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A. General

1. Operations shall proceed in accordance with the AMP which is comprised of Drawing 5 of these site plan notes, as updated and approved in accordance with Section F.
2. The AMP monitoring is comprised of Section B - Field Sampling Event Parameters and Section C - Continuous Monitoring as updated and approved in accordance with Section F.
3. Monitoring, as identified within the AMP and including biological monitoring, will occur for a minimum of three consecutive years prior to commencing extraction below the water table.
4. Should extraction below the water table begin in year 4, monitoring will occur in accordance with Tables 1 and 2.
5. Should extraction below the water table not occur in year four, subject to approval by MNR, a reduced monitoring program consisting of continuous monitoring in accordance with Table 2 shall be conducted. No other components of the AMP monitoring program are required as part of the reduced monitoring program.
6. If extraction below the water table ceases for one full year, the reduced monitoring program in Note A.5 is the only monitoring required.
7. All monitoring may be discontinued one year after final extraction is concluded, subject to approval by the MNR.

B. Field Sampling Event Parameters

1. Three Paired Monitoring Stations, each comprised of an index pool and shallow water monitoring location, have been establish in the vicinity of the continuous monitoring station at SW4.
2. Index pools and shallow water monitoring locations in the 3 Paired Monitoring Stations shall be monitored concurrently.
3. In Table 1 below, a monitoring frequency of "4 times per year" means once during spring, twice during mid-season and once during fall.
4. Monitoring at the reference reach of Walkers Creek shall only be required if the NVCA facilitates access to the reference reach in a timely manner for the proposed sampling event. If access is not provided, SW-7 and P/R3 will be used.
5. Brook trout monitoring activity, described in Table 1 shall consist of multi-pass electrofishing in 50m reaches to acquire data on fish species presence; and brook trout population parameters including relative abundance and length.
6. Three replicate benthic samples, as described in Table 1 shall be collected with a 500 um Surber sampler. Subsamples will be processed to lowest practical taxa. Data will be analyzed for parameters including richness, density, diversity, evenness and EPT (Ephemeroptera-Plectopera-Trichoptera).
7. Redd surveys will be conducted following *Salmonid Spawning Surveys of Selected Streams in the Grand River Watershed 1988-1989* (R.A. Grillmayer and R.J. Baldwin, GRCA).
8. Qualitative aquatic habitat assessment described in Table 1 shall consist of stream parameters including bank conditions, riparian vegetation and cover, substrate characteristics (including prevalence of fine sediment), instream cover, barriers and flow conditions.

Table 1: Field Sampling (Subject to Sections A and B)

Monitoring Activity	Groundwater		Surface Water - Lisle Creek		Pit Pond	
	Location	*Frequency*	*Location*	*Frequency*	*Location*	*Frequency*
Water Levels	3 boreholes at, or in the vicinity of, BH5, BH2002-5, and BH2000-10, and 2 in-stream piezometers at SW4 and SW7. Following completion of excavation footprint temperature monitoring; at two new downgradiant monitors; (~18m) to be location adjacent to BH2002-5, and one shallow (~5m) to be located generally southwest of BH2002-5.	4 times per year	P/R 1, P/R 2, P/R 3	4 times per year, or more often if required to support the development of defensible shallow water flow trigger criteria	permanent staff gauge in pit pond	4 times per year and Daily on any day when material is excavated from below the water table
Stream Flow	N/A	N/A	at SW-4, SW-7, SW-8 and P/R 1, P/R 2, P/R 3.	4 times per year, or more often if required to support the development of defensible shallow water flow trigger criteria.	N/A	N/A
Temperature	3 boreholes at, or in the vicinity of, BH5, BH2002-5 and BH2000-10, and 2 in-stream piezometers at SW4 and SW7. Following completion of excavation footprint temperature monitoring; at 2 new downgradient monitors; 1 deep (~5 m) to be located generally southwest of BH2002-5 and one shallow (~5m) to be located generally southwest of BH2002-5	4 times per year	Spot temperatures at SW-4, SW-7, SW-8. P/R 1, P/R 2, P/R 3 and the Side Tributary	4 times per year, or more often if required to support the development of defensible shallow water flow trigger criteria.	at staff gauge	Four times per year
Chemistry (BTEX Scan, TPH Scan, general chemistry)	3 boreholes at, or in the vicinity of, BH5, BH2002-5 and BH2000-10, and 2 in-stream piezometers at SW4 and SW7. Following completion of excavation footprint temperature monitoring at 2 new downgradient monitors; 1 deep (~18 m) to be located adjacent to BH2002-5, and 1 shallow (~5 m) to be located generally southwest of BH2002-5	4 times per year	SW-4 and SW-7	4 times per year	at staff gauge	once per year
Stream Habitat Assessment	N/A	N/A	Qualitative habitat assessment updates at P/R 1, P/R 2, P/R 3 and in the Side Tributary.	every other year	N/A	
Aquatic Ecology – Benthics	N/A	N/A	At shallow stations at P/R 1, P/R 2, P/R 3	every other year during fall		
Aquatics - Redd Survey	N/A	N/A	the portion of Lisle Creek on the site; the Side Tributary; (and in Walkers Creek if access is granted)	every other year during brook trout spawning period		
Aquatics - Brook Trout Sampling	N/A	N/A	near SW-4 and SW-7 (and in Walkers Creek if access is granted)	Every other year from mid-August to mid September.		

