

POLICIES

FOR THE ADMINISTRATION OF ONTARIO REGULATION 177/06

Development, Interference with Wetlands and Alterations to Shorelines and Watercourses



**NORTH BAY-MATTWA CONSERVATION AUTHORITY
POLICIES FOR THE ADMINISTRATION OF ONTARIO REGULATION 177/06
DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES
AND WATERCOURSES**

Summary of Revisions

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EXECUTIVE SUMMARY

North Bay-Mattawa Conservation Authority (NBMCA) is committed to articulating its program and policy interests and working collaboratively with partners and clients. Having regulation policies in place that are reflective of current provincial legislation and planning policy, easy to understand, reasonable and defensible offers a vital foundation for protecting public safety and property along with the features and functions of the NBMCA watershed. These policies contribute to sound and responsible development and the promotion of safe, sustainable communities.

This new manual summarizes the scope of NBMCA's regulatory and advisory responsibilities and requirements. It is expected that this manual will be used by NBMCA staff; municipal planning, building department, public works, engineering, and community services staff; developers and their agents; and, private landowners who may be seeking approval from the Conservation Authority (CA) under the Conservation Authorities Act (CA Act). For this reason, every effort has been made to create a document that is easy to understand and easy to use.

This manual provides information and guidance and has been developed to:

- Consolidate all regulatory and watershed plan review policies of NBMCA in one place to offer an up-to date and complete set of policies and provide NBMCA staff with a document against which to review CA Act permit applications and to provide plan review services to its municipal partners; and,
- Provide watershed municipalities, applicants and their agents, private landowners and special interest groups with a clear understanding of NBMCA's role, mandate and responsibilities regarding CA Act permit applications.

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HOW TO READ THIS MANUAL

The content of this manual has been divided into the following chapters:

Chapter 1 Introduction – Regulation Policies

Provides an overview of the legislative framework that determines NBMCA's regulatory role and responsibility. It also provides a summary of the role of CAs generally and describes the guidelines and policies that NBMCA staff relies on to make regulatory decisions.

Chapter 2 General Policies

Provides a set of general policies that pertain to all regulated areas.

The following chapters of this document are organized according to the areas/features regulated under Section 28 of the Conservation Authorities Act. Each of these sections is intended to be self-contained and all should be read in conjunction with Section 1.0 Introduction and Section 2 General Policies. It should be noted that more than one type of regulated feature may exist for a given property and application, and as such, reference must be made to all relevant sections and the policies must be applied concurrently. In preparing this document, technical publications have been summarized and as such, the reader is encouraged to consult the original documents.

In general, each section provides:

- the relevant excerpts from the Regulation;
- a discussion of the functions of the feature with a description of how the hazard is defined (where applicable); and,
- policies for implementing the Regulation.

Chapter 3 River or Stream Valleys

Chapter 4 Lake Nipissing Shoreline

Chapter 5 Other Hazardous Lands (Unstable Soil and Unstable Bedrock and the North Bay Escarpment)

Chapter 6 Watercourses

Chapter 7 Wetlands and Other Areas

Chapter 8 Glossary

Provides definitions for the purpose of interpreting these policy guidelines

1.0 INTRODUCTION – REGULATION POLICIES

1.1 BACKGROUND AND OVERVIEW

The policies contained in this document apply specifically to North Bay-Mattawa Conservation Authority's (NBMCA) regulatory role under Section 28 of the Conservation Authorities Act (CA Act) (Appendix A). These policies must be considered in their entirety, since NBMCA is required to regulate development that may affect the control of flooding, erosion, pollution or conservation of land, and activities that may change or interfere with the existing channel of a watercourse or with a wetland, either singly or in combination.

In 1956, the Province amended the CA Act to empower Conservation Authorities (CAs) to make regulations to prohibit filling in floodplains. These powers were broadened in 1960 to prohibit or regulate the placing or dumping of fill in defined areas where, in the opinion of the CA, the control of flooding, pollution or the conservation of land may be affected. In 1968, an amendment to the CA Act further extended the power of CAs to prohibit or control construction and alteration to waterways, in addition to filling.

In 1998, the CA Act was changed as part of the Red Tape Reduction Act (Bill 25) to ensure that regulations under the Act were consistent across the province and complementary with provincial policies. To better reflect provincial direction and to strengthen protection of public safety and the environment, the CA Act was modified to enable CAs to enact the Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation (O. Reg. 97/04) (Appendix B) to replace the Fill, Construction and Alteration to Waterways Regulation (O. Reg. 162/90).

Ontario Regulation 97/04 requires CAs to regulate development in areas where flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by development. The purpose of this regulation is to prevent the creation of new hazards or the exacerbation of existing hazards.

The primary objectives of Ontario Regulation 97/04 are to:

- Prevent loss of life as a result of flooding or erosion hazards, or unstable soil or bedrock; and,
- Minimize property damage and social disruption resulting from flooding or erosion hazards, or unstable soil or bedrock.

In order to achieve these objectives, CAs take into consideration:

- Minimizing public and private expenditure for emergency operations, evacuations, disaster relief and restoration;
- Preventing hazardous development within floodplains, erosion areas, and unstable soil and bedrock which may in future require substantive mitigation measures;
- Ensuring development does not increase risks to upstream and downstream landowners;
- Preventing filling in and/or draining of natural storage areas and development that may impact the stage-storage discharge relationship of a floodplain, increase flood elevations and/or decrease slope stability;
- Preventing interference with the hydrologic function of wetlands; and,
- Preventing pollution and other degradation of rivers and other water bodies.

The Minister of Natural Resources approved Ontario Regulation 177/06 Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation (Appendix C) (hereafter

referred to as the Regulation) on May 4th, 2006 for NBMCA, consistent with the Cabinet-approved Ontario Regulation 97/04. Permission from NBMCA is required for proposed development in water-related hazard areas such as river or stream valleys (including lake shorelines), wetlands, or other hazardous lands; alterations to the existing channel of a river, creek, stream or watercourse; or interference with a wetland. The purpose of the Regulation is to guide development, ensuring that people are protected from risk and that properties are protected against flooding and erosion hazards, and unstable soil or bedrock. The following schematic illustrates the legislative context within which these policies fit:

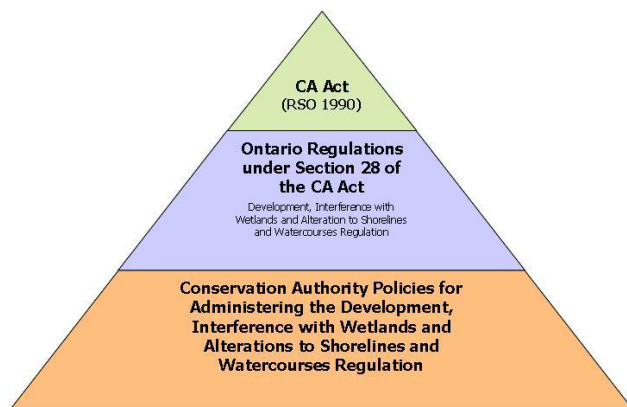


Figure 1: Hierarchy of Legislation and Policies

NBMCA is committed to providing a timely, objective, impartial, consistent and comprehensive review of all permit applications submitted for approval under the CA Act Section 28 Regulation (O. Reg. 177/06). Although permit applications are not reviewed pursuant to the Planning Act, where possible, NBMCA will endeavor to apply the Regulation in a manner consistent with the Provincial Policy Statement made under the authority of Section 3 of the Planning Act.

1.2 AUTHORITY OF THE REGULATION (177/06)

The Regulation provides NBMCA with specific authority to:

- a) Prohibit, regulate or require permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, or watercourse; or changing or interfering with a wetland; and,
- b) Prohibit, regulate or require permission for development if the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.

The Regulation does not:

- Limit the use of water for domestic or livestock purposes;
- Interfere with the rights or powers conferred upon a municipality in respect of the use of water for municipal purposes;
- Interfere with any rights or powers of any board or commission that is performing its functions for or on behalf of the Government of Ontario;
- Interfere with any rights or powers under the Electricity Act or the Public Utilities Act; or,
- Apply to activities approved under the Aggregate Resources Act (AR Act).

1.2.1 Areas Subject to the Regulation

NBMCA's area of jurisdiction is defined as the watersheds of the Mattawa River and all lands flowing to Lake Nipissing within the City of North Bay and the Municipality of Callander; approximately 2900km². The Mattawa River is part of the Ottawa River drainage system and Lake Nipissing is part of the Great Lakes drainage system. NBMCA's area of jurisdiction has been divided into 20 subwatersheds for planning and management purposes as depicted in Figure 2.

In accordance with Ontario Regulation 177/06, NBMCA has regulated areas within its jurisdiction as follows:

- River or Stream Valleys
- Lake Nipissing Shoreline
- Other Hazardous Lands (Unstable Soils, Unstable Bedrock and the North Bay Escarpment)
- Watercourses
- Wetlands
- Other areas where development could interfere with the hydrological function of a wetland

1.2.2 The Regulation Limit

The approximate extent of regulated areas associated with hazardous lands, wetlands, areas of interference with wetlands, watercourses, and river or stream valleys is identified by a Regulation limit. Throughout the watershed, the Regulation limit has been mapped by NBMCA in accordance with guidelines from the Ministry of Natural Resources and Forestry (MNR) and Conservation Ontario (CO) and in particular the *Terms of Reference, Determination of Approximate Regulated Area*, NBMCA 2006.

However, it is very important to recognize that this Regulation limit is merely an approximation that is based on the best available information and that, in case of a conflict, the written description of those areas in Section 2(1) of Ontario Regulation 177/06 shall prevail over the Regulation limit illustrated on the maps. In most cases, the exact limits of hazardous lands have not been mapped.

NBMCA Regulation limit mapping is available in hard copy at the North Bay-Mattawa Conservation Authority office. Municipal planning officials and building inspectors have also been provided with the mapping. NBMCA has developed a searchable on-line mapping tool to assist the public with determining if a property is within the Regulation limit.

1.2.3 Regulated Activities

The Regulation gives NBMCA the authority to prohibit or regulate development in areas described above within its jurisdiction (the watershed).

For the purposes of the Regulation, NBMCA uses the definition of development as defined by the CA Act. Under the CA Act, development means:

- ***the construction, reconstruction, erection or placing of a building or structure of any kind;***
- ***any change to a building or structure that would have the effect of altering the use or potential use of the building or structure;***

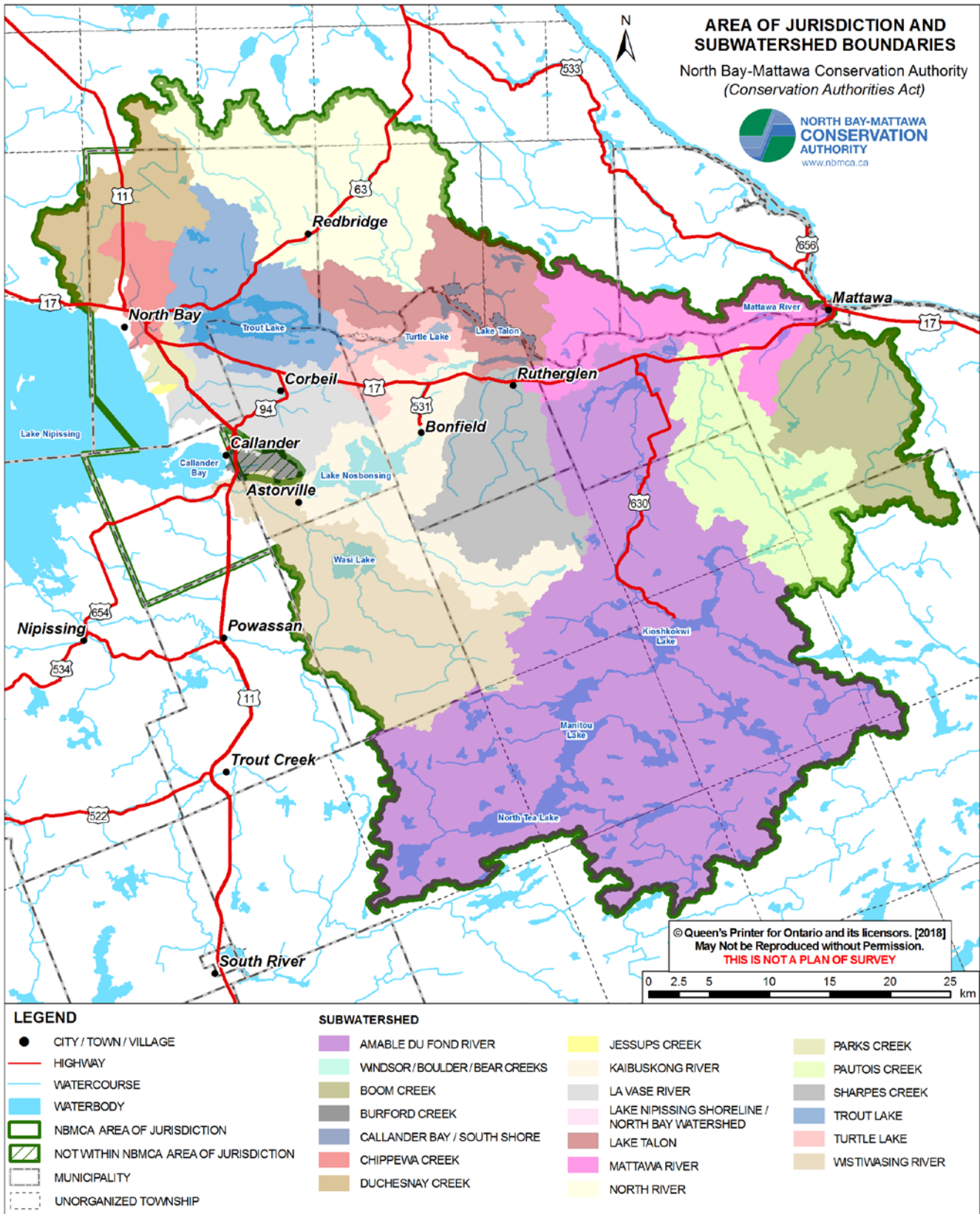


Figure 2: Subwatersheds within NBMCA's Area of Jurisdiction

- ***any change to a building or structure that would increase its size or structure or increase the number of dwelling units in the building or structure;***
- ***site grading; or,***
- ***the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.***

The Regulation also gives NBMCA authority to regulate activities which would result in:

- the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, or watercourse; or
- changing or interfering in any way with a wetland.

2.0 GENERAL POLICIES

2.1 REGULATED AREAS – GENERAL POLICIES

Within areas defined by the Regulation (Regulated Area) including river or stream valleys and an allowance; wetlands or other areas where development could interfere with the hydrologic function of a wetland (areas of interference); lands adjacent or close to the shoreline of Lake Nipissing and inland lakes and an allowance; watercourses, or hazardous lands, the following general policies will apply:

- 2.1.1** *Development, interference or alteration* will not be permitted within a Regulated Area, except in accordance with policies in sections 2-7.
- 2.1.2** *Development, interference and/or alteration* activities shall not be undertaken in a regulated area without written permission from NBMCA.
- 2.1.3** Where a regulated area pertains to more than one water-related hazard (e.g., lands susceptible to flooding that are part of a wetland), policies will be applied jointly, and where applicable, the more restrictive policies will apply.
- 2.1.4** *Development, interference and/or alteration* activities within a Regulated Area may be permitted where it can be demonstrated through appropriate technical studies and/or assessments, site plans and/or other plans as required by NBMCA that:
- a) the risk to public safety is not increased,
 - b) susceptibility to natural hazards is not increased or new hazards created,
 - c) there are no adverse hydraulic or fluvial impacts on rivers, creeks, streams, or watercourses,
 - d) grading (e.g. placing and removing fill) is minimized and maintains stage-storage discharge relationships and floodplain flow regimes for a range of rainfall events, including the Regional Storm,
 - e) there are no negative or adverse hydrologic impacts on wetlands,
 - f) pollution, sedimentation and erosion during construction and post construction is minimized using best management practices including site, landscape, infrastructure and/or facility design (whichever is applicable based on the scale and scope of the project), construction controls, and appropriate remedial measures,
 - g) intrusions on significant natural features or hydrologic or ecological functions are avoided, and no adverse impacts to significant natural features or hydrologic or ecological functions will occur,
 - h) groundwater discharge areas which support significant natural features or hydrologic or ecological functions on-site and adjacent to the site are avoided,
 - i) groundwater recharge areas which support significant natural features or hydrologic or ecological functions on-site and adjacent to the site will be maintained or enhanced,
 - j) safe access for emergency works, maintenance, and evacuation is available,
 - k) works are constructed, repaired and/or maintained according to accepted engineering principles and approved engineering standards or to the satisfaction of NBMCA, whichever is applicable based on the scale and scope of the project, and
 - l) the control of flooding, erosion, dynamic beaches, pollution or the conservation of land is not adversely affected.

- 2.1.5** Notwithstanding Section 2.1.4, **development, interference** or **alteration** in a Regulated Area may be permitted subject to supplementary policies or standalone policies as specified in Sections 3-7.
- 2.1.6** Applications for permission to undertake **development, interference** or **alteration** in Regulated Areas must be accompanied by appropriate technical studies and/or assessments, site plans and/or other plans as required by NBMCA. These studies/plans will demonstrate to the satisfaction of NBMCA, how the applicable policies in Sections 2, 3, 4, 5, 6 and 7 will be met.

Prohibited Uses

- 2.1.7** Notwithstanding Sections 2.1.4-2.1.6 General Policies, **development** will not be permitted within hazardous lands or wetlands where the use is:
- a) an institutional use associated with hospitals, nursing homes, pre-school, nurseries, day care or schools, where there is a threat to the safe evacuation of the sick, the elderly, persons with disabilities or the young,
 - b) an essential emergency service such as fire, police, ambulance or electrical substation,
 - c) associated with the disposal, manufacture, treatment, transfer or storage of hazardous substances,
 - d) associated with the outdoor storage of any materials, either temporary or permanent, or
 - e) associated with an assisted living facility.

Activities in regulated areas that are carried out by provincial ministries, Crown corporations or the federal government do not require a permit. Activities conducted on provincial crown land by third-party proponents in a regulated area may require a permit, unless acting as an agent of the Crown.

Works for which permission is required under the Regulation may also be subject to other legislation, policies and standards that are administered by other agencies and municipalities, such as the Planning Act, Public Lands Act, the Endangered Species Act, Nutrient Management Act, Drainage Act, Environmental Assessment Act (EA Act) or the Federal Fisheries Act, etc. It is the responsibility of the applicant (or applicant's agent) to ensure that all necessary approvals are obtained prior to undertaking any works for which a permit under this Regulation has been obtained.

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3.0 RIVER OR STREAM VALLEYS

3.1 ONTARIO REGULATION 177/06 DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

The following section identifies how the extents of river or stream valleys are determined for the purpose of administering the Regulation. Inland lakes that do not meet the definition of a “large inland lake” (i.e. waterbody that has a surface area equal to or greater than 100 square kilometres where there is no measurable or predictable response to a single runoff event) should be treated in a manner similar to a river or stream valley. The section of NBMCA Ontario Regulation 177/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses dealing with river or stream valleys is listed below.

“Development prohibited

2. (1) *Subject to section 3, no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,*

- (b) *river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse, the limits of which are determined in accordance with the following rules:*
 - (i) *where the river or stream valley is apparent and has stable slopes, the valley extends from the stable top of bank, plus 15 metres, to a similar point on the opposite side,*
 - (ii) *where the river or stream valley is apparent and has unstable slopes, the valley extends from the predicted long term stable slope projected from the existing stable toe of the slope or, if the toe of the slope is unstable, from the predicted location of the toe of slope as a result of stream erosion over a projected 100 year period, plus 15 metres to a similar point on the opposite side,*
 - (iii) *where the river or stream valley is not apparent, the valley extends the greater of,*
 - (A) *the distance from a point outside the edge of the maximum extent of the floodplain under the applicable Regulatory floodplain event standard, plus 15 metres to a similar point on the opposite side, and*
 - (B) *the distance from the predicted meander belt of a watercourse, expanded as required to convey the flood flows under the applicable flood event standard, plus 15 metres, to a similar point on the opposite side.”*

“Permission to develop

3. (1) *The Authority may grant permission for development in or on the areas described in subsection 2(1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development.*

(2) *The permission of the Authority shall be given in writing, with or without conditions.”*

3.2 DISCUSSION OF RIVER OR STREAM VALLEYS

In order to define the Regulation limits for river and stream valleys, it is important to understand the landforms through which they flow. While there are many different types of systems, the application of the Regulation limit for rivers and stream systems is based on two simplified landforms, as explained in the Technical Guides for River and Stream Systems (MNR, 2002a; and MNR, 2002).

3.2.1 Riverine Erosion Hazards

River or stream valleys are shaped and re-shaped by the natural processes of erosion, slope stability and flooding.

The Riverine Erosion Hazard applies to those portions of the valleyland system that are both apparent (confined) and not apparent (unconfined). The extent of the hazard varies and is dependent on the characteristics of the bedrock and soils which comprise the valley slope, the degree to which the valley slope is stable or unstable, and whether or not the valley slope is subject to active erosion.

Apparent Valley or Confined Valley means a watercourse located within a valley corridor, either with or without a floodplain, and is confined by valley walls. The watercourse may be located at the toe of the valley slope, in close proximity to the toe of the valley slope (less than 15 m) or removed from the toe of the valley slope (more than 15 m). The watercourse can contain perennial, intermittent or ephemeral flows and may range in channel configuration, from seepage and natural springs to detectable channels.

Apparent Valleys can exhibit three different conditions within which erosion hazards exist or may develop: valley slopes which are steep but stable, valley slopes which are over steepened and potentially unstable, and valley slopes which are subject to active stream bank erosion.

