



### Comment Index

Birrette's East Uniacke Quarry Expansion Project

Publication date: March 19, 2019

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1	Kwilmu'kw Maw-Klusuaqn Negotiation Office (KMKNO) Native Council of Nova Scotia	April 18, 2019

**No Public comments were received within the comment period.**

**From:** [McKenna, Chuck W](#)  
**To:** [Mageste da Silva, Renata](#)  
**Subject:** RE: Birrette's East Uniacke Quarry Expansion Project Environmental Assessment Registration  
**Date:** March 15, 2019 12:19:45 PM

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**Renata Mageste da Silva**

The Resource Management Unit has no comments.

Chuck McKenna

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Date: March 25, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Gillian Fielding, Aboriginal Consultation Advisor

Subject: Birrette's East Uniacke Quarry Expansion Project

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OAA has reviewed the proposed Birrette's East Uniacke Quarry Expansion Project Environmental Assessment Registration Document and has no comments at this time. OAA will however, continue to work with the EA Branch to address any comments submitted by the Mi'kmaq through the environmental assessment process.

**From:** [Morash, Scott](#)  
**To:** [Mageste da Silva, Renata](#)  
**Subject:** Environmental Assessment Application - Birette's East Uniacke Quarry Expansion  
**Date:** April 4, 2019 10:59:13 AM  
**Attachments:** [image003.jpg](#)

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Hello Renata:

I have reviewed the EA submission and I offer the following comments:

The current Birette quarry has operated for approximately 4 years and NSE has not received public complaints and there are no known approval deficiencies.

The setting is somewhat remote and approximately 2 km from another operating quarry.

The current footprint is located more than the required 800m from a residential structure and the report indicates that this separation will be maintained throughout the expansion.

Of concern is the disruption to wetlands within the study area, in particular ensuring that the EA trigger of disruption of 2ha or more of a wetland (or a wetland complex) is observed.

Regards,

Scott Morash

Signature



**Environment**

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Date: April 4th, 2019  
To: Environmental Assessment Officer  
From: Environmental Health Consultant, Sustainability and Applied Science  
Subject: Birrette's East Uniacke Quarry Expansion Project

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**Scope of review:**

The focus of this Environmental Assessment review from the NSE Sustainability and Applied Science Division's Regional Environmental Health Consultant is potential impacts on human health. In general, the scope of this review includes the assessment of the potential for the proposed undertaking/project to adversely affect human health in all phases of the project. Note that while general comments may be included, applicable technical specialists should be consulted for specific guidance. The recommendations provided below are meant to supplement the actions that are outlined in the EA submission documents.

**Documents reviewed:**

The documents outlined below formed the basis for this EA review, and is referred to as the 'EA submission' through the rest of this memorandum:

- Environmental Assessment Registration Document –Bio Design Earth Products Inc, Birrette's East Uniacke Quarry Expansion Project. Including Appendices A -J. Report Prepared by McCallum Environmental Ltd. Registered on March 19, 2019, and accessed from <https://novascotia.ca/nse/ea/east-uniacke-quarry-expansion/>

**Comments re: Birrette's East Uniacke Quarry Expansion EA document:**

**Surface Water**

The proponent did not include information on the potential impacts to the food chain, specifically the impacts that discharge of effluent from the settling ponds may cause to aquatic organisms and the risk it may pose to human health. Metals and other contaminants of potential concern can bioaccumulate in the food chain which impacts humans that consume them.

The proponent did provide surface water quality data for many parameters but did not include mercury and methyl mercury analysis in their sampling. This should be included prior to implementation of this project.

Additionally, the proponent should be required to monitor water quality in the adjacent downstream area of all settling pond discharge. While comprehensive water quality monitoring would be ideal, at a minimum the proponent should provide routine monitoring for the lifespan of this project for contaminants that are known to bioaccumulate in the food chain and impact human health. These include but may not be limited to arsenic, lead, cadmium, mercury and methyl mercury.

Exceedance in accordance with the CCMA Canadian Water Quality Guidelines for the Protection of Aquatic Life, beyond those provided in the Appendix D of the EA submission document should be required to be reported to the Department of Environment as additional mitigation and monitoring measures may be required to adequately protect human health from bioaccumulation of such metals in the food chain.

## **Air**

Sediment and dust deposition on lands impacted by the quarry site and trucking activities may increase the level of contaminants in plants and animals used as food sources. Dust may deposit on vegetation and be consumed directly or may be taken up by the plant and enter the food chain, as some contaminants have the ability to bioaccumulate (i.e. metals). Collection and analysis of local vegetation used as food sources in the area surrounding the quarry and the transportation route should be required as condition of approval of this submission. Routine and complaint-based monitoring of sediment and dust deposition on plants should be established and employed throughout the life of the project. Further information for the proponent on this topic is available in Health Canada's Document "Guidance for Evaluating Human Health Impacts in Environmental Assessment: Country Foods"  
[http://publications.gc.ca/collections/collection\\_2018/sc-hc/H129-54-5-2018-eng.pdf](http://publications.gc.ca/collections/collection_2018/sc-hc/H129-54-5-2018-eng.pdf)

## Environment

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Date: April 9, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: NSE Hydrogeologist

Subject: Birrette's East Uniacke Quarry Expansion Project

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- The hydrogeological characteristics of the area, and the separation distance from any known domestic wells or structures with inferred domestic wells, supports a conclusion that there is effectively no risk to either the quality or quantity of current drinking water supplies.
- The evaluation of the geology of the site is limited and leaves significant uncertainties about the potential for impacts to surface water resulting from exposure of fresh rock surfaces to oxygen, related to mineralogy of the rock.
  - Only limited testing (2 samples) is reported for acid rock drainage (ARD). This work was done in 2013, suggesting these samples are from the existing quarry area at the southeast corner of the site, rather than the expansion area.
  - This development is proposed to cover 30.5 hectares over 25 years. Due to the scale of the proposed expansion, the rock types encountered could change as the quarry advances.
  - Further rock samples should be obtained from the proposed quarry expansion areas for the characterization of the rock, prior to any substantial development of the expansion areas. This could potentially be required to be submitted as part of an industrial Approval application.
    - Additional rock characterization should be based on an initial representative sampling of rock at a sampling density consistent with the requirements in the *Sulphide Bearing Materials Regulations*. It should focus on the proposed 3- 6 year expansion area footprint (as shown on Figure 6 of Appendix A of the EA document). The geology encountered during the first 6 years has the potential to change the most compared to rock previously analysed for ARD from the current quarry, because the quarry will advance from its current location toward the northwest, approximately perpendicular to the strike of bedding planes (in the direction of maximum potential change in the chemistry of the rock units). The rock chemistry will probably change less after the development of the projected 6-year quarry footprint from Figure 6,

due to the expected advancement proceeding approximately along strike (parallel) to the bedding planes (west-southwest).

- The geology in this general region (between Mount Uniacke and Rawdon) is known to have gold mineralization in some places, with associated arsenic-bearing sulfide minerals. If the quarry area happens to have some mineralization, there could be related potential for leaching of arsenic from arsenic-bearing sulfide minerals in neutral (non-acid producing) conditions. If initial analysis for ARD indicates that the rock is a sulfide-bearing material using evaluation procedures consistent with the *Sulphide Bearing Materials Regulations*, evaluation of the potential for arsenic leaching should be undertaken for the first 6 year development area, even if net acid-producing potential is low.
- The submission states that no aggregate washing will occur on site. This limitation should be stated as a condition of Approval, potentially within the industrial Approval. Inclusion as an IA condition will allow it to be amended later if this changes, to address water demand, water sources, settling pond capacity, and compliance limits for wash water discharge.
- The submission states that dust will be controlled with the application of water. The source of water for dust control and any associated impacts should be identified. Water extraction volumes should be estimated to determine whether requirements for water withdrawal Approvals will be triggered. These could be conditions of information to be submitted with IA applications.

