

# Mining Management Plan Structure Guide for Mining Operations

## Explanatory Note

The primary purpose of a Mining Management Plan (MMP) is to formalise the actions to be taken and strategies to be implemented, that combined, will manage impacts to the environment to acceptable and sustainable limits over both the short and long-term. This is achieved by operators demonstrating that they fully understand the physical and social environment that they will be operating in and have clearly identified and understood all potential risks posed by their operation through a robust risk assessment process.

Where, during the MMP assessment process it is considered that the nature of the proposed mining activities triggers requirements for assessment under the NT *Environmental Assessment Act* (for example, the mining activities or areas within which they will be conducted has changed significantly, or the mining activities have the potential to cause significant environmental harm) the department may refer an MMP to the NT Environment Protection Authority (EPA) for a determination about the application of the NT *Environmental Assessment Act*. If the EPA determine that the *Environmental Assessment Act* applies, the operator will be required to comply with the requirements and procedures applied by the EPA to that assessment process. The assessment by the EPA may result in additional conditions (or other requirements) being applied to the mining activities or the area within which they will be conducted.

This MMP will remain confidential. Public reporting requirements (as per sections 37 (3)(e), (4) and (5) of the MMA) will be required following the MMP assessment process and in the form of the 'Environmental Mining Report'.

## How to Use this Document:

An MMP is required for new projects, on an annual (or as agreed) basis for existing projects, when operations or activities change or when changes are made to the environmental management systems. This document provides general guidance for preparing an MMP to meet obligations under the [Mining Management Act](#) (MMA). This document can also be used as a template to prepare the MMP.

The document contains instructions and some examples of environmental management issues for consideration. The operator must assess environmental issues relevant to the site and develop appropriate controls to manage the potential impacts.

While this document attempts to provide a framework for the operator to capture the majority of information required for an acceptable MMP, an operator may be required to provide additional information to the department for the purpose of assessment of compliance against the MMP.

- A person must not knowingly provide information to the department that is false or misleading (Part 9, Section 72, MMA).
- All commitments must be specific and auditable with measurable outcomes and clear timeframes.
- Use the terms 'will' and 'must', rather than 'should' or 'may' when committing to carry out management actions.
- Do not use ambiguous terminology such as 'where possible', 'as required', 'to the greatest extent possible' without further explanation.
- Clearly explain any technical terms or acronyms used, and/or define them in a glossary.

## Mining Management Plan Structure Guide for Mining Operations

### Notes:

- Presenting summary information in tables, where appropriate, is encouraged.
- Datums to be used are MGA94 or GDA 94 (expressed in decimal degrees) with elevations to be based on AHD.
- All plans, images, diagrams should have north points , legends, scales and scale bars where relevant
- The MMP should be submitted electronically with Optical Character Recognition (OCR) and this will be deemed the official version of the MMP.

## Mining Management Plan Checklist

The Mining Management Plan (MMP) Checklist must be completed. Cross reference page numbers from the MMP and provide comments or reasons for No (N) answers. If 'No' is answered to any of the sections below without adequate reason the department may reject the MMP and require re-submission.

Y/N	Page	Requirement	Department's Comment
		Has the plan been endorsed by a senior representative of the company?	
		<b>Introduction:</b> Have Operator details been included?	
		Is the company structure described?	
		Are title details included?	
		Is there a project summary and description improvements?	
		<b>Site Conditions:</b> Have all the physical environment conditions for the site and surrounds been identified?	
		Have the current land uses and users and stakeholders been identified?	
		Have Community Affairs been described?	
		<b>Statutory and Non-Statutory Requirements:</b> Has all legislation relevant to the operation and associated permits and approvals been identified? Have all non-statutory obligations been identified and included?	
		Have Aboriginal and heritage sites been identified?	
		<b>Operational Activities:</b> Have all operational activities relating to mining, processing, exploration and any related activities for the site been addressed in the MMP?	
		<b>Waste Rock Characterisation:</b> Have results of waste rock characterisation been included and discussed? Has a waste characterisation report been included? Does the MMP include a waste rock management plan?	
		<b>Environmental Management:</b> Has the Environmental Management structure and responsibilities been outlined?	
		Has the Environmental Policy been included?	
		Has a register of environmental commitments been included? Has a summary of all recommendations from the Environmental Impact Assessment been included and addressed if the project has been formally assessed?	
		Has training and induction been addressed?	

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Y/N	Page	Requirement	Department's Comment
		Is there an Environmental Emergency and response plan?	
		Have all environmental aspects and potential impacts been identified? Has a risk assessment been carried out?	
		Have Environmental Management Plans (EMP's) for identified risks been developed and included?	
		<b>EMPs:</b> Do all EMP's include: <ul style="list-style-type: none"> <li>• objectives and targets</li> <li>• management and mitigation strategies</li> <li>• monitoring and measurement</li> <li>• discussion and analysis of results</li> <li>• non-conformances and corrective actions?</li> </ul>	
		<b>Water Management:</b> Has a comprehensive description of surface water conditions been included?	
		Has a comprehensive groundwater model been described?	
		Have information or knowledge gaps been identified and described for water management?	
		Are there comprehensive details (including scopes of work) on actions proposed to be taken to respond to any identified information or knowledge gaps?	
		Have hazards been identified that could result from activities related to the operation and rank the associated risks of impacts to both surface and groundwater?	
		Are all strategies and actions that will be undertaken to manage any risks identified included?	
		Has the water monitoring program been detailed?	
		Has all monitoring data been included?	
		Has an interpretation of data by a suitably qualified person been included?	
		Has a discussion of trends over time been detailed?	
		Have details of remedial/corrective strategies and scopes of work been included?	
		Have proposed actions been detailed?	
		<b>Incident Reporting:</b> Has a table of all incidents recorded on site been included and discussed?	
		<b>Closure Planning:</b> Has a Life of Plan – Unplanned Closure plan been included? Are all disturbances described? Are remediation activities that would be required in the event of unplanned closure described? Are activities required to achieve end land use objectives, described?	
		Does the MMP include a detailed costing of closure activities	

## Mining Management Plan Structure Guide for Mining Operations

Y/N	Page	Requirement	Department's Comment
		for the life of plan? Have all past disturbances and those proposed for the next reporting period been identified and included?	
		<b>Maps and Plans:</b> Maps and plans have scale, scale bar, legend and north point? Datums used are MGA94 or GDA 94 (expressed in decimal degrees) with elevations based on AHD?	

