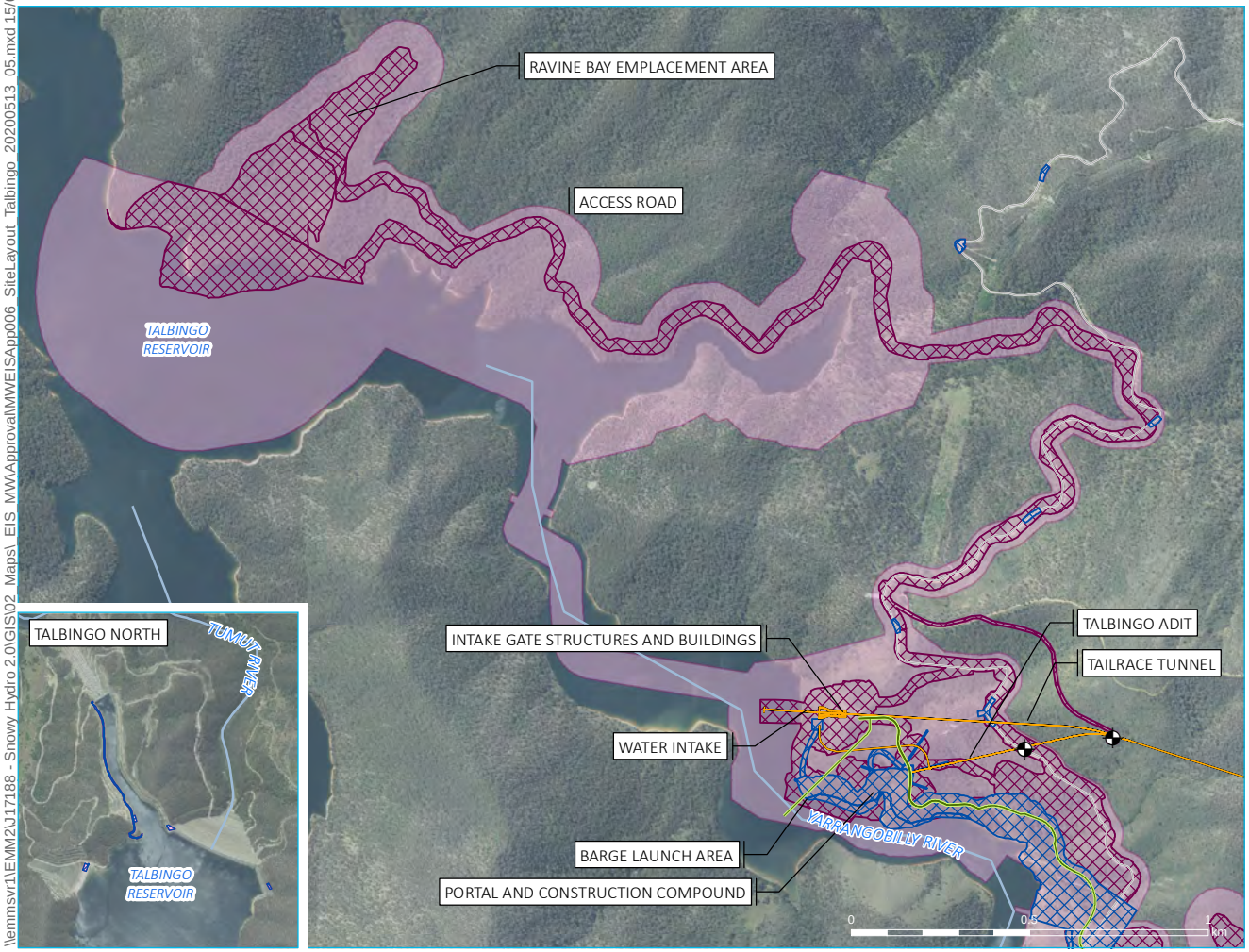
APPENDIX H – SITE LAYOUTS



KEY

Existing environment

- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site layout - Talbingo Reservoir

