

# CALL FOR PRE-QUALIFICATION MINING EQUIPMENT

**MATAWINIE MINING PROJECT**  
Saint-Michel-des-Saints, Québec, CA

**2020**



**NOUVEAU MONDE** GRAPHITE

## TABLE OF CONTENT

|           |   |          |
|-----------|---|----------|
| <b>1.</b> | <b>INSTRUCTIONS FOR SUBMISSION</b>                | <b>1</b> |
| <b>2.</b> | <b>FORWARD</b>                                    | <b>1</b> |
| <b>3.</b> | <b>PURPOSE</b>                                    | <b>2</b> |
| <b>4.</b> | <b>PROPOSED EQUIPMENT SUPPLY SCHEDULE</b>         | <b>2</b> |
| <b>5.</b> | <b>PROCUREMENT PROCESS AND TIMELINE</b>           | <b>3</b> |
| <b>6.</b> | <b>DETAILED EQUIPMENT CONFIGURATION(S)</b>        | <b>4</b> |
| 6.1       | Main Production - Excavator (85-95T)              | 4        |
| 6.2       | Main Production - Wheel-loader (45-55T)           | 4        |
| 6.3       | Main Production - Haul Truck (50-65T)             | 4        |
| 6.4       | Main Production – Drill (25-28)                   | 4        |
| 6.5       | Auxiliary – Excavator (45-55T)                    | 5        |
| 6.6       | Auxiliary – Bulldozer (38-45T)                    | 5        |
| 6.7       | Auxiliary – Bulldozer (20-25T)                    | 5        |
| 6.8       | Auxiliary – Motorgrader (20-30T)                  | 5        |
| 6.9       | Operation Support – Excavator (20-25T)            | 5        |
| 6.10      | Operation Support – Support Wheel Loader (20-25T) | 5        |
| <b>7.</b> | <b>BACKGROUND</b>                                 | <b>6</b> |
| 7.1       | Units and Definition                              | 6        |
| 7.2       | Location  | 6        |
| 7.3       | Operating Conditions                              | 6        |
| <b>8.</b> | <b>TECHNICAL DATA</b>                             | <b>6</b> |
| 8.1       | Technical notes                                   | 6        |
| 8.2       | Operating Time Parameters                         | 7        |
| 8.3       | Operating Loading Factors                         | 7        |
| 8.4       | Mine Design Parameters                            | 8        |
| 8.5       | Mine Plan   | 8        |

# 1. INSTRUCTIONS FOR SUBMISSION

All submissions should be uploaded directly on the Nouveau Monde Submissions Portal located at [www.nouveaumonde.group/qualification-electric-fleet](http://www.nouveaumonde.group/qualification-electric-fleet).

- The portal opens to submission on November 30, 2020 at 8:00 a.m. EST.

The web portal will not limit the amount of submissions made however it will close on the submission deadlines as identified below.

