THE MINISTRY OF ENERGY AND ENERGY INDUSTRIES
MINERALS DIVISION
MINE DESIGN TEMPLATE

1.0 GENERAL INFORMATION

OPERATOR NAME: _____

OPERATOR ADDRESS: _____

PHONE NUMBER: _____

FACSIMILE: _____

NAME OF CONTACT: _____

CELLULAR PHONE: _____

EMAIL ADDRESS: _____

PROJECT LOCATION: _____

Land Ownership

☐Private ☐State

Acreage of Land: _____

Your responses to this questionnaire are not limited to the spaces available. Please ensure that you present relevant and detailed information where it is deemed necessary.

2.0 Quarry Material:

- Sand and gravel. If selected, continue to "Topographic Profile Part A" then "Part C"
- Hard Rock. If selected, continue to "Topographic Profile Part B" then "Part C"
- Other. Please indicate resource of interest
  □ porcellanite □ clay □ asphalt □ yellow limestone □ blue limestone
  □ oil sands □ red sands
  If selected, continue to "Topographic Profile Part A" then "Part C"

3.0 TOPOGRAPHIC PROFILE PART A

3.1 <u>CROSS SECTIONS:</u>

Ensure that the following cross sections are submitted:

□Profile of quarry site prior to mining activity along a North-South transect
□Profile of quarry site prior to mining along a East-West transect
□Profile of quarry along a North-South transect while being developed
□Profile of quarry site along a East-West transect while being developed
□Profile of quarry site along a North-South transect after site restoration
□Profile of quarry site along a East-West transect after site restoration
□Proper use of a legend/ key: indicate all features along the section (such as watercourses (natural and man-made, slope, etc.)

All drawings must be done to the same scale as that provided in the data package, or at an appropriate scale if the data is derived from a private source.

3.2 Select the average **SLOPE ANGLE** of the property:

□ 0 – 5 degrees	□ 16 – 20 degrees	□ 31 –35 degrees
□ 6 – 10 degrees	□ 21 – 25 degrees	□ 36 – 40 degrees
□ 11 – 15 degrees	□ 26 – 30 degrees	□ Other

4.0 <u>DRAINAGE</u>:
4.1 ***What is the type of drainage present on or nearby the quarry site? Tick all those that apply:***

NATURAL SURFACE DRAINAGE:
□Watercourses □Natural outfalls □ Perennial □ Intermittent

MAN-MADE DRAINAGE:
□Roadside drains □Perimeter drains □Stormwater ponds □Silt traps □Settling ponds □Man-made outfalls (connected to municipal drainage)

4.2 Are Settling Ponds present?
□Yes □No

4.3 Give dimensions of the settling ponds.

4.4 Specify type of outfalls present in relation to settling ponds on site:
□Man-made □Outfall to rivers □Closed Loop □Use of silt traps

5.0 <u>GENERAL LAND USE OF PROPERTY</u>:

List those that are **SITE-SPECIFIC**.

List those within the **HOST COMMUNITY**.

6.0 <u>Vegetation Type</u>

□Primary forest □Evergreen seasonal forest □Semi-evergreen seasonal forest □Deciduous seasonal forest □Grasslands □Bush lands □Cultivated lands

6.1 Acreage covered by primary forest:

6.2 Acreage to be cleared:

6.3 Acreage to be left undisturbed:

7.0 <u>The Prepared Quarry Site</u>

7.1 Acreage used for overburden stockpile:

7.2 Acreage used for aggregate stockpile:

7.3 Acreage used for settling ponds:

7.4 Number of quarrying pits:

7.5 Acreage used for each quarrying pit or strip:

8.0 LAYOUT OF MINE

8.1 MINE DESIGN- The following checklist is provided to ensure that specific quarry site features are indicated on the Mine Design Plan/ Layout. Please produce details with respect to the location of:

□Mine boundaries

□Offices and buildings
□Fuelling site
□Wash plant
□Settling ponds
□Drainage and watercourses, complete with setback distances
□Stockpile and pit
□Berms
□Roadways in the vicinity and on the quarry site, complete with setback distances

8.2 Complete with diagrams to support data provided, give specifications of <u>BERMS</u> constructed:

HEIGHT:
□0 – 2 metres □3 – 5 metres □6 – 10 metres □10 – 15 metres □more than 15 metres

WIDTH:
□0 – 2 metres □3 – 5 metres □6 – 10 metres □ more than 10 metres

ANGLES:
□0 – 5 degrees □6 – 10 degrees □11 – 15 degrees □16 – 20 degrees □21 – 25 degrees □26 – 30 degrees □31 – 35 degrees □36 – 40 degrees □more than 40 degrees

