Plan

Conservation Significant Fauna Management Plan

Environment

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100-PL-EN-0022

Fortescue
The New Force in Iron Ore

	Conservation Significant Fauna Management Plan 100-PL-EN-0022		
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ACRONYMS

The following acronyms, defined in Table 1, have been used throughout this Plan.

Table 1: Acronyms

Acronym	Definition
BMS	Business Management System
Cwlth	Commonwealth of Australia
DoEE	Department of the Environment and Energy
DWER	Department of Water and Environmental Regulation (formerly Office of the Environmental Protection Authority)
EMS	Environmental Management System
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act
EPBC	Environment Protection and Biodiversity Conservation Act
GIS	Geographical Information Systems
HSE	Health Safety and Environment
LUC	Land Use Certificate
MS	Ministerial Statement
PaWS	Parks and Wildlife Service (within the Department of Biodiversity, Conservation and Attractions)
PIMS	Project Information Management System
RASCI	Responsible Accountable Supported Consulted Informed Model

1. INTRODUCTION

Fortescue Metals Group (Fortescue) is an integrated business comprised of mine, rail and port operations based in the Pilbara region of Western Australia, with its head office located in Perth.

Detailed background information regarding the timing and nature of Fortescue's environmental approvals under the *Environmental Protection Act 1986* (WA), the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), details of the location and nature of current operations, environmental information relevant to these locations and plans for future expansion are contained in Appendix 1 and 2.

1.1 Requirement for Management Plan

The Conservation Significant Fauna Management Plan (this Plan) is required by State and Commonwealth Government Ministers as part of development approval for Fortescues Iron Ore related infrastructure in the Pilbara approved under:

- State Government approvals:
  - MS 690 - Pilbara Iron Ore & Infrastructure Project: Port & North-South Railway (Stage A).
  - MS 899 (as amended by MS962 & 1010) – Cloudbreak Life of Mine.
  - MS 1033 - Christmas Creek Mine, East-West Railway and Mindy Mindy Mine.
- Commonwealth Government approvals:
  - EPBC 2005/2205 – Cloudbreak Open Pit Iron Ore Mine.
  - EPBC 2010/5513 – Additional Rail Infrastructure between Herb Elliot Port Facility and Cloudbreak Mine Site.
  - EPBC 2013/7055 - Christmas Creek Iron Ore Mine expansion project.
- Environmental Scoping Document
  - Eliwana Railway Project (Assessment No: 2129) – Action Item 33
  - Eliwana Iron Ore Mine Project (Assessment No: 2125) – Action Items 47 and 61

Following approval under the *Environmental Protection Act 1986* and the *Environment Protection and Biodiversity Conservation Act 1999*, this Plan will be updated to reflect any approval conditions associated with conservation significant fauna at the Eliwana Iron Ore Mine or Railway projects.

The State and Commonwealth Government approval conditions relevant to this Plan, and how they are addressed by this Plan, are detailed in Appendix 3.

The conditioned environmental objectives and targets for fauna management are outlined in Table 2. The data flow diagram for this Plan is available in Appendix 4.

1.2 Environmental Management Plan Provisions

The following Ministerial Statements contain management based conditions for terrestrial fauna management at Fortescue controlled sites:

- Condition 7 of MS 690 (MS690) – Pilbara Iron Ore & Infrastructure Project: Port & North-South Railway (Stage A).
- Condition 12 of MS 899 (MS899 as amended by MS962 & 1010)– Cloudbreak Life of Mine.
- Condition 8 of MS 1033 (MS1033) –Christmas Creek Mine, East-West Railway and Mindy Mindy Mine.

1.3 Objective and Scope

This Plan addresses DWERS's objective for the key environmental factor Terrestrial Fauna "*to maintain representation, diversity, viability and ecological function at the species, population and assemblage level*."

The objective of this Plan is to identify the potential direct and indirect impacts on conservation significant fauna species and develop management and monitoring measures that maximize the ongoing protection and long term conservation of these species within and adjacent to Fortescue controlled sites[1].

This plan addresses management issues relevant to conservation significant fauna within Fortescue controlled sites as defined in Section 1.4 of this Plan.

[1] Fortescue controlled site means sites that are under the legislative control of Fortescue including exploration sites, sites under construction, operational sites (sites that are managed and operated by Fortescue and sites that are managed by Fortescue but operated by contractors) and the Perth offices.

Table 2: Conditioned environmental objectives/requirements and measures/targets

Approval	Condition Type	Conditioned Environmental Objectives/Requirements [2]	Measure/ Target
MS690 Condition 7	Management	**Condition:** Conduct fauna surveys prior to ground-disturbing activities and if significant fauna are identified, do not disturb the land surface until significant fauna have been relocated or otherwise appropriately protected in accordance with a Site Fauna Management Plan. **Objective 1**: Identify the potential direct and indirect impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	100% of conservation significant fauna high risk areas are identified and available in the spatial system
		Objective 2: Establish management strategies to minimise the potential impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	No direct mortality to recorded conservation significant fauna within their recorded habitats as a result of ground disturbance activities within the project area. No direct loss to recorded conservation significant fauna habitat within the project area that is not approved [3] for disturbance.
		Objective 3: Where species presence and critical habitat has been confirmed within Fortescue controlled sites, develop monitoring programs to detect any impacts on conservation significant fauna and their critical habitats	No statistically significant[4] decline in the relative abundance of conservation significant species across impact sites compared to reference sites. OR Conservation significant species recorded within the area of impact for the project continue to have an ongoing presence.[4]
MS899 Condition 10	Management	**Objective 1**: Identify the potential direct and indirect impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	100% of conservation significant fauna risk areas are identified and available in the spatial system
		Objective 2: Establish management strategies to minimise the potential impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	No direct mortality to recorded conservation significant fauna within their recorded habitats within the project area as a result of ground disturbance activities.

[2] Under EPBC 2005/2205, EPBC 2010/5513, EPBC 2010/5567, EPBC 2012/6530. EPBC 2013/7055 - there are no conditioned environmental objectives

[3] Approved refers to an approval issued under the *Environmental Protection Act 1986*, *Environment Protection and Biodiversity Conservation Act 1999*, the *Mining Act 1978* or the *Bush Fires Act 1954*.

[4] When conservation significant species have been recorded in low densities during previous surveys, they may not have adequate population numbers to allow statistical comparison over time. Analytical test and power levels will be set at appropriate levels to detect change in spatial distribution and relative abundance of low density species. Where records are still inadequate, only ongoing presence will be measured to demonstrate compliance with Objective 3.

Approval	Condition Type	Conditioned Environmental Objectives/Requirements [2]	Measure/ Target
			No direct loss to recorded conservation significant fauna habitat that is not approved[3] for disturbance within the project area.
		Objective 3: Where species presence and critical habitat has been confirmed within Fortescue controlled sites, develop monitoring programs to detect any impacts on conservation significant fauna and their critical habitats	No statistically significant[4] decline in the relative abundance of conservation significant species across impact sites compared to reference sites. OR Conservation significant species recorded within the area of impact for the project continue to have an ongoing presence.[4]
MS1033 Condition 8	Management	**Condition:** Minimise direct and indirect impacts on conservation significant fauna species and their habitat, including but not limited to the Pilbara Olive Python, Northern Quoll, Greater Bilby, Night Parrot and migratory birds. **Objective 1**: Identify the potential direct and indirect impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	100% of conservation significant fauna risk areas are identified and available in the spatial system.
		Objective 2: Establish management strategies to minimise the potential impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites.	No direct mortality to recorded conservation significant fauna within their recorded habitats within the project area as a result of ground disturbance activities. No direct loss to recorded conservation significant fauna habitat within the project area that is not approved[3] for disturbance.
		Objective 3: Where species presence and critical habitat has been confirmed within Fortescue controlled sites, develop monitoring programs to detect any impacts on conservation significant fauna and their critical habitats	No statistically significant[4] decline in the relative abundance of conservation significant species across impact sites compared to reference sites. OR Conservation significant species recorded within the area of impact for the project continue to have an ongoing presence.[4]

1.4 Definition of Conservation Significant Fauna

'Conservation significant fauna' and 'threatened fauna' are defined as those listed as critically endangered, endangered, vulnerable or migratory under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* or as a Schedule species in accordance with the *Wildlife Conservation Act 1950.* Priority-listed fauna are as listed in the PaWS priority and listed fauna as shown on the PaWS website.

Species of national conservation significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are classified as:

- Critically Endangered - If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered - If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
- Vulnerable - If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Four classes (Schedules 1-4) of rare and endangered fauna are recognised under the *Biodiversity Conservation Act 2016*. Three other classes (Schedules 5-7) recognised under the Act are relevant to this plan. These are:

- Schedule 1: Fauna that is rare or likely to become extinct as critically endangered fauna (CR).
- Schedule 2: Fauna that is rare or likely to become extinct as endangered fauna (EN).
- Schedule 3: Fauna that is rare or likely to become extinct as vulnerable fauna (VU).
- Schedule 4: Fauna presumed to be extinct (EX).
- Schedule 5: Migratory birds protected under an International Agreement (IA).
- Schedule 6: Fauna that is of special conservation need as conservation dependent fauna (CD).
- Schedule 7: Other specially protected fauna (OS).

For the purposes of this Plan, conservation significant fauna have been limited to terrestrial vertebrate fauna species that meet the criteria above and have been recorded within Fortescue controlled sites or where monitoring requirements have been specified in State and/or Commonwealth approval conditions – see Table 3 [5]. This Table will be updated to reflect any

[5] Table 3 is current at the time of finalising Revision 3 of this plan. This Table will be updated outside of this plans review period to reflect any new conservation significant species identified during project surveys or ongoing monitoring activities.

new conservation significant species identified during project surveys or ongoing monitoring activities.

Table 3: Conservation Significant Fauna Species Recorded in Fortescue Controlled Sites

Class	Genus	Species	Subspecies	Common Name	EPBC Act 1999	Wildlife Conservation Act 1950	Port	Cloudbreak	Christmas Creek	Mainline Rail (including duplication)	Hamersley Rail
Aves	*Pezoporus*	*occidentalis*		Night Parrot	EN	CR		Recorded	MS1033 [7]	EPBC 2010/5513 [6]	
Mammalia	*Dasyurus*	*hallucatus*		Northern Quoll	EN	EN		Recorded	MS1033 [7]	Recorded	Recorded
Mammalia	*Rhinonicteris*	*aurantia*		Pilbara Leaf-nosed Bat [7]	VU	VU		Recorded		EPBC 2010/5513 [7]	
Mammalia	*Macrotis*	*lagotis*		Greater Bilby	VU	VU		EPBC 2005/2205 [7]	Recorded	Recorded	
Reptilia	*Liasis*	*olivaceus*	barroni	Pilbara Olive Python	VU	VU			Recorded	EPBC 2010/5513 [7]	Recorded
Aves	*Falco*	*hypoleucos*		Grey Falcon		VU		Recorded		Recorded	Recorded
Aves	*Apus*	*pacificus*		Fork-tailed Swift	M	IA					
Aves	*Merops*	*ornatus*		Rainbow Bee-eater	MI	IA		Recorded	Recorded	Recorded	Recorded
Aves	Haliaeetus	leucogaster		White-bellied Sea Eagle	MI			Recorded			
Aves	*Ardea*	*modesta*		Eastern Great Egret	MI	IA		Recorded	Recorded	Recorded	
Aves	*Tringa*	*Glareola*		Wood Sandpiper	M	IA			Recorded	Recorded	
Aves	*Tringa*	*nebularia*		Common Greenshank	M	IA			Recorded	Recorded	
Aves	Tringa	hypoleucos		Common Sandpiper	M	Sc5 - M				Recorded	
Mammalia	*Macroderma*	*gigas*		Ghost Bat	VU	Sc3 - VU			Recorded	Recorded	
Aves	*Falco*	*peregrinus*		Peregrine Falcon[8]		Sc7 - FRSP		Recorded	Recorded	Recorded	Recorded

Sc1 = Schedule 1, Sc 3 = Schedule 3, Sc4 = Schedule 4,
CR = Critically endangered, EN = Endangered, VU = Vulnerable, M = Migratory, MI = Marine, FRSP = Fauna Requiring Special Protection
Recorded = species recorded within the project area

[6] This species has not been recorded and is not likely to occur within Fortescue sites however MS 1033 and/or Controlled Actions, EPBC 2010/5513, 2005/2205, and EPBC 2010/5706 requires management and/or monitoring strategies to be implemented.
[7] This species has been recorded foraging within Fortescue Controlled Sites but no roosting or nesting sites have been recorded and as a result no management and monitoring strategies will be implemented.

1.5 Legislation and Regulatory Framework

Fortescue employees and contractors are obliged to comply with all relevant environmental Commonwealth and State legislation. Legislation directly relevant to the management of conservation significant fauna in Western Australia is provided in Table 4.

Table 1: Commonwealth and State Legislation Relating to Conservation Significant Fauna

Legislation	Application
Biosecurity and Agriculture Management Act 2007 (WA)	Prevention of new animal and plant pests and diseases from entering the State and management of and limitation to the spread of those pests and diseases already present.
Biodiversity Conservation Act 2016	Conservation and protection of biodiversity and biodiversity components. This Act repeals parts of the *Wildlife Conservation Act 1950*.
Conservation and Land Management Act 1984 (WA)	Provides for the vesting or reservation of land for conservation purposes, and the ability to enter into agreements with private landholders and pastoral lessees. It establishes a number of statutory bodies including the Conservation Commission of Western Australia.
Environmental Protection Act 1986 (WA)	State environmental impact assessment and Ministerial approval process.
Wildlife Conservation Act 1950 (WA)	State process that assesses the conservation significance of fauna species and forms the framework for significant species protection.
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)	Assesses the conservation significance of fauna species and forms the framework for significant species protection at the Federal level.

The following standards and guidelines are also of relevance to this Plan:

- *EPBC Act referral guidelines for the endangered northern quoll, Dasyurus hallucatus. EPBC Act Policy Statement* 3.25. Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2011).
- *EPBC Act Survey Guidelines for Australia's Threatened Bats, Guidelines for Detecting Bats Listed as Threatened Under the EPBC Act 1999*. Australia Government. Department of Water, Heritage and the Arts (2010).
- *EPBC Act Survey Guidelines for Australia's Threatened Birds, Guidelines for Detecting Birds as Threatened Under the EPBC Act 1999*. Australian Government. Department of Water, Heritage and the Arts (2010). (Note, for Night Parrot refer to the Night Parrot recovery team's survey methods: https://nightparrot.com.au/index.php/advice/)
- *EPBC Act Survey Guidelines for Australia's Threatened Frogs, Guidelines for Detecting Frogs Listed as Threatened Under the EPBC Act 1999*. Australian Government. Department of Water, Heritage and the Arts (2010).

- *EPBC Act Survey Guidelines for Australia's Threatened Fish, Guidelines for Detecting Fish Listed as Threatened Under the EPBC Act 1999.* Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2011).
- *EPBC Act Survey Guidelines for Australia's Threatened Mammals, Guidelines for Detecting Mammals Listed as Threatened Under the EPBC Act 1999.* Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2011).
- *EPBC Act Referral guidelines for the endangered northern quoll, Dasyurus hallucatus. EPBC Act Policy Statement 3.25*. Australian Government, Department of the Environment (2016)
- *EPBC Act Survey Guidelines for Australia's Threatened Reptiles, Guidelines for Detecting Reptiles Listed as Threatened Under the EPBC Act 1999*. Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2011).
- *Guidance Statement No.56 Terrestrial Fauna Surveys for Environmental Impact Assessments in Western Australia*. West Australian Government, Environmental Protection Authority, (2004).
- *Pilbara Northern Quoll Regional Project, Surveying and monitoring Dasyurus hallucatus in the Pilbara*. West Australian Government, Department of Parks and Wildlife (2014).
- *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Technical Report of the Environmental Protection Authority and the Department of Environment and Conservation (DEC) Edited by B.M. Hyder, J. Dell and M.A. Cowan. September 2010.
- *Terrestrial Biological Surveys as an Element of Biodiversity Protection. Position Statement No. 3*. West Australian Government, Environmental Protection Authority, (2002).

2. ROLES AND RESPONSIBILITIES

All Fortescue employees and contractors are required to comply with the requirements of this Plan.

Accountability for fulfilling the requirements of this Plan is dependent on the stage of project development (construction, operations, decommissioning) and the project type (port, rail or mine).

During construction stages, whether activities are undertaken by an external service provider or internal Fortescue personnel, the Project Director (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

During operational, decommissioning and closure stages, the General Manager (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

Where responsibilities are delegated, this must be clearly recorded and communicated.

In Section 4 specific Management Actions have been attributed to the appropriate personnel.

When site specific Conservation Significant Fauna Management Programs are developed to support this Plan, the RASCI framework should be utilised to delegate roles, responsibilities, and review and approval levels. RASCI is used to denote:

R-Responsible	Those who do the work to achieve the task.
A-Accountable	Those who are ultimately accountable for the completion of the deliverable or task and the one to whom the Responsible person is accountable.
S-Supportive	Resources allocated to the Responsible person and who will also assist in completing the task.
C-Consulted	Those whose opinions are sought, two-way communication.
I-Informed	Those whom are kept informed, one-way communication.

3. STAKEHOLDER CONSULTATION

Fortescue has undertaken an extensive stakeholder consultation program whereby landowners, regulators and other relevant parties have been consulted with regard to investigation and design of the mine sites and port and rail infrastructure through the environmental approvals process.

The then Department of Environment Regulation (DER), the then Office of the Environmental Protection Authority (OEPA) and the then Department of the Environment (DoE) were consulted and, where required, approved the content of the original plans for which this Plan will replace.

Revision 2 of this Plan was submitted to the then OEPA to satisfy the requirements of Condition 10 of MS899 and was approved in November 2013 (CB-EN-0137.01). The Plan was also submitted to the then OEPA to satisfy the requirements of Condition 7-1 of MS 690 and MS707 and Condition 12-1 of MS862 and was approved in October 2014 (100-EN-0441.03)

The current revision of this Plan will be submitted to the DWER and DoEE for their review, comment and approval, and PaWS for their review and comment, in accordance with the applicable Ministerial Statements and Controlled Actions.

Table 5 will be updated following receipt of stakeholder comment as a result of the review and approvals process.

Table 2: Stakeholder Consultation, Comments and Responses

Stakeholder	Correspondence	Comment	Change
DWER			
DoEE			
PaWS			

4. ENVIRONMENTAL MANAGEMENT

A series of environmental management objectives have been developed to mitigate environmental impacts on conservation significant fauna that could potentially be caused by Fortescue's activities (exploration, construction, operation and decommissioning). These are:

1. Identify the potential direct and indirect impacts on conservation significant fauna and their critical habitats within Fortescue controlled sites,
2. Establish management strategies to minimise the potential impacts on conservation significant fauna within Fortescue controlled sites,
3. Where species presence and critical habitat [9] has been confirmed within Fortescue controlled sites, develop monitoring programs to detect any impacts on conservation significant fauna and their critical habitats.

For each objective, management actions have been developed to ensure the impacts from Fortescue's operations are managed, and that appropriate monitoring, reporting and corrective action functions are implemented to support the successful implementation of the management actions.

The key elements of the environmental management process associated with each objective are described in Table 6.

Table 3: Description of Key Elements of Environmental Management Process to Achieve Identified Objectives

Element	Definition/Description
Objective	What is intended to be achieved?
Management Action	Tasks undertaken to enable the objective to be met.
Performance Indicators	Metrics for evaluating the outcomes achieved by Management Action.
Reporting/Evidence	Demonstrates that the Management Action has been applied and the outcome evaluated.
Timing	Period during which the Management Action should be undertaken.
Responsibility	Accountability for ensuring management action is completed. The responsible role is dependent on project timing.

The key management actions, performance indicators, evidence, timing and responsibilities for each objective are provided in Table 7.

[9] Critical habitat are areas with a high biodiversity value (IUCN, 2017). For the purposes of this plan are, critical habitat for conservation significant fauna species has been determined as being denning habitat areas for Northern Quolls, roosting areas for Pilbara Leaf-nosed and Ghost Bats, burrowing areas for Greater Bilbys, shelter areas for Pilbara Olive Pythons, nesting areas for Conservation significant bird species.

4.1 Managing Environmental Risk

Fortescue actively manages risk by undertaking an Annual Environmental Impact Risk Review. Although the review considers all environmental risks, there is a focus on the inherently moderate to high risk impacts. The review considers the effectiveness of management actions that are currently in place for these impacts. The review also considers any relevant incidents that may have occurred, if the actions from incident investigations have translated into new management actions, and generally considers the need for any new management actions to ensure lower risk targets can be achieved.

Appendix 5 provides details as to the relationship between key conservation significant fauna risk impacts and the management actions currently in place. (Namely, the management actions that are detailed in Table 7, under Objective 2).

Table 4: Key Management Actions for Conservation Significant Fauna Management in Fortescue Controlled Sites

Objective 1	Identify the potential direct and indirect impacts on conservation significant fauna and their critical habitats within Fortescue Controlled Sites						
Reference	**Site Location**			**Management Action**	**Performance Indicators**	**Reporting/Evidence**	**Timing**	**Responsibility**
	Rail	**Christmas Creek**	**Cloudbreak**					
1.1	X	X	X	Undertake targeted fauna surveys in accordance with applicable EPA and DoEE guidance (outlined in Section 1.6 of this Plan) to determine presence or absence of conservation significant fauna.	• Fauna surveys undertaken in accordance with appicable EPA and DoEE guidance. • GIS and PIMS updated	• Survey Reports • Approval documentation • GIS dataset • PIMS records	Design	Manager, Environmental Approvals
1.2	X	X	X	Where conservation significant fauna presence has been recorded undertake mapping surveys, where data is not available, to determine relevant species critical habitat and if future monitoring is required.	• Mapping survey completed of species critical habitat • GIS and PIMS updated • Future monitoring defined	• Surey Reports • GIS dataset • PIMS record • Monitoring planned	Operations	Group Manager, Environment
1.2	X	X	X	Conduct a risk assessment to identify high risk areas where conservation significant fauna species and critical habitat have been identified and potential impacts are likely.	• Risk assessment conducted to identify high risk areas where conservation significant fauna species and critical habitat have been identified and potential impacts are likely. • High risk areas identified • See management target in Table 1 - (*100% of conservation significant fauna high risk areas are identified and available in the spatial system*)	• Risk assessment outcomes / report	Design/ Construction/ Operation	Manager Environmental Approvals/ Project Manager/ Site HSES Manager
1.3	X	X	X	Conduct a desktop fauna assessment for LUC[10] applications for construction and operational activities when a Level 2 fauna survey (EPA, 2004) of the area has been previously conducted. When a Level 2 survey has not been conducted and conservation significant fauna have been identified during the desktop assessment ensure a fauna survey is conducted in accordance with EPA and DoE guidance (outlined in Section 1.6 of this Plan) and reassess accordingly.	• Desktop fauna assessment for LUC conducted prior to disturbance	• Survey Reports • Approval documentation • Desktop Assessment	Development/ Construction/ Operation	Project Manager/ Site HSES Manager

[10] An internal permit system required to undertake on-ground activities.

