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**Hydro Aluminium Kurri Kurri Pty Ltd**

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# **KURRI KURRI ALUMINIUM SMELTER DECOMMISSIONING, DEMOLITION AND REMEDICATION SOIL AND WATER MANAGEMENT PLAN**

# KURRI KURRI ALUMINIUM SMELTER DECOMMISSIONING AND DEMOLITION SOIL AND WATER MANAGEMENT PLAN

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Description **Ramboll Australia was engaged by Hydro Aluminium Kurri Kurri Pty Ltd to prepare a Remediation Works Environmental Management Plan (RWEMP) 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 Soil and Water Management Plan (SWMP) forms a component of the RWEMP.**

## Document Revision History

Final Rev 0	23/12/2020	Final SWMP document submitted to the Department of Planning, Industry and the Environment on 23 December 2023.
Final Rev 1	10/08/2023	SWMP revision in response to Modification 1 (MOD 1) and Modification 2 (MOD 2) to SSD 6666.

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Leachate Management Plan

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Contaminated Soils Management Plan

### Appendix 3

Initial Remediation Erosion and Sediment Control Plan

## ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CN	Cyanide
DA	Development Application
EC	Electrical Conductivity
EMP	Environmental Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environment Protection Licence
F	Fluoride
Hazards and Resilience SEPP	<i>State Environmental Planning Policy (Hazards and Resilience) 2021</i>
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
HWC	Hunter Water Corporation
LMP	Leachate Management Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RAP	Remedial Action Plan
RWEMP	Remediation Works Environmental Management Plan
SSD	State Significant Development
SWMP	Soil and Water Management Plan
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
WHS	Workplace Health and Safety

## GLOSSARY

Council	Cessnock City Council
The Department	The Department of Planning, Industry and the Environment
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 Soil and Water Management Plan (SWMP) has been prepared by Ramboll Australia Pty Ltd on behalf of Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to support the Remediation Works Environmental Management Plan (RWEMP) which addresses 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 SWMP are to:

- Detail the controls to be implemented to manage soil and water quality impacts.
- Provide a program to monitor soil and water quality impacts at the Smelter and Hydro Land.
- Provide a mechanism to assess performance against the relevant water quality impact assessment criteria.
- Detail the requirement for reporting exceedances of water quality impact assessment criteria.
- Establish the roles and responsibilities of all parties involved in soil and water quality management.
- Establish supervision, monitoring and reporting framework for the SWMP.

## 1.3 Purpose and Scope

The purpose of the SWMP is to:

- Specify management procedures for soil and water related issues and impacts during activities at the Smelter and on the Hydro Land, and
- Satisfy the relevant conditions of the development consent for demolition activities (DA 8/2015/399/1; DA 8/2018/45/1)
- Satisfy the relevant conditions of the development consent for remediation activities (SSD 6666)
- Satisfy the relevant conditions of the Environment Protection Licence (EPL) 1548.

## 1.4 Regulatory Requirements

### 1.4.1 Project Approval

A list of the development consent conditions related to soil and water management and where they are addressed in this document are outlined in **Table 1-1**.

**Table 1-1: Relevant Project Approval Conditions**

No.	Condition	Location in SWMP
<b>SSD 6666</b>		
<b>SOILS, WATER QUALITY AND HYDROLOGY</b>		
<b>Imported Material for Containment Cell Construction</b>		
B16	The Applicant must:	N/A
B16(a)	ensure that only VENM, ENM, or other material approved in writing by EPA or site auditor is brought onto the site;	Table 3-2
B16(b)	keep accurate records of the volume and type of fill to be used; and	Table 3-2
B16(c)	make these records available to the Planning Secretary upon request.	Table 3-2
<b>Erosion and Sediment Control</b>		
B17	Prior to the commencement of any construction or other surface disturbance the Applicant must install and maintain suitable erosion and sediment control measures on-site, in accordance with the relevant requirements of the <i>Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book</i> (Landcom, 2004) guideline and the Erosion and Sediment Control Plan included in the RWEMP required by Condition C2.	Appendix 3
<b>Stormwater Management System</b>		
B18	Prior to the placement of contaminated waste materials in the containment cell, the Applicant must install and operate a stormwater management system for the development. The system must:	N/A
B18(a)	be generally in accordance with the design in the CCDDR;	Containment Cell Management Plan (CCMP)
B18(b)	be in accordance with applicable Australian Standards;	CCMP
B18(c)	ensure that the system capacity has been designed in accordance with Australian Rainfall and Runoff (Engineers Australia, 2016) and <i>Managing Urban Stormwater: Council Handbook</i> (EPA, 1997) guidelines;	CCMP
B18(d)	divert existing clean surface water around operational areas of the site;	Table 3-2 and CCMP
B18(e)	direct all sediment laden water in overland flow away from the leachate management system; and	Table 3-2 and CCMP
B18(f)	prevent cross-contamination of clean and sediment or leachate laden water.	Table 3-2 and CCMP
B19	Within two months of the completion of remediation works or within another timeframe agreed by the Planning Secretary, works-as-executed drawings signed by a registered surveyor must be submitted to the Site Auditor demonstrating that the stormwater drainage and finished ground levels have been constructed as detailed in the RAP.	Table 3-2
B19	The stormwater management system must be operated and maintained for the duration of the containment cell.	Table 3-2
<b>Water Treatment Management Plan</b>		
B19A	Prior to the operation of the Temporary Water Treatment Plant (TWTP), the Applicant must prepare, to the satisfaction of the Planning Secretary, a TWTP Management Plan that includes, but is not limited to, details regarding treatment processes and commissioning and operation stage management protocols. The TWTP Management Plan must be prepared in consultation with the EPA and include, at a minimum:	Appendix 1
B19A(a)	specifications and final design details of the TWTP, including expected treatment performance for all pollutants of concern;	Appendix 1

