Report and recommendations of the Environmental Protection Authority

Hamersley Agriculture Project

Hamersley Iron Pty Ltd

Report 1416

October 2011

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
28/01/2011	**Referral of Proposal**	
28/03/2011	**API Scoping Guidelines issued and Level of Assessment set**	
09/05/2011	**Proponent's draft API document received by EPA**	
1/08/2011	**Final API document submitted by proponent**	
15/09/2011	**EPA report presented and considered by the EPA**	**7**
17/10/2011	**Publication of EPA report**	**4**
31/10/2011	**Close of appeals period**	**2**

The Environmental Protection Authority met its timeline objective for completion of the assessment report and provision of a recommendation to the Minister.

Dr Paul Vogel
Chairman

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1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal to establish the Hamersley Agriculture Project, within the central Pilbara. The proposal aims to utilise surplus mine water from the Marandoo Mine Phase Two (MMP2) to cultivate crops for agricultural purposes and on-selling to pastoralists in the region as stock feed.

The proposal would directly contribute to minimising the requirement for surplus water to be discharged into the surrounding ephemeral ecosystems. Also, establishing irrigated agriculture in the Pilbara region has the potential benefit of increasing localised stocking rates, reducing total area grazed and effectively spell large areas that may be under pressure from grazing. The proponent for this proposal is Hamersley Iron Pty Ltd, a subsidiary of Rio Tinto Iron Ore.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The proponent has submitted a referral document setting out the details of the proposal, potential environmental impacts and proposed commitments to manage those impacts.

The EPA considers that the proposal, as described, can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA has determined under Section 40 of the EP Act that the level of assessment for the proposal is Assessment on Proponent Information (API). The EPA's decision was made on 28 March 2011. This report provides the EPA's advice and recommendations in accordance with Section 44 of the EP Act.

2. The proposal

The area for assessment occurs on the Hamersley Station, located 37 km east of Tom Price and 77 km north-east of Paraburdoo, within the central Pilbara (Figure 1). In close proximity to the proposal area is the Karijini National Park, located 1 km to the north and 1.7 km east at its closest point (Figure 2).

The proposal involves establishing an agricultural scheme that comprises a series of irrigated pivot cells for hay production, and will aim to increase productivity and sustainability of pastoral operations in the Pilbara. The proposal will utilise mine water, surplus to other MMP2 requirements, and forms an important component of the integrated MMP2 water management strategy.

The proposal aims to cultivate hay, namely Rhodes Grass (*Chloris gayana*) and Forage Oats (*Avena sativa*), within circular pivot cells ranging in size from 28 to 50 hectares (ha). The harvested crop will be cut and baled on a rotational basis and will be delivered to the Hamersley Station for cattle stock feed, with excess produce provided to other pastoral operators.

The proposal area is approximately 2800 ha of which a maximum of 1815 ha is likely to be disturbed. This includes 1650 ha of direct impact and approximately 165 ha of indirect impact. The proposal will be implemented in stages (Figure 1), including:

Stage 1 – Central and Western Agriculture areas and Storage Dam

Stage 2 – Option A (the Eastern Agriculture area)

OR

Option B (the Southern Fortescue Borefield (SFB) Agriculture area).

Stage 1 is required for the proposal to proceed and is planned to be developed following approval. Stage 2 will only be developed if required, based on the performance of Stage 1, and will only consist of one option as detailed above. If development of Stage 2 is required, prior to the approval and implementation, the proponent will be required to carry out the appropriate biological surveys of the SFB Agricultural area, and provide a report to the EPA comparing the environmental impacts of the two alternative options.

The main characteristics of the proposal are summarised in the table below:

Table 1: Summary of key proposal characteristics

Element	Description
Proposal Life	Proposal life based on availability of surplus water from MMP2: • Approximately 22 years
Overall Proposal Area	• 2800 ha
Area of Direct Impact	Disturbance to approximately 1650 ha within the proposal including: • Stage 1 – 1270 ha • Stage 2 – 380 ha
Area of Indirect Impacts	Disturbance to approximately 165 ha within the proposal based on a 30 m perimeter surrounding pivots including: • Stage 1 - 115 ha • Stage 2 - 50 ha
Power usage and supply	• Overhead power line from the Marandoo Village to the dam transfer pump station and fertigation system.
Water usage and supply	• Irrigation water sourced from surplus water from the MMP2 main transfer pipeline. • Approximate water usage 29.2 GL/year. • Irrigation areas will use a centre pivot irrigation system. Irrigation water application rates will be regulated such that water loss through runoff or seepage below the crop root zone is minimised • 4 GL water storage dam.
Fertigation system	• Fertigation sheds and associated infrastructure. • Liquid fertilisers applied with irrigation water in low concentrations to meet the daily crop plant growth on a daily basis. • Liquid chemicals applied with irrigation water at very low concentrations on an as needed

	basis.
Other facilities and infrastructure development	• Office buildings, ablutions, fuel and storage, machinery wash down area and contractors machinery shed. • An access road from the Marandoo Village to the Dam and transfer pump station. • Fencing around proposal to restrict the ingress of livestock. • Inspection areas will be located at each agricultural area. • One wash down bay will be located at the central agricultural area.

The details of the proposal are discussed by the proponent in section 6.1 of the referral document, *Hamersley Agriculture Project*, Revision 2 August 2011 (Rio Tinto, 2011).

