From: BDC Lgoima
To:
Subject: Official Information Request Ref: 054/022
Date: Wednesday, 24 August 2022 3:19:00 pm
Attachments: 220060 Application.pdf
220060 Federation Mining Applin Final 17 June 2022.pdf
image002.png

Dear

We refer to your official information request dated 23 August 2022 for consent applications for Snow River gold mine.

The information you have requested is attached.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

If you wish to discuss this decision with us, please feel free to contact the Buller District Council by return email to lgoima@bdc.govt.nz.

Please note that it is our policy to proactively release our responses to official information requests where possible. Our response to your request will be published shortly at https://bullerdc.govt.nz/district-council/your-council/request-for-official-information/responses-to-lgoima-requests/ with your personal information removed.

Kind regards

Sean Judd | Group Manager Regulatory Services
DDI 03 788 9614 | Mobile 022 31 00 883 | Email sean.judd@bdc.govt.nz

Buller District Council | Phone 0800 807 239 | bullerdc.govt.nz
PO Box 21 | Westport 7866

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BULLER DISTRICT COUNCIL
Te Kaunihera O Kawatiri

WEST COAST NEW ZEALAND
UNTAMED NATURAL WILDERNESS

FORM 9

APPLICATION FOR RESOURCE CONSENT

Sections 88 and 145, Resource Management Act 1991

To Chief Executive
Buller District Council
PO Box 21
Westport 7866

1. **OceanaGold (New Zealand) Limited (C/- Federation Mining) apply for the following type(s) of resource consent:**

- **Land use consent** – to construct, operate and maintain a processing plant, a water treatment plant and associated infrastructure at the Snowy River Mine Site.
- **Section 127 Change in Conditions of RC130025**

2. **The activity to which the application relates (the proposed activity) is as follows:**

OceanaGold Limited ("**OGNZL**") holds a number of existing resource consents to construct, operate, maintain and rehabilitate the Snowy River Mine site ("**Snowy River Mine**"), near Reefton. These are referenced as RC13042 from the West Coast Regional Council and RC130025 from the Buller District Council. Federation Mining is in the process of acquiring the Snowy River Mine from OceanaGold, and as part of this, is seeking additional consents to process ore at the site, and an amendment to the consented waste rock stack ("**WRS**") design and overall water management for the site.

An ore processing plant on site was not proposed by OGNZL and therefore not provided as part of the existing resource consents. It is also proposed that the filtered tailings generated from the sulphide flotation underflow in the processing plant will be collected and placed within a specially designed cell within the waste rock stack as dry stacked tailings.

This differs to the currently consented WRS design on the basis that the existing consents only anticipated storing of material that only included unmineralized Greywacke, considered as a non-acid forming rock type ("**NAF**"). The management of this leachate from the waste rock stack, as well as further characterisation of potential contaminants, has identified that an additional suite of contaminants should be managed and more importantly, an expanded suite of contaminants should be treated by the proposed water management and treatment systems employed at the site.

From a land use perspective, the processing plant is the only additional or "new" feature within this existing environment that requires an additional consent. The size and scale of the WRS will be increased, however, in terms of land use type effects, these are considered to be of a similar nature and scale to what has already been consented. Therefore, a variation to the existing land use consent conditions to provide for the revised WRS footprint and water management infrastructure is being sought from the Buller District Council for these features.

Federation Mining has commissioned various technical reports and an assessment of environmental effects to provide further detail and support the application. These should be referred to and form part of the application.

3. **The site at which the proposed activity is to occur is as follows:**

The Snowy River Mine site is approximately 30km south of Reefton and 10km east of Ikamatua and is accessed via the Snowy River Road 8km from State Highway 7. The project site lies to the east of Snowy River. The site is bound by the Victoria Forest Park to the east and pastoral farms to the west.

Granville Mining Ltd is, the sole owner of the land which all activities (which are the subject of this application) will directly take place on. The legal description of the land parcel on which the project lies is Sections 9-10 Block XVI Mawheraiti Survey District. A copy of the relevant title is attached as **Appendix A** to the Assessment of Environmental Effects.

4. **There are no other activities that are part of the proposal to which this application relates.**

5. **The following additional resource consents are needed for the proposal to which this application relates:**

Various **discharge permits and section 127 application for a change in conditions** to RC13042 from the West Coast Regional Council to authorise the processing plant, a revised WRS and water treatment system including discharges to land, water and air, as described in the Assessment of Environmental Effect attached to this application for resource consent is also being sought.

6. **I attach an assessment of the proposed activity's effect on the environment that—**

(a) includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and

(b) addresses the matters specified in clause 7 of Schedule 4 of the Resource Management Act 1991; and

(c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

7. **I attach an assessment of the proposed activity against the matters set out in Part 2 of the Resource Management Act 1991.**

8. **I attach an assessment of the proposed activity against any relevant provisions of a document referred to in section 104(1)(b) of the Resource Management Act 1991, including the information required by clause 2(2) of Schedule 4 of that Act.**

Date: 17 June 2022

Signature: 

(Person authorised to sign on behalf of applicant)

Address for Service: **Mitchell Daysh Limited**
PO Box 489
Dunedin 9054

Contact person: **Claire Hunter**

Telephone: **021 996 473**

Email: **claire.hunter@mitchelldaysh.co.nz**

Note to applicant

You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.

You may apply for 2 or more resource consents that are needed for the same activity on the same form. If you lodge the application with the Environmental Protection Authority, you must also lodge a notice in form 16A at the same time.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991 (if any).

If your application is to the Environmental Protection Agency, you may be required to pay actual and reasonable costs incurred in dealing with this matter (see section 149ZD of the Resource Management Act 1991)

MITCHELL DAYSH

OCEANAGOLD NEW ZEALAND LIMITED

C/- FEDERATION MINING LIMITED

SNOWY RIVER MINE

Resource Consent Application and Assessment of Environmental Effects

17 June 2022

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REPORT INFORMATION

Report Status	FINAL
Our Reference	MDL001722
File Location	Federation Mining / MDL001722 Snowy River Mine, Reefton / 06 Application
Author	Claire Hunter
Review By	Pip Walker (Environmental Law)
Version Date	17 June 2022

PART A

Resource Consent Application

FORM 9

APPLICATION FOR RESOURCE CONSENT

Sections 88 and 145, Resource Management Act 1991

To Chief Executive
Buller District Council
PO Box 21
Westport 7866

1. **OceanaGold (New Zealand) Limited (C/- Federation Mining) apply for the following type(s) of resource consent:**

- **Land use consent** – to construct, operate and maintain a processing plant, a water treatment plant and associated infrastructure at the Snowy River Mine Site.
- **Section 127 Change in Conditions of RC130025**

2. **The activity to which the application relates (the proposed activity) is as follows:**

OceanaGold Limited ("**OGNZL**") holds a number of existing resource consents to construct, operate, maintain and rehabilitate the Snowy River Mine site ("**Snowy River Mine**"), near Reefton. These are referenced as RC13042 from the West Coast Regional Council and RC130025 from the Buller District Council. Federation Mining is in the process of acquiring the Snowy River Mine from OceanaGold, and as part of this, is seeking additional consents to process ore at the site, and an amendment to the consented waste rock stack ("**WRS**") design and overall water management for the site.

An ore processing plant on site was not proposed by OGNZL and therefore not provided as part of the existing resource consents. It is also proposed that the filtered tailings generated from the sulphide flotation underflow in the processing plant will be collected and placed within a specially designed cell within the waste rock stack as dry stacked tailings.

This differs to the currently consented WRS design on the basis that the existing consents only anticipated storing of material that only included unmineralized Greywacke, considered as a non-acid forming rock type ("**NAF**"). The management of this leachate from the waste rock stack, as well as further characterisation of potential contaminants, has identified that an additional suite of contaminants should be managed and more importantly, an expanded suite of contaminants should be treated by the proposed water management and treatment systems employed at the site.

From a land use perspective, the processing plant is the only additional or "new" feature within this existing environment that requires an additional consent. The size and scale of the WRS will be increased, however, in terms of land use type effects, these are considered to be of a similar nature and scale to what has already been consented. Therefore, a variation to the existing land use consent conditions to provide for the revised WRS footprint and water management infrastructure is being sought from the Buller District Council for these features.

Federation Mining has commissioned various technical reports and an assessment of environmental effects to provide further detail and support the application. These should be referred to and form part of the application.

3. **The site at which the proposed activity is to occur is as follows:**

The Snowy River Mine site is approximately 30km south of Reefton and 10km east of Ikamatua and is accessed via the Snowy River Road 8km from State Highway 7. The project site lies to the east of Snowy River. The site is bound by the Victoria Forest Park to the east and pastoral farms to the west.

Granville Mining Ltd is, the sole owner of the land which all activities (which are the subject of this application) will directly take place on. The legal description of the land parcel on which the project lies is Sections 9-10 Block XVI Mawheraiti Survey District. A copy of the relevant title is attached as **Appendix A** to the Assessment of Environmental Effects.

4. **There are no other activities that are part of the proposal to which this application relates.**

5. **The following additional resource consents are needed for the proposal to which this application relates:**

Various **discharge permits and section 127 application for a change in conditions** to RC13042 from the West Coast Regional Council to authorise the processing plant, a revised WRS and water treatment system including discharges to land, water and air, as described in the Assessment of Environmental Effect attached to this application for resource consent is also being sought.

6. **I attach an assessment of the proposed activity's effect on the environment that—**

(a) includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and

(b) addresses the matters specified in clause 7 of Schedule 4 of the Resource Management Act 1991; and

(c) includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

7. **I attach an assessment of the proposed activity against the matters set out in Part 2 of the Resource Management Act 1991.**

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Date: 17 June 2022

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FORM 9

APPLICATION FOR RESOURCE CONSENT

Sections 88 and 145, Resource Management Act 1991

To Chief Executive
West Coast Regional Council
PO Box 66
Greymouth 7840

1. **OceanaGold (New Zealand) Limited (C/- Federation Mining) apply for the following type(s) of resource consent:**

- **Discharge permit –** to discharge waste rock to land. RC13042-13 authorises the discharge of up to 1.1 million m^3 of waste rock to land at the Snowy River Mine. This is anticipated to increase in volume to approximately 1.4 million m^3 and new material from the processing plant (tailings cell) and material from the treatment facilities will also be disposed of. This was not provided for as part of the existing consents, as such a new consent is being sought.
- **Discharge permit –** to discharge contaminants to air. RC13042-14 authorises various discharges to air associated with mining operations from within the Snowy River project site. However, it does not specifically cover the discharge from the processing plant or the tailings cell as part of the waste rock stack. As such, a new consent is being sought for these activities in terms of discharge to air.
- **Discharge permit –** to discharge tailing waste material underground. The mining method, top-down mining sequence with pastefill backfill regime, will allow Federation Mining to return approximately 50% of the Process Plant waste tailings material to the mine. A discharge to land consent is therefore required to provide for the disposal of this material underground.
- **Section 127 Change in Conditions of RC13042**

2. **The activity to which the application relates (the proposed activity) is as follows:**

OceanaGold Limited ("**OGNZL**") holds a number of existing resource consents to construct, operate, maintain and rehabilitate the Snowy River Mine site ("**Snowy River Mine**"), near Reefton. These are referenced as RC13042 from the West Coast Regional Council and RC130025 from the Buller District Council. Federation Mining is in the process of acquiring the Snowy River Mine from OceanaGold, and as part of this, is seeking additional consents to process ore at the site, and an amendment to the consented waste rock stack ("**WRS**") design and overall water management for the site.

An ore processing plant on site was not proposed by OGNZL and therefore not provided as part of the existing resource consents. It is also proposed that the filtered tailings generated from the sulphide flotation underflow in the processing plant will be collected and placed within a specially designed cell within the waste rock stack as dry stacked tailings.

This differs to the currently consented waste rock stack design on the basis that the existing consents only anticipated storing of material that only included unmineralized Greywacke, considered as a non-acid forming rock type ("**NAF**"). The management of this leachate from the waste rock stack, as well as further characterisation of potential contaminants, has identified that an additional suite of contaminants should be managed and more importantly, an expanded suite of contaminants should be treated by the proposed water management and treatment systems employed at the site.

The proposal also seeks to authorise a revised water management and treatment system from that which has been consented previously. Federation Mining has commissioned various technical reports and an assessment of environmental effects to provide further detail and support the application. These should be referred to and form part of the application.

3. **The site at which the proposed activity is to occur is as follows:**

The Snowy River Mine site is approximately 30km south of Reefton and 10km east of Ikamatua and is accessed via the Snowy River Road 8km from State Highway 7. The project site lies to the east of Snowy River. The site is bound by the Victoria Forest Park to the east and pastoral farms to the west.

Granville Mining Ltd is, the sole owner of the land which all activities (which are the subject of this application) will directly take place on. The legal description of the land parcel on which the project lies is Sections 9-10 Block XVI Mawheraiti Survey District. A copy of the relevant title is attached as **Appendix A** to the Assessment of Environmental Effects.

4. **There are no other activities that are part of the proposal to which this application relates.**

5. **The following additional resource consents are needed for the proposal to which this application relates:**

A **land use consent and section 127 application for a change in conditions** to RC130025 from the Buller District Council to authorise the processing plant and ancillary activities as described in the Assessment of Environmental Effect attached to this application for resource consent is also being sought.

6. **I attach an assessment of the proposed activity's effect on the environment that—**

(a) includes the information required by clause 6 of Schedule 4 of the Resource Management Act 1991; and

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B

PART B

Assessment of Environmental Effects

1. INTRODUCTION

1.1 OVERVIEW OF THE ACTIVITY

The Snowy River Mine, situated below the formerly known Blackwater Mine, is located approximately 30km south of Reefton and 10km east of Ikamatua in the South Island of New Zealand. The area is zoned rural, with forestry plots and Department of Conservation ("**DoC**") land in the immediate vicinity. The township of Ikamatua has approximately 200 residents. The township of Reefton has 900 residents.

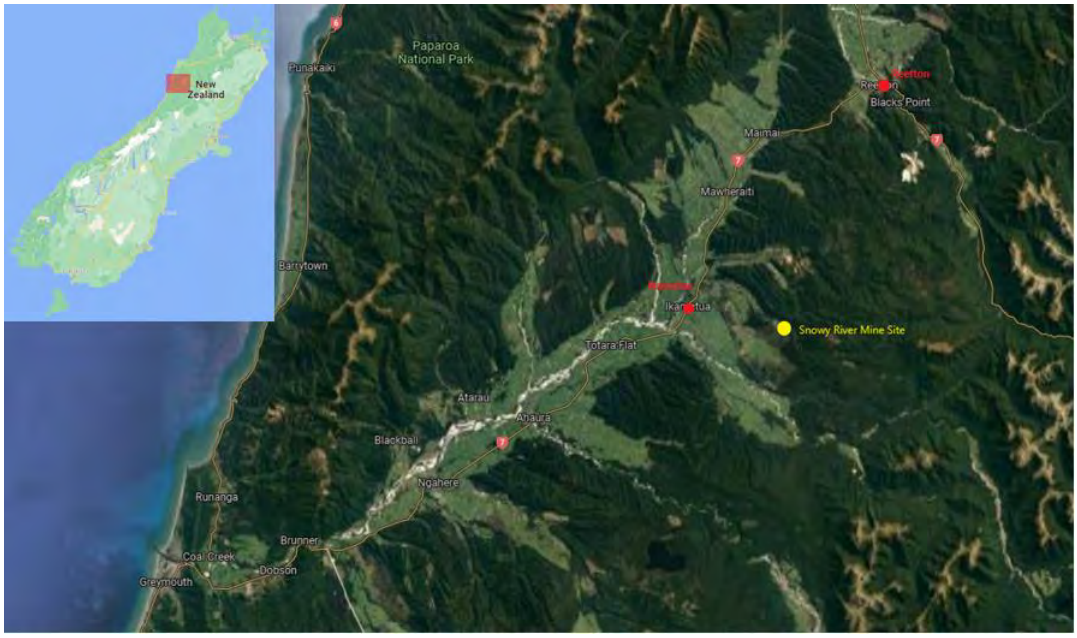

Figure 1: General location of the Snowy River Mine site.

In 2014 both the West Coast Regional Council ("**WCRC**") and the Buller District Council ("**BDC**") granted resource consents to develop and operate the Snowy River Mine (at that time it was referred to as the Blackwater mine). These were sought and obtained and are still held in the name of OceanaGold (NZ) Limited ("**OceanaGold**"). The consents include:

- The development and operation of a gold mine targeting Birthday reef;
- Vegetation clearance and incidental earthworks;
- Modification of riparian margins within 10m of Snowy River for construction and use of a bridge across Snowy River to the Blackwater Mine Site;
- Construction of a road to Snowy River Road to access the bridge and associated road improvements;
- Land use consents;
- Water permits; and
- Discharge permits.

These consents were obtained on the basis that ore won from the mine would be processed at OceanaGold's processing facility at Reefton, or at the Macraes Mine in Otago. This is no longer feasible, and Federation Mining Limited ("**Federation Mining**") proposes to establish and operate its own processing facilities at the Snowy River Mine.

The premise of this application is therefore for the additional consents above and beyond those already held for the operation in order to provide for on-site processing activities, and ancillary activities that derive from this (e.g., disposal of tailings material from the processing plant).

1.2 BACKGROUND AND EXISTING CONSENTS

The Snowy River Mine sits within the Reefton goldfield on the western side of the Victorian Forest Park. Quartz lodes were discovered in 1905 at the site named Birthday Reef, subsequently these were mined between 1906 and 1951 to a depth of almost 900m.

In May of 1991 GRD Macraes Limited purchased the interests of CRA Limited in New Zealand, which encompasses an area of 2,356 ha and includes the Blackwater Mine. Since then, GRD Macraes carried out drilling programmes, feasibility studies, and applied for a suite of consents which were granted under the Resource Management Act 1991 ("**the Act**" or "**the RMA**"). At the time of consenting, the mine was named Blackwater Mine, but is now referred to as Snowy River Mine and are one in the same.

Regional and district consents granted initially in 2004 to OceanaGold allowed for surface infrastructure, the extraction of water from Snowy River during the development and mining phases, discharge to a wetland and a tributary of Snowy River and 200,000 tonnes of waste rock at Snowy River. The duration of the development was estimated to be 1 year followed by 7 years of mining.

Further consents were granted to OceanaGold in 2014 following the revision of some components of the project, including an extension of the lifetime of the project to 3 years development, 7 years mining, and 1 year for closure, the confinement of surface infrastructure to the Snowy River site alone, an increase in the amount of waste rock, and increased water and discharge consents. All consents, those granted in 2004 and 2014, expire in 2034 with a lapse date of 5 years.

The BDC granted resource consents (reference RC130025) to develop and operate an underground gold mine (with twin declines) at Birthday Reef, plus consents for associated works including:

- Vegetation clearance and incidental earthworks;
- Modification of riparian margins within 10m of Snowy River, for the construction and use of a bridge across the river to the mine site; and

- Construction of a road to Snowy River Road to access the bridge and associated road improvements.

The WCRC granted consents (reference RC13042) to support the development and operation of the mine, including:

- Land uses (vegetation clearance, earthworks);
- Water permits; and
- Discharge permits.

In 2019, development of the decline commenced on site, and therefore, both the district and regional council consents have been exercised.

1.3 SUMMARY OF NEW ACTIVITIES AND PROPOSED CHANGES TO THE CONSENTED ACTIVITIES

Federation Mining is in the process of acquiring the Snowy River Mine from OceanaGold and via this application is seeking additional consents for processing ore at the site, and an amendment to the waste rock stack ("**WRS**") design and water management plan for the site.

As discussed above, an ore processing plant on site was not proposed and therefore not provided for as part of the existing resource consents. The proposed processing plant will be constructed and operated on a fill platform located south of the waste rock stack on land which is currently cleared and will occupy an area of approximately 10,000m^2. The potential visual and amenity (i.e. landscape and air quality) effects, heritage, noise and traffic effects arising from the processing plant and associated activities have been considered as part of this application.

It is also proposed that the filtered tailings generated from the sulphide flotation underflow in the processing plant will be collected and placed within a specially designed cell within the waste rock stack as dry stacked tailings.

This differs to the currently consented waste rock stack design on the basis that the existing consents only anticipated storing of material that only included unmineralized Greywacke, considered as a non-acid forming rock type ("**NAF**"). The management of this leachate from the waste rock stack, as well as further characterisation of potential contaminants, has identified that an additional suite of contaminants should be managed and more importantly, an expanded suite of contaminants should be treated by the proposed water management and treatment systems employed at the site.

The proposal therefore also seeks to authorise a revised water management and treatment system from that which has been consented previously. Technical assessments which explain the revised waste rock stack engineering design, the proposed water

management and treatment system, and assess the effects in terms of geochemistry, water quality and aquatic ecology are attached to this application.

1.4 OCEANAGOLD (NEW ZEALAND) LIMITED

OceanaGold is a significant multinational gold producer and New Zealand's largest producer of gold. OceanaGold's current operating assets in New Zealand consist of two large open pit mines (at Macraes in the South Island and at Waihi in the North Island), and four underground mines (Frasers at Macraes, Favona, Trio and Correnso at Waihi). OceanaGold also has a large open pit mine at Reefton in the South Island which is currently in the closure phase and the company operates and owns a mine at Didipio in the Northern Philippines, and at Haile in South Carolina, United States of America. OceanaGold commenced operations in New Zealand at Macraes Flat in 1990 and has been operating continuously since that time.

OceanaGold has signed an agreement with Federation Mining for the future development of the Snowy River Mine Project. OceanaGold will support the establishment of the project, and once decline access is completed, Federation Mining will undertake a drilling program to support a decision to mine. Under the agreement, once Federation Mining makes the decision to mine it has an exclusive right to purchase the mine from OceanaGold, and resource consents would then be transferred to Federation Mining. Up until the time that resource consents are transferred to Federation Mining, OceanaGold permits Federation Mining to exercise the consents.

1.5 FEDERATION MINING LIMITED

1.5.1 Overview

Federation Mining is an Australian incorporated company. Pursuing opportunities fitting within the sustainable and responsible development of mining projects framework is at the core of their company. With 47 employees at the Snowy River site in New Zealand and 7 employees in the Corporate Head Office in Sydney, Federation Mining is growing to become a high-level competitor for mining across Australasia and North America. Over a 10-year period when the mine moves into full production, Federation Mining aims to generate significant local employment (over 11,000 jobs) for both permanent and contract staff. The operation will make a significant contribution to the Regional New Zealand Economy and the West Coast.

The Snowy River Mine itself is operated by Tasman Mining Limited, a wholly owned subsidiary of Federation Mining.

1.5.2 Federation Mining's Environmental Policy and Environmental Management Systems

Federation Mining considers that strong environmental performance, and its social licence to operate, are an integral part of being a successful business. The company is committed to working collaboratively with the local community to create opportunities, build resilience and leave a positive, long-lasting legacy, well beyond the mining lifecycle. This commitment is detailed in a suite of company policies which are available on the Federation Mining website.[1]

1.6 REPORT STRUCTURE

Section 1 Is this introduction.

Section 2 Describes the existing environment for the Snowy River Project.

Section 3 Provides a description of the Snowy River Mine and associated activities.

Section 4 Provides a summary of the key changes to the consented existing environment.

Section 5 Sets out the resource consent requirements for the Snowy River Project.

Section 6 Addresses the actual and potential environmental effects of the Snowy River Project.

Section 7 Outlines the management and monitoring of the actual and potential effects.

Section 8 Describes the consultation undertaken by Federation Mining in relation to the Snowy River Project.

Section 9 Sets out the RMA statutory framework within which the application for resource consents is made and assesses the proposal against those provisions.

Section 10 Is the concluding statement.

Various technical assessments commissioned by Federation Mining provide the detailed technical information to support this AEE. These are appended to this AEE, are referenced throughout, and include:

Appendix A: Record of Title

Appendix B: Archaeological and Heritage Assessment, Origin Consultants

[1] https://www.federationmining.com.au/

Appendix C: Noise Effects, Tonkin and Taylor

Appendix D: Mintrex Report, Proposed Processing Plant

Appendix E: Snowy River Gold Project – Waste Rock Stack Preliminary Design Report, PDP

Appendix F: Snowy River Gold Project – Management of Minewater, PDP

Appendix G: Geochemistry Report – Mine Waste Management ("**MWM**")

Appendix H: Landscape and Visual Effects, Frank Boffa

Appendix I: Transportation Effects, Stantec

Appendix J: Ryder, Water Quality and Aquatic Ecology Assessment ("**Ryder Report**")

Appendix K: Air Quality, Pattle Delamore Partners Limited ("**PDP**")

Appendix L: Affected Party Approval Form - Landowner

2. THE EXISTING ENVIRONMENT

The existing environment includes activities that have existing use rights, existing activities carried out under existing consents and resource consents which have been granted but not yet implemented, where it appears those consents will be implemented.

Applying the existing environment is important to the assessment of Federation Mining's proposal to process ore at the site given that mining operations are already largely authorised, and any additional effects from the proposed activities only need to be considered where they are over and above already consented effects.

2.1 LOCATION

The Snowy River Mine site is approximately 30km south of Reefton and 10km east of Ikamatua and is accessed via the Snowy River Road 8km from State Highway 7. The project site lies to the east of Snowy River. The site is bound by the Victoria Forest Park to the east and pastoral farms to the west. The Snowy River runs through the middle of the project site.

Figure 2: Environmental setting for the Snowy River Mine Project.

The site is isolated from the main highways and towns of the West Coast and can be reached only from Snowy River Road off State Highway 7. State Highway 7 connects Reefton to the North and Greymouth to the South.

2.2 LAND OWNERSHIP

Granville Mining Ltd is, the sole owner of the land which all activities (which are the subject of this application) will directly take place on. The legal description of the land parcel on which the project lies is Sections 9-10 Block XVI Mawheraiti Survey District. A copy of the relevant title is attached as **Appendix A**.

There is a historic access agreement between OceanaGold and Granville Mining Ltd, dated 21.10.2010, with extensions issued in 2013, 2016, and 2018, for access to and the use of the land. Federation Mining, in agreement with OceanaGold, has executed an agreement to lease the whole of Section 10 with an easement in Section 9. The option is open to lease some or all of Section 9 in the future. The lease will remain in place for the duration of mining in entirety and the land reverted to Granville Mining Ltd at closure.

The land to which the mine relates by either taking place on, intersecting, or going under, is owned by numerous entities including Granville Mining Limited, Her Majesty the Queen, and Ngai Tahu Forest Estates Limited.

2.3 LAND USE

The operative Buller District Plan attributes different areas of land a specific zoning which reflects the intended purpose and dominant land use of that area.

The zoning attributed to the Snowy River Mine site is the Rural Zone. The Victoria Forest Park immediately to the east, and under which the mine shaft will extend, lies in a Natural Environment Area. The current proposal does not affect land that is within the Natural Environment Area.

2.4 EXISTING AND AUTHORISED MINING ACTIVITIES

As noted above, mining activities are already authorised to occur at the site.

2.5 BULLER DISTRICT COUNCIL CONSENT

Table 1 provides a description of the activities that have been authorised by the existing BDC consent and describe how these might be conditioned or limited in any way via the consent decision, AEE or technical reports that accompanied the 2014 application.

Table 1: Description of the Existing Activities that have been authorised by the Existing BDC Consent

Activity	Extent of Activities Authorised Within the Existing Environment
Land use activities	› Surface activity will be limited to one location, being the Snowy River site, on the true right bank of the Snowy River. › Surface infrastructure associated with the mine will be located at the site and will include: - A waste rock stockpile; - Mine water treatment facilities and water management ponds; - Ventilation fan (90Kw); - Compressor plant (capable of delivering 150l/s at 700kpa); - Electrical switch yard (to allow 11kV cabling and a 2.5MW power draw); - Explosives magazine (5 tonne capacity with a detonator annex); - Office and ablution blocks, grey water/sewage system; - A single bay workshop and store with a wash down slab, fuel farm and fuelling pad (25,000 litres, 6,000 litre lube / grease pod farm); - Vehicle parking area; and - Roading and bridge across Snowy River.

Activity	Extent of Activities Authorised Within the Existing Environment
Land parcels	› Within Exploration Permit area EP 40 542 (now MP60473). › Sections 9 and 10 Block XVI Mawheraiti Survey District Nelson Land District NL 10 A/347. › River bed – Crown Land. › Easement to cross the Snowy River between sections 9 and 10 Block XVI Mawheraiti Survey District Nelson Land District NL10A/347. › The mine infrastructure components will be located within the land parcel Sect 10 Blk XVI Mawheraiti SD, to the west and northwest of the Portal.
Decline	› Two parallel tunnels. › Approximately 8,400m in distance – comprising two tunnels at approximately 3,300m and connections between the tunnels at regular intervals. › Main and Northern tunnel are approximately 5m x 5m.
Vegetation clearance / disturbance	Areas affected: › Rough pasture cover – 12.0ha. › Previously logged Beech Forest – 2.5ha. › Exotic Planation – 1.3 ha. The BDC consent conditions allows for the modification of riparian margins as shown on Plan EDENG0102. The total area of riparian margin modification shall not exceed those identified areas by more than 10%. The BDC consent conditions also provide for the removal of indigenous vegetation within Section 10 Blk XVI Mawheraiti SD in addition to the identified areas shown on EDENG0102. The total area of indigenous vegetation clearance shall not exceed those areas by more than 10%.
Waste Rock Stack Physical Characteristics	› Capacity of 1,100,000m^3 (2,000,000 t). › Height of 193mRL during the decline development. › Maximum height of 210RL during the mining phase. › Cover an area of approximately 11 ha. › Approximately 300,000 cubic metres of the mine waste during mining operations will be used as backfill within the mine stopes during the last 4 years of mining, thereby reducing the

Activity	Extent of Activities Authorised Within the Existing Environment
	volume of mine waste at the time of mine closure to about 800,000 cubic metres. › Consent requires progressive revegetation.
Water management	**During development phase:** Extraction of water from flooded workings decline to a containerised treatment plant, discharge to a constructed ponds at Snowy River Road site with further discharge to the Snowy River. The silt ponds will be 2m deep and the treatment pond will be spread over an area of 6.5ha, shallow and no more than 3m in depth. The volume of water contained in the silt ponds will be 3,300m^3. **During mining phase:** Extraction of mine water via Snowy River decline with treatment plant at Snowy River Road site, and discharge to Snowy River. **Post Closure:** Portal at Snowy River site will be sealed with pipe/valve arrangement to allow groundwater to flow out once mine has flooded with ground water.
Traffic movements Revised as part of a variation application 2019	**Decline construction phase (30 – 36 months):** - Light vehicles 25 trips/day. - Heavy vehicles 4 trips/day. **Mining Phase (7 years):** - Light vehicles 40 trips/day. - Heavy vehicles 26 trips/day. Trucking movements along Snowy River Road related to mining and ancillary activities shall only occur between the hours of 7am and 9.30pm. Trucking movements shall also be scheduled around the school bus timetable so trucks are not using Snowy River Road when the school bus is using the road.
Access	Access to the surface declines and portal will be via Snowy River and a private haul road and single lane bridge across the Snowy River. Public access is not to be permanently restricted on legal road reserve.

Activity	Extent of Activities Authorised Within the Existing Environment
	(An easement has been obtained for the bridge. Power and telecommunications infrastructure will be located within the same easement corridor).
Traffic network improvements	› Undertake local road widening at the Snowy River Road/SH7 intersection in accordance with 'Diagram E' in NZTA's Planning Policy Manual, to allow slow moving trucks to accelerate and decelerate clear of through traffic. › Widen (to the north) the Snowy River Road approach to the intersection with SH7 to enable trucks turning left into Snowy River Road to negotiate the turn at a reasonable speed and without crossing the Snowy River Road approach centre-line. A flush or painted throat island may be required on Snowy River Road. › Install truck-crossing signage on both the southern and northern approaches to the Snowy River Road/SH7 intersection. › Erecting a truck crossing sign at the mine access point on Snowy River Road. › Signage stating "Children" is to be placed near the Mossy Creek Bridge no.1 and the State Highway 7 intersection of Snowy River Road. › Install gravel laybys on Snowy River Road to create additional room for vehicles to pass, particularly when large equipment is being transported during construction of the mine. Gravel shoulder widening may be constructed on Snowy River Road at other locations to provide passing bays, as required. › Undertake localised curve widening on Snowy River Road to avoid large vehicles tracking onto the road berms. › Sealing of Snowy River Road from the end of the existing seal to the turn off to the proposed bridge over the Snowy River. This is a distance of approximately 500m. The timing of roading upgrades has been amended by a subsequent application to vary the conditions to enable the upgrade of Snowy River Road to be undertaken when mining and ancillary activities commence, rather than about the same time as the surface decline construction.
Other infrastructure on the site	› A weighbridge. › Crushing and screening facility (within noise insulated building / container).

Activity	Extent of Activities Authorised Within the Existing Environment
	› Ore stockpile during the mining activity.
Staffing / Hours of Operation	› 24/7 operation. › 12 hour shifts with up to 10 persons per shift.
Gravel for roads and laydown areas	› 20cm gravel surface. › Approximately cover an area of 5,600m^2.
Hazardous substances	› Fuel storage at the Snowy River Road site. › Oils, cleaners etc, in the workshop. › Explosives at Snowy River Road site. › Explosives within the underground mine.
National Environmental Standard for Assessing and Managing Contaminants in Soil Regulations 2011 ("**NESCS**")	Consent has been obtained under the NESCS.
Archaeological Features	› A water race crosses part of the land above the portal and an adit adjacent to the water race. › These features are located above the mine portal and are likely to date post 1900. They will not be affected by the proposal. › No other features have been identified.
Noise	› Construction noise. › Noise from piling have been assessed at properties nearest to the mine site and will comply with NZS 6803:1999. › Piling activity – temporary 4 week activity. › Construction of the portal will comply with District Plan noise limits. › WRS noise levels will be at or below the background sound in the area on a calm day.

2.6 WEST COAST REGIONAL COUNCIL

In 2014, the WCRC also granted consents for the construction and operation of the mine. These consents authorised the activities which are generally described in Table 2 below.

Table 2: WCRC Regional Council Consents for the Snowy River Mine

Consent Reference	Consent Type	Activity
RC13042-01	Land use	To undertake land surface, disturbance, and earthworks associated with the construction, use, maintenance and rehabilitation of the access roads and haul roads and a bridge over the Snowy River (including undertaking works in the riparian margins of the Snowy River), install culverts, disturb the bed of an unnamed tributary, and erect structures in the tributary. Cut and fill and undertake earthworks to create the mine site at the Snowy River site, including construction, use, maintenance and rehabilitation of diversion drains.
RC13042-02	Land use	To undertake land surface disturbance and earthworks associated with the construction, use, maintenance and rehabilitation of temporary and permanent silt ponds, sumps, bunds and treatment system.
RC13042-03	Land use	To undertake vegetation clearance associated with the construction, use, maintenance and rehabilitation of the Blackwater Mine including construction of infrastructure (including but not limited to pipelines and utilities), roads and a bridge over the Snowy River and other areas to be disturbed.
RC13042-04	Land use	To construct the Snowy Decline and undertake associated earthworks.
RC13042-05	Land use	To disturb the riverbed of the Snowy River for geotechnical testing and construction and use of a bridge over the Snowy River.
RC13042-06	Land use	To extract gravel from the dry bed of the Snowy River.
RC13042-07	Water permit	To divert stormwater around disturbed areas to silt ponds and to divert clean stormwater runoff from undisturbed areas to local surface drainage channels to minimise silt control requirements.
RC13042-08	Water permit	To recycle surface water and groundwater from Snowy River for mine operational purposes.

Consent Reference	Consent Type	Activity
RC13042-09	Water permit	To take groundwater from the Snowy Decline for dewatering purposes (to maintain dry working conditions in the shaft and underground workings).
RC13042-10	Water permit	To take water for use in mining, for dust control and for domestic purposes from the Snowy River.
RC13042-11	Water permit	To divert water for the purpose of constructing a bridge across the Snowy River.
RC13042-12	Discharge permit	To discharge surface water, groundwater, and contaminants to land at the Snowy River site (being water associated with drilling, underground operations, decline development, stormwater from the portal area, waste rock stack, ore stockpile and infrastructure area) in circumstances that will result in that water and contaminant entering the Snowy River.
RC13042-13	Discharge permit	To discharge up to 1.1 million m^3 of waste rock to land at the Snowy River Road.
RC13042-14	Discharge permit	To discharge heat and other contaminants (including dust and vehicle emissions) to the air from mining operations and associated activities (including stockpiling and handling of waste rock and ore, venting air from the return airway tunnel and operating a diesel generator).
RC13042-15	Discharge permit	On site discharge of sewage and greywater treatment overflow at the Snowy River Road site.

The key component of the regional council consents relates to the use of water and the resultant discharges from activities at the mine site.

In summary, the existing consents provide for:

- Construction of a twin-tunnel decline from land at the Snowy River including establishment of surface mine infrastructure, water management structures, access roading (including a bridge across the Snowy River), a waste rock stack, provision of power and telecommunications, mine related buildings, a dangerous goods store, and some refurbishment of Snowy River Road;
- Exploration drilling and trial mining and dewatering of the historic workings;

- Mining of the ore body including sorting and screening of the ore – with offsite processing; and
- Mine closure and decommissioning. The constructed water management treatment system is to remain post closure.

The WCRC consents authorise the following activities:

- Place up to 1.1 million cubic metres of waste rock on surface;
- Divert storm water;
- Remove gravel from the Snowy River;
- Pump water from the Snowy River for mining, dust control and domestic use;
- Recycle surface and ground water for operational purposes;
- Discharge water to land;
- Onsite discharge of sewage and grey water;
- Discharge heat and other containments to the air;
- Undertake vegetation clearance for mine infrastructure;
- Take ground water for purposes of mine dewatering; and
- Construct decline and associated infrastructure.

