REPORT

QUARTERLY ENVIRONMENTAL WATER REPORT MARCH TO MAY 2022

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Rev. A

JUNE 2022

This Report has been prepared to satisfy the reporting requirements in the Main Works – Water Management Plan (WMP) and to meet Condition of Approval (CoA) 31(c)(d) of the Infrastructure Approval Schedule which requires publicly available reporting of the outcomes of the WMP. The Report provides commentary on the performance of the monitoring programs as part of the WMP.

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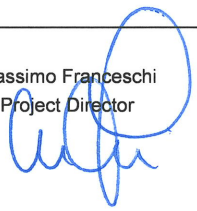
E ndorsed:	Name: Massimo Franceschi Job Title: Project Director Signed:  Date: 20/7/22

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ABBREVIATIONS AND DEFINITIONS

Acronym	Definition
AWS	Automatic weather stations
BoM	Bureau of Meteorology
CoA	Condition of Approval
ECVT	Emergency Cable and Ventilation Tunnel
EPL	Environmental Protection Licence
Future Generation	Future Generation Joint Venture
MAT	Main Access Tunnel
MDB	Murray Darling Basin
NEM	National Electricity Market
Snowy Hydro	Snowy Hydro Limited
Snowy Scheme	Snowy Mountains Hydro-electric Scheme
SWMP	Surface Water Management Plan
TARP	Trigger Action Response Plan
TBM	Tunnel Boring Machine
WMP	Water Management Plan
WQO	Water Quality Objectives

1. INTRODUCTION

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 and Snowy 2.0 Main Works (which has commenced).

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.

WeBuild, 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.

2. PURPOSE

This Environmental Water Report has been prepared to satisfy the reporting requirements in the Main Works – Water Management Plan (WMP) and to meet Condition of Approval (CoA) 31(c)(d) of the Infrastructure Approval Schedule which requires publicly available reporting of the outcomes of the WMP. The Environmental Water Report is intended to provide commentary on the performance of the monitoring programs as part of the WMP (identified in Table 2-1).

Table 2-1: Monitoring overview

Aspect	Objective
Surface Water Monitoring Program	
Routine receiving surface water quality monitoring	• inform and assess the performance of management processes/measures that seek to minimise the Project's impact on surface water quality • help determine source and extent of any water quality changes • collect baseline data to characterise water quality and determine site specific values
Event based wet weather overtopping water quality monitoring	
Groundwater Monitoring Program	
Groundwater level monitoring	• inform and assess the performance of management • processes/measures that seek to minimise the Project's impact on regional and local (including alluvial) aquifers and GDEs
Groundwater quality monitoring	
Water extraction monitoring	• inform and assess water consumption, site water balance and compliance with water access licenses

3. OVERVIEW

3.1. Reporting period

This Environmental Water Report covers the monitoring period from March 01 to May 31, 2022.

3.2. Construction progress

Table 3-1 summarises the key construction activities which have been undertaken during the reporting period.

Table 3-1: Key construction activities for March 01 to May 31, 2021.

Location	Key construction activities
Lobs Hole Ravine Road	• Ongoing maintenance of road, and erosion and sediment (ERSED) controls along Ravine Rd from R0-R15. • Asphalting of Ravine Road commenced. • Clearing for road widening works between R7-R15. • Improvement and implementation of additional ERSED controls at R5 laydown area, including rehabilitation plots.
Lobs Hole	• Tunnelling works continue. • Expansion of F8 (MY07) basin. • Level spreader and rock-lined batter chute rectification works ongoing. • Marica West HDD Pad construction and associated ERSED controls ongoing. • Pump installed at ECVT wedge pit. • Concrete lined slurry pons in Lick Hole Gully constructed for the receiving and treatment of slurry from Gooandra. • Track installed for access to ECVT. • Construction of wedge pit and concrete base for spoil yard. • Concrete slab for main poured.
Marica	• Road construction works continue. Installation of progressive erosion and sediment controls plans ongoing. • Installation of Dip Creek Crossing commenced. • Installation of various temporary controls for upgrade to CH 0-2100. • Close out plan for areas of the trail to be completed in preparation for snowfall. • Application of topsoil to batters along the trail in preparation for hydro-mulching 26/04/2022. • Installation of permeant design culverts ongoing. • Maintenance to erosion and sediment controls- installation of temporary sediment basin completed. • Surge shaft batter stonewalled to protect from topsoil from upcoming rainfall-hydromulching to occur on the 16/04/2022. • Boundary for surge shaft clearing area installed by survey. • C&G workflows for USS stockpile and Office Laydown area submitted.
Plateau	• Trenching along the alignment ongoing. • Clearing carried out for drill pads and towards Tantangara. • Site rehabilitation progressing. • ERSED improvement actions and items largely complete. • Water Quality Monitoring ongoing. • Underboring commenced.
Rock Forest	• NA – site under operational use as laydown area.
Talbingo	• Drill and blast activities ongoing. • Earthworks ongoing. • TBM cradle is under construction. • TBM / facilities U/G services substantially completed. • Talbingo Adit cradle installation works and WTP construction ongoing.