## Mining Operations Mining Management Plan

Include the following details on the title page:

- Operator Name
- Project Name
- Authorisation Number
- MMP Reporting Year
- Date
- Document Distribution List

The MMP must be endorsed by a senior representative of the company who has the appropriate level of delegation.

	Author	Reviewed by	Approved by
Date			
Name			
Signature			

I ..... (*name of approving person*) ..... (*position title*) declare that to the best of my knowledge the information contained in this mining management plan is true and correct and commit to undertake the works detailed in this plan in accordance with all the relevant Local, Northern Territory and Commonwealth Government legislation.

**SIGNATURE:** .....

**DATE:**.....

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### Amendments

As per Section 41(3) of the *Mining Management Act*, an MMP reviewed and amended under Section 41(1)(a) is to clearly identify amendments made. These changes must be outlined in a table, including relevant page numbers, as per the example below.

Section	Amendment
Section 1.1 – Organisational Structure / Chart	Change in organisational structure (p. 1)
Section 2.0 - Project Details	Additional title to be included in Authorisation (p. 1).
Section 4.6 – Identification of Environmental Aspects and Impacts	A new potential impact identified, as a result of change in procedure/process (pp. 25-30).

**NOTE:** If the MMP does not clearly identify the amendments made as per the above table, the MMP will be declared “Deficient” and returned to the operator without any further review.

# 1 Introduction

## 1.1 Operator Details

Identify the project operator and contact details including:

- Name of operator or company (as per Australian Securities and Investment Commission (ASIC) if applicable)
- Key contacts (ie senior on site personnel)
- Postal and street address
- Phone/fax/email contact details

Provide a brief background into the company portfolio (eg a single entity or in joint venture, ownership being domestic or international, major commodities, position in the market and countries where key business dealings are undertaken).

### 1.1.1 Organisational Structure and Responsibility

Describe the management structure and/or any changes over reportable period.

This section must include an organisational structure chart or particulars of the organisations' structure, as per Section 40(2)(d) of the *Mining Management Act*. The chart must include the names of the person filling the assigned roles. This section must also include the name and contact details of the Mine Manager and Environmental Manager and indicate who is responsible for maintaining the MMP and EMP's.

## 1.2 Title Details

Provide a register of ownership for the mining interests associated with the project such as the title numbers, title holders and status. If a title is under application at the time of preparing the MMP, this should also be identified, eg MLA2009.

Table 1: Mining interests			
Title number	Title holder	Grant Date	Expiry Date

**NOTE:** If the operator is not the title holder, a Nomination of Operator form must be completed by the titleholder, appointing the operator for the site, as per requirement under Section 10 of the *Mining Management Act*.

### 1.3 Project Description

#### 1.3.1 Location

Provide the mine site name and a brief description of its location. Identify the nearest major township and the distance of the project from the major township in kilometres. Provide details on the access to the site via highways, major roads and tracks. Include a description/map of the project location in relation to topographical features and regional infrastructure.

Provide current maps and site plans. All plans and maps must be produced at appropriate scale to show relevant detail. Cartographic features should be overlaid onto recent aerial photography or satellite imagery where possible. All features must be clearly labelled.

- A regional plan must show the tenure location within the Northern Territory in relation to the nearest town or main centre and in relation to underlying or surrounding tenure and land use (eg pastoral, national park, town boundary etc). Mineral tenure must be clearly labelled.
- A site plan should include but is not limited to the following features:
  - surface contours at an appropriate interval showing major topographic features including surface hydrology (rivers, creeks, lakes and drainage lines)
  - transport routes such as rail, roads, airstrips and tracks (including local roads, access roads and haul roads)
  - Previous disturbances
  - Infrastructure and mine site features such as:
    - pits (open or underground)
    - waste rock dumps (WRD)
    - tailings storage facility (TSF) or similar (eg residue storage)
    - water storage dams and water management infrastructure
    - processing and accommodation infrastructure
    - hydrocarbon and dangerous goods storage
    - other major infrastructure and areas of disturbance.
  - rehabilitated areas
- A site plan showing proposed changes and location and size of proposed disturbances for the oncoming period in relation to the above features.

Other features may include but are not limited to:

- Environmentally sensitive areas (Sites of Conservation Significance)
- Protected Areas (National Parks and Reserves)
- Cultural / heritage zones (AAPA restricted areas and No-Go zones)
- location of bores
- soil types
- vegetation communities
- easements or corridors for pipelines, roads or railway
- contaminated sites
- pastoral infrastructure where relevant

**NOTE:** All maps must include a scale, date of drawing, orientation (ie North point), contours and be able to be overlaid on the previous site plan.

**NOTE:** The department will require all disturbance areas be provided in an appropriate spatial dataset (ie gpx, kmz or kml files, MapInfo tab files or ArcGIS files).

### 1.3.2 Project Summary and Improvements

Provide a brief history of the mine development and current mine status. Include a history of past mining where relevant. Describe any historical rehabilitation undertaken or disturbances remaining. Any historical liabilities must be addressed in relevant sections on rehabilitation and closure in the MMP.

Describe any exploration, mining activities or other activities that have caused disturbance to the land within or in the vicinity of the mine site, including any access roads, bores or other infrastructure and any activities that have or may have resulted in impact to the environment.

Map where any **departmental audit outcomes** and non-compliances have been addressed in the MMP. Include a summary of corrective actions taken as a result of the audit and timeframes/schedules for ongoing actions.

## 2 Site Conditions

### 2.1 Physical Environment

The following sub-sections should provide a description of the environmental conditions of the project area. The effect of seasonal variation should be considered.

