Management Plan

Water

Risk Statement: High

This document will be reviewed on a one yearly basis, unless a process change occurs earlier than this period. The information in this document relates to management, monitoring and associated reporting required by Development Consent 11_0600 and Mining Leases 1247, 1367, 1641 and 1743.

Doc No.	Version No.	Next Review Date	Owner
PLN-0056	13	2/07/2022	Environment & Farms Superintendent

Revision Summary

First Issue	Issue Date	Implementation Requirements	Approved By
1	10 Jul 14	This document has been prepared to outline water management practices at Northparkes mines, to the satisfaction of its legal and other commitments. This document is a combination of multiple water documents that existed onsite and consequently, these have been archived. These documents include: - Water Strategy 2007 - Water Supply 2005 - Water Management Plan 2011 (draft) - Operational Water Management Plan 2009 - Water Management Plan 2010	

Version No.	Revision Date	Summary of Revision Details	Approved By
2	8 Apr 13	This document replaces the ESH Water Management Plan A480459 and also Management Plan Sitewide Operational Water A258054. For revision history see archived or previous versions. Mal Hutchinson. HSE Systems Advisor	HSEF Manager & OPD Manager
3	Sep 14	Re-write the whole document to satisfy the requirement of the new Project Approval 11-0060 by GHD	
4	Oct 15	Update the whole document with changes requested by the Department of Planning by Bharath Ram	
5	Feb 16	Updated with DPI changes. Updated section 10 and Section 11.2	
6	May 16	Updated to include comments from EPA	
7	Jul 16	Updated to include comments from EPA	
8	Sep 16	Reviewed for consistency with PA 11_0060	
9	May 17	Updated to include comments from EPA and changes to water management features	
10	May 18	Reviewed for consistency with the Surface and Ground Water management plans	
11	19 Feb 20	Updated to the new DCS.	M Row
12	June 20	Annual review	C Higgins
13	June 21	Annual review	C Higgins

Consultation Required	Hard Copy Locations
Environment REG Champion	Northparkes website

Associated Documents to be Reviewed
Not Applicable

Table of Contents

1. OVERVIEW

1.1 Background

CMOC Mining Services Pty Limited (CMOC) is the manager of the Northparkes Joint Venture, an unincorporated joint venture between CMOC Mining Limited (80%); Sumitomo Metal Mining Oceania Pty Ltd (13.3%) and SC Mineral Resources (6.7%). Northparkes is a copper-gold operation in Goonumbla, situated 27 kilometres north-west of the town of Parkes.

Construction of the ore processing plant and associated facilities began in 1993. Open cut mining commenced on the E22 and E27 ore bodies in late 1993. Development of the E26 lift 1 block cave underground mine began in 1994, with full scale production commencing in 1997.

1.2 Mining Context

Operations at Northparkes primarily comprises underground mining from multiple ore sources that feed a processing plant with a capacity of 6½ million tonnes per annum (Mtpa). The underground mine is accessed via a decline ramp from the surface for people and materials with ore transported to the surface via inclined conveyors and a hoisting shaft, with a nominal capacity of 7.2 Mtpa. Northparkes utilises low cost block and sub-level cave mining and exploits industry leading technology, such as semi-autonomous loaders and various cave monitoring systems.

The ore processing operation consists of four stages: crushing, grinding, flotation and thickening / filtering. In addition to producing concentrate, the ore processing team also manages tailings disposal. The concentrator was constructed in two modules. Each module consists of its own grinding circuit with a single flotation circuit, concentrate thickener and filter. After extracting the copper and gold bearing minerals, the tailings are combined in a single tailings thickener before being deposited in the active tailings storage facility.

Northparkes' copper concentrate is transported to a rail siding at Goonumbla where it is then transported by rail to Port Kembla, for shipping to overseas customers.

1.3 Water Management

The Northparkes Mines (Northparkes) Water Management Plan (WMP) has been prepared in accordance with the requirements of Project Approval 11_0060 (PA 11_0060).

Northparkes location is provided in Figure 1 Northparkes Mine Location Map.

PA 11_0060 was granted under section 75J of the Environmental Planning and Assessment Act 1979 (EP&A Act) on 16 July 2014. On 16 June 2015, Northparkes were issued with modification under section 75W of the Environmental Planning and Assessment Act 1979.

The new Project Approval is for the Mine Extension, which includes the construction of new tailings storage facility, two new open cut operations and associated infrastructure.

Northparkes has developed a Water Management Plan (WMP) for the mine in accordance with the conditions of Condition 23, Schedule 3 of Project Approval 11_0060 which was granted under the Environmental Planning and Assessment Act 1979 (EP&A Act).

The WMP will be progressively developed as water management requirements change over time. A Surface Water Management Plan, Groundwater Management Plan and Site Water Balance have been prepared to support the WMP and are provided as attachments respectively. The WMP applies to all Northparkes personnel and contractors associated with operations at Northparkes.

2. PURPOSE / OBJECTIVES

The WMP has been developed to provide an overview of practices undertaken at Northparkes to comply with regulatory requirements and achieve best practice in water management to ensure the efficient, safe and sustainable use of water throughout mining, ore processing and other related activities.

The purpose of the WMP is to:

- Outline management controls to minimise the potential impact of Northparkes operations on the receiving surface and groundwater environment (refer to Section **Error! Reference source not found.**).
- Ensure compliance with the requirements of Environmental Protection Licence (EPL) 4784, CD 11_0060 and various water access licences and works approvals (refer to Section **Error! Reference source not found.** and Section **Error! Reference source not found.**).
- Clearly define the responsibilities and actions required to respond to environmental incidents relating to water (refer to Section **Error! Reference source not found.**).
- Keep the local community and regulators informed of activities where required and respond quickly and effectively to issue or complaints (refer to Section **Error! Reference source not found.**).

3. SCOPE

This document applies to all activities undertaken by Northparkes including mining and exploration activities, processing of copper / gold ore resources, project development, maintenance activities, mine closure, logistics, associated service and support functions, bore fields, farming operations and products.

The WMP applies to all operations as specified in DC 11_0060 and shown in Figure 2.