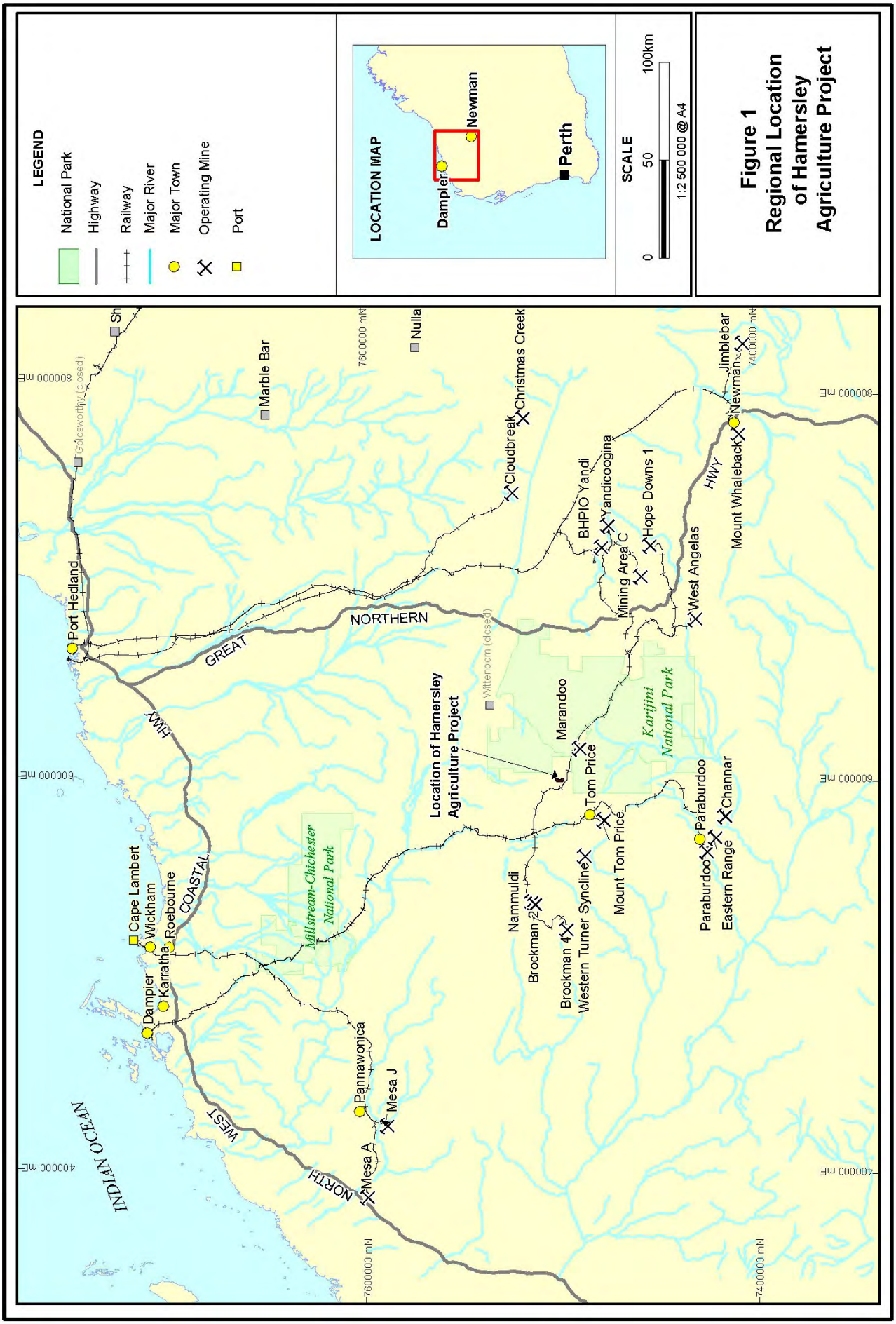

Figure 1:– Regional Location of the Hamersley Agriculture Project

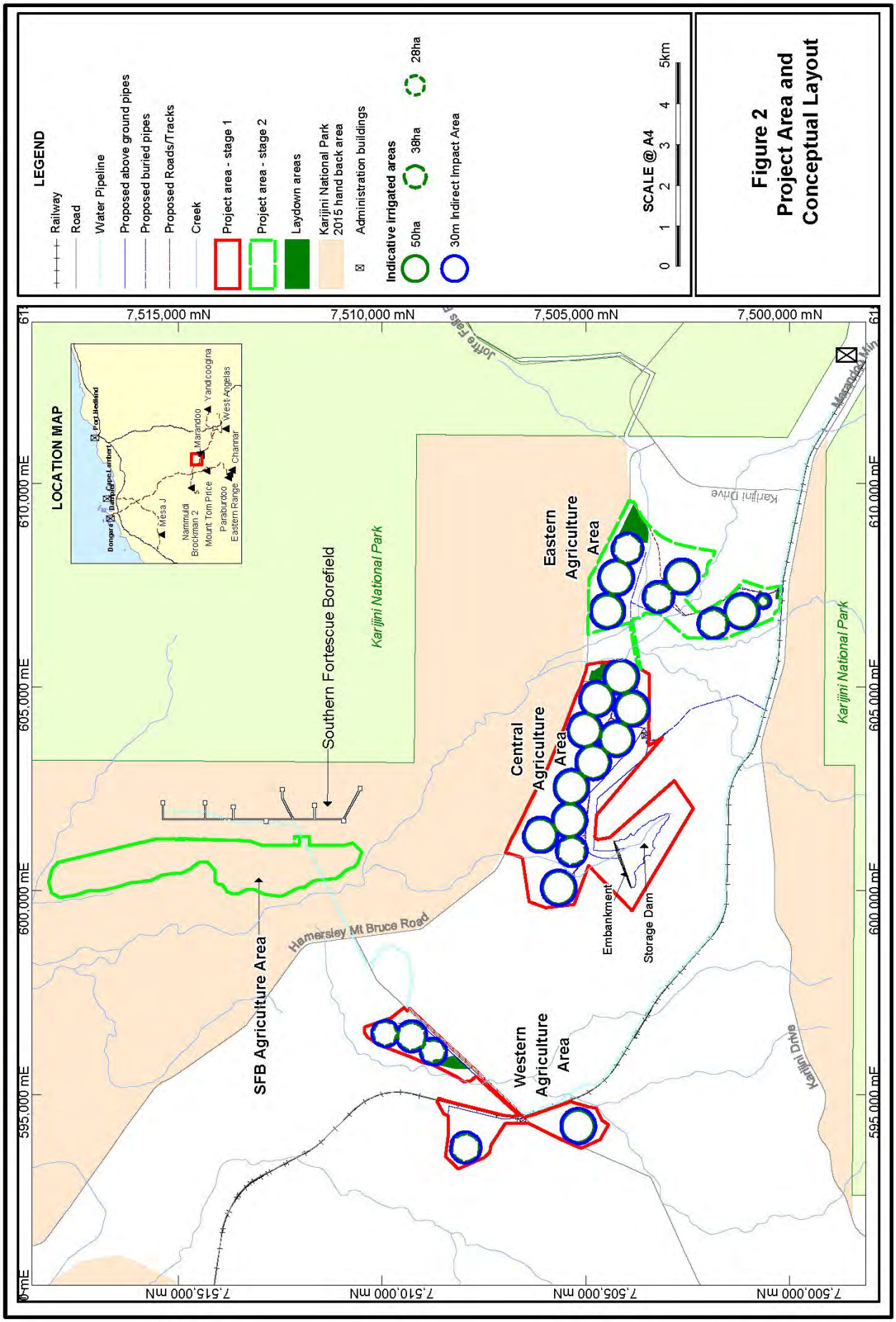

Figure 2:– Project Area and Conceptual Layout

3. Consultation

A number of discussions and meetings have been held by the proponent with the relevant traditional owners, government agencies and non-government organizations. Key agencies that were consulted in the process included the departments of Environment and Conservation (DEC), Water (DOW), Agriculture and Food (DAFWA), and Indigenous Affairs. The proponent has committed to ongoing consultation with relevant stakeholders during the environmental approval process and the detailed design stage.

A detailed synopsis of the consultation undertaken is provided in Section 4 of the *Hamersley Agricultural Proposal Environmental Review Document* (Rio Tinto, 2011).

4. Key environmental factors

It is the EPA's opinion that the following key environmental factors relevant to the proposal require evaluation in this report:

(a) Flora (Spread of weeds);
(b) Water quality and quantity;
(c) Rehabilitation; and
(d) Visual amenity (proposal options).

The key environmental factors are discussed below in Sections 4.1-4.4. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

4.1 Flora (spread of weeds)

Description

The proposal will involve the clearing of 1650 ha for the introduction and cultivation of two crop species, namely Rhodes Grass (*Chloris gayana*) and Forage Oats (*Avena sativa*). The establishment of agriculture has the potential to spread crop species within the locality, which may affect the surrounding vegetation and fauna habitats. The potential for adverse environmental impacts is dependent on the species selected and implementation of robust monitoring and control measures.

It should be noted that clearing for this proposal will not affect any significant area of fauna habitat. The proposal is considered unlikely to significantly affect Short Range Endemic taxa, or the conservation status of any mammals of elevated conservation significance found within the locality (Biota 2010).