Not Apparent Valley (unconfined valley) means a watercourse is not located within a valley corridor with discernible slopes, but within relatively flat to gently rolling plains and is not confined by valley walls. The watercourse can contain perennial, intermittent or ephemeral flows and may range in channel configuration, from seepage and natural springs to detectable channels.

Where the valley is Not Apparent, the flow of water is free to shift across the shallower land. Although toe erosion and slope stability are not deemed potential hazards, consideration for the meandering tendencies of the system must be provided.

3.2.1.1 Defining the Riverine Erosion Hazard

The Regulation limit of the river or stream valley (i.e. the Regulated Area) is the furthest extent of the erosion hazard or flooding hazard plus a 15 metre allowance. The following sections describe how the various components and Regulation limits of a river or stream valley are determined.

To provide access and protection against unforeseen conditions, provincial guidelines recommend that development should generally be set back a minimum of 6 metres adjacent to erosion hazards. The Erosion Access Allowance is a 6 metre development setback within the 15 metre allowance applied to the erosion hazard for confined (apparent) and unconfined (not apparent) river or stream systems. The erosion access allowance is applied to provide for emergency access to erosion prone areas, provide for construction access for regular maintenance and access to the site in the event of an erosion event or failure of a structure, and, provide for protection against unforeseen or predicted

external conditions which could have an adverse effect on the natural conditions or processes acting on or within an erosion prone area.

For the purpose of defining the regulated area, the extent of the erosion hazard is based on whether or not a valley is apparent (confined) or not apparent (unconfined) and whether or not the valley slopes are stable, unstable, and/or subject to toe erosion.

Apparent (confined) river or stream valleys where the valley slopes are stable (Figure 3)

Where the valley slopes in Apparent Valleys have a slope inclination of 33 1/3 percent (3H:1V) or less steep, the limit of the regulated area includes two components: the river or stream valley extending to the top of slope; and an allowance from the top of slope of 15 metres, which includes a 6 metre Erosion Access Allowance.

The 15-metre allowance helps to buffer development from the hazards of slope instability and to prevent the influence of development on the rate of slope movement. Development adjacent to valley slopes can cause increased loading forces on the top of slope, compromise slope stability or worsen erosion of the slope face, and result in the loss of stabilizing vegetation. Allowances also provide access for emergencies, maintenance and construction activities.

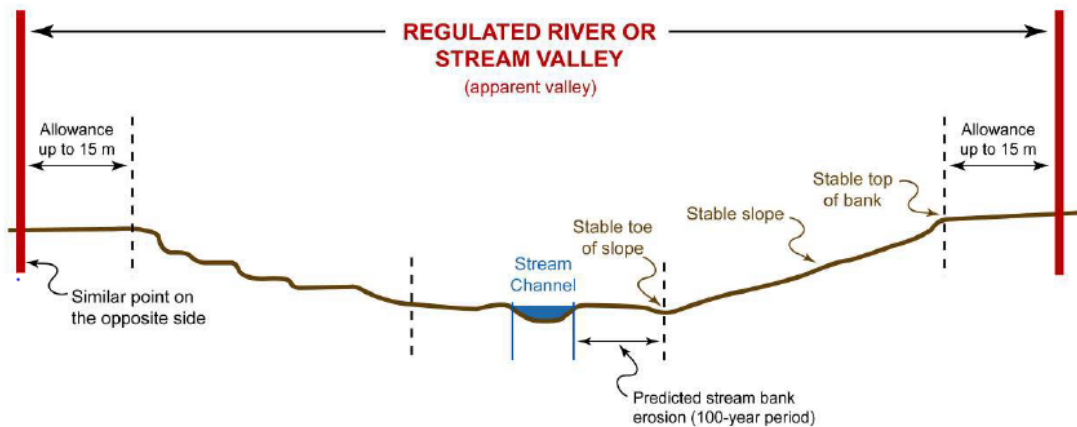


Figure 3: Apparent (confined) river or stream valley where the valley slopes are stable

Apparent (confined) river or stream valley associated with unstable slopes and stable toe (Figure 4)

Slopes are considered unstable when the gradient is 3H:1V (33 1/3 percent slope) or steeper.

On unstable slopes, where the toe of the slope is stable, the Regulation limit consists of two components: the river or stream valley including the predicted long term stable slope projected from the existing stable toe of slope; and an allowance from the predicted stable top of slope of 15 metres, which includes a 6m Erosion Access Allowance.

The Stable Slope Allowance is calculated as 3:1 (h:v) minimum OR as determined by a study using accepted geotechnical principles.

Figure 4 shows the two components used to establish the Regulated Area where slopes are oversteepened (unstable) and no erosion is occurring at the toe of the valley slope.

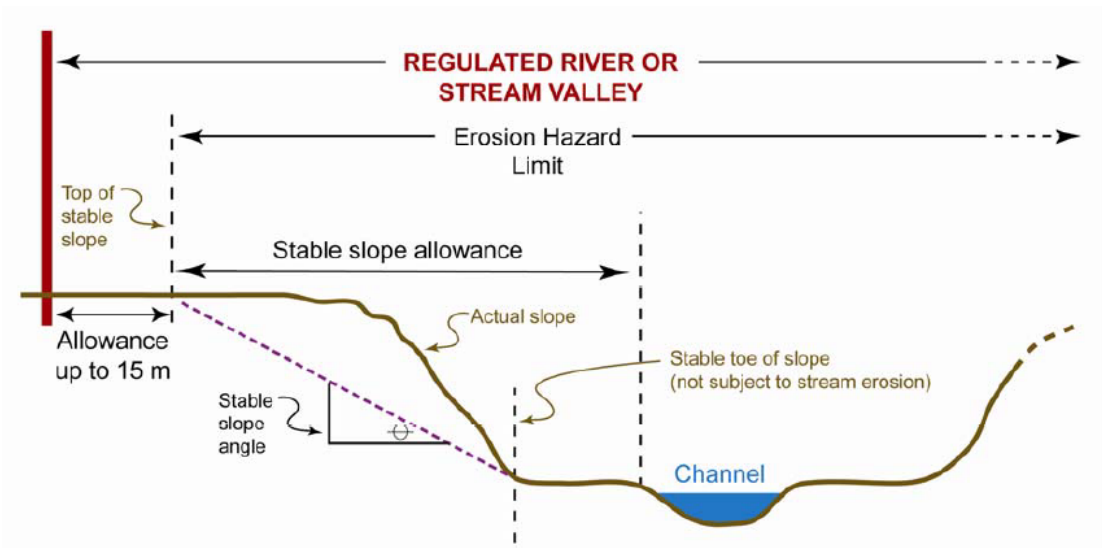


Figure 4: Apparent (confined) river or stream valley associated with unstable slopes and stable toe

Apparent (confined) river or stream valley with unstable slopes and active toe erosion (Figure 5)

Where valley slopes in Apparent Valleys are subject to active toe erosion, a Toe Erosion Allowance is added into the Riverine Erosion Hazard. The Toe Erosion Allowance can be determined from Table 2 of the Technical Guide – River and Stream Systems: Erosion Hazard Limit, (MNR, 2002b); OR 100 times the average annual recession rate of the toe) OR as determined by a study using accepted geotechnical and engineering principles.

The Regulation limit associated with the erosion hazard consists of: the river or stream valley including the long term stable slope projected from the predicted stable toe of slope; and an allowance from the predicted stable top of slope of 15 metres, which includes a 6m Erosion Access Allowance.

Figure 5 illustrates the three components used to establish the Regulated Area where slopes are oversteepened and active toe erosion is occurring.

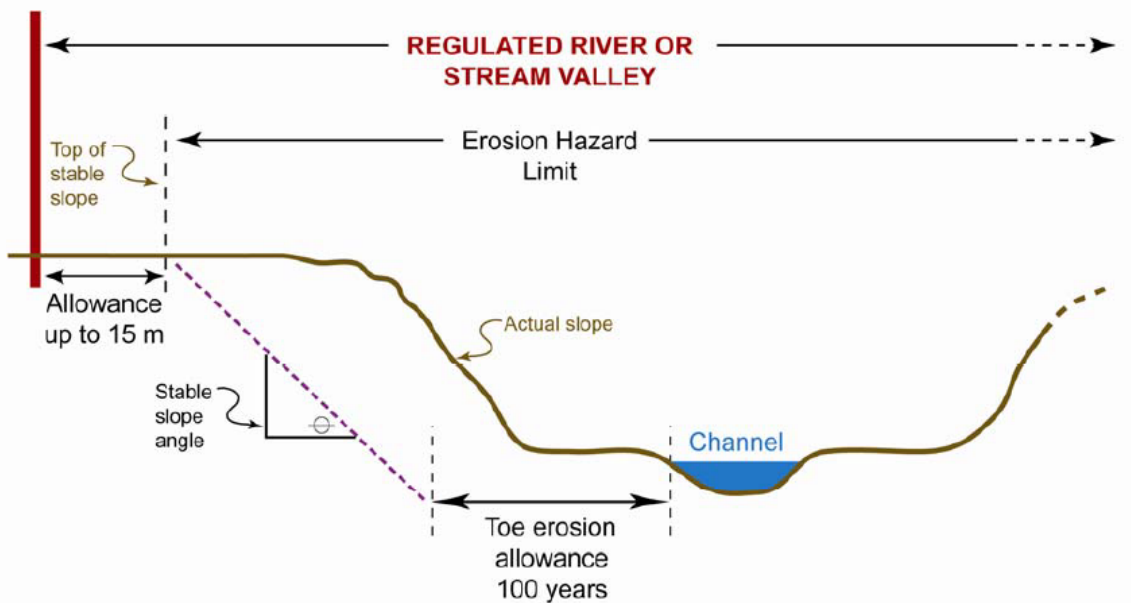


Figure 5: Apparent (confined) River or Stream Valley with unstable slopes and active toe erosion

Not-Apparent (unconfined) river and stream valleys (Figure 6)

Not Apparent Valley (unconfined valley) means a watercourse is not located within a valley corridor with discernible slopes, but within relatively flat to gently rolling plains and is not confined by valley walls.

In these valley sections, the Regulated limit is the greater of the extent of the Riverine Flooding Hazard plus the prescribed allowance or the Meander Belt Allowance, plus an allowance of 15 metres (with a 6m Erosion Access Allowance included in the 15m allowance).

The Meander Belt Allowance provides a limit to development within the areas where the river system is likely to shift. This allowance is based on twenty (20) times the bankfull channel width, where the bankfull channel width is measured at the widest riffle section of the reach. A riffle is a section of shallow rapids where the water surface is broken by small waves. The meander belt is centered over the channel (Figure 6). Alternatively, the meander belt allowance may be determined through a technical study carried out by a qualified professional, using established procedures and recognized methodologies to the satisfaction of NBMCA. Sections 3.0, 3.3 and 4.4 of the Technical Guide – River and Stream Systems: Erosion Hazard Limit, (MNR, 2002b) and the supporting documentation entitled “Belt Width Delineation Procedures” (TRCA, 2001) provide further details.

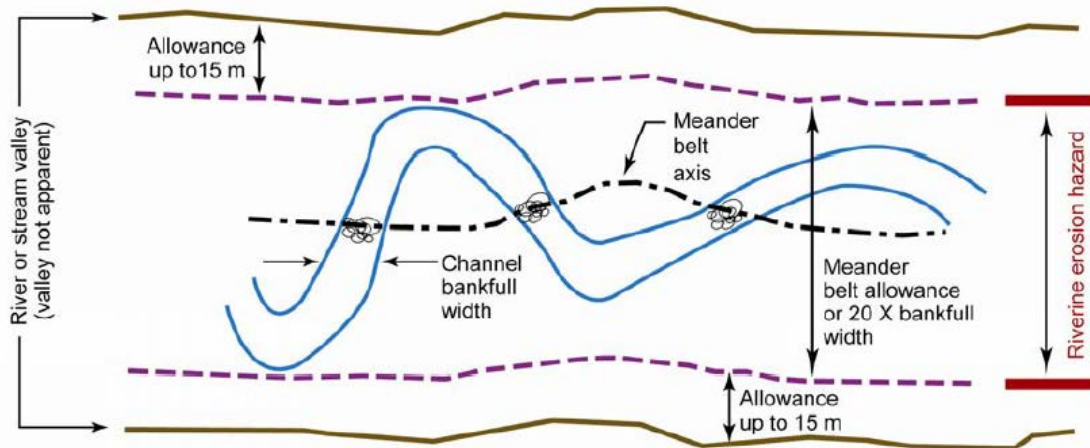


Figure 6: Not Apparent River or Stream Valley (Meander Belt)

3.2.1.2 Technical Analysis for Erosion Hazards

Frequently technical analysis can be undertaken to refine the appropriate limits of toe erosion, slope stability, and meander belt allowances. These technical studies should be carried out by a qualified professional, with recognized expertise in the appropriate discipline, and should be prepared using established procedures and recognized methodologies to the satisfaction of the Conservation Authority. With respect to riverine erosion hazards, technical studies should be in keeping with the Technical Guide – River and Stream Systems: Erosion Hazard Limit, (MNR, 2002b) and/or Belt Width Delineation (TRCA, 2001) and must demonstrate that there is no increased risk to life or property. Pre-consultation with NBMCA is advised to ensure appropriate criteria methods are utilized.

The Technical Guide provides four methods of determining the toe erosion allowance. The technical guide also states that toe erosion rates are best determined through long-term measurements and that a minimum of 25 years of data is recommended for erosion assessment rates. Sections 3.0, 3.1, 4.1, and 4.3 of the Technical Guide are particularly relevant in this regard. It is essential that qualified professionals properly characterize the watercourse in question to identify what processes are occurring. For channels where processes indicative of instability, such as downcutting, are identified, very detailed fluvial geomorphic analyses would likely be required to predict erosion rates. As well, watercourses in catchments experiencing rapid land use change where the sediment and hydrologic regimes are changing could be experiencing erosion rates that are shifting in response, and that rate of change may not be quantifiable without significant detailed analysis.

Sections 3.0, 3.2, 4.1, and 4.3 of the Technical Guide provide important direction with respect to slope stability analysis. Slope stability analysis should also be undertaken in accordance with the Geotechnical Principles for Stable Slopes (Terraprobe Limited and Aqua Solutions, 1998). Recognized analytical methods should be utilized. An appropriate Factor of Safety should be incorporated into all designs/analysis based on the consequences or risks to land use or life in the event of a slope failure. Recommended minimum Factors of Safety are provided in the Technical Guide based on land use above or below the slope (Table 4.3, Page 60, Technical Guide – River and Stream Systems: Erosion Hazard Limit (MNR, 2002b)). These Factors of Safety should also be increased when necessary to account for the reliability of the information available for the technical analysis due to aspects such as natural soil variability in the subject area, limited site work due to constraints, etc.

3.2.2 Riverine Flooding Hazard

In Ontario, either storm-centred events, flood frequency based events, or an observed event may be used to determine the extent of the Regulatory floodplain. These events are:

- a) A **storm-centred event** - either Hurricane Hazel storm (1954) or Timmins storm (1961). A storm-centred event, sometimes called a Regional storm event, refers to a major storm of record which is used for land use planning purposes. The rainfall actually experienced during a major storm event can be transposed over another watershed and when combined with the local conditions, Regulatory floodplains can be determined. This centering concept is considered acceptable where the evidence suggests that the storm event could have potentially occurred over other watershed in the general area;
- b) **100 year flood event** is a frequency based flood event that is determined through analysis of precipitation, snow melt, or a combination thereof, having a 1% chance of occurring or being exceeded in any given year The 1:100 year flood level is the minimum acceptable standard for defining the Regulatory floodplain; and
- c) An **observed event**, which is a flood that is greater than the storm-centred events or greater than the 1:100 year flood level and which was actually experienced in a particular watershed, or portion thereof, for example as a result of ice jams, and which has been approved as the standard for that specific area by the Minister of Natural Resources and Forestry.

In the North Bay-Mattawa Conservation Authority area of jurisdiction, the Regulatory Floodplain is described in the Regulation as follows:

11. (1) The applicable flood event standards used to determine the maximum susceptibility to flooding of lands or areas within the watersheds in the area of jurisdiction of the Authority are the Timmins Flood Event Standard, the 100 Year Flood Event Standard and the 100 year flood level plus wave uprush, described in Schedule 1. O. Reg. 177/06, s. 11 (1).

(2) The Timmins Flood Event Standard applies to all watersheds within the area of jurisdiction of the Authority except for,
(a) Chippewa Creek and its tributaries below the North Bay Escarpment, Parks Creek, the Mattawa River in the Town of Mattawa and the La Vase River where the 100 Year Flood Event Standard applies; and
(b) Lake Nipissing where the 100 year flood level plus wave uprush applies. O. Reg. 177/06, s. 11 (2).

Approval of a Reduced Flood Standard – City of North Bay and East Ferris Township

The City of North Bay had a long history of flooding from Lake Nipissing and certain area creeks. When the province introduced one-zone floodplain policies based on the Timmins storm in the 1970's it was soon realized that a large majority of the serviced portion of North Bay would be undevelopable. In the early 1980's NBMCA investigated a more practical approach to floodplain management for the City of North Bay. Based on several technical studies it was determined that the 1:100 year storm was more practical for the City of North Bay, therefore, floodplain mapping for Chippewa Creek, Parks Creek, the La Vase River was based on the 1:100 year storm.

On February 23, 1987 the Minister of Natural Resources (Vincent Kerrio) approved the change in the regulatory flood standard for the watersheds of Chippewa Creek, Parks Creek and the La Vase River from the Timmins storm to the 1:100 year storm (Appendix D). The lowering of the flood standard in a

portion of North Bay is only one part of a complex management package which includes an Official Plan Amendment to establish strict environmental protection policies in North Bay, an amendment to the City of North Bay Comprehensive Zoning By-law to place land use restrictions on flood prone lands, a Site Plan Control Area affecting all those areas impacted, a commitment to remedial works which will protect existing development from flooding, and the control of construction and filling within the floodplain areas through regulation by the Conservation Authority.

By way of Resolution from council (Resolution No.5, November 12, 1986) East Ferris supported the City of North Bay in its request to reduce the regulatory flood on the La Vase River from the Timmins Regional Storm to the 1 in 100 year flood level.

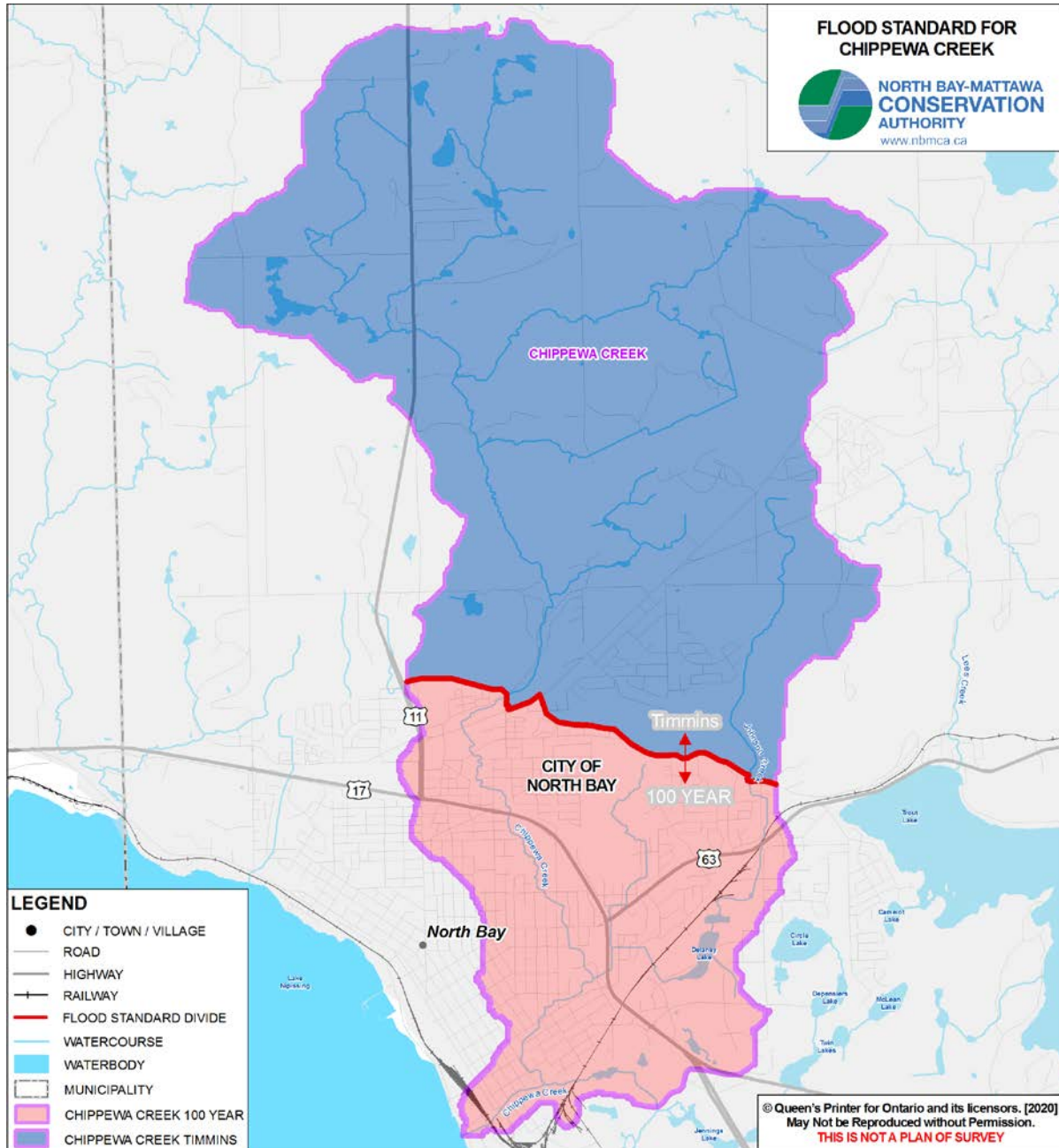


Figure 7: Chippewa Creek Regulatory Flood Event Standards

3.2.2.1 Defining the Riverine Flooding Hazard

The Regulatory floodplain for river or stream valley systems is defined as the area adjacent to the watercourse which would be inundated by a flood event resulting from either the Timmins Storm, an observed event, or by the 1:100 year frequency based event.

