

Intended for
Hydro Aluminium Kurri Kurri Pty Ltd

Document type
Report

Date
December, 2020

KURRI KURRI ALUMINIUM SMELTER DECOMMISSIONING, DEMOLITION AND REMEDIATION LEACHATE MANAGEMENT PLAN

KURRI KURRI ALUMINIUM SMELTER DECOMMISSIONING AND DEMOLITION LEACHATE MANAGEMENT PLAN

Ref **318000533**
Document ID **Hydro Kurri Kurri SWMP_Appendix 1_FINAL Leachate
Management Plan_20201223**
Revision **Final**
Made by **C Whitehill**
Checked by **S Taylor**
Approved by **F Robinson**
Description **Ramboll was engaged by Hydro Aluminium Kurri Kurri Pty Ltd to
prepare an Environmental Management Plan (EMP) to describe
how environmental management will be undertaken at the former
Hydro Aluminium Kurri Kurri aluminium smelter at Hart Road
Loxford, NSW and the surrounding land owned by Hydro. This
Leachate Management Plan (LMP) forms a component of the
SWMP.**

Ramboll Australia
Level 2, Suite 18
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
T +61 2 4962 5444
www.ramboll.com

CONTENTS

ACRONYMS AND ABBREVIATIONS	I
GLOSSARY	II
1. INTRODUCTION	1
1.1 Background	1
1.2 Objectives	1
1.3 Purpose and Scope	1
1.4 Regulatory Requirements	1
1.4.1 Development Consent	1
1.4.2 Environmental Protection Licence	1
2. EXISTING ENVIRONMENT AND POTENTIAL IMPACTS	3
2.1 Groundwater	3
2.2 Surface Water	3
2.3 Leachate	4
2.3.1 Capped Waste Stockpile	4
2.3.2 Containment Cell	4
2.3.3 Dickson Road South	4
2.3.4 Leachate Storage and Treatment	5
2.3.4.1 Leachate Storage	5
2.3.4.2 On Site Treatment Plant	5
2.3.4.3 Off Site Leachate Treatment	5
3. IMPLEMENTATION	7
3.1 Roles and Responsibilities	7
3.2 Management Measures	8
4. MONITORING AND REVIEW	12
4.1 Monitoring	12
4.1.1 Leachate Monitoring	12
4.1.2 Surface Water	12
4.1.3 Groundwater Monitoring	12
4.1.4 Monitoring Program	12
4.1.5 Soil and Water Management	12
4.2 Reporting	12
4.3 Non-conformances	12
4.4 Complaints	13
4.5 Review and Improvement	13
5. REFERENCES	14
6. LIMITATIONS	15
6.1 User Reliance	15

FIGURES

Figure 2-1 Location of Leachate Management Infrastructure 6

TABLES

Table 1-1: Relevant EPL Conditions 2
Table 3-1: Hydro Personnel and Environmental Management Responsibilities..... 7
Table 3-2: Leachate Management Measures..... 9

ACRONYMS AND ABBREVIATIONS

AEP	Annual Exceedance Probability
EC	Electrical Conductivity
EMP	Environmental Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
F	Fluoride
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
LMP	Leachate Management Plan
SSD	State Significant Development
SWMP	Soil and Water Management Plan
TDS	Total Dissolved Solids
Total CN	Total Cyanide
TSS	Total Suspended Solids
TWTP	Temporary Water Treatment Plant
WHS	Workplace Health and Safety

GLOSSARY

Council	Cessnock City Council
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
Hydro Land	The land owned by Hydro Aluminium Kurri Kurri Pty Ltd which includes the Smelter and surrounding land.
Remediation	Remediation of contaminated land and soils at the Smelter and on Hydro Land, including the construction of a Containment Cell as addressed in the State Significant Development application to the Department of Planning and Environment SSD 6666.
Stage 1 Demolition	Demolition of Smelter buildings addressed in the development application to Cessnock City Council 8/2015/399/1.
Stage 2 Demolition	Demolition of Smelter buildings, three concrete stacks, a water tower, subsurface structures to 1.5m below ground surface and operation of a concrete crushing plant addressed in the development application to Cessnock City Council 8/2018/46/1.
The Smelter	The former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter at Hart Road, Loxford.