Figure 1 Locality plan

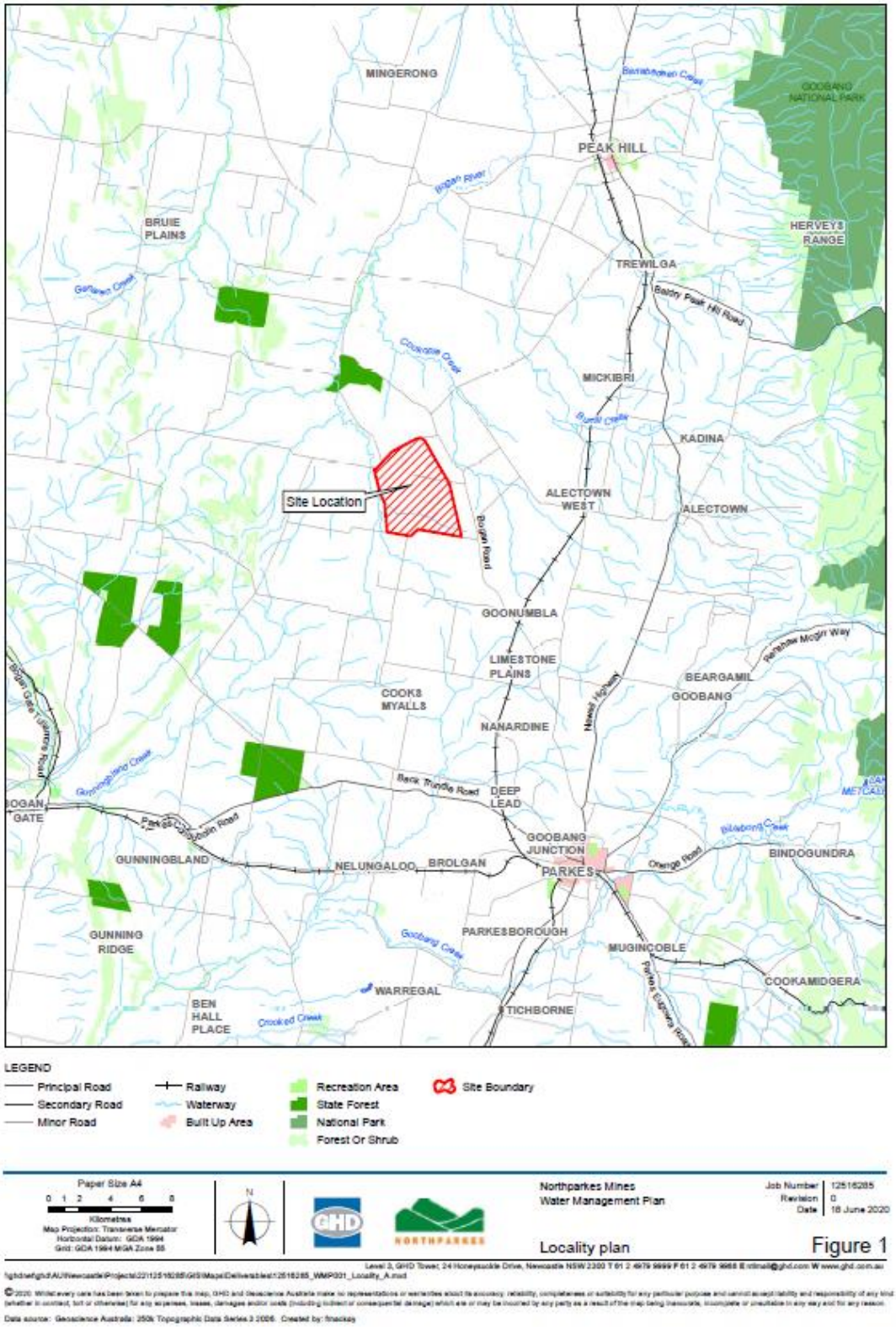

Figure 2 Site features

4. STATUTORY REQUIREMENTS

4.1 Environmental Planning and Assessment Act 1979

The EP&A Act, which is administered by the NSW Department of Planning, Industry and Environment (DPIE), is the core legislation relating to planning and development activities in NSW and provides the statutory framework under which development proposals are assessed. The Northparkes Step Change Project was granted approval under Part 3A of the EP&A Act in July 2014.

This WMP has been developed in accordance with Schedule 3, Condition 24 and Schedule 6, Condition 3 of DC 11_0060, as well as the Statement of Commitments (SOC) from the Northparkes Step Change Project Environmental Assessment (EA). Table 1 indicates where each component of the Conditions are addressed within this document.

Table 1 Water Management Plan requirements

Condition	Requirement	Section
Schedule 3 Condition 24	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:	Whole document
	a) be prepared in consultation with DPIE - Water and the EPA, by suitably qualified and experienced persons whose appointment has been approved by the Secretary;	Whole document
	b) be submitted to the Secretary for approval by 30 June 2014;	Whole document
	c) in addition to the standard requirements for management plans (condition 3 of Schedule 6), this plan must also include a: (i) Site Water Balance that: • Includes details of: - Sources and security of water supply, including contingency planning for future reporting periods; - Water use and management on site; - Reporting procedures, including the preparation of a site water balance for each calendar year; • Describes the measures that would be implemented to minimise clean water use on site;	5.1
	(ii) Surface Water Management Plan, that includes: • Detailed baseline data on water flows and quality in the waterbodies that could be affected by the project; • A detailed description of the water management system on site; • Detailed plans, including design objectives and performance criteria, for the: - Tailings storage facilities - Final voids (see the Rehabilitation Objectives in Table 8); • Detailed performance criteria for the following, including trigger levels for investigating any potential adverse impacts associated with the project; - The water management systems (clean, dirty and contaminated); - Downstream surface water quality; - Downstream flooding impacts; and - Stream and riparian vegetation health for Bogan River, Tenandra Creek, Goonumbla Creek and Cookopie Creek; • A program to monitor and report on:	Appendix B

Condition	Requirement	Section
	- The effectiveness of the water management systems (clean, dirty and contaminated); - Surface water flows and quality, stream and riparian vegetation health in the watercourses that could be affected by the project; and - Downstream flooding impacts; • Reporting procedures for the results of the monitoring program; and • A plan to respond to any exceedances of the performance criteria, and mitigate any adverse surface water impacts of the project;	
	(iii) Groundwater Management Plan, that includes: • Detailed baseline data on groundwater levels, yield and quality in the region and privately-owned groundwater bores that could be affected by the project; • Groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; • A program to monitor and report on: - Groundwater inflows to the block cave, sub-level cave and open cut mining operations; - The seepage/leachate from water storages, emplacement and final voids; - Background changes in groundwater yield/quality against mine-induced changes; - Impacts of the project on: - Regional and local (including alluvial) aquifers; - Groundwater supply of potentially affected landowners; and - Riparian vegetation; - A program to validate the groundwater model for the project, and comparison of monitoring results with modelled predictions; and - A plan to respond to any exceedances of the groundwater assessment criteria.	Appendix C
Schedule 6 Condition 3	The proponent shall ensure that the management plans required under this approval are prepared in accordance with the relevant guidelines, and include	
	a) detailed baseline data;	Surface Water Management Plan (Appendix B), Groundwater Management Plan (Appendix C)
	b) a description of	
	• the relevant statutory requirements (include any relevant approval, licence or lease conditions);	**Error! Reference source not found.**
	• any relevant limits or performance measures/criteria;	Surface Water Management Plan (Appendix B), Groundwater Management Plan (Appendix C)
	• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Surface Water Management Plan (Appendix B), Groundwater Management Plan (Appendix C)

Condition	Requirement	Section
	c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Surface Water Management Plan (Appendix B), Groundwater Management Plan (Appendix C)
	d) a program to monitor and report on the: • Impacts and environmental performance of the project; • Effectiveness of any management measures (see c above);	Surface Water Management Plan (Appendix B), Groundwater Management Plan (Appendix C)
	e) a contingency plan to manage any unprecedented impacts and their consequences;	5.4
	f) a program to investigate and implement ways to improve environmental performance of the project overtime;	5.4, 8
	g) a protocol for managing and reporting any; • incidents; • complaints; • non compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and	5.4, **Error! Reference source not found.**
	• A protocol for periodic review of the plan.	8

