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CAPTAINS FLAT RAIL CORRIDOR ENVIRONMENTAL MANAGEMENT PLAN

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CONTENTS

1.	Introduction	3
1.1	Purpose	3
1.2	Site Description	3
1.3	Current Site Use	4
1.4	Topography and Hydrology	4
1.5	Geology	4
1.6	Hydrogeology	5
1.7	Residual Contamination	5
1.7.1	Soil Observations	5
1.7.2	Soil Results	5
1.7.3	Tier 1 Human Health Risk Assessment	6
1.8	Air Quality Monitoring	9
1.9	Further Assessment	10
1.10	Operation of the EMP	10
2.	Management Framework	11
2.1	Roles and Responsibilities	11
2.2	Legislative and Regulatory Framework	12
2.3	Periodic Review	12
2.4	Non-Compliance and Corrective Actions	12
2.5	Record Keeping	12
3.	Management Activities	13
3.1	Hazard Identification	13
3.2	Management Strategy	13
3.3	Hazard Mitigation	13
3.4	Communications and Notifications	15
4.	Summary Monitoring and Verification Requirements	17
5.	Limitations	19
6.	References	20

TABLE OF TABLES

Table 1-1: Site Identification	4
Table 1-2: Summary of Soil Exceedances	6
Table 1-3: Soil Exceedances from southern terminus to Beverly Hills Road Crossing	7
Table 1-4: Soil exceedances from Beverly Hills Rd to the north.	8
Table 1-5: Summary of Surface Water Results	9
Table 1-6: Air Quality Monitoring Locations	10
Table 2-1: Roles and Responsibilities	11
Table 3-1: General Hazard Mitigation Measures	14
Table 4-1: Summary of interim monitoring requirements	18

APPENDICES

Appendix 1

Figures

Appendix 2

SAFework NSW Lead Notification Requirements

Appendix 3

Monitoring Checklist

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was commissioned by Transport for NSW (TfNSW) to prepare an environmental management plan (EMP) for the interim management of risks associated with soil contamination that has been identified at Lot 4425 DP1217100 in the Country Regional Network (CRN) at Captains Flat, New South Wales (NSW) (the site). The site is noted to form part of the Captains Flat Heritage Trail (Ramboll 2020b) and has been accessible by members of the public. A site locality plan is presented as **Figure 1** and a site features plan is presented as **Figure 2, Appendix 1**.

1.1 Purpose

The purpose of this EMP is to provide strategies to minimise and manage risks from exposure to contamination onsite until a long-term remedial strategy is implemented. This plan shall be integrated with UGL Regional Linx (UGL) management systems for the CRN. Integration within UGL's management system provides a mechanism for enforceability and UGL will be responsible for implementing the EMP.

Development and implementation of this EMP is an element of a Voluntary Management Plan agreed to with the NSW EPA and is a legal requirement.

This EMP contains passive controls (no direct actions) and active controls (direct actions) protective of rail workers and members of the public.

Public services (power, water, communications) have been identified passing underground through the site (Ramboll 2020a) however this EMP has not been prepared to be protective of service workers.

Further assessment is required to delineate the extent of contamination within the rail corridor. The type and extent of controls described within this EMP may require refinement based on outcomes of further assessment.

This EMP has been prepared in general accordance with the relevant legislation and industry standards, with reference to the NSW Environment Protection Authority (EPA) *Contaminated Land Guidelines, Consultants Reporting on Contaminated Land* (EPA 2020) and SafeWork NSW guidance.

1.2 Site Description

The site forms a section of the Bungedore Junction to Captains Flat Line that operated between Bungendore and Captains Flat and was used as part of an ore loadout facility for the adjacent Captains Flat (Lake George) Mine from 1940 until 1969 when the mine closed. Site details are summarised in **Table 1-1**.

Table 1-1: Site Identification

Information	Description
Street Address:	Copper Creek Road, Captains Flat NSW
Identifier:	Lot 4425 Deposited Plan (DP) 1217100
Local Government:	Queanbeyan-Palerang Regional Council
Owner:	Managed by UGL as part of the CRN on behalf of TfNSW
Current Site Use:	Commercial / industrial – non-operational rail corridor

1.3 Current Site Use

The site currently forms part of the non-operational Captains Flat – Bungendore rail line. Site use appears limited to the following activities:

1. A fenced compound south-east of Copper Creek Road leased by Queanbeyan Palerang Council on behalf of the State Emergency Service, here-in referred to as the SES lease area
2. The Captains Flat Heritage Trail
3. The Copper Creek Road crossing
4. Utilities which pass through the corridor (communications, power, water)

Surrounding land use includes:

North: A private residence, Copper Creek, Captains Flat Road, bushland, former Railway Station (now leased as a private residence)

East: Miners Road, Northern Tailings Dump of the former Lake George Mine, Captains Flat Sewage Treatment Plant, residential community of Captains Flat

South: A former processing area of the Lake George Mine, now bushland

West: Copper Creek and large lot residential properties

1.4 Topography and Hydrology

Site topography is characterised by a moderate north facing slope intersected by a moderate – steep gully directing Copper Creek which flows north-east to the Molonglo River. Copper Creek passes beneath the rail line through a culvert and an area of apparent fill. Topographical contours are presented on **Figure 1 and 2, Appendix 1**.

1.5 Geology

The regional geology of the Captains Flat area is characterised by a well-defined north-south trending graben.¹ (2 to 8 km wide), bounded by two horsts.² at its southern and northern ends. The horsts comprise tightly folded Middle to Upper Silurian felsic pyroclastics, volcanogenic sediments and shales. Faults at the boundaries of these structures have the potential to be preferential pathways for groundwater (GHD, 2018). Review of the Department of Regional NSW interactive GIS portal MinView.³ indicates the Narongo Fault passes through the site orientated north – south between Copper Creek Road and Copper Creek.

