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CONSULTING



SURFACE WATER MONITORING PROGRAM
Black Point Quarry Project

October 25, 2024



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October 25, 2024

Mr. Chris Ridgway
Black Point Aggregates Inc.
PO Box 730
Halifax, NS B3J 2V1

Dear Mr. Ridgway,

Re: Surface Water Monitoring Program
Black Point Quarry Project

Attached is the Surface Water Monitoring Program prepared for the Black Point Quarry Project.

The report documents our observations, findings, and recommendations.

We trust this to be satisfactory at this time. Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,

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RECORD OF AMENDMENTS

Version	Date	Amendment

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Appendix A: Drawings

1.0 INTRODUCTION

Black Point Aggregates Inc. (BPAI) will operate the Black Point Quarry Project (the "Project") in Chedabucto Bay, Nova Scotia (NS) (Drawing 1, Appendix A). The Project will produce aggregate from granite (drilling, blasting, processing, and stockpiling) and involve the construction and operation of a marine shipping terminal.

BPAI received Environmental Assessment (EA) Approval with Conditions from the Minister of Environment and Climate Change Canada (ECCC) and the provincial Minister of Environment on April 26, 2016. Per Terms and Condition 2.2 (a and d) of the EA Approval from Nova Scotia Environment [now Nova Scotia Environment and Climate Change (NSECC)], BPAI is required to design and implement a Surface Water Monitoring Plan (the "Plan").

1.1 Purpose

This Plan establishes a monitoring program to assess baseline and potential Project-generated impacts to surface water during operations. In addition, this Plan details the methodology to monitor and evaluate surface water data and provides an avenue to propose mitigation measures to be implemented across Project activities in the event that any negative impacts are observed within the nearest natural surface water features.

The nearest topographically mapped surface water features are Fogherty Lake (located 0.1 km west of the Project), Murphys Lake (0.2 km east of the Project), and Reynolds Brook (1.2 km southeast of the Project) (Drawing 1, Appendix A). Additional watercourses in closer proximity to the Project were field verified throughout the property boundary in 2024 (Drawing 2, Appendix A) in support of the provincial permitting process.

1.2 Scope

This Plan details the surface water monitoring program, including the location of baseline monitoring locations and monitoring parameters, and proposed locations for operational monitoring and monitoring parameters. The program is designed to evaluate potential impacts on surface water volume discharge and quality. This Surface Water Monitoring Plan does not include wetland monitoring which is described separately within the wetland alteration application.

Based on the results of the monitoring program, BPAI will modify mitigation plans or quarry operations (if necessary) to prevent unacceptable environmental effects.

This Plan will describe the collection of volume discharge measurements and water quality data that will be used to verify the interpretations and conclusions of the Project's Environmental Impact Statement (EIS).

1.3 Revision and Document Control

This Plan is a "living" document and will be revised and updated as necessary; BPAI will review and update, at minimum, annually. Revisions will also be undertaken whenever work or

mitigation methods are deemed inappropriate or ineffective or if directed by a Regulatory authority. Any new methodologies or approaches not listed in this Plan must be reviewed and approved by NSECC prior to implementation. A copy of this Plan will be provided to all Project personnel and contractors completing Project-related activities. In addition, all Plan records, including inspection and action log activities, will be kept on-site with BPAI for future reference and to confirm that any necessary corrective actions have been completed and/or addressed.

2.0 METHODOLOGY

Baseline surface water assessments are being completed quarterly in 2024 within a selection of the watercourse systems within and surrounding the property boundary (Drawing 2, Appendix A). The surface water quality and quantity monitoring program during Project operations will be limited to those systems determined to be within or adjacent the radius of influence from the quarry as determined through the EIS that are not proposed to be completely altered through the provincial watercourse alteration application process and federal *Fisheries Act* Authorization (FAA). Once site conditions stabilize, BPAI will look to reduce the frequency of surface water sampling to annual, in collaboration with NSECC.

2.1 Climatic Data

Local climatic data (precipitation) will be obtained annually from the nearest meteorological station with adequate climatic data, with a minimum daily data interval. The data will be evaluated during surface water sampling events to determine whether sampling was completed during high or low precipitation events that may influence local surface water levels. In addition, observations by field crews will be used to document site conditions during the monitoring events.

