

TOWN OF WINDSOR WATER UTILITY
MILL LAKES WATERSHED
SOURCE WATER PROTECTION PLAN



November 2022

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Executive Summary

The Town of Windsor Council established the Mill Lake Watershed Advisory Committee in 2005 as a means to implement the Province of Nova Scotia Drinking Water Strategy introduced in 2002 which aimed to ensure that water supplies in Nova Scotia remain safe and sustainable. The Town of Windsor recognized that source water protection was the first step in a multi barrier approach to clean, safe drinking water.

The Mill Lakes Watershed Advisory Committee was established consisting of elected officials from the Town of Windsor and the Municipality of the District of West Hants along with private landowner representatives, Windsor Water Utility Staff, West Hants Planning Department Staff, a representative from the Department of Natural Resources and a resource member from Nova Scotia Environment.

The committee has met more regularly since 2005 with the focus being the review and revision of the Regulations Respecting Activities and the evaluation of potential contaminant risks based upon current activities within the watershed.

This Source Water Protection Plan document highlights the work done to date by the committee in identification of potential risks and the development of Best Management Practices which are intended to minimize the risks. This plan will have to be reviewed on an annual basis to assure that source water protection measures are kept up to date as activities evolve within the protected watershed area.

2.0 Introduction

The Windsor Water Utility is responsible for monitoring and managing all activities that may impact water quality in the Mill Lakes surface water supply area. This document, Source Water Protection Plan, outlines the current management of the source water area, risk assessment and the management plan together with the monitoring program.

The Windsor Water Utility has an operating budget of roughly \$ 1.3 million dollars and capital asset value of approximately \$ 8.6 million dollars.

2.1 Provincial Drinking Water Strategy

The Provincial Drinking Water Strategy implemented in 2002 identified the requirement for Water Utilities to provide a multi barrier approach to assure that drinking water is safe. The barriers are as follows:

- Source Water Protection
- Removing contaminants through treatment
- Monitoring and Testing

The second and third barriers have been implemented with the Town of Windsor Water Treatment Plant being commissioned in 2002 and monitoring and testing implemented in accordance with the water utility Permit to Operate. The Source Water Protection Barrier which is the subject of this document is the final barrier that requires formal introduction.

2.2 Mill Lakes Watershed

The following provides a brief description of the Mill Lakes Watershed and the current activities within the watershed.

2.2.1 Description

The Town of Windsor/West Hants Regional Municipality has utilized the Mill Lakes for drinking water since the late 1800's. In 1945 an earthen dam was constructed to create a single lake thereby increasing the yield available to the utility. Treatment was restricted to chlorination and pH correction until 2002 when a new treatment facility was constructed to include conventional treatment with clarification using dissolved air floatation technology.

The Mill Lakes Watershed is located east of Martock Mountain and south of the Township of Windsor. Discharges from the lake to Falls Brook are regulated by a dam and control structure that is operated by the Town of Windsor Water Utility. The dam also contains an overflow spillway. Falls Brook is a tributary to Lebreau Creek that conveys flows to the Avon River which ultimately discharges to the Minas Basin. Water for the Town of Windsor water treatment plant is taken from Fall Brook at an impoundment reservoir located approximately 4 km downstream of Mill Lakes. Fall Brook Dam was replaced in 2006.

The watershed contains 4395 acres of land which is either under private ownership or owned by the West Hants Regional Municipality or the Crown.

See Appendix 3 for location and boundary for the Mill Lakes Watershed.

2.2.2 Forestry

The Mill Lakes watershed area is undeveloped and predominantly mixed forest with a few meadows. The watershed forestry operations are regulated by the Watershed Protected Water Area Regulations and cutting operations have been limited to 100 cords or 50,000 board feet without approval and with approval from the Town of Windsor required for operations exceeding these limits. Woodlot harvest operations within the watershed have been modest in size and frequency. Best Management Practices have been created by the Watershed Advisory Committee and will be used for all forestry operations starting in 2013.

2.2.3 Recreation

The Mill Lakes Watershed Protected Water Area Regulations (both past and current) have restricted recreational activities within the watershed for non-property owners. Off highway vehicles are prohibited except where used by landowners for the sole purpose of gaining access to their lands and camps. There is ample evidence that non-property owners use the land for off highway vehicles and recreational activities. Restricted area signs are posted and staff attempt to monitor to the extent possible and to date these activities have not created a serious problem impacting water quality.

2.2.4 Roads

There are no public roads within or close to watershed area but a network of forest access roads exist. Contamination from road salts or vehicle fluids (other than off road vehicles or forestry operations) is not a concern within this watershed at this point.

2.2.5 Chemicals

The use of chemicals for pest control is controlled by the restriction in the Regulations. Town of Windsor treatment plant chemicals are delivered on an as required basis by truck. While the point of delivery is near the raw water intake location the surrounding ground is sloped away and downstream of the plant intake.

2.2.6 Scotian Windfields

SWEB Development Inc. has constructed three wind turbines within Mill Lakes Protected Watershed Area. These windmills are located at 412080.95E and 4975562.97N and are situated on approximately 118.9 hectares of forested resource land owned by the West Hants Regional Municipality.

An environmental protection plan was developed and implemented to ensure all environmental protection measures were in place to cover all activities for the construction phase. All criteria were met regarding any relation to this plan. All further environmental risks regarding this site are covered under the West Hants Regional Municipality's Emergency Preparedness Plan for Mill Lakes and Fall Brook Reservoir System.

3.0 Mill Lakes Source Water Protection Committee

The Mill Lakes Watershed Advisory Committee was established by Windsor Town Council in 2005 (now West Hants) and is comprised of four private landowner representatives, two councillors from the West Hants Regional Municipality, one staff representative from the Windsor Water Utility and one staff representative from the West Hants Planning Department. The committee also includes one representative from the Department of Natural Resources and one resource member (non-voting) representing the Nova Scotia Department of Environment.

Following the formation of the Advisory Committee, the committee followed the steps outlined in the Department of Environment manual for Development of a Source Water Protection Plan.

The Terms of Reference for the Watershed Advisory Committee is attached as Appendix 2.

4.0 Delineate a Source Water Protection Plan Boundary

The boundary for the Mill Lakes Watershed Protected Water Area was delineated in the designation and regulations of 1964 and no changes to the description were proposed. See Appendix 3 for boundary description and map.

5.0 Identify Potential Risks

5.1 Risk Assessment

The Mill Lakes Watershed Committee reviewed the full range of potential risks and risks based upon current activities within the watershed. Current activities include forestry and related operations; wood's camp activity related to forestry and recreation and recreational traffic related to permitted and illegal activities. Table 1 outlines the committee findings related to activities and risk ratings.

Table 1: Summary of Activities and Risks within the Mill Lakes Watershed

Activity	Potential Contaminant	Risk Rating	Potential Impact
0 -5 (high risk)			
=====			
Recreation	fuel, oil, sedimentation	3.8	direct discharge to stream or lake, sedimentation
Off-Highway Vehicles	fuel, oil, sedimentation	3.4	as above, includes non-recreational activities
Stream Crossings	fuel, oil, sedimentation	3.3	unauthorized and unsupervised crossings resulting in stream contamination
Forestry Operations	fuel, oil, sedimentation, nutrients	2.2	direct discharge of fuel or oil, sedimentation and nutrients due to runoff
Illegal Dumping	can vary greatly	1.8	stream & lake contamination

5.2 Natural Disasters / Dam Structural Failure

In the event of natural disasters such as severe storms, floods, forest fires, aircraft crashes or major oil spills that pose a threat to water quality, the Windsor Water Utility EPP would be implemented, and control of the situation would be handed over to the lead agency. The Windsor Water Utility would implement target-based testing to determine when a disaster of this nature presented a threat to water quality. In the event that natural disasters or structural failure of a dam structure presented a threat to drinking water quality or public safety the Mill Lakes and Fall Brook Reservoir EPP (updated 2013) procedures would be implemented. A copy of the EPP Table of Contents has been included in Appendix 5 for reference and this document is posted at the Water Treatment Plant and filed with the Town of Windsor EMO.

6.0 Management Plan/Risk Mitigation

The following management plan identifies a variety of steps that have and will continue to be implemented by the West Hants Regional Municipality to mitigate the risks that have been identified by the Watershed Advisory Committee and to also heighten public awareness of the need for diligence in our efforts to assure that a safe clean supply of drinking water is maintained. Annual review of the SWPP to address new or changing activities will be a priority for the Advisory Committee.

6.1 Land Acquisition

The West Hants Regional Municipality owns roughly 15-20 percent of the land within the watershed and will continue to make strategic purchases within operational budget restraints as parcels become available. Control over activities by way of ownership of sensitive parcels of land is one of the best tools available to assure that risks are minimized.

6.2 Best Management Practices

The Watershed Advisory Committee has determined that the two activities within the watershed that pose the greatest risk to water quality are forestry and road construction. Best Management Practices have been developed for these activities and are included as Appendix 4.

6.3 Land Use Planning

The West Hants Municipal Planning Strategy has established a Water Supply (W) zone which is applied to the municipal water supply areas within West Hants. This zone is subject to the requirements of the West Hants Land Use By-law, *Section 24.0 Water Supply*, attached as Appendix 7. The Land Use By-law list the uses permitted in the zone as-of-right, and also sets

out setbacks, minimum lot area, and the requirements of an environmental study if a development is proposed within 65 m of a watercourse or waterbody. The by-law also restricts development on slopes greater than 15%, and controls the size of woods camps.

6.4 Designation – Source Water Protection Area

The Watershed Advisory Committee spent a considerable amount of time reviewing the existing regulation (1964) and preparing new regulations for submission to the Minister. This work was completed in early 2013 and the revised draft regulations have been submitted to the Minister. The draft regulations were reviewed during a public consultation meeting held in January 2014 and was modified to reflect public comments before being submitted to NSE for formal approval and posting. The revised regulations will assist the Committee and Water Utility operator in their attempts to assure that safe water is maintained. Regulations attached as Appendix 1.

6.5 Contingency Planning

The West Hants Regional Municipality has contingency plans in place to deal with emergency issues such as Boil Water Orders; Forest Fires; Dam Failures; Dam Breaches and Severe Storms. These contingency plans are contained in the Standard Operating Procedures for the Water Treatment Plant and our EPP for Mill Lake and Falls Brook Dams. The water treatment facility has full back up power for all plant operations and spare equipment parts are stocked for all essential equipment. While the Utility does not have a back up water supply, there is the possibility of connecting to the Falmouth Water System at Falmouth Bridge which would help to maintain minimum water system supply for short durations. Annual review of all these documents will help to assure that the Utility is ready for any event that may pose a risk to water quality.

6.6 Education

Ongoing education of the public through web site information; public meetings and Watershed Advisory Committee participation will serve as useful tools to educate and advise the general public with respect to maintaining water quality within the watershed. This is an area where improvement can be made in the existing operations and will be a focus for 2013 / 2014.

6.7 Enforcement

This is an area where further work during the first year of implementation will be required to develop cooperative arrangements between the Utility and Provincial Departments for adequate enforcement of the protected water area regulations and Provincial regulations.

6.8 Access

The Windsor Water Utility maintains control of access to roads that are solely under their control but common roads that are shared between a number of landowners continue to be a challenge with respect to security and elimination of non-landowner recreational OHVs. As with enforcement, this is an area that needs work to develop cooperative arrangements between the Utility and various enforcement agencies.

6.9 Monitoring Program

The Water Utility Operators make monthly monitoring trips into the watershed in conjunction with their raw water testing procedures at the lake. These trips provide the operator with insight into activities that may be taking place within the watershed that could present a hazard with respect to water quality. Additional trips into the watershed area take place based upon reported activities.

7.0 Raw Water Sampling Program

7.1 Routine Sampling

The Utility conducts monthly raw water sampling for turbidity, pH and color at the sluice gate location on the Mill Lake Dam. Daily sampling for turbidity, pH and color is also conducted at the treatment plant reservoir. Semi-Annual Standard Water Analysis and Metal Scan are also conducted on the raw water supply. Changes in test results are monitored to determine if they are simply weather related or the result of activity based concerns.

7.2 Target Sampling

Target sampling would be initiated if a watershed activity resulted in concerns that water quality may be impacted. Based upon current activities identified in the Mill Lakes Watershed the following risks have been identified:

- Hydrocarbons from recreation vehicles or forestry equipment engaged in forestry or road construction activities
- Suspended Sediments related to forestry operations, culvert and road drainage issues, and stream crossing activities.
- Phosphorus and Nitrates related to forestry or road construction activities
- Turbidity related to natural events such as forest fires and severe storms

Sampling procedures for these situations would be determined in consultation with NSE and the treatment plant intake would be monitored to determine if the resulting contamination presented a threat to drinking water quality.

8.0 Recommended Plan Review and Revision Process

The following actions are recommended going forward:

- Review Plan yearly to determine if activities within the watershed have changed and if Best Management Practices have to be updated or added.
- Review baseline water monitoring results to determine if there has been any change in water quality that may suggest that activities have to be more closely monitored and corrective action taken. Corrective action could include target water quality testing or increased patrolling of watershed to locate problem areas.
- Update Public Information process on a yearly basis (during final quarter meeting) to determine effectiveness. Observations and reports of illegal activity would be one measure of the effectiveness of our public information program.
- Update mapping with respect to land ownership, road locations etc on a yearly basis.
- Continue to hold regular Watershed Advisory Committee meetings as required to discuss and address issues and to review the effectiveness of the Watershed Management Plan.
- Call special meetings as required to receive input from government departments and other organizations that may have information to share regarding developments planned for the area, pending changes to regulations or other matters that could impact water quality.

APPENDIX 1 – REGULATIONS

Schedule "B"

Regulations Respecting Activities in the Mill Lakes Watershed Protected Water Area Pursuant to subsection 106(6) of Chapter 1 of the Acts of 1994-95, the *Environment Act*

Citation

- 1 These regulations may be cited as the *Mill Lakes Watershed Protected Water Area Regulations*.

Interpretation

- 2 In these regulations,
 - (1) "Act" means the Environment Act;
 - (2) "Department" means Nova Scotia Department of Environment;
 - (3) "off-highway vehicle" has the same meaning as in the *Off-highway Vehicles Act*;
 - (4) "pesticide" or "pest control product" has the same meaning as in the Act;
 - (5) "Protected Water Area" means the land and water designated by the Minister under subsection 106(1) of the Act as the Mill Lakes Watershed Protected Water Area;
 - (6) "release" has the same meaning as in the Act;
 - (7) "Water Works Operator" means the Town of Windsor, operator of the Town of Windsor Water Utility;
 - (8) "watercourse" has the same meaning as in the Act;
 - (9) "watershed" has the same meaning as in the Act;
 - (10) "wetland" has the same meaning as in the Act.

Public Notification

- 3
 - (1) The Water Works Operator must take appropriate measures to provide notice to the general public of these regulations.
 - (2) A person must not alter any sign or notice posted by the Water Works Operator under the Act or these regulations.

Prohibited Activities

- 4**
- (1) A person must not fish in a watercourse within the Protected Water Area.
 - (2) A person must not swim, bathe, or wash in a watercourse within the Protected Water Area.
 - (3) A person must not boat in a watercourse within the Protected Water Area.
 - (4) A person must not skate or engage in any other ice surface recreational activities in or on any watercourse within the Protected Water Area.
 - (5) A person must not operate a vehicle on or over any watercourse within the Protected Water Area except at a bridge or crossing approved by the Department.
 - (6) A person must not operate an off-highway vehicle in or on a watercourse within the Protected Water Area.
 - (7) A person must not wash a vehicle, vessel, or mechanical equipment within the Protected Water Area.
 - (8) A person must not carry out maintenance of a vehicle, vessel, or mechanical equipment except as may be required for emergency repair within the Protected Water Area.

Exceptions for Landowners

- 5**
- (1) Despite Section 4, owners of land in the Protected Water Area may fish in Mill Lakes.
 - (2) Despite Section 4, owners of land in the Protected Water Area may use row boats, canoes, other non-motorized vessels or vessels powered by electric motors on Mill Lakes.
 - (3) Despite Section 4, owners of land in the Protected Water Area may, for the sole purpose of accessing their land, operate off-highway vehicles on Mill Lakes when the lake is covered by ice provided it is safe to do so.

Forestry Restrictions

- 6**
- A person must not harvest in excess of 50,000 board feet or 100 cords in one calendar year on land within the Protected Water Area unless the landowner has submitted a forestry plan to the Water Works Operator and has received written permission from the Water Works Operator.

Refuse, Waste and Discharge Restrictions

- 7**
- (1) A person must not establish any form of dump, landfill, compost operation, or waste disposal site within the Protected Water Area.

- (2) A person must not, within the Protected Water Area, release or cause or permit to release gasoline, oils, petroleum products, toxic chemicals, pest control products, garbage, litter, solid or liquid waste or effluent, or any other waste products or material of any kind, into any well, lake, river, pond, spring, stream, reservoir or any other water or water course, or onto any shore or bank thereof or into any place that may cause pollution or impair the quality of the water.

Road Construction

- 8 (1) A person must not construct a road within the Protected Water Area unless the person has submitted plans for construction of the road to the Water Works Operator and has received written permission to construct from the Water Works Operator.
- (2) An owner, operator, or person who is responsible for a road, bridge, or culvert within the Protected Water Area must maintain and repair the road, bridge, or culvert to the satisfaction of the Water Works Operator.
- (3) A person must provide the Water Works Operator with a copy of any approvals for water crossings given by the Department.

Pest Control Restrictions

- 9 (1) A person must not use pest control products within the Protected Water Area unless the person has
 - (i) provided the Water Works Operator with a copy of any approvals given by the Department in relation to the use; and
 - (ii) received written permission from the Water Works Operator.
- (2) Subsection (1) does not apply if
 - (i) the use of the pesticide is for small scale personal use, such as the application of mosquito repellent; or
 - (ii) the application is within a structure such as a camp.

Watercourse or Wetland Alteration

- 10 A person must not alter the natural features of any water course or the natural movement of water within the Protected Water Area without first obtaining all necessary approvals from the Department and providing the Water Works Operator with copies of such approvals.

Easement Restriction

- 11** A person must not commence the construction or maintenance of public roads, pipelines, railways, and powerlines, or similar undertakings within the Protected Water Area unless the person has
- (i) provided the Water Works Operator with plans for the construction or maintenance; and
 - (ii) received written permission from the Water Works Operator.

Gravel and Mineral Extraction

- 12** (1) A person must not operate or use any pit, mine or quarry for extraction of gravel, rock or minerals within the Protected Water Area unless the person has
- (i) provided the Water Works Operator with a copy of any approvals given by the Department in relation to the pit, mine or quarry; and
 - (ii) received written permission from the Water Works Operator.
- (2) This section does not apply to a woodlot owner using granular material for the building and maintenance of roads on their woodlot.

Agricultural Waste Setbacks from Watercourses

- 13** (1) A person must not pasture any cow, sheep, horse, pig or any domesticated animal within the Protected Water Area.
- (2) A person must not pile or accumulate agricultural refuse or farm waste such as manure and compost within the Protected Water Area.

Aquaculture

- 14** A person must not conduct aquaculture activities within the Protected Water Area.

Application for Written Permission

- 15** (1) If the Water Works Operator receives an application for written permission to conduct an activity, the Water Works Operator may request further information from the applicant if such information is reasonably related to the activity, and the application will not be considered completed until such information is received by the Water Works Operator.
- (2) The Water Works Operator must respond to an application for written permission to conduct an activity within 10 working days of receiving the completed application.

APPENDIX 2 – TERMS OF REFERENCE

Terms of Reference for the Mill Lakes Watershed Advisory Committee

1. Official Name

Mills Lake Watershed Advisory Committee.

2. Members/Composition

Four (4) Landowner Representatives
One (1) Councillor and one (1) alternate
One (1) Nova Scotia Department of Lands and Forestry Representative
One (1) Water Utility Representative
One (1) Planning and Development Department Representative
One (1) Nova Scotia Environment Representative

Landowners

The landowners are responsible for having representation on the Watershed Committee. They are in a unique position of knowing the watershed and their land, in addition to their own and their neighbours' land use practices. The landowners are encouraged to: Express their concerns and interests; advise and provide information to the Committee on land use management and source water protection; communicate with other landowners on Committee activities; and report any problems that they may encounter within the watershed.

