
NOTE: CONSTRUCTION OF THE POND AND ACCESS CORRIDOR TO THE POND TO BE IMPLEMENTED WITH MINIMAL DISTURBANCE AND MINIMAL REMOVAL OF THE EXISTING VEGETATION ABUTTING THE THE NORTHERLY BOUNDARY OF THE ROAD ALLOWANCE BETWEEN CONCESSIONS 9 & 10. TEMPORARY PRESERVATION FENCING SHALL BE INSTALLED PRIOR TO CONSTRUCTION.

## OPERATIONAL NOTES

**1. SETBACKS:** Extraction setbacks shall be 40m along the County Road 17 road allowance boundary, 30m adjacent to the south boundary of Area 2 & Area 3 and as shown along the northwesterly side of Area 1B and in the southeasterly corner adjacent to Area 3. There shall be no disturbance, i.e. no tree removal, no stripping, no stockpiling within the buffer zone shown between the licence boundary and the ANSI. The extraction setback in Area 1A is 5m from the surveyed dripline and shall be fenced.

**2. VEGETATED BUFFER:** A "20m Existing Forest Setback" shall be maintained and enhanced adjacent to the County Road 17 boundary. Similarily, a "30m Existing Forest Setback" shall be maintained and enhanced within the southern 30m setback area adjacent to the road allowance between Concessions 9 & 10. Refer to drawing 8, "Landscaping Details" and drawing 9, "Vegetation Inventory & Preservation Plan by L. Porter for details.

**3. MAXIMUM DEPTH OF EXTRACTION:** The maximum depth of extraction shall be to the bottom of the Amabel Formation at the approximate elevations shown (228m to 230m in Area 1B, 2 & 3, 234 in Area 1A). The perimeter area adjacent to the extraction limit along the northerly boundary of Area 1B shall only be extracted to 242m where shown in order to allow backfilling and the creation of 3:1 slopes adjacent to the 100m ANSI setback line. The slope will be constructed from the limit of extraction to +/−1 metre below the final water level of the future pond of +/−244m.

**4. SIDE SLOPES:** Perimeter side slopes to elevation 244m adjacent to the 100m ANSI setback and the SE corner of Area 3 shall be created by backfilling with onsite overburden and topsoil and clean inert fill. Final perimeter slopes adjacent to the 100m ANSI setback and the SE corner of Area 3 shall be constructed no steeper than 3(horizontal) to 1(vertical). All other boundaries shall have vertical faces at the limit of extraction. Final slopes adjacent to the 100m ANSI setback and the SE corner of Area 3 shall be spread with a minimum of 0.15 metres (6 inches) of topsoil and shall be seeded and planted as outlined on Drawing 6, Progressive Rehabilitation & Final Rehabilitation Plans and Drawing 7, Cross−Sections and Details. Where the slopes adjacent to the 100m Ansi setback boundary and the SE corner of Area 3 reach the 243 metre level the "slopes" will be vertical to the bottom of the quarry.

**5. ENTRANCE/EXIT/GATE:** The entrance to the quarry shall be on the eastern boundary of Area 1B as shown to Grey County Road #17. Any required turning lanes, deceleration lanes or tapers shall be constructed to Grey County Standards and according to Grey County procedures. The entrance area treatment including grading, planting, gates, signage and lighting shall be constructed as outlined drawing 9, "Vegetation Inventory & Preservation Plan by L. Porter for details. Area 1A shall be accessed through the existing Keppel quarry entrance. A gate (minimum height 1.2m) with a lock shall be installed and maintained at the entrances. The entrance shall be closed & locked when the quarry is not operating.

**6. FENCING:** Post & wire fencing (minimum height 1.2 metres) shall be repaired or installed on the proposed licence boundary, where shown. Marker posts at intervisible intervals not to exceed 60m shall replace fences on the west and north side of the 50m infiltration pond access corridor. Warning signs shall be posted on the marker posts and along the fence at 20 metre intervals. Fences, marker posts and signs shall be maintained for the life of the quarry.

**7. TOPSOIL/OVERBURDEN STORAGE:** Stripped topsoil and overburden, and imported inert fill shall be used to construct the proposed berms where shown. These berms shall be constructed to the recommended heights as indicated in the Sequence of Operations notes. Also see note #27. After the required berms have been constructed, any further stripped materials not used immediately for rehabilitation, may be stored separately in berms in the perimeter areas and eventually used for perimeter backfilling. Stripped topsoil & overburden shall be graded to stable side slopes. Berms shall be seeded with perennial grasses. Vegetation on the berms and stockpiles shall prevent erosion.

**8. VEGETATION:** Vegetation on all berms, stockpiles, vegetated buffers and rehabilitated areas that dies or is otherwise damaged shall be reseeded or replanted in accordance with drawing 9, "Vegetation Inventory & Preservation Plan by L. Porter.

**9. STOCKPILES:** No stockpiles of aggregate or stripped materials shall be located within 30 metres of the licence boundary, north and west boundaries excepted. See overrides. Stockpiles shall not exceed a height that is greater than 2m below the top height of the accoustical berms.

**10. PROCESSING EQUIPMENT:** Processing equipment to be utilised on this site shall include scrapers, bulldozers, loaders, excavators, rock drills, drill rigs, crushers, screeners, conveyors, a wash plant and dump trucks. A wash plant may be operated once a valid Permit To Take Water has been obtained. Washing would entail the construction of three ponds on the quarry floor. The ponds will be approximately 50m by 20m and 2m deep. The ponds shall be constructed from low permeable clay. The first pond is a sedimentation pond, the second a clearing pond and the third a clear water pond. Water from the clear water pond is recirculated through the wash plant. The sedimentation pond shall be cleaned out as required to maintain the depth. The material removed from the pond shall be dried and sold for uses such as agri−lime on farm fields or other clay products. Ponds may be laid out in various configurations and may be relocated from time to time as dictated by operations.

**11. DUST CONTROL:** Dust control shall be maintained through the application of water when necessary.

**12. NOISE, DUST OR GROUNDWATER INTERFERENCE PROBLEMS:** Should noise, dust or groundwater interference complaints be received, the licensee shall take appropriate measures as deemed necessary by the Ministry of the Environment to rectify the problem(s).

**13. DEWATERING:** Sumps and dewatering facilities shall be located on the quarry floor and may be relocated from time to time as extraction progresses. Ground water and precipitation shall be pumped as outlined in the sequence of operations. See the Adaptive Management Plan summary on Drawing 5, "Adaptive Management Plan". The final water elevation in the pond is anticipated to be +/−244m.

**14. SCRAP STORAGE:** There shall be no scrap permanently stored on this site.

**15. PETROLEUM STORAGE:** Petroleum storage facilities shall be relocated to the vicinity of the shop in the new quarry from the old quarry when pumping to the old quarry commences. All petroleum storage shall be in above ground containers that meet the requirements of the Technical Standards and Safety Act 2000 and the Liquid Fuel Handling Code 2001 as may be amended. Any spills shall be removed and disposed of at a facility approved by the Ministry of the Environment. See the Spills Contingency Plan on this page. Mobile fuel tanks shall be the new generation engineered double−tanked variety with vacuum sealed valves.

**16. BUILDINGS:** Operational buildings shall be located within the areas shown in Phase 1B.

**17. DRAINAGE:** Surface drainage and ground water shall be captured in temporary sumps and removed as indicated in Note 13 above.

**18. HOURS OF OPERATION:** The hours of operation for this site shall be: Shipping: from 7am to 6pm Monday to Friday. No shipping on Saturday or Sunday, except in emergency situations. Processing: from 7am to 6pm Monday to Friday.

**19. EXTRACTION AREA:** The area to be extracted is 26.85 hectares.

**20. TONNAGE CONDITION:** The maximum number of tonnes to be removed from this site in any calendar year is 600,000. Note that while old Keppel quarry is still operating, the combined tonnage of this site and old Keppel quarry shall not exceed 600,000 tonnes.

**21. TREE REMOVAL:** Trees cut during stripping operations shall be marketed for lumber where possible or shall be cut up for fire wood. Stumps shall be stored for future use on the edges of the future quarry pond. All ash (fraxinus) tree removal and disposal shall be in accordance with CFIA regulations.

**22. RECYCLING:** Asphalt and concrete may be imported into this site for recycling and stored in the area shown.

**23. TUNNEL:** A tunnel, if required, shall be constructed between Area 1A and Area 1B for the transport of material between Areas. The tunnel, if required, shall consist of a precast and pre−engineered concrete culvert and shall be constructed and installed to meet the requirements of the Grey County Engineering Department.

**24. ARCHAEOLOGICAL RECOMMENDATIONS** (by Scarlett Janasus, Archaeological & Heritage Consulting, Tobermory, Ontario): Should deeply buried archaeological material be found on the property during excavation activities, the Ministry of Citizenship, Culture and Recreation (MCCR) shall be notified immediately (519−675−7742). In the event that human remains are encountered during excavation, the proponent shall immediately contact both the MCCR and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer & Commercial Relations (416−326−8392)

**25. NATURAL ENVIRONMENT RECOMMENDATIONS** (by Aquatic and Wildlife Services, Shallow Lake, Ontario): See Drawing 4 of 8: "Consultant Recommendations" Drawing 5 "Adaptive Management Plan" and Drawing 7, "Cross−sections and Details".

**26. HYDROGEOLOGICAL RECOMMENDATIONS:** (by MTE Consultants Inc., Kitchener, Ontario): See Drawing 4: "Consultant Recommendations", Drawing 5, "Adaptive Mangement Plan".

**27. NOISE CONTROL RECOMMENDATIONS:** (by Aercoustics Engineering Limited, Toronto, Ontario) See Drawing 4: "Consultant Recommendations".

**28. BLASTING CONTROL RECOMMENDATIONS:** (by Aercoustics Engineering Limited, Toronto, Ontario and DST Consulting Engineers Inc., Sudbury, Ontario) See Drawing 4: "Consultant Recommendations".

**29. SECTIONS AND DETAILS:** See Drawing 7: "Cross−sections and Details".

**30. IMPORTATION OF FILL:** Only topsoil, subsoil and overburden meeting the definition of inert fill under Regulation 347 of the Environmental Protection Act shall be imported into this site for the purposes of constructing berms or conducting rehabilitation. Incoming loads of fill shall be monitored by staff and as per NEC 2.2.1.1.1.5.

**31. PRESERVATION FENCING:** Prior to the commencement of tree removal and topsoil stripping temporary preservation fencing shall be installed along the dripline of the vegetation within: 1) the 20m setback forested zone abutting County Road 17, 2) the 30m setback forested zone along the Road Allowance between Concessions 9 & 10, and 3) the area 1A vegetated area that is to be retained. The installed fencing shall be inspected by the consulting Landscape Architect and a confirmation letter shall be submitted to NEC.

**32. WILDLIFE SIGNAGE:** In consultation with the County of Grey Roads Department and under the Highway Traffic Act, the licensee shall erect "ANIMAL CROSSING" signs at the locations shown. In addition, the licensee shall erect a "CAUTION, WILDLIFE CROSSING" sign at the quarry entrance. The licensee shall also request of the OPP and the County to forward any incident reports from their monitoring of any increased collisions along County Road 17 for 1 kilometre in both directions from the Keppel Quarry, for the inclusion in the reports to the Stakeholders Liason Committee and subject to other actions of posting signage or additional preventative measures.