No.	Condition	Location in SWMP
B19A(b)	<p>a TWTP commissioning stage monitoring program that includes:</p> <ul style="list-style-type: none"> <li>(i) the collection and collation of data on both the influent and treated effluent quality for all pollutants of concern; and</li> <li>(ii) a verification process to ensure that the treated water quality is consistent with the 'Treated Leachate Target Values' (Document: Hydro Kurri Kurri Aluminium Smelter Remediation-Mod-1 (SSD-6666-Mod-1): Additional information, dated 31 July 2021) before discharge to the North Dam</li> </ul>	Appendix 1
B19A(c)	<p>a TWTP operational stage monitoring program that ensures each treated effluent batch meets <u>all</u> the 'Treated Leachate Target Values' prior to discharge to the North Dam;</p>	Appendix 1
B19A(d)	<p>Protocols and operational rules in the event the treated effluent does not meet <u>all</u> the 'Treated Leachate Target Values' including but not limited to:</p> <ul style="list-style-type: none"> <li>(i) recirculation through the TWTP</li> <li>(ii) offsite removal by tanker for disposal at licensed facility</li> </ul>	Appendix 1
B19A(e)	<p>Details of the timing and implementation of decommissioning of the TWTP</p>	Appendix 1
B19B	<p><b>Fluoride Treatment</b></p> <p>Prior to operation of the TWTP, the applicant must explore all practical and reasonable treatment measures to reduce specifically the fluoride concentration in the treated effluent from the TWTP to levels consistent with the ANZECC (2000) long term trigger values for irrigation. The fluoride target value in 'Treated Leachate Target Values' (Document: Hydro Kurri Kurri Aluminium Smelter Remediation-Mod-1 (SSD-6666-Mod-1): Additional Information, dated 31 July 2021) must be adjusted to reflect the final target fluoride level following investigation and implementation of further treatment measures.</p>	Appendix 1
B19C	<p><b>Irrigation Management Plan</b></p> <p>Prior to operation of the TWTP, the Applicant must prepare, to the satisfaction of the Planning Secretary, an Irrigation Management Plan in consultation with the EPA. The Irrigation Management Plan must include, but is not limited to:</p>	Appendix 1
B19C(a)	<p>A plan showing the area to be irrigated by treated effluent from the TWTP;</p>	Appendix 1
B19C(b)	<p>Irrigation rules to ensure that irrigation water quality meets the North East Dam Target Values prior to irrigation (Document: Hydro Kurri Kurri Aluminium Smelter Remediation-Mod-1 (SSD-6666-Mod-1);</p>	Appendix 1
B19C(c)	<p>Details of ongoing treated effluent quality monitoring, including sample take location and frequency;</p>	Appendix 1
B19C(d)	<p>Identification of operational triggers (such as 'trigger action response plans') to ensure that the treatment process is functioning correctly and to prevent unacceptable impacts to the irrigated area. Triggers and associated responses must be provided for, but not limited to, the following:</p> <ul style="list-style-type: none"> <li>(i) excessive saturation of the soil profile (waterlogging)</li> <li>(ii) any surface water runoff of treated effluent from the North Dam; and</li> <li>(iii) any water quality impacts to downstream receiving environment.</li> </ul>	Appendix 1
B19C(e)	<p>Operating rules to ensure the North Dam maintains a 1 in 5-year rainfall event or 20% AEP design storm capacity;</p>	Appendix 1
B19C(f)	<p>Develops a Trigger Action Response Plan (TARP) which includes contingencies to identify and manage an unpredicted impacts (such as poor water quality within the North Dam) and ensure corrective actions are implemented. Contingency measures could include, but are not limited to:</p> <ul style="list-style-type: none"> <li>(i) additional treatment of leachate through the TWTP;</li> <li>(ii) treatment of the North Dam water quality through the TWTP;</li> <li>(iii) offsite removal by tanker for disposal at a licensed facility.</li> </ul>	Appendix 1

No.	Condition	Location in SWMP
	<b>Water Quality Monitoring Program</b>	
B19D	Prior to operation of the TWTP, the applicant must prepare a Water Quality Monitoring Program in consultation with the EPA that informs the Irrigation Management Plan and Trigger Action Response Plans. The monitoring program should include, at a minimum:	Appendix 1
B19D(a)	water quality monitoring locations (including but not limited to the North Dam and downstream receiving environment)	Appendix 1
B19D(b)	analyte list for all pollutants with the potential to cause non-trivial harm (including all the 'Treated Leachate Target Values' (Document: Hydro Kurri Kurri Aluminium Smelter Remediation-Mod-1 (SSD-6666-Mod-1)	Appendix 1
B19D(c)	sampling method for each location	Appendix 1

No.	Condition	Location in SWMP
<b>DA 8/2015/399/1</b>		
10	Submit to Council an Environmental Management Plan (EMP) for review and written authorisation. The EMP shall contain, but not be limited to, the following specialist plans: Air Quality Management Plan, Noise and Vibration Management Plan, Waste Management, <b>Soil and Water Management Plan</b> , Demolition Strategy, Traffic Management Plan, Stakeholder Engagement and Notification Plan; Work Health and Safety Management Plan; and Heritage Management Measures and shall include, among other things, legislative and regulatory requirements; responsibilities for implementation of the management measures; and the monitoring, recording and improvement for environmental management performance.	This SWMP
12	The applicant must prepare a Soil and Water Management Plan (SWMP) incorporating the following matters.	
	a) Minimise the area of soils exposed ay any one time	Table 3-2
	b) Conservation of top soil	Table 3-2
	c) Identify and protect proposed stockpile locations	Appendix 6
	d) Identify the locations for storage of the various waste streams	Appendix 6
	e) Identify the management measures to be applied to the material and at the storage location	Table 3-2
	f) Prevent soil, sand, sediments leaving the site in an uncontrolled manner	Table 3-2
	g) Control surface water flows through the site in a manner that: i) Diverts clean runoff around disturbed areas ii) Minimises slope gradient and flow distance within disturbed areas iii) Ensures surface run-off occurs at non erodible velocities iv) Ensures disturbed areas are promptly rehabilitated	Table 3-2
	h) Sediment and erosion control measures in place before work commences	Table 3-2
	i) Materials are not tracked onto the road by vehicles entering or leaving the site	Table 3-2
	j) Details of drainage to protect and drain the site during works	Table 3-2
<b>DA 8/2018/46/1</b>		
9	The Applicant must stablish 'no go zones' to ensure that the temporary crushing plant, all machinery, plant and activities is kept a minimum distance of 40 metres from mapped watercourses, including underground draining, on the development site.	Table 3-2
11	The applicant must prepare a Soil and Water Management Plan, being compatible with the Construction Management and Traffic Management Plan referred to in this Development Consent and incorporating the following matters. The plan must be submitted to and approved by Council prior to the commencement of works.	This SWMP
	a) Minimise the area of soils exposed at any one time	Table 3-2
	b) Conservation of topsoil.	Table 3-2
	c) Identify and protect proposed stockpile locations.	EMP
	d) Preserve existing vegetation. Identify revegetation technique and materials.	Table 3-2
	e) Prevent soil, sand, sediments leaving the site in an uncontrolled manner.	Table 3-2

No.	Condition	Location in SWMP
	f) Control surface water flows through the site in a manner that: <ul style="list-style-type: none"> <li>i) Diverts clean-runoff around disturbed areas</li> <li>ii) Minimises slope gradient and flow distance within disturbed areas</li> <li>iii) Ensures surface run-off occurs at non erodible velocities</li> <li>iv) Ensures disturbed areas are promptly rehabilitated.</li> </ul>	Table 3-2
	g) Sediment and erosion control measures in place before work commences.	Table 3-2
	h) Materials are not tracked onto the road by vehicles entering or leaving the site.	Table 3-2
	i) Details of drainage to protect and drain the site during works.	Table 3-2
13	The requirements of the Soil and Water Management Plan must be in place prior to the commencement of demolition works and/or construction works and must be maintained throughout the demolition and/or construction process.	Table 3-2
18	The control of erosion, and the prevention of silt discharge into drainage systems and waterways, will be necessary in accordance with Council's "Engineering Requirements for Development", and Landcom's Soils and Construction Manual – April 2004. Erosion control measures are to be implemented prior to the commencement of any earthworks, and shall be maintained until satisfactory completion and restoration of site earthworks, including revegetation of all exposed areas.	Section 2.2.1, Table 3-2 and Appendices 6 and 7
19	Alterations to the natural surface contours must not impede or divert natural surface water runoff, so as to cause a nuisance to adjoining property owners.	Table 3-2
20	During all phases of demolition, excavation and construction, it is the full responsibility of the applicant and their contractors to:	Table 3-2
	a) Ascertain the exact location of the Council stormwater drainage pipeline and associated pits traversing the site in the vicinity of the works.	None impacted
	b) Take measures to protect the in-ground Council stormwater drainage pipeline and associated pits.	N/A
	c) Ensure dedicated overland flow paths are satisfactorily maintained through the site. <p>Stormwater drainage pipes can be damaged through applying excessive loading (such as construction machinery, material storage, and the like). All proposed structures and construction activities must be sited fully clear of Council's stormwater drainage pipes, pits, easements, watercourses and overland flow paths on the site.</p> <p>If the Council pipeline is uncovered during construction, all work must cease, and the PCA and Council must be contacted immediately for advice. Any damage caused to the Council stormwater drainage system must be immediately repaired in full as directed, and at no cost to Council.</p>	Section 2.1.2

#### 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 EPL No. 1548 for the Smelter operations. The EPL currently contains one licensed point for the purposes of monitoring and/or the setting of limits for discharges of pollutants to water, as well as 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 water management and where they are addressed in this document are outlined in **Table 1-2**.