Snowy 2.0
Main Works
Figure 2.1

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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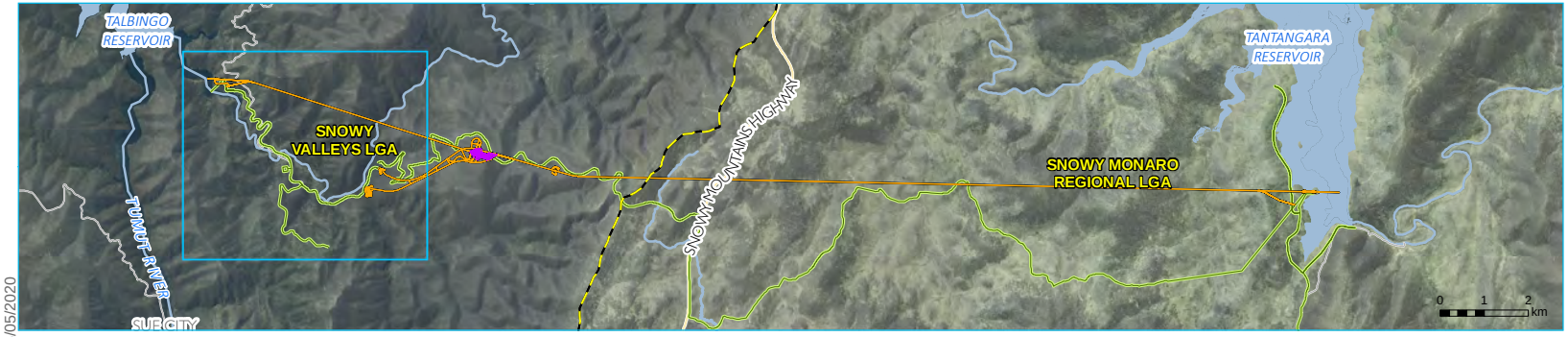