Statement of Commitments for Step Change Project Surface Water		
6.10.1	Northparkes will continue to manage its operations in accordance with its existing Water Management Plan, which will be updated to reflect the proposed amendments to the surface water catchments and additional monitoring and management measures. This will involve updates to the existing Northparkes Water Management Plan and environmental monitoring program.	This document
6.10.2	Additional catch drains will be developed around operational mining areas to intercept sediment-laden runoff and direct this material to new sediment dams. Consistent with the existing water management system, these works will seek to maintain separation between the three classifications of water on site (clean, dirty and contaminated water). To manage potential flood risk, Northparkes proposes to include a 1 m high bank at the toe of the proposed waste rock stockpiles which will incorporate the proposed catch drain.	Completed Surface Management Plan (Appendix B)
6.10.3	Northparkes will continue to manage contaminated water on site as a closed circuit process designed to manage runoff up to and including a 1 in 100 year average recurrence interval, 72 hour design storm event.	Ongoing Surface Water Management Plan (Appendix B)
6.10.4	All erosion and sediment control measures will continue to be carried out in accordance with the relevant guidelines for erosion and sediment control, including *Managing Urban Stormwater: Soils and Construction* (the Blue Book) Volume 1 (Landcom, 2004) and Volume 2E Mines and Quarries (DECC, 2008).	Ongoing Surface Water Management Plan (Appendix B)
6.10.5	The predicted annual water demands for Northparkes will remain consistent with the currently approved water demands with external sources of water accessed in accordance with existing approved and licensed extraction limits.	Ongoing Site Water Balance

Statement of Commitments for Step Change Project Groundwater		
6.9.1	Northparkes commit to the continuation of the existing approved groundwater monitoring program as part of the project.	Ongoing Groundwater Management Plan (Appendix C)
6.9.2	In additions to the continuation of the existing groundwater monitoring program, Northparkes commit to the following additional groundwater monitoring and management measures: • The extent of dewatering, impacts on current users and future resources will be monitored throughout the life of the project in accordance with a revised groundwater monitoring program. • Monitor dewatering volumes to verify that volumes are within licensed allocations. • Trigger levels, regarding declines in groundwater levels and the degradation of groundwater quality, will be reviewed to manage the potential impacts as part of the updated monitoring program. Where monitoring results indicate levels in excess of the trigger values, an investigation appropriate for the situation will be conducted to assess the need to implement management/mitigation/remedial measures. The existing water monitoring program will be updated for the project in accordance with relevant approval requirements.	Ongoing Groundwater Management Plan (Appendix C)

4.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the EPA. The objectives of the POEO Act are to protect, restore and enhance the quality of the environment.

The POEO Act achieves these objectives through reduction of pollution at source and monitoring and reporting of environmental quality. The POEO Act regulates and requires licensing for environmental protection, including for waste generation and disposal and for water, air, land and noise pollution.

Under the POEO Act, an EPL is required for premises at which a 'scheduled activity' is conducted. Schedule 1 of the POEO Act lists activities that are scheduled activities for the purposes of the Act.

Northparkes holds Environment Protection Licence (EPL) 4784 for the scheduled activity of 'mining for minerals' at the Northparkes Mines premises. EPL 4784 identifies two surface water discharge locations and six monitoring locations. For the groundwater monitoring locations, EPL 4784 also details groundwater monitoring requirements, including parameters, frequency, sampling method and testing method. There are no surface water monitoring requirements set by the licence.

4.3 Water Act 1912

The *Water Act 1912* is administered by DPIE Water and has historically been the main legislation for managing water resources in NSW. The *Water Act 1912* has been progressively phased out and replaced by water sharing plans (WSPs) under the *Water Management Act 2000* (WM Act), with the exception of monitoring bores.

Northparkes holds a number of bore licences under the Water Act 1912 for monitoring bores at Northparkes Mines, as detailed in Appendix D – Groundwater Management Plan.

4.4 Water Management Act 2000

The Water Management Act (WM Act) is administered by DPIE Water and NRAR. The aim of the WM Act is to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It is also intended to provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses as well as to provide for protection of catchment conditions. Fresh water sources throughout NSW are managed via WSPs under the WM Act. Key rules within the WSPs specify when licence holders can access water and how water can be traded.

An amendment to the WM Act (Section 60I) came into effect on 1 March 2013. This amendment provides that it is an offence for a person without an access licence to take, remove or divert water from a water source or relocate water from one part of an aquifer to another part of an aquifer in the course of carrying out a mining activity. Various activities are captured by the provisions of the amendment including mining, mineral exploration and petroleum exploration.

WSPs relevant to the Northparkes Mines site are The Macquarie Bogan Unregulated and Alluvial Water Sources and the NSW Murray Darling Basin Fractured Rock Groundwater Sources. Operations at Northparkes are supported by external water sources supplied by water regulated by the WSPs for the Lachlan Regulated River Water Source and the Lachlan Unregulated and Alluvial Water Sources.

Water access licences (WALs) and works approvals held by Northparkes are summarised in Table 2.

Table 2 Water access licences and works approvals

WAL	Water source	Management Zone	Category	Share components	Nominated works approval
43208	Lachlan Regulated River Water Source	That Part Of The Water Source Upstream Of Lake Cargelligo Weir	Regulated River (High Security)	1,305	70WA600026
43207			Regulated River (General Security)	3,463	
34955	Lachlan Fold Belt Mdb Groundwater Source		Aquifer	232	80WA718412
32138	Upper Lachlan Alluvial Groundwater Source	Upper Lachlan Alluvial Zone 3 Management Zone	Aquifer	1110	70CA613938
32120				1050	70CA613702
32004				1600	70CA613802
31969				1728	70CA613936
31963				700	70CA613868
31930				600	70CA613874
31850				500	70CA613780
31863		Upper Lachlan Alluvial Zone 5 Management Zone	Aquifer	534	70CA614066

4.5 Mining Act 1992

The objects of the *Mining Act 1992* are to encourage and facilitate the discovery and development of mineral resources in NSW, having regard to the need to encourage Ecologically Sustainable Development (ESD). In relation to water, the Act requires that Northparkes ensure effective rehabilitation of disturbed land and water and to ensure mineral resources are identified and developed in ways that minimise impact to the environment. Northparkes holds several Mining Leases (ML1247, ML1367, ML1641, ML1743) under this Act.

4.6 Guidelines and policies

4.6.1 NSW Aquifer Interference Policy

The NSW Aquifer Interference Policy (DPI 2012) clarifies the water licenscing and approval requirements for the taking of water from an aquifer by mining. A WAL is required if it is taken incidentally by the aquifer interference activity (such as groundwater filling a void). Sufficient WALs must be held to account for all water take, including the take of water that continues after mining until the aquifer system reaches equilibrium.

4.6.2 NSW State Groundwater Policy

The objective of the NSW State Groundwater Policy Framework Document (DLWC 1997) is to manage the State's groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW.
This management plan will seek to follow the principles of this policy and include groundwater triggers.

4.6.3 Australian and New Zealand Guidelines for Fresh Water Quality

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) provide guidance for assessing and managing ambient water quality in a wide range of water resource types and according to specified environmental values, such as aquatic ecosystems, primary industries, recreation and drinking water. A revised Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) was published in 2018 after a scientific review of the ANZECC (2000) guidelines.

5. WATER MANAGEMENT

This sections provides a brief outline of the various components of water management at Northparkes, as identified in the Document Hierarchy on page 3, and where to find further details if required.