Location	Key construction activities
Tantangara	• Water treatment plant commissioned and operational. • Sediment basin construction at gate shaft. • Surplus concrete from batch plant being crushed for re-use. • Tantangara Intake commenced blasting. • Quarry Trail Road widening ongoing. • Construction of concrete pad and wedge pit under the BM spoil conveyor.

4. WEATHER CONDITIONS

There are several weather stations along the alignment of the project that report real-time data. These include:

- "Lobs Hole" - which is an Automatic Weather Station managed by Future Generation in Lobs Hole construction site.
- "Cabramurra" - an Automatic Weather Station located near the lookout in the Cabramurra township managed by the Bureau of Meteorology
- "Tantangara" - an Automatic Weather Station managed by Future Generation in Tantangara construction site.

The Tantangara and Cabramurra gauges are in sub-alpine environments, with elevations of approximately 1220 m and 1475 m, respectively. Cabramurra records substantially higher annual rainfall amount than the lower-elevation gauges at Lobs Hole and Tantangara. Tantangara and Lobs Hole weather stations record actual onsite conditions at the respective construction sites, while Cabramurra weather station, at 1470 m is representative of conditions at Marica – which has an elevation of 1480 m and is approximately 15 km north of the Cabramurra Station.

A summary of climate data for the ravine and plateau areas is provided in Table 4.1

Table 4-1: Weather conditions for 01 March to 31 May 2022.

Parameter	Lobs Hole[1]			Marica (Cabramurrra)			Tantangara[2]		
	Mar	Apr	May	Mar	Apr	May	Mar	Apr	May
Temperature									
Mean maximum	12.51	9.00	4.69	9.50	6.48	2.91	21.10	16.08	11.98
Mean minimum	25.39	19.94	15.30	17.17	12.25	7.88	8.83	5.26	1.94
Rainfall									
Monthly	39.00	98.80	100.60	50.20	83.00	104.40	58.20	110.60	67.40
Long Term Average	63.7	41.6	48.6	82.6	79.5	93.2	56.0	46.4	47.1

1. Lobs Hole long term average rainfall is taken from the Tumbarumba weather station
2. Tantangara long term average rainfall is taken from the Adaminaby Alpine Tourist Park weather station

During the months of Autumn, higher than average rainfall was experienced across the region, with April precipitation being significantly higher than the long-term average across all sites (**Table 4-1**).

The ongoing influence of La Nina across Eastern Australia caused local impacts within the snowy 2.0 construction works.

5. SURFACE WATER MONITORING PROGRAM

5.1. Routine surface water quality monitoring

Routine surface water quality monitoring is undertaken in accordance with CoA31 and the Environment Protection Licence No. 21266 (EPL - 21266) to determine if the project is resulting in any impacts to receiving water quality against the Water Quality Objectives (WQO). The WQOs are specified in Table 2-2 of the Main Works – Surface Water Monitoring Program.

Publicly available surface water quality monitoring results undertaken in accordance with EPL - 21266 can be accessed here.

In general, the surface water monitoring results are consistent with those observed during the previous reporting period. However due to complications with the laboratory experienced during April and May, several analytes were unable to be assessed. On several occasions, EPL monitoring results exceeded the Water Quality Objectives, however results are consistent with the baseline monitoring and upstream of the Snowy 2.0 construction activities.

For the reporting period, the quarterly monitoring results demonstrate that the water quality is relatively consistent across multiple EPL monitoring locations with the exceedances not shown to have increased since the onset of the proximal construction of Snowy 2.0.

In addition, no discharge was occurring at the time the samples at EPL41 were collected in March to May 2022. Elevated nitrogen, nitrates and faecal coliform presence are likely due to the algae blooms in the reservoir which can effect the results.

Exceedances to the water quality objectives within surface waters across the site are not considered to be caused or added to by the ongoing construction works of Snowy 2.0. The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

5.2. Event based monitoring

Event based wet weather overtopping water quality monitoring is undertaken in accordance with the SWMP Trigger Action Response Plan (TARP 2) to monitor stormwater overtopping sediment basin discharges. Sediment basins for the Project have been designed to meet the design rainfalls depths identified in Table 5-1.