**From:** Colomb, Sylvie <Sylvie.Colomb@novascotia.ca>  
**Sent:** April 11, 2019 10:24 AM  
**To:** Mageste da Silva, Renata <Renata.MagestedaSilva@novascotia.ca>  
**Subject:** RE: Birrette's East Uniacke Quarry Expansion Project Environmental Assessment Registration

Hi Renata,

TIR staff have reviewed this EA. The proponent is proposing an expansion of an existing quarry to replace existing reserves. The proponent does not anticipate more truck volumes than what is being done now currently, and also does not anticipate any additional volumes of aggregate to be shipped. No new accesses will be required for the quarry, nor are any changes proposed for the existing haul routes.

Therefore, TIR has no issues or concerns about this project.

Regards,

*Sylvie Colomb*

Environmental Analyst/French-language Services Coordinator  
Environmental Services Group  
Nova Scotia Transportation and Infrastructure Renewal Department  
Johnston Building, 3rd Floor, 1672 Granville Street, P.O. Box 186  
Halifax, Nova Scotia, B3J 2N2  
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E-mail: [sylvie.colomb@novascotia.ca](mailto:sylvie.colomb@novascotia.ca)

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***"A Healthy and Safe Environment: Everyone, Everywhere, Every day"***



## Lands and Forestry

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### MEMORANDUM

**TO:** Renata Mageste da Silva, NS Department of Environment  
**FROM:** Department of Lands and Forestry  
**DATE:** April 16, 2019  
**RE:** Birrette's East Uniacke Quarry Expansion Project

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The Department of Lands and Forestry provides the following comments on the above project:

#### **Crown Lands:**

The project is located on private lands and would not require any authorities or permissions from Land Administration

#### **Wildlife, Wildlife Habitat and Surveys:**

The Department recommends that the following mitigation measures be considered as conditions of approval for the project:

- *Section 4.1.1.1 Priority Species.* Page 30 refers to “breeding bird status”. This term is used as a qualifier to determine whether a species is a “Priority Species”. It is unclear why the breeding status of the species is being used as the primary means of determining if a species is a Priority Species under this EA. Species may be protected either through the MBCA, the Wildlife Act, the NS ESA, or the SARA regardless of its breeding status or whether it was seen during the breeding timing window. **It is recommended that the proponent be required to provide the rationale for the narrow scope used to determine priority status for the bird species or provide a copy of prior approvals from either Environment and Climate Change Canada or Department of Lands and Forestry (or both). If the rationale is deemed not to be acceptable and there were no approvals issued, the proponent would then be required change the way it has identified “Priority Species”.**
- *Section 4.1.1.3.3 Common Nighthawk.* It is stated that surveys “...were conducted from the end of June to early - July at dawn, one hour before sunrise

to 30 minutes after sunrise'. Common Nighthawk (*Chordeiles minor*) are mainly crepuscular foragers, with their peak activity periods before and after sunset; this is the best time to conduct a survey to detect this species (as outlined under survey methodologies the species). The Methodology described in this report is inadequate to properly assess the presence/absence of the species. **It is recommended that new surveys for Common Nighthawk be conducted.**

- *Owl Surveys.* Confirmed breeding behaviour was identified for Barred Owl (*Strix varia*) during the second Maritime Breeding Bird Atlas (MBBA), and other species of owls were discovered showing territory or breeding behaviour. **Owls are protected under the Wildlife Act, therefore field surveys for owls must be conducted prior to any work commencing, and appropriate mitigation measures be developed if any species and/or nests are discovered.**
- *Mitigations.* It was stated in the document that Snapping Turtles (*Chelydra serpentina*) were not observed during surveys but were regularly observed by residents during the public consultation process (*Section 5.4.4*). **Given that a gravel pit has the potential to create artificial nesting habitat for the species, it is recommended that a mitigation plan be developed in the event snapping turtles are encountered during the course of work.**

**Environment**

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Date: April 17<sup>th</sup>, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Executive Director, Policy and Corporate Services, Nova Scotia  
Department of Agriculture, Fisheries and Aquaculture

Subject: Birrette's East Uniacke Quarry Expansion Project

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Thank you for the opportunity to review the Environmental Assessment Registration Document for the Birrette's East Uniacke Quarry Expansion Project.

The Nova Scotia Department of Agriculture does not have any additional comments given that the proposed site is classified as class 7 soils, which is not considered suitable for agriculture.

**Environment**

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Date: April 17, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Executive Director, Policy and Corporate Services, Nova Scotia Department  
of Agriculture, Fisheries and Aquaculture

Subject: Birrette's East Uniacke Quarry Expansion Project

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Thank you for the opportunity to review the Environmental Assessment Registration Document for the Birrette's East Uniacke Quarry Expansion Project.

Given the location of the proposed site, the Nova Scotia Department of Fisheries and Aquaculture does not have any additional comments.



Suite 200                      Bureau 200  
1801 Hollis Street        1801 rue Hollis  
Halifax, NS B3J 3N4      Halifax, NE B3J 3N4

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Date:            April 17, 2019

To:              Renata Mageste da Silva, Environmental Assessment Officer, Nova Scotia Environment

From:          Emily Gregus, Environmental Assessment Officer, Canadian Environmental Assessment Agency

Subject:        Birette's East Uniacke Quarry Expansion Project

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The federal environmental assessment process is set out in the [Canadian Environmental Assessment Act, 2012](#) (CEAA 2012). The [Regulations Designating Physical Activities](#) (the Regulations) under CEAA 2012 set out a list of physical activities considered to be "designated projects." For designated projects listed in the Regulations where the Canadian Environmental Assessment Agency (the Agency) is the responsible authority, the proponent must provide the Agency with a project description that includes information prescribed by applicable regulations ([Prescribed Information for the Description of a Designated Project Regulations](#)).

The relevant entries in the Regulations for this type of project are:

16(g). The construction, operation, decommissioning and abandonment of a stone quarry or sand or gravel pit, with a production capacity of 3 500 000 t/year or more.

17(g). The expansion of an existing stone quarry or sand or gravel pit that would result in an increase in the area of mine operations of 50% or more and a total production capacity of 3 500 000 t/year or more.

Based on the information submitted to the Province of Nova Scotia on the proposed Birrette's East Uniacke Quarry Expansion Project, it does not appear to be described in the Regulations. Under such circumstances the proponent would not be required to submit a project description to the Agency. However, the proponent is advised to review the Regulations and contact the Agency if, in their view, the Regulations may apply to the proposed project.

The proponent is advised that under section 14 of CEAA 2012, the Minister may, by order, designate a physical activity that is not prescribed by regulations made under paragraph 84(a) if, in the Minister's opinion, either the carrying out of that physical activity may cause adverse environmental effects or public concerns related to those



effects may warrant the designation. Should the Agency receive a request for a project to be designated, the Agency would contact the proponent with further information.

The proposed project may be subject to sections 67-72 of CEEA 2012. Section 67 requires that, for any project occurring on federal lands, the federal authority responsible for administering those lands or for exercising any power to enable the project to proceed must make a determination regarding the significance of environmental effects of the project. The Agency is not involved in this process; it is the responsibility of the federal authority to make and document this determination.

If the proponent proposes a change to the project that meets the above or any other description of a designated project listed in the Regulations, the proponent is required to submit a project description to the Agency. It is ultimately the proponent's responsibility to determine whether their proposed project is listed in the Regulations. The Agency can provide guidance and advice in this determination process.

The proponent is encouraged to contact the Agency at (902) 426-0564 if it has additional information that may be relevant to the Agency or if it has any questions or concerns related to the above matters.

