

IN THE MATTER OF Chapter 1 of the Acts of
Nova Scotia 1994-95, the *Environment Act*

- and -

IN THE MATTER OF an Order issued pursuant
to Section 125 of said Act to **Nova Scotia
Lands Inc.** Harbourside Place, 45 Wabana
Court, Sydney, Nova Scotia.

MINISTERIAL ORDER

I. **WHEREAS Nova Scotia Lands Inc.**, hereafter called “NS Lands”, is responsible for the operation of a plant, structure, facility, undertaking or thing, to wit: a former bleached kraft pulp mill effluent treatment facility and all of its associated works which is located at or near 340 and 580 Simpson Lane, Pictou Landing, Pictou County, Nova Scotia, hereafter called the “Site”;

II. **AND WHEREAS** NS Lands executed a Reservation of Rights against Northern Pulp Nova Scotia Corporation, who hold a lease of the Site until December 31, 2030 and operated the Facility under Approval #2011-076657-A01 until its expiry on January 30th, 2020, assuming operational control of the aerated stabilization basin;

III. **AND WHEREAS** the Minister of Environment and Climate Change believes on reasonable and probable grounds that the persons named in this Ministerial Order have contravened or will contravene the:

Environment Act

s. 50(2) No person shall commence or continue any activity designated by the regulations as requiring an approval, unless that person holds the appropriate class of approval required for that activity;

IV. **AND WHEREAS** the Minister is of the opinion that it is in the public interest to do all things and take all steps necessary to comply with the *Environment Act* or to repair any injury or damage, or to control, eliminate or manage an adverse effect;

IT IS HEREBY ORDERED:

That upon service of this Ministerial Order and pursuant to subsection 125(1) of the *Environment Act*, the persons named in this Ministerial Order shall, at their own cost, comply with the terms and conditions, including compliance times, set forth in Schedule "A" attached to and forming part of this Ministerial Order.

AND TAKE NOTICE if the persons to whom the Ministerial Order is directed fail to comply with the Ministerial Order, or any part thereof, the Minister, pursuant to Section 132(2) of the *Environment Act*, may take whatever action the Minister considers necessary to carry out the terms of the Order and may recover any reasonable costs, expenses and charges incurred by the Minister pursuant to Section 132 of the *Environment Act*.

AND FURTHER TAKE NOTICE that the appeal provisions respecting the issuance of a Ministerial Order are more fully outlined in Section 138 of the *Environment Act*, including a 30-day time period from the date of the issuance of the Ministerial Order to file an appeal.

ISSUED at Halifax, in the Halifax Regional Municipality, Province of Nova Scotia,
this 28th day of May 2021


The Honourable Keith Irving
Minister of Environment and Climate Change

SCHEDULE "A"
TERMS AND CONDITIONS
Nova Scotia Lands Inc.

1. NS Lands shall operate the Facility in accordance with the Environment Act S.N.S. 1994-1995, c.1 and its Regulations, as amended from time to time.
2. Unless otherwise notified in writing by the Minister, the contact person at the Department to receive any correspondence relating to this Order is:

Manager of Special Projects Kathleen Johnson, P.Eng.
Nova Scotia Environment and Climate Change
20 Pumphouse Road
Granton, Nova Scotia B2H 5C6

Definitions

3. Act means the Environment Act S.N.S. 1994-1995, c.1, as amended from time to time and includes all regulations made pursuant to the Act.
4. Adverse Effect means an effect that impairs or damages the environment or changes the environment in a manner that negatively affects aspects of human health.
5. ASB means the aerated stabilization basin portion of the Boat Harbour Effluent Treatment system.
6. Associated works means any building, structure, processing facility, pollution abatement system or stockpiles associated with the Facility.
7. BHETF means the Boat Harbour Effluent Treatment Facility, a facility designed to remove impurities which have a detrimental effect on water quality by a combination of physical, chemical and biological processes which includes the property, any building, structure, treatment and monitoring equipment associated with effluent management and treatment at the effluent treatment system located at 340 and 580 Simpson Lane, Pictou Landing, Pictou County.