¹ A graben is a valley caused by the downward displacement of a section of the earth's crust. These are produced by parallel faults.

² A horst is a raised block of land bounded by parallel normal faults. Horsts are bits of land which have either been lifted or has remained stationary while the land on either side (graben) have fallen.

³ <https://minview.geoscience.nsw.gov.au/#/?lon=149.4385&lat=-35.59053&z=18&bm=bm1&l=ge611:n:100,ge610:n:100,ge69:n:100,ge68:n:100,ge67:n:100,ge66:n:100,ge65:n:100,ge64:n:100,ge63:n:100,ge62:n:100,ge61:n:100,ge612:y:100,hi1:n:25,wa1:y:100,ut1:y:50,ad0:y:100> accessed 27/09/2021.

1.6 Hydrogeology

A review of the Bureau of Meteorology's National Groundwater Information System (BOM, 2019) indicated that no registered groundwater bores are located within 1 km of the site.

The Hydrogeology Map of Australia (Geoscience Australia, 2000) indicates the site is within an area of fractured or fissured aquifers of low to moderate productivity.

1.7 Residual Contamination

The Lake George Mine now forms part of the NSW Government Legacy Mines Program (former Derelict Mines Program) and is a known source of heavy metal contamination and acid mine drainage (AMD) impacting the surrounding area (NSW Department of Resources and Geoscience 2020).

Recent investigations of the Captains Flat rail corridor (Ramboll 2020a and Ramboll 2020b) have identified potential risks to human health and the environment associated with contamination onsite relating to the adjacent Lake George (legacy) mine and the historic loadout of ore from the mine by rail. A site features plan including summary assessment of contaminant concentrations is presented on **Figure 2, Appendix 1** and discussed in the following sections.

1.7.1 Soil Observations

The highest contaminant concentrations observed through field portable x-ray fluorescence metals analyser (FPXRF) were generally associated with soils comprising of grey/green gravelly sand. This material was identified along the rail formation and beneath rock capping at the former load-out/weigh bridge area. To the west and east of the rail formation towards Copper Creek, soils comprised of fill material containing coal and foreign materials. Fibre cement sheeting suspected of containing asbestos was identified in areas where this material had been applied.

1.7.2 Soil Results

A tabulated assessment of soil concentrations against Tier 1 assessment criteria is presented as **Appendix 5**. A summary of contaminant concentrations that exceeded Tier 1 assessment criteria is summarised in **Table 1-2**.

Table 1-2: Summary of Soil Exceedances

	Sample Number ¹	Minimum	Maximum	Mean	No > HIL D	No > EIL Commercial / Industrial
Metals						
Arsenic	346	6	10305	425	3	88
Chromium	346	0	144	47	0	0
Copper	346	18	3607	427	0	89
Iron	346	1273	320603	36762	-	-
Lead	346	13	315567	5418	123	110
Nickel	346	60	168	101	0	0
Zinc	346	17	116599	2306	0	109
Asbestos w/w %	10	<0.01	0.32	-	3 ³	-
TRH (F2)	10	<50	280	158	-	1
Benzo(a)pyrene	10	<0.5	1.2	1.2	-	1

Notes

¹Soil sampling previously completed within the rail corridor described in **Section 1.4.2** (Ramboll 2020) is included in **Table 1-2** to provide a complete summary of soil data.

²A SSTL was developed for lead at the SES lease area however samples from the SES lease area are included in the assessment against HIL D criteria above in accordance with the tiered risk assessment approach recommended in the NEPM (NEPC 2013). Site specific risk assessment for the SES lease area is presented in **Section 1.4.3**

³Asbestos was detected through sample analyses at three locations and was also observed as visible fragments in surface soils at multiple locations.

A total of 123 of 346 lead concentrations measured, three arsenic concentrations and multiple visual observations of ACM exceed the adopted human health assessment criteria. Within this context lead and asbestos are considered the primary drivers of potential risks to human health.

A total of 88 of 346 arsenic concentrations, 89 copper concentrations, 110 lead concentrations and 109 zinc concentrations, one TRH concentration and one B(a)P concentration exceeded the adopted ecological assessment criteria. Within this context Arsenic, copper, lead and zinc are considered the primary drivers of potential risks to ecology.

The distribution of contaminant concentrations exceeding Tier 1 criteria protective of human health and ecology are described in **Section 1.4.3**.

1.7.3 Tier 1 Human Health Risk Assessment

Figure 2 presents a summary of the distribution of contaminants exceeding Tier 1 human health assessment criteria on site around historic ore loader. The lateral distribution of lead and asbestos in surface soils is described by shading and the vertical distribution of lead is described by sample results presented in summary tables on the figure for each test pit advanced. **Figure 2**,

Appendix 1 present soil results exceeding Tier 1 criteria on site north of Copper Creek in summary tables at each sampling location where exceedances were observed. While shading has not been applied to delineate the extent of lead north of **Figure 2** extent as data is not considered adequate to accurately define the extent of lead exceedances in this area.

The highest lead concentrations were observed in surface soils at the loader and within the rail formation. Lead exceedances in soil were not found to extend to the western site boundary though were observed along the eastern site boundary around the loader and to the northern extent of the area assessed. fpXRF measurement of metals in test pits at 0.1 m vertical intervals indicates lead exceedances are generally limited to the upper 0.5 mbgl within the formation and to the upper 0.2 mbgl in soils adjacent the formation.

The degree of lead concentrations was observed to decrease with increased distance north from the loader however exceedances remained to the northern extent of the area assessed; approximately 1.7 km from the loader. To inform consideration of human health risks from lead exposure the degree and extent of contamination has been considered based on geographic boundaries (not cadastral) and separable human health exposure scenarios.

Soil metal results from the southern terminus to the Beverly Hills Road crossing are summarised in **Table 1-3** below.