Regards,

Emily Gregus  
Environmental Assessment Officer  
Canadian Environmental Assessment Agency  
[Emily.Gregus@canada.ca](mailto:Emily.Gregus@canada.ca)  
902-426-8157

**Environment**

File No: 40100-30-296

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Date: April 17th, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Air Quality Unit

Subject: Birette's East Uniacke Quarry Expansion Environmental Assessment

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Further to your request, the Air Quality Unit provides the following comments with respect to the Air Quality sections of the Class I Environmental Assessment Registration Document, dated March, 2019, for the above-mentioned project:

**Operational Issues/Other Permitting Processes**

- 1) The Division V Application for Approval should include mitigation strategies for particulate matter generated at the site. The mitigation strategies should be incorporated into any Division V Approval issued for the project.

**From:** [McPherson, Robyn](#)  
**To:** [Mageste da Silva, Renata](#)  
**Cc:** [Steele, Cynthia](#); [Campbell, Sue K](#)  
**Subject:** RE: Birrette's East Uniacke Quarry Expansion Project Environmental Assessment Registration  
**Date:** April 17, 2019 10:41:11 AM

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Hello Renata,

It appears this project is entirely on private land and would not require approvals from Land Admin.

Thanks,  
Robyn

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Date: April 17, 2019

To: Environmental Assessment Officer

From: Climate Change Division

Subject: Birrette's East Uniacke Quarry Expansion Project - Environmental Assessment Registration Comments

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### Climate Change Adaptation

The potential effects of climate change on the project and mitigation measures were not incorporated in this registration document. We request the proponent consider potential impacts on the project from climate change and have a plan in place to mitigate any potential risks. The proponent should consider reviewing the Nova Scotia Environment's *Guide to Considering Climate Change in Environmental Assessment in Nova Scotia* for guidance. The guide is available at <https://novascotia.ca/nse/ea/docs/EA.Climate.Change.Guide.pdf>

We advise that in analysis, the proponent should consider not only historical and present conditions, but projected climate conditions as well. The climate projection data available on Nova Scotia Environment Climate Change Unit's website can be used in making projections and anticipating future changes.

### GHG mitigation

The proponent has not provided any estimation for greenhouse gas emissions to be released during preparation and operation of the Quarry. However, it is expected that the additional impact of the project on Nova Scotia greenhouse gas emissions will be low and will be captured by the reports of fuel supplier emitters under the Nova Scotia Greenhouse Gas Quantification, Reporting, and Verification regulations. The proponent should consider mitigative measures for greenhouse gas emissions. These may include no idling of machinery and vehicles, and proper maintenance of equipment.

## Environment

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Date: April 17, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Engineer, Industrial Unit

Subject: Birrette's Quarry Expansion Project

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The following comments relate to the reclamation of the quarry.

- The proponent should clarify if they intend to leave any ponds or standing water on the site once reclamation is complete.
- Page 25 indicates that a rehabilitation plan can be completed at the request of the department. There are some issues with this statement.
  - In accordance with the existing approval a reclamation plan must be submitted and accepted by the department within a year of beginning operations. As a result of this condition, A plan should already exist.
  - In accordance with the approval, the plan must be updated every 3 years.
  - The quarry operator should contact the regional office to clarify rehabilitation plan update expectations given change/extension to the approval.

When the reclamation plan is submitted, we would expect to see details on the following:

- Objectives for final land use
- Site contouring and stabilization:
  - for long term erosion control;
  - to mitigate impacts of offsite drainage to adjacent lands, wetlands, or watercourses; and
  - to blend with natural topography.
- Slope specifications which ensure a safe & stable site
- Use of overburden for revegetation purposes
- Use of native vegetation
- Specifications of any ponds or standing water left on site
- Specifications of safe exits for any ponds or standing water feature
- Removal of equipment and structures

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**Date:** April 18, 2019  
**To:** Renata Mageste da Silva, Environmental Assessment Officer, DoE  
**From:** Gordon Smith, Provincial Director of Planning  
**Subject:** **Birrette's East Uniacke Quarry Expansion Project**

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As requested, staff at the Department of Municipal Affairs have reviewed the Environmental Assessment Registration Documents for Birrette's East Uniacke Quarry Expansion Project. We offer the following comments:

- The O'Hearn Flowage component of the project appears to intersect with the Miller Lake natural watershed area in East Hants. This watershed system is primarily connected to the Halifax Regional Municipality's (HRM) watershed system and is part of their drinking water supply system.
- If HRM is not aware of this project, we suggest that they be informed of the intersection between the O'Hearn Flowage and the HRM watershed.
- Municipal Affairs cannot determine the significance of this connection. In addition, we assume that adequate consideration of this connection by Nova Scotia Environment staff responsible for drinking water regulations will occur.

Thank you for the opportunity to review the Registration Document for the above-noted project. Should you require additional information, please feel free to contact either Alan Howell, Senior Planner (902-483-3746 / Alan.Howell@novascotia.ca), or me (902-424-7918, Gordon.Smith@novascotia.ca).

Yours truly,



Gordon Smith  
Provincial Director of Planning

c: Alan Howell, Senior Planner, DMA



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Date: April 18, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Erin Morash, Fisheries Biologist, Regulatory Review, Ecosystem Management

Subject: Birette's East Uniacke Quarry Expansion Project

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Dear Ms. Mageste da Silva,

Below you will find the comments from DFO, Fisheries Protection Program regarding impacts to fish and fish habitat for the above referenced project:

- The Environmental Assessment Registration Document identifies 19 wetlands and 5 watercourses that will be directly or indirectly impacted by the quarry expansion. Watercourses WC1 and WC4 will be directly impacted during the expansion while the remaining watercourses (WC2, WC3, and Unnamed Trib A) will experience indirect impacts over the course of expansion. WC4 is directly within the development area and will be completely altered. WC1 is located immediately outside the development area but its headwaters (WL4) are within the development area and will be completely altered thereby eliminating its primary water source which will ultimately cause it to run dry. WC1 feeds WL7 which is also outside the development area but will be indirectly impacted by the changes in surface water flow as a result of quarry operations. WL7 feeds WC2 and WC3 which feed into O'Hearn Flowage.
- A water balance assessment was conducted and it is predicted that WC2 will see a 15.0% reduction in streamflow, WC3 is predicted to see a 15.8% reduction in streamflow, and Unnamed Tributary A is predicted to have a 3.6% streamflow reduction. The overall loss to O'Hearn Flowage is predicted to be 2.1%. The consultant compares Ecological Maintenance Flow (EMF) requirements outlined in the Province of Nova Scotia's, 'Guide To Surface Water Withdrawal Approvals' with the predicted reduction of streamflow. They state that since the EMF is being maintained downstream, impacts to fish and fish habitat are not anticipated. However, this Guide was written specifically for the withdrawal of surface water from a water body such as a lake or river not the alteration of drainage areas that cause reductions in surface water flows. It forms part of the Approval process that generally has measurable terms and conditions, and usually involves the installation of equipment and the requirement to monitor how

much water is used and ensuring the proponent stays within the established limits. It also only forms part of the decision making process surrounding the issuance of water withdrawal approvals. Comparing predicted streamflow reductions with the EMF in this manner is not acceptable as it is not the right application. The proponent should consider baseline monitoring of streamflow for WC2, WC3 and Unnamed Trib A in order to provide the opportunity to measure the actual reduction in streamflow of the watercourses as the quarry expands.