West Hants Regional Municipality Councillors

It is the responsibility of the Councillors to represent the interests of the residents served by the Windsor Water Utility, West Hants Water Utility for the community of Three Mile Plains and Council. The Councillors will also represent the landowners interests within the watershed.

Department of Lands and Forestry (DLF)

The DLF representative will work with the Committee providing information and advising on topics related to forestry, wildlife, and source water protection. The representative will also represent the Department's interests as a landowner in the watershed.

Staff (Water Works Operator, Planning and Development Department Representative)

Staff will report to the Committee on activities undertaken by the West Hants Regional Municipality and any approvals in the Protected Water Area. Staff will work with the Committee providing information and advising on topics relating to source water protection, watershed management, land use and the operation of the Windsor Water Utility. Staff will also bring forth concerns relating to water quality and watershed management.

Nova Scotia Environment (NSE)

The NSE representative will work with the committee providing information and advising on topics related to source water protection, watershed management, the Environment Act and Protected Water Area Regulations.

Term of Membership

All landowners appointed by Council will serve for a two-year term (except for the first term whereby half of the members will serve for a one and half year term until October 2021 and the other half a two and a half year term until October 2022 to ensure continuity of membership). Subsequent appointments or re-appointments of landowners to the Committees will be for a term of two years.

3. Goals

The primary goal of the Mill Lakes Watershed Advisory Committee is to provide a forum for the Landowners, the Windsor Water Utility, and other Stakeholders to work cooperatively to maintain the water quality and quantity in the Mill Lakes Watershed. The Committee recognizes that the protection of source water is the first step in the multi-barrier approach to clean, safe drinking water.

4. Deliverables

The Mill Lakes Watershed Advisory Committee advises the West Hants Regional Municipality Council and Director of Public Works on issues pertaining to the Mill Lakes Watershed. In addition, the Watershed Advisory Committee will:

- Assist in the development and implementation of a Source Water Protection Plan, which will be reviewed periodically.
- Assist with revisions of the regulations for the Protected Water Area as required.
- Review these Terms of Reference annually.
- Amend these Terms of Reference for the Mill Lakes Watershed Advisory Committee as needed.
- Provide a forum for the involvement of landowners and exchange of information in matters regarding the watershed and water resources.
- Provide a forum to deal with issues and concerns in the watershed. The Committee will address problems and solutions on matters of concern, as they arise.
- Advise on forest matters and other land use issues.
- Develop Best Management Practices for activities in the watershed. These Best Management Practices will also be used to guide any approval processes for activities.
- Review and make recommendations on activities affecting the Protected Water Area, as requested by the West Hants Regional Municipality.
- Provide and develop information and education about the Protected Water Area for local residents, landowners, and users of the watershed.
- Liaise with government agencies and other resources not represented on the committee on matters affecting the Protected Water Area, such as the provincial Department of Agriculture and Fisheries (DAF) and the federal Department of Fisheries and Oceans (DFO).
- To provide information on Committee activities to landowners in the Protected Water Area.

5. Jurisdiction

The Mill Lakes Watershed supplies the reservoir from which the Windsor Water Utility, operated by the West Hants Regional Municipality, withdraws water. The Windsor Water Utility currently supplies water to the communities of Windsor and Three Mile Plains, Curry's Corner, Garlands Crossing and Wentworth Creek.

In 1964, the area surrounding Mill Lakes, Hants County, was designated a Protected Water Area. Regulations were also enacted for the designated area to protect the water supply. The

regulations were updated in 1986 under the Water Act.

The Mill Lakes Watershed Protected Water Area contains four thousand three hundred ninety four and a half (4394.5) acres of land (1778.4ha).

The Watershed Committee was established in 2005 in response to the need to develop a Source Water Protection Plan. An initial Public Meeting of watershed landowners was held to select landowners to serve on the committee.

6. Resources/ Budget

The budget for the Mills Lake Watershed Advisory Committee, resources and any recommended projects to occur in the Protected Water Area will be determined annually through the regular budgetary process of the Regional Municipality and Windsor Water Utility.

7. Governance

The role of this committee is an advisory role to council. All approved motions from the Committee pertaining to the direct affect of the Mills Lake Watershed and/or the Source Water Protection Plan will be submitted to Council for consideration and approval.

Meeting Details:

- Meeting Quorum: Five (5) Committee Members, of which two (2) must be private landowners and One (1) Councillor.
- Motions must be approved by 50% plus 1 to be carried.
- Chair: The Committee Chair will be elected biannually on even numbered years by the Committee.
- All Landowners are welcome to attend Watershed Advisory Committee meetings as observers.
- An Annual General Meeting may be called at the discretion of the Committee.
- Administrative Services will be provided by the West Hants Regional Municipality.
- Meetings will be held Bi-Annually in April & October.

8. Communications

A contact list will be circulated to the committee members and updated as required.

Meeting invites and packages will be circulated via an email list a minimum of one week prior to the meeting.

Committee members may communicate in person at meeting, electronically by email or virtual meeting or by phone.

9. Related Policies, Procedures and Legislation

Meeting and Committee Procedural Policy, RCOGE-003.00

Approved by: _____

Laurie Murley, Committee Chair

Adoption	
Notice to Council:	Not Applicable
Approval:	April 14, 2021
Description: Initial approval of the Mills Lakes Watershed Advisory Committee Terms of Reference.	

Original signed by Laurie Murley, Mills Lakes Watershed Advisory Committee Chair.

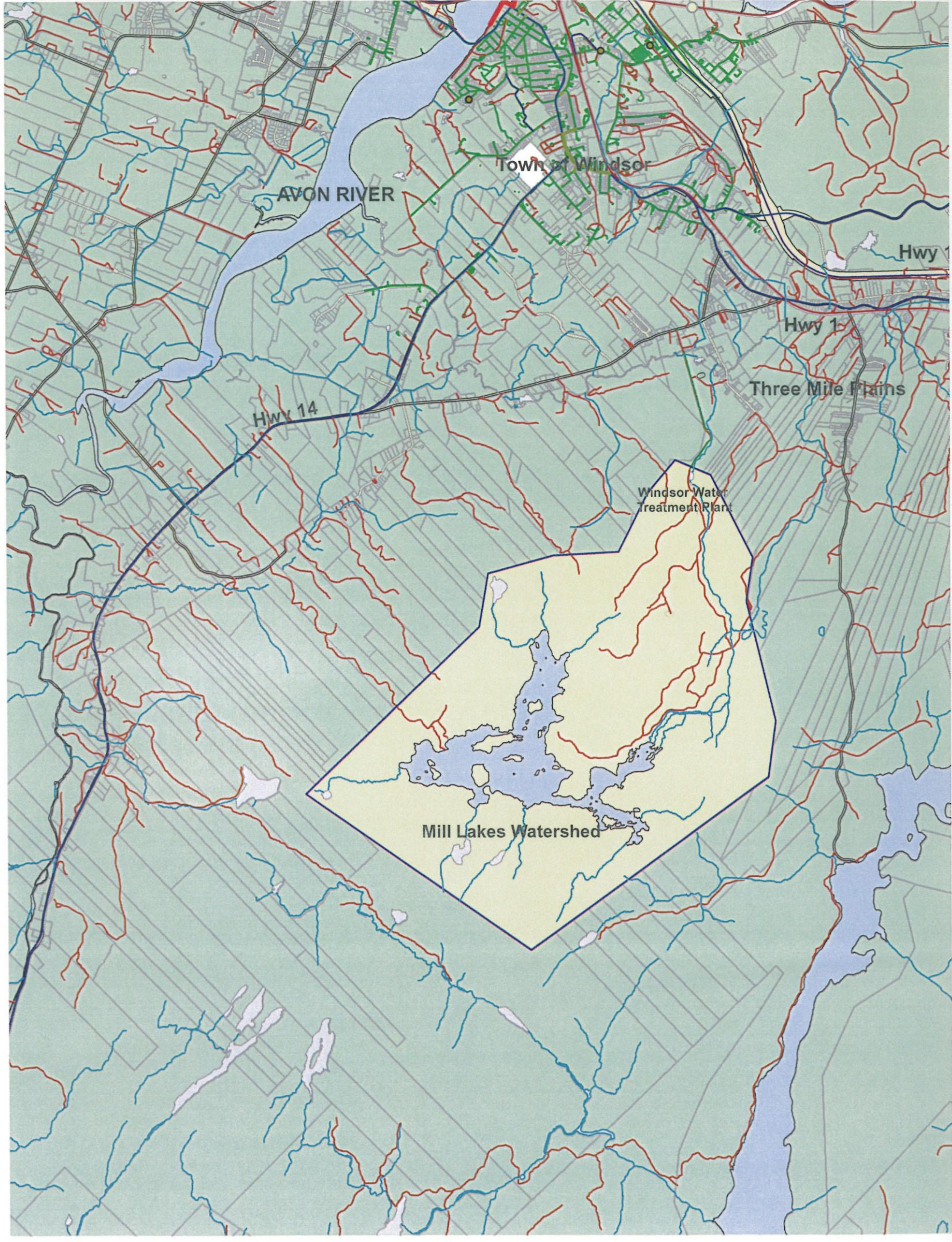
APPENDIX 3

Mill Lakes Watershed - Description

All that certain area of land situate, lying and being in the Mill Lakes areas, in the vicinity of the Town of Windsor, County of Hants, Province of Nova Scotia, said area of land being shown on plan number P-080/83A on file in the office of the Director of Surveys, Department of Natural Resources in Halifax, and being more particularly described as follows:

beginning at Point "A" as shown on said plan number P-080/83A, said point being S62°20'16"E a distance of 7737.67 feet from Nova Scotia Coordinate Monument number 8644 (said bearings and distances referred to herein are based on the Nova Scotia 3° Modified Transverse Mercator Projection, Zone 5, Central Meridian 64°30' Longitude West);
from thence N38°53'04"E a distance of 1698.56 feet to a Point "B";
thence S68°10'33"E a distance of 1526.75 feet to Point "C";
thence S28°05'16"E a distance of 3644.43 feet to Point "D";
thence S07°31'26"W a distance of 1753.94 feet to Point "E";
thence S14°33'44"E a distance of 4854.10 feet to Point "F";
thence S06°28'45"W a distance of 2238.71 feet to Point "G";
thence S53°02'22"W a distance of 11 595.16 feet to Point "H";
thence N56°14'49"W a distance of 10 776.44 feet to Point "I";
thence N45°04'07"E a distance of 9512.73 feet to Point "II";
thence N08°36'56"E a distance of 2131.03 feet to Point "JJ";
thence N73°30'38"E a distance of 2658.56 feet to Point "J";
thence N85°37'05"E a distance of 2576.43 feet to Point "K";
thence N25°35'19"E a distance of 2582.71 feet to the place of beginning containing 4394.515 acres.

Refer to attached map.



AVON RIVER

Town of Windsor

Hwy 1

Hwy 1

Three Mile Plains

Hwy 14

Windsor Water
Treatment Plant

Mill Lakes Watershed

APPENDIX A MILL LAKES WATERSHED BEST MANAGEMENT PRACTICES: ROAD CONSTRUCTION & MAINTENANCE

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Objective:

These best management practices for roadway construction and maintenance are intended to guide road construction and maintenance activities in a manner that will protect the quality of source water in this watershed. Should forestry operations related to road construction exceed the 100 cord/50,000 board feet limit where applications, approvals and additional permits are required, a concise plan must be included within the applicant's forestry plan which demonstrates how these Best Management Practices will be followed.

1.0 Municipal, Provincial and Federal Regulations

All relevant Municipal, Provincial and Federal regulations that apply to these activities ***are to be considered minimum standards***. Any legal requirements not listed within shall supersede these Best Management Practices. Should a discrepancy exist the more stringent shall apply.

2.0 Standards and Use

Watershed roads are managed to provide adequate access to lands for watershed management activities, access to lands for timber management, fire suppression, wildlife habitat improvement and recreational activities permitted in the French Mill Brook Watershed Protected Water Area Regulations. All construction and maintenance work must follow the Protected Water Area Regulations.

4.0 Additional Permits and Fees

- The applicant shall be responsible for their expenses incurred in carrying out environmental monitoring related to the road construction as required by the Water Works Operator or Nova Scotia Environment (NSECC);
- The applicant shall be responsible for any expenses incurred in complying with Provincial or Federal Acts and associated regulations;
- The applicant shall be responsible for acquiring all permits, approvals or other permissions required by NSE, Department of Lands and Forestry or any other governing body and expenses incurred.

5.0 Planning, Design and Location Guidelines

5.1 Road Planning

- Applicable permits and approvals must be obtained prior to the beginning of operations, and on site at all times;
- Plan and design roads to minimize damage to soil and water quality. Where possible, use existing roads as they usually provide the best long-term access. When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety;
- Roads should be designed no wider than necessary to accommodate the immediate anticipated use;
- Roads to be constructed a minimum of 30 meters from any watercourse where possible;
- Where possible, locate roads on high ground and along ridges to reduce erosion and prevent sedimentation of streams. Avoid locating roads along the sides of hills with greater than 30% slope;
- Avoid opening and clearing excessive areas for road construction prior to installation of drainage and culverts;

- Design cut and fill slopes to minimize mass soil movement.
- Avoid marshes and wetlands;
- Minimize stream crossings and cross streams at right angles where possible;
- Plan turnouts for opposing traffic at intervals along single lane roads and turnarounds at the ends of all roads;
- Provide culverts, water bars and drainage to minimize soil erosion.
- Design bridge and culvert installations using stream flow data and provide a reasonable margin of safety;
- Construct roads when moisture and soil conditions are not likely to result in excessive erosion or soil movement;

5.2 Road Layout

- Road layout will be completed using a GPS handheld unit or a compass accompanied by photo and map showing a minimum:
 - a. Harvest boundaries
 - b. Special Management Zones
 - c. Waterways and water bodies
 - d. Roads
 - e. Property Boundaries
 - f. Significant areas such as wetlands, heritage sites, and wildlife values
- Ribbon layout:
 - a. Three (3) ribbons indicate the end of a road
 - b. Two (2) ribbons indicate a corner in the road or block
 - c. Blue ribbon marked will be used to mark road center line location as well as skid trails into or between harvest blocks that have not already roaded.
- Ensure the ribbons are tied in a manner that is clearly visible to the operator during anytime of the year;
- If an alteration to the road location is required, remove old ribbons so as not to create confusion of the correct road ribbons to follow;
- If road construction does not start up within a year of completing road layout, the site is to be revisited and the lines are to be refreshed where needed. The Water Works Operator shall be notified once completed.

6.0 Road Construction

6.1 Right Of Way Clearing and Road Construction

- Applicable permits and approvals must be obtained prior to operations beginning and on site at all times;
- Road construction should only take place during dry periods between June 1 to September 30 of each year
- “Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time;
- Cut landings and pile wood away from drainages to avoid obstructing water.
- Trees are not to be felled into a watercourse;
- No landings or wood piling areas are to be located within 30m of a watercourse;
- Ditches, water bars, off-take ditches, cross drains and settling ponds must be a minimum of 30m from any watercourse;

- Where ditches are required, construct them in a manner to divert water into the green belt;
- Cut down chicots (standing deadwood) that are closer than one tree length from the road edge;
- Do not leave lodged or spring trees;
- Slash and stumps created from right of way (ROW) clearing and road construction must be used in a manner that minimizes the roadside debris (e.g., construction of roadbeds, turn-a-rounds, back filling of borrow pits) unless otherwise approved by the Water Works Operator or Department of Lands and Forestry;
- Where possible, construct roads and landings away from areas of advanced regeneration;
- Stop operations if a potential value that has not been previously identified is encountered (e.g., stream, stick nest, cabin, grave site). Immediately contact the Water Works Operator or Department of Lands and Forestry for advice on how and where to resume operations;
- Cross drainage culverts will be a minimum diameter of 300mm (12inches).
- All watercourse crossings will be calculated using the 1:100 storm event;
- The travel surface on all forest access roads (Class-D = 3m) should be covered to a thickness of 10cm to 15cm with 5cm (2inch) gravel, free of contaminants, in order to reduce erosion and potential sedimentation from the road surface.
- Ensure a copy of the most recently approved map is on site at all times showing the location during operations;
- The use of explosives is not permitted unless special written permission is granted by the Water Works Operator
- Once operations are completed, leave all existing roads, ditches and culverts in the same or better condition as prior to operations;
- All spills must be reported immediately to NSE and the Water Works Operator. (See Section 10 for contact information).

6.2 Fueling and Fluid Disposal

- No fuel bulk storage stations may exceed 450 liters/118 gallons unless approved by The Water Works Operator or Department of Lands and Forestry;
- All fuel tanks must conform to the Transportation of Dangerous Goods (TDG) Regulations;
- All authorized fuel storage tanks must be fully labelled and contained;
- An emergency plan must be located on site and known to all users;
- During transport, ensure all fluid containers, are leak-free and secured to avoid damage and spills; all openings should be securely closed and locked if possible;
- All fuel containers must be marked clearly identifying their contents (with name of product contained and TDG UN number);
- Vehicles specifically designed for delivering fuel/fluids must be escorted at all times;
- Pumping devices for all fuel tanks must have automatic shut-off valves and be attended at all times while in use; no gravity fed pumps allowed; fueling hoses should be in good repair and not have any cuts or patches.
- Designated fueling or storage areas must be at least 30m (98.4 feet) from the edge of any riparian zone or watercourse;
- All fueling stations and motorized equipment must have an appropriately sized spill kit located on board;

- Fuel equipment on bare-mineral, stable, level ground; fueling pads must be grounded or not on coated vehicle truck beds to prevent static buildup and chance of accidental ignition;
- All fuel stations must have a 4.5kg/10lb 6A80BC serviceable fire extinguisher available at all times.
- Do not smoke while refueling equipment; engines being fueled should be cool to avoid flash ignition.
- Prior to beginning work, all fluid maintenance must be completed;
- Dispose of waste fluid at a government approved facility;
- All spills must be reported immediately to NSE and the Water Works Operator (**See section 10.3**)

6.3 Erosion Control

- Refer to NSE's Watercourse Alteration Standard for additional erosion and sediment control provisions;
- Use erosion and sediment control techniques (i.e., straw bales, filter cloth, seeding, silt fences, ditch dams, etc.) to prevent foreign material from entering the water. Install erosion and sediment control measures prior to working near streams;
- Seeding and mulching on "sensitive" areas with high sedimentation potential such as bridge approaches or cut and fill areas within 30m of streams are especially important;
- For rip rap, use clean coarse granular material durable and nontoxic to aquatic life to line all bridge and culvert faces above the high water mark to protect against erosion during periods of high water. Rip rap must be non sulphide bearing aggregate
- Avoid operating equipment on unstable slopes, stream banks or soft ground. Use straw, hay or clean crushed stone to stabilize banks or slopes to prevent soil from falling into stream;
- Continuously monitor and conduct routine maintenance as required on erosion and sediment control measures during and after road construction operations.
- Ensure that drainage features are fully functional prior to spring or fall runoff.
- Where erosion is anticipated on steeper sections or near culverts/bridges consider using surfacing material (gravel and rocks) to reduce erosion and potentially extend the operating season;
- Diversion ditches must be at least 30m away from a water body or watercourse. Where slope is greater than 10%, a diversion ditch is required every 30m into the green belt;
- No grubbing shall take place within 30m of any water body or watercourse to prevent erosion and sedimentation;
- Vehicle traffic should be restricted on soft roads during the wet season of the year and during heavy rains (30mm in one hour, 50mm in one day) when road surface is rutting;
- Avoid skidding or forwarding on truck roads unless conditions are such that the road profile will be maintained;
- For roads with a slope of 10% or less, avoid having water run in a ditch for greater than 300m to minimize erosion;
- For roads with a slope of greater than 10%, avoid having water run in a ditch for greater than 30m to minimize erosion;
- When construction lasts more than one day, exposed soils must be stabilized at the end of each day;