8. BOD₅ means biochemical oxygen demand defined as the amount of dissolved oxygen consumed by aerobic biological organisms in a body of effluent to break down organic material present, over a five (5) day period at 20 °C.
9. Decommissioning, for the purpose of this Order, means to make inoperative, empty, purge, decontaminate and secure to ensure no adverse impact to the environment may occur.
10. Department means Nova Scotia Environment and Climate Change.
11. Exceedence means a breach of a regulatory requirement outlined in the Act, the Regulations made pursuant to the Act and/ or this Approval.
12. Point C means the location identified as Point C on the diagram located in Appendix C of this Order.
13. Point D means the location identified as Point D on the diagram located in Appendix C of this Order.
14. Site means the lands owned by the Province of Nova Scotia where the Boat Harbour Effluent Treatment system and associated works are located.

Wastewater

15. NS Lands shall retain the services of a Class III Wastewater Treatment System Certified Operator to oversee the day to day operation of the BHETF as of June 1st, 2021, until such time as the Minister authorizes otherwise in writing.
16. NS Lands shall follow the plan entitled *Transition Plan for the Time Period Before Decommissioning of BHETF*, prepared by CBCL Limited, dated June 19, 2020 and the requirements of the correspondence from the Department to NPNS dated June 24th, 2020, contained within Appendix D of this Order, until such time as the Minister authorizes otherwise in writing.
17. NS Lands shall manage, including but not limited to operating the aeration system, the wastewater within the BHETF until remediation of the ASB begins, and/or until authorized by the department in writing.
18. NS Lands shall monitor Point C for the parameters outlined in Table 1 of Appendix A of this Order until such time as the Minister authorizes otherwise in writing.

19. NS Lands shall monitor Point D for the parameters outlined in Table 2 of Appendix A. While flow continues to flow into Boat Harbour from Point C, the criteria in Table 2 of Appendix A are compliance criteria. If discharge at Point C ceases permanently, monitoring for compliance purposes shall continue for 10 days following the cessation of flow, after which, monitoring for informational purposes shall continue until the decommissioning of the BHETF has been completed to the satisfaction of the Department. Should flow at Point C into the Stabilization Basin be intermittent, NPNS shall monitor for the parameters outlined in Table 2 of Appendix A at Point D for compliance purposes.
20. NS Lands shall implement the proposal entitled *Fish Mortality Mitigation Options Analysis, Boat Harbour Remediation Project*, dated February 25, 2021, prepared by Strum Consulting in accordance with the schedule outlined in the proposal.
21. NS Lands shall obtain a Watercourse Alteration Approval from the Department if the anchoring system proposed for use in the plan outlined in Condition 20 of this Order has requires an alteration to the bed or bank of the watercourse.
22. NS Lands shall contact the Federal Department of Fisheries and Oceans for authorization, if required, to deploy the net system below the gates of the dam.
23. NS Lands shall ensure debris in the water around the dam at Point D and the net system(s) is removed on a regular basis.

Air Emissions

24. NS Lands shall ensure emissions from the Facility do not contribute to an exceedance of the maximum permissible ground level concentrations specified in Schedule A of the Air Quality Regulations.
25. For the purpose of determining compliance with Schedule A of the Air Quality Regulations, the measurement of Total reduced Sulphur (TRS) at ambient air monitoring station shall be considered the measurement of hydrogen sulphide (H₂S).
26. NS Lands shall operate an ambient air monitoring station and monitors at Pictou Landing (PID 65006785) to measure the following parameters:
 1. 1-hour and 24-hour rolling average concentration of Total Reduced Sulphur (TRS) in parts per billion; and

2. Meteorological data: wind speed, wind direction, ambient temperature, barometric pressure and humidity.
27. NS Lands shall maintain the ambient air quality station and monitors, identified in Condition 26 of this Order, in accordance with the following documents:

Total Reduced Sulphur

1. Addendum to Model TML87 Instruction Manual (P/N 047400000 Rev.A4) for Model TML60 Total Reduced Sulfur Analyzer with Model 501 TRS Thermal Converter, prepared by Teledyne Instruments Monitor Labs, dated REV.A2, February 8, 2007; and
2. Calibrate/Maintain TRS Analyzers, prepared by Environmental Services, Nova Scotia Power, dated Revised: January 14, 2015

Meteorological Data

3. Instrument Manufacturers Requirements
28. Effective June 1st, 2021, NS Lands shall submit quarterly summary reports within 15 days of the end of each quarter containing the following information:
1. a summary of any air quality related emergency and non-emergency incidents pursuant to the Environment Act, the Air Quality Regulations or this Order, including the date and time of the incident(s);
 2. a summary of any operational problems related to the ambient air monitor(s), including the date and time of the incident(s);
 3. a summary of the quality assured, quality controlled (QA/QC) ambient air quality data from the ambient air monitor(s) identifying the one hour averages and 24-hour rolling averages of total reduced sulphur in parts per billion, hourly average wind speed, wind direction, ambient temperature, barometric pressure and humidity including the dates used to calculate the averages;
 4. the electronic spreadsheets of the quality assured, quality controlled (QA/QC) air quality data; and