5.1 Site water balance

Water is a finite and shared resource that is critical to Northparkes operations. Northparkes' water supply is from:

- External supply from the Lachlan River and the Lachlan borefield, in cooperation with Parkes Shire Council;
- Dirty and contaminated surface runoff captured, contained and recirculated by the surface water management system;
- Groundwater intercepted during underground and open cut mining operations.

Water is used for the following activities at Northparkes Mines:

- Ore processing;
- Underground mining;
- Dust suppression;
- Wash-down areas;
- Construction purposes;
- Exploration and evaluation; and
- Domestic use, including potable water.

A portion of water used is unavoidably lost to evaporation, copper concentrate or retained in tailings. The recycling of water from ore processing and mining is maximised to minimise the required external supply and so that Northparkes Mines is nil discharge site.

Northparkes maintains a site water balance model to track inputs, throughputs and outputs of water, based on observed rainfall, flow meters and water storage volumes. The Northparkes water balance is reviewed and updated as per requirements of DC 11_0060, each calendar year and reported through the Annual Review process.

The annual average water balance for the current operations at the site is summarised in Water access licences and works approvals.

Table 3 Annual average water balance

	Average annual flow (ML)
INFLOWS	
Raw water from Lachlan borefield and Lachlan River	3041
Direct rainfall and catchment runoff	1915
Groundwater intercepted by underground workings	153
TOTAL INFLOWS	**5109**
OUTFLOWS	
Evaporation	1513
Entrained in tailings	3027
Operational raw water losses, including dust suppression	211
Product concentrate	33
Potential off site discharges	23
TOTAL OUTFLOWS	**4808**
CHANGE IN STORAGE	
Build up of on site water inventory	301
TOTAL CHANGE IN STORAGE	**301**

Water access licences and works approvals shows an average annual increase in surface water inventory, which reflects a deliberate operational strategy to build up on site water inventory within water storage capacity not required for environmental containment as a contingency drought measure.

5.2 Surface water management

Surface water management at Northparkes Mines includes:

- Dams, drains, pumps and pipelines that divert clean water around and capture, contain and recirculate dirty and contaminated from the disturbed areas of the site.
- Surface water monitoring programs that identifies potential impacts of operations on the surrounding environment.

Surface water management is described in the Surface Water Management Plan (SWMP) in Appendix B, (PLN-0058).

5.3 Groundwater management

Groundwater management at Northparkes Mines includes:

- Pumps and pipelines for the extraction of groundwater intercepted in underground mining areas
- Monitoring bores and groundwater monitoring programs that identifies potential impacts of operations on the surrounding environment.

Groundwater management is described in the Groundwater Management Plan (GWMP) in Appendix C, (PLN-0057).

5.4 Trigger Action Response Plans

The Northparkes Flood & Drought Trigger Action Response Plans (TARPs) set out the actions and responses that will occur if the surface or groundwater impact assessment criteria are exceeded. Surface water triggers are based on the SRK report (2016) as described in the SWMP. TARPs are included in Appendix D, (PRO-0241).

6. REPORTING

Reporting requirements related to water management are summarised in Table 4 and detailed in this section.

Table 4 Northparkes reporting requirements.

Report	Frequency	Water Information Reported	Recipient
Internal monthly report	Monthly	Water management performance and targets	Northparkes Senior Leadership Department
Environmental Monitoring Summary	Quarterly	Monitoring results for surface water quality, groundwater quality and groundwater levels	Public via the Northparkes website
Community Consultative Committee	Biannual	Discussion of water management performance	Representatives from a cross-section of the community
Neighbours meeting	Biannual	Discussion of water management performance	Neighbours of Northparkes Mining Lease and Exploration Licence boundaries
Annual Return	Annual	Statement of Compliance and summary of monitoring and complaints recorded over the 12 month reporting period	Environment Protection Authority
Annual Review	Annual	Monitoring results for surface water quality, groundwater quality and groundwater levels; assessment of water management system performance	Government agencies; public via the Northparkes website
National Pollution Inventory	Annual	Monitoring results for surface water quality and groundwater quality	Shareholders; public via the Northparkes website

6.1 Incident reporting

Any incident which occurs within the Project Area or is associated with operations at Northparkes must be reported by the employee or contractor who has been associated with or witnessed the incident. The method for reporting the incident is outlined in the Northparkes Pollution Incident Response Management Plan (PIRMP).

In accordance with the requirements of EPL 4784 and the PIRMP, Northparkes, its employees or contractors must notify the EPA of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident. Notifications must be made in accordance with the PIRMP and include telephoning the Environment Line service on 131 555. Northparkes must also provide written details about the notification to the EPA within seven days of the incident.

Northparkes must notify DPIE - Water in writing immediately upon becoming aware of a breach of any conditions set out in WALs held by Northparkes

6.2 Environmental protection licence

In accordance with Section 66(6) of the POEO Act and requirements issued by the EPA, Northparkes must publish water quality monitoring data that has been collected as a result of EPL 4784 requirements. A summary of all monitoring results are made publicly available at the mine and on the Northparkes website and is updated on a quarterly basis.

6.3 Water access licences

Northparkes will keep a record of the volume of water extracted under its WALs (refer to Section 4.4). As required by the conditions set out in the licenses, the record must be kept for at least five years and be produced for inspection when requested by DPIE Water. The record must include the following details:

- The date and period of time during which water is taken under the licence.
- The volume of water taken.

- The water supply work approval number of the water supply work used to take the water; and
- The purpose for which the water was taken.

6.4 Complaints

In accordance with the requirements of EPL 4784, Northparkes must keep a record of any complaint made to Northparkes or any employee or agent of Northparkes in relation to pollution arising from any Northparkes activities. The record of complaint must be kept for at least four years and must include the following details:

- The date and time of the complaint.
- The method by which the complaint was made.
- Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
- The nature of the complaint.
- The action taken by Northparkes in relation to the complaint, including any follow up contact with the complainant.
- If no action was taken by Northparkes, the reasons why no action was taken.

6.5 Annual return

An annual return must be provided to the EPA in accordance with the requirements of EPL 4784 comprising a Statement of Compliance and a summary of monitoring and complaints recorded over the 12 month reporting period.

7. ANNUAL REVIEW

Northparkes will prepare an annual review that reviews the performance of operations at Northparkes against the requirements of the WMP, provides an overview of environmental management actions taken and summarises the monitoring results over the 12 month reporting period. The annual review typically includes the following elements specific to water management:

- Any amendments to licensing or statutory approvals.
- A summary of any complaints or incidents relating to the performance of the water management system.
- A summary of the monitoring results collected over the reporting period and assessment against any relevant criteria.
- A summary of the water take under all WALs held by Northparkes.
- An evaluation of any trends in the monitoring results occurring across the site.
- Identification of any discrepancies between the predicted and actual impacts of the Project and an analysis of the potential cause of any significant discrepancies;
- Any non-compliance recorded during the reporting period.
- An update of the site water balance.
- A summary of management actions to be implemented over the next year to improve the environmental performance of the project.

8. RESPONSIBILITIES

Personnel carrying out work under this water management plan must be familiar with the requirements of this document and comply with it in full. Roles and responsibilities for this WMP are detailed in Table 5.