6.4 Water Crossing Installation

- Applicable permits and approvals must be obtained prior to operations beginning and on site at all times;
- All watercourse alterations (both activities under notifications and approval) must be completed by a certified watercourse alteration installer who have successfully completed the NS Watercourse Alteration Certification Program and has a current certificate, who is to remain on site to supervise the installation. Person(s) responsible for the installation must be able to provide proof of successfully completing taking the course and a valid certification;
- All permanent bridge and culvert installations should be completed during the dry season between June 1 and September 30 of each year. Temporary bridges can be installed year round; however, the installer must comply with Watercourse Alteration Standard or Approval Terms & Conditions, manufacturer instructions, and obtain the appropriate permissions from Nova Scotia Environment (NSE), and the Water Works Operator. For emergency repair of any watercourse structure contact NSE. (See Section 10.1);
- For specific construction requirements see the link in section **10.2 Nova Scotia Watercourse Alterations Standard**
- “Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time;
- Minimize soil disturbance near streams;
- No in-water work is allowed unless approved by NSE;
- Ensure no fluids, debris or soils enter the water;
- Allow free flow of water at all times to allow fish passage. Temporary obstruction maybe allowed with the approval of NSE if there is no other means of water crossing installation, such as cofferdam or dam and pump option.
- No fording through water bodies or water courses of any kind is permitted unless approved by NSE;
- If an erosion and sediment control plan is required for the crossing, have the plan on site at all times; . Make sure the plan is correctly implemented.
- Ensure a copy of the most recently approved map is on site at all times showing the location during operations. The old versions are to be destroyed;
- Equipment must be clean and mechanically sound ensuring no fluid leaks of any kind prior and during water crossing installation;
- Where possible, build crossing at right angles to the stream to build more stable crossings and prevent changes in the water flow;
- Avoid wetlands, sensitive and unique areas where possible when choosing a later crossing;
- No beaver dams are to be removed unless approved by The Water Works Operator or Department of Lands and Forestry;
- When constructing bridge cribbing use geo-textile and clean fill to prevent sedimentation;
- Remove all leftover debris or building material from the site;
- No multiple culvert installations are permitted unless approved by NSE, The Water Works Operator. If the removal will result in the disturbance to a bed or bank of a watercourse an approval is required from NSE;
- After construction is complete, re-vegetate disturbed soils located within 30m of water bodies, outside the travel surface;
- Regularly inspect and clean culverts when necessary to avoid washouts and ponding from occurring on the upstream side of the culvert. A routine culvert inspection and maintenance program can avoid costly repairs and reduce negative water quality impacts;

- Ensure all end corners of the bridges are well marked with reflective bridge markers;
- Regularly inspect and maintain bridges for structural repairs and to remove any debris which may clog the opening and hinder stream flow;

6.5 Water Crossing Removal

- Applicable permits and approvals must be obtained prior to operations beginning and on site at all times;
- No in water-work is allowed unless approved by NSE;
- Ensure no fluids, debris or soils enter the water;
- Allow free flow of water at all times to allow fish passage. Temporary obstruction may be allowed with the approval of NSE if there is no other means of water crossing installation, such as cofferdam or dam and pump option;
- Stabilize approaches once crossing has been removed (e.g., seeding, rip rap).
- Minimize disturbance to greenbelt (riparian zone);
- Ensure construction material has been removed from site once crossings completely removed and disposed of at an appropriate approved facility;
- Machines must be cleaned and leak free prior to crossing removal;
- All crossings that are to be removed must be removed during dry conditions. During wet periods (rain, snow melt) removal must be suspended until the ground around the removal location has dried up;
- Ensure a copy of the most recently approved map is on site at all times showing the location during operations. The old versions are to be destroyed;
- Ensure short term and long term erosion and sediment control measures are put in place during and after removal to maintain bank stability and prevent sedimentation;
- Safety measures must be taken to notify users of removal and to proceed with caution. Place barriers and warning signs in plain view to allow for adequate warning time;

7.0 Maintenance

Maintenance of active and inactive roads shall be sufficient to maintain a stable surface, keep drainage systems operational and protect water quality. Inspections to ensure water control measures are functioning properly are essential.

- Culverts to be checked and cleared as necessary;
- Road surface should be free of ruts to keep traffic moving safely. The road should be bladed and reshaped to conserve existing material; and to retain the original in sloped, out sloped, or crowned design;
- Water bars to be inspected and repaired as necessary.
- Fill and side cast areas must be checked to make sure they aren't becoming saturated and unstable.

8.0 Gates

- Gates should be installed and maintained at the entrance of a road and remain locked when operations are not taking place;
- Gates shall be visible, marked and deemed safe;

- Access should only be granted to landowners, operational staff and authorized personnel during construction;
- A copy of the gate key may be requested the Water Works Operator.

9.0 Glossary of Terms

Allowable cut	The volume of wood that may be harvested, under management, for a given period.
Area regenerating	Includes areas that have been harvested recently (less than 10 years ago), and areas depleted by such natural disturbances as fire, insects and disease.
Basal area	1. Of a tree: The area in square metres of the cross section at breast height of the stem. 2. Of a forest, stand, or forest type: The area in square metres per hectare of the cross section at breast height of all trees.
Base of tree	Part of the tree consisting of the first 25 cm of trunk
Basic silviculture	All the silvicultural practices required to achieve free-growing (or established) regeneration of desired species at specified densities and stocking.
Board feet	A unit of volume used for softwood and hardwood lumber: one board foot equals 1/12 of a cubic foot.
Buffer zone	A strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities adjacent to roads, trails, waterways and recreation sites.
Canopy	The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees
Clearcut	An area of forest land from which all merchantable trees have recently been harvested.
Clearcutting	A silvicultural method in which most merchantable trees in a stand are harvested simultaneously, producing a fully exposed microclimate for the development of a new age class.

Clearing	1. A considerable open space in a forest, which can be natural or artificial. 2. Removal of standing, usually scrubby, vegetation to prepare a site for reforestation
Conifer (Softwood)	Member of a group of trees commonly called softwoods or gymnosperms.
Crown land	Public land that is managed by the federal or provincial/territorial government.
Deadwood	Timber produced from dead standing trees. More commonly, timber in dead standing trees.
Deciduous tree	(Hardwood) Member of a group of trees commonly called hardwoods or angiosperms.
Deforestation	Permanent removal of forest cover and withdrawal of land from forest use, whether deliberately or circumstantially.
Drainage	Hydrology/engineering: The process of removal of water from soil, particularly by surface runoff and subsurface percolation and artificially by measures for hastening removal, e.g., by ditching.
Ecosystem	The sum of the plants, animals, environmental influences, and their interactions within a particular habitat.
Environmental Assessment	A process designed to contribute pertinent environmental information to the decision-making process of forest management or other natural resource projects and programs.
Feller-buncher	A self-propelled machine used to fell trees by shearing them off near the ground using a hydraulic apparatus. Some models also strip limbs and bunch the logs for later pickup.
Fording	Crossing a shallow river, stream, etc.
Forest	Ecosystem that generally covers a large area and is composed of woody vegetation dominated by trees growing in a relatively dense pattern.
Forest Management	That branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation
Forest practices	Any activities that enhance or recover forest growth or harvest yield (e.g., site preparation, planting, thinning, fertilizing, harvesting, etc.), and road construction or reconstruction within forest lands.
Forestry	Generally, a profession embracing the science, business, and art of creating, conserving, and managing forests and forest lands for the continuing use of their resources, material or other.

Global Positioning System (GPS) A system of satellites and receiving devices used to compute positions on the Earth.

Grubbing Removal of stumps from the ground by any of several methods or combination of methods

Habitat The environment in which a population or individual lives; includes not only the place where a species is found, but also the particular characteristics of the place (for example, climate or the availability of suitable food and shelter) that make it especially well-suited to meet the life cycle needs of that species.

Management plan A predetermined course of action and direction to achieve a set of results, usually specified as goals, objectives and policies.

Mixed stand A stand composed of two or more species in which less than 80% of trees in the main crown canopy are of a single species. The threshold in Manitoba and New Brunswick is 75%. cf. pure stand

Non Sulphide Bearing Rock Some rock, commonly referred to as slate or shale can be acid generating if disturbed and exposed to air and water. Slate and shale rock can be tested to determine its acid-producing potential.

Old-growth forest An old growth forest differs significantly from younger stands in structure, ecological function and species composition with respect to canopy closure, age class structure, accumulation of woody debris and the presence of species and functional processes that are representative of the potential natural community.

Pretreatment Assessment The Pretreatment Assessment (PTA) is a ground-based cruising program that was designed to collect the site and stand conditions necessary to produce an ecosystem-based treatment recommendation using the Nova Scotia Forest Management Guide. The Nova Scotia Forest Management Guide prescribes uneven-aged management and non-clearcut harvesting methods when appropriate as a first choice and favors natural regeneration harvest methods where possible within stand and site limitations. The PTA field collection cruise also provides an opportunity for gathering information on biologically sensitive features for use in mitigation plans.

Regrowth A term used in reference to coppice, as well as recovery of vegetation from treatment designed to impede or control its growth.

Rip Rap Rock, cobbles, boulders, or broken stone placed along the bank or bed of a watercourse as protection against erosion by water or the elements. Rip-rap must be a well-graded mixture that consists of clean, hard, sound, durable rock;

Riparian forest	At a large scale, it is the band of forest that has a significant influence on a stream ecosystem or is significantly affected by the stream. At a smaller scale, it is the forest at the immediate water's edge, where some specialized plants and animals form a distinct community.
Riparian Forest Buffer	A strip of forested land of variable width adjacent to a flowing body of fresh water, which it influences and is affected by. Prone to flooding, a riparian forest buffer can be integrated into an agroforestry system and help counter stream bank erosion, protect water quality, and regularize water flow.
Riparian zone	A strip of land of variable width adjacent to and influenced by a body of fresh water.
Risk assessment	A quantitative and qualitative approach to determining the hazardous capacity of a new product. This involves the identification and characterization of hazards, an assessment of exposure to the product, and a final risk characterization of the product.
Skidder	A self-propelled logging machine with an articulated frame, used for hauling operations.
Slash	Woody material or debris left on the ground after an area is logged. Also known as brush
Snag	A standing dead tree from which the leaves and most of the branches have fallen.
Stand	A community of trees possessing sufficient uniformity in composition, age, arrangement, or condition to be distinguishable from the forest or other growth on adjoining areas, thus forming a silvicultural or management entity.
Sustainable Forest Management	Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social and cultural opportunities for present and future generations
Thinning	A partial cutting or spacing operation made in an immature forest stand to accelerate the growth of the remaining trees.
Timber	A general term for forest crops and stands, and sometimes for any lesser aggregation of such trees.
Water Bar	Shallow channel laid diagonally across the surface of a road to lead water off the road and prevent soil erosion.
Watercourse	The bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and (ii) all ground water.

Windfall 1. A tree or trees thrown down or with their stems broken off or other parts blown down by the wind. 2. Any area on which the trees have been thrown down or broken by the wind.

10.0 Additional Resources

10.1 Contacts

West Hants Regional Municipality (Water Works Operator)

Todd Richard
Director of Public Works
trichard@westhants.ca
(902)798-8391

Martin Croney
Operations Manager – Water Treatment
mcroney@westhants.ca
(902)798-8000

Nova Scotia Environment (NSE)

24 Hour Emergency
1-800-565-1633

NSE Regional Office – Kentville
(902) 679-6086

Website: <https://novascotia.ca/nse/contact.asp?div=gen&pg=dept&bk=/nse/Default.asp>

Department of Lands and Forestry

24 Hour Emergency
1-800-565-2224

Tim O'Brien, RPF
Regional Forester, Crown Land
Tim.obrien@novascotia.ca

Website:
<https://novascotia.ca/nse/contact.asp?div=gen&pg=dept&bk=/nse/Default.asp>

10.2 Links

Mill Lakes Watershed Protected Water Area Regulations
<https://novascotia.ca/just/regulations/regs/envpwmilreg.htm>

Activities Designation Regulations
<https://novascotia.ca/just/regulations/regs/envactiv.htm>

Environmental Emergency Regulations
<https://novascotia.ca/just/regulations/regs/envemerg.htm>

On-site Sewage Disposal Systems Regulations
<https://novascotia.ca/just/regulations/regs/envsewage.htm>

Pesticide Regulations

<https://novascotia.ca/just/regulations/regs/ENVPEST.HTM>

Nova Scotia Watercourse Alterations Standard,
<https://novascotia.ca/nse/watercourse-alteration/docs/Watercourse-Alterations-Standard.pdf>

[Guide to Altering Watercourses](https://novascotia.ca/nse/watercourse-alteration/docs/NSE-Watercourse-Alteration-Program-May29.pdf)
<https://novascotia.ca/nse/watercourse-alteration/docs/NSE-Watercourse-Alteration-Program-May29.pdf>

[Certification Manual for Watercourse Alteration Installers](https://novascotia.ca/nse/watercourse-alteration/docs/certification-manual-for-watercourse-alteration-installers.pdf)
<https://novascotia.ca/nse/watercourse-alteration/docs/certification-manual-for-watercourse-alteration-installers.pdf>

[Certification Manual for Watercourse Alteration Sizers](https://novascotia.ca/nse/watercourse-alteration/docs/certification-manual-for-watercourse-alteration-sizers.pdf)
<https://novascotia.ca/nse/watercourse-alteration/docs/certification-manual-for-watercourse-alteration-sizers.pdf>

Well Construction Regulations
<https://novascotia.ca/just/regulations/regs/ENVWELLC.htm>

Water and Wastewater Facilities and Public Drinking Water Supplies Regulations
<https://novascotia.ca/just/regulations/regs/envwaste.htm>

Environment Act. 1994-95, c. 1, s. 1.
<https://nslegislature.ca/sites/default/files/legc/statutes/environment.pdf>

Non-essential Pesticides Control Act:
https://nslegislature.ca/legc/bills/61st_2nd/1st_read/b061.htm

Exceptions to Prohibitions on Non-essential Pesticides Regulations:
<https://www.novascotia.ca/just/regulations/regs/nepexcept.htm>

Wetland Conservation Policy
<https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf>

Municipality of West Hants, Land Use Bylaw
<https://www.westhants.ca/planning/planning-documents/2165-wh-land-use-by-law-consolidated-apr-3-2019-pdf/file.html>

Municipality of West Hants, Fire Protection Bylaw
<https://www.westhants.ca/by-laws/31-fire-protection-by-law/file.html>

10.3 Section 69 Environment Act – Reporting Spills

Environment Act

Duty to report release

69 (1) Any person responsible for the release of a substance into the environment that has caused, is causing or may cause an adverse effect, shall forthwith, as soon as that person knows or ought to know of the release, report it to

(a) the Department at its emergency telephone number;

(b) the owner of the substance, where applicable, if the person reporting knows or is readily able to ascertain the identity of the owner;

(c) the person having care, management or control of the substance, where applicable, if the person reporting knows or is readily able to ascertain the identity of that person; and

(d) any other person who the person reporting knows or ought to know may be directly affected by the release.

(2) Any person responsible for the release of a substance into the environment that is in excess of an amount, concentration, level or rate of release expressly authorized by an approval or regulations, shall forthwith, as soon as that person knows or ought to know of the release, report it in the manner prescribed in the approval or the regulations, as the case may be, to the persons identified in clauses (1)(a) to (d).

(3) Any person who discovers or becomes aware of a release of a substance into the environment that is in excess of an amount, concentration, level or rate of release expressly authorized by an approval or the regulations shall forthwith, as soon as that person knows or ought to know of the release, report it in the manner prescribed in the approval or the regulations, as the case may be, to the persons identified in clauses (1)(a) to (d). 1994-95, c. 1, s. 69; 2011, c. 61, s. 33.

Environmental Emergency Regulations

“unauthorized release” means a release of a substance into the environment that is any of the following:

(i) prohibited by the Act or a regulation or standard made under the Act,

(ii) in excess of an amount specified in an approval or by the Act or a regulation or standard made under the Act,

(iii) a release described in subclause (i) or (ii) that is reasonably expected to occur in the foreseeable future.

10.4 Forest Fire Protection Regulations

Forest Fire Protection Regulations

made under Section 40 of the

Forests Act

R.S.N.S. 1989, c. 179

O.I.C. 2019-248 (effective September 17, 2019), N.S. Reg. 135/2019

Table of Contents

Please note: this table of contents is provided for convenience of reference and does not form part of the regulations.

Citation

1 These regulations may be cited as the *Forest Fire Protection Regulations*.

Definitions

2 (1) In the Act and these regulations,

“burn” means to set, start, kindle, ignite or maintain a fire;

“fire” means combustion or burning, in which substances combine chemically with oxygen from the air and typically give out bright light and heat.

(2) In these regulations,

“ABC fire extinguisher” means an ABC fire extinguisher of a type approved by the Canadian Standards Association or the Underwriters Laboratories of Canada;

“Act” means the *Forests Act*;

“campfire” means an open fire that burns no larger than 0.5 m in diameter and is intended for recreation, but does not include a fire set for survival;

“designated” means designated under Section 5;

“domestic burning” means domestic burning as defined in Section 4;

“domestic burning permit” means a permit to burn in the form of a public announcement in accordance with Section 5 that authorizes domestic burning;

“extinguished” means to fully put out a fire such that there is no bright light, heat or smoke and the embers are cool to the touch throughout with no chance of reigniting;

“flammable debris” means waste material that is at risk of igniting or spreading fire, including loose paper, cured grass and logging slash;

“forest protection area” means in the woods or within 1000 ft (305 m) of the woods, as specified in the Act;

“industrial burning permit” means a permit to burn that authorizes the holder to carry out industrial burning as defined in Section 9;

“online mapping tool” means an online map of the Province on the Department’s Forest Protection website that depicts each county and the domestic burning permit issued for each county;

“operation or activity” means any work carried out and includes a construction project, industrial project or forestry operation;

“permit to burn” means a permit issued under the Act and these regulations that authorizes a person to carry out domestic burning or industrial burning.

Fire season prescribed

- 3** Except as otherwise modified by the Minister under subsection 23(2) of the Act, the period from March 15 to October 15, both dates inclusive, is prescribed as the fire season for all counties in the Province.

Domestic burning defined

- 4** In these regulations, “domestic burning” means burning, for no remuneration, tree limbs, leaves, brush or cut grass that meets any of the following criteria:
- (a) the material being burned is in no more than 2 piles, each of which is no wider than 3 m in diameter and no taller than 2 m;
 - (b) it is a campfire;
 - (c) it is carried out while burning for blueberry crops within an area smaller than or equal to 2 ha.

Domestic burning permit for each county announced

- 5** (1) Each day during a fire season, the Minister or a person delegated by the Minister must publicly announce the domestic burning permitted in each county of the Province, by designating the day as 1 of the following:
- (a) burn day;
 - (b) restricted burn day;
 - (c) non-burn day.
- (2) A day designated under subsection (1) means the 18-hour period between 2 p.m. of that day to 8 a.m. on the following day unless otherwise authorized by the Minister or a person designated by the Minister.
- (3) A public announcement required by subsection (1) must be published on the online mapping tool and be available by telephone through the Department’s toll-free phone number.

Burn day authorized burning

- 6** In addition to any restrictions or conditions in Section 27 of the Act, on a designated burn day, domestic burning is permitted in the forest protection area only if all of the following conditions are met:

- (a) piles of material to be burned are at least 10 m apart;
- (b) the fire is extinguished by 8 a.m. on the morning following the ignition of the fire.

Restricted burn day authorized burning

- 7** In addition to any restrictions or conditions in Section 27 of the Act, on a designated restricted burn day, domestic burning is permitted in the forest protection area only if all of the following conditions are met:

- (a) piles of material to be burned are at least 10 m apart;
- (b) burning occurs only during the restricted time period specified in the domestic burning permit public announcement.

Non-burn day

- 8** (1) On a designated non-burn day, there is no permit to burn issued.
- (2) Despite subsection (1), a person may carry out domestic burning on a designated non-burn day if the local Area Manager of the Department determines that it is safe and reasonable to carry out burning for a special event and grants express written permission to do so.

Industrial burning defined

- 9** In these regulations, “industrial burning” means burning that meets any of the following criteria:
- (a) it is carried out by a person for remuneration;
 - (b) it is carried out for land-clearing or agricultural purposes, including burning for blueberries within an area larger than 2 ha;
 - (c) the material being burned is in more than 2 piles of any size;
 - (d) the material being burned is wider than 3 m in diameter or taller than 2 m;
 - (e) the fire is not extinguished by 8:00 a.m. of the morning following the ignition of the fire.