5. a summary of any complaints received from the public and how they were responded to by NS Lands, including the date and time of the complaint and any correlation to an incident that occurred;

Hydrology and Hydrogeology

29. As of June 1st, 2021, NS Lands shall sample and analyze the groundwater and surface water monitoring network at the BHETF as outlined in Table 3 of Appendix B.
30. NS Lands shall ensure all surface and ground water samples are collected in a consistent manner in accordance with established industry standards and best practices.
31. The monitoring well network at the BHETF shall be visually inspected during each field visit and maintenance performed, as required. The monitoring wells shall be fitted with a protective well casing and secured.
32. The Department reserves the right to modify groundwater or surface water monitoring locations, parameters and frequency, and to require remedial measures based on the change of site activities, results of monitoring data and/or site inspections.
33. NS Lands shall not modify, (addition, deletion or replacement), the groundwater or surface water monitoring program, including locations, parameters, or frequency, without written authorization from the Department. Any request to modify the groundwater or surface water monitoring program shall be submitted to the Department in writing, including justification for the change(s), prepared by a qualified professional, licensed to practice in Nova Scotia by Geoscientists Nova Scotia (APGNS) or Engineers Nova Scotia (APENS).
34. NS Lands shall submit any request for modification to the groundwater or surface water monitoring program a minimum of thirty (30) days prior to the proposed implementation of the modification.
35. NS Lands shall review the groundwater and surface water quality monitoring data as it is collected in order to identify potential changes in water chemistry. Any change in groundwater quality shall be reported immediately to the Department.
36. NS Lands shall maintain records for all groundwater monitoring wells at the BHETF, including maintenance records, for a minimum of 15 years.

37. NS Lands shall submit an Annual Report for the groundwater and surface water monitoring at the BHETF to the Department by April 1st, of the year following monitoring. The Annual Report shall include, but is not limited to, the following information:
1. a review of field methodologies, including sampling techniques;
 2. a description of the current groundwater monitoring network;
 3. a description of the current surface water monitoring network;
 4. a review of the current groundwater and surface water monitoring programs and recommendations for modifications, as applicable;
 5. summary of any deficiencies noted during the visual inspections of the monitoring well networks and a summary of the required and completed maintenance, as required;
 6. current and historical static water level data in tabular format;
 7. groundwater gradients and flow direction.
 8. current and historical groundwater quality data in tabular format with comparison to applicable guidelines and historical data;
 9. current and historical surface water and leachate quality data in tabular format with comparison to applicable guidelines and historical data;
 10. laboratory certificates of analysis;
 11. a detailed interpretation of the groundwater, surface water and leachate quality data including an analysis of spatial and temporal trends; and
 12. the identification of any adverse impacts to groundwater and/or surface water and associated recommendations, as applicable.
38. The annual report shall be prepared by or under the direction of a qualified professional licensed to practice in Nova Scotia by Geoscientists Nova Scotia or Engineers of Nova Scotia.

39. NS Lands shall ensure that the following discharge limits for suspended solids are met for any water which is discharged from the Site to a watercourse or wetland at the Site:

Clear Flows (Normal Background Conditions):*

1. Maximum increase of 25 milligrams/litre from background levels for any short-term exposure (24 hours or less)
2. Maximum average increase of 5 milligrams/litre from background levels for longer term exposure (inputs lasting between 24 and 30 days)

High Flow (Spring Freshets and Storm Events):*

3. Maximum increase of 25 milligrams/litre from background levels at any time when background levels are between 25 milligrams/litre and 250 milligrams/litre
4. Shall not increase more than 10% over background levels when background is > 250 milligrams/litre

CCME Environmental Quality Guideline for Aquatic Life, as amended.

40. NPNSC shall notify the Department in advance of any change that is not addressed in this Order, as an Approval may be required.

Appendix A

TABLE 1: Effluent Monitoring Parameters

| Parameter | Sample Type | Monitoring Frequency | Location |
|--|--------------------|-----------------------------|--|
| Biochemical Oxygen Demand (BOD₅) | Continuous* | 3 days per Week | Effluent Monitoring Station Point C |
| Suspended Solids | Continuous* | Daily | Effluent Monitoring Station Point C |
| pH | Continuous* | Daily | Effluent Monitoring Station Point C |
| Dissolved Oxygen | Continuous* | Daily | Effluent Monitoring Station Point C |

*Continuous monitoring if flow over the dam at Point C, otherwise grab sample required.

