



P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. Info Item 2
North West Community Council
January 13, 2025

TO: Chair and Members of North West Community Council

FROM: Brad Anguish, Commissioner of Operations

DATE: December 4, 2024

SUBJECT: Bedford West Water Quality Status Update – Summer 2024

INFORMATION REPORT

ORIGIN

Bedford Municipal Planning Strategy, Bedford West Secondary Planning Strategy, Policies BW-3, SW-4 and SW-5. Development Agreements between the Halifax Regional Municipality and West Bedford Holdings Ltd, between Halifax Regional Municipality and Cresco Ltd, and between Halifax Regional Municipality and Clayton Developments Ltd.

EXECUTIVE SUMMARY

A water quality monitoring program has been ongoing in the Bedford West Secondary Plan area since 2009, through Development Agreements executed under the Bedford West Secondary Planning Strategy. Results from the summer 2024 sampling event are presented in this report.

Exceedances of the 10 µg/L phosphorus threshold were observed at all locations in the summer 2024 sampling event. Resampling took place in September 2024, when all sampling stations showed exceedances, although most exceedances were lower than those observed in August.

BACKGROUND

The Bedford West area is one of three areas designated as existing growth areas under the Regional Plan for serviced development (municipal water and wastewater systems). The Bedford West area is approximately 1,052 hectares (2,600 acres) in size and located on the west side of the Bicentennial Highway, in the vicinity of Hammonds Plains Road and Kearney Lake Road. In 2006, the Bedford West Secondary Planning Strategy (BWSPS) was adopted with the policy directive to enable new mixed-use communities while ensuring their design considered protection of the natural environment. *Figure 1* illustrates the areas encompassed by the BWSPS. Sub Areas 2 to 9 have approved development agreements and are either constructed or under construction. Sub Areas 1, 10 and 12 are Special Planning Areas designated through the Province of Nova Scotia's *Housing in the Halifax Regional Municipality Act*.

