Frances Creek Project; Northern Territory

Public Environmental Review Supplement

Prepared for:

Territory Iron Limited

October 2006

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MBS ENVIRONMENTAL

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1. INTRODUCTION

1.1 BACKGROUND

Territory Iron Limited proposes to establish an iron ore project in the Frances Creek area which is located approximately 25 kilometres north of Pine Creek. The Project will involve re-opening the Frances Creek mine by developing two new open pits and extending three existing open pits, installation of a crushing and screening plant and upgrade of existing roads and tracks for road haulage of product. A new railway siding will be constructed adjacent to the Alice Springs to Darwin Railway to allow transport of product to Darwin Port for export.

1.2 ASSESSMENT PROCESS

1.2.1 Northern Territory Process

The assessment process to gain the necessary approvals for Territory Iron's Frances Creek Iron Ore project is set out below:

- Notice of Intent (NOI) – An NOI was submitted to the then Northern Territory Department of Primary Industries, Fisheries and Mines (DPIFM) on 9 November 2005.
- Determination of Level of Assessment - On 20 December 2005 it was determined by the Minister for Natural Resources, the Environment and Heritage that the level of assessment for the proposed Frances Creek Project would be a Public Environmental Report (PER).
- Public Review of Guidelines – Draft Guidelines covering issues to be addressed in the PER were released for public comment on 25 February 2006 for 14 days. On 29 March 2006, final Guidelines were issued.
- Preparation of a PER– The PER was prepared between March and August 2006.
- Submission of the PER and Public Review – The PER was released for public comment for 28 days from 14 August 2006 to 8 September 2006.
- Preparation of PER Supplement – Comments received as part of the public consultation period are addressed in a Supplement (this document). The Supplement together with the PER will be submitted to the Environment Protection Agency (EPA) for review.
- Government Review and Decision – A review of the information submitted will be conducted by the EPA and recommendations forwarded to the relevant Ministers for consideration.

1.2.2 Commonwealth Process

In addition to the PER procedures of the Northern Territory Government, under the Commonwealth Government's *Environment Protection and Biodiversity Conservation*

(EPBC) Act 1999, developments require assessment if they have the potential to affect matters of national environmental significance.

A referral under the EPBC Act was submitted to the Commonwealth Department of Environment and Heritage (DEH) in relation to the Frances Creek on 17 January 2006. A decision was made on 17 February 2006 that the proposed development constituted a Controlled Action under the following sections of the Act:

- Sections 12 and 15A (World Heritage).
- Sections 18 and 18A (Listed threatened species and communities).
- Sections 20 and 20A (Migratory species).

1.2.3 Bilateral Agreement

Controlled Actions under the *EPBC Act* are subject to final approval by the Commonwealth. On 17 February 2006, notification was received from DEH that the project would be assessed through accreditation of the NT assessment process under the terms of the Bilateral Agreement between the Commonwealth and Northern Territory Governments.

Under the Bilateral Agreement between the Commonwealth and the NT Government, the terms of assessment are considered on a case by case basis. Once assessment is completed to the satisfaction of the NT Minister for Natural Resources, the Environment and Heritage, EPA will report its findings to DEH, who will then advise of their final decision within 30 business days of submission of the EPA's recommendations. It is expected that EPA will continue to liaise with DEH through the remainder of the approval process to ensure that both agencies are satisfied that all matters are being satisfactorily addressed throughout the process.

1.2.4 PER Release and Supplement Preparation

As noted in Section 1.2.1, the Frances Creek Iron Ore Project PER was released for public comment on 14 August 2006. The PER describes the proposed mining process, and assesses the likely environmental, social and economic impacts of the proposal.

The PER was prepared in accordance with the guidelines issued by the EPA.

The public notice sought comments on the PER till 8 September 2006, a period of 28 days. One late submission was accepted on prior agreement with the Northern Land Council.

Copies of the PER were available for viewing at the:

- Department of Natural Resources, Environment and the Arts (NRETA), Darwin Plaza Building, 41 Smith Street, Darwin, NT and 2 Giles Street, Katherine, NT.
- Department of Primary Industries, Fisheries and Mines (DPIFM), Centrepoint Building, Smith Street Mall, Darwin, NT.
- Katherine Town Council and Katherine Public Library, Katherine, NT.

- Pine Creek Community Government Office and Pine Creek Public Library, Pine Creek, NT.
- Northern Territory Library, Parliament House, Cnr Bennett and Mitchell Streets, Darwin NT.
- Commonwealth Department of the Environment and Heritage Library, John Gorton Building, King Edward Tce, Parkes, ACT.

The PER document was also available to be examined for the duration of the public review period on the Northern Territory Government Website:

http://www.nt.gov.au/nreta/environmental/assessment/register/index.html.

CD ROM copies of the PER were available free of charge. Hard copies of the PER report and associated appendices were available for $20 per set.

Submissions were treated as public documents unless confidentiality was requested.

1.2.5 PER Consultation

The PER was subject to a four week public review period. Territory Iron maintained its existing stakeholder consultation program during the public review period. The programme included the following actions:

- Ongoing consultation with the NLC and Traditional Owners.
- A community meeting involving a site visit, to address AAPA issues.
- Placing links to the PER on the Territory Iron and MBS Environmental websites.
- Media releases to provide information on the PER and its availability for review.
- Presentations to and discussions with certain Government Agencies who responded to the PER to discuss any outstanding issues.
- Providing information to stakeholders when requested.

1.3 NUMBER OF SUBMISSIONS AND KEY ISSUES

A total of ten submissions were received, all of which were received from local and Territory government agencies and bodies. Only one was received from an individual or non-government organisations. The ten public submissions were received from the:

- Aboriginal Areas Protection Authority (AAPA).
- Department of Health and Community Services (DHCS) - Environmental Health Division.
- Department of Health and Community Services (DHCS) - Medical Entomology Branch.
- Northern Territory Police.

- Department of Primary Industry, Fisheries and Mines (DPIFM).
- Department of Natural Resources, Environment and the Arts (NRETA) - Conservation and Natural Resources Group.
- Department of Business, Economic and Regional Development - Economic Development Division (DBERD).
- Northern Land Council (NLC).
- Department of Natural Resources, Environment and the Arts (NRETA) – Environment Protection Authority (EPA).
- Department of Planning and Infrastructure (DPI).

One of the ten submissions commented they had no issues of concern after review of the PER document.

The areas of primary interest and/or concern, reflected by the number of submissions and comments, were:

- Water management.
- Impacts on vegetation.
- Impacts on fauna.
- Waste rock management.
- Cultural heritage.
- Greenhouse gas emissions and management.
- Rehabilitation.
- Environmental Management Plan.
- Socio economic impacts.

A summary of the issues raised in each submission is contained in Appendix 1.

1.4 PROCESS USED TO SUMMARISE THE SUBMISSIONS

Upon receipt from the EPA, MBS Environmental numbered and recorded all submissions. Submissions were summarised and edited into a consistent format for inclusion in the Supplement (this document). Copies of the summaries were forwarded to the EPA for review to ensure that the summaries adequately represented comments made in submissions.

The summarised issues, along with the responses to them, make up the main body of text of this Supplement.

1.5 STRUCTURE AND SCOPE OF THE SUPPLEMENT

Comments were received on most of the chapters of the PER. For ease of assessment, as far as practicable the order of the subject matter presented in this Supplement follows the order of the PER.

Throughout the text, the summarised and amalgamated key issues and comments are shown in bold italics. Each is immediately followed by Territory Iron's response in plain text.

1.6 PROJECT CHANGES IN RESPONSE TO SUBMISSIONS

No direct comments were submitted by the Community that need to be addressed in this Supplement. However, based on other comments and with the Community in mind, the following cooperative measures will be adopted:

- Territory Iron will liaise with the Pine Creek Community Government on company matters affecting the local Community and provide a register for complaints related to the Frances Creek Project.
- Territory Iron will liaise with the Pine Creek Police, Fire Brigade and Medical Centre on Emergency Response Plans for the Frances Creek Project and in assistance to the Community.

Table 1 details the additional commitments that have been made throughout this document in response to the submissions received.

Table 1: Additional Commitments Made in Response to Submissions

Commitment Number	Commitment
S1	If human remains are unearthed during construction or operation of the project, Territory Iron will notify Pine Creek Police and NRETA Heritage Conservation Services as soon as possible.
S2	Territory Iron will liaise with DPIFM personnel and personnel of other mining projects that propose to commence mining operations during the period where Territory Iron enters construction and operation to ensure potential cumulative impacts are detected and minimised.
S3	Territory Iron will prepare a Traffic Management Plan.
S4	Territory Iron will prepare a Security Plan and will submit this as part of the Mining Management Plan.
S5	Territory Iron will investigate the potential for using the Pine Creek landfill in preference to development of an onsite facility.
S6	In the event that fresh black siltstone rock is encountered during mining, Territory Iron will conduct further testing of this material and encapsulate it with inert waste rock in the waste rock stockpiles where required.
S7	As part of finalising design of the waste rock stockpiles, Territory Iron will seek geotechnical advice.

Commitment Number	Commitment
S8	Territory Iron will report greenhouse gas emissions on a facility basis for the Commonwealth Greenhouse Gas Challenge Plus.
S9	Annual reporting of greenhouse gas emissions will be undertaken through the MMP/EMP process.
S10	Territory Iron will install erosion control structures at erosion vulnerable points within the operations area.
S11	The need for construction of additional spillways or weirs at dams additional to Frances Creek Main Dam will be evaluated. If the risk of collapse is considered high, suitable structures will be constructed.
S12	Territory Iron will undertake aquatic ecosystem assessment and monitoring as part of the catchment monitoring program detailed in the EMP.
S13	Territory Iron will undertake further surveys to: • Determine whether Ghost Bats have returned to or are utilising the conveyor tunnel. • Locate potential or actual alternative roost sites within or immediately adjacent to the project area.
S14	Territory Iron will undertake a survey of suitable habitat to determine if there are any active pebble mounds within the disturbance area.
S15	If any fauna species of conservation significance are observed, Territory Iron will notify regulatory authorities and if impacts from mining operations are considered likely, will work with authorities to develop appropriate management plans.
S16	Territory Iron will consult the updated threatened species list for the Northern Territory during preparation of the EMP.
S17	Territory Iron will undertake Cane Toad trapping programs during the life of the Frances Creek Project.
S18	Territory Iron will include limnological monitoring as part of its operational monitoring programs.
S19	Territory Iron will erect signage along roads warning/advising of wildlife movements.
S20	Territory Iron will establish a complaints procedure by which the public can lodge complaints about the operation or impact of the mine.
S21	Territory Iron will undertake to investigate alternate access routes to the dam. If a safe access route can be found that does not require entry into operational areas, Territory Iron will allow access to the dam
S22	Territory Iron will ensure that future discussions regarding land use and access include the Wagiman group.

Commitment Number	Commitment
S23	Territory Iron will implement the following measures to assist with biting insect control: • The margins of new dams will be kept clear of vegetation growth where practicable. • The final surface of mine waste rock stockpiles will be contoured so that the surface area is free draining and has no surface depressions. • Fish are already present in dams. Fish populations will be maintained to assist with control of biting insect larvae.
S24	Territory Iron will consult with the NLC during preparation of the Rehabilitation Plan.

2. GENERAL COMMENTS

The Northern Territory Police has commented that there is little likelihood of human remains being unearthed during construction or operation, however if this were to occur it is requested that Police at Pine Creek are notified as a priority to ensure all protocols are adhered to.

If human remains are unearthed during construction or operation of the project, Territory Iron will notify Pine Creek Police and NRETA Heritage Conservation Services as soon as possible (**Commitment S1**).

DPIFM have commented that the project does not constitute value adding as that term would apply to processing or refining the iron, not export of unrefined bulk materials.

Comment is noted.

NLC have commented that cumulative effects from previous mining activities and from other planned developments (e.g. the gold mining at Maude Creek) have not been considered during development of the PER. While the proposed project may be environmentally acceptable as a stand-alone venture, soluble metal and sediment loads may not be acceptable if other mines come into operation in the region. This is a real concern as gold mining at Maude Creek (the catchment of which is expected to be affected by the Frances Creek project) is expected to recommence during 2006 or 2007. Soluble metal loads for Maude Creek and allowances should be made for potential effects of other mining ventures when trigger values for watercourses are proposed.

Territory Iron can only describe the activities it proposes to conduct and assess these in light of information known about the historical mining activities which previously occurred at the site. Baseline studies conducted as part of the Frances Creek PER considered environmental impacts of previous mining. This includes impacts related to discharge of sediments or metals from un-rehabilitated historic disturbance. Water monitoring proposed to be conducted up and down stream of operations described in the PER will ensure water quality is known and understood prior to construction and mining commencing, during operations and after rehabilitation is complete.

Territory Iron will liaise with DPIFM personnel and personnel of other mining projects that propose to commence mining operations during the period where Territory Iron enters construction and operation. This will ensure potential operations are understood, specifically those that may have impacts upstream of Territory Iron operations. Where projects have potential to impact catchments upstream of Territory Iron, monitoring programs will be reviewed to ensure they remain relevant and will detect potential cumulative impacts (**Commitment S2**).

DBERD-EDD has advised they have no issues of concern in relation to the PER. The Proponent has effectively addressed the guidelines in relation to identification and management of the project's potential economic impacts.

Territory Iron thanks DBERD-EDD for their positive comment.

3. PROJECT DESCRIPTION AND MANAGEMENT

3.1 ALTERNATIVES CONSIDERED

DPIFM have requested that a discussion of the alternatives considered in terms of the location of infrastructure and the process plant be included in the PER.

EPA has commented that although explanation has been provided for the selected location of the processing plant (west of Helene 5 pit), an alternative location has not been provided in the PER. As previously identified, the swamp associated with the Tailings Storage Facility is considered to be a sensitive habitat (even though it is man-made). By providing an alternative location for the processing plant, the stockpiles which need to be either side of the plant may then be moved away from the swamp.

The location of infrastructure as shown in the PER was primarily based on existing disturbance, availability of flat ground suitable for construction of the required facilities and for security of the plant and mine workshops from public access. Care was taken when selecting infrastructure locations to minimise the need for additional vegetation clearing. Consideration was also given to distances between various components of the project and economic implications of differing locations of key infrastructure.

Discussion was included in the PER on alternatives being considered for construction of haul roads for export of iron ore from the site to the railway siding.

Other sites for the plant are not available without disturbing undisturbed areas in adjacent valleys. The mine office is located to the south of the plant and offsite visitors will be required to report there. It is essential that mobile mine equipment does not interact with offsite vehicles and for this reason visitors will not be able to proceed beyond the office car park. Also the offsite haul road will be restricted to use by road trains only by appropriate signage at the Mt Wells Road crossing.

The TSF is man made as a result of previous mining. As described in Section 4.4, it is not considered by Territory Iron to be significant in a regional context. The presence of water in the wetland during the site visits by Low Ecological Services was strongly influenced by pit dewatering being conducted as part of exploration activities. Usage by fauna is considered to be opportunistic. The wetland described has had to adapt to seasonal and human related influences. Visits during times where dewatering is not occurring are likely to reflect lower usage. Location of infrastructure will not necessitate destruction of the wetland, however, the proximity of mining and waste rock disposal activities may affect future fauna usage of the wetland.

3.2 MINING SCHEDULE

DHCS-EH has requested clarification on the estimated life of mining operations and if it is likely to extend beyond three years.

EPA has noted that estimates of existing ore reserves will allow the mine to operate for a period of 3 years (page 13). The future of the mine is briefly mentioned on page 40 of the PER. Please elaborate on the possible future extension to the mine operation, and discuss the probability of mining satellite ore bodies.

The known mine life based on JORC reported reserves is currently three years.

In the context of the operation at Frances Creek, all likely iron ore deposits to be mined and extend the operation at Frances Creek form part of the same system of ironstone ridges trending north-west to south-east. Territory Iron is actively drilling the more prospective areas in this system with the aim of increasing reserves. Until further deposits are proven, extensions to the mining operation would be speculative and cannot be commented on. Satellite ore bodies have not yet been discovered in relation to the operation at Frances Creek.

3.3 MINING METHODS

EPA commented that details of drilling and blasting have been provided on page 20 of the PER, however the guidelines also requested information on the frequency of these operational procedures.

The frequency of drilling and blasting of production blast-holes will be daily.

3.4 INFRASTRUCTURE

DHCS-EH has suggested that the proponent seek advice from a qualified hydraulic consultant about the most suitable wastewater disposal system for the mines' mobile crib unit and ablution unit. Reliability and low maintenance costs of remote on-site wastewater disposal systems should not be underestimated.

The design of septic tank systems is detailed in the Northern Territory Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent (The Code). The Code was gazetted on the 11 November 1998 and is called up in Regulations 28-28B of the Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations.
DHCS administers the provisions of the Public Health Act & Regulations with respect to the:

- ***Type approval of septic tanks and associated products.***
- ***Notification to install an Alternative Septic Tank System (ASTS) for a single residential dwelling.***

- ***Conventional septic tanks located outside Building Control Areas.***
- ***Site-specific design approval of an ASTS.***

Conventional Septic Tanks (e.g. septic tank reticulating to absorption trenches or evapo-transpiration bed) must be installed by licensed plumbers and drainers outside Building Control Areas. Alternative Septic Tank Systems (ASTS) are septic tank systems that treat effluent to a higher quality than that offered by conventional septic tank system. For example, these include Aerated Wastewater Treatment Systems (AWTS), Composting Toilets, Hybrid Systems and Ecomax Systems. In addition to the self-certification of the installation, ASTS require either a notification to install or site specific design approval. Septic Tank application forms can be downloaded online or by contacting the relevant Environmental Health Office.

Territory Iron has already sought advice from a registered plumber and an alternative dry system (Rotalec) regarding the most suitable wastewater treatment systems for various locations at Frances Creek. Further advice will be sought prior to installation and commissioning.

Territory Iron is aware of the Code and Commitment 8.4.2.i of the PER specifically states that the requirements of the Code will be complied with.

EPA have advised that further information is needed regarding borrow material requirements, extraction methods and uses. In particular, the location where material will be sourced and what remediation (if any) will be undertaken on the borrow pits.

Very little borrow material will be required. Hardstand areas for offices and the plant already exist and should not require additional material. Internal haul roads will need only to be regraded. The one exception will be the track to Ochre Hill pit. This will need suitable road base and surfacing material that will be sourced from the operating pits.

With the external haul road (Alternative 1 - the preferred shorter route), as stated in the PER, in raised sections the top of the rail formation will be lowered to increase its width to a minimum of five metres; where cuttings need to be widened this material may be used to provide the base for the Ochre Hill haul road or the rail siding interconnecting haul road. The latter haul road will be designed so that cut and fill material are equalised. Railway siding hardstand material will be sourced from cut material on site.

In the case of Alternative 2, the haul road follows established roads i.e. the Frances Creek and Mt Wells roads except for the interconnecting haul road to the rail siding, where cut and fill will be balanced. Surfacing material for this haul road will be sourced from suitable cut material.

3.5 TRANSPORT

DPI is supportive of proposed route 1 (former rail spur line) outlined at section 4.7.2.1 of the PER as the preferred haulage route. This option keeps the proposed haulage mainly off public roads and separates haulage traffic from general traffic (except at one point which can be managed appropriately).

Preference is noted.

DPI has advised that if the use of non-standard vehicles is proposed for route 1, a permit will be required for crossing the public road. If route 2 is selected, the use of non-standard vehicles will not be permitted.

The Department of Planning and Infrastructures response to the PER has favoured the use of Route 1 (the old railway formation) over Route 2 (using the public road) as it provides less interaction of road trains with public traffic and would be safer with a controlled crossing at one location. Guidelines from the NT Government following this Supplement will advise Territory Iron on the recommended route to be used. Appropriate clearances have been obtained from AAPA for Heritage and Sacred Sites for the haul routes and mining areas.

DPI have noted that proposed route 1 includes a proposal to construct on the alignment of the previous Frances Creek mine rail spur to Roney Siding through Mary River West Pastoral Lease and have advised this area of land is owned by the NT Land Corporation and may be subject to a remnant land claim under the Aboriginal Land Rights (NT) Act 1976. Further advice should be sought from the Northern Land Council and the Land Administration Division of this Department regarding negotiating appropriate ownership / use agreements.

Territory Iron have sought advice from the NT Land Corporation regarding this matter. Territory iron will also be discussing the matter with the NLC as part of ongoing mine access negotiations.

DPI have made note of Commitment 8.11.2b regarding maintenance on Mt Wells Road. Further consultation by Territory Iron will be required with DPI and the relevant local Council regarding maintenance to appropriate standards.

Comment noted. Territory Iron will continue to consult with DPI, Pine Creek Community Council and Katherine Town Council regarding road use and maintenance issues.

DPI have advised any construction work on roads under the care and control of DPI will require a Traffic Management Plan for construction activities prior to commencement of works.

Comment noted. Territory Iron will prepare a Traffic Management Plan (**Commitment S3**).

EPA notes the PER advises that Territory Iron will use one of two alternative routes for haulage (page 28). The Supplement should indicate which haul route will be used for the mining operation so that appropriate clearances can be obtained for heritage and sacred sites.

The Department of Planning and Infrastructures response to the PER has favoured the use of Route 1 (the old railway formation) over Route 2 (using the public road) as it provides less interaction of road trains with public traffic and would be safer with a controlled crossing at one location. Guidelines from the NT Government following this Supplement will advise Territory Iron on the recommended route to be used.

3.6 HAZARDOUS MATERIALS

DPIFM have advised that under SSAN guidelines a security plan for explosives is required.

Territory Iron will prepare a Security Plan and will submit this as part of the Mining Management Plan (**Commitment S4**).

3.7 WASTE MANAGEMENT

DPIFM have suggested that given the location and proximity to a landfill at Pine Creek, and commercial operators in Darwin, it may be advantageous to dispose of industrial waste off site.

This will be further investigated as suggested. If suitable, cost effective local collection and disposal facilities are available, this will be used in preference to development of an onsite landfill (**Commitment S5**).

3.8 WASTE ROCK MANAGEMENT

NRETA has noted that operations are expected to produce over three million tons of waste rock each year of which approximately 10% will be returned to the pits. Overburden and the bulk of the waste rock is proposed to be stockpiled next to the pits. It is assumed that overburden (which is proposed to be used in progressive rehabilitation) is to be stockpiled separately.

Overburden and waste rock will not be disposed of separately, but in the one stockpile. Due to the location of the pits in elevated topographic positions, it is not anticipated that there will be large volumes of overburden. As stated in the PER, the stripping ratio is anticipated to be about four cubic metres of waste rock to one cubic metre of ore. Overburden will typically be rocky material and is unlikely to have more favourable characteristics for rehabilitation compared to waste rock from deeper in the profile. All waste material – overburden or rock will be progressively rehabilitated.

NRETA has recommended that there should be an explicit statement as to whether ten waste rock samples from six pit locations are adequate to safely establish their acid forming potential and potential for trace-element pollution of groundwater.

A total of thirty-four metres of drill cutting waste rock material from nine sites, plus individual bulked composite samples of footwall and hanging wall material unlikely to be mined as waste, were collected from eleven sites at Frances Creek. The locations of these sites were determined after reference to the Territory Iron drill database and to the analytical X-ray fluorescence scan records for 160 waste rock samples which penetrated through both hanging wall and footwall material.

On the basis of this data, some eighteen intervals were selected for analysis. These intervals also included the highest content of possible deleterious and leachable trace metals and the highest recorded sulphur values from each of the available proposed mining areas.

The assay laboratory was only able to supply sufficient sample material for eleven of these sites with an average interval of three metres for each site. The samples adequately cover all waste rock types likely to be obtained and one sample of actual ore material was included for additional reference.

A larger number of samples would have been preferable, but the extremely uniform data from the Territory Iron database indicates that the sample selection is adequate on which to base conclusions.

DPIFM has recommended that a pH of less than 5 should be considered problematic and worthy of appropriate management strategies and proponent should provide a prediction of the volume of Thelma 2 waste and whether it is likely that other pits will encounter this material. Any material likely to add to AMD problems in the smallest positive increment should be identified and managed.

A pH of less than 5 is only problematical where the cause of the pH is oxidation of sulphides and that further sulphide oxidation is possible. Where the pH is caused by natural organic acids from natural degradation of leaf litter and naturally occurring organic materials, it is appropriate to not require any specific management strategy.