Industrial burning permit

- 10** (1) The fee for an industrial burning permit is \$62.30, inclusive of any applicable taxes.

- (2) A person authorized or designated by the Minister to issue an industrial burning permit must complete any returns that the Minister directs, and must remit to the Minister all money received from the sale of industrial burning permits less any amount allowed by the Minister by way of commission.

Municipal landfill sites

- 11 (1) An industrial burning permit may be issued to a municipality that operates a municipal land fill site, for the purpose of operating the landfill site, for a period of time equivalent to the fire season for the county where the landfill site is located.
- (2) Despite subsection (1) and in addition to any other conditions that may be imposed, an industrial burning permit issued under subsection (1) may contain any conditions respecting suspension or cancellation of the permit that the permit issuer considers necessary for the adequate protection from and control of forest fires.

Terms and conditions of permit to burn mandatory

- 12 Any terms and conditions specified for a permit to burn are part of the permit and a person must comply with the terms and conditions contained in their permit.

Suspended or cancelled permit to burn

- 13 (1) In subsection 23(8) of the Act,

“fire permit” means a permit to burn;

“permit holder” includes a person acting on that person’s behalf.

- (2) A permit holder must surrender to the Department, on request, any permit to burn issued to them that has been suspended or cancelled.

Fire fighting equipment based on number of persons employed at site

- 14 Except where the Department has prescribed or approved specific alternatives, the fire fighting equipment required to be provided and maintained under subsection 27(4) of the Act by a person in charge of an operation or activity conducted in the forest protection area during the fire season, based on the number of persons employed at the site of the operation, is as follows:

Required equipment for fire fighting**	Total number of persons employed at site of operations*				
	1-2	3-5	6-10	11-20	21+
Any combination of axe, Pulaski or shovels	2	3	6	10	13

Back tanks or bags with pump and nozzle	1	2	4	5	7
*The total number includes individuals operating heavy equipment and machinery.					
**This total does not include the equipment affixed to Class I or Class II machines.					

Fire fighting equipment for Class 1 and Class 2 machinery

15 (1) In this Section,

“Class 1 machine” means a farm tractor, a skidder, a forwarder, a roadside slasher, a roadside delimber, a loader, a wood transporting vehicle, road construction equipment, a welding vehicle or an equipment servicing vehicle;

“Class 1 operation” means an operation or activity conducted during the fire season in the forest protection area in which a Class 1 machine is used;

“Class 2 machine” means a chipper, a feller buncher, a wood harvester or a wood processor;

“Class 2 operation” means an operation or activity conducted during the fire season in the forest protection area in which a Class 2 machine is used.

- (2) A person in charge of Class 1 operation or a Class 2 operation must ensure that all of the following equipment is securely affixed to the machines used in the operation as set out in the following table:

Class of machine	Equipment to be affixed to machine
Class 1	1 5-lb (2.25 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges OR 2 2.5-lb (1.13 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges
Class 2, equipped with on-board suppression system	1 10-lb (4.54 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges • OR 2 5-lb (2.25 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges
	1 back tank pump unit containing no less than 18 L of water • OR an additional 10-lb (4.54 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges

Class 2, not equipped with on-board suppression system	<ul style="list-style-type: none"> 1 20-lb (9 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges OR 2 10-lb (4.54 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges
	<ul style="list-style-type: none"> 1 back tank pump unit containing no less than 18 L of water OR an additional 20-lb (9 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges

- (3) In addition to the requirements of subsection (2), every person in charge of a Class 2 operation must have a 2-way communication system available at the operations site.

Fire fighting equipment available and in working order

16 A person in charge of an operation or activity conducted in the forest protection area during the fire season must ensure that all fire fighting equipment required to be kept at the site of the operations is, at all times,

- (a) readily available; and
- (b) kept in proper working order.

Operating power saw or clearing saw on forest lands during fire season

17 (1) A person must not operate a power saw or clearing saw in the forest protection area during the fire season unless the power saw is equipped with an exhaust muffler in functional condition and the adequate spark arresting device required by subsection 27(4) of the Act.

- (2) A person who operates a power saw or clearing saw in the forest protection area during the fire season must keep an ABC fire extinguisher containing not less than 0.5 lb. (0.225 kg) of dry chemical at the site where the person refuels the power saw.

Portion of fine paid for information

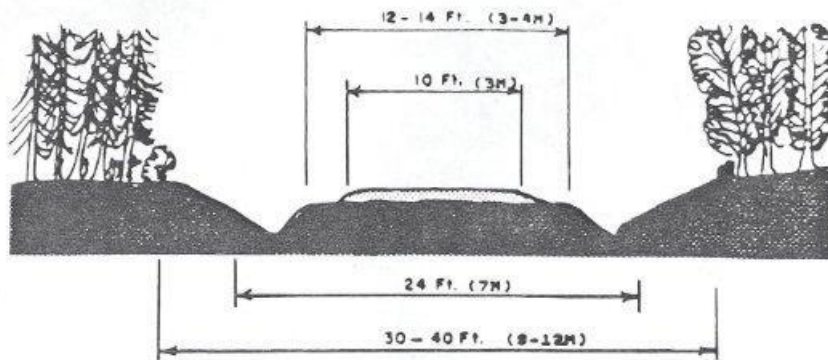
18 (1) If a complaint is laid and information provided by a person other than a conservation officer, the Minister may pay the complainant an amount of up to 1/2 of any fine collected for a prosecution for a violation of the Act or the regulations resulting from the complaint and information.

- (2) If a complaint is laid by a conservation officer on information provided by another person other than a conservation officer, the Minister may pay the person who provided the information an amount of up to 1/4 of any fine collected for a prosecution for a violation of the Act or the regulations resulting from the information.

10.5 Road Classification Diagrams

SCHEDULE "C"

Q-TYPE ROAD EXTRACTION ROAD



TYPICAL SECTION

- SPECIFICATIONS — RT. OF WAY CLEARED 30-40 FT. (9-12M)
ROAD SURFACE — 12-14 FT. (3-4M)
TRAVEL AREA — 10 FT. (3M)
SHOULDER & BACK SLOPES — 1 1/2:1
GRAVEL THICKNESS — 3-4 IN. (8-10CM)
TURNAROUNDS — TO BE LOCATED AT THE
END OF EVERY DEAD END
ROAD.

APPENDIX 4(B)
MILL LAKES WATERSHED
BEST MANAGEMENT PRACTICES: FORESTRY

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1.0 Objective

These best management practices are intended to guide all forestry activities in a manner that will protect and enhance the quality and quantity of source water in this watershed. Should forestry operations exceed the 100 cord/50,000 board feet limit in one calendar year where applications, approvals and additional permits are required, a concise plan must be included within the applicant's forestry plan which demonstrates how these Best Management Practices will be followed.

2.0 Municipal, Provincial and Federal Regulations

All relevant Municipal, Provincial and Federal Regulations apply to activities ***and are to be considered the minimum standards***. Any legal requirements not listed within shall supersede these Best Management Practices. Should a discrepancy exist the more stringent shall apply.

3.0 Watershed Forestry Regulations

Harvesting in excess of 50,000 board feet or 100 cords in one calendar year requires that the owner must receive approval from the Water Works Operator before such work begins and provide a forestry plan in accordance with objectives and policy described in the "Mill Lakes Watershed Source Water Protection Plan".

******The maximum annual harvest area (AHA) is recommended to not exceed 1% (44 acres/18 hectares) of the forested watershed. If harvesting is required for the protection of water quality, it is recommended that up to 6% (264 acres/107 Hectares) of the watershed may be harvested annually for a period of no more than 3 years; after which, harvesting must return to 1% or less per year over the next 6 years. Exception to this rule may be given in the event of an unplanned disaster such as a fire or windstorm damage.

4.0 Forest Harvesting Approvals

4.1 Applications

Applications for forestry activities over 100 cords or 50,000 board feet submitted to the Water Works Operator must include:

- Map of property showing area to be cut;
- Size of harvest (acres/hectares);
- Type of harvest;
- Location of any existing roads or proposed roads, and landings;
Locations of existing and proposed stream crossings and a copy of Nova Scotia Environment (NSE) approval;
- Location of special management areas such as wetlands, high erosion hazard areas within the harvest area;
- Proposed monitoring schedule for vehicles and other equipment;
- Proposed water sampling and sediment trap checks if required by provincial or federal acts and their associated regulations;
 - List of equipment to be used in the operation;
 - Anticipated start and time frame for work;

- Other information required by the Water Works Operator or NSE as a result of work near special management areas;
- Applicant's Best Management Plan;
- A Pretreatment Assessment (PTA) may be required at the request of the Water Works Operator.
- See **Section 9.1** for contact information

4.2 Application Approval Process

- The Water Works Operator will immediately forward any forestry applications to the Watershed Advisory Committee and follow up with a proposed recommendation on the application subject to the Committee approval to proceed;
- The Watershed Advisory Committee reserves the right to deny any application should it be felt the application is incomplete, the integrity of the watershed is at risk or the annual harvest area has exceeded the recommended 1% in that calendar year. The Watershed Advisory Committee reserves the right to permit an exception should circumstances allow;
- Should the application be approved, upon completion of the forestry operation the "Completion of Approved Work Form" shall be completed and forwarded to the Water Works Operator.

4.3 Additional Permits and Fees

- The applicant shall be responsible for any and all expenses incurred in carrying out environmental monitoring related to the forestry operation as required by the Water Works Operator or NSE;
- The applicant shall be responsible for any and all expenses incurred in complying with Provincial or Federal Acts and associated regulations;
- The applicant shall be responsible for acquiring all permits, approvals or other permissions required by NSE, Department of Lands and Forestry or any other governing body and expenses incurred.

5.0 Road Construction and Maintenance & Stream Crossings

Refer to BMP for ***Road Construction and Maintenance***.

6.0 Forestry

Timber harvesting consists of felling the tree, transporting (yarding) to a central accumulation point (landing), and transporting processed wood offsite. Each of these [activities can have minimal to severe impacts on water quality](#), depending in part on the level of planning and the implementation of best management practices. Of primary importance are the density and location of skid trails, type of yarding system selected, soil compaction and saturation, and amount of soil disturbance.

If, in the opinion of the Water Works Operator, NSE or Department of Lands and Forestry, forest operations are causing excessive damage to the natural forest environment, the operation will be ordered discontinued until the situation has been assessed.

6.1 Operations

- All applicable permits and approvals must be obtained prior to operations beginning and on site at all times;
- No harvesting or other works shall take place in the forest buffer (30m) of any lake, river, or stream without special approval from NSE, The Water Works Operator or Department of Lands and Forestry. The width of any riparian forest buffer zone shall be equal to or greater than 30 meters/98.4 feet from the high-water mark. The width of the buffer shall increase by 1m/3.3sqft for each additional 2% slope to a maximum width of 60m/197ft;
- Ensure harvest areas and riparian zones are flagged off;
- Ensure a copy of the most recently approved map showing the location is on site at all times during operations;
- The harvesting machine(s) must have a copy of the most recently approved map on board showing a minimum:
 - Harvest boundaries
 - Special Management Zones
 - Watercourses
 - Roads
 - Property Boundaries
 - Significant areas such as wetlands, heritage sites and wildlife values
- “Active Operation” signs or similarly worded signs must be posted in work areas to advise people of heavy equipment operating. The signs must be posted in plain sight to allow for adequate warning time;
- Employ directional falling and yarding techniques to protect riparian zones, do not fall trees into any watercourse;
- Do not obstruct or divert the water flow of natural streams;
- While felling trees along a harvest boundary ensure the boundary ribbons are left intact;
- While felling trees along a property boundary ensure the boundary markers and blazes are left intact and do not fall trees into adjacent property;
- Do not fall trees over block boundary lines;
- Ensure no lodged or spring trees are left in the harvest area;
- Operate machinery in a manner that minimizes rutting and erosion. If possible, operate during dry or frozen conditions. All ruts to be repaired before leaving the site;
- No motorized equipment may travel through/over a watercourse unless an appropriate crossing structure is in place;
 - Surface water from roads, landings and skid trails shall not be channeled directly into watercourses, but filtered through vegetated buffer areas to minimize sediment entering into the watercourse;
- Do Not allow machinery or debris to enter a watercourse or areas that are periodically flooded;
- Provide portable washroom facilities for operational personnel;
- Trucking should be suspended during heavy rains (30mm/1.2 inches in one hour, 50mm/2 inches in one day) until deemed reasonably dry;
- The contractor engaged in forest operations in the watershed will be responsible for the conduct of all employees and agents with respect to law, regulations and guidelines pertaining to activities on watershed lands;
- Any deviance on the part of the contractor or employees of the contractor from these working conditions will be immediately corrected as directed by The Water Works Operator;

- Leave known recognized recreational trails (i.e. hiking, walking) in as good as or better condition than found, and clear off debris;
- Open fires and smoking are not permitted on the job site during the fire season;
- All burning activities must strictly adhere to the Forest Fire Protection Regulations (**See section 9.4**)

6.3 Fueling and Fluid Disposal

- No fuel bulk storage stations may exceed 450 litres/118 gallons unless approved by The Water Works Operator or Department of Lands and Forestry;
- All fuel tanks must conform to the Transportation of Dangerous Goods (TDG) Regulations;
- All authorized fuel storage tanks must be fully labelled and contained;
- An emergency plan must be located on site and known to all users;
- During transport, ensure all fluid containers, are leak-free and secured to avoid damage and spills; all openings should be securely closed and locked if possible;
- All fuel containers must be marked clearly identifying their contents (with name of product contained and TDG UN number);
- Vehicles specifically designed for delivering fuel/fluids must be escorted at all times;
- Pumping devices for all fuel tanks must have automatic shut-off valves and be attended at all times while in use; no gravity fed pumps allowed; fueling hoses should be in good repair and not have any cuts or patches;
- Designated fueling or storage areas must be at least 30m (98.4 feet) from the edge of any riparian zone or watercourse; The storage area must be above the high-water mark.
- All fueling stations and motorized equipment must have an appropriately sized spill kit located on board;
- Fuel equipment on bare-mineral, stable, level ground; fueling pads must be grounded or not on coated vehicle truck beds to prevent static buildup and chance of accidental ignition;
- All fuel stations must have a 4.5kg/10lb 6A80BC serviceable fire extinguisher available at all times;
- Do not smoke while refueling equipment; engines being fueled should be cool to avoid flash ignition
- Prior to beginning work, all fluid maintenance must be completed;
- Dispose of waste fluid at a government approved facility;
- All spills must be reported immediately to NSE, Department of Lands and Forestry and the Water Works Operator as per Section 69 of the Environment Act. (**See section 9.3**)

6.3 Biodiversity Values

- Be aware of wildlife habitat features, such as cavity trees or nests, and protect these from disturbance during operations;
- Corridors left for wildlife should follow land form or stand boundaries to create irregular cut boundaries;
- Snags and coarse woody debris shall be left on site after any harvesting activity to maintain site productivity and biodiversity values, in a manner similar to natural patterns if possible.

6.4 Old Cuts

If harvesting next to a previous harvest, unless it is for the continuation of a road, wait 10 years or until the average height of the regeneration is at least 2m/6.5 feet tall (whichever comes first) to avoid creating larger cuts.

6.5 Other

Remove all garbage from the site daily and dispose of materials properly.

7.0 Special Management Areas

7.1 Buffer Zones

Any buffer zone can be established at the direction of the Water Works Operator.

7.2 Slopes

Within the 30 meter/98.4 feet forest buffer, land that has an average slope greater than 20%, the operator shall increase the width of the buffer zone by 1 m/3.3ft for each additional 2% slope to a maximum width of 60 meters/197 feet.

7.3 Wildlife Habitat and Watercourse Protection Regulations (WHWP)

Excerpt from regulations:

No forestry operator shall within a special management zone

(a) permit the use of, use or operate a vehicle for forestry operations within 7 m of the watercourse;

(b) reduce the basal area of living trees to less than 20 m² per hectare; or

(c) create an opening in the dominant tree canopy larger than 15 m at its greatest dimension.

(4) Despite clause (3)(a), the operation of a vehicle for the purpose of watercourse crossings approved by the Department of Environment is permitted within a special management zone.

8.0 Glossary of Terms

Allowable cut The volume of wood that may be harvested, under management, for a given period.

Area regenerating Includes areas that have been harvested recently (less than 10 years ago), and areas depleted by such natural disturbances as fire, insects and disease.

Basal area	1. Of a tree: The area in square metres of the cross section at breast height of the stem. 2. Of a forest, stand, or forest type: The area in square metres per hectare of the cross section at breast height of all trees.
Base of tree	Part of the tree consisting of the first 25 cm of trunk
Basic silviculture	All the silvicultural practices required to achieve free-growing (or established) regeneration of desired species at specified densities and stocking.
Board feet	A unit of volume used for softwood and hardwood lumber: one board foot equals 1/12 of a cubic foot.
Buffer zone	A strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities adjacent to roads, trails, waterways and recreation sites.
Canopy	The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees
Clearcut	An area of forest land from which all merchantable trees have recently been harvested.
Clearcutting	A silvicultural method in which most merchantable trees in a stand are harvested simultaneously, producing a fully exposed microclimate for the development of a new age class.
Clearing	1. A considerable open space in a forest, which can be natural or artificial. 2. Removal of standing, usually scrubby, vegetation to prepare a site for reforestation
Coniferous Tree	(Softwood) Member of a group of trees commonly called softwoods or gymnosperms.
Crown land	Public land that is managed by the federal or provincial/territorial government.
Deadwood	Timber produced from dead standing trees. More commonly, timber in dead standing trees.
Deciduous tree	(Hardwood) Member of a group of trees commonly called hardwoods or angiosperms.
Deforestation	Permanent removal of forest cover and withdrawal of land from forest use, whether deliberately or circumstantially.
Drainage	Hydrology/engineering: The process of removal of water from soil, particularly by surface runoff and subsurface percolation and artificially by measures for hastening removal, e.g., by ditching.
Ecosystem	The sum of the plants, animals, environmental influences, and their interactions within a particular habitat.

Environmental Assessment	A process designed to contribute pertinent environmental information to the decision-making process of forest management or other natural resource projects and programs.
Feller-buncher	A self-propelled machine used to fell trees by shearing them off near the ground using a hydraulic apparatus. Some models also strip limbs and bunch the logs for later pickup.
Fording	Crossing a shallow river, stream, etc.
Forest	Ecosystem that generally covers a large area and is composed of woody vegetation dominated by trees growing in a relatively dense pattern.
Forest Management	That branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation
Forest practices	Any activities that enhance or recover forest growth or harvest yield (e.g., site preparation, planting, thinning, fertilizing, harvesting, etc.), and road construction or reconstruction within forest lands.
Forestry	Generally, a profession embracing the science, business, and art of creating, conserving, and managing forests and forest lands for the continuing use of their resources, material or other.
Global Positioning System (GPS)	A system of satellites and receiving devices used to compute positions on the Earth.
Grubbing	Removal of stumps from the ground by any of several methods or combination of methods
Habitat	The environment in which a population or individual lives; includes not only the place where a species is found, but also the particular characteristics of the place (for example, climate or the availability of suitable food and shelter) that make it especially well-suited to meet the life cycle needs of that species.
Hardwood(s)	Trees whose leaves are not persistent and fall off at the end of a defined growing season or during a period of temperature or moisture stress. This is the predominant tree type in deciduous forests. Also refers to the wood produced by these trees.
Management plan	A predetermined course of action and direction to achieve a set of results, usually specified as goals, objectives and policies.
Mixed stand	A stand composed of two or more species in which less than 80% of trees in the main crown canopy are of a single species.