For most of NBMCA's area of jurisdiction the *Riverine Flooding Hazard* is based on the greater of the Timmins storm event (the *Regional Storm*) or the 1:100 year flood level. The flood produced through these calculations is called the *Regulatory Flood*, the limits of which define the extent of the *Riverine Flooding Hazard*.

Where the *Riverine Flooding Hazard* is delineated a 15 metre allowance has been added. The allowance is included to address limitations in base mapping scale and accuracy and consider activities directly adjacent to the *Riverine Flooding Hazard*, which could aggravate or increase the hazard risk.

The regulated area includes the floodplain and for not apparent valley systems, an allowance. The allowance is not to exceed 15 metres from the hazard (Figure 8).

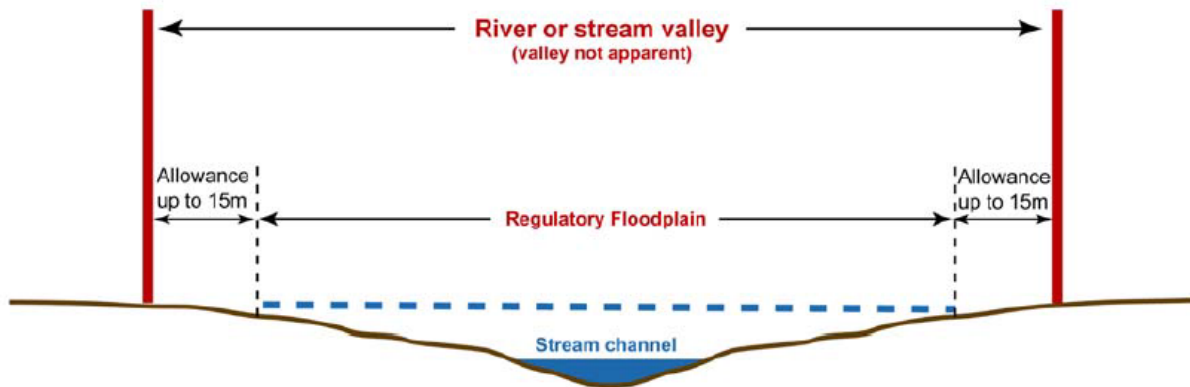


Figure 8: Regulated area of floodplain for a not apparent valley

Within Ontario, there are three policy concepts for floodplain management: One-zone (Figure 9), Two-zone (Figure 10), and Special Policy Area (SPA). Most regulated areas within NBMCA area of jurisdiction associated with the Riverine Flood Hazard are One-zone Policy Areas. In a One-zone Policy Area, the entire Regulatory Floodplain is considered the floodway.

3.2.2.2 One-zone Policy Approach

In a One-zone Policy approach the entire floodplain or the entire flooding hazard limit defines the floodway as shown by Figure 9. The one-zone concept is the preferred approach for the management of flooding hazards within river and stream systems as it provides the most cost effective means of minimizing potential threats to life and risks of property damage and social disruption. In general, development or site alterations within the boundaries of the regulatory flood level are restricted within areas of the one-zone concept. All development within this area should be prohibited or restricted to those structures which by their nature are to be located within this area, flood/erosion control works, or where appropriate, minor additions or passive, non-structural uses which do not affect flood flows.

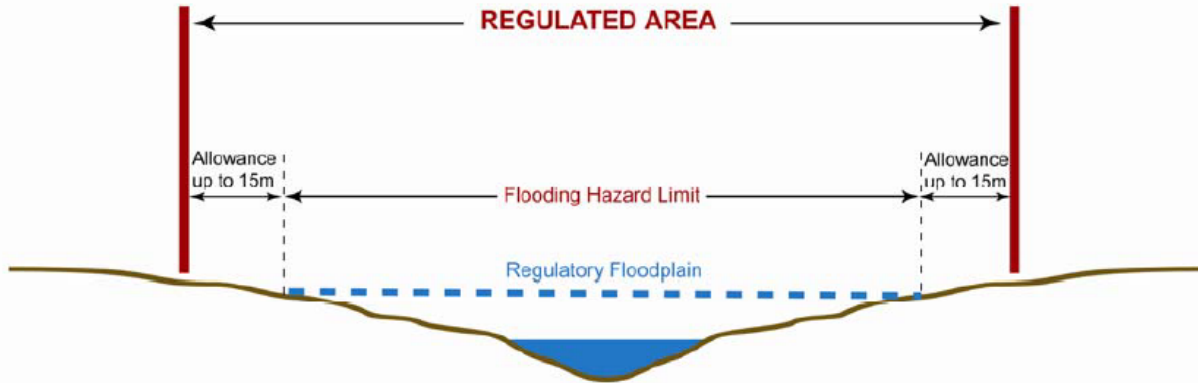


Figure 9: One-zone Policy Approach

3.2.2.3 Two-zone Policy Approach

In a **Two-zone** Policy Area, the floodplain is divided into two distinct sections – the floodway and the flood fringe as shown by Figure 10. The floodway is that area of the floodplain that is required to pass the flows of greatest depth and velocity. The flood fringe lies between the floodway and the edge of the floodplain. Depths and velocities of flooding in the flood fringe are much less than those in the floodway. The technical considerations used to determine the floodway-flood fringe delineation and the suitability of applying a Two-zone policy are described in the Ministry of Natural Resources Technical Guide River and Stream Systems Flooding Hazard Limit (2002). The application of a Two-zone Policy Area is not intended to be on a lot-by-lot basis, but on a subwatershed or major reach basis. Where NBMCA and the municipality agree to the use of a Two-zone Policy Area, appropriate official plan designations and zoning must be put into place.

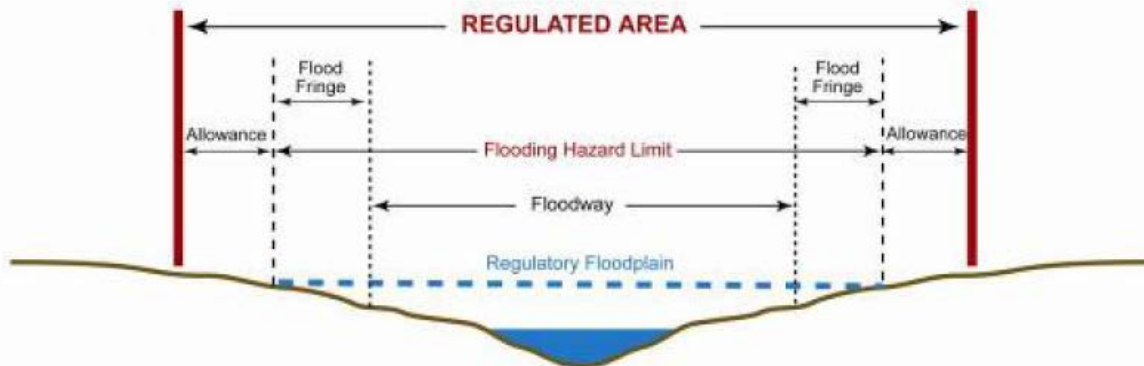


Figure 10: Two-zone policy approach

The City of North Bay Two-zone Policy Approach

Official Plan Amendment No.64, approved in 1991, re-designated portions of Chippewa Creek, Parks Creek and the lower portions of the La Vase River from Special Policy Areas to a Two-zone concept in keeping with the current Provincial Policy. The re-designation, however, maintained a status quo in floodplain management in these areas. The technical criteria in force for floodplain issues in the former special policy areas were effectively the same as those that would apply under the new two-zone policy. These same policies remain in effect today.

Chippewa Creek Two-zone Policy

The Regulatory Floodplain of Chippewa Creek consists of a floodway (1:25 year level) and a flood fringe (1:100 year level) and is supported with technical studies. This Two-zone policy for Chippewa Creek is described as between Thompson Park and Lake Nipissing, as well as to the Regulatory Floodplain of two Chippewa Creek tributaries known as Johnson Creek and Eastview Creek at the Northgate Square Shopping Mall bounded by Trout Lake Road, Highway 11 and 17 and the Ontario Northland Railway, as well as the spill area between Delaney (Mud) Lake and Circle Lake. This policy is supported by floodplain mapping at the NBMCA office. Note those areas north of Hwy 11/17 of the Eastview and Johnston Creek tributaries are a One-zone policy area.

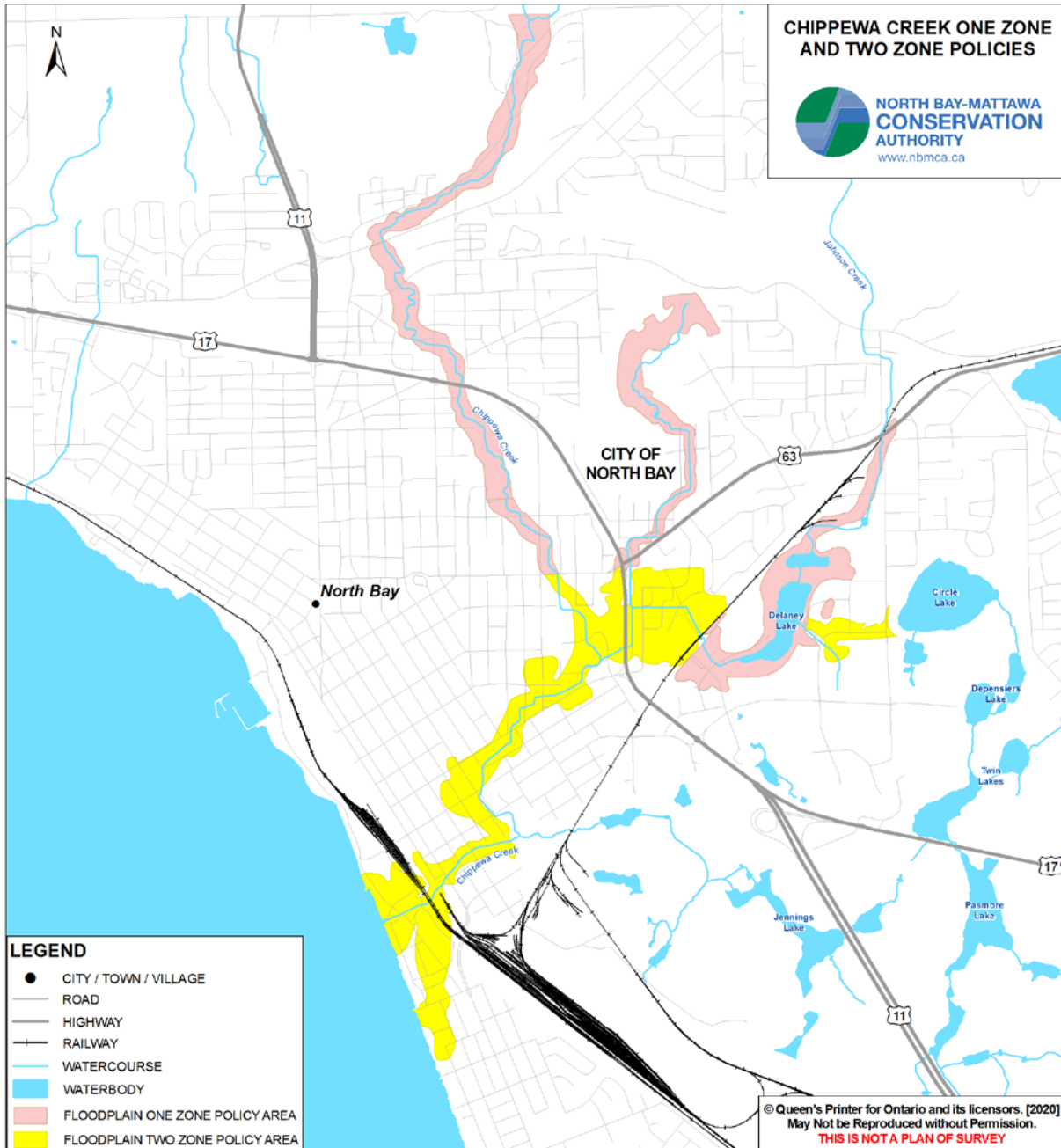


Figure 11: Chippewa Creek Two-Zone Policy Area

Parks Creek Two-zone Policy

This two-zone designation applies to lands below the regulatory flood elevation on Parks Creek between the CPR lines and Lake Nipissing. The floodplain consists of a floodway (45 metres centered on the channel) and a flood fringe (1:100 year level) and is supported with technical studies.

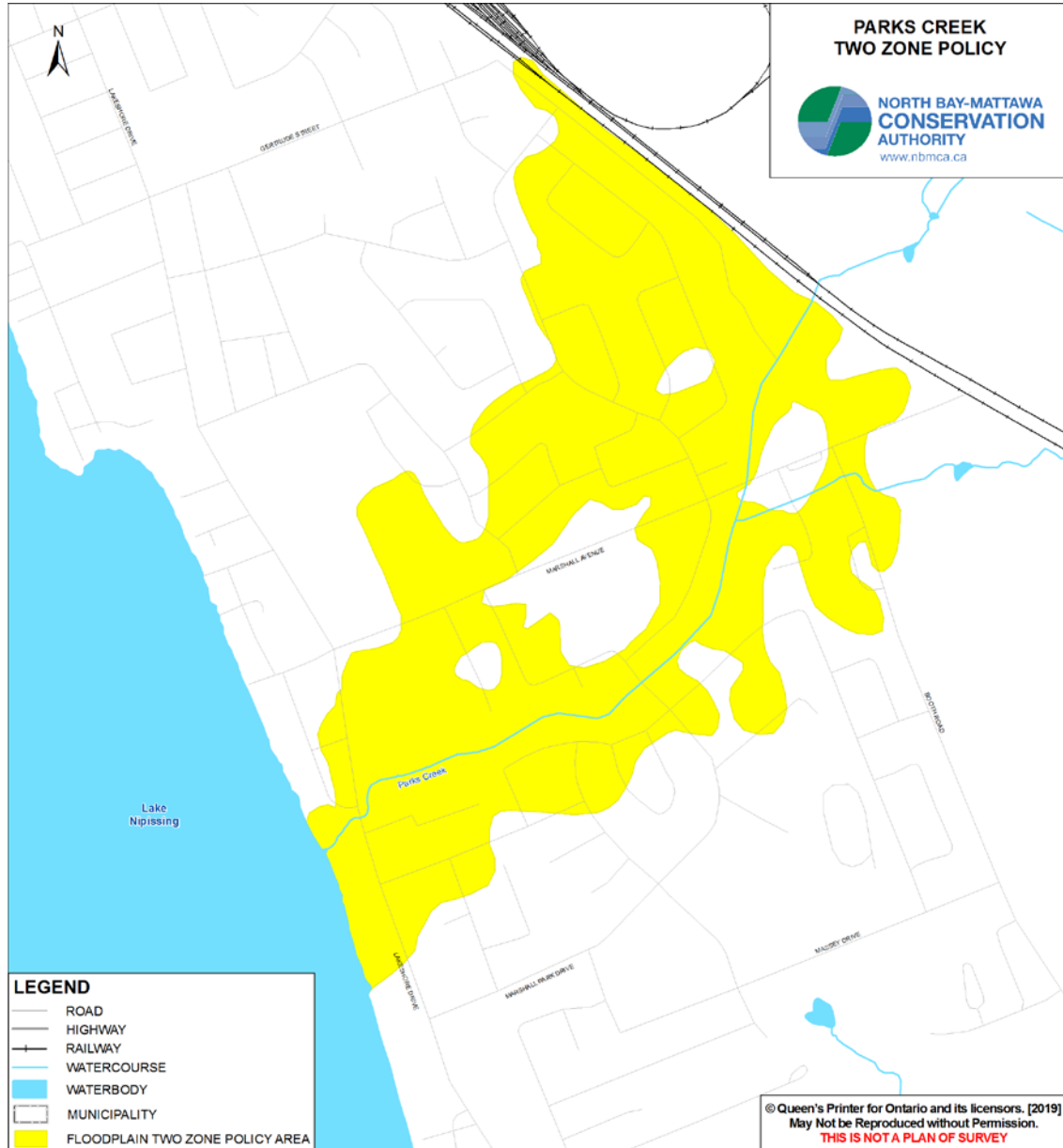


Figure 12: Parks Creek Two-zone Policy Area

La Vase River Two-zone Policy

This designation applies to lands within the regulatory floodplain of the La Vase River below Riverbend Road. The floodplain consists of a floodway (the greater of the 1:25 year level or 30 metres measured from the top of bank) and a flood fringe (1:100 year level) and is supported with technical studies.

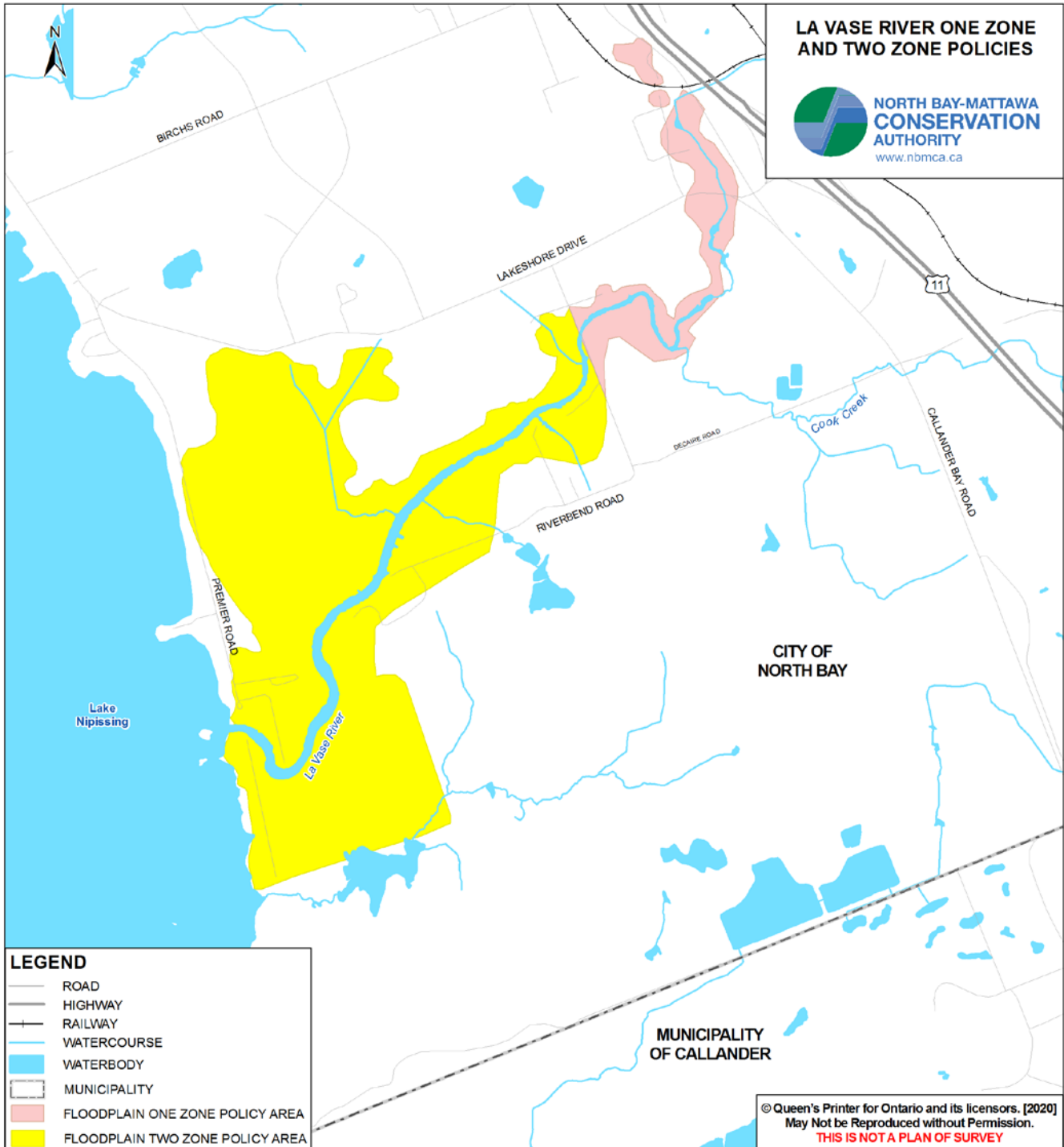


Figure 13: La Vase River Two-zone Policy Area

The Town of Mattawa Two-zone Policy Approach

In the past, floods have caused frequent property damage, inconvenience and social disruption to residents in the Town of Mattawa. Major floods occurred in 1947, 1952, 1957 and 1960 with the latter event being considered the worst flood in recent memory. Some 30-40 homes and commercial buildings were directly affected. Extensive flooding occurred in the commercial centre along Main Street and also along Mattawan Street, parallel to the river.

