CASE STUDY | CS-03

Municipality of East Hants Flood Mapping Upgrades

NOVA SCOTIA FEDERATION OF MUNICIPALITIES

Context

East Hants is a growing municipality located north of Halifax. The Barneys Brook watershed in East Hants spans an 8.5 km corridor from rural forests and farmland down through residential neighbourhoods and highway crossings to the Shubenacadie River.

During extreme storms—such as the historic July 2023 flood—the watershed experiences severe flash flooding and overland washouts.

The Challenge

The main flood trigger is a major bottleneck at the bottom of the brook, where all water is forced through a single culvert under a railway crossing.

High water levels in the Shubenacadie River downstream create a "tailwater effect," backing water up into Barneys Brook and driving floodwaters higher upstream.

Overgrown brush, mud, and active beaver dams further choked culverts and channels.

The Response

Over 500 manual survey points were collected to "ground-truth" provincial terrain data so their accuracy in this particular area could be trusted.

Engineers used computer software (HEC-HMS and HEC-RAS) to simulate storm patterns up to the year 2100 and map out exact flood hazard lines.

Structural Upgrades were proposed for the railway culvert bottleneck alongside a recurring channel maintenance schedule.

Key Insights

1 The Downstream Priority Rule

Standalone engineering upgrades to upstream highway bridges or culverts are ineffective if the primary downstream bottleneck is left unaddressed. Consider prioritizing clearing the lowest restriction in a drainage network first; otherwise, upstream investments may not provide adequate flood protection.

2 The Limits of Satellite Terrain Data

Publicly available provincial elevation maps (LiDAR) are highly useful, but they should be checked. Collecting manual ground-truth survey points in heavily vegetated or steep areas is an important technical requirement to prevent building flood models on inaccurate maps.

3 The Hidden Risk of Deferred Maintenance

Standard engineering models calculate drainage networks under the assumption that all channels and pipes are completely clean. Because natural debris, brush, and active beaver dams can reduce outfall capacity, an active, low-cost maintenance program is just as critical for public safety as costly structural additions.

Guiding Municipal Decisions

Municipalities can consider fixing the lowest downstream bottlenecks first, ground-truthing aerial radar maps with field measurements, and setting up routine clearing programs for streams and culverts.

Consider Your Municipality

Are there opportunities to collect, store, analyze and share data relating to community water back ups during heavy rain?

LEARN MORE: View the full Guidance Document at FloodAdaptNS.ca

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