Old-growth forest	An old growth forest differs significantly from younger stands in structure, ecological function and species composition with respect to canopy closure, age class structure, accumulation of woody debris and the presence of species and functional processes that are representative of the potential natural community.
Pretreatment Assessment	The Pretreatment Assessment (PTA) is a ground-based cruising program that was designed to collect the site and stand conditions necessary to produce an ecosystem-based treatment recommendation using the Nova Scotia Forest Management Guide. The Nova Scotia Forest Management Guide prescribes uneven-aged management and non-clearcut harvesting methods when appropriate as a first choice and favors natural regeneration harvest methods where possible within stand and site limitations. The PTA field collection cruise also provides an opportunity for gathering information on biologically sensitive features for use in mitigation plans.
Regrowth	A term used in reference to coppice, as well as recovery of vegetation from treatment designed to impede or control its growth.
Riparian forest	At a large scale, it is the band of forest that has a significant influence on a stream ecosystem or is significantly affected by the stream. At a smaller scale, it is the forest at the immediate water's edge, where some specialized plants and animals form a distinct community.
Riparian Forest Buffer	A strip of forested land of variable width adjacent to a flowing body of fresh water, which it influences and is affected by. Prone to flooding, a riparian forest buffer can be integrated into an agroforestry system and help counter stream bank erosion, protect water quality, and regularize water flow.
Riparian zone	A strip of land of variable width adjacent to and influenced by a body of fresh water.
Risk assessment	A quantitative and qualitative approach to determining the hazardous capacity of a new product. This involves the identification and characterization of hazards, an assessment of exposure to the product, and a final risk characterization of the product.
Skidder	A self-propelled logging machine with an articulated frame, used for hauling operations.
Slash	Woody material or debris left on the ground after an area is logged. Also known as brush
Snag	A standing dead tree from which the leaves and most of the branches have fallen.

Stand	A community of trees possessing sufficient uniformity in composition, age, arrangement, or condition to be distinguishable from the forest or other growth on adjoining areas, thus forming a silvicultural or management entity.
Sustainable Forest Management	Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social and cultural opportunities for present and future generations
Thinning	A partial cutting or spacing operation made in an immature forest stand to accelerate the growth of the remaining trees.
Timber	A general term for forest crops and stands, and sometimes for any lesser aggregation of such trees.
Water Bar	Shallow channel laid diagonally across the surface of a road to lead water off the road and prevent soil erosion.
Windfall	1. A tree or trees thrown down or with their stems broken off or other parts blown down by the wind. 2. Any area on which the trees have been thrown down or broken by the wind.

9.0 Additional Resources

9.1 Contacts

West Hants Regional Municipality (Water Works Operator)

Todd Richard
 Director of Public Works
 trichard@westhants.ca
 (902)798-8391

Martin Croney
 Operations Manager – Water Treatment
mcroney@westhants.ca
 (902)798-8000

Nova Scotia Environment (NSE)

24 Hour Emergency
 1-800-565-1633

NSE Regional Office – Kentville
 (902) 679-6086

Website: <https://novascotia.ca/nse/contact.asp?div=gen&pg=dept&bk=/nse/Default.asp>

Department of Lands and Forestry

24 Hour Emergency
 1-800-565-2224

Tim O'Brien, RPF
 Regional Forester, Crown Land
Tim.obrien@novascotia.ca

9.2 Links

Mill Lakes Watershed Protected Water Area Regulations
<https://novascotia.ca/just/regulations/regs/envpwmilreg.htm>

Activities Designation Regulations
<https://novascotia.ca/just/regulations/regs/envactiv.htm>

Environmental Emergency Regulations
<https://novascotia.ca/just/regulations/regs/envemerg.htm>

On-site Sewage Disposal Systems Regulations
<https://novascotia.ca/just/regulations/regs/envsewage.htm>

Pesticide Regulations
<https://novascotia.ca/just/regulations/regs/ENVPEST.HTM>

Nova Scotia Watercourse Alterations Standard
<https://novascotia.ca/nse/watercourse-alteration/>

[Guide to Altering Watercourses](https://novascotia.ca/nse/watercourse-alteration/docs/NSE-Watercourse-Alteration-Program-May29.pdf)
<https://novascotia.ca/nse/watercourse-alteration/docs/NSE-Watercourse-Alteration-Program-May29.pdf>

Well Construction Regulations
<https://novascotia.ca/just/regulations/regs/ENVWELLC.htm>

Water and Wastewater Facilities and Public Drinking Water Supplies Regulations
<https://novascotia.ca/just/regulations/regs/envwaste.htm>

Environment Act. 1994-95, c. 1, s. 1.
<https://nslegislature.ca/sites/default/files/legc/statutes/environment.pdf>

Non-essential Pesticides Control Act:
https://nslegislature.ca/legc/bills/61st_2nd/1st_read/b061.htm

Exceptions to Prohibitions on Non-essential Pesticides Regulations:
<https://www.novascotia.ca/just/regulations/regs/nepexcept.htm>

Wetland Conservation Policy
<https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf>

Municipality of West Hants, Land Use Bylaw
<https://www.westhants.ca/planning/planning-documents/2165-wh-land-use-by-law-consolidated-apr-3-2019-pdf/file.html>

Municipality of West Hants, Fire Protection Bylaw
<https://www.westhants.ca/by-laws/31-fire-protection-by-law/file.html>

9.3 Section 69 Environment Act – Reporting Spills

Environment Act

Duty to report release

69 (1) Any person responsible for the release of a substance into the environment that has caused, is causing or may cause an adverse effect, shall forthwith, as soon as that person knows or ought to know of the release, report it to

- (a) the Department at its emergency telephone number;
- (b) the owner of the substance, where applicable, if the person reporting knows or is readily able to ascertain the identity of the owner;
- (c) the person having care, management or control of the substance, where applicable, if the person reporting knows or is readily able to ascertain the identity of that person; and
- (d) any other person who the person reporting knows or ought to know may be directly affected by the release.

(2) Any person responsible for the release of a substance into the environment that is in excess of an amount, concentration, level or rate of release expressly authorized by an approval or regulations, shall forthwith, as soon as that person knows or ought to know of the release, report it in the manner prescribed in the approval or the regulations, as the case may be, to the persons identified in clauses (1)(a) to (d).

(3) Any person who discovers or becomes aware of a release of a substance into the environment that is in excess of an amount, concentration, level or rate of release expressly authorized by an approval or the regulations shall forthwith, as soon as that person knows or ought to know of the release, report it in the manner prescribed in the approval or the regulations, as the case may be, to the persons identified in clauses (1)(a) to (d). 1994-95, c. 1, s. 69; 2011, c. 61, s. 33.

Environmental Emergency Regulations

“unauthorized release” means a release of a substance into the environment that is any of the following:

- (i) prohibited by the Act or a regulation or standard made under the Act,
- (ii) in excess of an amount specified in an approval or by the Act or a regulation or standard made under the Act,
- (iii) a release described in subclause (i) or (ii) that is reasonably expected to occur in the foreseeable future.

9.4 Forest Fire Protection Regulations

**Forest Fire Protection Regulations
made under Section 40 of the
Forests Act
R.S.N.S. 1989, c. 179
O.I.C. 2019-248 (effective September 17, 2019), N.S. Reg. 135/2019**

Table of Contents

Please note: this table of contents is provided for convenience of reference and does not form part of the regulations.

Citation

- 1** These regulations may be cited as the *Forest Fire Protection Regulations*.

Definitions

- 2 (1)** In the Act and these regulations,

“burn” means to set, start, kindle, ignite or maintain a fire;

“fire” means combustion or burning, in which substances combine chemically with oxygen from the air and typically give out bright light and heat.

- (2)** In these regulations,

“ABC fire extinguisher” means an ABC fire extinguisher of a type approved by the Canadian Standards Association or the Underwriters Laboratories of Canada;

“Act” means the *Forests Act*;

“campfire” means an open fire that burns no larger than 0.5 m in diameter and is intended for recreation, but does not include a fire set for survival;

“designated” means designated under Section 5;

“domestic burning” means domestic burning as defined in Section 4;

“domestic burning permit” means a permit to burn in the form of a public announcement in accordance with Section 5 that authorizes domestic burning;

“extinguished” means to fully put out a fire such that there is no bright light, heat or smoke and the embers are cool to the touch throughout with no chance of reigniting;

“flammable debris” means waste material that is at risk of igniting or spreading fire, including loose paper, cured grass and logging slash;

“forest protection area” means in the woods or within 1000 ft (305 m) of the woods,

as specified in the Act;

“industrial burning permit” means a permit to burn that authorizes the holder to carry out industrial burning as defined in Section 9;

“online mapping tool” means an online map of the Province on the Department’s Forest Protection website that depicts each county and the domestic burning permit issued for each county;

“operation or activity” means any work carried out and includes a construction project, industrial project or forestry operation;

“permit to burn” means a permit issued under the Act and these regulations that authorizes a person to carry out domestic burning or industrial burning.

Fire season prescribed

- 3** Except as otherwise modified by the Minister under subsection 23(2) of the Act, the period from March 15 to October 15, both dates inclusive, is prescribed as the fire season for all counties in the Province.

Domestic burning defined

- 4** In these regulations, “domestic burning” means burning, for no remuneration, tree limbs, leaves, brush or cut grass that meets any of the following criteria:
- (a) the material being burned is in no more than 2 piles, each of which is no wider than 3 m in diameter and no taller than 2 m;
 - (b) it is a campfire;
 - (c) it is carried out while burning for blueberry crops within an area smaller than or equal to 2 ha.

Domestic burning permit for each county announced

- 5 (1)** Each day during a fire season, the Minister or a person delegated by the Minister must publicly announce the domestic burning permitted in each county of the Province, by designating the day as 1 of the following:
- (a) burn day;
 - (b) restricted burn day;
 - (c) non-burn day.
- (2)** A day designated under subsection (1) means the 18-hour period between 2 p.m. of that day to 8 a.m. on the following day unless otherwise authorized by the Minister or a person designated by the Minister.
- (3)** A public announcement required by subsection (1) must be published on the online mapping tool and be available by telephone through the Department’s toll-free phone number.

Burn day authorized burning

- 6** In addition to any restrictions or conditions in Section 27 of the Act, on a designated burn day, domestic burning is permitted in the forest protection area only if all of the following conditions are met:
- (a) piles of material to be burned are at least 10 m apart;
 - (b) the fire is extinguished by 8 a.m. on the morning following the ignition of the fire.

Restricted burn day authorized burning

- 7** In addition to any restrictions or conditions in Section 27 of the Act, on a designated restricted burn day, domestic burning is permitted in the forest protection area only if all of the following conditions are met:
- (a) piles of material to be burned are at least 10 m apart;
 - (b) burning occurs only during the restricted time period specified in the domestic burning permit public announcement.

Non-burn day

- 8** **(1)** On a designated non-burn day, there is no permit to burn issued.
- (2)** Despite subsection (1), a person may carry out domestic burning on a designated non-burn day if the local Area Manager of the Department determines that it is safe and reasonable to carry out burning for a special event and grants express written permission to do so.

Industrial burning defined

- 9** In these regulations, “industrial burning” means burning that meets any of the following criteria:
- (a) it is carried out by a person for remuneration;
 - (b) it is carried out for land-clearing or agricultural purposes, including burning for blueberries within an area larger than 2 ha;
 - (c) the material being burned is in more than 2 piles of any size;
 - (d) the material being burned is wider than 3 m in diameter or taller than 2 m;
 - (e) the fire is not extinguished by 8:00 a.m. of the morning following the ignition of the fire.

Industrial burning permit

- 10** **(1)** The fee for an industrial burning permit is \$62.30, inclusive of any applicable taxes.
- (2)** A person authorized or designated by the Minister to issue an industrial burning permit

must complete any returns that the Minister directs, and must remit to the Minister all money received from the sale of industrial burning permits less any amount allowed by the Minister by way of commission.

Municipal landfill sites

- 11 (1)** An industrial burning permit may be issued to a municipality that operates a municipal land fill site, for the purpose of operating the landfill site, for a period of time equivalent to the fire season for the county where the landfill site is located.
- (2)** Despite subsection (1) and in addition to any other conditions that may be imposed, an industrial burning permit issued under subsection (1) may contain any conditions respecting suspension or cancellation of the permit that the permit issuer considers necessary for the adequate protection from and control of forest fires.

Terms and conditions of permit to burn mandatory

- 12** Any terms and conditions specified for a permit to burn are part of the permit and a person must comply with the terms and conditions contained in their permit.

Suspended or cancelled permit to burn

- 13 (1)** In subsection 23(8) of the Act,

“fire permit” means a permit to burn;

“permit holder” includes a person acting on that person’s behalf.

- (2)** A permit holder must surrender to the Department, on request, any permit to burn issued to them that has been suspended or cancelled.

Fire fighting equipment based on number of persons employed at site

- 14** Except where the Department has prescribed or approved specific alternatives, the fire fighting equipment required to be provided and maintained under subsection 27(4) of the Act by a person in charge of an operation or activity conducted in the forest protection area during the fire season, based on the number of persons employed at the site of the operation, is as follows:

Required equipment for fire fighting**	Total number of persons employed at site of operations*				
	1-2	3-5	6-10	11-20	21+
Any combination of axe, Pulaski or shovels	2	3	6	10	13
Back tanks or bags with pump and nozzle	1	2	4	5	7

*The total number includes individuals operating heavy equipment and machinery.

**This total does not include the equipment affixed to Class I or Class II machines.

Fire fighting equipment for Class 1 and Class 2 machinery

15 (1) In this Section,

“Class 1 machine” means a farm tractor, a skidder, a forwarder, a roadside slasher, a roadside delimber, a loader, a wood transporting vehicle, road construction equipment, a welding vehicle or an equipment servicing vehicle;

“Class 1 operation” means an operation or activity conducted during the fire season in the forest protection area in which a Class 1 machine is used;

“Class 2 machine” means a chipper, a feller buncher, a wood harvester or a wood processor;

“Class 2 operation” means an operation or activity conducted during the fire season in the forest protection area in which a Class 2 machine is used.

- (2) A person in charge of Class 1 operation or a Class 2 operation must ensure that all of the following equipment is securely affixed to the machines used in the operation as set out in the following table:

Class of machine	Equipment to be affixed to machine	
Class 1	1 5-lb (2.25 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges OR 2 2.5-lb (1.13 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges	
Class 2, equipped with on-board suppression system	<ul style="list-style-type: none">1 10-lb (4.54 kg) ABC fire extinguisher, fully charged and equipped with pressure gaugesOR2 5-lb (2.25 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges	
	<ul style="list-style-type: none">1 back tank pump unit containing no less than 18 L of waterORan additional 10-lb (4.54 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges	
Class 2, not equipped with on-board suppression system	<ul style="list-style-type: none">1 20-lb (9 kg) ABC fire extinguisher, fully charged and equipped with pressure gaugesOR2 10-lb (4.54 kg) ABC fire extinguishers, fully charged and equipped with pressure gauges	

	1 back tank pump unit containing no less than 18 L of water OR • an additional 20-lb (9 kg) ABC fire extinguisher, fully charged and equipped with pressure gauges
--	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------

- (3) In addition to the requirements of subsection (2), every person in charge of a Class 2 operation must have a 2-way communication system available at the operations site.

Fire fighting equipment available and in working order

- 16 A person in charge of an operation or activity conducted in the forest protection area during the fire season must ensure that all fire fighting equipment required to be kept at the site of the operations is, at all times,

- (a) readily available; and
- (b) kept in proper working order.

Operating power saw or clearing saw on forest lands during fire season

- 17 (1) A person must not operate a power saw or clearing saw in the forest protection area during the fire season unless the power saw is equipped with an exhaust muffler in functional condition and the adequate spark arresting device required by subsection 27(4) of the Act.
- (2) A person who operates a power saw or clearing saw in the forest protection area during the fire season must keep an ABC fire extinguisher containing not less than 0.5 lb. (0.225 kg) of dry chemical at the site where the person refuels the power saw.

Portion of fine paid for information

- 18 (1) If a complaint is laid and information provided by a person other than a conservation officer, the Minister may pay the complainant an amount of up to 1/2 of any fine collected for a prosecution for a violation of the Act or the regulations resulting from the complaint and information.
- (2) If a complaint is laid by a conservation officer on information provided by another person other than a conservation officer, the Minister may pay the person who provided the information an amount of up to 1/4 of any fine collected for a prosecution for a violation of the Act or the regulations resulting from the information.

APPENDIX 5



WEST HANTS REGIONAL MUNICIPALITY

EMERGENCY PREPAREDNESS PLAN

MILL LAKES AND
FALL BROOK RESERVOIR
WATER SUPPLY SYSTEM

Prepared by: YMCL Engineering Limited
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1809 Barrington Street
Halifax, Nova Scotia
B3J 3K8

Revised- November 28, 2022

PURPOSE

This Emergency Preparedness Plan details the identification of emergencies, notification, and response procedures to be implemented by the West Hants Regional Municipality, and the coordination of these activities with the local Emergency Measures Organization and other affected authorities during potential emergency situations associated with the Mill Lakes and Fall Brook Reservoir Water Supply System.

It should be noted that the West Hants Regional Municipality has an excellent Dam Safety Record, and that the preparation of this Emergency Preparedness Plan does not in any way reflect upon the integrity of the structures at the Mill Lakes and Fall Brook dam sites. It demonstrates rather, the West Hants Regional Municipality's ongoing commitment within the community to safe operation and maintenance of its facilities.

LIMITATION OF LIABILITY

The west Hants Regional Municipality , its officers, employees, consultants and contractors shall not be held liable to the users of this Emergency Preparedness Plan or to any part in respect to the accuracy of, or reliance on the information contained herein, including, without limitations, predictions with respect to flooding, or any loss or damage sustained by users of third parties, claims for direct, indirect, consequential, or punitive damages or any claim which is based on tort, contract, warranty, negligence, strict liability or any other theory or remedy at law or equity.

REVISIONS

The following revisions have been issued for this Emergency Preparedness Plan. It is the responsibility of the plan holder to ensure that the latest revision is placed appropriately.

<u>Revision No.</u>	<u>Revision Date</u>	<u>Description</u>
Draft Copy	April 2005	First draft of the EPP
Revision 1	2006	Update of Contacts
Revision 2	2007	Update of Contacts
Revision 3	2008	Update of Contacts
Revision 4	2009	Update of Contacts
Revision 5	2010	Update of Contacts
Revision 6	2011	Update of Contacts
Revision 7	2012	Update of Contacts
Revision 8	2013	Update of Contacts
Revision 9	2015	Update of Contacts
Revision 10	2018	Update of Contacts
Revision 11	2022	Update of Contacts and Title Information

EMERGENCY PREPAREDNESS PLAN (EPP) MILL LAKES AND FALL BROOK RESERVOIR WATER SUPPLY SYSTEM

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1.0 GENERAL

1.1 Introduction

The West Hants Regional Municipality owns and operates a Water Treatment facility and distribution system located in Windsor, Hants County, Nova Scotia. Fresh water for the water treatment plant process is stored at the Mill Lakes and flows through a control structure into Fall Brook. Fall Brook empties into a reservoir above the Fall Brook Dam where water is drawn into the water treatment plant. A maintenance flow spills over the Fall Brook Dam spillway and travels downstream where the brook empties into Lebreau Creek. Lebreau Creek empties into the Pesaquid Lake. These water storage, control, and conveyance structures are all owned, operated, and maintained by the West Hants Regional Municipality.

The West Hants Regional Municipality (formerly under the direction for the Town of Windsor until April 2020) has retained YMCL Engineering Limited to develop an Emergency Preparedness Plan (EPP) encompassing this water supply system.

The Emergency Preparedness Plan (EPP) has been prepared in accordance with the guidelines presented in the Dam Safety Guidelines 2007.

The document further states that an "...EPP is a formal written plan that identifies the procedures and processes that the dam operators should follow in the event of an emergency at a dam. The emergency could be, for example, failure of essential equipment such as flood gates, slope failure having the potential to cause dam failure, or a complete failure of the dam caused by overtopping, earthquake, or piping."

The EPP is intended to provide timely notification allowing for appropriate responsive action on the part of the dam owner. These coordinated measures in conjunction with the local Emergency Measures Organization (EMO) and other associated authorities including police, fire and medical services aim to protect and maintain the life, health and well being of upstream and downstream stakeholders and to mitigate the potential for damage to the environment and affected property.

An Inundation Study has been completed for the Mill Lakes and Fall Brook Reservoir Water Supply System, prepared by YMCL Engineering Limited.