2.2 Monitoring Locations

Surface water monitoring is being conducted seasonally through 2024 to establish baseline conditions within the four topographically mapped watercourse systems, which include: WC2, WC3 a tributary to Reynolds Brook and Fogherty Lake and Murphys Lake and their respective outlet watercourses. Additional smaller first order streams that were identified during field surveys in 2024 have also been assessed in support of the submission of provincial alteration applications and the Request for Review.

BPAI will also sample the water quality at established discharge locations [catch basin 1 (CB1) and catch basin 6 (CB6)] prior to discharge. The details associated with this aspect of the Project monitoring program can be found within the Stormwater and Erosion and Sediment Control Plan (under separate cover).

Watercourse systems and monitoring locations proposed for monitoring during Project operations are presented in Drawing 2 (Appendix A) and described below:

- Watercourse System 1 is comprised of Fogherty Lake and Watercourse 1 (WC1). WC1 flows from Fogherty Lake north into Chedabucto Bay.

- Watercourse System 1 is adjacent to the predicted draw down radius of influence of the quarry with the extent of influence ending along the eastern shoreline of Fogherty Lake (SLR, 2015).
 - Water quality and water level monitoring are proposed to occur in Fogherty Lake at SW2.
 - Water quality and flow monitoring are proposed to occur within WC1 at SW1.
- Watercourse System 2 is comprised of Watercourse 2 (WC2). WC2 is an ephemeral watercourse that flows in a north-westerly direction within a steep ravine to Chedabucto Bay.
 - Watercourse System 2 is proposed for complete alteration through the provincial watercourse alteration application process. The alteration will include the direct impact of WC2 where it intersects with the quarry footprint and the indirect impact from flow reduction due to a substantial loss of catchment.
 - Given that complete alteration of WC2 is proposed to support the Project, no monitoring during construction and operation of the Project is proposed (SW3).
- Watercourse System 3 is comprised of Watercourses 3, 4, 5, 6, and 7 (WC3, WC4, WC5, WC6, and WC7), which flow south into Reynolds Brook, discharging through Hendsbee and other lakes into Tor Bay. This watercourse system has been determined by Fisheries and Oceans Canada (DFO) to be a fisheries resource, based on the presence of American eel (*Anquilla rostrata*) and ninespine stickleback (*Pungitius pungitius*) in Reynolds Brook and the lower reaches of WC3 outside of the property boundary between 2010 and 2024.
 - WC6 and WC7 and the upper reaches of WC3 are proposed for direct alteration. The lower portion of WC3 and Reynolds Brook have been determined to be indirectly altered due to flow reduction.
 - Water quality samples will continue to be collected in the portions of WC3 and Reynolds Brook that will not be directly impacted by the Project at SW4 and SW5.
 - Volume discharge measurements (flow) within WC3 and Reynolds Brook are proposed to be collected at site SW4 and SW5 respectively.
 - No water quality samples, or quantity measurement samples are proposed within WC4 or WC5 as these are small tributary watercourses to WC3 and are located upstream of sample site SW4 (located in WC3).
- Watercourse System 4 is comprised of Murphys Lake and its outflow watercourse (both located east of the property boundary), which flow in a northeast direction to Chedabucto Bay.
 - Watercourse System 4 is adjacent the predicted draw down radius of influence of the quarry with the extent of influence ending along the western shoreline of Murphys Lake (SLR, 2015).
 - Water quality and water level monitoring are proposed to occur in Murphys Lake at SW7.

- Water quality and flow monitoring are proposed to occur within the outlet watercourse at SW6.

2.3 Water Quality Sampling Methodology

The following sections describe the sampling methodology employed for surface water quality data collection.

2.3.1 Field Chemistry

Surface water samples will be analyzed in the field for pH, temperature, conductivity, and dissolved oxygen using a Horiba YSI multimeter probe. The equipment sensor is to be placed in the surface water without disturbing the bed or bank and ideally suspended off the bottom to prevent contamination. All equipment is to be calibrated as described in Section 2.3.3.