TABLE 2: Wastewater Monitoring Parameters and Criteria

| Parameter | Sample Type | Monitoring Frequency | Location | Criteria |
|---|-------------|----------------------|-------------------------------------|----------------|
| Biochemical Oxygen Demand (BOD ₅) | Continuous | 5 days per Week | Effluent Monitoring Station Point D | 25 mg/L daily* |
| Suspended Solids | Continuous | Daily | Effluent Monitoring Station Point D | 25 mg/L daily* |
| pH | Continuous | Daily | Effluent Monitoring Station Point D | 6-9 |
| Acute Toxicity-rainbow trout** | Grab | once per month | Effluent Monitoring Station Point D | Pass LC50 |
| Acute Toxicity-Daphnia magna*** | Grab | once per week | Effluent Monitoring Station Point D | Pass LC50 |

* Concentration shall be calculated- $[TSS_{\text{measured}}] \times 0.667 = [TSS_{\text{for comp}}]$; $[BOD_{5 \text{ measured}}] \times 0.667 = [BOD_{5 \text{ for comp}}]$ Comp= compliance

** Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, 2nd Edition, December 200, Amended Feb 2016, EPS1/RM/13.

*** Biological Test Method Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2nd Edition, Dec 2000 amended May 2007 and Feb 2026, EPS1/RM/14.

Appendix B

Table 3: Boat Harbour Effluent Treatment Facility - Groundwater and Surface Water Monitoring Requirements

| Location* | Frequency | Parameters |
|--|-----------|--|
| Groundwater | | |
| MW15-1S MW15-1D MW15-2S MW15-2D MW15-3S MW15-3D MW15-4S MW15-5S | Quarterly | General Inorganic Chemistry (including Fluoride) Dissolved Metals DOC COD TKN Total phosphorus Absorbable Organic Halogens (AOX) Water Levels |
| Surface Water | | |
| Point 1 Point 2 Pond 2 | Quarterly | General Inorganic Chemistry (including Fluoride) Total Metals (including Mercury) Trivalent chromium Hexavalent chromium Dissolved Zinc DOC TSS BOD COD TKN Total phosphorus Total Petroleum Hydrocarbons (TPH/BTEX) Polycyclic Aromatic Hydrocarbons (PAHs) Volatile Organic Compounds (VOCs) Absorbable Organic Halogens (AOX) |

*As depicted in Figure 3-1 of the following report: Dillon Consulting Limited (File 18-7281-2000). March 2019. Boat Harbour Effluent Treatment System – 2018 Monitoring Program.

Appendix C



Appendix D



June 19th, 2020

Terri Fraser, P. Eng.
Technical Manager
Northern Pulp Nova Scotia

Dear Ms. Fraser:

RE: Transition Plan for the Time Period Before Decommissioning of BHETF

1. Introduction

As of April 26th, 2020, Northern Pulp Nova Scotia Corp (Northern Pulp) ceased the release of mill site effluent to the Boat Harbour Effluent Treatment Facility (BHETF). On May 14th, an order from the Minister of Environment of Nova Scotia was issued to Northern Pulp, requiring the services of a 3rd Party Professional Engineer to develop a transition plan to ensure BHETF does not experience a septic condition or any other change in condition that may cause an adverse effect, including but not limited to an adverse effect to water quality and/or air quality.

A Transition Plan has been prepared by the undersigned, both employees of CBCL Limited, and registered Professional Engineers in the Province of Nova Scotia. The plan provides recommendations on how to operate and monitor the BHETF to mitigate potentially adverse effects that may occur between now and the commencement of decommissioning activities. Under the order, Northern Pulp is required to submit a BHETF Decommissioning Plan for approval by August 1st, 2020 which is outside of CBCL's current mandate.

