



Ranger Mine Closure Plan 2024

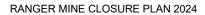
Issued Date: 1 October 2024

Revision number: 1.23.2



TABLE OF CONTENTS

1	INTE	RODUCT	TION	1
	1.1	1 Operator Details		
	1.2	Title Details		
	1.3	Purpos	se of this MCP	6
	1.4	Scope	of this MCP	6
2	STA	TUTORY	, CULTURAL AND CLIMATIC CONTEXT	10
	2.1	Statuto	ory Context	10
		2.1.1	Shared Regulatory Responsibility and the Ranger Authorisation	10
		2.1.2	Australian Government (Commonwealth) Legislation	11
		2.1.3	Northern Territory Government Legislation	13
		2.1.4	Closure Objectives and Closure Criteria	14
	2.2	Cultura	al Context	14
	2.3	Climati	ic Context	15
		2.3.1	Climate	15
		2.3.2	Climate Change	15
3	STA	KEHOLD	DER ENGAGEMENT	18
	3.1	Stakeh	olders and Engagement Mechanisms	19
	3.2	Engage	ement with Traditional Owners	23
	3.3	Current Engagement Context		
	3.4	Future Priorities for Engagement		
	3.5	Supporting the Jabiru Community Transition		
	3.6	Community and Social Performance Plan (2024–2027)		
4	DES	CRIPTIC	ON OF CLOSURE ACTIVITIES	26
	4.1	Pit 1		30
		4.1.1	Installation of the Underdrain and Deposition of Tailings	30
		4.1.2	Wicking	33
		4.1.3	Geotextile Placement and Initial Capping	33
		4.1.4	Backfill	33
		4.1.5	Tailings Consolidation and Removal of Pit Tailings Flux	34
		4.1.6	Creation of Final Landform	34
		4.1.7	Revegetation and Habitat Creation	37
		4.1.8	Planned Future Activities in the Pit 1 Closure Domain	38
	4.2	Pit 3		41





	4.2.1	Construction of the Underfill and Underdrain	43
	4.2.2	Pit 3 Underfill Capacity and Brine Injection	44
	4.2.3	Tailings Deposition	47
	4.2.4	Tailings Consolidation and Wicking	49
	4.2.5	Activities Occurring at Present – Drying out of Tailings	49
	4.2.6	Planned Future Activities	53
4.3	Water N	Management at Ranger	57
	4.3.1	Ranger Water Classes	57
	4.3.2	Water Treatment Infrastructure	58
	4.3.3	Water Management Areas	62
4.4	Decom	missioning, Demolition and Disposal of Contaminated Material	65
	4.4.1	Decommissioning	65
	4.4.2	Demolition and Disposal	65
	4.4.3	Disposal of Contaminated Material	67
	4.4.4	Other Infrastructure and Services on the RPA	75
4.5	Ranger	Water Dam Deconstruction	84
	4.5.1	Tailings Transfer and Process Water Return	85
	4.5.2	RWD Wall and Floor Cleaning	85
	4.5.3	Current Use of the RWD	86
	4.5.4	Planned Future Activities	87
4.6	Ranger	3 Deeps Decline	90
	4.6.1	Planned Future Activities	93
4.7	Trial La	ndform	93
	4.7.1	Establishment of Trial Landform	93
	4.7.2	Planned Future Activities	94
4.8	Final La	andform	95
	4.8.1	Final Landform Design Principles	95
	4.8.2	Material Discrimination and Placement	97
	4.8.3	Surface Layer Construction	103
	4.8.4	Ecosystem Establishment on the Final Landform	104
4.9	Erosion	and Sediment Control	104
	4.9.1	Sediment Basins	105
	4.9.2	Rock Check Dams	105
	4.9.3	Access Tracks	105