In 1982 NBMCA commissioned Proctor and Redfern (P&R) Ltd to undertake a floodplain management study for lands below the 1:100 year flood level (156.4 metres C.G.D.), for the Town of Mattawa. The 1:100 year flood level from the Ottawa River is 156.6 metres which P&R stated "agrees quite well with the level used for the Town's floodplain mapping of 156.4 metres produced in an earlier study." The hydrotechnical analysis indicated that flooding conditions were primarily a result of backwater from the Ottawa River during periods of high flows. The depths and velocities of flow over the floodplain were relatively small. These factors were considered in the selection of an appropriate floodway. Because of these backwater conditions, the concept of stage/storage preservation is not strictly applicable, and controlled re-development of the flood fringe area would not increase water levels to any measurable degree.

The P&R study calculated the 1:100 year flood level due to Mattawa River flows only to be 154.8 metres. The report indicated that high water levels through the Town are primarily a result of back-up from the Ottawa River. The 100 year flood level for the Ottawa River at Mattawa is 156.48 metres. Generally overbank flow velocities in the floodplain are less than 0.15m/s and flood depths are generally less than 1 metre. This indicates a relatively low level of flooding hazard in terms of the potential loss of life and major structural damage.

The floodway corresponds to elevation 155.4 metres which contains the faster and deeper flowing portions of the river. The floodway generally corresponds to the alignment of Mattawan Street, excluding a low-lying pocket at Pine Street. Refer to Figure 14.

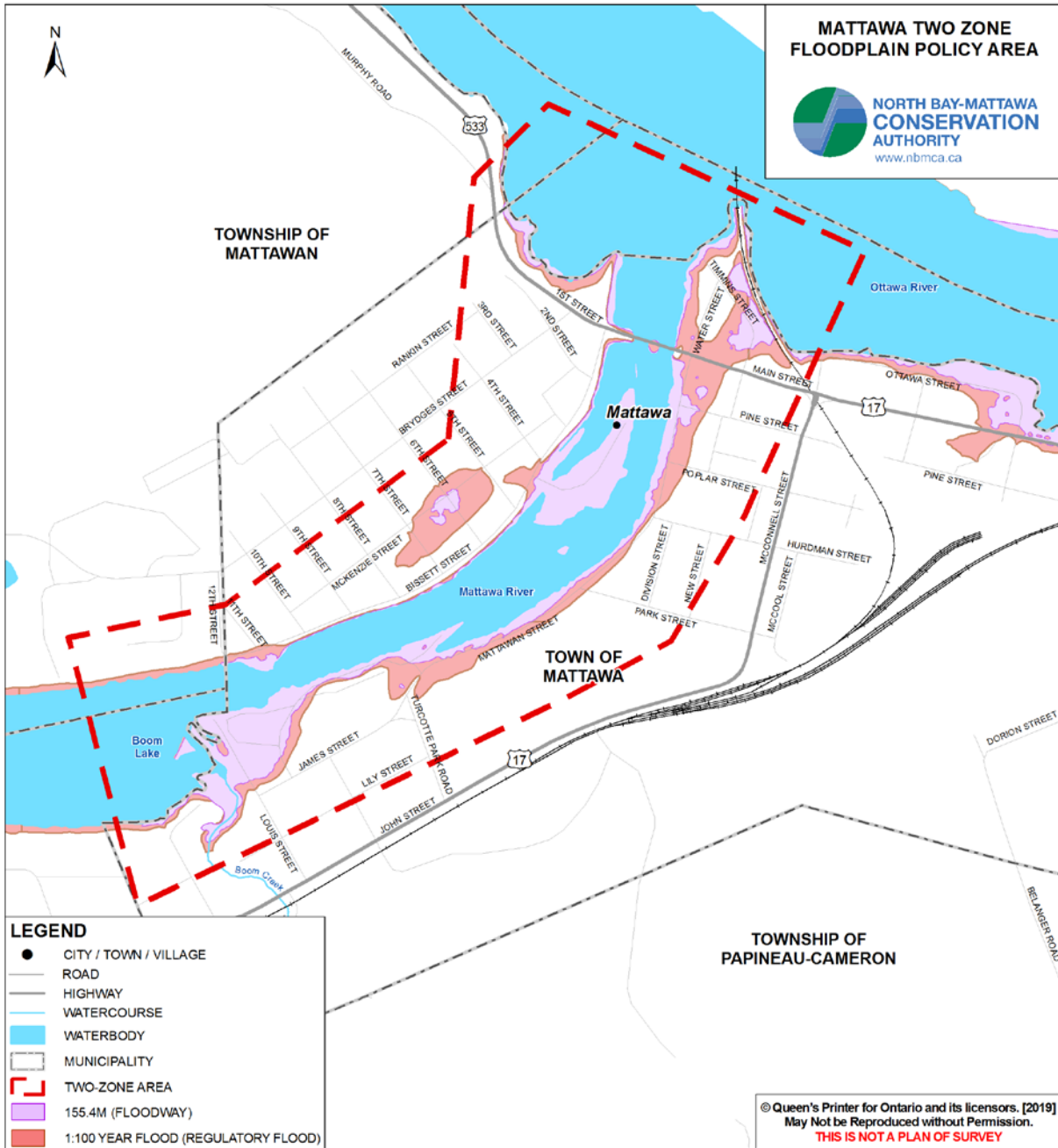


Figure 14: Town of Mattawa Two-zone Policy Approach

3.2.2.4 Special Policy Area (SPA)

Where the One-zone or Two-zone approaches have been demonstrated to be too stringent and would likely cause significant social and economic hardships to the community, SPAs may be considered. Where an SPA is applied, the municipality, CA, and the Province of Ontario (MNR and MMA) must agree to relax provincial floodproofing and technical standards and accept a higher level of risk. SPA application is generally limited to areas of historic development that qualify on the basis of community and technical criteria. Application of a SPA requires the approval of the Province of Ontario (Ministry of Municipal Affairs and Ministry of Natural Resources and Forestry) and suitable policies and standards must be incorporated into the municipality's official plan and zoning regulations. Procedures for approval as specified by the Province must be adhered to. There currently are no SPAs within NBMCA's area of jurisdiction.

3.2.3 Identification of the Hazard Limit – Flooding and Erosion Hazards

When *development* is proposed within or adjacent to a *river* or *stream valley* and the *floodplain* limits for the *watercourse* are not available, NBMCA may require that the applicant (or agent) provide appropriate technical reports identifying the *floodplain* limits on the subject lands to the satisfaction of NBMCA. The *floodplain* limit is to be based on the greater of the flood produced by the Timmins storm or the 1:100 year flood level.

In cases where *development* is proposed within or adjacent to an apparent river or stream valley and the valley is unstable or adjacent to a *river* or *stream* where there is no *apparent valley*, NBMCA may require that the applicant (or agent) provide appropriate technical reports identifying the extent of the *erosion hazard* limit on the subject lands to the satisfaction of NBMCA.

Erosion hazard limits will be determined through site specific field investigations and technical reports where required. These limits will be established and confirmed to the satisfaction of NBMCA as appropriate, where:

- a) a slope is steeper than 3:1 (horizontal:vertical). Slopes in sandy soil areas may be unstable if the slope is steeper than 5:1 (horizontal:vertical);
- b) a slope is greater than or equal to 2 metres in height;
- c) There is visible evidence of slope instability or erosion on the site or adjacent slopes as determined by an appropriate professional;
- d) bankfull flow location of a watercourse is within 15 metres of the valley toe of slope; and/or
- e) there is a history of slope instability on the site or adjacent sites or slopes.

The limits of the flood hazard will be determined through NBMCA's floodplain mapping program in accordance with Provincial standards. Where floodplain limits for a watercourse are required and not available, the applicant is responsible for carrying out the appropriate technical reports to the satisfaction of NBMCA.

3.3 REGULATION ALLOWANCES

River or stream valley allowances allow CAs to regulate development adjacent to erosion and flooding hazards in a manner that provides protection against unforeseen or predicted external conditions that could have an adverse effect on the natural conditions or processes of the river or stream valley.

Allowances give the CA the opportunity to protect access to and along a valley and/or floodplain. This access may be required for emergency purposes, regular maintenance to existing structures or to repair failed structures.

Development within the allowance must be regulated to ensure that existing erosion and flooding hazards are not aggravated, that new hazards are not created, and to ensure that pollution and the conservation of land will not be affected. The allowance provides the CA with the opportunity to maintain and enhance the natural features and ecological functions of the river or stream valley.

Regulation of development in the allowance is also required to deal with issues related to accuracy of the modeling and analysis tools utilized to establish the limits of the erosion and flooding hazards.

To provide access and protection against unforeseen conditions, provincial guidelines recommend that development should generally be set back a minimum of 6 metres adjacent to erosion and flooding hazards (Sections 3.0 and 3.4, Erosion Access Allowance, Technical Guide – River and Stream Systems: Erosion Hazard Limit (MNR, 2002b)). MNR recommends that this setback not only be applied to the erosion hazards discussed in the sections above, but also adjacent to the flooding hazard because of the potential for erosion throughout the flooding hazard as a result of the flow of water during significant runoff events. For those situations where additional study is warranted to determine the development setback required to provide public safety and access, a study should be undertaken using accepted scientific, geotechnical, and engineering principles.

Protection of public safety and access, however, may not be sufficient to provide for all of the above noted requirements or purposes for the allowances. Additional technical studies by qualified professionals may be required to establish the appropriate extent and location of development within the allowance. A CA may also determine that a reduced development setback is appropriate where the existing development already encroaches within the recommended 6 metre setback, and where further development will not aggravate the erosion or flooding hazard.

In addition to the 6 metre Erosion Access Allowance, CAs also regulates a 15 metre allowance from the limit of the erosion or flood hazard to establish the limit of the Regulated Area. The Erosion Access Allowance of 6m is contained within the overall 15 metre allowance.

3.4 POLICIES TO REGULATE OR PROHIBIT DEVELOPMENT

3.4.1 Policies for Riverine Erosion Hazards and the Associated Allowances

3.4.1.1 Development will not be permitted within the Riverine Erosion Hazard and the associated allowance except in accordance with the policies in Sections 3.4.1.2-3.4.1.22

Development in the Riverine Erosion Hazard Allowance – Apparent Valleys

3.4.1.2 *Development* within the Riverine Erosion Hazard Allowance may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where a site-specific geotechnical or engineering assessment based on established provincial guidelines and an appropriate factor of safety against slope failure or slipping establishes a more precise Riverine Erosion Hazard limit, and where it can be demonstrated that:

- a) there is no feasible alternative site outside the Regulated Area,
- b) the proposed development is not subject to a Riverine Erosion Hazard or a Riverine Flooding Hazard,
- c) there is no impact on existing and future slope stability,
- d) the risk of creating new Riverine Erosion Hazards or aggravating existing Riverine Erosion Hazards as a result of the development is negligible,
- e) the potential of increased loading forces on the top of the slope is addressed through appropriate structural design,
- f) the potential for surficial erosion is addressed by a drainage plan,
- g) access into and through the valley for preventative actions or maintenance or during an emergency will not be prevented, and
- h) an appropriate setback from the Riverine Erosion Hazard, as established in Sections 3.4.1.3-3.4.1.10, is maintained.

3.4.1.3 *Non-Habitable Accessory Buildings or Structures* associated with an existing residential use such as tool sheds, gazebos and other similar structures, may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2 provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard, where practical.

3.4.1.4 *Accessory Buildings or Structures* associated with an existing industrial/commercial/institutional uses may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2, provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard.

3.4.1.5 *Ground Floor Additions* to existing residential buildings or structures may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2 provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard.

3.4.1.6 *Ground Floor Additions* to existing industrial/commercial/institutional buildings or structures may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2 provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard.

3.4.1.7 *An Additional Storey* to existing buildings or structures within the Riverine Erosion Hazard Allowance may be permitted in accordance with the policies in Section 3.4.1.2 provided that the existing development setback is maintained.

3.4.1.8 Buildings or Structures associated with new multi-lot or multi-unit uses (residential/industrial/commercial/institutional), large-scale uses such as golf courses or commercial/institutional complexes may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2, provided that all building lots or greens and fairways (in the case of golf courses) are set back, in their entirety, a minimum of 6 metres from the Riverine Erosion Hazard.

3.4.1.9 Buildings or Structures on single lots not associated with new multi-lot or multi-unit uses (residential/industrial/commercial/institutional), large-scale uses or commercial/institutional complexes may be permitted within the Riverine Erosion Hazard Allowance in accordance with the policies in Section 3.4.1.2, provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard.

3.4.1.10 Replacement or relocation of existing buildings or structures located within the Riverine Erosion Hazard Allowance may be permitted in accordance with the policies in Section 3.4.1.2, provided that a development setback of not less than 6 metres is maintained from the Riverine Erosion Hazard.

3.4.1.11 Development within the Riverine Erosion Hazard Allowance may be permitted without a site-specific geotechnical or engineering assessment where existing geotechnical or engineering assessments based on established provincial guidelines and an appropriate factor of safety against slope failure or slipping undertaken in the immediate area establish that the site is not subject to a flooding or erosion hazard and it can be demonstrated that the policies in Section 3.4.1.2 are met.

Development Associated with Existing Uses in the Riverine Erosion Hazard – Apparent Valleys

3.4.1.12 Development associated with existing uses located within the Riverine Erosion Hazard may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated through a site-specific geotechnical or engineering assessment based on established provincial guidelines that:

- a) there is no feasible alternative site outside the Riverine Erosion Hazard,
- b) proposed development or building or structure is located in the area of least risk,
- c) the site is located in an area where an appropriate factor of safety has been identified in accordance with the type of use and size of the building or structure,
- d) there is no impact on existing and future slope stability and bank stabilization or erosion protection works are not required,
- e) the risk of creating new Riverine Erosion Hazards or aggravating existing Riverine Erosion Hazards as a result of the development is negligible,
- f) the potential of increased loading forces on the top of slope is addressed through appropriate structural design,
- g) access into and through the valley for preventative actions or maintenance or during an emergency will not be prevented, and
- h) the potential for surficial erosion is addressed by a drainage plan, where applicable.

3.4.1.13 Non-Habitable Accessory Buildings or Structures less than or equal to 46.5 m² associated with an existing residential use such as tool sheds, gazebos and other similar structures, may be permitted within the Riverine Erosion Hazard in accordance with the policies in Section 3.4.1.12. Additions may be permitted provided that the combined area of the existing non-habitable accessory building or structure and the addition is equal to or less than 46.5 m².

3.4.1.14 Accessory Buildings or Structures less than or equal to 100 m² associated with an existing industrial/commercial/institutional uses may be permitted within the Riverine Erosion Hazard in accordance with the policies in Section 3.4.1.12. Additions may be permitted provided that the combined area of the existing accessory building or structure and the addition is equal to or less than 100 m².

3.4.1.15 Ground Floor Additions to existing residential uses may be permitted in accordance with the policies in Section 3.4.1.12 provided that the addition is less than 50 percent of the original ground floor area of the building or structure to a maximum footprint of 46.5 m².

3.4.1.16 Ground Floor Additions to existing industrial/commercial/institutional uses may be permitted in accordance with the policies in Section 3.4.1.12 provided that the addition is less than 50 percent of the original ground floor area of the building or structure to a maximum footprint of 100 m².

3.4.1.17 An Additional Storey to existing buildings or structures may be permitted in accordance with the policies in Section 3.4.1.12.

3.4.1.18 Replacement or relocation of existing buildings or structures may be permitted in accordance with the policies in Section 3.4.1.12.

Development – No Apparent Valleys

3.4.1.19 Development will not be permitted within the Riverine Erosion Hazard where there is no apparent valley. A site-specific geotechnical or hydraulic engineering assessment may be required to establish more precise limits for the Riverine Flooding Hazard and the Riverine Erosion Hazard.

3.4.1.20 Development proposed in an area subject to the Riverine Flooding Hazard but beyond the limits of the Riverine Erosion Hazard, may be permitted in accordance with the policies in Section 3.4.2. - Policies for Riverine Flood Hazard Limit and Associated Allowances.

Public Infrastructure

3.4.1.21 Public Infrastructure including but not limited to roads, sanitary sewers, utilities, water supply wells, well houses, and pipelines, may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and provided that: (a) there is no feasible alternative site outside the Regulated Area as determined by an Environmental Assessment or other *comprehensive plan* supported by NBMCA, and (b) a site-specific geotechnical or engineering assessment based on established provincial guidelines and an appropriate factor of safety establishes a more precise Riverine Erosion Hazard, and (c) where it can be demonstrated that:

- a) there are no impacts on existing and future slope stability,
- b) the risk of creating new Riverine Erosion Hazards or aggravating existing Riverine Erosion Hazards is minimized through site and infrastructure design and appropriate remedial measures,
- c) the potential of increased loading forces on the top of the slope is addressed through appropriate structural design,
- d) the potential for surficial erosion is addressed by a drainage plan, and
- e) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices

including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

Recreational Infrastructure

3.4.1.22 Recreational Infrastructure which by its nature must locate in river valleys such as fencing, stairways, and access points, and other recreational uses deemed appropriate by NBMCA may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated through a site-specific geotechnical or engineering assessment based on established provincial guidelines and appropriate factor of safety that:

- a) there is no impact on existing and future slope stability,
- b) the risk of creating new Riverine Erosion Hazards or aggravating existing Riverine Erosion Hazards is minimized through site and infrastructure design and appropriate remedial measures,
- c) facilities are designed and constructed to minimize the risk of structural failure and/or property damage,
- d) the potential for surficial erosion is addressed by a drainage plan, and
- e) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

Prohibited Uses within the Riverine Erosion Hazard

3.4.1.23 Notwithstanding Sections 3.4.1.2-3.4.1.22, development will not be permitted within the Riverine Erosion Hazard as specified in Section 2.1.7 - General Policies, or where the use is:

- a) a bank stabilization project intended to protect new development, with the exception of public infrastructure,
- b) placement or dumping of fill not associated with works approved by NBMCA,
- c) a Stormwater Management Facility, or
- d) excavation works at the toe of a valley slope, with the exception of works which may be permitted in accordance with the policies in Section 6.1.

3.4.2 Policies for Riverine Flood Hazard Limits and Associated Allowances

Policies for One-zone Flood Hazard Limit (excluding allowances)

3.4.2.1 Development will not be permitted within the *Riverine Flooding Hazard* except in accordance with the policies in *Section 2.1.1-2.1.6 – General Policies* and *Sections 3.4.2.2-3.4.2.22 – Policies for One-zone Policy Areas*.

Existing Uses

3.4.2.2 Development associated with existing uses located within a Riverine Flooding Hazard may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated that:

- a) there is no feasible alternative site outside the Riverine Flooding Hazard,
- b) the site is not subject to frequent flooding,¹
- c) ingress and egress is “dry” where this standard can be practically achieved, or floodproofed to an elevation which is practical and feasible, but no less than “safe”,
- d) floodproofed to an elevation of 0.3 metre above the regulatory flood elevation in accordance with floodproofing standards outlined in Appendix E – Floodproofing and Access Standards,
- e) there is no risk of structural failure due to potential hydrostatic/dynamic pressures, and
- f) there is no loss of flood storage (i.e. cut & fill volumes are balanced)

Residential

3.4.2.3 Ground Floor Additions to existing residential buildings or structures may be permitted in accordance with the policies in Section 3.4.2.2 – Policies for One-zone Policy Areas, and where it can be demonstrated that:

- a) the ground floor addition is 50 percent or less of the original habitable ground floor area to a maximum footprint of 46.5 m² or in the case of multiple additions, all additions combined are equal to or less than 50 percent of the original habitable ground floor area to a maximum footprint of 46.5 m².
- b) the number of dwelling units is the same,
- c) floodproofing to an elevation of 0.3 metre above the regulatory flood elevation in accordance with floodproofing standards outlined in Appendix E – Floodproofing and Access Standards, and
- d) no basement is proposed and any crawl space is non-habitable and designed to facilitate services only.

3.4.2.4 An Additional Storey to existing residential buildings or structures may be permitted in accordance with the policies in Section 3.4.2.2 – Policies for One-zone Policy Areas, and where it can be demonstrated that the number of dwelling units is the same.

3.4.2.5 Replacement² of residential buildings or structures other than those destroyed by flooding, may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

¹ Frequent flooding means that a site is subject to the 1:25 year flood event or a more frequent flood event.

² Replacement does not include reconstruction on remnant foundations or derelict or abandoned buildings or structures.

- a) the building or structure to be replaced is relocated outside the Riverine Flooding Hazard or where this is not feasible, the building or structure is relocated to an area within the existing lot where the risk of flooding and property damage is reduced to the greatest extent, wherever possible,
- b) the number of dwelling units is the same or less,
- c) where the site is subject to frequent flooding, the new building or structure is the same size or smaller than the original habitable ground floor area of the former building or structure and the use is the same,
- d) where the site is not subject to frequent flooding, the new building or structure is the same size or larger to a maximum of 50 percent of the original habitable ground floor area or a footprint of 46.5 m², whichever is the lesser and the use is the same,
- e) the ground floor elevation is at or exceeds that of the former building or structure and raised to the greatest extent possible, where it is not practical to raise it to the level of the Regulatory Flood,
- f) ingress and egress is “dry” where this standard can be practically achieved, or floodproofed to an elevation which is practical and feasible,
- g) no basement is proposed and any crawl space is non-habitable and designed to facilitate services only,
- h) electrical, mechanical and heating services are located above the level of the Regulatory Flood, wherever possible, and
- i) there is no risk of structural failure due to potential hydrostatic/dynamic pressures.

3.4.2.6 Relocation of existing residential buildings and structures may be permitted in accordance with the policies in Section 3.4.2.5– Policies for One-zone Policy Areas, provided that the risk of flooding and property damage is reduced through relocation.