- The fish and fish habitat assessment states that WC4 is confined between two wetlands and fish are unable to access it. WC1 also flows between wetlands and has little to no downstream connectivity for fish passage and would be considered poor fish habitat. Therefore, the complete alteration of these two watercourses are not expected to impact fish or fish habitat . The reports states that WC2 and WC3 which both flow into O'Hearn Flowage contain Type II habitat in the lower reaches which is defined as having good feeding and holding areas in deeper pools, and good rearing habitat with limited spawning capability. The consultant also conducted electrofishing in WC2 and WC3 as part of the assessment and the report states no fish were caught or observed, however the original results of the electrofishing were not included in the report. Depending on the time of year and species, fish may not have been found in the watercourses but that does not mean definitively it is not fish habitat. Fish may still use the watercourses part of the year. Depending on the actual reduction in streamflow each watercourse experiences as a result of the quarry expansion, it may negatively impact the fish and fish habitat found within these watercourses.
- The use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs causing death to fish. Blasting vibrations may also kill or damage fish eggs or larvae. As the quarry operation expands over time, any blasting or use of explosives should be conducted in a way that mitigates any potential serious harm to fish.
- Under section 35 of the *Fisheries Act* (FA), 'No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery'. Serious harm to fish includes the death of fish, or any permanent alteration to, or destruction of, fish habitat. When proponents are unable to completely avoid or mitigate serious harm to fish, their projects may require an Authorization under Subsection 35(2) of the FA.

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Date: April 18, 2019

To: Renata Mageste da Silva, Environmental Assessment Officer

From: Coordinator Special Places, Culture and Heritage Development

Subject: Birrette's East Uniacke Quarry Expansion Project

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Staff of the Department of Communities, Culture and Heritage has reviewed the EA document for the Birrette's East Uniacke Quarry Expansion Project and have provided the following comments:

***Archaeology***

Staff reviewed the Registration Document and the sections particular to archaeology. There are no archaeological concerns. Staff noted that the EA document should cite in the body of the Registration Document (page 103-104), the specific recommendations from the Archaeological Resource Impact Assessment report completed by Davis MacIntyre & Associates (Appendix G, Section 5.0). The brief statement of low potential on page 104 of the EA document is incomplete.

***Paleontology***

Staff have reviewed the Registration Document, and sections particular to geology and paleontology resources. Although the application does not explicitly identify paleontology heritage resources, the surficial geology and bedrock geology appear to have low probability for containing significant fossil remains. There is always the chance that isolated fossil elements are distributed throughout the glacial sediments, but these would be considered exceptionally rare. Should larger elements (e.g. tusks or teeth of Mastodon) ever be encountered in the overlying deposits, it would be valuable to know the location and have the material examined by Nova Scotia Museum staff.

## **MEMORANDUM**

**DATE:** April 18, 2019

**TO:** Renate Mageste da Silva

**FROM:** Peter Labor, Director of Protected Areas and Ecosystems

**SUBJECT:** Birrette's East Uniacke Quarry Expansion Project

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The Protected Areas and Ecosystems Branch have reviewed the Environmental Assessment application for the Birrette's East Uniacke Quarry Expansion Project

### **Wetland Comments:**

- Project will result in a loss of a total of approximately 3.9 hectares of wetland over the proposed 25 year development period to support the expansion if the existing 3 hectares to approximately 30 hectares. Wetlands within the study area were identified and assessed using methodologies acceptable to NSE. The majority of wetlands within the study area were found to be isolated swamps and bogs which provide storage of surface water and groundwater recharge services. Wetlands 1, 4, 7, 16, 17 and 18 are headwater or through flow wetlands that support downgradient aquatic resources. Wetlands 1, 7, 16, 17 and 18 provide the most benefit to downstream aquatic habitats. Loss of recharge to underlying groundwater regime as a result of quarry development is possible; however; given the relatively small size of these wetlands in relation to catchment area, it is not likely to be significant provided conditions and mitigations described in relevant groundwater sections of the report are acceptable. Similarly, the wetlands known to support aquatic resources will also be subject to losses of source water, including in some cases direct loss in drainage/watercourse features, and diversion of overall drainage to the eastern extent of the study area via proposed drainage ditches. Proposed mitigations to minimize the impacts to water quantity and quality conditions to remnant wetland features and downgradient environments rely heavily on the predicted mass water balance, calculation of Ecological Maintenance Flow and the existing settling pond treatment and subsequent upgrades to support phased development. Careful consideration of the methodologies used to predict the potential to water quantity/quality changes as a result of this development is warranted, given the reliance placed on the proposed methods of mitigation. Ultimately, hydrologic control and water purification services provided by the isolated wetlands within the study will be lost and will be required to mitigated through effective engineered water management infrastructure (contouring, drainage, treatment pond etc.). Most wetlands within the study area also provide healthy habitat for birds, mammals, pollinators and native plants. While no Species at Risk were identified to occur within any of the wetlands, a number of Species of Conservation Interest species were

found to be associated with wetlands (either within, near or downgradient in the watershed(s)). SOCI flora and lichen species will likely be lost as a result of quarry development and aquatic species and their habitats could be impacted as a result of changes to water quantity/quality inputs, hence the importance of the suitability of proposed mitigations that are protective of these valued environmental components.

- Mitigations proposed to minimize impacts to wetlands from the project include standard requirements for approval applications and compensation. Compensation for loss of wetland area and functions will be required. Monitoring of all wetlands that are partially impacted by the project will also be required. To address indirect impacts, monitoring of wetlands along that have been site outside of the quarry development (ie. Wetlands 2, 7,9,13, and 17) and establishment and maintenance of buffer habitats should be implemented, as proposed, to minimize impacts to habitat along the property boundary. It is important to note that development will occur over a 25 year period and can be expected to much more manageable than a rapid development to the proposed 30 hectare quarry. Additionally, progressive rehabilitation of exhausted quarry area may provide mitigative possibilities as quarry operations proceed.
- Of note, the wetland that ultimately receives the quarry runoff discharge from the existing settling pond, and will continue to receive discharge over the life of the quarry, has been excluded from the study area. Discharge from the settling pond is diverted to this wetland indirectly via the road network ditching.

#### **Protected Areas Comments:**

- The proposed project will have minimal impacts on Nova Scotia' protected areas. The nearest protected area is Devil's Jaw wilderness area, about 3 km to the north of the proposed project. Given the size of the project and time span of development minimal impacts are expected. The proposed project is surrounded by roads and some human development and given the size of the project; it is not expected that animal movement within or between the landscape and the wilderness area to be significantly affected. Nor is there likely to be significant impacts to landscape processes that interact between the wilderness area and surrounding landscape.

## **Environment**

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Date: April 18, 2019

To: Manager, Water Management Unit

From: Senior Surface Water Quality Specialist, Water Management Unit

Subject: Birrette's East Uniacke Quarry Expansion Project Environmental Assessment – Review Comments & Recommendations

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### **Scope of Review**

As Senior Surface Water Quality Specialist with the Nova Scotia Environment (NSE) Sustainability and Applied Science Division, the following Birrette's East Uniacke Quarry Expansion Project Environmental Assessment (EA) review focuses on the following subjects:

- Surface water quality & its management
- General surface and groundwater resources, and fish and fish habitat & their management

The following review considers whether the environmental concerns associated with the above subjects and the proposed mitigation measures have been adequately addressed in the Environmental Assessment. The recommendations provided below are meant to supplement the actions outlined in the EA submission documents.

While general comments on fish and fish habitat, wetlands, surface water quantity, and groundwater quality and quantity may be included below, applicable technical specialists should be consulted for specific review and comment.

### **Reviewed Documents**

The following document was the basis for this EA review:

McCallum Environmental Ltd. 2019. *Environmental Assessment Registration Document Birrette's East Uniacke Quarry Expansion Project, East Uniacke, Hants County, Nova Scotia*. Bio Design Earth Products Inc.

### **Comments**

#### *General*

- No aggregate washing processes are proposed to take place at the site. This type of activity would typically require a water withdrawal approval application and consideration in the design of the settling ponds to receive and treat the discharge.