The statement that "...any S above 0.02% in these poorly buffered conditions will be generally acid forming ..." is incorrect. Any sulphide-sulphur perhaps so, but definitely incorrect where all the sulphur present is there as sulphates. The iron ore bearing formation has a consistently moderate content of barium and the depositional sedimentary facies is such that most, possibly all of the sulphur, is probably present as $BaSO_4$.

In reference to the comments in Section 8.2.1, the only location where any problem with acidity has been sighted, is at the Thelma 2 pit area where no further mining is proposed. No problems exist elsewhere. Natural soils throughout the area have pH values ranging from 4.6 to 6.0 with a median value of 5.2, substantially much more acidic than from the existing wastes which, excluding Thelma 2, range from 4.9 to 8.1 with a median value of 6.6. In addition, there are no surface stockpiles with greater than 0.1% S and there are unlikely to be any in the future based on the Territory Iron database of several thousand samples. The

suggestion that any material above 0.02% S should be encapsulated is not supported where such material, as is the case here, cannot produce acid in the absence of sulphide-Sulphur.

Finally, the Thelma 2 waste rock sample is from footwall waste that had to be mined in order to obtain access to the pit as it was deepened. It is only in footwall waste that there is any possibility of encountering sulphides which can contribute sulphide-Sulphur and minor traces of chalcophile elements. This material will normally not be encountered during the open pit mining at Frances Creek.

In the event that the entry to a pit does encounter the black carbonaceous siltstone similar to that exposed at Thelma 2, then that material will be tested for sulphide-Sulphur and if necessary encapsulated (**Commitment S6**). The quantities likely to be involved will be extremely small compared with other wastes and encapsulation will present no problems.

DPIFM has queried, if the conversion factor for S means that the MPA for a 0.1% S is actually 3.2, where does -0.8 come from? Any S above 0.02% in these poorly buffered materials will be generally acid forming. Regarding the comments 8.2.1 - this has implications for surface stockpiles above 0.1%S as well. Any material above 0.02% in poorly buffered materials should be encapsulated.

In the case of Thelma 2 waste where the pH was measured as 4.9, the analyses indicated that "more than" 100% of the total sulphur present was present as fully oxidised sulphate and therefore incapable of producing any sulphuric acid. It is because of this small analytical error that the calculated NAPP is negative 0.8 kilograms H_2SO_4 per tonne.

The conversion figure from 0.1% sulphide-Sulphur to an MPA value is 3.2. In the case in question, the sulphate-Sulphur exceeds the Total Sulphur due to a very slight analytical error. Thus the sulphide-Sulphur value is actually nil. MPA is the conversion from sulphide-Sulphur, not from Total Sulphur. The actual analysis values have been quoted, thus the MPA is quoted as -0.8, not as Nil.

DPIFM has commented that the PER should indicate why the value of 0.1%S has been selected as the trigger. It is possible that the low pH and higher metal values in pit waters are not entirely due to organic acids. More work needs to be done in this area. 0.1% sulphur, waste rock with pH of 4.9 and no buffering capacity create conditions that have the potential to cause problems

The Total Sulphur value in the waste rock from the entry to the Thelma 2 pit was 0.1% S. No other Total S value exceeded 0.01 in samples analysed for this report, and the highest value obtained previously was 0.02% S in only one of 160 sulphur determinations from the Territory Iron database. Thus, the 0.1% S value was a massive outlier, five times higher than the highest previous recorded value. The "trigger" value recommended by the geochemist in the Western Australian Department of Industry and Resources is 0.2%. Territory Iron elected to be conservative and use 0.1%.

Please note that the median Total Sulphur value in ore and waste rock for the drilled area at Frances Creek is less than 0.005% S and probably greater than 99% of that amount is non-

sulphide Sulphur. The likelihood that this small quantity of possible sulphide-Sulphur available (which is less than 0.1% of the normal average world-wide content for sulphur in soil), can cause potential ARD problems is effectively nil.

DPIFM recommended that ongoing testing of waste rock should be committed to and that the inference that successive wet seasons will flush the leachate away and sufficiently dilute the problem is an inadequate response to what could be a significant problem

The existing extensive Territory Iron sample database where extensive analyses for a very wide range of elements has been undertaken has not encountered any other examples of the minimal problems experienced at Thelma 2 Pit. By not undertaking further mining from Thelma 2 Pit, it is very unlikely that similar conditions will recur. Despite this, Territory Iron agrees that on-going testing of waste rock will be conducted if fresh black siltstone rock is encountered during mining (**Commitment S6**).

DPIFM commented that without a process for containment of ARD material and an appropriate void management strategy it is likely that exposed S will produce long term water quality conditions outside of the accepted range.

Further determination is required as to whether or not material has acid generation potential. Given that water quality at the point of emission (i.e. at dump toes, pit overflows and the like) is the required compliance point, individual point sources must be acceptable for closure even if overall management is acceptable.

The sulphur present is not sulphide-Sulphur and the materials to be exposed are not likely to be ARD producing materials. All data clearly shows that all typical waste rock tested (Thelma 2 was specifically collected because it was atypical) are Non Acid Forming due to the total or near to total absence of sulphide-Sulphur. Not one sample collected contained a measurable quantity of sulphide-Sulphur.

DPIFM argue that the view that "no rock types will require special handling" is debatable.

The view that "no rock types will require special handling" is supported by the analytical data available, as described in the responses above.

DPIFM recommends that a geotechnical review should be provided particularly from the perspective of erosion, given that 18 degrees is quite steep.

Conceptual waste rock stockpile designs were included in Appendix 3 of the PER. Section 9.2 also details management and mitigation measures relevant to waste rock management. Commitment 9.2.2d states that waste rock stockpiles will be constructed with gentle slopes between 10 to 18 degrees to facilitate water shedding. Waste rock stockpile geometry will also be strongly influenced by the shape of the valleys they will be located in and at times fill.

As part of finalising design of the waste rock stockpiles, Territory Iron will seek geotechnical advice (**Commitment S7**).

NRETA has remarked that the proposal appears inconsistent with section 3.1.8 which states that "where practicable, stockpile locations will be selected such that they do not cross drainage lines as:

- ***It is proposed that waste rock stockpiles from the Helene 6/7 and Thelma Rosemary pits be used to "partially fill minor valleys with ephemeral water courses" thus diverting minor water courses around piles (section 3.3.7).***
- ***It is also proposed to "build diversion drains wherever stockpile construction obstructs significant watercourses" (8.2.2c Table 4 section 13).***

It is also proposed that the waste rock stockpiles from the Jasmine East pit are used to fill a number of small steep-sided valleys and it is noted that this operation will not require the diversion of any watercourses (section 3.7.3). Destroying microhabitats is obviously far from a best-practice measure and would tend to further simplify rather than maintain habitat heterogeneity in the project area.

Waste rock stockpiles have been designed to minimise impact on water courses where possible, however much of the terrain of the project area is steeper than waste rock stockpiles slopes. This means the only possible location for stockpiles is to fill valley bottoms. The stockpile locations have been chosen to preferentially fill upper valleys where there is no defined water course and no distinct riparian vegetation.

As described above, it does not contradict Section 3.18 because in several cases it is not practical or possible to avoid drainage lines entirely.

Table 28 of the PER describes the amount of land disturbance for each land unit. From this it can be seen that the total amount of land required to be cleared for construction of waste rock stockpiles is 116 hectares. Of this, 33 hectares (28%) has previously been disturbed. Fifty four hectares (65%) of the previously undisturbed land (83 hectares) is in the ridge crest and slopes land unit and 34% is in the low hills land unit. Only 0.5 hectares will affect previously undisturbed riparian land unit. The two land units that will be most disturbed are well represented locally and regionally.

NRETA notes that the claim is made that "long term change to the landscape will be minimal" (section 7.1) but dumping waste rock in existing gullies (with or without watercourses) is plainly inconsistent with this aim.

Waste rock will be generated by mining operations. Opportunities to place this within existing voids will be further investigated as part of mine planning activities. Where this is not a practicable option, out of pit waste rock stockpiles will need to be formed. Every effort has been and will continue to be made to minimise long term impacts of these. Rehabilitation of waste rock stockpiles will also assist with minimisation of long term impacts.

Territory Iron acknowledges that development of open pits and waste rock stockpiles will have long term effects on the landscape as these are permanent features. This is an unavoidable

impact of open pit mining. This being stated, Territory Iron has made every effort to minimise the impacts of these through careful design and commitment to rehabilitation. Implementation of these measures will ensure adverse impacts do not result because of physical or chemical instability of waste rock stockpiles.

DPIFM notes that the statement "limited potential exists to place waste rock as backfill in pits. This will be done when economically feasible i.e. without double handling" can be interpreted as meaning that there will not be any backfilling, given that double handling of the waste rock is inevitable.

Several of the pits to be mined are located in close proximity to existing pits, creating an opportunity for waste rock to be backfilled directly into adjacent pits. The feasibility of backfilling large quantities will depend on project scheduling which has yet to be fully determined, but it is incorrect to say that there is no possibility of backfilling.

3.9 RADIATION

DHCS – EH notes that the Radiation Protection Act 2004 applies to servicing, testing, installing, decommissioning, manufacturing, possessing, using, storing, transporting, disposing of or otherwise dealing with a radiation source. A radiation source is defined in the Act. The provisions of the Radiation Protection Act may apply to this project if the operation includes the use of radiation sources. The Act covers safe control of the use of all radiation sources, both Ionizing and non-ionising from all radiation sources. The source can be radiation apparatus or radioactive material. Natural sources of radiation may be included in the definition if radiation exposure results from the enterprise. Generally, unmodified concentrations of radioactive material in most raw materials are not included unless there is a possibility of significant radiation exposure. If the unmodified concentration is below concentrations of radioactivity as listed in the latest edition of the National Directory for Radiation Protection, that material is not defined as radioactive.

Notwithstanding, the Radiation Protection Act 2004 is not expected to apply to any mining operation in which the most exposed person could not receive a radiation dose that is greater than 1mSv per year.

Estimated radiation dose for the most exposed person is less than 1mSv per year (Section 7.10 of the PER). Territory Iron will implement management and monitoring measures to ensure radiation exposure is as low as reasonably achievable, and confirm it remains below the 1 mSv per year limit.

3.10 GREENHOUSE GASES

NLC commends Territory Iron's commitment to participate in the Federal Government's Greenhouse Gas Challenge Plus Program and to report emissions as part of the National Pollutant Inventory. NLC believes that this data should be reported in a manner that provides for greatest transparency and analysis and should therefore be reported on a facility level rather than a company-wide level. An assessment of how the company's Greenhouse Gas (GHG) emissions compare with other major industries and the Northern Territory's overall emissions would also be useful.

Comment noted. Territory Iron will report GHG emissions on a facility basis for the Commonwealth Greenhouse Gas Challenge Plus (**Commitment S8**).

Greenhouse gas emissions for the mining sector across Australia were estimated at 44.9 mega tonnes CO_2-equivalent in 2004 while emissions for non-energy mining were estimated at six mega tonnes CO_2-equivalent (Australian Government, 2006). The estimated GHG emissions for the Northern Territory in 2004 were 15.6 mega tonnes CO_2-equivalent (Australian Government, 2006). This compares to annual estimated GHG emissions for Frances Creek of 0.028 mega tonnes CO_2-equivalent with an estimated 0.083 mega tonnes CO_2-equivalent over the three year mine life. This will be less than 0.18% of the annual emissions for the Northern Territory.

NLC has commented that Territory Iron suggests that the full amount of GHG emissions from vegetation clearing will be balanced by carbon uptake during revegetation (Section 8.7.1.1), but do not indicate if this is a firm commitment under the program, nor how it will be assessed. If this is actually a commitment then that should be specified, along with an indication of how this will be measured and assessed.

This is not intended to be a commitment. Rather it is a general observation that rehabilitation aims to return the land to the pre-mining land use (pastoral) and will also involve the rehabilitation of some existing disturbances where practicable. This rehabilitation will result in GHG emissions from land clearing being at least partially offset by regrowth of woody species. As both rehabilitation and land clearing will occur progressively throughout the life of the project, offsetting of GHG emissions will occur at an early stage.

EPA has commented that Territory Iron has provided basic information regarding Greenhouse Gas Emissions, however many of the issues identified for consideration in the PER Guidelines and Appendix A "NT Environmental Impact Assessment Guide: Greenhouse Gas Emissions", have not been addressed. For example, measures to be undertaken to minimise greenhouse, emissions have not been outlined. Commitment 8.7.2.3 (a) relating to Greenhouse commits Territory Iron to "joining the... Greenhouse Challenge program and monitoring greenhouse emissions and efficiency". While participation in "Greenhouse Challenge Plus" (note name change) is appreciated, for public transparency some outline in the PER of potential emissions minimisation measures would be appropriate.

As outlined in PER Commitment 8.7.2.3b, Territory Iron will make energy efficiency a major consideration in the selection and design of all equipment and plant. This may include:

- Variable speed drive control of conveyors, fans and pumps.
- Preferentially selecting high energy efficient motors for use in plant and equipment.
- Selection of equipment with low emission specifications.
- Integration of processes, such as pumping systems.
- Use of energy efficient lighting.
- Purchasing energy efficient office equipment.

Energy efficiency will also be achieved through regular maintenance of all plant and equipment to ensure optimal performance.

All employees and contractors will be educated in energy efficient practices and encouraged to reduce the amount of energy they use.

EPA has recommended that Territory Iron join the Commonwealth Government's Greenhouse Challenge Plus program, and investigates opportunities to offset greenhouse gas emissions from the proposed operation.

Territory Iron has committed to joining the Australian Government's Greenhouse Challenge Plus program.

EPA has recommended Territory Iron consider investing in any greenhouse offsets. If mining was to proceed, the Environment Protection Agency Program would expect the proponent to identify opportunities for offsetting greenhouse gas emissions from the operations.

Territory Iron will investigate opportunities for investing in greenhouse gas offsets. Potential greenhouse gas offsets include investing in alternative energies, participating in the BP Global Choice fuel offset program, participating in emission offset programs such as the Men of the Trees Carbon Neutral program and investing directly in tree planting initiatives.

Territory Iron believes that progressive rehabilitation of the site will partially offset greenhouse gas emissions over the life of the project.

EPA has commented that greenhouse emissions from land clearing should be presented in Table 30 titled "Predicted Emissions" (page 102 of Volume 1 of the PER) so that a complete total for the project is clearly presented. Section 8.5: Vegetation and Flora states that 172 hectares of native vegetation will be cleared for the project. The statement in Section 8.7.1.1: Greenhouse Gases that "new clearing is about 94 hectares" is irrelevant as degraded and regrowth vegetation still produces emissions when cleared. The 172 hectares of clearing represents approximately 43,000 tonnes of greenhouse emissions, which should be included in Table 30 on page 102.

Comment noted. Table 30 has been updated to include emissions from land clearing. The total emissions from land clearing have been revised using 172 hectares instead of 94 hectares. Some of the previously disturbed areas do not support vegetation as concrete foundations and other such artificial surfaces were left. Despite this, emissions were calculated for 172 hectares. Emission estimates have also been added for explosives. Automotive diesel oil GHG emissions has been broken down into those generated by power generation and those from transport. The corrected Table 30 is presented in Appendix 2.

EPA has noted that the final sentence of section 8.7.1.1 states that emissions from land clearing will be "balanced" by carbon uptake during revegetation. Given that not all areas cleared will be revegetated, and there will be a very significant time lag before woodland is fully regrown on revegetated areas, it would be accurate to use the team "partially offset" here, rather than "balanced".

Comment noted.

EPA has commented that Table 30, titled "Predicted Emissions of Greenhouse Gases" and the subsequent text regarding emissions of methane from landfill are confusing. It is unclear whether the methane emissions are included in the figures shown in Table 30 against "landfill", and how they are calculated to be 31.4 kg per year, when CO2 equivalent from landfill is calculated to be 1.2 tonnes. A clear outline of total emissions and sources needs to be provided.

The figures presented in Section 8.7.1.1 for methane are included in the total emissions figure (CO_2-equivalent) presented in Table 30. The paragraph following Table 30 is provided to give detail of specific gases produced from landfill sites. The values for methane emissions were calculated using the following equation:

$$\textit{Methane Emissions (kg/yr)} = (\textit{CO}_2\textit{-equivalent emissions (kg)} * 0.55)/21$$

As stated in Section 3.7 of this document, Territory Iron will investigate commercial services to dispose of waste off site in preference to establishing an onsite landfill.

EPA has advised the Northern Territory Government is committed to introducing mandatory public reporting of greenhouse gas emissions by major industry. Implementation of this commitment is currently being explored in relation to a Council of Australian Governments commitment to report on the preparation of national purpose-built legislation to provide for cost-effective mandatory reporting and disclosure of greenhouse and energy data at the company level at the earliest practicable date.

Comment noted.

EPA has noted that the proponent has already made a commitment to join the Greenhouse Challenge Plus program. Reporting obligations under the Greenhouse Challenge include: providing timely annual reports with agreed content on greenhouse gas emissions and emission reduction activities; making accurate annual public statements about participation in the program; and participating in independent verification of annual progress reports. Until a national or Northern Territory reporting system is established, it is recommended that annual reporting should be undertaken through the Environmental Management Plan/Mining Management Plan process. At a minimum, reporting should detail total annual greenhouse gas emissions, provide a breakdown of emissions by gas and source (actual emissions and in carbon dioxide equivalents), and the emissions intensity of production.

Comment noted. Annual reporting of GHG emissions will be undertaken through the MMP/EMP process (**Commitment S9**).

4. BIOPHYSICAL ENVIRONMENT

4.1 LANDFORMS AND SOILS

NRETA has noted that there is no mention of implications of the substantial open-cut pits that will remain at completion of the project. Additionally, there is no consideration of the significance of considerable changes to local landforms that are proposed for the project area in Section 7.1

The project would involve enlargement of three existing open pits and development of two new pits. The Frances Creek area has already been substantially disturbed by mining, specifically open pit mining. At the time of this disturbance, rehabilitation was not a standard industry practice or community expectation. Territory Iron will progressively rehabilitate disturbed areas as part of normal mining operations. Backfilling of pits (historic or those subject to current mining) will be undertaken where practicable to minimise long term impacts on local landform. Open pits will however remain a feature of the local landform. Abandonment bunds will be installed as per industry practice to minimise the risk of unauthorised access.

Development of previous open pits in the Frances Creek area has not been reported to have resulted in adverse impacts on local landforms.

4.2 GROUNDWATER

NRETA has commented that there is no reference made to determining or monitoring dewatering discharge sites for exacerbated erosion. This needs to be outlined further in the PER and detailed in the Water Management Plan and Rehabilitation Plan of the EMP.

All groundwater discharges will be via existing infrastructure that has regularly discharged water from the Frances Creek site to Frances Creek. Discharge of surface water collected in the Ochre Hill Pit will be from a new structure.

Water will discharge primarily from Frances Creek Dam. This is constructed on Frances Creek and it currently overflows regularly into Frances Creek due to natural stream flows from Frances Creek. There will be no diversion, but flow will be increased slightly due to dewatering discharges entering the dam after settling and dilution. Dewatering discharges make up only a small proportion of natural flows through the dam system. Average annual runoff currently to Frances Creek Dam is about 2,900 ML, with dewatering this would rise to 3,200, an increase of about 10%.

Repairs to the Main Frances Creek Dam Spillway have already been carried out by Territory Iron as part of approved exploration activities on the tenements. Other dam spillways were found to be in good repair.

The PER includes the following commitment.

- All dam spillways will be inspected before each wet season, and after each discharge event and repairs carried out if necessary **(Commitment 8.4.4a)**.

This will also apply to any additional discharge sites besides the dam spillways.

Monitoring programs are being developed and will be detailed in the Mining Management Plan and associated Environmental Management Plan. Territory Iron will ensure that the monitoring programs include provision for monitoring for erosion at any discharge point used during the course of operations.

EPA has suggested draw down curves of ground water may be affected by mining activities and that this may result in changes to the available soil water to vegetation. Irrigation could be used to supplement vegetation water needs (in particular creek line vegetation) and contribute to a reduction and re-use of the volume of water requiring disposal from the site. As stated in the PER there will be an increase in discharges from the Helene 11 Dam to Frances Creek Main Dam from a pre-mining average of 550 megalitres a year up to 882 megalitres a year (pg 26)

The only pit where water will be drawn down is Helene 6/7 pit that will be deepened. Typical drawdown cones for pits are no more than double the pit diameter or depth. The drawdown cone around this pit does not intersect any water courses and associated riparian vegetation within the draw down area that will be affected. Reticulating water to supplement soil water removed by drawdown is not practical and would only contribute to water that is being pumped out of the pit as recycled water.

4.3 SURFACE WATER AND WATER DISCHARGE

DHCS-MEB has recommended that erosion prevention structures be constructed at the overflow points from the various pits and dams within the development site and at erosion vulnerable points within the diverted watercourses, to prevent erosion and the downstream siltation of drainage paths, which could lead to the creation of mosquito breeding sites.

Territory Iron will install erosion control structures at erosion vulnerable points within the operations area (**Commitment S10**). Sediment ponds will also be constructed where necessary to ensure sediment does not leave operational areas and enter natural water systems.

DPIFM has commented that if the containment dams (Helene 9, Dam 11, Main Dam) overflow on an annual basis as a consequence of water management on site, it may be necessary to establish stable overflow structures such as spillways or weirs to reduce the chance of erosion and wall collapse. The Main Dam is already showing evidence of substantial erosion and potential failure from the wet season of 2005/06.

The spillways of the Frances Creek Main Dam have already been inspected and have been repaired following damage related to the 2005/06 wet season as part of exploration work

underway on the tenements. Further regular inspections will be carried out prior to each wet season as detailed in PER Commitment 8.4.4b.

The need for construction of additional spillways or weirs at other dams will be evaluated. If the risk of collapse is considered high, suitable structures will be constructed (**Commitment S11**).

DPIFM has advised that Shultz et al (2002) report is a useful document to characterise regional chemistry and mineralogy, however, it should be used with caution for the following reasons:

- ***All metal concentrations were total measurements and thus overestimate the bio-available component (especially when comparing with the ANZECC guideline values).***
- ***The sites used to calculate the ranges, percentiles and other descriptive statistics included some test sites downstream of known mining contamination sources. The true ranges of background metal concentrations are therefore much lower when these sites are removed from the analyses.***

Comparisons with the Shultz et al (2002) document will lead to misinterpretation of the Frances Creek metal concentrations from a regional perspective. Further comparison between ranges presented in this document and ANZECC (2000) Guidelines is also flawed as a result of the inclusion of test sites in the analyses.

The information from the Schultz et al (2002) report was included to provide background information on regional water quality. It does include data from monitoring sites downstream of known mines. This is expressly stated in the document. The ranges of background concentration would be lower if these sites were removed from the analysis, however the median values given are unlikely to be greatly affected by excluding the small number of mine site monitoring sites. It could be argued that including sites downstream of mines gives a truer picture of the actual water quality in the catchment.

Water quality targets for management of mine site water will be based on local monitoring where possible, and obviously will reflect natural background water quality, not contaminated water quality.

DPIFM have commented that all pits except Thelma 2 appear benign in water chemistry and that if mining is advanced in Thelma 2 (or close by, but intersecting the same problematic ore), it may be necessary to treat or isolate this water and also present strategies for mining and waste encapsulation of new waste to ensure further contamination does not occur.

No mining is proposed for Thelma 2 Pit because there is no economic resource there. The water present in the old pit is mildly acidic (due to lack of buffering). The problematic waste material is not ore and the amount of actual acid in Thelma 2 pit water is so low (again due to the extreme lack of buffering capacity of the enclosing rocks) that it supports healthy plant life to the high water mark. It does not create an environmental problem. The amount of

dissolved metals is also very low with only nickel exceeding ANZECC drinking water guidelines.

Territory Iron recently received aerial photographs of the project area that were flown in June 2006. Plate 1 shows Thelma 2 pit and surrounds. From this it can be seen that vegetation growth has not been compromised by pit water quality.

Plate 1: Thelma 2 Pit as of 1 June 2006

DPIFM have advised that onsite monitoring programs should be determined with assistance and advice from DPIFM to ensure appropriate rigour is applied to the sampling methods and site selections.

Monitoring plans are being developed and will be included in the Mining Management Plan and associated Environmental Management Plan. These plans are required to be submitted to DPIFM for approval before mining can commence.