5	STR	UCTURE	AND CONTENT OF CHAPTER 6 TO CHAPTER 11	108
	5.1	Progres	ss Status	108
	5.2	Preven	tative Controls	110
	5.3	Correct	ive Actions	111
	5.4	Bow-tie	Diagrams	113
6	LAN	DFORM		115
	6.1	Closure	Objectives and Criteria	116
		6.1.1	Erosion Characteristics	116
		6.1.2	Isolation of Tailings	117
	6.2	Design	Elements	118
	6.3	Releva	nt Studies / Knowledge Base	119
		6.3.1	Erosion Characteristics	120
		6.3.2	Isolation of Tailings	132
	6.4	Bow-tie	Diagrams	136
	6.5	Preven	tative Controls and their Effectiveness	139
		6.5.1	Final Landform Design and Construction	140
		6.5.2	Erosion Control Measures Including Preparation of Final Landform Surface	141
		6.5.3	Sediment Control Measures Including Sediment Basins	141
		6.5.4	Drainage Control Structures Including Sinuous Armoured Drainage Channels	142
		6.5.5	Revegetation of Final Landform Surface	142
		6.5.6	All Tailings Deposited into Pits 1 and 3	143
		6.5.7	Tailings Buried Below Predicted Depth of Gully Formation	143
		6.5.8	Understanding Final Tailings Elevations	143
		6.5.9	Legal Instruments	144
	6.6	Monitor	ing Program	144
		6.6.1	Closure Monitoring Program	145
		6.6.2	Post-closure Monitoring Program	146
	6.7	Correct	ive Actions and their Effectiveness	150
	6.8	Trigger	, Action, Response Plan	151
	6.9	Future '	Work	155
7	WAT	ER AND	SEDIMENT	157
	7.1	Closure	Objectives and Criteria	158
		7.1.1	Water Quality Management Framework	158
		7.1.2	Objectives and Management Goals	160





	7.1.3	Justification for Outcome, Parameter and Criteria	165
7.2	Design	Elements	173
7.3	Relevar	nt Studies / Knowledge Base	173
	7.3.1	Ranger Conceptual Model	174
	7.3.2	Source Terms and CoPC	177
	7.3.3	Groundwater Modelling and Uncertainty Analysis	179
	7.3.4	Solute Movement in Shallow Groundwater	180
	7.3.5	Surface Water Model	181
	7.3.6	Solute Movement in Surface Water	187
	7.3.7	Aquatic Pathways Risk Assessment	193
	7.3.8	Vulnerability Assessment Framework	200
	7.3.9	Eutrophication	202
	7.3.10	Acid Sulfate Soils	204
	7.3.11	Preliminary Human Health Risk Assessment	207
	7.3.12	Studies to be Completed	209
7.4	Bow-tie	Diagrams	212
7.5	Prevent	ative Controls and their Effectiveness	216
	7.5.1	Site-wide Preventative Controls	216
	7.5.2	Djalkmarra Catchment and Corridor Creek Catchment	220
	7.5.3	Coonjimba Catchment and Gulungul Catchment	222
	7.5.4	Final Landform and Land Application Areas	224
7.6	Monitori	ing Program	225
7.7	Correcti	ive Actions and their Effectiveness	228
7.8	Trigger,	Action, Response Plan	231
7.9	Future \	Nork	234
SOIL	.S		235
8.1	Closure	Objectives and Criteria	236
8.2	Design	Elements	236
8.3	Relevar	nt Studies / Knowledge Base	237
	8.3.1	Studies Completed to Date	237
	8.3.2	Studies to be Completed	243
8.4	Bow-tie	Diagram	246
8.5	Prevent	ative Controls and their Effectiveness	248
	8.5.1	Containment Cell within RP2 for PFAS	249

