PART C

GUIDELINES

GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

TERRA GOLD MINING LTD
MAUD CREEK GOLD PROJECT

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These guidelines have been developed to assist Terra Gold Mining Ltd (Terra Gold) in preparing an Environmental Impact Statement (EIS) for the proposed Maud Creek Gold Project in accordance with Clause 8 of the Administrative Procedures of the *Environmental Assessment Act* of the Northern Territory.

Administrative Procedures of the *Environmental Assessment Act* of the Northern Territory state that the Minister will specify the following in the guidelines:

- Matters relating to the environment which the proponent shall deal with;
- Number of copies of the report to be provided to Minister/other agencies; and
- Newspapers in which and on occasions when the proponent will publish a notice.

The EIS should demonstrate that the proponent has identified all risks associated with the issues raised, undertaken comprehensive assessment of those risks (including quantification where practicable) and identified effective controls for significant risks. Residual risks should also be identified. All aspects of the risk assessment should be accompanied by statements about levels of uncertainty. Steps to reduce uncertainty or precautions taken to compensate for uncertainty should also be identified and their effect demonstrated.

Information provided should permit the reader to understand the likelihood of the risk, its potential severity, and any uncertainty about the effectiveness of controls. If levels of uncertainty do not permit robust quantification of risk, then this should be clearly acknowledged.

Information should be presented in a concise format, using maps, overlays, tables and diagrams where appropriate to clarify the text.

The EIS should include the following sections, but need not be limited to these sections or inferred structure.

1 EXECUTIVE SUMMARY

The Executive Summary should include a brief outline of the project and each chapter of the EIS, allowing the reader to obtain a clear understanding of the nature and scope of the proposed project, the environmental risks associated with it and proposals for management of those risks to avoid or minimise impacts on the environment.

The Executive Summary should be written as a stand-alone document, able to be reproduced on request by interested parties who may not wish to read or purchase the EIS as a whole.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

This section should describe the development proposal to allow a detailed understanding of infrastructure design and engineering and all stages of construction, operation and management of the project and include relevant plans, photos and maps. Aspects to be covered include:

- An explanation of the objectives, benefits and justification for the project. The purpose of this is to place the proposal in the local and regional context;
- A description of the project's location indicating distance from Katherine, and the project in relation to the Stuart Highway and the Adelaide to Darwin Railway. Also indicating location in relation to Gold Creek, Maud Creek and the Katherine River;
- A discussion on existing infrastructure and components from past mining practices, including waste rock dumps and tailings facilities. Include discussion on condition of components and treatments required to maintain stability of prior acid rock encapsulation;
- An overall layout of the proposed mine site including pits, waste rock dumps, power generation, other infrastructure, waterways, access and existing features of interest;
- Comprehensive maps showing topography and all project components and land tenure;
- Project schedule;
- Location and design criteria for each component of the project including design limitations imposed by site characteristics;
- Land requirements, land tenure, acquisition requirements (permits, rezoning and Native Title), and the tenures under which the project would be held including details of relevant legislative processes required to grant proposed tenure;
- Infrastructure requirements and specifications (permanent and temporary) and ancillary activities (e.g. storage areas, waste dump areas etc);
- Employment and business opportunities (direct and indirect), including sources of workforce, skill levels required and opportunities for local people and businesses; and
- Methods for storage, handling, containment and emergency management of chemicals and other hazardous substances (including fuel and explosives).

Construction should be consistent with NT Health and Community Services Requirements for Mining, Construction and Bush Camps (Environmental Health Information Bulletin No. 6) (Appendix A).

For the development and operation of the mine the proposal description should consider, as a minimum, the following:

2.1 Site Preparation

- Outline the construction timing, methods, equipment and materials (types, sources and quantities);
- Describe water requirements, usage, source, storage, treatment and disposal. Information is to be provided on how much water is required and how this water is to be sourced; and
- Describe on-site and off-site borrow material requirements, extraction methods and uses.

2.2 Mine

- Current ore reserves and mine life;
- Outline design of pits and their dimensions (including maps, plans and geological cross-sections);
- Describe mining methods, scale of operations and timetable for ore extraction operations and identify the associated risks;
- Detail drilling and blasting requirements (including frequency) and identify the associated risks; and
- Outline possible future extensions to the mine operation, and discuss the probability of mining satellite ore bodies.

2.3 Waste Rock Management

- Identify total amount of waste rock to be produced;
- Characterise waste rock in terms of AGP (acid generation potential) and neutralising capacity from drill core samples and in-situ assessments (kinetic tests and field trials); include sample selection methodology; and
- Outline proposed waste dump locations, dimensions, water catchments, surface treatment and final landform (discuss alternatives) and identify associated risks and risk treatments.

Please note that Waste Rock Management is dealt with in greater detail in Section 5.2

2.4 Ore Processing and Tailings Management

While it is noted that processing of ore is to occur at Unions Reef Gold Mine, the treatment of the ore, waste products, and processing risks should be comprehensively dealt within this EIS.

- Describe capacity of the ore processing facility to treat the ore and safely dispose of the tailings produced;
- Indicate all input products (solids, gases and liquids) and pathways for each item in the process;
- Indicate all output products (solids, gases and liquids) and pathways for each item in the process;
- Describe proposed tailings disposal;
- Detail any proposed stockpiling of ore on site and associated management; and

- Provide an overview of the proposed new processing circuit at Unions Reef including the expected major environmental impacts and likely management

2.5 Rehabilitation and Decommissioning

The rehabilitation program should be integrated into the mine plan and considered as part of the mining operation, rather than as a separate phase at the end of the mine life.

The project description should consider, as a minimum, the following:

- Identification and analysis of risks of a post mining land use and rehabilitation objectives;
- Rehabilitation commitments and timetables (for both temporary and permanent facilities) including waste management, pollution control and stabilisation and rehabilitation plans for mined areas;
- Analysis of risks associated with the feasibility of backfilling of pits with waste rock; and
- In detail describe and analyse risks for the following:
  - progressive and final rehabilitation plans for pits, waste rock dumps, ROM pad, roads and infrastructure sites;
  - design of rehabilitated landforms, in particular rehabilitation techniques, including methods to reconstruct the landscape using the materials available;
  - profile reconstruction and viability for the growth of native species;
  - collection and selection strategy for native species, e.g. native grasses and other vegetation;
  - runoff and erosion control measures of rehabilitated areas;
  - final topographic and drainage morphology;
  - maintenance of water quality; and
  - revegetation procedures.

2.6 Exploration and Future Development

- Outline briefly the potential for additional mining developments in this area, beyond the scope of this proposal; and
- Outline the impacts of any continuing exploration activities within the mining tenements – in particular, the potential risks to groundwater and surface water.

3 ALTERNATIVES

Alternative proposals, which may still allow the objectives of the project to be met, should be discussed, detailing reasons for the selection and rejection of particular options. The selection criteria should be discussed, and the advantages and disadvantages of preferred options and alternatives detailed. The short, medium and long-term potential beneficial and adverse impacts of

each of the options should be considered and associated risks should be detailed and analysed. The potential impacts of the alternatives should be described.

Alternatives to be discussed should include:

- Not proceeding with the project;
- Alternative locations, including process plant;
- Alternative sources of raw materials for the project, including water supply;
- Alternative transport corridors and options such as transport of ore to Unions Reef by train;
- Alternative extraction and processing technologies;
- Alternative environmental management technologies considered, such as treatment and disposal of byproducts and waste products;
- Alternative decommissioning options – analysis should include reference to industry 'best practice' guidelines, including exploration of the option of backfilling the pit with waste rock;
- Alternative workforce accommodation;
- Alternatives to the proposed waste rock dump which is currently partly within the probably maximum flood level inundation boundary; and
- Alternative to Gold Creek channel diversion.

4 HAZARDS AND RISKS TO HUMANS AND FACILITIES

The EIS should include a risk assessment of the risks to people, the environment and nearby facilities associated with the construction, operation and maintenance of the various components of the proposal, and the storage and transport of materials to and from the complex. The aim of this section is to demonstrate that:

- The proponent is fully aware of the risks to human health and safety associated with all aspects of the development;
- The prevention and mitigation of risks to human health and safety are properly addressed in the design specifications for the facility; and
- The risks can and will be managed effectively during the construction, commissioning, operation and decommissioning of the development.

Sufficient quantitative analysis should be provided to indicate whether risks are likely to be acceptable compared with similar ventures in Australia and overseas. Assumptions used in the analyses should be explained. Relevant standards, codes and best practice that minimise risks should be discussed.