Contact has been made with Mr Cyrus Edwards of the DPIFM Authorisation and Evaluation Division of Minerals and Energy since receipt of the DPIFM submission. Additional water quality monitoring data has been provided to Territory Iron as a result of this. Territory Iron will continue to liaise with Mr Edwards to ensure the Surface Water Monitoring Procedure currently being developed as part of the Mining Management Plan meets DPIFM requirements.

DPIFM commented that some of the chemistry presented in Table 15 and also Table 2 of Appendix 4 is wrong. The excessively high Aluminium (filtrate) concentrations reported for Helene 9 and 11 dams have been inadvertently pasted as a microgram value into an mg/L column and therefore are 1000 times greater than the true values. It would appear two separate data sets have been combined without checking the units or fractions. The original analyses for samples collected on the 15th, 20th and 21st of May 2005 and submitted to NTEL need to be reviewed and compared with data presented in Appendix 4 Table 2.

To further support this it would be practically impossible to get a sample with a dissolved Aluminium concentration of 21,800 with an EC of only 26 µS/cm as shown for Helene 9 Dam (app4, Table2).

Further independent sampling from DPIFM conducted in May 2006 resulted in filtered Aluminium concentrations of 77µg/L, 8µg/L and 18µg/L for Helene 9, Helene 11 and Main dam respectively.

There are serious implications for water management if the chemistry is not reviewed. It is definitely in Territory Iron's best interest to establish what the true chemistry results are so appropriate decisions can be made about the environmental implications of uncontrolled flows from containment ponds. This may also influence the WDL conditions as set by DNRETA.

An error was made in transcribing data from laboratory analysis. Laboratory reports for the site contained a mixture of results reported in micrograms per litre and milligrams per litre depending on the analysis used, which led to the error. Some background water quality samples have anomalously high aluminium concentrations likely due to unfiltered samples being collected in pre-acidified bottles. Future samples will be collected in non-acidified bottles and only acidified after filtering at the laboratory. Corrected water analysis results and the laboratory reports are included in Appendix 3.

NLC has commented that nearby watercourses represent the receiving environment for any potentially harmful wastes, including any acid mine drainage, that may emanate from the mine.

Watercourses would represent the receiving environment if any harmful wastes were to be generated. Territory Iron believes they have designed the project and committed to implement a range of management and mitigation measures so that harmful wastes will not be generated or emitted.

NLC has noted that Territory Iron has provided estimated annual water balances for the period 2006 – 2009 (Section 4.6.3) and that the mean rainfall values provided in Table 7 for 2007 and 2008 are significantly higher (by ~28%) than for both 2006 and 2009. This is problematic and confusing because the rationale for this increase in rainfall over a two year period only has not been explained and because the average runoff estimated for the same period has not increased to reflect this additional rainfall. Any calculations based on the data provided for this period may therefore be in error.

While the mine's location is such that water management may not be a major issue during it's short life span, any fundamental errors in water balances or failure to account for significant changes to local climate may have disastrous environmental consequences. Contingencies have not been proposed for extreme weather events. Determination of annual water balances based upon a range of, for example, ± 33% of the mean rainfall may also be of assistance in determining contingencies for dealing with any on-going water management problems during operations at the site.

The rainfall figure in the water balance is the component of inflow from direct rainfall on the Helene 11 Dam water surface and Helene 5 and 6/7 pits. This is calculated by multiplying the rainfall by the contributing areas (the surface water area of Helene 11 Dam and Helene 5 and 6/7 pits). The lower figures for 2006 and 2009 reflect a reduction in these contributing areas due to dewatering only occurring for only part of the year in 2006 and 2009, compared to full years in 2007 and 2008. Whilst dewatering and mining is not occurring, direct rainfall to the pits will accumulate in the pits and will not be pumped to Helene 11 Dam. Similarly the dam water level will fall due to reduced inflow, reducing the surface area of water receiving direct rainfall as opposed to runoff.

Table 2 below shows the variation in water balance for the 2008 year if it is assumed the 2007/2008 wet season is roughly a 1 in 10 year low rainfall year (10th percentile) or a 1 in 10 year high rainfall year (90th percentile). It can be seen that some discharge will still occur to Frances Creek Main Dam in both scenarios, and Frances Creek Main Dam will still overflow to Frances Creek in both scenarios. High levels of dilution are maintained. In the high flow scenario large amounts of natural runoff will mix with the dewatering. In the low flow scenario only a small amount of discharge (128 megalitres) will mix into a still full Frances Creek Main Dam (1,300 megalitres) resulting in a 1:10 dilution with dam water.

Table 2: Water Balance for High and Low Rainfall Scenarios

Variation to 2008 Discharge with rainfall.	10th Percentile	Mean	90th Percentile
Direct Rain (ML)	91	126	199
Runoff (ML)	65	770	1864
Dewatering (ML)	586	586	586
Dust Suppression (ML)	-190	-190	-190
Evaporation (ML)	-303	-304	-305
Helene 11 Dam Minimum Storage (ML)	249	251	251
Discharge to Frances Creek Main Dam (ML)	182	882	2050
Overflow from Main Dam to Frances Ck (ML)	128	2370	6165

NLC have commended Territory Iron on their commitment to monitoring upstream and downstream of all mining activities within the tenements, including stockpiling at the railway siding (Section 8.4.5). They have noted that Territory Iron plan to utilize ANZECC guidelines as values against which deterioration of water quality can be measured, but do not indicate which guidelines or values are to be used. These should be specified.

Additionally, Territory Iron provides only limited water quality data for Frances Creek, its tributaries and Maude Creek tributaries (Table 15 – Section 6.5). A large number of samples analysed are shown to be characterised by enhanced concentrations of a number of elements, some of which exceed the ANZECC freshwater guideline values. For example, Territory Iron states that aluminium concentrations are well in excess of the ANZECC default value, but within the range observed for the natural watercourses in the project area (Table 27 – Section 8.4.3).

The NLC believes that it would be unsuitable to utilize these values as background values or as trigger values for monitoring purposes because the catchment areas have been affected by prior mining operations. Pre-mining analytical data for the river systems and tributaries should be available from previous mining companies and it is this data that should be used for development of any triggers for use in monitoring programmes. This data has not been provided and there is no evidence that it has been sought.

Triggers developed using this data should be verified against calculations using data collected at upstream monitoring sites, and the triggers and parent data should be made available for public review and included in the terms of the NRETA issued water discharge license.

All triggers to be used for water quality monitoring should be site specific and derived using an ecotoxicological approach, rather than using default values (ANZECC, 2000). These, or appropriate interim trigger values should be in place prior to commencement of mining operations. If interim trigger values are to be used to allow mining to commence, then final values should be derived within the following 18 – 24 months. The NLC believes this to represent best practice and recognizes it as the preferred approach to using triggers for water monitoring in the Northern Territory.

Final monitoring and discharge requirements will be developed in cooperation with DPIFM and the EPA and will have to be approved by these agencies in the Mining Management Plan and Water Discharge Licence. The ANZECC 2000 guidelines will be used in development of criteria. These guidelines outline a procedure to develop appropriate guideline trigger levels. This will primarily involve comparison with the ANZECC default trigger values, local and regional background monitoring data. Very limited data is available for the local catchment, consisting of that presented in the PER and some additional monitoring conducted by regulatory authorities in the catchment. Some data is available from nearby catchments with similar geology, but most likely not sufficient for development of rigid local trigger values. The most likely approach will be to monitor undisturbed catchments in close proximity upstream of mining operations, and set investigation trigger values based on mine water or water downstream of the mine exceeding a percentage greater than observed in the upstream control sites. The indications of monitoring completed is that discharge water will be of comparable quality to existing natural flows so ecotoxicological studies are unlikely to be appropriate. Ecotoxicological studies would only be required if mining operations were expected to have a significant effect on downstream water quality, in this case toxicological studies could be carried out to determine the significance of such a change.

The statement in Section 8.4.3 about aluminium resulted from an error in transcribing monitoring results. Both the dewatering aluminium concentration and some natural background monitoring results were incorrectly converted from milligrams to micrograms per litre. The true values are 1,000 times lower than reported in the PER for discharge water and for the natural catchment water at Helene 9 Dam. This places the dewatering well below ANZECC default guidelines, and at the lower end of observed levels both locally and in the greater Mary River catchment. Appendix 3 contains corrected PER Table 27 and associated text, and copies of the laboratory analysis results to confirm these corrections.

The local water sampling data referred to in the PER as natural background quality was collected upstream of all previous disturbances. This is the most appropriate data available to assess natural water quality in the area. Previous mining operations at Frances Creek ceased in 1974 with liquidation of the company. Investigation including searches of NT and Federal archives by Territory Iron has failed to find any records of monitoring data from the previous operation. It is considered likely that no records of pre-mining water quality in the project area exist. There are no other mining operations upstream of Frances Creek as it is located in the uppermost headwaters of the Frances Creek catchment. Other nearby mining operations such as Union Reef are located in quite different geology and as such water quality data from these sources would be of limited applicability.

EPA requires a discussion of mass loading and the potential of cumulative impacts at a catchment based scale in relation to other major catchment industry such as the Union Reef processing plant by Burnside operations and the Mt Porter Gold Project.

Monitoring data indicates that discharge water will not differ significantly chemically from the receiving water. It is estimated approximately 1,300 megalitres of dewatering will occur over three years, at a maximum of about 585 megalitres per year. Table 3 shows the estimated annual and total masses of all substances to be emitted from dewatering of Helene 6/7 Pit for

which sampling data is available. It can be seen that total masses are very low especially considering the large flow volumes in Frances Creek and the Mary River system.

Table 3: Mass Loading of Dewatering Discharge

Element	Annual Loading (kg)	Total Mass Discharged (kg)
Al_F	0.004	0.009
As_F	0.001	0.001
B_F	0.011	0.025
Ba_F	0.007	0.015
Ca_F	0.567	1.261
Co_F	0.000	0.000
Cr_F	0.000	0.000
Cl	6.370	2.867
Cu_F	0.001	0.001
F	0.234	0.520
Fe-Sol	0.035	0.078
K_F	1.463	3.250
Li_F	0.010	0.022
Mg_F	5.382	11.960
Mn_F	0.007	0.015
Mo_F	0.000	0.000
Na_F	4.388	9.750
Ni_F	0.001	0.002
P_F	0.006	0.013
Pb_F	0.000	0.000
SO_4	0.702	1.560
Sr_F	0.003	0.007
Si_F	4.680	10.400
U_F	0.000	0.000
V_F	0.000	0.001
Zn_F	0.004	0.009

No other mining operations are planned within the Frances Creek catchment. Mt Porter is within the Nellie Creek Catchment, which joins Mary River seven kilometres upstream of Frances Creek. Union Reef and Union Extended mines are within the McKinlay river catchment which joins the Mary River about 60 kilometres downstream of Frances Creek. It can be seen from Table 3 that the mass loadings from Frances Creek are so low as to be insignificant at the downstream points where combination with runoff from these other mine

catchments will occur after dilution with runoff from hundreds of square kilometres of natural catchment.

EPA has commented that as the project area is located on a pastoral lease (Ban Ban Springs Station) an examination of livestock drinking water standards for the dams and an identification of the level of protection needs to be conducted.

Livestock drinking water standards are typically less stringent than those for protection of fresh water ecosystems. By using those for protection of fresh water ecosystems, it is considered impacts on stock have also been accounted for.

Discussions with Station Managers indicate that stock are not present within areas of Frances Creek immediately affected by this project. Regular communication with Station Managers will continue to ensure Territory Iron is aware of stock movements near to mining and transport operations.

EPA has advised that the quality of waters entering the environment as a result of stormwater discharge will need to be at a standard comparable with the receiving environment. The proponent has provided mitigation measures to ensure water quality standards are met through licensing conditions. It would be relevant to include a discharge regime and proposed treatment system in the Supplement.

An error was made in transcribing aluminium concentrations in the PER. Corrected data and discussion, and the laboratory data are included in Appendix 3. The monitoring undertaken shows the existing quality of discharge water is comparable with the receiving environment. The treatment outlined in the PER of settling and dilution is considered by Territory Iron to be adequate to protect the receiving environment. Due to the good quality of discharge water it is proposed to allow water to discharge naturally when the storage and sedimentation area is caused to overflow by runoff from contributing catchments. This will tend to cause discharge at the same time as flows are occurring in downstream water bodies.

EPA has advised that key strategies to maintaining both the beneficial uses and water quality objectives for the Mary River Catchment are:

- ***Retain as much vegetation on site as possible;***
- ***Revegetate disturbed areas a soon as possible; and***
- ***Protect riparian zone vegetation.***

Maintaining water quality while removing habitat in the riparian zone may not sufficiently protect the beneficial uses of aquatic ecosystem protection for Mary River system.

As outlined in Section 4.4, less than six hectares of riparian vegetation will be removed during the course of operations. Over 90% of this has previously been disturbed by historic mining activities and much of it is “artificial” in that it has been created as a result of post mining landforms such as the TSF. Mine plans have taken this into account and it was considered

preferable to disturb riparian vegetation associated with artificial landforms rather than disturb pristine areas.

Where riparian vegetation is required to be removed, pollution prevention structures such as sediment ponds will be installed to ensure downstream water quality is not adversely impacted.

When considering impacts on the Mary River catchment, it should be remembered that historic mining activities where little to no environmental regulation occurred and no rehabilitation was undertaken have affected this catchment for over 25 years. Catastrophic impacts on the Mary River catchment have not resulted to Territory Iron's knowledge. Current mining activities will operate in a climate of much greater stakeholder expectation in regards to environmental performance and modern environmental management and mitigation measures described in the PER will ensure adverse impacts do not result for the Mary River catchment.

EPA has commented that the statement on page 91 that compares aluminium in the dewatering discharge with that of natural watercourses is incorrect. The range reported in Schultz et al 2002, is actually <5 - 260 µg/L (Table 27) for the Mary River Catchment. Therefore 6 800 µg/L is well above this value by a factor of approximately 45.

EPA has noted the PER states on pages 27 and 117 dewatering flows will be diluted by approximately 50 percent with natural runoff before discharge into the Frances Creek Main Dam. Figures presented for the Helene 6/7 pit dewatering illustrate highly elevated levels of aluminium compared to local surface waters. The 90th percentile for local waters is 150µg/L, while the pit water has a value of 6 800 µg/L requiring a minimum dilution of approx 45 times. The pit water should be subject to a water management hierarchy approach, including avoidance of discharge, re-use, recycling or treatment before disposal. If disposal is required a dilution regime will be needed including:

- ***Appropriate treatment;***
- ***Setting of water quality targets;***
- ***Accounting for seasonality;***
- ***1Q20 (one day in 20 year low flow) worst case low flow analysis;***
- ***Scenario Planning for start of flow, base flow, recessional flow and cease of flow; and***
- ***Toxicant assessment for total and filterable metals including any hardness modified trigger levels.***

An error in units was made in reporting aluminium concentrations in the PER, as discussed above. The concentration of aluminium in the Helene 6/7 dewatering samples was actually 6.8 micrograms per litre. This is toward the low end of the range observed for the Mary River catchment, and was lower than all natural background quality monitoring sites in the project area.

It is proposed that due to the good quality of dewatering discharge it will be adequately managed by detention in the Helene 11 Dam. Dewatering flows are such that in low rainfall

scenarios little discharge from the Helene 11 Dam will occur. Discharges will be initiated only by rainfall events causing natural runoff flows to the dam.

EPA has commented that although reference is made to Appendix 4 within the section on water discharge, it is unclear if the values represented in Table 27 of the PER are totals or filterable.

Samples F1 to F7 were analysed without filtering. All other samples were filtered at NTEL prior to analysis. No samples were filtered at time of collection. A copy of laboratory analysis results produced by NTEL is included in Appendix 3.

EPA has commented that aquatic ecosystem condition assessment is essential to determine appropriate levels of protection for aquatic toxicants. Condition assessments include physico - chemical and biological monitoring such as AUSRIVAS. Regular assessment of aquatic ecosystem condition is required and action must be taken to maintain or enhance aquatic ecosystem condition if required.

Territory Iron will undertake aquatic ecosystem assessment and monitoring as part of the catchment monitoring program detailed in the EMP (**Commitment S12**). Territory Iron will consult with relevant experts to determine the most appropriate methods to use.

4.4 VEGETATION AND FLORA

NRETA has commented that the project involves clearing 172ha. (185.35 / 196.5ha – Draft EMP) of native vegetation. Apart from the threatened Cycas armstrongii, no other plant species of conservation concern are recognised (Section 5.7).

The correct figure for land clearing is 172 hectares. The figure included in the draft EMP of 196.5 hectares was incorrect and was based on an earlier mine plan.

It is correct that the only plant species of conservation significance recorded from the project area is the threatened *Cycas armstrongii*.

NRETA has requested that although there are additional details of vegetation in the appended fauna/flora survey results, there is no meaningful discussion of anticipated impacts on particular vegetation types in the body of the PER and that an adequate appraisal of the impacts of loss of vegetation is presented for further consideration.

NRETA has commented that the draft EMP appended to the PER also indicates an undisclosed (but "small") area of riparian vegetation and swamp is to be destroyed but there are no further details and that the proposal is inconsistent with the analysis of the regional conservation value of riparian values (in terms of species diversity and its role as a refuge habitat) and recommends that there should be no disturbance to this habitat (Appendix 7B Section 7.1)

The amount of vegetation to be cleared per land unit is given in Table 28, Section 8.5.1 of the PER. This is provided again for information in Appendix 4. From this it can be seen that Territory Iron proposes to disturb about six hectares of Riparian vegetation. Of this, 5.5 hectares has previously been disturbed and is in fact riparian vegetation created by previous mining activities i.e. the "Swamp" downstream of the TSF. Disturbance of this will be required for construction of the Helene 5 waste rock stockpile. As can be seen from examination of preliminary Waste Rock Stockpile designs included in Appendix 3 of the PER, space for construction of this structure is limited and no real practical alternative exists. The most practical alternative option was considered to the point of preliminary design, but rejected due to environmental impacts as discussed in the response to the second comment in Section 4.5.

Reilly *et al.* (2005, 2006) have mapped the vegetation types outlined in Section 6.6.1 for the Frances Creek area. The total area mapped was about 2,105 square kilometres. Ridge Crest and Slopes cover about 180 square kilometres, Low Hills 955 square kilometres, Small Alluvial Flats 15 square kilometres, Granite Hills five square kilometres and Low Undulating Plains 950 square kilometres. Development of the mine site will occur predominantly in the Ridge Crests and Slopes with the remaining development areas in the Low Hills and Small Alluvial Flats. The proposed haul road along the historical rail spur alignment is located in the Low Undulating Plains.

The Frances Creek project will result in the removal of about 81.6 hectares of Ridge Crests and Slopes vegetation, 71.4 hectares of Low Hills vegetation, nine hectares of Small Alluvial Flats vegetation and four hectares of Low Undulating Plains vegetation. This is less than two percent of the area mapped by Reilly *et al.* (2005, 2006) with about 0.46% of the Ridge Crests and Slopes, 0.07% of the Low Hills, 0.65% of the Small Alluvial Flats and 0.004% of the Low Undulating Plains being impacted. The Granite Hills are not impacted by this proposal.

The vegetation units of the project area are widely represented both in the local area and in the Pine Creek region.

NRETA has noted that the only specific reference to vegetation re-establishment is "to reduce loss of biodiversity". Nowhere is it identified whether the waste rock dumps will have similar characteristics to endemic soils/micro geography or the characteristics will typically support the local vegetation and that a local species suite will be used to revegetate the site.

Rehabilitation of all disturbed surfaces, including waste rock stockpiles is discussed in Sections 9.2 and 11 of the PER. As stated in rehabilitation objectives contained in Section 11.1, local native species will be used to rehabilitate waste rock stockpiles and other disturbed areas.

As stated in the PER, preference will be given to good management of topsoil resources to maximise establishment of vegetation from contained seed resources. If monitoring shows this is not successfully being achieved, local native seed will be applied. Care will be taken when selecting seed to use species that will suit environmental characteristics of each specific

site being rehabilitated. This will consider soil chemistry, soil physical properties, soil depth, surface water drainage and aspect.

EPA has commented that Territory Iron has declared that there are no known Threatened Ecological Communities (TEC) which occur within the Frances Creek project area (page 65). However Table 17 provides a list of species of conservation significance. Species of conservation significance use the ecological community.

The term Threatened Ecological Community (TEC) is used in the PER to refer to listed threatened ecological communities as defined in Section 528 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

4.5 FAUNA AND HABITATS

NRETA have commented that the seasonal aridity of the project area suggests that the seasonal and semi-permanent natural waterholes recognised as occurring in the project area may be important to local wildlife but these areas also receive little consideration

The waterholes are located along the Frances Creek and will not be affected directly by mining operations.

They will receive diluted dewatering discharge during flood events. This may result in an overall increase in the size of these pools and their longevity into the dry season.

EPA have commented that the PER states disturbance to riparian vegetation and the swamp (that has developed at the old TSF) will occur as a result of building waste rock stockpiles. Both these habitats are sensitive to disturbance and it should be a consideration of the proponent to avoid impacts by relocating/redesigning the proposed stockpile sites and providing a suitable buffer to protect these habitats from mining influences. Creek line vegetation serves to maintain bank stability and preserve water quality. It has also been recommended by Low Ecological Services (Appendix 7), that the TSF is a good quality wetland and management efforts to retain this quality should be adopted.

The TSF area is on the line of iron ore mineralisation and exploration drilling has shown inferred ore material beneath this site, which may turn out to be economic. The TSF area was formed as a result of previous mining and although it may be quoted by Low Ecological Services as a good quality wetland area, it is not unique or a rare habitat in the Northern Territory and is not one that Territory Iron would protect, if it means that potential economic ore material is unnecessarily sterilised. The assessment of value of the wetland is also strongly influenced by its condition at the time. As described in Section 3.1, dewatering of pits to allow exploration activities will have meant that the wetland had more water flowing through it during 2005 than in previous years and it wasn't subject to seasonal drying as it typically is. The waste rock stockpiles associated with mining Helene 5 have been sited to avoid sterilisation of ore and to utilise a previously disturbed area that was not fully rehabilitated by previous mining operations.

A preliminary design was completed for an alternative waste rock stockpile location for Helene 5. This was located to the east of the pit on steep terrain. Due to unfavourable terrain the alternative stockpile would have covered an area of 27 hectares (seven hectares more than the chosen design) and would have had a dump face 46 metres in height, compared to about 12 metres for the chosen design. The design would require the destruction of 27 hectares of relatively undisturbed native vegetation including filling three small valleys with previously undisturbed riparian vegetation. All these factors make the current proposed waste rock stockpile site preferable.

NRETA have commented that although artificial in its origins (as will most of the resulting rehabilitated habitat), the existence of a functioning wetland system can be regarded as a positive offset to other environment disturbances in the area. This area should not be disturbed beyond any approved works that would enhance its further rehabilitation and function as a wetland refuge.

A waste rock stockpile has been proposed for the former stockpile area and part of the TSF. The design aims to maintain existing surface water flow paths and retain the more permanent water pools of the TSF. Siting of the waste rock stockpile in this location prevents clearing of a much larger area of natural vegetation which would be required for alternative locations (see comment above). It also allows the waste rock stockpile to be sited away from water courses and natural riparian vegetation.

Much of the vegetation of the wetland is introduced and characterised as weeds. Plate 2 shows the condition of the wetland in the area of the proposed waste rock stockpile while Plate 3 shows the view towards the stockpile from the open water section of the wetland. Note that the foreground shown in Plate 3, including the open water area, will not be impacted upon. Territory Iron believe siting of the proposed waste rock stockpile as described in the PER strikes the correct balance between preserving the artificial fauna habitat that has been created and minimising the impact on undisturbed native vegetation and landforms.