**Table 1-2: Relevant EPL Conditions**

<b>No.</b>	<b>Condition</b>	<b>Location in SWMP</b>
P1	Location of monitoring/discharge points and areas	Section 3 and Section 4.1
L1	Pollution of waters	Section 3
O4	Effluent application to land	Section 3 and Section 4.1.2
M1	Monitoring records	Section 4.1
R1	Annual return documents	Section 4.1 and Section 4.2
E1	Groundwater interception and monitoring - Capped Waste Stockpile	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*
- *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)*

## 2. EXISTING ENVIRONMENT AND POTENTIAL IMPACTS

### 2.1 Existing Environment

#### 2.1.1 Soils and Geology

The Smelter site and Hydro Land are underlain by siltstone, marl and minor sandstone from the Permian aged Rutherford Formation (Dalwood Group) in the Sydney Basin.

The Sydney Basin is a sedimentary basin consisting of Permian and Triassic sedimentary rocks, which extends from Newcastle in the north to Batemans Bay in the south and to Lithgow, just west of the Blue Mountains. The basin overlies older basement rocks of the Lachlan Fold Belt. The sedimentary rocks of the basin generally consist of near horizontal sandstones and shales, with some recent igneous dykes. Only minor folding and faulting has occurred since these sedimentary rock sequences first formed. The Dalwood Group is stratigraphically located near the base of the Sydney Basin below both the Greta Coal Measures and Newcastle Coal Measures and was deposited in a marine environment.

Quaternary sediments which are associated with Swamp Creek (located to the east of the Smelter), Wentworth Swamps and the Hunter River consist of complex interbedded fluvial and marine sands and estuarine muds deposited within an estuarine environment during periods of sea level rise and fall.

##### 2.1.1.1 Contaminated Soils

Contaminated soils within the Smelter, the Capped Waste Stockpile and stockpiled soil from category 2 remediation works under the *State Environmental Planning Policy (Resilience and Hazards) 2021* (the Resilience and Hazards SEPP), formally known as the *State Environmental Planning Policy No. 55: Remediation of Land* in the Hydro Land are located within the Smelter site. **Figure 2-1** shows the location of the Capped Waste Stockpile and key areas of contamination within the Smelter, including the temporary stockpile locations.

Contaminated site investigations have identified a number of small areas within the Hydro Land that require remediation. This will involve the excavation and removal of the contaminated soils in accordance with a Remediation Action Plan (RAP). This includes:

- The former Municipal Landfill on Hart Road.
- Dickson Road South.
- Asbestos contaminated soils at former residential properties.

The remediation of these areas will be category 2 remediation works under the Resilience and Hazards SEPP with permanent disposal to the Containment Cell. The measures for the management of contaminated soils in accordance with the RAP is detailed in the Contaminated Soils Management Plan in **Appendix 2**.

#### 2.1.2 Surface Water

Wentworth Swamp is the main water feature on the Hydro land. Swamp Creek, Black Waterholes Creek and several smaller tributaries are tributaries of Wentworth Swamp. Swamp Creek flows in a northerly direction in the east of the Hydro land, while Black Waterholes Creek flows in a northerly direction in the northwest of the Hydro land. Both creeks flow into the Wentworth Swamp discharging to Wallis Creek, which then flows into the Hunter River. Swamp Creek is approximately 180 metres to the east of the southeast corner of the Smelter.

An unnamed watercourse is located approximately 45 metres to the west of the Smelter. This unnamed watercourse is a tributary to Black Waterholes Creek. Other small ephemeral watercourses and low lying areas are located to the east of the Smelter and drain to Swamp Creek.



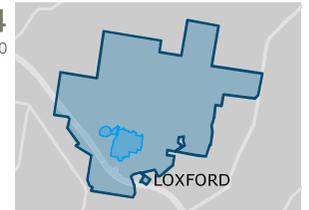
RAMBOLL AUSTRALIA - GIS MAP file : 318000353\_GIS\_P002\_RemediationEMP | F005\_ContractSite\_V02 | 9/08/2023

Aerial photography by Nearnap, flown 01.07.2023

**Legend**

- Project site
- AEC (Area of Ecological Concern)
- Stockpiled contaminated soil

A4  
1:8,000



**Figure 2-1 | Smelter Contaminated Soil Locations**

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.

**Figure 2-2** shows the existing Smelter water management system.

The Temporary Water Treatment Plant (TWTP) is located to the west of the Capped Waste Stockpile (CWS) and is responsible for treating leachate generated from the Containment Cell and the CWS to a quality suitable for discharge to the existing Smelter water management system.

The demolition and remediation activities require an available water supply for dust suppression use. Going forward, the use of the irrigation area as a point of discharge will be complemented by the use of water contained within the Smelter water management system for onsite dust suppression. The Flood Modelling and Hydrology Review (PCB, 2018) concluded:

- Throughout most of the demolition and remediation activities there will be sufficient water captured and stored within the Smelter water management system to supply dust suppression requirements.
- Based on the rainfall modelling, if a dry period occurred the modelled minimum quantity of stored water will provide for 20 days of dust suppression. Hydro will then access reticulated potable water for dust suppression.
- The Smelter water management system is designed to manage a 20% annual exceedance probability storm event. The use of water for dust suppression will help maintain storage capacity and minimise the potential for overflows from the Smelter water management system.

### 2.1.3 Groundwater

Regional groundwater is expected to follow topography and flow northeast towards surface water bodies that feed into the Hunter River. Groundwater aquifers are present within both bedrock and unconsolidated sediments.

Groundwater flow at the Smelter is typically toward the north east, although the complexity of the system likely results in discontinuities occurring within the flow pathways. Swamp Creek and Wentworth Swamp influence the regional groundwater flow regime. Swamp Creek is the closest identified receptor for groundwater flow from the site.

Two aquifer systems are present within the Smelter:

- A shallow aquifer within the estuarine sand, between 1m and 5m below ground surface (bgs) in the eastern portion of the Smelter and immediately east of the Smelter; and
- A deep, confined aquifer within the underlying bedrock/residual clay between 7m and 11m bgs to the north west of the Smelter at the location of the Containment Cell.

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.



RAMBOLL AUSTRALIA - GIS MAP file : 318000353\_GIS\_P002\_RemediationEMP | FOOT\_ExistingWaterMngSys\_V02 | 9/08/2023

Aerial photography by Neamap, flown 01.07.2023

**Legend**

- Project site
- Waterway (NSW Spatial Services)
- Berm
- Underground pipe
- Pond

A4  
1:8,000



**Figure 2-2 | Existing Smelter Water Management System**

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 operating procedure for the groundwater interception trench is included in **Appendix 1**. The groundwater interception trench performance monitoring and reporting requirements are discussed in **Section 4**.

Remediation of the Capped Waste Stockpile will remove the source of groundwater contamination and negate the requirement for the interception trench in the future. Management measures applicable to leachate generation, capture and treatment are provided in the Leachate Management Plan (LMP) in **Appendix 1**.

A perched accumulation of groundwater has occurred within the Dickson Road Landfill. The perched groundwater contains elevated levels of fluoride. Being perched it is not connected to the groundwater system.

#### **2.1.4 Water Supply and Use**

The Smelter is currently connected to the Hunter Water Corporation (HWC) potable water supply system. Hydro proposes to maintain connection to this system.

Water will be extracted from the Smelter water management system and supplemented with potable water as required for dust suppression of the following:

- Unsealed access roads.
- Soil, concrete and other dust generating stockpiles.
- Building demolition.
- Concrete crushing.
- Earthworks associated with the construction of the Containment Cell.
- Remediation activities.