Objective 2	Establish management strategies to minimise the potential impacts on conservation significant fauna and their critical habitats within Fortescue Controlled Sites						
Reference	**Site Location**			**Management Action**	**Performance Indicators**	**Reporting/Evidence**	**Timing**	**Responsibility**
	Rail	**Christmas Creek**	**Cloudbreak**					
2.1	X	X	X	Ensure staff and contractors are provided with appropriate training to ensure conservation significant fauna and associated critical habitat are protected.	• Inductions completed • Pre-start meetings informed. • Role dependent training completed	• Induction materials and register of attendees • Record of Pre-start meetings • Training materials/ registers	Development/ Construction/ Operation	Project Manager/ Site HSES Manager
2.2	X	X	X	Prior to conducting ground disturbance activities, ensure known locations of conservation significant fauna and their associated critical habitat and buffers are identified and management measures are implemented.	• LUC obtained • Management measures implemented • Surface water management measures implemented where required • Weed management measures implemented where required • See management targets in Table 1 - (*100% of conservation significant fauna high risk areas are identified and available in the spatial system*)	• Completed LUC • Annual Compliance Reporting	Construction/ Operation	Project Manager/ Site HSES Manager
2.3	X	X	X	Ensure drainage infrastructure location and design aligns with the risk assessment outcomes to minimise interference and disruption of natural surface water flows that support conservation significant fauna habitat.[11]	• Location and design of drainage infrastructure aligns with risk assessment outcomes where possible • See Action 3.4 of this table.	• Risk assessment • Monitoring reports	Construction/ Operation	Project Manager/ Site HSES Manager
2.4	X	X	X	When conservation significant fauna species have been recorded in proposed impact areas within associated habitat, and the records have been verified through survey activities undertaken in the last five years, ground-truth the area and similar habitats within the area. Where individual animals are present implement mitigation measures, including the relocation of fauna, prior to disturbance.	• Impact areas where fauna has been recorded within associated habitat are assessed prior to ground disturbance • BMS/GIS updated • PaWS consulted and mitigation measures implemented • Number of fauna successfully relocated	• BMS record • GIS Table • Annual Compliance Reporting • Consultation records	Construction/ Operation	Project Manager/ Site HSES Manager
2.6			X	Direct lighting onto active construction and operational areas to minimise the potential for light overspill resulting in fauna disturbance, injuries or deaths.	• Light overspill mitigation measures incorporated where required • No evidence of fauna disturbance, injury or death from light overspill • Pre-start meetings informed.	• Incident reports in BMS • Toolbox meeting minutes • Record of Pre-start meetings	Construction/ Operation	Project Manager/ Manager Mining

2.7	X	X	X	Prior to conducting ground disturbance activities, ensure known locations of priority weed populations are identified and management measures to minimise the potential for weed spread are included in the LUC.	• Degradation of fauna habitat minimised • Weed populations and management measures are identified in the LUC	• Completed LUC	Construction/ Operation	Project Manager/ Site HSES Manager
2.8		X	X	Fauna management measures, including exclusion or exit/egress structures, to minimise potential impacts to conservation significant fauna, are in place: - For mining infrastructure that poses a fauna entrapment and drowning risk (including storage ponds, operational mine void water and tailings storage areas). - When conducting excavation or trenching activities.	• No mortality of conservation significant fauna: o Due to entrapment and drowning in mining infrastructure o As a result of excavation or trenching activities	• BMS record • Annual Compliance Reporting	Construction/ Operation	Project Manager/ Manager Mine Services or Manager Technical Services/ Site HSES Manager
2.9		X	X	Develop and implement a Feral Animal Control Program to effectively manage and control feral animals within Fortescue controlled sites to minimise impacts on conservation significant fauna.	• No significant increase in feral animal records from sightings and road transect counts • Awareness material included in site induction programs • All opportunistic feral animal sightings are registered in BMS	• Annual Compliance Reporting	Construction/ Operation/ Decommissioning	Project Manager/ Site HSES Manager
2.10		X	X	To minimise the potential for dust deposition on vegetation on conservation significant fauna habitat, implement relevant dust suppression measures within identified high risk areas.	• Dust suppression measures implemented • Vegetation Health Monitoring Program includes dust	• Annual Compliance Reporting • Monitoring report	Construction/ Operation	Project Manager/ Manager Mining
2.11		X	X	When constructing a fire break or carrying out a prescribed burn where conservation significant fauna and habitat have been identified, adhere to the requirements outlined in the: • LUC • Local shire's Firebreak Notice issued under the *Bush Fire Act 1954* • Permit to Burn issued by the local Bushfire Control Officer and the Burn Prescription that is developed.	• Fire breaks undertaken to the requirements of the Firebreak Notice • Prescribed burns undertaken to the requirements of Permit to Burn and the Burn Prescription • Fire breaks and prescribed burns are undertaken in accordance with the requirements of the LUC	• Relevant permits • Notice from the local authority • Correspondence with relevant Pastoral Lessee • Completed LUC	Construction/ Operation	Project Manager/ Site HSES Manager
2.12	X	X	X	To minimise the potential for fauna injuries or deaths, implement appropriate traffic mitigation measures such as speed limit restrictions and the prohibition of off-road driving.	• Appropriate signage in areas identified as high risk areas • Awareness programs delivered	• Incident reports in BMS • Staff induction materials • Site notices	Construction/ Operation	Project Manager/ Site HSES Manager
2.13		X	X	All surface holes drilled for the purpose of resource definition are to be plugged immediately after drilling and sampling to prevent fauna entering the hole.	• Drill holes plugged immediately after drilling and sampling.	• Inspection reports	Operation	Manager Mining
2.14	X	X	X	Where a conservation significant fauna injury or death has occurred as a result of Fortescue Operations, internally report, investigate the incident and notify PaWS. Update management actions, where required, to inform an adaptive management approach.	• Incident reported in BMS • Incident investigated • Notify regulator	• BMS incident record • Annual Compliance Reporting	Construction/ Operation	Project Manager/ Site HSES Manager
2.15	X	X	X	Conduct progressive rehabilitation of disturbed areas no longer required for operations prioritising areas with known conservation significant fauna and associated habitat.	• Disturbed areas no longer required for operations and with known conservation significant fauna and associated habitat progressively rehabilitated	• Annual Compliance Reporting • GIS table and BMS record	Exploration Development/ Operation/	Manager Exploration/ Manager Mining

							Decommissioning/ Closure	
Objective 3	**Develop monitoring programs to detect any impacts on conservation significant fauna and their critical habitats within Fortescue Controlled Sites**							
Reference	**Site Location**			**Management Action**	**Performance Indicators**	**Reporting/Evidence**	**Timing**	**Responsibility**
	Rail	**Christmas Creek**	**Cloudbreak**					
3.1	X	X	X	Undertake a baseline conservation significant fauna survey prior to the first monitoring event where possible to: • Document conservation significant fauna populations within impact and reference sites • Identify the baseline for existing conservation significant fauna populations at impact and reference sites • Compare conservation significant fauna populations between potential impact and reference sites (and/or regional PaWS monitoring sites where available).	• Baseline survey undertaken for all monitoring sites • Baseline survey undertaken prior to the first monitoring event where possible • Where baseline monitoring identify the absence of conservation significant fauna and critical habitat, following independent review (see Section 5.2.9) of the monitoring results, cease monitoring.	• Baseline monitoring reports	Construction/ Operation	**Construction:** Project Manager **Operations**: Group Manager, Environment
3.2	X	X	X	Where populations of conservation significant fauna listed under the *Biodiversity Conservation Act 2016* or the *Environment Protection and Biodiversity Conservation Act 1999* have been recorded in Fortescue controlled sites and critical habitat, implement a Conservation Significant Fauna Monitoring Program.	• Monitoring Program developed and implemented	• Monitoring Reports • Annual Compliance Reporting	Construction/ Operation/ Decommissioning/ Closure	Group Manager, Environment
3.3	X	X	X	When monitoring indicates a potential impact on conservation significant fauna, implement contingency actions defined in Table 11 and any reporting requirements defined in Section 9.3. Update this Plan where required, to inform an adaptive management approach to fauna management across the business using the approach detailed in Section 7.	• Corrective actions implemented • Reporting requirements met • Plan updated where required	• Monitoring reports • Reporting records • Updated Plan	Construction/ Operation	**Corrective Actions:** Project Manager/ Site HSES Manager **Reporting and Plan Update**: Group Manager Environment
3.4	X	X	X	Implement the vegetation health monitoring program as defined in the Vegetation Health Monitoring and Management Plan to detect any impacts on conservation values of conservation significant fauna critical habitat.	• See Vegetation Health Monitoring and Management Plan (includes groundwater and surface water monitoring requirements)	• Vegetation Health Monitoring reports	Construction/ Operation/ Decommissioning/ Closure	Group Manager, Environment

5. MONITORING GUIDELINES

A conservation significant fauna monitoring program is required to measure the effectiveness of the broad management actions outlined in this Plan. The outcomes of the monitoring program for each site will contribute to ongoing improvements in management actions to ensure an adaptive management approach is adopted.

5.1 Objectives

The guiding objectives of the conservation significant fauna monitoring program include:

1. Undertake monitoring for three years to determine presence of conservation significant fauna and critical habitat within Fortescue controlled sites,
2. Where conservation significant fauna and critical habitat is recorded:
    (a) Measure impacts of Fortescue's activities on conservation significant fauna within Fortescue controlled sites,
    (b) Monitor and measure spatial and temporal changes in the abundance and distribution of conservation significant fauna within Fortescue controlled sites, and
    (c) Monitor and measure the success of management measures to inform an adaptive management approach.

Baseline and operational monitoring will be informed by the findings of the monitoring itself as they become available. These findings may similarly lead to ongoing refinements to this Plan and its management strategies to ensure an adaptive management approach is undertaken during Fortescue activities.

5.2 Program Summary

An effective long-term conservation significant fauna monitoring program may be adaptive. Innovations in monitoring techniques and methods should be incorporated into the program design over time. This would, however, be dependent on, and driven by, the quality and quantity of data collected from each site, coupled with a periodic review of monitoring methods. Further, program design should be based on replicable sampling at impact and reference sites.

The intention of the program is the repeat sampling at the same impact sites throughout the monitoring program. However, if access is prevented due to developments of the mine, changes to land access agreements or similar, sites will be relocated to the nearest suitable location. Any changes will be documented in annual monitoring reports.

The number and approach to the selection of monitoring sites varies dependent upon the species being monitored.

5.2.1 Night Parrot Monitoring Sites

No fixed monitoring site locations have been identified for Night Parrot. This is due to the fact that a resident population of the species has not been identified from monitoring efforts to date. Monitoring would target locations that potentially supports Night Parrot critical habitat. This is currently thought to be:

- Cloudbreak mine site (based on EPBC 2010/5696):
  - Ranges, hills and hillslopes;
  - Fringes of Samphire flats containing Samphire; and
  - Fringes of Samphire flats without Samphire.
- Christmas Creek mine site (not listed in Approval)
  - Marsh
  - Low hill habitat type

Future monitoring locations shall be selected based on the above and/or guidance from Night Parrot leading researchers.

5.2.2 Northern Quoll Monitoring Sites

Northern Quoll monitoring sites (Figure 1) are located in Northern Quoll critical habitat (i.e. breeding and denning habitat) within Fortescue operational sites where the species has been confirmed. This includes 3 sites at Main Line Rail (Figure 2) and 3 sites at Hamersley Rail (Figure 3).

At Christmas Creek mine site 3 sites (Figure 4) have been established using non-invasive techniques, due to the absence of confirmed records of the species. Control data is utilised from PaWS regional Northern Quoll monitoring program (i.e. PaWS sites at Indee, Hoopoley and Mt Florance), to which the methods are aligned.

5.2.3 Conservation Significant Bats (Ghost Bat and Pilbara Leaf-nosed Bat) Monitoring Sites

Conservation significant bat monitoring sites (Figure 5) are located in known bat foraging (no critical habitat (i.e. roosting habitat) are believed to occur) within Fortescue operational sites and offsite for reference sites. Three impact and three reference sites are established at Christmas Creek (Figure 6) mine sites, and at Main Line Rail (Figure 7). Monitoring sites may be relocated if roosts are located, to allow abundance monitoring to be completed.

5.2.4 Greater Bilby Monitoring Sites

Great Bilby monitoring methods are aligned to PaWS regional Bilby monitoring program, and comprise abundance monitoring and occupancy monitoring sites (Figure 8).

Abundance monitoring sites have been established at two known populations, one reference site and one potential impact site at Main Line Rail (Figure 9). Due to the nomadic nature of Greater Bilby populations, these two sites will not be static and will follow the population if they move (as far as practical).

Occupancy monitoring sites are located in potential critical habitat (i.e. burrowing habitat) at Main Line Rail (approx. 40 sites) (Figure 10-13) and Christmas Creek mine site (approx. 30 sites) (Figure 14). These occupancy search sites are not fixed locations, but located throughout the habitat mapping shown these figures.

5.2.5 Pilbara Olive Python Monitoring Sites

Pilbara Olive Python monitoring sites (Figure 15) are positioned in Pilbara Olive Python foraging and critical habitat (i.e. shelter habitat) within Fortescue operational sites and offsite for reference sites. Three impact and three reference sites are established at the Christmas Creek mine site (Figure 16). Vehicle transects are also conducted at each site.

5.2.6 Conservation Significant Birds (excl. Night Parrot) Monitoring Sites

Conservation significant bird (excl. Night Parrot) monitoring sites (Figure 17) are positioned in suitable habitat within Fortescue operational sites and offsite for reference sites. Three impact and three reference sites are established at Cloudbreak and Christmas Creek mine sites (Figure 18), as well as Main Line (Figure 19 and Figure 20) and Main Line/Hamersley Rail Line (Figure 21). To note, Cloudbreak and Christmas Creek share reference sites.

5.2.7 Monitoring Program Implementation

A conservation significant fauna monitoring program will be undertaken annually. The program will be led by appropriately skilled, Pilbara experienced, ecologists who will conduct in-field monitoring, analyse monitoring results and write monitoring reports.

5.2.8 Monitoring parameters and methods

A set of monitoring parameters and methods have been selected to provide broad coverage of potential changes in spatial distribution and relative abundance of conservation significant fauna that can be expected under a range of different mining related impacts. The number of parameters will vary depending on the site specific conditions and the target conservation significant fauna.

A summary of monitoring parameters and methods have been provided in Table 9.

Table 5: Conservation Significant Fauna Monitoring Parameters and Methods

Monitoring Parameter	Method
Individual data/ biometric data	Direct results from trapping and observation monitoring methods
Population	Cumulative results from single season monitoring programs, as well as over annual programs
Habitat characteristics	Observation, habitat mapping, photographs etc.
Meteorological data	Data from Weather Stations installed near monitoring site locations
Environmental threats	Observation, mapping, photographs etc.

Table 10 provides the monitoring parameters to be monitored for each conservation significant fauna species recorded within Fortescue controlled sites.

Table 6: Summary of Conservation Significant Fauna Monitoring

Fauna Species	EPBC Act 1999	Wildlife Conservation Act 1950	Fortescue Sites	Method	Monitoring Parameters	Monitoring Effort [12]	Timing
Night Parrot (*Pezoporous occidentalis*)	CR	CR	Cloudbreak (EPBC 2005/2205, EPBC 2010/5696) Christmas Creek [13] (EPBC 2013/7055, MS1033)	**Non-invasive:** Point monitoring, targeted habitat searches, spotlighting, bird calls, area searches, sniffer dogs, motion cameras **Invasive:** Drift fences and walk-in traps. Replicated in control and impact sites.	Presence Habitat characteristics Meteorological data Environmental threats	Minimum Effort (or suitable equivalent) [14] Bird calls: 1 SM2Bat recorder per sampling site. 2 months. Alternative Effort (or suitable equivalent) Point surveys: 10 minute search time for each sampling point. 10 nights Spotlighting: two 200m transects per 5 hectare site, 10m per minute. Repeat same transects for a minimum of two separate nights. 10 nights Areas searches: 20 minute search time for every 2 hectare sampling site. 10 nights Motion cameras: 10 cameras per hectare sampling site. One sampling site per representative habitat. 120 camera nights per sampling site. 12 nights. Drift fences and walk-in traps: 1 drift fence and walk-in trap per sampling site. 7 nights. Where possible, monitoring will align with DPaW regional monitoring programs.	October to March
Northern Quoll (*Dasyurus hallucatus*)	EN	EN	Hamersley Rail Corridor Mainline Corridor Christmas Creek (EPBC 2010/5706) (MS 1033) (EPBC 2013/7055, MS1033)	**Non-invasive:** Active searches and searches for scats and other signs, motion cameras **Invasive:** Cage traps and Elliott traps. Replicated control and impact sites.	Individual data/ biometric data • Sex • Body measurements • Health • Breeding status/ Reproductive condition • Behaviour Area of occupancy Habitat characteristics Meteorological data Environmental threats Culvert usage	Minimum Effort (or suitable equivalent) Elliott and Cage Traps: in alignment with “Pilbara northern Quoll Project, Surveyed and Monitoring *Dasyurus hallacatus* in the Pilbara, Western Australia” - (PaWS 2014). Alternative Effort (or suitable equivalent) Active searches and searches for scats and other signs: ten hours per sampling site. Motion cameras: 5 cameras per sampling site. 4 nights Where possible, monitoring will align with DPaW regional monitoring programs.	May to August
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)	VU	VU	Mainline Corridor (EPBC 2010/5513) Hamersley Rail Corridor (EPBC 2010/5567)	SM2Bat recorders	Presence Habitat characteristics Meteorological data Environmental threats	SM2Bat recorders: 4 recorders per 50 hectare sampling site. 28 detector nights per sampling site. 7 nights. Where possible, monitoring will align with DPaW regional monitoring programs.	November to May

[12] Monitoring frequency subject to review. See section 5.2.9

[13] This species has not been recorded at this site but a condition of a Ministerial Statement or Controlled Action specifies monitoring for this species.

[14] Minimum and alternative effort and monitoring methods are pending confirmation of methods defined as part of the EPBC Night Parrot Research Project.

Fauna Species	EPBC Act 1999	Wildlife Conservation Act 1950	Fortescue Sites	Method	Monitoring Parameters	Monitoring Effort [12]	Timing
Greater Bilby (*Macrotis lagotis*)	VU	VU	Mainline Corridor (EPBC 2010/5513) Christmas Creek (EPBC 2013/7055, MS1033)	**Non-invasive:** Diurnal monitoring and diurnal searches for tracks and other signs, motion cameras on burrows, spotlighting, hair funnels	Abundance Area of occupancy Habitat characteristics Meteorological data Environmental threats Culvert Usage	<u>Abundance (where known population) sites:</u> • Diurnal monitoring and diurnal searches for tracks and other signs (2 ha sites) • Scat collection and genetic analysis to determine population size (2 ha sites) • Food plots (3 per site) • Remote cameras <u>Occupancy sites:</u> • Diurnal monitoring and diurnal searches for tracks and other signs (2 ha sites) • Two phase sampling (subset of sites) Where possible, monitoring should align with PaWS regional monitoring program.	No specified time.
Ghost Bat (Macroderma Gigas)	VU	VU	Cloudbreak Mainline Corridor (EPBC 2010/5513)	SM2Bat recorders	Presence Habitat characteristics Meteorological data Environmental threats	As a minimum, SM2Bat recorders: 4 recorders per 50 hectare sampling site. 28 detector nights per sampling site. 7 nights, until such time that a new method suitable for Ghost Bat monitoring is developed (i.e. scat analysis) Where possible, monitoring will align with PaW regional monitoring programs.	November to May
Pilbara Olive Python (*Liasis olivaceus barroni*)	VU	VU	Christmas Creek (EPBC 2013/7055, MS1033) Mainline Corridor (EPBC 2010/5513)[12]	Searches for signs, spotlighting	Individual data/biometric data • Weight • Length • General body condition Area of occupancy Habitat characteristics Meteorological data Environmental threats	Searches for signs: 2 hour search time for each hectare sampling site. 7 nights. Spotlighting: monitor two 200m transects per 5 hectare site, replicate across habitat types in areas > 5 hectares. Repeat same transects for a minimum of two separate nights. 7 nights. Where possible, monitoring will align with PaWS regional monitoring programs.	December to February
Grey Falcon (*Falco hypoleucos*)		VU	Cloudbreak	Area searches, transect point monitoring	Area of occupancy Habitat characteristics Meteorological data Environmental threats	Area searches: 20 minute search time for every 2 hectare sampling site. Transect point monitoring: Vehicle searches at speeds <20kph. 10 days.	December to February
Rainbow bee-eater (*Meropsornatus*)		IA	Cloudbreak Christmas Creek (EPBC 2013/7055, MS1033) Mainline Corridor Hamersley Rail Corridor	Area searches, targeted resource and habitat searches, bird calls	Number of birds Habitat characteristics Meteorological data Environmental threats	Area searches: 20 minute search time for every 2 hectare sampling site	December to February
Eastern Great Egret (*Ardea modesta*)		IA	Cloudbreak Christmas Creek (EPBC 2013/7055, MS1033) Mainline Corridor	Area searches, targeted resource and habitat searches, bird calls	Number of birds Habitat characteristics Meteorological data Environmental threats	Area searches: 20 minute search time for every 2 hectare sampling site	December to February
Wood Sandpiper (*Tringa glareola*)	M	IA	Christmas Creek (EPBC 2013/7055, MS1033)	Area searches, targeted resource and habitat searches, bird calls	Number of birds Habitat characteristics	Area searches: 20 minute search time for every 2 hectare sampling site	December to February

Fauna Species	EPBC Act 1999	Wildlife Conservation Act 1950	Fortescue Sites	Method	Monitoring Parameters	Monitoring Effort [12]	Timing
			Mainline Corridor		Meteorological data Environmental threats		
Common Greenshank (*Tringa nebularia*)	M	IA	Christmas Creek (EPBC 2013/7055, MS1033)	Area searches, targeted resource and habitat searches, bird calls	Number of birds Habitat characteristics Meteorological data Environmental threats	Area searches: 20 minute search time for every 2 hectare sampling site	December to February

5.2.9 Monitoring Program Review

The overarching monitoring program will be technically assessed and reviewed upon acceptance of this plan[15] and then every three years thereafter. The main objective of the assessment and review will be to ensure that the methods, parameters and frequency used are considerate and appropriate to the findings of the monitoring program. If no triggers are exceeded (detailed in Table 11) after three years, the frequency of monitoring will be reduced to a frequency supported by the review. The review will also provide the opportunity to review monitoring results and the monitoring evidence of the absence of conservation significant fauna and critical habitat.

The assessment and review will be undertaken by an independent Pilbara ecology expert with a relevant tertiary qualification and a minimum 10 years terrestrial Pilbara ecology experience.

Contingency action (Section 5.3) and reporting requirements (Section 9) will be implemented where required.

5.2.10 Data handling and Statistical Analysis

Data will be handled in accordance with the data handling protocol established as part of the annual monitoring tender. The protocol will include the requirements as to data storage and protection, data extraction, quality control, analysis, interpretation, reporting and presentation. The protocol will also directly reference and align with the requirements detailed in *Document Control, Information Management (100-ST-DC-001)* and *Geographic Information Systems and Raw Data Guidelines (100-GU-EN-0009)*.

Statistical analysis of data will be undertaken where data permits. Where data capture allows, analysis will include univariate or multivariate analysis, as deemed appropriate, to determine whether there are any statistical variation in monitoring data.

Monitoring reports will also be provided to the State and Commonwealth Governments as dictated by annual reporting requirements. In addition, the monitoring raw data will be made available to the Western Australian State Government and the Commonwealth Government upon request or where conditioned to provide.

5.3 Contingency Actions

Contingency actions will be initiated during construction, operational and decommissioning activities when an exceedance of a trigger is identified and monitoring indicates that implemented management measures are not successfully mitigating impacts on conservation

[15] This is primarily due to the fact that a number conservation significant fauna species monitoring programs have been ongoing for over 5 years.

significant fauna and their supporting habitats and/or the management objectives are not being achieved.

Contingency actions for conservation significant fauna monitoring triggers have been developed to meet requirements under the environmental approvals listed in Table 11 of this Plan.

Table 7: Trigger criteria and associated contingency measures

Approval	Trigger	Contingency Measure
MS690	• Statistically significant decline in the relative abundance of conservation significant species across impact sites compared to reference sites. • No continued presence of conservation significant species recorded within the impact areas.	• Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites. • Re-examine applied monitoring paramaters to validate they are operating within management levels. • Identify the reason for the change and where it was caused by construction, operation or decommissioning activities, review management measures with an adaptive management response.
MS899	• Statistically significant decline in the relative abundance of conservation significant species across impact sites compared to reference sites. • No continued presence of conservation significant species recorded within the impact areas.	• Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites. • Re-examine applied monitoring paramaters to validate they are operating within management levels. • Identify the reason for the change and where it was caused by construction, operation or decommissioning activities, review management measures with an adaptive management response.
MS1033	• Statistically significant decline in the relative abundance of conservation significant species across impact sites compared to reference sites. • No continued presence of conservation significant species recorded within the impact areas.	• Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites. • Re-examine applied monitoring paramaters to validate they are operating within management levels. • Identify the reason for the change and where it was caused by construction, operation or decommissioning activities, review management measures with an adaptive management response.

Approval	Trigger	Contingency Measure
		• REPORTING - Where the exceedance is attributable to construction, operation and decommissioning activities, report the exceedance within 21 days of the exceedance being identified.

6. COMPLIANCE

Fortescue ensures compliance with its legal obligations through first party quality assurance by site environment teams with a focus on effective environmental management through the corporate Environmental Management System (EMS).

Fortescue has adopted a risk based approach to monitor compliance with its legal obligations. Site environment teams will monitor their compliance with this Plan and the required site specific management and monitoring programs using the *Self-Verification of High Risk Environmental Legal Obligations Guideline* (100-GU-EN-0030).

Where non-conformance issues are identified these will be documented and managed via BMS.

7. ADAPTIVE MANAGEMENT

Fortescue will implement adaptive management practices to learn from the implementation of mitigation measures, monitoring and evaluation against management targets, to more effectively meet the conditioned environmental objective. Adaptive management practices that will be assessed for the conservation significant fauna management and monitoring program as part of this approach will include:

- Evaluation of the monitoring program, data and comparison to baseline data and reference sites on an annual basis to verify whether responses to project activities are the same or similar to predictions,
- Evaluation of assumptions and uncertainties of the conservation significant fauna management and monitoring program,
- Re-evaluation of the risk assessment and revision of risk based priorities as a result of monitoring outcomes,
- Review of data and information gathered over the review period that has increased understanding of site environment in the context of the regional ecosystem,
- Review of management actions as the project matures and new management measures and technologies become available that may be more effective for conservation significant fauna management, and
- Assessment of changes which are outside the control of the project and the management measures identified (i.e. a new project within the area or region; regional change affecting conservation significant fauna management).

8. REVIEW OF PLAN

Review of this Plan will be undertaken every five years or as required by a condition. Revisions of this Plan will be submitted to the State and Commonwealth Governments for approval, in accordance with relevant approval conditions.

9. REPORTING

9.1 Annual Monitoring Report

An Annual Monitoring Report will be developed with the results of the conservation significant fauna monitoring programs across all Fortescue controlled sites. The report will outline the conservation significant fauna monitoring undertaken during the period, the data captured and the analysis completed during the reporting period. Further, it will report compliance against management targets and conditioned environmental objectives.

9.2 Annual Compliance Reporting

9.2.1 State Government Reporting

Fortescue is required to report against its compliance with this Plan in the Compliance Assessment Report prepared in accordance with the OEPA's Post Assessment Guideline for Preparing a Compliance Assessment Report, Post assessment Guideline No. 3.

Annual Compliance Assessment Reports (CAR) are required to be submitted in accordance with the following Ministerial Statements with conservation significant fauna related conditions:

- Condition 5-1 of MS690.
- Condition 4-6 of MS899.
- Condition 3-6 of MS1033.

The reporting requirements against management targets and conditioned environmental objectives are provided in Table 1. In the event that trigger criteria were exceeded during the reporting period, the CAR will include a description of the effectiveness of the contingency actions that have been implemented to manage the impact and any adaptive management measures applied as a result of the exceedance.

9.2.2 Australian Government Reporting

Fortescue is required to report against its compliance with this Plan in the annual compliance report prepared in accordance with the DoEEs Annual Compliance Report Guidelines, 2014.

Annual Compliance Reports are required to be submitted in accordance with the following EPBC Act Decisions with conservation significant fauna related conditions:

- Condition 8 of EPBC 2005/2205

- Condition 2-f of EPBC 2010/5513
- Condition 4 of EPBC 2013/7055

9.3 Reporting of Potential Non-Compliances

9.3.1 Reporting to State Government

Fortescue is required to report against exceedances of management targets for management based environmental conditions within conditioned timeframes. This requirement is specific to MS1033.