1.2 Description of the Water Supply System

The following engineering reports and documents are referenced in the ensuing information that describes the Water Supply System.

- Mill Lakes Watershed Assessment Study, dated July 2003, prepared by CBCL Limited.
- Fall Brook Reservoir Dam Evaluation, July 2003, prepared by YMCL Engineering Limited.
- Environmental Approval Application – Fall Brook Reservoir Dam Repairs, dated April 2004, prepared by YMCL Engineering Limited
- Mill Lakes Dam Evaluation, dated July 2004, prepared by YMCL Engineering Limited.

Mill Lakes Watershed

The watershed that drains into the Mill Lakes was determined in the CBCL document. This document was prepared to determine the minimum flows that would occur in Fall Brook and to ensure adequate supply to the Water Treatment Plant.

Mill Lakes Dam

The Mill Lakes Dam is a rock dam approximately 600 feet long with ends running into the original terrain. The upstream face is a vertical stone rubble wall, and the downstream side is sloped at 2 Horizontal to 1 Vertical.

Water in Mill Lakes exits through a gate control structure located at the centre of the dam or a natural overflow channel located at the east end of the dam. The water creates two separate channels that come together downstream to form Fall Brook.

Fall Brook Dam

The Fall Brook Reservoir Dam consists of a cast-in-place concrete gravity structure. The crest length of the dam is 159'-10" and varies in height from approximately 4'-0" to 19'-2". The dam is 3'-4" wide at the crest and has a vertical face on the upstream side and a sloping face on the downstream side. The downstream face of the dam has a slope of approximately 1.6 vertical to 1.0 horizontal.

The reservoir is normally allowed to spill continuously over the dam free-overflow spillway section with a crest 30'-1" long and 1'-0" lower than the top of the main dam structure. The cross section through the spillway is otherwise similar to the typical dam cross section. During periods of extreme flow, the entire dam acts as a free-overflow broad crested weir.

On the upstream side of the dam a screen/intake structure was originally constructed but has been abandoned and replaced with a new intake structure that is not incorporated into the dam structure. The water storage reservoir that is retained by the dam structure is approximately 300' long, 175' wide and 14' deep at the centre area of

the reservoir.

The reservoir has an intake structure that is connected by a buried pipe to the water treatment building.

Water entering the reservoir flows from the Mill Lakes via Fall Brook to the settling pond immediately upstream of the reservoir. A rock filled berm separates the settling pond from the main reservoir. Under normal conditions the water surface of the settling pond is approximately 1.35 feet above the reservoir water surface. A concrete inflow structure is located in the rock berm on the settling pond side. The inflow structure has two sets of wood stop logs that regulate flow into two 5'-0" diameter concrete pipes that discharge into the reservoir.

The settling pond has an intake structure that is connected by a buried pipe to the water treatment building enabling the small settling pond to be utilized as a secondary, or "back-up" reservoir if the main reservoir is drained.

The rock berm has a depressed area that forms an overflow or spillway channel should the intake become clogged with debris, or a high flow is experienced. This channel is approximately 4'-7" lower than the crest of the rock berm/dam.

Water that flows over the Fall Brook Dam continues downstream until Fall Brook meets Lebreau Creek. Lebreau Creek continues downstream parallel a connector road that joins Highway 14 to Highway 1. Lebreau Creek passes under this connector and then under Highway 14 and empties into Pesquid Lake.

1.3 Responsibilities Under the Emergency Preparedness Plan (EPP)

The responsibilities of the appropriate West Hants Regional Municipality personnel in responding to an emergency situation relating to the operation and function of the dam and structures are outlined in this document. The notification procedure for communication with the local Emergency Measures Organization (EMO) is also listed. The West Hants Regional Municipality will coordinate its actions under this plan with the procedures of the EMO.

Observer

An observer in most circumstances would be an experienced West Hants Regional Municipality employee responsible for ongoing dam and water supply maintenance and inspection and the reporting of an emergency or potential incident as defined in Section 2.0

Emergency Response Procedure.

In the event that an observer is of the general public, it is expected that they may call the West Hants Regional Municipality office or the Provincial 911 Emergency Centre. The result in either situation is that the West Hants Regional Municipality will receive the information for immediate responsive action.

Water Treatment Plant Attendant

There is an attendant available for the Water Treatment Plant on a 24 hour, 7 days per week, 52 weeks per year basis. The Water Treatment Plant Attendant shall be responsible for the receipt of an emergency or potential emergency call and shall subsequently immediately contact the Director of Public Works or designate with the information.

West Hants Regional Municipality Director of Public Works

The Director of Public Works for the West Hants Regional Municipality is responsible for the overall operation including maintenance and local control of the water supply system associated with Mill Lakes and Fall Brook. Upon notification of an emergency, the Director of Public Works, or nominated replacement/designate, will take charge of local West Hants Regional Municipality initiated mitigative operations and will follow notification procedures, maintain close communication with and put forward recommendations to the local EMO.

Emergency Measures Organization (EMO)

The EMO is responsible for issuing precautionary alerts and carrying out evacuation orders and procedures based on information concerning the emergency situation as supplied by the West Hants Regional Municipality. The EMO will coordinate the efforts of the RCMP, fire and medical services and local government, provincial and federal regulatory authorities.

1.4 Posting the Emergency Preparedness Plan

The EPP along with copies of the *Notification Flowcharts* located in Section 3.0 and the *Emergency Report Form* located in Appendix D shall be displayed in an open and prominent location at the West Hants Regional Municipality engineering office and the Water Treatment Plant.

Posting of the EPP in locations frequented by operating personnel will ensure access to current updates and the appropriate communication channels to be used for incident

reporting in a timely and effective manner.

1.5 Training of Personnel

The West Hants Regional Municipality will conduct training and refresher courses on an annual basis for all operating personnel designated to have responsibilities under the EPP. A review of the monitoring and notification procedures, chain of command and the specific actions to be initiated during emergency and potential emergency events.

The Director of Public Works is responsible to ensure that training and periodic briefings concerning any revisions to procedural and water system management operations have been performed. This shall be documented by the completion of the form, *Record of Presentations, Training and Operational Tests* found in Appendix A.

1.6 Annual Review and Updating of EPP

A comprehensive review of the adequacy and relevance of information and procedures contained in the EPP will be conducted by the West Hants Regional Municipality once per year.

This approach will include the identification of any new developments, changes, or potential impacts, either natural or man-made, which may affect conditions upstream or downstream of the dam and water control/conveyance structures. These will be reviewed in order to determine whether appropriate revisions to the EPP are warranted.

In addition, a verification of the communications system and all associated numbers and channels shall be instituted after the modification or installation of any new equipment that could affect the previous protocols and set-up of the telecommunications network.

The Director of Public Works or designate will be responsible to annually review and verify that all notification personnel and contact numbers as outlined in the *Notification Flowcharts* of Section 3.0 are current and valid. This action shall be documented by the completion of the *Test Report Form* found in Appendix A.

Receipt of the EPP document shall be confirmed by completion of the *Receipt Acknowledgement Form* found in Appendix B. Revisions to the EPP shall be initiated by the completion of the *Revision Report Form* found in Appendix C. The Director of Public Works or designate will be responsible to have the EPP updated as may be necessary based on this latter referenced form. Such revisions to the EPP document shall be provided in a timely manner to all affected personnel who have responsibilities under the plan as well as all appropriate authorities, agencies, and organizations.

1.7 Testing of the EPP

Simulated testing of the EPP will be conducted on an as needed basis by the West Hants Regional Municipality, in order to test the training, readiness and effectiveness of the procedures and responsible personnel. The simulation will involve the West Hants Regional Municipality, the local EMO and all appropriate police, fire, and medical services along with the appropriate governmental and regulatory personnel. It will include a complete response exercise based on one of the potential emergency situations up to but not including evacuation.

The West Hants Regional Municipality will evaluate the simulation including the input from all parties associated with the test to clearly identify any requirements for revisions or upgrades to the existing EPP. The evaluation will include the performance of the surveillance, monitoring and communication systems in addition to the response time and the effectiveness of the notification, response and mitigative procedures.

1.8 Critique and After-Action Report

After the review of the simulation, the West Hants Regional Municipality will critique the existing EPP in order to evaluate the effectiveness of the notification, response and mitigative procedures to suit an emergency situation. This will include a critique of the events preceding, during and after the declared emergency, the actions initiated by each participant and any unsatisfactory or deficient measures encountered with respect to procedures, access, materials, equipment, or personnel.

Any resulting recommendations or revisions should be contained in a report and utilised in revising the existing EPP.

1.9 Public Information

In areas that may be adversely affected by the emergency circumstances associated with the operation of the dam and water control/conveyance structures of this water supply system, it is important that timely and factual information be channelled to the general public. This may be enhanced by the usage of print, radio, television, and other electronic media to facilitate the dissemination of information to the public on an ongoing emergency situation via relevant updates, news briefings, announcements and bulletins.

Public information will be handled in a cooperative and coordinated approach jointly by the Information Officer for the local EMO and by the designated Public Relations/Communications Officer for the West Hants Regional Municipality. Local safety and evacuation issues will generally be dealt with by the EMO Information Officer. Municipality related issues concerning the dam structures and water control

operations will be generally handled by the West Hants Regional Municipality.

2.0 EMERGENCY RESPONSE PROCEDURES

2.1 Definitions and Identification

2.1.1 Dam Breach

A dam breach is defined as a break in the dam itself or its foundation, which results in large or rapidly increasing uncontrolled releases or flow of water from the reservoir.

2.1.2 Limited Structural Failure

A limited structural failure is defined as a failure of an element or component which leads to an uncontrolled release or flow of water but does not threaten the main dam integrity and is within the spilling capacity of downstream structures.

An example would be the collapse of a gate structure.

2.1.3 Potential Dam Breach

A potential dam breach is defined as any situation that poses an immediate threat to the safety of the dam or its foundation and which could result in large or rapidly increasing uncontrolled releases of water from the reservoir. Such a situation requires swift response to prevent a dam breach.

Examples would be:

- 1) Abnormally high seepage flows through, under and around the dam.
- 2) Abnormal slumping, cracking, or structural movement in the dam.

2.2 Dam Breach

2.2.1 Responsibility of Observer

Any person who observes a dam breach shall report the emergency as a *Dam Breach* as follows:

- 1) Notify immediately the Water Treatment Plant Attendant and state the nature of the incident.

- 2) e.g. “A DAM BREACH HAS OCCURRED IN THE MILL LAKES DAM.”

Contact	Work
West Hants Regional Municipality	(902) 798-8391
Water Treatment Manager	(902) 790-1545

- 3) Relate the following information as it relates to you:

LOCATION

NAME

POSITION

TELEPHONE NO.

RADIO CALL NO.

- 4) Briefly describe the emergency in the following manner:

MAGNITUDE

ESTIMATED TIME OF OCCURRENCE

CAUSE

AREAS AFFECTED

MEASURES TAKEN

PRESENT STATUS

2.2.2 Responsibility of Water Treatment Plant Attendant

For any reported dam breach or suspected dam breach, the Water Treatment Plant Attendant shall respond as follows:

- 1) Complete an *Emergency Report* Form as found in Appendix D while taking the call.
- 2) Notify immediately the Town of Windsor’s Director of Public Works or designate and state the nature of the emergency:

e.g. “A DAM BREACH HAS OCCURRED IN THE MILL LAKES DAM.”

Contact	Work	Home	Cell
Director of Public Works	(902) 798-8391ext.208	(902) 798-9559	(902) 798-7214
Alternate -	(902) 798-8000		(902) 790-1545

- 3) If the Director of Public Works or designate cannot be notified immediately, proceed to notify the alternate shown on flowchart FIG 3.1 of Section 3.0.
- 4) Ensure that the Director of Public Works or designate is provided with as much detailed information as is possible.

2.2.3 Responsibility of Director of Public Works

For any reported dam breach, the Director of Public Works or designate shall respond as follows:

- 1) Notify immediately the following personnel, listed in order of priority here and also as outlined on flowchart FIG. 3.1 of Section 3.0:

e.g. “A DAM BREACH HAS OCCURRED IN THE MILL LAKES DAM

For a breach of the Mill Lakes Dam and/or the Fall Brook Dam, in the Region of West Hants, the Highways 14 and Windsor Back Road should be closed in the vicinity of the bridges crossing Lebreau Creek.

Contact	Work	Home	Cellular
Emergency Measures Organization	902-798-8391ext 207		902-790-4985
West Hants Regional Municipality Mayor	902-798-8391		902-790-1566
Dept. of Agriculture and Fisheries	1-800-565-1633		
West Hants Regional Municipality CAO	902-798-8391		902- 670-2455

- 2) Ensure that the EMO is provided with detailed information on areas to be evacuated based on Flood Inundation Mapping and provide interpretation of same as required.
- 3) Refer to **Downstream Hazard** below for a brief description of the consequences of the dam breach at Mill Lake and/or Fall Brook.
- 4) Maintain communication with the EMO and provide updates on the breach when necessary.

2.2.4 Downstream Hazard

The following is a brief description of the consequences or downstream hazards associated with a dam failure at Mill Lakes and/or Fall Brook. The intent is to provide a brief and ready overview of the estimated predicted results of a particular dam failure.

Mill Lakes and Fall Brook Dam Breach

A fairweather breach of the dam at Mill Lakes would release a peak flood flow in Fall Brook large enough to trigger overload and overtopping of the dam structures at Fall Brook Reservoir.

The resulting overtopping failure of the dam at Fall Brook would release a peak flood flow down the channel of Fall Brook towards Lebreau Creek and into Pesaquid Lake. As the flood wave travels down Fall Brook, a large amount of forest growth will be encountered, which may result in an increase of suspended debris in the flood wave and blockages at flow restrictions. There are several small crossings along Fall Brook, located on gravel access roads. It is expected that these crossing would be damaged and/or washed out, cutting off access to the Mill Lakes and Fall Brook Dams.

The flood wave will continue flowing downstream, until it flows into Lebreau Creek. Shortly after joining with Lebreau Creek, an electrical distribution line crosses Lebreau Creek. Further downstream, there is an electrical substation located adjacent to the river. Aerial photographs suggest that both the power distribution line and the electrical substation may be within the path of the flood wave. If the flood wave damages either the electrical substation or the power distribution line, a loss of power to local residents may occur. In fair weather, failure of the energized power pole may cause a forest fire.

As the flood wave proceeds downstream, it passes under two crossings, located on access roads to the power distribution line. It is expected that they possess adequate flow capacity for the dam breach flow; however, sustained flood flows could lead to destabilization of the bridge structure and foundations. Any damage to these bridges may delay repairs to the power distribution system should it become damaged as described in the preceding paragraph.

Further downstream, the flood wave travels under the Windsor Back Road. It is expected that the flow capacity under the timber structure is adequate to handle the flood wave. Lateral loads imposed on the structure by debris, and foundation scour may affect the structural integrity of the bridge. Under these conditions, it would have to be closed.

As the flood wave continues to travel downstream, it passes under Highway 14. The bridge has enough flow capacity below, that the flow will not be significantly impeded. The lateral load of debris and foundation scour may damage the structural integrity of the timber structure.

After the flood wave passes under Highway 14, it continues downstream and flows into

Pesaquid Lake. There would likely be minimal impact on the water levels of Pesaquid Lake due to the flood wave even at storm surge events.

2.2.5 Responsibility of EMO

For a reported dam breach, the EMO shall respond to the emergency as follows:

- 1) Confirm that notification of a dam breach has been received from the Director of Public Works or designate.
- 2) Refer to **Downstream Hazard** above for a brief description of the consequences of the dam breach.
- 3) Initiate immediate evacuation procedures for the flooded areas.
- 4) Maintain communication with the Director of Public Works or designate for updates on the dam breach. (Refer to flowchart FIG. 3.1 of Section 3.0).
- 5) Notify the personnel shown on flowchart FIG. 3.1 of Section 3.0.

2.3 Limited Structural Failure

2.3.1 Responsibility of Observer

Any person who observes the failure of a gate or any other component, shall report the emergency as a *Limited Structural Failure* as follows:

- 1) Notify immediately the Water Treatment Plant Attendant and state the nature of the incident.

e.g. “A LIMITED STRUCTURAL FAILURE HAS OCCURRED AT THE MILL LAKES DAM.”

Contact	Work	Cell
Water Treatment Plant Attendant	(902) 798-8000	(902)790-1545

- 2) Relate the following information as it relates to you:

LOCATION
NAME
POSITION
TELEPHONE NO.
RADIO CALL NO.

- 3) Briefly describe the emergency in the following manner:

MAGNITUDE
ESTIMATED TIME OF OCCURRENCE
CAUSE
AREAS AFFECTED
MEASURES TAKEN
PRESENT STATUS

2.3.2 Responsibility of Water Treatment Plant Attendant

For any reported limited structural failure, the Water Treatment Plant Attendant shall respond as follows:

- 1) Complete an *Emergency Report* Form as found in Appendix D while taking the call.
- 2) Notify immediately the Director of Public Works or designate and state the nature of the emergency:

e.g. "A LIMITED STRUCTURAL FAILURE HAS OCCURRED AT THE MILL LAKES DAM."

Contact	Work	Home	Cell
Director of Public Works	(902) 798-8391ext.208	(902) 798-9559	(902) 798-7214

- 3) If the Director of Public Works or designate cannot be notified immediately, proceed to notify the alternate shown on flowchart FIG 3.2 of Section 3.0.
- 4) Ensure that the Director of Public Works or designate is provided with as much detailed information as is possible.

2.3.3 Responsibility of Director of Public Works

For any reported limited structural failure, the Director of Public Works or designate shall respond as follows:

- 1) Notify immediately the following personnel, listed in order of priority here and also as outlined on flowchart FIG. 3.2 of Section 3.0:

e.g., “A LIMITED STRUCTURAL FAILURE HAS OCCURRED AT THE MILL LAKES DAM.”

Contact	Work	Home	Cell
Emergency Measures Organization	902-798-8391 ext.207		902-790-4985
West Hants Regional Municipality Mayor	902-798-8391		902-790-1566
Dept. of Agriculture and Fisheries	1-800-565-1633		
Department of Agriculture ()	902-798-5325		
West Hants Regional Municipality CAO	902-798- 8391		902-670-2455

- 2) Immediately assess the magnitude of the failure and water flow conditions.
- 3) Mobilize crews to implement and alleviate the problem.
- 4) If releases appear to be significant through the system, the Director of Public Works or designate is responsible to assess the potential flooding risks, notify the EMO that a potential for some flooding exists and define the potentially affected areas.
- 5) Maintain communication with the EMO and provide updates and recommendations for issuing a precautionary warning alert and initiating evacuation procedures.

2.3.4 Downstream Hazard

A limited structural failure does not immediately threaten the downstream population. However, depending on the magnitude of the failure, unusually high releases could result in some flooding.

2.3.5 Responsibility of EMO

For a limited structural failure, the EMO shall respond to the emergency as follows:

- 1) Confirm that notification of a limited structural failure has been received from the Director of Public Works or designate.
- 2) For significant releases through the system, a decision to prepare for warning and evacuation of potentially affected areas can be determined by a co-ordinated review of the Flood Inundation Map included in Appendix E.
- 3) Maintain close communication with the Director of Public Works or designate for updates on the limited structural failure.
- 4) Notify the personnel shown on flowchart FIG. 3.2 of Section 3.0.

2.4 Potential Dam Breach

2.4.1 Responsibility of Observer

Any person who observes either abnormally high seepage flows through, under and around the dam or abnormal slumping, cracking or structural movement in the dam shall report the emergency as a *Potential Dam Breach* as follows:

- 1) Notify immediately the Water Treatment Plant Attendant and state the nature of the incident.

e.g. "A POTENTIAL DAM BREACH HAS OCCURRED AT THE MILL LAKES DAM."

Contact	Work	Cell
Water Treatment Plant Attendant	(902) 798-8000	(902) 790-1545

- 2) Relate the following information as it relates to you:

LOCATION

NAME

POSITION

TELEPHONE NO.

RADIO CALL NO.