## SITE PLAN OVERRIDES OF THE OPERATIONAL STANDARDS

**1. STANDARD 5.1 –**

**a.)** The licensed boundaries shall not be fenced on the west or north side of the pond access corridor in the SW corner. Marker posts, minimum height 1.2m, shall be placed at the corners and at intervisible distances not to exceed 60m on any unfenced boundaries.

**b.)** The part of Area 1A that abuts the adjacent, existing Keppel quarry shall not be fenced. Marker posts shall be placed at the most northerly and most southerly corners of the unfenced boundary.

**2. STANDARD 5.10.1 –** Regulatory setbacks have been reduced to zero metres adjacent to lands owned by the licensee.

**3. STANDARD 5.13.1 –** Stockpiling within 30m of the north and west boundaries adjacent to lands owned by the licensee.

## SPILLS CONTINGENCY PLAN

In case of accidental spill of petroleum based products the following contingency plan will be activated:

**1.** All spills of petroleum based products regardless of the quantity will be cleaned up immediately following the spill.

**2.** A supply of absorbent material suitable for use on spilled petroleum products (e.g., sand, "Stay−Dry") will be maintained on site. The absorbent material will be stored in a easily accessible location in bags or containers that can be moved by hand. The absorbent material will be kept dry by protective coverings or containers.

**3.** The quantity of absorbent material stored on site will be sufficient to meet the supplier's recommendations for absorbing petroleum products. If using sand, the owner will maintain a reasonable volume (3cu. m to 5 cu. m.) on site.

**4.** The owner will first contain the spill using the absorbent material and block any crack or route by which a spilled product could enter the rock or soil on and around the site. After containment, the owner will proceed to clean up the spill using additional absorbent materials as necessary.

**5.** All contaminated material will be removed from the site and placed in an approved landfill site.

**6.** The adjacent property owners will be notified of any spill that occurs on site as per the Environmental Protection Act.

**7.** For spills in excess of 20 L that are cleaned up immediately, the owner will also notify the local offices of the Ministry of the Environment and of the Ministry of Natural Resources of the occurrence and of the procedures followed including the disposal location.

**8.** For any spill regardless of quantity which can not be immediately cleaned up, the owner will notify the local offices of the Ministry of the Environment and of the Ministry of Natural Resources and the adjacent land owners of the problem. Action to clean up the spill will be undertaken as soon as possible and all parties will be notified when cleanup is complete.

*LEGEND:*

- NOISE ATTENUATION BERM
- 230 APPROXIMATE BENCH ELEVATIONS
- EXCAVATION DIRECTION
- PROPOSED LICENCE BOUNDARY
- EXTRACTION SETBACK LINE (EXCAVATION LIMIT)
- LINE BETWEEN AREAS
- ENTRANCE/EXIT
- 1.2m HIGH FENCE
- LOT LINE
- 20m EXISTING FOREST SETBACK
- ANSI AREA
- REFORESTATION AREAS

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R.R. #2, KEMBLE, ONTARIO, N0H1S0

**NEW KEPPEL QUARRY**

PARTS LOTS 26, 27 & 28, CONCESSION 10

TOWNSHIP OF GEORGIAN BLUFFS (formerly Keppel Twp)

COUNTY OF GREY

**OPERATIONAL PLAN**

DRAWING 2 of 9

SCALE: 1:3000

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| No. | AMENDMENT | DATE |
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December 11, 2014

## IN GENERAL:

1. Prior to the commencement of operations in Area 1A, all required fencing and signs shall be constructed and the limits of extraction surveyed and clearly marked where shown. Unfenced boundaries shall be marked at intervisible distances not to exceed 60m with marker posts and signs. All fencing and markers shall be maintained for the life of the licence.

2. Prior to the commencement of operations in Area 1B, 2 and 3, all required fencing and signs shall be constructed and the limits of extraction surveyed and clearly marked where shown. Unfenced boundaries in these areas shall be marked and maintained as per Note 1.

3. Prior to the commencement of extraction and processing in any areas or any parts of areas, acoustical attenuation berms shall be constructed as shown on drawing 4, "Consultant Recommendations". The accoustical berm elevations shall be confirmed by survey to ensure that stockpile elevations remain a minimum of 2m below the accoustical berm elevations.

4. Once the acoustical attenuation berms are completed and the elevations confirmed by survey the planting of the tree/shrub screening plantings will be installed within the first year of operations.

5. The calculation to determine the phasing timeline is based on using 500,000 tonnes per year for extraction and a conversion of 1 cubic meter of rock to 2.5 tonnes. The timelines associated with the phases could be longer or shorter depending on yearly sales volumes. The MNR tonnage limit is 600,000 tonnes per calendar year.

6. Drainage sumps will be created within the licensed area to support the dewatering operation in various areas. Pumps and associated piping will routinely be relocated within the licensed area as the sumps are created. The creation of any new sumps or the movement of the associated pumps and piping will not require any additional permitting.

7. Area 3 shall not be excavated for a period of 12 years from the issuance of a license under the Aggregate Resources Act. The excavation of Area 3 may only proceed if it is determined acceptable by the MNR and MOE through the results of the Adaptive Management Plan (AMP) developed for this site.

8. The maximum depth of extraction shall be to the elevation of the bottom of the Amabel Formation and in the general direction of the arrows shown.

9. If it is determined from the Natural Environment monitoring and the Adaptive Management Plan shown on drawing 5 that the existing ephemeral pond has had unacceptable impacts, then an ephemeral pond shall be constructed and maintained as directed by the Natural Environment consultant or by MNR.

10. Prior to the commencement of tree removal and topsoil stripping temporary preservation fencing shall be installed along the dripline of the vegetation within: 1) the 20m setback forested zone abutting County Road 17, 2) the 30m setback forested zone along the Road Allowance between Concessions 9 & 10, and 3) the area 1A vegetated area that is to be retained. The installed fencing shall be inspected by the consulting Landscape Architect and a confirmation letter shall be submitted to NEC.

## Phase 1 (The period when excavation focus is in Area 1A–Year 1 to 3)

### AREA 1A

1. Area 1A shall be operated as an extension of the existing Keppel quarry with processing of aggregates taking place in the adjacent Keppel quarry. The depth of extraction shall be to +/−234m. The limit of extraction on the west side of the quarry will be set at 5m from the existing tree line. A fence is to be installed 5m from the trees to denote the limit of extraction.

2. Tunnel construction under County Road 17 can commence when Area 1A reaches the 242m level.

3. Extraction to the 234m level shall then be completed in Area 1A.

4. The asphalt plant is to be removed from the existing Keppel quarry by December 31, 2014.

### AREA 1B

1. Construct access to Area 1B in accordance with landscape drawings.

2. Commence clearing and stripping operations in the north and north easterly portions of Area 1B and construct the required berms in the berm area along County Road 17 and in the berm area adjacent to the north boundary.

3. Execute the planting program for the 20m wide buffer strip between Area 1B and County Road 17.

4. Commence removal of aggregate in the proposed tunnel area to the 242m level and truck to the existing Keppel quarry for processing.

5. Complete tunnel construction from Area 1A.

6. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped to the "Sump Pond" located in the southeast corner of the Existing Keppel Quarry (as per ECA no. 3515–8M4PWM) when necessary. Associated pumps and piping shall also be moved within the licence area accordingly.

### AREA 2

1. Commence stripping in the proposed berm area between Area 2 and County Road 17 and construct the proposed berm.

2. Execute the planting program for the 20m wide buffer strip between Area 2 and County Road 17.

### Area 3

1. Commence stripping in the proposed berm area between Area 3 and County Road 17 and construct the proposed berm.

2. Execute the planting program for the 20m wide buffer strip between Area 2 and County Road 17.

3. Execute the planting program for the 30m wide buffer strip between Area 3 and Concession 10.

4. Area 3 shall be surveyed and the line between Area 2 and Area 3 shall be marked with highly visible marker posts at a minimum height of 2m.

## Phase 2 (The period when excavation focus is in Area 1B–Year 3 to 7)

### AREA 1A

1. Processing equipment shall be located in Area 1A until sufficient working area is established in Area 1B.

2. Commence moving aggregate from Area 1B to Area 1A through the tunnel for processing in Area 1A.

3. All processing equipment must be removed from Area 1A and rehabilitation commenced a maximum of seven (7) years after the issuance of the ARA licence.

4. Remove pumping equipment from Area 1A to Area 2.

5. Move existing stockpiles in Area 1A and from the old quarry floor to Area 1B as required.

### AREA 1B

1. Establish the quarry floor working area at the 242m level in the north eastern part of Area 1B and relocate the primary crusher to Area 1B. Continue at elevation 242m until work area is made large enough to accommodate operational equipment. Once the 242m working area has been created, commence extraction to the lower bench levels.

2. Once the primary crusher has been established in Area 1B, crushed rock shall be transported through the tunnel for further processing in Area 1A.

3. Continue to clear and grub in the directions of the arrows shown.

4. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped to the "Sump Pond" located in the southeast corner of the Existing Keppel Quarry (as per ECA no. 3515–8M4PWM). Associated pumps and piping within the licensed area shall be moved/relocated within the licensed area when necessary.

5. Re-locate all processing equipment in the eastern part of Area 1B to the 230m level and commence all processing operations in Area 1B.

### AREA 2

1. Clear the minimum required area and construct Sedimentation pond #1 (0.4 ha in size) on the north east side of Area 2. Construct the rip rap outlet south of sedimantation pond #1.

### AREA 3

1. No action required.

### Infiltration Pond

1. Subject to the results of the AMP the infiltration pond may be constructed and clear water pumped to it during this phase.

## Phase 3 (The period when excavation focus is in area 1B–Year 8 to 14)

### AREA 1A

1. Commence perimeter and entrance rehabilitation in Area 1A.

2. Rehabilitation starts in year 8 as the old quarry starts to fill with water.

3. Decommission the tunnel under County Road 17.

### AREA 1B

1. Continue excavation to a depth of approximately 228m to 230m (to the bottom of the Amabel Formation).

2. Complete clearing and stripping operations in the southerly portion of Area 1B to Area 2.

3. Temporary sumps shall be created where necessary to catch precipitation and ground water which will then be pumped or trenched to the Sedimentation Pond #1 in Area 2. Associated pumps and piping shall be relocated where necessary.

4. Extraction in Area 1B continues south easterly.

### AREA 2

1. Commence clearing and stripping in the rest of Area 2.

2. Pump clear water from sedimentation pond 1 to the riprap area so it can drain naturally to the karst openings.

### AREA 3

1. No action required.

### Infiltration Pond

1. Subject to the results of the AMP the infiltration pond may be constructed and clear water pumped to it during this phase.

## Phase 4 (The period when excavation focus is in Area 1B–Year (15 to 18)

### AREA 1A

1. Perimeter slope and entrance rehabilitation has been completed. The old quarry is filling with water.

### AREA 1B

1. Continue all processing operations in Area 1B.

2. Extraction in the southern part of Area 1B shall continue south easterly to a depth of approximately 228m to 230m (the bottom of the Amabel Formation).

3. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped to Sedimentation Pond #1 located in Area 2. The water shall then be pumped to the rip rap in Area 2 and allowed to flow naturally to the observed karst openings. Associated pumps and piping within the licensed area shall be moved/relocated when necessary.

### AREA 2

1. Complete clearing and stripping operations in Area 2.

2. Extraction shall commence in Area 2 in the direction of the arrows shown (south easterly) to a depth of approximately 229m to 230m (the bottom of the Amabel Formation).

3. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped or trenched to Sedimentation Pond #1 located in Area 2. Clear water shall then be pumped to the riprap in Area 2 and allowed to flow naturally to the observed karst openings.

### AREA 3

1. No action required.

### Infiltration Pond

1. Subject to the results of the AMP the infiltration pond may be constructed and clear water pumped to it during this phase.

## Phase 5 (The period when excavation focus is in Area 2–Year 19 to 26)

### AREA 1A

1. Perimeter rehabilitation has been completed. The old quarry is filling with water.

### AREA 1B

1. Area 1B will accommodate stockpiles.

2. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped or trenched to Sedimentation Pond #1 located in Area 2. Clear water shall then be pumped to the rip rap in Area 2 and allowed to flow naturally to the observed karst openings. Associated pumps and piping within the licensed area shall be moved/relocated when necessary.

### AREA 2

1. Extraction and production shall continue in Area 2 in the direction of the arrows shown to a depth of approximately 229m to 230m (the bottom of the Amabel Formation).

2. Temporary sumps shall be created where necessary to catch precipitation and groundwater which will then be pumped to Sedimentation Pond #1 in Area 2 and clear water shall be pumped to the rip rap in Area 2 and allowed to flow naturally to the observed karst openings.

### AREA 3

1. The excavation of Area 3 may only proceed if it is determined acceptable by the MNR and MOE through the results of the Adaptive Management Plan (AMP).

2. Upon authorization to excavate Area 3 being granted by MNR and MOE,– commence clearing and grubbing the area in preparation for extraction. Extraction from Area 2 can proceed through into Area 3.

3. Construct Sedimentation Pond #2 in the location shown on the plans in the south east corner of Area 3 along Concession 10 and construct the riprap area.

4. Temporary sumps shall be created where necessary to catch precipitation and groundwater which shall then be pumped to Sedimentation Pond #2 in Area 3. The water will make its way into the riprap and be released into the adjacent observed karst openings. Associated pumps and piping shall be moved/relocated when necessary.

### Infiltration Pond

1. Depending on the results of the AMP the infiltration pond may be constructed and clear water pumped to it during this phase.

## Phase 6 (The period when excavation focus is in Area 3–Year (27 to 29)

### AREA 1A

1. Perimeter rehabilitation has been completed. The old quarry is filling with water.

### AREA 1B

1. Area 1B may accomodate stockpiles.

2. Temporary sumps shall be created where necessary to catch precipitation and groundwater which shall then be pumped to Sedimentation Pond #2 in Area 3. The water will make its way into the riprap and be released into the adjacent observed karst openings. Associated pumps and piping shall be moved/relocated when necessary.

3. Upon completion of extraction in Area 2 and Area 3, all operational buildings and structures shall be removed from the 242 level in Area 1B and that area shall be excavated to 230m (the bottom of the Amabel Formation).

4. As part of the rehabilitation works the berm along the ANSI boundary shall be removed in sections of 50 metres. The bedrock will be stripped to the extraction limit, drilled and blasted to the 243m level as shown in "Rehabilitation Shoreline Detail to 100m ANSI Setback" on Page 7. The blasted rock is to be cast to the quarry floor and the berm material placed into the excavated notch. The backfill material shall be graded to a 3:1 slope. The process shall be repeated in 50m increments moving northeasterly to the eastern extraction limit.

5. Step number 4 shall be repeated until all of the quarry rock is mined out from the northern perimeter area to elevation 243m.

6. The remaining perimeter berm on the roadside boundary shall also be excavated and used to finish the rehabilitation along the northern perimeter. The final perimeter rehabilitation shall be completed as shown on Drawing 7, "Cross-Sections and Details."

7. Once all final rehabilitation has been completed the quarry shall be allowed to fill with water from groundwater and precipitation.

### AREA 2

1. Complete extraction in Area 2.

2. Area 2 may accomodate stockpiles.

3. Temporary sumps shall be created where necessary to catch precipitation and groundwater which shall then be pumped to Sedimentation Pond #2 in Area 3. The water will make its way into the riprap and be released into the adjacent observed karst openings. Associated pumps and piping shall be moved/relocated when necessary.

### AREA 3

1. Move all processing operations into Area 3 when sufficient space becomes available. Processing equipment shall be located on the quarry floor at elevation 230m.

2. Continue excavtion south easterly to 230m (the bottom of the Amabel Formation).

3. Temporary sumps shall be created where necessary to catch precipitation and groundwater which shall then be pumped to Sedimentation Pond #2 in Area 3. The water will make its way into the riprap and be released into the adjacent observed karst openings. Associated pumps and piping shall be moved/relocated when necessary.

4. Relocate the sedimentation pond to the quarry floor and contine extraction to the 230m level. Temporary sumps, previously created to catch precipitation and groundwater, shall pump to the relocated sedimentation pond and then to the old quarry or to the infiltration pond if it has been created. Associated pumps and piping shall be moved/relocated when necessary.

5. Create a 3:1 slope in the southeast corner as shown on Drawing 6.

### Infiltration Pond

1. If, based on the results of the AMP, the infiltration pond has been previously constructed and clear water pumped to it during operations, then once operations are completed and the infiltration pond is no longer needed as per the results of the post-closure monitoring program described in the AMP, the pond shall be regraded to form a shallow depressed area that shall naturally form a small marsh area.

### Final

1. Once all operations are completed the quarry shall be allowed to fill with water.

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**NEW KEPPEL QUARRY**
PARTS LOTS 26, 27 & 28, CONCESSION 10
TOWNSHIP OF GEORGIAN BLUFFS (formerly Keppel Twp)
COUNTY OF GREY

**SEQUENCE of OPERATIONS**
DRAWING 3 of 9

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December 11, 2014

## NATURAL ENVIRONMENT RECOMMENDATIONS (BY Aquatic Wildlife Services, Shallow lake, Ontario)

### 1 Mitigation Measures

These measures are recommended to maintain the ecological functioning role and natural heritage features that have been identified within this study area and are in keeping with provincial and municipal policies and guidelines.

**1.1** The proposed licensed boundary is to maintain a minimum setback distance of 120 m from the Provincially Significant Shouldice Wetland boundary and a minimum setback of 100m from The Glen ANSI boundary.

**1.2** The setback lands from the identified significant features are to be considered 'buffer lands' to these features; as such no site development is to occur including noise attenuation berms, aggregate stockpiling or buildings. Buffer lands are to remain in a natural vegetation condition though minor site alterations through reforestation; boundary fencing, and property internal road/trail upkeep is acceptable. The setback/buffer lands compliance monitoring shall be incorporated into the Aggregate Resources Act–Annual Compliance Assessment Reports.

**1.3** In conjunction with the approved 'Adaptive Management Plan' if a yellow threshold level mitigative action requires construction of a new seasonal ephemeral pond, said pond shall be constructed with a low permeable bottom/lining, in suitable terrain conditions prior and location approved by reviewing agencies. Said ephemeral pond design & construction shall reflect the following design guidelines:

– Continuous forest cover around the pond perimeter to be maintained with direct linkage to the forested ANSI lands. No fencing or berm placement around the pond perimeter.

– Pond to maintain a minimum of 10:1 slope, with 20cm of native topsoil deposited over the pond bottom for the establishment of natural hydrophilic plants. Pond to be constructed with varying widths and depths but should not exceed 10m in width or exceed 0.7m in depth and a minimum length of 50m

– The ephemeral pond construction site should maximize natural terrain snowmelt runoff to the site. Pond design parameters should try to maintain surface waters within the pond between the spring snowmelt periods to late June, during the remaining life of the quarry operations and rehabilitative period.

**1.4** The identified 'Significant–Rare' plant mitigation relocation measures within the 2012 extraction lands, shall be undertaken prior to extraction phase 1B start up and carried out by or under the direct supervision of a qualified person. Annual monitoring shall be undertaken by a qualified person during the flora growing season of relocated flora for survival rates, for 3 years post planting year relocation efforts.

**1.5** Any and all equipment storage, stock piled material, out buildings etc. in relation to this aggregate extraction proposal shall be contained within the 'limit of extraction' area.

**1.6** No vegetation clearing or overburden stripping should occur during the months of April, May or June in any given year, for the maintenance and protection of forest nesting birds, in accordance to the Migratory Birds Convention Act. The site clearing compliance monitoring aspects shall be incorporated into the Aggregate Resources Act–Annual Compliance Assessment Reports.

**1.7** Required advanced tree and vegetation removal should be undertaken only 1–2 years prior to required extraction for that 'phase area' during the previous year's summer, fall or winter seasons. Land clearing should not occur beyond what can be utilized within the quarry for a 2–year period, other than those lands identified as being used for the settling/infiltration ponds.

**1.8** The final rehabilitation plan is to include a 'Naturalized Shoreline' fronting the ANSI boundary incorporating the following design recommendations, but not limited to:

– Shoreline to be stabilized to a 3:1 slope out to a minimum water depth point of 1.0 m

– Removal of berm and any fence fronting the ANSI boundary with material utilized to slope shoreline and provide suitable growing substrate (above and below water).

– Reforestation phase shown on operational plan, with native tree/shrub species, sizes and density planting guideline.

– Final 'water's edge' of quarry environment fronting the ANSI boundary to be restored to a natural environment, with an irregular shoreline providing habitat cover creation (rock piles, logs, stumps, boulders), varying water depths through deposition of topsoil (berm material from overburden clearing) out to the quarry vertical face (approx. 1.5 m water depth zone).

**1.9** A 'Stewardship Management Plan' focused on wildlife habitat and woodland ecology shall be completed for Lot 25, 26 and 27, Concession 10, geographic Township of Keppel, for the lands HSC Aggregates Ltd. owned lands which occur beyond the quarry extraction boundary. This Stewardship Plan shall follow the format of the Ontario 'Guide to Stewardship Planning for Natural Areas' and shall be submitted for review to the Ontario Ministry of Natural Resources, Niagara Escarpment Commission, SON, the Grey Sauble Conservation Authority and the Stakeholders Liaison Committee, prior to Extraction Phase 1B start up.

**1.10** 10. Reforestation mitigation zones that occur outside the licensed boundary area have been shown on the "REFORESTATION AREAS" figure on the Operational Plan, drawing 4. Said reforestation measures shall follow provincial standards outlined on the public document ' OMNRF Extension Notes AGCEX 322–Tree Planting' for planting plan, tree densities and native species to Grey County, with draft planting plan submission to SON for review and commenting with reforestation to be completed prior to extraction phase 1B start up. Annual reforestation monitoring shall be undertaken by a qualified person for 3 years post planting, during the flora growing season, with survival target rates of 80% and restoration plans if deemed necessary. Said monitoring activities shall be reported to provincial agencies, SON, Grey Sauble Conservation Authority and the Stakeholders Liaison Committee by calendar years end for that reporting year.