Table 1-3: Soil Exceedances from southern terminus to Beverly Hills Road Crossing

Heavy Metals	HIL Criteria	EIL Criteria	No. of Measurements	Min	Max	Average	No. > HIL	No. > EIL
Arsenic	3000	160	325	6	10305	431	3	78
Chromium	3600	320	325	0	144	47	0	0
Copper	240000	310	325	18	3607	441	0	80
Iron	-	-	325	1273	320603	36717	-	-
Lead	1500	1800	325	13	315567	5484	108	95
Nickel	6000	380	325	60	168	97	0	0
Zinc	400000	930	325	17	116599	2398	0	105

Surface soil results from the Beverly Hills Road crossing to the northern extent of the site are summarised in **Table 1-4** below.

Table 1-4: Soil exceedances from Beverly Hills Rd to the north.

Heavy Metals	HIL Criteria	EIL Criteria	No. of Measurements	Min	Max	Average	No. > HIL	No. > EIL
Arsenic	3000	160	21	27	627	327	0	10
Chromium	3600	320	21	30	63	49	0	0
Copper	240000	310	21	54	535	274	0	9
Iron	-	-	21	7503	100185	37433	-	-
Lead	1500	1800	21	41	11059	4484	15	15
Nickel	6000	380	21	97	165	124	0	0
Zinc	400000	930	21	161	5814	916	0	4

For the purpose of considering potential risks associated with asbestos, the shading on **Figure 2**, **Appendix 1** includes areas where asbestos was observed⁴. Results from laboratory analyses of fibre cement sheeting fragments at three locations (TP08, TP09, TP12) identified presence of chrysotile asbestos within the fragments. Analytical results for asbestos % w/w at locations where visible ACM fragments were observed at the surface (TP02, TP06, TP08, TP09, TP12) did not identify asbestos fines of friable asbestos. Cumulatively, the analytical results indicate asbestos impacts can be characterised by visible fibre cement fragments that contain bonded chrysotile asbestos.

Bonded ACM fragments were observed around Captains Flat train station and within the rail formation at numerous locations sporadically to the northern extent of the site. Bonded ACM fragments are considered less likely to be present in other areas of the corridor however vegetation in these areas limited capacity for thorough inspection. No ACM fragments were observed in soil below 0.1 m however intrusive investigation of the Copper Creek culvert could not occur and asbestos was most concentrated in this area

⁴ ACM fragments that were removed were disposed of at an appropriately licensed waste facility. A receipt confirming disposal is presented in **Appendix XX**.

Table 1-5: Summary of Surface Water Results

	Number of Samples	Detections	Minimum	Maximum	Mean	No > health-based recreational criteria	No > Ecological 95% Fresh Water Criteria
Metals							
Arsenic	6	3	0.001	0.002	0.001	0	-
Arsenic (filtered)	6	6	0.001	0.002	0.002	-	0
Cadmium	6	6	0.001	0.032	0.014	2	-
Cadmium (filtered)	6	6	0.001	0.028	0.013	-	6
Chromium	6	4	0.001	0.002	0.001	0	-
Chromium (filtered)	6	2	0.001	0.002	0.002	-	1
Copper	6	6	0.040	0.200	0.088	0	-
Copper (filtered)	6	6	0.036	0.160	0.073	-	6
Lead	6	6	0.075	0.410	6	5	-
Lead (filtered)	6	6	0.052	0.340	6	-	6
Mercury	6	0	0.000	0.000	6	0	-
Mercury (filtered)	6	0	0.000	0.000	6	-	0
Nickel	6	6	0.005	0.017	6	0	-
Nickel (filtered)	6	6	0.004	0.015	6	-	3
Zinc	6	6	0.730	27.000	6	0	-
Zinc (filtered)	6	6	0.660	23.000	6	-	6

Analytical results from surface water exceeded adopted human health criteria for cadmium at two locations and lead at five locations.

SW03 was collected from Copper Creek upstream of the both the adjacent mine and the site and reported contaminant concentrations below the adopted health criteria. SW04 – SW06 were collected from Copper Creek downstream of the site and reported lead above the adopted health criteria. SW01 and SW02 were collected downstream of a dam on the mine site within a drainage line that passes through the southern end of the site. Cadmium and lead exceeded the adopted health criteria in both SW01 and SW02.

1.8 Air Quality Monitoring

An air quality monitoring (AQM) network has been established within Captains Flat targeting metals identified as CoPC from historic mining in the area. The AQM network consists of total suspended particulate (TSP) monitoring using high-volume air samplers (HVAS; Hi-Vol 3000) at five locations around Captains Flat. A meteorological station maintained at one location (MET) to

inform movement and dispersion of air. The network was established 22 June 2021 and it is anticipated will run for at least 12 months.

The five monitoring locations are summarised in **Table 1-6**.

Table 1-6: Air Quality Monitoring Locations

ID	Location	Description	Monitoring Technique	Parameters measured
AQM1	Residence, Old Mine Road	Representative of potential impacts to the south-west. Located on elevated terrain relative other selected locations	High-volume air sampler (HVAS) with total suspended particulate (TSP) size selective inlet, measuring for 24-hours every 1 day in 6	Heavy metals in TSP (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)
AQM2 & MET	Residence, 2 Copper Creek Road (the site)	Identified as the nearest sensitive receptor to identified mining areas to the north-west	HVAS with TSP inlet, measuring for 24-hours every 1 day in 6	Heavy metals in TSP (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)
			Meteorological Station at 10m and 2m height	10m: wind speed; wind direction. 2m: wind speed; wind direction; temperature; humidity. Ground: rainfall.
AQM3	Captains Flat former Preschool, 27 Foxlow Street	Identified as a sensitive receptor of interest and representative of potential impacts to the south-east	HVAS with TSP inlet, measuring for 24-hours every 1 day in 6	Heavy metals in TSP (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)
AQM4	Captains Flat Public School, Montgomery Street	Representative of potentials impacts of the largest community to the north-east	HVAS with TSP inlet, measuring for 24-hours every 1 day in 6	Heavy metals in TSP (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)
AQM5	Residence, 2 Braidwood Road	Representative of potential impacts to residents down-wind of the mine	HVAS with TSP inlet, measuring for 24-hours every 1 day in 6	Heavy metals in TSP (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)

AQM 2 and MET are located adjacent the site and supplement Tier 1 risk assessment with lines of evidence particularly relevant to potential ongoing migration of lead in airborne dust and subsequent human exposure via inhalation and/or deposition on the site.