#### *Surface Water Resources*

- The EA Registration Document and NS hydrology geographic information system (GIS) layer identify that the proposed project development is in the headwaters of the St. Croix River secondary watershed. The site is separated into four catchments (unnamed Tributary A, unnamed Tributary B, WC2 (unnamed) and WC3 (unnamed)) that drain into the O'Hearn Flowage/O'Hearn Brook, a headwater tributary of the St. Croix River. The St. Croix River eventually discharges into the Bay of Fundy.
- Unnamed Tributary A, Unnamed Tributary B, WC2 and WC3 are the watercourses with channels that are within 100 m or less of the development area. The Unnamed Tributary A watershed has been manually delineated as being outside the project development area.
- Within the development area, a number of wetlands are proposed to be altered or removed, and there will be changes to surface water drainage patterns in the three drainage areas.
- Two unmapped watercourses (WC1 and WC4) were field delineated and determined to connect to local wetlands within the project development area. The two watercourses are proposed to be removed.
- The EIS Registration Document has field mapped watercourse channel paths for WC2 and WC3 (Appendix A, Figure 7). The WC3 is mapped in the NS hydrology GIS layer.
- The existing quarry operation discharges into an access road side ditch that drains into an unmapped wetland. A desktop assessment in the EIS Registration Document was conducted that estimated the flow path as discharging into the WC2 channel prior to it emptying into the O'Hearn Flowage.
- There are no source water protection areas for surface water features located within or downstream of the project area.
- The EA Registration document indicates that no seepage is observed in the existing quarry site. There is one wetland (WL1) identified adjacent to the site, which is displayed in Appendix A, Figure 5 as draining into a ditch, which discharges into the settling pond system.

#### *Surface Water Quality*

- Section 5.5.3 indicates that water samples were collected from WC3. Results are only provided for samples collected at sites WQ1, WQ2 and WQ3, of which none are not located along WC3 (Appendix A, Figure 8). Field water quality parameter results are provided for WC3 on September 28, 2018 (Table 23). No rationale is provided for why a water sample was not collected from WC3.
- The quarry footprint is located within the watershed for Unnamed Tributary A (Appendix A, Figure 7). There are predicted changes (3.6% reduction) to surface water runoff flows for Unnamed Tributary A. No water quality sampling, watercourse assessment or fish and fish habitat assessments were conducted along Unnamed Tributary A downstream of the proposed project area for the baseline study. The EA Registration Document states the following about why monitoring did not occur in along this Tributary: *"Land to the west of the Study Area was observed to comprise wetland habitat from the Study Area boundary, but could not be accessed by the Project Team for further evaluation due to it existing on private land."* With the potential for changes in surface water runoff quality and quantity from the project there is the potential for effects to the Unnamed Tributary A.

- Water quality samples were collected from Unnamed Tributary B (WQ1) and along an unnamed and previously unmapped watercourse, identified for the project as WC2 (WQ2) for single events on separate days in July 2018 (Section 5.5.3.1). The samples were analysed for general chemistry and total metals at Maxxam Analytics. Surface water runoff from the project development area is not estimated to be directed into the Unnamed Tributary B. No discussion or rationale is provided to indicate how a single event sample from each of these watercourses during the summer season and potentially baseflow conditions is enough for a baseline water quality study.
- WQ3 which is located at the settling pond outflow from the existing quarry is stated in Section 4.1.2.3 as having been extensively sampled for total suspended solids (TSS) and pH between 2014 and 2018. Only one water quality monitoring result for this monitoring program is presented, discussed or analysed in the EA Registration Document on September 12, 2018, and there is no information on the outflow condition of the settling ponds (flowing/not flowing). The document indicates that prior to additional quarry development a baseline general chemistry and metals sample will be collected at the WQ3 site (5.5.3). There is no discussion on why the results from the 2014 to 2018 monitoring period were not included or assessed in the EA Registration Document, and why WQ3 was not sampled as part of the submitted baseline study. As WQ3 is the existing discharge point for the operating settling ponds, water quality data from this site would potentially indicate what the expected treated discharge water quality will be during operation of the proposed quarry development area using an expanded version of the existing settling pond system.
- Section 2.3 states that TSS samples have been collected monthly since 2015 from the outlet drainage ditch of the settling ponds in support of the Industrial Approval (2014-089114) required surface water quality monitoring, and only one sample exceeded the discharge criteria. The discharge criterion is 50 mg/L for TSS in the Approval. The EA Registration Document does not identify which monitoring event for the existing quarry this exceedance was observed.
- Section 9.2.2.1 states the following with respect to TSS sample exceedances for the existing quarry operation: *“Capacity of settling ponds exceeds current IA requirements, and TSS samples collected in the outflow ditches of the settling pond since 2015 has indicated no exceedances to date.”* This statement contradicts the Section 2.3 statement above.
- Within the Industrial Approval, the outlets from Wetlands 2 and 7 are included within the discharge monitoring program. Assuming the same nomenclature from the Industrial Approval, Wetland 7 discharges into WC2 and would potentially represent an existing condition monitoring site. Wetland 2 would discharge into unnamed Tributary B. The water quality monitoring parameters for the approved program include total suspended solids (TSS) and pH. No water quality monitoring data from these discharge monitoring sites is presented or discussed within the EA Registration Document. This data would potentially represent additional baseline condition water quality data for these wetland features.
- Table 22 lists the baseline water quality results for the WQ1 and WQ2 sites that exceeded the Canadian Council of the Ministers of the Environment (CCME) Canadian Environmental Quality Guideline for Freshwater Aquatic Life (CEQG-FAL) criteria. Total chromium was measured and not analysed as per the criteria, which is based on valence level (VI and III) and was subsequently interpreted

based on assuming the chromium concentration was predominantly in the III form. This interpretation is based on a US Environmental Protection Agency document about the potential sources of chromium and its behaviour, including the VI valence form being produced more frequently by industry. No additional sampling was conducted to verify the dominant valence form of chromium at the site.

- WQ2 located on WC2 is identified as not receiving direct surface water runoff from the existing quarry site and to represent a background water quality monitoring location. The WC2 drainage area includes the existing quarry site and discussion within the EA Registration Document indicates that the existing quarry has all its site drainage flow via the settling ponds into the adjacent road side ditch to the east.
- Appendix F presents a water quality results table for monitoring sites WQ1 and WQ2 for a single sample event. The following is a summary of the comments for the results table:
  - Concentrations for parameters that were below the laboratory reportable detection limit are presented as the acronym 'ND' for non-detect. The representative reportable detection limit is not presented in the table. Presenting the reportable detection limit value for each parameter would indicate whether the analysis method had a detection limit that was lower than the criteria value.
  - Within the table, the sample dates are not provided and there is no identification of the lab that conducted the analysis.
  - Ammonia as nitrogen is presented as not having a CCME CEQG-FAL, when there is a guideline method to calculate a site-specific criterion.
  - Zinc is presented as having value-based criteria for long-term and short-term conditions when there is a CCME CEQG-FAL guideline method to calculate a site-specific criterion.
- Erosion and sediment control systems are proposed to be installed within the development area during operation with one of the primary measures being settling ponds. A Project Environmental Protection Plan (EPP) is planned to be developed and to include site specific measures for erosion and sediment control. This is a typical management practice for quarry operations.

#### *Fish and Fish Habitat*

- WC2 and WC3 were assessed via desktop analysis and field surveys for suitability as fish habitat and with respect to fish passage, which were both identified as potential feeding and rearing habitat when water levels were high enough. Electrofishing within the two watercourses found no fish and no fish were observed incidentally during field surveys.
- WC1 and WC4 are located within the project development area and are proposed to be removed. WC1 has been identified as potentially connecting to fish resources during seasonal high flows. WC4 was found to have no direct connectivity to a downstream fish resource.
- Both WC2 and WC3 are expected to have reductions in their drainage areas with development of the quarry site and the water balance model predicts reductions in flows within each watercourse of 15 and 15.8%, respectively. These reductions are assumed to apply directly to the ecological maintenance flows and would be less than a 25% reduction in median flow during the driest month. Flows are assumed to be redirected via the settling pond outlet to a location approximately

360 m downstream of the WC2 outlet in the O'Hearn Flowage. The amount of flow that this makes up within the O'Hearn Flowage is not estimated. It is also assumed these flow reductions would occur gradually over the lifespan of the quarry. The impacts are considered not significant due to magnitude of the 2.1% reduction in flow within the O'Hearn Flowage and those expected reductions in flow being less than 25% of existing ecological maintenance flows, based on the water balance results. The less than 25% of existing ecological maintenance flows is from the NS Guide to Surface Water Withdrawals (2016), which is specifically for supporting water withdrawal approval applications. This project as proposed would not classify as a surface water withdrawal. The water balance approach and subsequent interpretation of the ecological maintenance flows is discussed in the Water Quantity section in more detail.