#### 2.1.1 Climate

The MMP should include meteorological information necessary to adequately assess and manage all climatic impacts that could have a significant impact on the project. For example, the minimum drainage design might be based on a 1 in 100 year, 72 hour duration rainfall event. However, in most situations it may be appropriate to complete an independent risk assessment to determine if a 1 in 100 provides sufficient protection.

Climate information should be presented as a graph or table of climate data where appropriate. At least the following should be included:

- Summary data of rainfall (annual, monthly variability), evaporation, temperatures (annual, monthly average - maximum, minimum) and wind speed from nearby stations which are representative of the climatic conditions at the project site.
- Frequency of extreme events such as tropical cyclones, floods, drought and fire.
- Reference to any reports or studies undertaken (eg quantified estimates or measurements of climatic factors).
- Reference to the source of the meteorological data presented.
- Wind speed and wind direction (seasonal variations to be taken into account)

#### 2.1.2 Land Systems

The descriptions should be supported by map(s) at appropriate scales (aerial or topographical) or referenced to an Appendix.

##### 2.1.2.1 Topsoil and Subsoil

Topsoil and subsoil layers should be analysed to identify possible adverse parameters such as low or high pH, high salinity, nutrient, trace element deficiencies, poorly structured soils, dispersive or sodic soils and any potentially hazardous compounds, which may impact on soil management and final land-use and rehabilitation techniques etc.

Where the site has been subject to previous activity (particularly industry or mineral processing) there may be the requirement to investigate possible contamination. Where appropriate, the removal of contaminated material will need to be incorporated into rehabilitation plans and security calculations.

As part of the development of soil management plans, it is recommended that field trials are conducted to test soils for germination and plant growth characteristics. The results will assist in determining the depth of soil profile for harvesting and whether subsoil should be removed as well.

### 2.1.2.2 Topography and Geology

Describe the topography and geology of the area. Include maps to support this section.

### 2.1.2.3 Vegetation

Describe the vegetation land units of the area. More detailed information regarding species should be provided in section 2.1.3. Include maps to support this section.

## 2.1.3 Flora and Fauna

Provide baseline information on plants, animals (terrestrial and/or aquatic) and habitat that may be affected by, or have an effect on, the mining activities. This should include the immediate area, surrounds and those communities downstream which may be impacted. Information must include:

- Identification and description of any species of interest including threatened species (eg under the EPBC Act and NT TPWC Act).
- Habitat description.
- Reference to any reports, studies or database searches undertaken that quantify baseline measurements.
- Description of any invasive species (feral animals and weeds) in the area.

Provide map(s) at appropriate scales (aerial or topographical) or reference maps to an Appendix.

For large projects a detailed flora and fauna survey may be required for inclusion in the EMP.

Flora and fauna surveys must be conducted by suitably qualified and experienced personnel and vegetation descriptions should be according to accepted/published structural classes.

## 2.2 Socio-Economic Environment

Provide a background into the current status of the socio-economic environment of surrounding communities. This information should be sourced in order to measure and manage any changes brought about by the mining operation.

For a mine already operating, describe the changes brought about by the operation over the reporting period.

### 2.2.1 Current Land Use

Describe the current land use on and adjacent to the project area. Information should include:

- Land tenure and land use (eg traditional Aboriginal ownership, Parks and Reserves, pastoral properties, existing mining activities, communities and townships).
- A brief history of any past activities that have occurred on the project area.
- Public and private infrastructure such as roads, power supply, landfills, airstrips, ports, bores, dams etc.

This sub-section should be supported by maps, plans or diagrams at appropriate scales (aerial or topographical) or referenced to an Appendix.

### 2.2.2 Identified Stakeholders and Consultation

This section must include the following:

- A list of all interested parties and stakeholders likely to be associated with the proposed activity, ensuring that both statutory and non-statutory stakeholders that have been identified and consulted. This may include, but is not limited to:
  - Lease owner
  - Land owner
  - Land/pastoral Manager
  - Land claimants (Native Title)
  - Land Council representing the Traditional Owners for the country
  - Neighbours and communities
  - Tenement manager
  - Government Departments
  - Tourism and recreation stakeholders
  - Shareholders.
  - Employees (internal)
- Name and title of persons consulted and issues discussed. Include any specific concerns raised during consultation, actions taken to address them and the current status of these matters.
- An outline of the ongoing arrangements and consultation process undertaken with the underlying landowners and managers, and other interested stakeholders, to ensure they are informed and that their concerns are taken into account.
- Evidence of two-way communication with other relevant stakeholders has been carried out as required must be provided (may be included as an appendix).
- Where mining activities are proposed on parks and reserves and land managed by the Parks and Wildlife Commission, evidence of two-way communication with Parks and Wildlife Commission must be provided (may be included as an appendix).
- Details of the agreed arrangements for maintaining the communications process throughout the life of the MMP.

Notification to and responses from landholders and managers will be considered before MMP approval is issued.

### 2.2.3 Workforce Description and Demography

Outline the workforce to be onsite. Include both company and contractor personnel. Factors for consideration include:

- number in workforce for both current and anticipated activities
- any relevant socio-economic aspects
- number of indigenous employees

### 2.2.4 Community Affairs

**NOTE:** The Minister may require a Community Benefits Plan.

Provide an overview of community affairs initiatives over the MMP reportable period.

This section should include:

- statistics (eg sponsorships, donations, number of traineeships generated, special community projects, and expenditure in local community)
- community affair initiatives (eg protection of historic, cultural, educational, recreational, and aesthetic values)
- Community partnership programs
- Capacity building in local communities to encourage sustainable local and regional enterprise
- Opportunities as a result of the operations presence that will continue beyond the life of the mining operation
- reference to stakeholder commitments at Section 2.2.2 Identified Stakeholders
- How the operation manages and monitors the performance of these social programs.

Community affair initiatives should be based on managing mining activities to protect or enhance values such as historic, cultural, educational, recreational, aesthetic, overall physical well-being, wealth distribution, employment profiles and social structure.

Provide a list of complaints (if any) including dates and operator responses to them.