Lead concentrations were reported below adopted assessment criteria for human health indicating low risk of contaminant migration via airborne dust over the monitoring period. It is noted however that meteorological variability may significantly affect movement of airborne dust and that the monitoring period to date does not include hotter drier months when more airborne dust may be expected. Further information is presented in the Captains Flat Air Quality Monitoring Report June to December 2021 (Ramboll 2021c).

1.9 Further Assessment

Further assessment is required to delineate the extent of contamination within the rail corridor. The type and extent of controls described within this EMP may require refinement based on outcomes of further assessment.

1.10 Operation of the EMP

The requirements of this EMP apply to the management of contaminated soil onsite.

This EMP will remain in place until a long-term plan is developed and implemented or until the site has been remediated and validated.

2. MANAGEMENT FRAMEWORK

2.1 Roles and Responsibilities

All site personnel (including TfNSW, UGL and their contractors) have a responsibility for protecting human health and the environment. The key roles and responsibilities for this EMP are presented in **Table 2-1**. TfNSW is ultimately responsible for developing a process to ensure this EMP is implemented for works on site.

Table 2-1: Roles and Responsibilities

Role	Responsibility
TfNSW / UGL Maintenance Delivery, Project Delivery, Environment Manager, Property Manager	<ul style="list-style-type: none"> • Ensure any site workers and contractors engaged in activities at the site are inducted on the requirements of this EMP • To engage consultants and contractors as required for rail work • To ensure that all employees, contractors and consultants that commission or carry out rail work on the site (Figure 1, Appendix 1) are aware of the contents of this EMP • To implement controls to mitigate risks associated with exposure of members of the public to site contamination • To ensure compliance to the requirements of this EMP through surveillance and monitoring of consultants and contractors completing rail work • Provision of a copy of this EMP to utility managers with assets passing through the site and any future purchasers or occupiers of the site and attach a copy of the document to the contract of sale / lease • Maintain ultimate responsibility for the implementation of this EMP for the site • Responsible for revisions and amendments to this EMP if site conditions change • Track all management of the revisions and amendments, and ensure amendments are communicated to all stakeholders • Review effectiveness of this EMP following any incident or any other event that suggests this EMP is ineffective • Undertake corrective actions to rectify non-conformances or complaints (in conjunction with WHS Representative)
UGL Environment Manager	<ul style="list-style-type: none"> • Undertake all stakeholder management including liaison with regulatory bodies and follow-up of all external complaints
All site personnel	<ul style="list-style-type: none"> • To take reasonable care for their own health and safety and for the health and safety of their co-workers. With specific regard for this EMP all workers have a responsibility to implement controls as relevant to their site duties and to report any non-conformances with this plan to the UGL Project Manager / Site Manager
UGL Work Health and Safety (WHS) Representative, UGL Site Supervisor and all site personnel	<ul style="list-style-type: none"> • Implement EMP controls during all rail work at the site • Monitor and report (where relevant) on environmental and safety hazards, impacts or improvements to work activities • Immediate reporting of all non-conformances or complaints to UGL or concerns regarding the implementation of this EMP • Undertake corrective actions to rectify non-conformances or complaints (in conjunction with Site Supervisor)
UGL Environmental Representative	<ul style="list-style-type: none"> • Provide advice on environmental issues and incidents as necessary • Undertake monitoring and reporting requirements outlined in this EMP • Update this EMP as necessary

NSW SES Station Representative	<ul style="list-style-type: none">• Ensure utility owners are aware of the EMP requirements for entering the site• Ensure staff are made aware of the environmental management plan• Keep records of staff and contractor inductions
Utility Owners	<ul style="list-style-type: none">• Ensure staff are made aware of the environmental management plan• Keep records of staff and contractor inductions

2.2 Legislative and Regulatory Framework

This EMP has been prepared to address the requirements of relevant legislation and codes. The key pieces of legislation applicable to this EMP are:

1. *NSW Work Health and Safety Act 2011* (WHS Act)
2. NSW Work Health and Regulation 2017
3. *Protection of the Environment Operations Act 1997*
4. Protection of the Environment Operations (Waste) Regulation 2014
5. *Contaminated Land Management Act 1997*

The key codes of practice are:

1. SafeWork NSW Lead Guidance
2. SafeWork Australia Code of Practice Managing Risks of Hazardous Chemicals in the Workplace
3. NSW EPA LeadSmart – Work Smart: Tradespeople and Mining Industry Workers
4. NHMRC Managing Individual Exposure to Lead in Australia – A Guide for Health Practitioners 2016
5. Workplace Exposure Standards for Airborne Contaminants (SafeWork NSW 2018)

2.3 Periodic Review

This EMP must be reviewed routinely from date of issue or when:

1. Requested by a health and safety representative from UGL
2. Contaminated material is removed, disturbed, sealed or enclosed
3. Changes to land use occur
4. When a longer-term lead management plan is in place
5. At least annually

2.4 Non-Compliance and Corrective Actions

Where non-compliances and/or corrective actions are identified these must be communicated to the UGL Site Supervisor and the UGL Environment Manager. Corrective actions should be administered by the UGL Site Supervisor. Where a non-compliance with controls listed in **Table 3-1** is identified, corrective action must be implemented immediately.