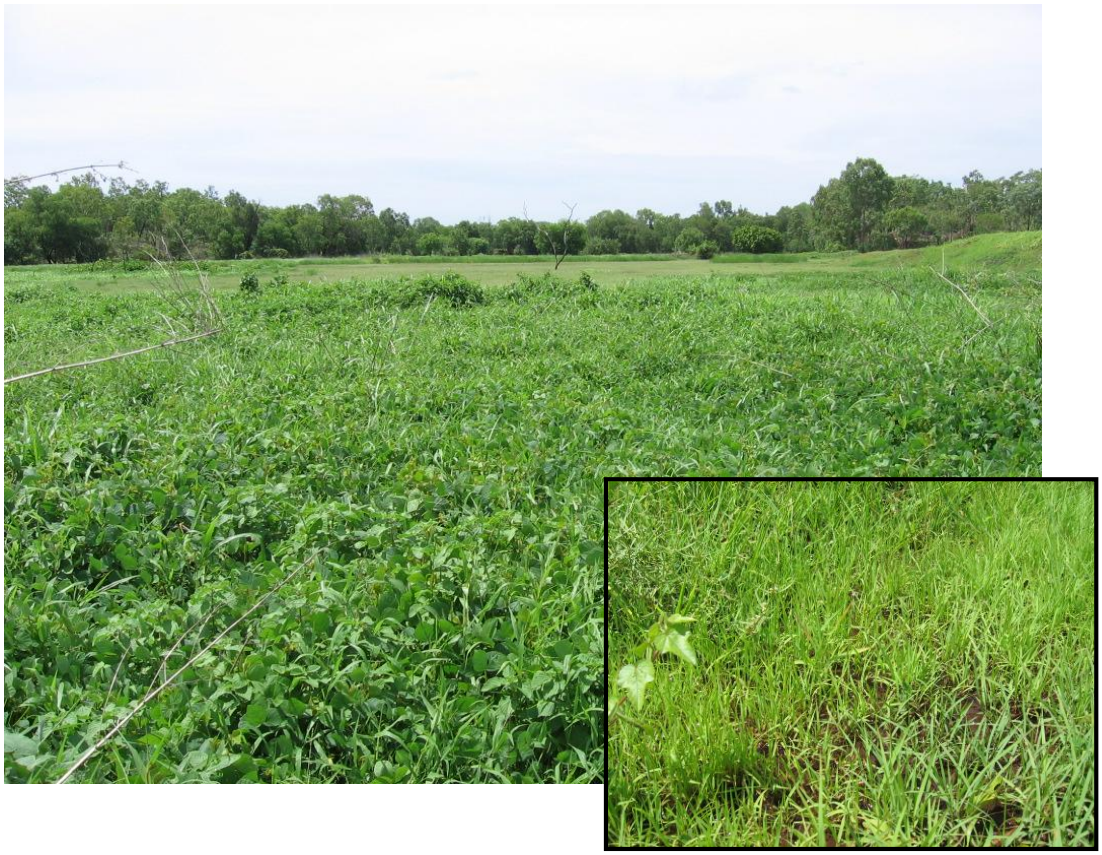

Plate 2: Old TSF Wetland in the Vicinity of the Helene 5 Waste Rock Stockpile

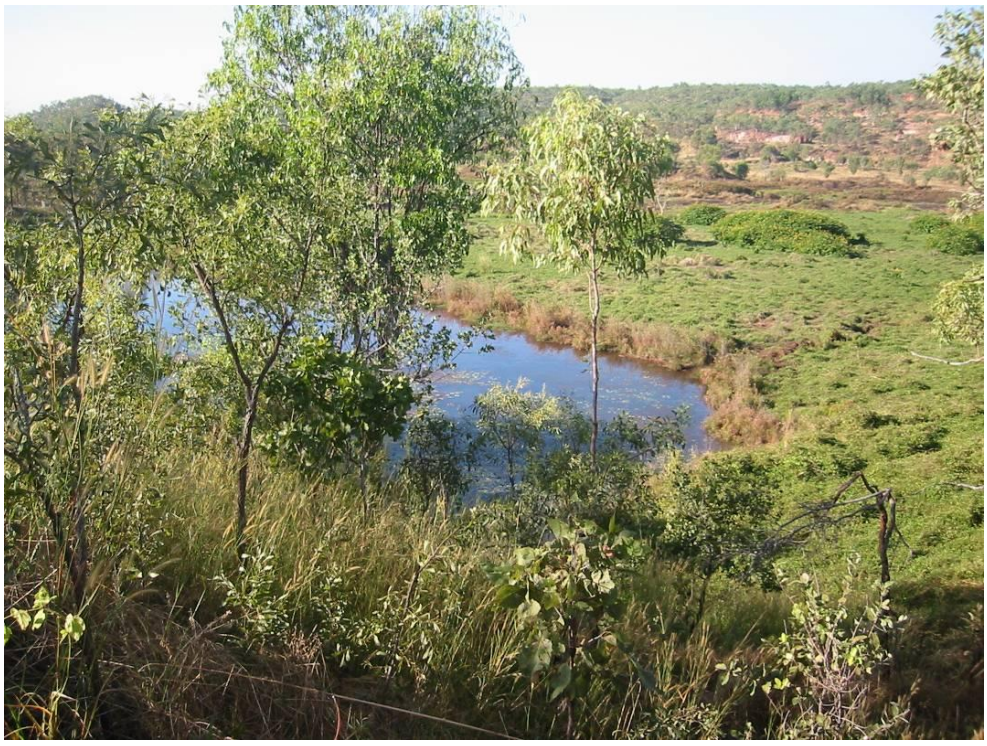

Plate 3: Looking from Open Water Area of Wetland Towards Helene 5 Waste Rock Stockpile Area

NRETA have stated that there should be no disturbance of roosting ghost bats in the area or destruction of roost sites natural or artificial (8.6.2.f table 4 section 13) without further investigation of the significance of the roost and identification of other suitable roosts in the area.

NLC believes claims that the old conveyor tunnel would not be the only likely roost site for a Ghost Bat colony are unsubstantiated, and some verification of this should be provided before their habitat is disturbed. In the event that other roost sites are not found, construction of an artificial roost would be mandatory.

EPA have commented Section 8.6: Fauna, raises the issue of removal of Ghost Bat roost through destruction of the historical conveyor tunnel. Commitment 8.6.2f & g relates to this matter. The action should be the construction of an artificial alternative ghost bat roosting site. This would be proactive if undertaken prior to the destruction of the existing roost site and should be a high priority commitment considering the near threatened status of the Ghost Bat.

Ghost Bats are known to utilise a number of roosts within their range (Dennis Matthews *pers. comm.* 2006 as sited in Reilly *et al.* 2006) and the loss of one roost should not adversely impact the bats. Ghost Bats are easily disturbed. During the May 2006 survey the bats vacated the roost while it was being inspected and had not returned before the end of the survey. A bat detector was set up at the mouth of the tunnel to record any bats that may have returned. This suggests that the bats do have alternative roost sites within the area.

There is a large, well known roost at Kohinoor Mine, about 1.5 kilometres south of Pine Creek and about 26.5 kilometres south of Frances Creek. It is possible that the Frances Creek colony is a sub-colony of the Kohinoor Mine colony.

The old conveyor tunnel the Ghost Bats are currently roosting in is within the footprint of the proposed Helene 5 Waste Rock Stockpile, next to the Helene 5 pit and close to the Plant and ROM area. Disturbance of the Ghost Bats is unavoidable. Though there is scope to move the Helene 5 Waste Rock Stockpile and avoid the roost, development of the Helene 5 pit, in particular blasting activities, and constant traffic along the haul road would most likely disturb the bats and result in them vacating the roost. Territory Iron inspected the tunnel in September 2006 as part of responses to the PER to determine whether the tunnel could be moved. The inspection revealed that the tunnel is decaying and parts of it may collapse in the near future. Depending on the scale of collapse, this may compromise its ongoing use as a roosting site. Changing the location of the Helen 5 Waste Rock Stockpile would have significant adverse operational impacts and this combined with the fact that mining activities are already likely to disturb the bat colony, it is not viewed as something that would result in the outcome regulatory authorities and Territory Iron would prefer to achieve namely protection of Ghost Bats.

Territory Iron have committed to investigating the potential for establishing a new artificial roost in consultation with appropriate experts. Territory Iron will not be able to move the conveyor tunnel to a new location away from the mine area. Efforts to move the old tunnel are likely to cause more harm to the Ghost Bat colony than benefits that would result from movement of it. Its decaying condition will also prevent its relocation. Experiments at Pilbara

Iron mines in the Hamersley Ranges, Western Australia have produced promising results for artificial bat roosts.

In addition, Territory Iron will undertake further surveys to:

- Determine whether Ghost Bats have returned to or are utilising the conveyor tunnel.
- Locate potential or actual alternative roost sites within or immediately adjacent to the project area (**Commitment S13**).

Territory Iron, in consultation with relevant experts, will establish a monitoring program for Ghost Bats within the mine site.

EPA has noted that a Gouldian Finch monitoring program and Management Plan will be established (page 99). Table 17 lists species of conservation significance recorded from or expected to occur within the projected area. It is also important to include species listed as vulnerable and near threatened into a monitoring program.

NLC is concerned about Territory Iron's proposed plan to deal with management of fauna, especially those that have been classified as threatened, endangered or rare under the EPBC Act, TPWC Act and IUCN.

Territory Iron has indicated that specific management measures will be implemented for a number of fauna species (Section 8.6.2). Detail of these specific management measures is largely missing and detailed comment is therefore impossible.

NLC is interested in understanding more clearly how fauna management and monitoring plans for the following species are to be implemented, as there is no information or risk assessment provided by Territory Iron with respect to these species.

- ***Orange Horseshoe Bat***
- ***Arnhem Sheathtail Bat***
- ***Partridge Pigeon***
- ***Pale field rat***
- ***Western Chestnut mouse and***
- ***Calaby's Pebble-mound mouse.***

Although these species are recognized by Territory Iron (Section 8.6.1) as having conservation significance, and are likely to be impacted by mining operations, no management plans have been proposed. Particular attention should be given to the Calaby's Pebble-mound mouse and its specific habitat requirements, given its 'threatened' status in the Northern Territory and 'rare' IUCN status.

The Orange Horseshoe bat has very specialised roost requirements. During the November 2005 and May 2006 surveys no roosting habitat suitable for this species was identified. Reilly *et al.* (2006) suggests that the few recordings obtained for this species are due to it flying in from nearby areas and the species is not resident in the mine area.

While the Arnhem Sheathtail Bat was also recorded during the November 2005 and May 2006 surveys, the vegetation of the project area does not represent preferred habitat for the bat. As this species was only recorded during one night at one site, it is likely that it is flying in from nearby areas of Kakadu National Park and is not resident within the mine area.

Bat surveys to be conducted during operations will provide further information regarding the presence of these two species. If such surveys identify they are present and may be impacted by Territory Iron operations, Territory Iron will work with bat specialists and regulatory authorities to develop measures to prevent or minimise impacts on them.

Partridge Pigeons have only been seen on a section of the rail alignment that will be used for transport of ore to Roney Siding. The Wildlife Rescue Procedure mentioned in the PER and further described in this document has been developed specifically to address potential impacts on this species.

Pale Field Rats were observed during both the November 2005 and May 2006 surveys. They were caught in both previously disturbed and undisturbed areas suggesting that "populations were not affected by previous iron ore mining" (Reilly *et al.*, 2006). While being listed as Near Threatened in the Northern Territory, this species is known to be common in the local area. The preferred habitat of the Pale Field Rat is typically tall grasslands associated with watercourses. Within the project area it is most likely to be encountered within the Small Alluvial Flats and into the Low Hills around the Small Alluvial Flats. As mining will impact mainly on the Ridge Crests and Slopes with only minor impacts on the Small Alluvial Flats, it is considered unlikely that there will be any significant impact on this species.

Western Chestnut Mice are commonly found on alluvial slopes and hills with a dense cover of tussock grass. Within the project area, Western Chestnut Mice were found to be a common to uncommon resident of the Small Alluvial Flats and Riparian vegetation. None were observed in the Low Hills or Ridge Slopes and Crests. As only a small amount of the Small Alluvial Flats and Riparian vegetation types are to be impacted by the project, it is considered unlikely that there will be significant impacts on the Western Chestnut Mouse.

While one adult Calaby's Pebble-mound Mouse was caught in a pit trap just to the south of the development area, no pebble-mounds were observed during the November 2005 or May 2006 surveys. Calaby's Pebble-mound Mice are typically found on gravely slopes with an open woodland and tall grass understorey (Woinarski *et al.*, 1995). There is potential for this species to be found in the Low Hills land unit, though this is unlikely as no pebble-mounds were seen during the two surveys. Territory Iron will undertake a survey of suitable habitat to determine if there are any active pebble mounds within the disturbance area (**Commitment S14)**.

The site induction will contain information about fauna species of conservation significance in the Frances Creek area. Employees and contractors will be encouraged to report observations of any such species. If any species of conservation significance are observed, Territory Iron will notify regulatory authorities and if impacts from mining operations are considered likely, will work with authorities to develop appropriate management plans (**Commitment S15**).

NLC has commented that the new draft threatened species list for the Northern Territory was released for public comment during August 2006. Although this post-dates Territory Iron's PER, the final updated list, expected by December 2006, should be used as the basis for the Environmental Management Plan when it is drafted. This should ensure that all species of conservation significance within the project area have been identified and that appropriate management measures have been accordingly developed and implemented.

Comment noted. Territory Iron will consult the updated threatened species list for the Northern Territory during preparation of the EMP (**Commitment S16**).

EPA have noted Commitment 8.6.2j states that the proponent will participate in feral animal control programs on Ban Ban Springs and Mary River West stations, if requested by owners. A firmer commitment to feral animal control should be provided by Territory Iron. Mining activities could attract cane toads by providing permanent water bodies and industrial lights. Simple trapping techniques could be employed to reduce the number of cane toads and the negative impacts this introduced species has on native fauna. FrogWatch have developed a number of traps designed specifically to capture cane toads. A management program to control cane toads and other feral animals, as listed on page 70, should form the basis of another commitment by Territory Iron.

Territory Iron will undertake Cane Toad trapping programs during the life of the Frances Creek Project (**Commitment S17**). This is in recognition that the water bodies present within the operations may attract Cane Toads to areas that may otherwise be dry.

Implementation of small site specific feral animal control programs for animals other than Cane Toads will be ineffective and a waste of resources unless they form part of a wider regional program. It is for these reasons that the commitment in the PER refers to co-operation with feral animal control programs at Ban Ban Springs and Mary River West Stations. Territory Iron will proactively seek to be part of regional feral animal control programs.

EPA have noted an assessment of the aquatic ecosystems was conducted in May 2006 (page 66), and although no aquatic fauna of conservation significance were observed, a monitoring program of aquatic species should also be considered in order to detect impacts from the mining operation and to satisfy the requirements the declared Beneficial Uses (environmental i.e. to provide water to maintain the health of aquatic ecosystems).

Territory Iron will include limnological monitoring as part of its operational monitoring programs (**Commitment S18**).

EPA have queried how Commitment 8.6.2c: Reporting sightings of species of conservation significance to the Northern Territory Parks and Wildlife Commission as a management and mitigation measure, will be used to minimise loss of fauna habitat and to re-establish appropriate habitat through rehabilitation?

PER Commitment 8.6.2c is not intended to be used to minimise loss of fauna habitat or re-establish appropriate fauna habitat. It is intended instead as a source of information to improve knowledge of the distribution of fauna species of conservation significance. Territory Iron agree that the opening sentence of Section 8.6.2 suggests that Commitments 8.6.2a - l are intended to minimise loss of fauna habitat or re-establish appropriate fauna habitat, however this was not the intent of Commitment 8.6.2c.

EPA have noted Commitment 8.6.2i refers to the development of a Wildlife Rescue Procedure and request that further details regarding relocation of animals to appropriate habitat ranges be provided. This should include an understanding of the territorial nature of some species. Birds and animals can only be moved successfully if there is unoccupied territory available.

The Wildlife Rescue Procedure will be developed specifically to deal with wildlife that has been injured on the mine site or haul road to Roney Siding. It is expected that injured wildlife will be taken to a local wildlife carer or veterinarian for treatment. Subsequent release will occur in the area where it was captured unless it is an operational area where it is considered a high level of risk of re-injury exists. In such instances, Territory Iron will consult with wildlife experts to determine the most appropriate course of action.

EPA has commented that as outlined in Commitment 8.6.2h, Territory Iron intends on restricting speeds on haulage routes and mine roads to minimise fauna death on roads. As an added precaution, signs should also be erected to warn mine employees of wildlife movements.

Comment noted. Signs advising/warning of wildlife movements will be erected (**Commitment S19**).

4.6 AIR RESOURCES MANAGEMENT

EPA has stated baseline information on prevailing wind direction and maximum wind gusts as requested in the Guidelines have not been provided in the PER. Understanding of this meteorological condition can assist with design layout of the ROM and maximising mitigation measures relating to dust, air quality, and noise dispersion levels.

Climatic data has been sourced. This is summarised in Table 4.

Table 4: Climatic Data

Season	Wind Direction	Mean Wind Speed Km/hr	High Wind Speed Km/hr
Summer	North West and North East with some South East	4 - 5	9 - 19
Autumn	North East and North West Turns to South East later in Autumn	5 - 7	13
Winter	South East	6	13 Reached peaks of 28 in August
Spring	Variable, South East to North, North East, North West and West North West	5 - 6	19

While it is acknowledged that climatic data is useful in designing the site layout and selecting management and mitigation measures related to air quality and noise, selection of the location of these facilities was influenced more strongly by the desire to use existing disturbed areas to minimise the need for additional land clearing and resultant habitat destruction. The large distance to receptors which may be influenced by air or noise emissions was also considered. Management and mitigation measures proposed to minimise air and noise emissions will ensure affects on people working at the project are minimised as are effects on fauna where possible.

EPA have commented Section 6.8: Air Quality states particulate levels are expected to vary seasonally due to, among other things, bushfires. Commitment 8.7: Air Resources could include an action for minimising the risk of contributing to starting fires such as spark arresters on machinery, ULP vehicle movements in dry grass (although it is expected that vehicles will be diesel) employee commitment to NOT throwing cigarettes or matches from vehicles and an awareness of operating procedures on Total Fire Ban days or High Fire Danger days.

Territory Iron is aware they have a responsibility to reduce the risk of occurrence of human started bushfires. All of the issues mentioned by the EPA will be addressed within the employee/contractor/visitor induction.

No vehicles will be allowed to travel off defined roads and tracks without prior permission.

EPA have noted Territory Iron considers that the location of the mine site is isolated, however mechanisms for the community to lodge complaints relating to dust and noise will need to be made available. Provision of this service will need to be included and the proponent will need to develop a method of monitoring and assessing any complaints.

Territory Iron will establish a complaints procedure (**Commitment S20**). This will be described in the EMP.

Territory Iron will work with the Pine Creek Community Government to establish a relationship where complaints are reported and results of investigations are communicated to the community.

5. SOCIO-ECONOMIC ENVIRONMENT

5.1 SOCIAL IMPACT

EPA has commented that Section 8.12.1 (Page 111) states "increased level of employment among the local indigenous population" as a potential Aboriginal Cultural Impact. This sentence should be included in the Section 8.13 Socio Economic Environment.

Comment noted.

DHCS-EH has requested more information on the employment strategies the proponent use to engage local Aboriginal people in the project workforce?

Territory Iron is about to sign an agreement with the Northern Land Council in which it will provide financial, educational and training assistance to local Aboriginal people, which will enable them to be eligible for employment on the mine site either by the mining contractor or operator. The Company has previously presented their 'Indigenous Employment, Training and Business Development Strategies' to the Indigenous Mining and Exploration Task Force (IMETF) and will follow this up with further meetings with the IMETF, when the NLC Agreement has been signed by both parties.

DHCS-EH have requested further information on investigations the proponent has made to ensure there is sufficient accommodation in Pine Creek for the workforce considering that there are two other mines planned in the district and if it is expected that the workforce will stay long-term at a caravan park or motel in Pine Creek.

Territory Iron will establish a camp in Pine Creek. Discussions have been held with owners of former mining camps in the Pine Creek area regarding provision of accommodation for the construction and operations workforce (see Tables 33 and 43). During these discussions, it has been acknowledged that future accommodation will require additional facilities compared to previous camps i.e. units with ensuite bathrooms, laundries and improved communications. Territory Iron will construct new facilities and or upgrade of existing facilities. On completion of mining activities, these facilities may be used by other mining companies or for tourism.

DHCS-EH has recognised that the PER states there will be increased pressure on Pine Creek medical services. They strongly recommended that the proponent discuss this issue with DHCS Remote Health Services.

Territory Iron will be meeting with the Pine Creek health services in late September to discuss matters relating to emergency response and provision of medical services. While it has been acknowledged that the predicted increase in the population of Pine Creek due to the mine will increase the pressure on health services, Territory Iron believes that this will not result in unmanageable levels of demand. The facilities at Pine Creek have catered for employees of

mines around Pine Creek for many years and at population levels much higher than is currently the case or will be the case while the Frances Creek mine is operating.

EPA has noted as stated in the PER, Territory Iron is planning to provide accommodation at a former mining camp at Pine Creek (page 140). Territory Iron also recognises that there will be increased pressure on Pine Creek accommodation and medical services (page 113). The supplement should identify alternative workforce accommodation in anticipation that the former mining camp at Pine Creek may not be feasible.

The former mine camp at Pine Creek is feasible. An additional 20 units consisting of four ensuite rooms will be constructed. In addition to this, two laundries comprising of five washers and five dryers will be provided. Current facilities available at the camp site, which will be utilised include a kitchen and recreation room. Territory iron will provide additional facilities such as pool tables, table tennis and a gymnasium.

The camp size is sufficient to accommodate workforce members that are not recruited locally.

Territory Iron acknowledge there will be increased pressure on the Pine Creek medical services and as described above, discussions are being held with Pine Creek medical service providers to ensure this can be managed. First-aid units to be provided at Frances Creek for treating minor on-site accidents are expected to provide the majority of medical services required by Territory Iron employees.

DPIFM have advised that if access to the Frances Creek Dam it to be limited or excluded during operations, this should be outlined as closure of access may impact on community expectations.

Access to the Frances Creek Dam area has already been limited by Territory Iron due to exploration activities. Public notices have been placed to this effect in Pine Creek and local newspapers. Response to this notice has resulted in an exemption being allowed for (Katherine Water Ski Club). The community have been made aware of this via the notices and other community consultation undertaken as detailed in the PER. No adverse response has been received regarding this.

Territory Iron will undertake to investigate alternate access routes to the dam. If a safe access route can be found that does not require entry into operational areas, Territory Iron will allow access to the dam **(Commitment S21)**. Dam users would be required to indemnify Territory Iron for any liability for activities undertaken on the dam.

NT Police have commented that there will be minimal impact on social issues in the township of pine creek. They have further commented that there will be minimal impact on traffic and are likely to be employment benefits for the Pine Creek district.

Territory Iron thanks the NT Police for their positive comments.

5.2 CULTURAL HERITAGE

APAA have noted that the railway siding has associations with the Wagiman group.

Noted. The Wagiman group has been consulted during the PER process. Territory Iron will ensure that future discussions regarding land use and access include this group (**Commitment S22**).

AAPA have also advised that the Indigenous Custodians have indicated that they still carry out Indigenous land use activities such as hunting and resource collection in the region, as well as the recreational activities of camping and swimming.

As discussed in Section 7.3 of the PER, Territory Iron has entered into discussions with the traditional owners via the NLC. An agreement has been reached on Aboriginal site and heritage protection, Aboriginal use of the land, employment opportunities, mine site rehabilitation, and financial compensation when mining begins. Use of operational areas of Frances Creek will not be able to continue during the life of operations to ensure human safety is protected.

AAPA have suggested that the Management and Mitigation measures listed at 8.12.1 could be expanded into a detailed Cultural Heritage Management Plan (CHMP) which would become part of the Environmental Management Plan (EMP).

The management and mitigation measures will be included in the Environmental Management Plan being prepared as part of the Mining Management Plan submission to DPIFM. Territory Iron does not intend to prepare a separate Cultural Heritage Management Plan.

EPA Heritage Conservation Services notes that Territory Iron has undertaken an archaeological survey of mining tenement MLA 24727 and also notes that the proposal includes Ms 25087, 25088, 25152, 25152, 25396 and 25529. While it is understood that a proportion of this land is disturbed through previous mining activity, the proponent has not investigated whether use of these areas will impact on cultural heritage resources. The proponent should give consideration to cultural heritage issues for these additional areas by either investigating the potential for previously unrecorded places protected under the Heritage Conservation Act or demonstrating the extent of disturbance (this may simply involve a desktop exercise).

The archaeological report covers the whole area of the proposed project identified within the PER excluding the transport routes as these had not been resolved when the survey took place. Inclusion of only MLA 24727 within the title, introduction and through the body of the report is an inaccuracy that may have caused a misunderstanding of the coverage of the survey.