**1.11** The Natural Environment Ecological Monitoring Plan requirements have been incorporated into the Keppel Quarry Adaptive Management Plan which shall be considered a mitigative measure for both short–term and long–term environmental monitoring activity with adaptive management strategies, threshold levels, remedial action works and contingency plans if deemed necessary. Said monitoring activities shall be reported to all reviewing agencies in a timely manner as per the 'AMP' monitoring program outline.

**1.12.** Terrestrial Invasive Plant Species Monitoring will be undertaken once a year between June 15th to September 15th within the Licence area (non–operating lands in that year), and Natural Environment Buffer Zones, plus an additional 30 meters in adjacent lands owned by HSC Aggregates Ltd. Said monitoring shall be conducted by a qualified person as 'general visual observations' of terrestrial invasive species, numbers, location and mapping with annual recommendations and reporting by calendar years end for that reporting year to the Stakeholder Liaison Committee, during the Quarry active operational period.

### NETR NOTES:

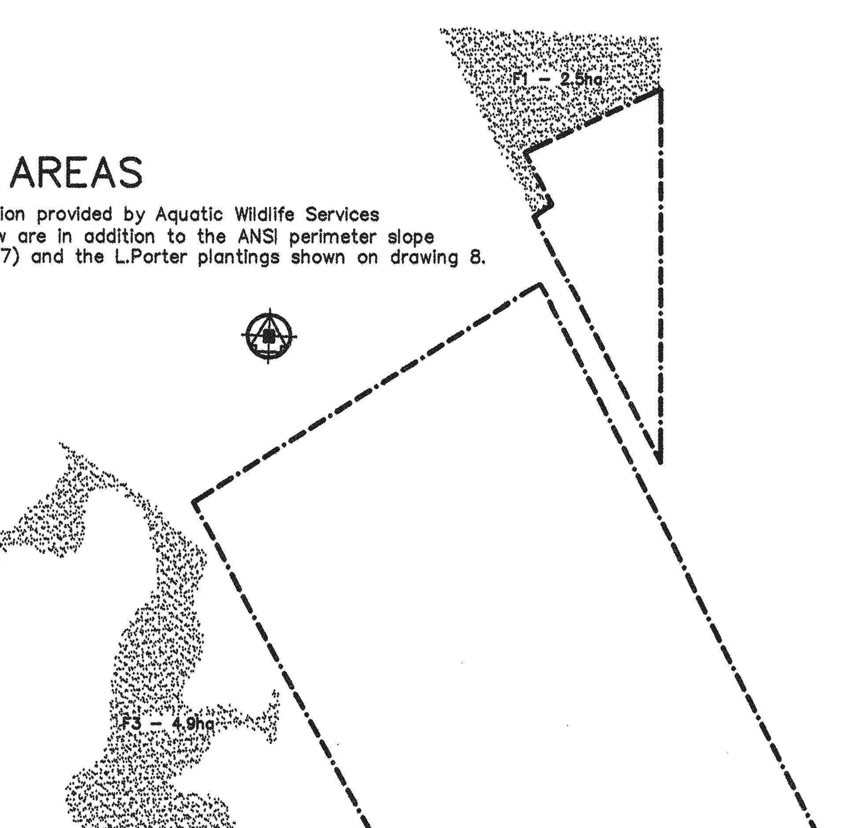
**1)** The 2007 Natural Environment Technical Reporting figures are based upon the draft extraction lands at that time, which have been significantly reduced to–date through the agency review/commenting process. The current licence lands and extraction area is still contained within the original 2007 Natural Environment Technical Reporting 'study lands' and as such environmental data analysis, impact assessment and conclusions are valid and consistent with the current licence/extraction lands and operational design.

**2)** The 2007 Natural Environment Technical Reporting for 'Mitigation Measures' and 'Ecological Monitoring Program' have been modified and revised above, to address the current 2012 licence boundary, extraction lands, Adaptive Management Plan and supplementary technical reporting on hydrology and hydrogeological assessment.

**3)** The 2007 Natural Environment Technical Reporting for the 'Recommendations' section associated with Mr. Sutherlands land holding of Lot 30, Concession 10 of the former Keppel Township are no longer deemed applicable to this current and significantly reduced extraction land area.

### REFORESTATION AREAS

This figure is derived from information provided by Aquatic Wildlife Services
The reforestation areas shown below are in addition to the ANSI perimeter slope planting (+/– 0.55 ha.) (see dwg 7) and the L.Porter plantings shown on drawing 8.




## NOISE CONTROL RECOMMENDATIONS (By Aercoustics Engineering Ltd.)

**1)** The Area 2 and Area 3 extraction shall have the working face moving towards the R1 receptor.

**2)** In Area 2 and Area 3, the secondary processing plant crushers and screens shall be positioned at a maximum distance of 60m from the quarry face in the direction towards the R1 receptor.

### 1.1 GENERAL CONTROLS

**1.1.1** Equipment used in site preparation and other construction activities shall satisfy the noise emission levels of MOE NPC–115 "Noise due to Construction Equipment".

**1.1.2** Quarry equipment shall satisfy the reference power levels listed in Table 1.

**1.1.3** The drilling, extraction and processing (crushing, washing and/or screening) operations shall be limited to the daytime hours of 07:00 – 18:00.

**Table 1: Reference Sound Power Levels of Quarry Equipment**

| Equipment | Reference Sound Power Level (dB(A)) |
|---|---|
| Rock Drill | 111 |
| Primary Crusher | 121 |
| Secondary Processing Plant | 129 |
| Extraction Loader or Shovel | 114 |
| Pit Trucks (40 passes/hr, 100m section. 25km/hr) | 104 |
| Loader for shipment, loading trucks | 109 |

**1.2 AREA 1A** (see Figure 1) – The following noise controls in addition to the general controls are recommended.

**1.2.1** Extraction should proceed in a northwesterly direction. See Figure 1 below.

**1.3 AREA 1B** – (See Figure 2) The following noise controls in addition to the general controls are recommended.

**1.3.1** Extraction shall proceed in a south or south–easterly direction.

**1.3.2** Acoustic barriers (6m high) in the form of an earth berm, acoustic fence, or combination of these shall be constructed on the north and east perimeter of the quarry area as shown in Figure 2. This 6m perimeter acoustic barrier shall remain for the life of the quarry.

**1.3.3** The primary plant shall travel with the working face positioned such that the working face provides shielding towards receptor R1.

**1.3.4** When operating in Area 1B the secondary processing plant shall be located on the quarry floor at EL242m or less and shielded from the R1 and R2 receptors by an acoustic barrier. The barrier shall have minimum height of 8m and be positioned at a maximum distance of 50m from the processing plant crushers and screens. The acoustic barrier must be solid without gaps or openings and satisfy an area density of 20 kg/m2.

**1.4 AREA 2 and AREA 3** (See Figure 3) – The following noise controls in addition to the general controls are recommended.

**1.4.1** Extraction shall proceed in a southeasterly direction with the working face moving towards the R1 receptor.

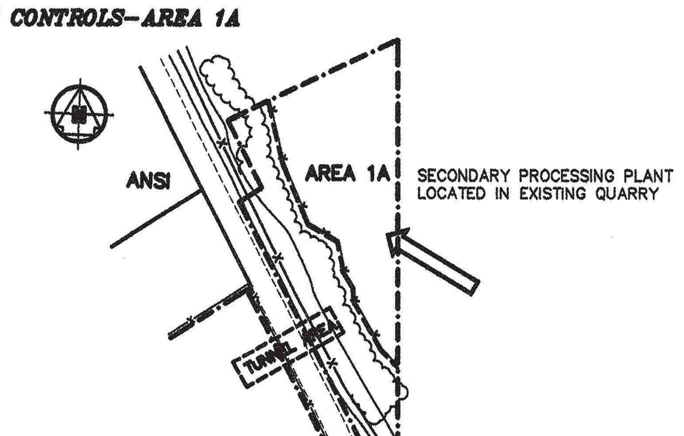
**1.4.2** The primary plant shall travel with the working face positioned such that the working face provides shielding towards receptor R1.

**1.4.3** The secondary processing plant shall be positioned on the quarry floor +/–EL230m and be shielded from the R2 receptor with an acoustic barrier. The barrier shall have a minimum height of 8m and be positioned at a maximum distance of 50m from the processing plant crushers and screens. The acoustic barrier must be solid without gaps or openings and satisfy an area density of 20 kg/m2. An acoustic barrier can take the form of a stockpile, an un–extracted rock face, stacked ISO containers, or anything else satisfying the requirements of an acoustic barrier.

**1.4.4** In Area 2 and Area 3, the secondary processing plant crushers and screens shall be positioned at a maximum distance of 60m from the quarry face in the direction towards the R1 receptor.

**1.4.5** When operating in Areas 2 or 3, the secondary processing plant shall be positioned on the quarry floor +/–EL230m and be shielded from the R2 receptor with an acoustic barrier. The barrier shall have a minimum height of 8m and be positioned at a maximum distance of 50m from the processing plant crushers and screens. The acoustic barrier must be solid without gaps or openings and satisfy an area density of 20 kg/m2. An acoustic barrier can take the form of a stockpile, an un–extracted rock face, stacked ISO containers, or anything else satisfying the requirements of an acoustic barrier.

