6. SUMMARY OF ASSESSMENT OF PRELIMINARY KEY FACTORS

A summary of the assessment of each of the preliminary key environmental factors identified for the Proposal is provided in **Table 14.** This table outlines the potential impacts to each factor, mitigation measures proposed to prevent or minimise impacts, the regulatory processes that manage these actions and the overall likely outcome expected based on proposed management processes.

TABLE 14: SUMMARY OF ASSESSMENT OF PRELIMINARY KEY ENVIRONMENTAL FACTORS

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
1	Flora and Vegetation				
EPA Objective: To maintain representation, diversity, viability and ecological function at the species, population and community level.					
No TECs or Threatened flora listed under either the WC Act or EPBC Act recorded in the Proposal Area 11 Priority listed flora species recorded from the Proposal Area: o *Goodenia omearana ms.*(P1) o *Heliotropium muticum*(P1) o *Tephrosia rosea var.* Port Hedland (A.S. George 1114) (P1) o *Paspalidium rryiglume* (P2) o *Abutilon trudgenii* ms. (P3) o *Bulbostylis burbidgeae*(P3) o *Goodenia nuda* (P3) o *Gymnanthera cunninghamii* (P3) o *Hibiscus brachysiphonius*(P3) o *Sida* sp. Wittenoom (W.R. Barker 1962) (P3) o *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (P3). Three PECs recorded within the Proposal Area o Brockman Iron cracking clay communities of the Hamersley Range o Fortescue Marsh (Marsh Land System) o Four plant assemblages of the Wona Land System. o Four groundwater dependant vegetation communities lie within the Proposal Area					

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
1.1	Clearing of vegetation, up to a maximum of approximately 3,000 ha of remnant vegetation, including: • potential direct loss of Priority flora individuals or populations • disturbance to portions of PECs (<1% potential to disturb each PEC including 201 ha of the Fortescue Marsh PEC, 58 ha of Brockman Iron cracking clay communities of the Hamersley Range PEC and 10.8 ha of the Four plant assemblages of the Wona Land System PEC)	BOTS formation and associated infrastructure	• Elevated BOTS design with use of spaced substructures (instead of traditional earth embankment with ballast), significantly reduces area of ground disturbance • Large portion of disturbance will be temporary (i.e. for pylon construction pads and construction camps). Actual BOTS alignment and associated infrastructure will be positioned in areas that avoids direct loss of Priority species and ecological communities, where possible • Prohibit all off-road driving to prevent accidental losses of Priority fauna or impacts to PECs • Areas not required for ongoing operations will be rehabilitated • Rehabilitation success has a high likelihood due to linear nature of disturbance footprint	Native Vegetation Clearing Permit (NVCP) to be obtained under Part V of the EP Act through DER.	The Proposal is not expected to affect the conservation status of any Priority taxa or PECs known to occur in the Proposal Area, or have a significant effect on the representation of species or vegetation communities at a local or regional level.
1.2	Drawdown of groundwater and/or alteration of subsurface flows resulting in direct impacts to groundwater dependant vegetation	Groundwater abstraction (for construction and operation activities)	• Construction activities will utilise existing bores, where possible or cart water from the Iron Valley Project site • Groundwater drawdown activities will be minimal, unlikely to result in significant drawdown.	Licence to Take Water (5C) to be obtained under the RIWI Act managed by the Department of Water (DOW)	The volume of groundwater required for construction activities for the Proposal is unlikely to result in any significant drawdown on groundwater resources and therefore groundwater dependant vegetation communities or other water users are not expected to be impacted.
1.3	Modification of surface water flows resulting in direct	Physical presence of BOTS alignment and associated	• Elevated nature of BOTS will result in minimal permanent disturbance (if	Licence to Interfere with the bed and banks of a watercourse to be obtained under the RIWI Act managed by the DOW where	Based on the elevated nature of the BOTS, minimal permanent modifications to existing surface

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
	impacts to vegetation communities	infrastructure	any) to natural surface water flows • The four groundwater dependant vegetation communities are narrow in shape and permanent infrastructure will avoid disturbance to these where possible • All BOTS associated infrastructure (i.e. construction camps, construction pads) will be located off drainage lines and flood prone areas, where possible	relevant.	water flows is expected and as such, vegetation communities relying on local surface water flows are not expected to be impacted.
2	**Terrestrial Fauna**				
EPA Objective: To maintain representation, diversity, viability and ecological function at the species, population and assemblage level					
One Threatened Fauna taxa listed as Endangered under the WC Act and EPBC Act recorded in the Proposal Area: o Northern Quoll (*Dasyurus hallucatus*) – Schedule 1 and Vulnerable Four Priority fauna species listed by DPAW recorded in the Proposal Area: o Brush-tailed Mulgara (*Dasycercus blythi*) – P4 o Western Pebble-mound Mouse (*Pseudomys chapmani*) – P4 o Ghost Bat (*Macroderma gigas*) – P4 o Australian Bustard (*Ardeotis australis*) – P4 Two Migratory species listed under the recorded in the BOTS Proposal Area: o Rainbow Bee-eater (*Merops ornatus*) o White-bellied Sea-Eagle (*Haliaeetus leucogaster*) Five significant fauna habitats identified within the vicinity of the Proposal Area: o Fortescue Marsh o Linear sand dunes habitats adjacent to Weeli Wolli Creek o Cracking clay habitat units associated with the Chichester Range o Granite rockpiles scattered on the Abydos plain o Major drainage systems. It should be noted that no significant fauna species or habitats are restricted to the Proposal Area.				