C. Continuous Monitoring (subject to Sections A and C)

1. Continuous monitoring stations for water level and water temperature will be established at boreholes located within the footprint of below water excavation (excavation footprint temperature monitoring) and downgradient (downgradient monitoring), in-stream piezometers, surface water stations and the Pit Pond per Table 2.
2. "Continuous" monitoring in Table 2 means monitoring between April 1 and October 15 using automated sampling/recording device (data loggers) recording measurements at 0.25 hr intervals
3. At any location where seasonal or weekly data downloading is required, and automated sampling/recording device that remotely uplinks data may be used, in which case the seasonal or weekly downloading of data is not required.

Table 2: Continuous Monitoring

Monitoring Activity	Groundwater		Surface Water - Lisle Creek		Pit Pond	
	Location	*Frequency*	*Location*	*Frequency*	*Location*	*Frequency*
Water Levels	2 boreholes at, or in the vicinity of BH2002-5 and BH2000-10, and 2 in-stream piezometers at SW4 and SW7. Following completion of excavation footprint temperature monitoring; at 2 new downgradient monitors; 1 deep (~18 m) to be located adjacent to BH2002-5, and 1 shallow (~5 m) to be located generally southwest of BH2002-5	continuous sampling with data loggers; seasonal download of data in a season when there is no below water table extraction, and weekly download of data in a season when there is below water table extraction	Continuous at SW-4, SW-7 and SW-8	continuous sampling with data loggers; seasonal download of data in a season when there is no below water table extraction, and data from the automated sampling / recording device(s) will be automatically uplinked for remote web based access when there is below-water extraction	at staff gauge	continuous sampling with data loggers; seasonal download of data in a season when there is no below water table extraction, and weekly download of data in a season when there is below water table extraction
Temperature	2 boreholes at, or in the vicinity of BH2002-5 and BH2000-10, and 2 in-stream piezometers at SW4 and SW7. Following completion of in pit thermal monitoring; at 2 new downgradient monitors; 1 deep to be located adjacent to BH2002-5, and 1 shallow to be located generally southwest of BH2002-5	continuous sampling data loggers; seasonal download of data in a season when there is no below water table extraction, and weekly download of data in a season when there is below water table extraction	3 sites (SW4, SW7 and SW8) and air temperature	continuous sampling with data loggers; seasonal download of data in a season when there is no below water table extraction, and data from the data loggers will be automatically uplinked for remote web based access when there is below-water extraction	at staff gauge	continuous sampling with data loggers; seasonal download of data in a season when there is no below water table extraction, and weekly download of data in a season when there is below water table extraction
Excavation Footprint Temperature	Excavation footprint monitoring at 3 locations downgradient of the year 1-2 pit for below water excavation	continuous sampling with data loggers for a minimum of 2 years following commencement of below water extraction; and continuing until monitors are removed by excavation; seasonal download of data in a season when there is no below water table extraction, and weekly download of data in a season when there is below water table extraction				

D. Data Assessment During Below Water Operations

1. In a season where there is active below water table extraction, the continuous monitoring data collected in accordance with Table 2 will be reviewed weekly (including use of direct downloads and uplinks) by the monitoring professionals to determine if trigger have been exceeded.
2. A "monitoring Professional" is a person or persons qualified to interpret monitoring data and provide expert opinions on this adaptive management program including implementation of contingency measures and modifications to monitoring.
3. The field data collected in accordance with Section B shall be compared and assessed with the continuous monitoring data collected in accordance with Section C.