8

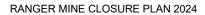


8.6 8.7 8.8 8.9	Correcti	In Situ Treatment of Mildly Contaminated, or Culturally Sensitive, Sites Tilling ing Program ve Actions and their Effectiveness	250250251
8.7 8.8 8.9	Monitori Correcti	ing Program	
8.7 8.8 8.9	Correcti		251
8.8 8.9		ve Actions and their Effectiveness	
8.9	Trigger.		252
	995.,	Action, Response Plan	253
ECC	Future V	Vork	255
	SYSTEM	S	256
9.1	Closure	Objectives and Criteria	257
9.2	Design I	Elements	262
9.3	Relevan	nt Studies / Knowledge Base	262
	9.3.1	Vegetation Reference Ecosystems	265
	9.3.2	Fauna Reference Ecosystems	269
	9.3.3	Ecosystem Establishment Strategy	270
	9.3.4	Weeds and Introduced Flora and Fauna	274
	9.3.5	Sustainability Processes (Including Resilience to Disturbance) and Recruitment	279
	9.3.6	Fire Resilience	282
9.4	Bow-tie	Diagrams	285
9.5	Preventi	ive Controls and their Effectiveness	293
	9.5.1	Weed Management	295
	9.5.2	Fire Management in Surrounds and Introduction to Rehabilitation Areas	298
9.6	Monitori	ing Program	299
	9.6.1	Adaptive Management Monitoring	300
	9.6.2	Vegetation Ground Surveys and Habitat Monitoring	301
	9.6.3	Multispectral Machine Learning Data Capture	301
	9.6.4	Image and/or LiDAR Capture	302
	9.6.5	Litter Decomposition and Nutrient Cycling Monitoring	302
	9.6.6	Mammal, Bird and Reptile Monitoring	303
	9.6.7	Ant Monitoring	303
	9.6.8	Non-ant Terrestrial Invertebrate Monitoring	304
	060	Planned Fire Regime Monitoring	304
	9.0.9		
	9.6.10	Resilience Monitoring	304
9.7	9.6.10	Resilience Monitoring ve Actions and their Effectiveness	304 305
		9.6.5 9.6.6 9.6.7	 9.6.5 Litter Decomposition and Nutrient Cycling Monitoring 9.6.6 Mammal, Bird and Reptile Monitoring 9.6.7 Ant Monitoring 9.6.8 Non-ant Terrestrial Invertebrate Monitoring





	9.9	Future \	Work	314
10	RADI	ATION		316
	10.1	1 Closure Objectives and Criteria		317
	10.2	2 Design Elements		319
	10.3	Relevar	nt Studies / Knowledge Base	319
		10.3.1	Radiation Exposure Pathways	319
		10.3.2	Natural Background Levels	319
		10.3.3	Factors that Affect the Dose Assessment'	321
		10.3.4	Predicted Radiation Dose to the Public'	324
		10.3.5	Radiation Effects on Terrestrial and Aquatic Biota	325
	10.4	Bow-tie	Diagrams	326
	10.5	Prevent	tative Controls and their Effectiveness	329
	10.6	Monitor	ing Program	330
	10.7	Correcti	ive Actions and their Effectiveness	332
	10.8	Trigger,	, Action, Response Plan	332
	10.9	Future \	Work	335
11	CULTURAL			336
	11.1	Closure	Objectives and Criteria	337
	11.2	Design	Elements	341
	11.3	Knowle	dge Base	341
		11.3.1	Cultural Heritage Management System	341
		11.3.2	Post-closure Use and Diet	343
		11.3.3	Culturally Important Flora and Fauna	344
		11.3.4	Potential Impacts to Cultural Values	344
	11.4	Bow-tie	Diagrams	344
	11.5	5 Preventative Controls and their Effectiveness		348
	11.6	6 Monitoring Program		353
	11.7	Corrective Actions		354
	11.8	Trigger, Action, Response Plan		358
	11.9	Future Work		359
12	CON	SOLIDAT	TED RISK ASSESSMENT	361
	12.1	CSIRO Led 2013 Risk Assessment		361
	12.2	Archer I	Risk Assessment	362
	12.3	2.3 Umwelt Led 2023 Risk Assessment		