2.5 Record Keeping

UGL are the current operators of the CRN and shall keep records of the inductions, monitoring and inspections (as required in **Section 4**), corrective actions and reports prepared for the Site. If the CRN operator changes the responsibility should be transferred to the new contractor responsible for the CRN operations. These records should be evaluated and used for completing the review of this EMP.

3. MANAGEMENT ACTIVITIES

Soil onsite, particularly on the rail line and in the south-western portion of the site at the former loadout area, are contaminated with metals with the potential to harm the health of rail workers and members of the public. The extent of identified contamination is defined by exceedances of adopted assessment criteria presented on **Figure 2, Appendix 1**. Further investigation of contaminant extent is ongoing, and areas of impact may extend further than currently identified.

3.1 Hazard Identification

Lead is known to cause health effects in humans, especially children and developing foetuses. SafeWork NSW recognises that females with childbearing capacity are the most sensitive receptor at work sites.

Migration of metals into the environment, soils, groundwater and surface water, may cause environmental harm.

The primary routes of exposure to human health and the environment are from dust generation and the transport of soils or dissolved contaminants with surface water. These actions can result in dermal contact, ingestion and inhalation of contaminated soils and water. Activities causing soil disturbance at the site can exacerbate the movement of contaminated soils.

SafeWork NSW definitions of lead risk work is provided in **Appendix 2** of this EMP.

3.2 Management Strategy

Section 17 of the WHS Act requires risks to health and safety be eliminated so far as is reasonably practicable. The SafeWork Australia code of practice for managing risks of hazardous chemicals in workplace provides a hierarchy of control measures. This includes (most preferred to least) eliminate hazard, substitution, isolation and implementing engineering controls. SafeWork NSW also advocates elimination of the hazard as the most preferred method of control.

The site management strategy is therefore to temporarily isolate contaminated soil. This strategy is considered appropriate for mitigating potential impacts to both human health and the environment. As the mode of exposure is increased with soil disturbance, measures should also be aimed at minimising dust generation and surface water flow at the site.

3.3 Hazard Mitigation

The principal hazard mitigation measure is to restrict access to the contaminated area by creating an exclusion zone until such time as the area is remediated and risks are documented to be acceptable. Where access is required, strict management controls are to be implemented.

Hazard mitigation measures for are provided in **Table 3-1**.

Table 3-1: General Hazard Mitigation Measures

Category	General Requirements
Exclusion	
Exclusion Zones	<p>The site has been recently demarcated as an exclusion zone through construction of rural fencing and application of signage. Except for Copper Creek Road, the site should only be accessed by persons inducted to this EMP or by utility managers working under an EMP developed specifically for the works they are undertaking. The exclusion zone should be maintained including signage that reads:</p> <p style="text-align: center;">DANGER DO NOT ENTER Induction to Environmental Management Plan required.</p> <p>Contact West Wyalong Superintendent David Scealy (M: 0418 761 471 or P: 1300 661 390) for further information</p> <p style="text-align: center;">(a map will be presented defining the exclusion zone)</p> <p>Queanbeyan Palerang Council (as the lessee of the SES Lease Area) and entities with services crossing the site should be notified of the presence of contamination onsite and advised of requirement to provide an EMP for UGL approval before completing any works that require soil disturbance.</p>
Works that do not require soil disturbance	
Engineered controls Administrative controls for onsite workers / contractors PPE Facilities	<p>A durable, erosion-resistant capping layer should be maintained over the Copper Creek Road crossing to prevent inadvertent access to contaminated soils at this location. A spray seal was recently applied by QPRC to the public road surface and across trafficable surfaces within the SES compound. Providing the spray seal is maintained it would be considered an adequate capping layer.</p> <p>Vehicle access to unsealed (fenced) portions of the site shall be minimised. If required onsite vehicles shall not contain baby equipment, child car seats etc and should be kept free of other personal items to the extent practical.</p> <p>The following rail corridor compliant PPE shall be worn at all times – full length clothing (sleeves and trousers / overalls), orange high visibility upper clothing or vest, safety (steel capped) boots, protective eyewear, hard hat and gloves.</p> <p>Where works are required onsite the following facilities are to be provided:</p> <ul style="list-style-type: none"> • Clean and dust with wet towel/mop workers area for eating and drinking • Toilet facilities and wash up areas for decontamination • Facilities for disposal of PPE. Used PPE shall be placed in durable plastic bags (200 µm or similar) and disposed of as GSW at an appropriately licensed facility. This may occur via interim disposal to a UGL depot where skip bins etc exist.
Soil disturbance	
<p>Note: Minor soil disturbance (less than 5 m³) by UGL can occur through implementation of all controls defined below. If larger soil disturbance by UGL, any soil disturbance by utility managers or any stockpiling site won soils by any party is required or specific EMP must be developed for the proposed scope of work. Specific EMPs must integrate all controls contained within this document.</p>	