In the event that monitoring, tests, surveys or investigations indicate an exceedance of a management target in Table 1 has occurred within the reporting period, Fortescue will:

- Where the exceedance is attributable to construction, operation or decommissioning activities, report the exceedance in writing to the OEPA within 21 days of the exceedance being identified in accordance with Condition 6-4 (1) of MS1033.
- Investigate to determine the cause of the management targets being exceeded in accordance with Condition 6-4(2) of MS1033.
- Provide a report to the OEPA within 90 days of the exceedance being reported as required by Condition 6-4(1) in accordance with the requiements of condition 6-4(3) of MS1033.

In the event that monitoring of compliance, tests, surveys or investigations indicate that one or more management actions have not been implemented within the reporting period, Fortescue will:

- Report the failure to implement management action(s) in writing to the OEPA within 7 days of identification in accordance with Condition 6-5 (1) of MS1033,
- Investigate to determine the cause of the management action(s) not being implemented in accordance with Condition 5-5(2) of MS1033,
- Investigate to provide information for the OEPA to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management actions in accordance with Condition 6-5(3) of MS1033, and
- Provide a report to the OEPA within 21 days of the reporting required by condition 6-5(1) in accordance with the requirements of condition 6-5(4) of MS1033.

10. REFERENCES

Environmental Protection Authority, WA (2015). “Environmental Assessment Guideline No.17 Preparation of management plans under Part IV of the Environmental Protection Act 1986 – EAG 17”

Fortescue Metals Group, WA (2013) “Environmental Management System Manual – 100-MA-EN-0004”.

International Union for the Conservation of Nature (IUCN), (2017) “Red List of Threatened Species”

Fortescue
The New Force in Iron Ore

Report

Groundwater Management Plan

Environment

June 2018
100-PL-EN-1009_Rev0B

	Groundwater Management Plan		
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ACRONYMS

The following acronyms, defined in table 1, have been used through this Plan.

Table 1: Acronyms

Acronyms	Definitions
LUC	Land Use Certificate
EP Act	*Environmental Protection Act 1986*

1. INTRODUCTION

Fortescue Metals Group (Fortescue) is an integrated business comprised of mine, rail and port operations based in the Pilbara region of Western Australia, with its head office located in Perth.

Detailed background information regarding the projects, timing and nature of Fortescue's environmental approvals under the *Environmental Protection Act 1986* (WA), the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), current operations and plans for future expansion is contained in Appendix 1.

1.1 Requirements for Management Plan

The Groundwater Management Plan is required by the Environmental Scoping document as part of the environmental scoping document for development approval for Fortescue Iron Ore related infrastructure in the Pilbara under:

- Environmental Scoping Document: Action Item 20 - Eliwana Iron Ore Mine Project
- Environmental Scoping Document: Action Item 48 – Eliwana Railway Project

The environmental objectives and targets for groundwater management are outlined in Table 1.

This Groundwater Management Plan will be superseded by a site specific Groundwater Operating Strategy required to be developed under the *Rights in Water and Irrigation Act 1914* in accordance with Operational Policy 5.08: Use of operating strategies in the water licensing process (DoW).

1.2 Objective and Scope

The Plan addresses the OEPA's objective for the following key environmental factors:

- inland waters environmental quality "to maintain the quality of groundwater and surface water so that environmental values are protected"
- hydrological processes "to maintain the hydrological regimes of groundwater and surface water so that environmental values are protected."

The objective of this Plan is to identify the potential direct and indirect impacts on groundwater flows and/or quality and develop management and monitoring measures that maximise the ongoing protection of groundwater dependent systems to be retained from disturbance as approved under a Ministerial Statement issued under Part IV of the *Environmental Protection Act 1986* and/or under a Controlled Action issued under the *Environment Protection Biodiversity Conservation Act 1999*.

Table 2: Environmental objectives and measures/targets

Approval	Condition Type	Environmental Objectives	Target
Eliwana Mine/ Railway	Management	Assess the potential direct and indirect impacts on groundwater levels and quality and the associated groundwater dependent systems within identified high risk areas.	100% of high risk areas within the approved project boundary are identified and available in the spatial system
		Establish management strategies to minimise potential impacts on groundwater levels and quality and the associated groundwater dependent systems within identified high risk areas.	No direct loss of groundwater dependent systems within identified high risk areas as a result of groundwater management activities within the approved project boundary.
		Develop and implement a groundwater monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on groundwater levels, quality and any associated groundwater dependent systems within identified high risk areas.	**Groundwater quality:** No exceedance of site specific background trigger values **Groundwater levels:** Groundwater level change from baseline to be within the tolerance of the identified groundwater dependent system(s).

1.3 Definitions

Groundwater management infrastructure may include bores, sumps and associated pumps, power sources, interconnected pipelines, settlement ponds and direct conveyance pipelines.

Groundwater dependent vegetation (GDV) is defined as terrestrial vegetation that is dependent on the presence of groundwater to meet some or all of its ecological water requirements. GDV as a component of groundwater dependent ecosystems in the Pilbara plays an important ecological role by providing essential habitat and oases of biological diversity and productivity. GDVs are a component of groundwater dependent ecosystems.

Groundwater dependent ecosystems (GDE) are ecosystems that require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services (NWC, 2011). GDEs include aquatic, terrestrial and subterranean ecosystems.

High risk areas are defined as areas where groundwater dependent systems have been identified to be retained from disturbance and potential impacts are significant (as defined through ongoing impact assessment of potential direct and indirect impacts of the project).

Water dependent systems are parts of the environment in which the composition of species and natural ecological processes are determined by the permanent or temporary presence of flowing or standing surface water or groundwater. The in-stream areas of rivers, riparian vegetation, springs, wetlands, floodplains, estuaries, karst systems and groundwater-dependent terrestrial vegetation are all examples of water dependent systems (Department of Water, January 2013). Water dependent systems are addressed in both the Groundwater Management Plan and the Surface Water Management Plan for the Eliwana project.

1.4 Legislation and Regulatory Framework

Fortescue employees and contractors are obliged to comply with all relevant environmental Commonwealth and State legislation. Legislation directly relevant to the management of weeds in Western Australia is provided in Table 3.

Table 3: Commonwealth and State Legislation Relating to Groundwater

Legislation	Application
Biodiversity Conservation Act 2016 (WA)	Conservation and protection of biodiversity and biodiversity components. The Act repeals parts of the *Wildlife Conservation Act 1950*.
Environment Protection and Biodiversity Conservation Act 1999 (Cth)	Assesses the conservation significance of fauna species and forms the framework for significant species protection at the Federal level.

Legislation	Application
Environmental Protection Act 1986 (WA)	State environmental impact assessment and Ministerial approval process.
Environmental Protection (Unauthorised Discharge) Regulations 2004 (WA)	Prevention of direct discharge of sediment or pollutants to the surrounding surface waters.
Rights in Water and Irrigation Act 1914 (WA)	Relates to rights in water resources, to make provision for regulation, management, use and protection of water resources, to provide for irrigation schemes, and for related purposes.
Soil and Land Conservation Act 1945 (WA)	Addresses the conservation of soil and land resources and the mitigation of the effects of erosion.
Wildlife Conservation Act 1950 (WA)	State process that assesses the conservation significance of fauna species and forms the framework for significant species protection.

The following standards and guidelines are also of relevance to this Plan:

- Water Quality Protection Guidelines for Mining and Mineral Processing (Department of Water, 1999)

2. ROLES AND RESPONSIBILITIES

All Fortescue employees and contractors are required to comply with the requirements of this Plan.

Accountability for fulfilling the requirements of this Plan is dependent on the stage of project development (construction, operations, decommissioning) and the project type (port, rail or mine).

During exploration, the Group Manager Exploration will be accountable for ensuring the requirements of the Plan are met.

During construction stages, whether activities are undertaken by an external service provider or internal Fortescue personnel, the Project Director (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

During operational, decommissioning and closure stages, the General Manager (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

Where responsibilities are delegated, this must be clearly recorded and communicated.

In Section 4 specific Management Actions have been attributed to the appropriate personnel.

When site specific Vegetation Health Management and Monitoring Programs are developed to support this Plan, the RASCI framework should be utilised to delegate roles, responsibilities, and review and approval levels. RASCI is used to denote:

R-Responsible Those who do the work to achieve the task.

A-Accountable Those who are ultimately accountable for the completion of the deliverable or task and the one to whom the Responsible person is accountable.

S-Supportive Resources allocated to the Responsible person and who will also assist in completing the task.

C-Consulted Those whose opinions are sought, two-way communication.

I-Informed Those whom are kept informed, one-way communication.

3. MANAGING ENVIRONMENTAL RISK

Fortescue actively manages risk by undertaking an Annual Environmental Impact Risk review. Although the review considers all environmental risks, there is a focus on the inherently moderate to high risk impacts. The review considers the effectiveness of management actions that are currently in place for these impacts. The review also considers any relevant incidents that have occurred, if the actions from incident investigations have translated into new management actions, and generally considers the need for any new management actions to ensure lower risk targets can be achieved.

The environmental risks associated with groundwater management at Eliwana Mine include:

- Groundwater abstraction for mine dewatering and water supply
- Injection of excess water
- Controlled release of excess water into inactive mining voids or via surface water discharge
- Groundwater drawdown and alteration of hydrological processes as a result of mine dewatering and water supply abstraction
- Groundwater mounding in areas of surplus water injection;
- Altered hydrogeology and water balance associated with the creation of permanent and episodic mining void water bodies.

The environmental risks associated with groundwater management at Eliwana Railway include:

- Groundwater abstraction for water supply resulting in localised groundwater drawdown.
- Impacts to groundwater quality associated with hydrocarbon or chemical spills.
- Changes to the hydrological regimes of the Ashburton River catchment and the Duck Creek sub-catchment.
- Changes to the hydrological regimes of the Lower Fortescue River Catchment and the Weelumurra Creek sub-catchment, recognising the importance of the Millstream water source.
- Groundwater abstraction drawdown resulting in impacts to groundwater dependent vegetation.

Section 5 provides the management actions proposed to manage these potential environmental risks at the Eliwana Mine and Railway project.

4. ENVIRONMENTAL MANAGEMENT

A series of environmental management objectives have been developed to mitigate environmental impacts on groundwater dependent systems to be retained from disturbance as approved under the *Environmental Protection Act 1986* and/or the *Environment Protection Biodiversity Conservation Act 1999.* These include:

1. Assess the potential direct and indirect impacts on groundwater levels, groundwater quality and any associated groundwater dependent systems within identified high risk areas.
2. Establish management strategies to minimise potential impacts on groundwater levels, groundwater quality and any associated groundwater dependent systems within identified high risk areas.
3. Develop and implement a groundwater monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on groundwater levels, ground water quality and any associated groundwater dependent systems within identified high risk areas.

For each objective, management actions have been developed to ensure the impacts from Fortescue's operations are managed, and that appropriate monitoring, reporting and corrective action functions are implemented to support the successful implementation of the management actions.

Only management actions that have been risk ranked as High or Very High have been included in the Plan. Management actions that have been listed with a risk based priority of low or medium have been included as a result of an approval condition. As a result, the site location for actions with a low or medium risk rating are restricted to the sites where the approval condition applies.

The key elements of the environmental management process associated with each objective are described in Table 4.

Table 4: Description of Key Elements of Environmental Management Process to Achieve Identified Objectives

Element	Definition/ Description
Objective	What is intended to be achieved
Management Action	Tasks undertaken to enable the objective to be met
Performance Indicators	Metrics for evaluating the outcomes achieved by Management Actions
Reporting/ Evidence	Demonstrates that the Management Action has been applied and the outcome evaluated.
Timing	Period during which the Management Action should be undertaken.
Responsibility	Accountability for ensuring management action is completed. The responsible role is dependent on project timing.

The key management actions, performance indicators, evidence, timing and responsibilities for each objective are provided in Table 5.

Table 5: Key Management Actions for Groundwater Management

Objective 1	Identify the potential direct and indirect impacts on groundwater levels, groundwater quality and associated groundwater dependent systems within identified high risk areas						
Reference	**Site Location**		**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
	Rail	**Mine**					
1.1	x	x	When a groundwater management activity requires a 5C Licence under the *Rights in Water and Irrigation Act 1914:* • where required, conduct a hydrological assessment in accordance with the parameters outlined in the Operational policy no. 5.12 Hydrological reporting associated with a groundwater well licence (DoW). • where required, develop and implement a Groundwater Operating Strategy in accordance with the Operational policy 5.08: Use of operating strategies in the water licensing process.	• 5C Licence application completed • Hydrological assessment report developed and approved • Compliance with Policy no. 5.12 • Groundwater Operating Strategy developed, where required	• Hydrological assessment report • Correspondence with DWER • Groundwater Operating Strategy	Feasibility/ Design	Manager Long Term Planning and Hydrology
1.2	x	x	Conduct a risk assessment to identify high risk areas where groundwater dependent systems have been identified and potential impacts are significant.	• Risk assessment conducted • High risk areas identified	• Risk assessment outcomes	Design	Manager Environmental Approvals/ Project Manager/ Group Manager Environment
1.3	x	x	Where groundwater dependent systems have been identified within identified high risk areas undertake mapping surveys to determine relevant species critical habitat and if future monitoring is required.	• Mapping survey completed • GIS and PIMS updated • Future monitoring defined	• Mapping survey • GIS dataset • PIMS record • Monitoring Planned	Design	Group Manager, Environment
1.4	x	x	Conduct a desktop assessment for all LUC[1] applications to ensure groundwater dependent systems within high risk areas are identified prior to ground disturbance. Where the works have the potential to impact on groundwater and any associated water dependent systems, apply relevant management measures to the LUC prior to approval.	• Desktop assessment undertaken • Management measures included in relevant LUCs	• Desktop assessment • LUC approval	Construction/ Operation	Project Manager/ Site HSES Manager
Objective 2	**Site Locations**		**Establish management strategies to minimise potential impacts on groundwater levels, groundwater quality and associated groundwater dependent systems within identified high risk areas**				
Reference	**Rail**	**Mine**	**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
2.1	x	x	Ensure staff and contractors are provided with appropriate training to ensure groundwater and associated groundwater dependent systems are protected.	• Inductions completed • Pre-start meetings conducted • Role dependent training completed	• Induction materials and register of attendees • Record of pre-start meetings • Training materials/ records	All stages	Project Manager/ HSES Manager
2.2	x	x	Ensure groundwater management infrastructure location and design aligns with the risk assessment outcomes to minimise impacts to groundwater levels, quality and associated groundwater dependent systems. For the Eliwana Rail Project, the risk assessment outcomes are provided in the *Groundwater Impact Assessment: Eliwana Rail Water Supply* (750ES-3100-RP-HY-0002).	• Location infrastructure aligns with risk assessment outcomes where possible	• Risk assessment • Monitoring reports	All stages	Project Manager/ Manager Long Term Planning and Hydrology

[1] An internal permit system required to undertake on-ground activities.

2.3		x	Fauna management measures, including exclusion or exit/egress structures, to minimise potential impacts on conservation significant fauna, are in place: • For infrastructure that poses a fauna entrapment or drowning risk • When conducting excavation or trenching activities In accordance with the *Conservation Fauna Management Plan* (100-PL-EN-0022).	• Compliance with the Plan • No mortality of conservation significant fauna as a result of entrapment, drowning, excavation or trenching activities • No significant increase in feral animal records	• BMS Record • CAR	Construction/ Operation	Project Manager/ Manager Mine Services or Manager Technical Services
2.4		x	Where a subterranean fauna survey indicates a risk of loss of subterranean species or communities, and those species or communities are deemed significant due to their restricted distribution within the project area, develop a Subterranean Fauna Management Plan as required by the *Subterranean Fauna Survey Plan* (45-PL-EN-0010).	• Subterranean fauna surveys completed • Where a risk of loss of species or communities identified, Plan developed	• Subterranean Fauna survey • Subterranean Fauna Plan	Design	Group Manager Environment
2.5	x	x	Chemical and hydrocarbon storage areas will be designed, constructed and operated in accordance with the requirements outlined in the *Chemical and Hydrocarbon Management Plan* (100-PL-EN-0011) and a Licence issued under Part V of the *Environmental Protection Act 1986*.	• Compliance with Plan • Role/area dependent training completed • Water quality remains within required limits	• Laboratory sample results • AEMR	Construction/ Operation	Project Manager/ NPI Manager
2.6		x	When injecting excess dewater into a compatible aquifer utilise methods outlined in the Operational Policy 1.01 managed Aquifer Recharge in Western Australia (DoW) and an applicable and approved Groundwater Operating Strategy as required under a 5C Licence.	• Compliance with Policy 1.01 • Compliance with the requirements outlined in the corresponding Groundwater Operating Strategy	• Annual aquifer review • Triannual aquifer review	Operation	Planning Manager
2.7		x	When dewatering activities result in volumes in excess of what can be injected into a compatible aquifer and/or utilised for onsite activities such as dust suppression and OPF operations, discharge surplus water to the environment in accordance with the requirements of the Surface Water Management Plan (100-PL-EN-1015).	• Surface Water Management Plan implemented	• CAR	Operations	Planning Manager
2.8	x	x	When an uncontrolled release of water has occurred as a result of Fortescue activities and the release has caused or is likely to cause pollution or environmental harm, investigate and report the incident in accordance with the *Incident Event Management Procedure* (100-PR-SA- 0011).	• Incident reported	• BMS records • Where required Regulator notification	Construction/ Operation	Project Manager/ Manager Mine Services
2.9		x	Where post closure mine voids are present within the project boundary and impacts to groundwater dependent systems are expected, the requirements of the *Eliwana Mine Closure Plan* (EW-PL-EN-0001) will be adhered to.	• Mine Closure Plan implemented	• Monitoring reports • CAR • AER	Closure	Planning Manager
2.10	x	x	Conduct progressive rehabilitation of disturbed areas no longer required for operations, including bores and associated infrastructure, in accordance with the *Eliwana Mine Closure Plan* (EW-PL-EN-0001) and the I*ntegrated Rail Network Closure Plan* (R-PL-EN-0041) developed in accordance with the Guidelines for Preparing Mine Closure Plans.	• Mine Closure Plan implemented	• Monitoring reports • CAR • AER	Closure	Planning Manager / Manager Rail Maintenance

Objective 3	Site Locations		Develop and implement a groundwater monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on groundwater levels, groundwater quality and associated groundwater dependent systems within identified high risk areas.				
Reference	**Rail**	**Mine**	**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
3.1		x	Ensure baseline modelling and groundwater sampling are undertaken to: • Document groundwater levels and quality within impact and reference sites • Identify baseline modelling and groundwater quality at impact and reference sites • Compare data across impact and reference sites (and/or regional monitoring sites where available).	• Baseline modelling and /or groundwater sampling undertaken for all sites • Data comparison undertaken	• Baseline monitoring reports	Design/ Construction/ Operations	Project Manager/ Manager Long Term Planning and Hydrology
3.2		x	Implement a groundwater monitoring program in areas identified as high-risk areas where groundwater dependent systems have been identified and potential impacts are significant.	• Monitoring program implemented	• Monitoring reports • Compliance Assessment Report (if the Plan is conditioned under the EP Act) • Annual aquifer review • Triannual aquifer review	Construction/ Operations/ Decommissioning and Closure	Manager Long Term Planning and Hydrology
3.3		x	Where monitoring indicates a potential impact on groundwater levels and/or quality or associated groundwater dependent systems, implement contingency actions defined in Table 9. Update this Plan where required to inform an adaptive management approach to groundwater management across the business.	• Monitoring program implemented • Contingency actions implemented	• Monitoring reports • Compliance Assessment Report (if the Plan is conditioned under the EP Act) • Annual aquifer review • Triannual aquifer review	Construction/ Operations/ Decommissioning and Closure	Manager Long Term Planning and Hydrology
3.4		X	Implement the sites surface water monitoring program as defined in the Surface Water Monitoring Plan to detect any impacts on surface water dependent systems (inclusive of partial and infrequent dependent systems) as a result of a change in groundwater levels and/or quality.	• Monitoring program implemented	• Monitoring report • Reporting records	Construction/ Operation/ Decommissioning/ Closure	HSES Manager
3.5		x	Implement the sites conservation significant fauna monitoring program as defined in the Conservation Significant Fauna Monitoring Plan to detect any impacts on conservation significant fauna and associated habitat as a result of a change in groundwater levels and/or quality.	• Monitoring program implemented	• Monitoring report • Reporting records	Construction/ Operation/ Decommissioning/ Closure	Group Manager Environment
3.6		x	Implement the sites vegetation health monitoring program as defined in the Vegetation Health Monitoring Plan to detect any impacts on conservation significant flora and vegetation as a result of a change in groundwater levels and/or quality.	• Monitoring program implemented	• Monitoring report • Reporting records	Construction/ Operation/ Decommissioning/ Closure	Group Manager, Environment

5. MONITORING GUIDELINES

A monitoring program is required to measure the effectiveness of the management actions as defined in this Plan. The outcomes of the monitoring program will contribute to ongoing improvements in management actions to ensure an adaptive management approach is adopted.

5.1 Objectives

The guiding objectives of the groundwater monitoring program includes:

1. Determine whether the levels and water quality in groundwater dependent systems potentially impacted by Fortescue activities are significantly different from baseline modelling and/or control site values.
2. Monitor and measure the success of management measures to inform an adaptive management approach.
3. Obtain adequate data to measure spatial and temporal changes in site hydrology within Fortescue controlled sites.

Baseline and operational monitoring will be informed by the findings of the monitoring itself as they become available. These findings may similarly lead to ongoing refinements to this Plan and its management strategies to ensure an adaptive management approach is undertaken during Fortescue activities.

5.2 Baseline Modelling/ Sampling

Initial baseline modelling for groundwater hydrology has been conducted as part of the groundwater impact assessment to obtain a representative baseline dataset of the site hydrology.

Baseline sampling for groundwater quality will be conducted where possible prior to construction to obtain an accurate baseline dataset.

5.3 Program Summary

An effective monitoring program may be adaptive over time, dependent on quality and quantity of data collected from each site, with innovations in monitoring techniques and methodologies incorporated into program design over time. This would however be dependent on and be driven by the quality and quantity of data collected from each site, coupled with a periodic review of monitoring methods. Further, program design should be based on replicable sampling at impact and reference sites.

Frequency of monitoring will be dependent on the requirements of the environmental approval(s). The monitoring program will be assessed every three years to ensure the methods, parameters and frequency are considerate of the monitoring program findings.

A set of monitoring parameters and methods have been selected to provide broad coverage of potential changes in groundwater flow and quality that can be expected under a range of different mining related impacts. The number of monitoring parameters will vary depending on the approval conditions and groundwater dependent systems.

A summary of monitoring parameters and methods have been provided in Table 6.

Table 6: Monitoring Parameters and Methods

Monitoring Parameter	Method
Rainfall	Rainfall gauge
Hydrochemistry	Sample collection (field)/ Analysis (lab)
Field EC and pH	Water quality meter (field)
Water levels	Water level indicator (field)

Table 7 provides the monitoring parameters to be monitored per location type within Fortescue controlled sites where water is present and accessible.

Table 7: Types and Associated Parameters and Site Locations

Type	Parameter	Site
Rainfall	Rainfall	Suitable location within representative catchment boundary and within the approval boundary
Select bores near: Landfill TSF Waste dumps GDE	Field EC and pH	Monitoring Bores Dewatering and Injection Bores Abstraction Bores
Select bores near: Landfill TSF Waste dumps Bulk Fuel Facilities GDE	Groundwater levels	Monitoring Bores Dewatering and Injection Bores Abstraction Bores
Select bores near: Landfill TSF Waste dumps GDE	Hydrochemistry	Monitoring Bores Dewatering and Injection Bores Abstraction Bores

Type	Parameter	Site
Select bores near[2]: Waste dumps TSF	See *Acid and Metalliferous Drainage Sampling Plan* (100-PL-EN-1014)	Monitoring Bores
Select bores near: Bulk Fuel Facilities	Total Recoverable Hydrocarbons	Monitoring Bores

Contingency actions (Section 5.5) and reporting (Section 8) requirements will be implemented where required.

Monitoring locations will be finalised once the Mine Plan is approved.

Results of the groundwater monitoring program will also inform and be informed by the following monitoring programs to determine impacts to ecosystem health:

- Conservation significant fauna
- Vegetation health
- Surface Water
- Subterranean fauna (where surveys have identified a restricted species and management and monitoring is required).

5.4 Data Handling Statistical Analysis

Data will be handled in accordance with the data handling protocol established as part of the annual monitoring tender. The protocol will include the requirements as to data storage and protection, data extraction, quality control, analysis, interpretation, reporting and presentation.

The protocol will also directly reference and align with the requirements detailed in *Document Control, Information Management* (100-ST-DC-001) and *Geographic Information Systems and Raw Data Guidelines* (100-GU-EN-0009).

Statistical analysis of data will be undertaken where data permits. Where data capture allows, analysis will include using time series line charts for each parameter and scatterplots to determine relationships between parameters. If parameter relationships appear to be present or exceedances or trends occur determine cause and implement corrective actions.

[2] Waste landforms will be monitored when determined to be a potential source in the sites source, pathway, receptor risk model as defined by the Acid and Metalliferous Drainage Management Plan (100-PL-EN-1016)

The results of chemical and physical data should be analysed after every sample event, values of each parameter should be compared against trigger values to determine if an exceedance has occurred.

Monitoring reports will also be provided to the State and Commonwealth Governments as dictated by annual reporting requirements. In addition, the monitoring raw data will be made available to the Western Australian State Government and the Commonwealth Government upon request or where conditioned to provide.

5.5 Contingency Actions

Contingency actions will be initiated during construction, operational and decommissioning activities when an exceedance of a trigger is identified and monitoring indicates that implemented management measures are not successfully mitigating impacts on groundwater dependent systems and/or the management objectives are not being achieved.

Contingency actions for groundwater monitoring triggers have been developed in Table 8.