1. INTRODUCTION

1.1 Background

This Leachate Management Plan (LMP) has been prepared by Ramboll Australia Pty Ltd on behalf of Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to support the Soil and Water Management Plan (SWMP) and the Environmental Management Plan (EMP) for the decommissioning, demolition and remediation activities at the former Hydro Aluminium Kurri Kurri Smelter (the Smelter) at Hart Road Loxford and the management of the surrounding land owned by Hydro (the Hydro Land).

1.2 Objectives

The objectives of this LMP are to:

- Detail how leachate from the Containment Cell, Capped Waste Stockpile and the Dickson Road Landfill will be managed to protect water quality within and surrounding the Smelter during the material removal and the placement of material in the Containment Cell.
- Provide a program to monitor leachate generation and quality
- Provide a mechanism to assess performance against the relevant assessment criteria.
- Detail the requirement for reporting exceedances of assessment criteria.
- Establish the roles and responsibilities of all parties involved in leachate management.
- Establish supervision, monitoring and reporting framework for the LMP.

1.3 Purpose and Scope

The purpose of the LMP is to:

- Specify procedures for leachate management during remediation of the Capped Waste Stockpile and other contaminated areas, and the placement of material into the Containment Cell
- Satisfy the relevant conditions of the Development Consent for State Significant Development (SSD) 6666 relating to remediation activities and specifically leachate management.

The LMP reflects the design and operational procedures of the Containment Cell leachate collection and management system detailed in the *Containment Cell Detailed Design Report* (GHD, 2018) and measures described in the *Response to Submissions Report: Former Hydro Aluminium Kurri Kurri Smelter Remediation* (Ramboll, 2020) (the RtS).

1.4 Regulatory Requirements

1.4.1 Development Consent

The development consent for SSD 6666 does not include specific conditions relating to leachate management. However as required by condition A2, leachate management will be undertaken in accordance with the Environmental Impact Statement (EIS) and the RtS. This LMP has been prepared to describe how the leachate management measures described in the EIS and RtS will be implemented.

1.4.2 Environmental Protection Licence

The *Protection of the Environment Operations Act 1997* (POEO Act) requires any person carrying out scheduled work (as described in Schedule 1 of the POEO Act) to obtain an environment protection licence (EPL) that authorises that work to be carried out at the premises.

Hydro holds Environment Protection Licence (EPL) No. 1548 for the Smelter operations. The EPL contains conditions relating to the groundwater interception trench and leachate management system association with the Capped Waste Stockpile. A list of the EPL conditions related to leachate management and where they are addressed in this document are outlined in **Table 1-1**.

Table 1-1: Relevant EPL Conditions

No.	Condition	Location in LMP
L1	Pollution of waters	Section 2
O5	Processes and management	Section 0
M1	Monitoring records	Section 4.1
R1	Annual return documents	Section 4.1
E1	Groundwater interception and monitoring - Capped Waste Stockpile	Section 2.3 and Section 4.1.3

In addition, the plan aims to comply with the following legislation and guidelines:

- *Environmental Planning and Assessment Act 1979*
- *Protection of the Environment Operations Act 1997*
- *Protection of the Environment Operations (Waste) Regulation 2014*
- *Water Management Act 2000*
- *Water Act 2012*
- *National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)*
- *Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004)*
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination (DEC, 2007)*

2. EXISTING ENVIRONMENT AND POTENTIAL IMPACTS

2.1 Groundwater

Groundwater within the Smelter site has been impacted by Smelter activities primarily due to leaching of fluoride and aluminium from smelter materials into groundwater.

Groundwater immediately down gradient of the Capped Waste Stockpile has been impacted by leachate generated from contact of wastes in the Capped Waste Stockpile with shallow groundwater and from the infiltration of water through the Capped Waste Stockpile (prior to capping). The leachate plume extends approximately 350m north east of the eastern toe of the Capped Waste Stockpile and is characterised by elevated fluoride, cyanide and sodium concentrations and by a high pH.

A groundwater interception trench was constructed to intercept leachate impacted water from the Capped Waste Stockpile in order to mitigate potential off-site environmental impacts.

The groundwater interception trench was constructed with the following objectives:

- To intercept leachate impacted shallow, perched groundwater when it rises towards the ground surface (during high rainfall conditions); and
- Dispose of the captured water via the existing Smelter water management system.

The groundwater interception trench performance monitoring and reporting requirements are discussed in **Section 4**.