The risk assessment should as a minimum, address:

- Potential impacts associated with the siting of the project in the catchment of the Katherine water supply;
- Perceptions of risk to the surrounding community regarding the project;

- The effect of unusual and extreme weather conditions on vulnerable components of the complex, including extreme rainfall and flooding;
- Emergency plans for an alternative water supply for the town of Katherine, should contamination prevention measures fail;
- Development of emergency plans, response procedures and staff responsibilities in the event of an emergency or accident, including floods, bushfires lightning strikes and mine collapse;
- Emergency evacuation procedures and requirements, including nearby residents or the public;
- Potential impacts from an incident on health and safety;
- Consequences of possible incidents;
- Responsibilities and liability in the event of an incident or accident;
- Design, construction, operational, and decommissioning requirements of the project to satisfy relevant codes, standards and legislation;
- Potential accidents associated with the construction, operation, maintenance and decommissioning of the various components of the proposal, including storage and transport of materials to and from the complex; and
- Risk treatments should include contingency plans for dealing with spillage of hazardous materials.

The hazard and risk analysis will identify the critical areas that need to be addressed in management plans, monitoring programs, contingency and emergency plans.

5 EXISTING ENVIRONMENT, POTENTIAL IMPACTS OF THE PROJECT AND MANAGEMENT

Studies to describe the existing environment should be of a scope and standard sufficient to serve as a benchmark against which the impacts of the project may be assessed over an extended period. Control areas not impacted by the project should be included in studies and long term monitoring locations established.

This section should also include an assessment of the level of significance of the impact, be it global, regional or local (e.g. global and national implications of greenhouse gases and the localised impact of service roads or artificial water bodies).

Cumulative impacts should also be discussed. The reliability and validity of forecasts and predictions, confidence limits and margins of error should be indicated as appropriate.

Description of those areas potentially impacted by the project should, as a minimum, should include:

5.1 Hydrology / Hydrogeology and Water Management

As highlighted in Part B of the Guidelines, water management issues are of high priority in the environmental assessment of this project as the impacts of water management could result in unacceptable risks to Katherine's town drinking water supply and to the Declared Beneficial Uses of Maud Creek and Katherine River. The detail and level of information and plans provided in the EIS should reflect this priority.

Baseline

- Describe the site and regional surface water systems including:
  - rivers;
  - creeks; and
  - streamlines.
- Describe the site and regional ground water systems including:
  - confined aquifers;
  - unconfined aquifers; and
  - ground soaks, expressions etc.
- For both ground water and surface water systems, discuss:
  - their significance;
  - current uses;
  - beneficial uses;
  - flows (including flood contours) and discharge rates;
  - water quality;
  - release or seepage of heavy metals;
  - characterisation of all water sources (both surface and groundwater);
  - detail the site water requirements and identify sources; and
  - provide a site water balance (all inputs and outputs) for the expected mine life, including rehabilitation.
- Thorough detail is needed on the quality and characteristics of the existing pit water, including:
  - an evaluation of the current pit water quality and how the proposed irrigation regime (including application rates and method of delivery – planned seasonally) will be managed with respect to potential environmental impacts including any preparation of the surface which is to receive the water;
  - will the planned regime have significant impact on associated surface and ground water quality? Support this with technical assessment;
  - will the irrigation regime induce out of season flows in the downstream water courses and what will be the impact to the receiving body?
  - assess and discuss the potential for attenuation of solutes in the irrigation areas. Will these areas require significant rehabilitation at the end of mine life (e.g. scraping and removal of soils etc)?
  - given that the hydrology of the area will likely change significantly as it passes from operation to non-operation phases, how will the vegetation and ecology of the site be managed through rehabilitation? Include requirements for vegetation surveys, weed management, monitoring and rehabilitation requirements;

  - the Operator needs to demonstrate an understanding of the potential contributions of the mine site and its impact on the downstream receiving waters; and
  - indicate the monitoring regime that would be associated with the management of the area (this may include surface and ground water monitoring, soil sample etc.).
- Detail the results of further hydrogeological investigations that confirm dewatering rates and groundwater drawdown;
- Characterise the local aquifer (will need to be updated from 1998); and
- Estimate the demand for potable and raw water for the operational period and discuss this in relation to the resource capacity and current use.

An analysis of previous monitoring data from the former oxide mine is required. This should include past monitoring data from:

- the dewatering bores;
- water quality in the pit void; and
- flows into Gold Creek - specifically addressing the observed seepage into Gold Creek from the existing pit.
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The analysis should look at the impacts of the oxide mine and propose measures to improve management if needed.

Impacts

Describe and assess the risks of how the project will or has the potential to impact on each element with particular consideration given to the following:

- Impacts on surface and groundwater from mining, ancillary activities and associated infrastructure requirements, including impacts on:
  - water quality;
  - changes to/ diversion of surface waters; and
  - aquatic flora and fauna.
- Impacts associated with dewatering of the pits (including water disposal);
- Potential of any contaminated groundwater or irrigation water to reach Maud Creek and Katherine River;
- Possible acidification of groundwater due to aerial exposure in the pit void;
- Possible chemical constituents in drainage, specifying test methods (provide all test information);
- Current downstream surface and groundwater uses and users and their requirements;
- Identify the risks from, and proposed management of clean, dirty and contaminated water;
- Identify the risks from potential acid drainage and contaminated waters. Assess this risk of management options, with the purpose of determining that the preferred option is justified;
- Identify the risks from, and proposed management of the diversion of Gold Creek and any other surface waters;

- Identify the risks from, and proposed management of dewatering of the pit, including expected water quantities and qualities;
- Identify the risks from, and proposed management of high and extreme rainfall events. Flood modelling from 1998 Draft EIS (Dames and Moore) should be updated to reflect the extensive hydrological modelling carried out in the Katherine region since that time;
- Identify any water management issues that will occur with the water management zone of the Katherine Local Area Plan (NT Planning Scheme);
- Specific impacts to be addressed in reference to risks to the quality of Katherine's town water drinking supply include:
  - increased water turbidity;
  - discharge of contaminants to the surrounding environment; and
  - long term leaching of contaminants from the tailings dam, waste rock dump and pit void.
- Detailed information is required on the proposed diversion of Gold Creek and the flood management plans for the site; and
- Outline the potential impacts of the open pit on the quality of surface water and groundwater after the operational life of the mine.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Treatment, storage and disposal of waste water, including stormwater run off;
- Management of clean, dirty and contaminated water;
- Management of high rainfall events;
- Protection of beds and banks of watercourses;
- Means of interception and management of potential acid mine drainage;
- Management of pit water including disposal of existing pit water;
- Need for a waste discharge licence;
- Protection of surface water from potential contamination;
- Protection of groundwater from potential pollution sources;
- Proposed monitoring of surface and ground waters;
- Continued water monitoring and discharge requirements following decommissioning;
- Ongoing water requirements for the maintenance of water management structures;
- Thorough details for use of irrigation water – including proposed location, scale, sustainability and management of any use of irrigation waters, also preparation of receiving area e.g. land clearing and associated impacts;
- Ensure that any actions that take place outside of the mining lease that are within the water management zone, comply with the requirements of the Katherine Local Area Plan (the NT Planning Scheme), the Planning Act and the Water Act; and

- Outline a plan for communicating with Power and Water Corporation on water management issues relating to the water quality in the Katherine River (Donkey Camp).

Include a map of water management system showing all structures and routes. Details of surface water sampling points and groundwater investigation bores should also be included.

Water management for this development, should take into consideration the requirements of the surrounding water management zone, as determined under the NT Planning Scheme and Planning Act. The water management zone was established to prevent risks to the Katherine town water supply. While the mining lease area is exempt from this regulatory instrument, it should still seek to comply with the standards as much as possible, given its placement in the catchment.

A high priority on water management should be reflected in the comprehensiveness of management and monitoring strategies.

In particular the following management actions should be carefully considered:

- Plans should reflect a target of no contamination 'zero discharge' leaving the mine site, given the close proximity to the source of Katherine's town water supply; and
- A monitoring program for both ground and surface water to include:
  - Determination of flows in Maud Creek;
  - Total loads of contaminants in Maud Creek (not just concentrations);
  - Upstream and downstream monitoring to clearly identify mine impact; and
  - Annual independent audits.

5.2 Waste Rock and Tailings Management

Please note the information below is in addition to that provided in section 2. This information applies to both the Maud Creek and Unions Reef site.