2. Assumptions

The following assumptions were made in the preparation of the Transition Plan:

- This plan proposes to prevent and mitigate adverse conditions related to stored water and sludge within the boundaries of the BHETF site, bounded by the Aerated Stabilization Basin (ASB) and outfall at Point C on the north side, and the settling ponds to the east.
- Within the plan we consider septic conditions as areas that may fall anaerobic, or oxygen-deficient. The mitigations for septic conditions will focus primarily on the *upper* layers of the ASB (Cells 1-4), the traditional aerobic, or oxygen rich zone. We understand that a minimum free dissolved oxygen (DO) concentrations of **2 mg/L** is required to maintain an aerobic water column that will mitigate any adverse effects created by the underlying layers of the ASB where settled sludge is being anaerobically digested e.g. in the benthic zone. Anaerobic digestion of sludge will not be considered a septic condition requiring mitigation in this plan.
- The adverse effects of air quality cited in the order are assumed to be based on the concern that a potential change in the types of odours emitted from the BHETF is possible. We will mitigate this concern by preventing septic conditions as described above.

3. Review of BHETF

The BHETF, when operational, consisted of primary settling basins to remove settleable material followed by the ASB. These two areas are still operational but are no longer processing mill effluent. Stormwater run-off of the adjacent watersheds primarily drain to the Boat Harbour basin, with some water directed by gravity to the ASB (Wetland 4 discharge and government sludge storage cell run-off and leachate). A small pump station is installed in a wetland northwest of BHETF to provide as-needed process water. When BHETF was receiving effluent from the mill, pre-treatment of the ASB influent included a blended urea addition (a source of ammonia and phosphorous for bacteria). Urea is no longer required as the system is no longer treating effluent. The ASB has fixed and floating mechanical aerators for supply of oxygen to promote aerobic conditions. Floating aerators are currently installed in Cells 1, 2, and 3, and 4. Fixed aerators are inoperable due to the water level decrease resulting from the zero influent flow condition. The mill's regulatory outfall when the BHETF was fully operational, traditionally called Point C in environmental documentation, is located on the north side of Cell 4.

BHETF has experienced significant changes in operation in 2020. First, the Kraft pulp mill operations ceased in mid-January. The mill continued to operate its power boiler and collect other mill site effluent until April 26th. Since then, the inlet to the settling ponds have been drained and the effluent pipeline has been drained and fully isolated. The BHETF was flushed with fresh water from Middle River for a few weeks after the power boiler was taken out of service in mid-April. The ASB continues to operate the aeration systems and monitor the site on a daily basis.

4. Potential Adverse Effects, Impacts and Mitigations

We believe there are three general categories of potential impact/adverse effects during the transitional time period before decommissioning of BHETF:

1. Development of Septic Conditions
2. Reduction in Water Levels
3. Elevated Total Suspended Solids (TSS)

Septic Conditions and Odours

If DO falls below 2 mg/L in the ASB, the water is approaching conditions where it may become septic which can lead to a change in odours at the BHETF. Oxygen will continue to be supplied by the surface aerators as the principal means of preventing this. During the transition time period, the primary demand for oxygen transfer is expected to be that exerted by the settled sludge. The potential for septic conditions can be evaluated in a number of ways. One way is to compare the previous loading conditions to the current loading conditions, understanding that there was sufficient oxygen supplied to maintain the ponds in an aerobic condition during the previous years' operation.

Table 1 provides a review of the past year's operation of BHETF, including the estimated oxygen demand.

Table 1: Summary of 2019 Operating Conditions & ASB Oxygen Demand

| | |
|--|-----------------------------|
| Effluent Flow | 65,500 m ³ |
| cBOD at Inlet to Settling Ponds | 275 mg/L |
| cBOD at Inlet to ASB | 175 mg/L |
| Estimated Oxygen Demand | 15,000 kg O ₂ /d |
| Oxygen Supply of Aerators¹ | 17,000 kg O ₂ /d |

¹ Estimated based on current available aerator horse power and oxygen transfer rates (FTR -Field Transfer Rate & SOTR - Standard Oxygen Transfer Rate) obtained from literature. Sources: Aerated Stabilization Basins for Pulp and Paper Mills (Klopping & Foster, 2003) & Oxygen Transfer Test Results (Aerators Inc. Print Brochure).

This data indicates that the ASB had sufficient aerator capacity to prevent septic conditions when cBOD loading to the facility averaged over 11,400 kg/d. Now that there is no influent, the only potential loading comes from the residual sludge that remains within the ASB. Table 2 provides a summary of sludge volumes and characteristics in the ASB gathered from 2019 bathymetry data and historical dredged % solids.