	12.4 Findings	363
13	TIMING AND FINANCIAL PROVISION FOR CLOSURE	374
	13.1 Rehabilitation Provision	374
	13.2 Cash Flow Timing	375
	13.3 Government Agreement	375
14	MANAGEMENT OF INFORMATION AND DATA	376
	14.1 Data Collection and Management	377
	14.2 Data Availability and Reporting	377
15	REFERENCES	381
FIGL	JRES	
Figur	e 1-1: Location of Ranger Project Area (RPA)	2
Figur	e 1-2: Ranger Mine – Closure Domains	3
Figur	e 2-1: Jabiru mean monthly rainfall and evaporation (1971 to 2024: BoM 2024)	15
Figur	e 4-1: Indicative timeline of planned activities	27
Figur	e 4-2: Ranger Mine– Closure Domains	28
Figur	e 4-3: Schematic of Pit 1 with key elevations (not to scale)	31
Figur	e 4-4: Pit 1 water balance schematic	34
Figur	e 4-5: Areas within the Pit 1 Domain	39
Figur	e 4-6: Schematic of Pit 3 with key elevations (not to scale)	42
Figur	e 4-7: Pit 3 in 2014 (left) and after construction of the underfill in 2021 (right)	43
Figur	e 4-8: Pit 3 underfill brine storage capacity (2.5 GL at -100 mRL)	45
Figur	e 4-9: Location of Well Heads of the Directionally Drilled Brine Injection Wells	46
Figur	e 4-10: View of the Pit 3 wall for proposed tip head (south-west view)	47
Figur	e 4-11: Pit 3 dewatering zones	52
Figur	e 4-12: Decant well typical section (indicative only – subject to change)	55
Figur	e 4-13: Nominal location of decant wells and monitoring towers	56
Figur	e 4-14: Ranger water circuit	59
Figur	e 4-15: Processing Plant proposed demolition phases (Phase 1 – Green; Phase 2 – Blue)	70
Figur	e 4-16: Temporary laydown area (Pit 3 at top and RP2 on right)	71
Figur	e 4-17: Nursery (on right) and old core yard (on left) at Jabiru East (August 2024)	74
Figur	e 4-18: Jabiru airport and ERISS buildings (August 2024)	75



Figure 4-19: Old magazine site (August 2024)	77
Figure 4-20: Gagudju yard and surrounding disturbance (August 2024)	78
Figure 4-21: Ranger Mine Village – with plants establishing (August 2024)	80
Figure 4-22: Magela Levee (August 2024)	81
Figure 4-23: Existing pipeline corridors (yellow lines) and proposed central services corridor (purple lin	es). 82
Figure 4-24: Jabiru dredge removal plan	88
Figure 4-25: R3 Deeps portal and offices	90
Figure 4-26: Plan view of the R3 Deeps decline	91
Figure 4-27: Final landform boundary and contours	96
Figure 4-28: Stockpile drilling program	98
Figure 4-29: Illustration of the height difference between current and final landform	100
Figure 4-30: Source locations of bulk material movements with place names	101
Figure 4-31: Destination locations of bulk material movements with place names	102
Figure 4-32: Early concept under assessment – subject to change	107
Figure 5-1: Spider web diagram from the Landform theme showing subjective percentage complete ar changes from 2023 to 2024	•
Figure 5-2: Example output from the bow-tie risk assessment process (Soils theme)	114
Figure 6-1: Pit 1 landform surface management water features	125
Figure 6-2: Pit 1 inlet channel telemetry and lab turbidity	126
Figure 6-3: Decrease in mean annual bedload yield with time since construction on the TLF (Lowry an Saynor, 2015)	
Figure 6-4: Stage 52 Inflow vs Outflow Turbidity (March 2024)	130
Figure 6-5: Calculated Pit 1 tailings surface as of May 2021 (S. Murphy, per. comms.1 June 2021)	133
Figure 6-6: Bow-tie diagram for erosion characteristics (L1)	137
Figure 6-7: Bow-tie diagram for tailings isolation (L2)	138
Figure 7-1: The Water Quality Management Framework (ANZG, 2018)	159
Figure 7-2: (Top) The main features of the ALARA procedure (Oudiz <i>et al.,</i> 1986) and (Bottom) Frame for the integration of risks from multiple hazards into a holistic ALARA demonstration (from Bryant <i>et a</i> 2017)	ıl.,
Figure 7-3: Ranger sitewide groundwater sheds	
Figure 7-4: Horsetail plot of Pit 3 uncertainty analysis modelled magnesium loads from Pit 3 sources	
Figure 7-5: P50 (peak) realisation load contributions from Pit 3 sources	
Figure 7-6: Pit 1 - CRS water quality data – Electrical Conductivity	
Figure 7-7: Pit 1 - CRS water quality data – Filtered uranium	
- · · · · · · · · · · · · · · · · · · ·	