Baseline

- Identify total amount of waste rock to be produced;
- Characterise waste rock in terms of AGP (acid generation potential) and neutralising capacity from drill core samples and in-situ assessments (kinetic tests and field trials); include sample selection methodology;
- Identify classes and amounts of waste rock for handling purposes;
- Characterise the tailings, including mineralogy, base metal content, neutralising capacity, sulfide content and net acid production potential;
- Describe tailings disposal and impoundment principles, surface configurations, wall designs and construction, estimated flood heights

and provisions for extreme rainfall events, erosion protection, spillway design and location, subdrainage and collection sumps; and
- Provide details on the linings proposed for all facilities on site such including ore stockpile, waste rock dump, waste dump settlement pond, tailings disposal and return water dam.

Analysis of previous data from the former oxide mine on waste rock characterisations should also be presented.

Impacts

- Assessment of the existing dump acid generating potential and the levels of potential contaminants such as (but not limited to) Arsenic and Antimony;
- Thorough analysis of waste rock and tailings to better understand the potential for:
  - acid rock drainage;
  - metals mobilisation; and
  - surface water and groundwater contamination.
- A thorough study of the base of the tailings storage facility, with particular focus on permeability qualities and potential impacts on the surrounding environment from leakage;
- Detail options for processing the ore and identify the risks these activities present;
- Detail the nature, toxicity and management of reagents to be used during on-site processing; and
- Groundwater modelling to include potential interaction with all waste and tailings storage facilities.

Management

- Outline proposed waste dump locations, dimensions, water catchments, surface treatment and final landform (discuss alternatives) and identify associated risks and risk treatments;
- Describe in detail the methods for waste rock disposal and dump construction; including strategic positioning of different waste rock types and identify associated risks and risk treatments;
- Describe means of interception and management of potential acid mine drainage and identify associated risks and risk treatments;
- Detection and remediation plans for tailings or waste rock dump seepage;
- Detail on tailing storage facility cover construction;
- Describe plans and actions relating to waste rock and tailings storage to manage risks associated with high rainfall and flood events;
- Describe and justify design selected for both the waste rock dump and the tailings storage facility with emphasis on the prevention rather than treatment of impact;

- Review the effectiveness of the impoundment methods and an evaluation of the risk of failure and management strategies should failure occur; and
- Include future monitoring time lines.

5.3 Socio-Economic

Baseline

- Describe the socio-economic characteristics of the region (including a prediction of trends over the expected operational life of the project); and
- Describe the range of services, facilities and infrastructure existing in the area.

Impacts

- Briefly outline the social and economic risks and opportunities relating to the projected direct employment, “downstream” employment effects, impact of transport external to the site and demand on current service infrastructure;
- Discuss risks associated with competing uses; and
- Describe risks to neighbouring land-holders and others using adjacent land.

Outline the overall economic benefits of the proposed project, the likely contribution of the project to the development of mining industry, regional economic development and Indigenous economic development in the Northern Territory, employment and skills development outcomes and linkages with other Territory business and sectors, including suppliers and other service providers.

The EIS should specify:

- Estimated value of construction, highlighting the proportion to be spent in the Northern Territory;
- Estimate the value of annual expenditure on regional goods and services;
- Estimate the quantity and value of production/exports;
- Anticipated markets for products;
- An estimate of royalties and taxes to be paid to the Northern Territory Government and Traditional Owners;
- Opportunities for local industry and Indigenous workforce participation in the construction and operation of the facility;
- A breakdown of skills/trades required, including specific opportunities for skills development that may be of benefit to the local community, past the lifetime of the mine;
- Identification of opportunities for facilities and infrastructure development that may be of benefit to the local community, past the lifetime of the mine;
- Identification of negative impacts or potential synergies with existing land uses; and

- A description of anticipated socio-economic impacts upon local residents, communities and towns including impact of transport through town.

Management

- Detail how potential local business and employment opportunities and opportunities for synergistic facilities and infrastructure development will be identified;
- Specify the mechanisms that will be utilised to inform local business community and workers of business and employment opportunities;
- Detail the socio-economic indications that will be monitored on an ongoing basis; and
- Detail traffic impact management and discuss/justify alternative route development.

5.4 Landform and Erosion Control

Baseline

- Provide maps and an interpretation of the regional geology and geomorphology of the site and peripheral areas;
- Discuss the soil types and land units of the site and peripheral areas;
- Provide seismic information for the site and peripheral areas;
- Detail the existing level of soil erosion and other disturbances;
- Specific information required for the protection levee includes:
    - A plan map of the proposed levee wall location including a catchment map of the area and the proposed surface area to be cleared;
    - Engineered plans for the levee wall including geotechnical assessment and material characteristics;
    - An identified source location for the material required to construct the levee wall (e.g. clay sources etc.);
    - An assessment of the potential impact resulting from a potential change in catchment boundaries – will this affect surrounding and downstream ecosystems significantly?
    - Flora, fauna and heritage clearance of the proposed area; and
    - Intentions and conceptual plans for the rehabilitation of the structure when it is no longer required.

Impacts

Describe and analyse risks of how the project will or has the potential to impact on each element with particular consideration given to the following:

- Discuss limiting properties of landform considering erosion, rehabilitation etc. This information may be provided through the development of a landform evolution model for the life of the project and beyond (this would also have benefit in assisting in progressive rehabilitation over the life of the project); and

- Detail impacts of mining to landform.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Measures to avoid or minimise impacts from identified risks;
- Management of topsoil; and
- Erosion and sediment control procedures and associated erosion and sediment control management plan.

A high priority should be given to ensuring sediment is prevented from entering into the surrounding waterways. This should be reflected in the management plans.

5.5 Ecology and Biodiversity

Baseline

- Specify the extent of any vegetation clearing (proposed annual and total amounts);
- Survey flora and fauna species (including migratory species) and biological communities;
- Survey methodology should:
  - follow best practice and advice from relevant agencies;
  - consider seasonality, species rarity, potential for occurrence of significant species and sensitivity of species to disturbance;
  - be included in appendices; and
  - identify rare, threatened and endangered species against NT and Commonwealth legislation, and species with indigenous conservation values.
- Special consideration should be given to the following:
  - ecologically outstanding areas;
  - vegetation that is the habitat of rare, threatened or endangered species or has ecologically significant diversity;
  - communities that are exceptional examples of their type; and
  - vegetation outside its normal distribution or of other biogeographical significance.
- Timeline to obtain any permits and meet other statutory obligations under NT legislation (IDCO No12. – *Planning Act 1999* and *s.38 Pastoral Land Act 1992*) for vegetation clearing; and
- Observations and discussion of feral animals, weeds and invasive species (including cane toad population) at the site.

Please note:

- Baseline data should include both dry and wet season fauna survey of flora and fauna (as previous surveys in this area for the Draft EIS by Dames and Moore relied primarily on data collected in the dry season) and in particular, a survey is conducted using pit traps with drift-lines to detect litter-dwelling fauna.

The Aquatic Ecology of Maud Creek is particularly important as one of its Declared Beneficial Uses is for protection of the aquatic ecosystem.

Impacts

Describe and analyse risks of how the project will or has the potential to impact on each element identified above with particular consideration given to the following:

- Impacts of clearing;
- Impacts on species or communities or habitats of local or regional or national significance. Detail this with reference to the inputs and outputs from the mining and processing operations;
- Rate the risk and seriousness of each impact;
- Identify noxious weeds that may result from the project activity;
- Impacts of groundwater drawdown on groundwater dependent ecosystems;
- Impacts on Declared Beneficial Uses for Maud Creek and the Katherine River;
- Impacts on the catchment hydrology and potential impacts on aquatic and surrounding ecosystems from the proposed diversion of Gold Creek; and
- Impacts of irrigation from pit dewatering.

Special consideration should be given to any potential impacts on the adjacent section of Nitmiluk National Park.

Given the importance of the Maud Creek catchment in the Katherine town water supply, special consideration should be given to impacts on the catchment. Given the Declared Beneficial Uses of Maud Creek and the Katherine River, special consideration should be given to identifying potential impacts on these values.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Minimisation of disturbance;
- Rehabilitation methods including revegetation strategies and flora selection;

- Weed Management Plan (to be included in the Environmental Management Plan and to follow best practice and advice from advisory agencies) – to include consideration of the impact of vehicle movement off-site;
- Vegetation Clearing Plan (to be developed as part of the Environmental Management Plan) – including what is planned for the disposal / use of cleared vegetation. This should adhere to the standards applied under the NT Land clearing guidelines;
- Fire Management Plan (to be developed as part of the Environmental Management Plan);
- Actions to prevent the development of mosquito and other biting insect breeding habitats; and
- Detail proposed feral animal control.