E. Contingency Implementation

1. If the assessments confirm that triggers have been exceeded, and that contingency measures are required, the monitoring professional will notify the site manager who will implement operational contingencies as per Table 3. MNR and NVCA staff will be advised of a trigger being exceeded.
2. Monitoring professionals will assess the site conditions (including more intensive field monitoring as appropriate) and determine when and if contingency measures should be adjusted or discontinued. Contingency measures may be discontinued after a minimum of 3 days have elapsed without a trigger being exceeded.
3. Table 3 identifies initial triggers for implementation of contingency measures in response to monitoring results for index pools. Shallow water monitoring stations triggers and associated contingency measures will be developed from empirical data in accordance with note Note F.5.
4. Additional trigger variables for flow and downstream temperature and associated contingency measures may be developed in accordance with Note F.5.

Table 3: Index Pool Contingency Triggers

Pool Depth	Reduction in the rate of Below-Water Extraction	Maximum Weekly Average Temperature (MWAT)
> 25 cm ►	0% (No reduction)	◄ < 18°C
20 - 25 cm ►	20% (1 day per week curtailment)	◄ 18 – 19°C
15 - 20 cm ►	60% (3 days per week curtailment)	◄ 19 – 20°C
< 15 cm ►	100% (Complete curtailment)	◄ > 20°C

F. Annual Reporting and AMP Updating

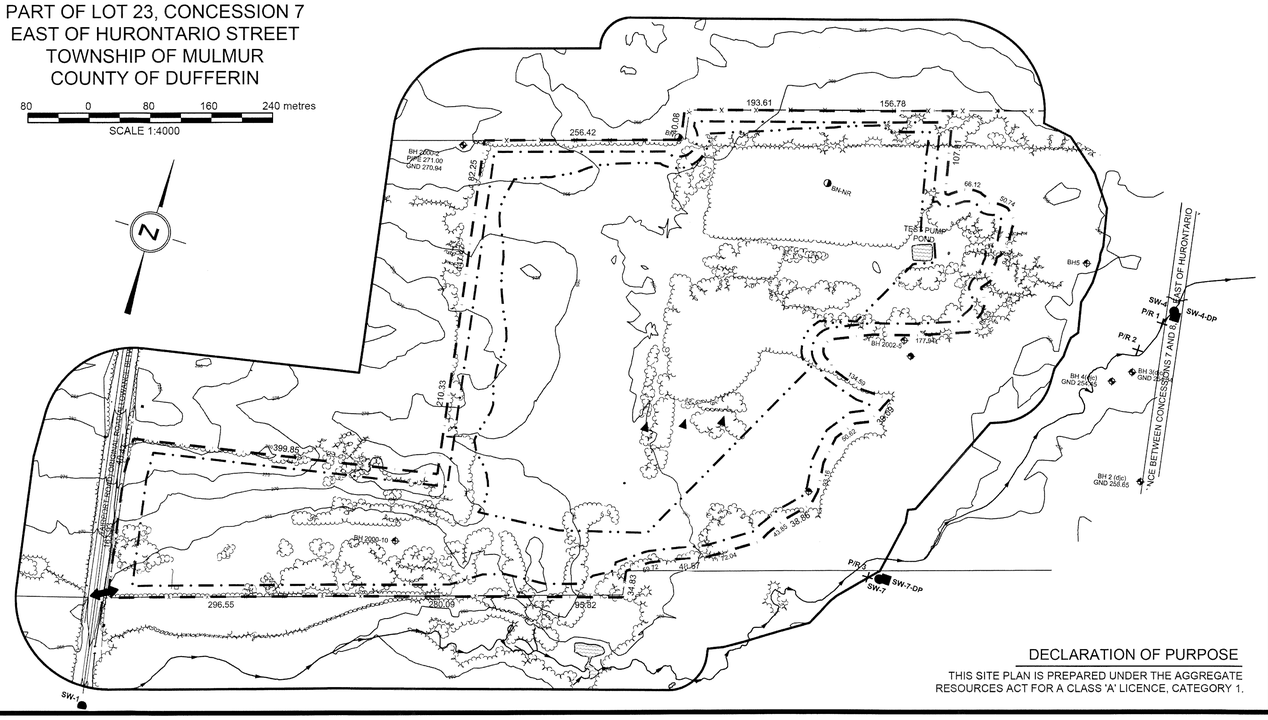
1. A copy of all monitoring data collected in accordance with Section B and Section C will be maintained on-site where it will be available to agency staff upon pre-arranged site meeting basis.
2. An Annual Report prepared by a Monitoring Professional will be submitted to the MNR within 2 months of the end of each calendar year. The MOE and the NVCA will be provided copies of the Annual Report. The Annual Report will contain:
   a) The verified monitoring data collected,
   b) An analysis and assessment of the data, and
   c) Recommendations pertaining to:
      i. The suitability of the proposed limit of below water table extraction;
      ii. The rate of aggregate extraction
      iii. Proposed changes to monitoring, if any;
      iv. Proposed changes to the trigger variables or trigger values and associated contingency measures, if any, and
      v. Proposed operational changes, if any.
3. Prior to implementing any proposed changes recommended in an Annual Report, such changes shall be approved by MNR, in consultation with NVCA.
4. Within two weeks of the MNR approving any changes to AMP that are recommended in an Annual Report, an updated Drawing 5 consolidating all approved changes to the AMP will be prepared and provided to the MNR and copied to the NVCA.
5. Prior to commencing below-water table extraction:
   a) Trigger values will be developed for the shallow water monitoring stations and associated contingency measures, based on empirical data (including regression and other analyses), to the satisfaction of the MNR in consultation with the NVCA and the MOE.
   b) Flow and downstream temperature variables and associated contingency measures will be assessed (including regression and other analyses) for potential new trigger variable and associated contingency measures to the satisfaction of the MNR in consultation with the NVCA and the MOE.
6. Excavation footprint temperature monitoring will be conducted for a period of at least two years following commencement of below water extraction. Assessment of this complete data set will be conducted to confirm model predictions of groundwater temperature extents and identify locations for the two additional monitors to be installed thereafter downgradient of the extraction limit for below water excavation. This assessment to be included in the Annual Monitoring Report for the year in which it conducted.