Table 2: Sludge Characteristics

| | |
|--|------------------------|
| Overall Volume of ASB Cells 1 - 4 | 710,000 m ³ |
| Sludge Volume¹ | 275,000 m ³ |
| % Capacity of ASB | 40% |
| Average % Solids² | 6% |

1. Based on ASB bathymetry gathered in June, 2019.
 2. From historical dredge solids analysis.

The oxygen demand of the solids was measured at approximately 0.5 g/m³/d. This results in a daily oxygen requirement of 140 kg/d. There are currently 5, 50 HP aerators operating in the ASB with at least one aerator in each cell. These aerators provide approximately 5400 kg of oxygen per day to the ASB. In addition to the oxygen provided by the mechanical aerators, re-aeration adds approximately 50 kg of oxygen per day to the water column. The presence of algae has the potential to add another significant amount of oxygen to the cell. To date only small amounts of algae have been observed in the ASB so we have not allowed for additional oxygen input from this source. Table 3 summarizes the oxygen balance around the ASB.

Table 3: Oxygen Balance

| | | |
|--------------------------|--|----------------------|
| Oxygen Sources | Mechanical Aeration Surface re-Aeration | 5400 kg/d 50 kg/d |
| Oxygen Demand | Solids Oxygen Demand | 140 kg/d |
| Surplus (Deficit) | | 5310 kg/d |

The oxygen balance indicates that the oxygen supply from the five mechanical aerators greatly exceed the estimated oxygen demands from the inactive ASB. There may still be some potential for isolated areas of oxygen deficiency due to poor circulation of the oxygenated water or areas of sludge build-up.

Monitoring of dissolved oxygen and observing pond conditions will be important during the transition period. Movement of surface aerators or using pumps to recirculate water can be employed to mitigate any adverse conditions that do develop.

It should be noted that when operational, the baffles within the ASB were important to direct the flow to prevent short circuiting. Without flow entering the ASB, these baffles now serve no purpose and can be removed at any time.

Reduced Water Level Due to Evaporation/Seepage

Maintaining a minimum water level will allow for more control of oxygen dispersion, suspended solids, and circulation of the ASB. Loss of level could lead to resuspension of solids or reduce DO concentrations. Stormwater run-off and sludge storage cell leachate will likely provide a base volume of added fresh water to the ASB but evaporation may require manual addition of water from a nearby source. Figure 2 shows a graphic of approximate surface water flows for both fresh non-contact water and BHETF water.