8.3 State the location of these berms on the property.

8.4 SETBACK DISTANCES (for example, distance of berms from rivers, setback from roadways):
□0 – 30 metres □31 – 35 metres □36 – 40 metres □41 – 45 metres □more than 45 metres

8.5 What is the thickness of the soil profile?
□0 – 6 inches □6.25 – 10 inches □10.25 – 12 inches □12.25 – 18 inches □18.25 – 24 inches □more than 24 inches

8.6 What is the thickness of the overburden?

□0 – 2 feet □2.1 – 5 feet □5.1 – 7 feet □7.1 – 10 feet □more than 10 feet

8.7 What is the volume of the overburden to be removed?

8.8 Please describe the method used to store overburden.

8.9 Ensure that well annotated diagrams/ drawings are submitted to show the location of the following on-site:

□ The pit(s) or benched slopes: Give dimensions such as height, width, depth, area, volume, and angle. Indicate drainage network used and number of benches.

□ The processing plant(s)

□ The water well or intake ponds and settling ponds

□ The stock pile(s) of topsoil, overburden, pit-run, processed material, spoil and fill

□ The office(s), lunch room(s), roads and related infrastructure

All drawings must be done to the same scale as that provided in the data package, or at an appropriate scale of the data is derived from a private source.

Data from boreholes appropriately used on Isopach maps could be supplied here to support volumes of overburden to be removed. Isopach maps are to be attached to the 'Geological Interpretation' Section of this document.

9.0 TOPOGRAPHIC PROFILE PART B:

9.1 What type of hard rock quarry will be operated?

□ Hill-side quarry □ Open-pit quarry

Provide a comprehensive analysis of the geotechnical properties of the hard rock. Consider fractures, joints and beddings. Prepare a detailed geological model for the site, and include it as part of the 'Geological Interpretation' of the quarry site.

9.2 Provide quarry design and phasing plans for the quarry site. Design rules provided should include the following:

□ Minimum allowable bench widths (both final positions and working bench widths)

□ Maximum allowable bench heights, and maximum overall slopes in all materials to be excavated

□ Maximum foundation slopes as well as maximum slope angles and heights for in pit and out of pit spoil (this may vary according to the type of material to be placed)

□ Minimum allowable haul road widths, maximum allowable haul road gradients. Any other aspect of mineral haulage in pit (e.g. maximum gradients for in pit conveyors and widths to be allowed for such structures).

If applicable, please submit an assessment of the quarry site identifying likely slope failure zones. Suggest the varying bench and slope arrangements in different areas of the pit and show how it has been accommodated into the quarry design. Show how the spacing and orientation of discontinuities and their dip have influenced the development of the quarry benches.

9.3 GEOLOGICAL INTERPRETATION

Select the Resource or Mineral of Interest to be extracted, as indicated in geological interpretation:

□Sand

Gravel
Porcellanite
Clay
Asphalt
Yellow limestone
Blue limestone
Oil sands
Red sands

9.4 ***Please ensure that the following are included:***

A geological map of the mine in plain view.
Geological cross-sections in the N-S and E-W directions (both at the surface and subsurface).
A geological block-model displayed in 3D.
Isopach Maps of the thickness of the overburden and available resource.

Submit drawings to support the information you have provided. All drawings must be done to the same scale as that provided in the data package, or at an appropriate scale if the data is derived from a private source.

9.5 Hydrogeological Setting

Submit data and supporting annotated maps to highlight aspects of the area's hydrogeological setting that would be affected by the quarrying activity. Data should include details of the following:

Confined or artesian aquifer
Confining layer
Consolidated rock
Discharge
Drawdown

□Groundwater
□Perched aquifer
□Recharge area zone
□Saturated zone
□Surface water
□Unconfined aquifer
□Unconsolidated materials
□Unsaturated zone
□Watershed
□Water table

10.0 PART C: SCHEDULING OF OPERATIONS

10.1 What is the procedure and schedule for the felling, storage and disposal of timber in the area to be mined?

10.2 What are the type, size and capacity of all plant and equipment to be used in the mining and processing of material? Please provide a list of each piece of equipment and their capacity that will be used in mining.

10.3 What is the method (give complete description) and rate of removal, storage and disposal of topsoil and overburden?

10.4 If applicable, what is the method and rate of de-watering of the mine?

10.5 What is the method and rate of extraction, storage, processing and disposal of aggregate?

10.6 Will a processing plant be on-site?

□ Yes □ No

10.7 Type of Processing Plant: □Wet □Dry

10.8 What is the source and rate of extraction of water for processing operations?

10.9 What is the method and rate of operation of the processing plant?

10.10 What is the method of treatment of water for use in processing operations?

10.11 What is the method and schedule for the cleaning, storage and disposal of fill from settling ponds?