Water will also be required for the following activities:

- Grass cover establishment. Water will be extracted from the Dams and supplemented with potable water as required.
- Staff amenities and kitchen facilities. Water will be sourced from the potable water supply.

#### **2.1.5 Wastewater**

Since closure of the Smelter operations, wastewater is limited to that generated from the amenity facilities for Smelter personnel located throughout the Smelter. Amenity facilities are connected to the HWC wastewater network. Hydro proposes to maintain this system until these facilities are demolished.

## **2.2 Potential Impacts**

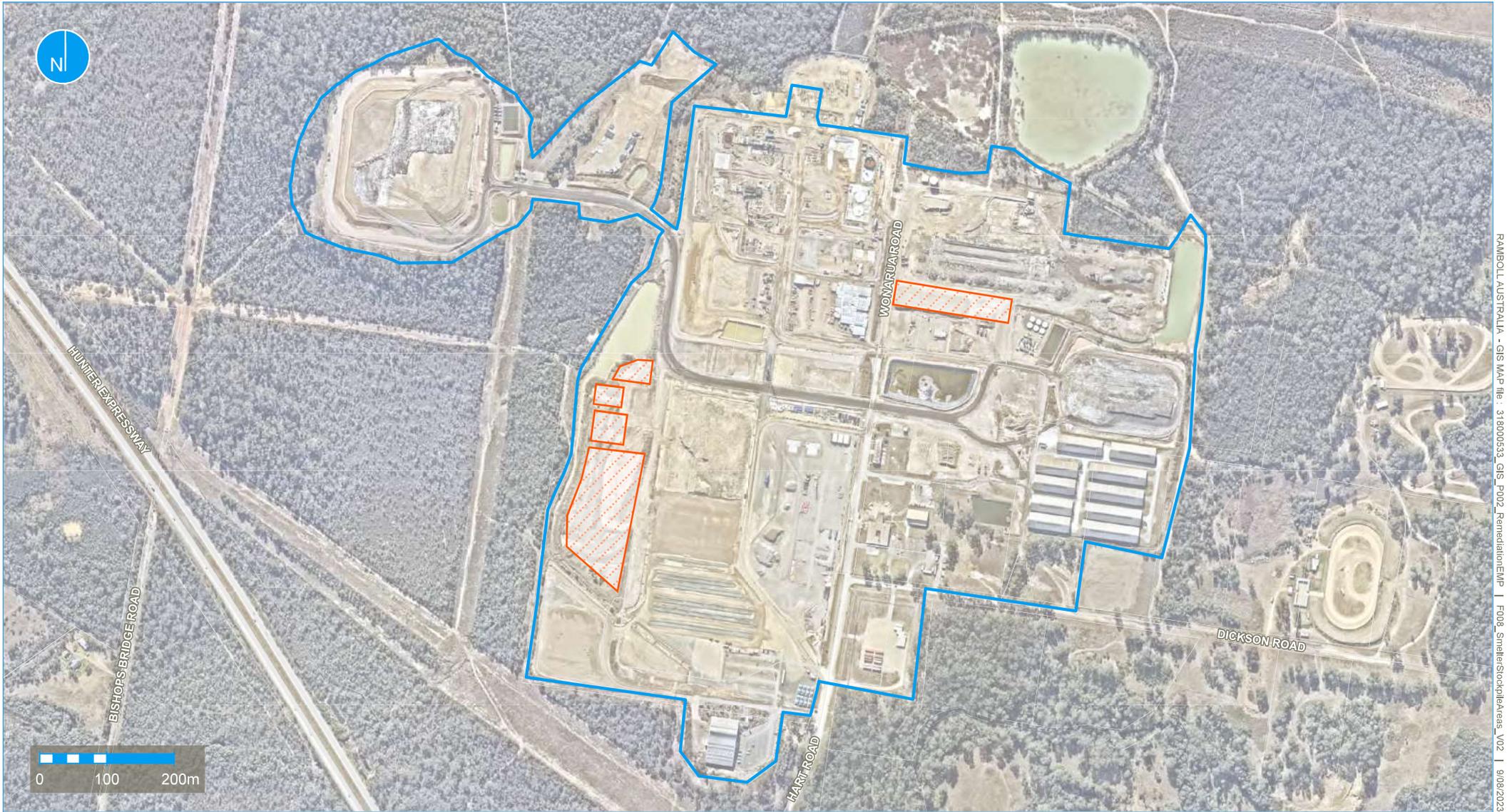
### **2.2.1 Erosion and Sedimentation**

Runoff from stormwater and dust suppression water has the potential to collect and disperse dust, soils (exposed following building demolition, and earthworks in the Hydro Land for contaminated soils remediation) and other particulates beyond the activity areas and into the surface water drainage within the Smelter and watercourses within the Hydro Land.

Sediment controls, such as geotextile fabric, would be installed at appropriate locations to capture and collect soils, dusts and particulates.

The western, northern and southern areas of the Smelter site will be used as a materials stockpile area. Erosion and sediment controls will be established to manage the stockpile area, and individual stockpiles within it as required.

**Figure 2-3** shows the Smelter stockpile locations.



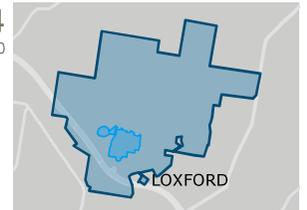
RAMBOLL AUSTRALIA - GIS MAP file: 318000593\_GIS\_P002\_RemediationEMP | E008\_SmelterStockpileAreas\_V02 | 9/08/2023

Aerial photography by Neamap, flown 01.07.2023

**Legend**

- Project site
- Stockpile area

A4  
1:8,000



**Figure 2-3 | Smelter Stockpiling Areas**

### 2.2.2 Leachate

Water that comes into contact with waste at the Capped Waste Stockpile or the Containment Cell will be classified as leachate and require collection and disposal and/or treatment as described in the LMP (**Appendix 1**).

### 2.2.3 Water Quality and Hydrology

The existing sealed road network within the Smelter will continue to be used for vehicle access within the Smelter site wherever possible, minimising vehicle movements over exposed soils and unsealed access tracks. The required haul road for transportation of wastes from the Capped Waste Stockpile to the Containment Cell will be constructed to collect and divert stormwater to the Smelter water management system.

The Smelter's existing stormwater and surface water management system will continue to collect surface water within the Smelter site prior to use for dust suppression. This system will be managed where ever practicable to divert existing clean water around operational areas of the Project site and prevent clean and sediment/ leachate laden water from mixing.

Stormwater from upgradient of the Containment Cell will be diverted around the Containment Cell and directed to three sediment detention basins via a series of culverts and swales. Water collected within unfilled cells within the Containment Cell will also be managed as clean water using the same system. As noted in **Section 2.2.2** any water collected within a filled cell will be managed in accordance with the LMP (**Appendix 1**).

Stormwater from the side walls and surrounds to the Capped Waste Stockpile will be diverted away from the area disturbed for material removal wherever possible and to the Smelter water management system. As noted in **Section 2.2.2** any water collected within the disturbed area of the Capped Waste Stockpile will be managed in accordance with the LMP (**Appendix 1**).

### 2.2.4 Groundwater

Groundwater interception will be limited to the excavation of the Capped Waste Stockpile, remediation of the Dickson Road Landfill and potentially demolition works below 1.5 metres within the Smelter. Groundwater impacted with fluoride is a potential concern for personnel undertaking subsurface activities, if intercepted.

Groundwater encountered in the Capped Waste Stockpile will be extracted using sumps or extraction wells within the Capped Waste Stockpile and treated as leachate as detailed in the LMP in **Appendix 1**.