Special consideration should be given to any potential to work in collaboration with adjacent land managers, particularly Nitmiluk National Park, for the management of impacts direct and in-direct, short term and long term, that may impact on surrounding areas of the catchment or the values of Park.

Management plans should include a high priority on protecting the Declared Beneficial Uses of both Maud Creek and the Katherine River.

5.6 Waste Management

- Identify and describe all sources of waste (note that waste rock issues are dealt with separately) and the risks associated with each;
- Details and risks associated with effluent disposal from the mine site;
- Outline proposed waste dump locations and dimensions (discuss alternatives) and the risks associated with this; and
- Justify the preferred waste management option.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Waste management program including reuse, recycling, storage, transport and disposal;
- Details of any pollutants that are likely to be released into the environment and measures to prevent or minimise this release of pollutants;
- Management of listed waste as per the Waste Management and Pollution Control Act; and
- Management of hazardous materials such as chemicals, fuels, oils and explosives.

5.7 Traffic and Transport

Baseline

Describe the existing transport infrastructure at locations likely to be impacted by the project.

Impacts

The project description should consider, as a minimum, the following:

- Identify the risks from, and proposed management of transport systems and methods to convey all site traffic (including materials, workers and product) to and from the site (both during construction and operation) including:
  - type, size and number of vehicles required during all phases of the proposal;
  - the estimated volumes, tonnage, composition, origin and destination of traffic generated by the proposal;
  - estimated times of travel; and
  - additional road infrastructure works required including site access and signage.
- Discuss the capacity of the infrastructure to sustain this usage and outline the environmental and safety management plans for the transport of these ores on public roads;
- Alternative transport routes, schedules and vehicles should be discussed, including train;
- Description of any proposed haul roads, including length, location, land requirements, tenure and acquisition requirements;
- Description of construction methods and timeframes for any proposed private and public haul roads;
- Discuss the possible transport of weeds or cane toads;
- Consultation undertaken with relevant regulatory agencies; and
- Necessary approvals required.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Methods for complying with any relevant road vehicle axle limits;
- Methods for securing loads;
- Measures to prevent sediment transport off-site via transport vehicles including shakedown areas or properly controlled truck-wash facilities;
- Measures to reduce any road traffic noise impacts, including proposed times of travel through town;
- Consultation with local communities affected by transport impacts;
- Traffic management; and

- Management of driver fatigue.

5.8 Air Quality and Noise

Baseline

- Provide background dust, air quality, noise and dispersion levels; and
- List all meteorological conditions including but not limited to:
  - prevailing wind directions and strengths;
  - maximum wind gusts;
  - precipitation data (maximum, minimum, average, design rainfall intensities);
  - temperature data; and
  - evaporation data.

Impacts

Describe and analyse risks of how the project will or has the potential to impact on each element with particular consideration given to the following:

- Potential air emissions;
- Dust, including projected particle size and distribution;
- Noise, including levels, timing and duration and comparison to current levels (with respect to any nearby receivers);
- Information on ore toxicity in terms of human health and Occupational Health and Safety; and
- Provide a full assessment of the potential impact of fugitive dust on water quality due to surface water run-off.

Management

For each risk, discuss the risk controls to avoid or minimise the occurrence and extent of unacceptable impacts and their likely effectiveness. These should include, but not be limited to:

- Dust suppression and monitoring, including during ore transportation; and
- Noise mitigation.

5.9 Cultural Environment

Baseline

This section should describe the anthropological, archaeological and heritage values of the development area, including sites and objects of Aboriginal significance.

As a minimum, information should be provided on the following:

- Historical uses of the site (Aboriginal and non-Aboriginal);
- Current use by Aboriginal people;
- Descriptions of the cultural values that could be impacted by the project. These should include:
  - places nominated for listing or listed on the Register of the National Estate or the Interim list of the Register of the National Estate;
  - places nominated for listing or listed on the Commonwealth or National Heritage list;
  - nominated, proposed and declared heritage places and objects under the NT Heritage Conservation Act 1991;
  - prescribed archaeological and heritage places and objects (Aboriginal) under the NT Heritage Conservation Act 1991;
  - areas with special values to indigenous and non-indigenous people, e.g. traditional land use, landscape, visual environment, recreational, commercial, tourism, scientific and educational;
  - areas of significance to the Aboriginal population and culture, including sacred sites within the meaning of the *Aboriginal Land Rights Northern Territory Act 1976* and the *Northern Territory Aboriginal Sacred Sites Act;*
  - National Parks, conservation reserves or any other category of Territory Park or Reserve;
  - consultation arrangements and any agreements with Local Aboriginal Groups or the Northern Land Council (NLC) under the Native Title Act 1993; and
  - local society and regional centres.

For each of these cultural values, indicate: importance, conservation status, national and international treaty obligations, and clearance permits required or obtained.

The methodology by which these sites and areas were identified, and their importance assessed, should include survey details such as dates, consultants, survey area and methods.

In relation to prescribed archaeological places and objects protected under the *Heritage Conservation Act*, the proponent should seek advice from an archaeologist and document the precise location of such places and objects in relation to the proposal.

The archaeologist should undertake a desktop review of the previous archaeological survey, provide a significance assessment and recommendations for previously recorded sites. The review may also require re-location of these sites to assess their current condition and integrity.

Further survey of areas not covered by the previous survey should also be undertaken to ensure that unrecorded sites, which are also protected by the

Act, are not included in the development area. Contact Heritage Conservation Services for advice regarding an appropriate scope of works.

The protocol to be followed in the event of discovery of new archaeological or heritage sites or objects during the construction phase should be documented and included in the Environmental Management Plan (see section 6). The proponent should seek advice on this from Heritage Conservation Services of the Department of Natural Resources, Environment and The Arts (DNRETA).

The proponent should describe the significance of the places and objects which are to be impacted by the proposal; and options for mitigation of loss of heritage value of places and objects that lie within the area of impact.

This section of the EIS should also include:

- Results of the inspection of the Register of Sacred Sites maintained by the Aboriginal Areas Protection Authority;
- Details of the application lodged with the Aboriginal Areas Protection Authority for an Authority Certificate within the meaning of Part 3, Division 1 of the Northern Territory Aboriginal Sacred Sites Act;
- A copy of the Certificate issued by the Authority as a result of that application containing conditions, if any, relating to the protection of sacred sites on, or in the vicinity of, the project area; and
- Status of any negotiations with native title claimants/NLC or other requirements under the *Native Title Act*.

Impacts

This section should describe the anticipated or potential impacts the project will have on each cultural value indicated in the previous section. Consideration is to be given to the impact of the proposal on local Aboriginal employment levels and the influx of additional workers into local centres. Describe how these potential impacts are to be mitigated or managed.

Management

The Notice of Intent (NOI) **Section 4.11.1** states that where possible disturbance to sites will be avoided. The NOI does not say how this would happen i.e. will the sites be fenced or flagged? It also states that a **Heritage & Archaeological Site Protection Program** will be developed. Further information is required (in the EIS) with respect to the protection of these sites.

Notice of Intent **Section 6.4.10 Heritage & Archaeological Site Protection** states that the specific impacts of the proposed mine and infrastructure on those archaeological sites have not been determined, but that if required, permission will be sought to disturb/ destroy them. The specific impacts should first be determined prior to just applying for blanket permission to disturb or destroy those sites. These sites may need to undergo further

detailed recording or have excavations and collections conducted on them prior to being disturbed.

The **Heritage & Archaeological Site Protection Program** also states a commitment to the continued protection of Aboriginal and heritage sites from disturbance and will also restrict activities in areas where sites are known to occur. Again, there is no information provided on exactly how this will be achieved, i.e. will the sites be fenced or flagged? This information should be included in the EIS.

Heritage Conservation Services (HCS) supports the recommendations made in the original archaeological survey report (1994), in particular that as MC1 is an artefact scatter of low significance, and is located where the Low Grade Ore Stockpile is scheduled to go, it can be disturbed once permission has been granted by the Minister for Natural Resources, Environment and Heritage. Sites MC2, MC3, MC4 and MC5 are considered to be of high archaeological significance and could be subjected to disturbance by the construction of the Access Road in the southern section of the project area. The recommendation that these four sites should be fenced and warning signs be erected is also supported by this office. The historic mining site MC6 appears to be outside of the planned infrastructure at this stage, but if further development is planned for that section of the lease, then more detailed recording of that site should take place, and be reported in the EIS, prior to any disturbance.

5.10 Greenhouse Gas Emissions

The Northern Territory Government's objective for managing greenhouse gas emissions from new and expanding operations is to reduce emissions to a level that is as low as practicable. An assessment of greenhouse gas emissions for the project should be undertaken, in accordance with the NT Assessment Guide for Greenhouse Gas Emissions found at Appendix B.