A conceptual plan which was attached to the 2014 consent documentation shows the location of the declines and the consented surface infrastructure at the site:

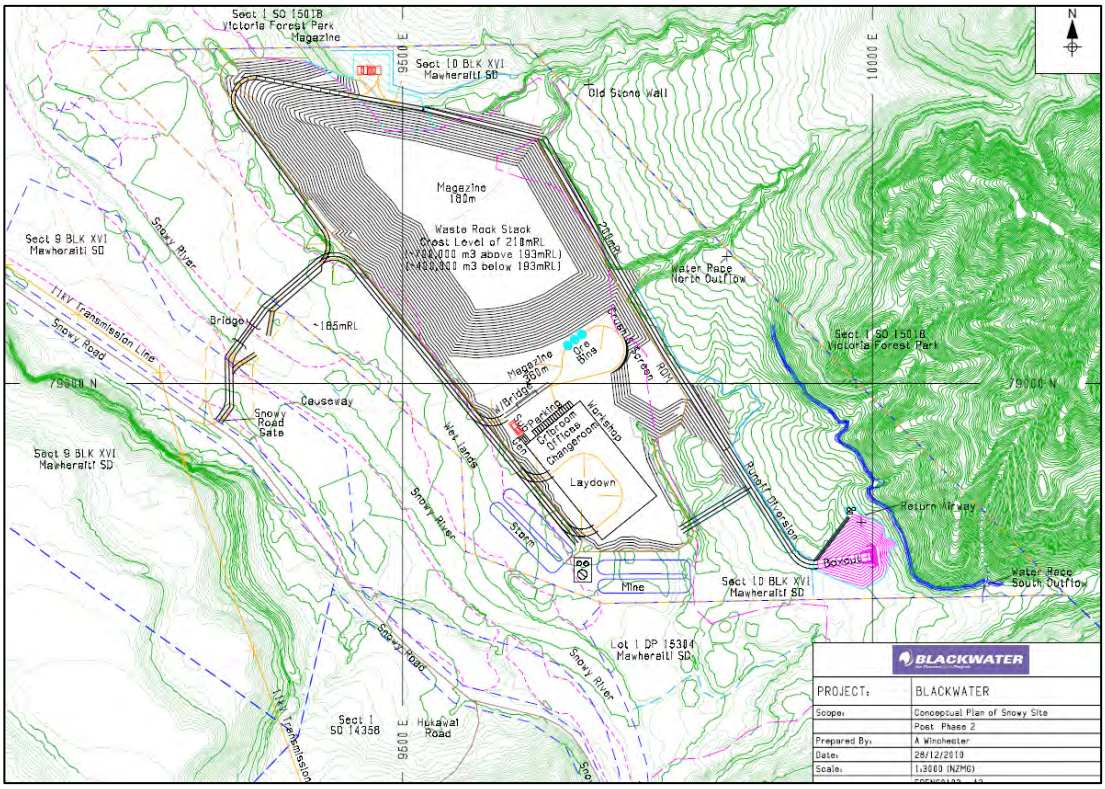

Figure 3: Consented Surface Infrastructure Site Plan

The existing land use consent(s) provides for the activity to occur in phases:

- The Decline Construction;
- Exploration Drilling and Trial Mining, and Dewatering;
- Mining; and
- Mine closure.

To date, some of these consents have already been given effect to and work has commenced at the site through vegetation clearance, establishment of the surface infrastructure facilities, construction of the bridge across the Snowy River, creation of the portal and establishing the waste rock stack.

Figure 4: **Site Establishment Works**

Figure 5: **Underground Portal**

Although consent is being sought to vary the waste rock stack design, those design modifications do not require deconstruction of those parts of the waste rock stack which have been constructed to date.

2.7 HERITAGE

Historic sites in the vicinity of the Snowy River Mine site are primarily represented by historical mining, including alluvial and underground mining operations. Origin Consultants have completed a detailed assessment of the heritage values which apply to the Snowy River Mine site. This report is attached as **Appendix B**.

The Snowy River was subject to alluvial mining in the 1860s. The most significant gold mining operation in the area was the Blackwater Mine at Waiuta, established in the early 1900's. A gold-bearing quartz reef named 'Birthday Reef' was discovered near the upper reaches of Blackwater Creek, that was historically mined until July 1951. The extent of the historic mining features in relation to the Snowy River Mine site is displayed in Figure 6 below.

Although there were several early 20th Century mining operations along the Snowy River, these mainly affected areas either upstream or downstream of the current Snowy River Mine site. The closest any 20th Century mining appears to have come to the Snowy River Mine was the excavation of prospecting adits and the establishment of a water race on the hillside above the site during the 1920s and 1930s. Any historic mining features that would have been present at the Snowy River Mine site have likely been destroyed by modern alluvial operations (1980s-1990s).

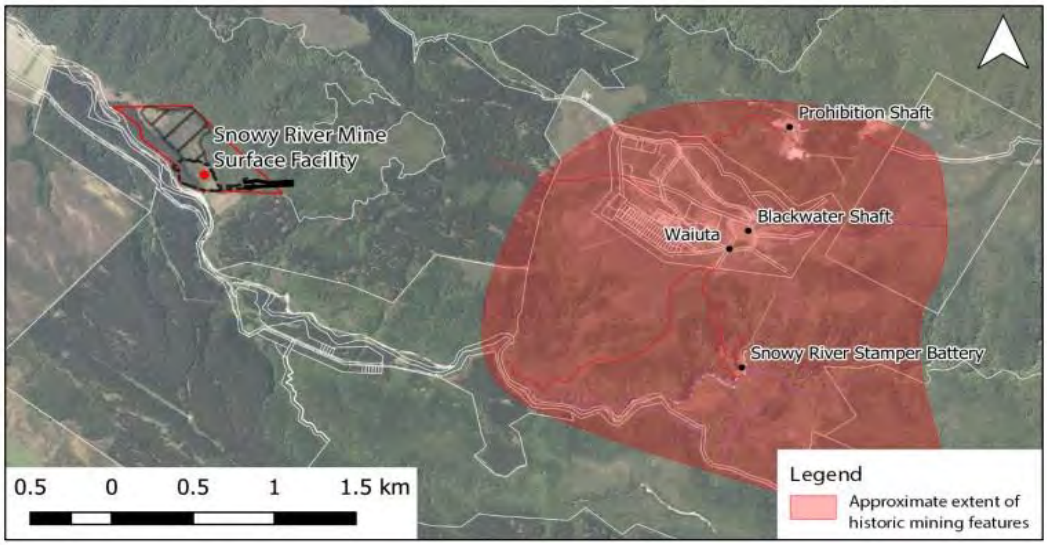

Figure 6: Approximate extent of above and below ground historic mine working (from Origin Consultants).

2.8 LANDSCAPE

Snowy River valley in its western downstream extent is quite narrow and linear in form and separated from the Ikamatua plain to the south-west by a distinct scrub-covered terrace. Much of the valley is open farmland with clear signs of previous alluvial mining. There are numerous dense patches of gorse and broom.

Upstream of the site the valley narrows, and the land cover changes to pine forestry surrounded in places by beech forest. The steep slopes above the Snowy River to the north and south-east have a dense cover of beech forest and are within the Victoria Forest Park. The Victoria Forest Park is managed for conservation purposes by the DoC.

2.9 ROAD NETWORK

Snowy River Road is a rural road which intersects SH7 about 60km south of the SH7 Snowy River Bridge intersection. It is two-laned with a centre line for the first 2km from the intersection with SH7, with an approximate width of 5.5m. Thereafter, it becomes a one-laned road, with approximately 4m width. 1.5km from the intersection with SH7 there is a one-laned bridge. Snowy River Road is sealed for the first 8km and then becomes gravel. The proposed haul road access to Blackwater Mine is located 8.5km from the SH7 intersection. There are 8 properties along that 8.5km section of Snowy River Road. The road provides access to the Snowy Battery Tramping Route. There are forest blocks located along the road. SH7 is a Strategic Route that provides inter-regional connections between Canterbury and Nelson/Marlborough with the West Coast. SH7 intersects with Snowy River Road at about 220km from the start of SH7 at Waipara (route position 212/8.3).

2.10 METEOROLOGY AND CLIMATE

The climate in the West Coast region is characterised by moderate to high rainfall throughout the year. The late summer months are generally the driest and warmest periods and winter temperatures are typically mild to cold. The site is located in the upper reaches of the Grey River/Mawheranui between the coastal Paparoa Range, located to the west and the Victoria Range located to the east, which merges with the Southern Alps. The Southern Alps heavily influence the region's climate, as westerly winds from the Tasman Sea are forced upwards by the Alps, generating orographic precipitation, resulting in precipitation to fall on the West Coast.

The nearest location from which meteorological data is available is Reefton, located approximately 20km to the north of the site, due to the impact of topography on regional scale winds, the meteorological information presented is only an approximation of the conditions experienced at the Snowy River Mine site. The windrose in Figure 7 shows the predominant wind direction is south-easterly and there is a low frequency of windspeeds (>7 ms^{-1}) that present a high risk of dust events. The average monthly rainfall is 155mm.

Rainfall between April through to December is relatively high, which will provide significant dust suppression during these months (Figure 8).

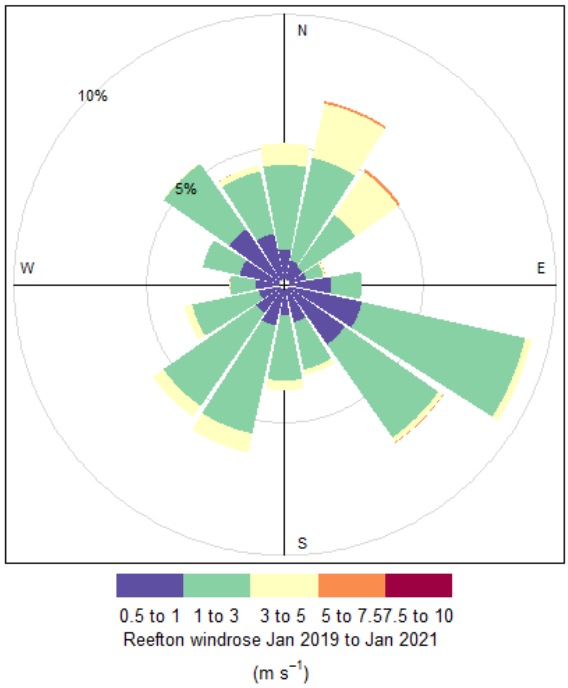

Figure 7: **Windrose for the Reefton Climate Station (2019-2021).**

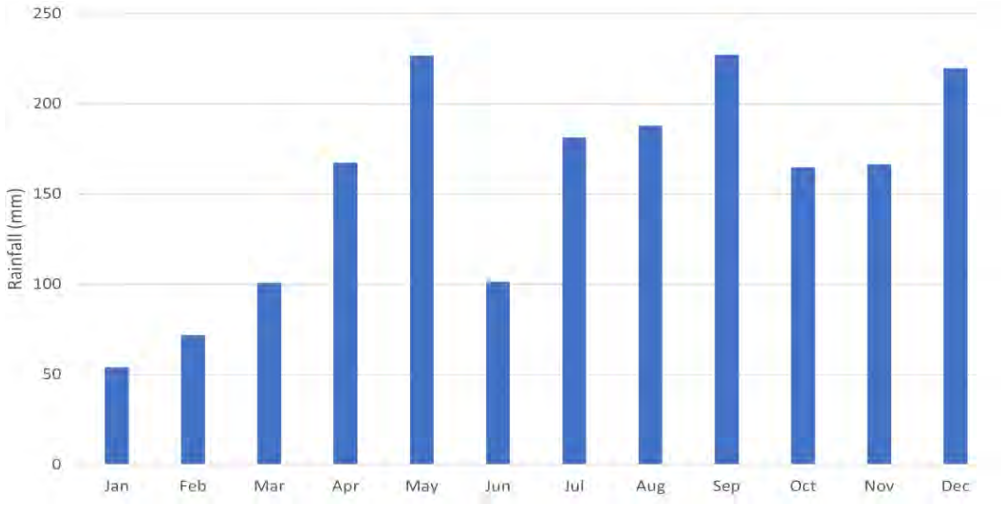

Figure 8: **Average monthly rainfall at the Reefton Climate Station (2019-2021).**

2.11 AIR QUALITY

Due to a lack of other sources and distance from any urban areas, the concentrations of air pollutants that have the potential to adversely affect human health is expected to be low (i.e. excellent air quality). The current consented and partially constructed WRS and activity onsite will be discharging some dust into the air, along with agricultural activities in the Snowy River valley and dust from natural sources such as alluvial material and sea salt.

2.12 NOISE

As required by the existing resource consent, noise (and vibration) monitoring has been ongoing since December 2020 and this data has been used to describe the local noise environment. This monitoring data is presented in the report attached as **Appendix C**.

A representative two-week period of data is shown in Table 3. The results include noise from all sources. Noise is below the district plan limit. There is a diurnal pattern of noise levels rising during the day and reducing at night. When there are light winds at night the ambient noise environment is around 32-35 dB $L_{Aeq(15\ min)}$ and during the day in the range of 42-45 dB $L_{Aeq(15min)}$. The measured data confirms that the area is relatively quiet.

Table 3: Existing noise at the Snowy River Mine site.

Period	District Plan limit	Duration (hours)	$L_{Aeq,t}$ (dB)	Range ($L_{Aeq,15min}$)
Monday to Friday 08:00 am to 11:00 pm	55 dBA L10	15h	42	33 – 56 dB
Saturday 08:00 am to 6:00 pm	55 dBA L10	10h	43	33 – 54 dB
All other times	45 dBA L10 L_{max} 75dBA	-	40	32 – 52 dB

2.13 GEOLOGY

The published information indicates that the geology in the vicinity of the site, is expected to comprise of the following geological formations:

- River alluvium: Underlies the low-lying areas with wetland vegetation and active bare riverbeds;
- Outwash gravels: Sand and gravel outwash plains and terraces. These broadly planar surfaces developed as stream deposits and the water source was mainly glacial meltwater. Former river channel patterns are commonly preserved in these deposits; and

- Glacial Moraine (ice deposited sediments): Comprised of interbedded till, subrounded to subangular up to boulder size in clay matrix and fluvial outwash gravel. Hummocky and irregular surface rises and troughs.

The glacial and river deposits in the vicinity of the site lie unconformably over:

- Blue Bottom Group ("**BBG**"): Terrigenous muddy sediments (terrestrially deposited). The BBG is a fluviatile sandstone; estuarine mudstone and minor conglomerate; and
- Greenland Group: Typically, an unfossiliferous, indurated, dark grey greywacke (sandstone), interbedded with greenish grey argillite.

The site is to the east of the Grey – Inangahua Depression (the low-lying area between Victoria Range and Paparoa Range). The nearest active or potentially active faults are as follows:

- Maimai Fault (18km), Lyell Fault (43 Km), and White Creek Fault (50 km);
- The Alpine Fault is approximately 25 km to the east of the site; and
- The southern segment of the White Creek Fault is a potentially active fault and lies approximately 7km to the east of the site.

2.13.1 Site Geology

Geology at the site is divided into four main units based on geotechnical investigation that is consistent with the published geology discussed above, namely:

- River Terrace Alluvium;
- Blue Bottom Group;
- Greywacke Debris; and
- Greywacke Basement.

The geological model developed for the WRS indicates that:

- The River Terrace Alluvium overlies the Greywacke Basement and Blue Bottom Group;
- River Terrace Alluvium is present as a superficial layer across the whole site and is disturbed by recent alluvial mining activities; and
- The Greywacke Basement has a potential paleovalley trending southeast to northwest. The inferred southern edge of the paleovalley is indicated by Greywacke Basement directly underlying River Terrace Alluvium in the southern area of the site.

2.14 SURFACE WATER AND WATER QUALITY

In the vicinity of the mine site, approximately 4,310ha of catchment reports to the Snowy River.

A number of reports have been prepared on the water quality of the historic Blackwater Mine workings and the water quality within the Snowy River.

Water quality monitoring undertaken in 2010, 2011 and 2012 indicated adit waters and the Snowy River are sourced from areas of similar geology. The principal differences between the underground waters and the receiving waters are elevated concentrations of arsenic and iron in the mine waters, along with corresponding increases in major ions.

Concentrations of arsenic and iron in the low-level adit are similar to those reported historically (2003), which indicates the composition of flooded historic mine workings are relatively stable.

More recent water quality monitoring undertaken within the Snowy River by Federation Mining as part of compliance with the current consents indicates that water quality is being maintained, as too is the ecology and health of the waterbody.

2.15 AQUATIC ECOLOGY

The upper Snowy River catchment is primarily a mix of native beech and broadleaf forest with an increase in exotic species (e.g. gorse, broom, Pinus radiata) and general vegetation disturbance with distance downstream. Stream shading generally declines with distance downstream as riparian vegetation has become increasingly modified and the valley area opens up. Physical instream habitat is dominated by a mix of run and riffle habitat, with a range of mix size coarse bed substrates.

Periphyton communities are typically sparse and dominated by thin brown and green diatom films and are likely to be reflective of several factors including high stream shading (especially in the upper catchment), low nutrient concentrations, and disturbance frequency (e.g. high rainfall and flood prone nature).

Surveys completed in 2011 and 2012 found macroinvertebrate abundances and taxa richness varied between sites and among sampling dates, however, benthic macroinvertebrate communities at all sites are dominated by pollution sensitive taxa, especially mayflies and caddisflies, which indicate clean water and coarse stony bed substrates which are free from silt. Koura (freshwater crayfish) were recorded in low abundances at two of the upstream sites. Monitoring data associated with the consent has resulted in similar conclusions.

Macroinvertebrate Community Index ("**MCI**") scores and qualitative macroinvertebrate community indices scores ("**QMCI**"), an indicator of overall stream health, were above 120 and 7 respectively at all sites, which is indicative of excellent water and/or habitat qualities.

Macroinvertebrate scores in general suggest water quality (and thus benthic macroinvertebrate communities) were unaffected by any historic mine drainage. Six species of fish were identified from Snowy River during the surveys and five of the six species recorded had been previously found in the catchment. Short-finned eels were recorded from one site in June 2011 and had not been previously recorded in the catchment.

The most abundant fish species recorded was dwarf galaxias followed by brown trout. All brown trout caught were juveniles and no adult brown trout were observed during the surveys.

The information collected from the Snowy River indicates that little change has occurred in either biological communities or in the water and sediment quality since the original baseline survey was undertaken in 2003.

2.16 GROUNDWATER

The groundwater system within the site area can be separated into two main aquifer units: a shallow aquifer within the river terrace alluvium and a deep aquifer within the Greywacke Basement. A spatially discontinuous confining layer separates the shallow and deep aquifers.

The shallow aquifer is unconfined and is connected to the Snowy River. Therefore, groundwater level fluctuation will be largely dictated by the river flood levels. The flood response within the aquifer will diminish with distance away from the receiver and there will be an underlying seasonal groundwater level fluctuation, independent of flooding driven by rainfall aquifer recharge.

The deep aquifer is confined and has demonstrated artesian pressures. Recharge of the deep aquifer is partially derived from elevation (above the valley floor), and therefore, a conspicuous response to flooding is not expected. There is also likely a seasonal fluctuation in the deeper aquifer, however, the range of fluctuation is likely to be less than the shallow aquifer due to the increased distance to recharge.

2.17 TERRESTRIAL ECOLOGY

2.17.1 Vegetation

The project site is located within the Totara Flat Ecological District in the North Westland Ecological Region. The vegetation of the District has been substantially modified by human activities, with large areas of forest on the more fertile alluvial flats converted to pasture, other areas have been harvested for timber and either left to regenerate or converted to forestry. The vegetation of the Snowy River site is beech forest to the north-east, with much of the area proposed for the surface infrastructure being rough pasture, gorse, broom and blackberry.

Figure 9: Beech Forest in the Background surrounding the working area of the site.

The margins of the Snowy River vegetation cover were once largely dominated by pine plantation and are now largely a mixture of exotic species.

Figure 10: Snowy River Margin, in the background pine has been felled.

The entire area over which structures are planned to be constructed is highly impacted by cattle grazing throughout, with large areas having already been disturbed by historic gold dredging.

A small portion of the infrastructure will impact on native vegetation (i.e. the regenerating mixed beech forest). This vegetation is not considered to be of conservation significance.

The regenerating mixed beech forest vegetation type at this site is an immature state of a well-represented and protected type throughout the Totara Flat Ecological District. No nationally threatened or uncommon plant species have been identified. The immature forest at this site tracks the western edge of a more mature forest type that runs along the north-eastern side of the true right of the Snowy River flood plain and does not provide any significant role in the terms of ecological connectivity or buffering.

2.17.2 Fauna

The development is adjacent to, but not part of, public conservation land (Victoria Conservation Park) that has been designated as part of the North West Wildlife Corridor ("**NWWC**"). Since the original planning of the NWWC in 1992, transfers of indigenous forests from Timberlands West Coast Limited to the conservation estate have resulted in a substantial increase in the area of indigenous forest below 600 mRL that is part of the NWWC.

The avifauna of the area is typical of North Westland beech and beech/podocarp forests with a good population of common indigenous birds including grey warbler, fantail, bell bird, kereru and brown creeper, while other birds such as robin, kakariki and kaka are widespread but not abundant.

3. DESCRIPTION OF THE SNOWY RIVER MINE AND ACTIVITIES

3.1 THE SNOWY RIVER MINE

This chapter of the AEE describes the activities to be undertaken as a part of the of the Snowy River Mine Project in the following sections:

Section 3.2 Describes the main project components.

Section 3.3 Describes the site establishment methods.

Section 3.4 Describes the proposed mining methods.

Section 3.5 Describes the storage and use of hazardous substances.

Section 3.6 Describes the proposed project schedule.

Section 3.7 Describes the proposed workforce.

Section 3.8 Describes the proposed rehabilitation and closure concepts for the Snowy River Mine.

Section 3.9 Describes the off-setting.

3.2 PROJECT COMPONENTS

Key project components of the Snowy River Mine include the twin decline tunnels and underground mining operation, as well as the surface infrastructure facilities that are necessary to support the mining activity.

It is important to note that to provide context, this project description encapsulates the entirety of the project, most of which has been authorised to occur via the existing regional and district council consents that the site holds. The new or altered activities (e.g. the processing plant, the waste rock stack, and the proposed water management system and treatment facilities) are discussed in further detail in Section 4 to this report.

3.2.1 Twin decline tunnels and underground mine

The Snowy River Mine will be accessed by a 3.3km twin tunnel to access the Birthday Reef ore body. Construction of the twin tunnel declines is already underway in accordance with the existing consents. Subject to resource drilling, this has a current Infrared Resource ranging between 700,000 and 1,000,000 ounces. The twin tunnel declines are 5m high by 5m wide. There will be cross cuts between the tunnels approximately every 250m to allow for emergency escape, ventilation, and the movement of equipment and personnel.

The vertical depth from the portal to the bottom of the Historical Blackwater Mine is approximately 40m. The mining operations for the Snowy River Mine descend a further 700m from the end of the twin tunnels to a depth of 1200m. The underground mine will be forcibly vented via primary ventilation fans located at the portal which are supported by secondary fans and a series of ventilation tubing to move air through the tunnels in the mine workings. Water from the old workings would be pumped from the Historic Blackwater mine to the Snowy River Mine surface infrastructure for treatment and reuse for site operations.

3.2.2 The surface infrastructure

The current existing and consented infrastructure is constructed and being utilised to support site operations:

- A waste rock stockpile;
- Mine water treatment facilities and ponds;
- Ventilation fan, compressor plant, electrical switch yard;
- Explosive magazine;

- Offices and associated amenity facilities;
- Workshop;
- Vehicle parking areas;
- Roading and bridge across Snowy River; and
- Development of the Mine Tunnels.

3.3 SITE ESTABLISHMENT

The project has commenced under existing consents with the excavation and forming of the area for the portal and surface infrastructure. This construction of the portal, decline and the ventilation system down to the drill platforms commenced in December 2020. Underground mining of ore will commence following the completion of resource drilling and commissioning of a feasibility study.

3.4 MINING METHODS

The mine will use standard drilling and blasting methods with electric and/or low emission diesel-powered mobile fleet of equipment to mine below the former Blackwater underground.

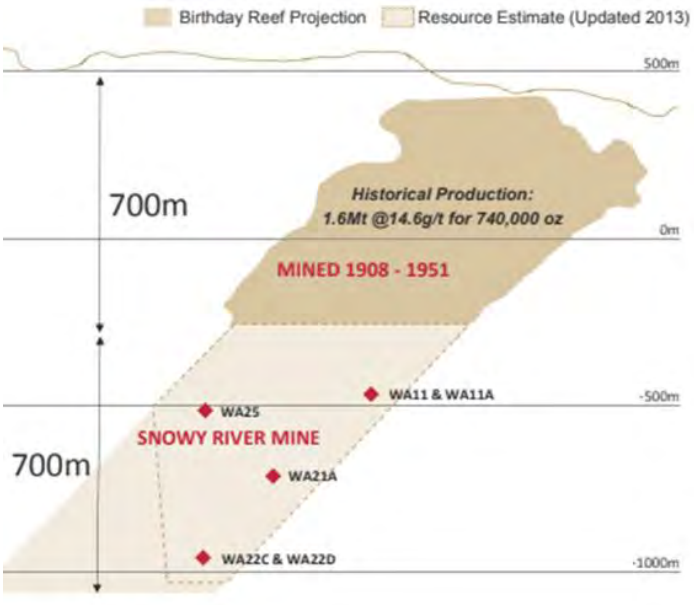

Figure 11: Proposed Mining layout

The mining will be a top-down sequence, largely dictated by the pastefill backfill regime allowing approximately 50% of processing waste tailings material to be returned underground.

Measures have been included to ensure a minimum number of stoping fronts are available to maintain required production rates over the mine life. Dual level access will provide four stoping fronts on each level. Crown pillars have been designed at every nine stoping levels to allow mining to commence on underlying levels and effectively open up additional stoping fronts. The orebody will be retreated in 10m stope intervals.

Blasting is expected to occur 2-4 times per shift operating in a similar nature to the existing development model. While mining activities will be undertaken 24/7, the fleet will be undertaking operations underground and will not be heard at the surface. The site will also continue to maintain vibration and noise monitoring to ensure compliance with resource consent conditions.

3.5 HAZARDOUS SUBSTANCES

Explosives in quantities will be transported to the mine and stored in explosives magazines. These explosives will be transported underground on a regular basis for daily use in the underground operations.

Other hazardous substances will be used as part of mining and processing operations and will be stored in designated locations on the surface infrastructure. These are:

- Lubricants and coolants will be used in vehicles and machinery which are currently consented;
- Reagents: Dry – stored in shed (PAX potassium amyl xanthate; cyanide (tablets); SMBS sodium metabisulphite); copper sulphate; flocculant (bag discharges into a dry bulk hopper on the mixing unit));
- Reagents: Liquid – delivered in 1000 litre volumes and stored in bunded undercover storage (hydrochloric acid; caustic soda; frother (Orica DSF002A/ MIBC or similar);
- Leach aid – deliver as a pallet of 48x10 kg pails stored in gold room;
- Cardon bead – delivered as 400kg pallet of 20kg bags;
- Oxygen produced on site by small PSA plant;
- Fuel - there is an existing diesel tank in place at which will be used for mobile equipment which is currently consented; and
- Explosive use (including blasting accessories such as detonators, primers, detonating cord and surface delays), and the handling of explosives and the method of firing will be in accordance with standard practices for the Snowy River Mine and is currently consented.

Key management measures used at the site include:

- Explosives will be securely stored and monitored in accordance with site management plans;

- People using hazardous substances will be certified under the Health and Safety at Work (Hazardous Substances) Regulations 2017;
- Relevant location certificates and stationary containment certificates for hazardous substances for the site under the above Act will be in place;
- Material safety data sheets will be held on an electronic database;
- Bunding will be used for all bulk hazardous substance storage. The majority of bunds will have sump pumps fitted to recover any spillages;
- Spill kits, fire extinguishers and other safety equipment will be available, and signage will be in place;
- Staff will be trained in emergency procedures to follow in the event of an incident; and
- The location of hazardous substance storage will be located well away from neighbouring residences and will be located to avoid the nearest watercourses.

There have been no major spillage events at the Snowy River Mine project, and the following controls are in place:

- A Management Plan for each identified hazard at site to address any health and safety risks to personnel;
- A Health and Safety Management system; and
- An Emergency Management Plan.

3.6 PROJECT SCHEDULE

The operational phase of the Snowy River Mine is expected to take at least 10 years following the completion of all preliminary works including the conclusion of the twin declines, feasibility study, decision to mine and construction of the processing facility.

Proposed Project Timeline

The Life-of-Mine programming currently has the following major milestones:

- Complete decline development: April 2023
- Drilling and feasibility study: May 2023
- Processing Plant construction: Mid 2024
- Processing plant operational: December 2024
- Mining finished, and begin final rehabilitation: April 2034

3.7 WORKFORCE

The existing underground workforce at the Snowy River Mine will be retained for the life of the project, lasting at least 10 years including rehabilitation.

The workforce is expected to grow from the current 40 to over 110 staff when the mine moves to full production in late 2024.

3.8 REHABILITATION AND CLOSURE

Rehabilitation is an integral part of all mining operations at the Snowy River Mine and a key issue considered in all mine planning.

The approach to rehabilitation taken for the Snowy River Mine will be progressive and include:

- Careful design and construction of the waste rock stack to integrate with the existing landform character of the area;
- Keeping the surface area disturbed to a minimum while remaining compatible with day-to-day operations;
- Rehabilitating the site to a safe and stable condition as soon as practical;
- Removal and restoration of the haul roads used during the project if these are no longer required for future projects and the surrounding land is also rehabilitated;
- Containing and treating all contaminants on-site in such a manner that they do not pose a long-term safety or environmental hazard; and
- Achieving a suitable and sustainable post-mining land use.

The project does not require disturbance of any new areas and will use existing, already disturbed land around the surface infrastructure.

The implementation of the closure strategy at the conclusion of operations will include:

- The access to the portals secured for safety;
- The surface infrastructure will be removed, and the site rehabilitated as per agreed consent conditions;
- The bridge and site access road will be retained as part of the land access agreement;
- The water treatment ponds to provide ongoing management of site run off; and
- The waste rock stack will be rehabilitated with native plants and integrated with existing landform character.

Federation Mining will work with OceanaGold to transition the existing partnership with DoC on the pest management project in adjoining landholdings from mid-2024 and for the duration of production.

3.8.1 Landscape Mitigation and Remediation at Project Closure

The waste rock stack is located in front of a naturally elevated landscape which will allow the stack to be keyed into the existing topography, and once rehabilitated, appear to be part of the natural hill side.

At mine closure, the mine portals will be sealed, and defunct sections of the access road (not required by the landholder) removed and restored during the closure phase of the project.

The surface structures will be removed, and all tunnels will be secured to ensure public safety.

All ancillary infrastructure not required to remain under consent or land access agreement will be removed.

If there is subsurface subsidence on the slopes above the portal, any large slump scraps that arise will be contoured and secured for safety.

3.9 COMPENSATION

Federation Mining has a strategy to compensate for the temporary removal of trees from the Snowy River Mine site for the purposes of mining operations. Native trees will be planted progressively on the perimeter of the site to provide compensation and assist with minimising visual effect from surface operations.

Federation Mining has partnered with the “Trees That Count” project to support the planting of native trees on the West Coast in cooperation with community planting groups. To date Federation Mining has sponsored the planting of around 500 native trees on the West Coast which will assist to offset 113 tonnes of CO_2 emissions. Federation Mining has a target of sponsoring “Trees That Count” with the aim of enabling the planting of 1000 trees per year for each year of production as part of their sustainability commitments.

Federation Mining acknowledge that climate related risk has the potential to impact the businesses and communities they operate within. Federation Mining will work to identify and actively manage climate change impacts, both in terms of physical and transition risks present in their operations.

During the production phase of the operation, Federation Mining will seek to use low emission equipment and will commission a study for the generation of hydroelectric power in the Snowy River.

Federation Mining is committed to reporting emissions and energy consumption and disclose material climate related risks to their stakeholders. These can be found in the company's Sustainability Report on their website.

4. KEY CHANGES TO THE CONSENTED EXISTING ENVIRONMENT

As discussed above, OceanaGold holds a suite of existing resource consents from both the District and Regional Councils that authorise a range of exploration and mining activities at the Snowy River Mine site. A detailed description of what the various consents authorise is set out in Section 2.4 above.

An on-site processing plant was not provided for as part of the existing resource consents, as it was intended for the ore to be transported to either OceanaGold's processing facilities that have been established elsewhere (e.g. at the time the Globe Process Mine or Macraes Gold Project in Otago). The current consent conditions anticipate an environment whereby the material is extracted from the site and transported elsewhere for processing to occur.

Transporting the ore offsite for processing is no longer the most practicable or efficient option[2] and as such Federation Mining is seeking to establish this facility on the site. It is the addition of this facility which means new or varied consents to provide for processing onsite are now required.

To ensure that this is abundantly clear, the following provides a description which is limited to those activities for which consent is now being sought. It relates to:

- The Processing Plant and Associated Activities;
- The WRS; and
- Water Management, Treatment (including drains, ponds and a new plant onsite) and Discharges.

4.1 PROCESSING PLANT

The existing resource consent does not provide for a processing facility which will be needed to process ore from underground to produce gold bars onsite. The processing facility will be constructed and operate on land that is currently cleared and will occupy an area of approximately 10,000m^2. A scoping study prepared by Mintrex setting out indicative specifications for the processing plant is attached as **Appendix D**.

Some of the key process elements of the plant are described further below.

[2] For example. Globe Mine is now in a care and maintenance phase.

- **Crushing**: The run-of-mine ore would be passed through an open-circuit primary jaw unit and closed-circuit secondary cone crusher. The crusher will deliver the ore to a Crushed Ore Bin, with excess feed overflows from the bin stacked by conveyor into stockpile which can be recovered and returned to the surge bin as mill feed when required.
- **Milling and Gravity**: The crushed ore is then milled, and the discharge slurry is classified by a cyclone cluster and transferred by gravity to the flotation area. Oversized screen is returned to mill feed. The gravity tail slurry is split between mill feed and mill discharge to maintain the correct mill slurry density.
- **Flotation**: The conditioning tank at the head of the flotation system is used to bring the slurry to the correct density with reagent additions to prepare it for sulphide flotation. Sulphide concentrate reports to a froth launder and deaeration/settling hopper. This hopper overflows a clarified solution to the process water system whilst the concentrate settles and is forwarded to the regrind mill. The float tail is forwarded to a thickener to settle for filtration.
- **Concentrate Treatment Plant**:
    - The settled float concentrate slurry is passed into a small roller-mounted regrind mill.
    - The mill discharge is pumped to an agitated intensive leach tank ("**ILT**"), with addition of caustic and cyanide to achieve the correct leaching conditions.
    - The ILT leach slurry product is transferred to a bank of carbon in pulp ("**CIP**") tank cells (Kemix) for extraction of dissolved gold into a carbon circuit. Carbon beads are moved counter-current to the slurry and recovered over a screen.
    - The leach tail from the CIP cells passes to an agitated cyanide detoxification tank. This uses sodium metasulfite ("**SMBS**"), copper sulfate (**$CuSO_4$**) and oxygen to destruct the weak acid dissociable ("**WAD**") cyanide.
- **Float Tails Processing**: The tails slurry from the flotation plant is thickened before being processed by a vacuum belt filter. The filter cake at ~80% solids is stacked by conveyor within a fabric-covered shed for weather protection. Most of the filter cake will feed the Paste Plant. Excess tails will be trucked for co-disposal with other mine waste on the WRS.
- **Gold Recovery**: The gold laden carbon extracted from the CIP module is accumulated in a wash shed, with a conventional carbon wash/elution process followed by solution electrowinning in the gold room to recover gold as cathode sludge. Sludge is removed from the cells, drained and oven-dried, then smelted to ore bars in a tilting furnace.

The schematic of the Process Plant is presented in Figure 12 below.