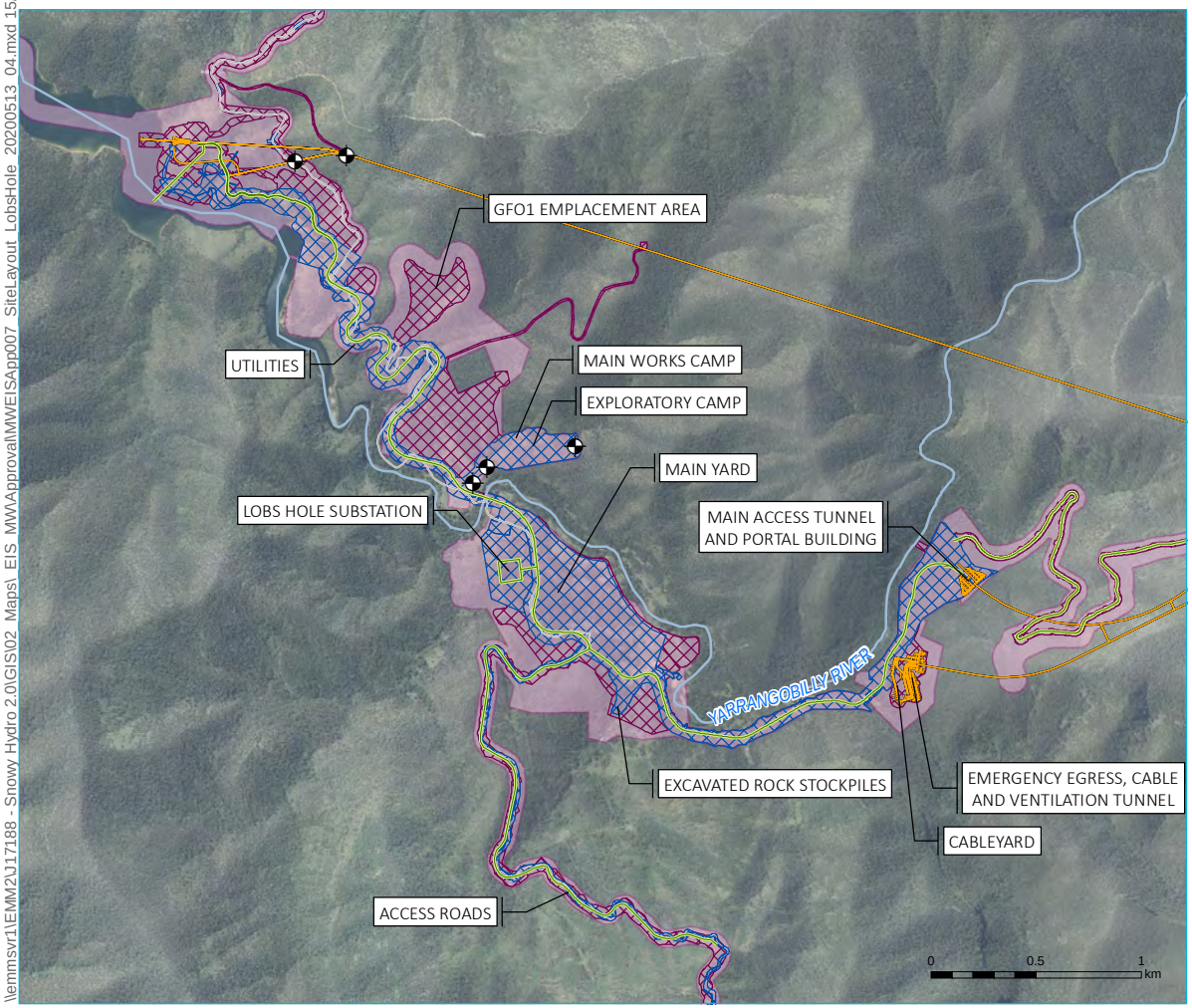

KEY

Existing environment
- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site layout – Lobs Hole

Snowy 2.0
Main Works
Figure 2.2

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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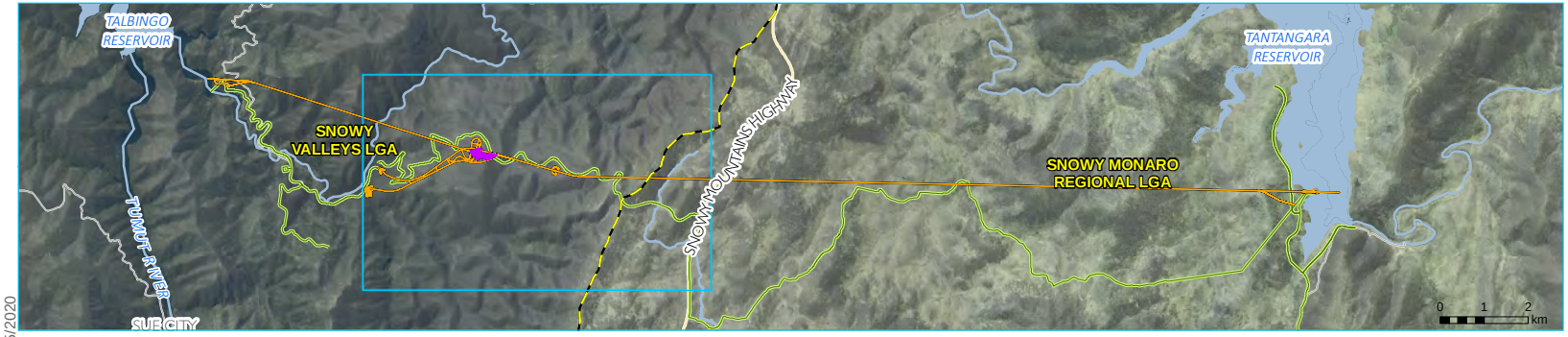