EPA has commented that the archaeological survey report for MLA 24727 accords recorded archaeological sites with a low to moderate level of significance on the basis of comparison with the Mt Porter sites complex. Although data describing archaeological site structure is provided for sites recorded within MLA 24727, this data is not provided for the Mt Porter sites on which the comparison is made.

Archaeological significance comparisons with the Mt. Porter site complex are based on the archaeological survey (Hill 2005) and the conclusion- as quoted on page 9- from Gunn (2005:19). The Mt. Porter archaeological sites are a complex of site types focused around the Gerowie Tuff raw material source- the assessment of significance is based on the assumption that sites at Mt. Porter have a greater capacity to provide information on Aboriginal land-use and archaeology in the area.

The report prepared by Gunn 2005 is part of the baseline studies commissioned by Arafura Resources for the Mt Porter Gold Project. It complemented a previous survey of the area undertaken by Mulvaney in 1993. Arafura Resources agreed to share findings of the baseline survey with Territory Iron.

EPA commented that the archaeological study acknowledges that the site known as Frances Creek 3 is relatively large in area and contains a dense and diverse range of stone artefact types and stone raw materials and states that this site has the highest significance. The structure described within this study tends to indicate major occupation site and should arguably be accorded with a high level of significance.

The assessment of France Creek 3 as being highly significant is supported- with the exception of the hilltop area which has been disturbed.

EPA has advised that Commitment 8.12.2a should focus on historical documentation of the existing rail spur line prior to the proposed upgrade to a haulage road. An archaeological survey should be undertaken for the 2.4km section between the historical rail spur line and the Alice Springs to Darwin Railway and the proposed Roney siding. Consideration should also be given to the location of the proposed siding in relation to the existing cultural heritage studies for the Alice Springs to Darwin Railway (see ADrail 2003). Extant sections of the North Australian Railway (NAR) between Birdum and Darwin have been nominated to the Northern Territory Heritage Register and are currently under assessment. The proponent should consult with Heritage Conservation Services regarding the proposed crossing point and demonstrate how they will limit the damage to extant NAR infrastructure.

An assessment of the historical significance of the France Creek mines (inclusive of rail spurs) was undertaken in 1994 (Mitchell) and determined not to meet the criteria for heritage listing. The report prepared for Territory Iron identifies re-assessment at the cessation of the project.

The location of the railway siding (Roney Siding) was selected by Freightlink with knowledge of the Cultural Heritage study undertaken for ADrail and was selected as a suitable site for a passing bay for trains as well as a siding.

EPA has commented that Commitment 8.12.2h should note that all archaeological places and objects, whether previously recorded or not and of high or low significance are afforded blanket protection under the Heritage Conservation Act. Consent to disturb archaeological places or objects (including isolated artefacts) is required from the Minister for Environment and Heritage or their delegate.

Territory Iron acknowledges the protection of archaeological places afforded under the *Heritage Conservation Act*. At this stage, only one archaeological site (Ochre Hill 1) will need to be disturbed. Territory Iron will apply for permission to disturb this site on completion of the environmental assessment process.

Protection of archaeological sites will be discussed as part of the site induction process to ensure employees and contractors are aware of the presences of such sites in the Frances Creek area and the need to prevent disturbance of them.

EPA has noted that the PER states only the site known as Ochre Hill 1 is scheduled to be impacted upon, meaning that the remaining 7 sites recorded (Frances Creek 1-5, Ochre Hill 1 & 2) during the archaeological survey of MLA 24727 (Hill 2005) are scheduled to be retained. Appropriate long term management should therefore be devised and incorporated into any EMP/MMP to be drafted for the operations phase. These strategies should incorporate the views and or wishes of the Aboriginal traditional owners /custodians referred to section 7.3. Heritage Conservation Services is not currently processing the penult application under section 29 referred to in Section 8.12.3. Territory Iron should note that this application process takes 4 - 6 weeks.

As noted above, the archaeological survey covered more then just MLA24727, covering all mining areas described in the PER. Ochre Hill 1 is identified directly within the footprint of the Ochre Hill pit. Permission to disturb this site will be sought on completion of the environmental assessment process.

Ochre Hill 2 and 3 are identified outside the mine footprint and appropriate management strategies for these have been identified. The EMP being prepared for the project addresses cultural heritage, including protection of archaeological sites.

EPA has advised that Territory Iron should liaise with Heritage Conservation Services and provide more specific detail regarding recommendations (2, 3, 4, 5, 7 & 8) made by Hill (2005).

Heritage Conservation Services should provide guidance on the type of specific information required. Without further guidance, the following information is provided:

- Artefacts from Ochre Hill 1 will be relocated to areas identified by Traditional Owners within the Ochre Hill 3 site prior to commencement of ground disturbance.
- Semi-permanent fencing will be constructed using standard high visibility plastic mesh and star-pickets and appropriately maintained during mining operations.
- Frances Creek 3 is not subject to disturbance within the current proposal.

- Management measures for identified sites along Frances Creek will be developed during the life of the project as described above. These will be included in the EMP.
- Salvageable ochre from the Ochre Hill area will be relocated to Ochre Hill for later use if required by Traditional Owners.
- Diligence will be taken during ancillary works in archaeologically sensitive areas- i.e. those areas identified by the predictive model (Hill 2005:24) which include creek banks, lower slopes and alluvial areas. Ancillary works are taken to include such things as storage and waste rock dump areas, vehicle and plant parking areas, fire breaks. The predictive model identifies that areas subject to mining (slopes and ridges) had a low archaeological sensitivity. This is compounded by existing disturbance from historical mining activity. As such, consent under Heritage legislation has not been sought for these areas, however a precautionary blanket permit could be applied for if considered appropriate by Heritage Conservation Services.

5.3 BITING INSECTS

DHCS-MEB have suggested that the relevant information from the 'Guidelines for preventing mosquito breeding sites associated with mining sites' should be incorporated into the Management and Mitigation Measures for the mine site, to ensure no new mosquito breeding sites are created and that the Guideline should be consulted during the design stage of the mine.

Territory Iron is aware of the *Guidelines for preventing mosquito breeding sites associated with mining sites*. These guidelines shall be consulted during the design and decommissioning phases of the project.

Territory Iron will implement the following measures to assist with biting insect control:

- The margins of all new dams will be kept clear of vegetation where practicable.
- The final surface of mine waste rock stockpiles will be contoured so that the surface area is free draining and has no surface depressions.
- Fish are already present in dams. Fish populations will be maintained to assist with control of biting insect larvae (**Commitment S23**).

DHCS has commented that there are two minor errors in Table 24. Peak abundance for Ochlerotatus normanensis should be changed to January to April, and Peak Abundance for Ochlerotatus vigilax should be changed to September to January.

Comment noted. Table 24 has been corrected as is included in Appendix 5.

6. REHABILITATION AND CLOSURE

DPIFM have commented that if it is the intent of Section 5.2 to require an assessment of the liabilities of premature closure, the proponent should specify the maximum expected environmental impact of a premature closure.

This section was included to meet the PER guidelines requiring alternatives considered to be discussed. It is not intended to address the liabilities of premature closure.

Premature closure costs will be addressed via the financial security calculation included within the Mining Management Plan. This is reviewed annually and the amount of the financial security will be modified to ensure it covers liabilities for each 12 month period.

DPIFM have asked how rehabilitation be managed differently if large amounts of carbonaceous footwall material is unearthed? This material appears to have impeded rehabilitation in the past.

Based on knowledge of pit designs, Territory Iron consider it very unlikely that carbonaceous footwall material will be encountered in large quantities (see Section 3.8). If such material is encountered, as the sulphur content is very low, it is considered that encapsulation within other NAF materials within the waste rock stockpiles will ensure it is effectively isolated in the long term (**Commitment S6**). Territory Iron have already committed to backfilling pits where total sulphur in exposed waste rock exceeds 0.1% (PER Commitment 8.2.2f).

DPIFM have noted that it would be best practice to apply seed at time of initial rehabilitation.

Previous experience within the mining industry has shown that rehabilitation is most effective if careful topsoil management procedures are implemented. Territory Iron will apply local native seed if topsoil can not be directly replaced, where disturbed areas are being rehabilitated without topsoil or where annual monitoring shows that vegetation establishment is not effective.

NRETA have requested that further discussion on soil rehabilitation and re-vegetation measures be outlined in the PER and detailed in the Rehabilitation Plan of the EMP

Soil rehabilitation and revegetation measures are clearly outlined in Sections 9.1.2.2 and 11 of the PER. The measures outlined are in compliance with mining industry best practice. A number of specific commitments have also been made regarding soil preservation, erosion protection, prevention of land contamination and rehabilitation of disturbed areas.

It is also noted within the PER, that many of the areas to be disturbed have either already been disturbed by previous mining operations or are located on rocky elevated areas. A direct result of this is that there will be limited topsoil resources present. This will mean that rehabilitation may need to occur with limited or no topsoil resources.

Territory Iron has committed to preparing a Rehabilitation Plan within the first 12 months of operation. This commitment is re-iterated within the Environmental Management Plan and Mining Management Plan.

NLC commented Territory Iron has indicated that rehabilitation will proceed in accordance with an approved Mine Management Plan. These plans are not generally made available to the public and stakeholders will have no opportunity to access the content of either the original or updated versions of the plan. Such plans should be made in conjunction with principal stakeholders.

Territory Iron will consult with the NLC during preparation of the Rehabilitation Plan (**Commitment S24**). NLC will be provided the opportunity to comment on the draft plan.

NLC recognizes that rehabilitation and closure will be a dynamic process, however the information provided in the PER is insufficient to allow third parties to comment on the adequacy or success of rehabilitation and closure commitments. Areas of particular concern include:

- ***Lack of any specific plans for rehabilitation or future protection of habitat requirements for species of conservation significance. Consideration should be given during the rehabilitation phase to creating localized habitats that could serve to bolster populations of endangered species (e.g. Gouldian Finch grass habitat) – provided they are consistent with the pre-existing vegetation patterns.***
- ***Lack of detail with respect to proposed annual monitoring programmes. These programmes appear to have been designed only to consider the vegetation. Annual monitoring of fauna species (especially those of conservation significance) should be included."***
- ***Lack of specific information with respect to indigenous plant species to be used in rehabilitation. Territory Iron has made no commitment to recreating vegetation patterns that are similar to those in existence prior to operations and there is a risk that species planted supplementary to natural seeding may not be endemic to the region.***
- ***Lack of any specific plans to deal with weeds during rehabilitation and closure at the site. It is recognized that a number of weed species already exist on the site; however both Territory Iron and the Northern Territory Government should consider the rehabilitation and closure plans offered by Territory Iron as opportunities to also address existing weed problems.***

Rehabilitation objectives are stated in Section 11.1 of the PER. Territory Iron will rehabilitate areas back to the pre mining land use. This is primarily pastoral for the project area, however it is recognised that return of disturbed area to habitat that would support fauna species of conservation significance would also be beneficial. Disturbed areas will be rehabilitated so that they support vegetation communities appropriate to the post mining landform that is created. This may mean that areas such as waste rock stockpiles are rehabilitated so that they

support vegetation similar to ridge crest and slope areas rather than alluvial flats. Species suitable for the landform of the rehabilitated areas will be selected and used.

Detail of monitoring programs including rehabilitation monitoring will be contained in the EMP. Fauna monitoring will not be included in annual rehabilitation monitoring programs, however as described in Section 4.5, monitoring of fauna species of conservation significance will occur during the life of the operations. Fauna monitoring is not warranted in early stage rehabilitation monitoring as while the information it may provide is likely to be interesting, it is typically would not provide information on why rehabilitation is failing if this is in fact occurring. Fauna typically will not colonise disturbed areas until landforms are rendered stable and support some form of vegetative cover. Rehabilitation monitoring will focus on achievement of physical and chemical stability.

As described above, Territory Iron will use local native flora species in all rehabilitation they undertake. This will be through salvage of topsoil from disturbed areas and use of supplementary seeding where deemed necessary. Where seeding is deemed necessary, species will be selected that suit the post mining landform being created.

Commitment 8.5.2.2a of the PER commits Territory Iron to preparing a Weed Management Plan. This states that:

"Territory Iron will prepare a Weed Management Plan as part of the EMP. The plan will include, but will not be limited to, issues of vehicle and personal hygiene in regards to weeds, identification of weed species (including noxious weeds) and control and eradication measures".

NLC has commented that it is preferable that all open pits are backfilled because generation of acidic waters in mine pits represents an intergenerational legacy that may result in long-term impacts upon groundwater and eventually surface water systems running into the Mary River. Territory Iron's plan to allow the pits to flood with water creates a risk of acid generation similar to that already observed in Thelma 2 Pit (refer Section 6.2.1.1) if sufficient evaporation occurs.

See responses in Section 3.8 regarding acid generation potential of pits and waste rock stockpiles. Monitoring has shown that only one of the six historic pit lakes is acidic. Geochemical investigations have determined the cause for this and management and mitigation measures proposed will ensure generation of acid as a result of future mining activities is prevented.

Backfilling of pits will be undertaken where practicable however it is not economically feasible to return all waste rock as backfill. Waste rock generated by modern mining activities is more likely to be used to backfill nearby historic pits rather than be placed in the pit it was generated from as the only way it can be placed in the pit it is generated from would necessitate double handling of material and development of a temporary storage facility.

NLC is not convinced that decayed organic material has contributed significantly to the high acid concentration seen in the Thelma 2 Pit only. Humic and fulvic acids are weak

acids and unlikely to produce a strong acid solution even after years of cyclic evaporation and dilution. If it was a major contributing factor, then it is reasonable to assume that similar pH values would also be observed in the other pits, which does not happen. It is more likely that localized areas of pyritic or another acid forming mineral has been exposed within Thelma 2 Pit and that has contributed to the high acid values. If this is the case, then there is a high risk that further cutbacks of existing pits, or creation of new pits, may lead to other pits becoming sources of acidic wastewater.

At the Thelma 2 Pit, the footwall is strongly carbonaceous and very weakly sulphidic carbonaceous siltstone (more than 12 times more sulphidic than any other sample in the Territory Iron database) was exposed in the entrance to the pit. This has been further explained in Section 3.7. There is no reason to believe, from the analytical drill database and the geological data for the proposed mine sections available that were made available to MBS Environmental, to suggest that a similar situation will occur at any of the newly proposed mine sites.

No "high sulphuric acid concentration" exists in the Thelma 2 Pit. Review of data contained in the waste characterisation report (Appendix 4 of the PER) shows that the TOTAL concentration of sulphur in water in the Thelma 2 pit is about 25 milligrams per litre or 25 parts per million of soluble Sulphur. This is less than 16% of the allowable value in the ANZECC Drinking Water Guidelines after conversion to sulphate. In addition, there is a lot of organic material including organic detritus in the bottom of the pit and also the carbonaceous siltstone footwall, which contains 6,800 milligrams per kilogram of (probably) reactive carbon, both very capable of supplying far more than the necessary amount of organic acids to supply sufficient hydrogen ion concentration within the period of more than 30 years since mining ceased at Thelma 2 Pit.

A concentration of 0.0078% sulphuric acid, the maximum possible amount if 100% of the sulphur in Thelma Pit water is present as sulphuric acid, cannot be described as a strong acid solution.

Similar pH values have not been recorded at the other pits. However, most other surface water values are significantly acidic (pH values of 4.5 - 6.1 in five of 17 samples analysed) after commencement of wet season rains. Only three of the 17 samples are naturally alkaline. Natural rainfall is alkaline due to dissolved bi-carbonate so these values will have been significantly more acidic in the dry season.

Territory Iron have committed to implementing surface and groundwater monitoring programs (Commitments 8.3.2a-e and 8.4.5a-c of the PER). These will occur during all stages of the project and will include post closure. If monitoring data detects acidic runoff, an investigation into the cause will be conducted and appropriate management strategies implemented.

Irrespective of the source of this acidity, and in the event that pits are allowed to flood, post-rehabilitation monitoring must also include surface and groundwater monitoring with contingencies proposed for dealing with potential AMD. Territory Iron has made no commitment to this, even though the risk of the Thelma 2 Pit becoming a long-term source of AMD has been recognized in the executive summary of the hydrology study (AGT, 2006a).

The hydrogeology study by AGT identified a risk of long term acid drainage requiring further investigation. The discussion in the PER is based primarily on the further investigation carried out in the Waste Characterisation study, which was completed subsequent to the hydrology study.

NLC has noted that the PER indicates the Thelma Rosemary waste rock stockpile has been positioned to bury the existing Thelma 2 waste rock stockpile (Section 4.4.5). Back-filling the Rosemary and, in particular, the Thelma 2 Pit with this material to mitigate the risk of acid mine drainage seems to represent a better long-term rehabilitation strategy than increasing the size of an existing stockpile that is already difficult to rehabilitate.

Backfilling of historic pits will be undertaken where practicable and economically feasible. As described in the PER and Section 3.8 of this supplement. The slightly acidic water in Thelma 2 pit appears to be in a stable state and is not causing visible environmental harm. Rehabilitation of the Thelma 2 waste rock stockpile has not progressed to what would be deemed acceptable by modern mining standards. This is largely due to poor siting of the dump and the lack of rehabilitation measures implemented at the time of placement. Covering the historic waste rock dump with fresh waste rock material from Thelma Rosemary pit will allow historic problems to be addressed. The carbonaceous siltstone material in the waste rock which contributes to acidic runoff will be covered by inert rock material from the Thelma Rosemary Pit. Surface drainage will be modified so that the dump no longer dams water courses, preventing the current leaching of runoff through carbonaceous siltstone waste. Surface slope angles will be reduced, drainage improved and suitable growth medium provided to allow revegetation. This is expected to effectively resolve current issues with lack of regrowth and acidic seepage from the existing stockpile.

Territory Iron has provided no detail with respect to its Closure Plan, but has indicated that it will be prepared and reviewed every three years. Review should be done in conjunction with all principal stakeholders to ensure that satisfactory closure criteria are developed and that closure is a success.

Preparation of the Closure Plan and subsequent review will be undertaken in consultation with the NLC and other interested stakeholders. Territory Iron intends to prepare a Closure Plan compliant with the framework outlined in the Australian and New Zealand Minerals and Energy Council (ANZMEC)/Minerals Council of Australia (MCA), (August 2000) *Strategic Framework for Mine Closure*.

In general, the NLC is of the opinion that Section 10 contains insufficient detail to allow fully informed comment.

Territory Iron disagrees with this statement.

7. DRAFT ENVIRONMENTAL MANAGEMENT PLAN

NLC believes that the draft EMP is lacking in detail and does not meet all of the requirements stipulated in the EPA PER Guidelines (2006), particularly in terms of performance indicators and targets. It is noted that no measurable targets or performance indicators have been set, by which all anticipated and potential impacts can be measured and assessed. In accordance with the PER guidelines, these need to be provided for in the draft EMP and comply with applicable legislation, regulations, standards and codes of practice. With regard to developing targets and performance indicators for surface water management, reference should be made to the NLC's comments on the preferred and best practice approach to developing and using triggers for water monitoring in the NT.

NLC believes that targets and performance indicators are integral components of an EMP as they provide a measurable benchmark against performance and a basis for future targets and improvements.

NLC further believes the EMP should provide greater detail on the environmental management structure of both the operational and construction phases of the project, and delineate between construction and operational impacts and management measures.

Objectives and targets are included for each aspect covered in the draft EMP. These form rows two and three of each table. The EMP is intended to be a dynamic document and as such the objectives and targets will be reviewed and amended as relevant to varying stages of the project.

Copies of the EMP will be provided to DPIFM as part of the Mining Management Plan process and to the NLC as part of agreements between Territory Iron and the NLC. Feedback from these stakeholders will be considered and included where necessary.

EPA has commented that Guidelines for the PER required the preparation and inclusion of a draft Environmental Management Plan (EMP). The PER states on page 11 that: "A draft Environmental Management Plan is included in this PER" This has not been submitted. The PER later states (page 132) that: "An Environmental Management Plan (EMP) will be developed in consultation with DPIFM and NRETA before construction starts. However, as requested, the proponent will need to provide the EPA Program with a draft EMP or an outline of the proposed EMP for review as part of the environmental assessment process and not at the completion of the process as suggested on page 11 of the PER.

A draft EMP was prepared and was included as Appendix 12 of the PER.

Work on completion of the EMP is progressing in parallel with preparation of the Supplement to the PER. Arrangements have been made to provide DPIFM with a copy of the full draft prior to submission of the Mining Management Plan. This will allow feedback to be incorporated and minimise delays in commencement of the project.

APPENDICES

APPENDIX 1
Summaries of PER Submissions

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
1	a	DHCS-MEB	Erosion prevention structures should be constructed at the overflow points from the various pits and dams within the development site, to prevent erosion and the downstream siltation of drainage paths, which could lead to the creation of mosquito breeding.	4.6.4	Surface Water	4.3
1	b	DHCS-MEB	Erosion prevention structures should be constructed at any erosion vulnerable points within the diverted water courses, to prevent erosion and the downstream siltation of water courses, which could lead to the creation of mosquito breeding.	4.6.5	Surface Water	4.3
1	c	DHCS-MEB	There are two minor errors in this table. Peak abundance for *Ochlerotatus normanensis* should be changed to January to April, and Peak Abundance for *Ochlerotatus vigilax* should be changed to September to January	7.6	Biting Insects	4.3
1	d	DHCS-MEB	The MEB guideline 'Guidelines for preventing mosquito breeding sites associated with mining sites' is applicable to this development. Relevant information from this guideline should be incorporated into the Management and Mitigation Measures for the mine site, to ensure no new mosquito breeding sites are created. The proponent should consult this guideline during the design stage of the mine.	8.15.2	Biting Insects	5.3
2	a	DHCS - EH	What is the estimated life of mining operations? Is it likely to extend beyond 3 years	4.4.1	Mining Operation	3.2
2	b	DHCS - EH	The proponent should seek advice from a qualified hydraulic consultant about the most suitable wastewater disposal system for the mines' mobile crib unit and ablution unit. Reliability and low maintenance costs of remote on-site wastewater disposal systems should not be underestimated. The project is located outside a Building Control area	4.9.1	Infrastructure	3.4
2	c	DHCS - EH	The design of septic tank systems is detailed in the Northern Territory *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent* (The Code). The Code was gazetted on the 11 November 1998 and is called up in Regulations 28-28B of the *Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations.* DHCS administers the provisions of the *Public Health Act & Regulations* with respect to the: · type approval of septic tanks and associated products · notification to install an Alternative Septic Tank System (ASTS) for a single residential dwelling · conventional septic tanks located outside Building Control Areas · site-specific design approval of an ASTS. **Conventional Septic Tanks** (e.g. septic tank reticulating to absorption trenches or evapo-transpiration bed) must be installed by licensed plumbers and drainers outside Building Control Areas. **Alternative Septic Tank Systems** (ASTS) are septic tank systems that treat effluent to a higher quality than that offered by conventional septic tank system. For example, these include Aerated Wastewater Treatment Systems (AWTS), Composting Toilets, Hybrid Systems and Ecomax Systems. In addition to the self-certification of the installation, ASTS require either a notification to install or site specific design approval. Septic Tank application forms can be downloaded online or by contacting the relevant Environmental Health Office.	4.9.1	Infrastructure	3.4
2	d	DHCS - EH	The *Radiation Protection Act 2004* applies to servicing, testing, installing, decommissioning, manufacturing, possessing, using, storing, transporting, disposing of or otherwise dealing with a radiation source. A radiation source is defined in the Act. The provisions of the Radiation Protection Act may apply to this project if the operation includes the use of radiation sources. The Act covers safe control of the use of all radiation sources, both ionising and non-ionising from all radiation sources. The source can be radiation apparatus or radioactive material. Natural sources of radiation may be included in the definition if radiation exposure results from the enterprise. Generally, unmodified concentrations of radioactive material in most raw materials are not included unless there is a possibility of significant radiation exposure. If the unmodified concentration is below concentrations of radioactivity as listed in the latest edition of the National Directory for Radiation Protection, that material is not defined as radioactive. Notwithstanding, the *Radiation Protection Act 2004* is not expected to apply to any mining operation in which the most exposed person could not receive a radiation dose that is greater than 1mSv per year	8.9	Radiation	3.9
2	e	DHCS - EH	It is stated that the potential social and economic impacts include increased local employment in the Pine Creek area. What employment strategies will the proponent use to engage local aboriginal people in the project workforce	8.13.3	Social Impact	5.1
2	f	DHCS - EH	It is also stated that there will be increased pressure on Pine Creek medical services. It is strongly recommended that the proponent discuss this issue with DHCS Remote Health Services	8.13.3	Social Impact	5.1