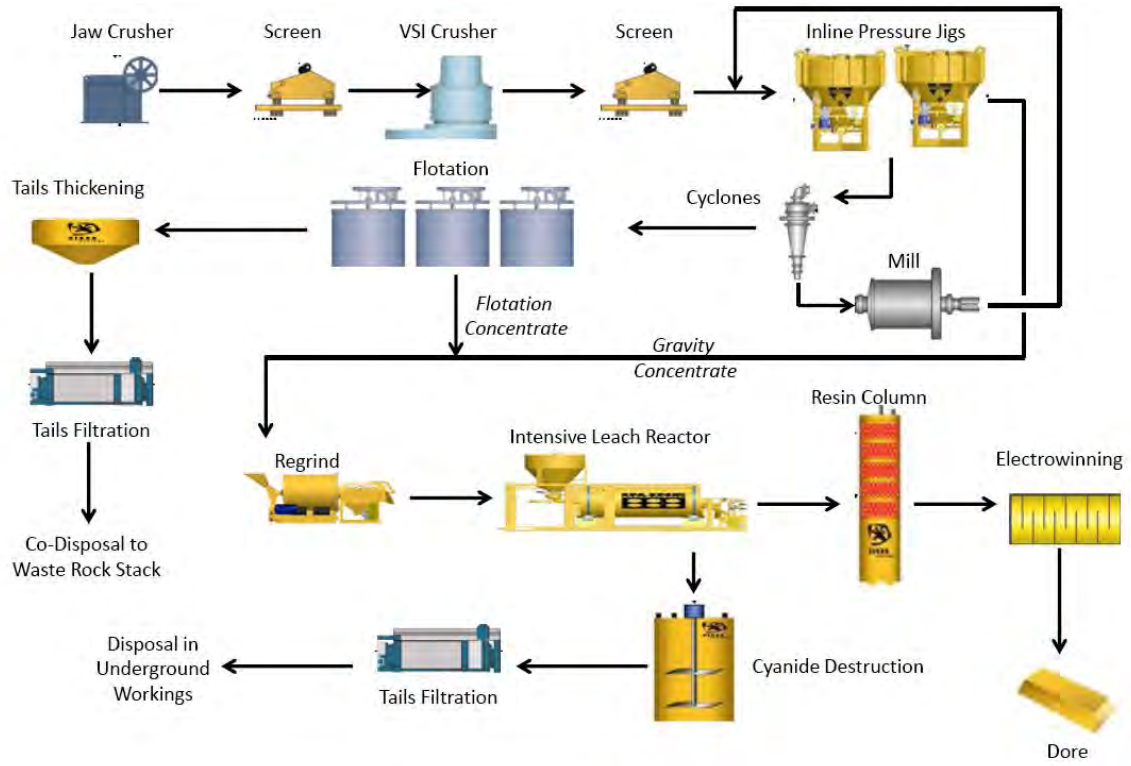

Figure 12: Processing Plant Schematic

4.1.1 Process Plant Reagents

The Process Plant requires multiple reagents to be handled in bulk and delivered into the process. These are handled in various ways depending on the usage rate, material properties and delivery format.

Flotation circuit

- Sodium Isobutyl Xanthate ("**SIBX**") is delivered to the plant in 1 tonne bulk bags, split opened inside a dust box by a bag breaker and discharged into the mixing tank. The tank has a closed top, sloped bottom and fitted with exhaust system to avoid poisonous gas build-up. The SIBX is made up to a 20 wt% solution.
- Copper sulphate (**$CuSO_4$**) activator is delivered to the plant in 25kg bags and mixed with water using an agitator to a solution concentration of 20 wt%
- Frother (Orica DSF002A/ MINC or similar) is delivered to the plant in Intermediate Bulk Containers ("**IBCs**") and is transferred to the Frother Holding Tank. It is dosed neat from this tank to the feed box of the Rougher Flotation Cells via a dosing pump.

Concentrate Treatment Plant

- Sodium cyanide (**NaCN**) is delivered to the plant in 1 tonne bulk bags, split open inside a dust box by a bag breaker and discharged into the mixing tank. The tank has a closed top and agitator. The sodium cyanide is made up to a ~25 wt% solution.
- Sodium metabisulphite ("**SMBS**") is delivered to the plant in 1 tonne bulk bags, split opened inside a dust box by a bag breaker and discharged into the mixing tank. The tank has a closed top and agitator. The SMBS is made up to a ~10 wt% solution.
- Sodium Hydroxide ("**NaOH"**) is delivered to the plant in IBCs and is transferred to the Sodium Hydroxide Holding Tank. It is dosed neat from this tank to the Barren Solution Tank, Resin Strip solution Tank, Detox Tank and the Acid Wash Tank via a dosing pump at the required process dosage.
- Hydrochloric acid ("**HCl"**) is delivered to the plant in IBCs and is dosed straight from the IBC to the Resin Acid Wash tank dedicated dosing pump at the required process dosage.

Electrowinning

- Leach aid (Leachwell 60X or similar) is delivered as a pallet of 48 x 10kg pails which is stored in the goldroom, and manually weighed out into the leach reactor batches.
- Carbon bead is delivered as a 400kg pallet of 20kg bags, with expected circuit make-up of ~1 bag/month. This is manually dosed into the last stage of the CIP tank cells.

4.1.2 Cyanide Management

Gold cyanidation is a technique for extracting gold from ore by converting the gold to a water-soluble coordination complex, and it is the most used leaching process for gold extraction.

Caustic and cyanide leach the gold from the concentrated gold bearing ore, either in the elution column or the intensive leach reactor ("**ILR**"). Then an electrowinning process, uses electrolysis to draw the gold out of the gold-cyanide complex onto the anode. Cyanide is reformed during the electrowinning process and reused again, but cyanide is lost to the leach tailings from the CIP cells. Whilst the waste tailings from the elution column and intensive leach tank pass through to CIP pump cells to further recover recovered gold in the leachate. The waste product of the CIP pumpcells will contain cyanide, which is pumped to the agitated cyanide detoxification tanks.

The cyanide detoxification tank uses SMBS, $CuSO_4$ and oxygen to destruct the WAD cyanide. The detoxified tailings are then pumped into a small plate and frame filter for dewatering and filter cake is discharged to a bunker. This residue (~1.5 tph) will be periodically loaded to a mine truck and taken underground as stope fill material to minimise risk associated with sulphide content.

Whilst the existing resource consents allow for a cyanide discharge of 0.1 g/m^3, the cyanide management process uses electrowinning to remove the gold from the cyanide complex without losing cyanide. Cyanide that leaves the process, via the CIP pump cells, will be detoxified before being placed underground. As a consequence, the management and proposed cyanide destruction controls employed should not result in any cyanide entering the Snowy River from the Process Plant.

4.1.3 Paste Plant

The mining method, top-down mining sequence with pastefill backfill regime (as shown in Figure 13 below), will allow Federation Mining to return approximately 50% of the Process Plant waste tailings material to the mine.

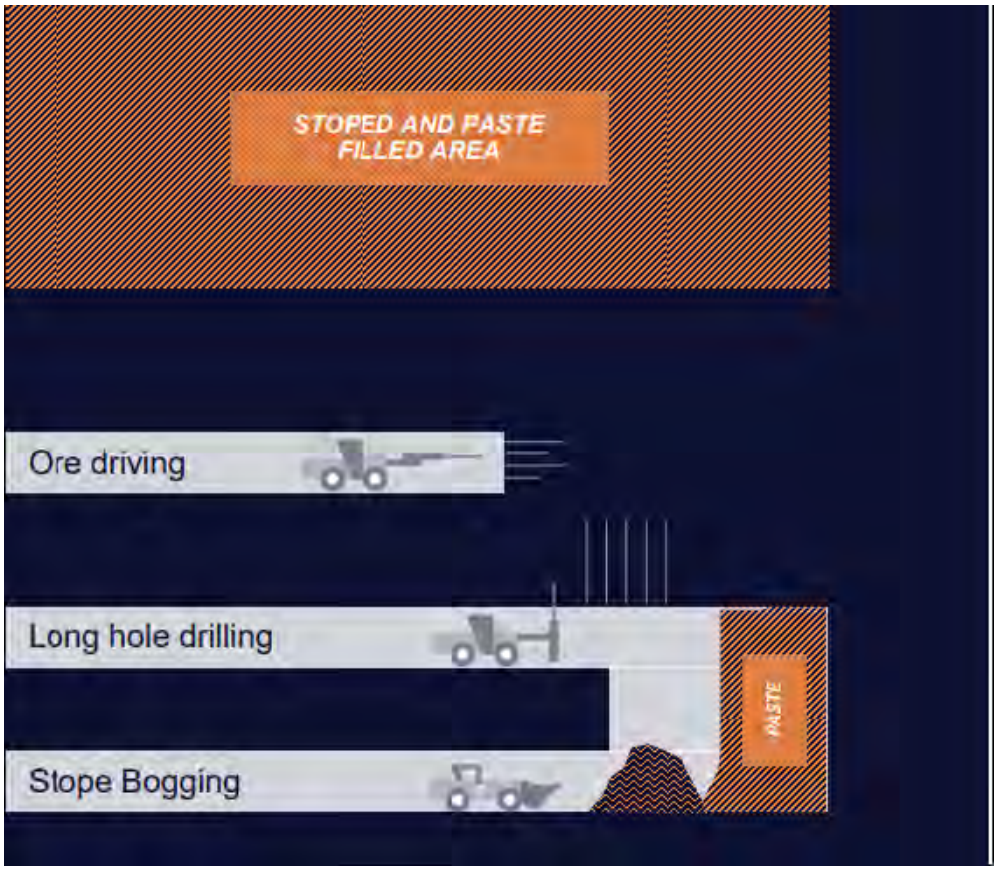

Figure 13: Pastefill Backfill Process

As outlined in the PDP Report attached as **Appendix E**, the cyanide detox treated high-sulphide leach tails can be added to the float tails filter feed stream and processed into backfill paste. Preferentially placing the sulphide rich waste stream back into the mine eliminates the risk that arsenic rich tails are placed in the WRS following intensive leaching. As outlined in the MWM Report (**Appendix F**), the placement of the Process Plant sulphide residuals (either placed back underground and encapsulated in the WRS) provides an effective management of high-risk materials that could leach metals and metalloids.

The addition of the paste binder (4% w/w (dry basis) of Low Heat Cement) will bind these sulphide bearing minerals and minimise the risk of ongoing leaching underground.

The paste plant will be provided to continuously deliver up to 40m^3/hr of paste back to the mine, with campaign durations as required.

4.2 WASTE ROCK DISPOSAL

The current consent allows for the placement of up to 1.1 million cubic metres of waste rock on the surface. The current waste rock stack is in operation and was designed by engineering firm PDP with design considerations including geotechnical, ground water, liquefaction, hydraulic testing, seismicity, soil strength and penetration testing.

The consented waste rock stack anticipated storing waste material from the decline and mine development, that included only mineralised greywacke, considered as a non-acid forming ("**NAF**") rock type. The NAF type waste from the decline development is assessed as low risk in terms of the potential to be acid forming which can then leach into the receiving environment.

The proposed waste rock stack will require the engineering and construction of a cell to store and secure processing plant waste. These materials have the potential to generate potential acid forming material ("**PAF**") that can leach into the receiving environment if not well contained and managed. The cell is therefore proposed to be centralised within the existing waste rock stack footprint to provide rock armouring and perimeter protection for the processing plant waste cell. Approximately 50% of the process tailings will be directed underground as paste fill and used to backfill and stabilise worked areas of the mine as required.

In addition to the internal cell, there have been changes to the proposed waste rock stack design from the consented footprint. These are explained in detail in the PDP report attached as **Appendix E** and a summary is provided below. As a result of the revised design, the total waste rock storage volume will increase to approximately 1.4 million cubic metres and 215mRL (from 1.1 million cubic metres and 210m RL as currently consented).

A potential beneficial reuse of the NAF Greywacke waste rock is the crushing of material and use as road base by local road authorities and contractors. This reuse option would potentially reduce the cost of maintaining and repairing local roads on the West Coast.

4.2.1 Waste Rock Stack Design

As explained in the PDP technical report attached as **Appendix E**, the waste rock stack will likely comprise of the following components. Design drawings are attached to the PDP report. This design is preliminary however and is subject to a detailed design review and further engineering work. However, because operation of the waste rock stack has already begun, some components discussed in the PDP report have already been incorporated

where these needed to be done at preliminary stages, and where no variation to the consent was required.

4.2.2 Foundations

The foundations of the waste rock stack were cleared of vegetation, loose soft alluvium or uncontrolled fill prior to the placement of any waste rock or fill material. In situ alluvium was reworked and compacted to form a low permeability layer at the base of the WRS where possible. Foundation layers were formed from unmineralized greywacke between the cleared ground / low permeable base and approximately 190m RL. The foundation layers were paddock stacked (not end tipped), bladed out (levelled) and underwent compaction by approved machinery in vertical lifts of around 1m.

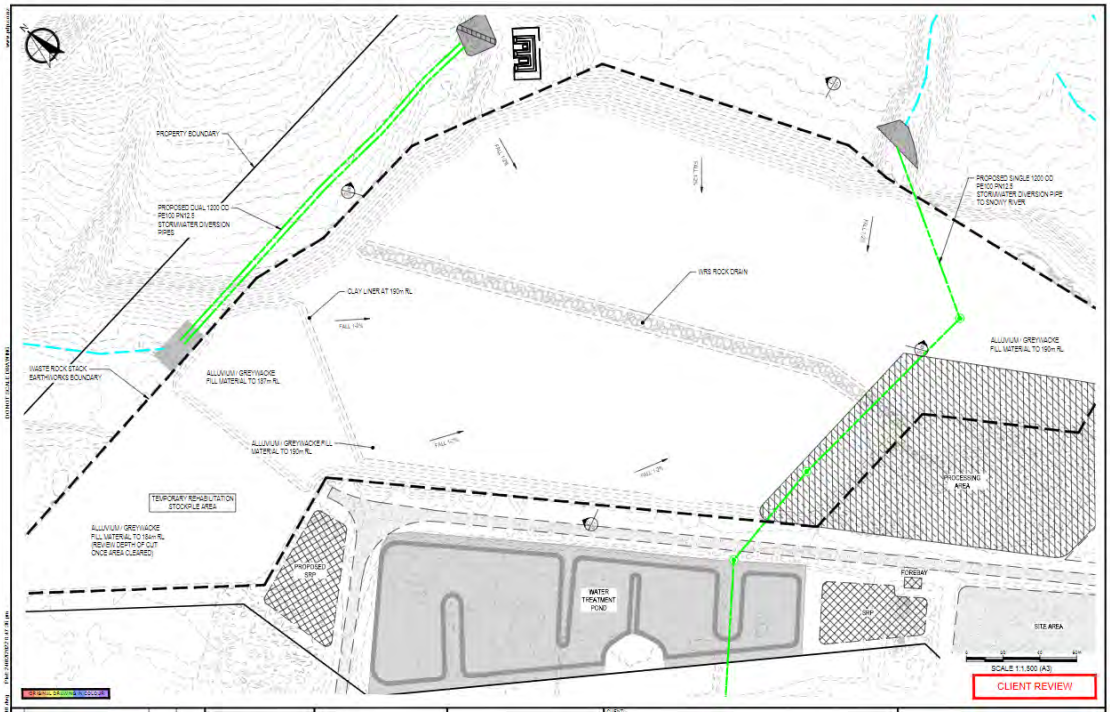

Figure 14: Base Layer Layout Plan of the Waste Rock Stack, PDP 2022

4.2.3 Compacted Clay Liner

Above the foundation layer a compacted clay liner has been formed below the main footprint of the waste rock stack and tailings cell to finished levels not less than 190mRL. The clay liner was constructed from fine grain cohesive, alluvial material which was sourced on-site. The clay liner is approximately 600mm thick. The purpose of the liner is to prevent seepage of leachate through to groundwater. The clay liner was graded towards the southeast such that runoff and seepage can be collected and directed towards the water treatment system.

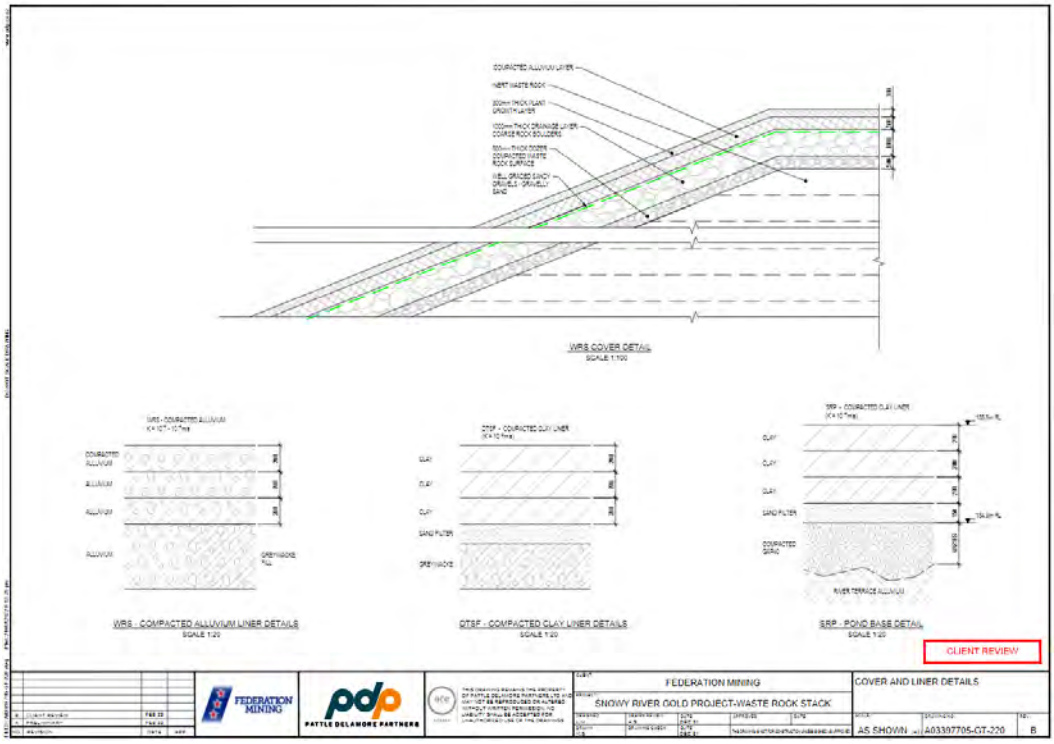

Figure 15: Cover and Liner Details

4.2.4 Waste Rock Stack Formation

The bulk of the waste rock stack will comprise inert unmineralized greywacke, used as a structural fill to the tailings cell. At the foundations and within 10m of the edge of the waste rock stack footprint to at least 10m horizontally into the waste rock stack, the rock is to be paddock stacked, bladed out and trafficked with heavy equipment to create a dense, compact rock stack. This compacted face is to limit oxygen ingress into the waste rock stack from a geochemistry perspective, and to also provide buttressing at the face of the stack.

A low permeability wall (approximately 4m wide) is proposed to be constructed between the waste rock stack and the higher ground to the northeast. The purpose is to minimise infiltration of groundwater and runoff by surface water. The wall will be formed by reworking and compacting alluvium layers.

The overall footprint of the waste rock stack is shown on Figure 16 below:

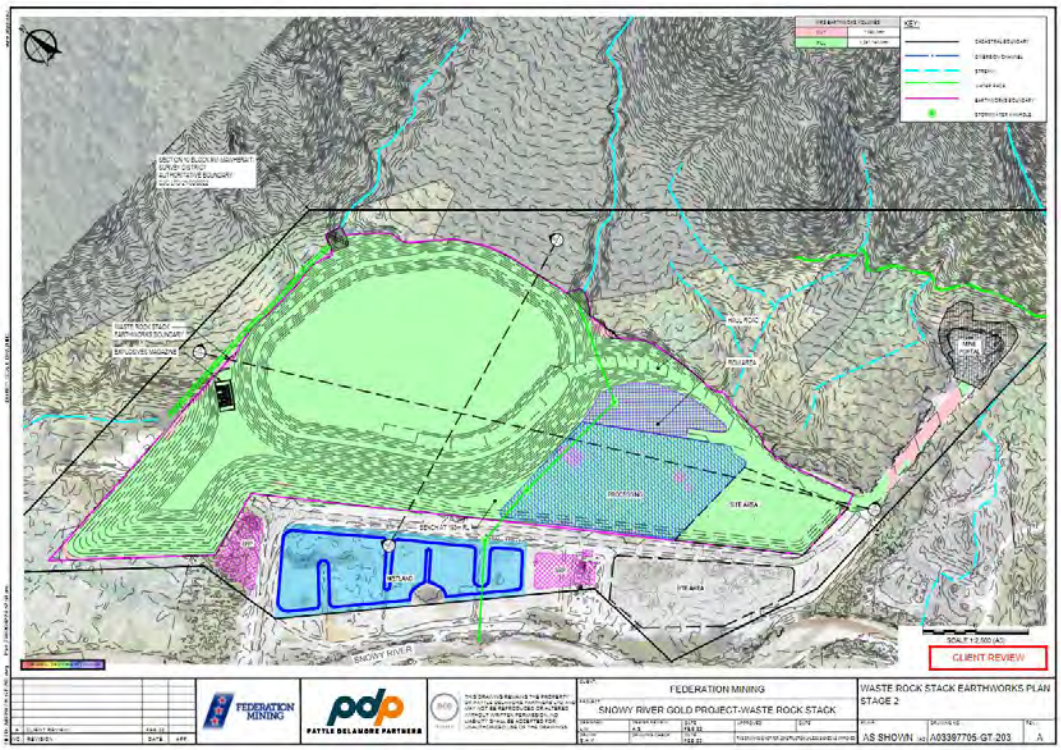

Figure 16: Waste Rock Stack Earthworks Plan

4.2.5 Dry Stacked Tailings Facility (Cell)

The waste rock stack will be designed to incorporate the co-disposal of dry stack tailings ("**DST**") with waste rock as a specially built cell. The DST material are the filtered gravity concentrate tailings from the sulphide flotation circuit that will be operated within the proposed processing plant. While the characteristics of the DST material are subject to further testing once production commences, it can be described as follows:

- The filtered tailings can be considered hard rock tailings ("**HRT**").
- HRT is typically sandy silt, no plastic to low plasticity.
- HRT particles range from fine sand down to include some fine silts and clays.
- Fine silt and clay faction are expected to be less than around 10 – 20%[3].

It is expected that dewatering of the tailings will be capable of producing soil like material. This material will be amenable to standard earthwork construction practices. Dewatered tailings can be 'dry stacked' into earth mounds and shaped into landforms with a reduced footprint.

[3] May be higher than this. To be confirmed by future test work and tails characterisation.

The cell facility is comprised of the following zones:

- Underdrain;
- Co-disposal Areas; and
- Dry Tailings.

These components are described below.

Underdrainage

The objective of the underdrainage is to maintain dry conditions and prevent pore pressure build up inside the tailings cell, by continually decanting ponded water (from incidental rainfall) and minimising infiltration into the dry stack. The underdrain will collect this water seepage and direct it to the water treatment plant.

The proposed underdrain will be constructed as a combined rock drain/perforated pipe to collect and channel water to the water treatment plant.

Penstock rings will be used to pipe stormwater to the underdrain and maintain only shallow ponding on the surface of the dry stack tailings. A central causeway extending into the cell will be formed (from the co-disposal of greywacke and tailings) to allow access to the decant. A scruffy dome (or similar) will be required and used as protection at the inlet to prevent accidental falls and debris clogging the inlet.

Co-Disposal Areas

Co-disposal areas will be constructed from a mix of greywacke and tailings. The co-disposal areas form the structural zones within the cell and encapsulation of the dry tailings. Co-disposal will require specialist equipment (e.g. screen and crusher compactor) to adequately mix tailings with coarse rock.

Dry Tailings

Dry stacking of the tailings (i.e. dewatering of the materials to achieve a lower moisture content) is considered the most appropriate option for the site. Structural zones will be present within the dry tailings and these will need to be placed and compacted using dedicated equipment to an engineering specification. This specification will be developed at an early stage of cell development. Subject to further engineering specification, it is anticipated that the structure zones will be a minimum of 10m width from the cell starter bunds, the causeway and the face of the moulded slopes constructed from dry stacked tailings.

Cell Dimensions

The volume of the cell may need to adapt during the Life of Mine plan, responding to tails production rates and results of future underground paste fill trials. The minimum distance of the cell will remain 10m from the outwardly facing slopes of the waste rock stack.

4.3 WATER MANAGEMENT AND TREATMENT

4.3.1 Revised Water Treatment Approach

As described in the Management of Mine Water Report prepared by PDP as **Appendix F**, the existing suite of resource consents and associated conditions regarding water management need to be reviewed as a result of the proposal for the site, which now seeks to include an on-site processing plant.

A review of the geochemical assumptions and water management concepts that were originally consented for the project has identified that an additional suite of contaminants should be managed, and more importantly, an expanded suite of contaminants should be treated by the proposed treatment systems.

Drawing upon recent water quality observations from the current WRS and more importantly data from OceanaGold's Globe Progress pits and tailings underdrainage the predicted geochemistry of the mine domains are likely to differ from the assumptions that underpin the consented (Golder, 2013) water management approach. These revisions are presented in Table 4, with bold text showing the change in contaminants being considered for treatment purposes.

Table 4: Water Domains – Water Management Approach and Contaminants of Concern

Water Domains – Water Management Approach and Contaminants of Concern		
Domain	**Golder (2013)**	**Revised (PDP)**
WRS Leachate	None (Leachate to Ground)	**Neutral Mine Drainage ("NMD") (As, Fe, Mg, Cu), Nitrate, Ammonia, and TSS** (WTP[2] and Treatment Ponds)
WRS Interflow	Not considered	**NMD (As, Fe, Mg, Cu), Nitrate, Ammonia, and TSS** (WTP[2] and/or Treatment Ponds)
WRS Runoff	TSS (SRP and Treatment Ponds)	TSS (SRP and Treatment Ponds)
Site Runoff	TSS, Hydrocarbons (Oil Separator, SRP, and Treatment Ponds)	TSS, Hydrocarbons (Oil Separator, SRP, and Treatment Ponds)

Water Domains – Water Management Approach and Contaminants of Concern		
Decline Development	TSS, Hydrocarbons (Oil Separator, SRP and Treatment Ponds)	TSS, **Ammonia and Nitrate, NMD** near the historic existing workings (WTP[2] and Treatment Ponds)
Existing Workings	NMD specifically As, Fe (WTP[1] and Treatment Ponds)	**NMD (As, Fe, Mg, Cu), TSS (particulate NMD and from the decline)** (WTP[2] and Treatment Ponds)
Future Workings	TSS, and NMD (contingent), Hydrocarbons (Oil Separator, WTP[1], SRP, and Treatment Ponds)	NMD (likely to be present), TSS, **Ammonia and Nitrate, pH (ex. Paste),** and hydrocarbons (WTP[2] and Treatment Ponds)
Closure	TSS (Treatment Ponds)	Adit – TSS (particulate NMD), **NMD (AS, Fe, Mg, Cu), Nitrate and Ammonia** (WTP[2] and Treatment Ponds)
		WRS Runoff – TSS (Treatment Ponds)
	WRS Leachate – (Not considered discharge to groundwater)	WRS Leachate & Interflow – **NMD (As, Fe, Mg, Cu), Nitrate, Ammonia, and TSS** (WTP[2] and Treatment Ponds)
Post-closure	TSS (Treatment Ponds)	Adit – TSS (particulate NMD), **NMD (AS, Fe, Mg, Cu)** (PTS and Treatment Ponds)
		WRS Runoff – TSS (Treatment Ponds)
	WRS Leachate – (Not considered discharge to groundwater)	WRS Leachate & Interflow – **NMD (As, Fe, Mg, Cu), and TSS** (WTP[2] and Treatment Ponds)

Notes:

Golder (2013) WTP compromised 20ft containers with rock and lime

Proposed WTP will have primary sedimentation, precipitation and absorption contact tanks, followed by secondary sedimentation.

In order to address these additional contaminants, Federation Mining is proposing a new water management treatment system at the site to that which has been consented. The objectives of the treatment system will be to:

- Manage the leachate from the WRS; and
- Address the risks that the additional contaminants (not previously identified) will have on the aquatic ecology and water quality within the Snowy River.

Specifically, a higher level of water treatment is being proposed. As described in the PDP Report, attached as **Appendix G**, to understand the treatment requirements, a Water Management Model ("**WMM**") has been developed to inform the treatment efficiency requirements, and in turn, understand the likely concentration of contaminants likely to be observed downstream of the mining operations (after treatment).

4.3.2 Minewater Management Approach

The objective of the minewater management approach is to 'minimise the adverse effects on the environment with practical management of the water that may be impacted because of the Snowy River Mine project'.

The key principles that underly the management of the minewater, are:

- Segregation of the minewater domains;
- Targeted treatment of the respective minewater domains;
- Minimise water consumption and beneficially reuse treated water;
- Discharge the treated minewater indirectly to the Snowy River – attenuate temporary variations in discharge water quality; and
- Provide flexibility in the minewater infrastructure to adapt to changes in mine scheduling and knowledge of the minewater discharges.

These principles, in conjunction with the proposed management and treatment of the minewater domains, were used to develop the following approach:

- Direct the creeks that flow through the mine site around the mine infrastructure, or via culverts around the WRS;
- Direct clean stormwater runoff away from the mine infrastructure;
- Construct the WRS with a liner to minimise the mass of leachate;
- Collect and treat the sediment laden runoff (e.g. haul roads, facilities hardstand) via the Sediment Retention Pond ("**SRP**") and Treatment Ponds;
- Recycle the decline and workings water, so as to minimise the water take from the Snowy River;

- Excess water from the decline and workings shall be treated to remove suspended solids, nutrients, and NMD (when present) prior to discharge;
- The Treatment Ponds shall be designed and operated to remove nutrients (nitrogen) and the residual suspended solids from the SRP and Water Treatment Plant ("**WTP**");
- The WTP shall be designed and operated to remove NMD from the decline, historic and active workings minewater. As the nutrient load in the minewater increases, additional treatment elements shall be installed to the WTP;
- To minimise the risk of the treated discharges that may impact the ecology of the Snowy River, specifically during periods of low river flows, the treated discharges shall be preferentially indirectly discharged to the Snowy River;
- Dust suppression – use polished (treated Treatment Pond water) or clean water from the Snowy River to control dust;
- Process Plant - use polished (treated Treatment Pond water) or clean water from the Snowy River in the Process Plant;
- Paste Production – use treated water from the WTP or SRP as makeup water for the Paste Plant;
- Monitor the performance of the minewater infrastructure and the water quality in the Snowy River. Adapt the management approach and/or treatment system if the minewater discharge(s) are nearing or exceeding consent limits; and
- Closure:
    - Cover the WRS to minimise the volume of leachate generated by the WRS.
    - Remove the mine facilities and WRS haul road. Reinstate, with armouring, the creeks around the WRS.
    - Continue to treat the WRS leachate and discharge from the decline. Initially with WTP that will be retained and operated, and ultimately replaced by a Passive Treatment System ("**PTS**") when the suspended solid, iron and arsenic load concentrations are appropriate for passive treatment.

4.3.3 Suspended Solids

Suspended solids from the surface runoff from the WRS, facilities, haul roads and other hardstand areas will be directed to the SRP to remove most of the sediment load, then polished in the Treatment Pond.

Minewater extracted from the decline/workings will be primarily treated, to reduce the solids concentration, and then preferentially recycled back into the decline for mining operations. Any excess minewater will then be initially directed to the SRP and Treatment

Pond to remove suspended solids and nitrogen compounds before indirectly discharging into the Snowy River.

During the dewatering of the historic workings, and during operational mining the minewater will be directed to the WTP, and then polished further in the Treatment Ponds. The treated provided by the WTP will be consistently high, due to the level of process control and the clarification provided by the final clarifier; the suspended sediment concentration leaving the WTP should be consistently better than 10 g/m^3. Like the SRP, the discharge from the WTP passes to the Treatment Pond for final polishing (to remove any excess suspended solids).

As no direct discharges of treated water will occur into the Snowy River, rather preferentially being indirectly discharged via soakage, no observable change in suspended solids is predicted in the Snowy River as a result of these discharges.

4.3.4 Nutrients

Federation Mining uses ammonium nitrate fuel oil ("**ANFO**") as an explosive to establish the mine and extract the gold bearing ore. 600 kg/d of ANFO in an emulsion form is currently being used, of which 95 % is consumed during firing. During the thermal explosion, every kg of detonated ANFO generates approximately 1000 litres of gas, principally consisting of carbon dioxide (**CO_2**), nitrogen (**N_2**) and water vapour (**H_2O**).

The residual 5%, will generate approximately 8.4 kg/d of Total Nitrogen (either in the form of NO_xN and/or NH4N), which will coat the waste rock (or ore extracted) or ultimately be washed into the decline (or mine) sump and pumped from the mine.

As outlined earlier, minewater pumped from the decline (or active workings) will undergo primarily sedimentation removal prior to being reused in the mine. In the later stages of the decline development and production mining, the rate of groundwater intercepted by the mine will exceed the moisture lost during the extraction of waste rock or ore. This excess minewater will be treated to remove suspended solids, reduce nutrients (NO_xN, NH4H), and any NMD that may be present.

A hierarchy of nutrient (nitrogen) removal processes will be employed:

- Treatment Ponds (free-water surface engineered wetlands);
- Water Treatment Plant – with additional contingent treatment processes;
- Ammonia Stripping;
- Biological Nutrient Removal – specifically denitrification; and
- Alternative – Land Disposal.

Based on the 1.3ha allocated to construct the Treatment Pond, and on the basis that this pond is eventually designed and operated as 'free water surface' engineered wetlands the pond is anticipated to denitrify between 0.8 to 2.3 kg NOxN/d, and nitrify ammonia in the range of 0.9 to 1.5 kg NH4N/d.

If additional ammonia removal or nitrate reduction is required to achieve compliance with the limits being proposed, it is possible that additional treatment stages could be added to the WTP, specifically an ammonia stripping and/or biological nutrient removal ("**BNR**") process. High nitrogen removal is possible with the ammonia stripping and BNR processes, however, they come with significant capital and operational expenditure, and will be considered if the treatment pond is unable to remove the influent nitrogen compounds.

Alternatives such as disposing of the nitrogen loads to land may also be an option. However, this would require access to third party land, which depending on the existing nitrogen loading, may necessitate a large volume of land being available to ensure effective discharge rates. It may also result in additional costs and effects associated with piping the discharge offsite. If this contingent option is pursued further, additional feasibility studies and effects assessments will be required to support the additional suite of resource consents needed to implement this option.

4.3.5 Neutral Mine Drainage

NMD from historic and active workings, in addition to the leachate from the WRS, will have elevated concentrations of metals and metalloids. These minewater streams will also be directed to the WTP, which will reduce the mass of metals and metalloids before the treated minewater is indirectly discharged to the Snowy River.

Post mine closure, the WTP will be deconstructed and the minewater stream from the decline and any WRS leachate will be treated by a PTS.

By providing a source of alkalinity (lime) and raising the pH of the NMD, iron and aluminium hydroxides precipitates will form. Iron oxides are commonly used to remove arsenic hydroxide and will be the primary mechanism employed by the WTP to absorb the arsenic from the minewater.

4.3.6 Surface and Minewater Flows

4.3.6.1 Surface Water Flows

Stormwater runoff from the haul roads, ROM, and hardstands will be directed to the SRP and then into the Treatment Pond.

The primary contaminant of concern is suspended solids ("**TSS**"), with treatment provided by the SRP.

The current consent requires any drain or water table to be designed to convey at least a 10 year annual return interval ("**ARI**") storm event (Condition 20.15). Due to the presence of the liner under the WRS a lower ARI can be adopted for surface structures above the liner.

As the WRS has underdrains, and the diversion channels around the WRS to convey the creek flows from the native forest catchments above the WRS, a higher level of service is required.

The proposed design standard for the WRS underdrains and erosion and sediment control structures will vary between a 5 year ARI to a 30 year ARI.

4.3.7 Waste Rock Stack – Water Management

The MWM Report, attached as **Appendix F**, identified that the material management of waste rock is important for the Snowy River Mine project to avoid adverse effects from mine impacted waters on the receiving environment.

The risk of NMD (and potentially arsenic generating waste ("**PAG**")) will increase as the waste rock extraction nears the ore body (Birthday Reef). PAG material will be processed via the ore processing plant, which will separate out the sulphides (i.e., arsenopyrite and pyrite) by flotation, with tailings residues (after gold extraction by intensive leaching) being placed back underground and encapsulated. As a consequence, only lower PAG forming materials are anticipated to be managed in the WRS.

Whilst there is a residual risk of NMD and PAG generating waste rock being placed in the WRS, a specifically designed cell(s) to provide encapsulation of these materials will be employed. To further control the risk of arsenic and other metals and metalloids being oxidised and released the WRS has been designed to reduce oxygen and water ingress, as much as practicable, which will in turn reduce the oxidation of any residual sulphide minerals in the WRS material, and in turn the mobilisation of contaminants.

As the oxidation cannot be eliminated, a liner has been included in the design to intercept leachate from the WRS. Intercepted leachate will be directed to the WTP (or PTS) for treatment.

4.3.7.1 Management of PAG Material

Potentially arsenic generating ("**PAG**") waste occurs in a narrow halo around the ore body. Whilst the majority of the PAG waste will be placed underground some PAG waste material may potentially be stored within the tailings cell (dry tailings storage facility ("**DTSF**")) as co-disposed material to reduce its chemical reactivity. If necessary, further segregation of this PAG material can be accommodated by creating a separate cell within the WRS.

4.3.7.2 Waste Rock Management

There are three sources of waste material to be managed in the WRS:

- Unmineralised greywacke extracted during the construction of the decline and mine development;
- Low PAG waste intercepted during mine development; and
- Filtered tailings from the process plant sulphide floatation circuit.

The bulk of the WRS will comprise inert unmineralised greywacke, used as structural fill to provide buttress to the DTSF. Co-disposal areas (constructed from a mix of greywacke and dry tailings(fines)) included at the base of the DTSF, as well as the cell starter bunds and a central causeway. The co-disposal areas form the structural zones within the cell and encapsulation of the filtered tailings.

As the filtered tailings are dewatered to less than 20% and can be 'dry-stacked' into earth mounds/waste dumps and shaped into landforms within a reduced footprint. Dry stacking is a suitable option where construction material is limited and/or space constraints for the co-disposal option.

Progressive rehabilitation and capping of the WRS is possible with the dry stacking option once the material is placed, as earthworks machinery can work on them immediately.