Groundwater interception during remediation will be limited to the excavation of the Capped Waste Stockpile and demolition works below 1.5m bgs. Construction of the Containment Cell is not expected to intercept groundwater with the base of excavation of the Containment Cell to be between one to three metres above the underlying aquifer however, management of groundwater is required during the initial phases of material emplacement as detailed within the SWMP.

Groundwater encountered in the Capped Waste Stockpile will be extracted using sumps or extraction wells within the Capped Waste Stockpile and either removed for treatment by a licenced waste contractor (**Section 2.3.4.3**) or treated through an on site temporary water treatment plant (**Section 2.3.4.2**) prior to discharge through the Smelter water management system.

Impacts to natural soils beneath the Capped Waste Stockpile have occurred to depths of less than 1.0m below the waste/natural soil interface. Excavation of these soils for relocation to the Containment Cell will also be required. Treatment of groundwater from this excavation will also be undertaken by draining groundwater to a sump. Where groundwater within the excavation is treated (removed), remediation of groundwater will be considered complete.

2.2 Surface Water

The Smelter has an existing stormwater and surface water management system. This includes:

- Subsurface and open surface water drainage throughout the Smelter.
- One dam in the west of the Smelter, one in the northeast of the Smelter and one on the southeast of the Smelter. These are the initial collection and treatment points for the water.
- Two dams located to the north of the Smelter. These have previously been used as part of the water collection and treatment system for the Smelter. These continue to capture surface water runoff from the Smelter, receiving water that has passed through the south, east and west surge ponds.
- Irrigation area. To the north of the Smelter is an irrigation area that receives water from the North Dams. The irrigation area is operated in accordance with the requirements of the EPL.

Surface water management of the Smelter site will be focused on the separation of clean stormwater from water that comes into contact with contaminated soils, waste or leachate. Clean stormwater will be directed into the Smelter water management system for dust suppression throughout the demolition and remediation activities. Water that comes into contact with any material from the Capped Waste Stockpile, waste in the Containment Cell or Dickson Road landfill will be classified as leachate and require collection and disposal and/or treatment as described in **Section 2.3.4**.

A stormwater diversion drain will be installed around the perimeter of the Containment Cell (including the perimeter access track) to divert clean water around the Containment Cell and reduce the amount of water requiring treatment.

The Containment Cell will be constructed with four initial internal cells, separated by internal bunds. Material will be placed within one internal cell at a time. This will allow any rain collected within unfilled cells to be managed as clean water; only water within the filled cell will need to be managed as leachate as per **Section 2.3.4**.

2.3 Leachate

Leachate will result from the remediation of the Capped Waste Stockpile and Dickson Road South, and from waste material emplacement into the Containment Cell. The Detailed Design Report (GHD, 2018) has estimated approximately 12,720kL of leachate will be generated and require treatment.

2.3.1 Capped Waste Stockpile

The Capped Waste Stockpile will require continued collection and treatment of the existing leachate as well as any stormwater collected within the exposed stockpile during remediation. Any water that comes in contact with leachate will be classified as leachate and treated accordingly. The remediation of the Capped Waste Stockpile will be staged to minimise the surface area of waste exposed to rainfall.

The area of the Capped Waste Stockpile uncovered at any time will be minimised. This will allow water from the remaining capped area to be diverted away from the exposed material and managed as clean water; only the water from the exposed material will need to be considered and managed as leachate.

Leachate within the Capped Waste Stockpile will be drained to a sump and either transported offsite or treated onsite as described in **Section 2.3.4**. Treatment will continue until the contents of the Capped Waste Stockpile are removed from the area.

2.3.2 Containment Cell

As stated in **Section 2.2**, waste material emplacement within the Containment Cell will occur as a staged process within four internal cells, separated by internal bunds. Each cell will contain a water collection/ sump system to enable the removal of leachate and/ or clean water for treatment or discharge into the Smelter water management system respectively.

Leachate within the Containment Cell will be drained to two sumps and either transported offsite or treated onsite as described in **Section 2.3.4**.

2.3.3 Dickson Road South

Remediation of the Dickson Road South site will require removal of the perched groundwater. The *Remedial Action Plan: Dickson Road South, Kurri Kurri, NSW* (Ramboll, 2018) concluded that the perched water is expected to be of sufficient quality to be pumped to the South Surge Pond to then be managed as part of the Smelter water management system. This water will be drained to a sump within the excavation bund.