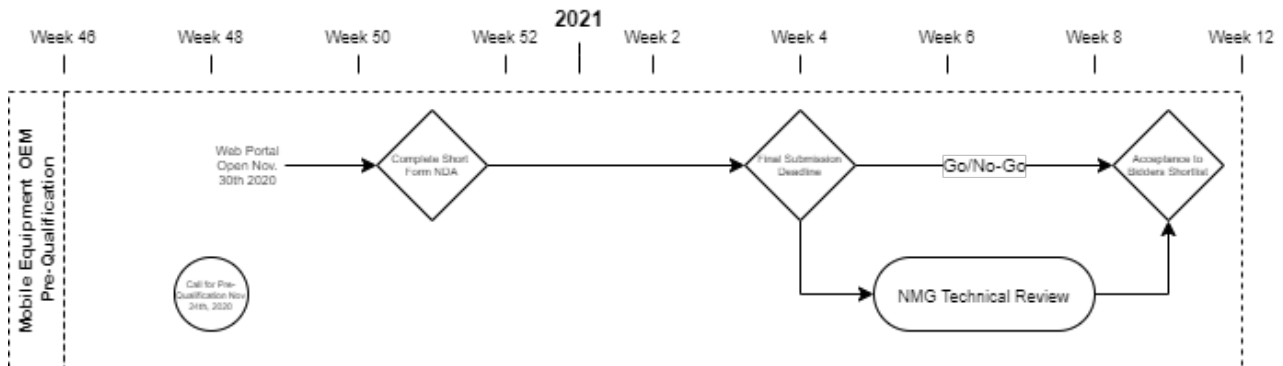


Figure 1: Mobile Equipment Pre-Qualification Schedule

- Complete short form NDA. Please submit any questions or concerns regarding the NDA prior to the NDA submission deadline of 4:00 p.m. EST on December 16, 2020.  
 Contact email: [electric@nouveaumonde.ca](mailto:electric@nouveaumonde.ca)  
 Email Subject: Mobile Equipment Pre-Qualification`
- Each proposal should include a detailed submission on current and on-going research with specific OEM development initiatives and plans for 2021-2028.
- Please complete the “Data Sheet – Equipment Specification” to the best of your abilities for each piece of equipment that you intend to supply detailing the performance of your proposed solutions.
- Include all other relevant and supporting technical information that will help us qualify your solutions for our operation.
- All final submissions should be received no later than 4:00 p.m. EST on January 30, 2020.

# 2. FORWARD

Nouveau Monde Graphite is set to become a key operator in the sustainable energy revolution. The Company is developing the only fully integrated source of green battery anode material in North America. Targeting full-scale commercial operations by early 2023, the Company will provide advanced carbon-neutral graphite-based material solutions to the growing Lithium-ion and fuel cell markets. With low-cost operations and the highest of ESG standards, Nouveau Monde Graphite will become a strategic supplier to the world’s leading battery– and automakers, ensuring robust and reliable advanced material while guaranteeing supply chain traceability.

The Company is committed to the sustainable development of its flagship property, the mining project in Matawinie, and in the implementation of its business strategy for the second transformation of graphite.

Nouveau Monde Graphite plans to reach neutral carbon operation to all activities, which should make it the world's first carbon neutral open pit mine.

A carbon-neutral open-pit operation at our Matawinie graphite property in Saint-Michel-des-Saints, Québec will:

- Eliminate the need for Diesel at our operation reducing both GHG and Noise emissions.
- Allow us access to some of the cheapest and cleanest energy worldwide. We can achieve hydro rates from 3.3 ¢/kwh which will return a positive economic position.
- Graphite is a key mineral found in most Li-Ion battery anodes and in the production of fuel cells. To encourage a circular economy, we would like to promote our position as a supplier of high-grade graphite by closing the loop and becoming a consumer of the product using the same technology in our mining fleet.

### 3. PURPOSE

Since releasing the feasibility study in 2018 Nouveau Monde Graphite have been hard at work determining the solutions that will support our transition towards a carbon neutral mining fleet. Regardless of current assumptions made and the mathematical indications that a carbon neutral mining fleet can exist we need to confirm our commercial partners to deploy the solutions at a commercial scale.

This call for pre-qualification will be used to select OEM's that have the capacity to meet the companies' requirements to adopt a carbon neutral vehicle fleet at our greenfield project. The approach will be to identify equipment whether commercially available or as prototypes and conduct in-depth performance research to better understand how the mine plan will have to adapt to this newly proposed technology. NMG is seeking to work together to generate the information needed to help standardize many of the components related to Battery Electric Vehicles, Cable Electric Vehicles and/or Hydrogen Fuel Cell Vehicles concepts needed.

These components could include (but are not limited to): common technology (interchangeability), common charging infrastructure, duty cycle requirements, mine design, standards/certification, health and safety requirements etc.

