Homeowner Involvement in Urban Flood Risk Reduction

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Basement Flood Symposium: May, 2011
Introduction

- Homeowner-level urban flood mitigation
- Encouraging lot-level mitigation
- Perception studies
- Study results
- Implications
Lot-Level Measures

- Seal Cracks
- Backwater Valve(s)
- Lateral Inspections, Repair
- Maintain Eavestroughs, Downspouts
- Downspout Disconnection, Splash Pads
- Foundation Drain, Sump
- Lot Grading, Swales
- Backfill Capping
Behavioural Measures

- Report events to municipality, ask municipality for information
- Talk to your insurer about coverage
- Do not pour FOGs down your drain
- Maintain lot grading and plumbing systems
- Investigations, permits, inspections
- Leave basement unfinished
Encouraging Homeowner Action

- **Education**
  - Public meetings associated with EAs
  - Meetings focused on affected neighbourhoods
  - Meetings focused on plumbing measures
  - Mass media, brochures, handbooks, websites, etc.
  - Insurance providers
- **Subsidy programs**
Subsidy Programs

- Toronto
- Brantford
- Edmonton
- London
- Ottawa
- Halton Region
- St. Catharines
- Welland
- Niagara Falls
- Hamilton
- Saskatoon
- Vaughan
- Durham (loan)
- Peel/Mississauga
- Sudbury
- Winnipeg
- Brandon

Max grant generally ~$3,000
80% up to $2,800 for BW valve and sump-pump in Toronto
60% up to $3,000 for BWV/Sump in Winnipeg
Range for backwater valve:
$500 in Niagara Falls to $1,250 in Toronto
Subsidy Programs

- Focused on flooding caused by sewer backup
- Programs available to:
  - All homeowners
  - Risk homeowners
  - Historically flooded homes
- Some require notification of future homeowners of flood reduction measures
  - E.g., Niagara Falls
- Some require drainage/plumbing inspections by municipal representatives
  - E.g., St. Catharines, Halton
Standards and Bylaws

- Lot grading
- I/I reduction at the property level
  - Eavestrough downspout connections
  - Foundation drains – sanitary sewer (e.g., Durham Region since 1983, Peterborough since 1991, Sault Ste. Marie since 1968)
- Backwater valves in new development
  - Code interpretation
  - “…where a building drain or a branch may be subject to backflow, a gate valve or backwater valve shall be installed…” (NPC Section 2.4.6.4.(3))

Courtesy: Mainline Backflow Products, 2008
Insurance Approaches

- Education materials
- Incentivizing mitigation
  - Sumps and backwater valves mentioned most often
- Incentives may take several forms:
  - Availability
  - Caps (e.g., for more than $10,000 in coverage, mitigation may be required)
  - Premiums
- Sewer backup questionnaires

Data Source: Compu-Quote, 2010
Hazard Perceptions

- Frequent hazard denial, denigration
  - Low probability events
  - “It won’t happen to me”
  - Misinterpretation of extreme event statistics
    - E.g., 1 in 100 yr storm
    - Gambler’s fallacy

- Infrequent adoption of risk reducing adjustments
  - Up-front investment in risk-reduction not viewed as worthwhile for low probability events
  - Moral hazard – insurance and public relief

Bollens et al., 1988; Burton et al., 1993; 1978; 1968; Kates, 1962; Kreutzwiser et al., 1994; Kunreuther, 2006; Laska, 1986; McPherson & Saarinen, 1977; Shrubsole et al., 1997; Wong & Zhao, 2001; Yoshida & Deyle, 2005
Hazard Perceptions

- Reliance on governments to reduce risk
  - Reliance on structural adjustments

- Transfer of blame regardless of severity of events

- Strong correlations between disaster experience and investment in risk reduction
  - Window of opportunity

Bollens et al., 1988; Burton et al., 1993; 1978; 1968; Kates, 1962; Kreutzwiser et al., 1994; Kunreuther, 2006; Laska, 1986; McPherson & Saarinen, 1977; Shrubsole et al., 1997; Wong & Zhao, 2001; Yoshida & Deyle, 2005
Perception Studies

- Peterborough
  - 2005
  - Self administered
- Toronto & Edmonton
  - 2007
  - Phone interview
- Sherwood Forest, London
  - 2010
  - Self administered/Face-to-face interview
Basement Flood Experience, London

- **Yes**: 60%
- **No**: 31%
- **Don't know**: 8%
- **No response**: 1%

n=674

- **Sewage**: 57%
- **Clean**: 21%
- **Sewage and Clean**: 4%
- **No response**: 18%

n=209
Source of Clean Water Flooding

- Cracks in basement floors or walls: 32%
- Base of basement wall: 22%
- Basement window or door: 20%
- Floor drain: 19%
- Sump pump: 17%
- Other basement drains: 2%
- Sewer cleanout: 1%
- Don't know: 9%
Reported to City?