Construction of the Containment Cell is not expected to intercept groundwater with the base of excavation to be between one to three metres above the underlying aquifer. A groundwater diversion system is included within the design of the Containment Cell to minimise liner uplift and any potential groundwater intrusion into the Cell. Groundwater intercepted by the diversion system will seep into a groundwater extraction system consisting of:

- Two 2.2m deep collection sumps located in the lowest eastern perimeters of the Containment Cell
- Two pipe extraction risers that contain the extraction pumps to remove any groundwater for collection and disposal at a licensed facility.

Remediation of the Dickson Road Landfill will require removal of the perched groundwater. The quality of this water will be regularly monitored to determine if it needs to be managed as part of the leachate management system (refer to the LMP in **Appendix 1**) or discharged into the Smelter water management system.

The water quality management measures included in this SWMP and appended specialised plans will protect groundwater quality.

## 3. IMPLEMENTATION

### 3.1 Roles and Responsibilities

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

**Table 3-1: Hydro Personnel and Environmental Management Responsibilities**

Position	Responsibilities
<b>OVERALL SITE MANAGEMENT</b>	
Managing Director	<p>Make certain that the Hydro Team and contractors are implementing this SWMP.</p> <p>Provide adequate resources and funding for the implementation of this SWMP.</p> <p>Review and approve RWEMP (including this SWMP).</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 SWMP 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>
<b>SMELTER DECOMMISSIONING, DEMOLITION AND REMEDIATION ACTIVITIES</b>	
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 soil and water quality), 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 SWMP.</p> <p>Review and approve the SWMP on an annual basis or when changes to activities at the Smelter occur.</p> <p>Facilitate implementation of the SWMP.</p>
Construction Manager	<p>Verify that the work of contractors and Hydro personnel on the Project are undertaken in accordance with this SWMP, 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 SWMP.</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 SWMP 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 RWEMP.</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 the environmental and community management (including soil and water quality).</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
Demolition Contractor	<p>Comply with the requirements of the SWMP as it applies to Smelter demolition activities.</p> <p>Implement the environmental measures and actions as described in the SWMP through a Demolition EMP, sub-plans and specific procedures that comply with this SWMP.</p> <p>Develop and implement procedures for self-checking environmental management compliance with the Demolition Contractor’s procedures and this SWMP.</p> <p>Report potential or actual environmental incidents associated with demolition activities at the Smelter, and assist as required in the investigation, implementation of corrective actions and recording of the incident.</p>
Remediation Contractor	<p>Comply with the requirements of the SWMP as it applies to Smelter and relevant Hydro Land remediation activities.</p> <p>Implement the environmental measures and actions as described in the SWMP through a Remediation EMP, sub-plans and specific procedures that comply with this SWMP.</p> <p>Develop and implement procedures for self-checking management compliance with the Remediation Contractor’s procedures and this SWMP.</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>
<b>CARE, MAINTENANCE AND HYDRO LAND MANAGEMENT ACTIVITIES</b>	
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 SWMP 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>
<b>ALL AREAS AND ACTIVITIES</b>	
Contractors	<p>Comply with the requirements of the SWMP as it applies to site environmental management and control.</p> <p>Implement the environmental measures and actions as described in the SWMP through procedures and management plans that comply with this SWMP.</p> <p>Develop and implement procedures for self-checking management compliance with Contractor’s procedures and this SWMP.</p>
All Personnel	<p>Implementation of the relevant environmental measures described in this SWMP applicable to their activities.</p>

**3.2 Management Measures**

Hydro will implement a number of controls to manage soil and water impacts that may be generated from activities at the Smelter and Hydro Lands. The soil and water management measures to be implemented on Site are outlined in **Table 3-2**.

**Table 3-2: Soil and Water Management Measures**

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
<p>All personnel will be informed during the site induction of their obligations to minimise erosion and protect water quality.</p> <p>Erosion and sediment controls will be installed prior to the commencement of activities.</p>	Soil and water quality management obligations and control measures to be communicated to personnel during site induction.	Prior to and during activities	WHS Manager	Section 3.3.2 of the RWEMP (inductions and training)
	Erosion and sediment controls (such as geotextile fabric) will be installed and maintained as shown in the Demolition Erosion and Sediment Control Plans	Prior to demolition	Project Manager Demolition Contractor	CMA CEMP Appendix E
	The Demolition Erosion and Sediment Control Plan will be implemented for any demolition activities at the Smelter that will disturb soils or potentially cause dust or particulate runoff.	During demolition	Project Manager Demolition Contractor	Daracon IPMP Appendix 3 of Appendix 4 CMA CEMP Appendix E
	Prior to any remediation activities (including the Capped Waste Stockpile removal) at the Smelter erosion, drainage and sediment controls will be installed as shown in the Containment Cell Erosion and Sediment Control Plan in <b>Appendix 3</b> . This plan would be updated by the Remediation Contractor throughout the remediation activities to reflect work activities as required.	Prior to and during remediation	Project Manager Remediation Contractor	<b>Appendix 3</b> Daracon IPMP Appendix 3 of Appendix 4
	An Erosion and Sediment Control Plan is to be developed and implemented prior to any remediation activities in the Hydro Land. This plan would be updated by the Remediation Contractor throughout the remediation activities to reflect work activities as required.	Prior to and during remediation	Project Manager Remediation Contractor	Daracon IPMP Appendix 3 of Appendix 4
	Prior to commencing the construction of the Containment Cell, erosion, drainage and sediment controls will be installed as shown in the Containment Cell Erosion and Sediment Control Plan in <b>Appendix 3</b> . This plan would be updated by the Remediation Contractor throughout the remediation activities to reflect work activities as required	Prior to remediation	Project Manager Remediation Contractor	<b>Appendix 3</b> Daracon IPMP Appendix 3 of Appendix 4

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
Erosion and sediment controls are to be inspected and maintained.	Erosion and sediment controls will be inspected on a fortnightly basis and after a rain event (greater than 5mm in any one period up to 24 hours in duration).	During activities Fortnightly and after a rain event	WHS Manager Environmental Officer	<b>Section 4.1.4</b> Section 5.2 of the RWEMP (inspections)
	Where an issue is identified during the inspection, the erosion and sediment controls will be maintained, repaired or improved.	During activities As required	WHS Manager Environmental Officer	<b>Section 0</b> Section 5.2 of the RWEMP (inspections) Section 5.4 of the RWEMP (corrective action)
	A record is to be maintained of the inspections and any maintenance, repair or improvement works required.	During activities Fortnightly and after a rain event	WHS Manager Environmental Officer	Section 5.2 of the RWEMP (inspections) Section 5.4 of the RWEMP (corrective action)
	Inspection records are to be made available upon request of the Department, the EPA and Cessnock City Council.	As required	WHS Manager Environmental Officer	
	The Erosion and Sediment Control Plans are to be reviewed and updated as required to reflect the dynamic nature of the activities to ensure adequate protection of surface water quality.	During demolition and remediation	Project Manager Demolition Contractor Remediation Contractor Environmental Officer	
The Smelter surface water management system is to be maintained.	The surface water drainage system will be inspected on a monthly basis.	During activities	WHS Manager Environment Officer	<b>Section 4.1.4</b> Section 5.2 of the RWEMP (inspections)
	Where an issue is identified during the inspection, the system will be maintained or repaired as required to prevent the uncontrolled escape of stormwater.	During activities	WHS Manager Environment Officer	<b>Section 0</b> Section 5.4 of the RWEMP (corrective action)
	Reeds and other vegetation are to be regularly removed from dams and drainage lines to maintain flows and storage capacity within the system	During activities as required	WHS Manager Environment Officer	<b>Section 0</b> Section 5.4 of the RWEMP (corrective action)