Table 8: Trigger Criteria and Associated Contingency Actions

Trigger	Contingency Action
No exceedance of site specific background trigger values	• Determine whether the changes observed in the impact sites are comparable to baseline modelling/sampling • Re-examine applied monitoring parameters to validate they are operating within management levels • Increase monitoring frequency • Identify the reason for the change and where it was caused by construction, operations or decommissioning/closure activities, review management measures with an adaptive management response.
Groundwater level change from baseline to be within the tolerance of the identified groundwater dependent system(s).	• Determine whether the changes observed in the impact sites are comparable to predicted values and/or baseline modelling/ sampling • Re-examine applied monitoring parameters to validate they are operating within management levels • Increase monitoring frequency • Identify the reason for the change and where it was caused by construction, operations or decommissioning/closure activities, review management measures with an adaptive management response
A statistically significant change in the primary parameter trends at predicted impact areas in comparison to reference sites AND	• See Vegetation Health Management and Monitoring Program

Trigger	Contingency Action
The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal	
Statistically significant decline in the relative abundance of conservation significant species across impact sites compared to reference sites	• See Conservation Significant Fauna Management Program
No continued presence of conservation significant species recorded within the impact areas	• See Conservation Significant Fauna Management Program

6. COMLIANCE

Fortescue ensures compliance with its legal obligations through first party quality assurance by site and corporate environment teams with a focus on effective environmental management through the implementation of the Fortescue wide Environmental Management System (EMS).

Fortescue has adopted a risk based approach to monitor compliance with its legal obligations. Site environment teams will monitor their compliance with this Plan and the required site specific management and monitoring programs using the *Self-Verification of High Risk Environmental Legal Obligations Guideline* (100-GU-EN-0030).

Where non-conformance issues or opportunities for improvement are identified these will be documented and tracked via the Business Management System (BMS).

7. ADAPTIVE MANAGEMENT

Fortescue will implement adaptive management practices to learn from the implementation of mitigation measures, monitoring and evaluation against management targets, to more effectively meet the conditioned environmental objective. Adaptive management practices that will be assessed for the vegetation health management and monitoring program as part of this approach may include:

- Evaluation of the monitoring program, data and comparison to baseline data and reference sites on an annual basis to verify whether responses to project activities are the same or similar to predictions
- Evaluation of assumptions and uncertainties of the management and monitoring program
- Re-evaluation of the risk assessment and revision of risk based priorities as a result of monitoring outcomes
- Review of data and information gathered over the review period that has increased understanding of site environment in the context of the regional ecosystem
- Review of management actions as the project matures and new management measures and technologies become available that may be more effective for environmental management
- Assessment of changes which are outside the control of the project and the management measures identified (i.e. a new project within the area or region; regional change affecting management)

Review of the Environmental Management Plan will be undertaken following the review of the associated monitoring program and the corresponding results

8. REPORTING

8.1 Annual Monitoring Report

An Annual Monitoring Report will be developed with the results of the monitoring programs across all Fortescue controlled sites. This report will outline the monitoring data captured during the reporting period and the analysis required to report compliance against management targets and conditioned environmental objectives.

8.2 Annual Compliance Assessment Report

Fortescue is required to report against its compliance with the Management Plan in the Compliance Assessment report prepared in accordance with the OEPA's Post Assessment Guideline for Preparing a Compliance Assessment Report, Post Assessment Guideline No. 3.

Annual Compliance Assessment Reports (CAR) are required to be submitted in accordance with relevant Ministerial Statements conditions.

The reporting requirements against management targets and conditioned environmental objectives are provided in Table 1. In the event that trigger criteria were exceeded during the reporting period, the CAR will include a description of the effectiveness of the contingency actions that have been implemented to manage the impact and any adaptive management measures applied as a result of the exceedance.

Currently, the Eliwana Iron Ore Mine Project is not required to report on compliance with the Groundwater Management Plan. Once approval is granted under Part IV of the *Environmental Protection Act 1986* and implementation of the Groundwater Management is conditioned in the Ministerial Statement, Fortescue will adhere to the reporting requirements outlined in section 9.2 of this Plan.

8.3 Annual Environmental Monitoring Report

Fortescue is required to report environmental monitoring data, as required by Operating Licences issued by the Department of Water and Environmental Regulation under Part V of the *Environmental Protection Act 1986*.

An Annual Environmental Monitoring Reports (AEMR) will be submitted in accordance with the relevant licence conditions once the Eliwana Mine project is approved and a licence is issued.

8.4 Annual/Triannual Aquifer Review

Fortescue is required to develop an Annual Groundwater Monitoring Summary and a Triennial Groundwater Monitoring Review as required by a Groundwater Operating Strategy issued under the *Rights in Water and Irrigation Act 1914*. Annual and Triennial reporting will be undertaken for the Eliwana Mine Project in accordance with the Operational Policy 5.08 in "*Use of Operating Strategies in the Water Licensing Process* (DoW, 2010).

During construction, the Eliwana Railway Project will utilise existing bores within the Southern Fortescue Borefield approved under the Solomon Iron Ore Project – Sustaining Production Proposal. Reporting requirements will be undertaken in accordance with the existing Groundwater Operating Strategy.

8.5 Reporting of Potential Non-Compliances

Fortescue is required to report against monitoring outcomes as per conditioned timeframes. Trigger criteria and where required threshold criteria have been identified in Table 1.

In the event that monitoring, tests, surveys or investigations indicate an exceedance of a management target in Table 1 Fortescue will report an exceedance of a management target in accordance with the requirements of the relevant Ministerial Statement condition(s).

Currently, the Eliwana Iron Ore Mine Project is not required to report on compliance with the Groundwater Management Plan. Once approval is granted under Part IV of the *Environmental Protection Act 1986* and implementation of the Groundwater Management is conditioned in the Ministerial Statement, Fortescue will adhere to the reporting requirements outlined in the Ministerial Statement.

9. STAKEHOLDER CONSULTATION

Fortescue has undertaken extensive stakeholder consultation program whereby landowners, regulators and other relevant parties have been consulted with regard to investigation and design of the mine sites and port and rail infrastructure through the environmental approvals process.

Regulatory agencies will be consulted in accordance with the requirements of EAG 17 Preparation of Management Plan under Part IV of the *Environmental Protection Act 1986*.

Table 4 will be updated following receipt of stakeholder comment as a result of the review and approval process.

Table 9: Stakeholder Consultation, Comments and Responses

Stakeholder	Correspondence	Comment	Change
DWER – Regions	CMS17164	The proponent has prepared a site-specific Eliwana Groundwater and Surface Water management plans to support the ERD submission. RSW will comment on the content and acceptability of these plans during the assessment period, makes note that whilst the plans presented contain information on potential management strategies, the plans do not define which surface and groundwater features are significant and will need management.	See attached Figures for relevant groundwater features.
DWER – Regions	CMS17164	No proposed management strategies (triggers and thresholds) established within the plan rather the plan commits to develop these strategies. It is unclear that this addresses the work required for task 18 of the scoping requirements.	*EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986* only require triggers and thresholds to be established where an outcomes-based condition is being proposed and as result only management targets have been identified. Water quality triggers have been identified within the Plan through reference to the ANZECC Guidelines, Water Quality Protection Guidelines for Mining and Mineral Processing and Water Quality Protection Note 68 where triggers are identified.
DWER - Regions	CMS 17164	As mentioned, the proponent has submitted the more general Pilbara wide groundwater and surface water management plans applicable to the Chichesters and Solomon Operations. These plans are not	*EAG 17 Preparation of Management Plans under Part IV of the Environmental Protection Act 1986* enables proponents to draft factor based plans for multiple

Stakeholder	Correspondence	Comment	Change
		applicable because the ESD requires standalone Eliwana surface water and groundwater plans to be submitted to support the Eliwana operations.	operations. This is the approach Fortescue is using for its EMP development program. The Plans submitted for surface water and groundwater include project detail for the Eliwana Project as required by the Guidance.
DWER -Terrestrial Ecosystems	CMS 17164	The SWMP and GWMP are also inadequate. They are plans to develop plans rather than containing specific information, management actions, monitoring techniques and SMART trigger and thresholds required. The SWMP should include management actions for maintaining sheet flow dependent vegetation.	*EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986* only require triggers and thresholds to be established where an outcomes-based condition is being proposed and as result only management targets have been identified. Management actions (Section 4), Monitoring methods (Section 5) and Management targets (Table 1) are outlined in the Plan as required under the Guidelines.

10. REFERENCES

Department of Water, January 2013. Managing the hydrology and hydrogeology of water dependent ecosystems in urban development, Guidance Note 7.

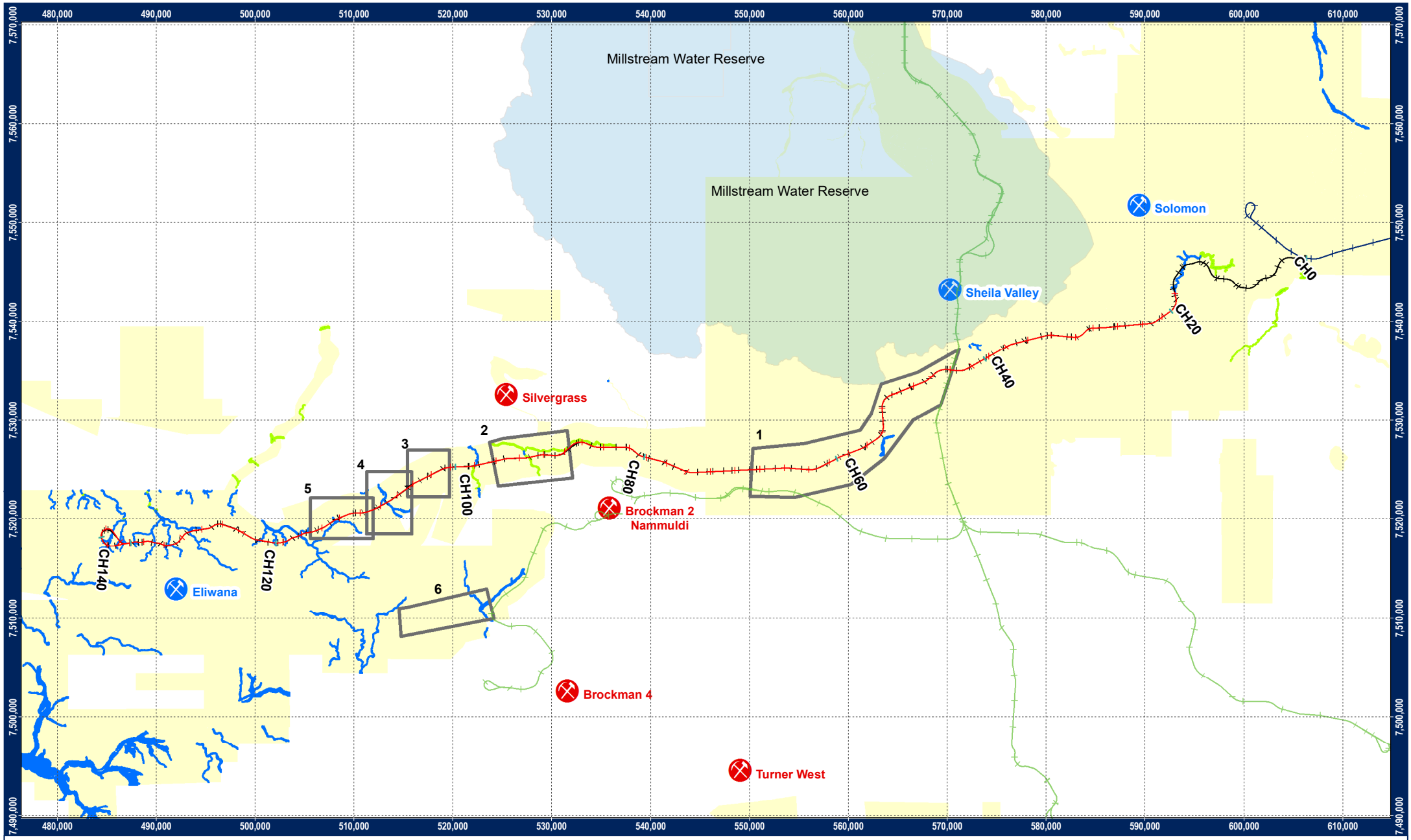
Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and Australian and New Zealand Environment and Conservation Council (ANZECC) 2000.

Australian guidelines for water quality monitoring and reporting. National Water Quality Management Strategy paper No 7, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and Australian and New Zealand Environment and Conservation Council (ANZECC) 2000, *NationalWater Quality Management Strategy: Australian Guidelines for Urban Stormwater Management*.

Richardson, E, Irvine, E, Froend, R, Book, P, Barber, S & Bonneville, B 2011, Australian groundwater dependent ecosystems toolbox part 1: assessment framework, National Water Commission, Canberra.

Figure 1: Environmental Consideration and Groundwater Impact Assessment Areas: Eliwana Rail



PER Rail Alignment
Eliwana Rail Camp Area
FMG Rail Alignments
Rio Tinto Rail

FMG Locations
Rio Tinto Mines

Vegetation Mapping Extents
Groundwater Impact Assessment Areas
Potentially Groundwater Dependent Assemblage
Groundwater Dependent Assemblage

PDWSA

Requested By: M Carroll
Drawn By: M Carroll
Revised By: mcarroll
Approved By:
Scale: 1:496,231
Coordinate System: GDA 1994 MGA Zone 50
Document Name: Potential GDV

Date: 1/06/2018
Size: A4L
Revision: 1
Confidentiality: 1

Figure 6
Environmental Considerations and Groundwater Impact Assessment Areas

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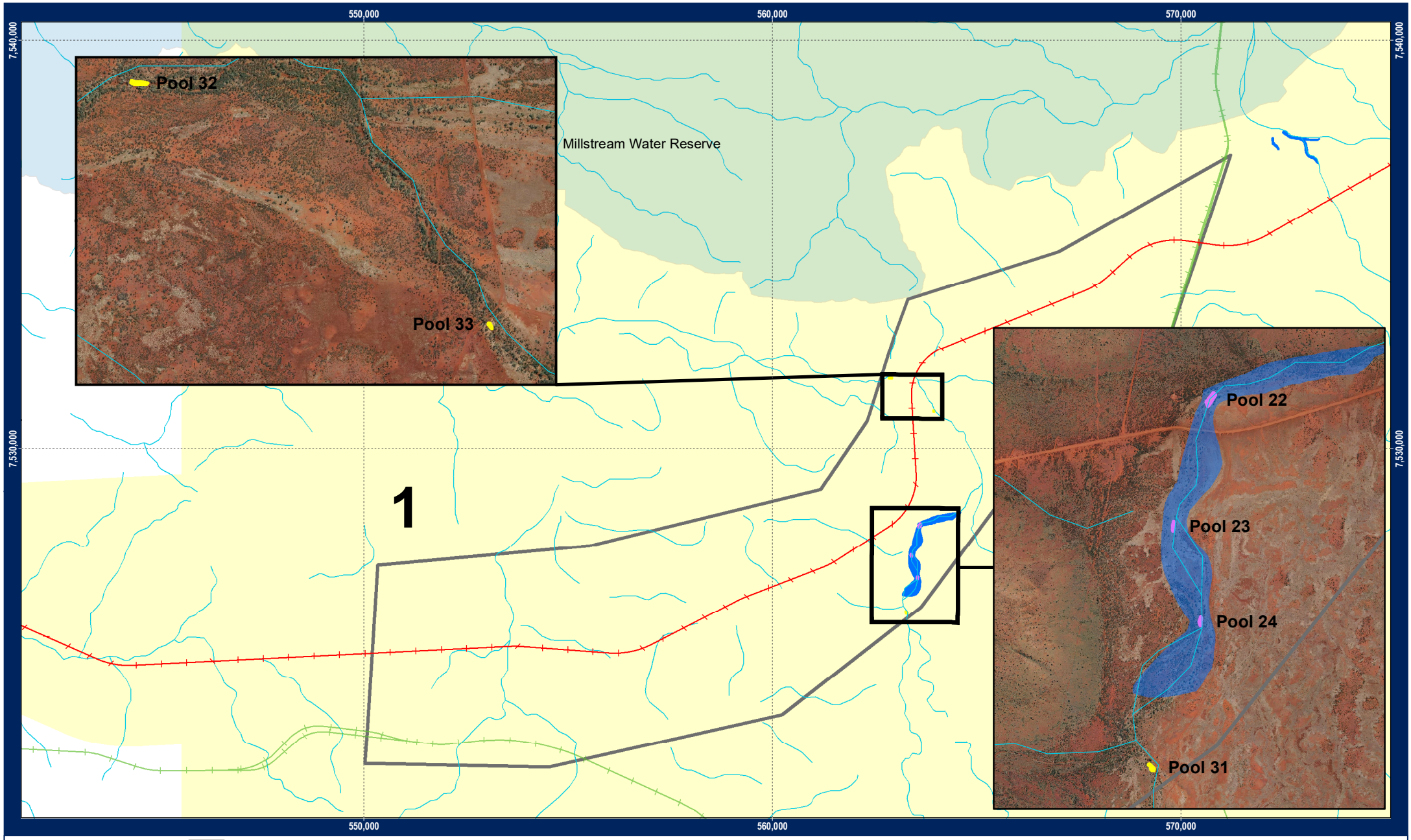

PDWSA
PER Rail Alignment
Rio Tinto Rail
Watercourse
Groundwater Impact Assessment Areas
Rail_SWFeature_Aug2004
Rail_SWFeature_Aug2013
Potentially Groundwater Dependent Assemblage
Groundwater Dependent Assemblage
Vegetation Mapping Extents

Requested By: M Carroll
Drawn By: M Carroll
Revised By: mcarroll
Approved By:
Scale: 1:120,114
Coordinate System: GDA 1994 MGA Zone 50
Document Name: Potential GDV - GIAA1

Date: 1/06/2018
Size: A4L
Revision: 0
Confidentiality: 1

Figure 7
Environmental Considerations in Groundwater Impact Assessment Area 1

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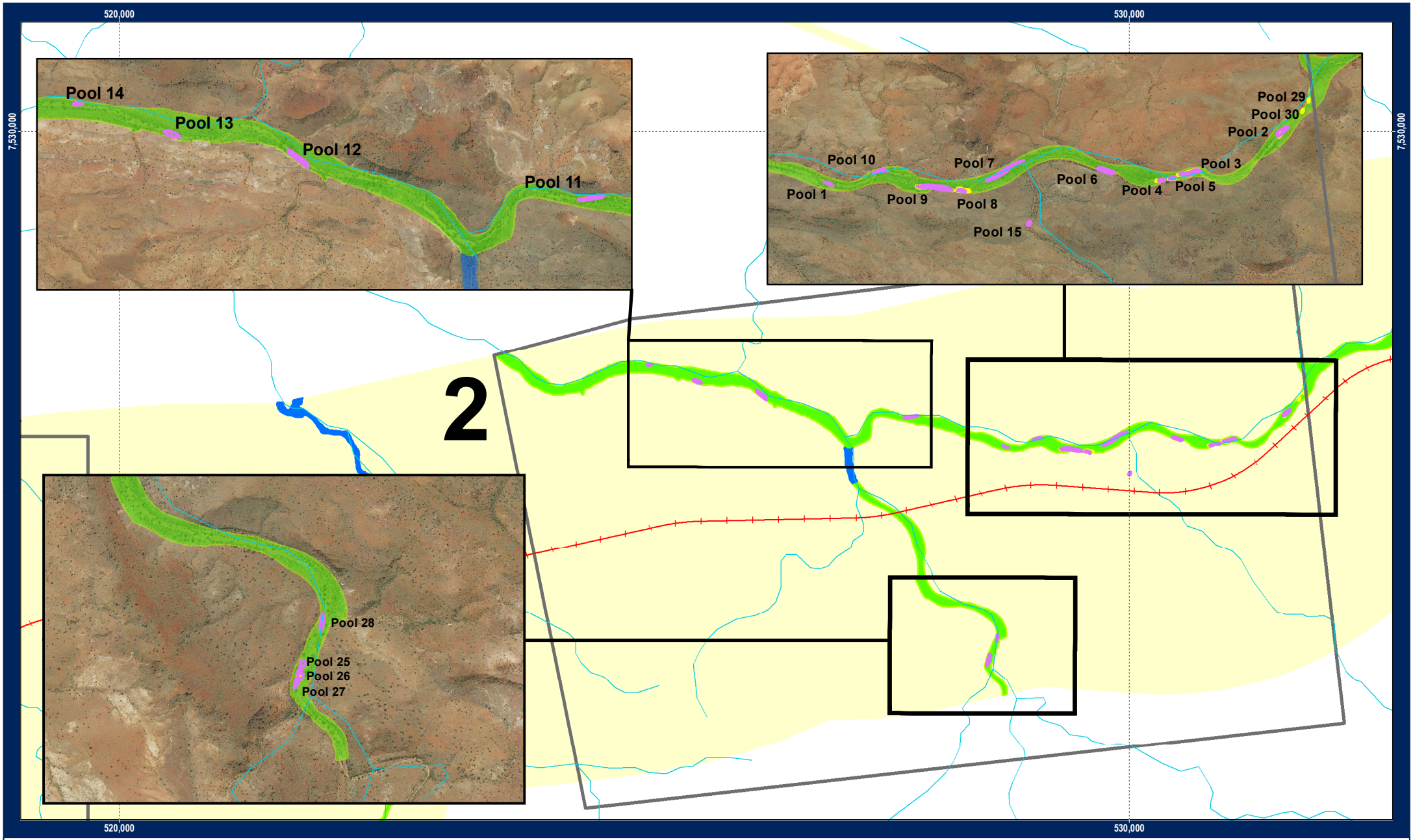

PDWSA
PER Rail Alignment
Rio Tinto Rail
Watercourse
Groundwater Impact Assessment Areas
Rail_SWFeature_Aug2004
Rail_SWFeature_Aug2013
Potentially Groundwater Dependent Assemblage
Groundwater Dependent Assemblage
Vegetation Mapping Extents

Requested By: M Carroll
Drawn By: M Carroll
Revised By: mcarroll
Approved By:
Scale: 1:48,669
Coordinate System: GDA 1994 MGA Zone 50
Document Name: Potential GDV - GIAA2

Date: 1/06/2018
Size: A4L
Revision: 0
Confidentiality: 1

Figure 8
Environmental Considerations in Groundwater Impact Assessment Area 2

Fortescue Metals Group Ltd
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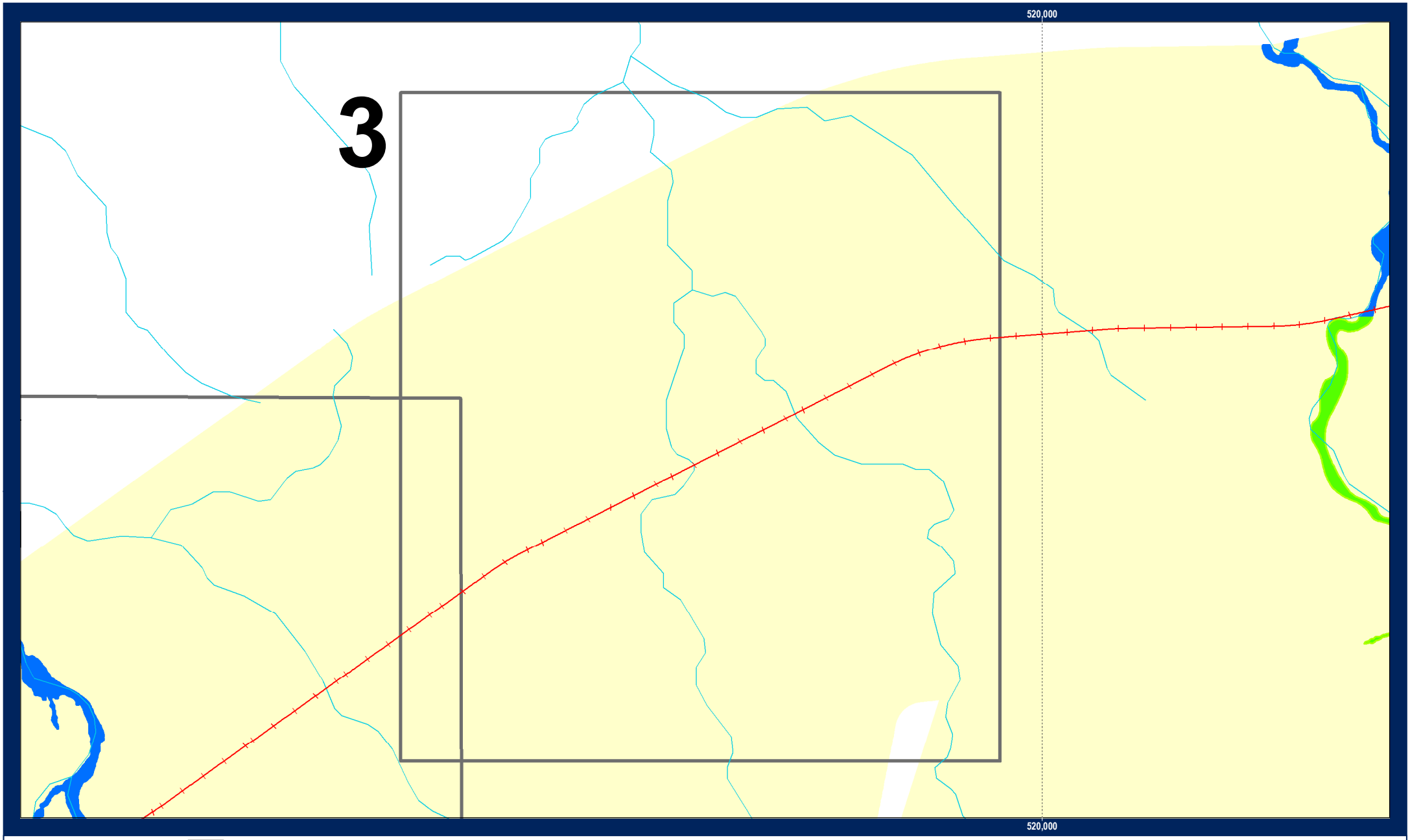

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PER Rail Alignment
Rio Tinto Rail
Watercourse
Groundwater Impact Assessment Areas
Rail_SWFeature_Aug2004
Rail_SWFeature_Aug2013
Potentially Groundwater Dependent Assemblage
Groundwater Dependent Assemblage
Vegetation Mapping Extents