Summarise the key initiatives or commitments in relation to community impacts, safeguards and objectives for the next reportable period.

Initiatives should take into consideration any developments occurring within the project over the next reportable period which have the potential to create social change, and have some adverse or beneficial effects on social values, not necessarily limited to those of the local community.

Community planning may incorporate cultural management. This section is an opportunity for the company to specify any proposed initiatives in this area for the oncoming reportable period and set any measurable targets and objectives. Planning should also take into consideration stakeholder commitments and the social-economic factors. Include any indigenous employment opportunities.

## 3 Statutory and Non-Statutory Requirements

### 3.1 Statutory Requirements

Provide a list of legislation applicable to the project activities (products or services). The list should include relevant legislation at the following levels:

- commonwealth and international
- local government
- State or Territory

Include information on any licences, approvals or permits required under this legislation.

## 3.2 Non-Statutory Obligations

Briefly provide information on any relevant:

- agreements with community groups or non-governmental operators
- guidelines
- codes of practice
- environmental best practice initiatives
- signatories

## 3.3 Sacred, Archaeological and Heritage Sites

Provide information on sacred, archaeological and heritage sites that may be affected by the mining activities. This should include any nominated, proposed or declared heritage places, sacred sites, archaeological sites and objects.

### 3.3.1 Sacred Sites

Results of an inspection of the Register of Sacred Sites maintained by the AAPA or surveys undertaken by land councils must be summarised and discussed. Results may be provided as an Appendix. Copies of applications, Authority Certificates from the Aboriginal Areas Protection Authority (AAPA) may be attached.

It is expected that Authority Certificates would be required for mining activities.

This should be supported by map(s) at appropriate scales (aerial photograph or topographical).

### 3.3.2 Heritage and Archaeological Sites

Heritage register search, NT Archaeological Resources Database search and any heritage and archaeological surveys completed should be summarised and discussed.

Complete survey reports may be attached as appendices.

Provide plans showing locations of features identified.

## 4 Operational Activities

This section should detail the operational activities associated with the mine. It may include, but is not limited to land clearing, mining, processing and exploration. The type of information sought for this section is detailed below for mining and processing as examples. Any other on-site activities will need to be identified by the operator and described.

Include for security purposes, in table format, a summary of areas of current disturbance, proposed disturbance for the oncoming reporting period and area rehabilitated.



### 4.1 Mining Activities

Provide a description of the key mining activities to be carried out for the coming reporting period.

Include:

- mining methods (eg open cut, underground)
- target commodity
- estimated quantities of ore and waste to be extracted
- dewatering requirements
- life of mine schedule
- Estimated mine life
- water requirements and planned extraction rates and usage
- any other mining related activities
- any changes or improvements from the previously accepted MMP and any proposed changes
- location and dimensions of ore and product stockpiles.
- Provide a description of each ore and product stockpile including seepage and drainage management

#### 4.1.1 Mine Design

Provide an overview of the current mine design. Information may be presented using updated maps or tables.

Discuss any modifications made since the last MMP and any proposed changes for the oncoming reporting period.

Engineered mine designs should be included showing the proposed final mine design.

Include surveyed plans of the current status of the mine in relation to the proposed mine design.

Show the schedule of mining for the coming reporting period in relation to the proposed mine design.

#### 4.1.2 Waste Rock Dump (WRD)

Provide an overview of the waste rock dump design if applicable to the operation. Information may be presented using updated maps or tables. Include:

- Description of the selected design taking into account the surrounding environment, climatic conditions and stakeholder considerations
- method and schedule of placement
- dimensions and locations of waste rock dumps
- material segregation strategies within emplacements
- erosion management and drainage design
- dimensions for current and proposed life of mine
- any design changes to be made over oncoming period
- any modifications to design since last MMP
- rehabilitation schedule

Plans showing WRD construction, current dimensions (surveyed) and final design must be included.

Include dimension and location of historic WRD's.

Details of management of impacts from all WRD's in context of the surrounding environment must be included or may be detailed in an Environmental Management Plan (EMP).

### 4.1.3 Mining Reserves and Geology

Provide a description of:

- ore reserves
- estimate of total waste rock
- ore: waste ratio
- mining schedule of ore and waste for the oncoming period
- mine geology
- quantities of PAF and NAF
- block models showing locations of ore and PAF/NAF waste rock

**Waste rock characterisation must be addressed as per Appendix 9.2 below**

### 4.1.4 Mining Performance against Previous MMP

This section should summarise the performance of the operational activities in accordance with the accepted MMP from the previous reporting period and identify any non-compliance issues that may have arisen.

A table of comparison of ore and waste mined against what was proposed must be included.

Provide plans of surveyed pits as at the start of the reporting period. Indicate what areas have been excavated during the previous reporting period and that proposed for the oncoming reporting period (unless presented in 4.1.1).

## 4.2 Processing Activities

### 4.2.1 Treatment and Ore Processing Operations

Provide a description of processing activities undertaken on site. Include a discussion of any changes made or improvements proposed. Information may include but is not limited to:

- throughput
- materials handling
- reagent and chemical requirements
- water requirements
- processing flow chart

### 4.2.2 Residue/Tailings Storage Facility

Information may be presented as updated maps or tables and may include but is not limited to the following:

- size and location of storage facilities including catchment details
- designs and construction methods
- design specifications (standards)
- source of construction material
- estimated flood heights
- erosion protection
- spillway design and location
- sub-drainage and collection sumps
- residue characterization (mineralogy, metal content, neutralizing capacity, sulfide content and net acid production potential)
- residue quantities generated (short, medium and long term)
- disposal method
- management of tailings/residue process lines
- life of mine tailings/residue disposal schedule
- any identified risks relating to storage facility design over the reportable period
- any modifications to design since last accepted MMP
- any upgrades or planned upgrades
- estimated life of the storage facility

Provide reference or summaries to key documents as appropriate, such as geotechnical reports.