2.3.2 Laboratory Chemistry

Surface water samples will be analyzed for total suspended solids (TSS) and RCap-MS including general chemistry (pH, conductivity, total dissolved solids, hardness, turbidity, etc.) and total metals. Results will be compared to the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater (CCME-FWAL) and the Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water.

Sample bottles are prepared and provided by Bureau Veritas Laboratories, and field staff collect samples directly from each water quality assessment site using the following methods:

- Collect samples from the shoreline without disturbing the waterbody bed or banks.
- Stand downstream (in flowing water) from the sample collection to avoid stream bed contamination.
 - The sampler should face upstream if there is a current and collect the sample without disturbing the bottom sediment.
- Wear latex gloves while sampling.
- Change latex gloves between sites.
- Use separate syringes and filters per assessment site for samples requiring field filtration.
- Sample bottles not supplied with preservatives, requiring filtering or sampling at depth, will be rinsed three times with on-site sample medium (local surface water) prior to collection.

During winter (frozen) conditions, water samples are collected through a borehole in the ice when necessary.

2.3.3 Quality Assurance and Quality Control

Laboratory samples should be kept at or below 10°C after collection. Sample storage throughout the field day should be in a cooler with ice or ice packs or a fridge for overnight storage. All samples are to be labelled in the field and Chain-of-Custody documents are filled out and remain

with the samples until analysis is completed and certified laboratory analyses are provided by the laboratory. All samples are to be submitted to the laboratory within their specified hold times. A duplicate sample will be taken per sampling event as a Quality Assurance and Quality Control (QA/QC) measure.

Non-laboratory sampling equipment is to be calibrated per the manufacturer's specification prior to the onset of a sampling program and continue at the manufacturer's suggested frequency. All calibration activities are to be recorded and logged.

2.4 Water Level and Quantity Sampling Methodology

The following sections describe the sampling methodology employed for the installation of hydrometric stations used to monitor water level and flow monitoring stations which are comprised of paired hydrometric stations and established discharge volume monitoring locations to support the collection of surface water quantity data. Water level and volume discharge measurements are paired to create a stage discharge curve for each flow monitoring station.

Per Terms and Condition 3.8.1.1 of the EA Approval from the Canadian Environmental Assessment Agency (CEAA) [now the Impact Assessment Agency of Canada (IAAC)] flow data associated with Reynolds Brook has been collected throughout 2024 to include seasonal variation. This data will be included in the Federal *Fisheries Act* Authorization (FAA) application planned for submission to DFO in December 2025.

2.4.1 Hydrometric Stations and Automated Water Level Loggers

Hydrometric stations are to be installed within the lakes to monitor water levels in 2025 prior to any major excavation activities that would initiate potential draw down. Hydrometric stations are installed to support flow monitoring stations in a flat (low velocity) section of the watercourse within 10 m of the established volume discharge monitoring. Five hydrometric stations were installed across and outside the property boundary to support baseline sampling with two additional proposed to be installed in the lakes in 2025. Six of these locations that are proposed for continued monitoring during Project operations, as shown on Drawing 2 (Appendix A). The locations are chosen where water depth is expected to remain sufficient throughout the driest times of the year. Each staff gauge is affixed to a piece of angle iron driven approximately 1 m into the bed of the lake or watercourse.

Each hydrometric station hosts a staff gauge graduated in centimetres (cm) and an automated water level logger. Automated water level loggers are suspended within a 5 cm diameter slotted PVC pipe stilling well using a length of twine.

Water level loggers record every 15 minutes and a barometric pressure logger records at the same interval. Per the manufacturer's specifications, the barometric pressure logger is installed in a central location within 30 km and 300 m elevation of all the automated water level loggers. Water level loggers are compensated for barometric pressure using Solinst Levelogger Software. During each monitoring event, staff gauge readings are collected, and logger data is downloaded seasonally.