***FIGURE 1: RECOMMENDED NOISE CONTROLS–AREA 1A***
(PERIMETER BERMING, PLANT LOCATION)



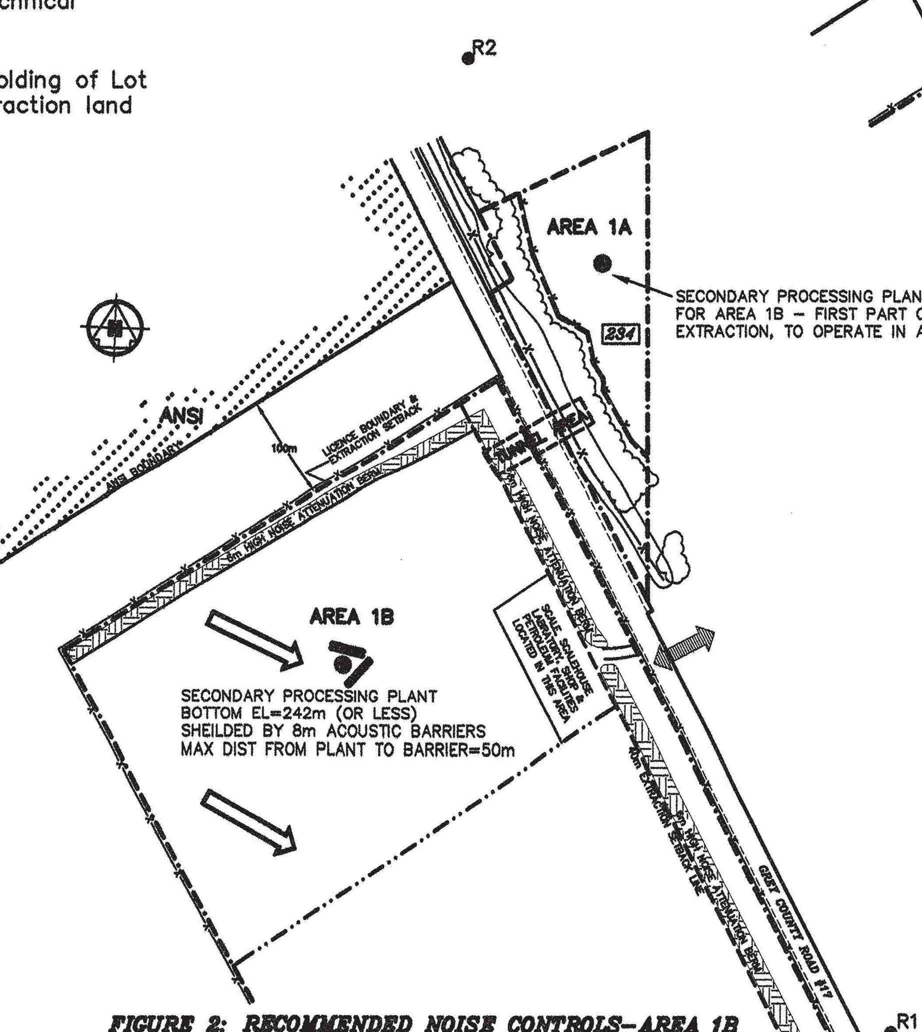




***FIGURE 2: RECOMMENDED NOISE CONTROLS–AREA 1B***
(PERIMETER BERMING, PLANT LOCATION)

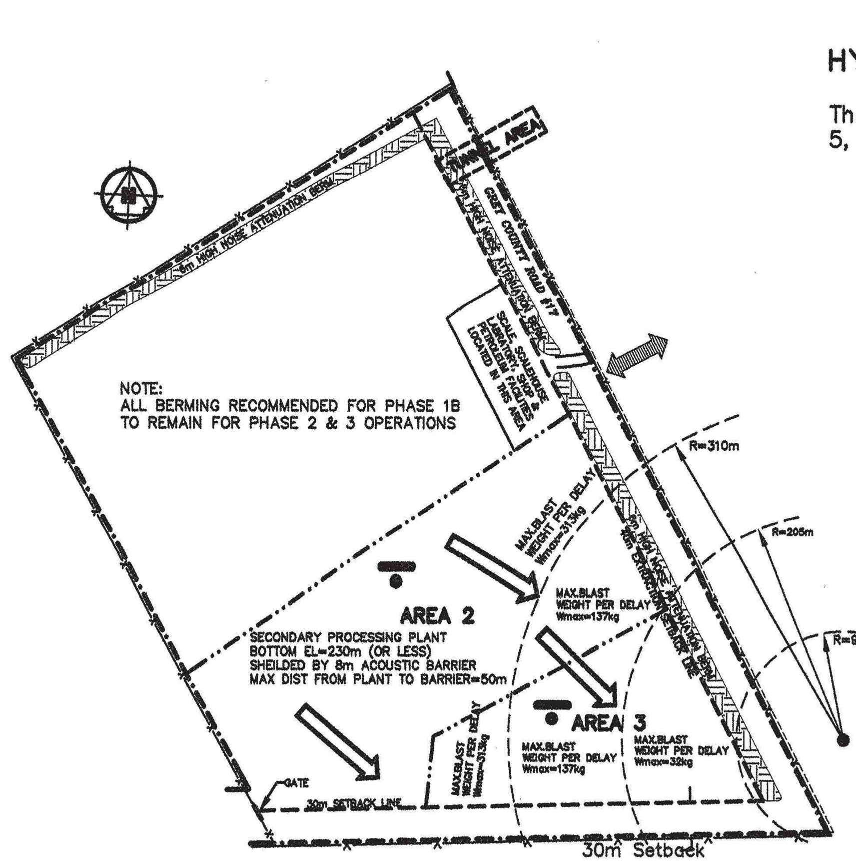



***FIGURE 3: RECOMMENDED NOISE CONTROLS–AREAS 2 & 3***
(PERIMETER BERMING, PLANT LOCATION)

## DETAILS OF RECOMMENDED BLASTING PROCEDURES (by DST Consulting Engineers Inc., Sudbury, On)

– Sequential blasting techniques will be used to ensure minimum explosives per delay period initiated. These include:
  – Non–electric blasting systems such as the EZ–Det / Handi–Det / Snap–Det systems or,
  – Electronic initiation system with remote detonation.

– Drilling pattern for initial quarry blasting will be maximum 3.05 m (10') Burden by 3.66 m (12'). The pattern may be adjusted for subsequent blasts in order to achieve the required fragmentation.

– Maximum drill–hole diameter for initial quarry blasting will be 102 mm (4"). Vibration and overpressure data acquired during initial blasting may allow for an increase in drill–hole diameter. The pattern will be adjusted to accommodate for the increase in drill–hole diameter.

– Minimum collar will be 1.2 m (4 ft.) for 102 mm (4") diameter drill–holes.

– Bench height will not exceed 15.24 m (50') for initial quarry blasting.

– Clear crushed stone will be used for stemming.

– Primary and secondary dust collectors will be employed on the rock drills to keep the level of dust to a minimum.

– Blasting should be avoided during heavy overcast and temperature inversions when possible.

– Blast–hole detonation will be limited to a single hole per delay period.

– The amount of explosives per delay period for initial quarry blasting shall not exceed 141.9 kg.

## BLAST IMPACT ANALYSIS RECOMMENDATIONS (by DST Consulting Engineers Inc., Sudbury, Ontario)

All blasts should be monitored for both vibration and overpressure (noise) at two of the closest third–party properties adjacent the site (Receptors 1 and 2) with digital seismographs. Compilation of the initial data should be used to establish a site specific vibration and noise attenuation graphs. The values of the Scaled Distance obtained from the graphs will assist in planning subsequent blasting operations. This will also allow blasts to be designed specifically for this location which should ideally induce vibration and noise levels within the MOE Guidelines. All subsequent blasts should also be monitored by the quarry operator at the closest third party building or facility to the blast site. The blasting operations should be audited periodically by an independent blasting consultant.

The seismographs must be self–triggering units and calibrated on an annual basis, or as recommended by the manufacturer. Seismogram copies as well as blast reports for each blast should be filed for future reference.

Detailed blast records should be maintained. The MOE (1985) recommended that the body of blast reports should include the following information:

**a)** Location, date and time of the blast.

**b)** Dimensional sketch including photographs, if necessary, of the location of the blasting operation, and the nearest point of reception (vibration receptor).

**c)** Physical and topographical description of the ground between the source and the receptor location.

**d)** Type of material being blasted.

**e)** Sub–soil conditions, if known.

**f)** Prevailing meteorological conditions including wind speed in m/s, wind direction, air temperature in degrees Celcius, relative humidity, degree of cloud cover and ground moisture content.

**g)** Number of drill holes.

**h)** Pattern and pitch of drill holes.

**i)** Size of holes.

**j)** Depth of drilling.

**k)** Depth of collar.

**l)** Depth of toe–load.

**m)** Weight of charge per delay period.

**n)** Number and time of delays.

**o)** The result and calculated value of Peak Sound Pressure Level in dB (L) and Peak Particle Velocity in mm/s.

**p)** Applicable limits.

**q)** The excess, if any, over the prescribed limits.

The blast parameters described within this report will provide a good basis for the initial blasting operations at this quarry. However, it may be necessary to refine these parameters once site–specific vibration and overpressure data from the blasting operations become available.

Blasting procedures such as drilling and loading should be monitored or audited on an occasional basis by an independent blasting consultant to ensure full compliance with governing guidelines and regulations.

## HYDROGEOLOGICAL RECOMMENDATIONS (by MTE Consultants Inc., Kitchener, Ontario)

The hydrogeological recommendations have been included within the Adaptive Management Plan on Drawing 5, "Adaptive Management Plan".

**HAROLD SUTHERLAND CONSTRUCTION LTD.**
R.R. #2, KEMBLE, ONTARIO, N0H1S0

**NEW KEPPEL QUARRY**
PARTS LOTS 26, 27 & 28, CONCESSION 10
TOWNSHIP OF GEORGIAN BLUFFS (formerly Keppel Twp)
COUNTY OF GREY

**CONSULTANT RECOMMENDATIONS**
DRAWING 4 of 9

| No. | AMENDMENT | DATE |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

December 11, 2014

## ADAPTIVE MANAGEMENT PLAN - NEW KEPPEL QUARRY

### WATER RESOURCES MONITORING PROGRAM

**Purpose: To track the performance of the New Keppel Quarry and the potential impacts on water resources**

1) Establish a weather station so that site-specific climate data can be obtained
2) Retain a person qualified to:
- Conduct monthly measurements of water levels at the observation wells, minipiezometers, and test pits listed below, and the private wells listed in the Private Wells Monitoring Program;
- Conduct monthly measurements of flows at springs, the Beaver Dam sinkhole, culverts, mud creek channel A, the Ephemeral Pond and the dugout pond listed below;
- Conduct monthly measurements of specific conductivity and temperature at springs listed below, the Beaver Dam sinkhole, culverts listed below, Mud Creek (Channel A) and the Dugout Pond;
- Install and maintain data loggers in 'Sentry Wells' listed below and download the data loggers monthly;
- Install and maintain data loggers in minipiezometers to be installed in spring s8, spring s13, and the dugout pond and download the data loggers monthly;
- Download precipitation data and pumping records monthly or as needed;
- Compile monitoring data and compare it to precipitation data and pumping records monthly;
- Inspect for water bearing fractures along active quarry faces immediately after a blast;
- Check infiltration pond (if installed) located near s13 for proper function on a weekly basis.

3) Retain an independent Hydrogeologist to:
- Assess and interpret water levels and flows measured against historical patterns, seasonal lows, trigger values, pumping records and precipitation records on a monthly basis;
- Compare monitoring data against trigger values on a monthly basis and make recommendations for monitoring program alterations if required;
- Map cone of influence on a monthly basis and assess its size and shape;
- Provide an annual monitoring report and make recommendations for future monitoring.