Figure 7-8: Pit 1 herbicide - water quality sampling locations	. 189
Figure 7-9: Daily rainfall (Jabiru airport) and estimated glyphosate applied daily in the Pit 1/CRS catchmetrom 1 Jan to 16 May 2024 (bottom). Glyphosate and AMPA concentrations at CRSP1IC and CRSUG (t	op).
Figure 7-10: Daily rainfall (Jabiru airport) and estimated oxyfluorfen applied daily in the Pit 1/CRS catchr from 1 Jan to 16 May 2024 (bottom). Oxyfluorfen concentrations at CRSUG and CRSP1IC (top)	
Figure 7-11: Daily rainfall (Jabiru airport) and estimated sulfometuron methyl applied daily in the Pit 1/CF catchment from 1 Jan to 16 May 2024 (bottom). Sulfometuron methyl concentrations at CRSUG and CRSP1IC (top)	
Figure 7-12: Conceptual model underpinning the APRA (BMT, 2023a)	
Figure 7-13: Decision tree for vulnerability assessment framework	. 201
Figure 7-14: Summary of preliminary site wide ASS conceptual model – potential source areas (ERM, 2020b)	. 206
Figure 7-15: Bow-tie diagram for Djalkmarra and Corridor Creek catchments (Pit 1, Pit 3 and RP2) (WS1)213
Figure 7-16: Bow-tie diagram for Coonjimba and Gulungul catchments (WS2)	. 214
Figure 7-17: Bow-tie diagram for Final Landform and Land Application Areas (WS3)	. 215
Figure 8-1: Areas of potential concern – Overview	. 242
Figure 8-2: Bow-tie diagram for contaminated soils (S1)	. 247
Figure 9-1: Current ecosystem development trials (including distinct management areas)	. 264
Figure 9-2: Surveyed reference sites with vegetation types mapped by Schodde and others (1987)	. 268
Figure 9-3: Bow-tie diagram for vegetation composition, abundance and community structure (ES1)	. 286
Figure 9-4: Bow-tie diagram for fauna composition, abundance or habitat formation (ES2)	. 287
Figure 9-5: Bow-tie diagram for nutrient cycling (ES3)	. 288
Figure 9-6: Bow-tie diagram for fire resilience (ES4)	. 289
Figure 9-7: Bow-tie diagram for resilience to disturbance (ES5)	. 290
Figure 9-8: Bow-tie diagram for management of weed risk (ES6)	. 291
Figure 9-9: Bow-tie diagram for management of introduced fauna risk (ES7)	. 292
Figure 10-1: Dissolved uranium concentrations in Magela Creek Upstream of Ranger	. 320
Figure 10-2: Bow-tie diagram for radiation doses to humans (R1)	. 327
Figure 10-3: Bow-tie diagram for radiation doses to non-human biota (plants and animals) (R2)	. 328
Figure 11-1: Bow-tie diagram for closure criteria – creating a landform that meets Traditional Owner requirements (CL1)	. 346
Figure 11-2: Bow-tie diagram for cultural management – to avoid destruction or damage to a cultural site (CL2)	



TABLES

Table 1-1: Ranger operator details	5
Table 1-2: Ranger mine title holder details	6
Table 1-3: Timelines of the operations and closure phases of Ranger	7
Table 1-4: Updates/changes between the 2023 and the 2024 MCP	8
Table 2-1: Comparison of AR5 and AR6 climate findings	17
Table 3-1: Committees and forums	20
Table 3-2: Other Stakeholder Engagement Mechanisms	22
Table 3-3: Jabiru transition framework	25
Table 4-1: Land disturbance and rehabilitation by domains (see Figure 4-2)	29
Table 4-2: Water quality classes at Ranger	58
Table 4-3: Capacity and description of on-site retention ponds	62
Table 4-4: Approximate amount and destination of waste materials for disposal	69
Table 4-5: Waste rock material types incorporated into the model	99
Table 5-1: Descriptors used to assess effectiveness of preventative controls and corrective actions	. 112
Table 6-1: Landform theme: Environmental Requirements	. 116
Table 6-2: Erosion Characteristics – Approved Closure Criteria	. 116
Table 6-3: Tailings Isolation – Approved Closure Criteria	. 117
Table 6-4: Predicted denudation rates for each catchment on FLv6.2	. 121
Table 6-5: Predicted gullying depth for each catchment on FLv6.2	. 134
Table 6-6: Summary of significant hazards and consequences	. 135
Table 6-7: Preventative Controls for Landform	. 139
Table 6-8: Landform monitoring	. 148
Table 6-9: Corrective Actions for Landform	. 150
Table 6-10: Trigger, Action, Response Plan for Landform	. 152
Table 7-1: Water and Sediment Theme: Environmental Requirements	. 158
Table 7-2: Approved guideline values for each management goal – most stringent and therefore adopted Guideline Values (GV) in italics and underlined	
Table 7-3: Draft water and sediment quality objectives under review	. 163
Table 7-4: Ranger source terms and their locations	. 177
Table 7-5: Solutes that are potential CoPC at Ranger and their BTVs in HLUs	. 178
Table 7-6: Predicted peak concentrations for peak groundwater loads at selected locations (all Ranger sources + background)	. 183