OEMs can submit commercially available solutions or equipment under development for NMG mining/production fleet. We also do not expect that a single OEM will be able to contribute solutions for the entire fleet and will accept proposals for individual items.

For development proposals the work could include: engineering, design changes, modifications and fabrication of new components and/or prototypes. We are also open to retrofit solutions but ultimately, we require a commercial strategy to transition away from diesel during the specified timeline.

### 4. PROPOSED EQUIPMENT SUPPLY SCHEDULE

The following is the projected list of equipment requirements, quantities and proposed timeline. Initial 2023 equipment requirements must be operational on-site by March 1st, 2023 for the beginning of the stripping operation.

| Item | Description                                    | Quantity Required on Site, by Year & Quarter |           |           |           |           |
|------|--|--|-----------|-----------|-----------|-----------|
|      |  | 2023 - Q1                                    | 2023 - Q2 | 2023 - Q3 | 2023 - Q4 | 2024 - Q1 |
| 1    | Main Production - Hydraulic Excavator (85-95T) |  | 2         |           |           |           |
| 2    | Main Production - Wheel-loader (45-55T)        |  | 1         |           |           |           |
| 3    | Main Production - Haul Truck (50-65T)          | 4-5  |           | 8-10      |           | 10-14     |
| 4    | Auxiliary – Excavator (45-55T)                 | 2  |           |           |           |           |
| 5    | Auxiliary – Bulldozer (38-45T)                 | 2  |           |           |           |           |
| 6    | Auxiliary – Bulldozer (20-25T)                 |  |           | 2         |           |           |
| 7    | Auxiliary – Motor grader (20-30T)              | 1  |           |           |           |           |
| 8    | Operation Support – Small Excavator (20-25T)   |  | 1         |           |           |           |
| 9    | Operation Support – Small Loader (20-25T)      |  | 1         |           |           |           |
| 10   | Production Drill (25-28T)                      | 1  |           |           |           | 2         |

Table 1: Equipment List

Please note that the equipment list provided does not include all equipment required for the operation. As an example, small auxiliary vehicles and personnel transport have been omitted.

- The quantity of each type of equipment listed in the table above shall be confirmed by the Supplier.
- The quantities of the table above are for total operating equipment. The schedule presented could change based on last project schedule review. It does not include replacement equipment.
- The Supplier may recommend alternatives to fulfill the requirements if required.
- The proposed equipment shall comply with all applicable Federal and Provincial regulations.

## 5. PROCUREMENT PROCESS AND TIMELINE

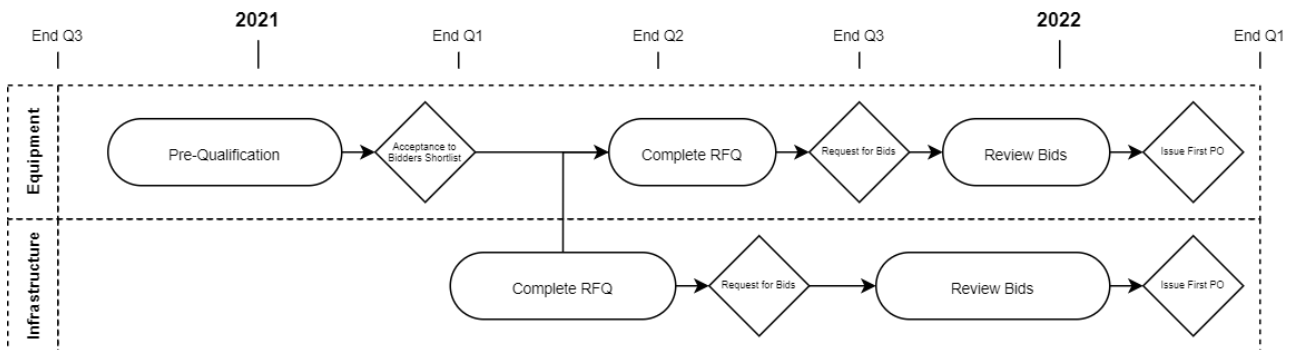


Figure 2: Procurement Schedule

We require our first carbon neutral equipment onsite in early 2023 meaning that purchase orders will be issued in the first quarter of 2022. This pre-qualification exercise is meant to establish all those equipment manufacturers who which to participate in our procurement program and to be considered for the upcoming RFQ process.