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
2.1	Removal of fauna habitat through clearing of native vegetation (up to 3,000 ha)	BOTS and associated infrastructure	• Elevated BOTS design with use of spaced substructures (instead of earth embankment with ballasted track as per traditional rail), significantly reduces area of ground disturbance resulting in removal of fauna habitats • Disturbance within significant fauna habitats shall be restricted to the BOTS alignment, maintenance tracks and construction pads. All other associated infrastructure (i.e. construction camps) will be located outside of these significant habitats, where possible • Areas not required for ongoing operations will be rehabilitated • Rehabilitation success has a high likelihood due to linear nature of disturbance footprint	Native Vegetation Clearing Permit (NVCP) to be obtained under Part V of the EP Act through DMP.	The Proposal is not expected to affect the conservation status of any Priority taxa or fauna habitats known to occur in the Proposal Area, or have a significant effect on the representation of species or habitats at a local or regional level.
2.2	Construction of linear infrastructure, resulting in habitat barriers to local fauna	Physical presence of BOTS formation and associated infrastructure	• In excess of 20% of the elevated BOTS alignment will be over 2m in height above existing ground levels. • Water flows and small native fauna movements will be unimpeded over the entire length of the BOTS. • Generally the alignment alternates between low and medium/high alignments regularly allowing ease of crossing under the BOTS structure by stock and local fauna.	As above	Due to the elevated nature of the BOTS formation, the Proposal will not act as a habitat barrier to local terrestrial fauna. There have however been 11 segments to date identified of more than 5km of continuous low module construction that will impede the movement of stock and larger fauna. Some temporary displacement of fauna may also occur during construction activities but impacts are not expected to affect the conservation status of any fauna taxa known to occur in the Proposal Area, or have a significant effect on the representation of any species at a local or regional level.

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
2.3	Increased artificial lighting may impact fauna sensitive to light	Physical presence of BOTS formation and associated infrastructure	• Lighting will be directed only upon construction areas and camp sites • Lighting will only be used as necessary to provide a safe environment for construction workers • Any short term maintenance activities to the track structure during the Operational phase will be conducted during daylight hours where possible to minimise impact • BOTS will be operated autonomously, monitored remotely from a Perth based location, reducing requirements for lighting along the length of the formation	n/a	The Proposal is not located in areas known to inhabit fauna that are significantly sensitive to light. As such, the use of artificial light during construction and operation of the Proposal is not expected to have any significant impact to local fauna.
3	Hydrological Processes				
EPA Objective: To maintain the hydrological regimes of groundwater and surface water so that existing and potential users, including ecosystem maintenance, are protected					
One Environmentally Sensitive Area listed under the WC Act and the EPBC Act is recorded in the Proposal Area: o Fortescue Marsh – Nationally Important Wetland (<%1 proposed to be disturbed) The BOTS Proposal Area also intersects at least six other major surface water bodies.					
3.1	Drawdown of local groundwater resources	Construction activities for the BOTS and associated infrastructure	• Construction activities will utilise existing bores, where possible or cart water short distances from the Iron Valley Project site • Groundwater abstraction activities will be minimal, unlikely to result in significant drawdown.	Licence to Take Water (5C) to be obtained under the RIWI Act managed by the DOW	The groundwater abstraction required for construction activities for the Proposal is unlikely to result in any significant drawdown on groundwater resources. It is expected that the existing hydrological regime of groundwater Proposal Area will be maintained.
3.2	Modification to groundwater / subsurface flows	Dewatering (for construction activities)	• Groundwater abstraction is expected to be minimal, unlikely to result in significant drawdown or alteration of groundwater/subsurface flows.	As above	As above
3.3	Modification to surface water flows	Physical presence of BOTS formation and associated	• Elevated design of BOTS formation will result in minimal permanent	Licence to Interfere with the Bed and Banks of a Watercourse to be obtained	Based on the elevated nature of the BOTS formation, minimal

No.	Potential Impact	Environmental Aspect	Mitigation Measures	Proposed Regulatory Measures	Outcomes that demonstrate Project meets EPA Objectives
		infrastructure	disturbance (if any) to natural surface water flows • Temporary associated infrastructure (i.e. construction camps, construction pads, soil and vegetation stockpiles) will be located off drainage lines, where possible	under the RIWI Act managed by the DOW	permanent modifications to existing surface water flows is expected and as such, the existing hydrological regime of groundwater resources in the Proposal Area will be maintained.

