LIMITING HOME AND COMMUNITY LEVEL FLOOD RISK: HOW ONTARIO SHOULD ADAPT

Dr. Blair Feltmate
Head, Intact Centre
bfeltmate@uwaterloo.ca

July 28, 2019

Generously supported by

UNIVERSITY OF WATERLOO

INTACT CENTRE ON CLIMATE ADAPTATION

Ontario Sustainable Energy Association

OSEA
1. Financial and social costs of extreme weather are increasing
2. Good news – there is well informed guidance to limit flood risk
3. Profile practical means to limit flood risk:
   - Home
   - Community
   - Natural Infrastructure
4. Summary/Discussion
COSTS OF EXTREME WEATHER: P&C CATASTROPHIC INSURABLE LOSSES ($CAD)

- premiums up 20-25% over past 5 years (15% = water)
- increase in % of homes with low cap limit ($10 - $20K)
- insurers pricing risk based on updated flood risk maps
  – home owners now receiving notice of premium adjustments/no insurance for some

Loss + Loss Adjustment Expenses
$2017 - total natural-catastrophe losses normalized by inflation and per-capita wealth accumulation
Courtesy: Insurance Bureau of Canada

Note: Cost to government and homeowners 3-4X that of private insurers.
MENTAL HEALTH IMPACTS OF BASEMENT FLOODING

- “It’s something you never want to experience again in your life”
- Average time off work following basement flood – 7.1 days

Three Years After A Flood:
Responses to "How Worried Do You Get When it Rains?"

% of Respondents Who Gave a 4 or 5 on a Scale of 1-5
(1= not worried, 5 = very worried)
GUIDANCE ON HOME AND COMMUNITY FLOOD RISK MITIGATION

Home Flood Protection Guideline

New Community Flood Guideline

Existing Community Flood Guideline

Commercial Real Estate Flood Guideline (RealPac & BOMA)
FLOOD RISKS OUTSIDE THE HOME

Top Flood Risks Outside the Home

- Window Wells < 4-6" Above Grade: 82%
- Downspouts Discharge < 2 m from Foundation: 78%
- Clogged Drains or Poorly Sealed Doors Below Grade: 75%
- Grading Directs Water Towards Foundation: 69%
- Sump Discharge < 2 m from Foundation: 68%
- Cracks or Gaps in Windows or Frames: 63%
- Undersized or Leaking Eaves Troughs: 62%
FLOOD RISKS INSIDE THE HOME

Top Flood Risks Recorded Inside the Home

- No Back-Up Sump Pump: 85%
- No Sump Pump Back-Up Power: 84%
- Furniture/Electronics at Risk of Water Damage: 71%
- Valuables at Risk of Water Damage: 65%
- Risk of Damage from Hazardous Materials: 61%
- Obstruction of Water Flow to Floor Drain: 35%
Significant percentage of residents have never maintained their backwater valve or sump pump systems.
1. ONTARIO ACTION: HOME OWNER FLOOD GUIDANCE

Step 1: Maintain What You’ve Got at Least Twice per Year
- Do-It-Yourself for $0
  - Remove Debris from Nearest Storm Drain
  - Clean Out Eaves Troughs
  - Maintain Plumbing, Fixtures and Appliances
  - Test Your Sump Pump
  - Clean Out Your Backwater Valve

Step 2: Complete Simple Upgrades
- Do-It-Yourself for Under $250
  - Install Window Well Covers
  - Extend Downspouts and Sump Discharge Pipes at least 2m from Foundation
  - Store Valuables and Hazardous Materials in Watertight Containers or Remove from Basement
  - Remove Obstructions to Basement Floor Drain
  - Install and Maintain Flood Alarms

Step 3: Complete More Complex Upgrades
- Work with a Contractor for Over $250
  - Install Window Wells that Sit 10-15 cm Above Ground and Upgrade to Water Resistant Windows
  - Disconnect Downspouts, Cap Foundation Drains and Extend Downspouts to Direct Water at Least 2m from Foundation
  - Correct Grading to Direct Water at Least 2m Away from Foundation
  - Install Backwater Valve
  - Install Backup Sump Pump and Battery

https://xd.adobe.com/view/22760d0e-f89a-4cba-6c3b-36e4ec217104-5447/?fullscreen
2. ONTARIO ACTION: COMMUNITY FLOOD RISK ASSESSMENT PROTOCOL

Promote Flood Risk Assessment
- applies to small towns & large cities
- low cost
- non-technical (low, medium, high scoring)

1. Age of Development (low, medium, high)
2. History of Flooding (low, medium, high)
3. Flood Forecasting & Warning Systems
4. Floodplain Mapping
5. Proximity to Floodplain
6. Topography
7. Land Use Intensification/Imperviousness
8. Sewer System Type
9. Wastewater Pumping Station Design Location
10. Sump Pump System
3. ONTARIO ACTION: SHORT TERM FLOOD RISK MITIGATION

WATERGATE BY MEGASECUR

- Set up around 5 city blocks by a staff of 2-4 people in 1 hour
- 600 meters of protection (1 m high), cost $165,000
- Reusable
- Made in Canada

Deployment in Calgary, AB

BOXWALL BY NOAQ

- Fast deployment (200 m/h)
- Works well for urban flat surfaces
- Lightweight
- Reusable
- Swedish company
Communities deploy permanent structures to mitigate flood risk:

1. Flood walls
2. Berms
3. Diversion channels
4. Holding ponds
5. Cisterns
6. Bio-swails
7. Permeable surfaces
8. Naturalized riparian zones
9. Behavioural - clearing culverts & dams
Wetlands can reduce infrastructure costs from major storms by 29 – 38%.

**Next Step:** launch national program focused on utilizing natural infrastructure to limit flood risk:
- retain what you have
- restore what you have lost
- build what you must
SUMMARY/DISCUSSION

1. Flood impacts
   - higher insurance premiums, lower insurance caps
   - growing un-insurability of the Canadian housing market
   - lost time from work claims. Higher mental health prescriptions?
   - depreciation in housing prices? Increase in mortgage defaults?

   Ontario Actions
   - Home Flood Guidance & Subsidy Program – infographic / APP
   - Community Flood Risk Assessment Program
   - Short Term Flood Risk Mitigation Program
   - Long Term Structural Flood Risk Mitigation Program
   - Natural Infrastructure Retention and Restoration Program

2. Questions