Due to the foreseen complicated nature of interoperability between suppliers we hope this pre-qualification will allow us the opportunity to review the current state-of-the-art and ensure there is alignment before issuing the first RFQ's. We are also in the process of defining the infrastructure required to manage a possibly autonomous, electric and/or fuel cell electric mine. This process has many overlapping elements

that require consideration long before first ore is produced in 2023. We expect the feedback from the pre-qualification process will finalize our decisions in this respect and trigger the completion of a separate RFQ process for things like chargers, on-site energy storage, substations, etc.

## 6. DETAILED EQUIPMENT CONFIGURATION(S)

### 6.1 MAIN PRODUCTION - EXCAVATOR (85-95T)

Two (2) unit, Hydraulic Excavator 85-95T.

5.5 - 6.5 m<sup>3</sup> Severe to Extreme duty bucket with corner Shrouds and side wear plates.

Standard lift configuration Mass operation able to load either 50-65T trucks.

Propel max speed 3.0 mph/3.2 kph.

### 6.2 MAIN PRODUCTION - WHEEL-LOADER (45-55T)

One (1) unit, Wheel Loader 45-55T.

Standard or High lift (depend on truck choices) lift configuration.

Tires 45/65R45 58PR L-5 mine rock loader tread.

Bucket – 5.5-7.5 m<sup>3</sup> heavy duty rock tooth and segment with heavy penetration tips.

### 6.3 MAIN PRODUCTION - HAUL TRUCK (50-65T)

Eight-fourteen (8-14) Articulated truck or Rigid Body Truck (units to determine).

Tires 33.25R29 to/or 24.00/R35.

### 6.4 MAIN PRODUCTION – DRILL (25-28)

Two (2) Drills: 25-28 metric tonnes- operating weight.

Down The hole Drill

Engine 350-400Kw

Hole Range from 4'' to 8''

Affected to production (10m bench height) and Pre-shear (20m wall height)

Drill Rods sizing to be determined

Hammer sizing to be determined

Rock hardness between 75-150Mpa

Bench Remote Option

Automation Technology and Hole Navigation System required, GPS

Flexibility to drill horizontally

Efficient Dust Collector

Reverse Circulation (RC) options.

## **6.5 AUXILIARY – EXCAVATOR (45-55T)**

Two (2) unit Hydraulic Excavator 45-55T.  
 Standard lift configuration Heavy duty Reach.  
 One (1) unit with mechanical quick attach.  
 3.0 – 3.5 m<sup>3</sup> Heavy to Severe duty bucket.  
 Width of Track Shoes 600mm (24in).

## **6.6 AUXILIARY – BULLDOZER (38-45T)**

Two (2) units Track Dozer operating weight 38-45T.  
 Blades Identical on dozer #1 and dozer #2.  
 Undercarriage - Track Extreme service +/-610mm  
 Ripper Single-Shank on Dozer #1 and no Ripper on dozer #2.

## **6.7 AUXILIARY – BULLDOZER (20-25T)**

Two (2) units Track Dozer operating weight 20-25T.  
 Blades Identical on dozer #1 and dozer #2, VPAT.  
 Undercarriage – Track landfill-tailing service LGP +/-760mm on dozer #1 and LGP +/-760mm on dozer #2.  
 No Ripper.  
 Ground pressure 40-60KPA.

## **6.8 AUXILIARY – MOTORGRADER (20-30T)**

Two (2) units Motorgrader operating weight 20-25T.  
 Moldboard Identical on grader #1 and grader #2, 14ft (4.3m).  
 Ripper 401mm.  
 Tire Arrangement 16.0R24.