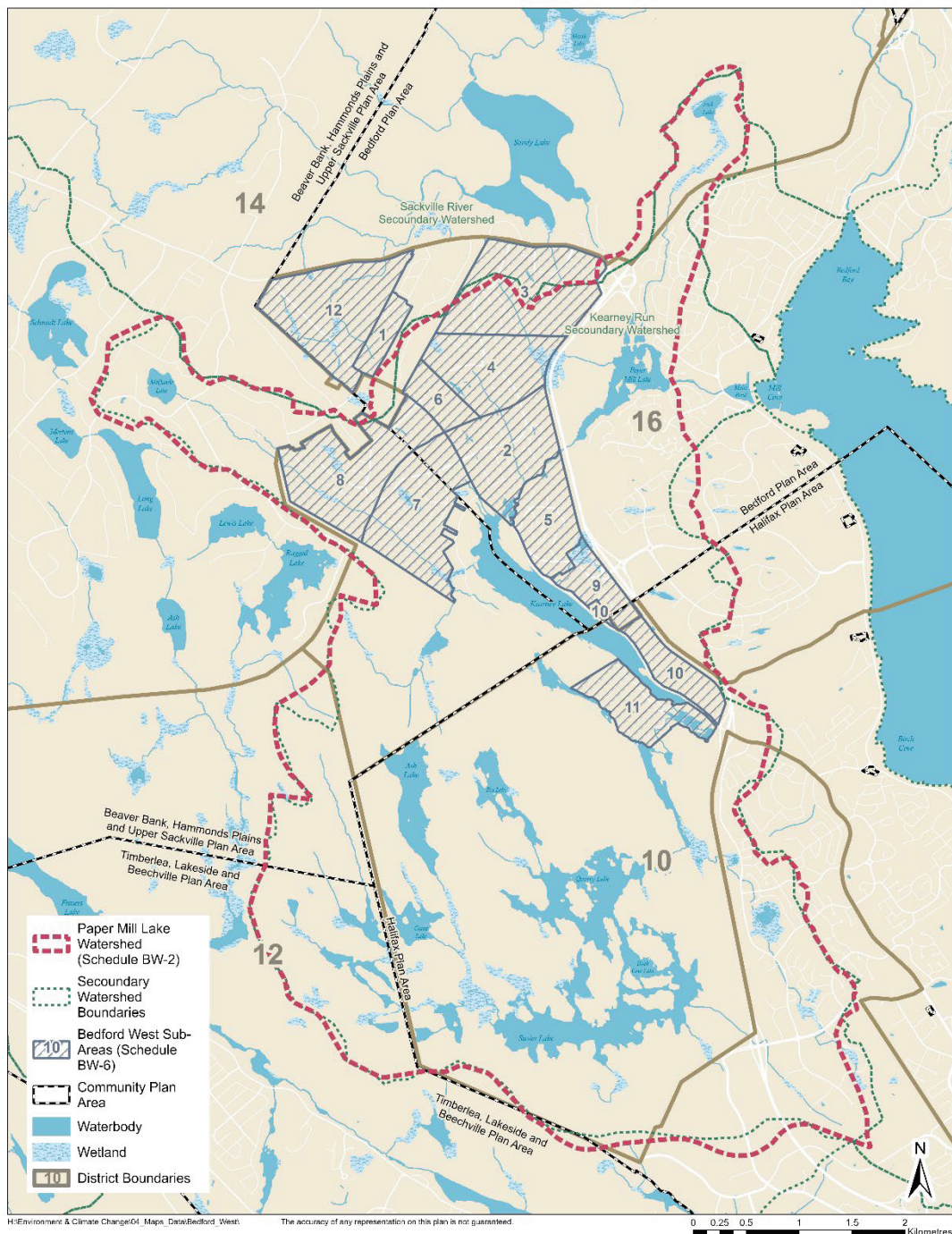


Figure 1: Sub-areas identified under the Bedford West Secondary Planning Strategy within the Paper Mill Lake watershed.

Policy BW-3 of the BWSPS requires a water quality monitoring program for the Paper Mill Lake watershed to track the eutrophication process. Eutrophication is the process of nutrient enrichment in lakes. While this eutrophication can happen naturally, it is primarily caused by human activities. Policy BW-3 aims to prevent nutrient enrichment from impacts of human activities in the Paper Mill Lake watershed. Land disturbances during construction, surface hardening, the use of chemical fertilizers, stormwater inputs, in-use and historic on-site septic systems, and vegetation removal are all potential sources of nutrients in lakes. These

changes can result in relatively rapid changes in trophic status, from lower trophic states (fewer nutrients) to higher trophic states (more nutrients). This rapid change in water quality leads to excessive plant growth, excessive algae growth, cyanobacteria blooms, and conditions generally resembling a poorly circulating backyard pond.

The water quality monitoring program was specified in the BWSPS in response to the Municipality's statement "that best management practices may be needed both during development and afterward to maintain water quality in the lakes" and "that a water quality monitoring program be established on lakes throughout the watershed" as published in the BWSPS in 2006.¹

The terms of the monitoring program are specified within the Development Agreements that have been negotiated in consultation with the former Bedford Watershed Advisory Board (Sub Areas 1-9). This board was dissolved in 2013 and replaced with the broader Regional Watersheds Advisory Board (RWAB). Development agreements for the Bedford West subdivision negotiated between 2013-2022 occurred in consultation with RWAB, except for those identified as Special Planning Areas.

All Development Agreements under the BWSPS have identified the value of 10 micrograms per litre (µg/L) of total phosphorus (TP) as a "trigger value," representing the transition point between the oligotrophic and mesotrophic states per Environment and Climate Change Canada's criteria (*Table 1*).

Table 1: Summary of Canadian trophic status triggers. Environment and Climate Change Canada (2004).