- No field surveys were conducted in unnamed Tributary A where there are expected reductions in watershed area leading to potential reduced surface water runoff contributions (predicted 3.6% reduction). The above surface water quality comments section provides the reasoning in the report for why an assessment was not conducted.

#### *Surface Water Quantity*

- Local drainage areas within the project study area were delineated manually with 5 m contour topographic information (Appendix A, Figure 7). The Unnamed Tributary B watershed was estimated to be outside the project development area. The manual delineation could potentially be interpreted, based on the presented contour mapping in Figure 7, to have a portion of the Unnamed Tributary B watershed located within the project development area.
- The water balance approach used to estimate the expected changes to surface water runoff from the project development was conducted using a simplistic approach that assumed the following for the pre- and post-development scenarios:
  - All climate variables (precipitation, evapotranspiration) are constant
  - Overall water storage does not change between pre- and post-development

Based on these assumptions, the change in flows to watercourses within the site development area for the full-scale post-development scenario are due only to the reduction in drainage area. The change in flow is assumed to be a 1:1 ratio between change in drainage area and change in watercourse flow.

This type of water balance does not account for potential change in infiltration to the groundwater system with the change in land use/drainage patterns (wetland/forest covered soils to below grade quarry floor of exposed bedrock). As the quarry site is located at a local topographic high point there is potential that this site represents a groundwater recharge area. The water balance also does not discuss whether there would be potential changes to shallow groundwater/lateral flow from the change in surface water drainage patterns due to the quarry development. There could be further potential reductions in contributions to stream flow than what is estimated in the Registration Document.

A typical water balance model considers potential changes to surface water runoff, infiltration rates, soil moisture storage, and snow accumulation and storage (depending on model time step). The water balance approach used in

the EA Registration Document is insufficient to assess the magnitude of the expected impacts on the surface water and groundwater systems and their associated valued ecosystem components (VECs).

- Stream flows are estimated to be reduced at a 1:1 ratio with respect to reduction in drainage area (e.g., 15% reduction in drainage area equals 15% reduction in streamflow). This ratio is assumed to apply to all flow conditions, including the ecological maintenance flows. No rationale or reference material is provided to support this calculation approach, which is not a typical or standard method for estimating changes in stream flow during different seasonal conditions due to a change in drainage area and landcover (forest/wetland to below-grade open quarry floor). These changes potentially impact infiltration and potential groundwater contribution flows to watercourses within the study area. There is insufficient information provided with respect to supporting the use of the 1:1 ratio methodology in assessing potential impacts to ecological maintenance flows.
- The reference used for the ecological maintenance flows and maintaining flows to not be reduced by greater than 25% of the median flow is from the NS Guide to Surface Water Withdrawals (2016). The specific reference within the document is that ecological maintenance flow requirement is calculated as being 75% of the median flow during the seasons when water withdrawals will take place. The guide is specifically developed to support the preparation of surface water withdrawal applications and not changes in local drainage patterns. The proposed changes to drainage areas for the watercourses within and downstream of the Project development area would not be classified as surface water withdrawals, and therefore the referenced document is not applicable.
- Within the O'Hearn Flowage the pre- to post-development scenario estimates a predicted reduction in streamflow of 2.1%, which is based on the loss of the surface water runoff from the development area (Section 5.5.4). Section 9.2.3.1 *Mitigation* states that to mitigate impacts to fish and fish habitat that surface water runoff within the development area will be directed to the settling ponds and discharge will drain into WC2 and the eventually the O'Hearn Flowage. The expected volume of this contribution from the settling pond outflows is not estimated in the EA Registration Document.
- The water balance considered two scenarios within the EA Registration Document: pre-development and end of quarry development. The reclamation scenario was not modeled where the land cover within the development area would be changed with sloping, surface contouring, seeding and establishing drainage (Section 2.5). The reclamation scenario would represent different infiltration rates and drainage routing within the development area in comparison to the pre-development and end of quarry development scenarios. Insufficient information is provided in the EA Registration Document to assess what the expect site drainage and impacts to surface water features and the groundwater system will be for the reclaimed condition scenario.
- The settling pond outflows are stated to be designed to accommodate up to the 20-year return period storm event flows, and the outflow will be designed to reduce potential impacts to the receiving water environment (offsite treed swamp habitat and eventually O'Hearn Flowage). Typically, the design storm event for a settling pond would be developed in consultation with NSE staff. Additionally, to reduce the potential for impacts to the receiving water environment, further assessment in support of the design would typically be done to match pre- and

post-development runoff discharge rates from a site. Potentially a scour assessment would be conducted of the settling pond outflow into the receiving water body to ensure that it is adequately designed to prevent scour and erosion.

- No mitigation measures are proposed to reduce potential impacts to surface water quantity due to reduced drainage areas for WC2, WC3 and unnamed Tributary A.
- Table 32 *Project- VEC Interactions by Project Phase on Surface Water* indicates that removal of overburden will not have potential project interactions and environmental effects with surface water quality and quantity. Given that these changes would impact drainage patterns (e.g., changes to localized infiltration, changes in water flow direction) it would be expected there would be potential changes in surface water quality and quantity from these activities. This expectation would also apply to storage areas for grubblings and overburden soils that potentially would have increased erosion and suspended solids in the surface runoff that would change surface water quality.
- Reclamation and re-vegetation will potentially impact surface water runoff within the quarry site by changing the land cover. This would subsequently change water quantity at the site, which is not identified in Table 32 *Project- VEC Interactions by Project Phase on Surface Water* as a potential VEC interaction.
- Table 33 *Project- VEC Interactions by Project Phase on Fish and Fish Habitat* lists the same activities as Table 32 *Project- VEC Interactions by Project Phase on Surface Water* and lists potential changes to surface water quantity and quality. The activities and their potential interactions with surface water quantity and quality in both tables do not align. No explanation is provided to explain this discrepancy between the two tables.

#### *Groundwater Quantity & Quality*

- The site is located within the Goldenville formation, which has the potential for acid rock drainage (ARD). Two samples were collected within the face of the existing quarry in 2013 and analysed for total sulphur content and assessed to have a low acid producing potential. The locations of the two rock sample collection sites are not presented in the EA Registration Document. There is no additional discussion on whether the additional quarry development will be located within similar rock to that sampled for the existing quarry operation (e.g., boreholes, rock sample analysis).
- No groundwater local water elevations in adjacent individual wells are evaluated to estimate elevations within the project development and study areas. The only discussion about local groundwater elevations is that groundwater has not been intersected within the existing quarry and no seeps have been observed. There is no assessment of the direction of flow for the groundwater system within and adjacent to the project development area. Anecdotal observations such as no groundwater seepage observed in the existing quarry are typically used to support assessment results.
- Wetland 1 is the only mapped wetland (Appendix A, Figure 5) that is immediately adjacent to the existing quarry site. Its existing outflow based on the site description is drained via an onsite ditch to the settling ponds prior to discharging to the environment. There are no other mapped wetlands immediately adjacent to the existing quarry that would potentially flow into the site via potential subsurface routes such as seepage, which as stated above is not observed in

the existing quarry site.