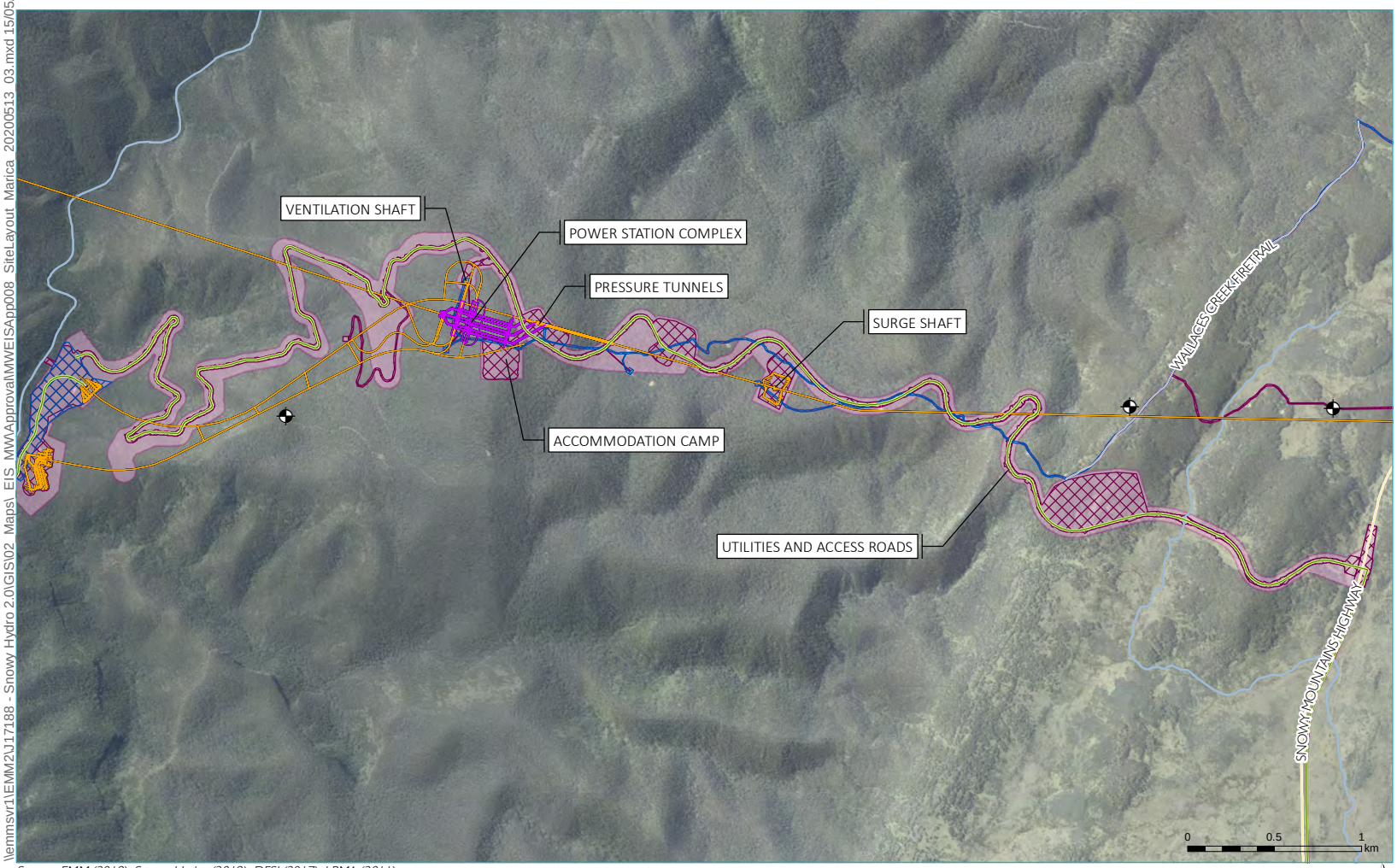

KEY

Existing environment

- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site Layout - Marica

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

Snowy 2.0
Main Works
Figure 2.3

snowy 2.0

EMM creating opportunities

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KEY

Existing environment

- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site layout - Plateau

Snowy 2.0
Main Works
Figure 2.4

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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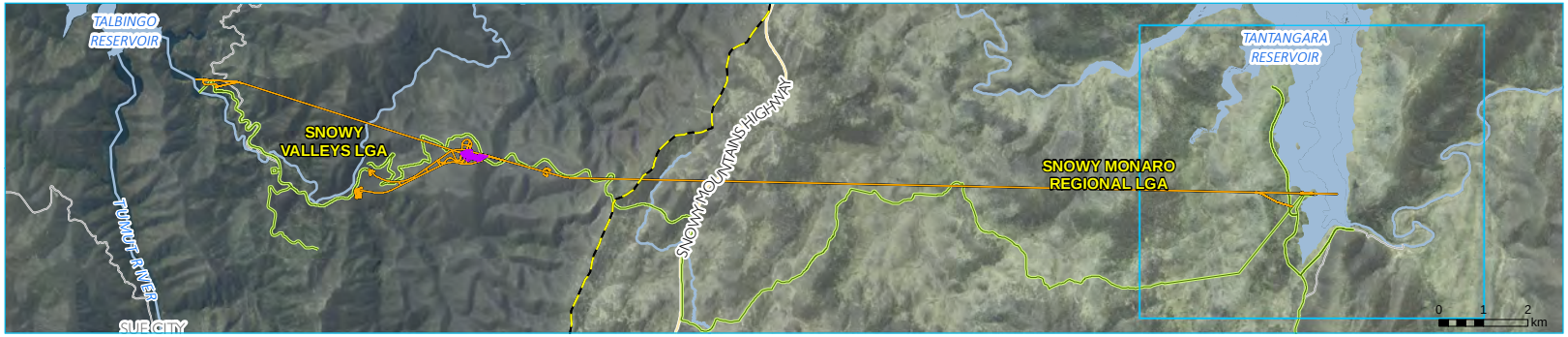