3.4.2.7 Ground Floor Additions to residential buildings or structures that have been replaced or relocated previously through permission received from NBMCA, may be permitted in accordance with the policies in Section 3.4.2.2– Policies for One-zone Policy Areas, provided that the total habitable ground floor area does not exceed 50 percent of the original habitable ground floor area of the building that was replaced or relocated to a maximum footprint of 46.5 m², and no new dwelling units are created.

3.4.2.8 Non-Habitable Accessory Buildings or Structures associated with an existing residential use such as unenclosed decks, detached garages, tool sheds, gazebos and other similar structures, may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated that:

- a) there is no feasible alternative site outside the Riverine Flooding Hazard,
- b) the site is not subject to frequent flooding,
- c) the building or structure is less than or equal to 46.5 m² or in the case of additions, the combined area of the existing building or structure and any proposed addition is equal to or less than 46.5 m²,
- d) the building or structure is securely anchored such that it does not obstruct downstream culverts during a flood event where applicable,
- e) floodproofing is undertaken to the extent practical, where floodproofing to the elevation of the Regulatory Flood is not technically feasible, and
- f) there is no opportunity for conversion into habitable space in the future.

3.4.2.9 Fences may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and subject to the following:

- a) Chain Link, Page, or Barbed Wire Fencing: Alignment of the fence in relation to flow direction should be considered in order to minimize the possibility of obstructing flood

waters as a result of trapped debris. Where alignment of the fence is perpendicular to the flow path and effects more than 25 percent of the total floodplain width, then an appropriate structural and hydraulic analysis that debris trapped against the fence will not cause adverse flooding or erosion problems will be required.

- b) **Wooden Fencing:** Wooden fencing of a landscaping nature (i.e. privacy fence) with sufficient spacing to allow for an undisturbed flow of water may be permitted within the floodplain. Sufficient spacing is defined as providing more than 50 percent opening for visual observation through the fence. Where alignment of the fence is perpendicular to the flow path and effects more than 25 percent of the total floodplain width, then an appropriate structural and hydraulic analysis that debris trapped against the fence will not cause adverse flooding or erosion problems will be required.
- c) **Solid Wood or Concrete Fencing:** Solid structures which may impede the flow of flood waters are not allowed to encroach into the floodplain. If alignment of the fencing allows for the passage of water without adversely affecting the flood characteristics, some fencing may then be allowed in the floodplain.

3.4.2.10 Above or Below Ground Swimming Pools may be permitted in accordance with the policies in Sections 2.1.3-2.1.4 – General Policies, and provided that:

- a) floodproofing of electrical facilities to the elevation of the Regulatory Flood is undertaken, and
- b) all fill, except that approved for landscaping, is removed from the Riverine Flooding Hazard.

Commercial/Industrial/Institutional

3.4.2.11 Additions to existing commercial/industrial/institutional buildings or structures may be permitted in accordance with the policies in Section 3.4.2.2– Policies for One-zone Policy Areas, and where it can be demonstrated that:

- a) the addition is 50 percent or less of the original ground floor area of the building or structure to a maximum of 100 m², or in the case of multiple additions, all additions combined are equal to or less than 50 percent of the original ground floor area of the building or structure to a maximum footprint of 100 m², and
- b) no basement is proposed and any crawl space is designed to facilitate services only.

3.4.2.12 Accessory Buildings or Structures associated with commercial/industrial/institutional uses may be permitted in accordance with the policies in Section 3.4.2.2– Policies for One-zone Policy Areas, and where it can be demonstrated that:

- a) the building or structure is less than or equal to 100 m² or in the case of additions, the combined area of the existing building or structure and any proposed addition is equal to or less than 100 m²,
- b) the building or structure is securely anchored such that it does not obstruct downstream culverts during a flood event where applicable,
- c) the cumulative impact of multiple accessory buildings or structures on the subject property is negligible, and
- d) no basement is proposed and any crawl space is designed to facilitate services only.

3.4.2.13 Parking Lots associated with existing non-residential uses located wholly or partially within the Riverine Flooding Hazard may be permitted in accordance with the policies in Section 3.4.2.2 – Policies for One-zone Policy Areas, and where it can be demonstrated that the risk of property damage is minimized through site design.

Internal Renovations

3.4.2.14 Internal Renovations to existing buildings or structures which change the use or potential use of the building or structure but provide for no additional dwelling units may be permitted provided that:

- a) the risks associated with flooding are low,
- b) the internal renovation does not result in a new use prohibited by Section 2.1.7,
- c) electrical, mechanical and heating services are located above the level of the Regulatory Flood, wherever possible, and
- d) there is no risk of structural failure due to potential hydrostatic/dynamic pressures.

Stormwater Management

3.4.2.15 Stormwater Management Facilities are generally not permitted but may be permitted within the Riverine Flooding Hazard but outside of the riparian zone or frequent flooding area, whichever is greater, in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, provided that there is no feasible alternative site outside the Riverine Flooding Hazard and where it can be demonstrated that:

- a) there is no loss of flood storage,
- b) natural erosion and sedimentation processes within the receiving watercourse are not impacted,
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions,
- d) facilities are excavated with minimal berming, stage-storage discharge relationships and floodplain flow regimes for a range of rainfall events including the Regional Storm are maintained, and all excavated material is removed from the Riverine Flooding Hazard, and
- e) design and maintenance performance requirements as determined by NBMCA for the receiving watercourse are met and the effect of the floodplain flow regime on the intended function of the facility is incorporated into the siting and design.³

Public Infrastructure

3.4.2.16 Public Infrastructure including but not limited to roads, sanitary sewers, utilities, water and sewage treatment plants, water supply wells, well houses, and pipelines may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, provided that there is no feasible alternative site outside the Riverine Flooding Hazard as determined through an Environmental Assessment or other comprehensive plan supported by NBMCA, and where it can be demonstrated that:

- a) adverse hydraulic or fluvial impacts are limited and any risk of flood damage to upstream or downstream properties is not increased or is minimized through site design and the affected landowner(s) is informed of the increased risk,
- b) there is no loss of flood storage wherever possible, and
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices

³ Stormwater management facilities are regulated through the Ministry of the Environment, Conservation and Parks (Environmental Compliance Approval). NBMCA reviews the plans and provides comments at the plan review and/or subwatershed/master drainage planning stage. Permission from NBMCA is required for the construction of the facility in a *Regulated Area*. The proposed works may be permitted provided that the policies in *Section 3.4.2.15* are met.

including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

3.4.2.17 The maintenance and repair of **Public Infrastructure** may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

Recreational Uses

3.4.2.18 Recreational Uses such as passive parks, trails and river access points and other uses deemed appropriate by NBMCA, but not including new campgrounds, new golf courses or expansions to existing golf courses, marinas or permanent docks, may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

- a) there is no feasible alternative site outside the Riverine Flooding Hazard,
- b) there is no loss of flood storage,
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site, facility and/or landscape design and appropriate remedial measures will adequately restore and enhance features and functions, and
- d) the risk of property damage is minimized through site and facility design.

3.4.2.19 Marinas and permanent docks may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

- a) there is no measurable loss of flood storage,
- b) facilities are designed to take advantage of existing impacted or open areas on the channel bank, wherever possible,
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site, facility and/or landscape design and appropriate remedial measure will adequately restore and enhance features and functions, and
- d) the risk of property damage is minimized through site and facility design.

Dug-Out/Isolated Ponds

3.4.2.20 A new **Dug-Out or Isolated Pond** or a **Redesign of an Existing Dug-Out or Isolated Pond** may be permitted in the Riverine Flooding Hazard in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated that:

- a) the pond is located outside of the Riverine Erosion Hazard, and
- b) finished side slopes are stable.

3.4.2.21 Dredging of an existing **dug-out or isolated pond** may be permitted where it can be demonstrated that:

- a) all dredged material is removed from the Riverine Flooding Hazard and the Riverine Erosion Hazard,
- b) dredging does not enlarge the pond in area or volume beyond what was previously constructed,
- c) finished side slopes are stable,

- d) hydrologic and ecological functions are restored and enhanced to the extent possible, and
- e) the risk of pollution and sedimentation during dredging operations is minimized.

Policies for Two-zone Flooding Hazard Limit (excluding allowances)

3.4.2.22 A Two-zone Policy Area may be applied in urban areas where:

- a) the application of a One-zone Policy will affect community viability in existing serviced built-up areas or where major channel enhancements or major dyke works have been carried out,
- b) the application of a Two-zone Policy Area is supported by NBMCA, the municipality and the Ministry of Natural Resources and Forestry after due consideration of a number of community-related and technical factors,
- c) a higher level of risk is accepted by the municipality and NBMCA,
- d) a hydraulic study is undertaken which determines the extent of the floodway and flood fringe, and
- e) the municipality incorporates appropriate policies and standards into its official plan and zoning by-laws.

3.4.2.23 Development in the floodway of a Two-zone Policy Area will not be permitted except in accordance with the policies in Sections 3.4.2.15-3.4.2.19 – Policies for One-zone Policy Areas (stormwater management, public infrastructure, and recreational uses).

3.4.2.24 Replacement⁴ of residential buildings or structures in the floodway of a Two-zone Policy Area other than those destroyed by flooding may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

- a) the building or structure to be replaced is relocated outside the Riverine Flooding Hazard or where this is not feasible, the building or structure is relocated to an area within the existing lot where the risk of flooding and the building or structure is floodproofed in accordance with floodproofing standards outlined in Appendix E – Floodproofing and Access Standards,
- b) the number of dwelling units is the same or less,
- c) where the site is subject to frequent flooding, the new building or structure is the same size or smaller than the original habitable ground floor area of the former building or structure and the use is the same, and

3.4.2.25 Replacement of an existing building or structure in the floodway, in the Town of Mattawa, that is damaged or destroyed may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

- a) structural plans and design specifications are to be prepared by a qualified professional engineer which consider regulatory flood depths, velocities, and hydrostatic pressure;
- b) the structure is floodproofed to the 156.6m C.G.D. elevation;
- c) the ground floor square footage as defined by the original foundation is not increased;
- d) the number of dwelling units is the same or less;
- e) re-development does not cause or increase flood-related damages to existing upstream or downstream property or uses; and
- f) approval of the North Bay-Mattawa Conservation Authority is obtained.

⁴ Replacement does not include reconstruction on remnant foundations or derelict or abandoned buildings or structures.

3.4.2.26 Buildings or Structures may be permitted within the flood fringe of a Two-zone Policy Area provided that:

- a) the building or structure is floodproofed in accordance with floodproofing standards outlined in Appendix E – Floodproofing and Access Standards,
- b) all habitable floor space and electrical, mechanical and heating services are above the elevation of the Regulatory Flood,
- c) no basement is proposed, or where a basement is proposed, it is in accordance with floodproofing standards outlined in Appendix E – Floodproofing and Access Standards and
- d) ingress and egress to the building or structure is “dry” where this standard can be practically achieved, or floodproofed to an elevation which is practical and feasible, but no less than “safe”.

3.4.2.27 Development in the flood fringe of a Two-zone Policy Area associated with existing uses may be permitted in accordance with the policies in Sections 3.4.2.2-3.4.2.14.

Policies for Special Policy Areas (excluding allowances)

3.4.2.28 A Special Policy Area (SPA) may be allowed in urban areas where:

- a) it can be demonstrated by the municipality through detailed studies and appropriate documentation that the application of a One-zone Policy or a Two-zone Policy is not adequate to maintain a community’s social and economic viability,
- a) the application of a Special Policy Area is supported by NBMCA, the municipality and the Ministry of Natural Resources and Forestry after due consideration of a number of community-related and technical factors,
- b) a higher level of risk is accepted by the municipality, the Province of Ontario (Ministry of Municipal Affairs and Housing and Ministry of Natural Resources) and NBMCA,
- c) a hydraulic study is undertaken to determine the extent of the floodway and flood fringe, and
- d) the municipality incorporates appropriate policies and standards into its official plan and zoning by-laws.

3.4.2.29 Development within a Special Policy Area may be permitted in accordance with the policies and standards approved by the municipality, Province of Ontario and NBMCA.

Prohibited Uses within the Riverine Flooding Hazard

3.4.2.30 Notwithstanding Sections 3.4.2.2-3.4.2.29, **development** will not be permitted within the Riverine Flooding Hazard as specified in Section 2.1.7 - General Policies, or where the use is:

- a) a new campground or the expansion of an existing campground,
- b) a new parking lot associated with residential uses in a One-zone Policy Area or the floodway of a Two-zone or Special Policy Area,
- c) underground parking associated with any use in a One-zone or Two-zone Policy Area,
- d) a driveway or access way to lands outside of Riverine Flooding Hazard where safe access is not achievable and no alternative access way providing safe access is available , or
- e) flood protection works and bank stabilization works to allow for future/proposed development.

Policies for Riverine Flooding Hazard Allowances

3.4.2.31 Development within Allowances associated with flooding hazards may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, provided that it can be demonstrated that.

- a) development does not aggravate the flood hazard or create a new one;
- b) development does not impede access for emergency works, maintenance and evacuation;
- c) the potential for surficial erosion has been addressed through proper drainage, erosion and sediment control and site stabilization/ restoration plans; and
- d) erosion hazards have been adequately addressed.

References Chapter 3

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4.0 LAKE NIPISSING SHORELINE

4.1 ONTARIO REGULATION 177/06 DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

The following section indicates how the extent of Lake Nipissing shoreline is determined for the purpose of administering the Regulation. The section of NBMCA Ontario Regulation 177/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses dealing with the Lake Nipissing shoreline is listed below.

“Development prohibited

2. (1) *Subject to section 3, no person shall undertake development or permit another person to undertake development in or on areas within the jurisdiction of the Authority that are:*

- (a) *adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beaches (i.e. Lake Nipissing), including the area from the furthest offshore extent of the Authority’s boundary to the furthest landward extent of the aggregate of the following distances:*
 - (i) *the 100 year flood level, plus the appropriate allowance for wave uprush shown in the most recent document entitled “Flood Damage Reduction Study of the Sturgeon River/Lake Nipissing/French River System” available at the head office of the Authority,*
 - (ii) *the predicted long term stable slope projected from the existing stable toe of the slope or from the predicted location of the toe of the slope as that location may shift as a result of shoreline erosion over a 100-year period,*
 - (iii) *where a dynamic beach is associated with the waterfront lands, an allowance of 15 metres inland to accommodate dynamic beach movement, and*
 - (iv) *an allowance of 15 metres inland;*

“Permission to develop

3. (1) *The Authority may grant permission for development in or on the areas described in subsection 2(1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development.*

(2) *The permission of the Authority shall be given in writing, with or without conditions.”*

4.2 DISCUSSION OF LARGE INLAND LAKES SHORELINES (LAKE NIPISSING)

Ontario’s large inland lakes represent an extensive, significant, and physically and biologically diverse environmental resource. Each of the lakes has its own unique combination of interrelated and interdependent sets of terrestrial, wetland, and aquatic environments.

There are fifty-three large inland lakes in Ontario representing thousands of kilometres of shoreline. The terrestrial or landside portion of the shoreline consists of a diversity of shore types from erosion resistant bedrock to highly erodible cohesive bluffs, to beach, dune and wetland complexes.

By definition, large inland lakes means those water bodies having a surface area of equal to or greater than 100 square kilometres where there is not a measurable or predictable response to a single runoff event. (Provincial Policy Statement, 2014).

Inland lakes (that do not meet the definition of “large inland lake”) should be treated in a manner similar to a river or stream valley and the reader should refer to Section 3.4 for policies that apply to these areas.

Lake Nipissing is a relatively large and shallow inland lake situated on the Canadian Shield between the Ottawa River and Georgian Bay. Its surface area is approximately 876 km² and its dimensions are 85 km east to west and 29 km north to south. Approximately 53.84 km of Lake Nipissing shoreline is within the jurisdiction of NBMCA.

The regulatory flood level for Lake Nipissing is 197.25 metres, including wind setup and wave uprush. The Lake Nipissing shoreline has several distinct features, including shallow water depths for extended distances off-shore, lack of sustained near-shore current patterns, very warm summer water temperatures, and major wind setup or seiche effects which result in a change in surface water elevation increase order of 0.1 metres between ten to twelve times per summer. The Lake Nipissing shoreline is relatively stable and does not undergo large accretion or erosion patterns during normal operating water levels. The primary concern is related to damage inflicted on shoreline properties during storm events at high water levels. The challenge is to design shoreline policies and protection works which: do not disrupt the natural beach processes which occur along this shoreline, allow property owners to maximize use of their properties, and allow continuous public access along the shoreline. The basis of the policy consists of defining the hazard areas and regulating proposed development where the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the proposed development. This is supported by guidelines for the construction of shore protection structures that will prevent damage during future storms. Significant damage occurs when Lake Nipissing rises above 196.22 metres.

Shorelines are comprised of three main components: 1) *flooding hazards*, 2) *erosion hazards*, and 3) *dynamic beach hazards*. For the purposes of defining the extent of the Regulated Area, a 15 metre allowance is added to the furthest landward extent of the flooding hazard, erosion hazard or dynamic beach hazard.

The NBMCA's *Development of a Shoreline Management Strategy* was completed in May 1994. The plan lays out the technical basis and recommended management plan for the Lake Nipissing Shoreline in the City of North Bay.

4.2.1 Shoreline Flooding Hazards

In general, flooding is a phenomenon influenced by and sensitive to water level fluctuations. Inundation of low-lying Lake Nipissing shorelines in and of itself does not necessarily constitute a significant hazard. The hazard is dependent on the type, design, location and density of any development in or near the flood inundated shorelines. However, where flooded lands are coupled with storm events, the cumulative impact can and frequently does pose significant degrees of risk.

The shoreline refers to the furthest landward limit bordering a large body of water. Factors to be addressed in the areas susceptible to flooding along the shoreline include: the 100 year flood level; and flood allowance for wave uprush and/or other water related hazards (Figure 15). The 100 year flood level is the water level due to the combined occurrences of mean monthly lake levels and wind set up having a 1percent chance of occurring during any year. The 100 year wave uprush level is based on mean monthly lake levels, wind setup and wind generated waves.

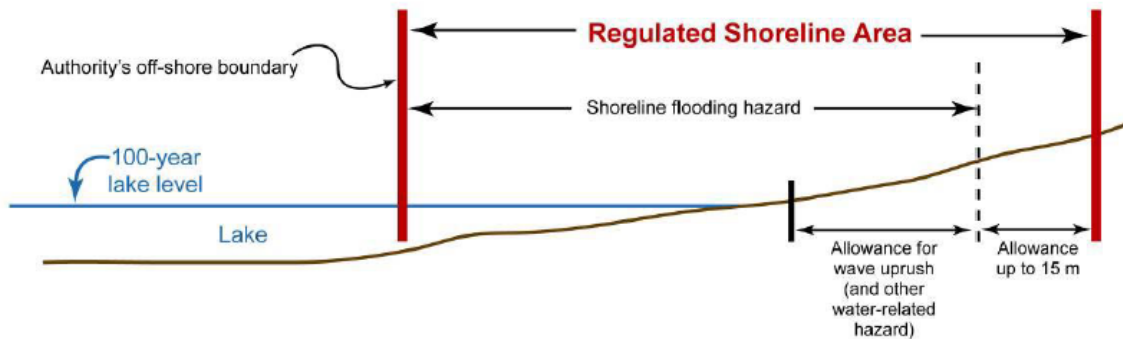


Figure 15: Lake Flooding

In areas susceptible to wave action, shoreline flood hazards extend landward beyond the 100 year flood level to the limit of wave action. All shorelines should be considered susceptible to wave action unless site specific studies using accepted engineering principles demonstrate that wave action is not significant.

In areas where waves act on shore protection works and other structures, and in areas with irregular shorelines, the wave action may include wave overtopping and wave sprays which are more difficult to determine and may require detailed study. Shoreline flood hazards include, but are not limited to:

- wave overtopping;
- wave spray;
- ice piling;
- ice jamming; and
- ship generated waves

Wave overtopping essentially occurs when the height of the natural shoreline, or of the protection work, above the still water line is less than the limit of the wave uprush. As a result, wave overtopping the shoreline or protection work can cause flooding of the onshore area and can threaten the structural stability of protection works.

High points of land not subject to flooding but surrounded by the shoreline flood hazard or “flooded land” are considered to be within the flood hazard and part of the shoreline flood hazard.

Lake Nipissing Flood Hazard = 100 year flood level + an allowance for wave uprush and other water-related hazards:

- Static water level (100 year flood level) = 196.95 metres Canadian Geodetic Datum (C.G.D.)
- Wave Uprush = 0.3 metres
- Flood Hazard = 197.25 metres Canadian Geodetic Datum (C.G.D.)

4.2.2 Shoreline Erosion Hazards

Erosion within the Lake Nipissing area is a concern, particularly within the low-lying regions. *Erosion* rates are dependent upon a number of lake and land processes as well as the composition and morphology of the shore. *Erosion* over the long-term is a continuous process influenced by these lakeside (i.e. wave action, water levels) and landside factors (i.e., surface/subsurface drainage, loading/weight of buildings, and removal of surface vegetation).

The rate of erosion may be heightened during severe storm events, resulting in large losses of land over a very short period of time. These large losses, which are more readily visible immediately following major storm events, at times can obscure the more continuing long-term processes.

The risk of erosion is managed by planning for the 100 year erosion rate (the average annual rate of recession extended over a one hundred year time span). The extent of the shoreline erosion hazard limit depends on the shoreline type: bluff or beach.

The shoreline erosion hazard limit includes the following (Figure 16):

- stable toe of slope (as may be shifted as a result of erosion over a 100 year period);
- predicted long term stable slope projected from the stable toe of slope; and
- an allowance inland of 15 metres on large inland lakes or 30 metres on the Great Lakes.