Key features of the WRS:

- Compacted clay liner;
- Direct intercepted leachate to the WTP;
- Co-disposal of filtered tailing fines;
- Dry-stacking of filtered tailings fines;
- WRS Cover and Revegetation;
- Progressive rehabilitation;
- Compacted waste rock (NAF) >0.5m;
- Drainage / Capillary Break Layer – Place rocky rubble zone approximately 1 m thick;
- Filter layer – Graded zone, using gravels and sandy gravels becoming progressively finer to retain fines and prevent clogging of the rubble zone;
- Compacted Seal – Clay or alluvium, placed in layers and compacted, approximately 0.5 m thick; and
- Plant Growth Layer – Organic rich clay, alluvium approximately 0.3 m thick, with loosely placed slash / mulch.

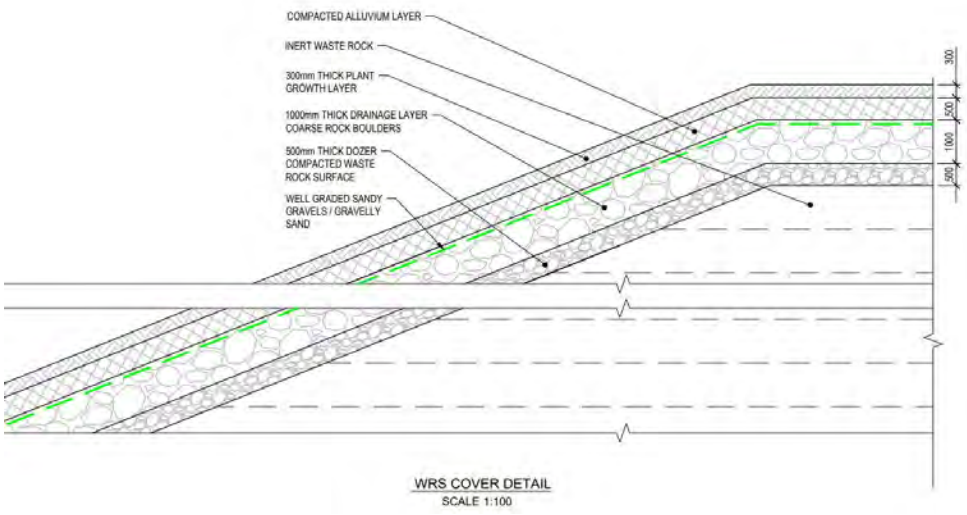

Figure 17: WRS Cover System (PDP, 2022c)

As a consequence of the above, features of the WRS will form three water domains to be managed:

- **Surface Runoff**. During the initial construction of the WRS most rainfall will pond and infiltrate through the waste material and form leachate; very little surface runoff will be captured. As the WRS cover system is established a greater proportion will be incepted and directed to the SRP.
- **Interflow**. Due to the grade of the drainage (capillary break) layer in the cover system some of the seepage through the upper plant growth and compacted alluvium layers will flow down this layer. Drains/seeps at the base of the drainage layer will be intercepted and directed to the SRP.
- **Leachate**. Rainfall that passes through uncovered sections of WRS and/or seep through the cover system will infiltrate through the tailings and waste rock. Leachate retained by the WRS liner will be directed to the WTP (or PTS post-closure), whilst any leachate not retained by the liner will seep into the groundwater below the WRS.

4.3.7.3 Surface Runoff

In the vicinity of the mine site, approximately 4,310 ha of catchment flows to the Snowy River. Of which, 130 ha passes through the mine site and needs to be managed. Approximately 104 ha of the 130 ha is forest catchment and will be redirected around the WRS and mine infrastructure.

These forest catchments are to be intercepted with small earth embankments, which will direct the impounded water around or through temporary culverts on the boundary of the WRS. These culverts will discharge into the Snowy River at a similar location to the pre-mining environment. Whilst these diversion structures will attenuate the peak discharges

from these natural forest catchments, any effect in peak flow in the Snowy River would be indetectable due to the relative size of these catchments (104 ha) compared to the primary catchment (4,310 ha) upstream of the mine.

During construction of the WRS, erosion and sediment control methods will be applied to minimise the entrainment of suspended solids into the surface runoff. However, all intercepted surface runoff will be directed to, and effectively treated in, the SRP and Treatment Ponds prior to indirect discharge into the Snowy River.

4.3.7.4 Interflow

As the cover system is constructed, some of the intercepted rainfall that falls on the cover will report to the drainage (capillary break) layer as interflow. This interflow occurs as the rainfall seeps through the upper plant growth and compacted alluvium layers and is intercepted by the drainage before seeping into the WRS. Drains/seeps at the base of the drainage layer will be directed to the SRP for treatment. As the drainage material will be constructed of NAF greywacke, no treatment other than possible suspended solids removal will be required, however, it is anticipated some time post-closure the suspended solids concentration will be very low (<10 g/m^3) and should be able to be redirected to the Treatment Pond.

4.3.7.5 Leachate

Underdrainage will be provided in the DTSF cell to maintain dry conditions and prevent pore pressure build up inside the tailings cell, by continually decanting ponded water (from incident rainfall) and minimising infiltration into the dry stack. The underdrain will collect this water seepage and direct it to the WTP. During the construction of the WRS and development of the DTSF cell the leachate will experience high concentrations of TSS, as well as elevated metals and metalloids.

As the WRS is progressively covered, the mass of TSS and rate of flow of leachate will decline.

MWM (**Appendix F**) predict that the WRS leachate metal and metalloid loads will progressively increase as the WRS is established and then decline post closure as the covered system is established.

4.3.7.6 Decline and Workings

The flow of groundwater intercepted by the decline is anticipated to peak at 5 L/s and reduce to around 4 L/s post closure.

It is estimated there is some 700,000m^3 of voids in the historic mine workings, which if dewatered at a rate of 25 L/s, will occur over a 12 month period. Once the historic workings are dewatered, they are anticipated to contribute 5 L/s of water to be pumped from the active mine.

4.3.8 Summary of Water Flows from the Site

The flow rates from the key mine domains are summarised in Table 5 below:

Table 5: Flowrates from Key Water Domains

Flowrates from Key Water Domains				
Source / Domain	**Decline Development**	**Dewatering Historic Workings**	**Operational Phase**	**Post-closure**
Decline[1]	5	5	5	4
Historic Workings[1]	-	25	5	30 [3]
Active Workings[1]	-	-	5	10 [5]
ROM	-	-	300 – 836 m^3/d	-
WRS – Runoff	-	-	4700 – 9800 m^3/month	5880 – 12200 m^3/month
WRS – Interflow	-	-	-	390 – 820 m^3/month
WRS – Leachate	-	-	780 – 2620 m^3/month	235 – 980 m^3/month

Notes:

Excess minewater, being minewater pumped from the mine, less water recycled back for mining purposes.

Units – L/s unless stated otherwise.

Golder (2014) estimated that 30 L/s will be pumped from the mine, being 5 L/s decline, 10 L/s (panel, access drive / historic workings), and 15 L/s introduced for mine operations.

PDP (2022d) *provides a range of runoff, leachate ranges depending on the stage of the WRS, and objective of the flowrate (WTP design or understanding the potential discharge to groundwater).*

The LLA is estimated to be discharging 10 L/s.

4.4 PROPOSED WATER TREATMENT SYSTEM

4.4.1 Reuse of Water Within the Site

Currently Federation Mining treat and use the minewater from the decline for further drilling and extraction of waste rock and ultimately recovered ore.

To control the suspended solids in the recycled minewater, the water undergoes the following processes and clarification (in the lamella clarifier):

- Sump and sump pump(s);
- Stone-trap;
- Lamella Clarifier (and sludge thickener tank);
- Pump to Decline Header Tanks; and
- Reuse.

During the initial phases of the decline development moisture on the extracted waste rock will exceed the groundwater intercepted by the decline, therefore, any net water loss is made up with water extracted from the Snowy River, as permitted under Consent RC13042-10.

In the latter stages of the decline development and during production mining, it is expected that the groundwater intercepted will exceed the moisture lost to the extracted waste rock and ore.

Excess or wasted minewater will have elevated concentrations of dissolved metals (NMD) and nutrients. Recent water quality monitoring of the recycled water during the development of the decline has observed nitrate concentrations vary between 10.1 NO_xN g/m^3 and 112 NO_xN g/m^3, whilst the ammonia concentration varied between 0.9 NH4N g/m^3 and 22.2 NH4N g/m^3.

Due to the risks that decline / minewater may have on the environment, a closed recycle loop should be employed. Similarly, any minewater that is not recycled back in the mine, will undergo additional treatment to remove the evaluated concentrations of dissolved metals and nutrients prior to discharging to the Snowy River (via the Treatment Ponds and/or WTP).

4.4.2 Stormwater Management and Treatment

4.4.2.1 Stormwater Diversions

The clean upstream water will be collected by small embankments constructed at the toe of the WRS. The water will be diverted via pipes around the WRS and through the processing plant area and drain to the Snowy River. The design of the diversions is based on the catchment sizes for the two main tributaries entering the WRS area and the 30 year rainfall design storm. Peak runoff is estimated using TP108, Auckland Council Guidelines for Stormwater Runoff Modelling.

The diversions proposed will be as follows:

- Stormwater diversion pipe 1 – Situated along the northwest margin of the WRS. It will be designed to accommodate flows of 2.2m^3/s.

- Stormwater diversion pipe 2 – Situated through the haul road, ROM and processing plant. It will be designed to accommodate flows of 1.5m^3/s.

4.4.2.2 Sediment Retention Ponds

As discussed above the primary sediment retention pond ("**SRP1**") will be designed to manage the sediment laden stormwater from the WRS, processing plant areas, haul roads, portal catchment and other hard stand areas within the site. The SRP1 will replace the existing sediment pond currently situated on the site.

The SRP1 has been designed with two forebays to preferentially capture the majority of the sediment load (using standard 20 foot containers). In turn, this will reduce the sludge load on the pond. The treated water will then pass into the planted treatment pond system for further polishing prior to infiltrating into shallow groundwater.

The pond will be sized to accommodate inflows arising from:

- 8.2 ha of hardstand areas and facilities within the mine site;
- Between 5 to 25 L/s from the decline / active works;
- Spillway 100 year storm event; and
- Conventional T-bar Decanter: 4.5 L/s x 6 (27 L/s).

The volume of the SRP will be approximately 1688m^3; with an additional 'dead' volume of 154m^3.

The forebays will routinely require desludging, whilst the pond may need periodic desludging. The forebays will be designed to allow the material with an excavator, with the recovered material being dewatered and disposed of in the WRS.

A second sediment pond ("**SRP2**") is proposed to accommodate the northwest end of the site, this is to be designed and constructed if considered necessary as the mine water management plan is developed. The SRP2 will direct water to the treatment ponds for polishing, or if required, could be pumped to the mine water treatment plant for further treatment.

4.4.2.3 Sediment and Erosion Controls

Upstream of the SRPs it will be necessary to construct check dams, temporary sumps and develop long drainage channels or v drains to divert water from the sloping face of the WRS, and control flow rates of impacted surface water. All impacted surface water will be diverted towards the primary SRP.

4.4.3 Minewater Treatment Plant

The existing consent anticipates that the minewater treatment plant would comprise a series of sea containers to house rock and limestone. This would oxidise the dissolved iron, which in turn would absorb the arsenic in the water from the historic workings. A review of the minewater domains by MWM and PDP (refer **Appendix F** and **Appendix G**) and expected contaminant loads arising from the activities onsite and the Processing Plant, identified that a new approach to the treatment system was required.

A revised WTP is therefore being proposed as part of this consent application. It will likely comprise the following elements:

- Primary Sedimentation – reduce the sludge load;
- Contingent – Ferric chloride and pH correction;
- Oxygenation – form iron hydroxides;
- Arsenic absorption reactor;
- Secondary Sedimentation – with sludge recycle;
- Waste sludge thickener;
- Contingent Treatment Units:
    - Ammonia Stripping
        - Lime addition – raise the pH of the minewater and convert ammonium to ammonia;
        - Fine Bubble Aeration Tank – strip the ammonia in the liquid phase into a gas phase; and
        - pH correction – addition of acid to drop the pH to sercum-neutral.
    - Biological Nutrient Removal (denitrification)
        - Lime addition;
        - Carbon source addition (acetic acid or molasses (or similar));
        - Anoxic Biological Reactor – bacteria in suspension will respire the nitrate in the minewater and give off nitrogen gas (N_2); and
        - Clarifier, recycle the sludge back to the anoxic bioreactor, a portion of the sludge will need to be wasted, thickened and taken offsite.

The proposed WTP is shown schematically in the figures below:

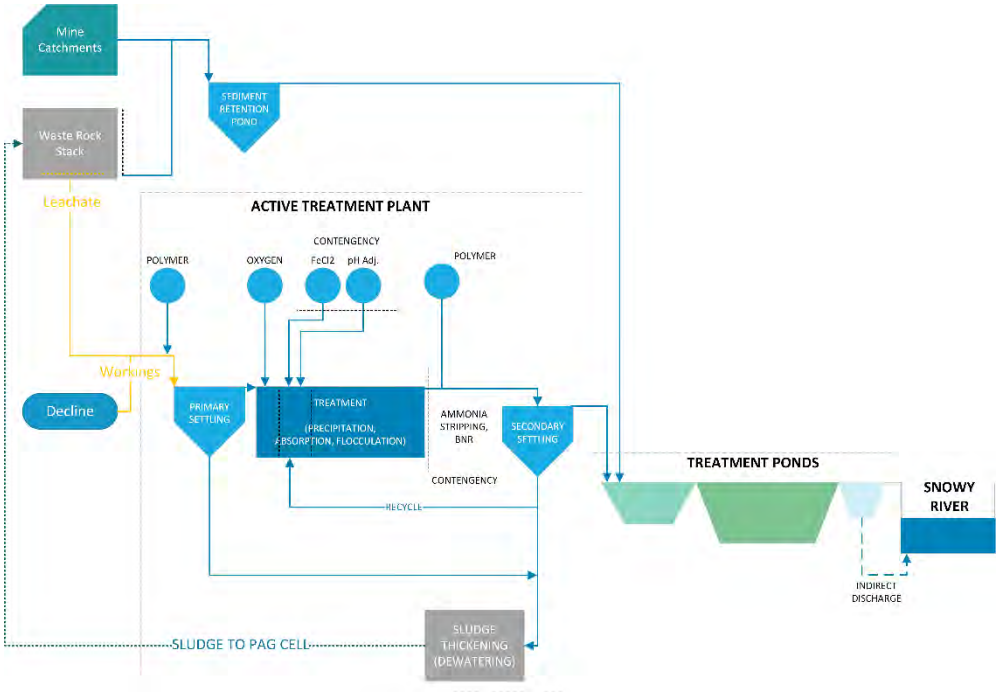

Figure 18: **Schematic of proposed water treatment process (during mining)**

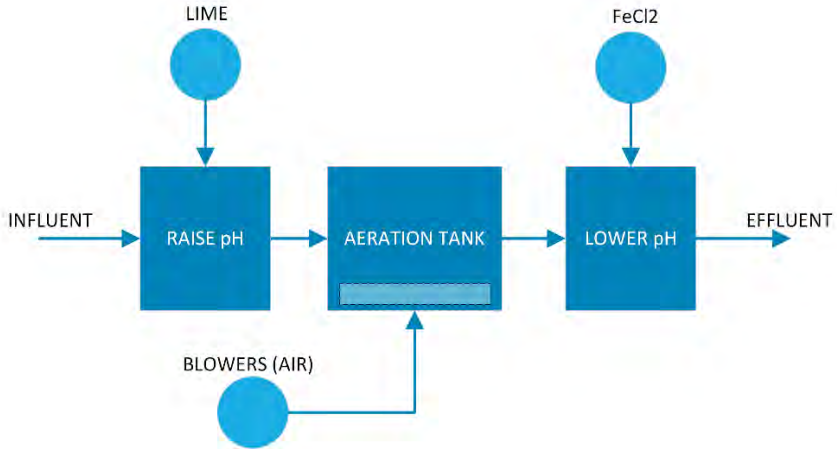

Figure 19: **Contingency Ammonia Stripping Process**

A conceptual design, presented schematically in Figure 20 of the biological anoxic reactor and clarifier, indicates with additional alkalinity, trace nutrients, phosphorous and a carbon source can be bolted onto the WTP to further reduce nutrient levels. This is a contingency option only at this stage should nutrient levels show elevation in the Snowy River.

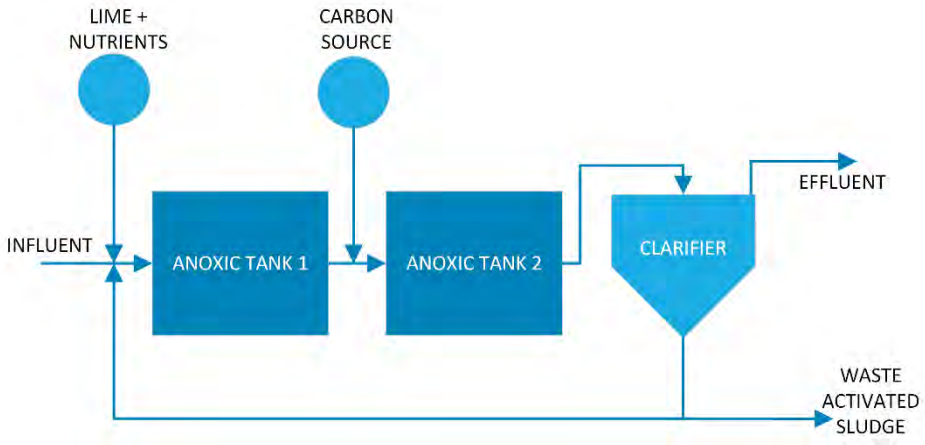

Figure 20: Contingency Biological Nutrient Removal (denitrification) Process

4.4.4 Treatment Ponds

Treatment ponds are proposed as part of the currently consented WTP system for the site. A treatment pond is being retained, however, a conceptual redesign of the site has brought the extent of the pond to within the property boundary, as well as allocating additional space to accommodate a larger and more efficient SRP and site an active WTP. As a consequence, the space available to site the Treatment Pond has reduced from 3.4 ha to 1.3 ha.

As a direct discharge to the Snowy River is not proposed, and the SRP will provide a higher level of suspended solid removal, in addition to bank filtration through the river gravels, the requirement that the Treatment Ponds reduce the TSS target is less important.

The surface area of the Treatment Pond is 1.3 ha, which should nitrify any ammonia in the influent to nitrate in range of 0.9 to 1.5 kg NH4N/d, whilst the nitrate should be denitrifying at a rate of between 0.8 to 2.3 kg NH_xN/d. The rate of nitrification and denitrification is strongly dependant on the water temperature and decreases as the temperature declines.

To ensure that the treatment efficiency is achieved, the seepage through the wetland base of the wetland should be minimised.

Whilst the Treatment Pond is designed to primarily remove suspended solids and nitrogen compounds, constructed wetlands are effective at removing some halogens, sulphur, metals and metalloids.

Sorption, precipitation and coprecipitation are the principal processes responsible for the removal of metals and metalloids, like arsenic, iron, aluminium, and manganese; whilst bacteria in the wetlands can mediate these processes, they can play a significant role under favourable environmental conditions. The most important factors affecting the speciation of arsenic, iron and manganese are pH, alkalinity, temperature, dissolved oxygen, the presence of other chemical species like iron, sulphur, phosphate, as well as a source of carbon, and the wetland substrate.

As the Treatment Pond is 1.3 ha in wetted area, and applying the typical treatment efficiencies, it is expected that the Treatment Pond will remove approximately:

- 208 to 5200 kg Fe/year.
- 18.2 to 260 kg Al/year.
- 1170 to 3400 kg Mn/year.
- A further 40 to 60 % of the residual arsenic that may pass through to pond.

4.5 CLOSURE

4.5.1 General

At closure the site buildings and offices, the processing plant, retaining walls and temporary structures will be removed. Sediment retention ponds and temporary sumps will be de-sludged and backfilled in layers using bulk fill to form stable ground.

The WTP and Treatment Ponds will remain, as will power to the site for the operation of the WTP.

The site will undergo progressive rehabilitation of completed areas, and as the processing plant and other buildings have been removed. Recontouring of the southeast slope above the processing and ROM areas and the temporary haul road will be carried out to slope grades so that they are in keeping with the surrounding land and to facilitate drainage and access.

4.5.2 Stormwater Diversions

At closure it is proposed to remove all the piped stormwater diversion, inlets and revert to overland, open drainage channels. These channels will need to be engineered to prevent excavation into the WRS, protect from erosion and scour risk, and also reduce infiltration into the WRS.

4.5.3 WRS Cover and Revegetation

Progressive rehabilitation of completed areas of the WRS will be completed by capping and covering (approximately 2m thick) in the following way:

- Compacted Waste Rock - Dozer compacted surface of the waste rock approximately 0.5 mm thick.
- Drainage / Capillary Break Layer – Place rocky rubble zone approximately 1 m thick.
- Filter layer – Graded zone, using gravels and sandy gravels becoming progressively finer to retain fines and prevent clogging of the rubble zone.
- Compacted Seal – Clay or alluvium, placed in layers and compacted, approximately 0.5 m thick.
- Plant Growth Layer – Organic rich clay, alluvium approximately 0.3 m thick, with loosely placed slash / mulch.

4.5.4 Passive Water Treatment System

A passive water management treatment system is proposed to replace the WTP after closure of the mine to treat key contaminants. Figure 21 shows what this system is anticipated to comprise of schematically:

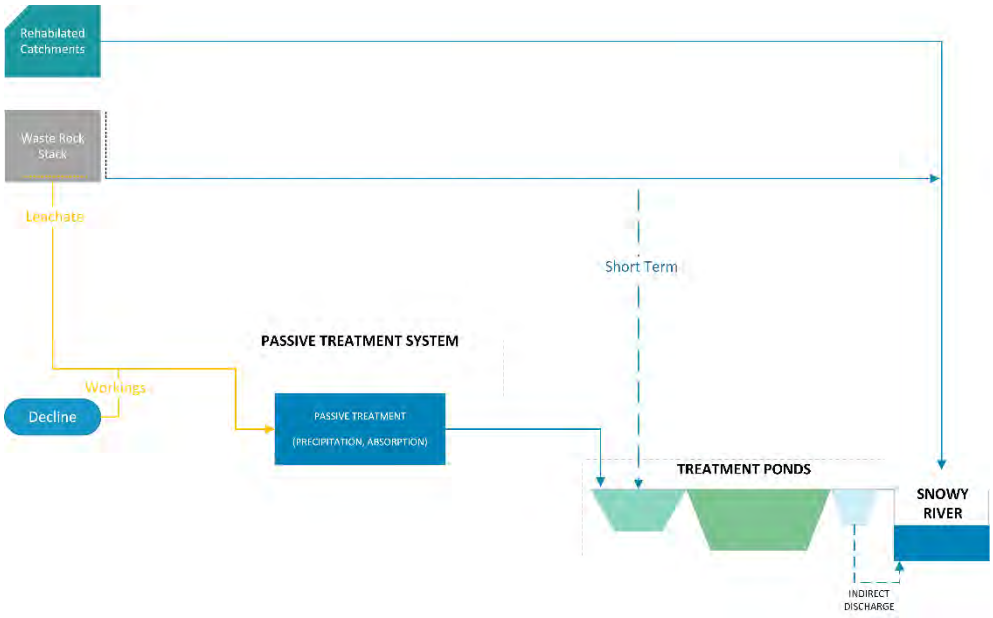

Figure 21: Passive Water Treatment System

4.5.5 WRS Leachate and Adit Drainage

After closure of the mine, underground workings are to be allowed to fill naturally with groundwater. Once filled to the level of the decline portal, a discharge will occur from the portal. Due to the hydraulic connectivity between the historic workings and the active workings, it is anticipated that the currently untreated discharge from the Low Level Adit ("**LLA**"), will report to the decline discharge.

Following closure, the WRS is to be rehabilitated through the establishment of a soil and vegetation cover. Over time the sediment load in the run-off and in seepage water should decrease, provided measures are in place to prevent erosion of the WRS and the soil cover. Ongoing compliance with consent conditions regarding suspended sediment concentrations should be achievable by continuing to treat the WRS surface run-off by the SRP and Treatment Pond.

As the WRS final cover is engineered to manage the ingress of oxygen and net percolation in the WRS, in turn this will reduce the mass of metals and metalloids leaving the WRS. MWM has evaluated and modelled the likely water quality of both the WRS leachate and post-closure decline water. It is estimated that 14 L/s will discharge from the decline, in addition another 0.1 L/s of leachate will be recovered from the WRS. MWM has evaluated and modelled the likely water quality of these domains which has informed the design of the WTP and future PTS.

The WTP will be retained initially to treat the leachate from the WRS and minewater from the closed decline. Once the metal and metalloid load from these water domains has stabilised and the PTS has been commissioned, the WTP will be decommissioned and deconstructed. It is proposed to retain the Treatment Ponds as a final polishing step, as well as improve the aesthetics of the rehabilitated mine site.

It is important to note that the untreated LLA discharge will no longer occur, rather the discharge will be treated by either the WTP initially, and ultimately, the PTS and Treatment Pond.

5. RESOURCE CONSENT REQUIREMENTS

5.1 OVERVIEW OF THE TYPES OF CONSENTS BEING SOUGHT

As outlined in Section 1, OceanaGold holds a number of existing resource consents to construct, operate, maintain and rehabilitate the site (refer to Tables 1 and 2 earlier in this report). For the most part, these will continue to be relied upon, except where there are variations or new consents identified as being required in Tables 6 and 7 below.

Given that the activities that are being developed and progressed by Federation Mining have largely been authorised to occur, it is considered that the consents being sought now, focus mainly on the:

- Physical addition of the processing plant and resulting effects from processing the ore on site (tailings material);
- Revised water management system and treatment plant; and
- Implications of inserting a cell dedicated to the storage of tailings within the waste rock stack to provide for the on-site ore processing activity.

Mitchell Daysh has considered whether these activities could be provided for within the scope of the existing consents, or by changing various conditions of the consents, or whether new consents are required.

With regard to the existing regional council consents, and insofar as water treatment and ultimately discharges from the site are concerned, provided any discharge to water is treated to a standard that can comply with the expected water quality standards of the existing discharge consents, there is scope for these activities to be authorised via a variation.

While the existing regional council consent provides for the construction, operation and maintenance of a WRS, the nature of the contaminants that will be within this structure, and that could potentially discharge to the receiving environment, is changing. Therefore, it is considered appropriate to apply for a new discharge to land consent for this material. Discharges to air are also consented at the site, however due to the addition of the processing plant and material within the WRS, it is similarly considered appropriate to apply for a new discharge to air permit to provide for these new activities.

In the case of the land use consents obtained from the Buller District Council, the key determinant as to whether the variation option could be progressed is whether the consents generally cover the activity being proposed (scope), and the scale of the changes proposed (extent of change). We have reached the view that the addition of a new processing facility and the ancillary activities that will be developed with it are within the scope of the activities authorised by the existing consents but are of such a scale as to warrant new consents being obtained. On this basis, a new land use consent will be required for the processing plant.

From a land use perspective, the processing plant is the only additional or “new” feature within this existing environment that requires an additional consent. The size and scale of the WRS will be increased, however, in terms of land use type effects, these are considered to be of a similar nature and scale to what has already been consented. Therefore, a variation to the existing land use consent conditions to provide for the revised WRS footprint and water management infrastructure is being sought from the Buller District Council for these features.

5.2 WEST COAST REGIONAL COUNCIL

Table 6 below identifies the activities associated with the development of the Snowy River Mine which require a resource consent (or a variation to an existing consent), and those which will be undertaken in accordance with an existing resource consent held for the site.

Table 6: Snowy River Mine Project Regional Council Consents

Activity	Resource Consent Required and Activity Status	Comment
Activities Associated with the Construction, Operation and Rehabilitation of Snowy River Mine		
To discharge waste rock material to land associated with the Snowy River underground mine, processing plant and onsite treatment facilities (e.g. sludge material from the ponds).	Yes. Discharge permit. Rule 91 of the Land and Water Plan. Discretionary Activity.	RC13042-13 authorises the discharge of up to 1.1 million m^3 of waste rock to land at the Snowy River Mine. This is anticipated to increase in volume to approximately 1.4 million m^3 and new material from the processing plant (tailings cell) and material from the treatment facilities will also be disposed of. This was not provided for as part of the existing consents, as such a new consent is being sought.
To undertake land surface disturbance and earthworks associated with the construction, use, maintenance and rehabilitation of temporary and permanent silt ponds, sumps, bunds and treatment wetland.	Yes. Change to the conditions of RC13042-02	RC13042-02 authorises land surface disturbance activities and earthworks associated with the water treatment facilities on-site including the sedimentation ponds and treatment ponds. A revised approach to water management and treatment on-site is being proposed as part of this consent as described in Section 4. This necessitates amendments to the design of the key features such as the sediment ponds and the treatment pond, which needs to be authorised by way of a variation to the existing consent conditions.
To discharge surface water, groundwater and contaminants to land at the Snowy River Road site (being water associated with drilling, underground operations, decline development, stormwater from the portal area, waste rock stack, processing plant, water treatment facilities, ore stockpile and infrastructure area) in circumstances that will	Yes. Change to the conditions of RC13042-12	RC13042-12 authorises the discharge of water and contaminants to land and to the Snowy River arising from the onsite activities. However, it does not cover discharges from the new processing plant, nor those from the tailing cell that will exist within the WRS. In addition, the existing consent and conditions anticipated the removal of sediment and sludge from the water treatment facility to be disposed of offsite, and this can now be provided for onsite, with the design of the WRS and the enhanced water

Activity	Resource Consent Required and Activity Status	Comment
result in that water and contaminants entering the Snowy River.		treatment plant and facilities being proposed. The water treatment plant will however seek to ensure compliance with the existing consented limits of this consent. As such, a change to the conditions of RC13042-12 is sought so that it authorises discharges from the new areas / activities.
To discharge contaminants to air associated with the operation of the processing plant and disposal of tailings within the WRS.	Yes. Discharge permit. Rule 16 of the West Coast Regional Air Quality Plan. Discretionary activity.	RC13042-14 authorises various discharges to air associated with mining operations from within the Snowy River project site. However, it does not specifically cover the discharge from the processing plant or the tailings cell as part of the WRS. As such, a new consent is being sought for these activities in terms of discharge to air.
To construct, operate, maintain and rehabilitate the Snowy River Mine site, and more specifically, to provide for the processing plant, water treatment facility and associated infrastructure and the co-disposal of material within the WRS.	Yes. Change to the general conditions attaching to RC13042.	The 'general' conditions attaching to all of the consents issued by the West Coast Regional Council require that the activities onsite are undertaken in accordance with the 2013 AEE. As a result of this application, key features (e.g. the processing plant, water treatment infrastructure) have been refined. The general conditions therefore need to be changed to recognise the matters covered in this application and supporting technical reports.
To discharge tailings waste material underground.	Yes. Discharge permit. Rule 91 of the Land and Water Plan. Discretionary Activity.	The mining method, top-down mining sequence with pastefill backfill regime, will allow Federation Mining to return approximately 50% of the Process Plant waste tailings material to the mine. A discharge to land consent is therefore required to provide for the disposal of this material underground.

5.3 BULLER DISTRICT COUNCIL

The site is within the Rural zone in the Buller District Plan (made operative in 2000, which is the same plan as the existing consents were issued under). As discussed in Section 2 the existing land use consent issued by the Buller District Council for the site provides for the construction, operation, maintenance and rehabilitation of the Snowy River gold mine project. The processing plant was not however anticipated at the time the land use consent was issued, because at that time the intention was for ore to be transported to the Globe Progress Mine site. It is this component which therefore triggers a new land use consent from the Buller District Council.

Mining is defined as:

> *Any activity which involves the taking, winning, or extraction by whatever means, of a mineral existing in its natural state in land, or a chemical substance from that mineral, for the purpose of obtaining the mineral or chemical substance, including quarrying. Mining also includes prospecting and exploration activities where these are not allowed as permitted, controlled or restricted discretionary activities in the District Plan. To mine has a corresponding meaning.*

This definition of "mining" is broad and legal advice obtained by Federation Mining indicates that it is appropriate to rely on this definition for the purposes of the processing plant. There is no other terminology in the plan such as mining activity or mining operations, therefore, it is arguable that the definition of mining includes the ancillary activities which are an integral part of the mining process. In other locations stockpiles, crib rooms, and in this instance, the processing plant and water treatment facilities, are commonly accepted as standard components of modern-day mining operations. This is made clear by the broad range of matters to which discretion is exercised in the District Plan. For example, 5.3.2.4.3.4 "total area of disturbance and effects of bulk and location of stockpiling and buildings" envisages buildings coming with the definition of "mining".

Federation Mining will only be processing ore and treating water from the site and there is a clear causal nexus between the taking and extraction of the mineral and the need for the processing plant and water treatment facilities, of which are now being proposed at the site.

Table 7 below identifies the activities associated with the development of the Snowy River Mine which require a resource consent (or a variation to an existing consent), and those which will be undertaken in accordance with an existing resource consent held for the site.

Table 7: Snowy River Mine Project Buller District Council Consents

Activity	Resource Consent Required and Activity Status	Comment
Land Use Activities Associated with the Construction, Operation and Rehabilitation of Snowy River Mine		
To construct, operate, and maintain a processing plant, a water treatment plant and associated infrastructure at the Snowy River site.	Yes. Restricted Discretionary Activity. Rule 5.3.2.4.4	The processing plant and water treatment facility was not anticipated under the existing land use consent and therefore a new consent is required.
To construct, operate, maintain and rehabilitate the Snowy River Mine including, but not limited to: • A waste rock stockpile; • Processing plant facilities; • Mine water treatment facilities and water treatment ponds; • Ventilation fan; • Compressor plant; • Electrical switch yard; • Explosives magazine; • Offices and ablution blocks, grey water/sewage system; • A single bay workshop and store with a wash down slab, fuel farm and fuelling pad; • Vehicle parking area; and • Roading and bridge across Snowy River.	Yes. Change to the general conditions attaching to RC130025.	The existing consent anticipated the activities on-site being undertaken in accordance with the 2013 AEE and the conditions reflect this. As discussed in Section 4 to this application, the following amendments to the onsite activities are being proposed: • Co-disposal of tailings material within the WRS; • An increase in the footprint and height of the WRS; • Changes to the onsite water management treatment system and facilities; • Changes to the location of supporting infrastructure and facilities such as the site offices and parking areas. These activities were largely anticipated as part of the existing land use consent (i.e. it authorises a WRS on the site and water treatment infrastructure), but changes to these are required as described in this application. These are considered to be within the scope and scale of the existing land use consent already issued for the site. As such Federation Mining is seeking a variation to the existing consent conditions to reflect this latest application.

5.4 CHANGES TO THE CONDITIONS OF CONSENT

As set out in Tables 6 and 7 above, changes to the conditions of existing consents are being sought as part of this application. This is pursuant to section 127 of the RMA. The changes to the conditions being sought are set out below.

5.4.1 West Coast Regional Council Consents

Additions to conditions shown as underline, and deletions shown as strikethrough text.

5.4.1.1 Schedule 1: General Conditions

1. Method of Operations

1.1 All activities authorised by these consents shall be undertaken in accordance with the information contained in the Application and Assessment of Environmental Effects dated February 2013, and all supporting technical documents and plans~~, as provided to the Consent Authority, expect where inconsistent with these conditions.~~ and the information contained within the Application and Assessment of Environmental Effects dated XX 2022, and all supporting technical documents and plans. Where there are inconsistencies between these documents the information contained in the Application and Assessment of Environmental Effects dated x 2022 and these conditions shall prevail.

5.4.1.2 Schedule 2: Specific Consents and Conditions

RC13042-02

20.15 Diversion channels and associated works shall be designed to convey the runoff resulting from a storm event having a return period of ~~10~~ 5 years or more.

20.21 The silt pond embankments for all silt ponds used during the operation of the mine and all permanent silt ponds shall be provided with a spillway designed for a ~~probable maximum flood event.~~ 100 year storm event.

20.24 The treatment wetland shall be generally constructed in accordance with the information contained in the ~~Golder Associate Report, February 2013, 'Blackwater Gold Project Mine Water Management Report~~'. PDP Report, April 2022, 'Project Snowy River: Management of Minewater".

RC13042-12

23.2 The Consent Holder shall regularly remove the sludge/sediment build up from the treatment plant system to ensure their efficient operation and to maximise their storage capacity. Any sludge/sediment removed shall be dewatered and disposed of ~~at Globe Progress Mine site in accordance with the consent conditions in place at~~

~~that site,~~ within the waste rock stack or at any other site with resource consents that authorise the disposal of this type of sludge/sediment.

23.16 The discharge to the Snowy River shall not result in the exceedance of the compliance limits specified in Table 6, as recorded by the difference between the water quality at the following sites:

(a) Monitoring site S2;

(b) Monitoring site S4.

Table 6 (of RC13042-12): Compliance Monitoring Limits

Parameter	Compliance Limits			Hardness Dependent Criteria
	Median	90th Percentile	Maximum	
pH	--	--	6.5 – 9.0 (min – max range)	--
Total Suspended Solids	6	--	25	--
Dissolved Aluminium	0.4		1	
Dissolved Antimony		0.01	1.6	
Dissolved Arsenic	0.1	0.15	0.34	
Dissolved Cadmium	--	--	0.0009	--
Dissolved Copper	--	--	Exp (1.038ln(hardness)-8.043)/2.6	0.015
Cyanide	0.007		0.1	
Iron (total)			5.0	

Parameter	Compliance Limits			Hardness Dependent Criteria
	Median	90th Percentile	Maximum	
Dissolved Zinc			Exp (0.9371ln(hardness)-4.801)/8.7	0.071
Sulphate			500	
Ammoniacal nitrogen (mg/L)	≤0.24[4]		≤0.40[5]	
Nitrate nitrogen (mg/L)	≤2.4[c]	≤3.5[6]		
Chlorophyll-a (mg chl-a/m^2)	>50 – ≤120			

5.4.2 Buller District Council Consents

Additions to conditions shown as underline, and deletions shown as strikethrough text.