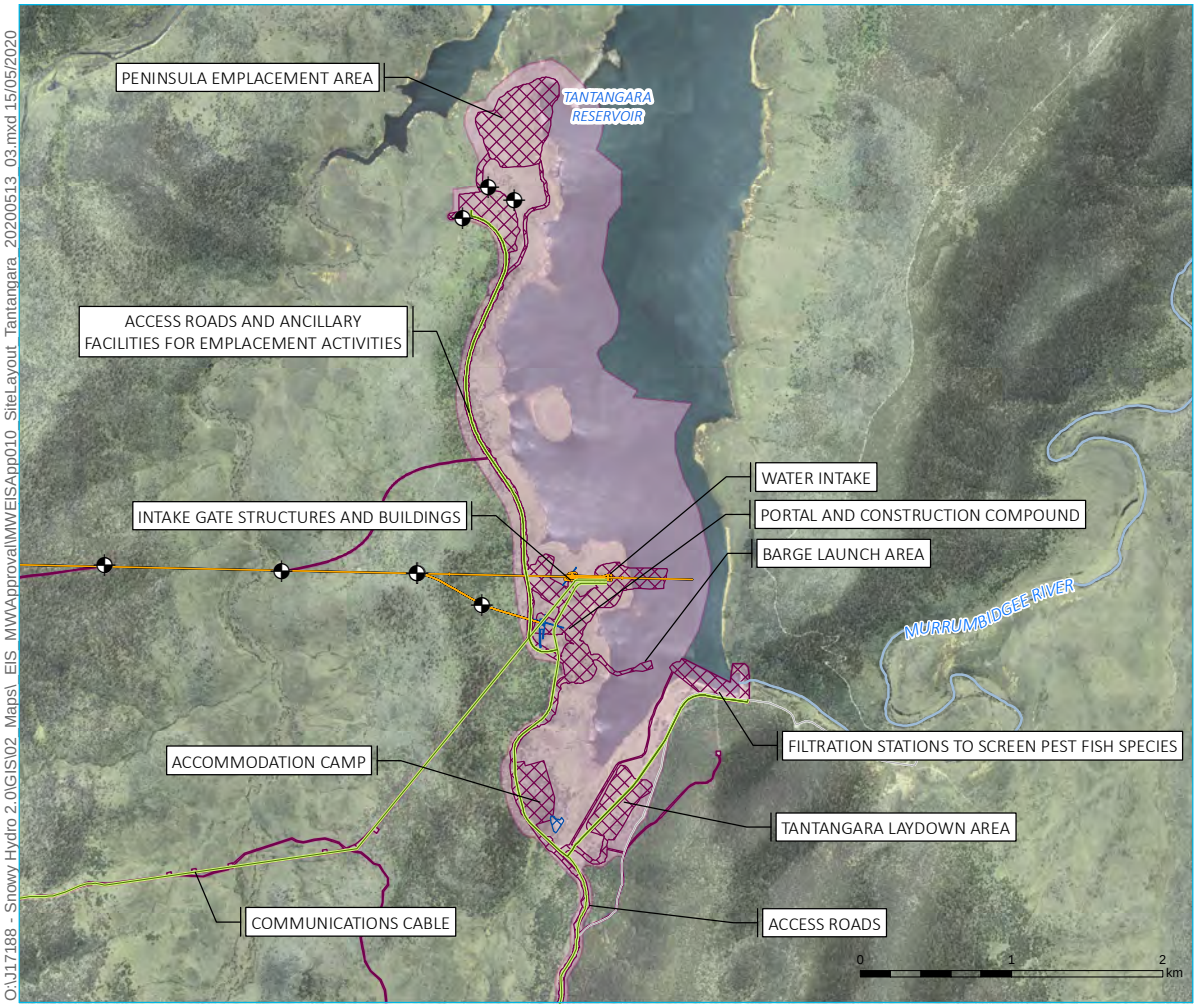

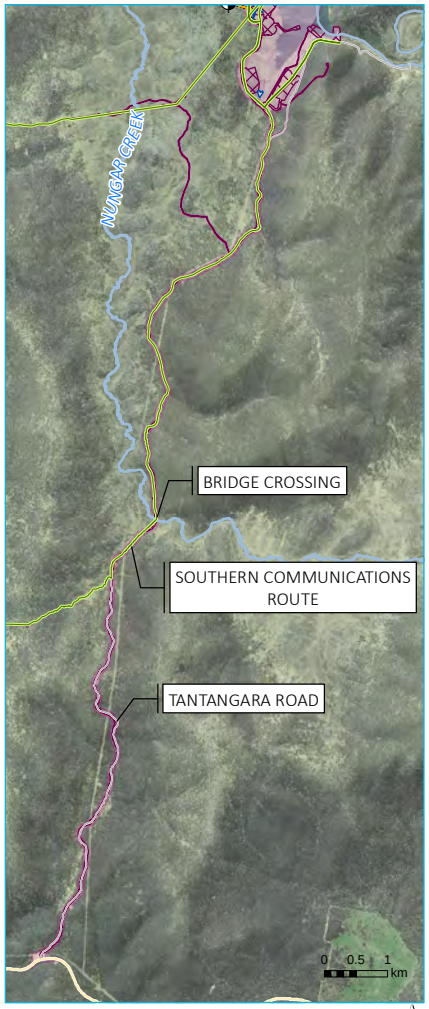

KEY

Existing environment

- Main road
- Local road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site Layout - Tantangara Reservoir

Snowy 2.0
Main Works
Figure 2.5

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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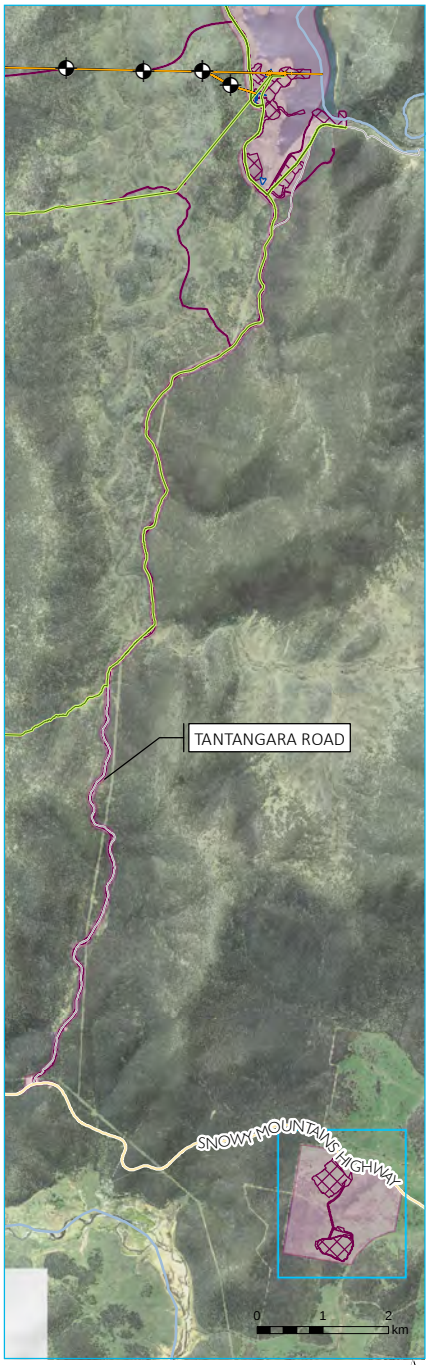

KEY

Existing environment
- Main road
- Local road
- Watercourse

Snowy 2.0 Main Works operational elements
- Tunnels, portals, intakes, shafts
- Utilities
- Geotechnical investigation
- Exploratory Works disturbance area
- Main Works indicative disturbance area
- Construction envelope

The disturbance area is an estimation of the area required for construction works based on the current level of project design. Detailed design is still required to be completed, therefore it is expected that the precise location of the disturbance area may move within the broader construction envelope and consequently there will be some further refinements to the disturbance area.
Note that the Approved Exploratory Works disturbance area (SSI 9208) will also be a disturbance area for Main Works, even following surrender of the Exploratory Works Approval. The cumulative disturbance area for the Main Works and approved Exploratory Works is therefore presented in this figure.

Site layout - Rock Forest

Snowy 2.0
Main Works
Figure 2.6

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55

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