G. SHARING Of DATA

1. The NVCA will be provided online access to non-verified monitoring data from Section C - Continuous Monitoring. Verified monitoring data will be included in the Annual Report required by Section F.
2. Data sharing in accordance with Note G.1 shall not be required until the Licensee has entered into a data sharing agreement with the NVCA that preserves the confidentiality of the data shared pursuant to Note G.1. while authorizing that data to be used by the NVCA for monitoring the pit and watershed management.

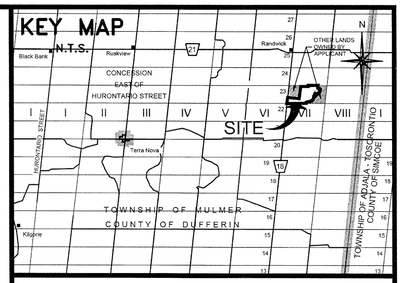
PART OF LOT 23, CONCESSION 7
EAST OF HURONTARIO STREET
TOWNSHIP OF MULMUR
COUNTY OF DUFFERIN

80 0 80 160 240 metres
SCALE 1:4000



DECLARATION OF PURPOSE

THIS SITE PLAN IS PREPARED UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS 'A' LICENCE, CATEGORY 1.



LEGEND

- LICENCED BOUNDARY
- LIMIT OF EXTRACTION - ABOVE THE WATER TABLE
- LIMIT OF EXTRACTION - BELOW THE WATER TABLE
- LINE INDICATING ALL POINTS WITHIN 120m (MINIMUM) OF LICENCED BOUNDARY
- PROPERTY LINE
- POST & PAGE WIRE FENCE (UNLESS OTHERWISE NOTED)
- PUBLIC ROAD
- WATER COURSE
- CONTOURS
- WOODED AREAS / PLANTATION
- POND
- P/R 3 — PAIRED MONITORING STATION
- BH 2000-10 — GROUNDWATER MONITORING WELL
- PROPOSED MONITORING WELL
- PROPOSED DEEP MONITORING WELL
- SW-7 — SURFACE WATER MONITORING STATION
- SW-7-DP — IN-STREAM PIEZOMETER
- EXCAVATION FOOTPRINT TEMPERATURE MONITORING WELL

SCHEDULE OF AMENDMENTS

NO.	DATE	DESCRIPTION	APPROVED
1.	July 2014	Amendments resulting from consultation process	ATG

ANNE TERRY GUIOT
IS APPROVED BY THE MINISTRY OF NATURAL RESOURCES PURSUANT TO SECTION 8 (4) OF THE AGGREGATE RESOURCES ACT TO PREPARE AND CERTIFY SITE PLANS.

ANNE TERRY GUIOT — DATE July 15/14

ARBOUR FARMS PIT
MULMUR TOWNSHIP

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TORONTO, ONTARIO
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ADAPTIVE MANAGEMENT PROGRAM

PROJECT NO. 98 - 1483 | DRWG. NO. 1483 - 5 OF 5
DATE: DECEMBER 2012 | SCALE: 1:3000
DRAWN: CAP | CHECKED: CP | APPROVED: ATG

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