5.4.2.1 General

1. All activities authorised by these consents shall be undertaken in accordance with the information contained in the Application, Assessment of Environmental Effects (OceanaGold (New Zealand) Limited, Blackwater Gold Project, February 2013) ("the Assessment of Environmental Effects"), and all supporting technical documents and plans, as provided to the Consent Authority, ~~and~~ the variation received 26 July 2019. ~~and~~ and the information contained within the Application and Assessment of Environmental Effects dated XX 2022, and all supporting technical documents and plans. Where there are inconsistencies between these documents the information contained in the Application and Assessment of Environmental Effects dated x 2022 and these conditions shall prevail.

   ~~expect where inconsistent with these conditions, in which case the terms and conditions of this consent shall prevail.~~

[4] Annual median B band.

[5] Annual maximum B band.

[6] 95th% B band.

5.4.2.2 Construction and Operational Management Plan

51. The Construction and Operational Management Plan shall as a minimum address the following matters:

--

j. Detailed engineering plans and design specifications for the construction and maintenance (where appropriate) for the following structures and activities:

i. Mine decline and portal areas;
ii. Silt dams and any other dam structures;
iii. All bridge and culverts;
iv. Waste rock stacks;
v. Processing plant and water treatment plant.

5.4.2.3 Truck Operations and Roading

56. Truck movements related to construction and site establishment ~~mining and ancillary~~ activities along Snowy River Road shall not exceed a maximum of ~~28~~ 14 heavy vehicle~~s~~ trips per day. During the mining and processing activities undertaken at the site the truck movements along Snowy River Road shall not exceed a maximum of 10 heaving vehicle movements per day. ~~Notwithstanding this, for 60 days per annum this may increase to 48 vehicle trips per day provided that the Consent Holder shall give 5 days notice of truck movements to the occupiers of land in Snowy River Road.~~

69. ~~That all ore is to be transported using truck and/or truck and trailer units.~~ If any rock material is to leave the site via a truck and/or truck and trailer unit, these truck and trailers are to be covered.

5.4.2.4 Compensation

New Condition –

The Consent Holder shall prepare a strategy to compensate for the temporary removal of trees from the Snowy River site for the purposes of mining operations. Options for this compensation include:

1. Planting around the perimeter of the site with native trees;
2. Partnering with “Trees That Count” project to support the planting of native trees on the West Coast in cooperation with community planting initiatives; or
3. Any other community or regional planting initiatives which align with the strategy goals.

The Consent Holder shall provide an update on the implementation of this strategy and submit it on an annual basis to the Consent Authority.

6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 INTRODUCTION

This project seeks to develop the Snowy River Mine. This application has been informed, and is supported, by a suite of technical assessments which consider the effects of the project on the environment. Given that the activities that are being developed and progressed by Federation Mining have largely been authorised to occur, the assessment of effects discussed in this section are confined to either the effects of the new activities proposed onsite (i.e. the processing plant) or the proposed changes to the existing consents (e.g. the WRS revised footprint and water management system).

6.2 POSITIVE / SOCIO-ECONOMIC EFFECTS

6.2.1 Economic Effects

The existing consent outlines the positive effects the proposed development will have on the region and the same benefits will arise from this proposal. The development of the Snowy River Mine will provide positive benefits to the district and region by providing increased employment opportunities, wages/salaries and expenditure and associated economic welfare, enhancing benefits associated with increased (or retained) levels of economic activity. There are already 110 people employed at the site and the proposed development is expected to create 100 jobs, resulting in a direct benefit to the region.

Federation Mining is a strong contributor to the New Zealand Regional economy with over NZ$20 million dollars spent across over 230 local NZ businesses and service providers since August 2020. Federation Mining have spent over NZ$8 million dollars in the West Coast region.

6.2.2 Climate Change and Emissions

Federation Mining is committed to reducing its carbon footprint

The Snowy River Mine operation uses grid power provided by New Zealand energy company Meridian which is generated primarily through a hydroelectric method on the South Island. The primary front line Epiroc M2D Jumbo and ST18 Loader have low emission Tier 4 engines, as do the Volvo Interchangeable tool carrier units. Federation Mining engaged Environmental Accounting Firm Green Base to undertake an independent assessment of the emissions profile for the Snowy River Mine for financial year 20/21. The emissions profile considered both direct (Scope 1) and indirect (Scope 2) emissions from the Snowy River Mine site, this review did not assess Scope 3[7] emissions which will be

[7] Scope 3 Emissions – are the result of activities from assets not owned or controlled by the reporting organisation, but that the organisation indirectly impacts in its value chain.

reviewed next financial year. The direct emission volume relates to the use of diesel, grease, oils and LPGs, while the indirect emissions relate to use of electricity (hydro).

Federation Mining is currently undertaking an options study on an emissions offsets program to support their emissions reduction strategy to meet their commitment to Net Zero emissions by 2050. The project is expected to have a low emissions intensity given the underground mining method, mobile fleet configuration and use of hydro power. The Company expects the emissions per ounce of gold produced will sit in the lowest industry quartile.

It is also noted that because the processing of the material will occur onsite as a result of this application, there will be a reduction in vehicle emissions arising from the transportation of material to other offsite processing plants, as was proposed under the current consent.

Federation Mining also supports community environmental initiatives such as, the “Trees That Count” Project, to plant around 500 native trees on the West Coast which will assist to remove 91 tonnes of carbon for the New Zealand environment.

6.3 LANDSCAPE AND VISUAL AMENITY

The existing consent identified aspects of the proposal that had the potential to be visible from Snowy River Road, from adjoining areas of farmland to the west of the site, and from the farmhouse in the upper farmed extent of the valley.

A visual and landscape assessment was completed for the proposed development of the Snowy River Mine by Frank Boffa and is attached in full in **Appendix H**.

6.3.1 General Observations

The 2014 Visual Effects Assessment carried out by OPUS, concluded that any visual effects of the project would be negligible due primarily to the screening effects of the pine plantation at the Snowy River Mine site, and on the immediately adjoining property. The Visual Effects Assessment noted at the time, that the majority of the pine plantation would remain for the full period of the project. However, prior to Federation Mining’s involvement the landowner felled the pine forest and the site area is now open and generally more visible from Snowy River Road, and more particularly, from Snowy River Road to the west and locations immediately adjacent to the site.

Relative to the vegetation on and adjacent to the site, Figure 22 below, which is based on an aerial photograph taken some time in the period 2015-2016, shows the site boundary, the currently consented footprint of the WRS, and the proposed WRS footprint. The pine plantation referred to in the 2014 OPUS Visual Assessment, is apparent on either side of the Snowy River.

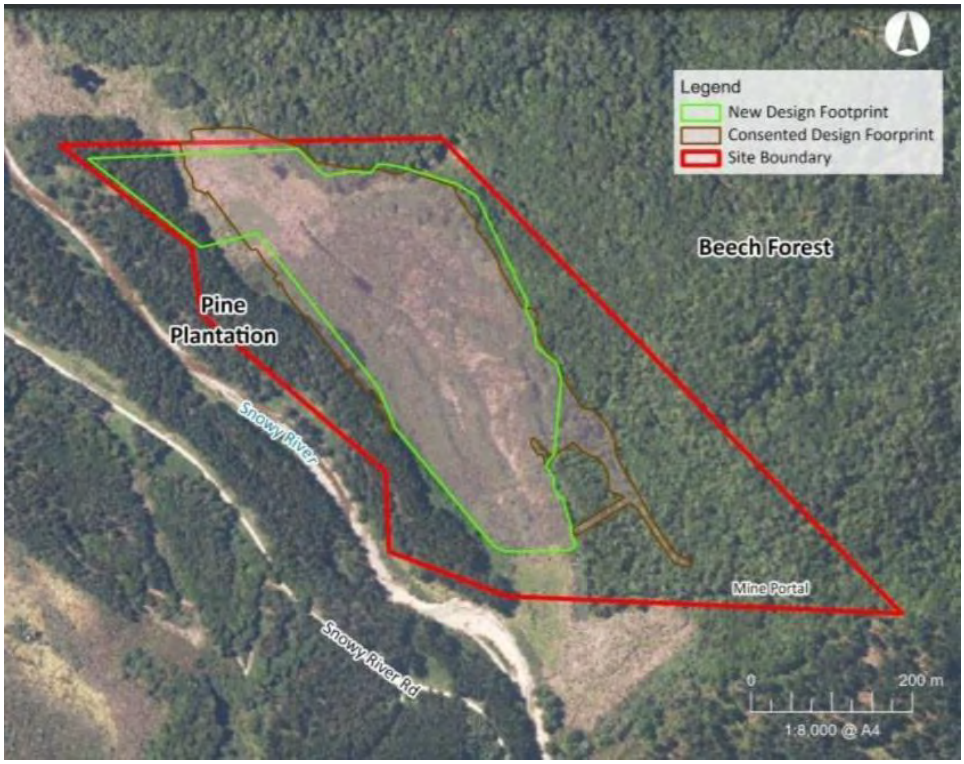

Figure 22: Vegetation Surrounding the Site – Pre-Removal

The beech forest to the north and east of the site boundary will largely remain undisturbed by the proposed new footprint. However, under the current consented footprint, further disturbance to the beech forest could occur in the vicinity of the eastern site boundary, and more particularly towards the south where a yet unconstructed haul road through the beech forest was envisaged and is consented. The proposed new footprint now seeks to avoid disturbance to this intact area of beech forest. Currently the intact beech forest has not been disturbed by the construction of a haul road even though the spur from the current haul road is shown near the tunnel portal to the northeast.

The Visual and Landscape Assessment identifies that the revised WRS footprint will have less overall effect on the beech forest than that which could occur under the current consent. Figure 22 above shows the likely event of both the current and proposed WRS footprints relative to the adjacent beech forest.

From a landscape and visual perspective, the new earthworks and design footprint will likely have a lesser effect on the existing beech forest, which will result in a positive, rather than a negative or adverse effect relative to that which is currently consented. This is beneficial from an indigenous vegetation perspective also.

6.3.2 Waste Rock Stack

An outline of the currently consented form of the WRS is shown in Figure 23. In landscape terms the form of this WRS does not relate particularly well to its local landscape setting

and would tend to appear as an “engineered mound” of waste rock. The west level of the WRS is consented to rise to a height of approximately 20 m to an RL of 210 m. While this height, in this particular setting will not result in a dominant (in terms of scale) or a visually prominent element, even with the removal of the pines, the completed form of the WRS landform will not appear to sit comfortably in its Snowy River landscape setting.

Figure 23: Existing WRS Footprint Authorised under the Existing Consents

Accordingly, the design footprint of the proposed WRS, has been carefully considered in terms of its form, scale and visual appearance. The revised layout is shown in Figure 24 below.

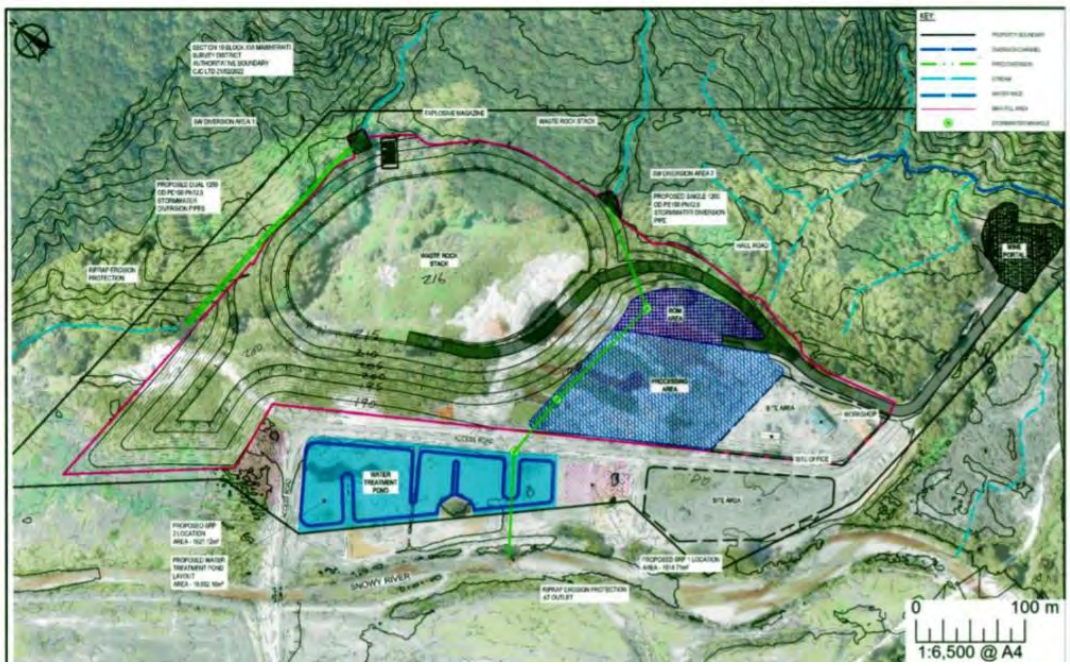

Figure 24: Amended WRS Footprint

In terms of the overall footprint, the WRS incorporating the DSTF, will not be much larger than the currently consented WRS footprint. Other than an increase in height of approximately 6 m, there will be a lower extension in the form of a tongue extending northwest towards the Snowy River. This tongue which will be at an RL of around 195 m, will accommodate the topsoil and site strippings to be used for rehabilitation and in part for WRS purposes, excluding any DSTF material, which will all be accommodated within the main DSTF cell. In visual terms, the WRS overall will appear as a two-stepped landform, rising to a maximum RL of 210 m in the first stage, to a final height above the DSTF of RL 216 m at the completion of the WRS.

From a visual perspective, the increase of 6 m in height between the consented and the proposed WRS, albeit with a slightly larger footprint, will not in the context of public viewing points, have more than a minor visual effect. The assessment concludes that the proposed stepped and more “organic” appearing form of the WRS, compared to the consented WRS, will result in a more appropriate and attractive landform in the local Snowy River landscape setting.

While the pine plantation was recently removed, and noting that the OPUS Report relied to some extent on its screening effect for the currently consented WRS, the now proposed WRS will be more visible. Notwithstanding this, visibility in itself is not an adverse effect, and whereas what was previously consented was largely hidden, it was little more than an engineered mound unrelated to its landscape setting. Given what is now being sought cannot be effectively hidden from view, every attempt has been made to make the WRS appear to be relatively natural and in keeping with its local landscape setting. As the

application site is now more open and visible, albeit to a small number of viewers, and the proposed WRS footprint is slightly larger and higher overall, the design and form of the WRS footprint has sought to achieve a visually appropriate outcome and one that will appear to sit comfortably in its Snowy River landscape setting.

Additionally, while the PDP plans show the contours as an "engineered form" with slopes ranging from 1v – 3h to 1v – 2.5h, it is anticipated that when rehabilitated, these slopes will appear to be more "rounded out" and less regular in appearance. Likewise, in the more publicly visible areas, the slopes will be progressively rehabilitated, particularly on the steeper slopes where grazing may not be applicable. These steeper areas could be planted in woody shrubs and flax, which in both the short, and long term will assist with erosion control.

6.3.3 Processing Plant

The ore processing plant will be constructed and operated on a low fill platform located south of the proposed WRS, on land which is currently cleared, and will occupy an area of approximately 10,000 m^2.

Based on recent flood assessment work, the platform for the processing area and the base of the dry-stacked tailings cell will be formed at an elevation of around 192 m RL. The raising of the ground level by approximately 1-2 m in potential flooding areas will be achieved with the use of compacted waste rock from onsite as bulk fill to bring the ground level up to around 192.5 m RL. The ROM pad will be elevated approximately 2-4 m above the processing plant platform.

Should low retaining walls be required between the processing plant, the ROM and the WRS slopes, these will be removed at closure along with the processing plant and other structures.

While the layout and heights of the processing plant are yet to be finalised, the facility will be considerably smaller than the processing plant at the Globe Process Mine. On the basis that the processing plant at the Snowy River Mine site will be at an RL of 193 m, and the adjacent ROM pad at an RL of around 197 m, the Stage 1 height of the WRS at 210 m and rising to a final crest height of 216 m, along with the northwest ridge rising to a height of around 200 m and extending towards the Snowy River, it is likely that most, if not all of the processing plant will be screened by the WRS.

Based on the information available, the effective screening of the processing plant by the WRS landform will be in the order of 7-8 m. Generally, the only publicly visible views of the processing plant will be from Snowy River Road adjacent to, or in the immediate vicinity of, the plant site. While the Landowners' farmhouse on Snowy River Road is approximately 1 km to the northeast of the plant site, it is likely that in combination with local screening in the vicinity of the house, views of the plant itself will largely be screened. Notwithstanding

this, it is intended the finishes and/or colours of the main elements of the processing plant will predominantly be in dark green or grey shades so as to better blend the facility into its forested backdrop.

Given the scale of the processing plant and the height of the various plant elements, along with the screening effect of the redesigned waste rock landform, the visual effects of the processing plant are likely to be low.

6.3.4 Overall Landscape and Visual Effects Conclusion

On the basis that the consents previously granted are to be considered part of the existing environment, the landscape and visual effects of the proposed consent amendments have been assessed as being no more than minor.

6.4 TRAFFIC, PUBLIC ACCESS AND ROADING

A traffic assessment for this project was undertaken by Stantec and is attached in **Appendix I**.

The site will be accessed from Snowy River Road, which intersects with SH7, about 60km south of the SH7 Snowy River Bridge intersection. In the existing consent, the safety assessment of Snowy River Road was assessed as excellent and visibility at the SH7 intersection exceeded 250m in both directions and was considered adequate. Access to the site for the proposed development of the Snowy River Mine remains the same as the existing consent.

The volume of movements during the construction phase under the revised project is comparable to the number of movements that was approved as part of the existing consent for the mining phase. Vehicle movements will peak at the start and end of the day. Each peak is likely to involve less than ten vehicle movements which is well within the capacity of Snowy River Road and will not contribute to noticeable operational effects. A temporary traffic management plan will be in place during the construction of the processing plant if there are periods that construction traffic will vary the normal operating conditions of Snowy River Road. The small increases in traffic volumes to and from the mine during the construction phase will have a negligible effect on the safety of the State Highway's operation.

During the mining phase, the processing plant will increase the number of staff that are on site at any one time. This will increase the average daily volume of light vehicle movements from 40 to about 70. However, as the ore will now be processed on site, there will be a large reduction in the number and type of heavy vehicle movements, reducing to less than 10 per day (compared to 26 truck and trailer movements per day previously consented). It is considered that this change will be beneficial to Snowy River Road, the SH7 / Snowy River Road intersection, and the wider State Highway network. The light vehicle traffic will be tidal by direction, with inbound movements occurring in the one-hour

period before the start of a shift and outbound movements in the one-hour period following the end of a shift. As a result, the likelihood of two vehicles travelling in opposite directions meeting on the narrower section of Snowy River Road will be low.

A number of the transport conditions outlined in the existing resource consent to mitigate the effects of the project on traffic and road safety will still be implemented for this proposal. These include passing bays constructed on Snowy River Road, that trucks will only pass each other at the passing bays and the timing of truck movements on Snowy River Road will not conflict with school bus times.

The traffic assessment concluded that some of the resource consent conditions related to the upgrading of both the SH7 / Snowy River Road intersection and Snowy River Road are considered unnecessary due to the reduced number of truck movements associated with the processing of ore on site. However, Federation Mining is committed to undertaking these improvements and as such is not seeking any variation to the current consented requirements at this time.

Overall, the effects of the proposed change on traffic and roads are considered to be no more than minor.

6.5 GEOTECHNICAL AND STABILITY MATTERS

The proposed changes to the existing resource consent include a larger WRS.

Seismic activity is identified as a natural hazard at the mine site. A preliminary geotechnical stability assessment was completed to assess the slope stability and liquefaction settlement risk on the revised WRS design. This report is attached in full in **Appendix E**.

6.5.1 Stability Assessment

The overall WRS can be considered a low risk structure, when assessed using basic criteria derived from waste rock stack classifications. The basic criteria assessed include:

- The overall WRS height is low, less than 50m;
- Volume is small to medium, 1×10^6 to 5×10^7 m^3;
- Slopes are flat less than 26° from horizontal;
- Foundation slope is flat (less than 10°) from horizontal;
- The WRS is moderately confined on two sides;
- Foundations are competent to weak, soils will gain strength with consolidation, adverse pore pressures can dissipate if loading is controlled;
- Fill material is strong and durable with less than 10% fines;
- The WRS is zoned with structural and engineered fills to control stability;

- The construction method proposed is favourable to improved stability using thin lifts and from the base up (ascending construction);
- Excess pore pressures are not expected, however, may develop in certain circumstance and some seepage in the foundations layers is possible;
- Construction rate for the WRS is slow development; and
- Temporary slopes of the WRS may be benched for ease of access and the slopes of the mounded tailings cell and co disposal areas are benched and buttressed by the bulk fill of the WRS.

Final slopes of the WRS will also be formed to mirror natural landforms to the extent practicable, which will also assist in promoting the long term stability and reduce erosion risks.

6.5.2 Overall Stability Conclusion

The effects of seismic displacement on the amended WRS are assessed as being minimal. The modelling indicates that displacement in the slope under seismic conditions would be significantly less than 200mm. The waste rock particle sizes exceed this potential displacement of the slope, and the damage may not be discernible. Damage due to an earthquake event is expected to be minor, and if it did occur it is unlikely to require remediation.

6.5.3 Liquefaction

Preliminary analyses were carried out to assess the likelihood of liquefaction of the natural alluvial gravels underlying the Snowy River flood plain. The results indicated that liquefaction may occur in the loose, shallow material to depths of around 3.5m bgl around boreholes in the southeast end of the site (the minor liquefaction risk area).

Overall, the waste rock stack is considered low risk from a geotechnical perspective when assessed using basic criteria derived from WRS classifications.

6.6 NOISE

The noise assessment completed for the proposed development was prepared by Tonkin & Taylor Ltd and is attached in **Appendix C**.

Noise associated with construction activities was the primary noise source identified in the existing consent. During the operation phase, the main noise source was noise from the placement of waste rock from the mine on the waste rock stack, screening of ore and trucking the ore offsite. As ore will no longer be transported offsite for processing, noise associated with this activity will not occur, which is a positive effect of the revised project.

Construction noise from the proposed development is expected to be below the relevant noise limits at all times, complying with the NZS 6803 daytime limits. Movement of construction vehicles along Snowy River Road will only be considerable for the short period of time while the vehicle drives past.

During the construction phase, management of noise is limited due to the spatial separation between the mine and the nearest noise sensitive receiver. Management of construction noise will be through the adoption of the best practical options and community engagement. Local residents will be informed when construction will commence and when large deliveries may occur.

The main source of noise under the revised project will be the processing plant as it will be operating continuously throughout the day and night, however, the WRS will provide some screening of this noise. Activities associated with the processing plant include the run of mine crusher, mill and truck movements.

The cumulative noise from the consented activities and proposal were modelled and are displayed in Table 8 below. Under worst-case modelling scenarios (all noise sources operating simultaneously and for the plant operating at the highest WRS elevation), noise from the processing facility is expected at the two closest residential buildings, with noise at the nearest property expected to increase by 5dB compared to the existing consented noise environment, 36dB. However, this is not considered to be significant as the measured noise of the existing environment sometimes fluctuates by 5dB. Therefore, noise from the combined effects of the activities associated with this proposal will at times be masked by the existing landscape. As this was under the worst-case scenario, it is also likely that noise levels will be less than those predicted in the noise assessment, thus, it is unlikely that the nearest residential property will perceive a change in the local noise environment that is more than minor.

During the operation phase, noise emissions from the processing facility will be limited for the health and safety of workers on site. Therefore, noise levels associated with the processing facility will be consistent with best practice standards.

Table 8: Cumulative noise levels and noise change at the nearest receivers.

Location	Existing L10 dBA	Proposal L10 dBA	Combined L10 dBA	Noise increase over existing dBA
724 Snowy River Road	36	39	41	5
265 Mossey Creek Road	23	26	28	3

Noise from the processing plant will be compliant with the relevant noise standards of the Buller District Plan and within the noise limits of the existing land use consent. The combined noise of the processing facility and the consented activities is also compliant with the relevant noise limits.

The noise effects from the proposed development are therefore assessed as being less than minor.

6.7 HERITAGE

An archaeological and heritage assessment was prepared by Origin Consultants to provide an overview of the site's archaeological values at and around the Snowy River Mine. The project effects on those values were assessed in the report, which is attached in full in **Appendix B.**

The assessment identified four archaeological features within the site, a water race, mining adits, logging tracks and features and the Blackwater and Prohibition mine shafts. These sites were assessed as having moderate to low values and the proposed development of the Snowy River Mine will not have an effect on the sites. The water race and mining adits were also identified as archaeological features under the existing consent and the development of site infrastructure would not have affected these features.

The revised site layout will not affect any pre-1900 archaeological material. It is possible that early (c. 1860s) alluvial mining features were previously present on the site, but these will have been destroyed by alluvial mining and/or the establishment of the existing surface facility, late in the 20th Century.

During the proposed development, every practical effort will be made to avoid damage to any archaeological site. In accordance with the existing consent conditions if any previously unidentified archaeological sites or Māori material are discovered during the proposed development, works will cease around the vicinity of the discovery and Heritage New Zealand Pouhere Taonga and mana whenua will be contacted immediately.

6.8 GEOCHEMISTRY

Mine Waste Management Limited ("**MWM**") was engaged by Federation Mining to assess the geochemical changes associated with the proposal to process ore at the site. This assessment is attached as **Appendix F**.

As part of the mining operation, it is anticipated that 4 million tonnes of ore will be extracted and processed, and 2 million tonnes of waste rock will be produced with 50-60% of the tailings being returned underground. The current resource consent allows for the placement of up to 1.1 million cubic metres (Mm^3) of waste rock on the surface in the designated waste rock stack area. Due to production requirements, the requirement is now estimated at 1.4 Mm^3.

The WRS will be designed to incorporate 0.8 Mm^3 (2.16 Mt) of dry-stack tailings ("**DST**") co-disposed with waste rock as a cell within this mine domain (PDP, 2022a). The DST are the filtered gravity concentrate tailings from the sulphide flotation circuit. All sulphide flotation concentrate that have been subjected to cyanide treatment for gold extraction will be stored underground within the underground mine workings.

6.8.1 Geochemical Assessment

A review of previous work for the project indicates that NMD is likely for materials excavated and for mine domains where these materials are exposed (e.g., underground workings, WRSs). NMD occurs where the acid produced by the oxidation of sulphide minerals has been neutralised by other minerals such as carbonates, with the resultant waters having elevated metal concentrations but remaining circum-neutral in pH. This expectation is based on the materials being classified as non-acid forming and water quality from the historic Blackwater Mine that is circum-neutral but elevated in potential contaminants of concern such as iron ("**Fe**") and arsenic ("**As**") amongst others.

Besides NMD impacted waters, there are also environmental risks associated with elevated nitrate and ammonia. These compounds are created from blasting using nitrogen-based explosives. Given the low sulphide content of the waste rock within the project area, it was recommended that the source terms for water quality for mine domains include nitrogenous compounds. Monitoring has been undertaken by Federation Mining, which shows that nitrate nitrogen and ammoniacal nitrogen in the discharge are currently elevated, and therefore, also needs to be treated.

Geochemical assessments have identified a zone of As enrichment around the Birthday Reef, the primary orebody. This is associated with the sulphide mineral arsenopyrite and includes:

- an As-rich zone that is 1-3 m wide and is referred to as potentially arsenic generating (PAG); and
- a proximal As-rich zone that can be 20-30 m wide on either side of the Birthday Reef.

The geochemical assessment confirms that appropriate materials management and water treatment will be required for the project to appropriately avoid and mitigate adverse effects on the receiving environment.

6.8.2 Conceptual Site Model

A conceptual site model was developed in conjunction with PDP. This model is useful to assist in identifying and understanding the type and potential for leaching of certain contaminants from within the key mine domains (referred to as the AMD management conceptual model).

6.8.2.1 Operational Phase

Figure 25 provides a schematic showing key mine domains within the AMD management conceptual model during the operational phase including:

- Historic workings;
- Active workings;
- WRS underdrain;
- Co-disposal DST / waste rock underdrain;
- ROM Pad;
- Process Plant;
- the Water Treatment Plant; and
- the Water Treatment Ponds.

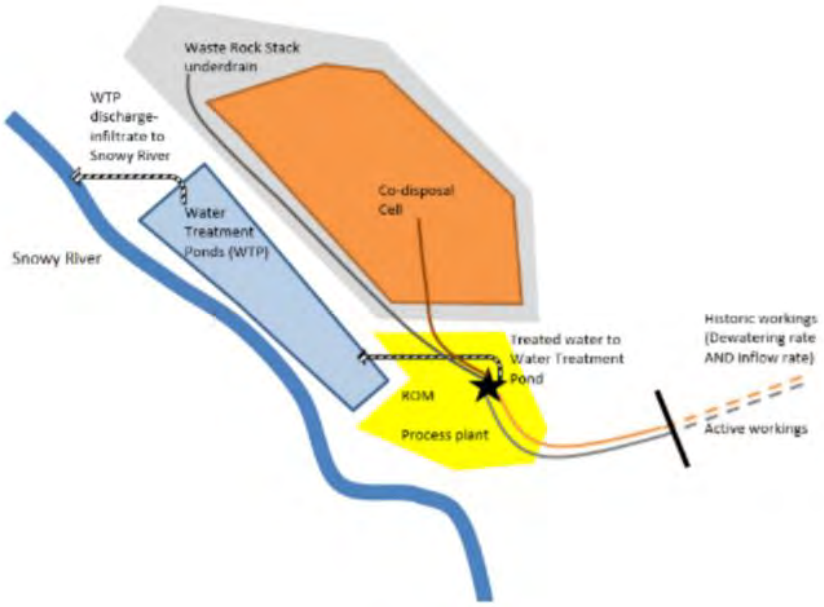

Figure 25: Water Management During Operation

Flow rates for the various mine domains during the operational phase of the mine have been determined by PDP. Water quality for the various mine domains has been determined by a combination of site monitoring data and empirical analogue data from the Globe-Progress Mine to estimate source terms for the water quality. These are shown in Table 9 below.

Table 9: Operational Flow Rates Reporting to the WTP and PTS

Domain	Description	Water Quality Data	Water Quantity Reporting To WTP
Historic workings (pumped dewatering and inflow)	Representing the flooded historic Blackwater Mine workings. Mine waters will have high contaminant concentrations. This includes the dewatering phase and ongoing inflows through the historic workings.	Historic workings overflow / LLA chemistry / Prohibition Shaft sampling.	25 L/s – pumped dewatering 5 L/s – inflow
Active workings	Representing mine water generated from active working areas (10 L/s from panels; 5 L/s from decline) and process water (15 L/s). Mine waters are likely to have high contaminant concentrations and TSS during operating phase with TSS decreasing post closure.	Water sampling sites M1 and M3.	30 L/s
Waste Rock Stack underdrain	AMD collected from the WRS domain, assuming tailings material stored in separate cell.	REE-RDRN (Globe Progress WRS underdrain) / supplemented with nitrate data from water quality monitoring location M3.	0.05 L/s
Co-disposal Cell underdrain	Lined cells used to contain tailings and waste rock.	REE-FWUD (Globe Progress Fossickers TSF underdrain)* / supplemented with nitrate data from water quality monitoring location M3.	0.4 L/s
ROM Pad	Unsaturated ore stockpile awaiting processing. Oxidation may lead to NMD with high contaminant concentrations. Periodic	REE-FWUD (Globe Progress Fossickers TSF underdrain) / supplemented with nitrate data from water	0 L/s

Domain	Description	Water Quality Data	Water Quantity Reporting To WTP
	flushing during rain events and possible seepage flows.	quality monitoring location M3.	
Process Plant	Process plant discharge water.	No discharge flows generated.	0 L/s

6.8.2.2 Closure Phase

The closure phase AMD management conceptual site model is shown in Figure 26. This is similar to the operational phase AMD management conceptual site model, except the mine workings change from dewatering (via pumps) to inflow through the mine workings. Inflow through historic workings remains the same and is separate regarding the contaminant load model calculation process. In the closure phase the WTP is replaced by a passive treatment system.

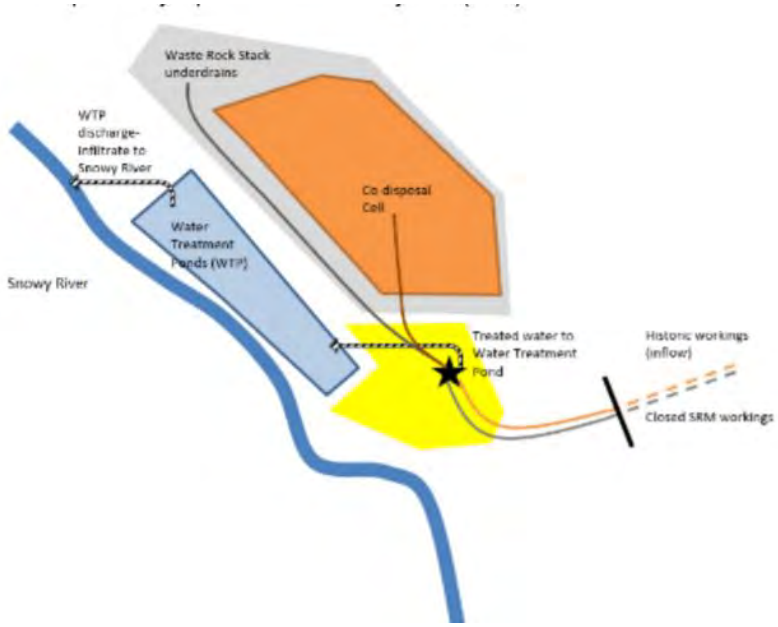

Figure 26: Water Management Post Closure

The contaminant loads from the various mine domains during closure are shown in Table 10 below.

Table 10: Closure Flow Rates Reporting to the WTP and PTS

Domain	Description	Water Quality Data	Water Quantity Reporting To WTP
Historic workings (pumped dewatering and inflow)	Representing the flooded historic Blackwater Mine workings. Mine waters will have high contaminant concentrations. This includes the dewatering phase and ongoing inflows through the historic workings.	Historic workings overflow / LLA chemistry / Prohibition Shaft sampling.	10 L/s
Active workings (Closed)	Representing mine water generated from closed Snowy River Mine working areas (underground). Mine waters chemistry expected to revert to 'Historic workings (inflow)' contaminant concentrations but with elevated nitrogen concentrations while blasting residues are attenuated.	Historic workings overflow / LLA chemistry / Prohibition Shaft sampling, water quality monitoring location M3 nitrogen concentrations.	4 L/s
Waste Rock Stack underdrain	AMD collected from the WRS domain, assuming tailings material stored in separate cell.	REE-RDRN (Globe Progress WRS underdrain) / supplemented with nitrate data from water quality monitoring location M3.	0.01 L/s
Co-disposal Cell underdrain	Lined cells used to contain tailings and waste rock.	REE-FWUD (Globe Progress Fossickers TSF underdrain)* / supplemented with nitrate data from water quality monitoring location M3.	0.1 L/s
ROM Pad	Unsaturated ore stockpile awaiting processing. Oxidation may lead to NMD with high contaminant	REE-FWUD (Globe Progress Fossickers TSF underdrain) / supplemented with	0 L/s

Domain	Description	Water Quality Data	Water Quantity Reporting To WTP
	concentrations. Periodic flushing during rain events and possible seepage flows.	nitrate data from water quality monitoring location M3.	
Process Plant	Process plant discharge water.	No discharge flows generated.	0 L/s

6.8.3 Prevention and Minimisation of AMD

The prevention of sulphide mineral oxidation, and the minimisation of water flow through sulphide-rich materials, are the key management mechanisms for the source control of AMD. Such methodologies have the potential to enable source control of AMD rather than accepting and utilising a treatment in perpetuity approach for AMD.

MWM report that industry experience indicates that WRSs are typically the principal mine domain associated with contaminant generation and typically can account for 60 – 80% of the contaminants from the site. Hence, if WRSs are constructed to minimise oxygen ingress and avoid interactions with water, there is the opportunity to significantly reduce the main source of contaminants reporting to the receiving environment. This can reduce the need for long term treatment.

International research has demonstrated that one of the most effective methods to minimise advective ingress of oxygen into WRS is to minimise the height of the tiphead to less than 4 – 6m and ensure that each lift has a compacted running surface, which reduces the size of the advective cell.

The following principles have been proposed at the Snowy River Mine site to minimise the effects of AMD, including techniques to minimise the ingress of oxygen and techniques to minimise the mobilisation of contaminants.

6.8.3.1 Short Lifts

It is proposed that the WRS will be constructed by paddock dumping. This will prevent grain-size segregation and minimise the advective ingress of oxygen into materials. Minimising sulphide oxidation will also help with the flotation of sulphide minerals (and Au recoveries) leading to fewer sulphides in the dry stack tailings stream (gravity concentrate).

6.8.3.2 Encapsulation

Lower sulphur NAF materials will be placed around the perimeter of the WRS to provide the longest distance possible from the edge of the waste rock stack to higher risk

materials such as the co-disposal cell(s). These cells will have a low permeability base to direct seepage to the water treatment plant and will include a final low permeability cover system installed at closure.