2.4.2 Discharge Volume Measurements

Five volume discharge monitoring locations were paired with the hydrometric stations established within and east of the Study Area to support baseline sampling. Four of these locations are proposed to continue during Project operations, as shown on Drawing 2 (Appendix A). Discharge volume is established using the mid-section method described in The Water Survey of Canada, Hydrometric Technician Career Development Program (Environment Canada, 1999). The wetted width is determined with a metered tape secured between two flagged, fixed station posts installed on either side of the watercourse. The wetted width of the watercourse is divided into a minimum of 20 cross-sectional intervals when the watercourse is greater than 2 m wide. Where the watercourse is less than 2 m wide, the wetted width is divided into 10 cm intervals. Point velocities are determined in each interval with a flow meter that displays average flow velocities over 30-second intervals and depth via meter stick readings. To determine the mean velocity at each interval, the one-point method is used for water depths less than 1.0 m (i.e., velocity is measured at 0.6 of the total depth below the surface). When depth is 1.0 m or greater or upstream obstructions are present, the two-point method is used (velocity is measured at 0.2 and 0.8 of the total depth then averaged). Multiple flow measurements in the deeper water sections of the channel provide more accurate data than single measurements.

The volume [cubic metres per second (m^3/s)] of water flowing within a watercourse past a given point is calculated by multiplying its flow velocity (m/s) by the cross-sectional water depth (m) and width (m). To obtain the volume flowing across the entire width of the watercourse, a series (generally a minimum of 20) of single-point velocity and depth measurements are combined to create a cross-sectional flow profile of the river. The data is entered into a spreadsheet that calculates volume discharge by combining the individual depth and interval measurements (flow and width) of the stream.

Flow velocity measurements are taken using an OTT MF Pro Flow Meter. The meter can read velocities ranging from 0 to 6 m/s. The flow meter's accuracy is +/- 2% of a given reading when the velocity is between 0 and 3 m/s and +/- 4% when the velocity is between 3 and 6 m/s.

3.0 ASSESSMENT ANALYSIS

Baseline surface water quality and quantity results are being used to create a database of known surface water quality parameters prior to the Project's operation. This database will be compared to long-term surface water monitoring results to determine spatial and temporal trends in surface water quality and quantity as possible results of the Project Operations. Water quality results will be compared to:

- The CCME Canadian Environmental Quality Guidelines – Water Quality Guidelines for the Protection of Aquatic Life, Freshwater
- Nova Scotia Tier I EQS for Surface Water
- Established baseline conditions.

Water quantity results will be assessed with consideration of local annual climatic conditions and in conjunction with groundwater monitoring results.

3.1 Assessment Frequency

Quarterly baseline samples are currently being collected through 2024 to establish baseline conditions. During construction and the operations phases of the Project, quarterly sampling will continue at the monitoring locations shown on Drawing 2 (Appendix A) until the site has stabilized, at which point, BPAI will recommend adjusting the frequency of sampling to annually, in collaboration with NSECC. Frequency of monitoring through closure and reclamation will be determined in collaboration with NSECC prior to entering those phases of the Project.

Additional surface water sampling may be required if effects due to the Project's activities are observed in the surface water monitoring plan results.

4.0 REPORTING AND RESULTS

Monitoring results will be summarized and reported annually. IAAC Condition 2.6.4 requires that “the results of any follow-up program” be reported in an Annual Report submitted by June 30 following the reporting year. BPAI must publish the Annual Report on the internet and inform IAAC and Indigenous groups once the reports are published. NSECC will also be informed of the report’s availability at this time.

Reports will include (at a minimum):

- Surface water chemistry results compared to relevant (Section 3.0) water quality guidelines, presented in tabular format.
- Discussion of surface water quality conditions.
- Hydrometric station hydrographs relating surface water elevations geodetically.
- Stage discharge curves for water quantity sites.
- A discussion of surface water levels in consideration of groundwater elevations.
- Recommendations for future monitoring or amendments to this Plan.

This Report will be submitted to NSECC, and any changes to the Plan will require approval from NSECC prior to implementation. This report will also satisfy IAAC Condition 3.8.1.2 to monitor water flow and water levels upstream of Hendsbee Lake during construction and operation and implement measures to maintain the water flow and water levels, recognizing the fact that a federal FAA for these predicted flow reductions is being sought by BPAI to support Project development.

5.0 MONITORING SUMMARY

The surface water monitoring program is summarized in Table 5.1 below.