To slow the erosion of shorelines, structures such as breakwaters, seawalls and revetments have been used. Technical Guidelines- Great Lakes –St. Lawrence River Shorelines- Part 7 – Addressing the Hazard (MNR, 1996b) provide guidance for considering how such structures may be considered to modify the Shoreline Erosion Hazard.

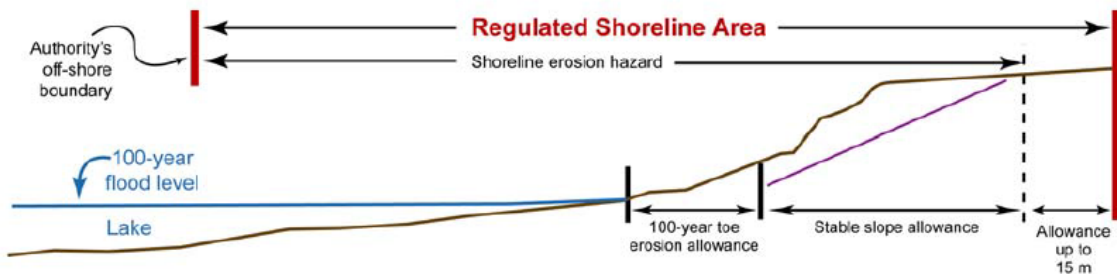


Figure 16: Lake Erosion

4.2.3 Dynamic Beach Hazards

The dynamic beach hazard is only applied where:

- beach or dune deposits exist landward of the water line (e.g., land/water interface);
- beach or dune deposits overlying bedrock or cohesive material are equal to or greater than 0.3 metres in thickness, 10 metres in width and 100 metres in length along the shoreline; and
- where the maximum fetch distance measured over an arc extending 60 degrees on either side of a line perpendicular to the shoreline is greater than 5 kilometres (this normally does not occur where beach or dune deposits are located in embayment's, along connecting channels and in other areas of restricted wave action where wave related processes are too slight to alter the beach profile landward of the waterline).

The criteria used to define and classify a section of shoreline as a dynamic beach are intended to be applied over a stretch of shoreline on the order of 100 metres or more in length. Where shorter sections of sediments occur on a rocky or cohesive shoreline they are likely to be transitory. Beach width and thickness should be evaluated under calm conditions and at water levels between datum (IGDL) and the average annual low water level. When lake level conditions are higher, consideration should be given to the submerged portion of the beach. If possible, mapping should not take place during high lake level conditions. It is expected that the person carrying out the mapping will exercise judgment, based on knowledge of the local area and historical evidence, in those areas where the beach width is close to the suggested criteria for defining a dynamic beach.

The Dynamic Beach Hazard includes the following (Figure 17):

- 100 year flood level;
- an allowance for wave uprush, and if necessary, an allowance for other water related hazards, including ship generated waves, ice piling and ice jamming; and
- an allowance inland of 30 metres to accommodate for dynamic beach movement on the Great Lakes and, in the case of large inland lakes (i.e. Lake Nipissing), this allowance is 15 metres.

The Lake Nipissing Dynamic Beach Hazard is that portion of a shoreline where accumulated unconsolidated sediment continuously moves as a result of naturally occurring processes associated with wind and water and changes in the rate of sediment supply. The extent of the dynamic beach hazard is defined as the extent of the flooding hazard plus a dynamic beach allowance of 15 metres (Figure 17).

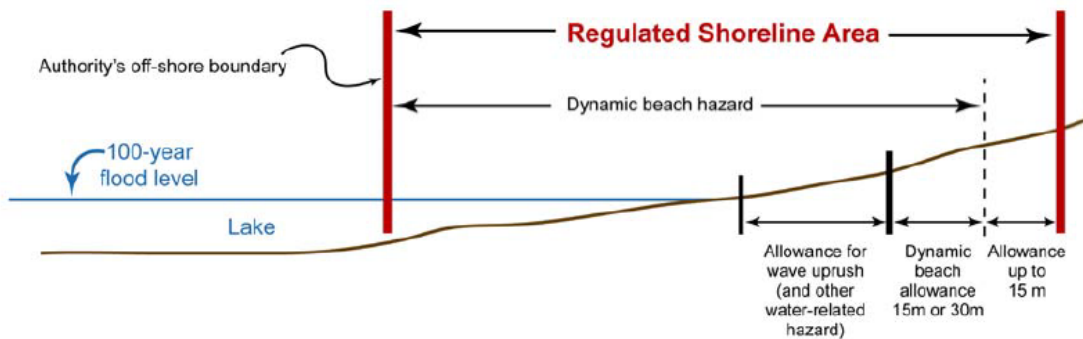


Figure 17: Dynamic Beach Hazard

4.3 REGULATION ALLOWANCES

Similar to the more detailed discussion provided in Section 3.3, the allowances adjacent to shoreline flood, erosion and dynamic beach hazards allow CAs to regulate development in these areas in a manner that:

- Provides protection against unforeseen or predicted external conditions that could have an adverse effect on public safety, property damage and the natural conditions or processes of the shoreline;
- Protects access to and along the shoreline hazard areas. Access may be required for emergency purposes, regular maintenance to existing structures or to repair failed structures;
- Ensures that existing erosion, flooding and dynamic beach hazards are not aggravated and that new hazards are not created;
- Ensures that the control of pollution and the conservation of land will not be affected;
- Maintains and enhances the natural features and ecological functions of shorelines; and
- Addresses issues related to accuracy of the modeling and analysis tools utilized to establish the limits of the flooding, erosion and dynamic beach hazards.

4.4 POLICIES TO REGULATE OR PROHIBIT DEVELOPMENT – LAKE NIPISSING SHORELINE

4.4.1 *Development* within the Regulated Area associated with the Lake Nipissing shoreline will not be permitted except in accordance with the policies in Sections 4.4.2-4.4.7.

Development – Lake Nipissing Shoreline Flooding or Erosion Hazard

4.4.2 *Development* within lands subject to Lake Nipissing Shoreline Flooding or Erosion Hazards may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where there is no feasible alternative site outside the flooding or erosion hazard, provided that it can be demonstrated that:

- a) the recommendations of the *Development of a Shoreline Management Strategy* (Baird & Associates, 1991) for the applicable shoreline reach, in North Bay, are met,
- b) flood proofing standards, protection works standards and access standards in Appendix E or as determined by NBMCA are met,
- c) vehicles and people have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies,
- d) no basement is proposed or where a basement is proposed it meets the floodproofing standards in Appendix E, and
- e) a maintenance access of at least 6 metres is retained to and along existing shoreline protection works.

4.4.3 *Relocation* of existing buildings and structures within lands subject to Lake Nipissing Shoreline Flooding or Erosion Hazard may be permitted in accordance with the policies in Sections 4.4.2-, provided that the risk of flooding, erosion and/or property damage is reduced through relocation.

4.4.4 **Ground floor additions** to existing buildings and structures within lands subject to Lake Nipissing Shoreline Flooding or Erosion Hazard may be permitted in accordance with the policies in Section 4.4.2..

4.4.5 ***Non-Habitable Accessory Buildings or Structures*** associated with existing residential uses such as unenclosed decks, detached garages, tool sheds, gazebos and other similar structures , may be permitted within lands subject to the Lake Nipissing Shoreline Flooding or Erosion Hazard, in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated that:

- a) there is no opportunity for conversion into habitable space in the future,
- b) flood proofing standards, protection works standards and access standards in Appendix E, or to the extent practical as determined by NBMCA when floodproofing to the Regulatory Flood level is not technically feasible, are met,
- c) a maintenance access of at least 6 metres is retained to and along existing shoreline protection works.

4.4.6 Fences within lands subject to Lake Nipissing Shoreline Flooding or Erosion Hazards may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies.

Development – Lake Nipissing Shoreline Flooding or Erosion Hazard Allowance

4.4.7 *Development* within the Lake Nipissing Shoreline Flooding or Erosion Hazard Allowance may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies,

and provided that a maintenance access of at least 6 metres is retained to and along existing and proposed shoreline protections works where possible.

Internal Renovations

4.4.8 *Internal Renovations* to existing buildings and structures within the Lake Nipissing Shoreline Regulated Area which change the use or potential use of the building or structure but provide for no additional dwelling units may be permitted provided that the internal renovation does not result in a new use prohibited by Section 2.1.7

Alterations to Lake Nipissing Shoreline

4.4.9 In general, alterations to Lake Nipissing shoreline shall not be permitted except in accordance with the policies 4.4.10 through 4.4.11

4.4.10 Notwithstanding Policy 4.4.9, the NBMCA may grant permission for the alteration of the Lake Nipissing shoreline provided that:

- a) no reasonable alternative for the proposed alteration to the shoreline exists and the alteration has been assessed through site specific studies (e.g. geomorphological, flood plain) where required, based upon the scale and scope of the proposed works; and
- b) the alteration is designed in accordance with the Development of a Shoreline Management Strategy report (Baird & Associates, 1991); and
- c) the alteration will not adversely affect the ecological function of the shoreline and surrounding riparian area and will result in a net environmental improvement; and
- d) the alteration will not adversely affect neighboring properties.

4.4.11 Shoreline hardening techniques such as the use of concrete, sheet steel, railway ties, pressure treated lumber and gabion baskets will generally not be permitted.

Prohibited Uses within Lake Nipissing Flooding or Erosion Hazards

4.4.12 Notwithstanding Sections 4.4.2-4.4.11, ***development*** will not be permitted in accordance with the policies in Section 2.1.7 – General Policies, or where the proposed location is:

- a) on lands within dynamic beach hazard and its associated allowance,
- b) to be used for a Stormwater Management Facility,
- c) to be used for underground parking, or
- d) within areas that would be rendered inaccessible to people or vehicles during times of flooding hazards, erosion hazards and/or dynamic beach hazards unless safe access is available.

References Chapter 4

City of North Bay Official Plan. 2012

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Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

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5.0 OTHER HAZARDOUS LANDS

5.1 ONTARIO REGULATION 177/06 DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

The following section indicates how the extent of other hazardous lands is determined for the purpose of administering the Regulation. The section of NBMCA Ontario Regulation 177/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses dealing with other hazardous lands is listed below.

“Development prohibited

2(1) Subject to section 3, no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,

(c) hazardous lands”

“Permission to develop

3. (1) The Authority may grant permission for development in or on the areas described in subsection 2 (1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development. .

(2) The permission of the Authority shall be given in writing, with or without conditions.”

5.2 DISCUSSION OF OTHER HAZARDOUS LANDS

Hazardous land is defined as land that could be unsafe for development because of naturally occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock. (*Conservation Authorities Act*, R.S.O. 1990, c. 27, s. 28, ss. 25). If the activity is within unstable soil, unstable bedrock, Leda clays or the North Bay Escarpment hazardous lands, then this chapter, “other hazardous lands” applies, otherwise refer to the River or Stream Valleys and Lake Nipissing shoreline chapters for other hazards such as flooding, erosion, and dynamic beaches.

Due to the specific nature of these areas, it is difficult to identify the hazards. The potential for catastrophic failures in some of these hazardous areas warrant site specific studies to determine the extent of these hazardous lands, and therefore the appropriate limits of the hazard and Regulation limits. The regulated area is based on the conclusions and recommendations of such studies.

Development within areas deemed as hazardous is considered through the “development” provision of the Regulation. Activities proposed within these hazardous lands must therefore meet the definition of “development” in the Conservation Authorities Act to be regulated.

5.2.1 Unstable Soil

Unstable soil includes but is not necessarily limited to areas identified as containing organic soils or sensitive marine clays (Leda clay).

5.2.1.1 Organic soils

Organic soils are normally formed by the decomposition of vegetative and organic materials into humus, a process known as humification. A soil is organic when the percentage weight loss of the soil, when heated, is five to eighty percent (MNR, 2001). As a result, organic soils can cover a wide variety of soil types. Peat soils, however, are the most common type of organic soil in Ontario and are often found in and associated with wetlands.

Design and construction in organic terrain requires very careful attention to specific problems that arise when the underlying soils consist of organic deposits. The main concerns with construction on organic deposits are the low bearing capacity of the deposits and the potential for large settlement resulting from consolidation of the material due to increase in applied load.

Strength of organic deposits has been recognized as being influenced by factors such as structural disturbance, initial effective stress conditions, and anisotropy (Ladd and Lambe 1963; Sandroni 1983) and is highly variable and difficult to define. Deformation characteristics of the organic deposits are also highly variable. For this reason, construction works on organic deposits require detailed study in order to assess the impact of the works with respect to potential settlement and instability. Settlement characteristics can be determined either from laboratory consolidation testing carried out on site specific organic soil samples or from field settlement observations.

Due to the high variability of organic soils the potential risks and hazards associated with *development* in this type of hazardous land are also highly variable. As such, assessment of *development* potential in areas of organic soils is site specific. Section 4.0 of the Hazardous Sites Technical Guide (MNR, 1996a) provides important guidance in this regard.

5.2.1.2 Sensitive Marine Clays (Leda Clay)

Sensitive marine clays, also known as Leda clays, are clays that were deposited as sediment during the last glacial period in the Champlain Sea. Undisturbed, the clays can appear as solid and stable, but when disturbed by excessive vibration, shock or when they become saturated with water, the clays can turn to liquid (MNR, 2001). The resulting failures or earthflows can be sudden and catastrophic.

Sensitive marine clays are restricted to specific locations in the province, however, they are not restricted to just along rivers and streams. In addition to the mapping that individual CAs may have developed or obtained, information is also available from Geological Survey of Canada and the MNRF.

There are no identified Leda clay deposits in the North Bay–Mattawa Conservation Authority’s area of jurisdiction.

5.2.2 Unstable Bedrock

Unstable bedrock includes but is not necessarily limited to areas identified as karst formations. Karst formations may be present in limestone or dolomite bedrock, and are extremely variable in nature. Local, site-specific studies are required for identifying karst formations. Air photo interpretation of surface features such as sink holes may provide an indication of karst formations (MNR and CO, 2005).

There are no identified karst formations in the North Bay-Mattawa Conservation Authority’s area of jurisdiction.

As with unstable soils, the potential for development to be undertaken safely in an area of unstable bedrock is site specific. Section 5.0 of the Hazardous Sites Technical Guide (MNR, 1996a) provides important guidance in this regard.

5.2.3 The North Bay Escarpment

The North Bay Escarpment is a 600-million year old geologic ridge of transformed sedimentary and metamorphic bedrock that became exposed as a one hundred metre high ridge when the adjacent area to the south was down-faulted by the cooling and shrinking of the earth's crust.

The escarpment exhibits unique biophysical characteristics such as steep slopes and considerable natural vegetation and is a major defining landmark for the City of North Bay. Stretching 20 kilometres in length from west to east across the City, the City of North Bay's Official Plan defines the core area of the escarpment by topographic contour elevations ranging from 220 metres at the bottom (toe) to elevation 280-290 metres at the top. The Escarpment is further defined where the slope exceeds 15 percent over 100 metres. A 150 metre wide buffer zone is defined along the top of the escarpment. These core and buffer definitions are sufficient for broad planning and study purposes, but require refinement in the field for site-specific developments and planning approvals (1999. Totten Simms Hubicki, North Bay Escarpment Management Plan).

For the purpose of screening maps, the limits of NBMCA's North Bay Escarpment were based on Ministry of Natural Resources approved Regulation lines (Fill Lines) set in 1985 and are shown in Figure 18.

NBMCA Policies for the Administration of O.Reg. 177/06
 Development, Interference with Wetlands and Alterations to Shorelines and Watercourses



Figure 18: Regulation limit of the North Bay Escarpment

5.3 POLICIES TO REGULATE OR PROHIBIT DEVELOPMENT WITHIN OTHER HAZARDOUS LANDS

5.3.1 *Development* within other hazardous lands will not be permitted except in accordance with the policies in Section 5.3.2.

Development within Other Hazardous Lands

5.3.2 *Development* may be permitted within other hazardous lands in accordance with the policies in Section 2.1.1-2.1.6 – General Policies, and where a site-specific study establishes a more precise hazard land boundary and where it can be demonstrated that:

- there is no feasible alternative site outside the Regulated Area, and
- the risk of instability which would result in structural failure or property damage is addressed to the satisfaction of NBMCA.

Prohibited Uses within Other Hazardous Lands

5.3.3 Notwithstanding Section 5.3.1, *development* will not be permitted in accordance with the policies in Section 2.1.7 – General Policies.

References Chapter 5

General

City of North Bay Official Plan. 2012

MNRF / Conservation Ontario Section 28 Peer Review and Implementation Committee. 2008. Draft Guidelines to Support Conservation Authority Administration of the “Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation”.

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6.0 WATERCOURSES

6.1 ONTARIO REGULATION 177/06 DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

The section of NBMCA Ontario Regulation 177/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses dealing with watercourses is listed below.

“Alterations prohibited

5. Subject to section 6, no person shall straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or change or interfere in any way with a wetland.”

“Permission to alter

6. (1) The Authority may grant permission to straighten, change, divert or interfere with the existing channel of a river, creek, stream or watercourse or to change or interfere with a wetland.

(2) The permission of the Authority shall be given in writing, with or without conditions.”

6.2 DISCUSSION OF WATERCOURSES

Section 28 (25) of the Conservation Authority’s Act defines the term watercourse as an identifiable depression in the ground in which a flow of water regularly or continuously occurs. These policies must be read in conjunction with the River or Stream Valleys section.

Watercourses transport both water and sediment from areas of high elevation to areas of low elevation. Watercourses are dynamic, living systems with complex processes that are constantly undergoing change. The structure and function of watercourses are influenced by channel morphology, sediment characteristics (soil type, bedrock, and substrate characteristics) and the nature of the riparian vegetation both on the overbank and rooted in the bed of the watercourse. Alterations to the channel of a watercourse can negatively impact the hydrologic and ecological features and functions provided by riparian zones.

Any alteration to the channel of a river, creek, stream or watercourse requires permission from NBMCA. This includes activities such as, but not limited to, culvert placement or replacement, bridge construction, bed level crossings, piping of watercourses, installation or maintenance of pipeline crossings, cable crossings, construction or maintenance of by-pass, connected or online ponds, straightening and diversions as well as any work on the bed or the banks of the watercourse such as bank protection projects. Alterations involving construction or repair of dams may also require a permit from the Ministry of Natural Resources and Forestry under the Lakes and Rivers Improvement Act.

The NBMCA supports the application of natural channel design principles in recognition of the environmental, human health, economic and aesthetic benefits of this approach.

6.3 POLICIES TO REGULATE OR PROHIBIT THE STRAIGHTENING, CHANGING, DIVERTING OR INTERFERING WITH THE EXISTING CHANNEL OF A RIVER, CREEK, STREAM OR WATERCOURSE

6.3.1 *Straightening, changing, diverting* or *interfering* with existing river, creek, stream or watercourse channel is not permitted except as specified in Sections 6.3.2 - 6.3.17.

Crossings

6.3.2 **Crossings** including but not limited to bridges, culverts, pipelines, and causeways may be permitted to be constructed, replaced or upgraded in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies and Section 3.4.1.22 (Recreational Infrastructure) and/or Sections 3.4.2.17 (Maintenance or repair of Public Infrastructure) - 3.4.2.18 (Recreational Uses) where appropriate, and provided that all feasible alternative sites and alignments have been considered through site-specific studies, where required, based on the scale and scope of the project⁵, and where it can be demonstrated that:

- a) crossings avoid any bends in the watercourse to the extent practical,
- b) crossings are located to take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible,
- c) crossing structures avoid the Riverine Erosion Hazard in order to accommodate natural watercourse movement, wherever possible,
- d) open bottom culverts are encouraged when culverts are required,
- e) the risk of flood damage to upstream or downstream properties is not increased and is reduced through site and infrastructure design, wherever possible,
- f) there is no inhibition of fish passage,
- g) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.
- h) physical realignments or alterations to the river, creek, stream or watercourse channel associated with a new crossing are avoided or are in accordance with the policies in Section 6.3.17,
- i) the crossing is designed by a qualified professional, where appropriate; and
- j) maintenance requirements are minimized.

Water Control Structures

6.3.3 **Water Control Structures** to protect existing development or other uses deemed appropriate by NBMCA from the Riverine Flooding Hazard including dykes and berms, but excluding stormwater management facilities and dams, may be permitted to be constructed maintained or repaired in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and where it can be demonstrated that:

- a) all feasible alignments have been considered through an Environmental Assessment supported by NBMCA or other site specific technical studies, whichever is applicable based on the scale and scope of the project, and
- b) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices

⁵ A study to address all feasible sites and alignments may not be required for the replacement, maintenance or upgrading of existing crossings.

including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.

Dams

6.3.4 Dams which by their nature must be located within or directly adjacent to a river, stream, creek or watercourse, including stormwater management facilities, may be permitted where it can be demonstrated that:

- a) all feasible alternative sites and alignments have been considered through an Environmental Assessment supported by NBMCA or through site-specific studies, whichever is applicable based on the scale and scope of the project,
- b) the water management benefits of the dam or stormwater management facility are demonstrated to the satisfaction of NBMCA,
- c) pollution, sedimentation and erosion during construction and post construction are minimized using best management practices including site, landscape, infrastructure design, construction controls, and appropriate remedial measures,
- d) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized, and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions, and
- e) works are constructed according to accepted engineering principles and approved engineering standards or to the satisfaction of NBMCA, whichever is applicable based on the scale and scope of the project.

6.3.5 Alterations⁶ to existing **Dams** may be permitted where it can be demonstrated that:

- a) pollution, sedimentation and erosion during construction and post construction are minimized using best management practices including site, landscape, infrastructure design, construction controls, and appropriate remedial measures,
- b) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized, and it can be demonstrated that best management practices including site and infrastructure design and infrastructure design and appropriate remedial measures will be adequately restore and enhance features and functions,
- c) there are no adverse impacts on the capacity of the structure to pass flows,
- d) the integrity of the original structure is maintained or improved, and
- e) works are altered according to accepted engineering principles and approve engineering standards or to the satisfaction of NBMCA, whichever is applicable based on the scale and scope of the project.