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
'No go zones' will be established to ensure that the temporary crushing plant, all machinery, plant and activities is kept a minimum distance of 40 metres from mapped watercourses, including underground draining.	Inspections of no go zones will be undertaken on a regular basis to ensure they are maintained.	During activities	Environmental Officer	Section 5.2 of the RWEMP (inspections)
A stormwater management system will be designed and installed for the Containment Cell prior to completion of remediation.	<p>A stormwater management system will be designed:</p> <ul style="list-style-type: none"> <li>• By a suitably qualified expert</li> <li>• In consultation with Council</li> <li>• In accordance with relevant Australian Standards</li> <li>• Generally in accordance with the conceptual design in the EIS</li> <li>• In accordance with <i>Australian Rainfall and Runoff</i> (Engineers Australia, 2016) and <i>Managing Urban Stormwater: Council Handbook</i> (EPA, 1997) guidelines</li> </ul> <p>Within two months of the completion of remediation works or within another timeframe agreed by the Planning Secretary, works-as-executed drawings signed by a registered surveyor will be submitted to the Site Auditor demonstrating that the stormwater drainage and finished ground levels have been constructed as detailed in the Containment Cell Detailed Design and the RAP.</p>	<p>Prior to completion of remediation</p> <p>Following completion of remediation</p>	<p>Project Manager</p> <p>Project Manager</p>	<p>Containment Cell Detailed Design</p>
Stored and temporarily stockpiled gypsum will be managed to minimise the potential for runoff.	<p>The gypsum will be unloaded and stored within the specified enclosed shed.</p> <p>A small daily quantity will be stockpiled at the gypsum application station within a bunded area. The material will be returned to the storage shed at the end of the day and in the event of rain.</p> <p>The gypsum application station will be cleaned on a weekly basis. Cleaned material will be placed within a loaded truck for disposal within the Containment Cell.</p>	<p>During remediation</p> <p>During remediation</p> <p>During remediation</p>	<p>Project Manager Remediation Contractor Environmental Officer</p> <p>Remediation Contractor Environmental Officer</p> <p>Remediation Contractor Environmental Officer</p>	<p>Remediation IPMP Appendix 7 (Materials Management Plan)</p> <p>Remediation IPMP Appendix 7 (Materials Management Plan)</p> <p>Remediation IPMP Appendix 7 (Materials Management Plan)</p>

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
<p>As soon as practicable following completion of activities in an area, the surface will be treated to reduce the potential for erosion and sediment loss, which may include methods such as grass seeding, jute mesh or crushed concrete depending on the intended future use of the area.</p> <p>Vehicles exiting the Smelter site will not track mud or dirt onto public roads.</p> <p>Use of chemicals and fuels will be managed to avoid spills and contamination of soil, surface water and groundwater</p>	<p>In the event gypsum enters the stormwater system, the water will be collected within the Smelter water management system prior to reuse for dust control or discharged in accordance with the EPL.</p>	<p>During remediation</p>	<p>Remediation Contractor Environmental Officer</p>	
	<p>Stabilise disturbed areas with grass seed or cover with appropriate material (such as jute mesh rolled crushed concrete) to prevent dust generation. Stabilisation method depends on the need for future activity in the area.</p>	<p>During demolition Following completion of activities within an area</p>	<p>Project Manager Demolition Contractor <b>Remediation Contractor</b></p>	<p>Demolition CEMP Appendix E Remediation EMP Appendix 3</p>
	<p>Undertake routine inspection and maintenance activities on stabilised areas to ensure stabilisation has occurred.</p>	<p>During and following activities</p>	<p>Project Manager Demolition Contractor Remediation Contractor</p>	<p><b>Section 4.1.4</b></p>
	<p>Conduct maintenance on stabilised areas as required.</p>	<p>As required following stabilisation Prior to and during activities</p>	<p>Project Manager Demolition Contractor Gate Security Project Manager Demolition Contractor Remediation Contractor</p>	<p>Section 5.2 of the RWEMP (inspections)</p>
	<p>Undertake inspection of vehicles exiting the site to ensure that vehicles are free of mud and dirt. Vehicles that do not meet this requirement will need to be manually cleaned.</p>	<p>As required</p>	<p>Environmental Officer Demolition Contractor Remediation Contractor</p>	<p>Demolition CEMP Appendix E Remediation EMP Appendix 3</p>
	<p>In the event that mud or dirt has been trucked onto public roads, appropriate action (based on the quantity of material) is to be taken to remove the deposited material.</p>	<p>During activities</p>	<p>Project Manager Demolition Contractor Remediation Contractor</p>	<p>Demolition CEMP Appendix E Remediation EMP Appendix 3</p>
	<p>Vehicle refueling will be undertaken using mobile refueling vehicles equipped with spill containment equipment and a spill kit.</p>	<p>During activities</p>	<p>Project Manager Demolition Contractor Remediation Contractor</p>	<p>Demolition CEMP Appendix E Remediation EMP Appendix 3</p>
<p>All chemicals and fuels on site will be stored in accordance with the applicable Safety Data Sheet.</p>				

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
	An appropriate spill kit is to be on site at all times and any spillage is to be immediately cleaned up. In the event of a large or hazardous spill, the fire brigade, police, ambulance and EPA will be contacted as appropriate, in accordance with Emergency Services Cooperation Agreement.	During activities	Project Manager Demolition Contractor Remediation Contractor	Demolition CEMP Appendix E Remediation EMP Appendix 3
	Any spills will be contained and disposed of at a licensed facility.	As required	Project Manager Demolition Contractor Remediation Contractor	Section 2.3.3 (waste tracking, transport and disposal) of the WMP
	Servicing of vehicles will only be undertaken within a sealed area with the appropriate environmental controls in place, including bunding where required.	During activities	Project Manager Demolition Contractor Remediation Contractor	Demolition CEMP Appendix E Remediation EMP Appendix 3
Implement the Water Treatment Plant Management Plan for the construction and operation of the TWTP as to minimise the impact that activities have on soil and water.	The TWTP will be constructed inside a bund designed to contain any spillage/leaks if they are to occur.	Construction and operation	TWTP Contractor (Enviroacific Pty Ltd)	<b>Appendix 1</b> TWTP Management Plan
	The Containment Cell Leachate Pond transfer pipe would be inspected on a weekly basis and damage observed during the inspection would be immediately repaired.	Operation	TWTP Contractor (Enviroacific Pty Ltd)	<b>Appendix 1</b> TWTP Management Plan
	Treated Leachate will be tested against the target values in the TWTP management plan prior to discharge. Treated leachate will not be discharged if an exceedance of any of the criteria occurred.	Operation	TWTP Contractor (Enviroacific Pty Ltd)	<b>Appendix 1</b> TWTP Management Plan
	In the event that the two storage dams are at capacity and the four tanks in the TWTP are also full, leachate water will be pumped back into the Containment Cell.	Operation	TWTP Contractor (Enviroacific Pty Ltd)	<b>Appendix 1</b> TWTP Management Plan
Implement the surface water monitoring program to assess the impact that activities have on sensitive receiving environments.	Implement the monthly surface water monitoring to assess compliance with the relevant surface water quality criteria.	During activities Monthly monitoring	Environmental Officer	<b>Section 4.1.4</b>
	Record, interpret and report on surface water monitoring data.	Prior to and during activities	Environmental Officer	Section 3.5 of the RWEMP (reporting)

Management Measures	Action	Timing / Frequency	Responsibility	Further Detail
	Implement the TWTP water quality monitoring program as a supplementary monitoring program required to ensure assess the discharge of treated leachate from the TWTP.	Operation	Environmental Officer	TWTP Water Quality Monitoring Program
	Record, interpret and report on TWTP water monitoring data.	Prior to and during activities	Environmental Officer	TWTP Water Quality Monitoring Program
Record any incidents that cause soil or water quality impacts, either on or off site, and the action taken to resolve the situation in the log book.	Record incidents in the incident register, undertake the required investigations and implement corrective actions	During activities As required	WHS Manager Environmental Officer	Section 3.5.4 of the RWEMP (incidents) Section 5.4 of the RWEMP (corrective action)
	Review corrective actions	During activities As required	WHS Manager Environmental Officer	Section 5.4 of the RWEMP (corrective action)

## 4. MONITORING AND REVIEW

### 4.1 Monitoring

#### 4.1.1 Surface Water

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

Surface water monitoring will be undertaken in accordance with the *National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000). Surface water monitoring will be undertaken at the locations shown on **Figure 4-1**. The program includes monitoring of pH, electrical conductivity, free cyanide, free fluoride, total suspended solids (TSS) and total dissolved solids (TDS).

