

Natural & Human Hazards/Constraints - Flooding

BACKGROUND:

- Media coverage of the recent flooding across Canada has highlighted the risks to public health and safety, extensive property damage, and immeasurable social disruption when development in close proximity to water is subject to flooding. For municipalities and governments, flooding events contribute to increased public liability, escalating public costs related to the installation, maintenance, replacement or upgrade of protection works required to protect vulnerable developments, and mounting public expense to address past development decisions.
- In the Town of Huntsville, the regulatory flood (the flood event established by the province as flood level for which municipalities must plan) identified by the Province is being the greater of:
 - i) The “100 year flood”, which is the area that would be flooded, on average, once in 100 years; or
 - ii) the “Regional Flood”, which is the area that would be flooded by a storm modeled on a particularly intense storm which occurred in Timmins in 1961, and could occur in this area.
- Typically in Ontario, the Province requires that a “One Zone” or a “Two Zone” approach be applied to guide development in the flood plain.
- Where the “One Zone” concept is applied the floodway (portion of the *flood plain* where *development* and *site alteration* would cause a danger to public health and safety or property damage) represents the entire contiguous floodplain. Under this approach, no new development, expansion of existing uses and /or site alteration (i.e. filling) should be permitted below the regulatory flood elevation. One exception could be to permit structures necessary for flood and/or erosion control works or structures which by their nature must be located on the shoreline, such as docks or non-habitable boathouses.
- Flood plain mapping for a downtown section of the Town of Huntsville identifies the regulatory flood elevation which defines the floodplain area. For this area, the province recommends that a “One Zone” approach be implemented.
- The “Hydrology Study for Major Lakes in the Muskoka River Watershed” (1988) was prepared for MNR and Environment Canada. A supplementary wave-runup/offset analysis was prepared in 1989. It identifies the regulatory flood elevation for major lakes within the Town of Huntsville. The table in Appendix “I” contains the stillwater and wave run-up elevations for several major lakes identified above noted 1988 and 1989 studies.
- The wave run-up elevations identified in the Muskoka Hydrology Studies are based on the maximum fetch on each lake (i.e. the maximum distance over which waves can build). These elevations may, therefore, be excessive for locations subject to a lesser fetch. A site-specific wave run-up calculation could be determined where property owners believe that the general wave run-up calculation is excessive. The Province

recommends that any site-specific revisions are determined by an engineer qualified in this field. However, in no case can the “One Zone” approach flood elevation be lowered below the stillwater flood elevation.

- A “Two Zone” approach is only used when a detailed engineered study has determined that certain portions of the floodplain could be safely developed with significant off-site increases in flood-related hazards (that is, without significantly increasing flood elevations or flow velocities on other properties). Under this approach:
 - Because flood depths and/or velocities are considered to be such that they pose a potential threat to life and/or property damage, the “floodway” is that part of the floodplain where new development, expansion of existing development and/or site alteration should not be permitted.
 - The “flood fringe” (the outer portion of the *flood plain where flood depths are significantly lesser than in the floodway*) is that part of the floodplain where it has been demonstrated that new structural development could safely occur without resulting in significantly increased flood-related impacts elsewhere. New development could be permitted within the flood fringe provided that it has safe access, all buildings and additions are adequately flood-proofed, and adequate provisions are made for the safe disposal of sewage.
- The Big East Flood Damage Reduction Program study (1989) allows for a “Two Zone” approach to floodplain management in certain locations along the Big East River. This two zone study determined that development and filling in the floodway should be prohibited due to the potential for property damage and the potential for off-site impacts. The only locations in which new development should be permitted within the flood plain were the areas identified as flood fringe.
- The Big East River Flood Damage Reduction Program mapping was a comprehensive engineering study. The Province requires that alterations to the Regulatory Flood Elevations or Regulatory Floodlines derived from this study should only be carried out where supported by a reviewed detailed engineering study which assesses cumulative impacts.
- Floodplain management is one of the natural hazard/constraint areas currently identified in the Huntsville Official Plan. Depending on the severity of the hazard, the policies either prohibit or limit permitted development.