Table 5 Roles and Responsibilities

Role	Responsibility
Managing Director/General Manager	• Provide resources required to implement the WMP
Mine Manager Production Manager	• Management and maintenance of water management infrastructure
People, Safety and Environment Manager	• Ensure the WMP is reviewed on an annual basis or any major changes in the operations.
Environment Team	• Undertake environmental monitoring as required • Investigate and water related incidents • Undertake required reporting (AR, EPL) and incident reporting
Risk Exposure Group - Environment	• Lead water management on site • Ensure coordination and progression of water related projects, actions and planning needs at the operation.

9. REVIEW

In accordance with Schedule 6, Condition 5 of DC 11_0060, within 3 months of:

- the submission of an Annual Review;
- the submission of an incident report;
- The submission of an audit; or
- Any modification to the conditions of DC 11_0060 (unless the conditions require otherwise),

Northparkes will review, and if necessary, revise this WMP. Where the review leads to revision of the plan, then within four weeks of the review, the revised document will be submitted to the Secretary for approval.

10. RELATED DOCUMENTS

Document Title	Doc ID No.
Northparkes Incident Reporting Procedure	PRO-0148
Environment Monitoring and Measuring Procedure	PRO-0150
Environment Monitoring and Measuring Schedule	REG-0008
Northparkes Surface Water Management Plan	PLN-0058
Northparkes Groundwater Management Plan	PLN-0057

11. REFERENCES

ANZECC and ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australia and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Default Guideline Values*. Australian and New Zealand Governments.

DECC (2008) *Managing Urban Stormwater: Soils and construction – Volume 2E Mines and Quarries,* Department of Environment and Climate Change.

DLWC (1997) *The NSW State Groundwater Policy Framework Document*, Department of Land and Water Conservation

DPI (2012) *NSW Aquifer Interference Policy,* Department of Primary Industries Office of Water

Landcom. (2004). *Managing Urban Stormwater: Soils and Construction Volume 1,* NSW Government

Umwelt (2013), *Environmental Assessment: Northparkes Mines Step Change Project*, prepared for North Mining Limited.

SRK report (2016) Water Quality Trigger Levels For Surface and Groundwater – Northparkes Mine

12. GLOSSARY

Term	Definition
Alluvial	Deposition from running waters.
Aquifer	The layer of rock that holds water and allows water to flow slowly through it.
Australian Height Datum	A common national surface level datum approximately corresponding to mean sea level.
Average recurrence interval	A statistical estimate of the average period in years between the occurrence of a flood of a given size or larger, e.g. floods with a discharge equivalent to the 1 in 100 year average recurrence interval flood event will occur on average once every 100 years.
Brackish water	Brackish water is water that has more salinity than fresh water, but not as much as seawater. Typically containing between 0.5 and 30 grams of dissolved salt per litre of water.
Block cave mining	A mining method in which an ore body is undercut by drilling and blasting and allowed to fall.
Bore	Constructed connection between the surface and a groundwater source that enables groundwater to be transferred to the surface either naturally or through artificial means.
Catchment	The land area draining through the main stream and tributary streams to a particular location.
Clean water	Water that has not come into physical contact with areas associated with mining, ore processing or tailings storage.
Contaminated water	Water associated with mining, ore processing and tailings storage.
Datum	A level surface used as a reference in measuring elevations.
Dewatering	Transfer of water from underground workings to the surface.
Dirty water	Water that contains an elevated sediment load.
Discharge	Quantity of water per unit of time flowing in a stream, for example cubic meters per second or megalitres per day.

Term	Definition
Drawdown	A reduction in piezometric head within an aquifer.
Electricity conductivity	A measure of the concentration of dissolved salts in water.
Ephemeral	Stream that is usually dry, but may contain water for rare and irregular periods, usually after significant rain.
Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or overland runoff before entering a watercourse and/or coastal inundation resulting from super elevated sea levels and/or waves overtopping coastline defences.
Fractures	Cracks within the ground strata, either natural or resulting from underground mining works.
Groundwater	Water in a saturated zone, stratum or aquifer beneath the surface of the land.
Guideline	Numerical concentration or narrative statement that provides appropriate guidance for a designated water use or impact.
Hardness	The concentration of multivalent cations present in water. Generally hardness is a measure of the concentration of calcium and magnesium ions in water and is expressed in units of calcium carbonate ($CaCO_3$) equivalent. Hardness may influence the toxicity and bioavailability of substances in water.
Hydraulics	The physics of channel and floodplain flow relating to depth, velocity and turbulence.
Hydrogeology	The area of geology that deals with the distribution and movement of groundwater in soils and rocks.
Hydrology	The study of rainfall and surface runoff processes.
Infiltration	Natural flow of surface water through ground surfaces as a result of rainfall events.
pH	Value taken to represent the acidity or alkalinity of an aqueous solution. It is defined as the negative logarithm of the hydrogen ion concentration of the solution.
Potable water	Water of a quality suitable for drinking.
Riparian	Pertaining to, or situated on the bank of a river of other water body.
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.
Runoff	Amount of rainfall that ends up as streamflow.
Sediment	Soil or other particles that settle to the bottom of lakes, rivers, oceans and other waters.
SILO	An enhanced climate data bank based on historical climate data from 1889 provided by the Bureau of Meteorology. Records are mainly based on observed data, with interpolation where there are data gaps.
Surface water	Water that is derived from precipitation or pumped from underground and may be stored in dams, rivers, creeks and drainage lines.
Tailings	The by-product resulting from the processing of ore.
Topography	Representation of the features and configuration of land surfaces.
Trigger value	The concentration or load of physicochemical characteristics of an aquatic ecosystem, below which there exists a low risk that adverse ecological effects will occur. They indicate a risk of impact if exceeded and should 'trigger' action to conduct further investigations or to implement management or remedial processes.
Underground water	Water stored in underground aquifers. During the mining process a proportion of this water is released and managed by the underground settling and pumping system.

13. APPENDICIES

Appendix A – Regulatory correspondence

On 1 September 2015, Northparkes received comments from Department of Planning and Environment (DPE) requesting Northparkes to amend additional information in the Water Management Plan. The comments are detailed in Table 6 along with Northparkes responses for each component of the Condition addressed within this document.

Table 6 Regulatory comments

Comment	Response
The WMP is still in draft form	Finalised
Include missing figures in the document	Figures included in finalised document
Include revision pages for all sub-plans	Included
Provide clear distinction between subplans required. Appendices for the whole plan (which are the subplans) can be confused with the appendices for the sub plans	Noted and changes made.
Have all EPA and DPI Water comments/recommendations been incorporated.	Included in Table 6

On 26 November 2015, Northparkes received comments from the DPE requesting Northparkes to amend further changes with the Management Plan submitted in October 2015. The comments are detailed in Table 7 along with Northparkes responses for each component of the Condition addressed within this document.