**Water Resources Monitoring Locations**

**Observation Wells**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Line 1:** | OW36 | OW37 | OW49 | OW50 | OW51 | OW52 | | | | | | | | | | |
| **Line 2:** | OW14s | OW14d | OW28s | OW28d | OW32s | OW32d | 3345 | OW33s | OW33d | | | | | | | |
| **Line 3:** | OW34 | OW35 | OW36 | OW14s | OW14d | OW41s | OW41d | OW67s | OW67d | OW68s | OW68d | OW58k | OW58s | OW58d | | |
| **Line 4:** | OW39 | OW65s | OW65d | OW66s | OW66d | OW12s | OW12d | OW25s | OW25d | OW59s | OW59d | | | | | |
| **Line 5:** | OW39 | OW40 | OW42s | OW42d | OW63s | OW63d | OW64s | OW64d | OW8s | OW8d | OW69s | OW69d | OW24 | | | |
| **Line 6:** | OW39 | OW40 | OW61s | OW61d | OW62k | OW62s | OW62d | OW9s | OW9d | OW70s | OW70d | OW27s | OW27d | | | |
| **Line 7:** | OW39 | OW7s | OW7d | OW43s | OW43d | OW11s | OW11d | OW46s | OW46d | OW47s | OW47d | OW48s | OW48d | | | |
| **Line 8:** | OW30s | OW30d | OW39 | OW10s | OW10d | OW44s | OW44d | OW45 | | | | | | | | |
| **Line 9:** | OW40 | OW7s | OW7d | OW29s | OW29d | | | | | | | | | | | |
| **Zone 1:** | OW3 | OW4 | OW7s | OW7d | OW10s | OW10d | OW11s | OW11d | OW14s | OW14d | OW29s | OW29d | OW30s | OW30d | OW34 | OW35 |
| | OW36 | OW37 | OW38 | OW39 | OW40 | OW42s | OW42d | OW43s | OW43d | OW61s | OW61d | OW63s | OW63d | OW65s | OW65d | |
| **Zone 2:** | OW15s | OW15d | OW28s | OW28d | OW31s | OW31d | OW32s | OW32d | OW41s | OW41d | OW44s | OW44d | OW46s | OW46d | OW49 | OW50 |
| | OW62k | OW62s | OW62d | OW64s | OW64d | OW66s | OW66d | | | | | | | | | |
| **Zone 3:** | OW8s | OW8d | OW9s | OW9d | OW12s | OW12d | OW13s | OW13d | OW24 | OW25s | OW25d | OW26 | OW27s | OW27d | OW33s | OW33d |
| | OW45 | OW47s | OW47d | OW48 | OW51 | OW52 | OW53 | OW58k | OW58s | OW58d | OW59s | OW59d | OW60s | OW60d | OW67s | OW67d |
| | OW68s | OW68d | OW69s | OW69d | OW70s | OW70d | OW71k | OW71s | OW71d | | | | | | | |
| **Sentry Wells** | OW8s | OW8d | OW9s | OW9d | OW12s | OW12d | OW13s | OW13d | OW33s | OW33d | OW45 | OW47s | OW47d | OW51 | OW67s | OW67d |
| | OW71k | OW71s | OW71d | | | | | | | | | | | | | |
| **Minipiezometers** | MP54 | MP55 | MP56 | MP57 | | | | | | | | | | | | |
| **Test Pits** | TP16 | TP17 | TP18 | TP19 | | | | | | | | | | | | |
| **Springs** | s1 | s2 | s3 | s8 | s13 | | | | | | | | | | | |
| **Beaver Dam Sinkhole** | flow into sinkhole | | | | | | | | | | | | | | | |
| **Culverts** | 1 | 2 | 3 | 4 | 5 | 5a | 6 | 6a | 7 | | | | | | | |
| **Mud Creek** | Channel A | | | | | | | | | | | | | | | |
| **Ephemeral Pond** | water levels | | | | | | | | | | | | | | | |
| **Dugout Pond** | water levels outflows | | | | | | | | | | | | | | | |

### Water Resources Triggers

| **Seasonal Values** | | | | | **Trigger Values** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Monitoring Station** | spring low | summer low | autumn low | winter low | green (spring) | green (summer) | green (autumn) | green (winter) | yellow (spring) | yellow (summer) | yellow (autumn) | yellow (winter) | red (spring) | red (summer) | red (autumn) | red (winter) |
| | March 21 - June 21 | June 21 - Sept 21 | Sept 21 - Dec 21 | Dec 21 - March 21 | March 21 - June 21 | June 21 - Sept 21 | Sept 21 - Dec 21 | Dec 21 - March 21 | March 21 - June 21 | June 21 - Sept 21 | Sept 21 - Dec 21 | Dec 21 - March 21 | March 21 - June 21 | June 21 - Sept 21 | Sept 21 - Dec 21 | Dec 21 - March 21 |
| **Sentry Observation Wells** | | | | | | | | | | | | | | | | |
| OW8s | 243.77 | 243.23 | 243.07 | 243.89 | 243.92 | 243.38 | 243.22 | 244.04 | 243.77 | 243.23 | 243.07 | 243.89 | 243.62 | 243.08 | 242.92 | 243.74 |
| OW8d | 243.19 | 242.45 | 242.31 | 243.46 | 243.34 | 242.60 | 242.46 | 243.61 | 243.19 | 242.45 | 242.31 | 243.46 | 243.04 | 242.30 | 242.16 | 243.31 |
| OW9s | 242.83 | 242.20 | 242.25 | 242.93 | 242.98 | 242.35 | 242.40 | 243.08 | 242.83 | 242.20 | 242.25 | 242.93 | 242.68 | 242.05 | 242.10 | 242.78 |
| OW9d | 243.01 | 241.99 | 242.23 | 243.23 | 243.16 | 242.14 | 242.38 | 243.38 | 243.01 | 241.99 | 242.23 | 243.23 | 242.86 | 241.84 | 242.08 | 243.08 |
| OW12s | 243.65 | 243.36 | 243.30 | 243.72 | 243.80 | 243.51 | 243.45 | 243.87 | 243.65 | 243.36 | 243.30 | 243.72 | 243.50 | 243.21 | 243.15 | 243.57 |
| OW12d | 243.47 | 242.89 | 242.76 | 243.68 | 243.62 | 243.04 | 242.91 | 243.83 | 243.47 | 242.89 | 242.76 | 243.68 | 243.32 | 242.74 | 242.61 | 243.53 |
| OW13s | 244.58 | 243.67 | 243.40 | 244.80 | 244.73 | 243.82 | 243.55 | 244.95 | 244.58 | 243.67 | 243.40 | 244.80 | 244.43 | 243.52 | 243.25 | 244.65 |
| OW13d | 241.99 | 241.42 | 241.32 | 242.48 | 242.14 | 241.57 | 241.47 | 242.63 | 241.99 | 241.42 | 241.32 | 242.48 | 241.84 | 241.27 | 241.17 | 242.33 |
| OW33s | 243.47 | 243.10 | 243.09 | 243.62 | 243.62 | 243.25 | 243.24 | 243.77 | 243.47 | 243.10 | 243.09 | 243.62 | 243.32 | 242.95 | 242.94 | 243.47 |
| OW33d | 239.25 | 238.59 | 238.73 | 239.92 | 239.40 | 238.74 | 238.88 | 240.07 | 239.25 | 238.59 | 238.73 | 239.92 | 239.10 | 238.44 | 238.58 | 239.77 |
| OW45 | 243.93 | 243.22 | 243.83 | 244.13 | 244.08 | 243.37 | 243.98 | 244.28 | 243.93 | 243.22 | 243.83 | 244.13 | 243.78 | 243.07 | 243.68 | 243.98 |
| OW47s | 243.45 | 243.00 | 243.14 | 243.47 | 243.60 | 243.15 | 243.29 | 243.62 | 243.45 | 243.00 | 243.14 | 243.47 | 243.30 | 242.85 | 242.99 | 243.32 |
| OW47d | 243.36 | 242.71 | 243.27 | 243.42 | 243.51 | 242.86 | 243.42 | 243.57 | 243.36 | 242.71 | 243.27 | 243.42 | 243.21 | 242.56 | 243.12 | 243.27 |
| OW51 | 239.75 | 239.00 | 238.97 | 240.08 | 239.90 | 239.15 | 239.12 | 240.23 | 239.75 | 239.00 | 238.97 | 240.08 | 239.60 | 238.85 | 238.82 | 239.93 |
| OW53 | 241.65 | 242.39 | 243.45 | 244.38 | 241.80 | 242.54 | 243.60 | 244.53 | 241.65 | 242.39 | 243.45 | 244.38 | 241.50 | 242.24 | 243.30 | 244.23 |
| OW67s* | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| OW67d* | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| OW71s* | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| OW71d* | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| OW71k* | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| **Springs** | | | | | | | | | | | | | | | | |
| Spring s8 Water Levels | 239.82 | 239.51 | 239.63 | 239.89 | 239.97 | NA | 239.78 | 240.04 | 239.82 | NA | 239.63 | 239.89 | 239.67 | NA | 239.48 | 239.74 |
| Spring s13 Water Levels | 242.86 | 242.33 | 242.35 | 242.93 | 243.01 | NA | 242.50 | 243.08 | 242.86 | NA | 242.35 | 242.93 | 242.71 | NA | 242.20 | 242.78 |
| **Dugout Pond** | | | | | | | | | | | | | | | | |
| SG1 | 243.09 | 243.01 | 243.07 | 243.06 | 243.24 | 243.16 | 243.22 | 243.21 | 243.09 | 243.01 | 243.07 | 243.06 | 242.94 | 242.86 | 242.92 | 242.91 |
| **Ephemeral Pond** | | | | | | | | | | | | | | | | |
| Staff Gauge | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |

TBD = To Be Determined    NA = Not Applicable

* = Seasonal values and subsequent trigger values shall be based on at least three years of monitoring data collected while extracting in Area 1B

### ECOLOGICAL MONITORING PROGRAM

**Purpose: To evaluate the ecological health of selected natural features throughout the life cycle of the quarry and ensure that their ecological function is maintained.**

The Ecological Monitoring Program relies upon an understanding of changes observed through the Water Resources Monitoring Program because ecological receptors tend to respond more slowly to impacts compared to the hydrogeologic regime. Therefore, the Water Resources Monitoring Program will be a critical early warning system for detecting potential impacts to ecological health. The Ecological Monitoring Program shall be carried out by a Biologist/Ecologist. The Ecological Monitoring Program is described in detail in the AMP report. Trigger values for the Ecological Monitoring Program will be established during year one of the Ecological Monitoring Program and reported on in the first annual report. Year one reporting shall be considered "normal" for flora community diversity and be used to establish trigger threshold levels for comparison to future monitoring results. Baseline data collection shall be undertaken during late spring which is considered by SON as the "high" water level season.

**Ecological Monitoring Areas (EMA)**

The Ecological Monitoring Program will be focused on features in the woodlands of the Area of Natural and Scientific Interest (ANSI), the Shouldice Wetland and the upper Glen Management Area and include both terrestrial ecological features (EMA-1 and EMA-2) and wetland ecological features (EMA-2 through EMA-6).

EMA-1: Woodland Tree Health, Woodland Regeneration and Woodland Flora Species Diversity;
EMA-2: Woodland Breeding Birds;
EMA-3: The Glen area s1 to s3 groundwater discharge feature;
EMA-4: The Shouldice Wetland at the s8 and s9 groundwater discharge feature;
EMA-5: The Woodland Ephemeral Pond amphibian breeding surface water feature; and
EMA-6: The lobe of the Shouldice Wetland encompassing spring s13 and the Dugout Pond and the upper headwater channel for the East Branch of Park Head Creek.