Trophic Status	Total Phosphorus (µg/L)
Ultra-oligotrophic	<4
Oligotrophic	4-10
Mesotrophic	10-20
Meso-Eutrophic	20-35
Eutrophic	35-100
Hyper-eutrophic	>100

In accordance with the terms for the Bedford West Development Agreements, the Municipality is required to submit test results to the Developer and the North West Community Council (NWCC) within three months of being received from the consultant, or immediately, if TP or bacterial results exceed management thresholds identified therein. RWAB was dissolved by Regional Council on July 9, 2024.² The Environment & Sustainability Standing Committee (ESSC) is the successor body to RWAB.³ Subsequent reports submitted in compliance with the BWSPS will be sent to NWCC and ESSC.

Monitoring provisions in the DA could be seen as assuming that development activity bears relation to the

¹ The Bedford West Secondary Planning Strategy can be found online here: [THE BEDFORD WEST SECONDARY PLANNING STRATEGY.pdf \(halifax.ca\)](#)

² The report associated with this decision of Regional Council is available online: [Governance Review – Phase 1 Implementation Plan and Advisory Committee Review - July 9/24 Regional Council | Halifax.ca](#)

³ The full text of Administrative Order 1 is available online here: [Administrative Order One, Respecting the Procedures of Council | Halifax.ca](#)

test results. Research done by the Centre for Water Resource Studies⁴ in the Paper Mill Lake Watershed has since pointed out that site-specific changes in water quality identified from lake sampling cannot be attributed to a single source and has recommended that individual developments should not be regulated based on trophic state indicators in a lake. Some reasons for this are:

1. Development-derived surface water contamination tends to originate from non-point sources, for example contamination tends to come from overland water flow across an entire site rather than from a single discharge pipe into a lake.
2. In-lake phosphorus, while easily measured, cannot be traced back to a single source. For example, phosphorus released by decomposing plant material in a lake cannot be differentiated analytically from phosphorus released by sediment flowing into a lake from a development site.

In cases where an exceedance of phosphorus is noted, staff can request confirmation testing and determine whether any corrective action is required by the developer as per their sedimentation and erosion plan.

DISCUSSION

The purpose of this report is to share the results of the water quality monitoring program in the Paper Mill Lake watershed undertaken as part of the Bedford West Development Agreements at the summer 2024 sampling event. A map identifying sampling locations is included in Attachment A. Sampling was done by WSP Canada Inc. and took place over two days on August 28-29, 2024.

Results from the summer 2024 sampling event are posted publicly on the [HRM Lakes & Rivers](#) webpage. Exceedances of the recreational bacteria (*E. coli*) guideline (235 colony forming units (CFU)/100mL) were not observed in the original sampling event. There was an error made by the lab that did not report the actual *E. coli* concentrations above 200 CFU/100mL for HWY102-1, HWY102-2, and LSD, so if an exceedance occurred it is unknown. *E. coli* samples for those three sights were collected on the September 23 resampling date. No *E. coli* exceedances were observed from the resampling event.

Table 2: Summer 2024 Total Phosphorus

Sampling Location	Acceptable Phosphorus Concentration (µg/L)	August 28-29 Total Phosphorus (µg/L)	September 23 Total Phosphorus (µg/L)
PML-1	10	25	23
PML-2	10	11	14
HWY102-1	10	16	13
HWY102-2	10	30	22
LU	10	26	22
KL-1	10	41	18
KL-2	10	15	23
KL-3	10	12	28
KL-4	10	14	28
KL-5	10	58	21
LSD	10	54	20

⁴ Presentation by Rob Jamieson, Ph.D., P.Eng., entitled “Phosphorus Loading and Trophic State Assessment in the Paper Mill Lake Watershed”, North West Community Council, November 15, 2016. The presentation can be found online here: <https://legacycontent.halifax.ca/Commcoun/central/documents/161115nwcc1131pres.pdf>.