5.11 Biting Insects

Biting insects need to be considered in the EIS, the Environmental Management Plan and Closure Plan due to the potential of mine sites to create extensive breeding sites for mosquitos of pest and disease significance.

A baseline Biting Insect Assessment should be conducted at the proposed mine site. Please refer to Appendix C for details.

Mining method and design needs to occur in a manner that prevents mosquito breeding. Please refer to the attached Guideline "Guidelines for Preventing Mosquito Breeding Sites associated with Mining Sites" at Appendix C.

6 PROJECT ENVIRONMENTAL MANAGEMENT

A draft Environmental Management Plan (EMP) should be provided in a form suitable for inclusion in a Mining Management Plan as required under the *Mining Management Act*. The draft EMP should be strategic, describing a framework for environmental management. Where possible specific management policies, practices and procedures should be included in the draft EMP. A final EMP would be prepared at the conclusion of the assessment, taking into consideration comments on the EIS and incorporating the Assessment Report recommendations.

The draft EMP should:

- Define the management structure of both the construction and operational phases and the relationship to the environmental management of the site;
- Describe the proposed measures to minimise adverse impacts and the effectiveness of these safeguards (e.g. provide performance indicators by which all anticipated and potential impacts can be measured);
- Describe how employees and visitors will be made aware of environmental responsibilities and safeguards (including induction process);
- Describe monitoring to allow early detection of adverse impacts;
- Describe remedial action for any impacts that were not originally predicted;
- Detail how monitoring will be able to determine the differences between predicted and actual impacts;
- Include a summary table listing undertakings and commitments made in the EIS, including performance indicators, with cross-references to the text of the report; and
- Provide for the periodic review of the management plan itself.

Reference should be made to relevant legislation and standards, and proposed arrangements for necessary approvals and permits should be noted. The agencies responsible for implementing and overseeing the management plan should be identified. Proposed reporting procedures on the implementation of the management plan, independent auditing or self auditing and reporting of accidents and incidents should also be described.

7 PUBLIC INVOLVEMENT AND CONSULTATION

Given the role of the EIS to inform the public, it is essential that the proponent demonstrate how public concerns were identified and influenced design and delivery of the project. Public involvement and the role of government organisations should be clearly identified. The outcomes of surveys, public meetings and liaison with interested groups should be discussed, and any resulting changes made to the proposal clearly identified. Details of any ongoing liaison should also be discussed including any negotiations with native title claimants.

Negotiations and discussions with local and community government, the Territory Government and the Commonwealth Government should be detailed, and any outcomes referenced. Details of any ongoing negotiations and discussion should also be presented.

In particular, for this proposal a stakeholder communication plan is recommended – for consultation, information sharing and involvement with the local community during the planning, construction, operation and decommissioning of the Maud Creek gold mine.

8 INFORMATION SOURCES, REFERENCE LIST, BIBLIOGRAPHY

The EIS should contain a comprehensive reference list or bibliography. Any source of information such as studies, research, maps and personal communications used in the preparation of the EIS should be clearly identified, cited in the text and referenced in the bibliography.

9 APPENDICES, GLOSSARY

Information and data related to the EIS, but unsuitable for inclusion in the main body of the statement, should be included as appendices. This may include detailed analyses, monitoring studies, baseline surveys, and raw data.

A glossary should be provided, defining the meaning of technical terms, abbreviations and colloquialisms. (Note: throughout the EIS, technical terms and jargon should be minimised).

10 ADMINISTRATION

- Once the draft EIS is complete, 25 copies of the draft EIS should be submitted to the EPA Program for distribution to NT Government advisory bodies.

- The EIS is to be publicly advertised for review and comment in the NT News and the Katherine Times. The EIS is to be made available for public comment for 8 weeks.

- The EIS should be placed on public review at:
  - Department of Natural Resources, Environment and The Arts (DRNETA) offices at Cavenagh House (Darwin) and Randazzo Arcade (Katherine);
  - Department of Primary Industries, Fisheries and Mines (DPIFM) offices at Centrepoint Building (Darwin);
  - Katherine Town Council Chambers;
  - the NT Library, Parliament House, Darwin;

- Katherine Public Library, Randazzo Centre Katherine;
- The Environment Centre (Darwin); and
- Northern Land Council offices in Darwin and Katherine.

- The EIS should be provided on CD ROM disc so that the EIS can be placed on the Department's Internet site. The CD ROM copies should be in ADOBE® *.pdf format for placement on the Internet.

APPENDICES

APPENDIX A:

Requirements for Mining, Construction and Bush Camps
(Environmental Health Information Bulletin No. 6)

APPENDIX B:

NT Environmental Impact Assessment Guide - Greenhouse Gas Emissions

APPENDIX C:

Guidelines for Preventing Mosquito Breeding Sites
Associated with Mining Sites
- Biting Insect Assessment (Baseline Survey); and
- Guidelines

APPENDIX A:

ENVIRONMENTAL HEALTH
INFORMATION BULLETIN No. 6

Requirements for Mining, Construction & Bush Camps

This information bulletin has been developed to provide information to proponents of Mining, Construction & Bush Camps with regard to the Department of Health and Community Services' (DHCS) environmental health requirements. Issues covered include food business registration, boarding house registration, on-site wastewater disposal, wastewater stabilisation ponds, potable water supply, solid waste disposal, fuel storage, public health nuisances, and environmental management plans.

Registration as a Food Business

Larger camps that are not self-catering generally incorporate a commercial food preparation area (kitchen). The *Food Act 2004* defines a food business as 'any business or activity that handles food intended for sale or selling regardless whether the business if of a commercial, charitable or community nature or whether it involves handling or selling on one occasion only'. Consequently the camp's commercial food preparation area is considered to be a food business and therefore requires registration with DHCS in accordance with the *Food Act 2004.*

Registration can be carried out on-line and does not attract a fee. The Registration period is for 12 months with renewals due on 1 July.

To register, go to the DHCS website link or contact the relevant Environmental Health Office:
http://www.transact.nt.gov.au/ths/healthmanager/HealthNotifications.nsf

The *Food Act 2004* also requires all food businesses to meet the minimum standards prescribed by the *Food Safety Standards*:

3.1.1 Interpretation and Application
3.2.2 Food Safety Practices and General Requirements
3.2.3 Food Premises and Equipment

These nationally endorsed standards have been designed to be descriptive, rather than prescriptive and provide the food industry with an increased flexibility in meeting the desired outcome of providing safe food to consumers. Accordingly, Environmental Health Officers (EHO) are also now required to adopt a more flexible approach when assessing how businesses are able meet the criteria contained within these Standards.

Australian Standard AS 4674 *"Design, Construction and Fit-out of Food Premises"* has been developed to assist the food industry in meeting the outcomes of the Standards. It is not prescribed by law that a premises must meet the requirements

contained within, however a premises that meets AS4674 is deemed to comply with the *Food Act* and *Food Safety Standards*.

A food premises that does not meet the requirements of AS 4674 may still able to meet the requirements of the relevant legislation. However, further evidence may be required to be provided to the EHO to ensure that they can be assured that the business will comply through other means. In some instances, a design issue may be able to be addressed through the development and implementation of appropriate workplace policies or procedures. This may, in turn, sometimes result in a delay of the approval process, and require the submission of more information than the typical application.

Approval Process

The approval process of a food business is dependent on its location, however it generally involves at least one inspection. Camps are by nature located in remote areas where Building Control in terms of the *Building Act* is not applicable. Building Control essentially means that a Building Certifier must certify all building structures to ensure compliance with the Building Code of Australia. Proponents are referred to Appendix 1 to determine if their project is located within a Building Control Area.

Inside a Building Control Area

Under the provisions of the *Building Act*, DHCS is a Reporting Authority and as such, Building Certifiers are required to seek the Department's comments on all building applications involving, amongst other things, new or existing food businesses. The Building Certifier must submit detailed plans to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Food Business with the relevant Environmental Health Office prior to operating.

Outside a Building Control Area

Since Building Certification does not apply then DHCS becomes the first point of contact for approval of a food business. The proponent must submit detailed plans and specification to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Food Business with the relevant Environmental Health Office prior to operating.

Registration as a Boarding House

The accommodation section of the Camp will require registration as a boarding house in accordance with the *Public Health Act and Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations.* The Registration period is for 12 months with renewals due on the 31 December. Annual Fees are applicable and are based on the number of bedrooms:

3-10	Bedrooms	$100 p.a.
11-20	Bedrooms	$125 p.a.
21-40	Bedrooms	$150 p.a.
> 40	Bedrooms	$250 p.a.