Ranger sources + background)	185
Table 7-8: Risk rating matrix	196
Table 7-9: Likelihood lookup table	196
Table 7-10: Sliding scale consequence lookup table (example for manganese)	196
Table 7-11: Comparison of manganese concentrations against consequence categories provided in Ta	
Table 7-12: Comparison of predicted annual loads and background levels (Holmes, 2023)	203
Table 7-13: Hazard Index results for the assessed scenarios – MG003 and MG009	208
Table 7-14: Hazard Index results for the assessed scenarios – Mudginberri Billabong (MB)	208
Table 7-15: Water and Sediment Theme: potential threats	216
Table 7-16: Preventative Controls for Water and Sediment – Site-wide	217
Table 7-17: Preventative controls for Djalkmarra Catchment and Corridor Creek Catchment	220
Table 7-18: Preventative Controls Coonjimba Catchment and Gulungul Catchment	222
Table 7-19: Preventative controls – final landform and LAAs	224
Table 7-20: Groundwater and surface water monitoring additional to monitoring requirements in the Ra	-
Table 7-21: Corrective actions for water and sediment (all 'active' corrective actions)	228
Table 7-22: Trigger, Action, Response Plan for water and sediment	232
Table 8-1: Soils theme: Environmental Requirements	236
Table 8-2: Soils – approved Closure Criteria	236
Table 8-3: Sources of contamination and potential contaminants	239
Table 8-4: Soil assessment screening criteria (focus values) – heavy metals	244
Table 8-5: Soil assessment screening criteria (focus values) – Total Recoverable Hydrocarbons (TRH) Petroleum Hydrocarbons (TPH) and BTEXNTRH	
Table 8-6: Preventative controls for soil contamination	248
Table 8-7: Corrective actions for soil contamination (all 'active' corrective actions)	253
Table 8-8: Trigger, Action, Response Plan for Soil	254
Table 9-1: Ecosystems Theme: Environmental Requirements	257
Table 9-2: Ecosystems – Closure Criteria	259
Table 9-3: Vegetation community descriptions in undisturbed areas of the RPA (Schodde <i>et al.</i> , 1987)	265
Table 9-4: Weed categories and currently managed species	275
Table 9-5: Approved herbicides and target species	277
Table 9-6: Introduced fauna species and control type	278



Table 9-7: Fire resilience mechanisms for Ranger rehabilitation	284
Table 9-8: Preventative controls for Ecosystem	293
Table 9-9: Weed management indicative program	295
Table 9-10: Preliminary nutrient cycling monitoring program	302
Table 9-11: Corrective Actions for Ecosystem (all 'Active' Corrective Actions)	305
Table 9-12: Trigger, Action, Response Plan for Savanna Woodland CRE (Establishment, 0–2 years)	308
Table 9-13: Trigger, Action, Response Plan for Savanna Woodland CRE (Years 2–5)	309
Table 9-14: Trigger, Action, Response Plan for Savanna Woodland CRE (Years 5–10)	310
Table 9-15: Trigger, Action, Response Plan for Savanna Woodland CRE (Years 10–15)	311
Table 9-16: Trigger, Action, Response Plan for Savanna Woodland CRE (Years 15–25)	312
Table 9-17: Trigger, Action, Response Plan for Savanna Woodland CRE (Years 25+)	313
Table 9-18: Future work for the ecosystem theme	314
Table 10-1: Radiation theme: Environmental Requirements	317
Table 10-2: Radiation – approved Closure Criteria	318
Table 10-3: Calculated background average values in groundwater (ERM, 2020a)	320
Table 10-4: Occupancy intentions on the former mine area	321
Table 10-5: Annual intake of bush tucker	322
Table 10-6: Radiation dose to the public (mSv/y)	325
Table 10-7: Modelled Ra226 Increments	326
Table 10-8: Preventative controls for Radiation	329
Table 10-9: Radiation monitoring	331
Table 10-10: Corrective actions for Radiation	332
Table 10-11: Trigger, Action, Response Plan for Radiation	333
Table 11-1: Cultural Closure Criteria – approval sought in the 2023 MCP, approval decision pending	338
Table 11-2: Preliminary Assessment of the Potential impacts to future cultural land use activities (ongoing consultation with Traditional Owners required)	-
Table 11-3: Preventative controls for Cultural	350
Table 11-4: Example of scalar measurement tool for cultural criteria monitoring	353
Table 11-5: Corrective actions for Cultural	355
Table 11-6: Trigger, Action, Response Plan for Cultural and Cultural Heritage	358
Table 12-1: Risk assessment consequence table	364
Table 12-2: Risk assessment likelihood table	366
Table 12-3: Risk assessment risk rating table and associated response	366