**Sewage Flooding**

- Yes: 56%
- No: 42%
- No Response: 2%

- N=52

**Clean Water Flooding**

- Yes: 13%
- No: 87%
- No Response: 1%

- N=128
Perceived Responsibility, Peterborough

Attribution of Responsibility for Sewer Backup
Perceived Responsibility, Toronto

1= Not Responsible, 6=Entirely Responsible
Made an Insurance Claim, London

Sewage Flooding

- Yes: 52%
- No: 44%
- No Response: 4%

Clean Water Flooding

- Yes: 20%
- No: 80%
- No Response: 0%

Survey Results:
- Sewage Flooding: n=52
- Clean Water Flooding: n=128
Do you have insurance coverage for sewer backup?

- Yes: 43%
- No: 11%
- Don't Know: 45%
- No Response: 1%

n=674
Insurance Coverage, London

Do you have insurance coverage for sewer backup?

- **Clean Water**: 46% Yes, 9% No, 25% Don't Know (n=128)
- **Sewage Water**: 52% Yes, 25% No, 23% Don't Know (n=52)
Insurance Coverage, Toronto & Edmonton

Do you have insurance coverage for sewer backup damages?

(Respondents who have experienced sewer backup in the past)
Which of the following does a standard home insurance policy cover?

- flooding
- coastal flooding
- wildfire
- faulty construction
- heavy snow fall
- severe wind
- burst pipes
- lightning
- hail
- theft
- fire

Frequency of “yes” responses
City Contact with Residents

- Information packages sent to residents in summer of 2009 by City of London
  - Letter of explanation
  - 1 page survey
  - Brochure
- Additional communications
  - Public meeting notification
  - Notification of downspout extension pilot program
Knowledge of City Programs

Is your municipal government currently taking actions to reduce sewer backup in your city?

- **Yes**
- **No**
- **Don’t know**

- **Edmonton (SB+)**
  - Yes: 42%
  - No: 24%
  - Don’t know: 35%

- **Toronto (SB+)**
  - Yes: 36%
  - No: 27%
  - Don’t know: 37%
Information Preferences, London

- No respondents wanted info only from insurers

Only 18% with flood history visited existing webpage
Survey Methods

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Part D: Basement Flood Reduction Plumbing

Image #1 is a backwater valve.

Image #2 is a backwater valve after it’s installed. There is usually a cover over the valve.

Backwater valves are in the basement floor, usually located near the basement wall that is closest to the City street.

Sump-Pit and Sump-Pump
The pictures on the right are sump-pits and sump-pumps. These are located in the basement floor, close to the basement wall.
20 respondents indicated that they were responsible for the installation of their backwater valve.
Sump System

Is there a sump-pit and sump-pump in your basement?

- Yes
- No
- Don't Know
- No Response

18 respondents responsible for installation of sump
No downspouts connected into municipal sanitary since development began in the area
Implications

- Low awareness of insurance coverage
- Low awareness of mitigation measures
  - BWVs specifically
  - Insurance company questionnaires
  - Are homeowners aware of maintenance requirements?
  - Homebuyers aware of mitigation measures?
Implications

- Installation of mitigation measures
  - Few chose to install plumbing measures on their own
  - Exemplifies the importance of mandatory installation (e.g., building codes, by-laws)

- Relatively low rates of reporting events to the City
  - Issues with identifying sewer backup/flood prone areas
  - E.g., in Edmonton, 2004: 4,000 reports to City, but 9,500 insurance claims
  - Possible fears: Insurance coverage issues, home value reductions
Implications

- Frequent infiltration flooding
- Sump-pump related flooding
  - Concern over sumps in open-ended responses, consistency of information for residents
- Limited awareness of City flood reduction programs
  - Despite information mailings
Implications

- Results indicate that respondents strongly prefer info from municipality, however:
  - Theory suggests that consistent information should be provided through a wide variety of sources
  - Insurers/brokers could work with municipalities and serve as a conduit for info
Conclusions

- Homeowner level actions an important part of overall flood mitigation strategies
- Many strategies employed to encourage risk reduction
- Challenge is to affect behaviour
- Willingness to retrofit, retrofit vs. mandatory installation
- Insurance incentives: Good step--right measures?
Thank You!

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