The Hydro Environmental Officer will be responsible for the monthly monitoring and the review of sample analysis results and trends in water quality. The Hydro Environmental Officer will be responsible for initiating an investigation when the deviation from background trends could result in environmental harm or when the result varies significantly from background trends. The investigation will be undertaken to assess if a 'potential risk' or an actual problem exists.

##### 4.1.1.1 TWTP Monitoring

A supplementary surface water monitoring plan was developed specifically for the management of treated leachate once it is discharged from the TWTP to the onsite stormwater management system in response to Modification 1 to the development consent for SSD 6666.

The TWTP water quality monitoring program outlines surface water monitoring locations, timing and frequency of surface water sampling for the existing water management system and downstream receiving environments to assess changes to water quality from leachate discharges. The TWTP monitoring program is presented in **Appendix 1**.

#### 4.1.2 Irrigation

As identified in **Section 2.1.2**, use of the irrigation area will be complemented by the use of water collected in the Smelter water management system for dust suppression. The irrigation area is shown in **Figure 4-2**.

Hydro is responsible for ensuring the discharge events to the irrigation area occur in accordance with the conditions contained in EPL 1548. Due to the post operational phase of the Smelter, surface water monitoring is no longer a requirement of the EPL.

An irrigation management plan was developed in response to Modification 1 to the development consent for SSD 6666 which documents the management and monitoring requirements for irrigation of stormwater at the Site. As per the irrigation management plan, the trigger to discharge from the North East Dam to the irrigation area is 50% capacity, with discharge ceasing when water level is reduced to 10% capacity, or prior to the generation of surface water runoff at the irrigation area in accordance with Condition O4.1 of Hydro's EPL No. 1548. The irrigation management plan is presented in **Appendix 1**.

#### 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. Groundwater monitoring locations are as shown in **Figure 4-2**. The groundwater monitoring program is further detailed in the LMP (**Appendix 1**)

Quarterly monitoring is undertaken for the following:

- Groundwater level.
- Groundwater quality - pH, Electrical Conductivity, Fluoride, Free Cyanide, Dissolved Oxygen and Redox potential.

At the completion of 12 months of monitoring, a report is prepared for the Capped Waste Stockpile monitoring wells for provision to the EPA that includes:

- Tabulated results for depth to water, physiochemical parameters and analytical data.

- Trend analysis of monitored parameters in key wells incorporating data collected since July 2013 (when the quarterly groundwater monitoring in this area commenced).
- Assessment of the impact of the leachate interception trench on the leachate plume.
- Conclusion and recommendations from the assessment of the leachate impacted groundwater.

#### 4.1.4 Monitoring Program

The surface water and groundwater monitoring program is outlined in **Table 4-1**.

**Table 4-1: Surface Water and Groundwater Monitoring Commitments**

Monitoring Details	Frequency	Locations	Parameters	Person/s Responsible
Visual inspection of erosion and sediment controls	Fortnightly After rain events	Where controls are installed/ implemented	Determine if controls are working or if they require maintenance, repair or replacement	Environmental Officer WHS Manager
Monitoring of surface water quality in water bodies located within the Hydro Land.	Monthly	Dams: ND1, ND2 Swamp Creek: A – up gradient of site, 14 – downgradient of CWS, B – downgradient of CWS, D – downgradient of Irrigation Area, 62 – Wentworth swamp water quality  Surge Ponds: Eastern Surge Pond Southern Surge Pond Western Surge Pond	pH, Conductivity, F, Free Cyanide, TDS, TSS	Environmental Officer
Dam Monitoring - for changes in dam water quality	Weekly	ND1, ND2 and Eastern Surge Dam	pH, F	Environmental Officer
Dam Monitoring - for changes in dam water quality	Monthly	ND1, ND2, West Surge Pond, South Surge Pond and East Surge Pond.	pH, EC, F	Environmental Officer
Visual monitoring of irrigation area during any discharges to this area to ensure no runoff occurs	Monthly	Irrigation Area	No visible water pooling or running off the surface prior to or during irrigation	Environmental Officer
Monitoring of groundwater quality	Quarterly	28 wells as follows: <ul style="list-style-type: none"> <li>• Section 1 wells: W2S, W2D, PUMP, W7S, W7M, E5 and E5D</li> <li>• Section 2 wells: W1S, W1D, E4</li> <li>• Section 3 wells: W4S, W4D, A7</li> <li>• Section 4 wells: E11, W5S, W5D, N2</li> <li>• Wells next to Swamp Creek: F5, F6, G5, G6</li> </ul>	Depth to groundwater, Temperature, pH, F, Free Cyanide, EC, Dissolved oxygen, Redox potential	Environmental Officer Principal Environmental Consultant
Surface water monitoring post rain event	Event based	All areas where leachate is observed following rain events	pH, F	Environmental Officer

Monitoring Details	Frequency	Locations	Parameters	Person/s Responsible
Monitoring groundwater level to identify need to engage interception trench	Event Based	W2S, W2D, PUMP, W7S, W7M, E5 and E5D	Depth to groundwater	Environmental Officer

**4.1.5 Soil and Water Management**

As noted in **Table 3-2** the erosion and sediment controls will be included as part of the regular inspection program 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 drains and dams will be inspected on a monthly basis.

Where an issue is identified during the inspection, the controls 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 RWEMP.

Reporting will also be undertaken in accordance with relevant legislation, guideline 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 RWEMP.

