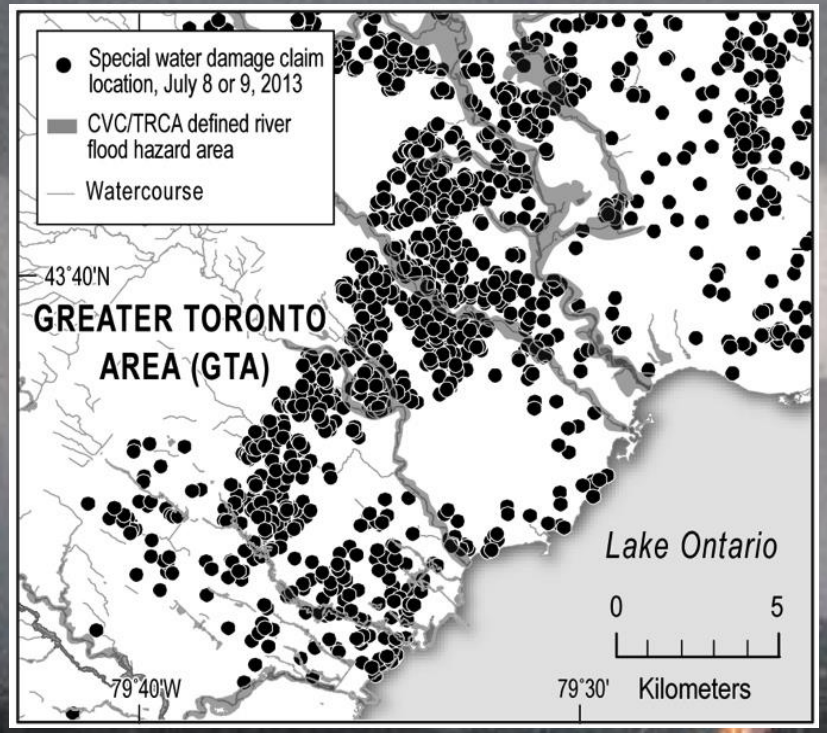
Institute for Catastrophic Loss Reduction
Building resilient communities

Institut de prévention des sinistres catastrophiques
Bâtir des communautés résilientes

Mitigating Urban/Basement Flood Risk:

Household-scale considerations

Dan Sandink, *Director of Research*
CCRF June 2018 – Halifax

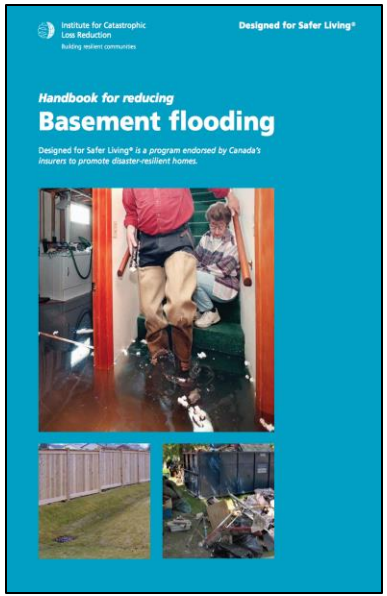


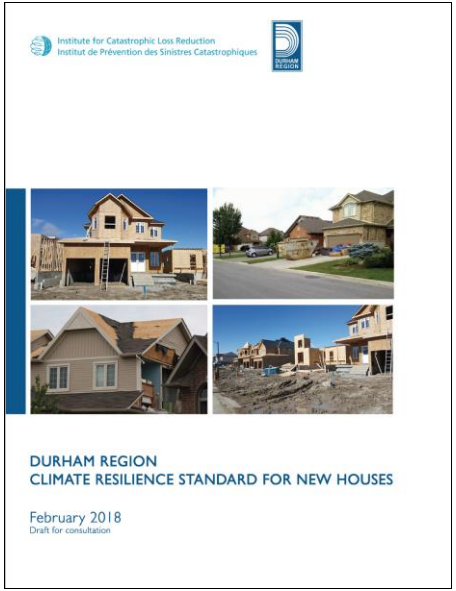
~$1 billion in insured losses (IBC)

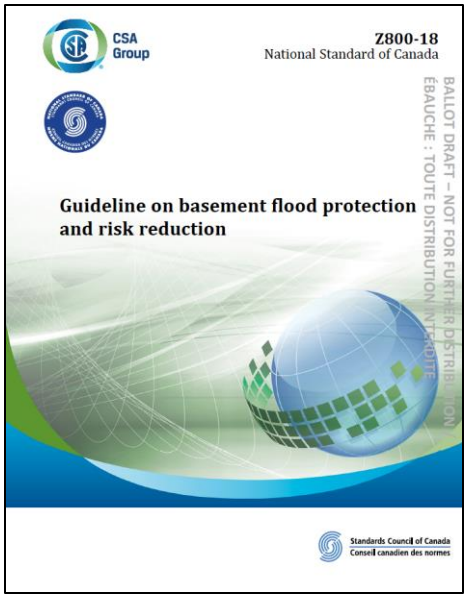
~60% of total losses from basement flooding in homes (sewer backup)
(CatIQ)