- 3) Briefly describe the emergency in the following manner:

MAGNITUDE

ESTIMATED TIME OF OCCURRENCE

CAUSE

AREAS AFFECTED

MEASURES TAKEN

PRESENT STATUS

2.4.2 Responsibility of Water Treatment Attendant

For any reported potential dam breach or suspected dam breach, the Water Treatment Plant Attendant shall respond as follows:

- 1) Complete an *Emergency Report* Form as found in Appendix D while taking the call.
- 2) Notify immediately the Director of Public Works or designate and state the nature of the emergency:

e.g. "A POTENTIAL DAM BREACH HAS OCCURRED AT THE MILL LAKES DAM."

Contact	Work	Home	Cell
Director of Public 7214	(902) 798-8391ext.208	(902) 798-9559	(902) 798-
Of Works			

- 3) If the Director of Public Works or designate cannot be notified immediately, proceed to notify the alternate shown on flowchart FIG 3.3 of Section 3.0.
- 4) Ensure that the Director of Public Works or designate is provided with as much detailed information as is possible.

2.4.3 Responsibility of Director of Public Works

For any reported potential dam breach, the Director of Public Works or designate shall respond as follows:

- 1) Notify immediately the following personnel, listed in order of priority here and as outlined on flowchart FIG. 3.3 of Section 3.0:

e.g. “A POTENTIAL DAM BREACH HAS OCCURRED AT THE MILL LAKES DAM.”

For a potential breach of the Mill Lakes Dam and/or the Fall Brook Dam, notify the Town of Windsor that Highway 14 and the Windsor Back Road should be closed in the vicinity of the bridges crossing Lebreau Creek.

Contact	Work	Home	Cell
Emergency Measures Organization	902-798-8391ext.207		902-790-4985
West Hants Regional Municipality Mayor	902-798-8391		902-790-1566
Dept. of Agriculture and Fisheries	1-800-565-1633		
West Hants Regional Municipality CAO	902-798-8391		902-670-2455

- 2) If any of the above cannot be notified immediately, refer to flowchart FIG. 3.3 of Section 3.0 for alternates.
- 3) Immediately assess and evaluate the situation and implement actions to alleviate or reduce the risk of an eventual breach.
- 4) Maintain close communication with the EMO and define the potentially affected areas. Provide updates and recommendations on whether to initiate a precautionary warning alert, should conditions deteriorate. Ensure that the EMO is provided with detailed information on areas to be evacuated based on Flood Inundation Mapping and provide interpretation of same as required.
- 5) If conditions drastically deteriorate and a breach is imminent, implement *Dam Breach* procedures as detailed in Section 2.2.
- 6) Refer to **Downstream Hazard** below for a brief description of the consequences of a potential dam breach at Mill Lakes and/or Fall Brook.

2.4.4 Downstream Hazard

A potential dam breach does not immediately threaten any of the downstream dams and population, however, should the condition deteriorate on a consistent basis, then a breach in

the dam may occur. Refer to **Downstream Hazard** in Section 2.2 **Dam Breach** for predicted effects that could occur in the event of a dam breach.

2.4.5 Responsibility of EMO

For a reported potential dam breach, the EMO shall respond to the emergency as follows:

- 1) Confirm that notification of a potential dam breach has been received from the Director of Public Works or designate.
- 2) Prepare to implement a precautionary warning alert for evacuation. Areas that could be affected will be defined by the Director of Public Works or designate.
- 3) Maintain close communication with the Director of Public Works or designate for updates on the potential dam breach. Based on recommendations coordinated with Director of Public Works or designate, a decision to issue a precautionary warning alert may be reached.
- 4) Should conditions be expected to deteriorate a decision to initiate evacuation procedures for potentially flooded areas will be reached based on recommendations from Director of Public Works or designate.
- 5) Notify the personnel shown on flowchart FIG. 3.3 of Section 3.0.

2.5 Severe Storms and Floods

Severe rainstorms over the drainage area of the water supply system can result in significant runoff into the storage reservoirs of Mill Lakes and Fall Brook. If the precipitation event is of sufficient intensity and duration and depending on the existing water level in the reservoir(s) then spilling or releasing storage water through the dam's spillways will occur. Depending on the factors previously noted, water releases could be of an unusually high volume that could result in downstream flooding.

In contrast to a fair-weather dam failure, which is sudden and without warning, major storm events generally are more predictable and take place over a period of time, which could be several hours or days. This latter situation allows some lead-time to prepare for impending flooding as the storm builds in intensity. However, early on in a major weather event, the magnitude to which the storm will build, or peak is unknown or ambiguous at best. Therefore, precautionary measures relative to handling flood events at the dam sites, as well as warning potentially affected residents or stakeholders, needs to be considered under such circumstances.

The inundation mapping, located in Section 8.0, contains approximated flood inundation

illustrations for major storm events. This information should be used to provide guidance for establishing evacuation zones and warning alerts.

In general, if severe weather warnings are predicted or received by the Water Treatment Plant Attendant from a qualified weather information service, then the following procedures should be followed:

2.5.1 Responsibility of Water Treatment Plant Attendant

- 1) Notify the Director of Public Works or designate and state that a severe storm weather warning is in effect. Refer to flowchart FIG. 3.4 of Section 3.0.

2.5.2 Responsibility of the Director of Public Works

- 1) Consult with Operations to determine water control strategies with respect to drawdown and spill requirements for the reservoir(s) in order to maintain desired and manageable levels.
- 2) Ensure close surveillance and continuous monitoring of the water level of the reservoir(s) during the storm with special attention to high levels.
- 3) If controlled releases are significant through the system, the potential flooding risks shall be assessed, and notification call will be made in accordance with the flowchart found in FIG. 3.4 of Section 3.0. Ensure that the EMO is notified that a potential for flooding exists and provide detailed information on affected areas based on Flood Inundation Mapping and provide interpretation of same as required.
- 4) Should the reservoir levels continue to rise such that the release of additional water will occur, then the Director of Public Works or designate will notify EMO, who will make a decision regarding issuing a precautionary warning alert to prepare for the evacuation of potentially flooded, inhabited areas.
- 5) The storm flood limits indicated in the Inundation Study shall be used for guidance in warning and evacuation of potentially affected residents.

2.5.3 Downstream Hazard

The following is a brief description of the consequences or downstream hazards associated with a major storm event and the subsequent runoff into the storage reservoirs contained by the dams at Mill Lakes and/or Fall Brook.

During a major storm event, Mill Lakes outlet has been deemed sufficient to pass projected flood flows. Spill water would advance to the downstream channel of Fall Brook to the Fall Brook Reservoir.

It is expected that the flood flow would raise the water level in the Fall Brook variably, depending upon channel width and gradient and take approximately one hour to reach the Fall Brook Reservoir.

The flood flow into the Fall Brook reservoir at would raise the water level considerably and will cause failure by overtopping of the main dam during severe storm events.

The Highway 14 and Windsor Back Road bridges that cross Lebreau Creek would have the embankments subjected to scour, washout, and erosion. Under these conditions, Highway 14 and the Windsor Back Road may need to be closed in these areas.

The surrounding cleared and topographically flatter estuarial areas would be flooded as they seek to attenuate the water flow.

2.5.4 Responsibility of EMO

- 1) Once notified of expected water releases, keep in contact with Director of Public Works or designate for further updates.
- 2) Should additional releases be required, the EMO will make a decision to issue a precautionary warning alert to potentially affected residents based on co-ordinated information from the Director of Public Works or designate.
- 3) The flood limits shown on the Flood Inundation Map contained in the Inundation Study of Section 8.0 shall be used as a guide for warning and evacuating potentially affected inhabitants.
- 4) Notify the personnel shown on flowchart FIG. 3.4 of Section 3.0.

2.6 Slumping, Cracking, and Increased Seepage Flows

Slumping, cracking, and increased seepage are representatives of internal erosion or instability relating to the dam fill. They are unlikely to be noticed by the casual observer, but rather by an experienced West Hants Regional Municipality operations and maintenance employee working at the dam site or performing regular dam and water level inspections.

2.6.1 Responsibility of Observer

- 1) Assess the situation and determine whether the observed slumping, cracking or increased seepage is threatening or non-threatening to the stability of the dam. If the observation appears to be threatening the stability of the dam, refer to the procedures in Section 2.4 **Potential Dam Breach**.

- 2) If the situation is categorized as non-threatening, notify immediately Director of Public Works, or designate and report the following observations. Refer to flowchart FIG. 3.5 of Section 3.0.

LOCATION OF SLUMPING, CRACKS OR SEEPAGE
SIZE
RATE OF DISCHARGE
CLEAR OR MUDDY

2.6.2 Responsibility of Director of Public Works

- 1) Immediately proceed to the dam and inspect the observation.
- 2) Initiate procedures to alleviate, contain and monitor the problem.
- 3) If the situation worsens or deteriorates, initiate the procedures in Section 2.4 **Potential Dam Breach** and as per flowchart FIG. 3.3 of Section 3.0.

2.7 Abnormal Instrumentation Readings

An abnormal instrumentation reading is one that is outside the historical range of measurements or indicates a sudden change that is unexplainable by rainfall, runoff conditions or changes in reservoir operation.

Instrumentation with respect to pressure measurements within the dam structure is not available at either of the dams at Mill Lakes or the Fall Brook Reservoir.

Remote monitoring of water levels at the dam locations of Mill Lakes and Fall Brook Reservoir is not currently completed. Operations personnel visit the dam at least once a month or more frequently as the situation requires and visually monitor a vertical staff gauge to indicate water levels in the reservoir.

2.7.1 Responsibility of Water Treatment Plant Attendant

- 1) Notify the Director of Public Works or designate when abnormally high or low water levels are reached, or a warning or alarm is received on an abnormal condition or for an unexplained reason.

2.7.2 Responsibility of Director of Public Works

- 1) The Director of Public Works or designate is responsible for monitoring and recording dam instrumentation readings.
- 2) If abnormal readings are recorded/received, the Director of Public Works or designate is responsible to verify the readings and take appropriate action to determine the reasons for such an occurrence.
- 3) Notify the personnel indicated on the flowchart in FIG. 3.6 of Section 3.0 should abnormal readings be unexplained.

2.8 Earthquake

2.8.1 Seismic monitoring

Western Nova Scotia is not considered to be a high-risk earthquake area, and therefore seismic monitoring devices are not installed near or on the dam structures at Mill Lakes or the Fall Brook Reservoir. Halifax is the location of the nearest monitoring station.

2.8.2 Responsibility of Director of Public Works

- 1) If an earthquake is felt or recorded to have occurred in the vicinity of the water supply system, then the Director of Public Works or designate shall immediately initiate an inspection of the dam sites starting with the upstream location at Mill Lakes. Depending on the findings, the Director of Public Works may feel that an emergency situation exists and shall initiate the appropriate emergency response procedure as outlined in flowchart FIG. 3.7 of Section 3.0.
- 2) If an emergency situation is not immediately evident, then the Director of Public Works or designate shall proceed with a detailed inspection and closely monitor the dams for at least 48 hours. The inspection should include the following:
 - a) Thoroughly inspect both the upstream and downstream faces including the spillway and crest of the dam.
 - b) Inspect the toe and abutments for earthfill slides or water seepage.
 - c) Inspect all drainage channels and note changes in water flow with respect to rate, suspended solids (clear or muddy) and direction.
 - d) Inspect the concrete structures for cracks or displacement.

- e) Perform an inspection two weeks after the event and submit an inspection report.

The notification flowchart for this occurrence is shown in FIG. 3.7 of Section 3.0.

2.9 Fire

A fire may be of electrical origin confined to a specific dam related structure or be a forest fire, which could threaten electrical power and communication/alarm lines to Water Treatment Plant or other Facilities

2.9.1 Structural Fire

If a member of the Water Treatment Plant operating personnel observes a fire in or near any of the structures near the water supply system, the observer shall respond as follow:

- 1) Implement local fire response.
- 2) Notify the Water Treatment Plant Attendant that water supply and possibly power and communication/alarm lines to the Water Treatment Plant may be affected.

2.9.2 Forest Fire

If a member of the Water Treatment Plant staff observes or learns of a forest fire in the vicinity, the observer shall notify the Water Treatment Plant Attendant and give:

- 1) Location and size of fire.
- 2) Proximity to affected structures, power and communication/alarm lines or other property.
- 3) Direction and force of wind.
- 4) The Water Treatment Plant Attendant will initiate the local fire response in accordance with the Water Treatment Plant procedural document, *Emergency Response Plan Manual*.

The notification flowchart for this occurrence is shown in Fig 3.8 on section 3.0.

2.10 Oil and Hazardous Substance Spills

During maintenance or other related activities at either the Mill Lakes or Fall Brook dam locations various petroleum-based products and other chemicals could be used.

If an oil spill or other pollutant including but not limited to petroleum, fuel oil, oil refuse, industrial chemicals or pesticides is spilled into the reservoirs, discharge channels or tributary streams, the observer shall immediately report the situation to the Water Treatment Plant Attendant. The Water Treatment Plant Attendant will notify the Director of Public Works or designate who shall implement the appropriate response based on the Water Treatment Plant procedural document, *Emergency Response Plan Manual*.

3.0 NOTIFICATION FLOW CHARTS

FIG. 3.1	Dam Breach
FIG. 3.2	Limited Structural Failure
FIG. 3.3	Potential Dam Breach
FIG. 3.4	Severe Storms and Floods
FIG. 3.5	Slumping, Cracking, and Increased Seepage Flows
FIG. 3.6	Abnormal Instrument Readings
FIG. 3.7	Earthquake
FIG. 3.8	Fire
FIG. 3.9	Oil and Hazardous Substance Spills

4.0 COMMUNICATION SYSTEMS

4.1 Voice Communications

4.1.1 Telephone Systems (Refer to **Communications Directory** in Section 9.0)

1) **Water Treatment Plant Internal Telephone Network**

There is no telephone system to the dam at Mill Lakes or other remote installations associated with the water control/conveyance facilities of this water supply system.

Location	Exchange
Fall Brook Reservoir Water Treatment	902 798 8000

2) **MTT (Aliant Telecom) Public Telephone Network**

Location	Public Telephone Network
Windsor Water Treatment Plant	(902) 798-8000
Plant Attendant	(902) 790-1545

3) **MTT (Aliant Telecom) / Rogers Cellular Telephone Network**

There is generally acceptable cellular telephone coverage from both dam locations at Mill Lakes and Fall Brook. Use of this type of communications permits access into the public telephone network.

4) **Mobile Radio System**

There is a two-way, mobile radio system servicing various vehicles associated with the Town of Windsor. There is generally acceptable coverage from both the dam locations at Fall Brook Reservoir and Mill Lakes.

5.0 ACCESS TO SITE

5.1 Roads

The access roads are indicated on *Site Map and Access Roads* found in Appendix F.

Access to the dam sites can be achieved from Highway 14. From Highway 14, turn onto the Windsor Back Road. Approximately 350m past Alexander Road, there is a gravel access road on the left-hand side, which leads to the Fall Brook and Mill Lakes Dam sites.

Alternatively, the dam sites can be accessed by continuing on the Windsor Back Road until it intersects with Mountain Road. After turning right on Mountain Road, travel approximately 800m and turn right onto a gravel access road. Follow the access to road to the Mill Lakes and Fall Brook Dam sites.

Access can also be achieved via Panuke Road. There is a gravel access road on the west side of the road which also leads to the Mill Lakes Dam and Fall Brook Dam sites

5.1.1 Seasonal Road Closure

- Seasonal Ban to public (forest fires)
- Snow Removal in winter

5.2 Air

5.2.1 Fixed Wing Aircraft

There are no appropriate airport facilities servicing the West Hants Regional Municipality area. Aircraft equipped with floatation pontoons suitable for landing on water could access the Mill Lakes dam.

5.2.2 Helicopters

Helicopter landing sites near or on the dam sites are possible. A designated helicopter landing site is available at the Hants Community Hospital in the Town of Windsor.

5.2.3 Effect of Dam Breach

For a breach of the Mill Lakes Dam and/or the Fall Brook Reservoir Dam, usage of the roads in the vicinity of the bridges of Highway 14 and in particular the bridge at Windsor Back Road. One or both structures crossing Lebreau Creek may require closing. It is also possible that the crossings along the access roads may be washed out during a flooding event. This will impede access to the dam sites during a flooding event.

Mill Lakes and Fall Brook Dam Breach

A fairweather breach of the dam at Mill Lakes would release a peak flood flow Fall Brook large enough to trigger overload and overtopping of dam structures at Fall Brook Dam.

The resulting overtopping failure of the dam at Fall Brook would release a peak flood flow down the channel of Fall Brook towards Lebreau Creek and into Pesaquid Lake. As the flood wave travels down Fall Brook, a large amount of forest growth will be encountered, which may result in an increase of suspended debris in the flood wave and blockages at flow restrictions. There are several small crossings along Fall Brook, located on gravel access roads. It is expected that these crossing would be damaged and/or washed out, cutting off access to the Mill Lakes and Fall Brook Dams.

The flood wave will continue flowing downstream, until it flows into Lebreau Creek. Shortly after joining with Lebreau Creek, an electrical distribution line crosses Lebreau Creek. Further downstream, there is an electrical substation located adjacent to the river. Aerial photographs suggest that both the power distribution line and the electrical substation may be within the path of the flood wave. If the flood wave damages either the electrical substation or the power distribution line, a loss of power to local residents may occur. In fair weather, failure of the energized power pole may cause a forest fire.

As the flood wave proceeds downstream, it passes under two crossings, located on access roads to the power distribution line. It is expected that they possess adequate flow capacity for the dam breach flow; however, sustained flood flows could lead to destabilization of the bridge structure and foundations. Any damage to these bridges may delay repairs to the power distribution system should it become damaged as described in the preceding paragraph.

Further downstream, the flood wave travels under the Windsor Back Road. It is expected that the flow capacity under the timber structure is adequate to handle the flood wave. Lateral loads imposed on the structure by debris, and foundation scour may affect the structural integrity of the bridge. Under these conditions, it would have to be closed.

As the flood wave continues to travel downstream, it passes under Highway 14. The bridge has enough flow capacity below that the flow will not be significantly impeded. The lateral load of debris and foundation scour may damage the structural integrity of the timber structure.

After the flood wave passes under Highway 14, it continues downstream and flows into the Pesaquid Lake. There would likely be minimal impact on the water levels

of the Pesaquid Lake from the flood wave even at storm surge events.

6.0 WARNING SYSTEMS AND DAM INSTRUMENTATION

6.1 Remote Monitoring

Mill Lakes

There is no remote water level monitoring, high- or low-level water alarms, surveillance or other warning systems or instrumentation associated with this dam location. Operations personnel visit the dam at least once a month or more frequently as the situation requires. There is a vertical staff gauge to indicate water levels in the reservoir.

Fall Brook Reservoir

An alarm for low water level at the screen chamber is relayed to an annunciator located at the Water Treatment Plant.

There is also a chlorine storage building located at this dam location and as such an alarm for low building temperature and a chlorine leak alarm either at the storage building or at the screen chamber is also similarly relayed to the Water Treatment Plant.

6.2 Stream Flow Indication

Visual observations are the only stream flow indications.

6.3 Public Warnings

Local EMO officials and governmental authorities are responsible for warning the public. There are no automated systems from the dam sites that provide early warnings to the public.

7.0 LOSS OF POWER SUPPLY

7.1 Remote Monitoring

Mill Lakes

There is no electric power supply at Mill Lakes Dam.

Fall Brook Reservoir

The electric power supply to Fall Brook Reservoir Dam (Water Treatment Plant) is via a pole line from the Town of Windsor. (Equipped with back-up generator)

7.2 Generation and Transmission

Flood inundation downstream of Fall Brook due to a dam breach or other significant water release event could result in some damage to the high voltage distribution that cross Lebreau Creek downstream of Mill Lakes and Fall Brook Dams. Flood waters could also cause inundations that could reach an electrical substation located just off Lebreau Creek. This equipment is owned and operated by Nova Scotia Power Inc. In addition, damage to other electric power poles, lines and transformers could also result in local power outages to the Town of Windsor and neighbouring communities within the West Hants Regional Municipality.

8.0 INUNDATION MAPPING

8.1 Introduction

As part of the West Hants Regional Municipality's preparation of an Emergency Preparedness Plan for the Mill Lakes and Fall Brook Reservoir Water Supply System, an Inundation Study was completed. The extent of the water supply system is indicated on the aerial photographs included in Appendix E. The Inundation Study was prepared to determine the extent of flooding from four different events.