6.8.3.3 Progressive Rehabilitation

Progressive rehabilitation of final landform slopes associated with the WRS is a best-practicable approach to minimising the ingress of oxygen and water into reactive materials. Progressive rehabilitation is proposed for the WRS.

6.8.3.4 Clean Water Diversion

The WRS has been designed to ensure clean-water is diverted away from the WRS. Water is the primary pathway for the mobilisation of contaminants from mine domains such as the WRS. Management methodologies, includes:

- Diversion of run-on water from streams to the west of the WRS;
- Design of operational WRS surfaces to shed water, where ponding of water on waste rock is avoided (e.g., sediment sumps);
- Flattening out paddock dumped materials to shed water before significant rainfall events; and
- Development of a capillary break between the WRS materials and the final topsoil layer to encourage the shedding of water rather than infiltration and the mobilisation of contaminants from waste rock and tailings.

6.8.4 Control and Treatment of AMD

At the Snowy River Mine site significant geochemical characterisation has been undertaken of the potential environmental geochemistry hazards for the project, which have been used to inform and develop prevention and minimisation engineering controls. However, the potential for mobilisation of contaminants could still occur, hence control and treatment management options are also required.

Control of mine impacted waters is a key step in the management and treatment of mine-impacted waters.

6.8.4.1 Underground Workings

The underground workings are divided into water generated by the historic workings and water generated from the new proposed workings.

During the operational phase:

- the historic workings will be dewatered and treated with ongoing historic mine water contributions, which will be pumped to the surface; and

- the new workings will also require dewatering, which will be pumped to the surface.

6.8.4.2 Waste Rock Stack

The WRS will include a variety of materials including low sulphur NAF rock, tailings, and materials potentially elevated in arsenic. It is anticipated that four pathways will be present from the WRS including:

- Surface runoff – which is assumed to be predominantly impacted by TSS, and will report to the sedimentation pond and then be treated by the water treatment ponds;
- WRS seepage collection – which captures a proportion of the net infiltration to the WRS and directs this flow to the WTP;
- Seepage to groundwater; and
- At closure, the final landform will have a cover system installed that will have a capillary break (constructed from waste rock) where this water may require management / treatment.

6.8.5 Water Treatment

The proposed treatment systems have been conceptually designed by PDP (**Appendix G**). All waters directed to these systems first pass through the sedimentation pond to reduce the total suspended sediments.

6.8.5.1 Water Treatment Plant

The WTP is primarily designed to remove Fe and As, which are the principal contaminants of concern targeted for removal by the active treatment system. The WTP is proposed for the active phase of mining. The system will include the addition of chemicals as necessary (flocculant, FeCl3, H2O2) and a series of steps including aeration, precipitation, and flocculation in a clarifier, followed by sludge / clean water separation. Bolt on systems to further reduce nutrients within the discharges can also be considered, if monitoring determines that this a necessary engineering solution to ensure compliance with recommended water quality limits.

6.8.5.2 Water Treatment Ponds

Water Treatment Ponds are designed to treat surface runoff and reduce the TSS, as well as remove minor contaminants such as Fe and As. A key purpose of these water treatment ponds is to facilitate the biological removal of nitrate and ammonia.

6.8.5.3 Passive Treatment Ponds

A passive treatment system is proposed to replace the WTP after closure of the mine to treat key contaminants (As, Fe). Designs for this will be advanced during the operational

phase of the mine once water quality and quantities are confirmed to ensure the designs align with treatment requirements.

6.8.6 Contaminant Load Model

A contaminant load model is required to understand the potential effects on the receiving environment and any water treatment requirements. The model is based on the conceptual site model for both the operational and closure phases of the project and the mine domains identified by MWM and PDP.

The contaminant load model combines the water quality and flow rate estimates to derive a contaminant load for each domain. The loads for different domains were added together, as required, for modelling purposes. This includes estimating combined contaminant loads (and back calculated contaminant concentrations) reporting to the water treatment systems.

During the operational phase, the modelled contaminant loads vary significantly for different domains, with the following conclusions:

- The active workings are expected to be the dominant contributor to TSS and nitrogenous contaminant loads reporting to the WTP; and
- The historic workings (both during dewatering or inflow) are the major contributors to As, Fe, and Mn loads.

The transition to the Closure Phase results in a decrease in flow rates reporting from the historic and closed Snowy River Mine underground workings. Some contaminant concentration changes are also anticipated as the site transitions to the Closure Phase, specifically a reduction in TSS concentrations from underground workings and the closed mine workings metalliferous contaminant concentrations (e.g., As, Fe, Mn, etc.) changing to match historic workings concentrations. The conclusions with regard to this phase are as follows:

- The underground workings are expected to be the dominant contributor to TSS (but at a much lower rate than during the Operational Phase);
- The historic workings and closed Snowy River Mine workings are the major contributors to As, Fe, and Mn loads; and
- The closed Snowy River Mine workings and the WRS are expected to be the major contributor of nitrogenous contaminant loads reporting to the PTS due to potential blasting residues stored in these domains.

6.8.7 Water Treatability

Quantifying the changes to contaminant concentration through the WTP / PTS is a key component of demonstrating how water treatment affects the site wide contaminant load, and therefore, effects on the receiving environment.

MWM reports that a key contaminant suite was identified from early contaminant load modelling, including:

- TSS – primarily from active underground workings;
- Iron and arsenic – mobilised from all mine domains; and
- Nitrogenous species (e.g., ammonia and nitrate) – derived primarily from blasting residue.

These contaminants are managed / treated by different stages of the sites water management infrastructure as discussed above.

The effect of water treatment (by the WTP during the operational phase) has been incorporated into the contaminant load model. The modelled change in contaminant concentrations and loads through the WTP is summarised in the MWM report (Table 19). In summary, based on the assumptions built into the model, this includes:

- A reduction in Fe concentration by 99% from 5.0 to 0.05 mg/L;
- A reduction in As concentration by 95% and because the influent Fe:As ratio is ~10:1) from 0.50 to 0.03 mg/L; and
- A discharge TSS concentration of 20 mg/L.

The Mn and nitrogen concentrations and loads are modelled conservatively through the WTP. The WTP discharge then report to the PTS for additional treatment to remove other contaminants such as nitrogenous compounds.

The effect of water treatment during closure has also been incorporated into the contaminant load model. The modelled change in contaminant concentrations and loads through the PTS is summarised in Table 20 of the MWM Report.

Based on the assumptions incorporated into the model, this finds:

- A reduction in Fe concentration by 99% from 9.6 to 0.1 mg/L;
- A reduction in As concentration by 95% and because the influent Fe:As ratio is >10:1) from 0.96 to 0.05 mg/L; and
- A discharge TSS concentration of 20 mg/L.

The effects of the effectiveness of the proposed water treatment on water quality and aquatic ecology and compliance with existing consented water quality limits, are discussed in Section 6.10 of this report.

6.9 WATER QUALITY AND QUANTITY

6.9.1 Surface Water Quality

The quality of treated water discharged under the existing resource consent was assessed as being able to meet water quality compliance limits, which is also close to the existing water quality of the Snowy River.

The proposed development is seeking to process the ore on-site, and therefore, more complex water treatment facilities will be required. Water discharge will be treated to a standard that will comply with the water quality standards of the existing discharge consent.

The proposed water treatment system is described in detail in the reports prepared by PDP and MWM. In turn Ryder has assessed the effects of this quality of water on the current water quality and aquatic ecosystem within the Snowy River. This report is attached as **Appendix J**.

The predicted concentrations of contaminants into and out of the proposed water treatment plant has been modelled by MWM during both the operational and closure phases of the project. These are shown in Tables 11 and 12.

Table 11: Operational Concentration of Contaminants Pre and Post Treatment

Contaminant	WTP Influent (g/m^3)	WTP Discharge (g/m^3)
TSS	5,314	20
Arsenic	0.50	0.03
Iron	5.0	0.05
Manganese	2.6	2.6
Nitrate-N	1.3	1.3
Ammonia N	12.6	12.6

Table 12: Closure Concentrations of Contaminants Pre and Post Treatment

Contaminant	WTP Influent (g/m^3)	WTP Discharge (g/m^3)
TSS	36	20
Arsenic	0.96	0.05
Iron	9.6	0.1

Based on the above, it is predicated that the water treatment plant will be effective in reducing acid and metalliferous contaminants in the discharge. These are to be treated so as to comply with the existing water quality limits in the discharge consent.

The technical assessments commissioned by Federation Mining have indicated that the mining activities could also contribute to downstream nitrogen loading in the receiving waterbodies. The source of this contamination is however largely derived from the use of explosives during the underground mining activity (which is a consented activity). In order to reduce the amount of nitrogen being released into the environment, best practice blast controls will be implemented by Federation Mining. It is also anticipated that the Treatment Ponds will assist in reducing nitrogen and ammonia levels within the water prior to this water entering the receiving environment.

Ryder has also assessed the effects of these potential nutrient sources within the Snowy River and has recommended that the NPS Freshwater Attribute B is an appropriate target for the Snowy River. Attribute B values are as follows:

- Nitrate-N g/m^3 (NO_3-N) – Annual median [>1.0 and ≤2.4] and Annual 95th percentile [>1.5 and ≤3.5]
- Ammoniacal-N g/m^3 (NH_4-N) – Annual median [>0.03 and ≤0.24] and Annual 95th percentile [>0.05 and ≤0.40]
- Sulphate (mg/L) – 500 maximum

This band provides for a high degree of protection against potential toxic effects of nitrate of freshwater biota. Band A provides protection for high conservation value systems (NPS-FW 2020). However, the Snowy River has been subject to modification and land use change over time and, while the river is currently in good condition, it cannot be regarded as having particularly high conservation value. Further, Ryder also recommends a periphyton limit to be included as part of the consent. This will act as an indicator of potential effects of nitrate other than those related to toxicity.

Federation Mining is committed to ensuring the water treatment system can achieve these limits. A variation is being sought to the discharge consent to include these new nutrient-based limits. As noted above, it is anticipated that the WTP and Treatments Ponds will be successful in reducing nitrogen loads and achieving ongoing compliance with these limits. If monitoring demonstrates that there is non-compliance arising, or nuisance growths are appearing downstream as a result of the mining activity, there are additional engineering solutions that can be "bolted on" to the WTP to further reduce ammonia and nitrogen levels in the discharge. While these are not expected to be required, they remain options that Federation Mining could pursue should this become necessary in order to achieve ongoing compliance with the recommended limits.

6.9.2 Groundwater Quality

The effects of the project on groundwater quality and quantity was examined by PDP in its report attached as **Appendix G**.

The proposal has the potential to impact groundwater quality through:

- Infiltration of waste rock stack seepage into groundwater; and
- Infiltration of treated water via the treatment ponds.

The WRS has been lined. The purpose of this is to prevent ingress of contaminants into the underlying groundwater system. The clay based liner will seek to ensure that any runoff and seepage from the WRS is collected and directed towards the water treatment plant. Adverse effects on the groundwater system are therefore largely avoided as a result of this liner.

Seepage generated from the tailings cell within the WRS will be controlled by the central underdrain, which will also direct all discharges to the water treatment plant.

To ensure the treatment efficiency of the ponds is maintained, it is recommended that seepage through the wetland base should be minimised. An insitu liner is therefore recommended. As a result, the potential for contaminants entering the groundwater system via the treatment ponds is very minor and will only affect a very localised area before entering the Snowy River surface water system. The contribution of potential contaminants on groundwater has therefore been taken into account in the surface water modelling, given that the surface water is the ultimate receiving environment for these discharges.

6.9.3 Water Quantity

The PDP Report attached as **Appendix G** provides an assessment of the flow rates from the site on the Snowy River.

6.9.3.1 Low Flow

In terms of determining the low flow regime for the Snowy River, earlier reports (Envirolink, 2003) determined that there is good correlation and is possibly conservative, between the flow in the Snowy River (at the State Highway Bridge) and the Inangahua River (at Black's Point).

The low flow statistics for the Snowy River that have been derived from this analysis are presented in Table 13.

Table 13: Low Flow Statistics for the Snowy River

Statistic	Flow (m^3/s)
Minimum instantaneous flow	0.12
Minimum daily flow	0.12
Average daily flow	0.71
1 day mean annual low flow (MALF)	0.19
7 day MALF	0.20

The Water Management Model developed by PDP indicates that groundwater recovered from the decline and workings during the operational phase will result in an increase in the net flow within the Snowy River in the order of 10 L/s, increasing the 1 day mean annual low flow ("**MALF**") from 0.19 m^3/s to 0.20m^3/s and the 7 day MALF from 0.20 m^3/s to 0.21 m^3/s. This is considered to have negligible effects on the hydrology within the Snowy River.

6.9.3.2 Storm Events

The formation of hardstand, haul roads, and the creation of the WRS has the potential to increase the stormwater runoff flows, and result in an increase in the peak flows leaving the mine site. This may increase to approximately 20% compared to a pre mining state. However, this magnitude of flow was anticipated as part of the existing consent, and there is no significant change in this regard to what is being proposed now.

It is also noted that the mine site will only influence approximately 3% of the catchment that contributes water to the Snowy River (being 130ha of the wider 4,130 ha upstream of the mine site). An increase of 20% in the peak discharge from the site will result in no observable change in the storm flows in the Snowy River once the remaining 4,180 ha is considered.

6.9.3.3 Water Take

The existing resource consents (RC13042-09 and RC13042-10), allows Federation Mining to take water from the decline, and underground workings (RC13042-09) and take water from the Snowy River for use in mining, dust control and domestic purposes (RC13042-10); which is limited to a water take from the Snowy River that is not permitted to exceed 20 L/s. Most of the water is returned to the Snowy River downstream as part of the water treatment process.

The inclusion of the Processing Plant and Paste Plant at the mine site is anticipated to result in the peak water take being in the order of 16.6 L/s. As this water take is consistent with the existing consented water take, no change in the consented water take is required at this stage. The proposed use for the water is shown in Figure 27 below.

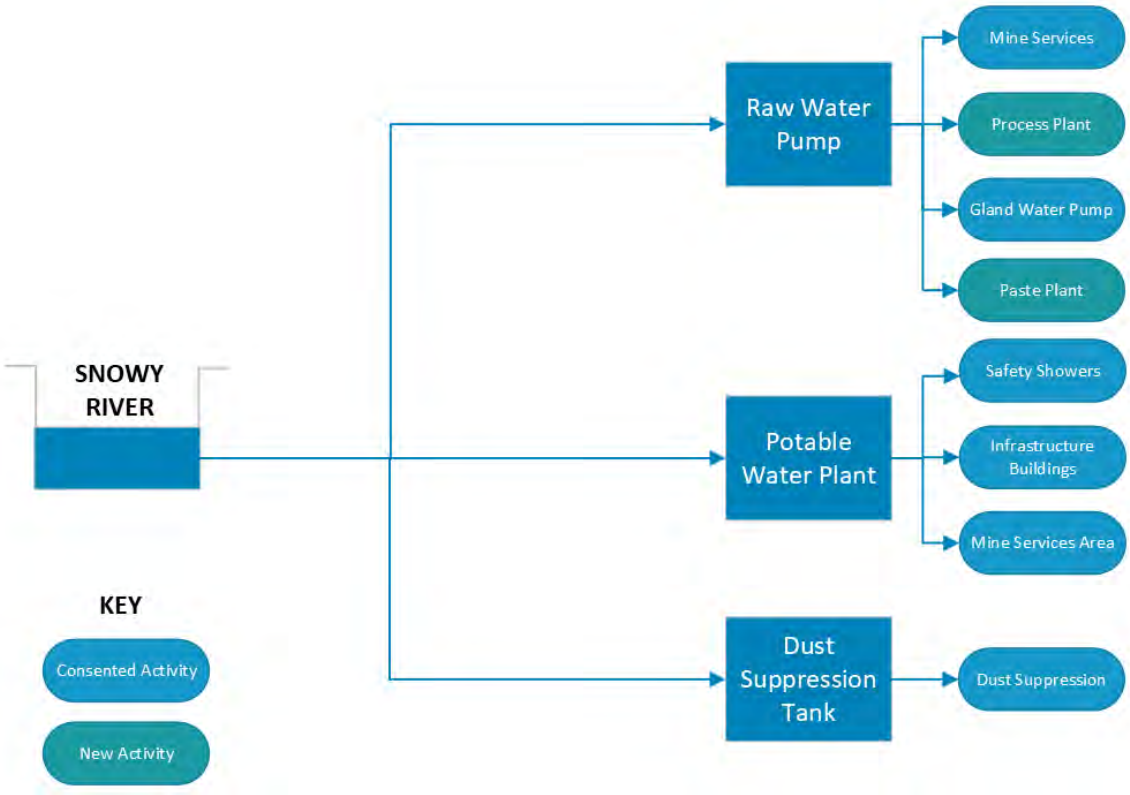

Figure 27: Water Use

6.9.4 Flow Risk

The main infrastructure areas, including the Processing Plant, will be located on a built up rockfill pad on the Snowy River alluvial terrace. A flooding assessment for the site was completed by Golder as part of the existing consent. The topographic elevation ranges from 190 m RL in the southeast of the site to 180 m RL at the northwest end near the property boundary.

The Snowy River flood plain is approximately 2 m above the average river level. The river levels fluctuate significantly during flood events. The fluctuations are in the order of 1 m – 2 m. Based on the Golder assessment, the maximum estimated flood inundation and 1000-year flood event will affect the portal and low-lying areas of site areas in the southeast, due to flooding from the 'upper' tributary just south of the site.

The flood assessment results show there is potential for low level flooding <0.2m depth both upstream and downstream of the bridge (assumed bridge deck elevation 187 m RL). Low-lying areas around the portal and site surface infrastructure had the potential to flood to between 0.2 m – 0.5 m (and up to 1m in places). The location of the processing plant and WRS are unaffected by the maximum flood and 1/1000-year flood event. The depth of flooding in these areas is indicated to be generally 0.2 – 0.5 m, and up to 1 m in places.

Based on the Golder flood inundation maps the general area where the main body of the WRS and processing areas are proposed are unaffected by flooding. Flooding affects predominantly the Crown Land adjacent to the river. The maximum flood and 1/1000-year event show little difference with regard to the effects on the site infrastructure and portal areas. The backwater effects behind the bridge are more evident under the 1/1000-yr event. PDP note the bridge is now located further downstream than the original proposed location.[8]

Golder recommended raising the ground level by 1 m – 2 m in the flood affected areas or constructing a stop bank of similar height to reduce the risk of inundation. When forming the site infrastructure areas, low-lying areas for the building platforms have been filled. In addition, a stop bank along the south boundary to protect the site infrastructure and portal areas from flooding has been formed.

It is intended that the platform for the processing area and base of the dry stacked tailings cell are to be formed at an elevation of at least 190 m RL or above based on the flooding assessment and current ground levels.

6.10 AQUATIC ECOLOGY

Due to the water treatment system and mitigation being proposed, mine-affected water will be treated to a level that will ensure compliance with the existing water quality standards. The report prepared by Greg Ryder (**Appendix J**) confirms that these standards will protect instream ecological values of the Snowy River.

6.10.1 Sedimentation Effects

Mining disturbs the land, removes vegetation and soil cover, and so increases the risk of fine sediment discharges to watercourses further down the catchment. Excessive fine

[8] Authorised via a variation.

sediment cover is usually detrimental to stream communities, particularly if flow variability is insufficient to regularly flush excess material away. Best practice erosion and sediment controls, including clean water diversions and sediment retention ponds, are being proposed to manage any potential adverse sedimentation effects. The current conditions also impose a limit on suspended solids entering the Snowy River.

6.10.2 Nutrients

Nitrates, ammonia, and sulphates are additional contaminants which have been identified as part of these assessments as requiring management. A key source in this regard is from the use of ammonium nitrate explosives during the underground mining activity.

Nitrate nitrogen is a nutrient that is necessary for algae and macrophyte (plant) growth. In excessive concentrations in freshwater, it can result in nuisance growths of these plant forms, particularly if sufficient phosphorus is also available for growth (along with other factors such as sufficient temperature and water clarity for light penetration). At even higher concentrations, these contaminants (e.g., nitrates, ammonia and sulphate) can be toxic to aquatic life to various degrees. As discussed in Section 4, modelling has been undertaken to predict the potential changes in receiving water concentrations as a result of the mining (blasting) activity on the site. This shows that nitrate and ammonia levels in the discharge from the site could be potentially elevated, without treatment.

In order to address this potential effect, Federation Mining will ensure blasting techniques are adopted such that they seek to reduce any excess nitrogen levels in the environment. In addition, a passive water treatment system is being retained on the site. This will assist in reducing elevated nutrient levels in the discharge prior to entering the Snowy River.

Ryder has completed an assessment of the ecological values within the Snowy River and confirms that applying the NPS-FW band B for nitrate – nitrogen would appear to provide ample protection for the ongoing protection of the aquatic community in the Snowy River catchment. Ryder also recommends a sulphate limit of 500mg/L to be introduced. Ongoing monitoring of biological indicators within the river system is also recommended to continue as per the current consent requirements (refer to conditions 23.7 and 23.13 of RC13042 -12). This will confirm that there are no adverse effects arising as result of periphyton or other nuisance growths within the river system, directly attributable to the discharges from the mining activity.

6.10.3 Other Potential Contaminants of Concern and Conclusion

In terms of other contaminants (e.g. metals) Federation Mining will seek to maintain compliance with the existing consented limits and monitoring regime. They will ensure all relevant contaminant risks are appropriately managed in order to achieve a healthy aquatic environment.

Overall Ryder concludes that predictions of downstream water quality in the Snowy River after mixing of any potential mine discharge or seepage from the treatment ponds indicates that recommended compliance limits can be met, and consequently there should be no adverse effects on the river's flora and fauna.

6.11 AIR QUALITY

An assessment of the potential effects of the project on air quality in the surrounding environment was completed by PDP, a copy of which is included in **Appendix J** to this AEE.

6.11.1 Existing Consent

The existing consent provided for a number of activities that will occur during construction and operation of the mine that will generate discharges to the air, including generation of dust, blasting, vehicle emissions and diesel. This consent remains valid, however, a new consent is being sought to provide for the addition of the processing plant and tailing cell within the WRS.

6.11.2 Emission Sources

Three key activities were identified in the assessment which have the potential to discharge contaminants into the air form the Snowy River Mine site. These are:

- The waste rock stack (already consented)
- The gold processing plant
    - Mechanical ore processing
    - Wet chemistry processes
    - Gold recovery
    - Bulk reagents
- The process tails storage cells within the WRS.

6.11.3 Effects of the Project

The key contaminant discharged from the gold processing and the process tail cells is particulate matter or dust. During the gold recovery process, activities that discharge contaminants to air include the elution heater, carbon regeneration kiln, calcine oven and ore smelter, which all use LPG as a fuel. LPG is a relatively clean burning fuel and has a low potential of any adverse impacts on human health. The potential adverse effects of the emissions to air are amenity effects from dust being deposited on surfaces, health effects from breathing in particulate matter and ecological effects, impacting sensitive flora and fauna if present in the immediate area.

Federation Mining will mitigate the effects associated with the key sources of contaminants to air, above and beyond what is required using the best practicable option or best available mitigation strategy. This will ensure emissions to air from the site are minimal and effects will be as low as possible. Emission mitigation measures adopting either the best practical option or best available option are outlined for each activity in the air quality assessment. These are mitigation measures associated with:

- General site dust;
- Gold processing plant;
- Process tails cells; and
- Bulk material handling.

To ensure the mitigation measures are effective, a comprehensive dust and meteorological monitoring programme will be implemented. A site Air Quality Management Plan will also be put in place that ties together the mitigation measures and environmental monitoring programme into an effective and auditable package. The plan will ensure that there will be no offensive or objectionable dust transported beyond the boundary of the site and that any adverse human health or ecological effects will be less than minor. Staff training requirements will ensure the plan is implemented effectively.

Due to the mitigation strategy to reduce the effects of source emissions on the environment, adverse effects generated by all Snowy River Mine emission sources will be less than minor. PDP have also confirmed that the current consent limit set out in RC13042-14, Condition 25.1 is appropriate to retain.

6.12 MANA WHENUA CULTURAL VALUES

It is acknowledged that it is for the mana whenua of the area to determine and assess the cultural effects of the proposal. However, to the extent that cultural values may align with water quality and ecological effects, addressing these matters will to some degree also avoid, remedy or mitigate cultural effects.

Federation Mining has engaged with Te Rūnanga o Ngāti Waewae regarding this proposal. Key matters which have been discussed relate to the effects of the proposal on water quality and instream values of the Snowy River. Te Rūnanga o Ngāti Waewae sought assurance from Federation Mining that existing water quality compliance limits would be maintained as a result of the processing plant and tailings disposal within the site.

Federation Mining is committed to achieving these limits via the revised water treatment system, including the water treatment plant and secondary treatment ponds. Aquatic ecology values within the Snowy River are expected to be maintained as a result of ongoing compliance with these limits.

7. MANAGEMENT AND MONITORING OF ACTUAL AND POTENTIAL EFFECTS

Section 6 of this AEE provides an assessment of the actual and potential effects of the proposed Snowy River Mine development, based on the various technical assessments commissioned by Federation Mining.

This assessment includes consideration of the positive effects associated with the project, which will include economic benefits for the West Coast region, including providing employment, incomes and expenditure. It is anticipated an additional 100 jobs will be established throughout the construction and operation of the Snowy River Mine and there will be increased economic activity in the region.

With respect to potential adverse effects on the environment, it is considered that the proposal can be undertaken in a manner that will appropriately avoid, remedy, mitigate or offset adverse effects to ensure that the sustainable management purpose of the Act is achieved.

In this regard, there is potential for amenity related to effects (e.g. visual, noise, traffic and air quality effects) to arise throughout the development and operation of the mine. However, Federation Mining will undertake mining activities in accordance with the best practicable option to avoid or mitigate any effects that are associated with the Snowy River Mine development, and in accordance with a range of consent conditions which will limit the potential for adverse effects on the environment and which, in many instances, align with the existing resource consents. A number of management plans will also be utilised to ensure Federation Mining undertakes practicable measures to minimise any potential disturbance or risk of adverse effects from the project.

As outlined in Section 4.2, Federation Mining engaged PDP to complete the design and geotechnical work necessary to support the development of the processing plant and the additional tailings storage within the waste rock stack. MWM have assisted in characterising the chemical composition of the tailings material and determining what level of treatment is required, and the resultant quality of the discharges from the site. A state-of-the-art water treatment plant, coupled with a passive treatment system being retained onsite, is being proposed as a result of this work. Changes to the WRS engineering design to prevent and suitably mitigate any potential adverse effects (e.g. the addition of a liner) are also being proposed.

Ryder has also provided an assessment of the discharges reporting from the site to the Snowy River and has determined that the current consent limits can be appropriately carried forward, with new limits on additional parameters of potential concern, in order to maintain water quality and a healthy aquatic life in the Snowy River.

The key management measures proposed by Federation Mining are summarised further in Table 14 below. In many instances these require ongoing compliance with the existing consented obligations.

Table 14: Summary of key management and monitoring measures for the Snowy River Mine.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
Landscape and Visual Amenity		
Potential landscape and visual amenity effects of the WRS.	Design of the WRS appearance to be as "natural" as can be achievable. Progressive rehabilitation of the WRS, potentially planting the steeper areas in woody shrubs and flax species.	Engineering design of the WRS to appear more stepped and "natural" in the environment. Monitor rehabilitation success and adapt method if necessary.
Potential landscape and visual amenity effects of the processing plant.	Planting of the processing plant in dark green or grey shades so as to blend the facility into the forested backdrop.	Upon closure and rehabilitation of the site, existing infrastructure, including the processing plant, shall be removed from the site.
Noise		
Potential for increased noise at the nearest residential properties during the construction phase and from the processing facility.	The adoption of the best practical options. Engagement with the community when construction commences and when large deliveries may occur. Noise will comply with the relevant noise standards of the Buller District Plan and the limits of the existing land use consent. Noise limits of the processing facility will be compliant with health and safety requirements.	Monitoring requirements. Conditions regarding hours of operation and noise limits.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
Traffic		
Potential for an increased volume of heavy vehicle movements during the construction phase.	Construction of passing bays (check still occurring) on Snowy River Road.	Monitoring of the condition of Snowy River Road during the construction phase and remedy any effects identified.
Potential for construction traffic outside of normal operating conditions.	A temporary traffic management plan will be implemented, outlining any measures along Snowy River Road and at the SH7 intersection.	Monitoring and management of conditions will be set out in the traffic management plan and the plan will be approved by BDC and Waka Kotahi.
Potential for truck movements to conflict with school buses.	Trucking operations will be scheduled around the school bus timetable, so trucks are not using Snowy River Road when the school bus is on the road.	Conditions regarding truck movement schedules. The proposed variation also confirms a reduction in the number of heavy vehicle movements during the operation of the mine.
Water Quality		
Potential for water quality in the receiving watercourses to be adversely affected by discharges of contaminants from the proposal.	Construction and operation of a water treatment plant. Construction and operation of secondary passive water treatment pond system. Onsite measures to prevent erosion and generation of leachates and to appropriately contain and /or treat contaminants prior to discharge. Ongoing monitoring of water quality in the receiving environment to confirm projections for water quality.	Conditions requiring water quality monitoring of the silt ponds, ground water and surface water. Conditions requiring compliance with water quality standards in the Snowy River. Conditions requiring a water quality management plan to address required actions in the event of water quality non-compliance.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
	Liner and engineering design/construction methodologies of the waste rock stack construction to improve seepage water quality.	
Groundwater		
Potential for groundwater quality to be adversely affected by seepage of contaminants and leachate from the WRS and treatment ponds.	WRS design, including underdrains and liner to avoid seepage ingress and potential groundwater contamination.	Conditions requiring compliance with water quality standards in the Snowy River.
Aquatic Ecology		
Potential for nuisance growths to arise within the downstream river environment.	Adherence to best practice explosive use to minimise excessive nitrogen compounds being released into the surrounding environment. Water treatment system including a secondary treatment pond to reduce nitrate and ammonia loads within the discharge.	Conditions requiring compliance with water quality standards in the Snowy River. Monitoring obligations as per the current consent (RC13042 -12) with respect to water quality, sediment and aquatic biology. If non-compliance with the limits is detected, or nuisance growths develop as a result of the mining activity, Federation Mining will investigate adding additional treatment facilities to the WTP to further reduce nitrogen and ammonia levels in the discharge.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
Air Quality		
Potential for dust to be discharged to the surrounding environment from general activities.	Site design to maximise buffer distances. Minimising area of unconsolidated surfaces. Haul roads formed and maintained well. Minimise travel distances on internal haul roads. Onsite speed limit 15km/hr. Regular water truck application on haul roads or fixed k-line watering system. The use of bunds to minimise wind exposure. Chemical stabilisation of stockpiles and roads to minimise dust emissions. Wheel wash facilities. Truck loads covered.	A comprehensive dust and meteorological monitoring programmes will be implemented. This monitoring programme will provide real-time information to the site operators on when high risk dust conditions occur and allow timely and reactive mitigation measures to be implemented. Compliance with currently consented limits regarding the discharges of dust from the site. An Air Quality Management Plan will be put in place that ties the mitigation measures and environmental monitoring programme together into an effective and auditable package.
Potential for contaminants to be discharged from the processing plant, adversely effecting human health, the amenity and ecology of the surrounding environment.	Ore crusher fitted with high pressure low volume misting system. All, where practical, bulk materials/reagents handled and stored indoors. Limiting the height and slope of material stockpiles. Covering or watering conveyors and minimising drop heights from conveyors. Covering or filtering hopper inlets and outlets.	The implementation of dust and meteorological monitoring programme and an air quality management plan to monitor the effectiveness of the mitigation measures.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
	HCN gas sensors on critical stages of ore processing and HCN destruction. Waste tails from the HCN detoxification plant are bound into a paste and stored in mine. Filters/mitigation measures on the Electrowinning and smelting processes to minimise the amount of contaminants discharged to air. To ensure adequate dispersion of the exhaust gases and reduce the risk of any potential adverse effects to less than minor, the combustion gases from these four sources will be discharged from stacks that are at least 1.5 times the height of any structures within a 50m radius of each respective burner. Regular (annual) burner combustion efficiency testing and tuning. Regular (annual) stack testing to quantify amounts of contaminant discharges from Electrowinning and smelting processes.	
Potential for contaminants to be discharged from the process tails cells, adversely effecting human health, the amenity and ecology of the surrounding environment.	Tails placed and compacted in 0.5-1.0m layers and up to 4.5m high lifts. Limiting total area of uncapped tails cells to 0.25 ha at any one time. Mobile water truck system to dampen surface of waste cells. Processing tails cells within waste rock pile shielded from wind by bunds, shipping containers or wind barrier fences.	The implementation of dust and meteorological monitoring programme and an air quality management plan to monitor the effectiveness of the mitigation measures.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
	Automated sprinkler system fitted to bunds shipping containers or wind barrier fences surrounding processing tails cells. Interim capping/cover over cells. Capping when cell is full.	
Potential for contaminants to be discharged during the bulk material handling, adversely effecting human health, the amenity and ecology of the surrounding environment.	Material handling procedures to minimise the frequency and volume of stockpile material disturbances. Minimise drop heights. Eliminate overloading of trucks and other machines. Cover truck loads when material has high dust potential. Containing emissions from opening and handling bulk reagents.	The implementation of dust and meteorological monitoring programme and an air quality management plan to monitor the effectiveness of the mitigation measures.
Heritage		
Accidental discovery and disturbance of archaeological items.	Use of appropriate accidental discovery protocols.	Conditions relating to accidental discovery protocol.
Hazardous Substances		
The release of hazardous substances into the environment or adverse effects on human health.	All hazardous substances will be stored in an approved and bunded containment in accordance with the relevant New Zealand Standards and Codes of Practice and the Health and Safety at Work (Hazardous Substances) Regulations 2017. Refuelling, lubrication and any mechanical repairs will be undertaken in a manner that provides sufficient mitigation	Conditions managing the use and storage of hazardous substances on-site.

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action
	measures to ensure that no spillages onto the land surface or into water occur. All fuels and oils used at the site will be contained in appropriately bunded or double skinned facilities and that all fuel/oil dispensers are fitted with non-return valves.	
Post-Closure Effects		
Risk of Federation Mining defaulting on its rehabilitation obligations.	The combination of the Project Overview and Annual Work and Rehabilitation Plan, contingency plan, and the bonds ensures that rehabilitation and closure of the site will occur under all circumstances, and that the costs associated with both the rehabilitation of the land and its long-term management will be met.	Existing bond conditions for rehabilitation.
Risk of WRS slope failure.	The geotechnical reports outline that the WRS design is appropriately stable in the long term.	WRS stability monitoring during operation.
Risk of water quality decline in receiving environment as a result of long-term discharges from site.	Water quality monitoring in receiving environment.	Monitoring of water quality, sediment and aquatic biology as per the current consent conditions. Bond conditions.

8. CONSULTATION

8.1 STATUTORY MATTERS

Consultation in the RMA sense has been clearly articulated through case law over time as follows[9]:

> *"Consulting involves the statement of a proposal not yet finally decided upon, listening to what others have to say, considering their responses and then deciding what will be done".*

and

> *"(i) The nature and object of consultation must be related to the circumstances.*
>
> *(ii) Adequate information of a proposal is to be given in a timely manner so that those consulted know what is proposed.*
>
> *(iii) Those consulted must be given a reasonable opportunity to state their views.*
>
> *(iv) While those consulted cannot be forced to state their views they cannot complain, if having had both time and opportunity, they for any reason fail to avail themselves of the opportunity.*
>
> *(v) Consultation is never to be treated perfunctorily or as a mere formality.*
>
> *(vi) The parties are to approach consultation with an open mind.*
>
> *(vii) Consultation is an intermediate situation involving meaningful discussions and does not necessarily involve resolution by agreement.*
>
> *(viii) Neither party is entitled to make demands.*
>
> *(ix) There is no universal requirement as to form or duration.*
>
> *(x) The whole process is to be underlain by fairness."*

Although there are no specific statutory requirements for consultation under the RMA[10], Federation Mining has undertaken an extensive and considered programme of consultation. It also makes sense to conduct a careful and strategic consultation process that informs the AEE. The Fourth Schedule, Clause 6(1)(f) of the RMA requires that an AEE must include identification of the persons affected by the activity, any consultation undertaken and any response of the views of any person consulted. As such, this information is included below. Although the applications are being made by OceanaGold, as Federation Mining is leading development of the Snowy River Mine, the consultation has been undertaken by Federation Mining.

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[9] West Coast United Council v Prebble (1988) 12 NZTPA 399.

[10] Reference to consultation is set out in the Fourth Schedule (persons affected by the application must be identified, any consultation undertaken, and any response to the views of any person consulted must be set out), and with reference to section 8 – Treaty of Waitangi.

8.2 CONSULTATION PROCESS

Federation Mining commenced consultation with key stakeholders, neighbours and members of the community in 2021. A record and summary of key consultation events is set out below.

8.3 LOCAL COMMUNITY

Notification of community meetings held were shared via local papers in Reefton, Westport and Greymouth. Notice of community meetings were also shared via the Federation Mining website, LinkedIn page and via a stakeholder email distribution list. Face-to-face community meetings were held in Reefton and in Ikamatua in December 2021. 35 participants were in attendance across both these meetings. Another community meeting was held in Reefton on 3 May 2022. This was attended by over 40 people. No concerns were raised regarding the consenting process during this meeting, and questions were focused on operational and economic matters relating to the mining activity more generally (e.g., potential employment prospects).

8.4 OCEANAGOLD

Federation Mining has consulted with OceanaGold as the existing resource consent holder. This has included providing OceanaGold with weekly and monthly reports, holding formal quarterly meetings (held on the 7/03/2022) and recording minutes of these meetings.