### 4.2.3 Process/Mine Water Dams

Include information on any process water dams or mine water dams and ponds utilized for storing process or poor quality water on site. Information should include but is not limited to:

- design and construction methods
- dimensions
- capacity
- spillway structures
- liners
- design specifications (standards used)
- character of water contained

Support this information with plans.

### 4.2.4 Processing Performance against Previous MMP

Assessment of processing performance should consider such factors as:

- mineral treatment (ore treated, feed grade, recovery, process plant performance)
- product, volumes and quality
- processing circuit (water use)
- energy requirements (power use)
- production and major reagents or chemicals consumption

- engineering upgrades
- a review of the life of mine residue disposal schedule

Detail any new processing initiatives, developments or changes proposed for the oncoming reportable period.

### **4.3 Exploration Activities**

In table format, provide details of exploration activities proposed in relation to the mine site. Include types of disturbance (eg drill holes, costeans, track clearing etc.), area of disturbance (ha, km etc.) and the proposed rehabilitation methods and timeframes.

Provide a comparison of exploration proposed in the previous reporting period against what was actually undertaken.

## **5 Environmental Management**

### **5.1 Environmental Management Structure**

Provide an organisational structure which shows the personnel responsible for environmental management.

### **5.2 Environmental Policy**

The Environmental Policy forms the basis upon which the operator sets its objectives and targets. It is a commitment of top management to comply with applicable legal and other requirements, to prevent pollution and to continually improve with the aim of minimising adverse environmental impacts from the operation. A signed and dated copy of the company environmental policy should be included.

### **5.3 Environmental Commitments**

#### **5.3.1 Commitments Contained in the MMP**

Provide a table of commitments contained in the MMP and which key environmental management issues the commitments relate to. Map these to where they are addressed in the MMP and describe the performance against the commitments.

<b>Table 2: Suggested Format</b>			
<b>Commitment</b>	<b>Due Date</b>	<b>Section in MMP</b>	<b>Performance Against Commitment</b>

### **5.3.2 Recommendations Resulting from Formal Environmental Assessment**

If the project underwent environmental impact assessment under the NT *Environmental Assessment Act* (EAA) within the last ten (10) years, then voluntary commitments made by the operator in the Public Environment Report (PER) or Environmental Impact Statements (EIS) and supplements need to be listed.

All recommendations contained in the assessment report should also be tabled and mapped to the relevant sections of the MMP where they have been addressed. Where a recommendation has not been addressed or a commitment has changed, justification should be given. A suggested table format is provided below.

If the proposal was determined to be a controlled action under the EPBC Act, then this list should also include any conditions imposed under Commonwealth jurisdiction as the NT environmental assessment process has been accredited under the terms of the Bilateral Agreement between the Commonwealth and Northern Territory Governments.

**Table 3:** Suggested format for environmental impact assessment recommendations and issues

<b>Environmental Assessment Report Number, Title and Date</b>		
<b>Recommendation/ Issue</b>	<b>Section in MMP</b>	<b>Performance against Commitment</b>

Discussion of the table or list of commitments should consider:

- progress made against recommendations made in pre-operational assessments
- timeframes for implementation of such recommendations
- expected outcomes
- any further commitments and agreements with statutory bodies relating to assessments

### **5.4 Environmental Training and Education**

Provide an overview of the environmental awareness training and education process regarding responsibilities under this MMP and the MMA.

This should include but is not limited to:

- the induction program (eg general, site, department)
- Communication of the requirements of the MMP to all employees and contractors
- Environmental emergency response training
- Particular training requirements for targeted personnel
- Any other environmental training or education requirements.

Records of all training and induction should be maintained and be available for inspection.

### 5.5 Environmental Emergency Preparedness and Response

Provide an overview of response to environmental emergency situations. Environmental emergency procedures should take into consideration:

- The nature of on-site hazards (eg flammable liquids, storage tanks and compressed gases and measures to be taken in the event of spillages or accidental releases)
- Natural disasters
- The most likely type and scale of emergency situation or accident
- The most appropriate method(s) for responding to an accident or emergency situation
- Internal and external communication plans
- The action(s) required to minimise environmental damage
- Mitigation and response action(s) for post-accident evaluation to establish and implement corrective and preventative actions
- Periodic testing of emergency response procedure(s)
- A list of key personnel and aid agencies, including contact details (eg fire department, spillage clean-up services)
- The possibility of mutual assistance from neighbouring operators
- The location of on-site information on hazardous materials
- Location of emergency response equipment eg oil booms, pumps, spill kits, neutralizing agents, and maintenance / testing schedules for these.

**NOTE:** OH&S is administered through NT WorkSafe under the legislative requirements of the Work Health & Safety (National Uniform Legislation) Act and Regulations; however some actions required may be similar for either an environmental or occupational emergency.

**NOTE:** Information on the storage, transport and handling of dangerous goods must be addressed as per section 9.3 in the Appendices below, or as an Environmental Management Plan under section 5.6.3.

### 5.6 Implementation, Monitoring and Review

#### 5.6.1 Identification of Environmental Aspects and Impacts

Identify all activities associated with the project including those carried out by contractors and suppliers. Identify the actual and potential impacts associated with each activity. Determine what environmental aspects (inputs and outputs, both intended and unintended) are significant.

Environmental aspects to consider include but are not limited to:

- emission to air
- releases to water
- releases to land
- use of raw materials and natural resources
- use of energy
- energy emitted, eg heat, radiation and vibration
- waste and by-products
- clearing

Potential impacts may include but are not limited to:

- disturbance to heritage or cultural sites
- disturbance to communities
- erosion of land
- harm to threatened species
- pollution/contamination to air, water or land
- introduction and spread of non-native species

### 5.6.2 Risk Assessment

Identify which environmental impacts are significant using risk assessment methods.

Provide an overview of risk management techniques and strategies. This section should outline how environmental hazards and associated risks are identified, assessed, evaluated and controlled. At least the following should be included in the overview:

- standards and procedures
- hazard identification
- risk assessment
- risk control
- frequency of assessment

An Environmental Risk Identification Matrix can be used to identify mine activities, processes and facilities which require control strategies to ensure environmental protection. Use this information to design the environmental management activities, controls and monitoring to prevent or minimise those environmental impacts. An example of a risk assessment matrix is included in the appendices.