6.3.6 The Retirement of Dams⁷ or the Removal of Dams which are structurally unsound or no longer serve their intended purpose, located within a river, stream creek or watercourse may be permitted where an Environmental Assessment or a detailed decommissioning plan supported by NBMCA demonstrates that:

- a) all potential hydrologic and ecological impacts have been identified and considered,

⁶ Alterations to existing dams in watercourses that, in the opinion of NBMCA, would not affect the control of flooding, erosion, pollution or the conservation of land and that would not result in changes in the capacity to pass river flows or impacts on integrity of the structure or in-water works do not require a permit under Regulation 177/06.

⁷ Retirement of a dam refers to a situation in which its original purpose or use is no longer necessary and its operation is cancelled. Some retirement activities may involve the demolition of a structure or a change in the purpose, use, capacity, or location of a structure.

- b) significant natural features and hydrologic and ecological functions within or adjacent to the river, creek, stream or watercourse are restored and enhanced through the retirement or removal of the structure and a site restoration plan supported by NBMCA.
- c) the risk of pollution and sedimentation during and after retirement or removal is addressed through a draw down plan supported by NBMCA, and
- d) susceptibility to natural hazards is not increased or new hazards created.

Conservation Projects within or Adjacent to a River, Creek Stream or Watercourse

6.3.7 Conservation Projects such as stream rehabilitation works, small impoundments and realignments which restore or enhance watercourse morphology or aquatic health and habitat may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies, and provided that:

- a) the hydrologic and ecological benefits of the project are demonstrated to the satisfaction of NBMCA,
- b) stream bank stability is enhanced,
- c) significant natural features and hydrologic and ecological functions are restored and enhanced using best management practices including site and/or infrastructure design and appropriate remedial measures,
- d) natural channel design principles are followed to the extent possible, and
- e) maintenance requirements are minimized.

Erosion and Sediment Control Structures

6.3.8 Erosion and Sediment Control Structures to protect existing development and other uses deemed appropriate by NBMCA may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 - General Policies, and where it can be demonstrated that:

- a) erosion risk on adjacent, upstream and/or downstream properties is reduced or erosion and sedimentation processes are controlled to reduce existing or potential impacts from adjacent land uses, whichever is appropriate,
- b) natural channel design principles are followed to the extent possible,
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized, and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions, and
- d) maintenance requirements are minimized.

Maintenance of Dams or Erosion and Sediment Control Structures

6.3.9 The maintenance and repair of ***Dams*** or ***Erosion and Sediment Control Structures*** may be permitted where it can be demonstrated that:

- a) pollution and sedimentation during maintenance and repair activities is minimized using best management practices including site and infrastructure design, construction controls and appropriate remedial measures,
- b) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized, and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions,
- c) susceptibility to natural hazards is not increased or new hazards created, and
- d) works are maintained or repaired according to accepted engineering principles and approved engineering standards or to the satisfaction of NBMCA based on the scale and scope of the project.

Ponds

- 6.3.10 Connected Ponds** with no water intakes from the watercourse but which outflow into the watercourse may be permitted provided that the provisions of Sections 2.1.1-2.1.6 – General Policies are met and a site plan and/or other site-specific study demonstrates that:
- there is no negative impact on the downstream water quality or thermal regime, and
 - maximum berm heights above existing grades do not exceed 0.3 metres within the Riverine Flooding or Erosion Hazard and all remaining fill is removed from the hazard area.
- 6.3.11 Bypass Ponds**⁸ connected to watercourses created as part of site restoration plan or a conservation project may be permitted subject to the provisions of Section 6.3.10 and where it can be demonstrated that the water intake is set above the elevation that permits the continuous flow (i.e. refreshing of the pond will depend on increased stream flows from snow and rainfall events).
- 6.3.12 On-Line Ponds**⁹ in a river, creek, stream or watercourse are not permitted except as specified in Sections 6.3.4 and 6.3.13.
- 6.3.13 On-Line Ponds** at the very upstream end of watercourses may be permitted for wetland restoration and/or fish and wildlife habitat enhancement in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies and where a site plan and/or other site-specific study demonstrates that:
- there is no negative impact on the downstream thermal regime,
 - there is no inhibition of fish passage, and
 - there are no negative impacts on areas of groundwater recharge/discharge.
- 6.3.14 Dredging** of an existing connected, bypass or on-line pond may be permitted in accordance with the policies in Section 3.4.2.21.

Dredging of a River, Creek, Stream or Watercourse

- 6.3.15 Dredging** of a river, creek, stream or watercourse may be permitted to improve hydraulic characteristics and fluvial processes or to improve aquatic habitat or water quality in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies and where a dredging plan and/or other site-specific study demonstrates that:
- stream bank stability is enhanced,
 - where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site design and appropriate remedial measures will adequately restore and enhance features and functions, and
 - all dredged material is removed from the Riverine Flooding and Erosion Hazard and safely disposed of in accordance with the policies in provincial guidelines.

⁸ A bypass pond is created by diverting some of the flow from a natural watercourse into an adjacent pond. The outlet of this type of pond usually returns water to a natural watercourse.

⁹ An on-line pond is built by digging-out or dredging an area within an existing watercourse or by damming a watercourse.

6.3.16 The **maintenance** and **repair** of a **Municipal Drain**¹⁰ may be permitted in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies and the *Drainage Act and Conservation Authorities Act Protocol, 2012*, which can be found in Appendix I.

Realignment, Channelization or Straightening

6.3.17 ***Realignment, channelization or straightening*** of a river, creek, stream or watercourse may be permitted to improve hydraulic characteristics and fluvial processes or to improve aquatic habitat or water quality in accordance with the policies in Sections 2.1.1-2.1.6 – General Policies and where a site plan and/or other site-specific study demonstrates that:

- a) all feasible alternative alignments have been considered through site-specific studies, appropriate to the scale and scope of the project,
- b) stream bank stability is enhanced,
- c) the alteration will not increase either upstream or downstream flood elevations, flood frequencies or rates of erosion,
- d) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site design and appropriate remedial measures will adequately restore and enhance features and functions,
- e) natural channel design principles are followed to the extent possible, and
- f) the alteration will not adversely affect neighboring properties or (the realigned channel may not be located any closer to a property line than the location of the original channel so that the development ability of the neighboring property (i.e. buffers, setbacks) is not affected.)

6.3.18 Hardening techniques such as the use of concrete, sheet steel, railway ties, pressure treated lumber and gabion baskets will generally not be permitted.

6.3.19 Erosion and sediment control measures shall be put in place prior to any work along a watercourse or shoreline and maintained during construction and until the site is permanently stabilized.

Enclosures

6.3.20 ***Enclosures*** of creeks, streams or watercourses may be permitted where there is an existing risk to public health and safety and/or property damage; or where the work is supported by an Environmental Assessment or ***comprehensive environmental study*** which has been approved by NBMCA. Proposed enclosures shall demonstrate:

- a) all other feasible options have been explored to address the hazard(s); and
- b) the risk to public safety is reduced,
- c) susceptibility to natural hazards is not increased and no new hazards are created,
- d) there are no negative or adverse impacts on hydrologic and ecological functions,
- e) pollution, sedimentation and erosion during construction and post construction is minimized using best management practices including site and infrastructure design, construction controls, and appropriate remedial measures,

¹⁰ Municipal Drain: A “drainage works” as defined under the Drainage Act. Under the Act, a drainage works is defined as a drain constructed by any means, including the improving of a natural watercourse, and includes works necessary to regulate the water table or water level within or on any lands or to regulate the level of the waters of a drain, reservoir, lake or pond, and includes a dam, embankment, wall, protective works or any combination thereof. To be a municipal drain, there must be a municipal by-law that adopts an engineer’s report that defines the drainage system and states how the cost of the system is to be shared among property owners.

- f) intrusions within or adjacent to the river, creek, stream or watercourse are minimized and it can be demonstrated that best management practices including site design and appropriate remedial measures will adequately restore and enhance features and functions to the extent possible,
- g) there is no negative impact on the downstream thermal regime,
- h) there is no inhibition of fish passage and no net loss of fish habitat, and
- i) works are constructed, repaired and/or maintained according to accepted engineering principles and approved engineering standards or to the satisfaction of NBMCA, whichever is applicable based on the scale and scope of the project.

References Chapter 6

General

Drainage Act and Conservation Authorities Act Protocol, 2012.

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7.0 WETLANDS AND OTHER AREAS

7.1 ONTARIO REGULATION 177/06 DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

The section of NBMCA Ontario Regulation 177/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses dealing with wetlands is listed below.

“Development prohibited

2. (1) Subject to section 3, no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,

(d) wetlands; or

(e) other areas where development could interfere with the hydrologic function of a wetland, including areas within 120 metres of all provincially significant wetlands and 30 metres of all other wetlands. O.Reg. 177/06, s. 2 (1); O.Reg. 73/13, s. 1 (1-3).”

“Permission to develop

3. (1) The Authority may grant permission for development in or on the areas described in subsection 2(1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development.”

“Alterations prohibited

5. Subject to section 6, no person shall straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or change or interfere in any way with a wetland.”

“Permission to alter

6. (1) The Authority may grant a person permission ...to change or interfere with a wetland.

(2) The permission of the Authority shall be given in writing, with or without conditions.“

7.2 DISCUSSION OF WETLANDS AND OTHER AREAS

7.2.1 Defining Wetlands

Section 28 of the Conservation Authority’s Act defines a wetland as land that a) is seasonally or permanently covered by shallow water or has a water table close to or at its surface, b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse, c) has hydric soils, the formation of which has been caused by the presence of abundant water, and d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water, but does not include periodically soaked or

wet land that is used for agricultural purposes and no longer exhibits a wetland characteristic referred to in clause c) or d).

The NBMCA has a comprehensive Wetlands Policy which can be found in Appendix G. According to this policy wetlands are designated within one of the following classifications:

- **Evaluated-Provincially Significant Wetland¹¹ (PSW)**
Wetlands which have been evaluated, using evaluation procedures established by the MNRF, and identified by the MNRF as a PSW will be classified under this Policy as PSW and will be subject to the relevant Regulations, Policies and Guidelines under Ontario Regulation 177/06, policies as established by the Province under the Provincial Policy Statement and the Policies and Guidelines under this Policy.
- **Evaluated–Not Provincially Significant Wetland (NPSW)**
Wetlands which have been evaluated, using evaluation procedures established by the MNRF, and determined by the MNRF as not meeting the criteria of a PSW will be classified under this Policy as an NPSW and will be subject to the relevant Regulations, Policies and Guidelines under Ontario Regulation 177/06 and the Policies and Guidelines under this Policy.
- **Unevaluated Wetland**
Unevaluated Wetlands (i.e., those that have not been evaluated using evaluation procedures established by the MNRF) will be subject to the Policies and Guidelines under this Policy related to such unevaluated wetlands until such time as they have been evaluated, using evaluation procedures established by the MNRF, at which time they will be managed in accordance to the policies and requirements relevant to their designated classification if applicable.

7.2.2 Defining Other Areas (Areas of Interference / Adjacent Lands)

As per NBMCA’s Wetlands Policy, activities on lands adjacent to wetlands which are classified within the Classification System above will typically have an effect on these wetlands. Therefore, as per subsection 2(2) of Ontario Regulation 177/06, a further description of land related to wetlands, called “Other Areas” will be established for purposes of this Policy.

Areas surrounding wetlands where development could interfere with the hydrologic function of the wetland are called “areas of interference/adjacent lands”. These other areas include lands that are 120 metres from the boundaries of a Provincially Significant Wetland or 30 metres from Evaluated – Non-Provincially Significant wetlands and Unevaluated Wetlands as shown in Figure 19. These areas may be adjusted where detailed hydrologic studies define a more accurate “area of interference”.

7.2.3 Development and Interference

There are three ways through which the Conservation Authorities Act and NBMCA’s Regulation address wetlands and other areas (areas of interference or adjacent lands within which development may interfere with the hydrologic function of the wetland) (Figure 18):

- Development within the wetland boundary (Section 2.1 (d) of the Regulation)

¹¹ Provincially Significant Wetlands are generally identified and approved by the Ontario Ministry of Natural Resources and Forestry using the current Wetland Evaluation System.

To be regulated, the activity must meet the definition of Development. Applications for development must be assessed with respect to the five “tests” outlined in the Conservation Authorities Act (control of flooding, erosion, pollution, dynamic beaches and the conservation of land);

- **Development within the “other areas”** (Section 2.1 (e) of the Regulation)

To be regulated, the activity must meet the definition of Development. Applications for development must be assessed only with respect to the hydrologic function of the adjacent wetland; and

- **Interference with Wetlands** (Section 5 of the Regulation)

To be regulated, the activity must occur within the wetland boundary and must constitute an interference in any way with the wetland. Applications for interference must be assessed with respect to the natural features and hydrologic and ecological functions of the wetland.

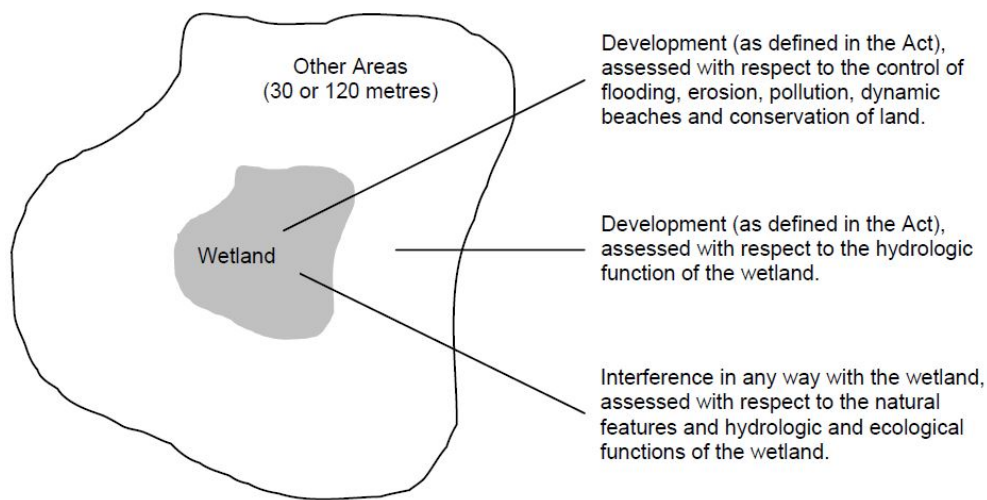


Figure 19: Conservation Authority Approach to Regulation of Wetlands

7.3 POLICIES TO REGULATE OR PROHIBIT DEVELOPMENT IN WETLANDS OR OTHER AREAS

The following policies are excerpts from Section 8 of NBMCA's Wetland Policy (Appendix G):

- 7.3.1 As it is a legal responsibility of NBMCA, it will consider, and where it deems appropriate, permit or not permit development or site alteration in or adjacent to a wetland.
- 7.3.2 Where NBMCA has jurisdiction under the Ontario Conservation Authorities (OCA) Act and Ontario Regulation 177/06, the following will apply:
 - i. Within any Provincially Significant Wetland (PSW), new development, site alteration and/or interference in any way will be prohibited. Notwithstanding this, certain exceptions and minor development, as follows, may be permitted subject to the policies of this Wetlands Policy (Appendix G) and the NBMCA Environmental Impact Study (EIS) Guidelines (Appendix H) and Procedural Guidelines as issued by the CA from time to time:
 - a) There may be instances where the CA has given approval in principle, for the intent to develop within a PSW. This may be as a result of planning comments

- prior to March 1, 2005. Development within the PSW in this instance, may be permitted if it has been demonstrated to the satisfaction of the CA that the control of flooding, erosion, pollution or the conservation of land will not be affected and the interference on the natural features and hydrologic and ecological functions of the wetland has been deemed to be accepted by the CA;
- b) **Public Infrastructure** (e.g. roads, sewers, flood and erosion control works) and various utilities (e.g. public pipelines) may be permitted within a PSW subject to the activity being approved through a satisfactory Environmental Assessment process and/or if it has been demonstrated to the satisfaction of the Conservation Authority that the control of flooding, erosion, pollution or the conservation of land will not be affected and the interference on the natural features and hydrologic and ecological functions of the wetland has been deemed to be acceptable by the Conservation Authority;
 - c) Development associated with public parks (e.g. passive or low intensity outdoor recreation and education, trail system, etc.) may be permitted within a PSW if it has been demonstrated to the satisfaction of the Conservation Authority that the control of flooding, erosion, pollution or the conservation of land will not be affected and the interference on the natural features and hydrologic and ecological functions of the wetland has been deemed to be acceptable by the Conservation Authority;
 - d) Certain “minor development” (e.g. a dock) as defined within the NBMCA Environmental Impact Study Guidelines and which occur within the established development envelope only; and
 - e) Conservation or restoration projects may be permitted within a PSW if it has been demonstrated to the satisfaction of the Conservation Authority that the control of flooding, erosion, pollution or the conservation of land will not be affected and the interference on the natural features and hydrologic and ecological functions of the wetland has been deemed to be acceptable by the Conservation Authority.
- ii. The requirements of this Wetland Policy will not apply to the following:
- a) A natural-occurring wetland which is less than 0.5 ha in area and is not:
 - Part of a Provincially Significant Wetland; or;
 - Located within a floodplain or riparian community; or;
 - Part of a provincially or municipally designated natural heritage feature, a significant woodland, or hazard land; or;
 - A bog, fen; or;
 - Fish habitat; or;
 - Confirmed habitat for a provincially or regionally significant species as determined by the MNR or as determined by the municipality; or;
 - Part of an ecologically functional corridor or linkage between larger wetlands; or;
 - Part of a significant groundwater recharge area; or;
 - Part of a significant groundwater discharge area associated with any of the above.
 - b) Wetlands which have been created as a result of the creation of a stormwater management facility.

7.3.3 Where development is proposed within a NPSW or an Unevaluated Wetland, the NBMCA, will review and consider whether or not to approve the development and issue a Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit on the basis of the following:

- i. Whether or not and how the development affects the control of flooding;

- ii. Implications relative to erosion;
- iii. Effects relative to pollution;
- iv. Interference on the hydrologic functions of the wetland.

Development within Areas of Interference

- 7.3.4** Where development is proposed within 120 metres of a PSW and 30 metres of a NPSW or an Unevaluated Wetland, the NBMCA will review and consider whether or not to approve the development and issue a Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit on the basis of the interference on the hydrologic functions of the adjacent wetland as defined in the NBMCA EIS Guidelines.
- 7.3.5** The NBMCA will classify types of development, site alteration and/or interference proposals into a “major” and “minor” classification consistent with the NBMCA EIS Guidelines (Appendix H) and will generally permit minor development, site alteration and/or interference proposals by issuing a Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit
- 7.3.6** Where a development proposal, site alteration and/or interference meets the criteria as a “major” development as per the NBMCA EIS Guidelines (Appendix H), the NBMCA will determine whether or not the proponent will be required to undertake an Environment Impact Study in accordance with the NBMCA EIS Guidelines. The undertaking of an EIS, if and as required by the NBMCA, does not necessarily mean that a development proposal site alteration and/or interference will be permitted.
- 7.3.7** Notwithstanding anything to the contrary in Policies 7.3.1 to 7.3.6 above, where an application for a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit is for a matter that is deemed to be a “minor work” in the opinion of the CA, the requirements of Policies 7.3.1 through to 7.3.6 will not apply and the CA may issue a Permit for the work, provided all other conditions associated with the Permit are complied with.
- 7.3.8** Applications to the NBMCA for a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permits will only be considered complete once all information necessary for NBMCA staff to evaluate the application has been submitted, and, all application fees have been paid. Any applications that are not complete by the time that this Policy comes into effect will be evaluated on the basis of this Policy, once the application has been completed.
- 7.3.9** The NBMCA will make efforts, to the extent it is capable and has the resources, to monitor and enforce compliance with the Terms and Conditions of any approvals given under the O.Reg. 177/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.
- 7.3.10** The NBMCA will communicate with member municipalities to detect and pursue violations to O.Reg. 177/06: Development, Interference with Wetlands and Alterations to Shorelines.
- 7.3.11** Where lands previously used for agriculture are no longer used for agricultural purposes and revert back to wetlands, the lands upon which a change in land use is proposed which is not associated with agriculture will be considered to be wetlands subject to this Policy.

In addition to these policies from the NBMCA Wetland Policy, the following policies will apply:

Conservation Projects within Wetlands and Areas of Interference

7.3.12 Wetland Conservation Projects within wetlands and areas of interference may be permitted where an Environmental Impact Study demonstrates how the hydrologic and ecological functions will be protected, created, restored and/or enhanced.

Stormwater Management within Wetlands and Areas of Interference

7.3.13 Stormwater Management Facilities will not be permitted within a wetland, but may be permitted in the area of interference where it can be demonstrated that:

- i. all structural components and actively managed components of the stormwater management facility including constructed wetlands, are located outside of the wetland,
- ii. a detailed study demonstrates how the hydrologic and ecological functions of the wetland will be protected, restored and/or enhanced,
- iii. pollution and sedimentation during construction and post construction are minimized using best management practices including site and facility design, construction controls, and appropriate remedial measures,
- iv. design and maintenance requirements as determined by NBMCA are met, and
- v. works are constructed, repaired or maintained according to accepted engineering principles and approved engineering standards or to the satisfaction of NBMCA, whichever is applicable based on the scale and scope of the project.