POLICY CONTEXT:

Provincial Policy Statement (2014):

- 3.1.1 Directs development away from lands subject to flooding and erosion.
- 3.1.2 Refines direction to prohibit development in a floodway, regardless of high points of land, and areas inaccessible to vehicles and people during times of flooding, unless it has been demonstrated that safe access is available for the nature of the development and the natural hazard.

- 3.1.4 Development may only be permitted in flood prone areas if a “special policy area” is approved by the province; or only permitted are those uses which by their nature must locate in the floodway.
- 3.1.6 Where floodplain mapping exists and a ‘Two Zone’ concept is applied, development may occur in the flood fringe if the risk can be mitigated (i.e. floodproofing, safe access, no new hazards created).
- 1.2.3, 3.1.3 The Town must consider the impacts of climate change and the potential for increased risk in the context of natural hazards

Current Muskoka Official Plan & Policy Directions Report:

- F.46, F. 49-52 Defines terms related to 100 year flood event (floodway, flood fringe, etc.) and illustrates lands on Schedules E & F.
- F.48, F.53-54 Generally directs development away from the floodplain but enables the use of the ‘Two Zone’ floodplain concept
- F.56 Prohibits alteration of a flood prone area (filling, etc.) that would significantly alter flood flows
- F.55, F.57-60 Outlines various agency roles in floodplain identification and maintaining water level control structures

Draft Muskoka Official Plan

- F1.3 a) Wetlands are important natural resources. The ecological, social and economic benefits that can be attributed to wetlands are substantial. Wetlands maintain and improve water quality; help control flooding; provide habitat for fish and wildlife; provide conditions for a wide variety of vegetation (including rare and unusual species); and contribute to substantial social and economic benefits such as hunting, fishing, wildlife viewing and appreciation of nature in general.
- F.1.13 a) It is the intent of this Plan to recognize the importance of the **ecological function** of all watercourses and **surface water features**, and their associated **floodplains**, valleys and stream corridors. Watercourses and **surface water features** are generally shown on the schedules to this Plan.
- F2.4 b) In order to control flooding, ponding, erosion and sedimentation and to protect water quality and aquatic habitat or other natural habitat which depend on watercourses and other water bodies for their existence, stormwater management plans shall generally be required for any new development consisting of more than four lots or for commercial or industrial developments with large amounts of impervious area. Stormwater management will be undertaken in accordance with the Provincial Ministry with jurisdiction’s guidelines (e.g. Stormwater Management Planning and Design Manual, 2003).

- G4.2 b) Landowners are encouraged to recognize the importance and value of forest resources as a source of wood and non-wood products as well as for their wildlife, **recreation**, aesthetic, environmental and soil and water conservation capabilities. In this regard, landowners are encouraged to:
- iii) Maintain and establish tree and shrub cover as appropriate, and in hazardous areas such as steep slopes, major drainage swales, shorelines and flood prone areas, in order to reduce runoff rates and minimize soil erosion;
- H1.2 **Development** shall generally be directed to areas outside of:
- b) Hazardous lands adjacent to river, stream and small inland lake systems which are impacted by flooding hazards and/or erosion hazards or areas at risk for **wildland fire**;
- H1.3 a) **Hazardous lands** are lands that could be unsafe for **development** due to naturally occurring processes.
- b) Along **river, stream and small inland lake systems**, this means the land, including that covered by water, to the furthest landward limit of the **flooding hazard** or **erosion hazard** limits. For the purposes of this policy, all of the lakes in the District are considered to be small inland lake systems.
- H1.5 **Development** and **site alteration** shall not be permitted within:
- a) Areas that would be rendered inaccessible to people and vehicles during times of **flooding hazards** and/or **erosion hazards**, unless it has been demonstrated that the site has safe access appropriate for the nature of the development and the natural hazard; and,
 - b) Where a two-zone concept is applied, a **floodway** regardless of whether the area of inundation contains high points of land not subject to flooding.
- H1.6 Notwithstanding Section H1.5 of this Plan, **development** and **site alteration** may be permitted in certain areas associated with the **flooding hazard** along **river, stream and small inland lake systems**:
- a) In those exceptional situations where a **Special Policy Area** has been approved. The designation of a **Special Policy Area**, and any change or modification to the official plan policies, land use designations or boundaries applying to **Special Policy Area** lands, must be approved by the Ministers of the Provincial Ministries with jurisdiction prior to the approval authority approving such changes or modifications; or,
 - b) Where the **development** is limited to uses that by their nature must locate within the **floodway**, including flood and/or erosion control works or minor additions or passive non-structural uses that do not affect flood flows.