### 5.6.3 Environmental Management Plans (EMP)

The EMP's should include the detailed mitigation and control measures to be used to prevent or minimise environmental impacts identified from the risk assessment process.

Environmental management plans for the higher risk aspects (prior to the application of controls) requiring management must be included in the MMP. For example, this would include all risks identified as moderate, high and extreme in the risk assessment matrix example in appendix 9.1. The low risks identified and managed by procedures should be available for review on request.

The EMP is a compilation of the activities directed toward:

- achievement of objectives and targets
- managing and reducing the impact of environmental aspects and impacts
- complying with all applicable regulatory requirements
- meeting the requirements of the organisation's environmental policy.

An EMP should specify the affected environmental values, potential impacts on environmental values and mitigation strategies. An EMP is required for those activities, operations, emissions, discharges and procedures which need regular monitoring and measurement. The types of EMP's required for a site should have been identified through the evaluation of aspects and impacts and risk assessment process.

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Depending on the risk assessment process, EMP's may include but are not limited to:

- **Water Management Plan (must be addressed in section 6 below)**
- Soil and Land Management Plan
- Native Flora and Fauna Management Plan
- Pest and Weed Management Plan
- Air Quality Management Plan
- Noise and Vibration Management Plan
- Energy Management Plan
- Waste (domestic and industrial) Management Plan
- Hazardous Material Management Plan
- Waste Rock Management Plan
- Tailings/Residue Management Plan
- Erosion Management Plan
- Cultural Heritage Management Plan
- Socio-Economic Management Plan
- Rehabilitation Management Plan

**NOTE:** The content to be included within **each** EMP is further described in the following Sections.

### 5.6.3.1 Objectives and Targets

Outline the relevant objectives and targets for the specified EMP. The objectives and targets should be measurable and consistent with the environmental policy. Compliance with relevant statutory requirements must also be addressed.

Objectives should address both short and long term matters and be consistent with the goals of the environmental policy. Targets need to be measurable and designed to fulfil the environmental objectives. The objectives and targets must address the significant environmental aspects/impacts that have been identified and demonstrate a commitment to the protection of the environment.

Objectives and targets should be:

- **Specific** and unambiguous, with explicit targets;
- **Measurable**, so that performance can be measured against targets;
- **Achievable**. Does the company have the resources or the capability to meet targets?
- **Realistic**, so not trying to achieve the impossible; and
- **Time-based**, so targets can be met within a certain time frame.

### 5.6.3.2 Management and Mitigation Strategies

This sub section should detail how the operator will meet its objectives and targets and reduce the impact of its environmental aspects.

The EMP must include short term and life-of-mine environmental management activities, mitigation and control strategies to be used to prevent or minimise environmental impacts.

Detailed mitigation measures identified from the risk assessment must be included. Timeframes for implementation of controls should be provided.

Where monitoring measures are identified the minimum performance level or criterion to be achieved must be indicated.



### 5.6.3.3 Monitoring and Measurement

Activities that have the potential to have a significant environmental impact require the establishment of regular monitoring and measurement. Appropriate procedures must be developed, implemented and maintained. Monitoring must be measured against key performance criteria.

Detail the monitoring programs required for the identified environmental aspect of the operation. Include details on schedules, performance indicators to be measured and elements to be analysed. The following issues need to be considered for monitoring and measurement programs:

- measuring performance against policy, objectives and targets
- measuring performance against regulatory requirements
- measuring against international or national measurement standards (if no such standards exist, the basis used for calibration should be recorded)
- Sampling procedures and frequency
- how results will be recorded
- laboratory techniques and methods of data analysis
- equipment and instruments calibrated or verified at specified intervals
- sample preservation techniques

### 5.6.3.4 Review Effectiveness of Management and Mitigation Strategies

Data and statistics of the reporting periods monitoring records need to be analysed with a **discussion and interpretation of results**. The findings need to be assessed against trends, trigger levels or benchmarks to determine the effectiveness of control strategies and whether the targets are being met. Inclusion of graphs showing performance against trigger levels or benchmarks must be used to assist this process.

### 5.6.3.5 Non-Conformance and Corrective Action

The EMP must describe the procedures for dealing with failure to meet performance criteria and targets, non-compliance with environmental management controls, environmental incidents and emergencies. Actions to be taken need to be appropriate to the nature and scale of the non-conformance and the resulting environmental impact.

The cause of the non-conformance must be determined, actions taken to avoid the recurrence documented and a review of the corrective action will need be undertaken.

Any non-conformances and corrective actions taken during the previous reporting period must be included.

## 5.7 Key Environmental Activities for the Oncoming Period

Detail any new environmental initiatives, developments, capital projects or changes proposed for the oncoming reportable period. Intentions should reflect any significant environmental risks identified as part of the EMS and any environmental monitoring programs where appropriate.

## 6 Water Management Plan

This section should cover all surface and groundwater located both on the mine lease and in the receiving environment both up and down gradient of the lease. In addition, it should cover all interactions of those waters with activities related to the operation of the mine and its infrastructure and how those interactions influence water quality and quantity and timing.

As required in the responses to the sections following, appropriately sized and scaled plans are to be provided. It is the operator's responsibility to insure that any imagery used is up to date and reflects the current surface conditions of the site including all infrastructure.

### 6.1 Current Conditions

A water balance with a representation of flows and volumes must be included. The water balance/s must include consideration of the full range of climatic conditions the site may experience, i.e, successive drier than average seasons and successive wetter than average wet-seasons and sensitivity to extreme events.

#### 6.1.1 Surface water

Provide a comprehensive description of surface water conditions (volumes, flows and quality) across the site and the sites relationship to the catchment/s that it is located within.

#### 6.1.2 Groundwater

Provide a comprehensive groundwater model for the site (to be prepared by an appropriately qualified person), at an appropriate scale so as to identify any potential impacts, including regional/off site impacts. This model must be regularly reviewed to ensure it remains relevant and accurate.

