# Mine planning

1. **AIM:** The aim of this program is to ensure that our mining activities are planned and conducted in a manner that, whilst achieving economic profitability, are performed in the safest practicable manner.
2. **WHAT:** We will draw up a site plan that can be used as the basis for the following:

* Emergency plan
* Traffic management plan
* Mine plan
* Inspection areas
* Explosive control plan (recording exclusion zone)
* Other (specify) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The site plan will be completed using Form 20A.

1. **WHO:** The information in Table 1 provides a risk assessment to determine if a statutory mine surveyor is required to prepare and certify our mine plan.

### **Table 1 – Mine plan risk assessment**

| **Issues present at the quarry** | Result (H,M,L) or n/a | Comment |
| --- | --- | --- |
| Underground voids or slope stability issues from adjacent workings (disused or current) |  |  |
| Inrush from a source such as a dam, tailings dam or other water source (not anticipated flooding) |  |  |
| Underground (buried) public utilities and infrastructure (electricity, gas, fuel, communications, hydrocarbons) on site or near boundary |  |  |
| Major natural features (geological features, faults, etc, which may have a major impact on the mine) |  |  |
| Mining in close proximity to the mine’s consent boundary (property, title boundaries) |  |  |
| Mining in close proximity to the final mine design plan (where accurate survey is required) |  |  |
| Storage of explosives |  |  |
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From the risk assessment we have determined that (please tick):

A detailed survey plan of the mine will be prepared and certified by a statutory mining surveyor.

The mine plan will be prepared by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (nominated person) and approved by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (nominated person) and may include plans of various parts of the mine, determined by the risk assessment, which have been surveyed by a qualified cadastral surveyor. This will include as a minimum the requirements of Form 20A.

The mine plan will be prepared by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (nominated person) and approved by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (nominated person) . The mine plan will be completed using Form 20A.

1. **HOW:**

## Mine plan

The mine plan is a document that visually describes the proposed workings of the site, along with its historical mining. It is acknowledged that alterations to the plan may be numerous as mining progresses, however the mine plan will be modified to reflect these alterations and in principle will be the centrepiece for all planning decisions. It will include as a minimum:

* the boundary of the quarry
* the boundary of any adjacent mine workings
* disused workings that are in close proximity
* location of any major geological structures
* end of life proposed rehabilitation requirements
* places for the storage of hydrocarbons or explosives
* proposed workings
* mine sequencing
* haul road layout
* benching layout
* water storage dams and stockpiles
* existing workings
* overhead or underground powerlines

## Mine sequencing

The mine plan will be updated \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(time period) to show previous mined areas and all new proposed workings, along with mine sequencing.

In general, extraction of a multi bench operation will begin at the top of the resource and work down to avoid the creation of high faces.

Our mine plan will be prepared after obtaining input from mine workers and consideration of the following mining sequences, (where applicable):

* topsoil removal and storage of material (stockpile locations)
* preparation of area to extract (access roads, stripping locations)
* extracting resources (bench locations, bench dimensions, firing sequences)
* process materials into saleable material (crusher location and stockpiles)
* transport of sold product off site (haul roads and transport access)
* storage and stockpiling of by products (sumps, dams and stockpiles of waste)
* rehabilitate extracted areas (final rehab design).

## Pit design

Our overall pit design has been developed to maximise the extraction of our resource in line with our development consent, whilst maintaining short and long-term stability of all excavations. It accounts for changes in geotechnical, geological and hydrological conditions and positions access and haul roads to minimise the potential for high faces, gradient exceedances, poor alignment, road slips, road failure and failing debris obstructing traffic. If at any stage our quarry becomes a multi bench operation, where additional knowledge is required regarding geotechnical issues, we intend to engage a geotechnical professional to assist with our design.

Our mine design has been based on the following design parameters, which will be recorded on our Mine Plan Form 20A. They will remain the guiding principles even where mine plan alterations are required.

* Design (regular) bench height \_\_\_\_ (m) [highwall height]
* Max bench height allowable \_\_\_\_ (m)
* Design working bench width \_\_\_\_ (m)
* Design terminal bench width \_\_\_\_ (m) [generally wide enough to allow for rehab]
* Design overall slope angle \_\_\_\_ (degrees) [angle from crest of top face to toe of bottom face]
* Design face angle \_\_\_\_ (degrees) [approx10o in primary rock]
* Final terminal face angle \_\_\_\_ (degrees) [generally approx 35o – 45o]
* Design face orientation \_\_\_\_ (direction) [NW etc]
* Allowable distance to boundary \_\_\_\_ (m) [generally to allow access]

## Stockpile design

Our operation is likely to construct a number of different types of stockpiles and dumps. These are broadly classified according to their construction method:

* By stacker – conveyor stacker that is manoeuvred by self-propulsion or pulled with a fit for purpose piece of equipment on level ground.
* Paddock style (on the ground) – placed by mobile equipment or highway delivery vehicles.
* On stockpiles and dumps (single layer) – where material is pushed up into a stockpile or tipped up a gradient to raise the height of the stockpile above the reach of a machine operating in its normal configuration.
* On stockpiles and dumps (multi layers) – where material is delivered in multiple layers by driving up onto a stockpile or dump.
* Tipping over faces – where a machine is required to tip material over a face.

Stockpiles will only be constructed after considering the following principles:

* The foundations are firm, level and free of excessive water ingress.
* The size of stockpiles will be such that mobile equipment can operate in and around the stockpile without restriction to visibility.
* The size of stockpiles will be such that machines can operate on stockpiles without risk of rollover or material collapsing onto a machine.
* Stockpiles will not be located under or in proximity to overhead power lines.
* Face heights of dumps will take into consideration potential for material segregation, slumping and sequencing of extraction and replacement.
* Dumps that require multiple fill depths will be constructed in layers with the following controls:
  + access ramps will be compatible with plant and will be no steeper than 1:10
  + access will be twice the width of the largest machine
  + access ramps will be compacted over the entire surface including edges
  + dumping short and pushing over is our first choice of construction method
  + where over edge dumping is performed tipping windrows need to be axle height of the machine, floors must slope down away from the edge, machines will dump perpendicular to the face.
  + all non-tipping edges need to have windrows
  + no undercutting will be allowed
  + under no circumstances will loading out from beneath where dumping operations are taking place occur
  + nonoperational areas will be isolate by a bund
  + pre-shift inspections will be conducted and will specifically look for undercutting, water pooling, cracking, slumping.
  + poles will be placed in the tipping area to mark the previous edge when pushing material forward
  + a spotter will be appointed in high hazard situations
  + no edge tipping will be performed in poor light or fog.

## Haul road design

Well designed, constructed and maintained quarry roads will enable mobile plant to operate safely in our quarry. The design and construction parameters for our haul roads are covered in Program 17 traffic management plan.

One of the main objectives of our mine planning program is to ensure that access roads and haul roads are incorporated into the mine sequencing in advance.

Each time the mine plan is reviewed, access to the working areas will be discussed and designs will be implemented to ensure that at no stage is equipment required to operate on roads that do not meet the machines operating capabilities. This is particularly important if planning to haul downhill.

Example of haul road standards

1. **WHEN:** The mine plan will be reviewed and updated as part of the yearly safety plan review (Form 1A).
2. **ACTION:** The mine plan will be displayed in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(location) and previous copies of the plan will be retained \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(location) as a reference.
3. **DOCUMENT CONTROL:** All documents associated with this program shall be recorded on document control master list (Form 3A) and filed in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(location).

Form 20A: Mine plan

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| --- |
| **Mine name:** |