H1.7 **Development** shall not be permitted to locate in **hazardous lands** and **hazardous sites** where the use is:

- a) An **institutional use** including hospitals, long-term care homes, retirement homes, pre-schools, school nurseries, day cares and schools;
- b) An **essential emergency service** such as that provided by fire, police and ambulance stations and electrical substations; or
- c) Uses associated with the disposal, manufacture, treatment or storage of **hazardous substances**.

Town Strategic Documents:

Strategic Plan

Natural Environment and Sustainability

Goal #1: Demonstrate the Town’s commitment to protecting the quality and character of the natural environment.

Goal #2: Integrate sustainability principles into planning and development policies and processes.

Unity Plan

Goal #5 Land Use Planning: Huntsville will become a model of sustainable community development, by incorporating the principles of smart growth, sustainable design and green buildings into all land use planning decisions. This will include a commitment to the protection and maintenance of Huntsville’s rural small town character and vibrant downtown, both of which are valued by the community.

Huntsville Official Plan:

3.6.1 Directs development away from lands subject to flooding.

3.6.2 Identifies a ‘Two Zone’ concept floodplain policy approach for the Big East River.

3.6.3, 3.6.4 & 3.6.8 In ‘One Zone’ concept floodplains, development is not permitted below the Regulatory Flood Elevation.

Wave uprush can be addressed through a site specific study. No new lot creation if inadequate space and access outside of floodplain.

3.6.5 Where the floodplain has been based on airphoto interpretation, the limits shall be spatially identified in zoning.

3.6.7 Openings for development in Brendale Square shall not be below the Regulatory Flood Elevation.

CONSIDERATIONS:

- Climate change is a critical issue for all of Muskoka and will likely manifest itself in more extreme weather events that will result in more intense impacts on hazard lands (i.e. flooding and wildland fires). These types of events could impact private property interests, community infrastructure and safety and insurance rates. Watershed Council has written a [background paper](#) on how climate change is anticipated to impact Muskoka. This paper recommends that through Official Plan Review processes, and in consultation with MNRF and DMM, area municipalities should ensure that regulations and advice governing built structures in floodplains are appropriate, and based on accurate, up-to-date information on likely patterns of water level fluctuations on our lakes and waterways in coming years.
- The provision of floodplain mapping for the Muskoka River through downtown, as well as updated mapping for the Big East River based on modelling of various climate change scenarios, is necessary to assist with policy preparation and emergency planning.
- The current floodplain planning policies address this matter through specific areas rather than in a more general way. They also do not provide direction to the zoning by-law for seasonal uses in flood prone areas.
- The Province has identified the need for policy which directs that new lot creation should not be permitted where there is inadequate building space outside the floodway or where access/egress is not safely available during times of flooding.
- The Province has identified the need for policy which directs that expansion of existing non-conforming uses should generally be prohibited.

SUMMARY:

A review of best practices from other municipalities across Muskoka has revealed that the following policy approaches may assist in addressing some of the considerations:

- Update hazard/constraint policies in recognition of and in reference to, climate change.
- Update floodplain policies to address this issue in more detail and to better inform the zoning by-law.

Appendix "I"

Lake	Stillwater Flood Elevation (m)	2 Yr. Wave Run-up (m)	Regulatory Flood Elevation including Wave Run-Up (m)
Peninsula Lake	285.29	1.17	286.46
Mary Lake	281.74	1.21	282.95
Fairy Lake	285.29	1.24	286.53
Lake Vernon	286.68	0.80	287.48
Fox Lake	295.72	0.64	296.36
Lake of Bays	315.84	1.34	317.18
Skeleton Lake	281.22	1.51	282.73
Buck Lake	301.95	0.70	302.65
Devine Lake	101.31	0.48	101.79
Clearwater Lake	101.73	0.57	102.30