The vegetation condition within the proposal's footprint has been documented as very good, with limited signs of erosion and low number of major weed populations. The Western Agricultural area (Figure 2) is the only area with sections of vegetation considered to be in Poor or Very Poor condition, as well as displaying more weed species and signs of cattle grazing. All the vegetation units found in the proposal area are typical of this section of the Hamersley subregion.

Threatened Ecological Community

The vegetation and flora surveys undertaken recorded no Threatened Ecological Communities (TECs) or Priority Ecological Communities within the overall project area. However, while there are no TECs occurring within the proposal area, there are stands of the Themeda grassland TEC situated 20 km to the north-west of the study areas, with smaller stands mapped as close as 3.5 km to the north of the proposed Stage 2 option B SFB Agricultural area (Figure 3).

Crop species selection

The proponent undertook a process of identifying the preferred crop species based on the systematic consideration of the following three criteria:

1. Reference to the DAWFA Permitted Species List and consideration of only Green or Amber rated species.
2. Review of the DEC Environmental Weed Strategy and consideration of Low rated species only.
3. Completion of a weed risk assessment to identify the selected species suitability to the locality (in terms of invasiveness, impacts and distribution).

In accordance with the selection process, Rhodes Grass (*C. gayana*) and Forage Oates (*A. sativa*) where selected due to both species only surviving under irrigated and fertilised conditions and therefore pose a low environmental risk. Both of these species are permitted plant species in Western Australia and have a low ratings according to the DEC Environmental Weed Strategy.

Management of weed species

The introduction and establishment of agriculture has the potential to spread crop species within the locality, and affect the surrounding vegetation and fauna habitats.

The proponent has provided documentation that indicates that seed dispersal by wind and wet conditions can extend as far as 100 m. However, the proponent describes the likelihood of establishment and growth to be low due to the selected species low persistence in reproducing in areas that are not mechanically disturbed and lack a consistent source of water (Hurter & Naaykens 2010). The climate of the Pilbara effectively creates a natural barrier to the spread and establishment of these crop species beyond the boundary of the proposal.

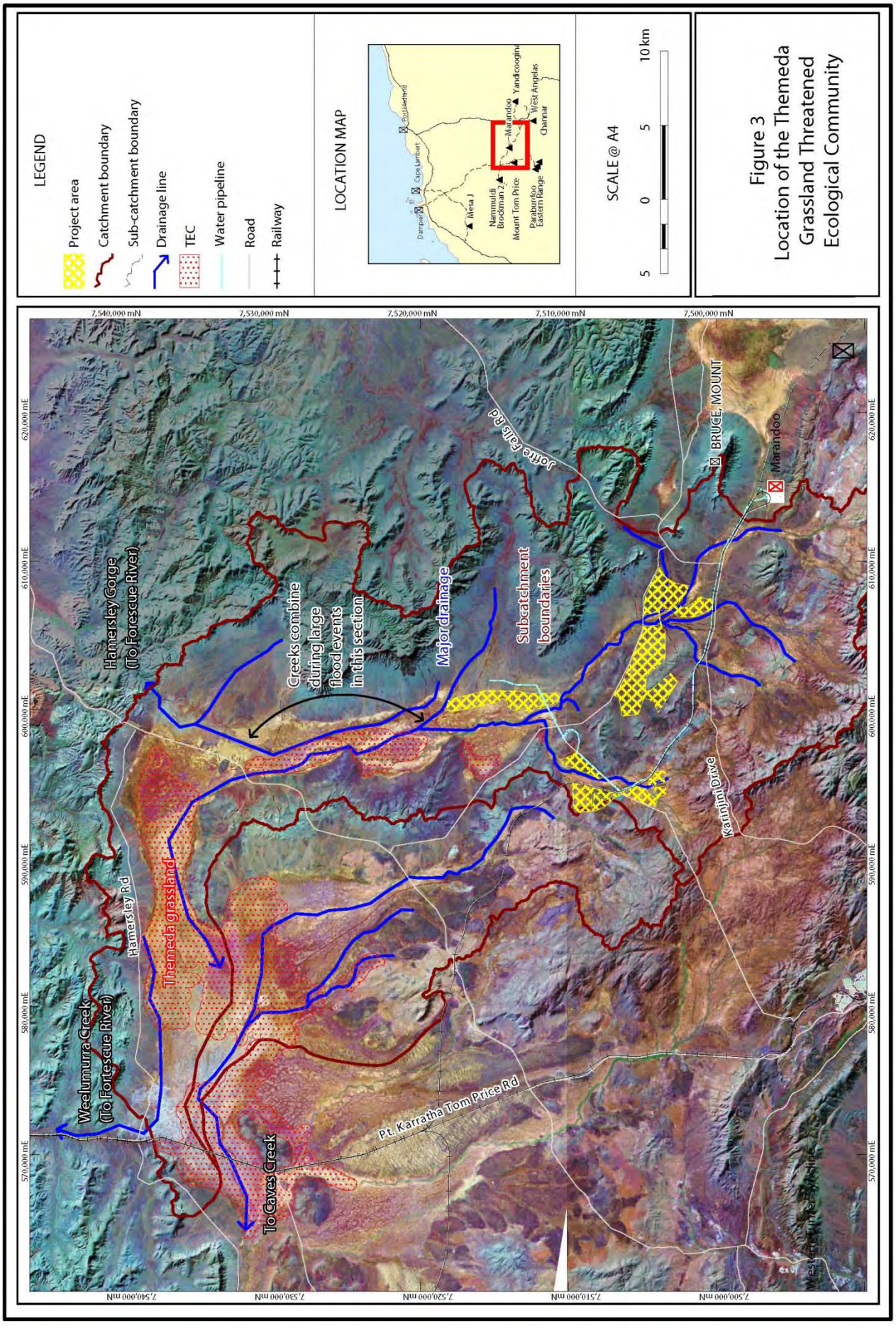

Figure 3: Location of the Themeda Grassland Threatened Ecological Community

Furthermore, harvesting will be scheduled to occur prior to the main heading and seeding period to reduce the risk of weed invasion. The proponent has also committed to ensuring that all machinery and vehicles are inspected when leaving and entering agriculture areas and the dam. All vehicles and machinery that are found to be contaminated will be washed down prior to entering or exiting these areas.

An important aspect of the proposal is the establishment of an indirect impact zone of 30 m surrounding each pivot cell. This would create a buffer area between the agricultural cells and surrounding environment and allow an area in which monitoring for weed species may occur. The buffer area was determined based on the selected crop species average spread of 3 m per year.

A Weed Management Plan forms part of the Project's Environmental Management Plan (EMP). The Weed Management Plan details the implementation of a monitoring program that will be carried out within and surrounding the agricultural areas, and includes both quantitative and surveillance monitoring for the spread of crop species. Sites will be established in the indirect impact zone adjacent to pivots and outside of the footprint (particularly around roads and drainage lines) to monitor and control any potential introduction or spread of weeds, and to monitor vegetation health and condition. These sites will be monitored quarterly. Management actions and contingency plans are also detailed in the EMP and will be implemented to manage, control and eradicate the spread and/or introduction of weed species in the surrounding environment.