8.5 DEPARTMENT OF CONSERVATION

Consultation was initiated with DoC by providing a project overview with the National level office. The case number for interactions with DoC was RC2368. Email interaction with the Reefton Community Ranger occurred on 07/03/2022 and a Microsoft Teams meeting was held on the 10/03/2022 for an initial meeting and overview of the project. No issues have been raised specifically around this consent process.

8.6 FISH AND GAME

Consultation in regard to this proposal with Fish and Game has been made with Dean Kelly, who is based on the West Coast. Dean Kelly was contacted on 06/04/2022 via email to organise a briefing session. Information on the proposal was provided to Fish and Game and no questions or request for further information have been received.

8.7 IWI

A good working relationship has been established with Te Rūnanga o Ngāti Waewae. Consultation with Iwi commenced in August 2021 and regular sessions have been held to update Chairperson, Francois Tumahai, on 08/09/2021, 06/10/2021, 02/11/2021, 10/02/2022 and 19/04/22.

8.8 LAND HOLDER – GRANVILLE MINING

As mentioned earlier, there is an access arrangement which provides Federation Mining with access onto the land. The landholder is briefed on the mining activity and status of the application on a regular basis. No issues with the existing operation or current proposal have been raised. The affected party approval of the landowner has also been sought as part of this application. A copy of this signed form is attached as **Appendix L**.

8.9 LOCAL LANDOWNERS

Contact has been made with the following local landowners regarding this proposal:

Table 15: Consultation Record with Local Landowners / Neighbours

Landowner	Progress	Details
Brett & Vanessa Hampton 41 Snowy River Road	In progress	Message left on voice mail Emailed with a follow up Emailed on the 14/3/22 acknowledging complaint and opening discussion on driveway Emailed 15/03/22 in relation to road use compliant Face-to-Face meeting held on the 31/3/2022 attended by VP, GM and HSEC Advisor – additional actions undertaken to resolve road related concerns (e.g. staff education about speed limits, additional signage and monitoring)
Ross Lemon 265 Mossey Creek Road	In progress	Initial contact 01/03/2022 Meeting 04/03/2022 – Generally supportive and would like assistance with mobile equipment for river bank repair
Gaylene Sweeney 9 Mossey Creek Road	Planned	Initial contact 1/3/22 Planned meeting in May 2022
Roger & Beverly Fleming Snowy River Road	In progress	Initial contact 1/3/22
Geoff Collis 144 Snowy River Road	In progress	Initial contact 1/3/22 Planned meeting set up

8.10 WAKA KOTAHI

Initial discussions commenced with the Christchurch Regional Office in September 2022. The matter was then transferred to the local Greymouth office to follow up. Additional information was requested by Waka Kotahi to help inform their review of the proposal in February 2022. All necessary information has been provided by Federation Mining and to date no issues or further consultation has been requested by the transport agency.

8.11 WEST COAST REGIONAL COUNCIL

Consultation with the West Coast Regional Council commenced in September 2021. Regular updates have been provided to key WRC consenting staff and executives.

8.12 BULLER DISTRICT COUNCIL

Consultation with the Buller District Council commenced in September 2021. Regular updates have been provided to key BDC consenting staff and executives.

8.13 HERITAGE NEW ZEALAND POUHERE TAONGA

Initial contact was made by Federation Mining in September 2021. The draft Heritage Report was reviewed by staff, and additional information on the previous OceanaGold application was requested and subsequently provided. Federation Mining understands that the current view of the application is “neutral” subject to all information being provided as requested. All information requests have been satisfied in this regard.

8.14 NOTIFICATION ASSESSMENT

It is assessed (see below) that the proposal does not meet any requirements of section 95A of the RMA requiring that it is notified for either the Buller District Council consents or the West Coast Regional Council consents. The assessment below also confirms that limited notification is not required under section 95B.

It is noted that the existing consents which have been obtained by OceanaGold for the development of the Snowy River Mine were processed on a limited notification basis. The only new activity being proposed as part of this application is the processing plant, which in turn necessitates amendments to the WRS engineering design and onsite contamination control. Federation Mining is however seeking to manage these inputs via comprehensive onsite management and treatment systems to ensure discharges leaving the site remain within consented limits. The technical reports commissioned by Federation Mining confirm that the effects of these activities will be no more than minor, and in some respects positive when compared to the currently consented activities. In this respect there is no change or increase in the scale of adverse effects and for this reason it is deemed appropriate to process this application on a non-notified basis.

8.14.1 Section 95A Public Notification

Whether the applications to these councils should be subject to public, limited or non-notification has been considered in accordance with sections 95A-E of the RMA.

It is considered that both the Buller District Council and West Coast Regional Council applications do not need to be publicly notified under s95A for the following reasons:

- No mandatory requirements for public notification apply (Step 1):[11]
  - The applicant has not requested public notification of the application (s95A(3)(a)).
  - The application does not include exchange to recreation reserve land under section 15AA of the Reserves Act 1977 (s95A(3)(c)).
- Public notification preclusions do not apply to this activity (Step 2):
  - Public notification is not precluded by any rule or national environmental standard (s95A(5)(a)).
  - The proposal includes the following activities: Non-complying land use consent from Buller District Council and discretionary activity discharges, water permits and land use from Otago Regional Council and is not an activity listed in s95A(5)(b)(i) – (iv). Therefore, the application is not precluded from public notification by any requirement of Step 2.
  - S95A(6) is not relevant to this application.
- Public notification is not required in this circumstance (Step 3):
  - This is not an application for 1 or more activities where any of those activities are required to be publicly notified by a rule or a national environmental standard.
  - The assessment of environmental effects (section 6) concludes that there are no effects on the environment that are more than minor as a result of the proposal. Furthermore, under section 95A(8)(b), in deciding if the activity will have adverse effects on the environment that are more than minor, the test under section 95D applies. Section 95D(a) says that effects on persons who own or occupy the land in, on, or over which the activity will occur, or any land adjacent to that land, will be disregarded. Therefore, public notification is not required pursuant to s95D for either the Buller District Council application or the West Coast Regional Council application.
- Public notification in special circumstances (Step 4):
  - There are no special circumstances in relation to this application.

[11] Public Notification will likely not be required in terms of refusal to provide further information or refusal of the commissioning of a report under section 92(2)(b) of the Act (s95A(3)(b)). The applicant will provide this information if requested by council.

- In considering whether special circumstances apply to warrant notification of an application, it is noted that special circumstances:
  - Are unusual or exceptional but may be less than extraordinary or unique;
  - Are unlikely to be justified where there is no evidence of adverse effects likely to arise from an activity; and
  - Can be applicable if the proposal is unusual or exceptional (which this proposal is not). The proposal is to enable the ongoing development of an underground mine and to dispose of waste rock within previously disturbed land close to the processing plant. The assessment undertaken in Section 6 and in the technical reports attaching to this application confirm that the adverse environmental effects arising from this proposal are no more than minor. In large part, this is due to the existing environment which is subject to current consents which authorise the underground mining, establishment of the WRS, other supporting infrastructure and an onsite water management system that already authorises discharges to land and to the Snowy River. This proposal will not result in adverse cumulative or additional effects on the receiving environment to the extent that these are more than minor as the proposal can be managed so that the site remains compliant with existing and acceptable environmental thresholds and parameters (e.g noise limits and water quality). In many respects, the technical assessments conclude that there will be positive effects as a result of this proposal, compared to the currently consented environment.

Therefore, public notification of the application by Buller District Council or West Coast Regional Council is not required.

8.14.2 Limited Notification

It is further assessed that neither the Buller District Council application or West Coast Regional Council application need to be limited notified under section 95B for the following reasons:

- Limited notification is not required as the proposal does not affect customary rights groups or customary marine title groups (Step 1).
- The application is not precluded from limited notification by a rule in the District Plan, the Regional Plan or an NES (Step 2).
- There are no affected parties as determined in the section below (s95E Affected Person Assessment) (Step 3).

8.14.3 (s95E) Affected Person Assessment

8.14.3.1 Landowner and Neighbours

The adverse effects of the proposal on surrounding landowners are expected to be similar to, or less than the existing consented environment. Therefore, there are no directly affected parties because of this application. The affected party approval of Granville Mining Limited as landowner of the site has also been obtained.

Due to the processing now being undertaken within the site, there will be less heavy vehicle movements to and from the site than what can occur under the current consent conditions. This is considered a positive effect for local landowners along Snowy River Road. Ongoing and proposed controls in terms of driver awareness, speed controls and other changes to the roading environment (e.g. passing lanes, signage) will also assist in mitigating any potential effects from increased light vehicle movements as a result of what is now being proposed.

When compared to the existing environment, noise effects will not be significantly altered as a result of the addition of the processing plant activity. Compliance with existing conditions will also continue to be achieved.

From a landscape and visual perspective, the effects of the proposal when compared against the existing consented environment, are assessed as being minor or less, and there are no directly affected parties in this regard.

8.14.3.2 The Department of Conservation ("DoC")

The effects of the proposal on DoC's interests (indigenous species and habitat values) are considered to be less than minor (due to there being less than minor effects on indigenous terrestrial ecology and no expected effects of the proposal on water quantity or quality (and resulting aquatic ecology) within Snowy River which would exceed the existing consented effects. Federation Mining also discussed the proposal to discharge paste back underground as part of the tailings management for the site. DoC did not raise any particular issue with this proposal. On this basis, the proposal will not have any effects on DoC land or interests that would require or reasonably justify giving them an affected party status in accordance with section 95E of the RMA.

8.14.3.3 Iwi

Te Rūnanga o Ngāti Waewae is identified as having Mana Whenua status for the area of land in which the Snowy River Mine is located. As such, consultation with Te Rūnanga o Ngāti Waewae is particularly important and has been carried out over a number of months by Federation Mining prior to lodging the application. Te Rūnanga o Ngāti Waewae has expressed its support for the ongoing development of the Snowy River Mine within the currently consented environmental limits which will continue to be adhered to under this

proposal. Given this, Federation Mining do not consider that the effects of this proposal are such that there are any directly affected parties, however, Federation Mining is committed to engaging with iwi throughout the application process and ongoing operation of the mine site.

A copy of the final draft AEE was provided to Te Rūnanga o Ngāti Waewae prior to lodgement with the West Coast Regional and Buller District Councils. Federation Mining understands that Te Rūnanga o Ngāti Waewae will provide feedback on the technical material and AEE. This may include provision of its affected party approval. Any relevant written comments received from Te Rūnanga o Ngāti Waewae will be provided to the Councils if Federation Mining receives these.

8.14.3.4 Fish and Game

The effects of the proposal on Fish and Games' interests (sport fish habitat) are considered to be less than minor due to there being less than minor effects on trout and salmonid habitat and no expected effects of the proposal on water quantity or quality (and resulting aquatic ecology) within Snowy River which would exceed the existing consented effects. Limits on potential nutrients within the discharge are proposed and Federation Mining will manage the site so as to ensure compliance with these. Compliance with these limits is appropriate to protect the instream values of the Snowy River.

9. STATUTORY ASSESSMENT

9.1 INTRODUCTION

The RMA is the principal statutory document governing the use of land, air and water. The purpose of the RMA is to "*promote the sustainable management of natural and physical resources*". This section of the AEE sets out the framework under the RMA that applies to the resource consents that are being sought from West Coast Regional Council and Buller District Council.

9.2 INFORMATION REQUIREMENTS

Section 88(2) of the RMA stipulates that a resource consent application must be made in the prescribed form and manner. It must also include an assessment of environmental effects in such detail as corresponds with the scale and significance of the effects that the activity may have in accordance with Schedule 4 of the RMA.

The resource consent application for the Snowy River Mine development is in the prescribed form as set out in Form 9 of Schedule 1 to the Resource Management (Forms, Fees, and Procedure) Regulations 2003.

With respect of the information requirements in Schedule 4 of the RMA, it is noted that Clauses (2), (3), (6) and (7) specify information requirements that are directly relevant to the

resource consent applications required for the Snowy River Mine project. These matters have been addressed throughout this AEE and in the relevant technical assessments.

9.3 SECTION 104 OF THE RESOURCE MANAGEMENT ACT 1991

Section 104 of the RMA lists the matters that a consent authority must, subject to Part 2, have regard to in determining whether a resource consent application should be granted. It states:

> *(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–*
>
> *(a) any actual and potential effects on the environment of allowing the activity; and*
>
> *(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
>
> *(b) any relevant provisions of—*
>
> *(i) a national environmental standard:*
>
> *(ii) other regulations:*
>
> *(iii) a national policy statement:*
>
> *(iv) a New Zealand coastal policy statement:*
>
> *(v) a regional policy statement or proposed regional policy statement:*
>
> *(vi) a plan or proposed plan; and*
>
> *(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*
>
> *(2) When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.*
>
> *(2A) When considering an application affected by section 124 or 165ZH(1)(c), the consent authority must have regard to the value of the investment of the existing consent holder.*

Section 104 of the RMA does not give any of the matters to which a consent authority is required to have regard primacy over any other matter. All of the relevant matters are to be given such weight as the consent authority sees fit in the circumstances, and all provisions are subject to Part 2 of the RMA - although it is understood that a consent authority is not required to consider Part 2 of the RMA beyond its expression in the relevant statutory planning documents.

The matters for consideration under Section 104(1)(a), (ab), (b) and (c) of the RMA are assessed in the sub-sections below.

9.3.1 Actual and Potential Effects

In accordance with section 104(1)(a), an assessment of actual and potential effects has been undertaken in Section 6 of this report and in the technical assessments commissioned by Federation Mining, which concludes that adverse effects are no more than minor. All adverse effects can be addressed via avoidance, remediation and mitigation. An assessment against the matters in section 104(1)(b) is provided below.

9.3.2 Measures Proposed to Offset or Compensate for Any Adverse Effects on the Environment

Section 104(1)(ab) requires decision makers to have regard to "*any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity*". The additional compensatory measures, relating to tree planting initiatives and other carbon reduction initiatives, being proposed by Federation Mining are described in Section 3.9.

9.4 RELEVANT STATUTORY PLANNING DOCUMENTS

In terms of Section 104(1)(b) of the RMA, the following sections provide an assessment of the activities associated with the proposed development of Snowy River Mine against the:

- The National Policy Statement for Freshwater Management ("**NPSFM**");
- The Resource Management (National Environmental Standards for Freshwater) Regulations 2020 ("**NES Freshwater**)";
- Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 ("**NESCS**");
- Resource Management (National Environmental Standard for Sources of Human Drinking Water) Regulations 2007 ("**NESHDW"**);
- Resource Management (National Environmental Standard for Air Quality) Regulations 2004 (**NESAQ**);
- The West Coast Regional Policy Statement (**Operative RPS**);
- The West Coast Regional Air Quality Plan;
- The West Coast Regional Land and Water Plan; and
- The Buller District Plan.

An assessment of the project against the relevant provisions of these statutory planning documents and regulations is provided in the sub-sections below.

9.5 NATIONAL ENVIRONMENTAL STANDARDS

National environmental standards prescribe standards for environmental matters in accordance with section 43 of the RMA. Each local authority must administer the national environmental standards. Where specified, a local authority can impose stricter or more lenient standards than those set out in a national environmental standard.

The national environmental standards potentially relevant to this project are discussed in the sub-sections below.

9.5.1.1 National Environmental Standard for Air Quality

The NESAQ sets out ambient air quality standards for a number of contaminants for the protection of public health - including fine particulates (PM_{10}), sulphur dioxide (SO_2), carbon monoxide (CO) and nitrogen dioxide (NO_2). It applies where people are likely to be exposed for periods commensurate with the relevant assessment averaging period. The NESAQ also includes concentration limits and the specified number of occasions that those concentration limits may be exceeded within any year.

The Air Discharge Report in **Appendix J** concludes that the concentrations of PM_{10}, NO_2, CO and SO_2 associated with any air discharges from the project and the existing mining operations are expected to remain within the relevant standards.

As such, the NESAQ is not an impediment to the granting of the air discharge permits required for the project.

9.5.1.2 National Environmental Standard for Assessing and Managing Contaminants in Soil

The NESCS seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed before it is developed. If necessary, affected land will need to be remediated or the contaminants contained to make it safe for human use.

Mining industries are included on the Hazardous Activities and Industries List ("**HAIL**"), although it is understood that the continuation of existing uses is not affected by the NESCS. Notwithstanding this, OceanaGold obtained a consent under the NESCS, and as such this consent remains applicable.

9.5.1.3 National Environmental Standard for Sources of Human Drinking Water

The NESHDW sets requirements for the protection of sources of human drinking water from contamination. A human drinking water source is a natural water body that is used to supply a community with drinking water. There are no drinking water supplies that will be affected by this project.

9.5.1.4 National Environmental Standard for Freshwater

The NES Freshwater sets standards to regulate activities that pose a risk to the health of freshwater and freshwater ecosystems. The proposal will not affect any natural inland wetlands, nor does it propose to reclaim any watercourse. The NES Freshwater is therefore not affected by this application.

9.6 NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT

Central to the NPSFM is the concept of Te Mana o Te Wai, which is described as:

> *"a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community."*

Te Mana o Te Wai encompasses six principles relating to the roles of tangata whenua and other New Zealanders.

Aligned to these principles is a hierarchy of obligations that prioritises:

- First, the health and well-being of water bodies and freshwater ecosystems;
- Second, the health needs of people (such as drinking water); and
- Third, the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future.

The sole objective of the NPSFM reflects this hierarchy of obligations and states:

> *...to ensure that natural and physical resources are managed in a way that prioritises:*
>
> *(a) first, the health and well-being of water bodies and freshwater ecosystems*
>
> *(b) second, the health needs of people (such as drinking water)*
>
> *(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future*

In respect of the NPSFM policies, those of most relevance to this proposal are discussed in detail below.

9.6.1 Policies 1 and 2

Policy 1 of the NPSFM seeks to ensure that freshwater is managed in a way that gives effect to Te Mana o te Wai. Policy 2 seeks to ensure that tangata whenua are actively involved in freshwater management and Māori freshwater values are identified and provided for.

As concluded in the AEE, through the onsite avoidance and mitigation strategies that are being proposed by Federation Mining, the health of the Snowy River is being protected.

Federation Mining continues to work with tangata whenua regarding the development of the Snowy River Mine including the proposed activities being sought as part of this application. Through this consultation process, the extent to which the project protects the mauri of the wai and restores and preserves the balance between water, the environment and community, will be established.

9.6.2 Policy 5

Policy 5 of the NPSFM requires that freshwater is managed in an integrated way that considers the effects of the use of land and development of land on a whole catchment basis, including the effects on the receiving environments.

The proposed water treatment will ensure that water quality outcomes already deemed acceptable for the site will be maintained. The assessment also confirms that the water quality downstream in the catchment is predicted to sit comfortably within the NPSFM Attribute Band B with regard to nitrogen. Ryder confirms that this limit is acceptable on the basis that the limit will provide ample protection for the aquatic community in the Snowy River catchment (it is far below species toxicity levels). Federation Mining is committed to ensuring ongoing compliance with these recommended limits through onsite management of blasting, as well as active and passive water treatment.

While this policy is focused on actions to be undertaken by the Regional Council, it is noted that the technical assessments commissioned by Federation Mining have considered the actual and potential effects of the project on land and freshwater resources in an integrated manner. This includes considering the potential effects of sedimentation, seepage and runoff from the mining activities and the WRS, both in terms of water quality and aquatic ecology.

9.6.3 Policy 6

Policy 6 of the NPSFM seeks to ensure that there is no loss to the extent of natural inland wetlands and that their values are protected. Policy 6 also promotes the restoration of natural inland wetlands.

There are no natural wetlands within the project area footprint. Accordingly, the proposal will not be inconsistent with this policy.

9.6.4 Policy 7

Policy 7 of NPSFM seeks to ensure the loss of river extent and values is avoided to the extent practicable. This is supported by clause 3.24 of the NPSFM which requires Regional Councils to include a new provision in their regional plans which guides how this policy will

be implemented at a regional level.[12] Collectively these provisions direct that river loss be avoided, unless:

- There is functional need to locate the activity in a way that causes loss of river extent and values; and
- If a functional need exists, the effects of the activity are managed in accordance with the effects management hierarchy described in the NPSFM. Specifically, the hierarchy requires:
    - Adverse effects are avoided where practicable;
    - Where adverse effects cannot be avoided, they are minimised where practicable;
    - Where adverse effects cannot be minimised, they are remedied where practicable;
    - Where more than minor residual effects cannot be avoided, minimised or remedied, aquatic offsetting is provided where possible;
    - If aquatic offsetting of more than minor residual effects is not possible, aquatic compensation is provided; and
    - If aquatic compensation is not appropriate, the activity itself is avoided.

When implementing and evaluating an application against the effects management hierarchy, Clause 3.24(3) of the NPSFM directs that the hierarchy be applied to any loss of extent or values associated with (but not limited to) ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values and amenity.

The proposal does not result in the physical loss of any instream extent. The proposed activities may however impact on values within the river, by affecting flows within the Snowy River, and by discharging treated water to groundwater and surface water. In accordance with this policy requirement, the adverse effects on river values are being avoided, or minimised by:

- In the first instance avoiding potential effects of instream values by not having a direct discharge into the Snowy River.
- Lining the WRS and intercepting potentially contaminated water from within the WRS and diverting it to the water treatment plant and secondary treatment ponds for treatment prior to discharge to the Snowy River. Similarly, runoff from the site will be captured by perimeter drains and collection ponds, prior to being diverted to the water treatment plant and ponds prior to discharge to the Snowy River.

[12] Policy 3.A.3, Waikato Regional Plan.

- The diversion of groundwater and surface runoff in this manner will minimise the potential for uncontrolled or seepage flows into these sources from the WRS and other worked areas throughout the mine site.
- Treating water as part of a comprehensive site water treatment facility including plant and passive pond systems.
- Maintaining compliance with water quality limits for potential contaminants of concern within the Snowy River, including additional contaminants identified as part of this application (e.g. nitrates).

Ultimately, with these measures in place, it is considered that there will be no loss of instream values as a direct result of this proposal.

9.6.5 Policies 9 and 10

Protection of habitats of indigenous freshwater species, trout and salmon is the focus of Policies 9 and 10 respectively.

Sediment and erosion control measures will be put in place throughout the duration of the works within the site to ensure that sedimentation and turbidity issues do not arise within waterbodies where indigenous freshwater species and trout could be present. Any sediment laden water from within the site will also be directed to the water treatment plant and ponds for treatment prior to discharge to the Snowy River.

Compliance with the water quality limits for key contaminants of potential concern in the Snowy River is also being proposed. This will ensure that the health of the Snowy River aquatic ecosystem is maintained.

9.6.6 Policy 11

The efficient use of freshwater, the phasing out of existing overallocation and the avoidance of future overallocation is the focus of Policy 11 of the NPSFM.

The site is already authorised to take water from the Snowy River. No changes to this consent are being sought as part of this proposal.

In terms of water quality impacts, it is noted that the discharges from the site will remain compliant with accepted water quality limits. The technical reports confirm these limits as being appropriate for the downstream receiving environment and will not result in an 'overallocation' in terms of downstream effects on water quality.

9.6.7 Policies 13 and 14

Water quality monitoring will continue in accordance with the current consent requirement. This monitoring will provide ongoing data to ensure that the proposal is being managed in a manner that aligns with policies 13 and 14 of the NPSFM. These policies seek the

monitoring of freshwater bodies and ecosystems and intervention to reverse deteriorating trends, and the provision of information about the state of waterbodies and challenges to their health and wellbeing that will be reported on and published. This aspect of the project is therefore considered to be consistent with this policy directive.

9.7 OPERATIVE REGIONAL POLICY STATEMENT

9.7.1 Introduction

The West Coast Regional Policy Statement became operative on 24 July 2020. The objectives and policies relevant to this project are outlined in the sub sections below.

9.7.2 Chapter 5: Use and Development of Resources

The objectives and policies relating to the use and development of resources seek the following outcomes:

- To recognise the central role of resource use and development on the West Coast to provide for the social, economic and cultural wellbeing of West Coast communities.[13]
- Manage the conflicts that arise from the use, development and protection of natural and physical resources.[14]
- Managing new activities to retain the potential future use of land with significant mineral resources.[15]

The ongoing development of the Snowy River Mine is consistent with these objectives and policies because there will be a number of social and economic benefits that arise from the construction and operation of the mine, as outlined above, and this will benefit the Buller District and wider West Coast community.

9.7.3 Chapter 7A: Natural Character

Relevant provisions within Chapter 7A seek to:

- Protect the natural character of the region's rivers and their margins from inappropriate use and development.[16]
- Provide for appropriate development to enable people and communities to maintain or enhance their economic wellbeing.[17]

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13 Objective 1, Chapter 5, RPS.

14 Objective 2, Chapter 5, RPS.

15 Policy 2(b)(i), Chapter 5, RPS.

16 Objective 1, Chapter 7A, RPS.

17 Objective 2, Chapter 7A, RPS.

In accordance with these matters:

- Natural character of the Snowy River will be protected by the onsite water treatment system which will ensure compliance with the water quality limits for the site. These limits will protect instream values within the Snowy River.
- Continuation of the development of the underground mine and processing activities will assist in providing for the economic wellbeing of people and communities. It is also considered to be an appropriate development given that the location of the ore has driven the need to situate the mine in this particular location.
- Upon closure and rehabilitation of the site it is recommended that any passive water treatment system that may remain is integrated with the natural river environment as far as can be practicably achieved. This will be via removal of man-made structures, and naturalisation of ponds through enhanced planting.

9.7.4 Chapter 8: Land and Water

Objectives and policies within Chapter 8 relate to the following matters:

- Maintaining or improving the life-supporting capacity of freshwater.[18]
- Providing for a range of land and water uses to enable the economic, social and cultural wellbeing of West Coast communities while maintaining or improving water quality and aquatic ecosystems.[19]
- Integrated management.[20]
- To avoid, remedy or mitigate, any adverse effects to ensure that water quality and aquatic ecosystems are maintained or improved.[21]
- Maintain or improve water quality within freshwater management units.[22]
- Provide for the social, economic and cultural wellbeing derived from the use and development of land and water resources, while maintaining or improving water quality and aquatic ecosystems.[23]

In accordance with these directions:

- The technical assessments that have been commissioned by Federation Mining have considered the actual and potential effects of the project on physical and natural

[18] Objective 1, Chapter 8, RPS.

[19] Objective 2, Chapter 8, RPS.

[20] Objective 5, Chapter 8, RPS.

[21] Policy 1, Chapter 8, RPS.

[22] Policy 5, Chapter 8, RPS.

[23] Policy 8, Chapter 8, RPS.

resources in an integrated manner. This includes considering the potential effects of seepage and runoff from the activity on the surrounding water resources.

- Modelling has been completed which has enabled Federation Mining to test the impact of ongoing and future mine development on downstream water quality.
- These assessments have confirmed that with the water treatment measures that are being proposed as part of this application, water quality is expected to remain within compliance limits and within recommended acceptable environmental limits for the existing aquatic ecosystem health and wellbeing.
- Best practice management techniques are being employed to minimise the effects of the discharge of contaminants and sediment during construction and operation of the WRS and processing plant. With these measures in place, the construction and operation of mine will not adversely affect the Council's ability to maintain or improve water quality within the Snowy River catchment as part of its Freshwater Management Unit ("**FMU**") obligations.

9.7.5 Chapter 10: Air Quality

Chapter 10 matters which are relevant to this proposal relate to the following:

- Allowing discharges to air which are part of activities contributing to the social, economic, and cultural wellbeing of people and communities on the West Coast, while managing adverse effects of those discharges.[24]
- Managing discharges of contaminants to air using technology, codes of practice, industry standards and the best practicable option to minimise the adverse effects of the discharge.[25]

The assessment regarding air (refer to Section 6.12 of this AEE) concluded that any effects generated by all Snowy River Mine emission sources will be less than minor. The best practicable options will be used to mitigate the effects associated with the key sources of contaminants to air, to effectively minimise discharges to air.

An air quality management plan will be used to implement a comprehensive dust and meteorological monitoring programme to ensure discharges to air are appropriately managed throughout the construction and operation of the mine.

9.7.6 Chapter 11: Natural Hazards

The relevant objectives and policies in Chapter 11 seek to:

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[24] Objective 2, Chapter 10, RPS.

[25] Policy 2, Chapter 10, RPS.

- Minimise the risks and impacts of natural hazard events on people, communities, property, infrastructure and our regional economy.[26]

'Natural hazard' is defined in the RMA as any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire, or flooding), the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment. The proposal does not constitute a natural hazard, but it is noted that mining activities can potentially exacerbate natural hazard risks.

As set out in Section 4 of this AEE, the underlying geotechnical conditions, seismic and flood hazard profile of the area have an been accounted for in the conceptual design of the WRS in particular, such that this feature will not present an unacceptable or intolerable level of natural hazard risk.

It is acknowledged that the site is adjacent to the Snowy River, which potentially increases the likelihood of flooding risk for the site. Key site infrastructure such as the processing plant, portal and WRS will be located outside any flood risk areas, which will in turn minimise any flooding effects on these features.

9.8 WEST COAST REGIONAL PLANS

The regional plans that have been reviewed for the purposes of this assessment, are as follows:

- West Coast Regional Air Quality Plan
- West Coast Regional Land and Water Plan

9.8.1 Regional Air Quality Plan

The Regional Air Quality Plan became operative on 11 December 2001.

Objectives and policies of relevance seek to:

- Avoid, remedy or mitigate adverse effects on amenity values, human health and ecosystems arising from the discharges of odour and dust;
- Avoid, remedy or mitigate adverse effects from the discharge of products of combustion to air; and
- Promote the reduction of discharges of ozone depleting substances, and the reduction of greenhouse gases.

[26] Objective 1, Chapter 11, RPS.

Table 16: Assessment of the application against the relevant Objectives and Policies of the West Coast Regional Air Quality Plan.

West Coast Regional Air Quality Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
Objective 7.3.1	The protection of human health, property, structures and ecosystems from the adverse effects of discharges of dust to air.	The mitigation measures outlined in Section 7 of this report go above and beyond to minimise any potential effect that could arise from the discharge of dust to air.
Policy 7.4.1	Adverse effects of the deposition of dust will be avoided, remedied, or mitigated by ensuring that any discharge of dust does not occur at a volume, rate or in a manner that could cause an offensive or objectionable effect, including the significant restriction of visibility or the soiling of property.	Deposition of dust will be mitigated using appropriate measures, primarily with the application of water, to effectively minimise any visual amenity effects and will not cause an offensive or objectionable effect.
Policy 7.4.2	Adverse effects of suspended dust will be avoided, remedied, or mitigated by ensuring that any discharge of dust does not occur at a volume, rate or in a manner that could cause an offensive or objectionable effect, including the impairment of human health.	Discharge of dust will be appropriately managed and mitigated using best practice measures, described above, to ensure any effects are negligible and there is no potential to harm human health.
Policy 7.4.3	In assessing offensive or objectionable effects from discharges of dust, the Regional Council will take into account the following factors: • Frequency of dust discharges; • Intensity of dust discharges; • Duration of dust discharges; • Offensiveness of the odour; • Extent of dust discharges (suspended and deposited); and • Location of dust discharges.	With the mitigation and management methods being proposed it is not anticipated that any offensive or objectionable discharges of dust will arise from the site.

West Coast Regional Air Quality Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
Objective 9.3.1	The reduction and minimisation of adverse effects from discharges of contaminants to air of global significance, such as ozone depleting substances or greenhouse gases.	As discussed in Section 3 of this AEE, Federation Mining is committed to reducing its carbon footprint as part of its everyday operations. Onsite processing will also reduce the need for heavy vehicle movements to and from the site, and in turn have a reducing effect of emissions.
Policy 9.4.1	To promote the reduction of discharges of ozone depleting substances.	
Policy 9.4.2	To promote the reduction of emissions of greenhouse gases.	

9.8.2 Regional Land and Water Plan

The Regional Land and Water Plan became operative on 27 May 2014. An assessment against the relevant objectives and policies is undertaken in the table below. Overall, it is concluded from this assessment that the proposal is consistent with the relevant provisions of this Regional Plan.

Table 17: West Coast Regional Land and Water Plan – Relevant Objectives and Policies Assessment

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
Objective 3.2.1	To provide for the sustainable use and development of land and water resources.	The proposal seeks to incorporate an onsite processing plant and to facilitate the co-disposal of tailings material as part of the WRS. To ensure that these activities can be sustainably provided for within the site, a revised approach to water management and treatment is being proposed as part of this application. This will ensure that the development and ongoing operation of the Snowy River Mine is sustainable in terms of its effects on the land and surrounding water bodies.

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
Objective 3.2.2	To protect water bodies from inappropriate use and development by maintaining and where appropriate enhancing their natural and amenity values including natural character and the life supporting capacity of aquatic ecosystems.	Potential discharges from the site will be managed via the proposed water management system and treatment that is being proposed as part of this application. The treatment will ensure that water quality compliance limits will be achieved in the river which have been developed in response to the ecological and water quality values existing within the Snowy River. In turn, this will ensure that the natural character and life supporting capacity of the Snowy River is being maintained.
Objective 3.2.3	To maintain or, where appropriate, enhance the spiritual and cultural values and uses of significance to Poutini Ngäi Tahu.	In developing the Snowy River Mine site and progressing with this application, Federation Mining has carefully considered the cultural values associated with the site and features within it. In this regard, it is acknowledged that water quality and aquatic ecology are important. The discharges from the site will maintain compliance with exiting consented limits, in turn protecting instream values and aquatic ecosystems. This will assist in seeking to sustain mahinga kai values within the watercourse.
Objective 3.2.4	To avoid or mitigate the exacerbation of any natural hazard or the creation of a hazard.	The proposal will be managed to ensure any natural hazard risk will not be exacerbated. This is primarily through the incorporation of appropriate factors of safety in the design and management of the mining activity
Policy 3.3.1	In the management of any activity involving water to give priority to avoiding, in preference to remedying or mitigating: (1) Adverse effects on:	The Snowy River is not specifically listed within Schedules 7A or 7B of the Land and Water Plan. Schedule 7C identifies the spiritual or cultural beliefs, values, or uses associated with water bodies of significance to Poutini Ngäi Tahu. The Snowy River is again not specifically

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	(a) The habitats of threatened species identified in Schedule 7A; (b) Water supply values identified in Schedule 7B; (e) Spiritual and cultural values and uses of significance to Poutini Ngäi Tahu identified in Schedule 7C; (d) The significant natural character of wetlands, and lakes and rivers and their margins; (e) Outstanding natural features and landscapes; (f) Significant indigenous vegetation and significant habitat of indigenous fauna assessed in accordance with Policy 9.2 of the West Coast Regional Policy Statement; (g) Existing public access to and along lakes and rivers; (h) Significant historic heritage; (2) Adverse effects which cause or exacerbate flooding, erosion, land instability, sedimentation or property damage; (3) Adverse effects on existing lawful uses including regionally significant infrastructure.	listed within this schedule, however, it is noted that such values may exist within the river without being specifically set out in this schedule. The landscape assessment does not assess the Snowy River as having outstanding or significant natural character values or features. Public access within the mining operation area and water treatment facilities needs to be necessarily restricted for public health and safety risks. Access to the river and its margins does however remain available. The heritage assessment stated the proposed development of the Snowy River Mine would not have any effect on sites of historical and cultural value. An accidental discovery protocol will be in place should any previously unidentified material be discovered. Significant indigenous vegetation and fauna has not been identified on the site. Natural hazard risk is assessed as being low, and the siting of the infrastructure and development within the site will seek to ensure any such risk is not exacerbated. The ongoing development and operation of the Snowy River Mine will not generate adverse effects on exiting lawful uses including regionally significant infrastructure.
Policy 3.3.7	In the management of any activity involving water, to avoid, remedy, or mitigate adverse effects on: (a) Water quality; (b) Amenity values;	As discussed in Section 4 to this AEE, a comprehensive water management and treatment system is being proposed. This will ensure that water quality downstream of the site will be managed so as to remain within already consented limits. Additional water

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	(c) Indigenous biological diversity; (d) Intrinsic values of ecosystems; (e) The natural character of wetlands, and lakes and rivers and their margins, not described in 3.3.1(1)(d); and (f) Historic heritage not described in 3.3.1(1)(h).	quality limits are also being proposed for contaminants which have been more recently identified as being present within the mine operational activities (i.e. nitrogen compounds from blasting activities). These limits will collectively seek to maintain the existing aquatic ecology values within the Snowy River.
Policy 3.3.10	To recognise and provide for the following features of water bodies when considering adverse effects on their natural character: (a) The topography, including the setting and bed form; (b) The natural flow characteristics; (c) The natural water level and its fluctuation; (d) The natural water colour and clarity; (e) The ecology; and (f) The extent of use or development within the catchment, including the extent to which that use and development has influenced (a) to (e).	The water quality limits being proposed for the Snowy River are characteristic of the existing water quality and aquatic ecosystem which exists. The flows from the site will result in negligible changes to the hydrology of the Snowy River. The water take (which remains consented) is also largely returned to the Snowy River as part of the discharges from the site, so there is no discernible effect on overall river hydrology, water levels or fluctuations as a result. The colour of the Snowy River is often influenced by the natural organic tannins that are released by several of the plant species in the area. This a natural occurrence and not exacerbated in anyway by the discharges from the site.
Policy 3.3.11	To have particular regard to the following qualities or characteristics of water bodies when considering adverse effects on amenity values: (a) Aesthetic values associated with the water body; (b) Recreational opportunities provided by the water body; (c) Sports fish habitats, as outlined in Schedule 8; and	The proposed discharge to the Snowy River will seek to achieve compliance with existing water quality consented limits, and recommended limits for nutrients in order to protect the instream and amenity values of the waterbody.