Category	General Requirements
Mandatory administrative controls for any soil disturbance	<ul style="list-style-type: none"> • If excavation of contaminated soils is required excavation must be completed so that visible airborne dust is not generated. Excavation should not occur on windy days; dust must be suppressed during excavation e.g. through use of a water cart. The details of this EMP must be communicated to all onsite workers including external contractors • Any soil disturbance works shall occur under the supervision of the UGL Environment Manager or a delegated representative and should be preferentially completed using machinery with an enclosed cabin/s • Personnel decontamination shall occur after leaving excavations areas by removing/washing/cleaning dusty work clothes, boots, shoes, tools, phones, hands/face/any other exposed body area. Cleaning should occur using a damp cloth/mop • Hands should be washed before eating or drinking, smoking or chewing gum • Eating or drinking should be conducted in a clean dust free location • Fingernails and toenails should be kept short • Showering should occur before returning home. Work gear should be kept separately from other clothing and washed separately.
Administrative controls - Machinery Operators	<p>Where machinery is floated to site a staging area must be established within a clean area of the site where loading and unloading from the float can safely occur. Machinery should by preference be selected with capacity for</p> <ul style="list-style-type: none"> • An enclosed cabin • Cabin air circulation system (air conditioning) equipped with high efficiency filter and • Cabin seals in good condition to eliminate cabin dust intrusion <p>At completion of works all soil must be removed such that machinery is free of site materials when entering the staging area for loading.</p>
Administrative controls - Workers outside assisting excavation	<p>Workers outside machinery should be used minimally. These workers should maintain a 20 m exclusion zone from areas where excavation is occurring, ideally upwind and adhere to all general requirements described above.</p>
PPE	<p>The following rail corridor compliant PPE shall be worn at all times – full length clothing (sleeves and trousers / overalls), orange high visibility upper clothing or vest, safety (steel capped) boots, protective eyewear, hard hat and gloves.</p> <p>A P2 dust mask shall be worn by all workers onsite during excavation who are outside machinery with enclosed cabins.</p> <p>If workers are required within the 20 m exclusion for excavation works disposable coveralls should also be worn.</p>

3.4 Communications and Notifications

The following stakeholders are identified and should be notified of site contamination and controls defined here-in:

1. UGL rail workers
2. The occupants of the residence adjacent the site
3. Queanbeyan-Palerang Regional Council as the lessee of the SES lease area
4. Queanbeyan and Braidwood visitor information centres as advertisers of the Captains Flat Heritage Trail

5. Evoenergy / Icon Water as the custodian of underground water service running through the site⁵
6. Telstra as the custodian of an underground communication service running through the site
7. Essential Energy as the custodian of an underground power service running through the site
8. The NSW EPA
9. SafeWork NSW should be notified if the work involves or is likely to involve lead risk work.

Notification shall include provision of a copy of this EMP.

⁵ Evoenergy / Icon Water supplied service plans in response to Dial Before You Dig search as the custodians of water, sewer, effluent, gas and electricity assets within the area. No services were identified on these plans however a suspected stop valve was observed during site inspection north of the Coppers Creek culvert and indicates a gas or water service may be present.

4. SUMMARY MONITORING AND VERIFICATION REQUIREMENTS

Monitoring is required until a permanent remediation solution is identified. A summary of the monitoring requirements is outlined in **Table 4-1**.

Table 4-1: Summary of interim monitoring requirements

Element	Frequency	Reference
Fencing and Signage	Quarterly	Section 3.3
Copper Creek Road rail crossing	Quarterly	Section 3.3

Monitoring to ensure that the controls described within this plan are maintained will include completion of the checklist presented as **Appendix 3**. Monitoring records will be stored in the UGL management system for the CRN.

5. LIMITATIONS

This document is issued in confidence to Transport for NSW for the purposes of informing management of risks to rail workers and members of the public associated with contaminated soil within the rail corridor at Captains Flat, NSW. It should not be used for any other purpose.

The report must not be reproduced in whole or in part except with the prior consent of Ramboll Australia Pty Ltd and subject to inclusion of an acknowledgement of the source. No information as to the contents or subject matter of this document or any part thereof may be communicated in any manner to any third party without the prior consent of Ramboll Australia Pty Ltd.

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

6. REFERENCES

Bureau of Meteorology (2019), Australian Groundwater Explorer – National Groundwater information System.

Department of Environment Climate Change and Water (2009) *NSW Waste Classification Guidelines*

Department of Infrastructure, Planning and Natural Resources (2004) *Guideline for the Preparation of Environmental Management Plans*

Geoscience Australia (2000), *Hydrogeology Map of Australia*, 2000

NHMRC *Managing Individual Exposure to Lead in Australia – A Guide for Health Practitioners 2016*

NSW EPA (2020) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land.*

NSW EPA *LeadSmart – Work Smart: Tradespeople and Mining Industry Workers*

<http://leadsmart.nsw.gov.au/wp-content/uploads/2016/09/LeadSmart-Brochure-Working.pdf>

Ramboll (2020a) *Captains Flat Rail Corridor, Detailed Site Investigation*, dated April 2021

Ramboll (2020b) *Captains Flat Rail Corridor, Preliminary Site Investigation*, dated October 2020