Assessment

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

To ensure this environmental objective is met, the EPA has identified the management and prevention of crop species spreading into the surrounding environment as a critical component of this proposal. The proponent has developed an EMP to manage the spread of crop species, however, due to the significance of this issue it has been identified as a key environmental factor.

The EPA notes that the proponent has selected two crop species with the inability to survive in the environmental conditions of the Pilbara without constant irrigation and mechanical disturbance. This may present a natural barrier to the spread of crop species, however ephemeral drainage lines do exist within the agricultural areas and have the potential to transport crop species beyond the proposal boundary. The EPA supports the proponent's approach of establishing monitoring sites within the indirect impact zone, as well as along drainage lines and roads to monitor for the spread of crop species, and undertake eradicating activities if found in the surrounding environment.

Of particular susceptibility to the spread of weeds are the communities of Themeda grassland located in close proximity to the proposal. The DEC has advised that the potential for weeds to escape from the agricultural areas, and particularly entering and establishing in the TEC, to be a significant issue. Although the main strands of

the TEC are situated 20 km to the north-west (downstream) of the proposal, there are smaller stands mapped as close as 3.5 km to the north of the proposed Stage 2 option B SFB Agricultural area (Figure 3). Therefore, the EPA requires the proponent to implement an extensive monitoring program with associated contingency actions as detailed in the EMP.

As mentioned above, the EMP addresses the management of crop species spread, but due to the concern and proximity to the Themeda Grassland TEC, as well as the surrounding environment, the EPA recommends Condition 5 (Appendix 2) to be applied to the proposal. This outcome based condition will require the monitoring of the spread of crop species beyond the boundary of indirect impact zone, and commit the proponent to eradicating any outbreaks that are detected.

Summary

Having particular regard to the:

- likelihood that the spread, establishment and growth of the selected crop species outside the proposal's boundary is low due to the chosen species inability to survive without mechanical disturbance and a constant source of water;
- establishment of an indirect impact zone of 30 m surrounding each pivot cell;
- establishment of monitoring sites in the indirect impact zone adjacent to pivots and outside of the proposal's boundary to monitor for the potential introduction and spread of the selected crop species; and
- contingency plans detailed in the EMP to manage, control and eradicate the spread and/or introduction of weed species,

it is the EPA's opinion that that the proposal can be managed to meet the EPA's environmental objectives for this factor, provided Condition 5 is applied.

4.2 Water quality and quantity

Description

The proposal is located within the south-eastern corner of the Southern Fortescue River Valley sub catchment (Figure 3), with a number of drainage lines traversing the agricultural areas. The drainage channels in this area are ephemeral and only flow after significant rainfall.

The EPA has identified a number of issues relating to the application of long-term irrigation water that could potentially impact on the surrounding hydrology of the area, including;

- waterlogging and erosion in the indirect impact zone and downstream of the agricultural areas;
- runoff contaminated with nutrients and fertilisers entering surface water bodies; and
- runoff contaminated with herbicides and pesticides entering surface water bodies.

A Nutrient Irrigation Management Plan (NIMP) has been developed in accordance with DOW's guidelines and forms part of the Project's EMP. The NIMP details the management of irrigation water and nutrient applications and aims to ensure these inputs are well matched to the plant growth cycle. This will effectively result in minimal erosion and contaminants leaching into the surrounding environment. The EMP also details the monitoring and contingencies that are proposed to ensure that the surrounding environment is protected. Furthermore, the proponent has committed to ensuring that the proposal will not cause the quality of the receiving surface systems to exceed the ANZECC Water Quality Guidelines (ANZECC/ARMCANZ 2000).

Waterlogging and erosion

Irrigated water usage during the operational phase of the proposal is estimated to reach a maximum of 80 ML/day from October to March and 60 ML/day from April to September. The proponent has committed to implementing an irrigation schedule that will apply irrigated water to the agricultural areas at a rate of 13.5 mm/day. The irrigation schedule and daily monitoring will ensure that surface water runoff, as a result of irrigation, is minimised. Irrigation will cease prior to and during forecast high rainfall events and when soils have reached field capacity. The irrigation pivots and infrastructure will not be located in high energy creek channels or drainage lines and will exclude areas susceptible to flooding under high frequency flood events. Furthermore, the proponent will work towards maintaining the topsoil structure effectively minimising the risk of water erosion.

Water monitoring will include utilising soil moisture probes to monitor the effect of irrigation rates on each pivot, which will communicate real time data for remote management. Soil moisture probes will be located down gradient of a representative number of pivots to assess water logging and the data collected will be used to refine the irrigation schedule. Soil moisture capture devices will also be installed adjacent to these probes and will capture any soil moisture present for analysis. Furthermore, bunds and sedimentation ponds will be constructed, if required, to prevent erosion during storm events.

Nutrients and fertiliser application

Nutrients and fertilisers will be applied periodically during the production of hay. There is a risk that transportation of nutrients and fertilisers may occur through the ephemeral drainage lines that traverse the area. Management of nutrient and fertiliser applications and run-off will form a significant aspect of the proposal to minimise this risk to the surrounding environment. The total annual nutrient requirement per hectare for the proposed system has been formulated in order to optimise production and water use. Nutrient applications will be matched to the daily growth needs of the crop species, thereby avoiding build up of nutrients in the soil. The EPA acknowledges that the nutrient requirements have been developed in conjunction with DAFWA and specialist consultants.

To ensure correct nutrient application rates, the requirements will be assessed on a daily basis and adjusted in response to the results of the nutrient monitoring and auditing program as detailed in the NIMP. Fertiliser application will also cease prior to and during forecast rainfall events and when soils have reached field capacity to minimises the nutrient loss pathways associated with wind-blown spray, deep drainage (groundwater recharge) and run-off through tail-water.

Chemical application

Herbicides and pesticides may sporadically be required for the control of weeds and pests. Pesticides and herbicides will be applied through the irrigation system, when required, using a chemical injection unit (chemigation), which introduces pesticides or herbicides at very low concentrations via irrigation on an as-needs basis. This system is also designed to mix chemicals with vegetable oil to ensure contact with plants is maximised to prevent infiltration into the soil.

Chemicals approved for use within Australia will be used, and only in accordance with their registered use with the Australian Pesticides and Veterinary Medicines Authority (APVMA). Chemicals will not be applied prior to or during rainfall events and will not be applied to any water bodies or drainage lines. All chemicals will be applied according to the recommendations of the agricultural consultant considering agricultural best practices. These management measures will minimise the risk to the surrounding environment.

Assessment

The EPA's environmental objective for this factor is to maintain the quality and quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected.

The EPA notes that the proponent has developed a NIMP to manage irrigation water, nutrient and chemical application within the agricultural areas.

The EPA notes that the NIMP details the application rates for nutrient and fertilisers, and the details the irrigation system and scheduling. The EMP describes the monitoring and contingencies that will be carried out to ensure the surrounding environment does not receive an influx of irrigated water causing erosion, or containing nutrients or chemicals.

The EPA notes that the use of any pesticides will be consistent with the DAFWA's *Code of Practice for the use of Agricultural and Veterinary Chemicals,* ensuring safe use and preventing the risk of detrimental environmental impacts. The proponent has stated that runoff and leaching of pesticides and herbicides will not occur, as they will not be applied prior to or during rainfall events. Furthermore, their application will be treated in the same manner as nutrient applications, except they will be injected into the system on an as-needs basis.