Table 5-1: Design rainfall depths (SWMP Section 5.1.1)

Catchment	Description	85th percentile, 5-day rainfall (mm)	90th percentile, 5-day rainfall (mm)	95th percentile, 5-day rainfall (mm)
Yarrangobilly River	Surface works at Lobs Hole and Marica	28.1	35.6	49.0
Upper Eucumbene River	Surface works between Marica and the Snowy Mountain Highway	35.2	43.4	56.9

Catchment	Description	85th percentile, 5-day rainfall (mm)	90th percentile, 5-day rainfall (mm)	95th percentile, 5-day rainfall (mm)
Tantangara construction compound	Surface works adjacent to the southern portion of Tantangara Reservoir	30.5	37.0	51.0
Goorudee Rivulet	Surface works at Rock Forest	20.0	25.7	36.1

During the reporting period, rainfall exceeded the design rainfall criteria numerous times, including:

- 6 – 10 March (46 mm Tantangara)
- 7 – 11 April (38 mm Tantangara)
- 20 – 24 April (43 mm Lobs Hole, 37 mm Tantangara)
- 12 – 16 May (28.4 mm Marica, 32.2 mm Lobs Hole, 30.8 mm Tantangara)
- 27 – 31 May (54 mm Marica, 49.8 mm Lobs Hole)

Across the sites, water quality upstream as well as downstream results were generally consistent. Water samples were collected for comprehensive water testing and the EPA were notified of the releases in accordance with R4.1 of EPL 21266.

The discharge identified a marginal elevation of turbidity levels downstream of the incident location. All other analytes were consistent with naturally occurring conditions and therefore no material harm has been caused by the overtopping events. In addition, no harm to health or safety of human beings or the environment that is not trivial has occurred.

6. GROUNDWATER MONITORING PROGRAM

6.1. Groundwater quality

Groundwater quality monitoring is undertaken in accordance with EPL - 21266 to determine if the project is resulting in any impacts to groundwater. Groundwater quality trigger levels for the Project are outlined in Table C-1 of the Main Works – Groundwater Monitoring Program.

Due to safe access restrictions, groundwater data is currently unavailable. This report will be updated once the groundwater data is obtained.

6.2. Groundwater levels

Groundwater level monitoring is undertaken in accordance with the Groundwater monitoring program to determine groundwater drawdown as a result from the Project.

Site specific groundwater level triggers as outlined in Attachment B of the Main Works – Groundwater Monitoring Program have been established to monitor whether observed drawdown is greater than construction related predicted drawdown.

Due to safe access restrictions, groundwater data is currently unavailable. This report will be updated once the groundwater data is obtained

6.3. Groundwater inflows

Groundwater inflow into the tunnels is monitored during construction and compared to predicted inflows. This data is required to monitor the volume of extracted groundwater against water access licence limits (Table 6-1).

Table 6-1: Water access licence

Water Access Licence	Project	Water Source	Share (ML)
WAL42407 – Specific Purpose Access Licence	Exploratory Works	Upper Tumut water source	227
WAL42408 – Groundwater Licence	Exploratory Works	Lachlan Fold Belt MDB	0
WAL42960 – Groundwater Licence	Exploratory Works	Lachlan Fold Belt MDB	354
RO13-19-093 – via Controlled Allocation	Main Works	Lachlan Fold Belt MDB	3,375
RO1-19-092 – via Controlled Allocation	Main Works	Lachlan Fold Belt South Coast	1,722
Specific Purpose Access Licence	Main Works	Tantangara Water Source	532

Tunnelling commenced in June 2021. The monthly inflows for the Construction Water Treatment Plant (CWTP) at the Main Access Tunnel (MAT) Portal are as follows:

- March 24.66 ML
- April 24.66 ML
- May 20.07 ML

7. CONCLUSION

Exceedances of water quality objectives were recorded during routine monitoring between March and May 2022. The trigger action response plans included in the water management plan have been followed for all analytes with concentrations exceeding the respective water quality values. At this time, no further action is required.

Due to safe access restrictions, groundwater data is currently unavailable. This report will be updated once the groundwater data is obtained.

Exceedances to the water quality objectives within surface across the site during monthly water monitoring and event specific monitoring were generally consistent with recorded baseline and background ranges.

Exceedances are not considered to be caused or added to by the ongoing construction works of Snowy 2.0.