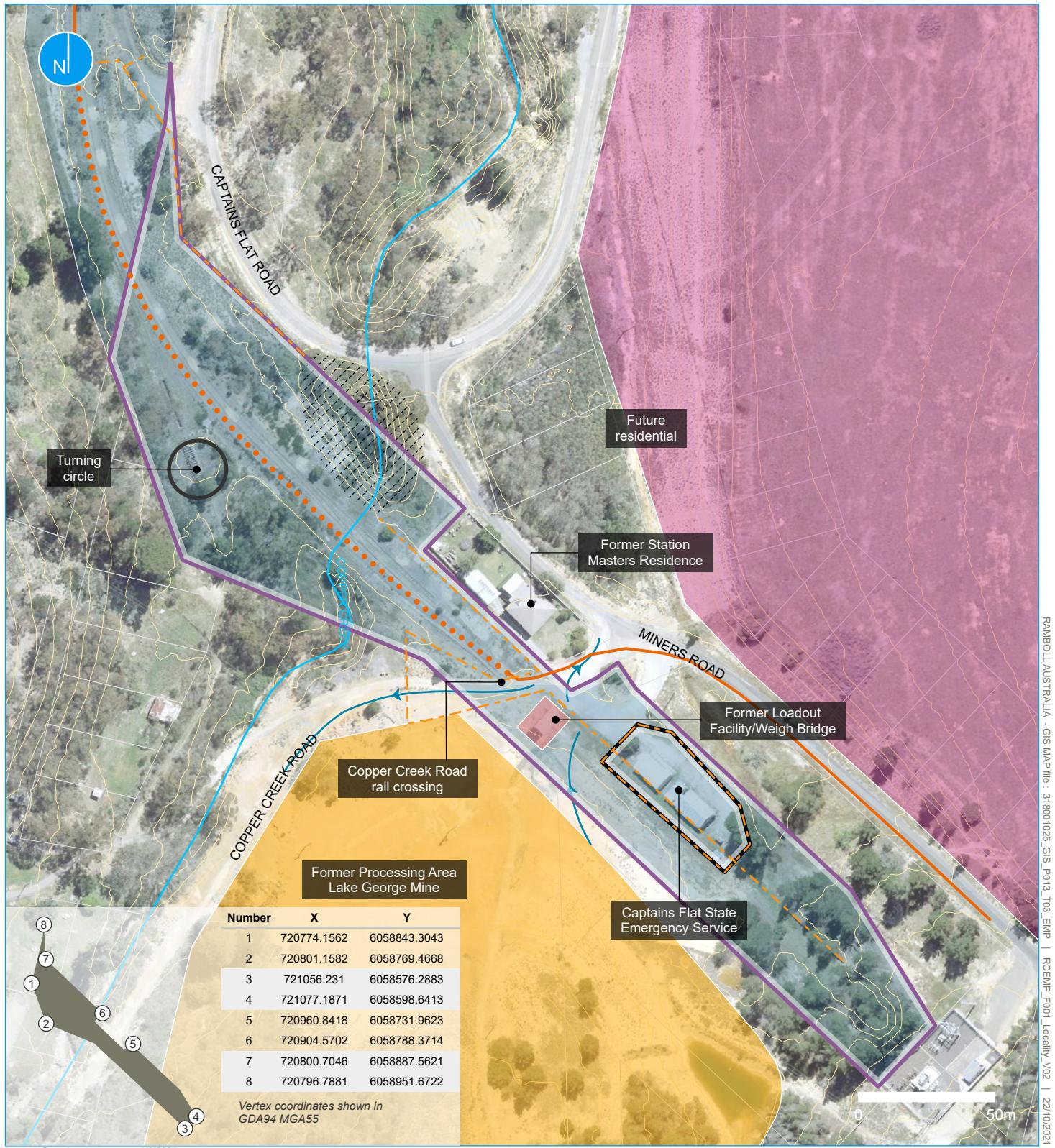
Ramboll (2021) Captains Flat Air Quality Monitoring Report June to December 2021

SafeWork NSW <https://www.safework.nsw.gov.au/notify-safework/lead-notifications>

SafeWork NSW (2016) *NSW Code of Practice Managing Risks of Hazardous Chemicals in the Workplace*

SafeWork Australia (2018) *Workplace Exposure Standards for Airborne Contaminants*

APPENDIX 1
FIGURES



Key

- [Purple line] Site boundary
- [Black line with square] Captains Flat SES Station
- [Pink shaded area] Northern Tailings Dump
- [Red shaded area] Onsite source
- [Yellow shaded area] Offsite source
- [Dotted orange line] Former heritage trail
- [Solid orange line] Remaining heritage trail
- [Light blue shaded area] Rail corridor
- [Black line] Rail
- [Blue arrow] Run off
- [Blue line] Copper Creek (Ecological receptor)
- [Yellow lines] Contours 2m

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1:1,994

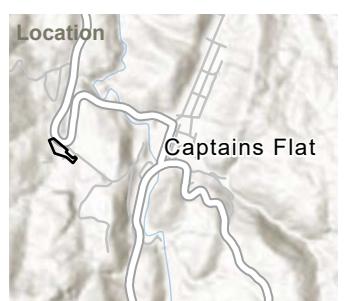


Figure 1 | Locality Plan
Captains Flat Rail Corridor Environmental Management Plan