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
2	g	DHCS - EH	It is stated that most of the workforce (total 73 – refer 4.12) already live in the region and therefore it is assumed that many of these people will need to reside in Pine Creek What investigations has the proponent made to ensure that there is sufficient accommodation in Pine Creek for the workforce considering that there are 2 other mines planned in the district? It is expected that the workforce will stay long-term at a caravan park or motel in Pine Creek'	8.13.3	Social Impact	5.1
3	a	AAPA	The *Northern Territory Aboriginal Sacred Sites Act 1989 (NTASSA)* is the full title.	3.2	Cultural Heritage	5.2
3	b	AAPA	The railway siding has associations with the Wagiman group	N/A	Cultural Heritage	5.2
3	c	AAPA	It is noted that an AAPA Authority Certificate has been applied for and conditions attached to the Authority Certificate will be kept.	7.2	Cultural Heritage	5.2
3	d	AAPA	Custodians have indicated that they still carry out Indigenous land use activities such as hunting and resource collection in the region, as well as the recreational activities of camping and swimming	8.12.2	Cultural Heritage	5.2
3	e	AAPA	The Management and Mitigation measures listed at 8.12.1 could be expanded into a detailed Cultural Heritage Management Plan (CHMP) which would become part of the Environmental Management Plan (EMP)	8.12.2	Cultural Heritage	5.2
4	a	NT Police	Construction and operation of the mine should have minimal impact on social issues in the township of Pine Creek	8.13	Social Impact	5.1
4	b	NT Police	There is little likelihood of human remains being unearthed during construction or operation, however if this were to occur it is requested that Police at Pine Creek are notified as a priority to ensure all protocols are adhered to.	N/A	Cultural Heritage	2
4	c	NT Police	There will be minimal impact on traffic	8.11	Social Impact	5.1
4	d	NT Police	There are likely to be employment benefits for the Pine Creek district as a result of the project	8.13	Social Impact	5.1
5	a	NRETA	There is no consideration of the significance of considerable changes to local landforms that are proposed for the project area in Section 7.1	7.1	Landforms and Soil	4.1
5	b	NRETA	There is no mention of implications of the substantial open-cut pits that will remain at completion of the project.	8.1	Mining Development	4.1
5	c	NRETA	Further discussion on soil rehabilitation and re-vegetation measures need to be outlined further in the PER and detailed in the Rehabilitation Plan of the EMP.	8.1.2/8.5.2	Rehabilitation	6
5	d	NRETA	As a consequence of groundwater inflows into Helene 6/7 pit, dewatering is required to continue operations below the level of the water table. Water is proposed to be removed and used for dust suppression. It is proposed that overflow from the main dam in the wet season be diverted into Frances Creek during "natural occasions of high stream flow" (section 3.7.2) after dilution and settling. Similarly, excess water is propose to released from the Ochre Hill pit into Maude Creek during "natural stream flow to ensure adequate dilution" (section 3.7.2). There is no reference made to determining or monitoring dewatering discharge sites for exacerbated erosion. This needs to be outlined further in the PER and detailed in the Water Management Plan and Rehabilitation Plan of the EMP.	4.6	Groundwater	4.2
5	e	NRETA	Operations are expected to produce over 3 million tons of waste rock each year of which approximately 10% will be returned to the pits. Overburden and the bulk of the waste rock is proposed to be stockpiled next to the pits. It is assumed that overburden (which is proposed to be used in progressive rehabilitation) is to be stockpiled separately	4.4.5	Waste Rock Management	3.8
5	f	NRETA	It is proposed that waste rock stockpiles from the Helene 6/7 and Thelma Rosemary pits be used to "partially fill minor valleys with ephemeral water courses" thus diverting minor water courses around piles (section 3.3.7). It is also proposed to "build diversion drains wherever stockpile construction obstructs significant watercourses" (8.2.2c Table 4 section 13). These proposals should be rejected particularly if riparian vegetation is also destroyed by such operations.	4.6, 8.2	Waste Rock Management	3.6
5	g	NRETA	The proposal appears in consistent with section 3.1.8 which states that "where practicable, stockpile locations will be selected such that they do not cross drainage lines	4.1	Waste Rock Management	3.6
5	h	NRETA	The proposal is also inconsistent with the analysis of the regional conservation value of vegetation of the project area which recognises the regional value of riparian values. (in terms of species diversity and its role as a refuge habitat) and recommends that there should be no disturbance to this habitat (Appendix 7B Section 7.1)	6.6, Appendix 7	Vegetation	4.4
5	i	NRETA	It is also proposed that the waste rock stockpiles from the Jasmine East pit are used to fill a number of small steep-sided valleys and it is noted that this operation will not require the diversion of any watercourses (section 3.7.3). Destroying microhabitats is obviously far from a best-practice measure and would tend to further simplify rather than maintain habitat heterogeneity in the project area.	4.6.5	Waste Rock Management	3.6
5	j	NRETA	The claim is made elsewhere that "long term change to the landscape will be minimal" (section 7.1 but dumping waste rock in existing gullies (with or without watercourses) is plainly inconsistent with this aim	7.1	Waste Rock Management	3.6

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
5	k	NRETA	There should be an explicit statement as to weather ten waste rock samples from six pit locations are adequate to safely establish their acid forming potential and potential for trace-element pollution of groundwater (section 5.3	6.2.1	Waste Rock Management	3.6
5	l	NRETA	Though there are additional details of vegetation in the appended fauna/flora survey results, there is no meaningful discussion of anticipated impacts on particular vegetation types in the body of the PER	8.5.3	Vegetation	4.4
5	m	NRETA	The project involves clearing 172ha. (185.35 / 196.5ha. – Draft EMP) of native vegetation. Apart from the threatened *Cycas armstrongii* , no other plant species of conservation concern are recognised (Section 5.7).	5.7	Vegetation	4.4
5	n	NRETA	The draft EMP appended to the PER also indicates and undisclosed (but "small") area of riparian vegetation and swamp is to be destroyed but there are no further details.	8.5.1	Vegetation	4.4
5	o	NRETA	An adequate appraisal of the impacts of loss of vegetation presented for further consideration	8.5.1	Vegetation	4.4
5	p	NRETA	The only specific reference to vegetation re-establishment is "to reduce loss of biodiversity". No where is it identified whether the waste rock dumps will have similar characteristics to endemic soils/micro geography or the characteristics will typically support the local vegetation and a local species suite will be used to revegetate the site	8.5.1, 10.3	Vegetation	4.4
5	q	NRETA	The seasonal aridity of the project area suggests that the seasonal and semi-permanent natural waterholes recognised as occurring in the project area may be important to local wildlife but these areas also receive little consideration.	8.6	Fauna	4.5
5	r	NRETA	The appended flora/fauna report also recognises the value of the rehabilitated tailings storage facility that has become a "well-utilised wetland environment for "for a diverse selection" of wildlife. Though artificial in its origins (as will most of the resulting rehabilitated habitat), the existence of a functioning wetland system can be regarded as a positive offset to other environment disturbances in the area. This area should not be disturbed beyond any approved works that would enhance its further rehabilitation and function as a wetland refuge.	8.5, 8.6	Fauna	4.5
5	s	NRETA	There should be no disturbance of roosting ghost bats in the area or destruction of roost sites natural or artificial (8.6.2.f table 4 section 13) without further investigation of the significance of the roost and identification of other suitable roosts in the area.	8.6.2/8.6.3.2	Fauna	4.5
6	a	DPIFM	If the expectation is that access to the Frances Creek Dam should be limited or excluded during operations, this should be outlined. Closure of access may impact on community expectations	2.4	Social Impact	5.1
6	b	DPIFM	"Limited potential exists to place waste rock as backfill in pits. This will be done when economically feasible i.e. without double handling". This can be interpreted as meaning that there will not be any backfilling, given that double handling of the waste rock is inevitable.	4.4.5	Waste Rock Management	3.6
6	c	DPIFM	Given the location and proximity to a landfill at Pine Creek, and commercial operators in Darwin, it may be advantageous to dispose of industrial waste off site. This reduces or eliminates the requirement for on site storage, is cost effective from a company perspective and deals with long term site contamination and legacy issues	4.9.6	Waste Management	3.5
6	d	DPIFM	Under SSAN guidelines a security plan from explosives is also required	4.1	Rehabilitation	3.4
6	e	DPIFM	Large amounts of carbonaceous footwall material appear to have impeded rehabilitation in the past. How will rehabilitation be managed differently if a similar deposit is unearthed?	4.4.5/ 6.2.1.1	Rehabilitation	6
6	f	DPIFM	This project does not constitute value adding as that term would apply to processing or refining the iron, not export of unrefined bulk materials.	5.21	Project Development	2
6	g	DPIFM	If the intent of this section is to require an assessment of the liabilities of premature closure, the proponent should specify the maximum expected environmental impact of a premature closure	5.22	Closure	6
6	h	DPIFM	A discussion as to what alternatives were considered should be included.	5.24	Project Development	3.1
6	i	DPIFM	A pH of less than 5 should be considered problematic and worthy of appropriate management strategies. The proponent should provide a prediction of the volume of T2 waste, and whether it is likely that other pits will encounter this material.	6.2.1.1 / Table 10	Waste Rock Management	3.6
6	j	DPIFM	Any material likely to add to AMD problems in the smallest positive increment should be identified and manage If the conversion factor for S means that the MPA for a 0.1% S is actually 3.2, where does -0.8 come from? Any S above 0.02% in these poorly buffered materials will be generally acid forming Regarding the comments in 8.2.1 - this has implications for surface stockpiles above 0.1%S as well. Any material above 0.02% in poorly buffered materials should be encapsulated	6.2.1.1 / Table 10	Waste Rock Management	3.6

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6	k	DPIFM	All pits except Thelma 2 appear benign in water chemistry. If mining is to be advanced in Thelma 2 (or close by but intersecting the same problematic ore), it may be necessary to treat or isolate this water and also present strategies for mining and waste encapsulation of new waste to ensure further contamination does not occur. Pit water at pH 3.5 containing dissolved metals is not easy to dispose of even under a WDL. Depending on quantity, either isolation or dilution may be appropriate solutions.	6.2.1.1	Surface Water	4.3
6	l	DPIFM	Ongoing testing of waste rock should be committed to - inference that successive wet seasons will flush the leachate away and sufficiently dilute the problem is an inadequate response to what could be a significant problem	6.2.1.2	Waste Rock Management	3.6
6	m	DPIFM	Without a processes for containment of ARD material and an appropriate void management strategy it is likely that exposed S will produced long term water quality conditions outside of the accepted range. This is an important point given the effects of this material mentioned above on water quality aspects of the Thelma Pit	6.4.2.1	Waste Rock Management	3.6
6	n	DPIFM	If the containment dams (Helene 9, Helene 11 dam, Main Dam) overflow on an annual basis as a consequence of water management on site, it may be necessary to establish stable overflow structures such as spillways or weirs to reduce the chance of erosion and wall collapse. The main dam is already showing evidence of substantial erosion and potential failure from the wet season of 2005/06.	6.5.2	Surface Water	3.6
6	o	DPIFM	The Schultz *et al* (2002) report is a useful document to characterise regional chemistry and mineralogy, however, it should be used with caution for the following reasons: 1. All metal concentrations were total measurements and thus overestimate the bio-available component (especially when comparing with the ANZECC guideline values) 2. The sites used to calculate the ranges, percentiles and other descriptive statistics included some test sites downstream of known mining contamination sources. The true ranges of background metal concentrations are therefore much lower when these sites are removed from the analyses Comparisons with the Schultz *et al* (2002) document will lead to misinterpretation of the Frances Creek metal concentrations from a regional perspective. Further comparison between ranges presented in this document and ANZECC (2000) Guidelines is also flawed as a result of the inclusion of test sites in the analyses	6.5.3	Surface Water	4.3
6	p	DPIFM	Some of the chemistry presented in table 15 and also Table 2 of Appendix 4 is wrong. The excessively high Aluminium (filtrate) concentrations reported for Helene 9 and 11 dams have been inadvertently pasted as a microgram value into an mg/L column and therefore are 1000 times greater than the true values. It would appear two separate data sets have been combined without checking the units or fractions. The original analyses for samples collected on the 15th, 20th and 21st of May 2005 and submitted to NTEL need to be reviewed and compared with data presented in Appendix 4 Table 2.	6.5.4	Surface Water	4.3
6	q	DPIFM	To further support this it would be practically impossible to get a sample with a dissolved Aluminium concentration of 21,800 with an EC of only 26 µS/cm as shown for Helene 9 Dam (app 4, Table2)	6.5.4	Surface Water	4.3
6	r	DPIFM	Further independent sampling from DPIFM conducted in may 2006 resulted in filtered Aluminium concentrations of 77µg/L, 8µg/L and 18µg/L for Helene 9, Helene 11 and Main dam respectively.	6.5.4	Surface Water	4.3
6	s	DPIFM	There are serious implications for water management if the chemistry is not reviewed. It is definitely in Territory Iron's best interest to establish what the true chemistry results are so appropriate decisions can be made about the environmental implications of uncontrolled flows from containment ponds. This may also influence the WDL conditions as set by DNRETA.	6.5.4	Surface Water	4.3
6	t	DPIFM	The proponent should indicate why the value of 0.1%S has been selected as the trigger. It is possible that the low pH and higher metal values in pit waters are not entirely due to organic acids. More work needs to be done in this area. 0.1% sulphur, waste rock with pH of 4.9 and no buffering capacity create conditions that have the potential to cause problems	8.2.1	Waste Rock Management	3.6
6	u	DPIFM	The view that "no rock types will require special handling" is debatable.	8.2.2	Waste Rock Management	3.6
6	v	DPIFM	A geotechnical review should be provided particularly from the perspective of erosion, given that 18 degrees is quite steep.	8.2.2	Waste Rock Management	3.6
6	w	DPIFM	Further determination is required as to whether or not material has acid generation potential. Given that water quality at the point of emission (i.e. at dump toes, pit overflows and the like) is the required compliance point, individual point sources must be acceptable for closure even if overall management is acceptable	8.2.3, 8.4.2, 8.4.6	Waste Rock Management	3.6

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6	x	DPIFM	Onsite monitoring programs should be determined with assistance and advice from DPIFM to ensure appropriate rigour is applied to the sampling methods and site selections. DPIFM will also be doing independent checks and monitoring that should complement existing programs. Adequate monitoring and control measures will ensure protection of downstream ecosystems	8.4.5	Surface Water	4.3
6	y	DPIFM	It would be best practice to apply seed at time of initial rehab.	10.2.4	Rehabilitation	6
7	a	DBERD - EDD	The department has no issues of concern in relation to the PER. The Proponent has effectively addressed the guidelines in relation to identification and management of the project's potential economic impacts	N/A	Economic Impact	2
8	a	NLC	Nearby watercourses represent the receiving environment for any potentially harmful wastes, including any acid mine drainage, that may emanate from the mine.	6.5.2, 8.4.2, 8.4.3	Surface Water	4.3
8	b	NLC	Territory Iron has provided estimated annual water balances for the period 2006 – 2009 (Section 4.6.3). The mean rainfall values provided in Table 7 for 2007 and 2008 are significantly higher (by ~28%) than for both 2006 and 2009. This is problematic and confusing because the rationale for this increase in rainfall over a two year period only has not been explained and because the average runoff estimated for the same period has not increased to reflect this additional rainfall. Any calculations based on the data provided for this period may therefore be in error. While the mine's location is such that water management may not be a major issue during it's short life span, any fundamental errors in water balances or failure to account for significant changes to local climate may have disastrous environmental consequences. Contingencies have not been proposed for extreme weather events. Determination of annual water balances based upon a range of, for example, ± 33% of the mean rainfall may also be of assistance in determining contingencies for dealing with any on-going water management problems during operations at the site.	4.6.3	Surface Water	4.2
8	c	NLC	It is commendable that Territory Iron has committed to monitoring upstream and downstream of all mining activities within the tenements, including stockpiling at the railway siding (Section 8.4.5). They plan to utilize ANZECC guidelines as values against which deterioration of water quality can be measured, but do not indicate which guidelines or values are to be used. These should be specified.	8.4.5	Surface Water	4.3
8	d	NLC	Territory Iron provides only limited water quality data for Frances Creek, its tributaries and Maude Creek tributaries (Table 15 – Section 6.5). A large number of samples analysed are shown to be characterized by enhanced concentrations of a number of elements, some of which exceed the ANZECC freshwater guideline values. For example, Territory Iron states that aluminium concentrations are well in excess of the ANZECC default value, but within the range observed for the natural watercourses in the project area (Table 27 – Section 8.4.3). The NLC believes that it would be unsuitable to utilise these values as background values or as trigger values for monitoring purposes because the catchment areas have been affected by prior mining operations. Pre-mining analytical data for the river systems and tributaries should be available from previous mining companies and it is this data that should be used for development of any triggers for use in monitoring programmes. This data has not been provided and there is no evidence that it has been sought. Triggers developed using this data should be verified against calculations using data collected at upstream monitoring sites, and the triggers and parent data should be made available for public review and included in the terms of the NRETA issued water discharge license. All triggers to be used for water quality monitoring should be site specific and derived using an ecotoxicological approach, rather than using default values (ANZECC, 2000). These, or appropriate interim trigger values should be in place prior to commencement of mining operations. If interim trigger values are to be used to allow mining to commence, then final values should be derived within the following 18 – 24 months. The NLC believes this to represent best practice and recognizes it as the preferred approach to using triggers for water monitoring in the Northern Territory.	6.5, 8.4	Surface Water	4.3

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8	e	NLC	Cumulative effects from previous mining activities and from other planned developments (e.g. the gold mining at Maude Creek) have not been considered during development of the PER. While the proposed project may be environmentally acceptable as a stand-alone venture, soluble metal and sediment loads may not be acceptable if other mines come into operation in the region. This is a real concern as gold-mining at Maude Creek (the catchment of which is expected to be affected by the Frances Creek project) is expected to recommence during 2006 or 2007. Soluble metal loads for Maude Creek and allowances should be made for potential effects of other mining ventures when trigger values for watercourses are proposed.	N/A	Cumulative Impacts	2
8	f	NLC	Another area of concern to the NLC is Territory Iron's proposed plan to deal with management of fauna, especially those that have been classified as threatened, endangered or rare under the EPBC Act, TPWC Act and IUCN. Territory Iron has indicated that specific management measures will be implemented for a number of fauna species (Section 8.6.2). Detail of these specific management measures is largely missing and detailed comment is therefore impossible.	8.6	Fauna	4.5
8	g	NLC	Claims that the old conveyor tunnel would not be the only likely roost site for a Ghost Bat colony are unsubstantiated, and some verification of this should be provided before their habitat is disturbed. In the event that other roost sites are not found, construction of an artificial roost would be mandatory.	6.7, 8.6	Fauna	4.5
8	h	NLC	The NLC would also be interested in understanding more clearly how fauna management and monitoring plans for the following species are to be implemented, as there is no information or risk assessment provided by Territory Iron with respect to these species. (1) Orange Horseshoe Bat (2) Arnhem Sheathtail Bat (3) Partridge Pigeon (5) Western Chestnut mouse and (6) Calaby's Pebble-mound mouse. Although these species are recognized by Territory Iron (Section 8.6.1) as having conservation significance, and are likely to be impacted by mining operations, no management plans have been proposed. Particular attention should be given to the Calaby's Pebble-mound mouse and its specific habitat requirements, given its 'threatened' status in the Northern Territory and 'rare' IUCN status.	8.6	Fauna	4.5
8	i	NLC	The new draft threatened species list for the Northern Territory was released for public comment during August 2006. Although this post-dates Territory Iron's PER, the final updated list, expected by December 2006, should be used as the basis for the Environmental Management Plan when it is drafted. This should ensure that all species of conservation significance within the project area have been identified and that appropriate management measures have been accordingly developed and implemented.	8.6, EMP	Fauna	4.5
8	j	NLC	The NLC commends Territory Iron's commitment to participate in the Federal Government's Greenhouse Gas Challenge Plus Program and to report emissions as part of the National Pollutant Inventory. The NLC believes that this data should be reported in a manner that provides for greatest transparency and analysis and should therefore be reported on a facility level rather than a company-wide level. An assessment of how the company's Greenhouse Gas (GHG) emissions compare with other major industries and the Northern Territory's overall emissions would also be useful.	8.7	Greenhouse Gasses	3.1
8	k	NLC	Territory Iron suggests that the full amount of GHG emissions from vegetation clearing will be balanced by carbon uptake during revegetation (Section 8.7.1.1), but do not indicate if this is a firm commitment under the program, nor how it will be assessed. If this is actually a commitment then that should be specified, along with an indication of how this will be measured and assessed.	8.7	Greenhouse Gasses	3.1
8	l	NLC	In general, the NLC is of the opinion that Section 10 contains insufficient detail to allow fully informed comment	10	Rehabilitation	2
8	m	NLC	Territory Iron has indicated that rehabilitation will proceed in accordance with an approved Mine Management Plan. These plans are not generally made available to the public and stakeholders will have no opportunity to access the content of either the original or updated versions of the plan. Such plans should be made in conjunction with principal stakeholders.	10.2	Rehabilitation	6

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8	n	NLC	It is recognised that rehabilitation and closure will be a dynamic process, however the information provided in the PER is insufficient to allow third parties to comment on the adequacy or success of rehabilitation and closure commitments. Areas of particular concern include: (1) Lack of any specific plans for rehabilitation or future protection of habitat requirements for species of conservation significance. Consideration should be given during the rehabilitation phase to creating localized habitats that could serve to bolster populations of endangered species (e.g. Gouldian Finch grass habitat) – provided they are consistent with the pre-existing vegetation patterns. (2) Lack of detail with respect to proposed annual monitoring programmes. These programmes appear to have been designed only to consider the vegetation. Annual monitoring of fauna species (especially those of conservation significance) should be included. (3) Lack of specific information with respect to indigenous plant species to be used in rehabilitation. Territory Iron has made no commitment to recreating vegetation patterns that are similar to those in existence prior to operations and there is a risk that species planted supplementary to natural seeding may not be endemic to the region. (4) Lack of any specific plans to deal with weeds during rehabilitation and closure at the site. It is recognized that a number of weed species already exist on the site; however both Territory Iron and the Northern Territory Government should consider the rehabilitation and closure plans offered by Territory Iron as opportunities to also address existing weed problems.	10.2	Rehabilitation	6 6
8	o	NLC	It is preferable that all open pits are backfilled because generation of acidic waters in mine pits represents an intergenerational legacy that may result in long-term impacts upon groundwater and eventually surface water systems running into the Mary River. Territory Iron's plan to allow the pits to flood with water creates a risk of acid generation similar to that already observed in Thelma 2 Pit (refer Section 6.2.1.1) if sufficient evaporation occurs.	6.2.1.1, 8.1.3, 8.2.1, 10.2.1	Closure	6
8	p	NLC	The NLC is not convinced that decayed organic material has contributed significantly to the high acid concentration seen in the Thelma 2 Pit only. Humic and fulvic acids are weak acids and unlikely to produce a strong acid solution even after years of cyclic evaporation and dilution. If it was a major contributing factor, then it is reasonable to assume that similar pH values would also be observed in the other pits, which does not happen. It is more likely that localized areas of pyritic or another acid forming mineral has been exposed within Thelma 2 Pit and that has contributed to the high acid values. If this is the case, then there is a high risk that further cutbacks of existing pits, or creation of new pits, may lead to other pits becoming sources of acidic wastewater. Irrespective of the source of this acidity, and in the event that pits are allowed to flood, post-rehabilitation monitoring must also include surface and groundwater monitoring with contingencies proposed for dealing with potential AMD. Territory Iron has made no commitment to this, even though the risk of the Thelma 2 Pit becoming a long-term source of AMD has been recognized	6.2.1.1, 10.3	Closure	6
8	q	NLC	Territory Iron indicates that the Thelma Rosemary waste rock stockpile has been positioned to bury the existing Thelma 2 waste rock stockpile (Section 4.4.5). Back-filling the Rosemary and, in particular, the Thelma 2 Pit with this material to mitigate the risk of acid mine drainage seems to represent a better long-term rehabilitation strategy than increasing the size of an existing stockpile that is already difficult to rehabilitate.	4.4.5	Rehabilitation	6
8	r	NLC	Territory Iron has provided no detail with respect to its Closure Plan, but has indicated that it will be prepared and reviewed every three years. Review should be done in conjunction with all principal stakeholders to ensure that satisfactory closure criteria are developed and that closure is a success	10.3	Closure	6
8	s	NLC	The NLC believes that the draft EMP is lacking in detail and does not meet all of the requirements stipulated in the EPA PER Guidelines (2006), particularly in terms of performance indicators and targets. It is noted that no measurable targets or performance indicators have been set, by which all anticipated and potential impacts can be measured and assessed. In accordance with the PER guidelines, these need to be provided for in the draft EMP and comply with applicable legislation, regulations, standards and codes of practice. With regard to developing targets and performance indicators for surface water management, reference should be made to the NLC's comments on the preferred and best practice approach to developing and using triggers for water monitoring in the NT.	12.1	EMP	7
8	t	NLC	The NLC believes that targets and performance indicators are integral components of an EMP as they provide a measurable benchmark against performance and a basis for future targets and improvements	12.1 iv	EMP	7