Table 12-4: Consolidated risks from bow-tie diagrams (see relevant chapters for details)	367
Table 12-5: Relevant project risks from 2024 Archer register (risks captured in Table 12-4 are not duplic in this table)	
Table 14-1: Indicative data collection types	379
PHOTOS	
Photo 4-1: Pit 1 nearing the completion of mining (1992)	30
Photo 4-2: Settlement monitoring plate, with standpipe, at time of installation	32
Photo 4-3: Tailings surface showing tops of vertical wick drains installed in Pit 1	33
Photo 4-4: Scarification of the surface on Pit 1 (October 2020)	35
Photo 4-5: View of the perimeter drain and rock check dams along the south-east edge of Pit 1 (January 2021)	
Photo 4-6: Completed Corridor Road Sump upgrade works with pumping infrastructure installed	36
Photo 4-7: Back-cutting erosion on the steeper slope leading into the temporary perimeter drain (2022).	37
Photo 4-8: Revegetation on Pit 1 (August 2024)	37
Photo 4-9: Former Orica Explosives Storage Yard	40
Photo 4-10: Former trial evaporators	40
Photo 4-11: Decommissioned pumping booster station	41
Photo 4-12: Tailings hung up on the tip head	48
Photo 4-13: Pit 3 tip head during removal of tailings (2 August 2024)	48
Photo 4-14: Pit 3 wicking barge and rigs	49
Photo 4-15: Amphibious excavator	50
Photo 4-16: Amphirol machines on Pit 3	51
Photo 4-17: Amphirol overturning tailings in Pit 3	51
Photo 4-18: Installation of geotextile, construction of groynes and initial capping on Pit 1	53
Photo 4-19: Brine Concentrator	60
Photo 4-20: Brine Squeezer	61
Photo 4-21: Corridor Creek Wetland Filter (CCWLF)	63
Photo 4-22: Corridor Creek Land Application Area	64
Photo 4-23: Rubber tyre dump on top of a waste rock stockpile	72
Photo 4-24: Gagudju workshop and surrounding infrastructure	79
Photo 4-25: Telstra communications tower upgrade	84
Photo 4-26: The Jabiru dredge	85





Photo 4-27: Limestone dosing to raise pH of the RWD water	86
Photo 4-28: The end of the steel multiplate tunnel (June 2022)	92
Photo 4-29: Coarse rockfill placed on top of the backfilled R3 Deeps ventilation shaft	93
Photo 4-30: Trial Landform (2023)	94
Photo 6-1: Pit 1 perimeter drain with sediments visible behind rock check dams	. 124
Photo 6-2: Pit 1 inlet channel on 16 January 2024 – noting release from CRS was not occurring at this tir	
Photo 6-3: Stage 52 HES Basin (31 January 2023)	. 130
Photo 7-1: Filamentous algae in Magela Creek – Western channel upstream from MG003 (9 May 2023) .	. 204
Photo 9-1: Trial landform (permanent monitoring plot 2) in 2009 (top left), 2016 (top right) and 2024	. 271
Photo 9-2: Weed management for stockpiles	. 297