A Boarding House application form can be downloaded online or by contacting the relevant Environmental Health Office:
http://www.nt.gov.au/health/healthdev/environ_health/environ_health.shtml
>application forms

Following a review of Northern Territory public health legislation, DHCS has developed *Public Health Guidelines for Commercial Accommodation 2005*. These Guidelines will eventually replace the current provisions relating to boarding houses in the *Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations* offering a less prescriptive approach and a clear set of minimum standards.

Room sizes in the Camp must comply with the provisions of *Public Health (Shops, Eating-Houses, Boarding Houses, Hostels and Hotels) Regulations* or the yet to be endorsed Guidelines. However, if the latter is chosen, it will be necessary for the proponent to make application in writing to the Chief Health Officer seeking approval to utilise the Guidelines.

Approval Process
The approval process of a boarding house is dependent on its location in a similar manner to food businesses, and also generally involves at least one inspection. Camps are by nature located in remote areas where Building Control in terms of the *Building Act* is not applicable. Building Control essentially means that a Building Certifier must certify all building structures to ensure compliance with the Building Code of Australia. Proponents are referred to Appendix 1 to determine if their project is located within a Building Control Area.

Inside a Building Control Area
Under the provisions of the *Building Act*, DHCS is a Reporting Authority and as such, Building Certifiers are required to seek the Department's comments on all building applications involving, amongst other things, new or existing boarding houses. The Building Certifier must submit detailed plans to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Boarding House with the relevant Environmental Health Office prior to operating.

Outside a Building Control Area
Since Building Certification does not apply then DHCS becomes the first point of contact for approval of a boarding house. The proponent must submit detailed plans and specification to the relevant Environmental Health Office prior to the construction of works. Following assessment and approval, the premises must be registered as a Boarding House with the relevant Environmental Health Office prior to operating.

Sanitary Accommodation & Ablution Facilities

Adequate numbers of ablution facilities and sanitary accommodation to be accessible for all operations in accordance with Building Code of Australia and relevant Northern Territory legislation.

Environmental Management Plans

The proponent shall provide the relevant Environmental Health Office with copies of Environmental Management Plans that relate to the Camp or Project Operations for initial comment.

On-site Wastewater Disposal

On-site wastewater disposal using septic tanks is likely to be the most suitable option for camps that have no major site constraints and comprise less than 20 staff. Larger camps may need to consider other options such as a treatment plant or waste stabilisation ponds. In all cases, the proponent should seek advice from a qualified hydraulic consultant about the most suitable wastewater disposal system. 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 the 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.*

The Role of Regulatory Authorities

Local Government Authorities in the Northern Territory have no jurisdiction over on-site wastewater management, i.e. approval or monitoring of septic tank installations.

The Department of Planning and Infrastructure (DPI) administer the provisions of the *Building Act & Regulations* with respect to all septic tank installations within a Building Control Area.

DHCS administers the provisions of the *Public Health Act & Regulations* with respect to the:

type approval of septic tanks and associated products.
conventional septic tanks located outside Building Control Areas.
notification to install an Alternative Septic Tank System (ASTS) for a single residential dwelling.
site-specific design approval of an ASTS.

Conventional Septic Tanks & Alternative Septic Tank Systems

Conventional Septic Tanks (e.g. septic tank reticulating to absorption trenches or evapotranspiration bed) must be installed by self-certifying plumbers and drainers within Building Control Areas or by licensed plumbers and drainers outside Building Control Areas. The administrative process is dependent on whether the installation is located within a Building Control Area (urban areas and along main highways) or outside a Building Control Area (remote 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:
http://www.nt.gov.au/health/healthdev/environ_health/environ_health.shtml
>application forms

Connection to existing Septic Tank Systems
If the proposal can utilise existing infrastructure such as septic tank systems, then the proponent will need to demonstrate that such infrastructure has adequate hydraulic capacity. This will require the proponent to engage a qualified hydraulic consultant to provide the relevant Environmental Health Office with as-constructed drawings of the existing infrastructure.

Trade Waste Pre-treatment Devices

Trade waste is defined as a *"liquid or liquid borne waste generated from any industry, business, trade, manufacturing process or similar that is approved for discharge to sewer but does not include wastewater from a toilet, shower, hand basin or similar fixture"*.

It is not recommended that trade waste be discharged to septic tank system, however a Camp's commercial food premises may prepare cooked food generating liquid trade waste that comprises of food scraps, detergents, fats, oils and grease. This liquid trade waste has a substantial impact on a septic tank system, and if not contained by pre-treatment equipment will cause system failure. For this reason, it is mandatory that all greasy liquid trade waste must be discharged to sewer via a pre-treatment device that has been approved by Power and Water Corporation's Trade Waste Section.

The requirements for trade waste pre-treatment devices are detailed in the following documents:

- Power and Water Corporation - *Guidelines for On-site Pre-treatment* which can be downloaded from the website at: http://www.powerwater.com.au/powerwater/business/trade_waste.html; and
- DHCS Information Bulletin – *Trade Waste Pre-treatment Devices* which can be obtained from the relevant Environmental Health Office.

Waste Stabilisation Ponds

Waste stabilisation ponds (also known as sewage ponds) are used extensively in the Northern Territory for the treatment of wastewater prior to final disposal.

There is legislation to control the reuse or disposal of treated sewage effluent. The responsibility for enforcement of such legislation is vested with DHCS and the Environment Protection Agency (EPA). The discharge of treated sewage effluent to land or water may therefore occur, but only in accordance with pertinent legislation,

or in its absence, to any reasonable conditions imposed by the relevant government agency.

Where treated sewage effluent is proposed to be discharged to a waterway and where the discharge does not have a potential to impact on public health, DHCS will liaise with the EPA as part of the approval process. Consideration will be given to the reuse/irrigation of treated sewage effluent in controlled public access areas, constructed and operated for this express purpose.

Approval Process

Any proposal to construct waste stabilisation ponds at a camp shall require the submittal of plans, design specifications and disposal methodology to the relevant Environmental Health Office & the EPA for approval, prior to construction.

Environmental Health Office will seek specific comment with regard to mosquito breeding from the Department's Medical Entomology Branch.

Potable Water Supply

The camp must have a potable that complies with the NH&MRC *Australian Drinking Water Guidelines*. The relevant Environment Health Office may set conditions on the provision of water testing results. Proponents should note that water analysis can be carried out by the Water Laboratories at:
Alice Springs – Department of Natural Resources, Environment and the Arts - located at the Tom Hare Building, phone (08) 8951 8233
Darwin – Department of Primary Industries and Fisheries - located at Berrimah Farm, phone (08) 8999 2346

Bore setbacks to onsite wastewater disposal shall be in accordance with the Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent.

Solid Waste Disposal

The *Waste Management and Pollution Control Act 1998* requires that certain waste management activities be licensed or approved by the EPA. An EPA approval for a landfill (rubbish dump) is not required if the landfill is for domestic waste generated on the premises or domestic waste from temporary construction camps.

An EPA licence for a landfill is required if the Camp serves a permanent population of more than 1000 persons or if the Project Operations generates hazardous waste. Further information can be obtained by contacting the EPA on (08) 8924 4139 or by going to their website: http://www.nt.gov.au/nreta/environment/index.html.

Providing the landfill does not have to be licensed or approved by the EPA, then the proponent will still need to demonstrate to the relevant Environmental Health Office that the Camp's landfill meets best practice and will not cause an environmental or public health nuisance. Reference should be made to the *Guidelines for Siting, Design*

and Management of Solid Waste Disposal Sites in the Northern Territory 2003 which can be downloaded from the EPA website:
http://www.nt.gov.au/nreta/environment/waste/codes/index.html

Fuel Storage

Camps and their respective operations generally have a fuel storage facility. Environmental Health does not regulate fuel storage and therefore proponents should discuss this issue with the EPA. Reference should be made to AS 1940-2004 (and amendments) *Storage and handling of flammable and combustible liquids.*

Public Health Nuisance

The proponent shall ensure that the construction and operation of the Camp does not create a public health nuisance, in particular from dust or other particulate matter. Environmental Health has provisions to deal with public health nuisances under the *Public Health (Nuisance Prevention) Regulations.*

APPENDIX B:

NT ENVIRONMENTAL IMPACT ASSESSMENT GUIDE: GREENHOUSE GAS EMISSIONS

PURPOSE

The Northern Territory Government's objective for managing greenhouse gas emissions from new and expanding operations is to minimise emissions to a level that is as low as practicable.