Requested By: M Carroll
Drawn By: M Carroll
Revised By: mcarroll
Approved By:
Scale: 1:34,944
Coordinate System: GDA 1994 MGA Zone 50
Document Name: Potential GDV - GIAA3

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Size: A4L
Revision: 0
Confidentiality: 1

Figure 9
Environmental Considerations in Groundwater Impact Assessment Area 3

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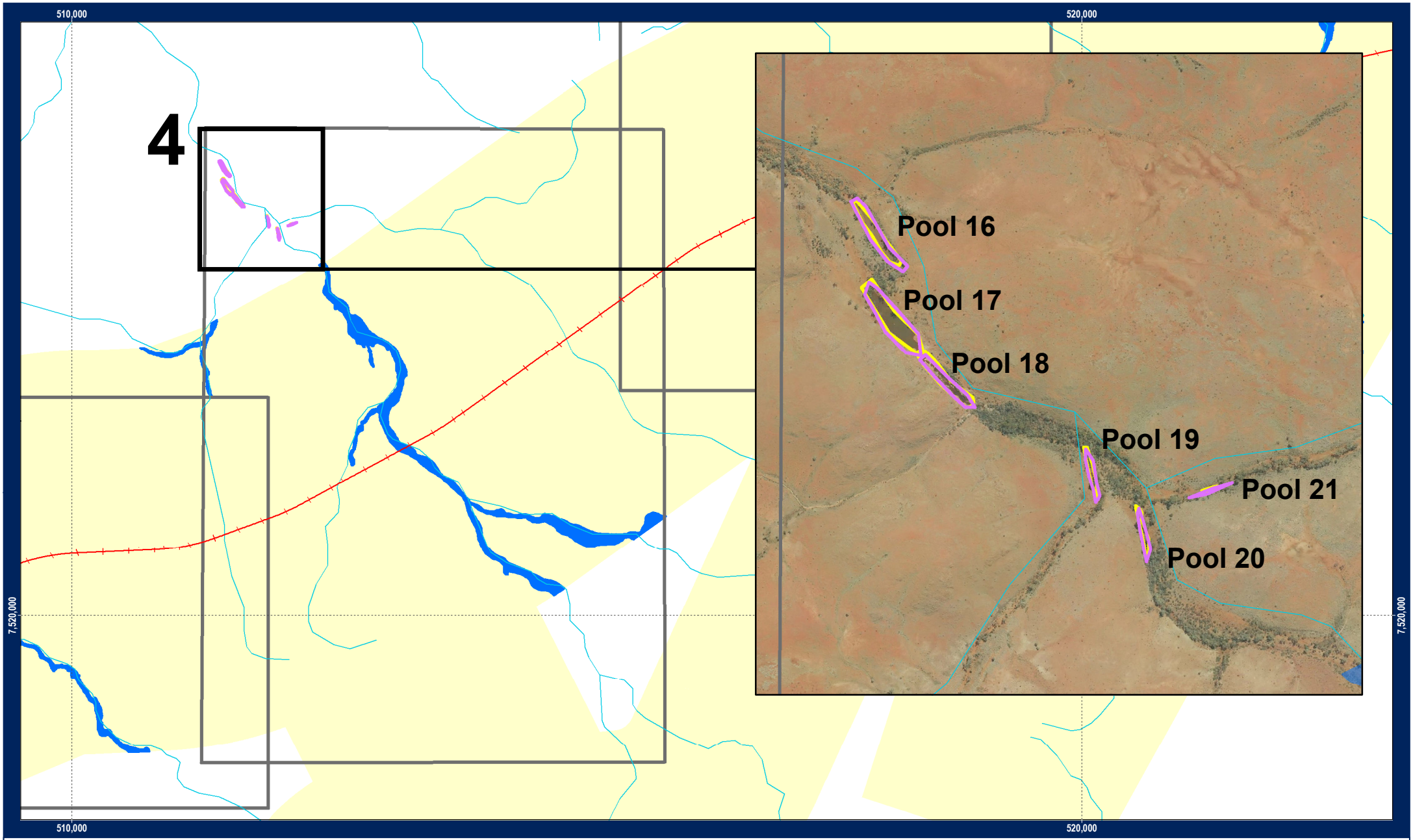

PDWSA
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Figure 10
Environmental Considerations in Groundwater Impact Assessment Area 3

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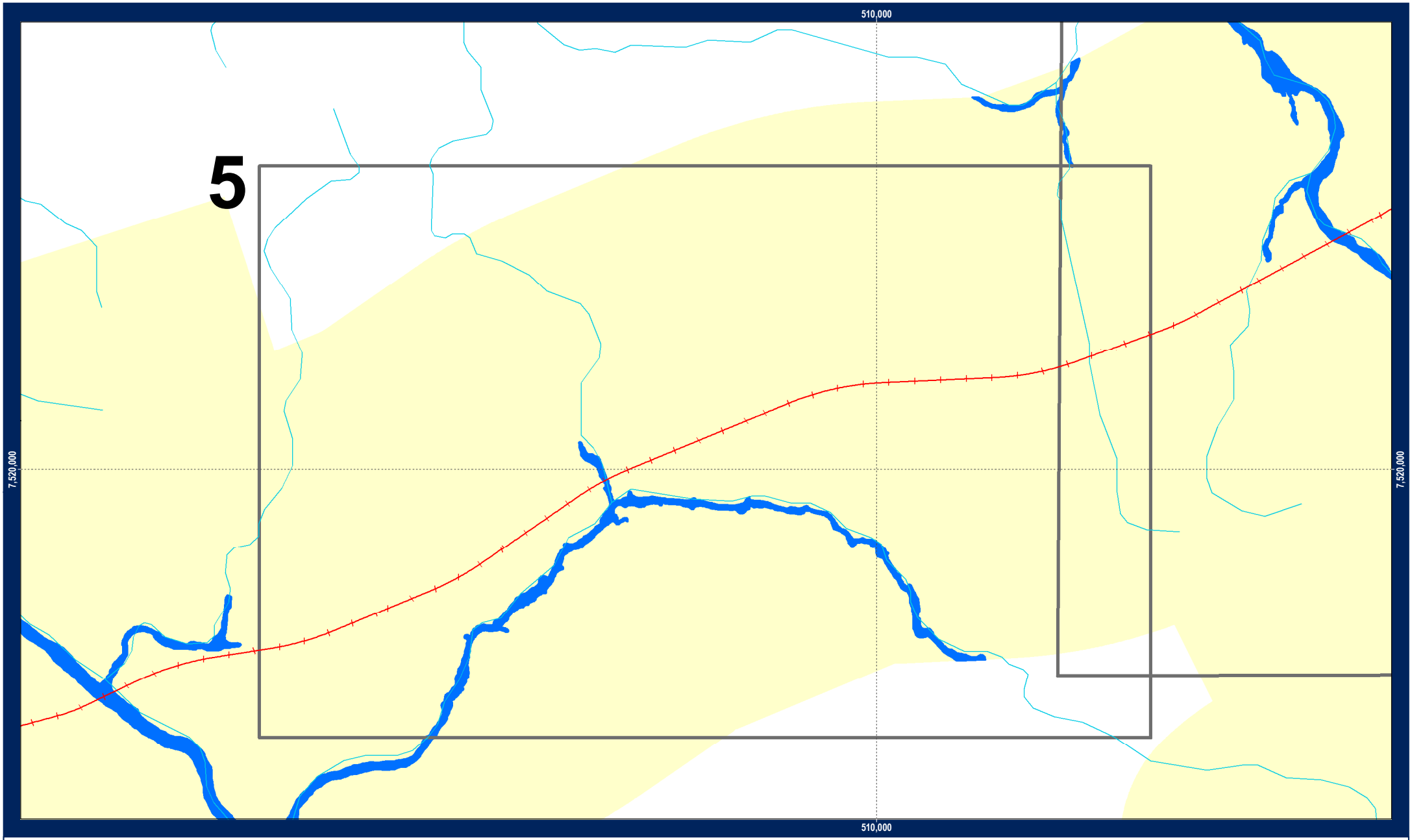

PDWSA
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Figure 11
Environmental Considerations in Groundwater Impact Assessment Area 5

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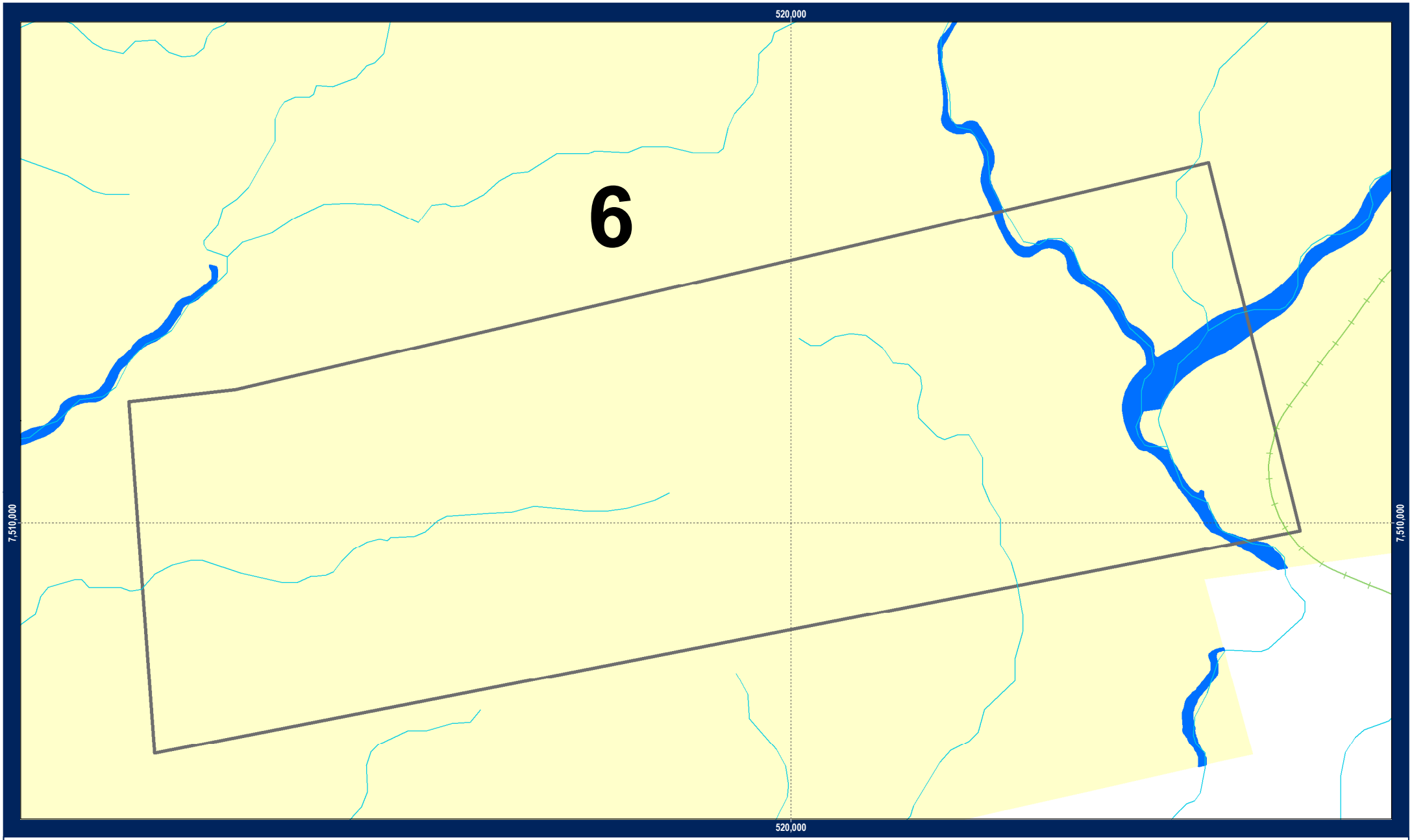

PDWSA
PER Rail Alignment
Rio Tinto Rail
Watercourse
Groundwater Impact Assessment Areas
Rail_SWFeature_Aug2004
Rail_SWFeature_Aug2013
Potentially Groundwater Dependent Assemblage
Groundwater Dependent Assemblage
Vegetation Mapping Extents

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Figure 12
Environmental Considerations in Groundwater Impact Assessment Area 6

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Fortescue
The New Force in Iron Ore

Report

Surface Water Management Plan

Environment

June 2018
100-PL-EN-1015 0B

	Surface Water Management Plan		
Document_Revision Number	100-PL-EN-1015 0B		**8/06/2018**
Status	**DRAFT**		
Summary of Changes	Revised to address DWER comments CMS17164		
Author	O. Hertsted	Signature	8/06/2018
Checked or Squad Review# (if applicable)	First Name Surname Here	Signature	Click here to enter a date.
Approved	First Name Surname Here or FMG-SQ#	Signature	Click here to enter a date.
Access to this document:	Choose an item.	**Next Review Date (if applicable)**	Click here to enter a date.

Revision History *(to be completed for each version retained by Document Control)*

Author	**Checker**	**Approver**	**Rev No.**	**Status**	**Issued Date**
Initial/Surname	Initial/Surname	Initial/Surname		Choose an item.	Click here to enter a date.
Initial/Surname	Initial/Surname	Initial/Surname		Choose an item.	Click here to enter a date.

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ACRONYMS

The following acronyms, defined in Table 1, have been used throughout this Plan.

Table 1: Acronyms

Acronyms	Definitions
LUC	Land Use Certificate
Ep Act	*Environmental Protection Act 1986*

1. INTRODUCTION

Fortescue Metals Group (Fortescue) is an integrated business comprised of mine, rail and port operations based in the Pilbara region of Western Australia, with its head office located in Perth.

Detailed background information regarding the projects, timing and nature of Fortescue's environmental approvals under the *Environmental Protection Act 1986* (WA), the *Environment*

1.1 Requirements for Management Plan

The Surface Water Management Plan is required by the Environmental Scoping document as part of the environmental scoping document for development approval for Fortescue Iron Ore related infrastructure in the Pilbara under:

- Environmental Scoping Document: Action Item 20 - Eliwana Iron Ore Mine Project
- Environmental Scoping Document: Action Item 48 – Eliwana Railway Project

The surface water management requirements for the Eliwana Iron Ore Mine Project have been developed in accordance with item number 20 of the Environmental Scoping Document for the Eliwana Iron Ore Mine Project (Assessment No: 2125).

The environmental objectives and targets for surface water management are outlined in Table 1.

1.2 Objective and Scope

The Plan addresses the OEPA's objective for the following key environmental factors:

- inland waters environmental quality "to maintain the quality of groundwater and surface water so that environmental values are protected"
- hydrological processes "to maintain the hydrological regimes of groundwater and surface water so that environmental values are protected."

The objective of this Plan is to provide a framework to guide ongoing assessment of potential direct and indirect impacts on surface water flows and/or quality and develop management and monitoring measures that maximise the ongoing protection of surface water dependent systems to be retained from disturbance as approved under a Ministerial Statement issued under Part IV of the *Environmental Protection Act 1986* and/or under a Controlled Action issued under the *Environment Protection Biodiversity Conservation Act 1999*.

Table 2: Environmental objectives and measures/targets

Approval	Condition Type	Conditioned Environmental Objective	Target
Eliwana Mine Project	Management	Assess potential direct and indirect impacts on surface water quality and quantity and the associated surface water dependent systems within identified high risk areas.	100% of high risk areas within the approved project boundary are identified and available in the spatial system
		Establish management strategies to minimise potential impacts on surface water quality and quantity and the associated surface water dependent systems within identified high risk areas.	No direct loss of surface water dependent systems within identified high risk areas as a result of surface water discharge activities within the approved project boundary.
		Develop and implement a surface water monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on surface water flows, quality and any associated surface water dependent systems within identified high risk areas.	No exceedance of site specific background trigger values[1] +/- 300mm water elevation change between recorded and modelled flood depth[2]

[1] Site specific trigger values will be developed in accordance with guidance outlined in ANZECC Guidelines.

[2] The water elevation trigger is based on consideration of modelling approach, grid size and sensitivity analysis of modelling results undertaken for peer review of the Surface Water Impact Assessment.

1.3 Definitions

High risk areas are defined as areas where surface water dependent systems have been identified to be retained from disturbance and potential impacts are significant (as defined through ongoing impact assessment of potential direct and indirect impacts of the project).

Water dependent systems are parts of the environment in which the composition of species and natural ecological processes are determined by the permanent or temporary presence of flowing or standing surface water or groundwater. The in-stream areas of rivers, riparian vegetation, springs, wetlands, floodplains, estuaries, karst systems and groundwater-dependent terrestrial vegetation are all examples of water dependent systems (Department of Water, January 2013).

Rainfall runoff is water flowing over ground surfaces and in natural stream and drains as a direct result of rainfall over a catchment.

1.4 Legislative and Regulatory Framework

Fortescue employees and contractors are obliged to comply with all relevant environmental Commonwealth and State legislation. Legislation directly relevant to the management of weeds in Western Australia is provided in Table 3.

Table 3: Commonwealth and State Legislation Relating to Surface Water

Legislation	Application
Biodiversity Conservation Act 2016 (WA)	Conservation and protection of biodiversity and biodiversity components. The Act repeals parts of the *Wildlife Conservation Act 1950*.
Environment Protection and Biodiversity Conservation Act 1999 (Cth)	Assesses the conservation significance of fauna species and forms the framework for significant species protection at the Federal level.
Environmental Protection Act 1986 (WA)	State environmental impact assessment and Ministerial approval process.
Environmental Protection (Unauthorised Discharge) Regulations 2004 (WA)	Prevention of direct discharge of sediment or pollutants to the surrounding surface waters.
Rights in Water and Irrigation Act 1914 (WA)	Relates to rights in water resources, to make provision for regulation, management, use and protection of water resources, to provide for irrigation schemes, and for related purposes.
Soil and Land Conservation Act 1945 (WA)	Addresses the conservation of soil and land resources and the mitigation of the effects of erosion.
Wildlife Conservation Act 1950 (WA)	State process that assesses the conservation significance of fauna species and forms the framework for significant species protection.

The following standards and guidelines are also of relevance to this Plan:

- Water Quality Protection Guidelines for Mining and Mineral Processing (Department of Water, 1999)

2. ROLES AND RESPONSIBILITIES

All Fortescue employees and contractors are required to comply with the requirements of this Plan.

Accountability for fulfilling the requirements of this Plan is dependent on the stage of project development (exploration, construction, operations, decommissioning) and the project type (port, rail or mine).

During exploration, the Group Manager Exploration will be accountable for ensuring the requirements of the Plan are met.

During construction stages, whether activities are undertaken by an external service provider or internal Fortescue personnel, the Project Director (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

During operational, decommissioning and closure stages, the General Manager (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

Where responsibilities are delegated, this must be clearly recorded and communicated.

In Section 4 specific Management Actions have been attributed to the appropriate personnel.

When site specific Vegetation Health Management and Monitoring Programs are developed to support this Plan, the RASCI framework should be utilised to delegate roles, responsibilities, and review and approval levels. RASCI is used to denote:

R-Responsible Those who do the work to achieve the task.

A-Accountable Those who are ultimately accountable for the completion of the deliverable or task and the one to whom the Responsible person is accountable.

S-Supportive Resources allocated to the Responsible person and who will also assist in completing the task.

C-Consulted Those whose opinions are sought, two-way communication.

I-Informed Those whom are kept informed, one-way communication.

3. MANAGING ENVIRONMENTAL RISK

Fortescue actively manages risk by undertaking an Annual Environmental Impact Risk review. Although the review considers all environmental risks, there is a focus on the inherently moderate to high risk impacts. The review considers the effectiveness of management actions that are currently in place for these impacts. The review also considers any relevant incidents that have occurred, if the actions from incident investigations have translated into new management actions, and generally considers the need for any new management actions to ensure lower risk targets can be achieved.

The environmental risks associated with surface water management at Eliwana Mine include:

- Potential impacts to surface water quality associated with the placement of infrastructure and landforms
- Potential impacts to surface water quality associated with leaching of acid and/or metalliferous drainage from temporary or permanent mine void water bodies, open mining void walls, tailing storage facilities and waste dumps during operations and following closure
- Potential changes to surface water quality as a result of excess water disposal options
- Impacts to surface water flow resulting from controlled surface discharge
- Permanent modifications to existing catchments and associated impacts to flow paths and inundation areas of surface water streamflows
- Impacts to surface water quality associated with hydrocarbon and chemical spills.
- Altered hydrologic water balance associated with the creation of permanent and episodic mining void water bodies.

Section 5 provides the management actions proposed to manage these potential environmental risks at the Eliwana Mine project.

4. ENVIRONMENTAL MANAGEMENT

A series of environmental management objectives have been developed to mitigate environmental impacts on surface water dependent systems to be retained from disturbance as approved under the *Environmental Protection Act 1986* and/or the *Environment Protection Biodiversity Conservation Act 1999.* These include:

1. Assess potential direct and indirect impacts on surface water flows, surface water quality and any associated surface water dependent systems within identified high risk areas.
2. Establish management strategies to minimise potential impacts on surface water flows, surface water quality and any associated surface water dependent systems within identified high risk areas.
3. Develop and implement a surface water monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on surface water flows, surface water quality and any associated surface water dependent systems within identified high risk areas.

For each objective, management actions have been developed to ensure the impacts from Fortescue's operations are managed, and that appropriate monitoring, reporting and corrective action functions are implemented to support the successful implementation of the management actions.

Only management actions that have been risk ranked as High or Very High have been included in the Plan. Management actions that have been listed with a risk based priority of low or medium have been included as a result of an approval condition. As a result, the site location for actions with a low or medium risk rating are restricted to the sites where the approval condition applies.

The key elements of the environmental management process associated with each objective are described in Table 5.

Table 4: Descriptions of Key Elements of Environmental Management Process to Achieve Identified Objectives

Element	Definition/ Description
Objective	What is intended to be achieved
Management Action	Tasks undertaken to enable the objective to be met
Performance Indicators	Metrics for evaluating the outcomes achieved by Management Actions
Reporting/ Evidence	Demonstrates that the Management Action has been applied and the outcome evaluated.
Timing	Period during which the Management Action should be undertaken.
Responsibility	Accountability for ensuring management action is completed. The responsible role is dependent on project timing.

The key management actions, performance indicators, evidence, timing and responsibilities for each objective are provided in Table 6.

Table 5: Key Management Actions for Surface Water Management

Objective 1	Site Location		Assess the potential direct and indirect impacts on surface water flows, surface water quality and associated surface water dependent systems within identified high risk areas				
Reference	**Rail**	**Mine**	**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
1.1	X	X	Conduct a risk assessment to identify high risk areas where surface water dependent systems have been identified and potential impacts are significant.	• Risk assessment conducted • High risk areas identified	• Risk assessment outcomes	Design	Manager Environmental Approvals/ Project Manager/ Group Manager Environment
1.2	X	X	Where surface water dependent systems have been identified undertake mapping surveys to determine relevant species critical habitat and if future monitoring is required.	• Mapping survey completed • GIS and PIMS updated • Future monitoring defined	• Mapping survey • GIS dataset • PIMS record • Monitoring Planned	Design	Group Manager, Environment
1.3	X	X	Conduct a desktop assessment for all LUC[3] applications to ensure surface water dependent systems are identified prior to ground disturbance. Where the works have the potential to impact on surface water and any associated water dependent systems within identified high risk areas, apply relevant management measures to the LUC prior to approval.	• Desktop assessment undertaken • Management measures included in relevant LUCs	• Desktop assessment • LUC approval	Construction/ Operation	Project Manager/ Site HSES Manager
Objective 2	**Site Location**		**Establish management strategies to minimise potential impacts on surface water flows, surface water quality and associated surface water dependent systems within identified high risk areas**				
Reference	**Rail**	**Mine**	**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
2.1	X	X	Ensure staff and contractors are provided with appropriate training to ensure impacts to surface water and associated surface water dependent systems within identified high risk areas are minimised where practicable	• Inductions completed • Pre-start meetings conducted • Role dependent training completed	• Induction materials and register of attendees • Record of pre-start meetings • Training materials/ records	All stages	Project Manager/ HSES Manager
2.2	X	X	Ensure drainage infrastructure location and design aligns with the risk assessment outcomes to minimise impacts to surface water flows, quality and associated surface water dependent systems with reference to the *Standard Engineering Specification for Drainage and Flood Protection* (100-SP-CI-0004). For the Eliwana Rail Project, the risk assessment outcomes are provided in *The Surface Water Impact Assessment* (750EE-3100-AS-HY-0002). The process for rail design and placement of surface water management infrastructure, including drains and culverts is described in this Impact Assessment.	• Location and drainage infrastructure aligns with risk assessment outcomes where possible	• Risk assessment • Monitoring reports	All stages	Project Manager/ Manager Long Term Planning and Hydrology
2.3	X	X	Avoid interaction with major drainage lines where possible to minimise impacts on downstream surface water flows and quality.	• Major drainage lines avoided where possible	• Design	Design/ Construction	Project Manager/ Manager Long Term Planning and Hydrology
2.4	X	X	Locate and design borrow pits to minimise interference and disruption of natural surface water flows and any potential downstream impacts to surface water dependent systems where practicable.	• Location and design of borrow pits reduce downstream impacts	• Design	Design/ Construction	Planning Manager

[3] An internal permit system required to undertake on-ground activities.