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8	u	NLC	The EMP should also provide greater detail on the environmental management structure of both the operational and construction phases of the project, and delineate between construction and operational impacts and management measures.	12.2.2	EMP	7
8	v	NLC	The Northern Land Council can offer only qualified support for this project as it is currently proposed. For the NLC to have full confidence in the project, it is recommended that Territory Iron:	N/A	N/A	N/A
			1. Review its water balances and water management programme to ensure that contingencies are presented to allow for positive or negative shifts in rainfall and for potential cumulative effects from other nearby mining ventures. The scope extent and frequency of the monitoring component of this programme should also be provided for stakeholder review;	4.6.3	Surface Water	4.2
			2. Specify and develop watercourse trigger values that are based on appropriate ecotoxicological testing as well as ANZECC guidelines. Development of triggers should be done in conjunction with stakeholders;	6.5, 8.4	Surface Water	4.3
			3. Develop additional management plans to deal with habitat destruction and reconstruction for the listed species identified earlier in this submission;	8.6	Fauna	4.5
			4. Produce closure criteria and additional rehabilitation monitoring programmes that provide a wider range of information against which those closure criteria may be cross-referenced;	12.7	Rehabilitation/EMP	7
			5. Back-fill Thelma Pit 2 with waste rock from the Thelma Rosemary Pit and cap it to prevent future acid mine drainage problems. In the event that this is not feasible, an assessment of the reasons why it is not feasible should be provided; and	4.4.5	Closure	6
			6. Develop performance indicators and targets for inclusion into the Environmental Management Plan.	N/A	EMP	7
9	a	DPI	The Department is supportive of proposed route 1 (former rail spur line) outlined at section 4.7.2.1 of the PER as the preferred haulage route. This option keeps the proposed haulage mainly off public roads and separates haulage traffic from general traffic (except at one point which can be managed appropriately).	4.7.2.1, 8.11.2	Transport	3.5
9	b	DPI	If the use of non-standard vehicles is proposed for route 1, a permit will be required for crossing the public road. If route 2 is selected, the use of non-standard vehicles will not be permitted.	4.7.2	Transport	3.5
9	c	DPI	Proposed route 1 includes a proposal to construct on the alignment of the previous Frances Creek mine rail spur to Rooney Siding through Mary River West Pastoral Lease. This area of land is owned by the NT Land Corporation and may be subject to a remnant land claim under the Aboriginal Land Rights (NT) Act 1976. Further advice should be sought from the Northern Land Council and the Land Administration Division of this Department regarding negotiating appropriate ownership / use agreements.	4.7.2	Transport	3.5
9	d	DPI	Commitment 8.11.2b regarding maintenance on Mt Wells Road is noted and further consultation by the proponent will be required with this Department and the relevant local Council regarding maintenance to appropriate standards.	8.11.2b	Transport	3.5
9	e	DPI	Any construction work on roads under the care and control of this Department will require a Traffic Management Plan for construction activities prior to commencement of works.	8.11	Transport	3.5
10	a	EPA	Further information is needed regarding borrow material requirements, extraction methods and uses. In particular, the location where material will be sourced and what remediation (if any) will be undertaken on the borrow pits	4.1	Mining Development	3.4
10	b	EPA	Details of drilling and blasting have been provided on page 20 of the PER, however the guidelines also requested information on the frequency of these operational procedures.	4.4	Mining Operation	3.3
10	c	EPA	It has been estimated that the existing ore reserves will allow the mine to operate for a period of 3 years (page 13). The future of the mine is briefly mentioned on page 40 of the PER. Please elaborate on the possible future extension to the mine operation, and discuss the probability of mining satellite ore bodies	4.2	Mining Development	3.2
10	d	EPA	It has been stated that disturbance to riparian vegetation and the swamp (that has developed at the old TSF) will occur as a result of building waste rock stockpiles. Both these habitats are sensitive to disturbance and it should be a consideration of the proponent to avoid impacts by relocating/redesigning the proposed stockpile sites and providing a suitable buffer to protect these habitats from mining influences. Creek line vegetation serves to maintain bank stability and preserve water quality. It has also been recommended by Low Ecological Services (Appendix 7), that the TSF is a good quality wetland and management efforts to retain this quality should be adopted.	8.5, 8.6	Waste Rock Management	4.5

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
10	e	EPA	Draw down curves of ground water may be affected by mining activities. This may result in changes to the available soil water to vegetation. Irrigation could be used to supplement vegetation water needs (in particular creek line vegetation) and contribute to a reduction and re-use of the volume of water requiring disposal from the site. As stated in the PER there will be an increase in discharges from the Helene 11 Dam to Frances Creek Main Dam from a pre-mining average of 550 megalitres a year up to 882 megalitres a year (pg 26)	8.3, 8.4	Groundwater	4.2
10	f	EPA	Discuss mass loading and the potential of cumulative impacts at a catchment based scale in relation to other major catchment industry such as the Union Reef processing plant by Burnside operations and the Mt Porter Gold Project	8.4	Surface Water	4.3
10	g	EPA	As the project area is located on a pastoral lease (Ban Ban Springs Station) an examination of livestock drinking water standards for the dams and an identification of the level of protection needs to be conducted	8.4	Surface Water	4.3
10	h	EPA	The quality of waters entering the environment as a result of stormwater discharge will need to be at a standard comparable with the receiving environment. The proponent has provided mitigation measures to ensure water quality standards are met through licensing conditions. It would be relevant to include a discharge regime and proposed treatment system in the Supplement.	8.4	Surface Water	4.3
10	i	EPA	Key strategies to maintaining both the beneficial uses and water quality objectives for the Mary River Catchment are: retain as much vegetation on site as possible; revegetate disturbed areas a soon as possible; and protect riparian zone vegetation. Maintaining water quality while removing habitat in the riparian zone may not sufficiently protect the beneficial uses of aquatic ecosystem protection for Mary River system	8.4	Surface Water	4.3
10	j	EPA	The statement on page 91 that compares aluminium in the dewatering discharge with that of natural watercourses is incorrect. Th range reported in Schultz et al 2002, is actually <5 - 260 ug/L (Table 27) for the Mary River Catchment. Therefore 6 800 ug/L is well above this value by a factor of approximately 45	8.4	Surface Water	4.3
10	k	EPA	As stated in the PER (pages 27 and 117), dewatering flows will be diluted by approximately 50 percent with natural runoff before discharge into the Frances Creek Main Dam. Figures presented for the Helene 6/7 pit dewatering illustrate highly elevated levels of aluminium compared to local surface waters. The 90th percentile for local waters is 150ug/L, while the pit water has a value of 6 800 ug/L requiring a minimum dilution of approx 45 times. The pit water should be subject to a water management hierarchy approach, including avoidance of discharge, re-use, recycling or treatment before disposal. If disposal is required a dilution regime will be needed including ● Appropriate treatment; ● Setting of water quality targets; ● Accounting for seasonality; ● 1Q20 (one day in 20 year low flow) worst case low flow analysis ● Scenario Planning for start of flow, base flow, recessional flow and cease of flow; and ● Toxicant assessment for total and filterable metals including any hardness modified trigger levels	6.5, 8.4	Surface Water	4.3
10	l	EPA	Although reference is made to Appendix 4 within the section on water discharge, it is unclear if the values represented in Table 2 of the PER are totals or filterable.	8.4 Table 27	Surface Water	4.3
10	m	EPA	The PER advises that Territory Iron will use one of two alternative routes for haulage (page 28). The Supplement should indicate which haul route will be used for the mining operation so that appropriate clearances can be obtained for heritage and sacred sites.	4.7	Transport	3.5
10	n	EPA	Although explanation has been provided for the selected location of the processing plant (west of Helene 5 pit), an alternative location has not been provided in the PER. As previously identified, the swamp associated with the Tailings Storage Facility is considered to be a sensitive habitat (even though it is man-made). By providing an alternative location for the processing plant, the stockpiles which need to be either side of the plant may then be moved away from the swamp.	5.2	Alternatives	3.1
10	o	EPA	As stated in the PER, Territory Iron is planning to provide accommodation at a former mining camp at Pine Creek (page 140). Territory Iron also recognises that there will be increased pressure on Pine Creek accommodation and medical services (page 113). The supplement should identify alternative workforce accommodation in anticipation that the former mining camp at Pine Creek may not be feasible.	5, 8.13	Alternatives	5.1
10	p	EPA	It has been stated that a Gouldian Finch monitoring program and Management Plan will be established (page 99). Table 17 lists species of conservation significance recorded from or expected to occur within the projected area. It is also important to include species listed as vulnerable and near threatened into a monitoring program	8.6	Fauna	4.5

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
10	q	EPA	Assessment of the aquatic ecosystems was conducted in May 2006 (page 66), and although no aquatic fauna of conservation significance were observed, a monitoring program of aquatic species should also be considered in order to detect impacts from the mining operation and to satisfy the requirements the declared Beneficial Uses (environmental i.e. to provide water to maintain the health of aquatic ecosystems).	8.6	Fauna	4.5
10	r	EPA	Commitment 8.6.2c: Reporting sightings of species of conservation significance to the Northern Territory Parks and Wildlife Commission. As a management and mitigation measure, how will this be used to minimise loss of fauna habitat and to re-establish appropriate habitat through rehabilitation?	8.6	Fauna	4.5
10	s	EPA	Section 8.6: Fauna, raises the issue of removal of Ghost Bat roost through destruction of the historical conveyor tunnel. Commitment 8.6.2f & g relates to this matter. The action should be the construction of an artificial alternative ghost bat roosting site. This would be proactive if undertaken prior to the destruction of the existing roost site and should be a high priority commitment considering the near threatened status of the Ghost Bat	8.6	Fauna	4.5
10	t	EPA	Commitment 8.6.2j states that the proponent will participate in feral animal control programs on Ban Ban Springs and Mary River West stations, if requested by owners. A firmer commitment to feral animal control should be provided by Territory Iron. Mining activities could attract cane toads by providing permanent water bodies and industrial lights. Simple trapping techniques could be employed to reduce the number of cane toads and the negative impacts this introduced species has on native fauna. FrogWatch have developed a number of traps designed specifically to capture cane toads. A management program to control cane toads and other feral animals, as listed on page 70, should form the basis of another commitment by Territory Iron.	8.6	Fauna	4.5
10	u	EPA	Baseline information on prevailing wind direction and maximum wind gusts as requested in the Guidelines have not been provided in the PER. understanding of this meteorological condition can assist with design layout of the ROM and maximising mitigation measures relating to dust, air quality, and noise dispersion levels	8.7	Air Resources Management	4.6
10	v	EPA	Section 6.8: Air Quality states that particulate levels are expected to vary seasonally due to, among other things, bushfires. Commitment 8.7: Air Resources could include an action for minimising the risk of contributing to starting fires such as spark arresters on machinery, ULP vehicle movements in dry grass (although it is expected that vehicles will be diesel) employee commitment to NOT throwing cigarettes or matches from vehicles and an awareness of operating procedures on Total Fire Ban days or High Fire Danger days.	6.8, 8.7	Air Resources Management	4.6
10	w	EPA	Territory Iron considers that the location of the mine site is isolated, however mechanisms for the community to lodge complaints relating to dust and noise will need to be made available. Provision of this service will need to be included and the proponent will need to develop a method of monitoring and assessing any complaints	8.7	Air Resources Management	4.6
10	x	EPA	Aquatic ecosystem condition assessment is essential to determine appropriate levels of protection for aquatic toxicants. Condition assessments include physio - chemical and biological monitoring such as AUSRIVAS. Regular assessment of aquatic ecosystem condition is required and action must be taken to maintain or enhance aquatic ecosystem condition if required.	6.5, 6.6, 8.4, 8.5	Surface Water	4.3
10	y	EPA	The proponent has declared that there are no known Threatened Ecological Communities (TEC) which occur within the Frances Creek project area (page 65). However Table 17 provides a list of species of conservation significance. Species of conservation significance use the ecological community	6.6	Vegetation	4.4
10	z	EPA	Commitment 8.6.2i refers to the development of a Wildlife Rescue Procedure. Further details regarding relocation of animals to appropriate habitat ranges needs to be provided. This should include *an* understanding of the territorial nature of some species. Birds and animals can only be moved successfully if there is unoccupied territory available	8.6	Fauna	4.5
10	aa	EPA	The proponent has provided basic information regarding Greenhouse Gas Emissions, however many of the issues identified for consideration in the PER Guidelines and Appendix A "NT Environmental Impact Assessment Guide: Greenhouse Gas Emissions", have not been addressed	6.8, 8.7	Greenhouse Gasses	3.10
10	ab	EPA	For example, measures to be undertaken to minimise greenhouse emissions have not been outlined. Commitment 8.7.2.3 (a) relating to Greenhouse commits Territory Iron to "joining the... Greenhouse Challenge program and monitoring greenhouse emissions and efficiency". While participation in "Greenhouse Challenge Plus" (note name change) is appreciated, for public transparency some outline in the PER of potential emissions minimisation measures would be appropriate.	6.8, 8.8	Greenhouse Gasses	3.10
10	ac	EPA	It is recommended that the proponent join the Commonwealth Government's Greenhouse Challenge Plus program, and investigate opportunities to offset greenhouse gas emissions from the proposed operation	8.7.2.3	Greenhouse Gasses	3.10

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
10	ad	EPA	Similarly, the proponent needs to consider investing in any greenhouse offsets. If mining was to proceed the Environment Protection Agency Program would expect the proponent to identify opportunities for offsetting greenhouse gas emissions from the operations.	6.8, 8.9	Greenhouse Gasses	3.10
10	ae	EPA	Greenhouse emissions from land clearing should be presented in Table 30 titled "Predicted Emissions" (page 102 of Volume 1 of the PER) so that a complete total for the project is clearly presented	6.8, 8.10	Greenhouse Gasses	3.10
10	af	EPA	Section 8.5: Vegetation and Flora states that 172 hectares of native vegetation will be cleared for the project. The statement in Section 8.7.1.1: Greenhouse Gases that "new clearing is about 94 hectares" is irrelevant as degraded and regrowth vegetation still produces emissions when cleared. The 172 hectares of clearing represents approximately 43,000 tonnes of greenhouse emissions, which should be included in Table 30 on page 102	6.8, 8.11	Greenhouse Gasses	3.10
10	ag	EPA	The final sentence of section 8.7.1.1 states that emissions from land clearing will be "balanced" by carbon uptake during revegetation. Given that not all areas cleared will be revegetated, and there will be a very significant time lag before woodland is fully regrown on revegetated areas, it would be accurate to use the team "partially offset" here, rather than "balanced".	6.8, 8.12	Greenhouse Gasses	3.10
10	ah	EPA	Table 30, titled "Predicted Emissions of Greenhouse Gases" and the subsequent text regarding emissions of methane from landfill are confusing. It is unclear whether the methane emissions are included in the figures shown in Table 30 against "landfill", and how they are calculated to be 31.4 kg per year, when CO2 equivalent from landfill is calculated to be 1.2 tonnes. A clear outline of total emissions and sources needs to be provided	6.8, 8.13	Greenhouse Gasses	3.10
10	ai	EPA	The Northern Territory Government is committed to introducing mandatory public reporting of greenhouse gas emissions by major industry. Implementation of this commitment is currently being explored in relation to a Council of Australian Governments commitment to report on the preparation of national purpose-built legislation to provide for cost-effective mandatory reporting and disclosure of greenhouse and energy data at the company level at the earliest practicable date.	6.8, 8.14	Greenhouse Gasses	3.10
10	aj	EPA	It is noted that the proponent has already made a commitment to join the Greenhouse Challenge Plus program. Reporting obligations under the Greenhouse Challenge include: providing timely annual reports with agreed content on greenhouse gas emissions and emission reduction activities; making accurate annual public statements about participation in the program; and participating in independent verification of annual progress reports. Until a national or Northern Territory reporting system is established, it is recommended that annual reporting should be undertaken through the Environmental Management Plan/Mining Management Plan process. At a minimum, reporting should detail total annual greenhouse gas emissions, provide a breakdown of emissions by gas and source (actual emissions and in carbon dioxide equivalents), and the emissions intensity of production.	6.8, 8.15	Greenhouse Gasses	3.10
10	ak	EPA	Whilst Heritage Conservation Services notes that the proponent has undertaken an archaeological survey of mining tenement MLA 24727, it is also noted that the proposal includes Ms 25087, 25088, 25152, 25152, 25396 and 25529. While it is understood that a proportion of this land is disturbed through previous mining activity, the proponent has not investigated whether use of these areas will impact on cultural heritage resources. The proponent should give consideration to cultural heritage issues for these additional areas by either investigating the potential for previously unrecorded places protected under the *Heritage Conservation Act* or demonstrating the extent of disturbance (this **may** simply involve a desktop exercise).	7.1, 7.2, 8.12	Cultural Heritage	5.2
10	al	EPA	The archaeological survey report for MLA 24727 accords recorded archaeological sites with a low to moderate level of significance on the basis of comparison with the Mt Porter sites complex. Although data describing archaeological site structure is provided for sites recorded within MLA 24727, this data is not provided for the Mt Porter sites on which the comparison is made.	7.2	Cultural Heritage	5.2
10	am	EPA	The archaeological study acknowledges that the site known as Frances Creek 3 is relatively large in area and contains a dense and diverse range of stone artefact types and stone raw materials and states that this site has the highest significance. The structure described within this study tends to indicate major occupation site and should arguably be accorded with a high level of significance.	7.2	Cultural Heritage	5.2
10	an	EPA	Section 8.12.1 (Page 111) states "increased level of employment among the local indigenous population" as a potential Aboriginal Cultural Impact. This sentence should be included in the Section 8.13 Socio Economic Environment.	8.12, 8.13	Social Impact	5.1

Submission No.	Comment No.	Submittor	Comment	PER Reference	Subject	Supplement Reference
10	ao	EPA	Commitment 8.12.2a should focus on historical documentation of the existing rail spur line prior to the proposed upgrade to a haulage road. An archaeological survey should be undertaken for the 2.4km section between the historical rail spur line and the Alice Springs to Darwin Railway and the proposed Rooney siding. Consideration should also be given to the location of the proposed siding in relation to the existing cultural heritage studies for the Alice Springs to Darwin Railway (see ADrail 2003). Extant sections of the North Australian Railway (NAR) between Birdum and Darwin have been nominated to the Northern Territory Heritage Register and are currently under assessment. The proponent should consult with Heritage Conservation Services regarding the proposed crossing point and demonstrate how they will limit the damage to extant NAR infrastructure.	8.12	Cultural Heritage	5.2
10	ap	EPA	Regarding Commitment 8.12.2h, the proponent should note that all archaeological places and objects, whether previously recorded or not and of high or low significance are afforded blanket protection under the *Heritage Conservation Act*. Consent to disturb archaeological places or objects (including isolated artefacts) is required from the Minister for Environment and Heritage or their delegate.	8.12	Cultural Heritage	5.2
10	aq	EPA	The proponent has stated that only the site known as Ochre Hill 1 is scheduled to be impacted upon, meaning that the remaining 7 sites recorded (Frances Creek 1-5, Ochre Hill 1 & 2) during the archaeological survey of MLA 24727 (Hill 2005) are scheduled to be retained. Appropriate long term management should therefore be devised and incorporated into any EMP / MMP to be drafted for the operations phase. These strategies should incorporate the views and or wishes of the Aboriginal traditional owners /custodians referred to section 7.3. Heritage Conservation Services is not currently processing the penult application under section 29 referred to in Section 8.12.3. Territory Iron should note that this application process takes 4 - 6 weeks.	8.12	Cultural Heritage	5.2
10	ar	EPA	The proponent should liaise with Heritage Conservation Services and provide more specific detail regarding recommendations (2, 3, 4, 5, 7 & 8) made by Hill (2005).	8.12	Cultural Heritage	5.2
10	as	EPA	As outlined in Commitment 8.6.2h, the proponent intends on restricting speeds on haulage routes and mine roads to minimise fauna death on roads. As an added precaution, signs should also be erected to warn mine employees of wildlife movements.	8.6	Fauna	4.5
10	at	EPA	Guidelines for the PER required the preparation and inclusion of a draft Environmental Management Plan (EMP). The PER states on page 11 that: "A draft Environmental Management Plan is included in this PER" This has not been submitted. The PER later states (page 132) that: "An Environmental Management Plan (EMP) will be developed in consultation with DPIFM and NRETA before construction starts. However, as requested, the proponent will need to provide the EPA Program with a draft EMP or an outline of the proposed EMP for review as part of the environmental assessment process and not at the completion of the process as suggested on page 11 of the PER.	Appendix 12	EMP	7

APPENDIX 2
Corrected PER Table 30 (Predicted Emissions of Greenhouse Gases)

Table 30: Predicted Emissions of Greenhouse Gasses

Emission Source	Annual (tonnes CO_2-equivalent)			Life of Mine (tonnes CO_2-equivalent)		
	Fugitive	**Point**	**Combined**	**Fugitive**	**Point**	**Combined**
Explosives		306	306		918	918
Land Clearing			14333			43000
Landfill			0.9			2.7
Power Generation	90.5	807	897	271.5	2421	2691
Transport	1200	10800	12000	3600	32400	36000
Total	**1290.5**	**11913**	**27536.9**	**3871.5**	**35739**	**82611.7**

APPENDIX 3

Corrected PER Table 15 (Discharge Water Quality), Table 27 and text following in Section 8.4.3, Corrections to PER Appendix 4 Table 2 and Laboratory Reports.

Table 15: Frances Creek Project Area Surface Water Quality

Sample	Location	EC (µS/cm)	pH	Other Characteristics (µg/L)
Frances Creek Tributaries				
F5	Helene 6 Dam upper Frances Creek Tributary Catchment includes old Helene waste rock stockpiles	306	4.8	Enhanced beryllium (0.35), cobalt (45), soluble iron (1800), nickel (**50**) and sulfate (105,000). Enhanced sodium (19,900) and chloride (17,300) indicates likely concentration through evaporation. Beryllium level is likely due to granite geology of upper catchment.
F4	Tailings Swamp, catchment includes tailings surface and old stockpile area	121	7.2	Trace of zinc (**30**).
Helene 4 Dam	Small tributary upstream of disturbances	34	6.6	No elements exceeding guidelines.
M3	Tributary undisturbed catchment between Helene 2 and Thelma	36	6.0	Slightly enhanced aluminium *(521), reduced iron (340).
M7	Diversion around Jasmine Pit	50	6.4	Trace of reduced iron (200), sulfate (4,900) almost high enough to account for acidity
Frances Creek				
Helene 9 Dam	Upstream of all disturbances	26	6.7	*Little reduced iron (300), extremely low sulphate (400) and negligible contents of toxicants.
Main Frances Creek Dam*	Downstream of TSF and stockpile area. Handheld meter readings	100	8.1	Moderate EC. No analysis of toxicants. Higher pH likely due to hand held meter versus lab analysis.
M4	Downstream of Main Dam	596	7.5	High in nitrates (**75**) and highest in both calcium (37,600) and sulphate (172,000). Exceeds Uranium Trigger Value (0.66 vs 0.50).
M8	Upstream of Ochre Hill crossing	132	6.9	No enhanced elements, red colour from road runoff.
M6	Waterhole, not flowing, downstream of all except Jasmine Pit	36	6.9	Slightly enhanced aluminium (***550**), reduced iron (600)
Maude Creek Tributaries				
M5	3 km downstream of Ochre Hill	45	6.1	Slightly enhanced aluminium (***463**), reduced iron (400)
F1	7.5 km north of Ochre Hill, northern tributary of Maude Creek unaffected by project	45	6.6	Significantly enhanced soluble Aluminium (**10,200**), Beryllium (0.20), Cobalt (5), Copper (***15.0**) soluble iron (*4,150), Lead (***7**), Thallium (0.09), Uranium (0.758), Vanadium (**20**) and Zinc (**30**) when compared against Fresh Water Trigger Values.