Table 5.1: Surface Water Monitoring Summary

Monitoring Location	Monitoring Frequency	Sampling Parameters	Guidelines
SW1	Quarterly	RCAp-MS, TSS, Volume Discharge	CCME and NS Tier I EQS
SW2	Quarterly	RCAp-MS, TSS, Water Levels	CCME and NS Tier I EQS
SW3	Quarterly (baseline only)	RCAp-MS, TSS	CCME and NS Tier I EQS
SW4	Quarterly	RCAp-MS, TSS, Volume Discharge	CCME and NS Tier I EQS
SW5	Quarterly	RCAp-MS, TSS, Volume Discharge	CCME and NS Tier I EQS
SW6	Quarterly	RCAp-MS, TSS, Volume Discharge	CCME and NS Tier I EQS
SW7	Quarterly	RCAp-MS, TSS, Water Levels	CCME and NS Tier I EQS
CB1	Quarterly	TSS, pH	CCME and NS Tier I EQS
CB2	Quarterly	TSS, pH	CCME and NS Tier I EQS

*Frequency to be visited through consultation with NSECC following assessment of initial results

Quarterly sampling is proposed across all locations until the site has stabilized, at which point, BPAI will recommend adjusting the frequency of sampling to annually, in collaboration with NSECC. Annual reports will compare results to baseline conditions per CCME-FWAL and NS Tier I EQS for Surface Water.

6.0 CONTINGENCY PLAN

If the Project's normal operations are determined to deteriorate the surface water quality or quantity, NSECC will be notified. The Project's operations will continue once NSECC is satisfied with the Project's resolution(s).

Potential indications that surface water quality or quantity have deteriorated are:

- Significant (factor of 10) increase or decrease change from baseline conditions in a surface water quality parameter that also exceeds the CCME Canadian Environmental Quality Guidelines – Water Quality Guidelines for the Protection of Aquatic Life, Freshwater or Nova Scotia Tier I EQS for Surface Water
- Observed trend of decreasing surface water elevations outside of climatic natural variability.

7.0 STATEMENT OF QUALIFICATIONS AND LIABILITY

This Report (the "Report") has been prepared by Strum Consulting (the "Consultant") for the benefit of Black Point Aggregates Inc. (the "Client") in accordance with the agreement between the Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents the Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to the Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report, and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole, and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

The consultant will be entitled to rely upon the accuracy and completeness of the information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by the Consultant and Client
- as required by law
- for use by governmental reviewing agencies

Consultant accepts no responsibility and denies any liability whatsoever to parties other than Client who may obtain access to the Report or the Information for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof will be borne by the party making such use.

This Statement of Qualifications and Limitations forms part of the Report, and any use of the Report is subject to the terms hereof.

Should additional information become available, Strum requests that this information be brought to our attention immediately so we may re-assess the conclusions presented in this report. This report was prepared by Ryan Gardiner, BSc. Senior Project Manager and was reviewed by Meghan Johnston, MES, Vice President, Environmental Assessment and Approvals.

8.0 REFERENCES

Environment Canada. 1999. The Water Survey of Canada Hydrometric Technician Career Development Program. Environment Canada, Fredericton, NB.

SLR. 2015. Hydrogeological Technical Report Proposed Black Point Quarry Project Guysborough County, Nova Scotia. SLR Project No: 210.05913.00000. SLR Consulting (Canada) Ltd.