## **6.9 OPERATION SUPPORT – EXCAVATOR (20-25T)**

Two (2) Hydraulic Excavator 20-25T.  
 Standard lift configuration Mass operation.  
 0.5 – 2.0 m<sup>3</sup> General Purpose duty bucket with quick attach.  
 Width of Track Shoes 600mm (24in).  
 Propel max speed 2.0 mph/3.2 kph.

## **6.10 OPERATION SUPPORT – SUPPORT WHEEL LOADER (20-25T)**

One (1) wheel loader (operating weight 20-25T).

Standard lift boom configuration.

3-4 m<sup>3</sup> GP bucket with bolt on cutting edge – quick attach.

Construction forks with hydraulic side shift – quick attach

Material handling arm – quick attach.

Tires 26.5R25 L3 mine rock.

## 7. BACKGROUND

These are the minimum requirements for the supply of carbon neutral solution for use at the Matawinie mine property.

### 7.1 UNITS AND DEFINITION

All specification data is expressed in metric units.

### 7.2 LOCATION

The mining operation lies within the municipality of Saint-Michel-des-Saints, Lanaudière Administrative Region, Province of Quebec, Canada. The centre of the operation is positioned approximately 120 km as the crow flies north of Montréal, more or less at latitude 46.63° and longitude -73.96°.

### 7.3 OPERATING CONDITIONS

Continental Humid Climate peak high 22-28 degrees C° and peak low temperature at -29 to -40 degrees C°

Monthly Rain precipitation around 95mm/month in summer and 50mm/month in winter, Yearly Avg. 75mm/month.

Monthly snow precipitation around 433mm/month in winter and 113mm/month in season transition, Yearly Avg. 243mm/month.

Mine operation altitude between 315 (pit Bottom) to 586 (Waste Dump)

Ore and Waste Material – 2.76 T/m<sup>3</sup> to 2.83 T/m<sup>3</sup>.

Overburden Removal from 5 to 35m thickness layer.

Stripping Ratio W:O = 1.10.

## 8. TECHNICAL DATA

### 8.1 TECHNICAL NOTES

The technical notes used to determine the efficiency, speed, fuel consumption profiles, productivity, and availability are provided. The parameters provide the information required to allow the Supplier to provide (after pre-qualification) NMG with a complete price proposal.



## 8.2 OPERATING TIME PARAMETERS

Production scheduled for +/- 3000 hours/year, 240 days/year (10 days for holidays and weather), 2 shifts/day at 8 hours/shift. All major and auxiliary equipment (except for the drill) follow the Schedule shown in Table 2. The operators will also follow the same Schedule.

| HOURS BREAKDOWN            |            |      |                     |
|----------------------------|------------|------|---------------------|
| Calendar                   |            |      | 16.00               |
| Availability (approx. 85%) |            | Down | 13.60               |
| Use (approx. 90%)          |            | std. | Gross (GOH) → 12.32 |
| Ready (approx. 84%)        | Op delay   |      | Net (NOH) → 10.35   |
| Direct                     | Efficiency |      | 7.76                |

Table 2: Production Schedule

## 8.3 OPERATING LOADING FACTORS

The operating and loading factors include constant factors such as material characteristics, timing, and mine design parameters. These factors are independent of the type of equipment and should be used in the optimization of selected equipment. All numbers represented in this request are from the Detailed engineering/Life of Mine 2020 exercise.

### Material Characteristics

In situ-Bulk Density

- Ore, Waste: 2.76t/m<sup>3</sup> – 2.82T/m<sup>3</sup>.
- Overburden: 2.1t/m<sup>3</sup>.

Swell of Material

- Ore, Waste: 40%.
- Overburden: 20%.

Loose Density

- Ore, Waste: 2.08t/m<sup>3</sup> – 2.13t/m<sup>3</sup>.
- Overburden: 1.86t/m<sup>3</sup>.