2.5		X	Pit flood management will be undertaken in accordance with a Pit Flood Response Plan that will allow for the provision of dewatering infrastructure to remove flood water from pits with the potential to discharge directly to the environment. This Plan will be developed in accordance with the requirements of the *Water Quality Protection Guidelines for Mining and Mineral Processing.*	• Compliance with the Pit Flood Response Plan • Monitoring demonstrates water quality within limits	• AEMR	Operations	Manager Mining
2.6	X	X	Chemical and hydrocarbon storage areas will be designed, constructed and operated in accordance with the requirements outlined in the Chemical and Hydrocarbon Management Plan (100-PL-EN- 0011) and a Licence issued under Part V of the *Environmental Protection Act 1986*.	• Compliance with Plan • Compliance with Licence	• Design • AACR • Lab results • AEMR	Construction/ Operation	Project Manager/ NPI Manager
2.7	X	X	Where rainfall runoff has come into contact with chemical or hydrocarbon storage areas and is potentially contaminated, verify water quality meets discharge requirements prior to release to the environment.	• Monitoring demonstrates water quality within limits	• Lab results • AEMR	Construction/ Operation	Project Manager/ NPI Manager/HSES Manager
2.8		X	Where surplus mine water is required to be discharged, a process of controlled discharge to the environment will be adopted where the water is allowed to flow into a designated water course in accordance with the *Strategic Policy 2.09: Use of mine dewatering surplus* (DoW, 2013). Effective erosion control measures will be implemented to ensure downstream water quality is not impacted.	• Controlled discharge adopted • Effective erosion control at discharge • Monitoring demonstrates water quality within limits	• AEMR	Operations	Planning Manager
2.9		X	Where post closure mine voids are present within the project boundary and impacts to surface water dependent systems are expected, the requirements of the *Eliwana Mine Closure Plan* (EW-PL-EN-0001) will be adhered to.	• Mine Closure Plan implemented	• CAR • AER	Closure	Planning Manager
2.10		X	Conduct progressive rehabilitation of disturbed areas no longer required for operations in accordance with the *Eliwana Mine Closure Plan* (EW-PL-EN-0001) developed in accordance with the Guidelines for Preparing Mine Closure Plans.	• Mine Closure Plan implemented	• CAR • AER	Closure	Planning Manager
Objective 3	**Site Location**		**Develop and implement a surface water monitoring program to assess the effectiveness of the management strategies to minimise potential impacts on surface water flows, surface water quality and associated surface water dependent systems within identified high risk areas**				
Reference	**Rail**	**Mine**	**Management Action**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
3.1	X	X	Ensure baseline modelling and surface water sampling are undertaken to: • Document surface water flow and quality within impact and reference sites • Identify baseline modelling and surface water quality at impact and reference sites • Compare data across impact and reference sites (and/or regional monitoring sites where available).	• Baseline modelling and/or surface water sampling undertaken for all sites • Data comparison undertaken	• Baseline monitoring reports	Design/ Construction/ Operations	Project Manager/ Manager HSES
3.2	X	X	Implement a surface water monitoring program in areas identified as high-risk areas where surface water dependent systems have been identified and potential impacts are significant.	• Monitoring program implemented	• Monitoring reports • Annual Compliance Reporting (if the Plan is conditioned under the EP Act)	Operations/ Decommissioning and Closure	HSES Manager

3.3	X	X	Where monitoring indicates a potential impact on surface water flows and/or quality or associated surface water dependent systems, implement contingency actions defined in table 9. Update this Plan where required to inform an adaptive management approach to surface water management across the business	• Monitoring program implemented	• Monitoring report • AEMR • Reporting records	Construction/ Operation/ Decommissioning/ Closure	HSES Manager
3.4	X	X	Implement the sites conservation significant fauna monitoring program as defined in the Conservation Significant Fauna Monitoring Plan to detect any impacts on conservation significant fauna and associated habitat as a result of a change in surface water flow and/or quality.	• Monitoring program implemented	• Monitoring report • AEMR • Reporting records	Construction/ Operation/ Decommissioning/ Closure	Group Manager Environment
3.5	X	X	Implement the sites vegetation health monitoring program as defined in the Vegetation Health Monitoring Plan to detect any impacts on conservation significant flora and vegetation as a result of a change in surface water flows and/or quality.	• Monitoring program implemented	• Monitoring report • AEMR • Reporting records	Construction/ Operation/ Decommissioning/ Closure	Group Manager, Environment
3.6	X	X	Implement the sites groundwater monitoring program as defined in the Groundwater Monitoring Plan to detect any impacts on groundwater dependent systems (inclusive of partial and infrequent dependent systems) as a result of a change in surface water flows and/or quality.	• Monitoring program implemented	• Monitoring report • AEMR • Reporting records	Construction/ Operation/ Decommissioning/ Closure	Group Manager, Environment

5. MONITORING GUIDELINES

A monitoring program is required to measure the effectiveness of the management actions within identified high risk areas as defined in this Plan. The outcomes of the monitoring program will contribute to ongoing improvements in management actions to ensure an adaptive management approach is adopted.

5.1 Objectives

The guiding objectives of the surface water monitoring program includes:

1. Determine whether the flow and water quality of surface water dependent systems potentially impacted by Fortescue activities are significantly different from baseline modelling and/or control site values.
2. Determine if the quality of water being discharged via drainage infrastructure is significantly different from acceptable guideline values and/or control site values.
3. Monitor and measure the success of management measures to inform an adaptive management approach.
4. Obtain adequate data to measure spatial and temporal changes in site hydrology within Fortescue controlled sites.

Baseline and operational monitoring will be informed by the findings of the monitoring itself as they become available. These findings may similarly lead to ongoing refinements to this Plan and its management strategies to ensure an adaptive management approach is undertaken during Fortescue activities.

5.2 Baseline Modelling/ Sampling

Initial baseline modelling for surface water hydrology has been conducted as part of the surface water impact assessment to obtain a representative baseline dataset of the site hydrology.

Baseline sampling for surface water quality will be conducted following significant rainfall events. To account for seasonal variation, water samples will be collected over a three-year period to ensure a statistically valid dataset of the sites water quality.

5.3 Program Summary

An effective monitoring program may be adaptive over time, dependent on quality and quantity of data collected from each site, with innovations in monitoring techniques and methodologies incorporated into program design over time. This would however be dependent on and be driven

by the quality and quantity of data collected from each site, coupled with a periodic review of monitoring methods. Further, program design should be based on replicable sampling at impact and reference sites.

Frequency of monitoring will be dependent on the requirements of the environmental approval(s). The monitoring program will be assessed every three years to ensure the methods, parameters and frequency are considerate of the monitoring program findings.

A set of preliminary monitoring parameters and methods have been selected to provide broad coverage of potential changes in surface water flow and quality that can be expected under a range of different mining related impacts. The number of monitoring parameters will vary depending on the approval conditions and surface water dependent systems.

A summary of monitoring parameters and methods have been provided in Table 7.

Table 6: Monitoring Parameters and Methods

Monitoring Parameters	Method
Rainfall	Rainfall gauge
Surface Water Quality	Field measurements using calibrated instruments Field sample with laboratory analysis
Water elevation	Pressure transducers Peak level indicators

Table 8 provides the monitoring parameters to be monitored per location type within Fortescue controlled sites.

Table 7: Types and Associated Parameters and Site Locations

Type	Parameter	Site
Rainfall	Rainfall	Suitable location within representative catchment boundary and within the approval boundary
Surface Water Discharge points	Water elevation	Downstream of discharge point, within the approval boundary
Surface Water Discharge points	Receiving Water Quality Criteria[4]	Downstream of discharge points, within approval boundary
Oily water ponds, sedimentation basins, wash down facilities, hydrocarbon storage areas	Surface water quality[5]	Discharge point of washdown bays and oily water ponds/sumps. If no discharge points are available, then a suitable location downstream of flow.
Creeks – representative sites/ specific interest	Surface water quality[4]	Suitable representative location with safe access

[4] Water Quality Protection Guidelines for Mining and Mineral Processing – Mine dewatering (Water and Rivers Commission 2000)

[5] Water Quality Protection Note 68– Mechanical equipment wash down (DoW, 2013))

Type	Parameter	Site
Creeks – representative sites/ specific interest	Water elevation	Suitable representative location with safe access
Waste landforms[6] - any leachate or seepage accessible	Receiving water quality criteria	Suitable representative location with safe access

Contingency actions (Section 6.4) and reporting (section 9) requirements will be implemented where required.

Results of the surface water monitoring program will also inform and be informed by the following monitoring programs to determine impacts to ecosystem health:

- Conservation significant fauna
- Vegetation health
- Groundwater.

5.4 Monitoring Program Review

The overarching monitoring program will be technically assessed and reviewed upon acceptance of this plan and then every three years thereafter. The main objective of the assessment and review will be to ensure that the methods, parameters and frequency used are considerate and appropriate to the findings of the monitoring program. If no triggers are exceeded (detailed in Table 9) after three years, the frequency of monitoring will be reduced to a frequency supported by the review.

Monitoring sites may need to be adapted over time in response to project impacts.

Contingency action (Section 6.6) and reporting requirements (Section 9) will be implemented where required.

5.5 Data Handling and Statistical Analysis

Data will be handled in accordance with the data handling protocol established as part of the annual monitoring tender. The protocol will include the requirements as to data storage and protection, data extraction, quality control, analysis, interpretation, reporting and presentation.

[6] Waste landforms will be monitored when determined to be a potential source in the sites source, pathway, receptor risk model as defined by the Acid and Metalliferous Drainage Management Plan (100-PL-EN-1016)

The protocol will also directly reference and align with the requirements detailed in *Document Control, Information Management* (100-ST-DC-001) and *Geographic Information Systems and Raw Data Guidelines* (100-GU-EN-0009).

Statistical analysis of data will be undertaken where data permits. Where data capture allows, analysis will include using appropriate statistical analysis techniques. If parameter relationships appear to be present or exceedances or trends occur, determine cause and implement corrective actions.

The results of chemical and physical data should be analysed after every sample event, values of each parameter should be compared against trigger values to determine if an exceedance has occurred.

Analysis of water elevation data should be conducted using site specific flood models developed as part of the baseline assessment outlined in Section 6.2. Monitoring data will be used to identify any variation in the baseline modelling using actual flood event data recorded from rainfall and surface water monitoring sites within the project catchments. A minimum of two annual seasonal events will be required to revisit the calibration for the site, and only events that have whole of catchment runoff will be considered as significant for modelling review to take place. Where an exceedance has occurred as defined in Table 9, complete recalibration of the flood model developed during baseline modelling will be required.

5.6 Contingency Actions

Contingency actions will be initiated during construction, operational and decommissioning activities when an exceedance of a trigger is identified, and monitoring indicates that implemented management measures within identified high risk areas are not successfully mitigating impacts on surface water dependent systems and/or the management objectives are not being achieved.

Contingency actions for surface water monitoring triggers have been developed in Table 9.

Table 8: Trigger Criteria and Associated Contingency Actions

Trigger	Contingency Actions
No exceedance of site specific background trigger values[7]	• Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites • Re-examine applied monitoring parameters to validate they are operating within management levels • Increase monitoring frequency of outlets and natural drainage lines in catchments where water quality has been compromised. • Identify the reason for the change and whether it was caused by construction, operations or decommissioning/closure activities, review management measures with an adaptive management response.
+/- 300mm water elevation change between recorded and modelled flood depth[8]	• Determine whether the changes observed in the impact sites are comparable to the predicted values and/or baseline modelling • Re-examine applied monitoring parameters to validate they are operating within management levels • Increase monitoring of outlets and natural drainage lines in catchments where changes in flow regime or water levels have been noted. • Identify the reason for the change and where it was caused by construction, operations or decommissioning/closure activities, review management measures with an adaptive management response • Recalibrate the flood model developed during baseline modelling

[7] Site specific trigger values will be developed in accordance with guidance outlined in ANZECC Guidelines.

[8] The water elevation trigger is based on consideration of modelling approach, grid size and sensitivity analysis of modelling results undertaken for peer review of the Surface Water Impact Assessment (FMG, 2017).

6. COMPLIANCE

Fortescue ensures compliance with its legal obligations through first party quality assurance by site and corporate environment teams with a focus on effective environmental management through the implementation of the Fortescue wide Environmental Management System (EMS).

Fortescue has adopted a risk based approach to monitor compliance with its legal obligations. Site environment teams will monitor their compliance with this Plan and the required site specific management and monitoring programs using the *Self-Verification of High Risk Environmental Legal Obligations Guideline* (100-GU-EN-0030).

Where non-conformance issues or opportunities for improvement are identified these will be documented and tracked via the Business Management System (BMS).

7. ADAPTIVE MANAGEMENT

Fortescue will implement adaptive management practices to learn from the implementation of mitigation measures, monitoring and evaluation against management targets, to more effectively meet the conditioned environmental objective. Adaptive management practices that will be assessed for the vegetation health management and monitoring program as part of this approach may include:

- Evaluation of the monitoring program, data and comparison to baseline data and reference sites on an annual basis to verify whether responses to project activities are the same or similar to predictions
- Evaluation of assumptions and uncertainties of the management and monitoring program
- Re-evaluation of the risk assessment and revision of risk based priorities as a result of monitoring outcomes
- Review of data and information gathered over the review period that has increased understanding of site environment in the context of the regional ecosystem
- Review of management actions as the project matures and new management measures and technologies become available that may be more effective for environmental management
- Assessment of changes which are outside the control of the project and the management measures identified (i.e. a new project within the area or region; regional change affecting management)
- Review of the Environmental Management Plan will be undertaken following the review of the associated monitoring program and the corresponding results.

8. REPORTING

Monitoring reports will be provided to the State and Commonwealth Governments as dictated by annual reporting requirements. In addition, the monitoring raw data will be made available to the Western Australian State Government and the Commonwealth Government upon request or where conditioned to provide.

An outline of the reporting requirements associated with surface water management and monitoring have been provided below.

8.1 Annual Monitoring Report

An Annual Monitoring Report will be developed with the results of the monitoring programs across all Fortescue controlled sites. This report will outline the monitoring data captured during the reporting period and the analysis required to report compliance against management targets and conditioned environmental objectives.

8.2 Annual Compliance Assessment Report

Fortescue is required to report against its compliance with the Management Plan in the Compliance Assessment report prepared in accordance with the OEPA's Post Assessment Guideline for Preparing a Compliance Assessment Report, Post Assessment Guideline No. 3.

Annual Compliance Assessment Reports (CAR) are required to be submitted in accordance with relevant Ministerial Statements conditions.

The reporting requirements against management targets and conditioned environmental objectives are provided in Table 1. In the event that trigger criteria were exceeded during the reporting period, the CAR will include a description of the effectiveness of the contingency actions that have been implemented to manage the impact and any adaptive management measures applied as a result of the exceedance.

Currently, the Eliwana Iron Ore Mine Project is not required to report on compliance with the Surface Water Management Plan. Once approval is granted under Part IV of the *Environmental Protection Act 1986* and implementation of the Surface Water Management is conditioned in the Ministerial Statement, Fortescue will adhere to the reporting requirements outlined in section 9.2 of this Plan.

8.3 Annual Environment Monitoring Report

Fortescue is required to report environmental monitoring data, as required by Operating Licences issued by the Department of Water and Environmental Regulation under Part V of the Environmental Protection Act 1986.

An Annual Environmental Monitoring Reports (AEMR) will be submitted in accordance with the relevant licence conditions once the Eliwana Mine project is approved and a licence is issued.

8.4 Reporting of Potential Non-Compliance

Fortescue is required to report against monitoring outcomes as per conditioned timeframes. Trigger criteria and where required threshold criteria have been identified in Table 1.

In the event that monitoring, tests, surveys or investigations indicate an exceedance of a management target in Table 1 Fortescue will report an exceedance of a management target in accordance with the requirements of the relevant Ministerial Statement condition(s).

Currently, the Eliwana Iron Ore Mine Project is not required to report on compliance with the Surface Water Management Plan. Once approval is granted under Part IV of the *Environmental Protection Act 1986* and implementation of the Surface Water Management is conditioned in the Ministerial Statement, Fortescue will adhere to the reporting requirements outlined in the Ministerial Statement.

9. STAKEHOLDER CONSULTATION

Fortescue has undertaken extensive stakeholder consultation program whereby landowners, regulators and other relevant parties have been consulted with regard to investigation and design of the mine sites and port and rail infrastructure through the environmental approvals process.

Regulatory agencies will be consulted in accordance with the requirements of EAG 17 Preparation of Management Plan under Part IV of the *Environmental Protection Act 1986*.

Table 4 will be updated following receipt of stakeholder comment as a result of the review and approval process.

Table 9: Stakeholder Consultation, Comments and Responses

Stakeholder	Correspondence	Comment	Changes
DWER - Regions	CMS 17164	The proponent has prepared a site-specific Eliwana Groundwater and Surface Water management plans to support the ERD submission. RSW will comment on the content and acceptability of these plans during the assessment period, makes note that whilst the plans presented contain information on potential management strategies, the plans do not define which surface and groundwater features are significant and will need management.	See Figures
DWER - Regions	CMS 17164	No proposed management strategies (triggers and thresholds) established within the plan rather the plan commits to develop these strategies. It is unclear that this addresses the work required for task 18 of the scoping requirements.	*EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986* only require triggers and thresholds to be established where an outcomes-based condition is being proposed and as result only management targets have been identified. Water quality triggers have been identified within the Plan through reference to the ANZECC Guidelines, Water Quality Protection Guidelines for Mining and Mineral Processing and Water Quality Protection Note 68 where triggers are identified.
DWER - Regions	CMS 17164	Page 131 of the ERD states that water will be pumped back to watercourses if intercepted by pits during flood events, in accordance with Fortescues Surface Water Management Plan. The Eliwana SWMP should be referenced here as opposed to the more general Fortescue Surface Water Management Plan	Pit flood management is outlined in Section 4, Table 5 (Action 2.5).

Stakeholder	Correspondence	Comment	Changes
DWER - Regions	CMS 17164	The Fortescue SWMP referenced on page 131 addresses the issues of stormwater management onsite however the management of pit surface water capture and release to creeks requires careful planning and consideration which is additional to the onsite stormwater management addressed in this document. RSW considers this issue should be addressed specifically for the Eliwana Project and relevant catchments in the Eliwana SWMP.	Pit flood management is outlined in Section 4, Table 5 (Action 2.5). The action states that a Pit Flood Response Plan will be developed in accordance with the requirements of the Water Quality Protection Guidelines for Mining and Mineral Processing. This would be undertaken during Operations as specified within the Table.
DWER - Regions	CMS 17164	The Eliwana SWMP references the Australian guidelines for urban stormwater management. This is not an applicable guideline for mine site stormwater management.	This reference has been removed.
DWER - Regions	CMS 17164	As mentioned, the proponent has submitted the more general Pilbara wide groundwater and surface water management plans applicable to the Chichesters and Solomon Operations. These plans are not applicable because the ESD requires standalone Eliwana surface water and groundwater plans to be submitted to support the Eliwana operations.	*EAG 17 Preparation of Management Plans under Part IV of the Environmental Protection Act 1986* enables proponents to draft factor based plans for multiple operations. This is the approach Fortescue is using for its EMP development program. The Plans submitted for surface water and groundwater include project detail for the Eliwana Project as required by the Guidance.
DWER - Terrestrial Ecosystems	CMS 17164	The SWMP and GWMP are also inadequate. They are plans to develop plans rather than containing specific information, management actions, monitoring techniques and SMART trigger and thresholds required. The SWMP should include management actions for maintaining sheet flow dependent vegetation.	*EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986* only require triggers and thresholds to be established where an outcomes-based condition is being proposed and as result only management targets have been identified. Management actions (Section 4), Monitoring methods (Section 5) and Management targets (Table 1) are outlined in the Plan as required under the Guidelines. Surface water flows including sheetflow, that support sheetflow dependent vegetation, is managed in Section 4 Table 5 through drainage infrastructure installation (Action 2.2), surface water monitoring (Action 3.2) and vegetation health monitoring (Action 3.5).
DWER - Water	CMS 17164	RSW considers the plans should be developed to manage impacts to hydrological (Surface water) regime, water quality and water sensitive receptors within the proposal disturbance footprint and associated	See Figures.

Stakeholder	Correspondence	Comment	Changes
		with the proposal, and is unsure if the above meets the EPA objectives for Inland Waters and Hydrological processes. Further to the above the proponent states that the objectives, measures and targets will only apply to those surface water dependent systems within identified high risk areas (within the project boundary). This does not appear to consider downstream surface water impacts (offsite impacts to surface water flows). RSW is unsure which areas have been identified as high risk based on the information provided.	

10. REFERENCES

Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and Australian and New Zealand Environment and Conservation Council (ANZECC) 2000.

Australian guidelines for water quality monitoring and reporting. National Water Quality Management Strategy paper No 7, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

Department of Water, January 2013. Managing the hydrology and hydrogeology of water dependent ecosystems in urban development, Guidance Note 7.

Fortescue Metals Group (FMG), 2017. PER: Eliwana Mine Proposal – Surface Water Impact Assessment.

Appendix 1: Surface Water Management Measures Near Conservation Significant Vegetation

Plan

Vegetation Health Monitoring and Management Plan

Environment

February 2018
100-PL-EN-1020

Fortescue
The New Force in Iron Ore

	Vegetation Health Monitoring and Management Plan 100-PL-EN-1020		
Revision Number	**0A**		**2/02/2018**
Status	**IFR - ISSUED FOR REVIEW**		
Author	O Hertsted	Signature	2/02/2018
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Confidentiality	**FORTESCUE STAFF & CONTRACTORS**	**Publish on Extranet**	☐ Yes ☒ No
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Initial/Surname	Initial/Surname	Initial/Surname		Choose an item.	Click here to enter a date.

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1. INTRODUCTION

Fortescue Metals Group (Fortescue) is an integrated business comprised of mine, rail and port operations based in the Pilbara region of Western Australia, with its head office located in Perth.

Detailed background information regarding the projects, timing and nature of Fortescue's environmental approvals under the *Environmental Protection Act 1986* (WA), the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), current operations and plans for future expansion is contained in Appendix 1.

1.1 Environmental Assessment Guidelines

Environmental Assessment Guidelines (EAG) are issued by the Environmental Protection Authority (EPA) to provide advice on the procedures and minimum environmental requirements that the EPA expects to be met during the environmental impact process.

There are two EAG's that apply to the development and implementation of Environmental Management Plans:

- *EAG 11 Recommending environmental conditions*
- *EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986*

EAG 11 Recommending environmental conditions describes the EPA's approach to preparing recommended proposal implementation conditions. The Approval conditions will be based on three condition models:

- Outcome based – these conditions identify a measurable environmental outcome that must be met. An outcomes based condition may require the preparation of an environmental management plan.
- Management based – these conditions identify an environmental objective that must be met. A management based condition requires the development of an environmental management plan.
- Prescriptive based – these conditions require the implementation of specified actions or procedures. The development of an environmental management plan is not required.

EAG 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986 provides guidance on the content of management plans conditioned under Part IV of the *Environmental Protection Act 1986* through an outcome or management based condition.

An environmental management plan developed to meet a management based condition relates to what identified management actions should achieve and demonstrate that the EPA's environmental objective for a particular factor will be met through implementation of the plan.

An environmental management plan developed to meet an outcome based condition sets out the proposal specific environmental outcome that is to be met by the implementation of the Plan. An outcomes based environmental management plan is required to identify two levels of management triggers:

- Trigger criteria are set at levels to forewarn of the approach of the threshold criteria and trigger response actions. Trigger criteria should be set at a conservative level to ensure trigger level actions are implemented well in advance of the threshold criteria to avoid non-compliance and compromising the environmental outcome.
- Threshold levels represent the limit of acceptable impact beyond which there is likely to be a significant effect on the environment. This indicates that the environmental outcome is not being met and the proponent is in non-compliance with the applicable implementation condition

Approval conditions relating to vegetation management at Fortescue controlled sites contain both outcome and management based conditions.

The following Ministerial Statements contain outcome based conditions for vegetation management:

- Condition 6 of Ministerial Statement 899 (MS899) – Cloudbreak Life of Mine
- Condition 7 of Ministerial Statement 1033 (MS1033) – Christmas Creek Mine, East-West Railway and Mindy Mindy Mine

The following Ministerial Statement contains management based conditions for vegetation management:

- Condition 12 and 13 of Ministerial Statement 1033 (MS1033) – Christmas Creek Mine, East-West Railway and Mindy Mindy Mine

1.2 Requirement for Management Plan

The Vegetation Health Monitoring and Management Plan is required by the Minister as part of the development approval for Fortescue Iron Ore related infrastructure in the Pilbara approved under:

- Part IV of the *Environmental Protection Act 1986* under MS899, MS 1033
- The *Environment Protection and Biodiversity Conservation Act 1999* under EPBC 2010/5706 and EPBC 2010/5696
- Environmental Scoping Document:
  - Eliwana Railway Project (Assessment No: 2129) – Action Item 11
  - Eliwana Iron Ore Mine Project (Assessment No: 2125) – Action Item 32

Following approval under the *Environmental Protection Act 1986* and the *Environment Protection and Biodiversity Conservation Act 1999*, this Plan will be updated to reflect any approval conditions associated with conservation significant flora and vegetation at the Eliwana Iron Ore Mine or Railway projects.

The conditioned environmental objectives and targets for vegetation management are outlined in Table 1.

The data flow diagram for this Plan is available in Appendix 2.

1.3 Objective and Scope

The Plan addresses the OEPA's objective for the key environmental factor Flora and Vegetation "*to maintain representation, diversity, viability and ecological function at the species, population and community level*".

The objective of this Plan is to identify vegetation management and monitoring measures to minimise the impact on conservation significant vegetation within and adjacent to Fortescue controlled sites[1].

This Plan addresses management issues relevant to conservation significant vegetation as defined in Section 1.4 of this Plan.

[1] Fortescue controlled site means sites that are under the legislative control of Fortescue including exploration sites, sites under construction, operational sites (sites that are managed and operated by Fortescue and sites that are managed by Fortescue but operated by contractors) and the Perth offices.