Note: Bold text indicates values exceeding ANZECC 2000 trigger values (see Table 14).

* indicates amended values.

Section 8.4.3 of PER Volume 1. Corrections to Table 27 and following text

Table 27: Discharge Water Quality

Element	Units	Helene 6/7 Dewatering Sample	Range observed in Project Area Natural Surface Waters	Range observed in Mary River Catchment Study (Shultz et al, 2002)	ANZECC Default Trigger Value
pH	none	7.9	4.8-8.1	6.1 - 7.8	6.0-7.5
EC(2000)	µS/cm	106	25-596	12 - 342	20-250
NO3 Nitrogen	mg/L	<0.005	5-115	na	na
NH3 Nitrogen	mg/L	0.005	5-2,610	<0.01-0.02	na
Sulphate	mg/L	1.2	0.4-172	na	na
Turbidity	NTU	5	na	0.7 - 15.0	2 - 15
Aluminium	µg/L	*6.8	*10-**10,200**	<5-**260**	55
Arsenic	µg/L	1.05	0.4-7.7	<1-18	37
Cadmium	µg/L	<0.02	<0.02-0.16	<1-**3**	0.2
Cobalt	µg/L	0.1	0.04-45	<1-5.9	na
Chromium	µg/L	0.2	0.2-**1.6**	<1-<1	1
Copper	µg/L	1	0.78-**15**	<1-**12**	1.4
Iron	µg/L	60	80-4,150	44-1200	na
Magnesium	µg/L	9,200	300-35,500	460-17,000	-
Manganese	µg/L	11	0.68-870	3.8-390	1900
Molybdenum	µg/L	0.20	0.05-0.85	<1-15	na
Nickel	µg/L	1.77	<0.01-**50**	<1-**16**	11
Lead	µg/L	0.06	0.03-7	<1-<1	3.4
Selenium	µg/L	<0.2	<0.2-4.8	<1-<1	na
Uranium	µg/L	0.05	0.01-0.758	<1-1.3	na
Vanadium	µg/L	0.5	<0.01-**20**	<1-1.2	100
Zinc	µg/L	7	<0.05-**195**	<1-**200**	8

It can be seen from Table 27 that the water sourced from Helene 6/7 dewatering is of good quality. It is slightly alkaline with extremely low sulfate, so there are no acid drainage issues. **No substance exceeds ANZECC default trigger values for protection of aquatic ecosystems or the range observed in local natural waters or the Mary River Catchment.**

PER Appendix 4 Table 2: Geochemical Data - All Waters (changes marked *)

	ELEMENT	Al_F
	UNITS	**mg/L**
	DETECTION LIMIT	***0.005/0.01**
	METHOD	***W100I/W100M/ *W200M**
	ANZECC DRINKING WATER GUIDELINES	(0.2)
	ANZECC FRESH WATER TRIGGER VALUES	0.055 M
	ANZECC LIVESTOCK TRIGGER VALUES	5
	SHORT DESCRIPTION	
	Rainfall run-off Water	
F1 14/11/05	**Surface pond.** Pristine completely undisturbed area, early wet season surface run-off water.	10.20
F6 14/11/05	**Helene 4 Dam**. Drains Wildman Siltstone and (mainly) Mundogie Sandstone. Regional background.	0.02
F5 14/11/05	**Surface Pond.** Upstream from F4, early wet season run-off from non-mineralised (Iron) Wildman Siltstone.	0.08
F4 14/11/05	**Surface pond.** Helene Tailings Area, early wet season run-off from mineralised area.	0.04
	Stream Channel and Standing Waters - basically unmineralised	
M2 13/12/05	**Waterfall Gully, Helene Area**. Standing water in Waterfall Gully. Unmineralised Wildman Siltstone catchment.	1.3
M3 13/12/05	**Frances Creek**. Non mineralised catchment, drains Mundogie Fm. Greyish water.	0.5
M6 13/12/05	**Central Frances Creek**. Water hole in Frances Ck, no flow, but creek is flowing further upstream. Dominantly unmineralised.	0.6
M5 14/12/05	**Ochre Hill North**. Wide swamp across road, little flow but large water body. Unmineralised catchment area.	0.5
	Stream Channel and Standing Water - mineralised	
M7 14/12/05	**Jasmine**. Creek across road just before Jasmine. Diversion around mine disturbance. Some mineralised Wildman Siltstone catchment.	0.3
M8 14/12/05	**Southern Frances Creek**. Frances Creek, upstream of ford, red colour, flowing. Equal proportions mineralised and unmineralised catchment.	0.3
M4 13/12/05	**Tributary**. Mineralised catchment downstream of Helene 11 Dam. Drains old stockpiles. Flowing, slight greyish coloured water.	*0.01
	Open Pit Groundwater plus Rainwater.	
M1 13/12/05	**Stagnant Stockpile Pool**. Pool within old ore stockpile. Possibly largely rainwater. Bright red colour but may be reflecting soil colour.	0.3
F7 14/11/05	**Helene 4 Open Pit.** Standing water in mine pit within low grade mineralisation.	0.62
F2 14/11/05	**Jasmine 1 Open Pit.** Standing water in mine pit. Red-brown colour.	0.06

F3 14/11/05	**Thelma 2 Open Pit.** Clear standing water, dark grey Wildman Siltstone footwall. Blue colour recorded.	6.72
	Territory Iron Data - Dewatering 2005	
HELENE PIT 6/7 15/4/05	**Helene Pit 6/7.** Analysis undertaken during 2005 dewatering. Effectively totally Groundwater.	*0.01
DAM 11 20/04/05	**Helene 11 Dam.** Analysis undertaken during 2005 dewatering. Effectively totally Groundwater.	*0.015
DAM 9 21/04/05	**Helene 9 Dam.** Analysis unaffected by 2005 dewatering. Mainly rainwater run-off near surface + minor deep groundwater component.	*0.022

WATER QUALITY ANALYSIS PREFORMED BY NT ENVIRONMENTAL LABS FOR THE DEWATER OF THE HELENE 6/7 PIT, 2005 EXPLORATION PROGRAM

IDENT	Job number	Project code	pH	EC	Alkalinity	CO3	HCO3	OH	Turbidity	TSS	TDS	NO2_N	NO2	NO3_N	NO3	Cl
UNITS		DEWATER OF	units	µS/cm	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SCHEME			ALK1	ALK1	ALK1	ALK1	ALK1	ALK1	TURB	TSSTDS	TSSTDS	FIA_4	FIA_4	FIA_4	FIA_4	FIA_4
Sample Location																
HELENE PIT 6/7 15/4/05	EL04499	HELENE PIT	7.9	106	51	<1	51	<1	5	<10	60	<0.005	<0.02	<0.005	<0.02	4.9
DAM 11 20/04/05	EL04499	HELENE PIT	7.4	198	86	<1	86	<1	6	<10	120	<0.005	<0.02	<0.005	<0.02	6.2
DAM 9 21/04/05	EL04499	HELENE PIT	6.7	26	13	<1	13	<1	3	<10	40	<0.005	<0.02	<0.005	<0.02	1.6
ANZECC (1992) GUIDELINE AQUATIC ECOSTYTEM			6.5-9.0	<1500												

PO4_P	NH3_N	F	Hardness	Ca_F	K_F	Mg_F	Na_F	SO4_F	SiO2	Ag_T	Al_T	As_T	Au_T	B_T	Ba_T	Be_T	Bi_T	Br_T
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIA_4	FIA	FISE1	TH1	W108I	W108I	W108I	W108I	W108I	W108I	W200M	W200M	W200M	W200M	W200M	W200M	W200M	W200M	W200M
0.01	0.005	0.4	40.5	1.1	2.5	9.2	7.5	1.2	8	<0.05	6.8	1.05	<0.01	19	11.6	<0.05	<0.05	9
0.01	0.015	0.2	79.1	10.2	1.6	13	15.6	12.6	9	<0.05	15.4	3.35	<0.01	15	13	<0.05	<0.05	45
0.005	0.005	<0.1	6.5	0.9	1	1	2.6	0.4	9.2	<0.05	21.8	1.75	<0.01	14.5	10.6	<0.05	<0.05	16

50

Ca_T µg/L W200M	Cd_T µg/L W200M	Ce_T µg/L W200M	Co_T µg/L W200M	Cr_T µg/L W200M	Cs_T µg/L W200M	Cu_T µg/L W200M	Dy_T µg/L W200M	Er_T µg/L W200M	Eu_T µg/L W200M	Fe_T µg/L W200M	Ga_T µg/L W200M	Gd_T µg/L W200M	Ge_T µg/L W200M	Hf_T µg/L W200M	Hg_T µg/L W200M	Ho_T µg/L W200M	I_T µg/L W200M	La_T µg/L W200M
970	<0.02	0.01	0.11	0.2	0.01	0.92	<0.01	<0.01	<0.01	60	<0.01	<0.01	<0.1	<0.01	<0.02	<0.01	10	<0.01
9360	<0.02	0.08	0.13	0.3	<0.01	0.78	<0.01	<0.01	<0.01	440	0.01	<0.01	<0.1	<0.01	<0.02	<0.01	25	0.04
800	<0.02	0.09	0.16	0.2	<0.01	0.86	<0.01	<0.01	<0.01	300	0.02	<0.01	<0.1	<0.01	<0.02	<0.01	<5	0.05
	0.2-2.0					2.0-5.0												

Li_T µg/L W200M	Lu_T µg/L W200M	Mg_T µg/L W200M	Mn_T µg/L W200M	Mo_T µg/L W200M	Nb_T µg/L W200M	Nd_T µg/L W200M	Ni_T µg/L W200M	Os_T µg/L W200M	Pb_T µg/L W200M	Pd_T µg/L W200M	Pr_T µg/L W200M	Pt_T µg/L W200M	Rb_T µg/L W200M	Re_T µg/L W200M	Sb_T µg/L W200M	Sc_T µg/L W200M	Se_T µg/L W200M	Sm_T µg/L W200M
17	<0.01	8070	11.4	0.2	<0.02	<0.01	1.77	<0.1	0.06	<0.05	<0.01	<0.01	2.49	<0.05	<0.05	1.5	<0.2	<0.01
1.8	<0.01	11800	69.2	0.15	<0.02	0.03	1.32	<0.1	0.19	<0.05	<0.01	<0.01	3.04	<0.05	<0.05	1.5	0.2	<0.01
0.2	<0.01	980	31.1	0.1	<0.02	0.04	0.36	<0.1	0.05	<0.05	<0.01	<0.01	3.05	<0.05	<0.05	1.5	<0.2	<0.01

1.0-5.0

Sn_T µg/L W200M	Sr_T µg/L W200M	Ta_T µg/L W200M	Tb_T µg/L W200M	Te_T µg/L W200M	Th_T µg/L W200M	Ti_T µg/L W200M	Tl_T µg/L W200M	Tm_T µg/L W200M	U_T µg/L W200M	V_T µg/L W200M	W_T µg/L W200M	Y_T µg/L W200M	Yb_T µg/L W200M	Zn_T µg/L W200M	Zr_T µg/L W200M
<0.1	5.18	<0.05	<0.01	<0.1	<0.01	<2	<0.01	<0.01	0.045	0.5	<0.05	0.01	<0.01	7	<0.05
<0.1	30.1	<0.05	<0.01	<0.1	<0.01	<2	<0.01	<0.01	0.063	0.2	<0.05	0.02	<0.01	10	<0.05
<0.1	5.78	<0.05	<0.01	<0.1	0.01	<2	<0.01	<0.01	0.01	0.2	<0.05	0.02	<0.01	1	<0.05
														5.0-50.0	

NTEL Results for TI November 2005 Water Sampling

IDENT	Job number	Project code	EC	pH	HCO3	TDS	NO3_N	Cl	NH3_N	F	Al_F	As_F	B_F	Ba_F	Be_F	Bi_F
UNITS			µS/cm	units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	µg/L
SCHEME			ALK1	ALK1	ALK1	TSSTDS	FIA_4	FIA_4	FIA	FISE1	W100I	W100M	W100I	W100I	W100M	W100M
F1 14/11/05	EL05177	FRANCES CREEK IRON ORE	45	6.6	10	110	<0.005	2.4	1.05	0.1	10.2	1.35	0.07	0.075	0.2	<0.05
F2 14/11/05	EL05177	FRANCES CREEK IRON ORE	40	6.9	9	30	<0.005	3.3	0.06	<0.1	0.06	1.55	0.07	0.01	<0.05	<0.05
F3 14/11/05	EL05177	FRANCES CREEK IRON ORE	279	3.5	--	100	0.035	3	0.035	0.4	6.72	0.4	0.06	0.045	1.65	<0.05
F4 14/11/05	EL05177	FRANCES CREEK IRON ORE	121	7.2	30	80	<0.005	5.5	0.345	0.2	0.04	2.4	0.07	0.035	<0.05	<0.05
F5 14/11/05	EL05177	FRANCES CREEK IRON ORE	306	4.8	<1	160	0.02	17.3	2.61	0.1	0.08	2.45	0.09	0.09	0.35	<0.05
F6 14/11/05	EL05177	FRANCES CREEK IRON ORE	34	6.6	8	40	0.07	5.6	0.2	<0.1	0.02	4.25	0.08	0.015	<0.05	<0.05
F7 14/11/05	EL05177	FRANCES CREEK IRON ORE	43	7.4	16	20	0.005	2.5	0.37	0.1	0.62	2.4	0.07	0.02	<0.05	<0.05

Ca_F	Cd_F	Co_F	Cr_F	Cu_F	Fe_F	K_F	Li_F	Mg_F	Mn_F	Mo_F	Na_F	Ni_F	P_F	Pb_F	S_F	Sb_F	Se_F	Si_F
mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	mg/L
W100I	W100M	W100I	W100I	W100I	W100I	W100I	W100M	W100I	W100I	W100M	W100I	W100I	W100I	W100M	W100I	W100M	W100M	W100I
1.3	0.08	0.005	<0.02	0.015	4.15	5.5	2.15	1.2	0.11	0.25	2.7	<0.01	<0.1	7	0.5	0.1	0.4	14.7
0.9	0.1	<0.005	<0.02	0.005	0.2	1.8	2.05	1	0.015	0.05	3.6	<0.01	<0.1	0.2	1.24	0.2	<0.2	10.6
1.1	0.16	0.045	<0.02	0.035	0.35	4.1	9	2.2	0.51	<0.05	3.9	0.11	<0.1	0.33	25	<0.05	0.4	14.2
4	0.06	<0.005	<0.02	<0.005	0.8	3.2	8.45	7.3	0.05	0.5	6.7	<0.01	<0.1	0.53	6	0.2	0.4	6.1
7.3	0.12	0.045	<0.02	<0.005	1.8	7.6	3.65	12.9	0.87	0.05	19.9	0.05	<0.1	0.22	34.8	<0.05	0.2	7
0.7	<0.02	<0.005	<0.02	<0.005	0.5	1.3	0.25	0.5	0.035	0.1	4.5	<0.01	<0.1	0.29	0.22	0.15	0.2	3.7
0.5	0.02	<0.005	<0.02	<0.005	0.5	1.4	2.4	2.9	0.04	0.15	3	<0.01	<0.1	0.21	0.06	0.15	<0.2	5.7

Sr_F	Tl_F	U_F	V_F	Zn_F
mg/L	µg/L	µg/L	mg/L	mg/L
W100I	W100M	W100M	W100I	W100I
0.005	0.09	0.758	0.02	0.03
<0.005	0.01	0.03	<0.01	0.01
0.01	0.47	3.11	<0.01	0.11
0.015	0.02	0.17	<0.01	0.03
0.055	0.02	0.03	<0.01	0.195
0.005	0.02	0.047	<0.01	<0.005
<0.005	0.01	0.133	<0.01	0.015

NTEL Water Quality Analysis Results for Territory Iron Water Samples December 2005

IDENT	Job number	Project code	pH	EC	Alkalinity	CO3	HCO3	OH	Turbidity	TSS	TDS	NO2_N	NO2	NO3_N	NO3	Cl
UNITS			units	µS/cm	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SCHEME			ALK1	ALK1	ALK1	ALK1	ALK1	ALK1	TURB	TSSTDS	TSSTDS	FIA_4	FIA_4	FIA_4	FIA_4	FIA_4
M1 STOCKPILE 131205	EL05306	M1- M8	5.9	17	7	<1	7	<1	150	210	60	<0.005	<0.02	0.29	1.28	1
M2 WATERFALL 131205	EL05306	M1- M8	5.7	25	7	<1	7	<1	45	10	40	<0.005	<0.02	0.005	0.02	3.7
M3 UPSTREAM 131205	EL05306	M1- M8	6	36	9	<1	9	<1	15	10	20	<0.005	<0.02	0.115	0.5	6.1
M4 MINERALISED 1312	EL05306	M1- M8	7.5	596	120	<1	120	<1	4	<10	360	0.01	0.04	0.075	0.34	13.4
M5 SWAMP 141205	EL05306	M1- M8	6.1	45	19	<1	19	<1	5	20	40	<0.005	<0.02	<0.005	<0.02	2.4
M6 FCKDS 141205	EL05306	M1- M8	6.9	36	23	<1	23	<1	20	20	30	<0.005	<0.02	0.025	0.1	1.1
M7 JASMINE CK 141205	EL05306	M1- M8	6.4	50	19	<1	19	<1	15	<10	30	<0.005	<0.02	0.06	0.28	3.9
M8 FDKMID 141205	EL05306	M1- M8	6.9	132	37	<1	37	<1	20	<10	80	<0.005	<0.02	0.1	0.44	3.7

PO4_P	NH3_N	F	Hardness	Ca_F	K_F	Mg_F	Na_F	SO4_F	SiO2	Al_F	Al_F	As_F	B_F	Ba_F	Be_F	Bi_F	Cd_F	Co_F
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
FIA_4	FIA	FISE1	TH1	W108I	W108I	W108I	W108I	W108I	W108I	W100M	W100I	W100M	W100M	W100M	W100M	W100M	W100M	W100M
0.085	0.075	<0.1	0.5	<0.1	3.9	<0.1	1.2	0.9	1.2	262	--	1.55	9.5	4.06	<0.05	<0.05	<0.02	0.49
0.01	0.115	<0.1	1.4	0.1	2.8	0.3	3	0.4	9.6	>LWR	1.3	7.7	23.5	9.18	<0.05	<0.05	<0.02	0.15
<0.005	0.05	<0.1	4.4	0.3	2.3	0.9	3.8	1.4	6	521	--	1.5	19	9.14	<0.05	<0.05	<0.02	0.14
<0.005	0.035	0.2	240	37.6	3.5	35.5	30.6	172	8.8	97.3	--	1.6	17.5	84	<0.05	<0.05	<0.02	0.17
0.025	0.185	<0.1	5.1	0.8	10.1	0.8	1.3	0.8	4	463	--	0.5	35	14.6	<0.05	<0.05	<0.02	1.15
<0.005	0.145	<0.1	11.2	2.3	3.4	1.4	0.9	1.4	0.8	550	--	1.35	16	10.6	<0.05	<0.05	<0.02	0.35
<0.005	0.03	<0.1	13.3	1.7	1.2	2.2	3.3	4.9	9	275	--	0.4	18	15.8	<0.05	<0.05	<0.02	0.04
0.005	0.05	<0.1	45.2	7	1.9	6.8	7.1	20.2	7	340	--	1.2	15.5	18.4	<0.05	<0.05	<0.02	0.12

Cr_F µg/L W100M	Cu_F µg/L W100M	Fe_F µg/L W100M	Li_F µg/L W100M	Mn_F µg/L W100M	Mo_F µg/L W100M	Ni_F µg/L W100M	Pb_F µg/L W100M	Sb_F µg/L W100M	Se_F µg/L W100M	Sr_F µg/L W100M	Th_F µg/L W100M	Tl_F µg/L W100M	U_F µg/L W100M	V_F µg/L W100M	Zn_F µg/L W100M
0.4	2.47	520	1.15	18.2	0.25	4.06	0.3	0.05	<0.2	3.55	0.06	0.02	0.248	0.5	5.8
1.6	3.05	620	0.35	3.74	0.25	1.11	0.96	0.1	0.2	2.32	0.28	<0.01	0.133	1.8	4
0.5	1.63	340	0.5	7.38	0.1	0.49	0.52	<0.05	<0.2	4.08	0.1	<0.01	0.059	0.6	2.2
0.2	2.37	80	0.85	2.33	0.85	1.48	0.03	<0.05	4.8	99.8	0.02	<0.01	0.659	0.4	0.2
0.9	4.18	400	0.65	291	0.3	2.17	0.32	<0.05	<0.2	5.24	0.12	0.03	0.112	1.7	5.3
0.7	2.57	600	0.45	26.8	0.25	1.76	0.35	<0.05	<0.2	8.39	0.08	<0.01	0.085	1	2.3
0.2	0.82	200	0.4	0.68	0.1	0.61	0.2	<0.05	<0.2	12.6	0.06	<0.01	0.066	0.5	1.4
0.5	1.35	260	0.65	3.81	0.25	1.44	0.09	<0.05	0.8	21.5	0.05	<0.01	0.074	0.7	1.8

APPENDIX 4
PER Table 28 (Land Clearing Requirements)

Table 28: Land Clearing Requirements

Name	Total Area (ha)	Total Area Previously Disturbed (ha)	Total Area Previously Undisturbed (ha)	Area Previously Undisturbed (ha)				Area Previously Disturbed (ha)				
				Ridge Crests and Slopes	Low Hills	Small Alluvial Flats	Riparian	Ridge Crests and Slopes	Low Hills	Small Alluvial Flats	Riparian	Low Undulating Plains
Plant, Magazine & Offices	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.60	0.40	0.00	0.00	0.00
Pits	38.50	19.00	19.50	15.50	4.00	0.00	0.00	17.00	2.00	0.00	0.00	0.00
Waste Rock Stockpiles	91.50	32.50	59.00	30.00	27.50	1.00	0.50[1]	17.00	10.50	0.00	5.50[2]	0.00
Product Stockpiles	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
ROM Stockpile	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Hardstand for Stockpiles & Plant	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
Workshops, Fuel Store & Wash down Bay	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
Roads	23.50	12.50	11.00	0.50	5.00	5.50	0.00	1.00	11.00	0.50	0.00	0.00
Haul Road to Railway Siding & Intersection Improvements	11.00	8.50	2.50	0.00	2.00	0.50	0.00	0.00	3.00	1.50	0.00	4.00
Railway Siding and Stockpile	2.00	0.00	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	172.00	78.00	94.00	46.00	40.50	7.00	0.50	35.60	30.90	2.00	5.50	4.00

[1] Estimate only as the width of riparian vegetation along creek lines varies considerably. This clearing estimate is based on a vegetation width of seven metres.

[2] Estimated area of the swamp created by the old tailings storage facility.

APPENDIX 5

Corrected PER Table 24 (Potential Pest Mosquitoes of the Frances Creek Project)

Table 24: Potential Pest Mosquitoes of the Frances Creek Project

Species	Nuisance Status	Potential Vectors	Peak Abundance
Anopheles annulipes s.l	+	Malaria	November - April
Anopheles bancroftii Black Malaria Mosquito	+++	Malaria	February – July
Coquillettidia xanthogaster The Golden Mosquito	+++	None known	March - August
Culex annulirostris Common Banded Mosquito	+++++	Murray Valley Encephalitis Virus Kunjin Virus Japanese Encephalitis Virus Ross River Virus Barmah Forest Virus	January - August
Culex palpalis Freshwater Banded Mosquito	+++	Murray Valley Encephalitis Virus Kunjin Virus Japanese Encephalitis Virus Ross River Virus Barmah Forest Virus	January - August
Ochlerotatus normanensis Floodwater Mosquito	+++++	Ross River Virus Barmah Forest Virus	January - April
Ochlerotatus vigilax Salt Marsh Mosquito	+++++	Ross River Virus Barmah Forest Virus	September - January