To achieve this environmental objective, the EPA recommends Condition 6 (Appendix 2) to be applied to the proposal. This condition will ensure soil saturation and run-off does not occur beyond the boundary of the indirect impact zone.

Summary

Having particular regard to:

- a NIMP has been developed as part of the EMP;
- the use of soil moisture probes to monitor the effect of irrigation rates on each pivot, and to allow for remote management;

- the management of pesticides and herbicides at very low concentrations via irrigation on an as-needs basis; and
- the commitment that the proposal will not cause the quality of the receiving surface systems to exceed the ANZECC Water Quality Guidelines (ANZECC/ARMCANZ 2000),

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor, provided Condition 6 is applied.

4.3 Rehabilitation

Description

The proposal has an estimated life of 22 years, based on the availability of surplus water from MMP2. The potential to continue the project beyond the MMP2 is dependent on the surplus water from the mine site remaining available, and will be assessed at the stage of decommissioning. At this point, the proposal will be assessed assuming a finite lifespan of 22 years, after which point closure and rehabilitation of the proposal will be required.

A Rehabilitation and Closure Plan forms part of the project's EMP and was developed in accordance with EPA Guidance Statement No. 6 (EPA 2006b). As part of the plan, the proponent will commit to developing and implementing a Final Decommissioning Plan at least five years prior to the scheduled closure of the operation.

The proponent has committed to the progressive rehabilitation of disturbed areas, where practicable, as the water supply from MMP2 decreases. Pivots will be phased out progressively by removing crop residues and other introduced species. Irrigation areas will be stripped of all nutrients through the use of exit crop strategies to return the soil nutrient levels to the consistency of regional ranges. Rehabilitation of agriculture areas will utilise local provenance species in order to match local relative plant densities in rehabilitation areas.

Rehabilitation monitoring will be undertaken to ensure that vegetation units approach the planned land use values for the area. In general, vegetation will be monitored to assess and compare composition, structure and function of the revegetated area to an adjacent control area.

The specific closure measures include:

- Pivots will be phased out progressively by removing crop residue and introduced species.
- Direct-seeding will be undertaken with local provenance seed consisting of regionally comparable vegetation composition.
- All above ground infrastructure not required for the final land use option will be demolished and removed from site.
- All services (including water lines, power lines and communications) not required for the final land use option will be removed from site. Services more than one

metre below final ground level will be left in situ if they pose no long-term threat to the environment.

- All concrete slabs, footings and retaining walls will be demolished and removed.
- All services and infrastructure associated with fertigation and chemigation will be removed.
- All bitumen surfaces within the site will be removed.
- All access tracks, laydown areas and other disturbed areas will be rehabilitated.
- The dam wall will be re-profiled and rehabilitated to remove the water retaining function and to provide acceptable post closure landform.

Assessment

The EPA's environmental objective for this factor is to ensure, as far as practicable, that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.

To achieve this objective, the EPA's default position is that the agricultural areas are closed and rehabilitated at the end of the specified period of 22 years. However, should surplus water from the MMP2 remain available beyond this point, the proponent has the ability to apply for a variation to extend the life of the proposal.

The EPA notes that the proponent will develop a Rehabilitation and Closure Plan that will be review and updated every five years. The EPA will require the rehabilitation activities specified to be carried out at the completion of the project. The EPA therefore recommends Condition 7 requiring the proponent to rehabilitate any areas affected by the implementation of the proposal at the end of the life of the proposal.

Summary

Having particular regard to:

- the proposals finite life of 22 years, after which the agricultural areas will be progressively rehabilitated and closed;
- a Rehabilitation and Closure Plan will be developed; and
- the proponent's commitment to prepare Final Decommissioning Plan at least five years prior to scheduled closure of the operation,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor, provided Condition 7 is applied.

4.4 Visual amenity (proposal options)

Description

The EPA is aware that the proposal is planned to be implemented in stages, with Stage 1 required for the proposal to proceed. Stage 1 includes the Central and Western Agricultural areas and a four gigalitre storage dam. Depending on the success of Stage 1 and the need for additional agricultural areas to manage surplus water, Stage 2 will be implemented. Stage 2 consists of two alternative areas forming

Options A (Eastern Agricultural area) and Option B (the SFB Agricultural area). Only one of the two options identified in Stage 2 will be implemented.

Option A – Eastern Agricultural Area

The Eastern agricultural area and associated infrastructure covers an area of approximately 380 ha. Due to the close proximity to Karijini National Park and visual amenity impact, the site was modified on DEC's request to contain fewer pivots and a larger buffer distance between the pivots and the Park's boundary (approximately 1.5 km).

Option B – Southern Fortescue Borefield (SFB) Agricultural Area

The alternative site to the Eastern agricultural area lies adjacent to the Southern Fortescue Borefield to the north of the Stage 1 Project area. The area is approximately 430 ha, consisting of 380 ha of direct impact and 50 ha of indirect impact. The area has not yet been surveyed by the proponent. Surveys will be a requirement prior to consideration for suitability of this site.

Proposal options

The proponent has proposed Option A as the desired location for Stage 2, and has conducted the necessary surveys throughout the area to characterise the vegetation and fauna habitats. Due to visual amenity impacts to the park, DEC proposed an alternative site located in the Southern Fortescue Borefield to the north of Stage 1. The proponent has indicated that it would investigate the Option B site to assess the suitability should the following requirements be met:

- Access to the land to undertake the proposed activity is confirmed.
- Completion of the relevant biological surveys in consultation with the DEC.
- Access to the 2015 land relinquishment area is provided and agreement with the Conservation Commission is reached.

Assessment

The EPA is of the view that Option A in its modified form is acceptable, however in accordance with the DEC's advice, Option B may prove to be preferable due to its reduced visual impact on the park. Prior to Option B being selected as the chosen site, the appropriate surveys of the area need to be carried out to determine the suitability for agriculture.

Therefore, the EPA has recommended a condition that addresses the selection process in Stage 2, by only permitting one of the two alternative options to proceed should the need for additional agricultural areas be required.

Summary

Having particular regard that:

- there are two options for Stage 2;
- stage 2 Option A largely meets the EPA's objectives, but has the potential to impact on the visual amenity of the Karijini National Park;

- before Stage 2 Option B is considered, the proponent is required to carry out the necessary environmental surveys to characterise the site; and
- only one option in Stage 2, either A or B, is required should the proposal need additional capacity,

it is the EPA's opinion that the proposal can be managed provided Condition 8 is applied.

5. Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that it recommends is imposed if the proposal by Hamersley Iron to develop the Hamersley Agriculture Project is approved for implementation. These conditions are presented in Appendix 2.

6. Conclusions

The EPA has considered the proposal by Hamersley Iron Pty Ltd to establish an agricultural project for the cultivation of hay for pastoral activities in the central Pilbara.

In conducting its assessment of the proposal the EPA has determined that the key environmental factors of flora (spread of weeds), water quality and quantity, and rehabilitation required detailed assessment in this report.

The EPA notes that the proponent has conducted a species selection process to select the most appropriate crop species for the project. With the implementation of a Weed Management Plan and weed monitoring within the indirect impact zone, drainage lines and roads, the EPA considers there is a relatively low risk of establishment of weed species beyond the agricultural pivot cells and indirect impact area.