**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 completion and signed off.

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

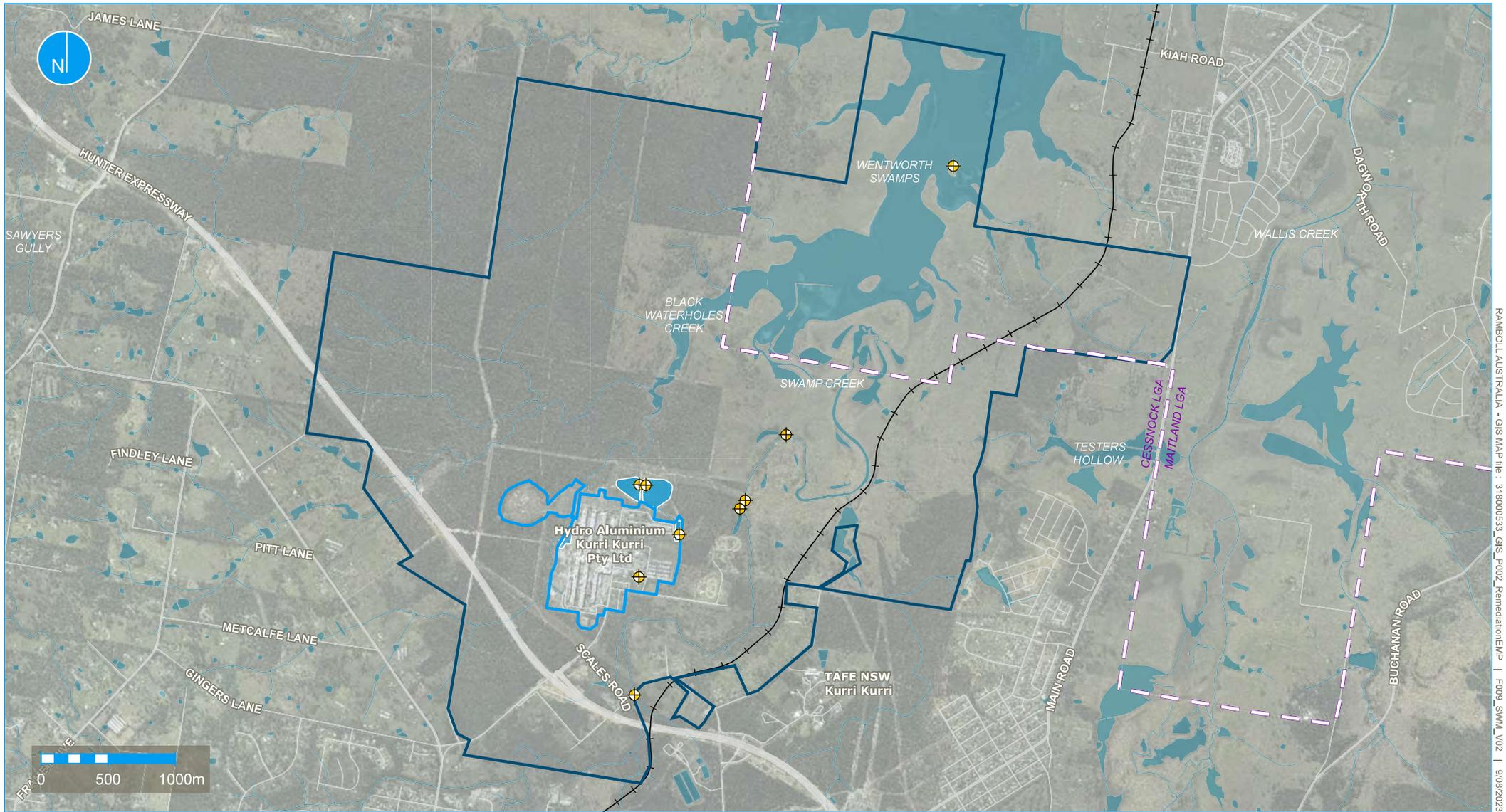
**4.5 Review and Improvement**

Continual improvement of the SWMP 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 RWEMP and specialist management plans is undertaken.

The RWEMP and specialist management plans will be reviewed on an as needs basis if changes to existing operations occur.

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



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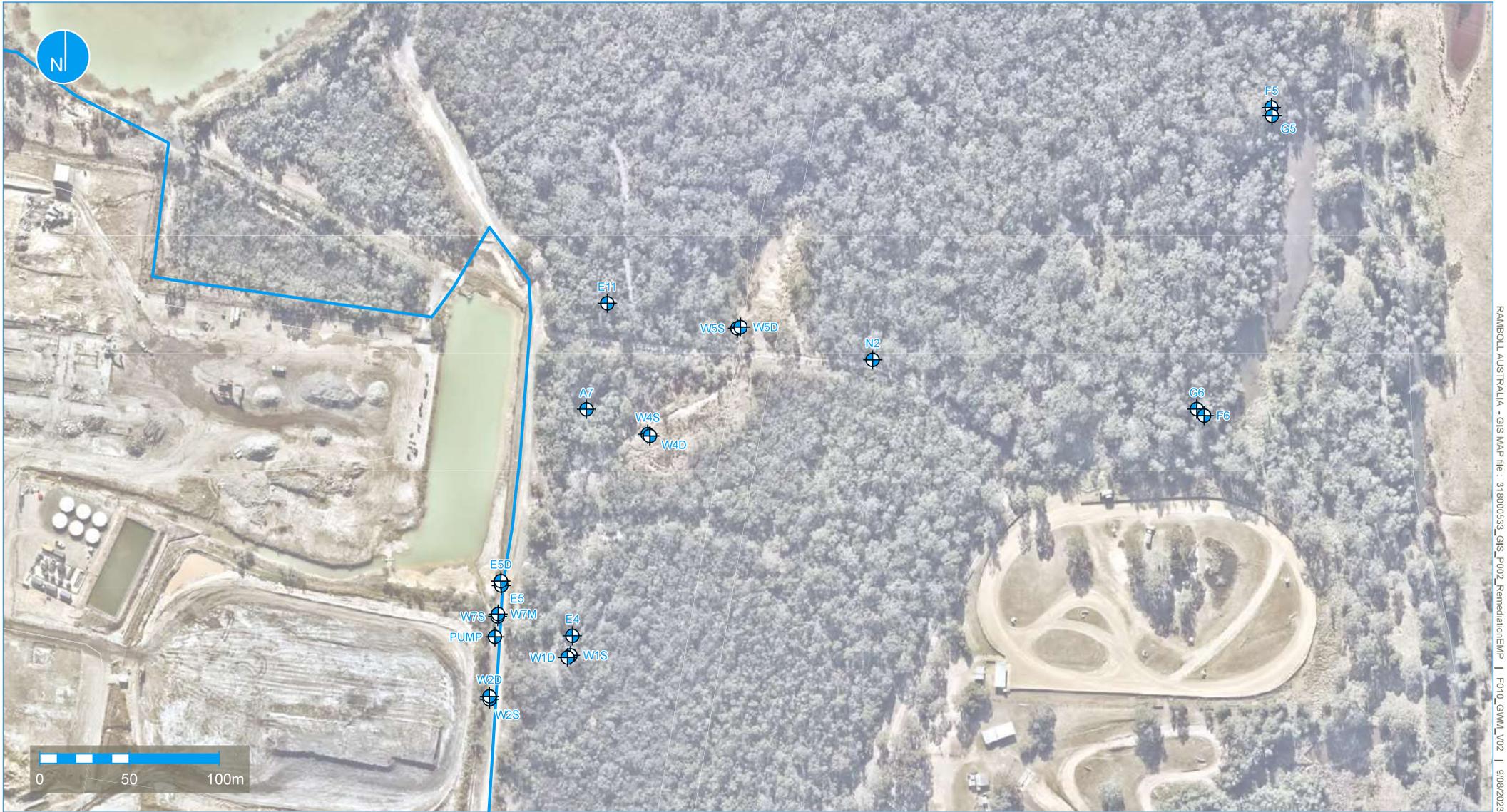
**Legend**

- Hydro owned land
- Project site
- LGA boundary
- + Surface water monitoring location
- Water course
- Water body

A4  
1:40,000



**Figure 4-1 | Surface Water Monitoring Locations**

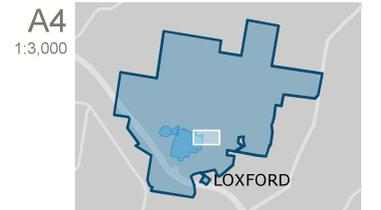


RAMBOLL AUSTRALIA • GIS MAP file : 318000333\_GIS\_P002\_RemediationEMP | F010\_GWM\_V02 | 9/08/2023

Aerial photography by Nearmap, flown 01.07.2023

**Legend**

- Project site
- + Groundwater monitoring location



**Figure 4-2 | Groundwater Monitoring Locations**

## 5. REFERENCES

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## 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.

**APPENDIX 1  
LEACHATE MANAGEMENT PLAN**

**APPENDIX 2  
CONTAMINATED SOILS MANAGEMENT PLAN**

**APPENDIX 3  
INITIAL REMEDIATION EROSION AND SEDIMENT CONTROL PLAN**