Inundation maps provide graphical information depicting the estimated, predicted, and approximate flood areas and water levels, under various reservoir water release scenarios, as a result of emergency situations. These maps form an integral part of developing early warning and evacuation procedures.

As part of the Emergency Preparedness Plan an Inundation Study was prepared to determine the extent of flooding from four events.

There are many variables and limitations to the current knowledge of flood prediction techniques, analysis, and interpretation. Along with the contour interval accuracy associated with the available mapping, areas inundated during an actual flood event may differ from the assumed areas shown on the inundation maps. Therefore, it should be noted that the determination of the flood limits and flood wave travel times must be considered as approximate only and are to be used only as a guideline for establishing potentially affected areas and evacuation zones.

The hydrological data used in this inundation study was obtained from information supplied by CBCL Limited in a fax report dated December 24, 2004, a copy of this fax is included in Appendix G. It is noted that the information used to develop the inundation limits is approximate and the results should also be considered as such.

Information for the Dam structures at Mill Lakes and Fall Brook Reservoir was obtained from drawings provided by the Town of Windsor.

8.2 Inundation Studies

The flood inundation study or analysis does not in any way imply that the dams of the water supply system are unsound. It is a hypothetical analysis to determine the downstream consequences in the unlikely event that a dam failure should ever occur.

A dam failure usually results from either:

- 1) overtopping due to severe storm generated floods, or water released from an upstream structure.
- 2) by internal erosion, precipitated by piping, sliding or earthquake induced displacements.

If a dam fails, the stored water is released, and uncontrolled flooding may occur to downstream regions. Studies that predict the flood wave height, time of arrival and duration are essential for evacuation and mitigation planning.

The events that were selected in this inundation study are as follows:

- Trial 1 – Fairweather Dam Breach.
- Trial 2 – 1:100 Storm Event.
- Trial 3 – 1:1000 Storm Event.
- Trial 4 – Probable Maximum Flood (PMF).

To calculate the inundation limits for each of these events a series of cross sections at various intervals were selected throughout the water supply system. Using the 1:10,000 contour drawings the resulting cross section was drawn in AutoCAD for each section.

The flood inundation illustrations are based on the Nova Scotia Department of Housing and Municipal Affairs Geomatic Centre's topographic digital database at a scale of 1:10,000 with 5 metre contour intervals. The maps are compiled from aerial photographs taken in the early 1990's. Developments established subsequent to the aerial photographs are not shown on the maps.

The provided volume of flow and velocity were used to calculate an area of flow at each cross section. Using this calculated area of flow a sequence of trials was undertaken to establish a graphical cross-sectional area of flow to best fit the calculated flow area. The flood limit at each cross section was then placed on the contour maps. Digitally the contour maps were placed on top of the aerial photographs to transfer the flood limits onto the aerial photographs.

The following sections describe the four inundation trials indicated above.

8.2.1 Trial 1 - Fairweather Dam Breach

The first inundation trial is an approximation, which involves a possible fairweather dam breach scenario at Mill Lakes. A fairweather dam failure assumes that reservoirs are at normal seasonal levels and that inflows and outflows are normal at the time of dam failure.

Breach flow has been estimated to be approximately relative to $0.5H_{ML}$, where this value represents the height of water flow resulting from a breach corresponding to about one half of the height of the earthen dam Mill Lakes.

This method of inundation determination is a very rough approximation. It is generally considered to be conservative in representation even though the effects of stream flow restriction are not considered.

As the $0.5H_{ML}$ breach flow progresses downstream from Mill Lakes, a great deal of forest growth will be encountered, which will contribute to suspension of heavy debris in the flood wave and blockages at flow restrictions.

There are two crossings located approximately 1700 m and 3300 m downstream of the Mill Lakes Dam, respectively. It is expected that the flow resulting from the Mill Lakes Dam will wash out both crossings, resulting in additional debris in the flood wave and increased blockages at flow restrictions.

Beyond these crossings, the flood flow would continue to the Fall Brook Reservoir via the settling pond, which is immediately up stream of the reservoir. A rock filled berm separates the settling pond from the main reservoir. A concrete inflow structure is located in the rock berm on the settling pond side. The rock berm also has a depressed area that forms a spillway channel should the intake structure become clogged, or a high flow is experienced. Beyond the rock berm, the flood flow would continue to the Fall Brook Reservoir, where the inflow would quickly overload outlet capacity at the spillway portion of the dam. A breach of the Fall Brook Dam would be expected. Outflow from the Fall Brook Reservoir would be characterised as minimal relative to the outflow resulting from the Mill Lakes Dam breach. The total flow of water travelling downstream of Fall Brook Dam will not be significantly increased by the breach of the Fall Brook Dam. As a result, the breach flow downstream of Fall Brook Dam will be approximated to be $0.5 H_{ML}$. While, this method of inundation determination is a very rough approximation, it is generally considered to be conservative in representation even though the effects of stream flow restriction are not considered.

The flood wave will continue to flow downstream until it connects with Lebreau Creek. About 90 m downstream of the location that Fall Brook joins Lebreau Creek, an electrical distribution line that is owned and operated by Nova Scotia Power Inc. (NSPI), crosses the river. Further downstream, there is an electrical substation. Aerial photographs suggest that power poles and substation may be within the path of the flood wave. If these wooden power poles fail due to the flood flow or suspended debris, it may result in loss of power to local residents. In fair weather, if failure of energized power lines supports occurs, there will be a danger of potential forest fire resulting from electrical discharge as the conductors ground.

There is a crossing approximately 460 m further downstream. The capacity of the crossing is large enough that the flow would not be significantly hindered. It is possible that damage may occur due foundation scour and the lateral impact of heavy debris on the structure.

Further downstream, there are two small bridges. These bridges have adequate flow capacity to handle the dam breach flow, however, there is potential danger to the structural integrity of these bridges due to foundation scour and lateral impact of heavy debris on bridge abutments. These bridges are both located on access roads, leading to power lines. Damage to these structures may impede repairs of any power lines damaged by the flood wave.

After the flood wave flows downstream of these two bridges, it approaches a timber bridge. There is enough flow capacity under the bridge to accommodate the dam breach flow without significantly impeding the flow. However, the lateral load of the debris may damage the structural integrity of the bridge. The structure may also experience damage due to foundation scour.

Further downstream, there is a timber bridge. The bridge has adequate flow capacity to handle the dam breach flow but may experience damage due to the lateral load of debris and foundation scour. After the flood wave has passed under this bridge, the water will continue to flow into the Pesaquid Lake.

8.2.2 Trial 2 – 1 in 100-year Storm

This second inundation trial is representative of a manual approximation of stream flow, this time resulting from a 1 in 100-year storm. Spillway and outlet capacities at Mill Lakes and Fall Brook Reservoir are easily able to pass

these design flows

Mill Lakes Outlet: 17.8 m³/s

Fall Brook Dam: 21.3m³/s

8.2.3 Trial 3 - 1 in 1000-year Storm

This inundation trial is an approximation of design flood flows during a 1 in 1000-year storm, the chosen Inflow Design Flood, or IDF.

The IDF flow characteristics can be summarized as follows:

A) *Mill Lakes Dam*

The approximate expected inflow/outflow peak at Mil Lakes during IDF can be as much as 32.8m³/s, which is within the spillway capacity.

B) *Fall Brook Reservoir Dam*

The approximate expected inflow/outflow peak at the Fall Brook Dam during IDF can be as much as 37.4m³/s,

The Fall Brook Reservoir Dam's primary spillway will not carry sufficient spill capacity to match the Mill Lakes Dam outlet and overflow channel flows. The expected inflow to Fall Brook Reservoir will be outflow from Mill Lakes plus cumulative surface run-off from upstream tributary areas. The inflow to Fall Brook Reservoir resulting from an IDF event will probably lead to a breach of the main dam at Fall Brook Reservoir under these conditions.

Highest intensity storms usually occur over a short duration in the summer months. The run-off coefficient, in the summer will be lowest indicating dry soil, rough conditions and abundant vegetation which all contribute to restricting run-off. Infiltration can be higher during these warmer, dryer months which reduces run-off.

Lower intensity storms, often with longer duration usually occur in the winter months. Such a storm is often accompanied by frozen ground conditions, which can cause the run-off coefficient to increase significantly. This reflects icy conditions, hard and impermeable ground, and reduced retention time. Therefore, winter storms can produce very severe conditions in spite of reduced intensity.

According to the *Dam Safety Guidelines, January 1999* of the Canadian

Dam Association:

“Dams shall be designed and evaluated to safely pass an Inflow Design Flood (IDF). Selection of the IDF for a dam shall be based on the consequences of failure.”

Consider that the IDF strikes without significant warning which means that the reservoirs are filled to the Full Supply Level (FSL) which is usually equivalent to the crest of the spillway. If some significant warning is available, reservoirs can be lowered to provide improved capacity for storage of flood waters.

In reference to the *Dam Safety Guidelines*, **Section 1.4 Classification of Dams, Table 1-1 Classification of Dams in Terms of Consequences of Failure**, the situation for this water supply system as per the manual rough approximation herein is that these structures qualify for the Low Consequence category of dams. There is limited opportunity for flood waters to cause damage to the electric power distribution lines, highways, power plant infrastructure as well as occupied residential dwellings. Loss of life as a result of dam failure is not likely.

From **Table 6-1 Usual Minimum Criteria for Inflow Design Floods** of the *Dam Safety Guidelines*:

CONSEQUENCE CATEGORY	INFLOW DESIGN FLOOD (IDF)
High	Annual Exceedance Probability (AEP) Between 1/1000 and the Probable Maximum Flood (PMF)
Low	AEP between 1/100 and 1/1000

The Probable Maximum Flood (PMF) was not considered as the IDF for the purposes of this rough determination of flood inundation.

8.2.4 Trial 4 – Probable Maximum Flood (PMF)

The fourth inundation trial is a manual representative of approximated stream flow associated with a Probable Maximum Flood (PMF) event. Such an event will lead to failure of dam structures at Mill Lakes and Fall Brook, and will result in flood inundation, which exceed those represented in Trial 1 – Fairweather Breach.

It is noted that the inundation maps reflect PMF flows only and the flow from dam breaches are not included in the PMF inundation limits.

8.3 Conclusions and Recommendations

In accordance with the Dam Safety Guidelines 2007, the dam classification is based at population at risk, environmental losses, cultural value losses, infrastructure losses and economic losses. Refer to Table 2-1 that is included in Appendix H that shows the various dam classifications.

The water supply system that has been described in the Emergency Preparedness Plan includes two dams that will have different dam classifications.

The dam classifications for the Mill Lakes Dam has been selected as LOW. This classification has been selected as there is no population at risk should a dam breach occur. Also, should a dam breach occur at the Mill Lakes Dam there will be minimal environmental losses and low economic losses. For a LOW dam classification, the inflow design flood (IDF) will be based on a 1/100 event.

The dam classification for the Fall Brook Dam is slightly more complicated as it will depend on the value of the economic losses related to the loss of drinking water supply and firefighting capability for the Town of Windsor. However, the population at risk is considered temporary. Therefore, the classification for the Fall Brook Dam has been selected as Significant. For a significant dam classification, the inflow design flood (IDF) is between the 1/100 and 1/1000 events.

9.0 COMMUNICATIONS DIRECTORY

The Communications Directory is a list of people and organizations classified so as to facilitate making a specific contact, rather than using the notification flowcharts. This directory does not replace the notification flowcharts and is only a complement to them. The contents of this section are divided into the following two sub-sections.

9.1 Telephone Communications

9.1.1 Long Distance Telephone Calls

- 1) The area codes for Nova Scotia 902 and 782.
- 2) For calls within Nova Scotia via the public telephone network, dial 1 + area code + seven-digit number.

1. Emergency Measures Organization (EMO)

Contact	Work	Home	Cellular
EMO Director of N.S.	902-424-5620 (24 hours)		
West Hants Regional Municipality Coordinator (Alternate)	902-798-8391 ext. 207 902-798-8391 ext. 133		902-790-4985 902-670-2455
West Hants Regional Municipality Mayor	902-798-8391		902-790-1566

2. Local Municipalities

Contact	Work	Home	Cellular
West Hants Regional Municipality Mayor	902-798-8391		902-790-1566
Fire Protection West Hants Regional Municipality Fire Service	Emergency 911		

3. RCMP

Contact	Work
Windsor Detachment	902- 798- 2207

4. Provincial Government

Contact	Work	After Hours
NS Department of the Environment		
Halifax	(902)-424-3600	
Bedford	(902)-424-7773	
Kentville	(902)-679-6086	

Contact	Work
NS Department of Natural Resources	
Hants West District Office	(902)-798-2016
Fire Control Centre	
Fisheries & Oceans Canada	1-800-565-1633
Windsor Office	
After Hours:	

NS Dept of Agriculture and Fisheries
Avon River Causeway Aboiteau Superintendent

Alternate:

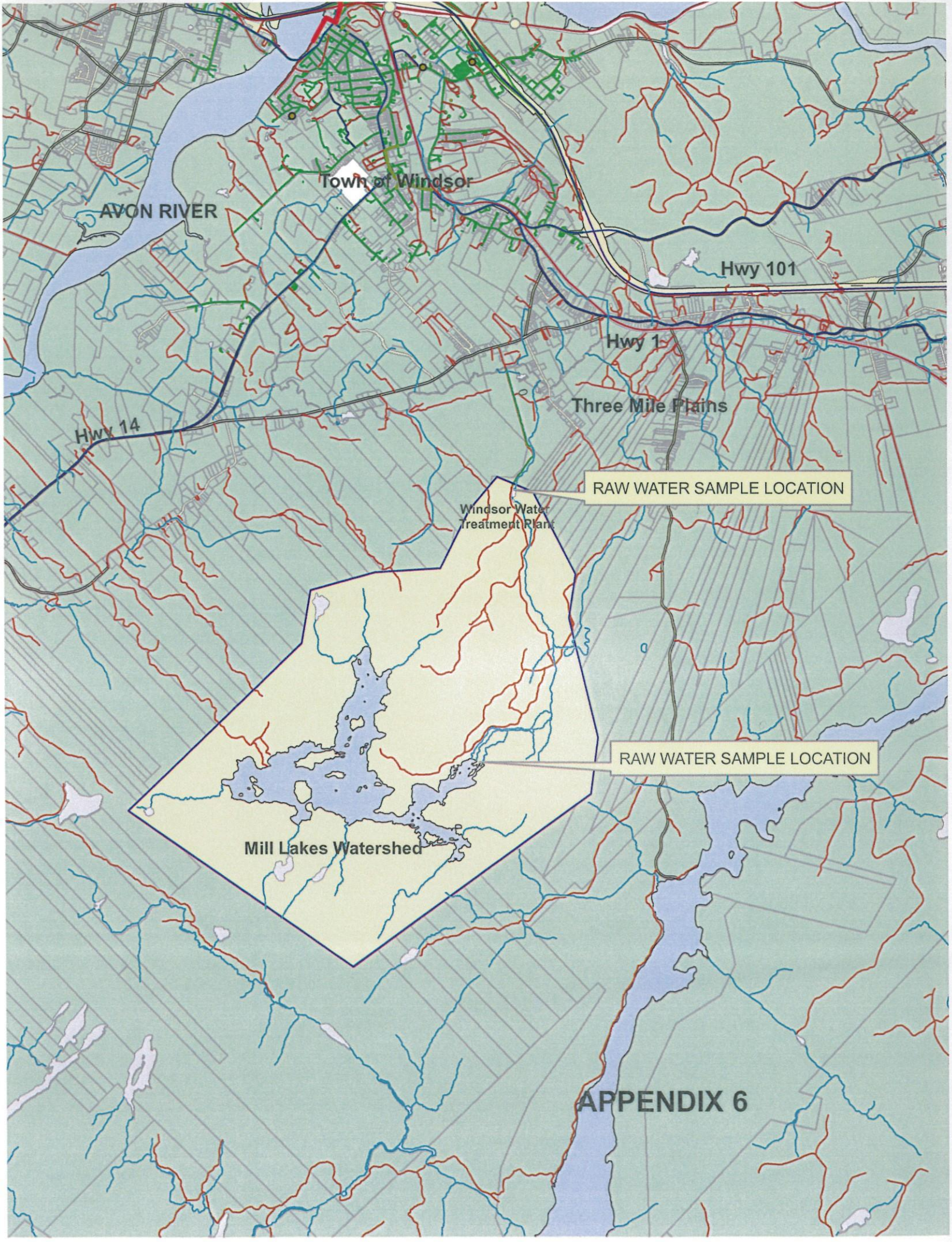
5. Nova Scotia Power

Superintendent Avon Hydro System, Tim Curry	(902)-542-5600	(902)-670-2420 (Cell)
Windsor Windsor Office		

10.0 CONSTRUCTION MATERIALS AND EQUIPMENT

The following is a list of supplies of material and equipment in the vicinity.

1. Heavy Equipment	Work	After Hours
Ernie Smith Excavating TMP 7357	(902)-798-5884	(902)-798-
B. Daniels Construction Ltd.	(902)-798-8812	(902)798-7778
2. Concrete Supplies	Work	After Hours
Annapolis Valley Ready Mix	(902)-798-2291	(902)797-1333
3. Lumber and Building Supplies	Work	After Hours
Home Hardware Windsor	(902)-798-3222	
Kent Building Supplies	(902)-798-4488	
Swinamer Home Building Center	(902)798-8386	
4. Equipment Maintenance and Repair	Work	After Hours
Atlantic Alltrade	(902)-456-7662	
Dave Reynolds Plumbing	(902)-798-7650	
Edgecomb plumbing	(902)-790-1160	
James Frenette Electrical	(902)-790-1748	



AVON RIVER

Town of Windsor

Hwy 101

Hwy 1

Three Mile Plains

Hwy 14

RAW WATER SAMPLE LOCATION

Windsor Water Treatment Plant

RAW WATER SAMPLE LOCATION

Mill Lakes Watershed

APPENDIX 6

APPENDIX 7

EXCERPT FROM WEST HANTS LAND USE BY-LAW (2008)

24.0 WATER SUPPLY (W)

Permitted Uses

24.1 The following uses shall be permitted in the Water Supply (W) zone:

- Agricultural uses excluding dwellings, the keeping of livestock and greenhouse operations
- Forestry uses excluding processing structures
- Historic buildings and sites
- Municipal water treatment and distribution uses
- Outdoor recreation uses provided no permanent structures are erected
- Uses, buildings and structures necessary for the prevention of floods, soil erosion and other similar natural occurrences
- Woods camps

W Zone General Requirements

24.2 In the W zone, no development permit, with the exception of municipal water treatment and distribution uses, shall be issued except in conformity with the following:

Minimum lot area	10 acres (4.05 ha)
Minimum lot frontage	200 ft (60.96 m)
Minimum water frontage*	300 ft (91.44 m)
Minimum front yard	50 ft (15.24 m)
Minimum rear yard	50 ft (15.24 m)
Minimum side yard	50 ft (15.24 m)
Maximum height of main building	35 ft (10.67 m)

*Water frontage requirement applies to lots with frontage on Mill Lake and Davidson Lake.

Environmental Study

24.3 No development permit shall be issued for any proposed development within 213.25 ft (65 m) of any watercourse or water body in the W zone until an environmental study, as described in Policy 9.3.8 of the Municipal Planning Strategy, has been completed and submitted to the Development Officer.

APPENDIX 7 (cont.) - EXCERPT FROM WEST HANTS LAND USE BY-LAW (2008)

Slope

24.4 No structure may be erected or land levels altered on any portion of a lot in the W zone where the slope is greater than 15 percent with the exception of buildings or structures related to:

- (a) the prevention of floods, or erosion, or which serve to facilitate drainage; and
- (b) municipal water treatment and distribution uses.

Protected Water Areas

24.5 In addition to all requirements of this By-law, additional regulations may apply to areas designated as Protected Water Areas under the Nova Scotia *Environment Act*, including the French Mill Brook and Mill Lakes water supply watersheds.

Woods camps

24.6 The total floor area of a woods camp in the W zone shall not exceed 600 ft² (55.74 m²), excluding any decks, balconies, exterior staircases and similar features.