7. PRINCIPLES OF THE EP ACT

The EP Act sets out five principles by which protection of the environment is to be achieved in Western Australia. Consideration has been given to these five principles by MRL and the manner in which they have been applied is outlined in **Table 15**.

TABLE 15: PRINCIPLES OF THE EP ACT

Principle and Description in EP Act	Principle Consideration Given by the	Section where addressed in documentation
1. Precautionary Principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by: • Careful evaluation to avoid, where practicable, serious or irreversible damage to the environment • An assessment of the risk- weighted consequences of various options.	MRL recognises the importance of minimising environmental impacts as it is vital in ensuring the proponent's longevity, success, growth and positioning in domestic and global markets. This will be achieved by successful management of potential risks to the environment. MRL operates existing environmental management plans (EMPs) that address all of its activities with potential to affect the environment. The key elements of the EMP include assessing environmental risk arising from environmental aspects with the intention of identifying issues early in the process to enable planning for avoidance and/or mitigation. Part of this process includes undertaking detailed site investigations of the biological and physical environs. Where these investigations identify significant conservation issues, management measures are incorporated into project design to avoid, where practicable, or minimise any potential impacts. As a result this project has been designed to minimise potential impacts to key environmental values of the flora, vegetation, fauna and hydrological processes.	**Table 14**
2. Intergenerational Equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	MRL's decision-making processes incorporate sustainability principles and the implementation of innovative technologies where feasible, BOTS being a prime example of this. The proponent aims to inspire an ethic and attitude that strives for continuous improvement and ongoing learning. MRL encourages its contractors and employees to engage in positive attitudes and behaviour concerning respect for the environment. We recognise sustainability cannot be achieved without the contribution and action of the entire team.	**Section 2** and **Table 14**
3. Conservation of Biological Diversity and Ecological Integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Conservation of biological diversity and ecological integrity is fundamental to MRL's approach to environmental management and is a major environmental consideration for the Proposal. Biological investigations of the corridor covering the majority of Proposal area have been previously undertaken by other proponents utilising infrastructure within the corridor. Surveys of the majority of the "gap" sections were completed early in the project planning	**Sections 1** and **2**, **Table 14**.

Principle and Description in EP Act	Principle Consideration Given by the	Section where addressed in documentation
	process (May 2015) to identify values of environmental conservation significance required to be protected from disturbance. Based on the number of previous surveys conducted in the vicinity of an unsurveyed ~10km "gap" section in the northern portion of the Proposal area, there is a low risk of any significant environmental values being associated with this area. However MRL commits to conducting flora and fauna assessments of the area prior to any proposed ground disturbance associated with the Proposal. This Proposal has been designed to minimise potential impacts to the key environmental values of the surrounding flora and vegetation and significant fauna species.	
4. Improved valuation, pricing and incentives mechanisms Environmental factors should be included in the valuation of assets and services. The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement. The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes. Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentives structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.	The Proponent acknowledges the need for improved valuation, pricing and incentive mechanisms and endeavours to pursue these principles when and wherever possible. For example: • Environmental factors have significantly influenced project design so as to minimise effects to those environmental factors • The Proponent has put in place procedures that will ensure that pollution-type impacts are minimised as far as practicable**.**	**Section Table 1** and **Table 14**
5. Waste Minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	The Proponent's approach to waste management is, in order of priority: • Avoid and reduce at source • Reuse and recycle • Treat and/or dispose.	**Section 2** and **Table 14**

8. PROPONENT CONCLUSIONS

The EPA Referral of the Proposal has provided supporting information to the EPA in order to determine the Level of Assessment for the Proposal. This document has provided information about the existing environment and potential impacts of implementation of the Proposal and defines MRL's approach of managing potential impacts for each of the EPA's environmental factors.

The Proposal has been designed to predominantly utilise exisiting previously EPA assessed rail infrastructure corridors, including existing supporting infrastructure such as rail maintanance tracks, thereby avoiding and minimising impacts to the preliminary key environmental factors where practicable.

MRL considers that the information and assessment presented in this Referral adequately identifies and addresses environmental aspects and issues relevant to the Proposal and is adequate to enable the EPA to conclude that Proposal does not require assessment under Part IV of the EP Act and can be appropriately managed under Part V of the EP Act, administered by the Department of Mines and Petroleum.

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