Abrasiveness: The material in the Block Tony deposit is less abrasive than average. Abrasive index tests were completed and indicated that the material has Ai values ranging from 0.085 to 0.185 (i.e. 12th-38th percentile, according the SGS).

Fill Factors: The haul truck bucket fill factors for ore, waste and overburden will range from 90-96%.

Fragmentation projected:

- Ore: P80=450 mm;
- Waste: P80=600 mm.

## 8.4 MINE DESIGN PARAMETERS

The bench design parameters and operational parameters are important for the selection of equipment. The production benches are planned for 10 m, double benches, where 2 flitches of 5m in the ore body. Pit configuration with a double lane ramp measuring 16m in width. The ramp grade is 10%.

| Parameters                       | Value     |
|----------------------------------|-----------|
| Benching Arrangement (operation) | 2 x 10 m  |
| Berm Width                       | 10.5 m    |
| Inter-Ramp Angle (IRA)           | 50° - 60° |
| Bench Face Angle (BFA)           | 80-85°    |
| Ramp Width (1-lane)              | 10 m      |
| Ramp Width (2-lane)              | *16 m     |
| Ramp Grade                       | 10%       |

Table 3: Pit Geometry

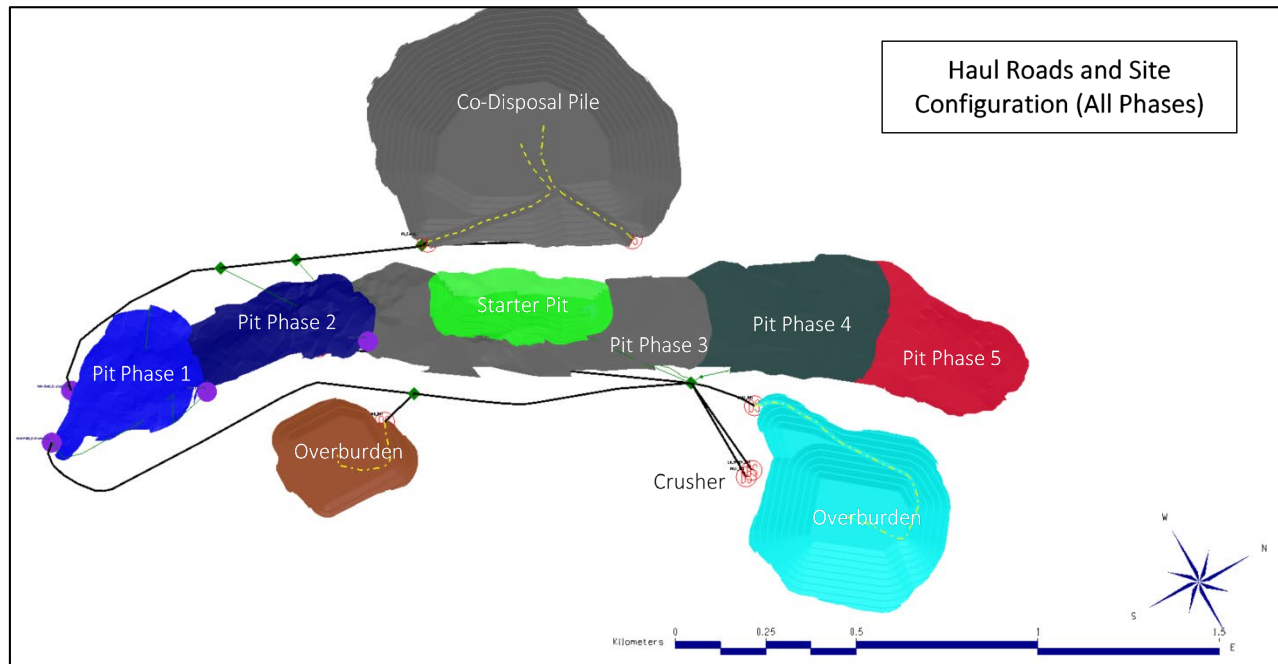
\*Ramp Width is set to 16m in all pit phases (1-5). Such ramp size is corresponding more to 50T trucks usage.

