Quality Assurance and Quality Control

The following QA/QC measures and precautions will be taken during the Soil and Groundwater Sampling Program to minimize the potential for cross contamination and to maintain sample integrity:

- Use of Arcadis standard operating procedures (SOPs) to ensure representative samples are collected;
- Using appropriately trained personnel;
- All investigation methods, sampling protocols, calibration techniques and QA/QC procedures throughout this study and any additional work that may result from this study will be clearly documented;
- Proper documentation of all aspects of the sampling program, which could potentially cause sampling bias. The documentation will include daily field summary sheets, separate filing of field notes, chain-of-custody forms and memos written when any major deviation from ideal protocol occurs (e.g., an ice-pack melts, a bottle is broken, etc.);
- Decontamination of sampling equipment. All re-usable sampling apparatus will be successively washed with Alconox or Citranox and distilled water;
- A minimum of 10% collected samples, with a minimum of one sample per parameter, submitted to the laboratory will be blind field duplicates. These duplicates are in addition to any duplicates and replicates analyzed as part of the standard lab QA/QC procedures. The blind duplicate samples will be labeled such that the laboratory does not know that the samples are duplicates;
- All samples for potential laboratory analysis will be collected in the appropriate new containers provided by the laboratory with any necessary preservatives;
- Delivery of samples directly to the laboratory, by courier, within the required sampling hold times. Samples will be immediately transferred and stored in coolers with ice packs to hold the sample temperature at approximately 4 to 10°C, as required by laboratory protocols;
- Field and laboratory QA/QC results will be reviewed to provide an indication of the reliability of laboratory analytical data. The laboratory data will be reviewed including their QA/QC and recoveries of surrogate samples; and,
- Samples submitted to the laboratory will be accompanied by the appropriate laboratory Chain of Custody documentation for tracking purposes.

Laboratory Analysis

All chemical analyses will be completed by Maxxam Analytical Services (Maxxam) in Calgary, AB. PFC analysis will be completed by Maxxam in Mississauga, ON. Maxxam is certified by the Canadian Association for Laboratory Accreditation Inc. (CALA). The proposed laboratory program will include verification that the selected analytical methods will have minimum detection limits which are less than the applicable environmental quality criteria or standard on which the numerical comparison will be based. The proposed analytical program for the Apron LTU is as shown below:

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Table 1: Apron LTU Analytical Program

Task	Analysis	Number of Samples
Groundwater Monitoring Program (as per NWB License 1BR-FTA1217)	- pH - Conductivity - Total Hardness - Total Alkalinity - Nitrate-Nitrite - Ammonia Nitrogen - Oil and Grease - Total Phenols - Calcium - Magnesium - Sodium - Potassium - Chloride - Sulphate - Dissolved Metals - PHCs F1 to F4 - PAHs - BTEX - Total Suspended and Dissolved Solids	9 plus 1 duplicate
Soil Monitoring Program (as per NWB License 1BR-FTA1217)	- BTEX and PHCs F1 to F4	6 plus 1 duplicate after tilling
Sump Water (Dewatering, as per NWB License 1BR-FTA1217)	- pH - Dissolved lead - Zinc - Oil and Grease - BTEX - PFC (not required by NWB license)	1
Soil Indicator Parameters for Natural attenuation	- total iron - total potassium - available phosphorus - total nitrogen	4 plus 1 duplicate
QA/QC	- Field Blank for BTEX, F1-F4 - Trip Blank for BTEX/F1	1 each

A letter of approval from Maxxam regarding consultant sampling protocols will be obtained by Arcadis to meet water license requirements prior to sampling. This letter will be forwarded by TC to the NWB.

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