## 6.2 Information/Knowledge Gaps

### 6.2.1 Identification of Information/knowledge gaps

Identify and clearly describe any information or knowledge gaps that were identified while preparing the responses to Sections 6.1.1 and 6.1.2 above.

### 6.2.2 Filling Information/Knowledge Gaps

Provide comprehensive details (including scopes of work) on actions proposed to be taken to respond to any identified information or knowledge gaps. A commitment to a time line is also required including regular progress reporting on longer timescale programs.

Where the process of identifying information and/or knowledge gaps has identified areas where there may be significant risk to the environment, propose interim management strategies until the information gathering process is completed.

### 6.2.3 Water Account

A water account based on the Minerals Council of Australia Water Accounting Framework is to be provided for the reporting period.

## 6.3 Risk Management

### 6.3.1 Identify Hazards and Rank Risks

Identify hazards that could result from activities related to the operation and rank the associated risks of impacts to both surface and groundwater. Consideration MUST be given to both potential short and long-term impacts, including mine closure. Provide a commitment including details, to a regular risk assessment process that ensures that any changes to the operation are identified and assessed.

### 6.3.2 Actions and Strategies in Response to Identified Risks

Describe in detail strategies and actions that will be undertaken to manage any risks identified in the risk assessment process. This is to include a commitment to an implementation timetable.

## 6.4 Monitoring

### 6.4.1 Monitoring Program

Detail the surface and ground water monitoring program that will be implemented to demonstrate that;

- a) impacts identified (if any) are within predicted and acceptable/agreed limits, and
- b) management strategies and actions are producing the required outcomes.

Before operations commence, the operator should ensure a comprehensive baseline data set has been collected over multiple seasons and years. Should operations have already commenced then the operator should ensure all available literature is researched and data collated for a baseline.

### 6.4.2 Data Review and Interpretation.

In addition to providing all raw data to the department on an agreed reporting period and in an agreed format, provide a comprehensive interpretation of the raw data by an appropriately qualified person. The interpretation shall include discussion of trends over time and performance against (a) and (b) above.

The review shall also include any modifications or changes proposed to the monitoring program with justifications for approval by the department.

## 6.5 Management

### 6.5.1 Remedial or Corrective Management Actions

Where interpretation of the monitoring data or other observations have detected the potential for or actual adverse trends in performance or impacts, detail what remedial/corrective strategies and actions will be implemented. Include scopes of work where appropriate together with a commitment to an implementation timetable and any modifications to the monitoring program required in order to assess the performance of the actions.

## 6.6 Actions Proposed Over the Reporting Period and their Potential to Impact on Water Quality

Provide details of any action planned or anticipated to be taken on the site over the forward reporting period including commitments to provide the department with an amendment to the Water Management section if and when they occur.

## 7 Incident Reporting

Provide details of incidents reported or included on the operator's register during the previous reporting period. Include details about the incident, how it occurred, where and when it occurred, physical actions taken to rectify, remediate or rehabilitate, and operational actions to address the future management of incidents of this type.

Include:

- reporting of identified hazards
- reporting of accidents/incidents and system failures
- determining the true cause
- checklists for investigations
- corrective actions taken
- preventative actions implemented
- review of corrective and preventative actions
- reporting to statutory authorities
- management of complaints.

## 8 Closure Planning

The department is in the process of drafting new guidelines for Mine Closure. This document will run in parallel with the MMP and will focus on ensuring that operators take the actions necessary to ensure that their operation can be closed in a manner that prevents or minimises the potential adverse long-term environmental and social impacts that may otherwise have resulted from the mining and/or processing operation.

To understand the content of the proposed guideline, operators are advised to view the Western Australia "Guidelines for Preparing Mine Closure Plans – June 2011" as these are being used as the basis for the new Northern Territory guidelines. Further guidance as to the proposed content can be found in the ANCOLD "Guidelines on Tailings Dams – Planning, Design, Construction Operation and Closure – May 2012"

### 8.1 Life of Plan – Unplanned Closure

The department requires that the MMP addresses the possibility and impacts of unscheduled or unplanned termination of operations during the plan life. The objective of this planning is to prevent or minimise potential adverse long-term environmental and social impacts that may otherwise have resulted from the mining and/or processing operation. The importance of the requirement to address Life of Plan Closure is clearly demonstrated by the following statistic: A study of more than 800 mine closures in Australia in the period between 1981 and 2005 revealed that more than 75% of the closures were unplanned (Laurence 2011).

This section must describe the remediation activities that would be required in the event of unplanned closure at any time during this reporting period. All disturbances existing and proposed,

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for this reporting period, must be addressed. This section feeds into the following section on security estimation.

All domains within the project should be addressed and a discussion of appropriate remediation techniques to be used to achieve end land use objectives, materials required and confirmation of their availability must be included.

Reference should be made to the monitoring and maintenance plans provided. Identify any additional/differing activities required as a result of unplanned closure where appropriate.

Provide a detailed description of activities undertaken (and possibly to be undertaken in the future) to achieve end land use objectives throughout the life of the plan. This section should:

- describe activities to be undertaken during the life of this plan to work towards determining agreed end land use objectives
- detail remediation work to be undertaken
- describe success or otherwise of works undertaken to date as reference to planned works – this must be supported by appropriate monitoring data and relate to agreed closure criteria.
- anticipated scope of activities to be undertaken for life of plan
- criteria to be utilised in assessing remediation/revegetation success.

### 8.2 Background for Costing of Closure Activities

Provide background information in sufficient detail for the department to make an assessment of the operators' liabilities.

<b>Table 4: Mining Disturbance Table</b>				
<b>Disturbance type</b>	<b>Quantity</b>	<b>Volumes</b>	<b>Area (ha)</b>	<b>Total area (ha)</b>
Open pit(s)				
Underground mine				
Waste rock dumps				
Product stockpiles				
Heap leach pads				
Tailings dams				
Process water dams				
Potable water dams				
Mine site infrastructure (including workshops and fuel storage)				
Accommodation facility and associated infrastructure				
Bore field and pipelines				
Borrow pits				
Access tracks				
Haul roads				
Laydown areas and other cleared ground not included elsewhere				
Exploration (specify)				
Other (specify)				

### 8.3 Security Estimate

The security estimate established must be consistent with third party costs and remediation requirements in the event of an unplanned closure at the end of the life of this plan, ie rehabilitation costs for disturbances proposed in this MMP and for any previous disturbances carried out. Post closure monitoring and maintenance costs should also be included.