This Guide aims to assist proponents in providing the information needed by the Environment Protection Agency (EPA) Program to assess the impact of greenhouse gas emissions from proposed projects during assessment under the *Northern Territory Environmental Assessment Act 1994*[1].

GUIDANCE

Emissions estimates

Proponents should detail the following in their environmental impact assessment documentation:

1. An estimate of the greenhouse gas emissions for the construction and operation phases:

(a) in absolute and carbon dioxide equivalent figures (refer to the Glossary in this Guide) for each year of the project;
(b) identified on a gas by gas basis; and
(c) by source (including on site and upstream sources such as emissions arising from land clearing and the production and supply of energy to the site).

Emissions estimates are to be calculated using the methodology developed and periodically updated by the National Greenhouse Gas Inventory Committee[2] or another national or internationally agreed methodology.

2. Details of the project lifecycle greenhouse gas emissions and the greenhouse gas efficiency of the proposed project (per unit and/or other agreed performance indicators).

Lifecycle emissions and greenhouse gas efficiency should be compared with similar technologies producing similar products.

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[1] As required under Action 6.4 of the NT Strategy for Greenhouse Action 2006, available at http://www.nt.gov.au/nreta/environment/greenhouse/publications/pdf/greenhouse_action.pdf

[2] Up to date methodology can be obtained from the Australian Greenhouse Office. See www.greeenhouse.gov.au.

To provide an understanding of the broader impact of the proposal, proponents are encouraged to place the estimated greenhouse gas emissions from the proposal into a national and global context[3].

Measures to minimise greenhouse gas emissions

Proponents must demonstrate consideration of a wide range of options and indicate the intended measures and efficient technologies to be adopted to minimise total greenhouse gas emissions from the proposed project, including:

(a) identifying energy conservation measures, opportunities for improving energy efficiency and ways to reduce fugitive emissions where applicable;
(b) indicating where potential savings in greenhouse gas emissions can be made through the use of renewable energy sources, taking into account fossil fuels used for supplementary power generation; and
(c) their commitment to offsetting greenhouse gas emissions.

The design measures to maximise efficiency and minimise emissions should represent best practice at the time of seeking project approval.

Proponents are to advise whether they will join the Commonwealth Government's Greenhouse Challenge program.

Emission offsets include activities that remove carbon from the atmosphere or reduce the greenhouse gas intensity (output per unit product) from current or future activities.

Examples may include but are not limited to:

- establishment and maintenance of perennial vegetation;
- sequestration of carbon by geological, chemical, biological or other means;
- reducing the carbon intensity of existing activities;
- replacing fossil fuels with renewable fuels;
- trading emissions permits in a nationally approved system;
- synergistic linking of enterprises to reduce net greenhouse gas outputs; and
- development of new greenhouse gas efficient technologies.

Proposed emissions offsets projects should include an estimate of greenhouse gas emissions savings that are likely to be achieved through implementation.

Measures that offset emissions within the NT are encouraged, and EPA staff can discuss possible options with proponents.

[3] Information on Australia's national emissions profile can be obtained from the Australian Greenhouse Office at www.greenhouse.gov.au; international emissions from the United Nations Framework Convention on Climate Change (UNFCCC) webite at http://unfccc.int/2860.php/ .

Emissions monitoring and reporting

Consistent with the principles of continuous improvement, a program is to be outlined in the proponent's Environmental Management Plan which includes ongoing monitoring, investigation, review and reporting of greenhouse gas emissions and abatement measures. It should be noted that in 2006, large energy users (those using greater than 0.5 petajoules per year) will be required by the Commonwealth Government to report publicly on their greenhouse gas emissions.

Preparedness for climate change

Proponents should demonstrate due consideration of the risk of climate change impacts to the proposal. Relevant variables may include, but are not limited to:

- increasing average temperature and evaporation rates;
- variation in rainfall and the incidence of floods;
- sea level rise;
- increased frequency and intensity of cyclones and storm surge levels; and
- altered distribution of pests and disease.

In assessing climate change risk, proponents should be guided by recent projections published by organisations such as the CSIRO and the Intergovernmental Panel on Climate Change. (For CSIRO projections, see: http://www.ipe.nt.gov.au/whatwedo/greenhouse/documents/pdf/ntclimatechange.pdf).

GLOSSARY OF GREENHOUSE TERMS

Abatement: Limiting, abating, avoiding or sequestering greenhouse gas emissions through source reduction, fuel displacement or switching, carbon stabilising techniques or sink enhancement.

Absolute emissions: Refers to the total emissions of greenhouse gases expressed in terms of the actual mass of each individual gas emitted over a specified time period.

Best Practice: A best practice is a process, technique, or use of technology, equipment or resource that has a proven record of success in minimising energy use and greenhouse gas emissions. A commitment to use best practice is a commitment to use all available knowledge and technology to ensure that greenhouse gas emissions are minimised.

Carbon Dioxide Equivalent: A unit of greenhouse gas emissions calculated by multiplying the actual mass of emissions by the appropriate Global
Warming Potential. This enables emissions of different gases to be added together and compared with carbon dioxide (see Table 1 below).

Commonwealth Government's Greenhouse Challenge program: A cooperative effort by industry and the Commonwealth Government to reduce greenhouse gas emissions through voluntary industry action. See: www.greenhouse.gov.au/challenge.

Greenhouse Gases: Table 1 lists the greenhouse gases proponents are required to report on.

Global Warming Potential (GWP): The warming potential of a gas, compared to that for carbon dioxide. GWPs are revised from time to time as knowledge increases about the influences of different gases and processes on climate change. Refer Table 1.

Project Lifecycle Greenhouse Gas Emissions: Those greenhouse gas emissions measured cumulatively over a defined period. Typically this period is from the point of extraction of the raw materials to either the beginning of the consumer phase of a product or the final disposal or recycling stage of a product, depending on its nature. Proponents should justify their choice of the defined period.

National Greenhouse Gas Inventory Committee: A committee comprising representatives of the Commonwealth, State and Territory Governments that oversees the development of greenhouse gas inventory methods and compilation of inventories for Australia.

Sequestration: Removal of greenhouse gases from the atmosphere by vegetation or technological measures. Sequestration is not yet precisely defined for the purposes of recognised trading or offset schemes. Accordingly, the EPA Program will take a common sense approach on a case by case basis in the interim. To assist proponents, the EPA regards sequestration as a process that results in the isolation of carbon dioxide from the atmosphere for a period which is significant in terms of influencing the global warming effect.

Source: Any process or activity that releases a greenhouse gas into the atmosphere.

Table 1: Greenhouse gases and respective Global Warming Potentials (GWPs)*

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous oxide (N_2O)	310
Perfluorocarbons (CF_x)	6500 - 8700
Hydrofluorocarbons (HFCs)	560 – 11 700
Sulphur hexafluoride (SF_6)	23 900

Greenhouse gas emissions expressed in carbon dioxide equivalent (CO_2-e) are calculated by multiplying the actual mass of emissions for each greenhouse gas by its respective GWP factor

* GWP factors listed are those published by the International Panel on Climate Change at the time of publication of this Guide

APPENDIX C:

GUIDELINES FOR PREVENTING MOSQUITO BREEDING SITES ASSOCIATED WITH MINING SITES

BITING INSECT ASSESSMENT (Baseline Survey)

Biting insects need to be considered due to the potential of mine sites to create extensive breeding sites for mosquitoes of pest and disease significance, and the potential for the introduction into the NT of dengue carrying mosquito species from North Queensland and overseas. The location of the mine site to natural creeklines and large water bodies created by past mining activities could also potentially expose mine workers to mosquitoes and mosquito borne disease. It is therefore recommended that a Biting Insect Assessment be conducted at the proposed mine site, with an outline of the proposed Biting Insect Assessment provided below.

A Biting Insect Assessment generally includes a 12 month adult biting insect trapping program, with traps set once a month around the time of the full moon to locate monthly abundance of mosquito and biting midge species. Ground assessments are also conducted to locate actual and potential mosquito breeding sites within the development area, and an assessment of aerial photography is undertaken to locate potential mosquito breeding sites outside of the development area that may impact on the development area. Mining plans are also examined to evaluate the potential for mining operations to create new mosquito breeding sites.

A detailed report is then prepared based on the findings of the biting insect assessment, with recommendations provided on how to prevent new mosquito breeding sites and reducing the impact of biting insects on mine personnel. The proponent or relevant environmental consultant should contact the Medical Entomology Branch to discuss the proposed Biting Insect Assessment.