Phosphorus exceedances were observed at all sampling locations at the resampling event (*Table 2*). Resampling to confirm concentrations was requested, and took place at all sampling locations on September 23, 2024. Most sample locations saw a decrease in total phosphorus from the original summer event. Four of 11 sample locations reported increases in phosphorus from the summer event to the resampling date.

Other water quality parameters were measured that exceed thresholds set in the Nova Scotia Tier 1 Environmental Quality Standards for Surface Water and Groundwater Discharging to Surface Water (EQS).⁵ These values are tabulated in Attachment B. These exceedances are consistent with results found during other sampling events under this program, and likely reflect background concentrations in the watershed.

To address the requirements of BWSPS Policy BW-5⁶ moving forward, staff are taking a combination of approaches to monitoring and managing development impacts on water systems. Water quality data collected under this program and through other programs underway in the area subject to the Bedford West Development Agreements is being considered collectively to assess current watershed health and lake trophic status. Staff are using this information to inform future development approvals, and to develop a watershed management framework for the entire municipality.

Development with the potential to affect lakes is being monitored as part of the [LakeWatchers](#) baseline water quality monitoring program. This program samples 73 lakes in the municipality semi-annually and reports the results against CCME thresholds. An example of this is the development underway at the former Penhorn Mall, upslope from Penhorn Lake.

A specific management plan for Kearney Lake, one of two primary lakes sampled under this program, was requested by Regional Council. A report recommending remediation actions was presented to Regional Council on August 23, 2022, and the recommendations put forward by staff in the report were accepted by Regional Council at that time. Staff are currently working to complete the recommended remediation, including sourcing designs to install floating treatment wetlands in Kearney Lake to lower the concentration of phosphorus in the water column.

In addition, on August 20, 2024, Regional Council accepted a draft framework for watershed management for implementation by staff.⁷ In coordination with the Halifax Green Network Plan and Regional Plan, this framework will support proactive protection of aquatic ecosystems and set water quality targets for managing land-based activities affecting water quality, aquatic and riparian ecosystems, and water resources. This framework will seek to manage collective land-use impacts on a watershed scale, in alignment with the terms of Policy BW-5 as quoted above. The Kearney Run watershed was recommended for the second round of watershed plan development, expected to begin in 2027.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

⁵ These standards can be found online here: [Tab 3. NS Tier I EQS Surface Water and GW discharging to SW.xlsx \(novascotia.ca\)](#).

⁶ Policy BW-5 states: In the event that water quality threshold levels, as specified under clause (c) of Policy BW-3, for Paper Mill Lake of Kearney Lake are reached, the Municipality shall undertake an assessment and determine an appropriate course of action respecting watershed management and future land use development in the area. An assessment shall consider the CCME guidelines. Water quality thresholds and any assessment reports shall be made available to the public

⁷ The staff report can be accessed online: [Municipal Watershed Management Framework - Aug 20/24 Regional Council | Halifax.ca](#)

COMMUNITY ENGAGEMENT

No community engagement was required for this report.

