

Table 16: Summary of Inherent and Residual Risk to the Environment				Inherent Risk				Residual Risk				
No.	Environmental Factor	Aspect / Hazard / Event	Impact (unmitigated)	Consequence	Likelihood	Risk Level	Rating Number	Summary of Further studies and Management Controls	Consequence	Likelihood	Risk Level	Rating Number
1	Flora and Vegetation	Excessive Land Clearing	Loss of flora and vegetation Habitat fragmentation Decreased biodiversity Loss of fauna habitat Promotion of weeds Increased erosion of soil	3-Moderate	A-Almost Certain	Critical	6	<p>Flora and fauna surveys to confirm the recorded distribution from previous surveys of protected species, habitats weeds, vegetation condition and associations over the whole route. Detailed engineering design incorporating more detailed hydrology, topography, geotechnical information to determine disturbance area Vegetation and Flora Management Plan Protected Fauna Management Plan Weed and Hygiene Management Plan Surface Water Management Plan Fortescue Marsh Management Plan Groundwater and Bore Management Plan Construction and Operation Environmental Management Plans for dust, noise, fire, chemicals.</p> <p>The plans will require induction and awareness programs and regular inspections</p>	2-Minor	D-Unlikely	Low	21
2		Fire	Death and damage to vegetation Habitat fragmentation Decreased biodiversity Loss of fauna habitat Promotion of weeds Increased erosion of soil	3-Moderate	B-Likely	High	9		2-Minor	D-Unlikely	Low	21
3		Dust	Smothering of vegetation	1-Insignificant	B-Likely	Moderate	19		1-Insignificant	C-Possible	Low	22
4		Water use and dewatering	Death of groundwater dependant vegetation Promotion of weeds Increased soil erosion	2-Minor	C-Possible	Moderate	18		2-Minor	D-Unlikely	Low	21
5		Vehicle movement outside of approved area	Habitat fragmentation Decreased biodiversity Loss of fauna habitat Promotion of weeds Increased erosion of soil	2-Minor	C-Possible	Moderate	18		1-Insignificant	D-Unlikely	Low	24
6		Drainage changes	Promotion of weeds Increased erosion of soil Death of surface water dependant vegetation	3-Moderate	A-Almost Certain	Critical	6		2-Minor	D-Unlikely	Low	21
7		Contamination	Loss of fauna habitat Promotion of weeds Increased erosion of soil Death of vegetation Poor water quality used in dust suppression results in vegetation destruction	2-Minor	C-Possible	Moderate	18		1-Insignificant	C-Possible	Low	22
8	Terrestrial Fauna	Disturbance outside approved areas	Loss of habitat Fauna injury and death	2-Minor	B-Likely	High	14		2-Minor	D-Unlikely	Low	21
9		Vehicle and machinery movement within construction area	Fauna injury and death	2-Minor	B-Likely	High	14		2-Minor	D-Unlikely	Low	21
10		Noise and Vibration	Change in natural behaviour Stress to fauna	2-Minor	A-Almost Certain	High	10		2-Minor	C-Possible	Moderate	18
11		Fire	Loss of habitat Fauna injury and death	3-Moderate	B-Likely	High	9		2-Minor	D-Unlikely	Low	21
12		Excavations and trenching	Loss of habitat Fauna injury and death Trapped animals Drowning	2-Minor	C-Possible	Moderate	18		1-Insignificant	C-Possible	Low	22
13		Feral animal introduction and attraction	Fauna injury and death Competition for resources Prey on native species Disease susceptibility	3-Moderate	C-Possible	High	13		2-Minor	D-Unlikely	Low	21
14		Human interactions	Fauna injury and death Foraging for food in refuse Dependency on humans for feeding	2-Minor	B-Likely	High	14		2-Minor	C-Possible	Moderate	18