Table 7 Regulatory comments on 26 November 2015

Comment	Response
References to NSW Office of Water (NOW) to be updated to DPI Water.	Updated.
As detailed in previous correspondence, Table 3 which displays *Water Act 1912* licences includes only a subset of current licences held at the site. It is recommended the complete list of licences provided with the previous response and attached to this response be reviewed. Where bores have been decommissioned notification is required to DPI Water to cancel relevant licences.	All bore licence information is provided in the GWMP.
It is recommended Section 10.1 and 10.2 which relates to exceedances of surface and groundwater triggers also include DPI Water as a notification agency.	Amended. Regulator notification is now managed as part of the TARPs in Appendix G.
Section 11.2 refers to Northparkes's requirement to keep a record of volumes related to WALs for water extraction at the Lachlan borefield and the Lachlan River. This section also needs to include a reference to the requirement for record keeping associated with WALs for water take in the pits and the underground.	Complete. WALs information is addressed in Section 11.2 [now Section 4.4]

On 21 April 2016, Northparkes received comments from the DPE requesting Northparkes to amend further changes with the Management Plan to include EPA comments. The comments are detailed in Table 8 along with Northparkes responses for each component of the Condition addressed within this document. Additional comments from EPA were received on the WMP, Groundwater Management Plan and Surface Water Management Plan following the submission of updated documents on 20, October 2016. These comments are detailed in Table 9.

Table 8 Regulatory comments on 21 April 2016

Aspect	EPA Comment	Response
Surface water quality trigger criteria	*"In the event that the site is required to undertake controlled discharges from the mine, the identification of site-specific trigger values should be determined to indicate the required values that should be met of the water expected to be discharged."* The EPA notes that no controlled discharges are proposed and advises that any controlled discharges would require an application for a licence variation and will not be considered as part of the current proposal.	Northparkes advises that there will be no controlled discharge from the mine. In the event of any controlled discharge, Northparkes will liaise with EPA for approval or licence variation where necessary.
	The proposed trigger criteria are intended to prompt management actions in response to contamination of the clean water system, dirty water system, and groundwater. The Plan does not provide an appropriate description of how the trigger criteria were calculated, but it appears that a conservative approach was not taken. Trigger criteria were selected from local watercourse site data or an ANZECC trigger, whichever value was furthest from the ideal range. The Plan indicated that two of the five watercourse sites used to derive site specific trigger criteria were typically dry and were only included In limited sampling rounds. Data from these two sites were the basis for 15 of the 26 trigger criteria. Some of the resulting trigger criteria are very high, including turbidity, copper, aluminium, and iron, being 52, 49, 1179, and 170 times the relevant ANZECC (2000) trigger values respectively. This suggests that some of the watercourse sites may have potentially been Impacted by contamination from mining operations.	In April 2016, Northparkes engaged SRK Consulting Pty Ltd to review the previous trigger levels. The revised surface water trigger values have been determined by statistical analysis of the historical water quality record for a specific sampling location or grouping of locations.
	If the trigger criteria are Intended to provide an early warning of contamination so as to trigger management actions, then values should be set conservatively, providing an indication of where levels fall outside the ambient range and pose a risk. The EPA recommends that if local data are used to develop trigger criteria, then reference sites that have not been affected by mining operations and where sufficient monitoring data is available should be used. This should be done in-line with ANZECC (2000), and the methodology used should be explained in the Plan. Alternatively, the default triggers provided in ANZECC (2000) should be used as trigger criteria for clean area farm dams and watercourses.	In April 2016, Northparkes engaged SRK Consulting Pty Ltd to review the previous trigger levels. The revised surface water trigger values have been determined by statistical analysis of the historical water quality record for a specific sampling location or grouping of locations.
Groundwater trigger criteria	The plan indicates that the ANZECC (2000) livestock drinking water triggers will be applied to data from some monitoring bores, while "*for all other monitoring bores the trigger criteria have been determined from statistical analysis of historical water quality data*". The plan should explain how the trigger criteria were calculated.	Groundwater quality trigger criteria developed based on the stock drinking guidelines and statistical analysis of historical data. Refer to GWMP in Appendix D.
Monitoring	The Plan proposes that monitoring of surface water will occur at a minimum frequency of once yearly for farm dams, watercourses and the contaminated water system (for most analytes). The EPA recommends that, where there is sufficient water to sample, surface water and groundwater should be monitored quarterly at a minimum.	Amended. The surface water monitoring program in Appendix C includes quarterly monitoring for all surface water monitoring locations.

Aspect	EPA Comment	Response
	The Plan also proposes surface water quality monitoring should only be undertaken when a sample depth of at least 0.3m can be achieved. The EPA recommends that, rather than setting a minimum depth requirement, surface water quality monitoring should be undertaken in such a way as to avoid disturbing bottom sediments or sampling surface material. This will increase the number of samples that may be collected.	Amended. The surface water monitoring program in Appendix C includes a procedure for sampling surface face without disturbing the bottom sediments.
Triggers and Management Responses	The Plan proposes that surface water quality stage 1 and stage 2 triggers will be reached after a trigger criterion is exceeded for 2 monitoring rounds. The EPA recommends that the triggers should be reached when a trigger criterion is exceeded once, reducing the management response time from 6 to 3 months if surface water Is monitored quarterly.	Amended. Stage 1 trigger based on a single exceedance as per TARPs in Appendix G..
	The Plan proposes that groundwater quality stage 1 and stage 2 triggers will be reached after a trigger criterion is exceeded for 2 and 4 monitoring rounds respectively. The EPA recommends that the stage 1 trigger should be reached when a trigger criterion Is exceeded once, while the stage 2 trigger should be reached when a trigger criterion is exceeded for 2 monitoring rounds, reducing the management response time from 12 to 6 months if groundwater Is monitored quarterly.	Amended. Stage 1 trigger based on a single exceedance as per TARPs in Appendix G..
	The management actions proposed as responses to surface water and groundwater quality triggers appear inadequate. The EPA recommends that management responses should Include a requirement for the proponent to report to and consult with relevant agencies in response to deteriorating water quality in watercourses, farm dams, and groundwater.	Amended. Notification and consultation with regulators included in TARP responses in Appendix G.
Cross-contamination of the contaminated, dirty and clean water systems	The EPA considers that the potential for contamination of the clean and dirty water systems has not been adequately addressed in the Plan. The Plan did not provide detailed monitoring results and only included general discussions comparing water quality at monitoring sites to "water quality objectives". The "water quality objectives" were not appropriate reference values to identify contamination, being based on data collected during 2009-2011 and potentially influenced by site operations.	All water quality monitoring results are reported in Annual Environment Monitoring Report, Quarterly Environment Report and EPL Annual Returns annually. Monitoring results are compared to trigger values as described in the TARPs in Appendix G.
Clean water system	The Plan should examine whether contamination of the clean water system has occurred and/or is occurring, providing a comparison of surface water quality against the ANZECC (2000) default triggers or site specific triggers. If site specific triggers are to be used, these should be developed In line with ANZECC (2000) and the methodology explained in the Plan. If contamination is suspected In the Clean water system, potential causes should be explored and management responses proposed in the Plan.	No indication of contamination of receiving water was identified during the EA assessment or the SRK (2016) trigger report. The trigger levels including for Cu, EC and TDS for the clean water system have been set considerably lower than for the other water management systems. This will indicate if there is any contamination of the clean water system.