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	(d) The extent of use or development within the catchment, including the extent to which that use and development has influenced (a) to (c).	
Objective 4.2.1	To avoid remedy or mitigate adverse effects from land disturbance so that the region's water and soil resources are sustainably managed.	Erosion and sediment control plans will be implemented during construction and operation of the Snowy River Mine including the construction of the WRS, and stockpiles to ensure sedimentation and erosion is minimised. All potentially sediment laden water will be directed to the water treatment system prior to discharge to the Snowy River.
Policy 4.3.1	To manage the disturbance of land and vegetation in order to avoid remedy or mitigate any adverse effects on: (a) The stability of land (e.g. slumping, subsidence, or erosion), river banks, and riverbeds and coastal margins; (b) Water quality, including clarity, turbidity, and temperature changes, and in stream values; (c) Changes in water level including water table; (d) Public access to rivers, lakes, and their margins and the coast; (e) Natural character, and aquatic ecosystems; (f) Soil depth and soil fertility; (g) The integrity of property, structures, or effects upon the operation or maintenance of regionally significant infrastructure;	As discussed in the AEE Section 4, the construction and operation of the mine, including the WRS and treatment facilities on the site will be designed so as to ensure: • That the WRS will be designed so as to achieve a high degree of slope stability; • Flood risk is to be managed by locating key infrastructure and the WRS on higher ground above; • Potential discharges to groundwater are minimised through engineering features incorporated into the WRS design (e.g. liner and underdrains to capture and direct groundwater to the treatment system); • An onsite water treatment system to treat contaminants of concern prior to discharge to the Snowy River; • Compliance with water quality limits to protect instream values and ecosystem health;

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	(h) Cultural and recreational values; and (i) Significant indigenous vegetation and significant habitats of indigenous fauna.	• Public access to and along the Snowy River will be retained where appropriate; • Cultural and recreational values will be sustained by maintaining compliance with water quality limits and ongoing monitoring of the Snowy River; • Vegetation removal has already been consented within the site to occur, the proposal results in a reduction in beech forest being removed.
Policy 4.3.3	To manage the disturbance of riparian margins to: (a) Maintain or enhance water quality (including clarity, turbidity, and temperature), and in-stream values, (including aquatic ecosystems); (b) Promote soil conservation; (c) Ensure that existing public access to water bodies is maintained or enhanced; (d) Protect the natural character of the coastal environment, wetlands, and lakes and rivers and their margins, from inappropriate use and development; (e) Enable the maintenance and safe operation of regionally significant infrastructure.	The water treatment ponds will be located near the edge of the Snowy River. The purpose of these ponds will be to further treat water prior to this water reaching the Snowy River. This will address sediment and potential contaminants of concern including nutrients. The treatment ponds will be planted with wetland/riparian type plant species.
Policy 5.3.1	To provide for appropriate use and development in lakes and rivers and recognise the social and economic benefit particularly related to West Coast communities of maintaining existing structures and infrastructure.	The mine and associated infrastructure are considered to be appropriate within the surrounding modified rural environment and have been configured to ensure that there are no adverse effects on the Snowy River, beyond

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
		those which are already consented to occur. The location of the mine has been driven by the location of the ore and it is appropriate to have the processing plant and water treatment facility located there as well.
Objective 7.2.1	To retain flows and water levels in water bodies sufficient to maintain their in stream values, natural character, and life supporting capacity.	There will be a minor increase in flows into the Snowy River. This will have a negligible effect on the overall river hydrology, and other values existing within the river.
Objective 7.2.3	To promote the efficient use of water.	Federation Mining recycles water around the Snowy River Mine site, both to reduce the impact on water resources in terms of the volume of water that is taken from the Snowy River, and to reduce the volume of water that is ultimately discharged back into the receiving environment. No increase in the volume of water being taken from the Snowy River is proposed as part of this application.
Policy 7.3.8A	The loss of river extent and values is avoided, unless the Council is satisfied: (a) that there is a functional need for the activity in that location, and (b) the effects of the activity are managed by applying the effects management hierarchy.	As discussed above, there is no physical loss of river extent as a result of this proposal. Values of the Snowy River could however be affected if discharges from the site are not appropriately managed. As discussed above, there is a functional need to locate the Snowy River Mine at this particular location (i.e. it is close to the mineral resource). The effects of any discharges from the activities are also being effectively avoided, or mitigated via the comprehensive water quality treatment system that will be implemented at the site. This will ensure the discharge is of such a quality to maintain compliance with existing consented water quality

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
		limits and those which are identified as being required for the Snowy River.
Policy 7.3.12	To require, where necessary, desirable and practicable, provision for fish migration.	The proposed activities will have no impact on fish migration.
Objective 8.2.1	To maintain or enhance the quality of the West Coast's water.	Discharges from the site will be managed so as to maintain the existing quality of the Snowy River.
Policy 8.3.2	Rivers which have acid drainage issues will be managed as follows: (a) Activities that reduce pH of receiving waters must avoid, remedy or mitigate acidity effects and should achieve the natural pH level of the affected river wherever practicable; and (b) Activities that increase dissolved iron concentrations or the concentration of any other metal or non-metal in the receiving water must avoid, remedy or mitigate adverse effects and the natural metal/non-metal concentration of the receiving water should be achieved wherever practicable.	Federation Mining has engaged MWM to understand the likely geochemical characteristics of the processing plant and WRS activities. This characterisation and contaminant load modelling indicates that water flows from the site need to be treated. A state-of-the-art water treatment plant is being proposed to manage pH and potential contaminants from the site. A further water treatment pond is also being proposed to assist in the treatment of nutrients from the activities. Water quality limits are proposed to ensure AMD does not adversely affect the Snowy River.
Policy 8.3.3	To encourage the remediation of orphan sites as a method to enhance existing water quality and offset adverse effects from new mining developments.	Prior to the Snowy River Mine being developed, the site released contaminated water from the adit that runs across DoC land to the Snowy River. As a result of the development of the mine, this adit has been intercepted and will be treated as part of the overall water treatment system on the site.
Policy 8.3.4	When considering applications for new resource consents for existing discharges of contaminants to water, to have regard to opportunities to enhance the existing water quality of	Monitoring has not indicated that there are any determinantal effects arising as a result of the current mining operation. These limits are supported by Greg

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	the receiving water body at any location for which the existing water quality can be considered degraded in terms of its capacity to support its natural and human use values.	Ryder as being appropriate to maintain water quality in the future.
Policy 8.3.5	When considering applications for resource consents to discharge contaminants to water to have regard to: (a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects; (b) The financial implications, and the effects on the environment of the proposed method of discharge when compared with other options; (c) The current environmental mitigation technology and the likelihood that the proposed method can be successfully applied; (d) The cumulative effects of discharges of contaminants and the assimilative capacity of the water body and actual or potential effects in the coastal marine area; and (e) Any relevant industry codes of practice or guidelines relating to the management of potential discharges.	Federation Mining has adopted the best practicable option for managing and treating flows within, and discharges from, the site. A state-of-the-art water treatment plant is being proposed which will maintain compliance with currently consented water quality limits. The existing consent and decision regarding these limits confirmed that these would ensure that the resulting water quality will be close to the baseline water quality of the Snowy River.
Policy 8.3.6	Mixing zones will be required for the discharge of contaminants to water. These will be limited to the extent necessary to take account of: (a) Water quality classes; (b) The size and sensitivity of the receiving environment;	Snowy River monitoring site S4 is recommended as the compliance point for any water quality parameters. This is consistent with the current consent compliance point. The site is approximately 250-300 m downstream of the treatment ponds and any seepage from the ponds are likely to be

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
	(c) The matters identified in Policy 3.3.1; (d) The physical processes acting on the area of discharge; and (e) The particular discharge, including contaminant type, concentration, and volume.	reasonably mixed at that point. It also has the added advantage of having a good set of historic monitoring data (ecological and water quality) and is considered reasonable.
Objective 10.2.1	To sustain existing uses of the West Coast's groundwater, by protecting water quantity and quality and avoiding depleting surface water flows.	Seepage from the WRS will be intercepted via the liner and underdrains being proposed as part of the engineering design, and will direct flows to the water treatment plant prior to discharge into the Snowy River. There will be no loss in groundwater flows to the Snowy River as a result of this proposal.
Objective 15.2.1	To ensure that the adverse effects from the discharge of hazardous substances into or onto land, on water and soil quality, social, cultural, and amenity values, indigenous flora and fauna, and human health are avoided, remedied, or mitigated.	The WRS inclusive of the tailings cell are hazardous substances. The WRS has been designed to minimise the potential of leaching of contaminants to groundwater and to land, and to withstand natural hazard events. All other hazardous substances transported to, stored or used will be done so in accordance with the requirements of the Hazardous Substances and New Organism Act.
Policy 15.3.1	To avoid inappropriate disposal or discharge of hazardous substances to land.	As above, there is not expected to be any inappropriate disposal or discharge of hazardous substances from the site.
Policy 15.3.2	To recognise, where appropriate, relevant industry codes of practice or guidelines relating to the management of hazardous substances and potential associated discharges.	All hazardous substances transported to, stored or used will be done so in accordance with the requirements of the Hazardous Substances and New Organism Act.

West Coast Regional Land and Water Plan Relevant Objectives and Policies		Assessment of Application Against these Provisions
Objective 16.2.1	To avoid, remedy, or mitigate risks to the environment presented by discharges from contaminated land, including risks to human health, social, cultural, and amenity values, and soil and water quality.	As above, all potentially contaminated discharges from the site will be intercepted and directed to the water treatment plant for treatment prior to discharge into the Snowy River. This will suitably avoid or mitigate any potential risks in terms of contamination within the receiving environment.
Policy 16.3.2	To contain and remediate, or appropriately manage, contaminated land that is causing significant adverse effects on the environment.	On closure of the mine, the site including the WRS will be rehabilitated in line with the closure plan. It is anticipated that this land will be suitable for use for other rural type purposes upon completion. Passive water treatment may need to continue in the medium to longer term to ensure potentially contaminated discharges from the site remain controlled and within acceptable environmental limits.

9.9 BULLER DISTRICT PLAN

The Buller District Plan was made operative on 28 January 2000, and subsequently amended on 8 October 2004, 25 May 2009 and 21 September 2011.

In 2016 the Buller District Council publicly notified Proposed Plan Changes 133 – 145 ("**Proposed Plan Change**"). The Proposed Plan Change relates to Parts 1-3 of the Buller District Plan which contains introductory material and Part 4 which contains the Significant Resource Management Issues, Objectives and Policies for the district. There are no rules that are proposed as part of this Plan Change which have relevance to the existing mine or the processing plant that is being proposed. It is understood however that this plan change is on hold pending the development of a combined district plan for the entirety of the West Coast.

An assessment of the relevant objectives and policies from these planning documents is provided in the tables below.

Overall, it is concluded that the land use components of this proposal sit comfortably with the outcomes anticipated by both the Operative Buller District Plan and the Proposed Plan Changes.

Table 18: Buller District Council Operative Plan, Objectives and Policies Assessment

Buller District Plan - Operative		
Relevant Objectives and Policies		**Assessment**
Part 4 Significant Resource Management Issues, Objectives and Policies		
Infrastructure		
Objective 4.2.5.1	To provide for the efficient development, operation and maintenance of infrastructure throughout the district, while avoiding, remedying or mitigating adverse effects.	Any effects that arise from the processing plant and other infrastructure onsite will be mitigated by adopting best practice mitigation measures outlined above to ensure the effects are no more than minor.
Rural Land and Water Resource		
Objective 4.4.4.1	To ensure that the overall integrity and character or the rural environment and productivity of rural land resources is protected while enabling rural communities to provide for their social, economic, and cultural wellbeing	The proposed processing plant, WRS and other infrastructure being proposed, are associated with an existing (consented) mining activity. The area is also relatively well contained within a wider working rural context. The design and form of the WRS footprint has sought to achieve a visually appropriate outcome and one that will appear to sit comfortably in its Snowy River landscape setting. The processing plant will in large part also be screened by the WRS.
Objective 4.4.13.1	Promote land use activities which maintain or improve the water quality of the District's rivers and do not adversely affect water quantity, in order to safeguard the life supporting capacity of water.	All potentially contaminated water from within the site will be captured and directed towards the water treatment plant and ponds for treatment prior to discharging into the Snowy River. The treatment that is being proposed will ensure compliance with acceptable water quality limits. Water flows into the Snowy River will not affect the overall hydrology of the river. The life supporting capacity of the Snowy River will be maintained as a result.

Buller District Plan - Operative		
Policy 4.4.14.2	Significant ecological, cultural and heritage sites related to the water resource shall be recognised and wherever possible protected through the encouragement of integrated land management practices.	The proposal will not result in any direct effects on any significant ecological, cultural or heritage sites. Discharges from the site, as discussed, will be managed so as to maintain water quality and instream values within the Snowy River. An integrated approach to the management of the site is being proposed by Federation Mining, and all potentially contaminated worked areas have been identified and will be managed.
Policy 4.4.14.4	The protection of water resources from adverse effects of land based activities shall be encouraged and promoted.	As above, the land based treatment that is being proposed will seek to mitigate any adverse effects arising from discharges to the Snowy River.
Policy 4.4.14.7	To protect and enhance riparian margins adjacent to rivers, streams, lakes, wetlands and the coast for the purposes of: (i) Maintenance of the natural character of waterways, natural habitats and water quality including the mitigation of adverse effects of contaminant discharges and other natural and aesthetic and amenity values associated with the adjacent waterway. (ii) Public recreation. (iii) Public access. (iv) Maintenance of bank stability and reduction in sedimentation	The water treatment ponds will utilise riparian / wetland plants to further treat potentially contaminated water before it is discharged into the Snowy River. Upon closure of the mine, any remaining passive water treatment systems (i.e ponds) will be integrated into the Snowy River receiving environment. Public access and recreational uses will not be directly affected by the proposal.
Mineral Resources		
Objective 4.5.4.1	To enable people and communities to provide for their economic and social wellbeing through the efficient utilisation and development of mineral resources.	The proposed development, in particular the proposal to process the material onsite, will enable the efficient utilisation of mineral resources in the Snowy River Mine, bringing positive

Buller District Plan - Operative		
		economic and social effects to the West Coast community.
Objective 4.5.4.2	To safeguard the life supporting capacity of air, water, soil and ecosystems and avoid, remedy or mitigate adverse effects from the use and development of mineral resources.	Effects that arise from the processing plant and associated activities will be mitigated effectively using best practice mitigation measures, to ensure there will be no change in the life supporting capacity of air, water, soil, and ecosystems, whilst still allowing the investigation and utilisation of the District's mineral potential. Regular monitoring will be in place throughout the development and operation of the mine to ensure the mitigation measures are effective, including maintaining existing water quality, air quality and ecosystem health. Federation Mining also regularly communicate with the regional council regarding the onsite activities. Post closure, rehabilitation will enable the land to be reverted back to agricultural farmland or other alternative land uses. There may also be opportunity to utilise shrub and flax plantings within steeper areas of the WRS, which will assist in erosion control and utilisation of indigenous plant species. Rehabilitation and closure outcomes will seek to achieve: • Careful design and construction of the WRS to integrate with the existing character of the area as far as can be practicably achieved; • Keeping the surface area disturbed at any one time to a minimum while remaining compatible with day-to-day operations;
Policy 4.5.5.1	The adverse effects of activities related to the utilisation of mineral resources shall be avoided, remedied or mitigated.	
Policy 4.5.5.2	The rehabilitation of mining sites shall be required where practicable.	
Policy 4.5.5.3	Co-ordination and liaison with the West Coast Regional Council shall be maintained on matters relating to mining activities where water resources and soil conservation are affected.	
Policy 4.5.5.4	To enable the investigation of the District's known mineral potential and the utilisation of mineral resources of regional significance while safeguarding the life supporting capacity of air, water, soil and ecosystems and ensuring the adverse effects of activities related to the investigation and utilisation of mineral resources are avoided, remedied or mitigated.	
Policy 4.5.5.5	To require mineral resource related activities to incorporate measures to protect water quality and ecosystems, and provide for the rehabilitation of disturbed areas to generally their original condition or another suitable condition as approved by Council.	

Buller District Plan - Operative		
Policy 4.5.5.6	When rehabilitation plantings are carried out pursuant to a resource consent, preference should be given to the use of indigenous species where appropriate, with a further preference for local genetic stock where indigenous species are to be used.	• Rehabilitating the site to a safe and stable condition as soon as practical; • Containing and treating all contaminants on site in such a manner that they do not pose a long-term safety or environmental hazard; and • Achieving a suitable sustainable post-mining land use.
Cultural / Historic Resources		
Objective 4.6.7.1	To protect places and sites of historical and cultural value from the adverse effects of land use activities and to ensure where appropriate, access to historic and cultural sites is maintained and enhanced.	The heritage assessment stated the proposed development of the Snowy River Mine would not have any effect on sites of historical and cultural value. An accidental discovery protocol will be in place should any previously unidentified material be discovered.
Ecosystems and Natural Habitats		
Objective 4.8.6.1	To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna and to recognise their importance to the character and quality of the natural and physical environment and to the wellbeing of the people and communities in Buller.	The existing land use consent authorises the removal of indigenous forest vegetation. This vegetation is however common throughout the West Coast Region and is not significant on this basis. The Beech Forest to the north and east of the site boundary will largely remain undisturbed by the proposed new WRS footprint. Further disturbance to the Beech Forest could occur however, under the current consented footprint in the vicinity of the eastern site boundary, and more particularly towards the south where a yet unconstructed haul road through the Beech Forest was envisaged and is consented. The proposed new WRS footprint now seeks to avoid disturbance to this intact area of Beech Forest and this is considered to be consistent with seeking to protect areas

Buller District Plan - Operative		
		of indigenous vegetation as sought by this objective. The processing plant and associated infrastructure (e.g. the water treatment plant) will be located on ground that has already been cleared.
Policy 4.8.7.1	The adverse effects of land use activities on natural habitats and ecosystems shall be taken into account when considering development proposals which impact on these areas.	As above, the revised WRS footprint results in a reduction in the amount of Beech Forest disturbance than what has currently been consented to occur and this proposal therefore encourages the retention of indigenous vegetation.
Policy 4.8.7.2	The protection and enhancement of the natural values of wetlands, estuarine habitats, whitebait spawning areas, significant indigenous vegetation and significant habitats of indigenous fauna shall be encouraged.	
Policy 4.8.7.7	To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna from inappropriate use, subdivision and development.	
Policy 4.8.7.8	To encourage the retention of existing indigenous vegetation on the margins of waterways, wetlands and the coast and the enhancement of these areas through the use of indigenous vegetation where rehabilitation plantings are to be carried out.	
Landscape and Natural Features		
Objective 4.9.3.1	To protect the distinctive character and unique values of outstanding landscapes and natural features	The Snowy River site and its general surrounds have not been identified as being within an Outstanding Natural

Buller District Plan - Operative		
Policy 4.9.4.1	To discourage activities which would significantly alter the character of outstanding landscapes.	Feature or Landscape ("**ONFL**"). In addition, the site or its immediate surrounds have not been identified in either the District or Regional Plans as having any particular significance or special characteristics or landscape values. The site is within a working rural environment and is subject to the normal rural landscape and amenity provisions.
Natural Hazards		
Objective 4.10.6.1	Taking into account community views, to reduce the risks to people and communities from natural hazards, and to avoid the establishment of activities which increase the likelihood of natural hazards occurring.	The development of the Snowy River Mine will be managed to ensure any natural hazard risk will not be exacerbated, primarily through the safe design of all mining activities. A geotechnical and site stability assessment has been undertaken by PDP which forms part of this application.
Policy 4.10.7.2	An assessment of natural hazard risk shall be provided where appropriate with all applications for resource consents.	
Hazardous Substances		
Objective 4.11.5.1	To encourage and promote the safe and efficient handling and disposal of hazardous substances throughout the district	All hazardous substances will be stored, handled and disposed of in accordance with the relevant New Zealand Standards, Codes of Practice and the Health and Safety at Work (Hazardous Substances) 2017 Regulations.
Policy 4.11.6.1	Compliance with approved codes of practice and national guidelines and standards shall be required for all activities involving the use, storage and transport of hazardous substances.	

Table 19: Buller District Council Plan Changes 133 – 145 Assessment

Buller District Plan – Plan Changes 133 - 145		
Relevant Objectives and Policies		**Assessment**
2.1 Culture and Heritage		
Objective	To identify examples of buildings, sites and structures that reflect the district's heritage and cultural values, and to provide for the management of those resources in a way that sustains the social, cultural and economic wellbeing of communities.	The heritage assessment has confirmed that the proposed new features of the development of Snowy River Mine would not have any effect on sites of historical and cultural value. An accidental discovery protocol will be in place should any previously unidentified material be discovered.
Policy 1	To identify and record buildings, sites and structures of significant heritage value, according to the following criteria: • Historical and Social Significance • Cultural and Spiritual Significance • Architectural Significance • Group or Setting Significance • Landmark Significance • Archaeological Significance • Technological and Scientific Significance	
Policy 2	To identify and record, in consultation with tangata whenua, sites of significance to Maori in a manner which will ensure that they are respected and protected.	Engagement with Ngāti Waewae has occurred. It is understood that provided the activity remains within the consented limits of the existing activity, there is general support.
2.2 Hazardous Substances		
Objective 1	To protect the environment from the adverse effects and risks arising from subdivision, land use and	The use of hazardous substances will remain consistent with best practice use and storage which shall seek to

Buller District Plan – Plan Changes 133 - 145		
	development activities involving hazardous substances.	minimise any risk to people and the environment.
Policy 1	Activities and facilities involving the use and storage of hazardous substances shall be designed, located, constructed and operated so as to minimise the risk to people and the environment.	
2.3 Mineral Resources		
Policy 4	To ensure that during and after mineral exploration and extraction activities, sites are progressively rehabilitated to enable the establishment of a land use appropriate to the area.	Closure and rehabilitation plans have been incorporated into the overall mining plan being developed by Federation Mining. Water management post closure has been considered and assessed by MWM and PDP. These assessments confirm that management long term to achieve water quality and ecological outcomes are achievable. Post rehabilitation the land will be returned to the owner for future use. The WRS will be progressively rehabilitated.
2.4 Natural Hazards		
Objective 1	To avoid or mitigate the adverse effects of natural hazards upon human life, infrastructure, property and the natural environment.	Natural hazard risks associated with this proposal have been identified. This includes risk associated with the construction of the WRS, and location of the mining operational facilities in proximity to existing natural hazards (e.g. flood risk). These assessments confirm that such risks can be suitably managed to avoid any significant natural hazard risks or effects arising.

Buller District Plan – Plan Changes 133 - 145		
2.7 The Natural Environment		
Objective 1	To enable appropriate subdivision, use and development within areas of significant vegetation and significant habitats of indigenous fauna, where indigenous biodiversity is maintained.	Terrestrial ecological values were assessed as part of the existing consents. The existing consent allows the removal of Beech Forest to a greater extent than what is being proposed as part of the amended WRS design. Aquatic ecological values will be maintained by achieving compliance with water quality limits and new limits relating to nutrients.
Objective 2	To enable appropriate subdivision, use and development of waterbodies, wetlands and their margins where adverse effects on significant natural character, ecological, recreational, amenity and cultural values are avoided or mitigated.	The proposal is not anticipated to give rise to adverse effects on significant natural character, ecological, recreational, amenity or cultural values. The activity will be undertaken to ensure compliance with water quality limits to protect instream ecological values. In this regard it is not seen to be an inappropriate activity in this location.
Objective 3	To recognise the economic, social, and cultural wellbeing of people, and in particular the rural community, depends on, amongst other things, making reasonable use of land.	The processing plant will generate significant economic and social benefits in that it will provide for the continued and ongoing operation of the Snowy River Mine.
Objective 5	To maintain and enhance public access to and along waterbodies where it is practicable and achievable.	The proposal does not limit public access to and along the Snowy River Mine directly.
Objective 6	To enable appropriate subdivision, use and development where the adverse effects on areas of outstanding natural features and landscapes are avoided or mitigated.	The proposal will not affect any scheduled outstanding natural features or landscapes.

Buller District Plan – Plan Changes 133 - 145		
Policy 1	To promote the protection of areas of significant indigenous vegetation and significant indigenous habitats of indigenous fauna through the resource consent process.	As noted above, existing consents allow for the removal of Beech Forest adjoining the WRS. A lesser extent of this forest will be removed as result of the amended WRS design. This is considered to assist in protecting indigenous vegetation. Areas of biodiversity affected by the Snowy River Mine were identified as part of the existing consent application and as part of that decision it was determined that the activity was not an inappropriate use or development. This is not expected to change given what is now being proposed. Federation Mining is proposing a more sympathetic WRS design which reduces the extent of native vegetation clearance required. Aquatic ecological values will also be maintained through the proposed water treatment plant and compliance with water quality limits and ongoing monitoring of instream indicators of stream health. The proposal does not limit public access to and along the Snowy River Mine directly.
Policy 3	To maintain indigenous biodiversity values having regard to the following matters in determining appropriate subdivision, use and development: (a) Actual or potential impacts on the significance of the affected area and on ecological values (including habitat, vegetation and fauna), cultural, intrinsic and/or amenity values. (b) The sustainability of the habitat or area of vegetation proposed to be modified or damaged by any adjoining habitat or area of vegetation to an area proposed to be affected. (c) The representativeness of the affected vegetation or habitat and impact on its inter-relationship or continuity with other habitats or areas of indigenous vegetation. (d) Whether the affected area retains the presence of rare or distinctive, threatened or at risk, indigenous flora or fauna species. (e) The extent to which the proposal is the minimum necessary to protect significant indigenous vegetation and significant habitats of indigenous fauna. (f) Where the adverse effects cannot be adequately avoided or mitigated, ensuring any residual effects that are more than minor,	

	are offset in a similar ecological context (in accordance with best practice principles) to achieve no 'net loss' of indigenous biodiversity. (g) The social and economic benefits to be derived from the use and development of the affected area.	
Policy 4	To recognise the need for land use and development to function efficiently and effectively while ensuring that any potential adverse effects on areas of significant indigenous vegetation and/or significant habitats of indigenous fauna are avoided, remedied or mitigated.	
Policy 6	To avoid or mitigate the adverse effects of subdivision, use and development, that would detract from or compromise significant natural character, ecological functioning, recreational, amenity and cultural values of water bodies, wetlands and their margins.	
Policy 8	Public access to and along waterways shall be maintained and enhanced, where appropriate, except where restrictions are necessary to ensure public safety or to avoid adverse effects on ecological values.	
2.8 The Rural Environment		
Objective 1	To provide for a range of activities that maintain the amenity and rural character values of the rural environment, while recognising that	The Buller District Plan anticipates mining activities to occur within the rural environment. In the long term the land will be rehabilitated and will be

Buller District Plan – Plan Changes 133 - 145		
	parts of the rural environment are also a productive working environment.	able to be used for productive working activities.
2.9 Transport		
Objective 1	To recognise the benefits of and to provide for a safe and efficient transportation network, where additions to the network are not detrimental to the existing network, and to avoid, remedy or mitigate adverse effects on the surrounding environment.	The Transportation Assessment determines that the effects arising as a result of this revised proposal to be minor or less on the road network. There will be a reduction in heavy vehicle movements that were authorised under the existing consents. Light vehicle movements will increase, however, these effects are no more than minor and will be further mitigated by Federation Mining's proposal to implement the road improvements and safety obligations that were required under the existing consent, for the management of heavy vehicles more specifically. These features will further reduce any potential for adverse effects on the road network to arise.

9.10 SECTION 104(1)(C) – OTHER MATTERS

There is no relevant iwi management plan. However, it is understood that the West Coast Regional Land and Water Plan has been drafted taking into account the Ngāi Tahu Freshwater Policy and Poutini Ngāi Tahu pounamu management plans as relevant iwi management plans. The assessment undertaken in Sections 9.7 – 9.9 are applicable in this regard.

9.11 SECTION 105 OF THE RESOURCE MANAGEMENT ACT 1991

Section 105 of the RMA sets out additional matters which must be considered by a consent authority when considering an application for a discharge permit. Section 105(1) states:

> *"If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—*
>
> *(a) the nature of the discharge and the sensitivity of the receiving environment*

to adverse effects; and

(b) the applicant's reasons for the proposed choice; and

(c) any possible alternative methods of discharge, including discharge into any other receiving environment.

All of the relevant matters set out in Section 105(1) of the RMA are addressed in this AEE and are summarised in Table 20 below. In particular, the nature of all discharges to the environment are detailed in Section 4 of this AEE, while the sensitivity of the receiving environment is discussed in Section 2. Overall, it is concluded that the proposed discharges of contaminants to air, land and water are the best practicable option for managing the activities associated with the Snow River Mine and any potential effects on the environment.

Table 20: Alternative effects assessment for discharges

Discharge	Receiving Environment	Alternative Methods of Discharge
Discharge of contaminants to air.	Refer to Section 2 of this AEE.	The recommended methods are those considered to be most appropriate considering the nature of those discharges and the receiving environment and are likely to go beyond what is required to mitigate any potential adverse effects.
Discharge material to land associated with the waste rock stack where it may enter water.	Refer Section 2 of the AEE.	In order to avoid potential effects on groundwater from seepage of material from the WRS, the design includes a liner. Clean water diversions are also proposed around the WRS. The effects arising from the discharge to land and potential for seepage and runoff into the downstream receiving environment are not expected to be significant and will be within existing consented parameters as the proposal seeks to direct all discharges from the WRS for treatment prior to these entering the PTS and ultimately the receiving water environment.
Discharges to water via the WTP and PTS.	Refer to Section 2 of the AEE.	A state-of-the-art water treatment system is being proposed by Federation Mining in order to significantly reduce any potential contaminants entering the receiving water environment. A passive water treatment system is also being retained to provide final polishing of the water before entering the

Discharge	Receiving Environment	Alternative Methods of Discharge
		Snowy River and to also reduce potential nutrient loads in the discharge. Limits on these contaminants are being proposed to ensure there are no adverse effects arising in the Snowy River. Additional engineering measures can be employed as part of the WTP should contaminants of concern such as nitrogen or ammonia remain elevated as the mining activity progresses. Federation Mining is committed to ongoing compliance with the existing and recommended water quality limits. Alternatives to ultimately discharging to the river have been investigated, however, at this stage these do not appear to be practicable alternatives as they would require access to a large area of third-party land and impose additional costs in terms of infrastructure (pipes across land for some distance). There is no certainty that the effects of a discharge to land would also be any less than what is being proposed given the expected water quality and aquatic ecology outcomes that will be achieved at the site.
Discharge of runoff and seepage water post mining.	As above.	Post closure effects arising from discharges have been considered as part of this assessment. Passive treatment may be required for a certain duration and overtime the contaminants are expected to reduce as the site is effectively rehabilitated.

9.12 SECTION 107 OF THE RESOURCE MANAGEMENT ACT 1991

Sections 107(1)(a) and (b) of the RMA specify that the consent authority shall not grant a discharge permit allowing the discharge of water / contaminant into water or land if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water) is likely to give rise to all or any of the following effects in the receiving waters:

- The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- Any conspicuous change in the colour or visual clarity;

- Any emission of objectionable odour;
- The rendering of fresh water unsuitable for consumption by farm animals; and
- Any significant adverse effects on aquatic life.

Based on the assessments in Sections x of this AEE, the discharge of water / contaminants to water or to land in circumstances where it may reach water will not give rise to any of the effects listed above after reasonable mixing.

9.13 PART 2 OF THE RESOURCE MANAGEMENT ACT 1991

It is understood that a consent authority is generally no longer required to consider Part 2 of the RMA beyond its expression in the relevant statutory planning documents, unless it is appropriate to do so. In this case, it is considered that it may be appropriate to undertake an assessment against Part 2 on the basis that the regional and district plans have not yet been updated to reflect national policy requirements, such as the NPSFM and have not gone through a "second generation" planning process. Therefore, for completeness and in accordance with Schedule 4(2)(1)(f) of the RMA, Part 2 of the RMA is considered in the following paragraphs.

The purpose of the RMA is to promote the sustainable management of natural and physical resources. The RMA defines "sustainable management" as:

> *"...managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."*

In this regard, the Snowy River Mine project will enable the social and economic wellbeing of the local community and wider West Coast region through the provision of continued and additional employment, and the generation of significant benefits to the local, regional and national economy. The proposal will also safeguard the life supporting capacity of air, water, soil and ecosystems. Sections 6 and 7 of this AEE set out the measures that are being proposed by Federation Mining to avoid, remedy or mitigate the actual and potential effects of the project on the environment. In this regard, Federation Mining will undertake mining activities in accordance with the best practicable option to avoid or mitigate any effects that are associated with the Snowy River Mine development, and in accordance with a range of consent conditions which will limit the potential for adverse effects on the environment and which, in many instances, align with the existing resource consents. A

number of management plans will also be utilised to ensure Federation Mining undertakes practicable measures to minimise any potential disturbance or risk of adverse effects from the project.

With respect to the key matters in sections 6, 7 and 8 of the RMA, the following points are pertinent:

- Water will be managed onsite and discharged in accordance with existing discharge compliance limits, such that there will be no change to the water quality or life supporting capacity of downstream receiving environments.[27]
- The effects of the project on indigenous flora and fauna and habitats have been assessed. The effects of the proposal are no greater than what can occur under the existing consented environment. Furthermore, the proposal seeks to reduce any potential effects through the project design (e.g. a reduced area of Beech Forest is being impacted as a result of the revised WRS design), and additional mitigation (e.g. water treatment measures) and offsetting that is being proposed.[28]
- The project will avoid areas of heritage significance.[29]
- The proposal will be managed to ensure any natural hazard risk will not be exacerbated. This is primary through the incorporation of appropriate factors of safety in the design and management of the mining activity.[30]
- The processing plant will assist in achieving the efficient use and development of natural and physical resources. The mining development is consented, and development is underway. Processing the material onsite creates efficiencies by locating within an already modified environment, utilising existing infrastructure and onsite facilities and reduces the need to heavy vehicle haulage offsite.[31]
- The amenity values of the landscape and surrounding area have been considered and will be maintained by the imposition of appropriate limits on noise, vibration and dust from mining activities on the site.[32]
- The project design, operational and receiving environmental limits that are being proposed take into account the intrinsic values of ecosystems.[33]

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27 Section 6(a).

28 Section 6(c).

29 Section 6(f).

30 Section 6(h).

31 Section 7(b).

32 Section 7(c).

33 Section 7(d).

- Federation Mining is directly engaging with Te Rūnanga o Ngāti Waewae. This will continue throughout the ongoing development and operation of the mine site to ensure cultural values are recognised as an integral part of the project development.[34]

Overall, and based on the technical assessments that Federation Mining has commissioned, it is considered that the proposed development of the Snowy River Mine will promote the sustainable management of natural and physical resources in accordance with Part 2 of the RMA.

10. CONCLUDING STATEMENT

Federation Mining is seeking additional resource consents (and variations) to support the ongoing development, operation and eventual closure of the Snowy River mine site. More specifically, Federation Mining is seeking via this proposal to develop a processing plant on the site to support the underground mining. Given that the existing mine development is consented, providing for processing plant facilities at the site creates additional efficiencies and reduces overall effects on the wider environment.

Integrating the mine development and the processing activities on the same site, also assists in ensuring that employment at the site is maintained and increased overtime. This in turn will make a significant contribution to the local, regional and national economy through the provision of wages and salaries, export earnings and capital investments.

The processing activities require amendments to the WRS design and water treatment facilities currently consented as part of the existing mine development plan. An assessment of the potential effects arising from these additional facilities is provided in Section 6 of this AEE and the various technical assessments commissioned by Federation Mining in support of its application. By way of summary, it is considered that these additional facilities can be accommodated into this existing environment without giving rise to new or cumulative adverse effects that are any more than minor. All disturbance activities will be undertaken within the existing consented footprint of the Snowy River mine site, and the works are of a nature and scale that is similar to what has already been consented at the site, and in some instances the technical assessments determine these to be less.

Federation Mining is committed to adopting the best practicable option when managing discharges from the site to land, water, and air. A state-of-the-art water treatment facility is being proposed to ensure ongoing compliance with existing and proposed water quality limits. Federation Mining is also proposing to incorporate additional measures into the

[34] Sections 7(a) and 8.

project design (e.g. the WRS) to minimise any potential discharges to land and treatment facilities, and discharges to air. Regular monitoring will be in place throughout the development and operation of the mine (as per the current consent conditions) to ensure the mitigation measures are effective, including maintaining existing water quality, air quality and ecosystem health.

Overall, it is considered that the development will be managed so as to ensure that the sustainable management purpose and principles of the RMA are achieved.

LIST OF APPENDICES ACCOMPANYING THE APPLICATIONS

Appendix A: Record of Title

Appendix B: Archaeological and Heritage Assessment, Origin Consultants.

Appendix C: Noise Effects, Tonkin and Taylor.

Appendix D: Mintrex Report, Proposed Processing Plant

Appendix E: Snowy River Gold Project – Waste Rock Stack Preliminary Design Report, PDP.

Appendix F: Snowy River Gold Project – Management of Minewater, PDP.

Appendix G: Geochemistry Report – Mine Waste Management ("MWM").

Appendix H: Landscape and Visual Effects, Frank Boffa.

Appendix I: Transportation Effects, Stantec.

Appendix J: Ryder, Water Quality and Aquatic Ecology Assessment ("Ryder Report").

Appendix K: Air Quality, Pattle Delamore Partners Limited ("PDP").

Appendix L: Affected Party Approval Form - Landowner