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15		Drainage changes	Loss of habitat Drowning Mosquito increase activity	2-Minor	C-Possible	Moderate	18	Detailed engineering design incorporating more detailed hydrology, topography, geotechnical information to determine disturbance area, drainage design, proposed excavations, specific sources of borrow materials. Numerical groundwater model to determine sustainable yields and potential long term impacts for proposed bore fields. Baseline sampling for subterranean fauna at proposed bore fields. Subterranean Fauna Management Plan. Surface Water Management Plan. Groundwater and Bore Management Plan. Construction and Operation Environmental Management Plans for should include chemicals / spills. The plans will require induction and awareness programs and regular inspections.	2-Minor	D-Unlikely	Low	21
16		Infrastructure	Loss of habitat Fauna injury and death Trapped animals Change of habitat	2-Minor	B-Likely	High	14		2-Minor	D-Unlikely	Low	21
17		Light	Stress Change in natural behaviour	2-Minor	B-Likely	High	14		2-Minor	D-Unlikely	Low	21
18	Subterranean Fauna	Dewatering	Changes to community diversity Change in water quality Loss of habitat	2-Minor	C-Possible	Moderate	18		2-Minor	C-Possible	Moderate	18
19		Drainage changes	Changes to amount of water and nutrients (and oxygen) infiltrates	2-Minor	D-Unlikely	Low	21		1-Insufficient	E-Rare	Low	25
20		Contamination from hydrocarbons	Contamination of habitat Death of fauna	1-Insufficient	C-Possible	Low	22		1-Insufficient	D-Unlikely	Low	24
21		Borrow pit construction	Loss of habitat	2-Minor	E-Rare	Low	23		2-Minor	E-Rare	Low	23
22		Noise and Vibration	Fauna stress Collapse of air cavities leading to loss of habitat	2-Minor	C-Possible	Moderate	18	1-Insufficient	C-Possible	Low	22	
23		Compaction of soil	Fauna stress Loss of habitat Habitat integrity reduction	2-Minor	D-Unlikely	Low	21	2-Minor	D-Unlikely	Low	21	
24	Surface Water	Infrastructure development	Reduced aquifer recharge Reduced flow downstream Reduced vegetation Water quality changes	4-Major	C-Possible	Critical	8	2-Minor	D-Unlikely	Low	21	
25		Fuel and chemical contamination	Water quality changes Health issues	2-Minor	C-Possible	Moderate	18	1-Insufficient	D-Unlikely	Low	24	
26		Vegetation clearing	Varies the flow patterns Increased sedimentation Erosion and sedimentation Water quality changes	3-Moderate	C-Possible	High	13	2-Minor	D-Unlikely	Low	21	
27	Groundwater	Infrastructure development	Changed water quality Sedimentation	2-Minor	D-Unlikely	Low	21	2-Minor	D-Unlikely	Low	21	
28		Contamination	Changed water quality Sterilisation of resource	2-Minor	D-Unlikely	Low	21	2-Minor	E-Rare	Low	23	
29		Dewatering / Abstraction	Lower water tables Reduced water availability to groundwater dependent ecosystems	2-Minor	C-Possible	Moderate	18	2-Minor	C-Possible	Moderate	18	

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No.	Environmental Factor	Aspect / Hazard / Event	Impact (unmitigated)	Inherent Risk			Summary of Further studies and Management Controls	Residual Risk				
				Consequence	Likelihood	Risk Level		Rating Number	Consequence	Likelihood	Risk Level	Rating Number
30	Air Quality	Vegetation clearing	Increased dust generated with subsequent possible effects on community/workers/vegetation health	2-Minor	B-Likely	High	14	Vegetation and Flora Management Plan Construction and Operation Environmental Management Plans for dust, noise The plans will require induction and awareness programs and regular inspections	1-Insignificant	C-Possible	Low	22
31		Vehicle and machinery movement and plant equipment operation	Exhaust fumes Dust Greenhouse gas emissions OHS issues	2-Minor	B-Likely	High	14	Environmental Management System Construction and Operation Environmental Management Plans for dust, noise	1-Insignificant	C-Possible	Low	22
32	Waste Management	Incorrect disposal	Injury, illness and death of fauna Spread of disease Visual amenity Contamination Smells Attracts fauna to scavenge Attracts pests	2-Minor	B-Likely	High	14	Waste Management Plan Environmental Management System	2-Minor	D-Unlikely	Low	21
33		Resource use	Increased volume of waste and refuse Volumes to landfill Water use	2-Minor	C-Possible	Moderate	18	Waste Management Plan Environmental Management System	1-Insignificant	C-Possible	Low	22
34	Visual Amenity	Infrastructure development	Physical presence in previously undisturbed area Negative community feedback Multiple road crossings Multiple infrastructure crossing	2-Minor	B-Likely	High	14	Stakeholder consultation including communication strategy. Detailed design considerations	1-Insignificant	C-Possible	Low	22
35		General clearing and rehabilitation	Negative stakeholder feedback	2-Minor	B-Likely	High	14	Stakeholder consultation including communication strategy. Detailed design considerations	1-Insignificant	D-Unlikely	Low	24
36	Social	Social competition for resources	Flights Accommodation Recreational activities Healthcare resources	2-Minor	C-Possible	Moderate	18	Stakeholder consultation including communication strategy. Sustainability Management Plan which will incorporate principles to provide local opportunities for employment etc and investment in the local communities.	2-Minor	C-Possible	Moderate	18
37	Cultural Heritage	Heritage sites	Destruction of sites Interfering with sites Reducing access either temporarily or permanently Temporary obstruction	3-Moderate	B-Likely	High	9	Archaeological and ethnographic studies Section 16 and/or Section 18 approvals under <i>Aboriginal Heritage Act 1972</i> where required Discussion with DEWHA about Fortescue Marsh listing on the Register of the National Estate (EPBC Act heritage) Cultural Heritage Management Plan	2-Minor	D-Unlikely	Low	21
38	Topsoil and Rehabilitation	Poor rehabilitation	Ongoing reduced visual amenity Ongoing promotion of weeds Ongoing loss of fauna habitat and poor vegetation condition	2-Minor	C-Possible	Moderate	18	Level 2 flora and fauna surveys to determine the distribution of weeds, vegetation condition and associations over the route. Topsoil and Rehabilitation Management Plan	1-Insignificant	D-Unlikely	Low	24
39		Inappropriate storage and use of topsoil	Ongoing promotion of weeds Ongoing loss of flora and fauna habitat	2-Minor	C-Possible	Moderate	18		2-Minor	D-Unlikely		