For more information contact:

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GUIDELINES FOR PREVENTING MOSQUITO BREEDING SITES ASSOCIATED WITH MINING SITES

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General Comments

All mining operations need to include a section in an Environmental Management Plan for the monitoring and control of mosquitoes. This is necessary because of the potential of mine sites to provide extensive breeding sites for mosquitoes of pest and disease significance. Mine sites also provide the potential for the introduction of mosquito species and mosquito borne diseases into the NT that are either exotic to the NT or have previously been eliminated.

The monitoring of adult mosquitoes in any new mine should include trapping of adult mosquitoes once a month at a number of sites for the initial 12 months baseline mosquito monitoring program. The baseline mosquito monitoring program provides an indication of the seasonal distribution of the mosquito species present and the relative potential impact of mosquito borne disease to mine personnel.

The monitoring and control of mosquito larvae should be an ongoing operation for the life of the mine. Mosquito larvae must be controlled with an approved mosquito larvicide (*Bacillus thuringiensis* var. *israelensis* or methoprene) as part of an organised monitoring and control program. Any mosquito control program should be discussed with the Medical Entomology Branch of the Department of Health and Community Services with regard to methods and insecticides.

Accommodation for personnel should be sited as far as possible from the most important biting insect breeding sites and be adequately insect screened or otherwise protected to reduce the impact of mosquitoes.

The potential for artificially created mosquito breeding sites can be minimised with the appropriate design of water holding facilities and water management procedures.

1. WATER DAMS

All water storage dams should be constructed with relatively steep sides (45° slope minimum) to discourage the establishment of semi-aquatic vegetation (eg. *Typha* and *Eleocharis* reeds) that will provide suitable habitats for mosquito breeding.

Dam margins should be as straight as possible to minimise the linear area available for the establishment of semi-aquatic vegetation.

Where possible, any closely grouped dams should be joined together to minimise the linear margin of vegetation.

The bottom of any dam should be graded as level as possible, with a slight slope to one end to form a deeper section for periods of low water. This will remove the potential for the formation of isolated pools as the water level recedes in the dry season.

Areas surrounding any dam that will be flooded during the wet season should be graded to enable water to drain freely into the dam as the water level recedes, without the formation of isolated pools that are capable of retaining water for a period greater than 5 days.

There must be no islands formed within any dam. All areas of impounded water should have a relatively deep (2 m) wet season stabilised water level to prevent the emergence of semi-aquatic vegetation.

Any drainage line directed into a dam must be fitted with a sediment trap or erosion prevention structures just upstream from the dam. This is necessary to prevent the formation of “alluvial fans” that will promote the establishment of semi-aquatic vegetation in the area of the fan where silt will be progressively deposited.

Any overflow areas from dams should have erosion protection measures to prevent the creation of plunge pools.

Local native fish should be introduced or have access into any dams where the water quality is suitable for their survival, to provide natural predators for the control of mosquito larvae.

The margins of any water dam should be inspected annually for vegetation growth such as semi-aquatic vegetation and grass. Any dense marginal vegetation should be herbicided or physically removed, to prevent the vegetation from creation suitable mosquito breeding sites.

2. WETLAND FILTERS

Wetland filters have the potential to provide prolific breeding sites for mosquito species of pest and disease significance. If no other alternative is available for the treatment and disposal of waste water, a wetland filter should incorporate the ability to annually reduce the build up of any dead vegetation. Plans for wetland filter design and siting should be forwarded to the Department of Health and Community Services (Medical Entomology Branch) at the planning stage to ensure that their potential impact on the health of mine site personnel is minimised.

Annual maintenance could be achieved by dividing a wetland filter into separate sections. A dual system will enable water to be directed into one section of the filter while vegetation is burnt or otherwise reduced in the other section. An ability to manipulate the water level in the filter to strand or drown vegetation would be beneficial for the management of vegetation and mosquito numbers.

Stocking the wetland filter with local native fish will provide a significant measure for controlling mosquito larvae. The provision of fish however will not remove the need for annual maintenance of the wetland filter.

Where appropriate, consideration should be given to the provision of a fish ladder on any overflow facility to enable the dispersal of fish into and upstream of the filter.

Wetland filters may need to be removed after mining operations are completed to enable the future development of adjacent land.

3. WEIRS

Any spillways must be fitted with erosion prevention structures to prevent scouring and siltation of creek lines during periods of overflow.

Fish ladders should be constructed where appropriate to enable the upstream dispersal of fish following periods of dam overflow.

4. MINE WASTE DUMPS

The final surface of mine waste dumps should be contoured so that the surface area is free draining and has no surface depressions.

Any runoff from a waste dump should be directed to a silt trap to prevent any siltation of natural creek lines. Siltation in creek lines can promote the formation of isolated pools or disrupt fish ecology and may lead to the subsequent establishment of mosquito breeding sites.

Mine waste dumps should be located away from natural drainage lines, to prevent the upstream impoundment of natural surface water flows. If impractical to locate mine waste dumps away from natural drainage lines, diversion drains will be required to direct surface water flows around the waste dump.

5. SEDIMENT TRAPS

Sediment traps need to be designed so that they are free draining within a period of 5 days after flooding.

Sediment traps should be maintained by silt and vegetation removal on an annual basis.

6. BORROW PITS

Borrow pits, costeans or scrapes must be rehabilitated such that they do not hold water for a period greater than 5 days. These sites can be rectified either by filling or rendering them to be free draining.

7. DRAINAGE PATHS

Natural drainage patterns should be maintained where possible. Access roads across drainage lines may need to be fitted with culverts of sufficient size to prevent upstream flooding for periods that will enable mosquito breeding. Culverts should be installed flush with the upstream surface level. Erosion prevention structures will need to be constructed on the downstream side of any culvert, and erosion prevention structures may also be required at the headwalls of any culvert.

Any disruption to surface drainage should be removed at the end of the mining operations.

8. WASTE WATER DISPOSAL

Septic tanks must be installed to DHCS guidelines and should be inspected on an annual basis by the Environmental Officer to ensure that tanks and their effluents do not breed mosquitoes.

Discharge, overflow or excess effluent from sewage treatment systems must be disposed of in a manner approved by DHCS. A sprinkler disposal system is suitable under most situations. Infiltration systems are acceptable if soil conditions are favourable. The discharge of excess effluent into ephemeral creek lines is not acceptable.

Sewage ponds should be constructed with steep sides with an impervious lining and be regularly maintained to prevent vegetative growth at the margins (see *"The prevention of mosquito breeding in sewage treatment facilities"*, available from the Medical Entomology Branch). Surface debris and algal scum should be removed on a regular basis. Monitoring of mosquito larvae should be conducted in sewage ponds on a regular basis and control treatments conducted when necessary.

Disposal of water into "Application areas" must ensure that water does not pool for a period greater than 5 days.

9. ARTIFICIAL CONTAINERS

Rainwater tanks must be adequately screened to prevent the entry of mosquitoes.

Any container capable of holding water, eg. machinery tyres, drums, disused tyres, tanks, pots, etc. should be stored under cover, be provided with drainage holes, emptied on a weekly basis, treated with an appropriate

insecticide on an appropriate schedule, or disposed of in an appropriate dump site to prevent the formation of mosquito breeding sites.

No used tyres, machinery or other containers that have previously held rain water should be brought to the NT from Queensland unless the containers or machinery has been thoroughly treated with chlorine or an appropriate insecticide to remove the possibility of the introduction of drought resistant eggs of exotic *Aedes* mosquito species.

10. RUBBISH AND GARBAGE DUMPS

Rubbish and garbage dumps must be operated in such a matter that there is no ground surface or water filled receptacle pooling of water for a period greater than 5 days, to prevent the formation of mosquito breeding sites.

Rubbish and garbage dumps must be rehabilitated by filling and surface contouring to ensure they are free draining and have no surface depressions.

11. DECOMMISSIONING AND REHABILITATION

A decommissioning and rehabilitation plan should be in place for all mining operations to ensure no actual or potential mosquito breeding sites remain after cessation of mining operations. All disturbed areas should be rehabilitated to be free draining where practical. The proponent should consult the Medical Entomology Branch for input when preparing this document.

Aspects to consider when decommissioning and rehabilitating a mine site include removing and appropriately grading all sediment ponds, removing all bund walls created for the development, removing infrastructure and artificial receptacles that could pond water, removing water dams and reinstating existing flowpaths where practical, rehabilitating borrow pits, removing wetland filters, sediment traps, and other facilities that could pond water and breed mosquitoes.

Facilities such as open pit voids and water dams can be left as water holding pits if they are constructed with steep sides (at least 1:2 slope), and stocked with fish during the rehabilitation process.