References Chapter 7

General

Ministry of Municipal Affairs and Housing. 2014. Provincial Policy Statement – Under the Planning Act.

MNRF / Conservation Ontario Section 28 Peer Review and Implementation Committee. 2008. Draft Guidelines to Support Conservation Authority Administration of the “Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation”

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8.0 GLOSSARY

Accepted Engineering Principles means those current coastal, hydraulic and geotechnical engineering principles, methods and procedures that would be judged by a peer group of qualified engineers (by virtue of their qualifications, training and experience), as being reasonable for the scale and type of project being considered, the sensitivity of the locations, and the potential threats to life and property.

Accepted Scientific Principles means those current principles, methods and procedures which are used and applied in disciplines including but not limited to geology, geomorphology, hydrology, botany, and zoology, and that would be judged by a peer group of qualified specialists and practitioners (by virtue of their qualifications, training and experience), as being reasonable for the scale and type of project being considered, the sensitivity of the locations, and the potential threats to life and property.

Access (Ingress/Egress) means standards and procedures applied in engineering practice associated with providing safe passage for vehicles and people to and from a shoreline or river-side property during an emergency situation as a result of flooding, other water related hazards, the failure of floodproofing, and/or protection works, and/or erosion that have been reviewed and approved by the North Bay-Mattawa Conservation Authority and/or the Ontario Ministry of Natural Resources and Forestry.

Accessory Building or Structure means a use or a building or structure that is subordinate and exclusively devoted to a main use, building or structure and located on the same lot.

Adjacent Lands means lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives (adapted from Provincial Policy Statement, 2005).

Adverse Hydraulic and Fluvial Impacts means flood elevations are not increased, flood and ice flows are not impeded and the risk of flooding to and erosion on adjacent upstream and/or downstream properties is not increased.

Anthropogenic means created by a human.

Apparent Valley or Confined Valley means a watercourse located within a valley corridor, either with or without a floodplain, and is confined by valley walls. The watercourse may be located at the toe of the valley slope, in close proximity to the toe of the valley slope (less than 15 metres) or removed from the toe of the valley slope (more than 15 metres). The watercourse can contain perennial, intermittent or ephemeral flows and may range in channel configuration, from seepage and natural springs to detectable channels.

Artificial Wetlands means wetlands which have been developed or have been created as a result of human influence on the landscape. Man-made ponds, lakes, lagoons, drainage courses, excavated

pits, and other structures made to store or convey water on the landscape often become wetlands when they are left to naturalize. Similarly, artificial surface and subsurface drainage systems which are not well managed will cause wetland formation on some sites.

Assisted Living Facility means a multiple residential unit that is constructed with limited kitchen facilities in the unit(s) or a group home, where individuals who require full or partial assistance with activities of daily living (e.g. bathing, toileting, ambulating, self-administration of medications, etc.) reside.

Aquifer means an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt or clay).

Areas of Interference means those lands where development could interfere with the hydrologic function of a wetland.

Bankfull Width means the formative flow of water that characterizes the morphology of a fluvial channel. In a single channel stream, "bankfull" is the discharge, which just fills the channel without flowing onto the floodplain.

Best Management Practices (BMPs) means methods, facilities and structures which are designed to protect or improve the environment and natural features and functions from the effects of development or interference.

Buffers are planned and managed strips of land and vegetation located between wetlands and development sites, which are intended to protect the wetland and sustain its identified ecological functions. In some developing areas the buffers may be the same as a setback. In others, as a result of detailed investigations, planning studies and site-specific environmental impact studies, the buffer can be a combination of topography, vegetation and soil in a relatively narrow area of land, designed to filter surface runoff, noise, and light while functioning as a windbreak to protect sensitive habitat. Buffers are studied and prescribed at a more detailed site specific level than setbacks. The type and scope of development are considered in prescribing buffers.

Comprehensive Plan means a study or plan undertaken at a landscape scale such as a watershed/subwatershed plan, an Environmental Assessment, a detailed Environmental Implementation Report (EIR) that has been prepared to address and document various alternatives and is part of a joint and harmonized planning or Environmental Assessment process, or a community plan that includes a comprehensive Environmental Impact Statement.

Conservation of Land means the protection, preservation, management, or restoration of lands within the watershed ecosystem.

Create in the context of wetlands means the development of a wetland through the manipulation of physical, chemical, or biological characteristics where a wetland did not previously exist.

Creek means a natural stream of water normally smaller than and often tributary to a river.

Cumulative Effects means the combined effects of all activities in an area over time and the incremental effects associated with individual project in an area over time.

Dam means a structure or work holding back or diverting water and includes a dam, tailings dam, dyke, diversion, channel, artificial channel, culvert or causeway (Lakes and Rivers Improvement Act, R.S.O. 1990 c. L3, s. 1)

Development means:

- the construction, reconstruction, erection or placing of a building or structure of any kind,
- any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure,
- site grading, or
- the temporary or permanent placing, dumping or removal of material, originating on the site or elsewhere.

Drainage Area means, for a point, the area that contributes runoff to that point.

Dug-out or Isolated Ponds mean anthropogenic waterbodies that are created by excavating basins with no inlet or outlet channels and in which surface and ground water collect.

Dwelling unit means a suite operated as a housekeeping unit, used or intended to be used as a domicile by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.

Ecological Function means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.

Ecosystem means systems of plants, animals and micro-organisms together with non-living components of their environment, related ecological processes and humans.

Effective Flow Area means that part of a river, stream, creek or watercourse where there are significant flow velocities and most of the flow discharge is conveyed.

Enclosure means a pipe or other conduit for carrying a creek, stream or watercourse underground.

Endangered Species means any indigenous species of fauna or flora which on the basis of the available scientific evidence is facing imminent extinction or extirpation.

Enhance in the context of wetlands means the altering of an existing functional wetland to increase or improve selected functions and benefits.

Environmental Assessment means a process that is used to predict the environmental, social and economic effects of proposed initiatives before they are carried out. It is used to identify measure to

mitigate adverse effects on the environment and can predict whether there will be significant adverse environmental effects, even after the mitigation is implemented.

Environmental Impact Study (EIS) means a report prepared to address the potential impacts of development or interference on natural features and ecological functions. There are three types:

- a *Comprehensive EIS* is a landscape scale, watershed or subwatershed study which sets the width of setbacks and offers guidance for the investigation, establishment and maintenance of buffers,
- a *Scoped EIS* is an area or site-specific study that addresses the potential negative impacts to features described previously in a comprehensive study,
- a *Full EIS* is an area or site-specific study prepared, in the absence of a comprehensive study to address possible impacts from a development. Due to the lack of guidance from a comprehensive study, the full EIS is typically much more detailed than a scoped study, and will also include statements to address possible negative impacts at a regional scale.

Ephemeral means a flow in a river or stream that only occurs during and immediately after rain or snowmelt.

Erosion Access Allowance means a 6 metre development setback within the 15 metre allowance, applied to the erosion hazard for confined (apparent) and unconfined (not apparent) river or stream systems. The erosion access allowance is applied to provide for emergency access to erosion prone areas, provide for construction access for regular maintenance and access to the site in the event of an erosion event or failure of a structure, and, provide for protection against unforeseen or predicted external conditions which could have an adverse effect on the natural conditions or processes acting on or within an erosion prone area.

Erosion Hazard means the loss of land, due to human or natural processes, that poses a threat to life and property. The erosion hazard limit associated with confined river and stream systems is determined using considerations that include an allowance for toe erosion, an allowance for slope stability, and an allowance for access. The erosion hazard limit associated with unconfined river and stream systems is determined using considerations that include the flooding hazard limit or the meander belt width, whichever is greater, plus an allowance for access.

Existing Use means the type of activity associated with an existing building or structure or site on the date of a permit application.

Factor of Safety means the ratio of average available strength of the soil along the critical slip surface to that required to maintain equilibrium. The design minimum factors of safety are provided by the Ministry of Natural Resources Technical Guide for River and Stream Systems (2002). The higher factor of safety is used in complex geotechnical conditions or where there are geologically metastable materials.

Land-Uses	Design Range in Factor of Safety
Passive: no buildings near slope: farm field; bush; forest; timberland; and woods.	1.10
Light: no habitable structures near slope: recreational parks; golf courses; buried small utilities; tile beds; barns; garages; swimming pool; sheds; satellite dishes; and dog houses.	1.20 to 1.30
Active: habitable or occupied structures near slope: residential, commercial and industrial buildings; retaining walls; decks; stormwater management facilities; and, storage/warehousing of non-hazardous substances.	1.30 to 1.50
Infrastructure and Public Use: public use structures or buildings (i.e. hospitals, schools, stadiums); cemeteries; bridges; high voltage power transmission lines; towers; storage/warehousing of hazardous materials; and, waste management areas.	1.40 to 1.50

Fill means any material used or capable of being used to raise, lower or in any way affect the contours of the ground, whether on a permanent or temporary basis, and whether it originates on the site or elsewhere.

Flood Fringe means the outer portion of the floodplain between the floodway and the Riverine Flooding Hazard limit where the depths and velocities of flooding are less severe than those experienced in the floodway.

Floodplain means the area, usually low lands, adjoining a river, stream or small inland lake system, which has been or may be subject to flooding hazards.

Floodproofing means structural changes and/or adjustments incorporated into the basic design and/or construction or alteration of individual buildings, structures or properties to protect them from flood damage.

Floodway for river, stream, creek, watercourse or inland lake systems means the portion of the floodplain where development would cause a danger to public health and safety or property damage.

- where the one-zone concept is applied, the floodway is the entire contiguous floodplain.
- where the two-zone concept or special policy area concept is applied, the floodway is the contiguous inner portion of the floodplain, representing that area required for the safe passage of flood flow and/or that area where flood depths and/or velocities are considered to be such that they pose a potential threat to life and/or property damage. Where the two-zone concept or special policy area applies, the outer portion of the floodplain is called the flood fringe.

Frequent Flooding means that a site is subject to the 1:25 year flood event or a more frequent flood event.

Geologically Metastable Material means a material susceptible to earth flow or where low safety factors may lead to creep movements and progressive softening.

Groundwater Discharge means the flow of water from an aquifer. Discharge areas are locations at which ground water leaves the aquifer and flows to the surface. Ground water discharge occurs where the water table or potentiometric surface intersects the land surface. Where this happens, springs or seeps are found. Springs and seeps may flow into fresh water bodies, such as lakes or streams, or they may flow into saltwater bodies.

Groundwater Recharge means downward movement of water through the soil to the groundwater or the process by which external water is added to the zone of saturation of an aquifer, either directly into a formation or indirectly by way of another formation. Most areas, unless composed of solid rock or covered by development, allow a certain percentage of total precipitation to reach the water table. The sustainable yield of an aquifer is mainly controlled by the amount of recharge it receives. If total discharges (natural discharge plus water use from human activities) exceed recharge, water levels in an aquifer will decline. This decline will continue until a new balance is reached between total discharge and recharge, or the aquifer becomes depleted to the point where further withdrawals are no longer feasible.

Quantifying recharge is not easy, because it depends on a number of variables including:

- soil type
- geology and hydrogeology
- precipitation (including amount, type, and melt rate for snow)
- prior soil moisture conditions runoff
- topography
- evapotranspiration.

For a given climatic condition, recharge is much higher in areas of coarse sands and gravels than in areas of low-permeability clays.

Habitable Floor Space means any area that has the potential to be used as or converted to residential living space, including basements.

Hazardous Land means land that could be unsafe for development because of naturally-occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock.

Hazardous Sites (as defined by the Provincial Policy Statement) means property or lands that could be unsafe for development and site alteration due to naturally occurring hazards. These may include unstable soils (sensitive marine clays (Leda), organic soils) or unstable bedrock (karst topography).

Hazardous Substances means substances which individually or in combination with other substances, are normally considered to pose a danger to or threat to public health, safety and the environment. These substances generally include a wide range of materials that are toxic, ignitable, corrosive, reactive, radioactive or pathological.

Headwater means the source and extreme upper reaches of a river, creek, stream or watercourse.

Hydrologic Function means the functions of the hydrologic cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things.

Hydrologic Study means a report prepared to address the potential impacts of development and interference on the hydrologic functions of a wetland or other natural feature.

Intermittent means river flow that is irregular and only occurs after heavy rain or snowmelt.

Karst means an area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns.

Maintenance, with respect to Municipal Drains, means the preservation of a drainage works.

Meander Belt Allowance means a limit for development within the areas where the river system is likely to shift. It is based on:

- a) twenty (20) times the bankfull channel width where the bankfull channel width is measured at the widest riffle section of the reach. A riffle is a section of shallow rapids where the water surface is broken by small waves. The meander belt is centred over a meander belt axis that connects the riffle section of the stream, or
- b) by a technical study utilizing the Meander Belt Width Delineation (TRCA 2001) method.

Meander Belt Axis means the line or "axis" that the meander belt is centred over which connects all the riffle sections of a stream.

Meander Belt means the area of land in which a watercourse channel moves or is likely to move over a period of time.

Multi-unit means any building or structure or portion thereof that contains more than one unit for any use (e.g. a residential dwelling unit, an industrial/commercial/institutional space designed or intended to be occupied or used for business, commercial, industrial or institutional purposes).

Municipal Drain means a "drainage works" as defined under the Drainage Act. Under the Act, a drainage works is defined as a drain constructed by any means, including the improving of a natural watercourse, and includes works necessary to regulate the water table or water level within or on any lands or to regulate the level of the waters of a drain, reservoir, lake or pond, and includes a dam, embankment, wall, protective works or any combination thereof. To be a municipal drain, there must be a municipal by-law that adopts an engineer's report that defines the drainage system and states how the cost of the system is to be shared among property owners.

Natural Channel Design means a practice used in stream realignment and restoration projects that attempts to reconstruct channels to emulate the self-sustaining geomorphic and ecological functions of natural watercourses.

Natural Hazards means physical and environmental processes operating at or near the surface of the earth and sites of unstable soils that limit potential uses of some lands. Sometimes the environmental processes and the characteristics of soils produce unexpected events of unusual magnitude or severity. Floods, ice jams, soil erosion and slope failures have resulted in damage to property, injury to humans and loss of life. Other lands are considered natural hazards due to the presence of unstable and sensitive marine clay, organic soils or karst topography.

Negligible means not measurable or too small or unimportant to be worth considering.

Not Apparent Valley or Unconfined Valley means a watercourse is not located within a valley corridor with discernible slopes, but within relatively flat to gently rolling plains and is not confined by valley walls. The watercourse can contain perennial, intermittent or ephemeral flows and may range in channel configuration, from seepage and natural springs to detectable channels.

One Hundred Year Erosion Rate means the predicted lateral movement of a river, creek, stream or watercourse or inland lake over a period of one hundred years.

One Hundred Year Flood Event (100 year flood) means rainfall or snowmelt, or a combination of rainfall and snowmelt, producing at any location in a river, creek, stream or watercourse a peak flow that has a probability of occurrence of one percent during any given year.

Other Water-related Hazards means water-associated phenomena other than flooding hazards and wave uprush which act on shorelines. This includes, but is not limited to ship-generated waves, ice piling and ice jamming.

Oversteepened Slope means a slope which has a slope inclination equal to or greater than 33 1/3 percent (3H:1V).

Perennial means river flow that continues through the year, and only dries up during prolonged drought.

Pollution means any deleterious physical substance or other contaminant that has the potential to be generated by development.

Potentiometric Surface means the potential level to which water will rise above the water level in an aquifer in a tightly cased well that penetrates a confined aquifer; if the potential level is higher than the land surface, the well will overflow.

Protect in the context of wetlands, means the preservation of wetlands in perpetuity through implementation of appropriate physical and/or legal mechanisms (e.g. ecological buffers, development setbacks, zoning, fencing, conservation easements, etc.).

Protection Works means structural or non-structural works which are intended to appropriately address damages caused by flooding, erosion and/or other water-related hazards.

Provincially Significant Wetland means an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time.

Qualified Professional means a person with specific qualifications, training, and experience authorized to undertake work in accordance with the policies in accepted engineering or scientific principles, provincial standards, criteria and guidelines, and/or to the satisfaction of NBMCA.

Regulated Area means the area encompassed by all hazards and wetlands, plus any allowances.

Regulatory Flood means the inundation under a flood resulting from the rainfall experienced during the Timmins storm, the 100 year flood, wherever it is greater, the limits of which define the *riverine flooding hazard*.

Repair, with respect to Municipal Drains, means the restoration of a drainage works to its original condition.

Replacement means the removal of an existing building or structure and the construction of a new building or structure. Replacement does not include reconstruction on remnant foundations or derelict or abandoned buildings or structures.

Riffle means a section of shallow rapids where the water surface is broken by small waves.

River means a large natural stream of water emptying into an ocean, lake, or other body of water and usually fed along its course by converging tributaries.

Restore, in the context of wetlands, means the re-establishment or rehabilitation of a former or degraded wetland with goal of returning natural or historic functions and characteristics that have been partially or completely lost by such actions as filling or draining.

Riparian Vegetation means the plant communities in the riparian zone, typically characterized by hydrophilic plants.

Riparian Zone means the interface between land and a flowing surface water body. Riparian is derived from Latin *ripa* meaning river bank.

Riverine Erosion Hazard means the loss of land, due to human or natural processes, that poses a threat to life and property. The *riverine erosion hazard* limit is determined using considerations that include the 100 year erosion rate (the average annual rate of recession extended over a one hundred year time span), an allowance for slope stability, plus a 15 metre allowance or, in unconfined systems, the meander belt allowance plus a 15 metre allowance.

Riverine Flooding Hazard means the inundation, under a flood resulting from the rainfall experienced during the Timmins storm or, the 100 year flood, whichever is greater.

Riverine Hazard Limit means the limit which encompasses the *flooding and erosion hazards* and the river, creek, stream or watercourse.

Safe Access means locations where during the *Regulatory Flood*, the flow velocity does not exceed 1.7m/s, the depth of flooding along the access route does not exceed 0.8 metres and the product of depth and velocity does not exceed 0.4 m²/s.

Setback means a physical separation. Setbacks form boundaries by establishing an exact distance from a fixed point, such as a property line, an adjacent structure, or a natural feature, within which development and/or site alteration is prohibited.

Special Policy Area means an area within a community that has historically existed in the floodplain and where site-specific policies, approved by the Ministers of Natural Resources and Forestry, Municipal Affairs and Housing, NBMCA and the municipality are intended to provide for the continued viability of existing uses (which are generally on a small scale) and address the significant social and economic hardships to the community that would result from strict adherence to the provincial policies concerning development. The Province establishes the criteria and procedures for approval.

A *Special Policy Area* is not intended to allow for new or intensified development, if a community has feasible opportunities for development outside the floodplain.

Stage-Storage Discharge Relationship means the relationship of flood storage and flood elevation values at various flood flow rates within a particular watercourse/floodplain reach. This relationship is used as a factor to determine whether the hydraulic function of the floodplain is preserved.

Stream means a flow of water in a channel or bed, as a brook, rivulet, or small river.

Thermal Impact means the impairment of water quality through temperature increase or decrease. Changes in temperature can also effect species composition of plants, insects and fish in a water body.

Toe of Slope means the lowest point on a slope, where the surface gradient changes from relatively shallow to relatively steep.

Top of Slope means the point of the slope where the downward inclination of the land begins, or the upward inclination of the land levels off. This point is situated at a higher topographic elevation of land than the remainder of the slope.

Valleyland means land that has depressional features associated with a river or stream, whether or not it contains a watercourse.

Watercourse means an identifiable depression in the ground in which a flow of water regularly or continuously occurs.

Watershed means an area that is drained by a river and its tributaries.

Wave Uprush means the rush of water up onto a shoreline or structure following the breaking of a wave; the limit of wave uprush is the point of furthest landward rush of water onto the shoreline.

Wetland means land that:

- a) is seasonally or permanently covered by shallow water or has a water table close or at the surface
- b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse,
- c) has hydric soils, the formation of which have been caused by the presence of abundant water, and
- d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water

But does not include periodically soaked or wet land that is used for agricultural purposes and no longer exhibits wetland characteristics referred to in clause (c) or (d). ("terre marécageuse") 1998, c. 18, Sched. I, s. 12.

Wetland Complex means a group of wetlands which are usually within the same watershed, located within 0.75 kilometres of each other and functionally linked to one another. As a group, they have similar or complimentary biological, social, and/or hydrologic functions.

Wetland Functions mean biological, physical, and socio-economic interactions that occur in the environment because of the properties of the wetlands that are present, including, but not limited to:

- Groundwater recharge and discharge
- Flood damage reduction
- Shoreline stabilization
- Nutrient retention and removal
- Food chain support
- Habitat for fish and wildlife
- Social and economic benefits

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix A

Conservation Authorities Act, R.S.O. 1990, c.C.27

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix B

**O.Reg. 97/04: Content of Conservation Authority
Regulations under Subsection 28 (1) of the Act:
Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses**

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix C

**O.Reg. 177/06: North Bay-Mattawa Conservation
Authority: Regulation of Development, Interference with
Wetlands and Alterations to Shorelines and
Watercourses**

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix D

City of North Bay Reduction of Flood Standard on Chippewa Creek, Parks Creek and the La Vase River

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix E

Floodproofing and Access Standards

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix F

Regulatory Floodplain Elevations – Lakes

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix G

North Bay-Mattawa Conservation Authority Wetlands Policy

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix H

North Bay-Mattawa Conservation Authority Environmental Impact Study Guidelines

Policies for the Administration of
Ontario Regulation 177/06



Development, Interference with Wetlands and Alterations
to Shorelines and Watercourses

Appendix I

**Drainage Act and Conservation Authorities Act Protocol
Protocol for Municipalities and Conservation Authorities for Drain
Maintenance and Repair Activities.**