# APPENDIX B: TRIGGER LIMITS AND MITIGATION MEASURES

### Water Resources/Ecological Green Actions

**Purpose: Identify changes prior to impacting groundwater and surface water features and implement investigative actions**

**In the event there is a green trigger exceedence in the Water Resources and/or the Ecological Monitoring Program:**

a) Report the exceedence to the quarry owner/operator within 24 hrs;
b) Report the exceedence to the Ecologist/Biologist within 24 hrs;
c) Report the exceedence to the Hydrogeologist within 24 hrs and increase monitoring frequency to weekly at:
- Observation wells along Lines 1 and 2, at Spring s1, s2, s3, and at the Beaver Dam Sinkhole IF a green trigger value is exceeded at OW33s, OW33d, or OW51
  - confirm that water is entering Beaver Dam sinkhole and that spring s3 is flowing
  - confirm that groundwater seepage along the north quarry face has not increased
- Observation wells along Lines 3, 4, 5, at Spring s8, at Test Pits TP15, TP16, TP17, TP18, and at Minipiezometers MP55, MP56, and MP57, IF a green trigger value is exceeded at OW67s, OW67d, OW12s, OW12d, OW8s, OW8d
- Observation wells along Lines 6, 7, 8, Spring s13, the Dugout Pond (water levels and flow) IF a green trigger value is exceeded at OW9s, OW9d, OW71k, OW71s, OW71d, OW47s, OW47d, OW45

d) Consult with a Hydrogeologist to review the extra data collected and make recommendations for changes to the monitoring program as required. Changes may include but not limited to:
- Increased frequency of monitoring
- Further investigation using pumping records and site-specific precipitation records
- Mapping the cone of influence using the most recent round of water levels;
- Installing new observation wells, if required, to more accurately define the cone of influence of the quarry with respect to a certain receptor;
- Retaining an Hydrogeologist to complete an analysis/evaluation of the data collected

### Water Resources/Ecological Yellow Actions

**Purpose: Implement mitigation measures that will prevent impacts to groundwater, the Shouldice Wetland, or the springs s1-s3 in the Glen Management Area thus preventing the need for Red Actions. If changes to natural features are related to climatological influences or non-quarry related activities then Yellow Actions may not be required.**

A "Yellow Action" precautionary mitigation response is triggered if:
1. A yellow trigger value has been exceeded in the Water Resources Monitoring Program that can be attributed to the quarry operations; and/or
2. Early indicators of ecological impacts are observed that can be attributed to the quarry operations.

**In the event of a yellow trigger exceedence in the Water Resources and/or the Ecological Monitoring Program:**

a) Report the exceedence to the quarry owner/operator within 24 hrs;
b) Report the exceedence to the Ecologist/Biologist within 24 hrs;
c) Report the exceedence to the Hydrogeologist within 24 hrs; and
d) Report the exceedence to MNR, MOE, NEC, and SON within 72 hours and Yellow Actions that will be implemented.

**Yellow Actions may include but may not be limited to:**

1) Initiation of an internal interdisciplinary review of all monitoring programs and the data available (i.e. ecological monitoring data, water resources monitoring data, and blasting monitoring data);
2) Reviewing the Operational Plan for possible alterations, which may include but may not be limited to:
- Changing or ceasing quarry operations in a certain direction; and/or,
- Changing the quarry floor elevation.

3) Preparing to augment flows[1] to the springs in the Shouldice Wetland or Glen Management Area;
- flow augmentation shall be done in consultation with the Hydrogeologist to ensure adequate protection;

4) Grouting fractures exposed by the quarry along active quarry faces immediately after a blast (as
5) Continuing to monitor weekly until the system recovers as determined by a Hydrogeologist;
6) If Yellow Actions prove to be working whereby water levels in affected area have recovered[2] and there is no observed impact to the Shouldice Wetland springs and/or the springs in the Glen Management Area then:
- Quarry activities in the direction of the affected area can resume;
- Extraction in the direction of s8 and/or s13 can continue only when their flows are observed to occur naturally as determined by the Hydrogeologist and the Biologist/Ecologist.

7) Summarize the results of any Yellow Actions in a report to the MNR, MOE, NEC and SON and make recommendations for the operation of the quarry.

***NOTES:***

[1] *Augmentation of flows to springs may be in the form of a pipe that directs water or an infiltration pond that allows water to recharge the groundwater system.*

[2] *Recovered water levels means that water levels in the affected observation well(s) has returned above green trigger values for at least three monitoring events spaced one week apart.*

### Water Resources/Ecological Red Actions

**Purpose: To implement mitigation measures that will minimize the impact on groundwater due to the quarry. If changes to natural features are related to climatological influences or non-quarry related activities then Red Actions may not be required.**

A "Red Action" immediate response is triggered if:
1) A red trigger value has been exceeded in the Water Resources Monitoring Program that can be attributed to the quarry operations;
2) Evidence of negative ecological impacts are observed that can be attributed to the quarry operations; and/or
3) The mitigative measures initiated during the Yellow Action failed to correct or reverse the impact.

**In the event of a red trigger exceedence in the Water Resources and/or the Ecological Monitoring Program:**

a) Report the exceedence to the quarry owner/operator within 24 hrs;
b) Report the exceedence to the Ecologist/Biologist within 24 hrs;
c) Report the exceedence to the Hydrogeologist within 24 hrs; and
d) Report the exceedence to MNR, MOE, NEC, and SON within 24 hours the exceeded trigger values and Red Actions that will be implemented.

**Red Actions may include but may not be limited to:**

1) Initiation of an internal interdisciplinary review of all monitoring programs and the data available;
2) Stopping quarry activities until signoff is obtained by the MNR indicating the quarry may restart;
3) Augmenting[1] flows to the bedrock system in the area of the observed impact;
4) Monitoring to determine the effectiveness of flow augmentation;
5) If it is deemed that flow augmentation is effective[2], then quarry activities may resume in a direction that will not exacerbate the impact, provided that a sign-off acceptance from the MNR has been obtained;
6) If it is deemed by the Hydrogeologist, the Biologist/Ecologist, the owner/operator and the MNR that the quarry cannot operate without negatively impacting water levels in the Shouldice Wetland and/or the springs in the Glen Management Area then the need to close the quarry should be assessed; and
7) Summarize the results of any Red Actions in a report to the MNR, MOE, NEC, and SON along with the recommendations for the operation of the quarry.

***NOTES:***

[1] *Augmentation of flows may involve direct discharges to the affected spring(s) or the construction of an infiltration pond that allows water to recharge the groundwater system.*

[2] *Groundwater levels in the impacted observation well(s) in Zone 3 have returned above green trigger values as determined by at least three monitoring events spaced one week apart.*

### PRIVATE WELL MONITORING PROGRAM

**Private Well Locations** **Category A Wells:** 3345, 3447, 5197, New Cramp Well **Category B Wells:** TBD

**Private Well Trigger Values**

| Monitoring Station | Green | Yellow | Red |
|---|---|---|---|
| **Well No. 3345** | None | 227.5 mAMSL | Complaint Received |
| **Well No. 3447** | None | TBD | Complaint Received |
| **Well No. 5197** | None | TBD | Complaint Received |
| **New Cramp Well** | None | TBD | Complaint Received |
| **Category B Wells** | None | TBD | Complaint Received |

TBD = To Be Determined

* = Seasonal values and subsequent trigger values shall be based on at least three years of monitoring data collected while extracting in Area 1B

### Private Well Yellow Actions

**Purpose: To implement mitigation measures that will prevent impacts to private water supply wells thus preventing the need for Red Actions. If impacts to private wells are not related to quarry activities then Yellow Actions may not be required.**

If a yellow trigger value is exceeded for any of the Category A or Category B private wells, then the following mitigation measures will be initiated:

a) Report the exceedence to the quarry owner/operator within 24 hrs;
b) The quarry operator shall report to the local MOE District Office within 72 hours the exceeded trigger values and Mitigative Actions that will be implemented;
c) Inform the resident and enquire about well yield;
d) If well yield is affected, then the quarry operator shall retain an MOE licensed plumber to inspect the well and mechanical components thereof and confirm if mechanical issues (i.e. the pump and/or plumbing system) are the cause and to validate the decrease in well yield;

e) If the cause is not mechanically related, then:
- The quarry operator will provide a temporary supply of water within 24 hours (if required);
- The quarry operator will make arrangements to provide a suitable alternative water supply;
- Provisions for the affected resident could include all or part of the costs associated with water delivered to fill a temporary water system and associated costs, lowering the pump, drilling a new well, well-deepening, abandonment of the old well.

### Private Well Red Actions

**Purpose: To implement mitigation measures that will minimize the impact to private water supply wells due to the quarry. If changes to private wells are not related to quarry activities then Red Actions may not be required.**

**Well Interference Complaint Response Procedure**

Upon receipt of a well interference complaint the receiver shall immediately notify the owner/operator by calling Harold Sutherland (Owner/Operator), at the following number(s):

**Working Hours Contact**
Phone: 519-376-5698
Fax: 519-371-6121
Mobile: 226-668-4495
Email: jennifer@hsc-ltd.com

**After Hours Contact:**
Mobile: 226-668-4495

A well interference complaint from a private well owner will constitute a red trigger breech, and the response procedure will be initiated:
1) Report to MOE within 24 hours the Mitigative Actions to be implemented;
2) The quarry operator will call a MOE licensed plumber immediately upon receipt of the complaint to inspect the well and mechanical systems to confirm that the problem is not mechanical (i.e. pump malfunction) and to validate the complaint;
3) If the complaint is determined not to be mechanically related (i.e. plumbing), the quarry operator will provide a temporary water supply within 24 hours for the affected resident and make arrangements to investigate (Hydrogeologist) the cause of the interference;
4) Where the results of the investigation indicate that the interference is legitimately from dewatering the New Keppel Quarry, the quarry operator will make arrangements to provide compensation. Compensation must be acceptable to the home owner and the quarry operator, and could include all or part of the costs associated with drilling of a new well, well deepening, abandonment of the old well;
5) Where the results of the investigation do not indicate interference from dewatering of the New Keppel Quarry, the quarry operator will provide a letter report summarizing the results of the investigation to the property owner. In this case, the quarry operator shall maintain the temporary water supply (provided under item 3) for at least an additional 24 hours to allow the resident to make alternate water supply arrangements;
6) The quarry operator shall document the interference complaint and its resolution and keep the results on file in the event that they be requested by a Ministry Inspector.

### BLASTING MONITORING PROGRAM

**Purpose: To ensure that the blasting operations are carried out in a safe and productive manner and to ensure that no possibility of damage exists to any buildings, structures or residences surrounding the New Keppel Quarry. The Blasting Monitoring Program is described in detailed in the AMP report**

Blasts should be designed so that the seismic activity (vibrations) and noise induced by the blasting operations will remain well within the MOE guidelines. HSCL staff will be trained by a Blasting Consultant to properly install, monitor, record and report the blast induced vibrations and overpressure. All blasts will be monitored for vibration and overpressure at the Ritchie Property (R1) and Cramp Property (R2) with digital seismographs.

**Green Blast Trigger**

Seismograph readings are within the MOE guidelines for vibration and overpressure, there is no flyrock generated beyond the blast area, there are no complaints from the public, and there is no negative report in the water tested from the quarry.

*Remedial Action* - No remedial action is necessary.

**Yellow Blast Trigger**

Seismograph readings exceeded the MOE guidelines for vibration and/or overpressure, there is no flyrock generated beyond the blast area, there are no reported damage complaints, there may be complaints from noise or vibration, and slight elevated nitrates and/or other chemicals associated with explosives in the discharge water tested from the quarry as part of the ECA requirements.

*Remedial Action* – Review the environmental conditions and blast design parameters. Make reasonable adjustments for subsequent blasts. Report the findings and remedial measures to be taken for subsequent blasts to complainants and affected residents.

**Red Blast Trigger**

Seismograph readings exceeded the MOE guidelines for vibration and/or overpressure and/or there is flyrock generated beyond the blast area, there are reported damage complaints, there are complaints from noise or vibration, and there is an elevated level of nitrates and/or other chemicals associated with explosives used for blasting in the discharge water tested from the quarry as part of the ECA requirements.