The quality of this water will be regularly monitored to determine if it needs to be managed as part of the leachate management system, or if it can continue to be discharged directly into the Smelter water management system.

As with the Capped Waste Stockpile, the area of the landfill uncovered at any time will be minimised. This will allow water from the remaining capped area to be diverted away from the

exposed material and managed as clean water; only the water from the exposed material will need to be considered for management as leachate.

2.3.4 Leachate Storage and Treatment

2.3.4.1 Leachate Storage

Figure 2-1 shows the locations of leachate storage within the Project site. This includes the basins at the Containment Cell and adjacent to the temporary water treatment plant.

2.3.4.2 On Site Treatment Plant

A modular temporary water treatment plant will be installed with the capacity to treat: existing leachate from within the Capped Waste Stockpile; contaminated stormwater collected within the exposed stockpile; contaminated stormwater and leachate from the Containment Cell; and the perched groundwater and leachate from Dickson Road South (if required).

The conceptual location of the temporary water treatment plant is shown in **Figure 2-1**. However, the temporary water treatment plant would be modular. This would allow it to be relocated closer to the leachate source and/or to facilitate access for demolition and remediation requirements.

Based on estimates of leachate generation the temporary water treatment plant will have a capacity of approximately 30 KL/day.

The temporary water treatment plant will include filtering and treatment columns to remove key contaminants including suspended solids, pH, fluoride (F) and hydrocarbons. The waste water would be treated to a level suitable to be discharged to the Smelter water management system, where it could be reused during for dust suppression.

2.3.4.3 Off Site Leachate Treatment

The ability to dispose of leachate via a licenced liquid waste contractor for treatment at a licensed waste facility will also be available. Temporary leachate storage dams will be established at the Containment Cell and the Capped Waste Stockpile. The licensed liquid waste contractor will pump the leachate from these dams at a designated location into their truck.

Based on a leachate removal truck with a capacity of 20 kL, this equates to approximately 636 truck movements by a licensed liquid waste contractor if all leachate was transported for off-site treatment. This will equate to approximately eight truck movements per week, or a maximum of two movements per day.



RAMBOLL AUSTRALIA - GIS MAP file : 31800333 GIS_P001_RemediationEMP | F018_LeachateMgmt_V02 | 30/07/2020

Aerial photography by Nearmap, flown 15.06.2020

Legend

- Project site
- Leachate storage dam
- Leachate treatment plant
- Leachate pipeline

A4
1:8,000

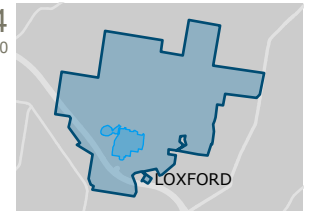


Figure 2-1 | Location of Leachate Management Infrastructure

3. IMPLEMENTATION

3.1 Roles and Responsibilities

Key personnel responsible for implementation of this LMP are in **Table 3-1** and consistent with the overall EMP.

Table 3-1: Hydro Personnel and Environmental Management Responsibilities

Position	Responsibilities
OVERALL SITE MANAGEMENT	
Managing Director	<p>Make certain that the Hydro Team and contractors are implementing this LMP.</p> <p>Provide adequate resources and funding for the implementation of this LMP.</p> <p>Review and approve EMP (including the SWMP and associated specialised plans).</p>
Principal Environmental Consultant	<p>Provide advice on and assistance in implementation, monitoring and auditing of environmental management and performance.</p> <p>Review and modify the LMP as directed by the Managing Director and/or Project Manager.</p>
Principal Communications Consultant	<p>Manage the mechanisms available for the community to receive information and to make enquiries or complaints about activities</p>
SMELTER REMEDIATION ACTIVITIES	
Project Manager	<p>Make certain that any proposed works or changes to existing activities, that may have an impact on the environment or the community (including leachate management), have the necessary legislative approval prior to the commencement of works.</p> <p>Make certain that the environmental aspects and issues, associated with proposed works or changes to existing activities, are adequately addressed in the LMP.</p> <p>Review and approve the LMP on an annual basis or when changes to activities at the Smelter occur.</p> <p>Facilitate implementation of the LMP.</p>
Construction Manager	<p>Verify that the work of contractors and Hydro personnel on the Project are undertaken in accordance with this LMP, relevant environmental management plans, procedures and standards.</p> <p>Provide appropriate training to contractors and Hydro personnel on the Project regarding environment and community requirements and responsibilities.</p> <p>Review and approve the contractors' environmental management documentation prior to commencement of activities and inform contractors of changes to the LMP.</p>
Contract Administrator	<p>Provide relevant environmental legislative, regulatory and management requirements in tender documentation.</p> <p>Verify that the work of contractors is undertaken in accordance with this LMP and other relevant environmental procedures and standards.</p>
Workplace Health and Safety (WHS) Manager	<p>Provide Hydro personnel with the necessary tools and training to enable effective implementation of the EMP and sub plans.</p> <p>Implement and maintain an induction package to be provided to all personnel working at the Smelter and Hydro Land, which will include information relevant to environmental and community management (including leachate management).</p> <p>Undertake a weekly inspection of the Project activities at the Smelter, for the duration of the Project.</p> <p>Maintain a record of personnel induction and training records.</p>