Table 1: Conditioned environmental objectives and measures/targets

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
MS899 Condition 6	Outcome	**Condition:** No adverse impact to conservation significant vegetation as a result of implementing the proposal, greater than: 1. 315 hectares to Mulga vegetation 2. 763 hectares to Samphire vegetation 3. 3 hectares to Coolibah/River Red Gum creekline vegetation outside the Mine Envelope.	**Trigger Criteria:** A significant difference in primary parameter (see Table 7) trends detected between impact and reference sites over two consecutive monitoring events. **Threshold Criteria**: A statistically significant change in the primary parameter (see Table 7) trends at predicted impact area in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.
MS 1033 Condition 7	Outcome	**Objective 1:** Ensure there is no disturbance (direct or indirect impacts) within the buffers of the known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2.	**Trigger Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (reference areas) over two consecutive monitoring events. **Threshold Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
			If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (of reference areas) over four consecutive monitoring events. AND Ground-truthing confirms the decline in vegetation index values has resulted in significant decline. AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal.
		Objective 2: Maintain the health of Mulga, Samphire and Coolibah/ River Red Gum vegetation that is not authorised to be cleared.	**Trigger Criteria**: A significant difference in primary parameter (see Table 7) trends detected between impact and reference sites over two consecutive monitoring events. **Threshold Criteria**: A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas. AND Subsequent investigation determine that the impacts are probably a result of the implementation of the proposal.
MS1033 Condition 12	Management	**Condition:** Minimise direct and indirect impacts on flora, vegetation and fauna from activities associated with the management of surface water, including but not limited to modifications to surface water drainage. **Objective 1:** Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats	100% of conservation significant flora/vegetation/fauna habitat high risk areas are identified and available in the spatial system.
		Objective 2: Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/or fauna habitats	No direct loss of conservation significant flora, vegetation or fauna habitat within the project area beyond the approved disturbance footprint.

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
		Objective 3: Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat	A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal.
MS1033 Condition 13	Management	**Condition:** Minimise impacts to Mulga vegetation communities **Objective 1:** Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats	100% of high risk mulga vegetation communities are identified and available in the spatial system
		Objective 2: Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/r fauna habitats	No direct loss of mulga within the project area beyond the approved disturbance footprint.
		Objective 3: Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat	A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas. AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal.

1.4 Definition of Conservation Significant Flora Species and Vegetation

Fortescue's vegetation health management and monitoring activities are targeted at conservation significant flora species and vegetation. Significant flora is defined by the Office of the Environmental Protection Authority (OEPA) in Guidance Statement No. 51 as "species, subspecies, varieties, hybrids and ecotypes that may be significant for a range of reasons, other than as Declared Rare Flora or Priority Flora, and may include the following:

- A keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species,
- Relic status,
- Anomalous features that indicate a potential new discovery,
- Being representatives of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range),
- The presence of restricted subspecies, varieties or naturally occurring hybrids,
- Local endemism/ a restricted distribution,
- Being poorly reserved.

Significant vegetation is defined by the OEPA in Guidance Statement No. 51 as "vegetation may be significant for a range of reasons, other than a statutory listing as Threatened Ecological Communities or because the extent is below a threshold level, which may include:

- Scarcity,
- Unusual species,
- Novel combinations of species,
- A role as a refuge,
- A role as a key habitat for threatened or large populations representing a significant proportion of the local to regional total population of a species,
- Being representative of the range of a unit (particularly, a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range),
- A restricted distribution.

Fortescue's vegetation health management and monitoring activities are targeted at conservation significant flora and vegetation where they form the dominant community striatum. Fortescue defines conservation significant species or communities as:

- Declared Rare Flora,
- Threatened Species,
- Priority Flora,

- Threatened Ecological Communities/Priority Ecological Communities,
- Mulga (sheet flow dependent),
- Phreatophytic Vegetation,
- Riparian Vegetation,
- Samphire Communities.

1.4.1 Declared Rare Flora (DRF)

Rare flora species are declared as such under Section 23F of the *Wildlife Conservation Act 1950* (WA) and listed in the Wildlife Conservation (Rare Flora) Notice. The Act makes it an offence to "take" (which includes to gather, pluck, cut, pull up, destroy, dig up, remove or injure) DRF without Ministerial approval.

1.4.2 Threatened flora

Threatened flora are also recognised at a Commonwealth Government level and listed under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act*. The threatened flora identified at the national level are listed on the Department of Environment and Energy website located at:

https://www.environment.gov.au/epbc/about/epbc-act-lists#species

Many of the species listed under State biodiversity protection legislation are also listed under the EPBC Act, however exceptions do occur.

1.4.3 Priority Flora

The Department of Parks and Wildlife (DPaW) has also established Priority Flora categories defined to cover poorly known species or taxa[2]. The categories are arranged to give an indication of the priority for undertaking further surveys based on the number of known sites, and the degree of threat to those populations. Priority flora categories also include those species that have been adequately surveyed and are considered to be rare but not currently threatened. Special consideration should be given to the management of these species.

[2] Taxa is an abbreviated term for taxonomic groupings of plants within the classification hierarchy of the International Code of Botanical Nomenclature. It has a wider application than the species classification, and can include intra-species classifications such as subspecies, varieties, hybrids or plants that are yet to be formally described.

1.4.4 Threatened Ecological Communities (TECs)/Priority Ecological Communities (PECs)

Communities may be described as 'Threatened Ecological Communities' (TEC) by both the State and Commonwealth governments. This occurs if they have been considered by the Western Australian Threatened Ecological Communities Scientific Advisory Committee and found to be Presumed Totally Destroyed (PD), Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). Selected plant communities have also been listed as 'Threatened Ecological Communities' under the EPBC Act. The TECs identified at the national level are listed on the Department of the Environment and Energy website located at:

https://www.environment.gov.au/epbc/about/epbc-act-lists#species

The State Government also considers communities that do not meet the survey criteria for TECs or are not adequately defined as Priority Ecological Communities (PECs). Although PECs are not protected under legislation the conservation status of PECs are continually monitored so consideration can be given to their declaration as threatened ecological communities into the future.

1.4.5 Mulga (sheet flow dependent)

The term Mulga refers to a highly variable species complex consisting of *Acacia aneura* and its close relatives (e.g. *A. ayersiana, A. minyura* and *A. paraneura*). The members of this complex are small trees that dominate the vegetation of arid regions, in all occupying around 20% of Australia. Mulga vegetation communities are extensive in the Pilbara region.

Mulga vegetation exhibits a high degree of structural, morphological and genetic variability. This variation occurs both between and within populations and often results in a very complex mosaic of mixed Mulga populations.

Banded and unbanded Mulga populations are found within Fortescue's operations area occupying different positions in the landscape – alluvial wash plains to rocky lower southern slopes and drainage channels.

Whilst Mulga vegetation types are not considered to be conservation significant flora under state or federal legislation, Fortescue has Ministerial Statement conditions which require Mulga (sheet flow dependent) to be managed as conservation significant vegetation as they:

- Appear to play an important role in water and nutrient capture and are important to ecosystem function,
- Exhibit a high degree of morphological variability between populations,
- Are susceptible to disturbance from fire, grazing, weeds and development,
- May support or provide refuge to restricted flora and fauna species,
- Represent the northern limit of Mulga dominated vegetation distribution.

1.4.6 Riparian vegetation

Main river and creek systems in the Pilbara region include riparian vegetation mostly dominated by *Eucalyptus camaldulensis* and *E. victrix*. Riparian vegetation is considered the main groundwater-dependent vegetation of the Pilbara, however it is also likely to be the most sensitive and least tolerant to decreased water availability (Loomes, 2010).

Riparian vegetation provides an important refuge for fauna and increases biodiversity of the arid landscapes.

Mining activities can affect riparian vegetation and therefore regular monitoring of groundwater levels and quality, as well as the surface water quality, is necessary to ensure there is no negative impact on this type of vegetation.

1.4.7 Samphire communities

The samphire communities in the Pilbara are situated on flat plains raised above adjacent saline mudflat areas (van Vreeswyk *et al*. 2004). The two main locations of the samphire communities in the Pilbara are found adjacent to the coastal mangrove systems and in the Fortescue Marshes area (Plate 2). The Fortescue Marshes and saline floodplains are dominated by a dense low shrubland of *Tecticornia* species or heath of samphires that provide important fauna habitat in an otherwise hostile environment. In addition, samphires are natural soil stabilisers (Datson, 2002) and appear to be pioneer species in many salt affected habitats.

1.5 Acronyms

The following acronyms have been used throughout the Plan and defined in Table

Table 2: Acronyms

Acronyms	Definitions
BMS	Business Management System
CAR	Compliance Assessment Report
DPaW	Department of Parks and Wildlife
DRF	Declared Rare Flora
EAG	Environmental Assessment Guidelines
EMS	Environmental Management System
EPA	Environmental Protection Authority

Acronyms	Definitions
GDP[3]	Ground Disturbance Permit
OEPA	Office of the Environmental Protection Authority
PEC	Priority Ecological Community
TEC	Threatened Ecological Communities

1.6 Legislation and Regulatory Framework

Fortescue employees and contractors are obliged to comply with all relevant environmental Commonwealth and State legislation. Legislation directly relevant to the management of native vegetation in Western Australia is provided in Table 3.

Table 3: State and Commonwealth Legislation Relating to Vegetation Health Management

Legislation	Application
Biodiversity Conservation Act 2016 (WA)	Conservation and protection of biodiversity and biodiversity components. This Act repeals the *Wildlife Conservation Act 1950*.
Conservation and Land Management Act 1984 (WA)	Provides for the vesting or reservation of land for conservation purposes, and the ability to enter into agreements with private landholders and pastoral leases. It establishes a number of statutory bodies including the Conservation Commission of Western Australia.
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)	Protection on environmental matters of national significance.
Environment Protection Act 1986 (WA)	Prevention, control and abatement or pollution and conservation protection and enhancement of environment.
Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA)	Regulates the clearing of native vegetation.
Rights in Water And Irrigation Act 1914 (WA)	Relates to rights in water resources, to make provisions for the regulation, management, use and protection of water resources, to provide for irrigation schemes and for related purposes.

1.7 Internal Management Plans and Procedures

The following Fortescue documents should be read in conjunction with this Plan:

- *Christmas Creek Groundwater Operating Strategy* (CC-PH-HY-0002)
- *Cloudbreak Groundwater Operating Strategy* (CB-PH-HY-0009)

This Plan replaces the following documents:

- *Fortescue Marshes Management Plan* (45-PL-EN-0009)

[3] It is planned that the current Ground Disturbance Permit (GDP) system will be replaced by a Land Use Certificate system (LUC) in the near future. Therefore, the term GDP is interchangeable for the term LUC meaning an internal permit system required to undertake on-ground activities.

- *Mulga Monitoring Methodology* (SO-RP-EN-0021)
- *Significant Flora and Vegetation Management Plan* (45-PL-EN-0017)
- *Vegetation Health Monitoring and Management Plan - Cloudbreak* (CB-PL-EN-0019)
- *Vegetation Health Monitoring and Management Plan – Christmas Creek Water Management Scheme* (CC-PL-EN-0004)

2. ROLES AND RESPONSIBILITIES

All Fortescue employees and contractors are required to comply with the requirements of this Plan.

Accountability for fulfilling the requirements of this Plan is dependent on the stage of project development (construction, operations, decommissioning) and the project type (port, rail or mine).

During construction stages, whether activities are undertaken by an external service provider or internal Fortescue personnel, the Project Director (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

During operational, decommissioning and closure stages, the General Manager (Port/ Rail or Mine) will be accountable for ensuring the requirements of this Plan are met.

Where responsibilities are delegated, this must be clearly recorded and communicated.

In Section 4 specific Management Actions have been attributed to the appropriate personnel.

When site specific Vegetation Health Management and Monitoring Programs are developed to support this Plan, the RASCI framework should be utilised to delegate roles, responsibilities, and review and approval levels. RASCI is used to denote:

R-Responsible	Those who do the work to achieve the task.
A-Accountable	Those who are ultimately accountable for the completion of the deliverable or task and the one to whom the Responsible person is accountable.
S-Supportive	Resources allocated to the Responsible person and who will also assist in completing the task.
C-Consulted	Those whose opinions are sought, two-way communication.
I-Informed	Those whom are kept informed, one-way communication.

3. STAKEHOLDER CONSULTATION

Fortescue has undertaken extensive stakeholder consultation program whereby landowners, regulators and other relevant parties have been consulted with regard to investigation and design of the mine sites and port and rail infrastructure through the environmental approvals process.

Regulatory agencies will be consulted in accordance with the requirements of EAG 17 Preparation of Management Plan under Part IV of the *Environmental Protection Act 1986* and the following approval conditions:

- DPaW in accordance with condition 6-2 of MS899, condition 7-1 of MS1033.

Table 4 will be updated following receipt of stakeholder comment as a result of the review and approval process.

Table 4: Stakeholder Consultation, Comments and Responses

Stakeholder	Correspondence	Comment	Change
DPaW			
OEPA			

4. ENVIRONMENTAL MANAGEMENT

Environmental management measures for vegetation health are required under the following Ministerial Statements:

- Condition 12 and 13 of MS1033

A series of environmental management objectives have been developed to mitigate environmental impacts on vegetation health in accordance with the requirements of MS1033. These include:

1. Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats
2. Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/or fauna habitats.
3. Develop and implement a vegetation health monitoring program to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat.

For each objective, management actions have been developed to ensure the impacts from Fortescue's operations are managed, and that appropriate monitoring, reporting and corrective action functions are implemented to support the successful implementation of the management actions.

The key elements of the environmental management process associated with each objective are described in Table 5.

Table 5: Descriptions of Key Elements of Environmental Management Process to Achieve Identified Objectives

Element	Definition/ Description
Objective	What is intended to be achieved
Management Action	Tasks undertaken to enable the objective to be met
Performance Indicators	Metrics for evaluating the outcomes achieved by Management Actions
Reporting/ Evidence	Demonstrates that the Management Action has been applied and the outcome evaluated.
Timing	Period during which the Management Action should be undertaken.
Responsibility	Accountability for ensuring management action is completed. The responsible role is dependent on project timing.

The key management actions, performance indicators, evidence, timing and responsibilities for each objective are provided in Table 6. Management actions that have been risk ranked as High or Very High have been included in the Plan. In some instances, management actions that have been listed with a risk based priority of low or medium have been included as a result of an approval condition. As a result, the site location for actions with a low or medium risk rating are restricted to the sites where the approval condition applies.

Table 6: Key Management Actions for Vegetation Health Management under MS1033

Objective 1	Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats							
Reference	**Rail**	**Mine[4]**	**Management Actions**	**Risk Based Priority**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
1.1			Undertake targeted flora surveys in accordance with OEPA Guidance Statement No 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment and the Flora and Vegetation Assessment Guidelines* (100-GU-EN-0005) to determine presence and distribution of conservation significant flora, vegetation and/or fauna habitat within the project area.	High	• Survey undertaken • GIS and PIMS updated	• Survey reports • GIS dataset • PIMS record	Design	Manager, Environmental Approvals
1.2			Conduct a risk assessment to identify high risk areas where conservation significant flora, vegetation and/or fauna habitats have been identified and potential impacts are likely.	Very high	• Risk assessment conducted • High risk areas identified • See management target in Table 1	• Risk assessment • High risk areas identified	Design/ Construction/ Operation	Manager Environmental Approvals/ Project Manager/ HSES Manager
1.3			Conduct a desktop flora assessment for Ground Disturbance Permit (GDP) applications for construction and operational activities. In areas where a Level 2 survey has not been conducted and conservation significant flora, vegetation and/or fauna habitat have been identified during the desktop assessment ensure a flora survey is conducted in accordance with OEPA Guidance Statement No 51 and reassess accordingly.	High	• Assessments conducted prior to disturbance • Where required, survey undertaken	• Survey reports • Approval documentation	Development/ Construction/ Operation	Project Manager/ HSES Manager
Objective 2	**Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/or fauna habitats**							
Reference	**Rail**	**Mine[3]**	**Management Actions**	**Risk Based Priority**	**Management Actions**	**Reporting/ Evidence**	**Timing**	**Responsibility**
2.1			Ensure staff and contractors are provided with the appropriate training to ensure conservation significant flora, vegetation and/or fauna habitats are protected.	High	• Site induction include conservation significant flora, vegetation and fauna habitat • Toolbox presentations delivered to targeted work groups	• Site induction • Toolbox presentations • Training materials/ registers	Construction/ Operation	Project Manager/ HSES Manager
2.2			Ensure drainage infrastructure location and design aligns with the risk assessment outcomes where possible to minimise interference and disruption of natural surface water flows that support conservation significant flora, vegetation and/or fauna habitats.	High	• Location and design of drainage infrastructure aligns with risk assessment outcomes where possible	• Risk assessment	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)/ Manager Operation Planning
2.3			Where sheet flow dependent Mulga communities have been identified and significant impacts from changes to sheet flow regimes are likely, incorporate appropriate drainage infrastructure into project design.	High	• Drainage infrastructure is included in areas of sheet flow dependent Mulga communities	• Audit/ inspection reports	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)
2.4			Where possible, align linear infrastructure with existing transport corridors or approved disturbance corridors so that surface water flow regimes are minimally impacted.	High	• Linear infrastructure aligned with existing	• Audit/ inspection reports	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)/ Group Manager

					transport/disturbance corridors where possible			Operational Mine Planning
2.5			Manage dewatering activities and water discharge to minimise impacts on groundwater dependent ecosystems.	High	• Changes to groundwater levels are minimised • Changes to groundwater quality are minimised • Vegetation Health Monitoring Program implemented	• Monitoring data	Construction/ Operations	Project Manager/ Group Manager Operational Mine Planning
2.6			Prior to conducting disturbance activities, ensure known locations of conservation significant flora, vegetation and/or fauna habitat and their associated buffers are identified and management measures to minimise any impacts to those areas are implemented.	Very High	• GDP identifies conservation significant flora, vegetation and/or fauna habitat and their associated buffers • Management measures implemented • Surface water management measures implemented where required • Weed management measures implemented where required • Dust management measures implemented where required • See management targets in Table 1	• GDP • Inspection/Audit records	Construction/ Development	Project Manager/ HSES Manager
2.7			Prior to conducting ground disturbance activities, ensure known locations of weed populations are identified and management measures to minimise the potential for weed spread are included in the Ground Disturbance Permit.	Medium	• Weed populations and management measures are identified in the GDP • Vegetation Health Monitoring program implemented	• GDP • Monitoring report	Construction/ Operation	Project Manager/ HSES Manager
2.8			To minimise the potential for dust deposition on conservation significant flora, vegetation and/or fauna habitat, ensure relevant dust suppressions measures are included in the Ground Disturbance Permit for areas identified as high risk areas.	Medium	• Dust suppression measures implemented • Vegetation Health Monitoring program implemented	• Compliance assessment report • Monitoring report	Construction/ Operation	Project Manager/ HSES Manager
2.9			When unauthorised clearing of conservation significant flora, vegetation and/or fauna habitat occurs, report the incident in accordance with the *Incident Event Management Procedure* (100-PR-SA-0011) and implement corrective actions	High	• Incident reported in BMS	• Incident report in BMS	Construction/ Operation	Project Manager/ HSES Manager

			defined in Table 9 and any reporting requirements defined in Section 8 of the Plan.		• Where required the incident is reported within the specified legislative or licensing timeframe	• Correspondence with the Regulator • Annual reporting		
2.10			Conduct rehabilitation of disturbed areas, particularly those areas with known conservation significant flora, vegetation and/or fauna habitat, no longer required for operations.	High	• Disturbed areas rehabilitated in accordance with the Plan • Compliance with the Plan • GIS updated with rehabilitation data	• Compliance Assessment Report • GIS dataset	Operation/ Decommissioning/ Closure	Project Manager/ Group Manager Operational Mine Planning
Objective 3	**Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat.**							
Reference	**Rail**	**Mine[3]**	**Management Actions**	**Risk Based Priority**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
3.1			Develop and implement a vegetation health monitoring program to determine the effectiveness of the management strategies on conservation significant flora, vegetation and/or fauna habitat.	Very high	• Vegetation health monitoring program implemented • Vegetation health monitoring undertaken in accordance with the required frequency • Monitoring location are identified in consultation with the appropriate Regulator where required • See management targets in Table 1	• Vegetation health monitoring program • Records of consultation with appropriate Regulators (emails, letters)	Construction/ Operation	Group Manager Environment
3.2			Undertake a baseline vegetation health survey of identified vegetation health sites prior to the first monitoring event where possible to: • Document all conservation significant flora, vegetation and/or fauna habitat within impact and reference sites • Identify the baseline for existing conservation significant flora, vegetation and/or fauna habitat at impact and reference sites • Compare conservation significant flora, vegetation and/or fauna habitat health between impact and reference sites.	High	• Baseline survey undertaken for all monitoring sites • Baseline survey undertaken prior to the first monitoring event	• Baseline monitoring reports	Construction/ Operation	Project Manager/ Group Manager Environment
3.3			When monitoring results indicate a potential impact on vegetation health, implement corrective actions defined in Table 9 and any reporting requirements defined in Section 8. Update the Plan where required, to inform an adaptive management approach to vegetation management across the business.	High	• Corrective actions implemented • Reporting requirements met	• Vegetation health monitoring report • Reporting records	Construction/ Operation	**Corrective Actions:** Project Manager/ HSES Manager **Reporting/ Program and Plan updates:**

					• Plan updated where required	• Updated Plan		Group Manager Environment

[3] Refers to Cloudbreak (MS899) and Christmas Creek (MS1033) mines. Solomon Mine has not been included as it is subject to a current submitted EPA proposal (EPA Ref # 2019).

5. MONITORING GUIDELINES

A vegetation health monitoring program is required to measure the effectiveness of the management actions outlined in the Vegetation Health Management and Monitoring Plan. The outcomes of the monitoring program for each site will contribute to ongoing improvements in management actions to ensure an adaptive management approach is adopted.

5.1 Objectives

The guiding objectives of the vegetation health monitoring program include:

1. Identify adverse impact in vegetation health within Fortescue controlled sites.
2. Monitor and measure the success of management measures to inform an adaptive management approach.
3. Identify if vegetation changes are impacting or threaten to impact vegetation values.
4. Determine if changes in vegetation health within Fortescue controlled sites is a direct or indirect result of Fortescue activities or broader regional changes.

Baseline and operational monitoring will be informed by the findings of the monitoring itself as they become available. These findings may similarly lead to ongoing refinements to this Plan and its management strategies to ensure an adaptive management approach is undertaken during Fortescue activities.

5.2 Baseline Survey

Baseline monitoring surveys have been undertaken for all monitoring sites to assess health and cover of the vegetation prior to the first monitoring event[5]. The baseline survey aims to:

- Document all conservation significant flora, vegetation and/or fauna habitat within impact and reference sites.
- Identify the baseline for existing conservation significant flora, vegetation and/or fauna habitat at impact and reference sites.
- Compare conservation significant flora, vegetation and/or fauna habitat health between impact and reference sites.

[5] In some instances, within the Cloudbreak (Appendix 4) and Christmas Creek Mines (Appendix 5), the original baseline monitoring sites are no longer monitored. This is due to the fact that since the original baseline monitoring survey, these sites have been considered not appropriate for longer term monitoring. Where this has occurred alternative sites have been established and incorporated into the longer term monitoring program. These new sites provide better spatial coverage and greater accuracy with regards to measuring potential impacts of the respective projects.

Results of baseline vegetation health surveys are available in the following Appendices:

- Appendix 4 Cloudbreak Mine Baseline Monitoring Reports.
- Appendix 5 Christmas Creek Mine Baseline Monitoring Report.
- Appendix 6 Hamersley Rail Baseline Monitoring Reports.
- Appendix 7 Mainline Rail Baseline Monitoring Report.

5.3 Program Summary

An effective long-term vegetation health monitoring program may be adaptive. Innovations in monitoring techniques and methods should be incorporated into the program design over time. This would, however, be dependent on, and driven by, the quality and quantity of data collected from each site. Further, program design should be based on replicable sampling at impact and reference sites.

For the vegetation health monitoring program, each vegetation unit will consist of a minimum of six monitoring sites per location (three impact and three reference) across all locations. However given the nature of the operational activities covered by this plan there are some variations.

Due to similarities in vegetation units and close proximity of mining operations in the Chichester's (Figures 3a-3d), reference sites are selected to be sufficiently representative to cover both Cloudbreak and Christmas Creek mining operations. Further, given that mining operations vary spatially during the life of a mine, a level of flexibility has been included into the design of the program. That is, different impact sites will be selected each monitoring year dependent on where mining operations are occurring. This is to ensure potential impacts are effectively being monitored.

However, to supplement the periodic change in impact monitoring sites, and to maintain a consistent dataset, 'core sites' have also been considered and included in the design. Core sites are monitoring sites that will be consistently monitored throughout the life of a mine no matter where operational activities and potential impacts may be occurring.

Monitoring will be using the following design, site location approach and methods:

- Mulga (Rail) (Figure 1 and 2): nested design with 100 m transects installed upstream (control) with 400 m transects installed downstream (impact) of the railway. 10 m x 10 m quadrats are nested on both control and impact transects

- Spinifex/Triodia (Figure 3a): 400 m^2 quadrats, a minimum of ten sample plants. 20 m line-intercept transects within these quadrats to measure cover
    - 4 impact (minimum of 3 monitored per event)
    - 4 reference (minimum of 3 monitored per event)
- Mulga (Mine) (Figure 3b): 2,500 m^2 quadrats containing ten sample trees
    - 12 impact (minimum of 3 monitored per event at each site)
        - 3 core identified (monitored all events)
    - 5 reference (minimum of 3 monitored per event)
        - 3 core identified (monitored all events)
- Phreatophytic Vegetation Communities (Figure 3c): 2,500 m^2 quadrats containing ten mature sample trees
    - 12 impact (minimum of 3 monitored per event at each site)
        - 3 core identified (monitored all events)
    - 6 reference (minimum of 3 monitored per event)
        - 3 core identified (monitored all events)
- Samphire Communities (Figure 3d): 200 m^2 quadrats, ten sample plants. 20 m line-intercept transects within these quadrats to measure cover
    - 8 impact (minimum of 3 monitored per event at each site)
        - 3 core identified (monitored all events)
    - 5 reference (minimum of 3 monitored per event)
        - 3 core identified (monitored all events)

Photopoint monitoring should be used in both impact and control sites for a photographic record of change between monitoring periods.