*Remedial Action* – Stop any further blasting until a full investigation has taken place into the reasons for the unexpected results. Make appropriate changes and report these changes before commencement of the blasting operation.

### REPORTING REQUIREMENTS

| Report Type | Reporting Requirements |
|---|---|
| First Annual Report | Annual reports detailing the results of the monitoring program will be provided to the MNR, MOE, NEC, and SON by a Qualified Person (QP). Annual reporting will involve data compilation, presentation and evaluation of the performance monitoring data, including the trend analysis. The reports will determine if the AMP is effectively monitoring the site conditions. The first annual report will be completed at the initiation of operations to summarize the baseline data (Water Resources and Ecological) collected pre-quarry. |
| Subsequent Annual Reports | All subsequent annual reports, written by a QP, will include a discussion on:<br>- The results of The Water Resources Monitoring Program<br>- The results of The Ecological Monitoring Program<br>- The results of The Private Well Monitoring Program<br>- The results of The Blasting Monitoring Program |
| Interim Reports | Interim reports, written by a QP, will be submitted to MNR and NEC if trigger values are triggered as listed under the "Green", "Yellow" and "Red" actions in the AMP. |

### TREE PRESERVATION PLAN (TPP)

**Purpose: To preserve trees in the TPP Corridor so that sufficient visual screening and buffering is achieved along CR 17 and Con Rd 10.**

**Tree Monitoring Protocol**

The health of the TPP Corridor will be monitored on an annual basis by a qualified professional. The qualified professional shall identify and monitor the health of Preservation Trees in the TPP Corridor for the following:
a) Individual tree numbering for long-tern identification;
b) Tree species and Diameter at Breast Height (DBH);
c) Number of stems and total tree height;
d) Crown class;
e) Percentage live crown;
f) Evidence of twig dieback, branch dieback, defoliation, and discoloration;
g) Evidence of wounds, signs/symptoms of insect infestation, and any other health stressors; and
h) Overall growing conditions and general tree health.

Monitoring shall be completed during the growing season (June 1 to September 15) of every year.

Pre-quarry (baseline conditions) of the TPP Corridor shall be established:
- Baseline monitoring data in Zone 1 of the TPP Corridor data shall be collected prior to any site alterations commencing in Area 1A.
- Baseline monitoring data in Zone 2 and Zone 3 of the TPP Corridor shall be collected prior to site alterations in Area 1B, Area 2, and Area 3.

**Tree Replacement Protocol**

If monitoring in the TPP Corridor identifies a Preservation Trees in "Fair-Health", then implement an action plan within one year to:
a) Encourage the growth of a Replacement Tree(s) by promoting the growth of surrounding immature tree(s) and/or promoting the expansion of the crown of adjacent trees; or
b) If there is no suitable Replacement Tree(s) is within 6 m, then plant two native stock samplings (one Deciduous [not Ash] and one Coniferous tree) that are at least 1.5 m in height; one on each side and in close proximity to the identified Fair-Health tree(s).

If monitoring in the TPP Corridor identifies a Preservation Tree(s) in "Poor-Health", then
a) Determine the effectiveness of any previous efforts implemented to encourage the growth of Replacement Trees (natural or planted); and
b) If Replacement Tree efforts are deemed ineffective, then plant two additional native stock saplings (not Ash), that are at least 1.5 m in height, in close proximity to the identified "Poor-Health" tree(s).

If monitoring in the TPP Corridor identifies a Preservation Tree(s) as dying/dead, then
a) Remove the dying/dead tree(s) without harming adjacent Replacement Trees(s), otherwise leave the dying/dead tree standing and remove the upper branches and tree top for safety reasons;
b) Look for a Replacement Tree(s) (planted or natural) that is at least 15 cm DBH and number them as the new Replacement Tree;
c) If a Replacement Tree(s) cannot be found, then plant enough saplings in proximity to the dying/dead tree to achieve the cumulative caliper (at least 15 DBH) of a Replacement Tree so that the future trees(s) will provide similar buffering and visual screening; and
d) Include the Replacement Trees(s) in future monitoring.

NOTE: The tables above were taken from the Adaptive Management Plan by MTE Consultants Inc., August 14, 2014

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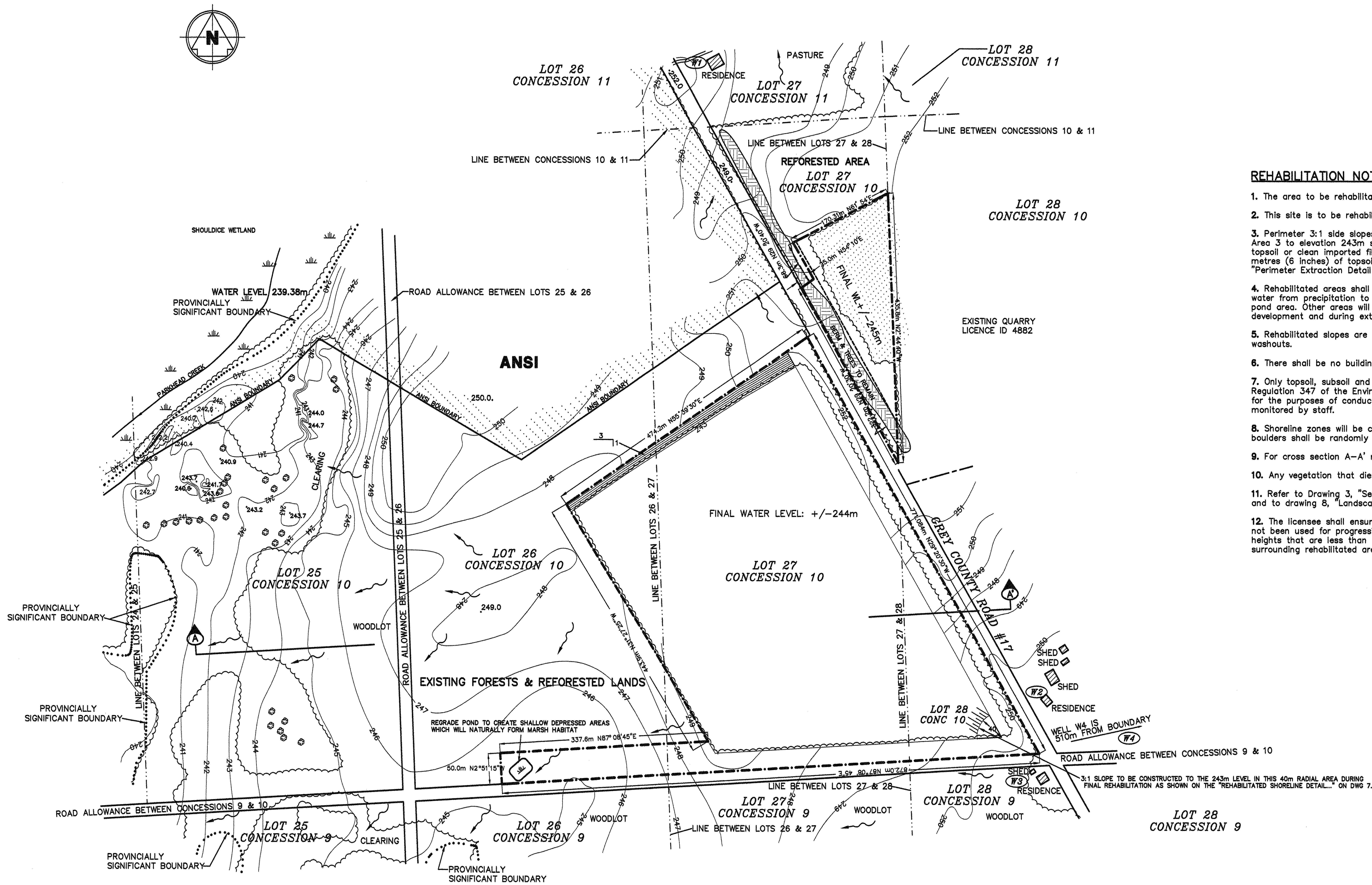
R.R. #2, KEMBLE, ONTARIO, N0H1S0
NEW KEPPEL QUARRY
PARTS LOTS 26, 27 & 28, CONCESSION 10
TOWNSHIP OF GEORGIAN BLUFFS (formerly Keppel Twp)
COUNTY OF GREY

ADAPTIVE MANAGEMENT PLAN
DRAWING 5 of 9

| No. | AMENDMENT | DATE |
|---|---|---|
| | | |
| | | |
| | | |

September 30, 2014




## REHABILITATION NOTES

1. The area to be rehabilitated is 26.85 hectares.

2. This site is to be rehabilitated to a natural environment after use.

3. Perimeter 3:1 side slopes along the 100m ANSI setback line and the SE corner of Area 3 to elevation 243m shall be created by backfilling with onsite overburden & topsoil or clean imported fill. Final slopes shall be spread with a minimum of 0.15 metres (6 inches) of topsoil and shall be seeded and planted as outlined on the "Perimeter Extraction Detail (ANSI Side) on Drawing 7, "Cross-sections and Details".

4. Rehabilitated areas shall drain in the direction of the arrows as shown. Surface water from precipitation to the north of the site will continue to drain towards the pond area. Other areas will drain in the same direction as they had prior to development and during extraction operations.

5. Rehabilitated slopes are to be regraded and replanted in the event of die out or washouts.

6. There shall be no buildings or roads on site upon completion of rehabilitation.

7. Only topsoil, subsoil and overburden meeting the definition of inert fill under Regulation 347 of the Environmental Protection Act shall be imported into this site for the purposes of conducting rehabilitation. Incoming loads of fill shall be monitored by staff.

8. Shoreline zones will be created in a jagged fashion where possible. Stumps and boulders shall be randomly strewn along the waters edge .

9. For cross section A–A' refer to Drawing 7, "Cross Sections and Details".

10. Any vegetation that dies or is otherwise damaged shall be reseeded or replanted.

11. Refer to Drawing 3, "Sequence of Operations", for progressive rehabilitation timing and to drawing 8, "Landscaping Details", by L. Porter, Landscape Architect.

12. The licensee shall ensure that any material remaining in acoustic berms that has not been used for progressive and final rehabilitation purposes shall be graded to heights that are less than 3m and vegetated with native species to blend in to the surrounding rehabilitated areas.

**LEGEND:**

| | |
|---|---|
| | WATER |
| | ANSI |
| | DRAINAGE DIRECTION |
| | PROPOSED LICENCE BOUNDARY |
| | PROVINCIALLY SIGNIFICANT BOUNDARY |
| | LOT LINE |
| .462.5 | SPOT ELEVATION |
| 464 | 1m CONTOUR |
| 465 | 5m CONTOUR |
| | DECIDUOUS TREE |
| | CONIFEROUS TREE |
| | WET AREA |

**HAROLD SUTHERLAND CONSTRUCTION LTD.**
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**NEW KEPPEL QUARRY**
PARTS LOTS 26, 27 & 28, CONCESSION 10
TOWNSHIP OF GEORGIAN BLUFFS (formerly Keppel Twp)
COUNTY OF GREY

**PROGRESSIVE REHABILITATION AND FINAL REHABILITATION PLANS**
DRAWING 6 of 9

SCALE: 1:4000
100 50 0 100 200 300

| No. | AMENDMENT | DATE |
|---|---|---|
| | | |

December 11, 2014