Position	Responsibilities
Remediation Contractor	<p>Comply with the requirements of the LMP as it applies to Smelter and relevant Hydro Land remediation activities.</p> <p>Implement the environmental measures and actions as described in the LMP through a Remediation EMP, sub-plans and specific procedures that comply with this LMP.</p> <p>Develop and implement procedures for self-checking management compliance with the Remediation Contractor’s procedures and this LMP.</p> <p>Report potential or actual environmental incidents associated with remediation activities at the Smelter and relevant Hydro Land, and assist as required in the investigation, implementation of corrective actions and recording of the incident.</p>
CARE, MAINTENANCE AND HYDRO LAND MANAGEMENT ACTIVITIES	
Environmental Officer/ Hydro Land Manager	<p>Coordinate and implement the environmental monitoring program</p> <p>Verify that the work of contractors and Hydro personnel on Hydro Land are undertaken in accordance with this LMP and relevant environmental procedures and standards.</p> <p>Undertake a weekly inspection of activities on the Hydro Land that will occur for two weeks or more.</p>
ALL AREAS AND ACTIVITIES	
Contractors	<p>Comply with the requirements of the LMP as it applies to site environmental management and control.</p> <p>Implement the environmental measures and actions as described in the LMP through procedures and management plans that comply with this LMP.</p> <p>Develop and implement procedures for self-checking management compliance with Contractor’s procedures and this LMP.</p>
All Personnel	<p>Implementation of the relevant environmental measures described in this LMP applicable to their activities.</p>

3.2 Management Measures

Hydro will implement a number of controls to manage leachate generation, treatment and disposal resulting from activities at the Smelter and Hydro Lands. The leachate management measures to be implemented on Site are outlined in **Table 3-2**.

Table 3-2: Leachate Management Measures

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
Water encountering any waste fill will be classified as leachate and require collection and treatment.	Surface water will be diverted around active remediation areas to minimise the volume of leachate generated during remediation activities.	Prior to and during remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	Perimeter bunds and diversion drains will be constructed around the Containment Cell, Capped Waste Stockpile and Dickson Road Landfill to prevent stormwater entering the active remediation area.	Prior to and during remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	Leachate generation will be minimised by reducing the area of exposed waste at any one time and covering of waste as soon as practicable.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
Controlled capture of leachate within the Capped Waste Stockpile	A sump will be constructed within the low point of the Capped Waste Stockpile to allow gravity drainage of leachate to one collection point.	Prior to remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	The leachate will be transferred to an appropriately lined temporary leachate storage dam.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	Leachate will be pumped out by a licensed waste contractor for off site treatment and disposal or to the temporary water treatment plant for onsite treatment.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
Controlled capture of leachate within the Containment Cell	The Containment Cell will be subdivided into four sub-cells by intracell bunds. The sub-cells will be filled progressively, resulting in potential leachate generation occurring from only one cell at a time.	Prior to and during remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	Leachate will be drained to one of two leachate sumps, located at the eastern boundary of the containment cell.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	Leachate extraction pumps will be used to extract the leachate and pumped to the leachate buffer storage dam for temporary storage.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design
	The operation depth of leachate in the cell will be limited to no more than 300 mm except during large storm events. Where the level of leachate exceeds 300 mm it shall be lowered to 300 mm as soon as is practicable.	During remediation	Project Manager Remediation Contractor	Containment Cell Detailed Design