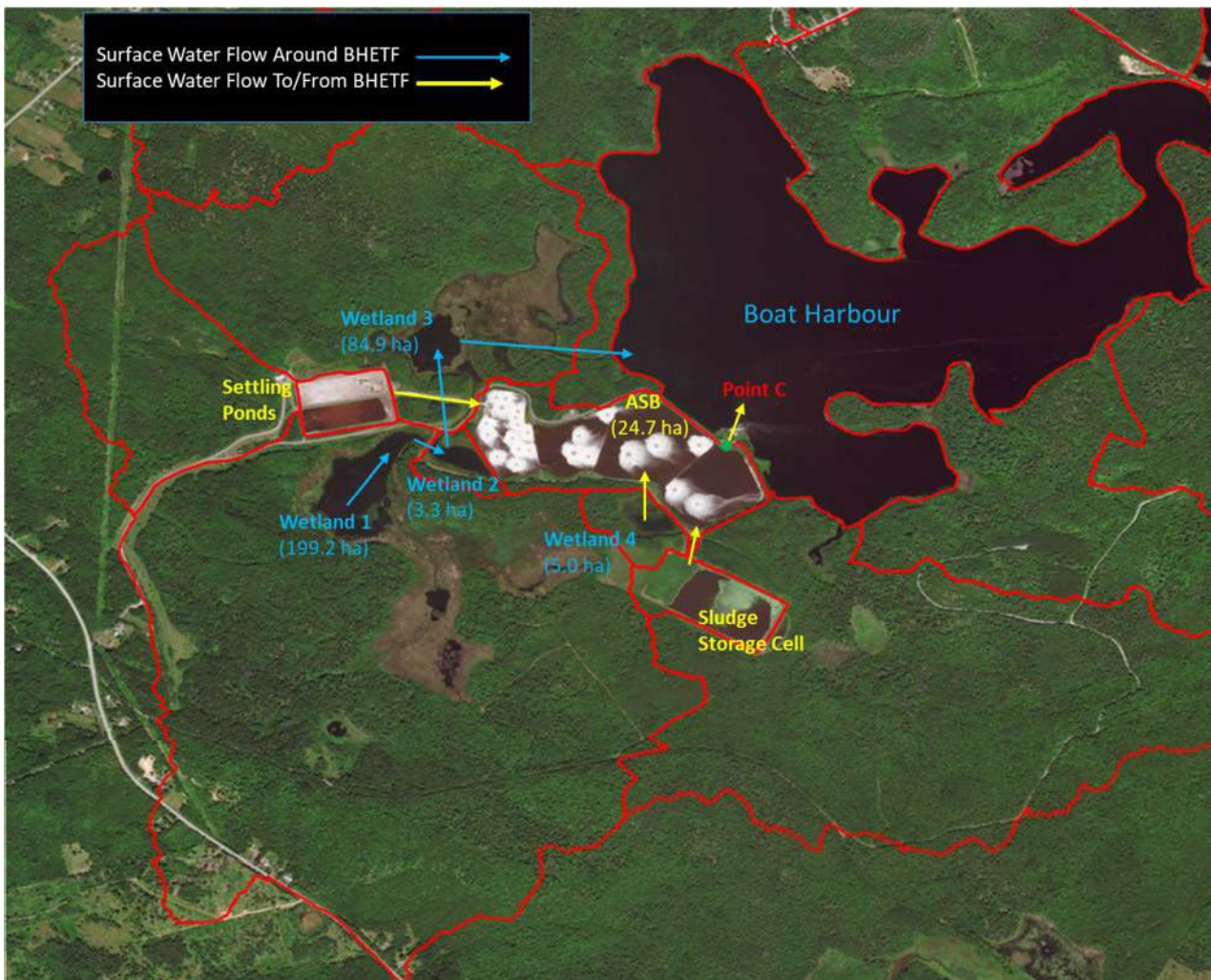


Figure 2: Approximate Watershed Delineation of BHETF

A water balance around the ASB was performed to determine the potential impacts on water level as well as the potential sources for make-up water, if required. Calculations were performed monthly for the transition period from June through September. The results of these calculations are provided in Table 4.

Table 4: ASB Water Balance

| Parameter | June | July | August | September |
|--|--------|--------|--------|-----------|
| Climate Normals (mm/month) | | | | |
| Evaporation | 102 | 117.8 | 96.1 | 69.0 |
| Precipitation | 86.9 | 77.0 | 81.4 | 110.3 |
| Water Inputs (m³/month) | | | | |
| Precipitation | 16256 | 14404 | 15227 | 20633 |
| Rainfall /Runoff into ASB | 778 | 690 | 729 | 988 |
| Wetland 4 Discharge | 463 | 410 | 433 | 587 |
| Water Losses (m³/month) | | | | |
| Evaporation | -19081 | -22036 | -17977 | -12907 |
| Surplus (Deficit) (m³/month) | -1584 | -6533 | -1588 | 9301 |
| Water Level Change (mm) | -8.5 | -34.9 | -6.3 | +49.7 |

The water balance indicates a maximum decrease of 35 mm in July which will not result in any adverse effects. These calculations are based on climate normals which may differ from actual conditions. Should actual conditions vary significantly from normal, more extreme water losses could be realized. In this case surface water from the wetlands that discharge to Boat Harbour can provide sufficient make up water to maintain water level. The volume of available water is provided in Table 5.

Table 5: Site Water Balance

| Source | June | July | August | September |
|--|-------|-------|--------|-----------|
| Wetland 1 (m³/month) | 24034 | 19621 | 22479 | 34201 |
| Wetland 2 (m³/month) | 91 | -248 | 78 | 840 |
| Wetland 3 (m³/month) | 10328 | 8518 | 9661 | 14504 |
| Total Wetland 1-3 (m³/month) | 34452 | 27890 | 32218 | 49545 |

These calculations demonstrate that there is a significant surplus of water generated in Wetlands 1-3 that discharge into Boat Harbour. Addressing the maximum deficit month would require approximately 6500 m³ of water to be added to the ASB. In terms of continuous pumping, this would require an addition of approximately 0.15 m³/min (40 USgpm). Ideally, this water would be pumped/diverted from standing water in Wetland 3. However, the water could be extracted after discharging to Boat Harbour, if necessary.

High TSS

With changes to circulation and aerator placement possible, areas such as Cell 4 and Point C may experience elevated total suspended solids from time to time. It will be important to ensure the outfall at Point C continues to have sufficient space for solids settling upstream as mitigation measures are

applied to control DO. The level of the ASB is controlled by a weir at the Point C outfall. It is recommended that the weir be operated at or near its highest level to help prevent resuspension of solids at the Point C outfall. Operators will be monitoring TSS and can adjust the location of the aerators in Cell 4 if necessary.