Aspect	EPA Comment	Response
Dirty water system	The EPA recommends that any assessment of the dirty water system should focus on contaminants likely to be generated from contamination and ore processing areas, rather than disturbed areas alone. The EPA considers that some components of the dirty water system may be contaminated, with levels of some contaminants greater than would be expected for run-off from uncontaminated disturbed areas. The Plan proposes that "dirty water" storages at the site should be designed based on Volume 2E of "Managing Urban Stormwater, Soil and Construction" and therefore the overflow frequency is related to erosion and sediment control. Volume 2E states that: "Areas where runoff may be polluted by contaminants other than sediment should be provided with separate drainage and treatment facilities". Volume 2E overflow frequency is, therefore, not appropriate for waters that have elevated levels of contaminants. Accordingly, the EPA considers that the proposed design and operation of the dirty water system is not appropriate to prevent discharge of contaminated water. The EPA recommends that management action is implemented to reduce current levels of contaminants in dirty water storages and prevent levels of contaminants returning to elevated levels. Until this management action occurs it is recommended that the dirty water system is managed as part of the contaminated water system. Specifically, the dirty water system should have a nil discharge requirement with an overflow frequency consistent with a contaminated water area rather than a sediment control area.	Northparkes has undertaken an upgrade of the water infrastructure onsite. Refer to Appendix C. Further upgrades and reviews of the water management system will occur as a response to changes in site layout, i.e. tailings dams wall lifts or rehabilitation commencement/completion.

Table 9 EPA Comments 24 November 2016

EPA Comment	Response
Water Management Plan	
The Site Water Balance should be reviewed and updated annually. Where is this described?	Refer to Section **Error! Reference source not found.**
Main report section 5.0 references WALS in Appendix G but they are not listed in Appendix G.	WALs held by Northparkes are summarised in Section 4.4
Section 8.4 includes an incomplete sentence.	Sentence updated.
Surface Water Management Plan	
Given Caloola Ponds are located on the boundary and relatively near Cookopie Creek, is any monitoring proposed for the ponds/creek?	The surface water monitoring program included in Surface Water Management Plan (Appendix C) updated to include two additional monitoring locations WC15 and WC16.
Clarify monitoring frequency in Table 7.	Quarterly monitoring frequency is specific in the surface water monitoring program included in Surface Water Management Plan (Appendix C).
How will water course stability be measured and monitored? Section 8.5 of the main report refers to a field monitoring sheet template which does not appear to be included in the WMP or appendices. Will photographic records be used? Section 8.5 of the main reports suggests so, but section 10.2 of the SWMP is more ambiguous on that question.	The Surface Water Management Plan (Appendix C) includes a field monitoring sheet for watercourse stability. The watercourse stability monitoring program in the Surface Water Management Plan (Appendix C) includes a requirement for photograph to be taken of water course assessments..
Groundwater Management Plan	
Section 12.1.2 is not clear. An AEMR should be completed annually.	The requirements of the Annual Review are included in Section **Error! Reference source not found.**.

Table 6 EPA Comments 16 March 2017

EPA Comments	Response
The proposed trigger value criteria appear appropriate. As recommended in the SRK report, the 2-3 sigma approach should be reviewed and updated on an annual basis to assess its reliability and robustness in detecting change.	Section **Error! Reference source not found.** provides a mechanism to review the trigger values.
Under the proposed Trigger Exceedance Response Plan, there is no specific action required in response to a Stage 1 exceedance under either surface water or groundwater monitoring requirements. It is recommended that, at a minimum, a consecutive Stage 1 exceedance should trigger a response equivalent to a Stage 2 exceedance to ensure that the exceedance is investigated and an appropriate management response provided.	The TARPS in Appendix F include a trigger for consecutive Stage 1 response to escalate to Stage 2 Trigger
As indicated in the EPA's letter, the EPA considers that some components of the dirty water system are likely to be contaminated with levels of some contaminants greater than would be expected for run-off from uncontaminated disturbed areas.	The Surface Water Management Plan in Appendix C documents the upgrades to achieve the design criteria of each storage in the surface water management system undertaken to date.

EPA Comments	Response
Page 16 of the WMP states that the dirty water storages are designed based on a 1hr, 20yr ARI. The SWMP refers to design criteria for dirty water storages being sized to capture 90th percentile 5 day management period rainfall (table 10). Following this, the SWMP (section 13.1.3 Settlement and retention pond upgrades) refers to upgrades being conducted at some components of the Northparkes Water Management System. It is unclear if this includes all the components of the dirty water system	The upgrades to the site Retention ponds and Sediment ponds has been based various assessment, including internal risk assessment. These upgrades are ongoing and are staged based on risk and capital planning. The Surface Water Management Plan in Appendix C documents the upgrades to achieve the design criteria of each storage in the surface water management system undertaken to date.
It is recommended that Northparkes clarify which dirty water system components are sized based on managing contaminated water (eg 1hr, 20 yr ARI) and which components of the dirty water system will be upgraded as part of ongoing site upgrades and responses to site layout changes.	The Surface Water Management Plan in Appendix C documents the upgrades to achieve the design criteria of each storage in the surface water management system undertaken to date.

Appendix B – Surface Water Management Plan

Appendix C – Groundwater Management Plan

Appendix D - Trigger Action Response Plans

Aspect	Normal	Stage 1	Stage 2
Drought Refer to Water Infrastructure Procedure and Tailings Storage Facility and Operational Water Emergency Management (Flood & Drought) TARP for operational details.	**Normal Trigger**: Water inventory steady or increasing over last 6 months **Response**: Continue to maximise water recycling and minimise requirements for external water.	**Stage 1 Trigger** Water inventory falling over last 6 months. **Response**: Review opportunities to further reduce water usage and maximum recycling. Alert Environmental Superintendent Alert Site Manager	**Stage 2 Trigger** Drought declaration issued by the NSW Government. Water inventory falling over last 12 months. **Response:** Review opportunities to further reduce water usage and maximum recycling. Review production schedule and construction activities. Alert Environmental Superintendent Alert Site Manager
Flood Refer to Water Infrastructure Procedure and Tailings Storage Facility and Operational Water Emergency Management (Flood & Drought) TARP for operational details.	**Normal Trigger:** No significant rainfall events forecast. **Response:** Maintain and operate water storages in accordance with Northparkes procedures.	**Stage 1 Trigger** Significant rainfall event forecast (>50 mm) **Response:** Inspect water management infrastructure. Alert Environmental Superintendent Alert Site Manager	**Stage 2 Trigger** Rare rainfall event forecast (>100 mm) **Response:** Inspect water management infrastructure. Prioritise personnel and resources for site water management Alert Environmental Superintendent Alert Site Manager
Emergency discharges	**Normal Trigger:** Storages within management levels defined within the Tailings Storage Facility and Operational Water Emergency Management TARP. **Response:** Continue to undertake the management measures within the Tailings Storage Facility and Operational Water Emergency Management TARP and Water Infrastructure Procedure	**Stage 1 Trigger** **(for consecutive Stage 1 triggers escalate to Stage 2)** Emergency discharge from sediment pond. **Response:** Investigate cause for emergency discharge and whether the appropriate procedures were followed. Undertake dewatering of relevant storages to areas water storage capacity exists. Undertake additional surface water quality monitoring rounds of downstream watercourses. Alert Environmental Superintendent Alert Site Manager	**Stage 2 Trigger** Retention pond emergency discharge into a watercourse or offsite **Response:** Investigate cause for emergency discharge and whether the appropriate procedures were followed. Undertake dewatering of relevant storages to areas water storage capacity exists. Undertake additional surface water quality monitoring rounds of downstream watercourses and retention ponds Alert Environmental Superintendent Alert Site Manager Implement PIRMP including notify EPA Notify DPIE Water, NRAR and EPA