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
On site leachate treatment through a temporary water treatment plant prior to discharge into the Smelter water management system.	Submit a detailed design for the plant to the Department and the EPA for approval.	Prior to construction of the plant	Project Manager Remediation Contractor	N/A
	The temporary water treatment plant will only operate during remediation activities and be decommissioned upon completion of the Containment Cell.	During remediation	Project Manager Remediation Contractor Environmental Officer	N/A
	Discharge from the temporary water treatment plant will be of a suitable quality to be discharged to the Smelter water management system and applied as dust suppression.	During remediation	Project Manager Remediation Contractor Environmental Officer	N/A
	Discharge from the temporary water treatment plant will be to the Smelter water management system or collected by a licensed contractor (if required).	During remediation	Project Manager Remediation Contractor Environmental Officer	N/A
Leachate transported from the Smelter is to be managed in accordance with the Protection of the Environment Operations (Waste) Regulation 2005 (POEO Waste Regulation) and the <i>Waste Classification Guidelines</i> .	Any leachate requiring transportation from the Smelter to a licensed facility will be subjected to waste tracking.	Prior to and during remediation	Project Manager Remediation Contractor Site Services Manager Waste Removal Contractor	Section 2.3.3 (waste tracking, transport and disposal) of the WMP
	Leachate will be removed from the Smelter to a licensed facility by a licenced waste contractor and transported to a licenced waste facility.	Prior to and during remediation	Project Manager Remediation Contractor Site Services Manager Waste Removal Contractor	Section 2.3.3 (waste tracking, transport and disposal) of the WMP
	A Waste Consignment Authorisation must be obtained, prior to transporting the leachate. The licenced waste contractor who removes the leachate is responsible for completing the Waste Consignment Authorisation.	Prior to and during remediation	Project Manager Remediation Contractor Site Services Manager Waste Removal Contractor	Section 2.3.3 (waste tracking, transport and disposal) of the WMP
	The types, quantity and receiving location for all leachate transported from the Smelter will be recorded within a database.	During remediation	Project Manager Remediation Contractor Site Services Manager Waste Removal Contractor	Section 2.3.3 (waste tracking, transport and disposal) of the WMP
Regular visual inspection of stormwater drainage to ensure stormwater and leachate are segregated.	Conduct fortnightly and event based visual inspection of drainage controls including perimeter bunds and diversion drains.	During remediation	Environmental Officer	Section 5.2 of the EMP (inspections)

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
<p>Continue the groundwater monitoring downgradient of the leachate impacted groundwater resulting from the Capped Waste Stockpile.</p> <p>Continue the surface water monitoring program to assess the impact that activities have on sensitive receiving environments.</p>	<p>Continue quarterly on-going monitoring of groundwater wells down-gradient of the Capped Waste Stockpile in accordance with the EPL.</p>	<p>During remediation</p>	<p>Project Manager Remediation Contractor Environmental Officer</p>	<p>Section 4.1 of the SWMP</p>
	<p>Continue the monthly surface water monitoring to assess compliance with the relevant surface water quality criteria.</p>	<p>During activities Monthly monitoring</p>	<p>Environmental Officer</p>	<p>Section 4.1 of the SWMP</p>
	<p>Record, interpret and report on surface water monitoring data.</p>	<p>Prior to and during demolition</p>	<p>Environmental Officer</p>	<p>Section 4.1 of the SWMP</p>

4. MONITORING AND REVIEW

4.1 Monitoring

4.1.1 Leachate Monitoring

Within the Containment Cell, leachate monitoring will be undertaken on a quarterly basis or after a significant storm event or immediately following an earthquake. Once the leachate collection sump reaches 300 mm level, it will be pumped out, temporarily stored in the leachate buffer storage dam and either collected by a licenced liquid waste contractor or treated through the water treatment plant.

4.1.2 Surface Water

Hydro will continue to monitor surface water quality to confirm remediation activities are not causing harm to the environment or community and to maintain compliance with relevant approvals and licences.

Further details on the surface water monitoring requirements are described in Section 4.1.1 of the SWMP.