LEGISLATIVE AUTHORITY

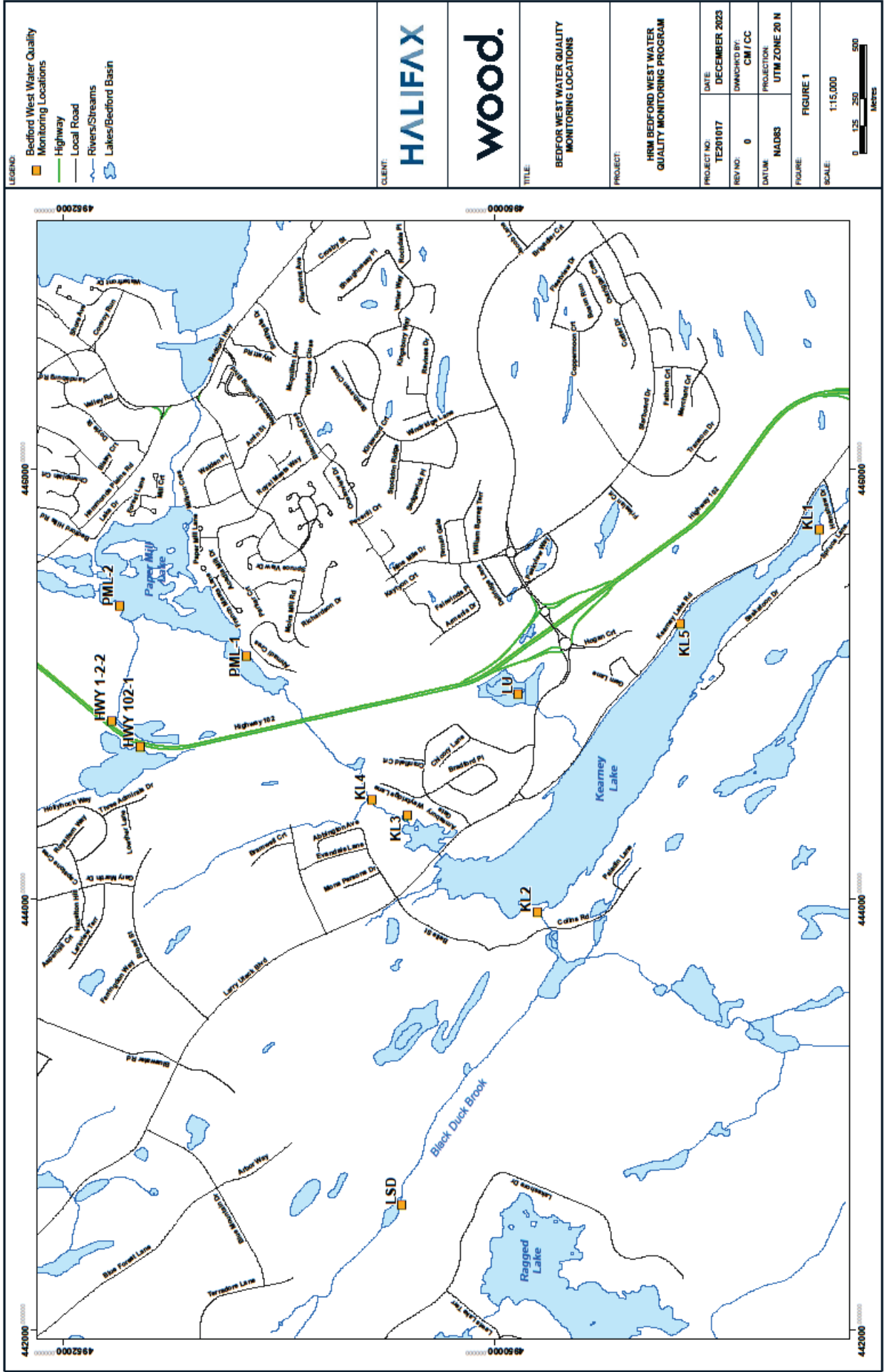
The Halifax Regional Municipality Charter, Part VIII, Planning and Development, Section 240, Development Agreements.

ATTACHMENTS

Attachment A Bedford West Water Sampling Locations
Attachment B Summer 2024 Exceedances

Report Prepared by: Elizabeth Montgomery / Water Resources Specialist / Environment & Climate Change /
Property Fleet & Environment / 902.943.1954

Attachment A – Bedford West Water Quality Monitoring Program Sampling Locations



Appendix B - Nova Scotia Tier 1 Environmental Quality Standards Exceedances Observed - Summer 2024

Water Quality Parameter	Lead (µg/L)	Aluminum (µg/L)	Zinc (µg/L)	Iron (µg/L)
Threshold Value	1	100	7	300
KL-1		125		
KL-2				
KL-3				
KL-4				
KL-5			9	
HWY102-1				
HWY102-2		139		2800
LU		146	18	
LSD	6.3	2240	26	4740
PML-1				
PML-2				