APPENDIX A

DRAWINGS

Chedabucto Bay

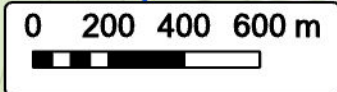
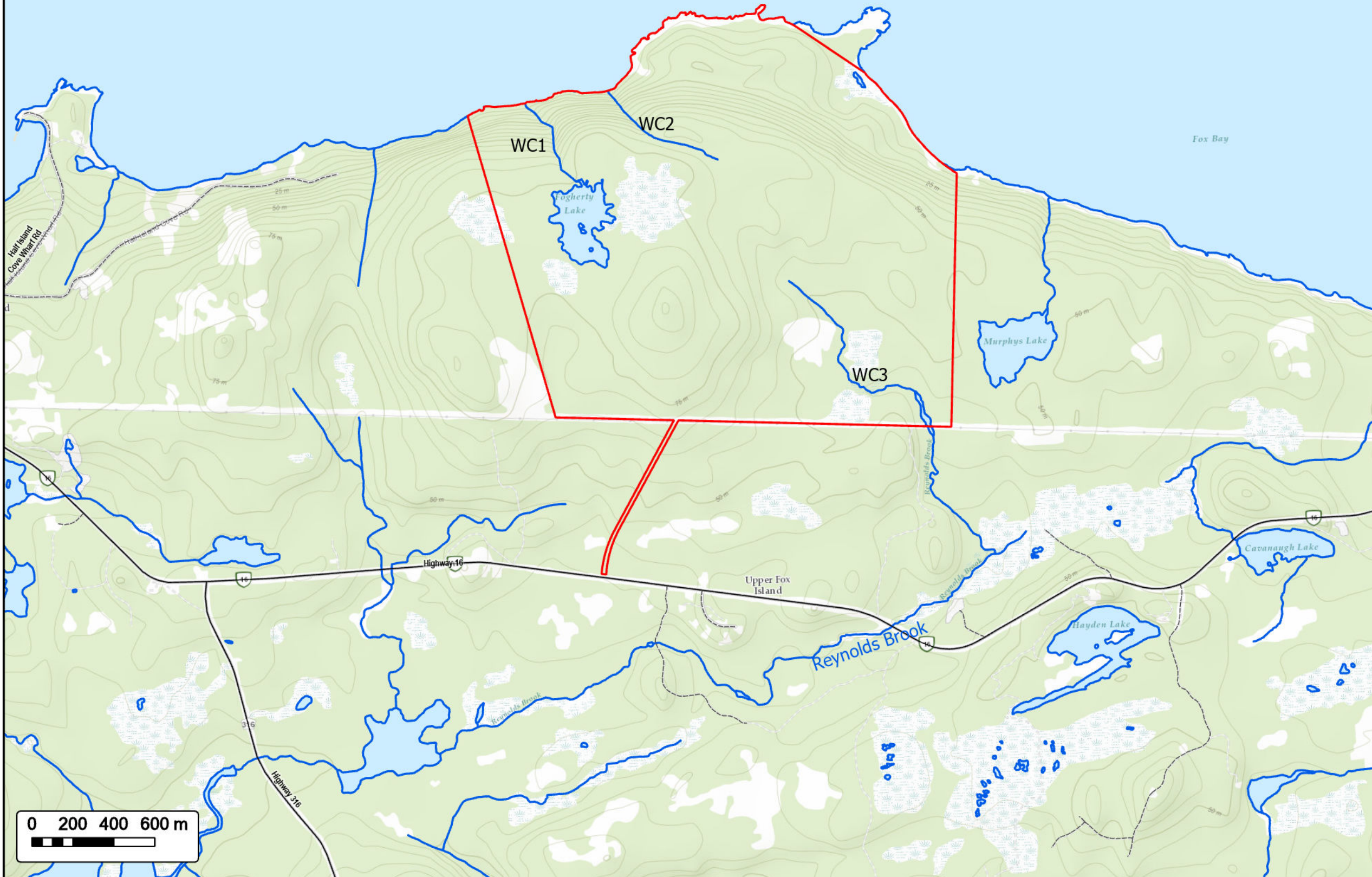


Black Point Quarry

Surface Water Monitoring
Project Location



Road	
Unpaved Road	
NSTDB Mapped Watercourse	
Property Boundary	



Coordinate System: NAD83 UTM Zone 20N
Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