4.1.3 Groundwater Monitoring

Hydro undertakes quarterly groundwater monitoring of selected groundwater wells at the Smelter. The program involves the collection of groundwater samples from 28 groundwater monitoring wells. This includes wells that assess the performance of the Capped Waste Stockpile leachate interception trench and the condition of the leachate plume that the trench was installed to mitigate.

The groundwater wells target the leachate plume that is migrating from the Capped Waste Stockpile in a north-easterly direction. The leading front of the leachate plume is approximately 300 m north-east of the Capped Waste Stockpile. The extent of the plume is shown on the attached figure. Characteristics of the leachate includes elevated concentrations of Fluoride, Cyanide, Aluminium and alkaline pH.

Further details on the groundwater monitoring requirements are described in Section 4.1.3 of the SWMP.

4.1.4 Monitoring Program

The surface water and groundwater monitoring program is described in Table 4-1 of the SWMP.

4.1.5 Soil and Water Management

As noted in **Table 3-2** the erosion and sediment controls including stormwater drainage controls (such as those diverting clean water away from waste materials and leachate) will be inspected fortnightly and after a rain event (greater than 5mm in any one period up to 24 hours in duration). Also, as noted in **Table 3-2** the existing surface water drainage and dams will be inspected prior to commencing remediation activities, and on a monthly basis thereafter.

Where an issue is identified during the inspection, the controls or the system will be maintained or repaired as required.

Records are to be taken (and filed) during these inspections and made available for review upon request of the EPA and Cessnock City Council.

4.2 Reporting

All internal and external environmental reporting requirements will be undertaken in accordance with the EMP.

Reporting will also be undertaken in accordance with relevant legislation, guidelines and notification requirements, as outlined in **Section 1.4**.

4.3 Non-conformances

The need for preventative or corrective action arises from the identification of non-conformance with environmental legal requirements, Hydro environmental requirements or the potential for non-conformances to occur.

Non-conformances will be resolved and recorded in accordance with the EMP.

4.4 Complaints

Community Complaints are considered environmental incidents and are investigated and documented accordingly. This will include any complaints relating to Smelter-related soil and water quality issues.

Investigations will be conducted by the Environment Officer, including provision of feedback to the complainant. Corrective actions will be documented and regularly reviewed until complete and signed off.

Handling of complaints will be undertaken in accordance with the EMP.

4.5 Review and Improvement

Continual improvement of the LMP will be achieved by the continual evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The Environmental Officer is responsible for ensuring that a regular review of the EMP and specialist management plans is undertaken.

The EMP and specialist management plans will be reviewed annually by an independent consultant in conjunction with preparation of the Annual Environmental Management Report (AEMR), or if changes to existing operations occur.

Reviews will be recorded in the document control section of this plan.

5. REFERENCES

ANZECC. 2000. *National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality*.

Department of Environment and Conservation (DEC). 2007. *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination*.

Landcom. 2004. *Managing Urban Stormwater – Soils and Construction, Volume 1*.

Pulver Cooper and Blackley (PCB). 2018. *Flood Modelling and Hydrology Review*.

Ramboll Environ (2015) *Statement of Environmental Effects - Demolition of Former Aluminium Smelter Buildings at Kurri Kurri*

Ramboll Environ (2016) *Environmental Impact Statement: Former Hydro Aluminium Kurri Kurri Smelter Demolition and Remediation*

Ramboll (2018) *Environmental Impact Statement: Former Hydro Aluminium Kurri Kurri Smelter Stage 2 Demolition*

Ramboll (2020) *Response to Submissions Report: Former Aluminium Kurri Kurri Smelter Remediation*

6. LIMITATIONS

Ramboll Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Pty Ltd dated 20 July 2018 and in accordance with our understanding and interpretation of current regulatory standards.

Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and Ramboll Australia Pty Ltd disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll Australia Pty Ltd's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll Australia Pty Ltd's knowledge as at the date of the assessment.

Ramboll Australia Pty Ltd did not independently verify all of the written or oral information provided to Ramboll Australia Pty Ltd during the course of this investigation. While Ramboll Australia Pty Ltd has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll Australia Pty Ltd was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

6.1 User Reliance

This report has been prepared exclusively for Hydro Aluminium Pty Ltd. It may not be relied upon by any other person or entity without Ramboll Australia Pty Ltd's express written permission.