Aspect	Normal	Stage 1	Stage 2
Surface water quality - Watercourses and farm dams	**Normal Trigger:** Surface water quality within historical average for all parameters. **Response:** Continue water quality monitoring in accordance with the program.	**Stage 1 Trigger** **(for consecutive Stage 1 triggers escalate to Stage 2)** Surface water quality concentrations outside of the Stage 1 Water Quality Trigger Levels for at least one parameter for more than one monitoring round. **Response:** Investigate the source for the change in surface water quality and whether it is caused from environmental change, mining related or external. Undertake further checking of equipment and resample if required to confirm reported value Alert Environmental Superintendent	**Stage 2 Trigger** Surface water quality concentrations outside of the Stage 2 Water Quality Trigger Levels for at least one parameter for more than one monitoring round. **Response:** Investigate the source for the change in surface water quality and whether it is caused from environmental change, mining related or external. Undertake further checking of equipment and resample if required to confirm reported value Alert Environmental Superintendent Alert Site Manager **Stage 2 Trigger** Investigation indicates deterioration in off-site water quality is due to Northparkes activities. **Response:** Notify DPIE Water, NRAR and EPA. Take reasonable and feasible steps to minimise potential harm to the environment.
Surface water quality - sediment ponds, retention ponds and process water systems	**Normal Trigger:** Surface water quality within historical average for all parameters. **Response:** Continue water quality monitoring in accordance with the program.	**Stage 1 Trigger** **(for consecutive Stage 1 triggers escalate to Stage 2)** Surface water quality concentrations outside of the Stage 1 Water Quality Trigger Levels for at least one parameter for more than one Monitoring round. **Response:** Investigate the source for the change in surface water quality and whether it is caused from environmental change, mining related or external. Alert Environment Superintendent. Undertake further checking of equipment and resample if required to confirm reported value Alert Environmental Superintendent	**Stage 2 Trigger** Surface water quality concentrations outside of the Stage 2 Water Quality Trigger Levels for at least one parameter for more than one monitoring round. **Response:** If possible isolate the problem area through diverting contributing surface flows to another appropriate storage, while the cause for the water quality exceedances are determined. Investigate the source for the change in surface water quality and whether it is caused from environmental change, mining related or external. Alert Environmental Superintendent Alert Site Manager

Aspect	Normal	Stage 1	Stage 2
Erosion and sediment control	**Normal Trigger:** Site inspections do not identify any unstable disturbance areas, or migration of sediment away from designated development areas. **Response:** Continue site inspections in accordance with the program in Section 7.	**Stage 1 Trigger:** **(for consecutive Stage 1 triggers escalate to Stage 2)** One or more areas have indicated surface erosion in the form of rilling, bank erosion or other movement of sediment from an area of disturbance. **Response:** Seek to stabilise the area to stop the erosion process. This can include the use of groundcover, or other temporary measures. Investigate works undertaken prior to the disturbance activities. Alert Environmental Superintendent	**Stage 2 Trigger** Stage 1 trigger leading to erosion or deposition of sediment in a watercourse. **Response:** Seek to stabilise the area to stop the erosion process. This can include the use of groundcover, or other temporary measures. Investigate works undertaken prior to the disturbance activities. If possible isolate the problem area through diverting contributing surface flows to another appropriate storage, while the cause for the water quality exceedances are determined. Alert Environmental Superintendent Alert Site Manager Notify DPIE Water, NRAR and EPA
Watercourse instabilities	**Normal Triggers:** Watercourse monitoring indicates no areas of instabilities from visual inspections. **Response:** Continue site inspections in accordance with the program.	**Stage 1 Trigger:** **(for consecutive Stage 1 triggers escalate to Stage 2)** Watercourse monitoring indicates one or more areas of instabilities in watercourses. **Response:** Seek to stabilise the instabilities, which may include advice from a geomorphic specialist. Investigate cause for instabilities, and whether recent construction works have created the instability. Alert Environmental Superintendent	**Stage 2 Trigger:** Watercourse monitoring indicates one or more areas of instabilities in watercourses causing sediment loads to migrate and or impact to riparian vegetation. **Response:** Seek to stabilise the instabilities, which may include advice from a geomorphic specialist. Investigate cause for instabilities, and whether recent construction works have created the instability. Alert Environmental Superintendent Alert Site Manager Notify DPIE Water, NRAR and EPA

Monitoring Parameter	Normal	Stage 1	Stage 2
Groundwater Quality	**Normal Trigger:** Groundwater quality is within trigger levels **Response:** Continue to monitor on a quarterly basis.	**Stage 1 Trigger:** **(for consecutive Stage 1 triggers escalate to Stage 2)** Groundwater quality is outside the exceed Stage 1 Water Quality Trigger Levels for at least one parameter. **Response:** Investigate if change in groundwater level is due to Northparkes activities. Consider site activities, historical baseline and results from nearby locations. Take further sample to verify results. Alert Environmental Superintendent **Stage 1 Trigger**: Complaint from adjacent bore owner regarding groundwater quantity or quality. **Response:** Alert Environmental Superintendent. Sample affected bore if possible. Sample surrounding bores if possible. Investigate degradation of groundwater quality.	**Stage 2 Trigger**: Groundwater quality is outside Stage 1 Water Quality Trigger Levels for at least one parameter for more than 4 monitoring rounds or exceeds Stage 2 trigger levels. **Response:** Investigate if change in groundwater quality is due to mining related activity. Consider site activities, historical baseline and results from nearby locations. Take further sample to verify results. Alert Environmental Superintendent Alert Site Manager **Stage 2 Trigger**: Investigation identifies that exceedance is the result of Northparkes activities. **Response:** Notify DPIE Water, NRAR and EPA. Take reasonable and feasible steps to minimise potential harm to the environment.

Monitoring Parameter	Normal	Stage 1	Stage 2
Groundwater Level	**Normal Trigger:** Groundwater level is within typical range of historical and climatic average. **Response:** Continue to monitor on a quarterly basis.	**Stage 1 Trigger:** Depth to groundwater of regional bore exceeds Stage 1 Groundwater Level Trigger Values. (for consecutive Stage 1 triggers escalate to Stage 2) **Response:** Investigate if change in groundwater quality is due to mining related activity. Consider site activities, historical baseline and results from nearby locations. Take further sample to verify readings Alert Environmental Superintendent **Stage 1 Trigger:** Complaint from adjacent bore owner regarding groundwater level. **Response:** Compare groundwater level to Groundwater trigger levels. Investigate if change in groundwater level is due to mining related activity. Consider site activities, historical baseline and results from nearby locations. Take further sample to verify readings Alert Environmental Superintendent	**Stage 2 Trigger:** Depth to groundwater of regional bore exceeds Stage 2 Groundwater Level Trigger Values. **Response:** Investigate if change in groundwater level is due to mining related activity. Consider site activities, historical baseline and results from nearby locations. Take further sample to verify readings Alert Environmental Superintendent Alert Site Manager **Stage 2 Trigger:** Investigation identifies that exceedance is the result of Northparkes activities. **Response:** Notify DPIE Water, NRAR and EPA. Take reasonable and feasible steps to minimise potential harm to the environment.