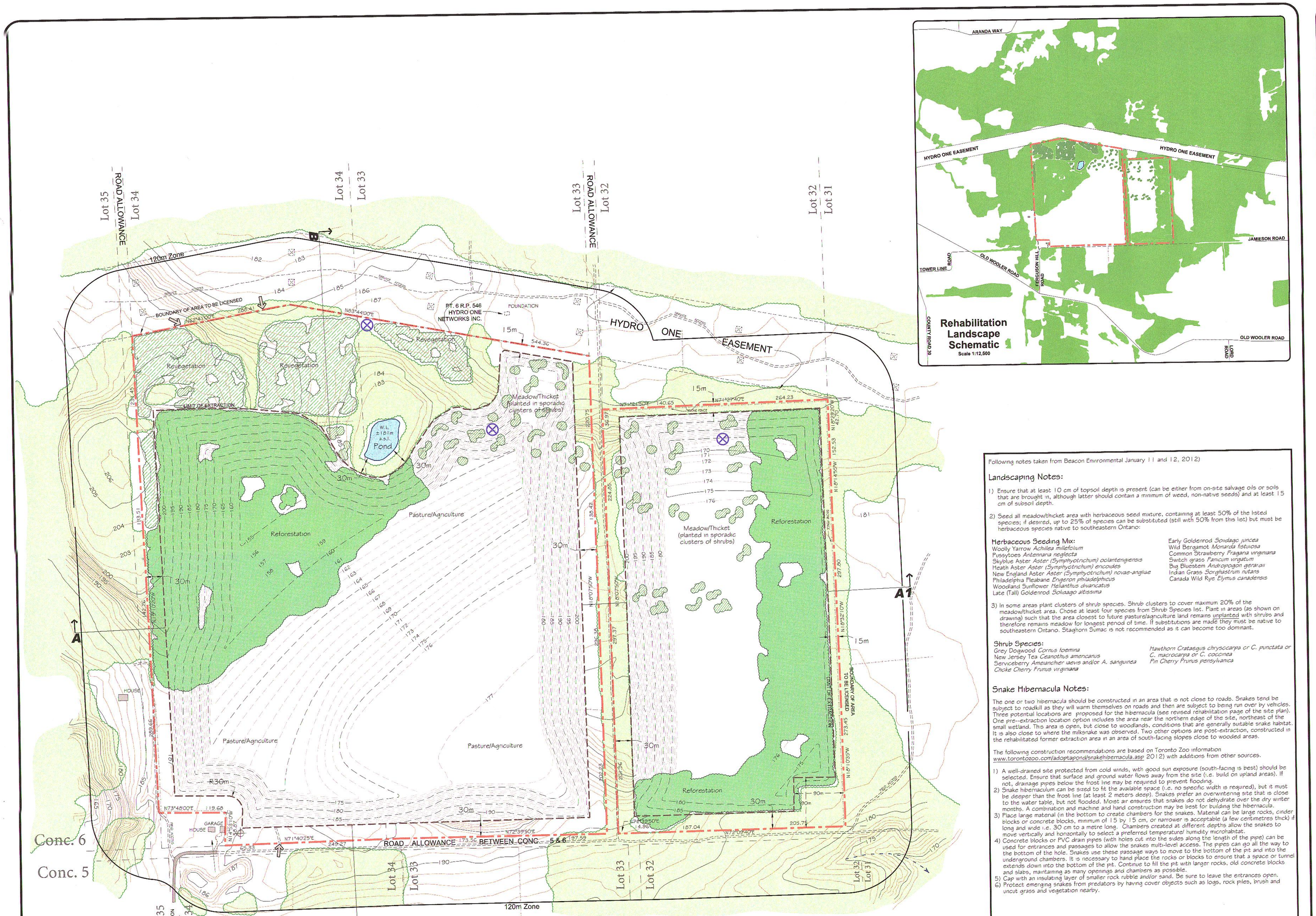
Final Rehabilitation



Legend

- Boundary of Area to be Licensed
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES.
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON SITE AND WITHIN 120m ARE SHOWN ON THIS PLAN
- Hydro Easement & Transmission Tower
- Elevation, Contour (195 / 196)
- Existing Vegetation
- Proposed Contour (170 / 171)
- Proposed Reforestation — PLANTED WITH SUPPLIED STOCK
- Existing Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Proposed Revegetation — PLANTED WITH SALVAGED/TRANSPLANTED STOCK FROM ONSITE AREAS WITHIN EXTRACTION LIMITS OR SUPPLIED STOCK
- Field/Residential Entrance
- Meadow Thicket — NATURAL REGENERATION, SEEDED WITH MEADOW PLANTS, SOME ADDITIONAL SHRUB PLANTINGS
- Travelled Laneway (580) — ROAD ALLOWANCES BETWEEN LOTS 32 & 33 AND CONC. 5 & 6 CONTAIN UNPAVED TRAVELLED PORTIONS PROVIDING ACCESS TO TRANSMISSION CORRIDOR.
- Existing Water Feature — AS INDICATED
- Cross Sections (A, A1, B, B1) — SEE PAGE 4 OF 4 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Surface Drainage Feature — ARROW INDICATES DIRECTION OF FLOW IF ANY
- Potential Snake Hibernacula Sites

Following notes taken from Beacon Environmental January 11 and 12, 2012)

Landscaping Notes:

1) Ensure that at least 10 cm of topsoil depth is present (can be either from on-site salvage oils or soils that are brought in, although latter should contain a minimum of weed, non-native seeds) and at least 15 cm of subsoil depth.

2) Seed all meadow/thicket area with herbaceous seed mixture, containing at least 50% of the listed species; if desired, up to 25% of species can be substituted (still with 50% from this list) but must be herbaceous species native to southeastern Ontario:

Herbaceous Seeding Mix:

- Woolly Yarrow *Achilea millefolium*
- Pussytoes *Antennaria neglecta*
- Skyblue Aster *Aster (Symphyotrichum) oolantengiensis*
- Heath Aster *Aster (Symphyotrichum) ericoides*
- New England Aster *Aster (Symphyotrichum) novae-angliae*
- Philadelphia Fleabane *Engeron philadelphicus*