With regard to water quality and quantity, the EPA notes that the proponent has developed a Nutrient Irrigation Management Plan to ensure the management of irrigation water and nutrient application will be well matched to the plant growth cycle. The EPA concludes that the proponent's approach is designed to minimise erosion of soil or contaminants leaching into the surrounding environment.

The EPA notes that the proposal is based on the availability of surplus water from MMP2 and that the proponent has committed to rehabilitating and decommissioning the site to its present condition when surplus water is no longer available.

The EPA notes that Stage 2 of the proposal has two options only one of which will be implemented. The EPA has considered one option (Option A) in detail and considers it acceptable. The EPA has recommended that further survey work needs to be done on Option B prior to proceeding with Stage 2, and that the best option then be selected based on a comparison of potential environmental impacts.

The EPA has therefore concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation of the

proposal as outlined in the referral documentation by the Hamersley Iron Pty Ltd and the recommended conditions set out in Appendix 2.

7. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is a proposal by Hamersley Iron Pty Ltd, subsidiary of Rio Tinto Iron Ore, to undertake the establishment of the Hamersley Agriculture Project in the central Pilbara, utilising dewater from the Marandoo Mine Phase Two Project.
2. That the Minister considers the report on the key environmental factors as set out in Section 4.
3. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation of the proposal as outlined in the referral documentation by the proponent and the recommended conditions set out in Appendix 2.
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

Biota Environmental Sciences (2010), *Hamersley Agriculture Project – Fauna Survey Report*, unpublished report prepared for Rio Tinto Iron Ore, Perth, Western Australia.

Environmental Protection Authority (2004) Environmental Assessment Guidelines, *No. 4: Towards Outcomes Based Conditions*, December 2009.

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Nufarm, 2010, Chlropyrifos 500 EC Insecticide Label

Rio Tinto Iron Ore (RTIO) (2011), *Hamersley Agricultural Proposal Environmental Review Document,* prepared by Rio Tinto Iron Ore, August 2011.

Rio Tinto Iron Ore (RTIO) (2011a), *Hamersley Agricultural Proposal Environmental Management Plan Rev 1,* prepared by Strategen for Rio Tinto Iron Ore, August 2011.

Appendix 2

Identified Decision-making Authorities
and
Recommended Environmental Conditions

Identified Decision-making Authorities

Section 44(2) of the *Environmental Protection Act 1986* (EP Act) specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
Minister for Water	*Rights in Water and Irrigation Act 1914*

The following have been identified as interested parties:

Interested Parties	
Minister for Environment	
Minister for Agriculture and Food	
Minister for Lands	

Statement No. xx

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE *ENVIRONMENTAL PROTECTION ACT 1986)*

Hamersley Agriculture Project

Proposal: The proposal involves utilising mine dewatering, surplus to other Marandoo Mine Phase 2 requirements, for irrigated agriculture. The Project area is located approximately 6 km to the west of Marandoo Mine. The Project area is approximately 2800 hectares of which a maximum of 1815 hectares is to be disturbed. This includes 1650 hectares of direct impact and 165 hectares of indirect impact.

The proposal is further documented in schedule 1 of this statement.

Proponent: Hamersley Iron Pty Ltd

Proponent Address: GPO Box A42
PERTH WA 6837

Assessment Number: 1878

Report of the Environmental Protection Authority: Report 1416

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer of the Office of the Environmental Protection Authority of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the Chief Executive Officer of the Office of the Environmental Protection Authority with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.

4-2 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

1 the frequency of compliance reporting;

2 the approach and timing of compliance assessments;

3 the retention of compliance assessments;

4 the method of reporting of potential non-compliances and corrective actions taken;

5 the table of contents of compliance assessment reports; and

6 public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the Chief Executive Officer of the Office of the Environmental Protection Authority.

4-5 The proponent shall advise the Chief Executive Officer of the Office of the Environmental Protection Authority of any potential non-compliance within seven days of that non-compliance being known.

4-6 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority the first compliance assessment report fifteen months from the date of issue of this Statement addressing the twelve month period from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

1 be endorsed by the proponent's Managing Director or a person approved in writing by the Chief Executive Officer of the Office of the Environmental Protection Authority, delegated to sign on the Managing Director's behalf;

2 include a statement as to whether the proponent has complied with the conditions;

3 identify all potential non-compliances and describe corrective and preventative actions taken;

4 be made publicly available in accordance with the approved compliance assessment plan; and

4 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Flora (Spread of Weeds)

5-1 The proponent shall ensure that the selected crop species, *Chloris gayana* and *Avena sativa*, are contained to the defined Project area and not spread beyond the boundary of the indirect impact zones, which consists of a 30 metre buffer area surrounding pivot cells as shown in Figure 1.

5-2 The proponent shall implement weed monitoring within the indirect impact zone, as well as adjacent roads and drainage lines on the proposal area, including drainage channels leading into the Themeda Grassland TEC shown in Figure 2, to ensure that requirements of condition 5-1 are met. This monitoring is to be carried out using methods detailed in the Weed Management Plan and Vegetation

Monitoring Design and Management Evaluation Framework that forms part of the Environmental Management Plan Revision 1, August 2011, and any subsequent approved revisions, prepared for this Project and to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.

5-3 The proponent shall commence weed monitoring as required by 5-2 three months before ground disturbing activities occurring within the agricultural pivot cells in order to collect baseline data.

5-4 The proponent shall submit annually the results of monitoring required by condition 5-2 to the Chief Executive Officer of the Office of the Environmental Protection Authority.

5-5 Should the results of monitoring required by conditions 5-2 show over five consecutive years that there has been no spread of crop species beyond the indirect impact zone the proponent may revise the frequency of monitoring and reporting required by conditions 5-2 and 5-4, to the satisfaction of the Chief Executive Office of the Office of the Environmental Protection Authority.

5-6 In the event that monitoring required by condition 5-2 indicates that the requirements of condition 5-1 are not being met:

1 the proponent shall report such findings to the Chief Executive Officer of the Office of the Environmental Protection Authority within 21 days of the spread of crop species being identified;

2 the proponent shall provide evidence to the Chief Executive Officer of the Office of the Environmental Protection Authority which allows determination of the cause of the spread of crop species;

3 if determined by the Chief Executive Officer of the Office of the Environmental Protection Authority to be a result of activities undertaken in implementing the proposal, the proponent shall submit actions to be taken to remediate the spread of crop species within 21 days of the determination being made to the Chief Executive Officer of the Office of the Environmental Protection Authority; and

4 the proponent shall implement the actions required by condition 5-4(3) to control and eradicate the spread of crop species upon approval of the Chief Executive Officer of the Office of the Environmental Protection Authority and shall continue to implement such actions until such time the Chief Executive Officer of the Office of the Environmental Protection Authority determines that the remedial actions may cease.

6 Water Quality and Quantity

6-1 The proponent shall ensure that run-off from the proposal area, including the agricultural pivot cells and storage dam, does not cause the quality of surface water within or leaving the proposal area to exceed trigger values established by the proponent on advice from the Office of the Environmental Protection Authority in accordance with ANZECC/ARMCANZ* guidelines, taking into consideration natural background water quality, protecting existing and potential users, including ecosystem maintenance. Trigger levels will be approved the by Office of the Environmental Protection Authority prior to commencing the application of irrigation water to the agricultural pivot cells.

* Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian Water Quality Guidelines for Fresh and Marine Waters and its updates.

6-2 The proponent shall ensure that changes to hydrological regime, specifically soil saturation, related to the establishment of irrigated pivot cells do not adversely affect the surrounding environment beyond the indirect impact zones shown in Figure 1.

6-3 The proponent shall ensure that irrigation water quality is consistent with the requirements of the ANZECC/ARMCANZ irrigation water criteria, or take such other in situ measures as are necessary and approved by the Chief Executive Officer of the Office of the Environmental Protection Authority, to prevent the accumulation of toxicants within the soil profile, and to prevent the degradation of soil structure due to sodicity and excessive salinity.

6-4 The proponent shall monitor the changes to the hydrological regime, specifically soil saturation, as well as the quality and quantity of run-off from the agricultural pivot cells and storage dam entering surface water within the boundary of the proposal area to ensure that requirements of condition 6-1 and 6-2 are met. This monitoring is to be carried out using methods detailed in the Nutrient Irrigation Management Plan that forms part of the Environmental Management Plan Revision 1, August 2011, and any subsequent approved revisions, prepared for this Project and to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.

6-5 The proponent shall commence the water quality and soil saturation monitoring required by 6-4 three months before ground disturbing activities occurring within the agricultural pivot cells in order to collect baseline data.

6-6 The proponent shall submit annually the results of monitoring required by condition 6-4 to the Chief Executive Officer of the Office of the Environmental Protection Authority.

6-7 In the event that monitoring required by condition 6-4 indicates that the requirements of conditions 6-1 and 6-2 are not being met:

1 the proponent shall report such findings to the Chief Executive Officer of the Office of the Environmental Protection Authority within 21 days of the decline in water quality standards being identified;

2 the proponent shall provide evidence to the Chief Executive Officer of the Office of the Environmental Protection Authority which allows determination of the cause of the decline in water quality standards;

3 if a decline in water quality standards is determined by the Chief Executive Officer of the Office of the Environmental Protection Authority to be a result of activities undertaken in implementing the proposal, the proponent shall submit actions to be taken to remediate the decline in water quality standards within 21 days of the determination being made to the Chief Executive Officer of the Office of the Environmental Protection Authority; and

4 the proponent shall implement the actions to remediate the decline in water quality standards required by condition 6-7(3) upon approval of the Chief Executive Officer of the Office of the Environmental Protection Authority and shall continue to implement such actions until such time the Chief Executive Officer of the Office of the Environmental Protection Authority determines that the remedial actions may cease.

7 Rehabilitation

7-1 The proponent shall undertake progressive rehabilitation towards the end of the proposal to achieve the following outcomes:

1 areas disturbed through implementation of the proposal, shall be rehabilitated with vegetation composed of native plant species of local provenance, specifically seed or plant material collected within 100 kilometres of the proposal;

2 the percentage cover and species diversity of living self sustaining native vegetation in all rehabilitation areas shall be comparable to that of the undisturbed natural analogue sites as demonstrated by Ecosystem Function Analysis or other methodology acceptable to the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation.

Undisturbed natural analogue sites for comparison shall be selected prior to ground disturbing activities to the requirements of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation;

3 no new species of weeds, including both declared weeds and environmental weeds, shall establish in the project area shown in Figure 1 as a result of the implementation of the proposal; and

4 the coverage of weeds, including both declared weeds and environmental weeds, in all rehabilitation areas shall be no greater than the average of the approved reference sites on nearby land, selected to the requirements of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation.

7-2 Rehabilitation activities shall continue until such time as the requirements of condition 7-1 are demonstrated by inspections and reports to be met for a minimum of five years to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation.

8 Visual Amenity and Hamersley Station 2015 Pastoral Lease Exclusion Area (Proposal Options)

8-1 Prior to the implementation of Stage 2, the proponent shall submit a report which includes the following:

1 biological surveys of the Option B (Southern Fortescue Borefield Agricultural area);

2 evidence of consultation with the Department of Environment and Conservation; and

3 comparison of environmental impacts of Stage 2 B (Southern Fortescue Borefield Agricultural area) with Stage 2 A (Eastern Agricultural area).

8-2 In the event that the proponent decides to proceed with implementing Stage 2, only one option, either Option A or Option B, shall be implemented with approval from the Minister for Environment on advice from the Environmental Protection Authority and the Department of Environment and Conservation.

Schedule 1

The Proposal (Assessment No. 1878)

The proposal is to establish and operate an agricultural project utilising mine dewatering, surplus to other Marandoo Mine Phase 2 requirements, to cultivate crop species (to increase productivity and sustainability of pastoral operations in the Pilbara region and reduce impacts on downstream ecosystems due to surface water discharge).

The Project area is 2800 hectares of which a maximum of 1815 hectares is likely to be disturbed. This includes 1650 hectares of direct impact and 165 hectares of indirect impact.

Irrigated water usage during the operational phase of the Project is to reach a maximum of 80 ML/day from October to March and 60 ML/day from April to September.

The proposal will be implemented in stages, with Stage 1 required for the Project to proceed. Stage 1 includes the Central and Western Agricultural areas and 4GL storage dam. Depending on the success of Stage 1 and the need for additional agricultural areas to manage surplus water, Stage 2 will be implemented. Stage 2 consists of two alternative areas forming Options A (Eastern Agricultural area) and Option B (the SFB Agricultural area). Only one of the two options identified in Stage 2 is permitted to be implemented.

The location of the various project components are shown in Figures 1 and 2.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1: Summary of Key Proposal Characteristics

Element	Description
Project Life	Project life based on availability of surplus water from MMP2.
Total Project Area	• 2800 ha
Direct Impact	Disturbance to 1650 ha within the Project area including: • Stage 1 – 1270 ha • Stage 2 – 380 ha
Indirect Impacts	Disturbance to165 ha within the Project area based on a 30m buffer perimeter surrounding pivots including: • Stage 1 - 115 ha • Stage 2 - 50 ha
Power usage and supply	• Overhead power line from the Marandoo Village to the dam

	transfer pump station and fertigation system.
Water usage and supply	• Water will be applied daily and regulated through the irrigation schedule. • Irrigation water sourced from surplus water from the MMP2 main transfer pipeline. • Water usage 29.2 GL/year. • Irrigation areas will use a centre pivot system • 4 GL water storage dam.
Other facilities and infrastructure development	• Fencing around Project area to restrict access to livestock. • Inspection areas will be located at each agricultural area. • One wash down bay will be located at the central agricultural area.