The departments 'Security Calculation Tool' should be used and all workings submitted with the MMP (<https://nt.gov.au/minerals-energy>).

## 9 Appendices

### 9.1 Risk Assessment Matrix

A Risk Assessment Matrix is an example of one of the tools that can assist with the risk assessment process. In assessing the risk:

- Consider what could go wrong?
- Determine how bad the consequences would be.
- Determine the likelihood of it happening
- Calculate the level of risk.

LIKELIHOOD	CONSEQUENCES				
	Catastrophic 5	Major 4	Moderate 3	Minor 2	Insignificant 1
Almost certain 5	10	9	8	7	6
Likely 4	9	8	7	6	5
Possible 3	8	7	6	5	4
Unlikely 2	7	6	5	4	3
Rare 1	6	5	4	3	2

Figure 1: Example of a Risk Assessment Matrix and Interpretation (adapted from Griffith University)

LIKELIHOOD		CONSEQUENCES	
<b>Almost certain</b>	Expected to occur in most circumstances	<b>Catastrophic</b>	Environmental disaster
<b>Likely</b>	Will probably occur in most circumstances	<b>Major</b>	Severe environmental damage
<b>Possible</b>	Might possibly occur at some time	<b>Moderate</b>	Contained environmental impact
<b>Unlikely</b>	Could occur at some time	<b>Minor</b>	Some environmental impact
<b>Rare</b>	May occur only in exceptional circumstances	<b>Insignificant</b>	Low environmental impact

Risk Score	Risk Rating	Action Required
9 - 10	Extreme	Immediate
7 - 8	High	Action plan required. Senior management attention
5 - 6	Moderate	Specific monitoring or procedures required
2 - 4	Low	Management through routine procedures

## 9.2 Waste Rock Characterisation and Management

The purpose of this section is to discuss the assessment and management of waste rock at a site, in the context of the potential for acid and metalliferous drainage (AMD) to be generated. It should be noted that AMD in this context also refers to neutral mine drainage and saline drainage.

The development of a comprehensive characterisation program is critical to the predication, prevention and management of AMD. This program should be designed to collect sufficient data to answer the following questions:

- Is AMD likely to occur and what are the potential sources?
- What type of chemistry is expected?
- When is it likely to start and how much will be generated?
- What are the significant pathways that transport contaminants to the receiving environment?
- What are the anticipated environmental impacts?
- What will be done to prevent or mitigate/manage AMD?

Information on methods typically applied to characterise material can be found in references such as The International Network for Acid Prevention, 2009. Global Acid Rock Drainage Guide.

In addition, where an AMD issue, or potential for, is identified then a waste rock management plan must be developed. It should include:

- What materials need to be managed and how are they going to be identified?
- What are the goals and objectives for the management of AMD generating material?
- How are they going to be managed?
- How is this management going to be integrated into the mine plan?
- What operational controls are going to be required (ie SOP's)?
- Who is going to be responsible for the implementation of the plan?
- How is the overall success or otherwise of the plan going to be assessed?

### 9.3 Storage, Transport and Handling of Dangerous Goods

Provide details of how hazardous materials are stored and managed and the monitoring/inspection regime implemented on site unless this has been addressed within an EMP.

Outline how environmental risk associated with dangerous goods and hazardous materials are managed. Information should include:

- identification of hazardous material and storage requirements
- volumes to be stored
- identification of potential and significant environmental impacts
- assessment of the probable adverse environmental conditions and/or events based on likelihood and consequence, ie determine the level of risk
- control strategies implemented
- relevant standards
- provide a reference to material safety data sheets (MSDS) and where they are located.

Illustrate the location of hazardous materials on a site layout diagram.

### 9.4 Supporting Information for Statutory Requirements and Non Statutory Obligations

Supporting information may be monitoring reports. Factors for consideration include:

- presentation of information as graphs or tables with previous years information
- maps of monitoring sites (here or in Section 9)
- reasoning behind monitoring site/s selection (as shown on supporting map)
- types of sample or measurement
- sampling/measurement frequency
- constituents and parameters and detection limits
- responsibilities for monitoring and response mechanisms
- reporting mechanisms and frequency
- analysis of results
- GEMIS guidelines and ANZECC guidelines
- any changes since last MMP
- may refer to Management System where appropriate.

### 9.5 Diagrams

Figures, maps, plans or diagrams may be included throughout the above Sections or referenced to here as a separate group of supporting information. This information will be used by the Department in the security calculation process. Other information for this process will be included elsewhere in the MMP. Maps and plans should be legible and of suitable quality to identify required detail. All maps must include a scale, date of drawing, orientation (ie North point), contours and legend.



### 9.6 Abbreviations

AAPA	Aboriginal Areas Protection Authority
ANZECC	Australian and New Zealand Environment Conservation Council
ARD	Acid Rock Drainage (also known as Acid Mine Drainage – AMD)
AHD	Australian Height Datum
EAA	Environmental Assessment Act (NT)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management Systems
EPBC Act	Environment Protection and Biodiversity Conservation Act (Commonwealth)
GDA	Geocentric Datum of Australia
GEMIS	Global Emission Model for Integrated Systems
IUCN	International Union for the Conservation of Nature
MGA94	Map Grid of Australia 1994
MMA	Mining Management Act (NT)
MMP	Mining Management Plan
MSDS	Material Safety Data Sheets
NAF	Non Acid Forming
PAF	Potentially Acid Forming
PER	Public Environment Report
RL	Reduced Level (based on AHD)
TSF	Tailings Storage Facility
WMP	Water Management Plan
WRD	Waste Rock Dump