- Woodland Sunflower *Helianthus divaricatus*
- Late (Tall) Goldenrod *Soliaago altissima*
- Early Goldenrod *Sondago juncea*
- Wild Bergamot *Monarda fistulosa*
- Common Strawberry *Fragaria virginiana*
- Switch grass *Panicum virgatum*
- Big Bluestem *Andropogon gerardii*
- Indian Grass *Sorghastrum nutans*
- Canada Wild Rye *Elymus canadensis*

3) In some areas plant clusters of shrub species. Shrub clusters to cover maximum 20% of the meadow/thicket area. Chose at least four species from Shrub Species list. Plant in areas (as shown on drawing) such that the area closest to future pasture/agriculture land remains unplanted with shrubs and therefore remains meadow for longest period of time. If substitutions are made they must be native to southeastern Ontario. Staghorn Sumac is not recommended as it can become too dominant.

Shrub Species:

- Grey Dogwood *Cornus foemina*
- New Jersey Tea *Ceanothus amencanus*
- Serviceberry *Amelanchier laevis* and/or *A. sanguinea*
- Chicke Cherry *Prunus virginiana*
- Hawthorn *Crataegus chrysocarpa* or *C. punctata* or *C. macrocarpa* or *C. coccinea*
- Pin Cherry *Prunus pensylvanica*

Snake Hibernacula Notes:

The one or two hibernacula should be constructed in an area that is not close to roads. Snakes tend be subject to roadkill as they will warm themselves on roads and then are subject to being run over by vehicles. Three potential locations are proposed for the hibernacula (see revised rehabilitation page of the site plan). One pre-extraction location option includes the area near the northern edge of the site, northeast of the small wetland. This area is open, but close to woodlands, conditions that are generally suitable snake habitat. It is also close to where the milksnake was observed. Two other options are post-extraction, constructed in the rehabilitated former extraction area in an area of south-facing slopes close to wooded areas.

The following construction recommendations are based on Toronto Zoo information www.torontozoo.com/adoptapond/snakehibernacula.asp 2012) with additions from other sources.