- A groundwater monitoring program is identified as an option that can be potentially established in support of the quarry development. There is no commitment to develop a monitoring program unless required by NSE.
- Groundwater impacts are assessed only with respect to the closest existing groundwater resource users, which is located approximately 930 m away.
- Wetlands within the project development area and proposed for alteration or removal are classified as a combination of groundwater recharge and discharge systems. Section 9.2.4 provides the following statement with respect to local groundwater level changes: *“...loss of these isolated wetlands has the potential to reduce groundwater recharge and could lead to some localized changes in groundwater level. These smaller isolated wetlands have the ability to hold water for longer and allow penetration of surface water into the relatively impermeable bedrock geology. Removal of recharge wetlands from the landscape reduces the ability for water to be collected, stored, and fed into underlying aquifers. Many of these wetlands across the Development Area however, are of a small size (ranging from 221m<sup>2</sup> to 10,448m<sup>2</sup>) and provide a limited source of water (precipitation and surface runoff), to groundwater at the landscape level.”*

No significant impacts are predicted to the regional groundwater system due to the above changes in wetland features within the Project development area, but localized changes are predicted. The magnitude of these localized changes is not estimated in the EA Registration Document.

## Recommendations

### *Planning/Design*

The activities conducted in supporting the Project effects assessment for surface water resources are inadequate to determine the significance of the effects to these resources. A revised and detailed assessment related to surface water resources and the associated VEC of fish and fish habitat is potentially required to adequately assess the significance of the Project impacts on them.

The following are associated recommendations for each of the above listed VECs:

- The predicted reductions in surface water flows to an upstream section of WC2, WC3, unnamed Tributary A, and increased flows to a downstream section of WC2 and their associated effects on the project VECs, should be assessed using additional methods to what is presented in the EA submission. Examples of these methods would potentially include, but not be limited to, a detailed water balance, and detailed assessment of predicted flow reductions and increases on fish and fish habitat in each individual watercourse section (e.g., substantiate the 15% reduction in flow in WC2 is not a significant impact on fish and fish habitat).
- The reclamation condition changes in surface water flows within the project area should be estimated and assessed with respect to potential effects on surface water resource, and fish and fish habitat VECs. Appropriate mitigation measures should be proposed depending on the results of the assessment.
- The drainage area for unnamed Tributary B should be re-delineated to determine

whether it will be potentially affected by the project development area.

- If ecological maintenance flows are to be considered as part of an additional information submission, a more detailed analysis than that used in the Registration Document submission should be developed in consultation with NSE and Fisheries and Oceans Canada (DFO) staff.
- The effects assessment for VECs associated with surface water quantity and quality, should be reviewed and re-assessed to be consistent throughout the EA with respect to project activities and potential interactions with changes to water quality and quantity (e.g., Tables 32 and 33 should list the same activities as having impacts on surface water quality and quantity).

### *Operational Issues/Other Permitting Processes*

#### *Surface Water Quality*

- The potential inclusion within the Industrial Approval of a condition that no aggregate washing activities occur at the Site.
- Submission of proposed dust control activities to NSE staff for review as part of the Industrial Approval application, including the proposed source of water, expected withdrawal volumes, and associated mitigation measures to reduce impacts. If water withdrawal volumes trigger requirements for a water withdrawal application, this should be prepared and submitted prior to the start of quarry operation.
- An erosion and sediment control plan developed by a qualified professional should be submitted for NSE review and approval prior to the start of construction and operation activities, including clearing, grubbing and stripping.
- Settling ponds should be designed by a qualified professional to reduce sediment loading from the quarry site. Pre- and post-development surface water runoff rates should be considered in the design with the objective of a zero increase in peak discharge from the project development area. Pond design should consider potential scour impacts to the receiving water environment. Appropriate mitigation measures should be implemented to support surface water management. Pond design criteria, storm event sizing, and effluent discharge concentration and monitoring requirements should be developed in consultation with and reviewed by NSE staff.
- A surface water quality monitoring program should be developed to monitor discharge from the settling ponds, and potential effects on watercourses impacted by the project development (e.g., WC2, WC3, Unnamed Tributary A, Unnamed Tributary B). A baseline monitoring site or sites should be established, if feasible. This plan should be submitted to NSE staff for review and approval.

#### *Surface Water Quantity*

- Given the proximity of the fully developed quarry site to Wetlands 13, 17, 9, 2 and 7 that are proposed to not be impacted by the site development area, long-term surface water quantity and/or water level monitoring should be conducted to assess potential impacts due to changes in local drainage patterns and the groundwater system.
- As proposed in the additional information submission, a water quantity monitoring program should be developed to monitor discharge from the settling ponds and potential effects on appropriate watercourses, if required. The sampling frequency and monitoring equipment used should be sufficient to estimate potential surface water quantity changes associated with the project. A baseline

monitoring site or sites should be established, if feasible. This plan should be submitted to NSE staff for review and approval.

*Groundwater Quality and Quantity*

- Additional testing should be conducted within the proposed development area to characterize the rock to be quarried and the program developed based on the requirements in the Sulphide Bearing Materials Regulations.
- The groundwater monitoring program proposed within the EA Registration Document should be developed and implemented in consultation with NSE staff prior to the start of quarry development, including a monitoring interval to represent baseline monitoring conditions.

**From:** [Tan, Minh](#)  
**To:** [Mageste da Silva, Renata](#)  
**Subject:** Birrette's East Uniacke Quarry Expansion Project EA  
**Date:** April 18, 2019 5:18:29 PM

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Hello Renata,

The Department of Business would like to submit our response to the Birrette's East Uniacke Quarry Expansion Project EA.

*"The proposed project is not inconsistent with the mandate of the Department of Business."*

Thank you for the opportunity to comment on the EA.

**Minh Tan**

*Corporate Strategist*  
Strategy & Policy

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Halifax, NS B3J 1V7

## MEMORANDUM

**To:** Renata Mageste da Silva, EA Branch

**From:** Hydrologist, Industrial Management Unit, Sustainability and Applied Science Division

**CC:** Paul Currie, Manager, Industrial Management Unit

**Date:** April 18, 2019

**Subject:** Birette's East Uniacke Quarry EA Review Comments

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### **Scope of review:**

The scope of this Environmental Assessment review from the NSE Sustainability and Applied Science Division Hydrologist is to assess the potential environmental impacts and proposed mitigations of the proposed undertaking on surface water quantity and management. While comments may also include considerations for impacts on general surface water quality, groundwater, freshwater fish habitat, and wetlands, appropriate technical specialists for these areas should be consulted for specific review and comment.

### **Documents reviewed:**

The documents outlined below formed the basis for this EA review, and is referred to as the 'the submission' through the rest of this memorandum:

- Environmental Assessment Registration Document – Birette's East Uniacke Quarry Expansion Project. Report Prepared by McCallum Environmental Ltd. Dated March, 2019, and accessed from <https://novascotia.ca/nse/ea/east-uniacke-quarry-expansion/>