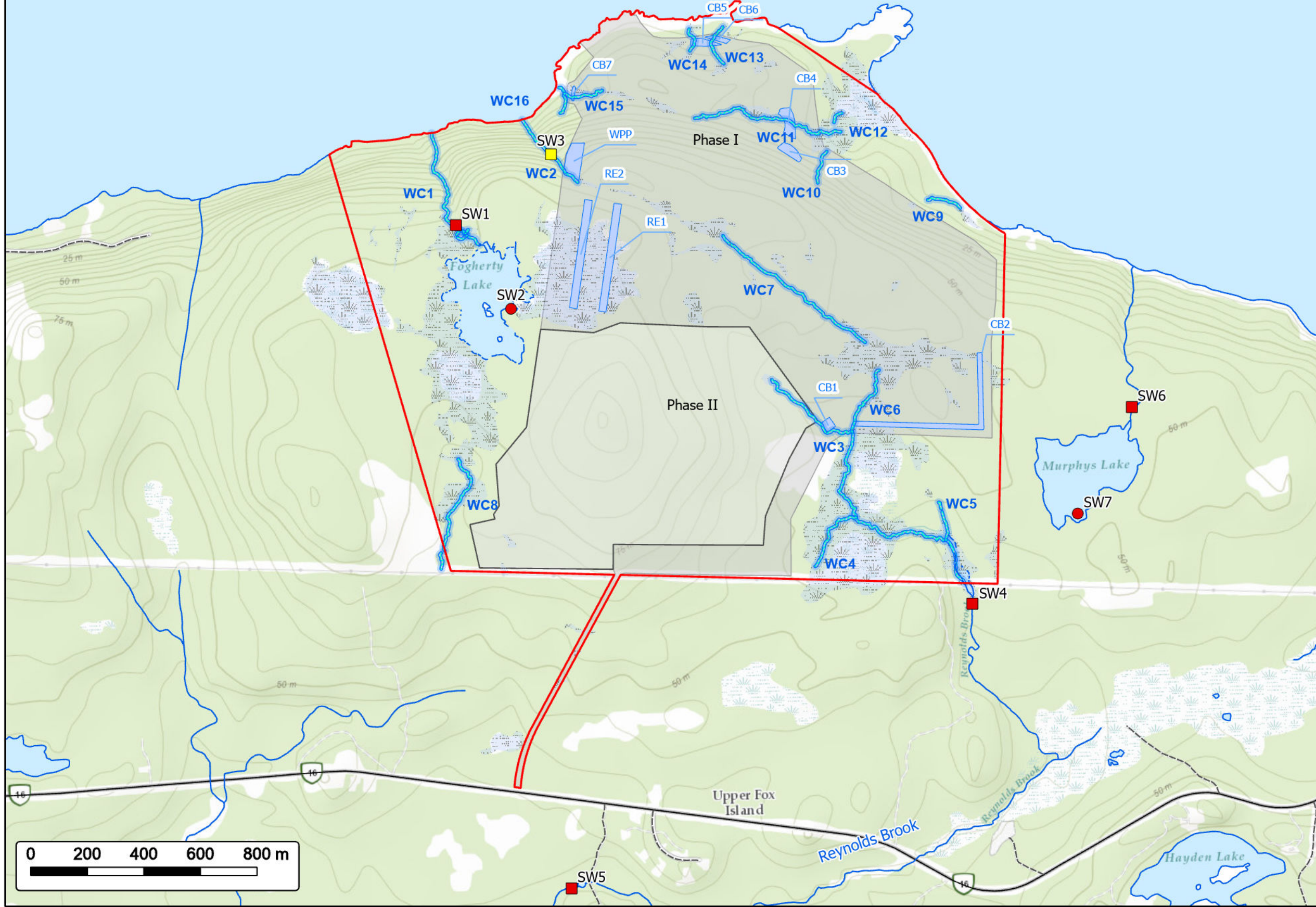
Date: Sept, 2024	Project #: 24-10030
Scale: 1:20,000	Drawing #: 1
Drawn By: M. Dubé	
Checked By: R. Gardiner	



Chedabucto Bay



Black Point Quarry Surface Water Monitoring Locations



Property Boundary	
Baseline and Proposed Monitoring - Water Quality and Water Level	
Baseline and Proposed Monitoring - Flow Monitoring and Water Quality	
Flow Monitoring - Flow Monitoring and Water Quality	
Phase I	
Phase II	
NSTDB Mapped Watercourse	
Field Assessed Watercourse (WC)	
Field Assessed Wetland (WL)	
Catchment Pond	
Transportation	
Road	
Unpaved Road	



Coordinate System: NAD83 UTM Zone 20N Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: October, 2024	Project #: 24-10030
Scale: 1:14,000	Drawing #: 2
Drawn By: M. Dubé	
Checked By: M. Johnston	