1) A well-drained site protected from cold winds, with good sun exposure (south-facing is best) should be selected. Ensure that surface and ground water flows away from the site (i.e. build on upland areas). If not, drainage pipes below the frost line may be required to prevent flooding.
2) Snake hibernaculum can be sized to fit the available space (i.e. no specific width is required), but it must be deeper than the frost line (at least 2 meters deep). Snakes prefer an overwintering site that is close to the water table, but not flooded. Moist ar ensures that snakes do not dehydrate over the dry winter months. A combination and machine and hand construction may be best for building the hibernacula.
3) Place large material (in the bottom to create chambers for the snakes. Material can be large rocks, cinder blocks or concrete blocks, minimum of 15 by 15 cm, or narrower is acceptable (a few centimetres thick) if long and wide i.e. 30 cm to a metre long. Chambers created at different depths allow the snakes to move vertically and horizontally to select a preferred temperature/ humidity microhabitat.
4) Concrete blocks or PVC drain pipes (with holes cut into the sides along the length of the pipe) can be used for entrances and passages to allow the snakes multi-level access. The pipes can go all the way to the bottom of the hole. Snakes use these passage ways to move to the bottom of the pit and into the underground chambers. It is necessary to hand place the rocks or blocks to ensure that a space or tunnel extends down into the bottom of the pit. Continue to fill the pit with larger rocks, old concrete blocks and slabs, maintaining as many openings and chambers as possible.
5) Cap with an insulating layer of smaller rock rubble and/or sand. Be sure to leave the entrances open.
6) Protect emerging snakes from predators by having cover objects such as logs, rock piles, brush and uncut grass and vegetation nearby.

General Notes:

1. THIS SITE PLAN IS PREPARED UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS 'A' LICENCE (CATEGORY 3).
2. TOPOGRAPHIC INFORMATION OBTAINED FROM FIRST BASE SOLUTIONS 'Mdar' MAPPING SERVICE. ADDITIONAL HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED ONSITE BY 43 DEGREES NORTH SURVEY & MAPPING SOLUTIONS IN MARCH 2007. RECTIFYING JAGGER HIMS MONITORING WELLS; BH05-2, BH05-18, BH05-19, BH05-20 & BH06-1 WITH EXISTING ELEVATIONS. CONTOUR INTERVAL IS 1.0 METRE. ALL ELEVATIONS ARE GEODETIC.
3. PROPERTY BOUNDARY DESCRIPTION WAS TAKEN FROM PLAN OF SURVEY, 39R 11088 DATED JANUARY 04, 2006 PREPARED BY KERRY BOEHME O.L.S.

Rehabilitation Notes:

Numbering scheme used for operations notes refers to Aggregate Resources Act Provincial Standards for a Class 'A' licence (Category 3) application.

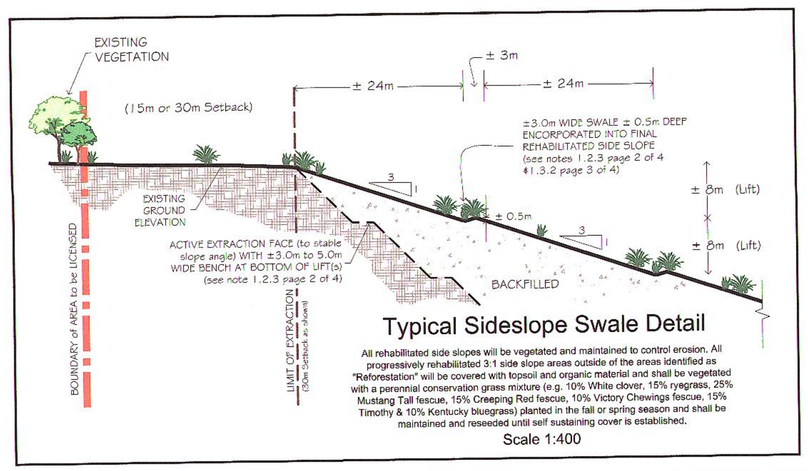
1.3.1 Rehabilitation will be progressive and proceed as limits of extraction are reached. The sequence of rehabilitation will follow the operational phasing sequence (note 1.2.1) and "Operations Schematic" diagram located on page 2 of 4.