### **Review re: Birette's East Uniacke Quarry Expansion EA document:**

#### **General:**

**Water quantity: Watercourses and Site Drainage**

- My understanding of the water balance approach used is that it has been assumed that the area of the quarry development within each watershed (i.e., Western LCA, Central LCA, Eastern LCA, and the greater O’Hearn Flowage LCA) is removed from the contributing drainage area within each of the watersheds, leading to an assumed reduction of flow to each downstream watercourse equal to the percentage loss in contributing drainage area.
  - The description of the methodology provided in Section 4.1.2.4 is difficult to follow, and there is a lack of details to support the assumptions that have been made. For example, while it is stated that the current assumptions reflect “a conservative approach to determining the reduction in streamflow” (pg 43), it is difficult to understand the basis on which the approach is based, and whether it adequately considers the key components of a water balance. For example, it is stated that no additional storage is gained or removed in 4)a)a4) on page 43, but where a surplus of precipitation vs. evapotranspiration exists, where is the water from the quarry development area going if it is no longer contributing to any of the downstream watercourses? It is also highlighted in the submission that more runoff is expected to be generated within the quarry development area as a result of the proposed works (e.g., “An increase in surface water runoff entering the settling pond is expected during the expansion...” on pg 126), but the connection of this statement to the assumptions in the water balance is not described.
  - It is outlined in the submission that the area upstream of the quarrying activities within the Central LCA represents area represents non-contributing watershed to downstream flows in bullet 5)a) on page 44. As the submission does not indicate that surface flow from undisturbed areas will be directed around the Project and/or away from disturbed areas, it is not clear why a similar approach was not taken for the Western or Eastern LCA. A review of the local topography on Figure 7 suggests that areas from these watersheds may also drain to the quarry development area and may be appropriate to be treated similarly – doing so would likely increase the reductions of flow to the watercourses described in the submission.
  - Groundwater is currently not mentioned as part of the water balance methodology, with no details as to why it has been omitted and the reasonableness of this assumption. It is stated in the submission that “Wetlands within the Study Area are comprised of a combination of groundwater recharge and groundwater discharge systems” pg 133, and other similar statements in the document allude to a water table near/at surface in the proposed quarry development area. Clarification of the rationale behind these assumptions are recommended, as groundwater inputs could have an impact on on-site water management from the perspectives of the quantity and quality of water to be managed.
- It is stated that “An increase in surface water runoff entering the settling pond is expected during the expansion, therefore the capacity of the settling ponds will increase as per engineered specifications and NSE IA requirements as the quarry expands. Additionally, this system will be designed to ensure that discharge rates and water quantities are protective of the receiving environment (i.e. offsite treed swamp habitat and eventually O’Hearn Flowage). This will involve the design of a settling pond designed to accommodate 1:20 year flows.” (pg 126). Additional clarity surrounding what is meant by the statement that the settling pond will

be designed to accommodate 1:20 year flows. What is the rationale for the use of the 20-year return period, what is meant by “designed to accommodate”, and what does this mean for the flows to be discharged downstream? It is stated in the submission that “An increase in surface water runoff entering the settling pond is expected during the expansion...” (pg. 126), and “...water loss from WC2 (15.0%) is expected to be replenished ~360m downstream from WL7 within WC2” (pg 130) – additional information surrounding settling pond design and the plan for discharges from the facility is required to understand the appropriateness of the mitigations proposed and the potential impacts to WC2, and how they mitigate the concerns raised in the statement “Furthermore, managing the local drainage of surface water flows across the landscape (i.e. through use of settling ponds) has the potential to alter natural flow regimes entering downstream aquatic resources” (pg 129) in the submission.

- It is stated that “The EMF requirement is determined to be a reduction of <25% of the median flow during the seasons that the predicted loss (due to catchment loss) is taking place (NSE 2016)” (pg 125). The reference for NSE 2016 found in the submission is for the ‘Well Logs Database’, where the likely intent was to refer to the Nova Scotia Guidance for Surface Water Withdrawals (the Guide). It is then stated that “Since EMF is being maintained in the downstream receiving environment, the potential impacts outlined above by Bunn and Arthington (2002) are not anticipated, therefore, no effect to fish and fish habitat is expected” (pg. 130). I have the following comments on this statement:
  - The definition of EMFs referenced in the submission is specific to the objectives of the Guide, which “describes the submission requirements, supporting documentation, and the criteria used by NSE to evaluate surface water withdrawal applications” (NSE, 2016). The use of this outside of those objectives is not appropriate, and it is not the intent that this calculation be used to determine impacts to fish and fish habitat resulting from permanent, non-reversible reductions in flow from watershed reduction/diversion, as is the case here.
  - For clarity, it is not stated in the Guide that ‘catchment loss’ is an appropriate measure for understanding predicted losses from a watercourse, as may be inferred by the quoted text from the submission above. In addition, for surface water withdrawal applications, additional studies to support assessment of EMFs for Category 3 applications are outlined as submission requirements in the Guide. These studies are reviewed with the other information provided in the application as part of assessing potential impacts on fish and fish habitat and developing appropriate approval conditions for surface water withdrawals. Approvals generated through this process can include conditions that provide limits to what water can be withdrawn and at what time of year, with restrictions to withdrawing water when streamflows drop below certain levels (which, as an aside, are not options in this case).
- It is understood through reading the document that no water withdrawals are planned as part of the proposed works. It is stated in the document that “No washing process takes place on site” (pg 21), but also mentions that “Should it be required, dust emissions will be controlled with the application of water” (pg 23). Details surrounding the potential source of this water are not provided in the submission.

## **Water Quality**

- The submission states that “Ongoing water quality monitoring will occur as per IA requirements to ensure that quarry operations are not impacting water quality conditions within aquatic features that discharge from the site, and as well to evaluate the surface water features which may be sourced to groundwater.” (pg 126). It is not clear through this sentence what the proponent is ensuring will occur.
- It is reported that “Capacity of settling ponds exceeds current IA requirements, and TSS samples collected in the outflow ditches of the settling pond since 2015 has indicated no exceedances to date” on page 125. Earlier in the submission, it is reported that there was an exceedance in TSS (pg 21).
- Limited details surrounding the settling ponds are provided in the submission. It is unclear in the EA submission how the settling ponds will be operated, and what this will mean for both quantity and quality of flows downstream. Sufficient information surrounding how the settling ponds will be designed and operated is required in order to have confidence in mitigating water quality and quantity concerns.

#### **Reclamation**

- General details related to reclamation are provided in the submission, but it is unclear what is proposed from a water management perspective for the reclamation phase. Without additional details and taking into account the landuse changes and potential for increased flows to WC2 between the operating and closure phases, it is difficult to understand what the closure phase will look like from a water perspective.

#### **Conclusions & Recommendations:**

My opinion is that the information that has currently been provided is insufficient for predicting adverse environmental effects resulting from the proposed works. The potential impacts associated with the works is currently unclear based on the current level of information provided, and as such it is difficult to assess the appropriateness of the mitigations currently proposed. Please see below for a summary of issues and recommendations:

#### **Planning/Design Issues:**

- Without clarity surrounding the rationale for the assumptions in the water balance, it is difficult to understand the basis for the decisions made and have confidence in the results.
  - It is recommended that further clarity be provided on the approach and results of the water balance assessment, in line with the feedback provided in the comments above.
  - It is recommended that the concerns with the approach taken re: EMF, as outlined in the comments above, be addressed.
- It is unclear in the submission what the reclamation case will look like from a water perspective, and as a result the potential long-term impacts of the proposed works.
  - It is recommended that a water balance scenario and details surrounding water management for the reclamation case be submitted.

#### **Operational Issues/Other Permitting Processes**

- Details related to final settling pond design by a qualified professional is required as part of any industrial approval application for the works, including a plan to monitor compliance during the different operational phases of the year.
- A detailed sediment and erosion control plan is to be developed by a qualified professional and is required to be submitted as part of any industrial approval application for NSE review and approval prior to construction activities, including clearing, grubbing, and stripping, take place.
- Details surrounding the plan for water use for the purpose of dust suppression must be provided to the Department prior to expansion activities taking place, with an assessment of potential impacts and identification of mitigations, where appropriate.

**From:** [Brown, Jillanna M](#)  
**To:** [Mageste da Silva, Renata](#)  
**Subject:** RE: Birrette's East Uniacke Quarry Expansion Project Environmental Assessment Registration  
**Date:** April 24, 2019 9:30:01 AM

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Hi Renata:

I have reviewed the material. The location is suitable for this activity. The Industrial Approval terms and conditions will be sufficient to achieve an acceptable operating facility.

Thanks,  
Jillanna



**Jillanna Brown, P. ENG**  
**Regional Engineer**  
**Inspection Compliance & Enforcement Division**

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Please consider the environment before printing this email 🌱

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