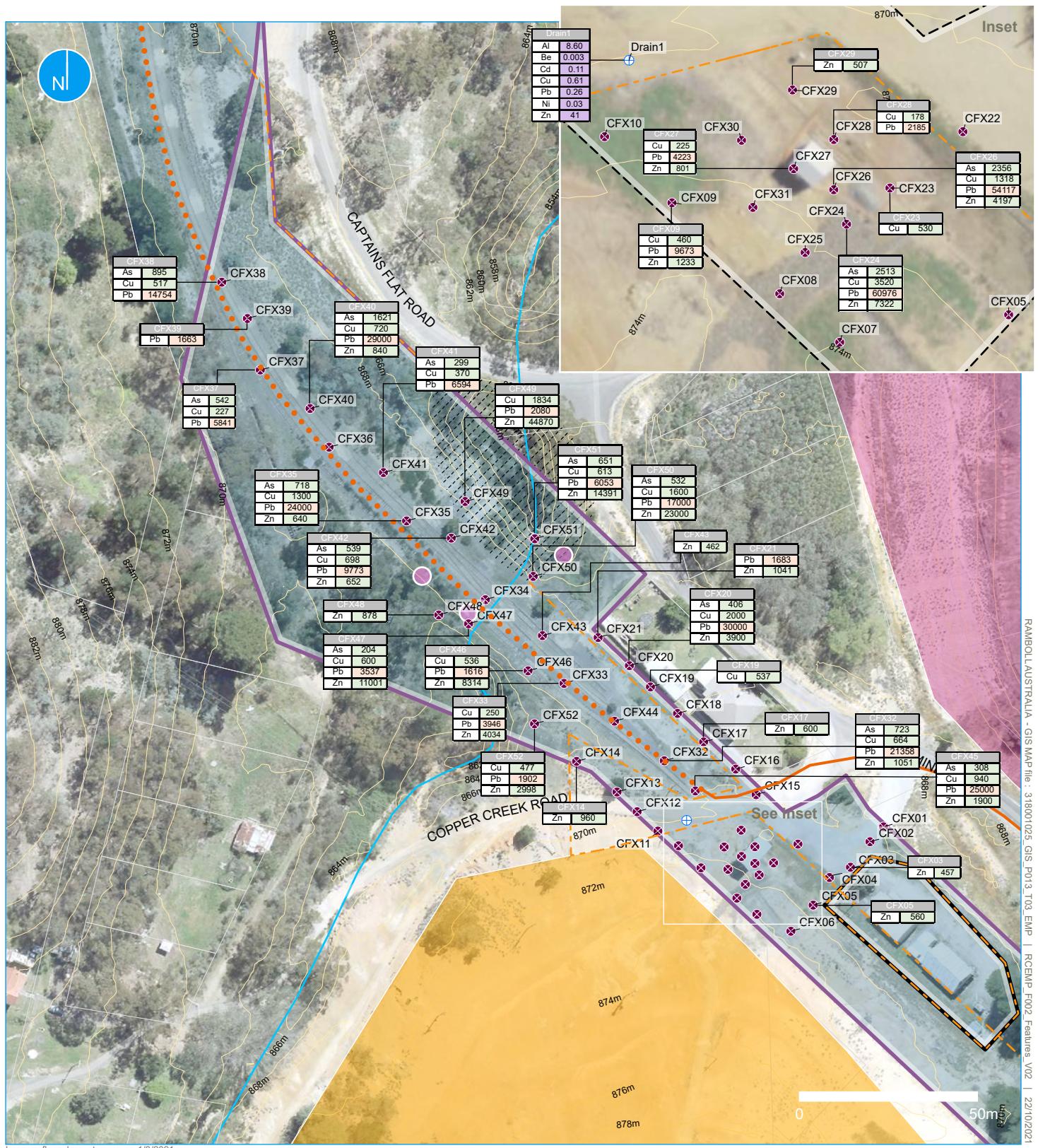
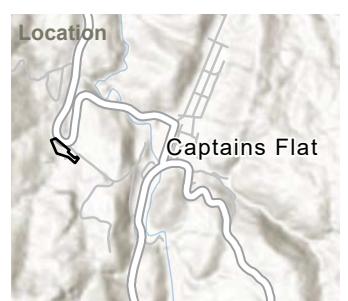


Figure 2 | Site Features Plan
Captains Flat Rail Corridor Environmental Management Plan



**APPENDIX 2
SAFework NSW LEAD NOTIFICATION REQUIREMENTS**

SafeWork NSW Lead Risk Definition

Lead risk work involves work that may cause lead levels in a worker's blood to exceed health limits.

For the period up to and including 30 June 2021 'lead risk work' means blood levels at or exceeding:

- 10 µg/dL (0.48 µmol/L) for a female of reproductive capacity
- 30 µg/dL (1.45 µmol/L) in other cases.

From 1 July 2021 'lead risk work' means:

- 5 µg/dL (0.24 µmol/L) for a female of reproductive capacity
- 20 µg/dL (0.97 µmol/L) in other cases.

SafeWork NSW Notifications

Notification must be provided if the work is likely to cause lead levels in a worker's blood to exceed healthy levels. Notification is also needed if a worker needs to be removed from working with lead.

Notification for lead risk work

SafeWork NSW states the following:

You must assess each process that involves lead to determine whether lead risk work is being carried out.

If you cannot determine whether lead risk work is being carried out, then assume it is and [notify us](#).

Submit the [Notification of lead risk work form](#) at least seven days before lead work begins. Each form is valid for the duration of the lead risk work.

You need to notify us if a worker needs to be removed from working with lead.

More information on this can be found in the [legislation](#) as well as in our [Guide on lead notifications](#). <https://www.safework.nsw.gov.au/resource-library/licence-and-registrations/guide-for-applicants-for-lead-notifications>

All lead notifications are free.

Health Monitoring

SafeWork NSW states that:

Health monitoring must be provided to workers before lead risk work starts and one month after starting.

For workers who perform ongoing lead work, biological monitoring must be arranged in accordance with the frequencies published in the WHS Regulation.

Additional guidance can be found at <https://www.safework.nsw.gov.au/notify-safework/lead-notifications>

**APPENDIX 3
MONITORING CHECKLIST**

Captains Flat EMP Inspection Checklist

Date:	UGL Representative completing inspection:			
Start time:				
Finish time:				
Weather:				
	BoM			
Date and volume of maximum rainfall in a 24hr period since last inspection?				
Date:				
Max volume (mm) in 24hr period:				
Plan Ref	Control	Inspection Yes No	Corrective Action	Implemented?
General Observations				
NA	Is airborne dust from site evident?			
	Is sediment run-off evident?			
	Is surface water discharging from site?			
	Is there evidence of excavation or other works non-compliant with the EMP?			
Table 3-1				
3.3	Is signage in place adjacent the Copper Creek Road crossing and at other readily accessible areas?			
	Is fencing in place to prevent access via the Coppers Creek Road crossing?			
	Exclusion Zone fencing and signage undamaged?			
	Is evidence of unauthorised site access visible?			
	Has durable erosion resistant capping been applied over the Coppers Creek Road crossing?			
	Is capping over Coppers Creek Road preventing inadvertent access to site materials?			
	Is excavation occurring onsite?			
Plan Ref	Control	Inspection Yes No	Corrective Action	Implemented?
3.3	Is the JHR Environment Manager or delegated representative supervising the excavation?			
	Are excavators operating with closed cabs?			
	Are excavation exclusion zones in place?			
	Are staff wearing appropriate PPE per Table 3-1 ?			
	Is dust suppression occurring?			

Other Observations