Frequency of vegetation health monitoring will be dependent on the requirements of the environmental approval:

- MS 899, no approval requirement
- MS 1033, no approval requirement

Where there are no approval requirements which specify the frequency of monitoring, an annual requirement will be implemented. The monitoring program will be assessed every three years to ensure the methods, parameters and frequency are considerate of the monitoring program findings. If no threshold criteria are triggered after three years, the frequency of monitoring will be reduced to biennial for two monitoring events, and thereafter every five years.

A set of monitoring parameters and methods have been selected to provide broad coverage of potential changes in vegetation health and that can be expected under a range of different mining related impacts. The number of monitoring parameters will vary depending on the site specific conditions and vegetation units. The advent of new technology may result in changes to sampling methods employed.

A summary of monitoring parameters and methods have been provided in Table 7.

Table 7: Vegetation health monitoring parameters and methods

Monitoring parameter	Method
Population structure and density	Quantitative counts of mortality and recruitment.
Condition and Health	Percentage canopy cover of target vegetation unit Water status health assessment (predawn and midday water potential) Visual assessment of vegetation health Chlorophyll fluorescence meters Remote Sensing (NDVI or equivalent)
Total weed cover and diversity	Calculate total weed cover within each monitoring site. *Weed Monitoring Guidelines* (100-GU-EN-0044)
Litter cover	Determine: • percentage cover • origin of litter • degree of composition/incorporation.
Groundcover/grasses	Cover of alive perennial grasses.
Erosion	Change in vertical shift of soil surface using a galvanised fence dropper. Visual assessment of erosion features, severity and classes.
Soil Moisture	Soil moisture levels are measured at a depth of 10 cm using hand operated probes
Ant sampling	Diversity measured utilising species richness, species diversity and evenness.
Surface water flow	Determine surface water flows using peak level indicators. *Surface Water Monitoring Guidelines* (100-GU-EN-0037)
Dust	Visual assessment of dust deposition on plant canopy. Dust deposition gauges can also be used. *Dust Monitoring Guidelines* (45-GU-EN-0004)

Monitoring parameter	Method
Groundwater	Monitoring will be undertaken in accordance with the site specific *Groundwater Operating Strategy.*
Sedimentation	Sedimentation heights using plot markers
Meteorological data	Data from weather stations installed near monitoring sites location.
Environmental threats (i.e. grazing)	Observation, mapping, photographs etc.

Table 8 provides the monitoring parameters to be monitored per conservation significant flora and vegetation type recorded within Fortescue controlled sites. Primary Parameters are used as the basis for determining trigger compliance or exceedance. Secondary parameters may be used to provide additional information to assist conclusions made from the results of the primary monitoring parameters.

Table 8: Vegetation Types and associated parameters and site locations

Vegetation Type	Primary Parameters	Secondary Parameters	Sites
Mulga (rail)	Population structure and density Condition and health	Surface water flow Litter cover Erosion Groundcover/grasses Total weed cover and diversity Meteorological data Environmental threats Ant sampling (Hamersley Rail)	Mainline Rail (Figure 1) Hamersley Rail (Figure 2)
Mulga (mines)	Population structure and density Condition and health	Litter cover Erosion Groundcover/grasses Total weed c over and diversity Groundwater Surface water flow Dust Meteorological data Environmental threats Ant sampling	Cloudbreak Mine (Figure 3) Christmas Creek Mine (Figure 3)
Phreatophytic Vegetation	Population structure and density Condition and health	Groundwater Meteorological data Environmental threats	Mainline rail (Figure 1) Cloudbreak Mine (Figure 3) Christmas Creek Mine (Figure 3)

Vegetation Type	Primary Parameters	Secondary Parameters	Sites
Samphire Communities	Population structure and density Condition and health	Groundwater Meteorological data Environmental threats	Cloudbreak Mine (Figure 3) Christmas Creek Mine (Figure 3)
Spinifex/Triodia Vegetation	Population structure and density Condition and health	Groundwater Meteorological data Environment threats	Cloudbreak Mine (Figure 3)
Calotis squamigera and *Eremophila spongiocarpa*	Condition and health	Meteorological data Environment threats	Christmas Creek Mine (Figure 3)

Statistical analysis of monitoring results will be undertaken using univariate or multivariate analysis to determine whether there is any statistical difference in the parameter values between impact and reference sites. Additional statistical analysis may be undertaken where deemed appropriate.

Contingency actions (Section 5.4) and reporting requirements (Section 8) will be implemented where required.

5.4 Contingency Actions

Contingency actions will be initiated during construction, operational and decommissioning activities when an exceedance of a trigger is identified and monitoring indicates that implemented management measures are not successfully mitigating impacts on conservation values of vegetation health and/or the management objectives are not being achieved.

Contingency actions for vegetation health monitoring triggers have been developed to meet requirements under MS899 and MS1033 (Table 9).

Table 9: Trigger Criteria and Associated Contingency Actions

Approval	Criteria	Contingency Action
MS899 Condition 6	**Trigger Criteria:** A significant difference in primary parameter (see Table 7) trends detected between impact and reference sites over two consecutive monitoring events. **Threshold Criteria**: A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas. AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.	**Trigger Contingency Actions** • Re-examine groundwater levels to validate that groundwater is within water management trigger levels in accordance with the Cloudbreak Groundwater Operating Strategy. • Increase vegetation monitoring frequency to a three month cycle at VMUs where trigger was exceeded and the associated reference site(s). • After the four consecutive monitoring events, determine if threshold criteria have been exceeded and a management response is required: compilation of all relevant, available data for detailed statistical analyses to further test the probability that project related impacts account for the trends detected. Probability will be determined objectively using accepted statistical techniques with significance (P) set at $P < 0.05$. • If after the four consecutive monitoring events, a threshold exceedance has not been identified, resume standard monitoring frequency. **Threshold Contingency Actions** • Increase vegetation monitoring frequency. • Implement adaptive management response (modified dewatering and reinjection regime) following management guidance within the *Cloudbreak Groundwater Operating Strategy.* • Report the threshold exceedance to the OEPA within 7 days of the exceedance being identified. • Provide evidence to the satisfaction of the OEPA which allows determination of the cause of the exceedance within 21 days of the exceedance being identified. • Where the exceedance is a result of construction, operation or decommissioning activities, submit a plan of actions within 21 days of the determination being made by the OEPA in accordance with condition 6-6(3).

Approval	Criteria	Contingency Action
		• Continue to implement actions to remediate the exceedance until approval to cease has been given by the OEPA in accordance with condition 6-6(4).

MS1033 Condition 7 Objective 1	**Trigger Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (of reference areas) over two consecutive monitoring events. **Threshold Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (of reference areas) over four consecutive monitoring events. AND Ground-truthing confirms the decline in vegetation index values has resulted in vegetation death. AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal.	**Trigger Contingency Actions** • Ground truth the results of the disturbance/NDVI assessment to determine level of direct and indirect impact. • Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites. • Re-examine applied monitoring parameters to validate they are operating within management levels. • Identify the reasons for the change and where it was caused by construction, operation or decommissioning activities, review management measures with an adaptive management response. **Threshold Contingency Actions** • Ground truth the results of disturbance/NDVI assessment to determine level of direct and indirect impact. • Increase monitoring frequency. • Report the exceedance in writing to the OEPA within 7 days of the exceedance being identified. • Implement contingency measures within 24 hours of the exceedance being identified. • Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites. • Identify the reasons for the change: o Where it was caused by construction, operation or decommissioning activities, submit a plan with actions within 21 days of the determination being made by the OEPA in accordance with condition 5-4(5). o Where it was not caused by construction, operation or decommissioning activities, resume standard monitoring frequency.

MS 1033 Condition 7 Objective 2	**Trigger Criteria** A significant difference in primary parameter (see Table 7) trends detected between impact and reference sites over two consecutive monitoring events. **Threshold Criteria**: A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.	**Trigger Contingency Actions** • Re-examine groundwater levels to validate that groundwater is within water management trigger levels in accordance with the Christmas Creek Groundwater Operating Strategy. • Increase vegetation monitoring frequency to a three month cycle at VMUs where trigger was exceeded and the associated reference site(s). • After the four consecutive monitoring events, determine if threshold criteria have been exceeded and a management response is required: compilation of all relevant, available data for detailed statistical analyses to further test the probability that project related impacts account for the trends detected. Probability will be determined objectively using accepted statistical techniques with significance (P) set at $P < 0.05$. • If after the four consecutive monitoring events, a threshold exceedance has not been identified, resume standard monitoring frequency. **Threshold Contingency Actions** • Increase vegetation monitoring frequency • Report the exceedance in writing to the OEPA within 7 days of the exceedance being identified • Implement contingency measures within 24 hours of the exceedance being identified • Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites • Identify the reasons for the change: o Where it was caused by construction, operation or decommissioning activities, submit a plan with actions within 21 days of the determination being made by the OEPA in accordance with condition 5-4(5). o Where it was not caused by construction, operation or decommissioning activities, resume standard monitoring frequency.

Approval	Criteria	Contingency Action
MS 1033 Condition 12 Condition 13	A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over four consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.	• Increase vegetation monitoring frequency • Report the exceedance in writing to the OEPA within 21 days of the exceedance being identified • Implement contingency measures within 24 hours of the exceedance being identified • Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites • Identify the reasons for the change: ○ Where it was caused by construction, operation or decommissioning activities, submit a report within 90 days of the exceedance being reported to the OEPA in accordance with condition 6-4(1). ○ Where it was not caused by construction, operation or decommissioning activities, resume standard monitoring frequency.

6. COMPLIANCE

Fortescue ensures compliance with its legal obligations through first party quality assurance by site and corporate environment teams with a focus on effective environmental management through the implementation of the Fortescue wide Environmental Management System (EMS).

Fortescue has adopted a risk based approach to monitor compliance with its legal obligations. Site environment teams will monitor their compliance with this Plan and the required site specific management and monitoring programs using the *Self-Verification of High Risk Environmental Legal Obligations Guideline* (100-GU-EN-0030).

Where non-conformance issues or opportunities for improvement are identified these will be documented and tracked via Fortescue's BMS.

7. ADAPTIVE MANAGEMENT

Fortescue will implement adaptive management practices to learn from the implementation of mitigation measures, monitoring and evaluation against management targets, to more effectively meet the conditioned environmental objective. Adaptive management practices that will be assessed for the vegetation health management and monitoring program as part of this approach may include:

- Evaluation of the monitoring program, data and comparison to baseline data and reference sites on an annual basis to verify whether responses to project activities are the same or similar to predictions.
- Evaluation of assumptions and uncertainties of the vegetation health management and monitoring program.
- Re-evaluation of the risk assessment and revision of risk based priorities as a result of monitoring outcomes.
- Review of data and information gathered over the review period that has increased understanding of site environment in the context of the regional ecosystem.
- Review of management actions as the project matures and new management measures and technologies become available that may be more effective for vegetation health management.
- Assessment of changes which are outside the control of the project and the management measures identified (i.e. a new project within the area or region; regional change affecting vegetation health management).
- Evaluation and introduction of new or different monitoring methods due to changes in technology.
- Review of the Vegetation Health Monitoring and Management Plan will be undertaken every five years or as required by a condition.

8. REPORTING

8.1 Annual Monitoring Report

An Annual Monitoring Report will be developed with the results of the vegetation health programs across all Fortescue controlled sites detailed. This report will outline the vegetation health monitoring data captured during the reporting period and the analysis required to report compliance against management targets and conditioned environmental objectives.

8.2 Annual Compliance Assessment Report

Fortescue is required to report against its compliance with the Vegetation Health Monitoring and Management Plan in the Compliance Assessment report prepared in accordance with the OEPA's *Post Assessment Guideline for Preparing a Compliance Assessment Report, Post Assessment Guideline No. 3.*

Annual Compliance Assessment Reports (CAR) are required to be submitted in accordance with the following Ministerial Statements with vegetation health related conditions:

- Condition 4-6 of MS899
- Condition 3-6 of MS1033

The reporting requirements against management targets and conditioned environmental objectives are provided in Table 1. In the event that trigger or threshold criteria were exceeded during the reporting period, the CAR will include a description of the effectiveness of the contingency actions that have been implemented to manage the impact and any adaptive management measures applied as a result of the exceedance.

8.3 Reporting of Potential Non-Compliances

Fortescue is required to report against vegetation health monitoring outcomes as per conditioned timeframes. Trigger criteria and where required threshold criteria have been identified in Table 1 for the Cloudbreak Mine (MS899) and Christmas Creek Mine and East-West Railway (MS1033).

When an exceedance of trigger criteria under MS899 has occurred, Fortescue will:

- Report to the OPEA within 7 days of the exceedance being identified,
- Provide evidence to the satisfaction of the OEPA which allows determination of the cause of the exceedance within 21 days of the exceedance being identified,
- If determined by the OEPA to be a result of construction, operation or decommissioning activities undertaken by Fortescue, submit actions to be taken to remediate the exceedances within 21 days of the determination being made,

- Implement the plan of actions to address the exceedance upon approval of the OEPA and shall continue until the OEPA determines that the remedial actions may cease.

When an exceedance of threshold criteria under MS1033 has occurred, Fortescue will:

- Where the exceedance is attributable to construction, operation or decommissioning activities, report the exceedance to the CEO (of the OEPA) within 7 days of the exceedance being identified in accordance with condition 5-4 of MS1033.
- Implement the threshold contingency actions specified in Table 9 within 24 hours and continue to implement those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required.
- Investigate to determine the cause of the threshold criteria being exceeded.
- Investigate to provide information for the OEPA to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded.
- Provide a report to the OEPA within 21 days of the exceedance being reported. The report shall include:
    - Details of threshold contingency actions implemented,
    - The effectiveness of the threshold contingency actions implemented, against the threshold criteria,
    - The findings of the investigations,
    - Measures to prevent the threshold criteria being exceeded in the future,
    - Measures to prevent, control or abate the environmental harm which may have occurred,
    - Justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that outcomes will continue to be met.

In the event that monitoring, tests, surveys or investigations indicate an exceedance of a management target has occurred within the reporting period, Fortescue will:

- Where the exceedance is attributable to construction, operation or decommissioning activities, report the exceedance in writing to the OEPA within 21 days of the exceedance being identified in accordance with Condition 6-4 (1) of MS1033.
- Investigate to determine the cause of the management targets being exceeded in accordance with Condition 6-4(2) of MS1033.

- Provide a report to the OEPA within 90 days of the exceedance being reported as required by Condition 6-4(1) in accordance with the requirements of condition 6-4(3) of MS1033.

In the event that monitoring, tests, surveys or investigations indicate that one or more management actions have not been implemented, Fortescue will:

- Report the failure to implement management action(s) in writing to the OEPA within 7 days of identification in accordance with Condition 6-5 (1) of MS1033.
- Investigate to determine the cause of the management action(s) not being implemented in accordance with Condition 5-5(2) of MS1033.
- Investigate to provide information for the OEPA to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management actions in accordance with Condition 6-5(3) of MS1033.
- Provide a report to the OEPA within 21 days of the reporting required by condition 6-5(1) in accordance with the requirements of condition 6-5(4) of MS1033.

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Figure 1: Vegetation Health Monitoring Sites: *Mainline Rail*

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Figure 2: Vegetation Health Monitoring Sites: *Hamersley Rail*

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Figure 3a: Vegetation Health Monitoring Sites: Cloudbreak Mine and Christmas Creek Mine – *Triodia/Spinifex*

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Figure 3b: Vegetation Health Monitoring Sites: Cloudbreak Mine and Christmas Creek Mine – *Mulga*

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Figure 3c: Vegetation Health Monitoring Sites: Cloudbreak Mine and Christmas Creek Mine – *Phreatophytic*

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Figure 3d: Vegetation Health Monitoring Sites: Cloudbreak Mine and Christmas Creek Mine – *Samphire*

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Appendix 1: Project Background

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Appendix 2: Data Flow Diagram

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Appendix 3: Ministerial Statement Condition Table

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Appendix 4: Cloudbreak Mine Baseline Monitoring Reports

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Appendix 5: Christmas Creek Mine Baseline Monitoring Report

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Appendix 6: Hamersley Rail Baseline Monitoring Reports

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Appendix 7: Mainline Rail Baseline Monitoring Reports

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Appendix 8: Ministerial Statement 899 – Cloudbreak Life of Mine

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Appendix 9: Ministerial Statement 1033 – Christmas Creek Mine and East-West Railway

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The Vegetation Health Monitoring and Management Plan is required by the Minister as part of the development approval for Fortescue Iron Ore related infrastructure in the Pilbara approved under Part IV of the *Environmental Protection Act 1986* under MS 1033.

The Plan has been written to meet the following outcome and management based conditions under MS1033:

- Condition 5
- Condition 6
- Condition 7
- Condition 12
- Condition 13

This Appendices has been provided to enable OEPA assessment of the Plan against the conditions specified under MS1033.

Table 1 meets the following conditions of MS1033:

- Condition 5-2(1)
- Condition 5-2(2)
- Condition 5-2(3)
- Condition 6-2(1)
- Condition 6-2(3)
- Condition 7-1(1)
- Condition 7-1(2)
- Condition 12-1

Table 10: Conditioned environmental objectives and measures/targets

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
MS 1033 Condition 7	Outcome	**Objective 1:** Ensure there is no disturbance (direct or indirect impacts) within the buffers of the known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2.	**Trigger Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (reference areas) over two consecutive monitoring events. **Threshold Criteria** A direct disturbance within the associated buffers of known records of the Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* within the Christmas Creek Mine Development Envelope, as delineated in Figure 2 of Schedule 1 and defined by the geographic coordinates in Schedule 2. OR If mean vegetation index values within significant flora buffers of known records of Priority 1 flora species *Calotis squamigera* and *Eremophila spongiocarpa* is significantly different from surrounding vegetation index values (of reference areas) over four consecutive monitoring events.

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
			Ground-truthing confirms the decline in vegetation index values has resulted in vegetation death. AND Subsequent investigation determines that the impacts are probably a result of the implementation of the proposal.
		Objective 2: Maintain the health of Mulga, Samphire and Coolibah/ River Red Gum vegetation that is not authorised to be cleared.	**Trigger Criteria**: A significant difference in primary parameter (see Table 7) trends detected between impact and reference sites. **Threshold Criteria**: A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over two consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.
MS1033 Condition 12	Management	**Condition:** Minimise direct and indirect impacts on flora, vegetation and fauna from activities associated with the management of surface water, including but not limited to modifications to surface water drainage. **Objective 1:** Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats	100% of conservation significant flora/vegetation/fauna habitat high risk areas are identified and available in the spatial system.
		Objective 2: Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/or fauna habitats	No direct loss of conservation significant flora, vegetation or fauna habitat within the project area beyond the approved disturbance footprint.

Approval	Condition Type	Conditioned Environmental Objectives	Measure/ Target
		Objective 3: Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat	A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over two consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.
MS1033 Condition 13	Management	**Condition:** Minimise impacts to Mulga vegetation communities **Objective 1:** Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats	100% of high risk mulga vegetation communities are identified and available in the spatial system
		Objective 2: Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/r fauna habitats	No direct loss of mulga within the project area beyond the approved disturbance footprint.
		Objective 3: Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat	A statistically significant change in the primary parameter (see Table 7) trends at predicted impact areas in comparison to reference sites. AND The decline is detected over two consecutive monitoring events and is associated with a decline in condition in comparison to the reference areas. AND Subsequent investigations determines that the impacts are probably a result of the implementation of the proposal.

Table 6 meets the following conditions of MS1033:

- Condition 6-2(2)
- Condition 6-2(4)
- Condition 12-1
- Condition 13-3

Table 11: Key Management Actions for Vegetation Health Management under MS1033

Objective 1	**Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats**					
Reference	**Management Actions**	**Risk Based Priority**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
1.1	Undertake targeted flora surveys in accordance with OEPA Guidance Statement No 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment and the Flora and Vegetation Assessment Guidelines* (100-GU-EN-0005) to determine presence and distribution of conservation significant flora, vegetation and/or fauna habitat within the project area.	High	• Survey undertaken • GIS and PIMS updated	• Survey reports • GIS dataset • PIMS record	Design	Manager, Environmental Approvals
1.2	Conduct a risk assessment to identify high risk areas where conservation significant flora, vegetation and/or fauna habitats have been identified and potential impacts are likely.	Very high	• Risk assessment conducted • High risk areas identified • See management target in Table 1	• Risk assessment • High risk areas identified	Design/ Construction/ Operation	Manager Environmental Approvals/ Project Manager/ HSES Manager
1.3	Conduct a desktop flora assessment for Ground Disturbance Permit (GDP) applications for construction and operational activities. In areas where a Level 2 survey has not been conducted and conservation significant flora, vegetation and/or fauna habitat have been identified during the desktop assessment ensure a flora survey is conducted in accordance with OEPA Guidance Statement No 51 and reassess accordingly.	High	• Assessments conducted prior to disturbance • Where required, survey undertaken	• Survey reports • Approval documentation	Development/ Construction/ Operation	Project Manager/ HSES Manager
Objective 2	**Establish management strategies to minimise potential impacts on conservation significant flora, vegetation and/or fauna habitats**					
Reference	**Management Actions**	**Risk Based Priority**	**Management Actions**	**Reporting/ Evidence**	**Timing**	**Responsibility**
2.1	Ensure staff and contractors are provided with the appropriate training to ensure conservation significant flora, vegetation and/or fauna habitats are protected.	High	• Site induction include conservation significant flora, vegetation and fauna habitat • Toolbox presentations delivered to targeted work groups	• Site induction • Toolbox presentations • Training materials/ registers	Construction/ Operation	Project Manager/ HSES Manager
2.2	Ensure drainage infrastructure location and design aligns with the risk assessment outcomes where possible to minimise interference and disruption of natural surface water flows that support conservation significant flora, vegetation and/or fauna habitats.	High	• Location and design of drainage infrastructure aligns with risk assessment outcomes where possible	• Risk assessment	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)/ Manager Operations Planning
2.3	Where sheet flow dependent Mulga communities have been identified and significant impacts from changes to sheet flow regimes are likely, incorporate appropriate drainage infrastructure into project design.	High	• Drainage infrastructure is included in areas of sheet	• Audit/ inspection reports	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)

Objective 1	**Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats**					
			flow dependent Mulga communities			
2.4	Where possible, align linear infrastructure with existing transport corridors or approved disturbance corridors so that surface water flow regimes are minimally impacted.	High	• Linear infrastructure aligned with existing transport/disturbance corridors where possible	• Audit/ inspection reports	Design/ Construction/ Operation	Project Manager/ Manager Infrastructure (Rail)/ Manager Operations Planning
2.5	Prior to conducting disturbance activities, ensure known locations of conservation significant flora, vegetation and/or fauna habitat and their associated buffers are identified and management measures to minimise any impacts to those areas are implemented.	Very High	• GDP identifies conservation significant flora, vegetation and/or fauna habitat and their associated buffers • Management measures implemented • Surface water management measures implemented where required • Weed management measures implemented where required • Dust management measures implemented where required • See management targets in Table 1	• GDP • Inspection/Audit records	Construction/ Development	Project Manager/ HSES Manager
2.6	Prior to conducting ground disturbance activities, ensure known locations of weed populations are identified and management measures to minimise the potential for weed spread are included in the Ground Disturbance Permit.	Medium	• Weed populations and management measures are identified in the GDP • Vegetation Health Monitoring program implemented	• GDP • Monitoring report	Construction/ Operation	Project Manager/ HSES Manager
2.7	When unauthorised clearing of conservation significant flora, vegetation and/or fauna habitat occurs, report the incident in accordance with the *Incident Event Management Procedure* (100-PR-SA-0011) and implement corrective actions defined in Table 9 and any reporting requirements defined in Section 8 of the Plan.	High	• Incident reported in BMS • Where required the incident is reported within the specified legislative or licensing timeframe	• Incident report in BMS • Correspondence with the Regulator • Annual reporting	Construction/ Operation	Project Manager/ HSES Manager
2.8	Conduct rehabilitation of disturbed areas, particularly those areas with known conservation significant flora, vegetation and/or fauna habitat, no longer required for operations.	High	• Disturbed areas rehabilitated in accordance with the Plan • Compliance with the Plan	• Compliance Assessment Report	Operation/ Decommissioning/ Closure	Project Manager/ Manager Mining

Objective 1	**Establish the potential direct and indirect impacts on conservation significant flora, vegetation and/or fauna habitats**					
			• GIS updated with rehabilitation data	• GIS dataset		
Objective 3	**Develop and implement vegetation health monitoring programs to detect impacts on conservation values of conservation significant flora, vegetation and/or fauna habitat.**					
Reference	**Management Actions**	**Risk Based Priority**	**Performance indicators**	**Reporting/ Evidence**	**Timing**	**Responsibility**
3.1	Develop and implement a vegetation health monitoring program to determine the effectiveness of the management strategies on conservation significant flora, vegetation and/or fauna habitat.	Very high	• Vegetation health monitoring program implemented • Vegetation health monitoring undertaken in accordance with the required frequency • Monitoring location are identified in consultation with the appropriate Regulator where required • See management targets in Table 1	• Vegetation health monitoring program • Records of consultation with appropriate Regulators (emails, letters)	Construction/ Operation	Group Manager Environment
3.2	Undertake a baseline vegetation health survey of identified vegetation health sites prior to the first monitoring event where possible to: • Document all conservation significant flora, vegetation and/or fauna habitat within impact and reference sites • Identify the baseline for existing conservation significant flora, vegetation and/or fauna habitat at impact and reference sites • Compare conservation significant flora, vegetation and/or fauna habitat health between impact and reference sites.	High	• Baseline survey undertaken for all monitoring sites • Baseline survey undertaken prior to the first monitoring event	• Baseline monitoring reports	Construction/ Operation	Project Manager/ Group Manager Environment
3.3	When monitoring results indicate a potential impact on vegetation health, implement corrective actions defined in Table 9 and any reporting requirements defined in Section 8. Update the Plan where required, to inform an adaptive management approach to vegetation management across the business.	High	• Corrective actions implemented • Reporting requirements met • Plan updated where required	• Vegetation health monitoring report • Reporting records • Updated Plan	Construction/ Operation	**Corrective Actions:** Project Manager/ HSES Manager **Reporting/ Program and Plan updates:** Group Manager Environment