Figures

Figure 1: Project Area and Conceptual Layout of the Hamersley Agriculture Project.
Figure 2: Location of the Themeda Grassland TEC

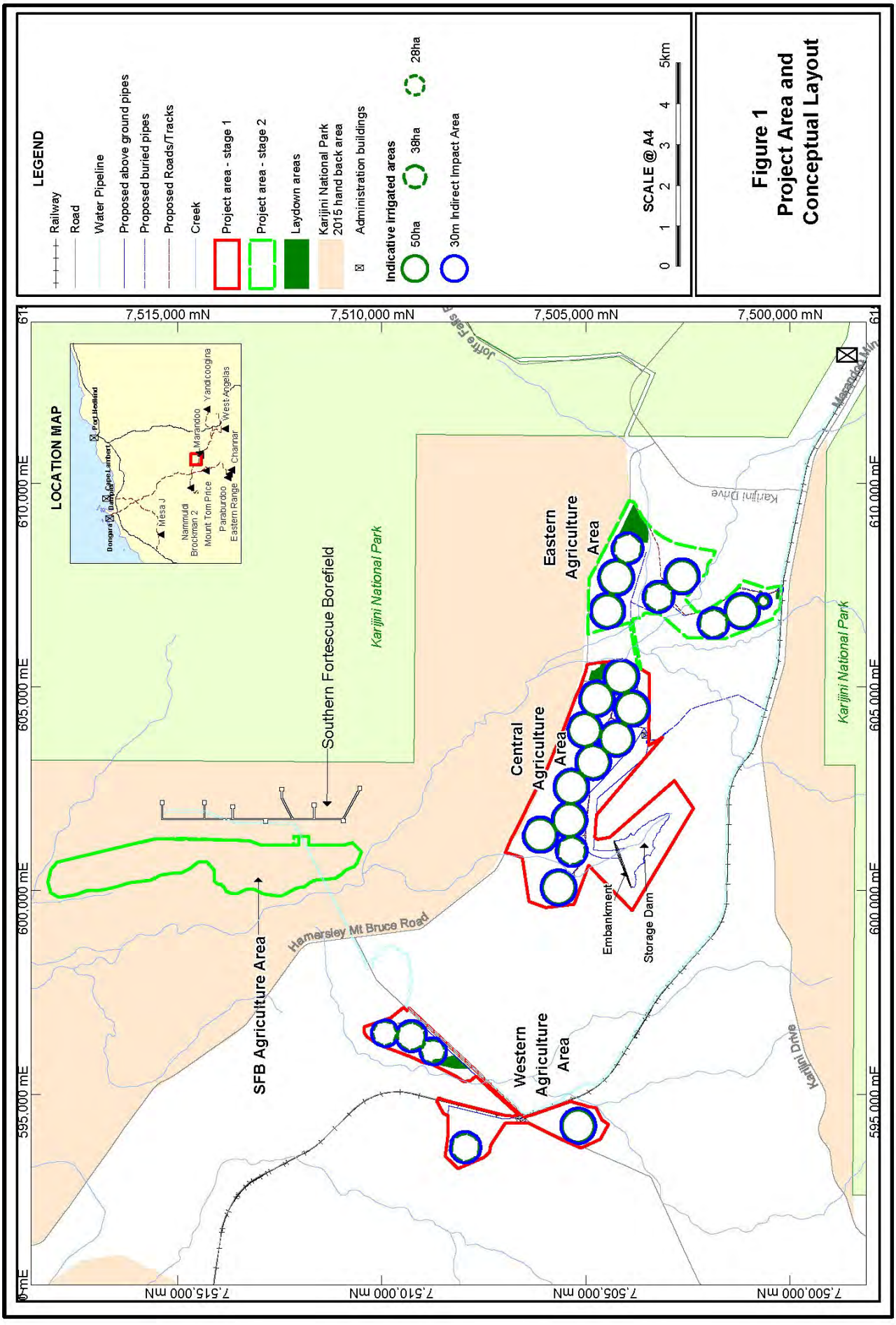

Figure 1: Project Area and Conceptual Layout of the Hamersley Agriculture Project.

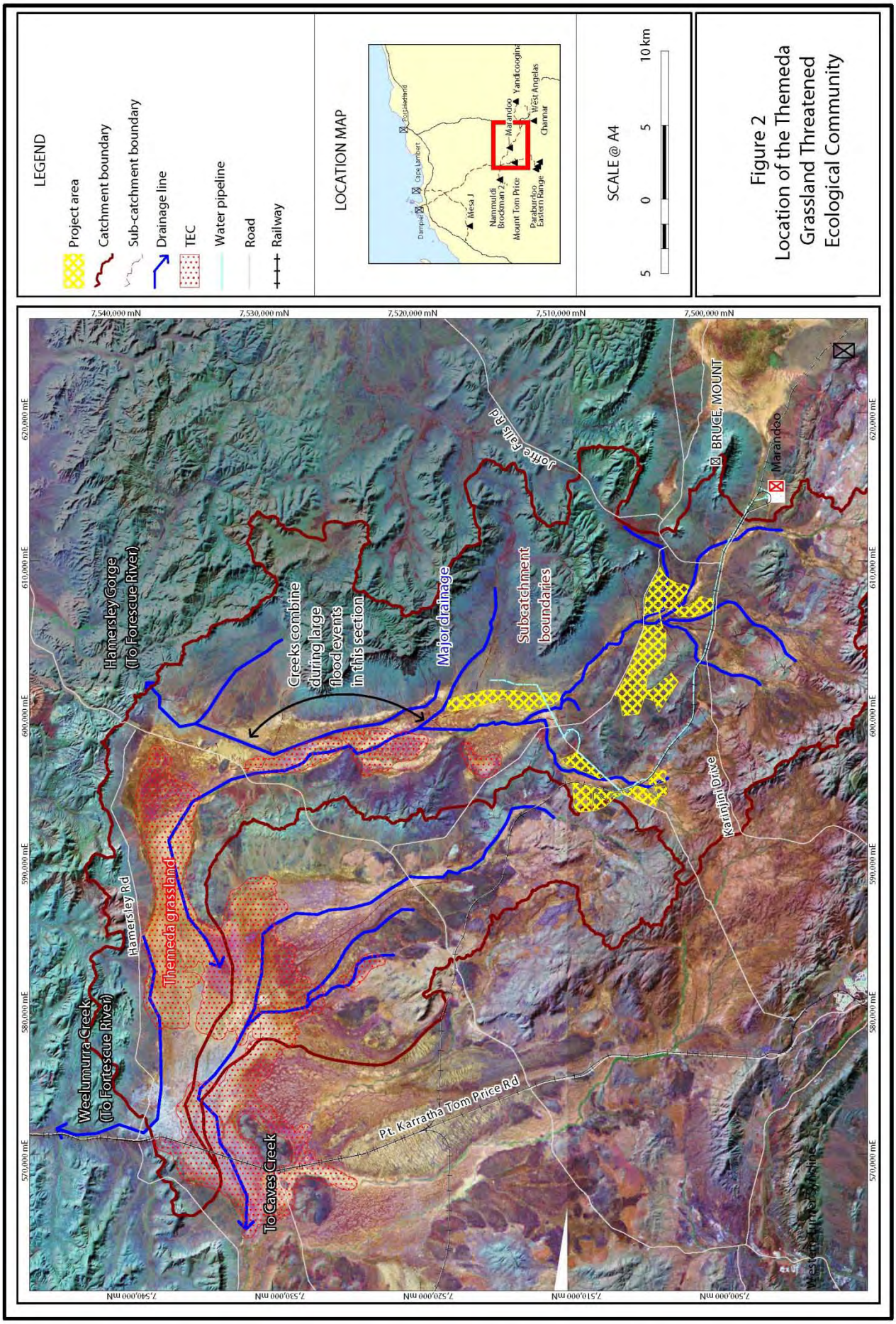

Figure 2: Location of the Themeda Grassland TEC.