However, after year 8 in the mine plan NMG will be mining phase 3 and further phases, where designs could ultimately be sets with ramp width up to 22m (max) allowing electrical/Neutral carbon truck to be bigger size, around 65T trucks.

## 8.5 MINE PLAN

| Mine Production    | 2023                 | 2024      | 2025      | 2026      | 2027      | 2028      | TOTAL      | 2029      | 2030      | 2031      | 2032      | 2033      | TOTAL      |
|--------------------|----------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|------------|
|                    | Year -1 (PP+Ramp-up) | Y-01      | Y-02      | Y-03      | Y-04      | Y-05      | 5 years    | Y-06      | Y-07      | Y-08      | Y-09      | Y-10      | 10 years   |
| Ore Mined (t)      | 624,847              | 2,360,192 | 2,409,507 | 2,493,110 | 2,552,916 | 2,651,150 | 12,466,875 | 2,439,128 | 2,396,035 | 2,294,997 | 2,361,905 | 3,302,921 | 25,261,862 |
| Waste Mined (t)    | 1,200,950            | 2,085,041 | 2,339,924 | 2,472,746 | 2,361,293 | 2,559,770 | 11,818,775 | 2,645,029 | 2,661,582 | 2,754,626 | 3,214,840 | 5,804,362 | 28,899,213 |
| Overburden (t)     | 526,803              | 639,601   | 252,369   | 12,001    | 535,791   | 139,080   | 1,579,041  | 165,844   | 92,383    | 250,377   | 1,662,625 | 219,185   | 3,969,454  |
| Total Mined (t)    | 2,352,599            | 5,084,834 | 5,002,000 | 4,977,857 | 5,450,000 | 5,350,000 | 25,864,691 | 5,250,000 | 5,150,000 | 5,300,000 | 7,239,370 | 9,326,468 | 58,130,529 |
| Rehandle (t)       | 758,687              | 2,673,881 | 2,599,017 | 2,499,862 | 2,551,058 | 2,503,023 | 11,082,505 | 2,549,753 | 273,347   | 147,603   | 97,238    | 66,058    | 14,216,504 |
| Non-Production (t) | 47,052               | 101,697   | 100,040   | 99,557    | 109,000   | 107,000   | 457,346    | 100,000   | 100,000   | 100,000   | 100,000   | 100,000   | 957,346    |
| Tonnage Moved(t)   | 3,158,338            | 7,860,412 | 7,701,057 | 7,577,276 | 8,110,058 | 7,960,023 | 37,404,542 | 7,899,753 | 5,523,347 | 5,547,603 | 7,436,608 | 9,492,526 | 73,304,379 |

Table 4: Mine Plan



Cycle Time (approx. from center of mass source to destination back & forth)

| Phases       | Starter Pit |            | Phase 1  |            | Phase 2  |            | Phase 3  |            | Phase 4  |            |
|--------------|-------------|------------|----------|------------|----------|------------|----------|------------|----------|------------|
|              | Distance    | Cycle time | Distance | Cycle time | Distance | Cycle time | Distance | Cycle time | Distance | Cycle time |
| <b>OVB</b>   | 1,790       | 5.09       | 4,540    | 17.06      | 4,110    | 13.06      | 3,186    | 10.75      | 3,577    | 12.44      |
| <b>Waste</b> | 1,381       | 4.71       | 2,552    | 8.98       | 2,036    | 6.47       | 1,381    | 4.71       | 1,525    | 5.32       |
| <b>Ore</b>   | 1,985       | 5.26       | 5,606    | 19.10      | 5,175    | 15.10      | 2,729    | 9.35       | 3,101    | 10.98      |

Table 5: Cycle Time Per Phase (Assumed)