1.3.2 Topsoil and overburden where present will be stripped, stored and replaced separately wherever there are distinguishable layers and sufficient thickness to allow handling in this manner. Topsoil from Phases 1 and 3 (wooded areas) will be transferred directly to reforestation areas whenever feasible to minimize storage and accelerate reforestation of northwest corner including those areas identified on this page as "Proposed Revegetation" outside the limit of extraction. Topsoil and overburden from forested areas will be stored separately from other topsoil and overburden sources (e.g. field) and only replaced in areas identified for reforestation /replanting. Overburden material will be used to backfill pit faces to desired finished grades (i.e. 3:1 slope). Where extraction occurs in 3 or more lifts a swale/bench, designed in accordance with the "Typical Side Slope Swale Detail" page 3 of 4, will be incorporated into the final rehabilitated 3:1 slope. Topsoil and organic material will be placed on these backfilled side slope areas.

1.3.3 & 1.4.3 The overall objectives are to minimize the effects of forest removals, and to return the site after extraction to land use proportions which maintain and enhance the function of the natural habitat which is currently existing. These objectives will be met by:

- Preservation
- Reforestation
- Regeneration; and
- Maintaining Existing Land Uses (agriculture).

Final pit landform will be generally in accordance with the drawing as shown on this page. The objective is to create a similar proportion of natural land use as exists now. Current proportions are approximately 39% pasture/agriculture, 36% forested, 21% cultural vegetation communities (thicket, meadow and hedgerow) and 2% wetland. At the same time the wildlife habitat conditions would ultimately be improved due to a changed woodland configuration and improved connectivity.



Rehabilitation Notes con'd:

Preservation

Roughly 10 ha of the site along the northwest edge will be retained in a natural or restored state. This area will contains the pond, small patches of deciduous forest, hedgerows as well as some agricultural lands that will be revegetated early in the life of the pit. The revegetation of the agricultural lands could occur with salvaged vegetation from the woodland area which will be removed for extraction purposes, or it could be re-planted with nursery stock. If salvaging is used it would mean that the existing seed bank, ground cover, shrubs and small trees on site would be moved from the woodlands on site and placed in the agricultural area to be revegetated. This will ensure that an ideal mix of species, already suited to the area will become established.

Reforestation

There is an opportunity, through pit excavation and planned woodland rehabilitation, to ultimately enhance the function of the woodlands by changing the shape and size of the forest once excavation is concluded. Planting would occur in the north-west corner (Lot 34) and south-east corner (Lot 32) of the extraction areas such that the woodland could be reconfigured larger than its original size, with a significantly increased quantity of interior woodland. The woodland areas would also be connected to the small pond, which would enhance the wildlife function of both features.

The following is a list of native tree species to be planted with the approximate percentages of each species:

- Red Oak (Quercus rubra) 35%
- Largetooth Aspen (Populus grandidenta) 20%
- Sugar Maple (Acer saccharum) 10%
- White Oak (Quercus alba) 10%
- White Pine (Pinus strobus) 10%
- Red Maple (Acer rubrum) 10%
- Black Cherry (Prunus serotina) 5%

Trees will be planted in clusters in approximately three (or more) size/grades, eg. 60 mm caliper (perhaps 10% of stock), 30 mm caliper (30%), and whips (1 to 2 m tall, 60%). Stock will range in age from about 2 years to 10 years old. Large-tooth Aspen and Black Cherry are good candidates for younger planting stock. Red Oak and White Pine are good species to plant in both smaller and larger sizes. Precise numbers and sizes and spacing will be determined through a detailed planting plan created by a professional arborist, forester and/or biologist and subject to plant availability.

In addition to the species listed for reforestation planting Bitternut Hickory and American Beech do not transplant well and may be regenerated using nuts planted over parts of the reforestation area in the fall at a density simulating natural conditions subject to availability at time of rehabilitation.

Native upland shrub species such as Chokecherry, Rough-leaved Dogwood, Maple-leaved Viburnum and Downy Arrow-wood would also be planted.