5. Monitoring & Operation

The transition plan is designed for the time period following the end of effluent being released from the mill site until the start of decommissioning activities. During this period, monitoring water quality, hydraulic conditions, and visible characteristics of the ASB will be required. The settling ponds are currently drained to allow the primary solids to dry out. The solids will be removed in June or July, as weather permits, as they have been every summer while the BHETF was in normal operation. The following monitoring and operational tasks are ongoing for the transition time period to prevent adverse effects:

Monitoring:

- Dissolved oxygen, BOD, TSS;
- Log of site observations e.g. weekly photos, wind direction, temperature/ pond color, etc.
- Observation of Inflow/Outflow of ASB
- Recording Rainfall/precipitation events and tracking data from weather stations;
- Recording aerator operational status;
- Recording pumping status – if recirculation pump(s) deemed necessary.

Operation:

- Provide for flexibility in adding/moving aerators as needed to maintain DO above 2 mg/L (Target 5 mg/L for safety) in all cells while maintaining gentle mixing;
- Maintain a high ASB water level to allow for fresh water circulation during precipitation events;
- Transfer or divert storm water run-off into the ASB if necessary;
- Consider temporary recirculation pumps to supplement circulation if necessary.

Yours very truly,

CBCL Limited



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June 24, 2020

Northern Pulp Nova Scotia Corporation
PO Box 549 Station Main
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Attention: Mike Wilson
Environmental Leader, Northern Pulp Nova Scotia Corporation

Dear Mr. Wilson

**RE: Submission of Final Transition Plan, June 19, 2020, Associated with
Condition 15 of Ministerial Order 60003**

Further to Northern Pulp Nova Scotia Corporation's (NPNSC's) submission on June 19, 2020 of the above noted plan, the Department has reviewed the document and offers the following comments:

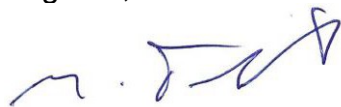
- Please provide a copy of the calculations and laboratory analysis for oxygen demand.
- Please note, there appears to be a calculation error in Table 4 under the "August" column. The water level change, based on the data presented, should be -8.5 not -6.3.
- NPNSC may follow the recommendations of CBCL to remove the baffles within the ASB, however, as stated within the report, sufficient space for solids settling upstream of Point C must be provided.
- Please note, the withdrawal of water from any wetland is considered an alteration to that wetland requiring an Approval regardless of the volume.
- Withdrawing or diverting water in a volume greater than 23 000 L per day from a source of surface water or ground water is designated as an activity that requires an approval if withdrawal is required for more than 2 consecutive weeks. Based on the volumes of water that are predicted to be required by NPNSC during June, July and August, the Department does not anticipate an Approval would be required to divert water from the Stabilization Basin back into the Aeration Basin. NPNSC is therefore encouraged to work with Nova Scotia Transportation and

Infrastructure Renewal (TIR) to develop a plan which is acceptable to TIR for diverting water from the Stabilization Basin to the Aeration Basin.

- The Final Transition Plan (the Plan) indicates monitoring of dissolved oxygen and observing pond conditions are important activities during the transition period. These activities are to be undertaken under the supervision and/or advice of a qualified 3rd party Professional Engineer licensed to practice in the Province of Nova Scotia.
- The Plan does not discuss the potential for odour due to “turnover” of the lagoon contents (i.e. when the water at the bottom of the lagoon rises to the surface due to temperature changes in the water column). Please note, the decommissioning plan which is due August 1, 2020 under Condition 22 of Ministerial Order 60003 and Condition 29 of Ministerial Order 55774, NPNSC shall address the potential for lagoon turnover, which may occur due to the anticipated stratification of the wastewater as a result of reduced aeration, should decommissioning not be completed before this temperature change occurs.
- As per Condition 16 of Ministerial Order 60003, NPNSC shall implement the recommendations for monitoring and operation of the Boat Harbour Effluent Treatment Facility outlined in Section 5 on page 6 of the Plan, dated June 19, 2020.
- In addition to those outlined in Section 5 of the Plan, the Department will require the recording of the number and location of operating aerators in relation to the dissolved oxygen sampling locations. NPNSC shall enact these recommendations immediately. The results of this monitoring shall be provided to the Department with the monthly report.

Should you have any questions or concerns regarding this information, please do not hesitate to contact Brendan Coyle or myself at 902-396-4194.

Regards,



Marc Theriault
District Manager

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