Monitoring and maintenance of newly planted trees and shrubs will occur over a two year period. Site preparation would include mulching (with seed-free straw, not hay, or wood chips) to a depth of three to five cm, in a 50 cm 'donut' around each tree. Trees will not need to be staked. Staking is not generally needed. Trees establish more quickly and develop stronger roots and trunks if un-staked. Survivorship monitoring will occur up until 12 months after planting with replacement of dead trees occuring if there is less than 90% survival rate.

Regeneration

The remainder of the site in Lot 32, and the northeast portion of the site in Lot 33 will be left to return to meadow and thicket habitat. Some of this area could also be seeded with meadow plants and planted with shrubs. This large block of meadow and thicket area would be connected to the thickets along the hydro line and would together support a diverse community of thicket wildlife such as exists on-site now.

Maintain Existing Land Uses

Rehabilitation of the remainder of the pit floor in Lots 33 & 34 returning to pasture/agriculture uses in a quality/quantity similar to existing conditions will consist of the following;

i) ripping to alleviate compaction where required,
ii) replace topsoil & subsoil to a similar depth as existing conditions (min. depth of 300mm for both soil horizons combined),
iii) seed to a grass/legume cover crop,
iv) manage & fertilize as required until self sustaining

1.3.4 & 1.4.2 Pit faces will be established at a minimum slope of 3:1 using available onsite overburden and non marketable material. All progressively rehabilitated 3:1 side slope areas outside of the areas identified as "Reforestation" will be covered with topsoil and organic material and shall be vegetated with a perennial conservation grass mixture (e.g. 10% White clover, 15% ryegrass, 25% Mustang Tall fescue, 15% Creeping Red fescue, 10% Victory Chewings fescue, 15% Timothy & 10% Kentucky bluegrass) planted in the fall or spring season and shall be maintained and reseeded until self sustaining cover is established.

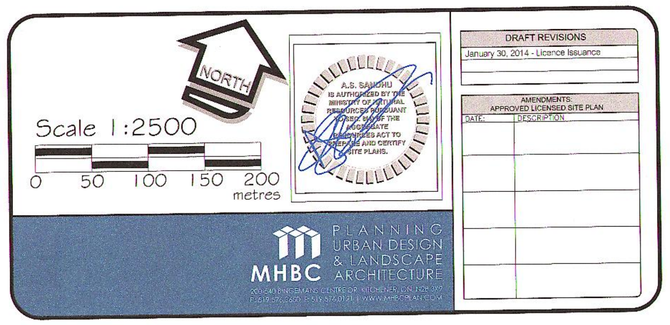
1.3.5 Rehabilitation will be progressive and proceed as limits of extraction are reached. The sequence of rehabilitation will follow the operational phasing sequence, see "Operations Schematic" diagram and notes on page 2 of 4 for details on progressive pit development.

1.3.6 & 1.4.1 No fill will be imported onsite.

1.4.4 No buildings or structures associated with aggregate operations will remain on site.

1.4.5 No internal haul roads will remain on the site. Access road(s) serving the agricultural uses may be established as part of site rehabilitation.

1.4.6 Final surface drainage will follow the rehabilitated contours as shown and generally be directed inwards towards the post-extraction pit floors where it will percolate vertically through the pit floor. Seasonal ponding/wet areas may occur on the pit floor at its lowest elevation in the northwest corner of the Western Parcel.



DRAFT REVISIONS
January 30, 2014 - License Issuance

AMENDMENTS APPROVED LICENSED SITE PLAN	
DATE:	DESCRIPTION

PROJECT NAME:

Codrington Pit

Job No.	Y321D CBM Codrington
Dwn. By	G.H. / D.G.
Chkd. By	A.S.
File No.	K:\Y321D_CBM_Hilton\A\Rehaplan_3of4.dwg

APPROVED
Aggregate Resources Act
Ministry of Natural Resources
Peterborough District
Name _____ Date May 16, 2014

Part Lots 32 -34
Concession 6
Municipality of Brighton
(geographic township of Brighton)
County of Northumberland

ST MARYS CBM

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