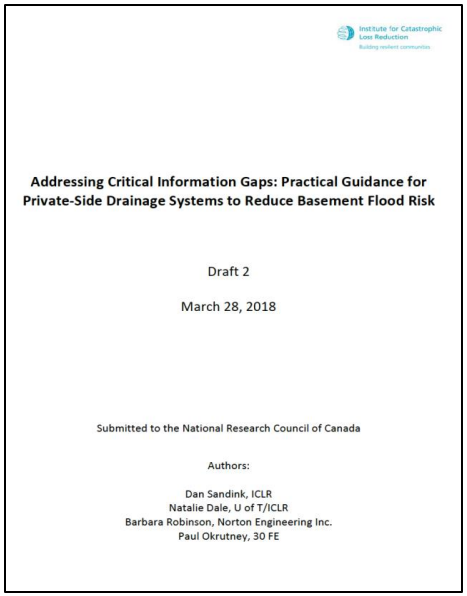
Map: Sandink *et al.*, 2016; Image: *BlogTO*, 2013

Information sources

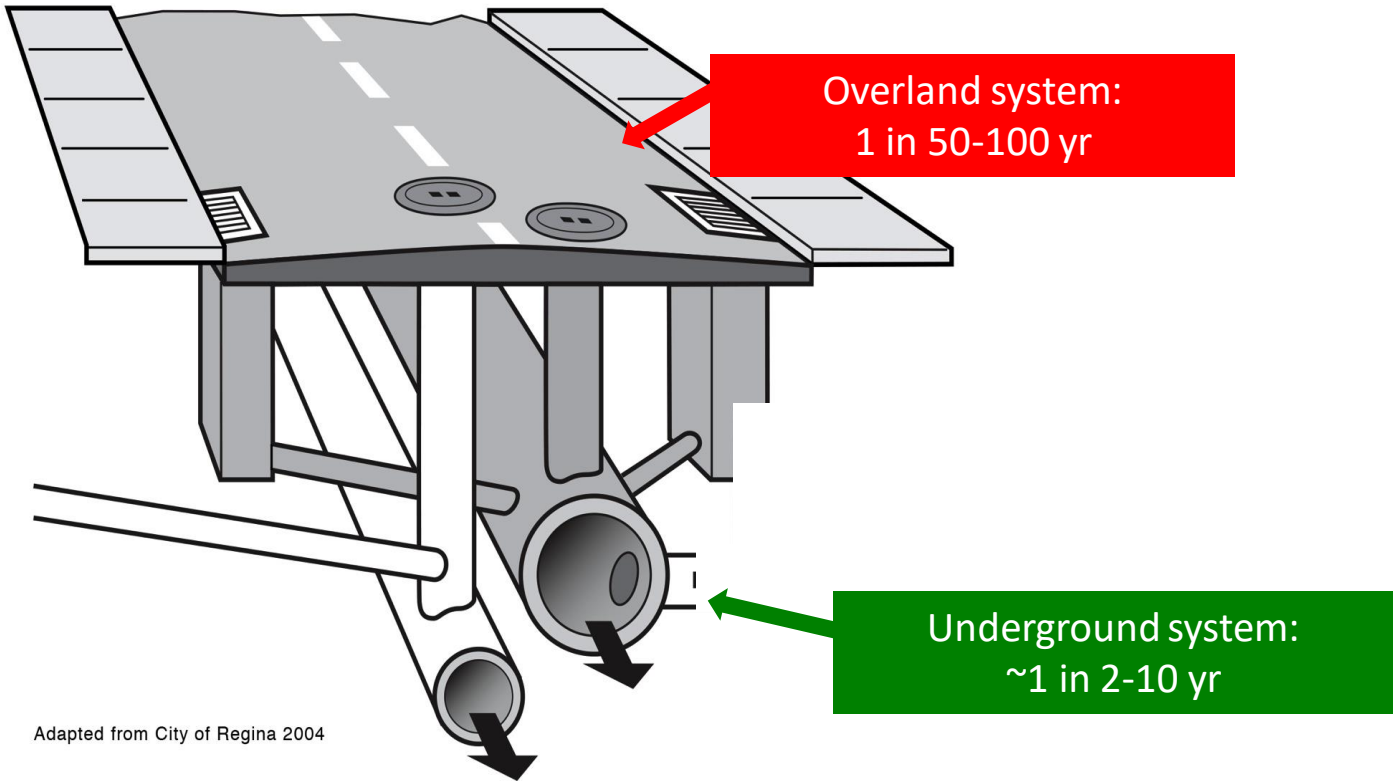








Major, minor systems

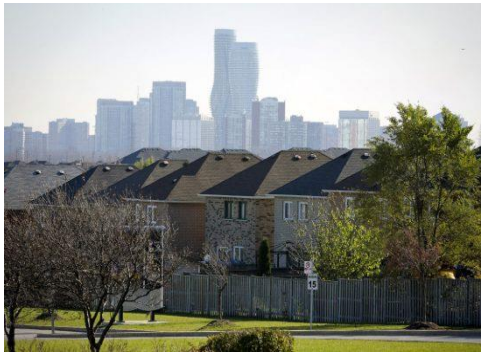


Essex County Floods, 2015: http://windsorite.ca/2015/05/photos-essex-county-floods

Binbrook, Hamilton, July 2012 - Luke Bell, Weather Network, 2012

SWM standards

- Pre-~1970s
  - 2 to 10 (minor system)
- Post-~1970s, 1980s
  - Major and minor
  - 50 to 100 year
  - Regional storms

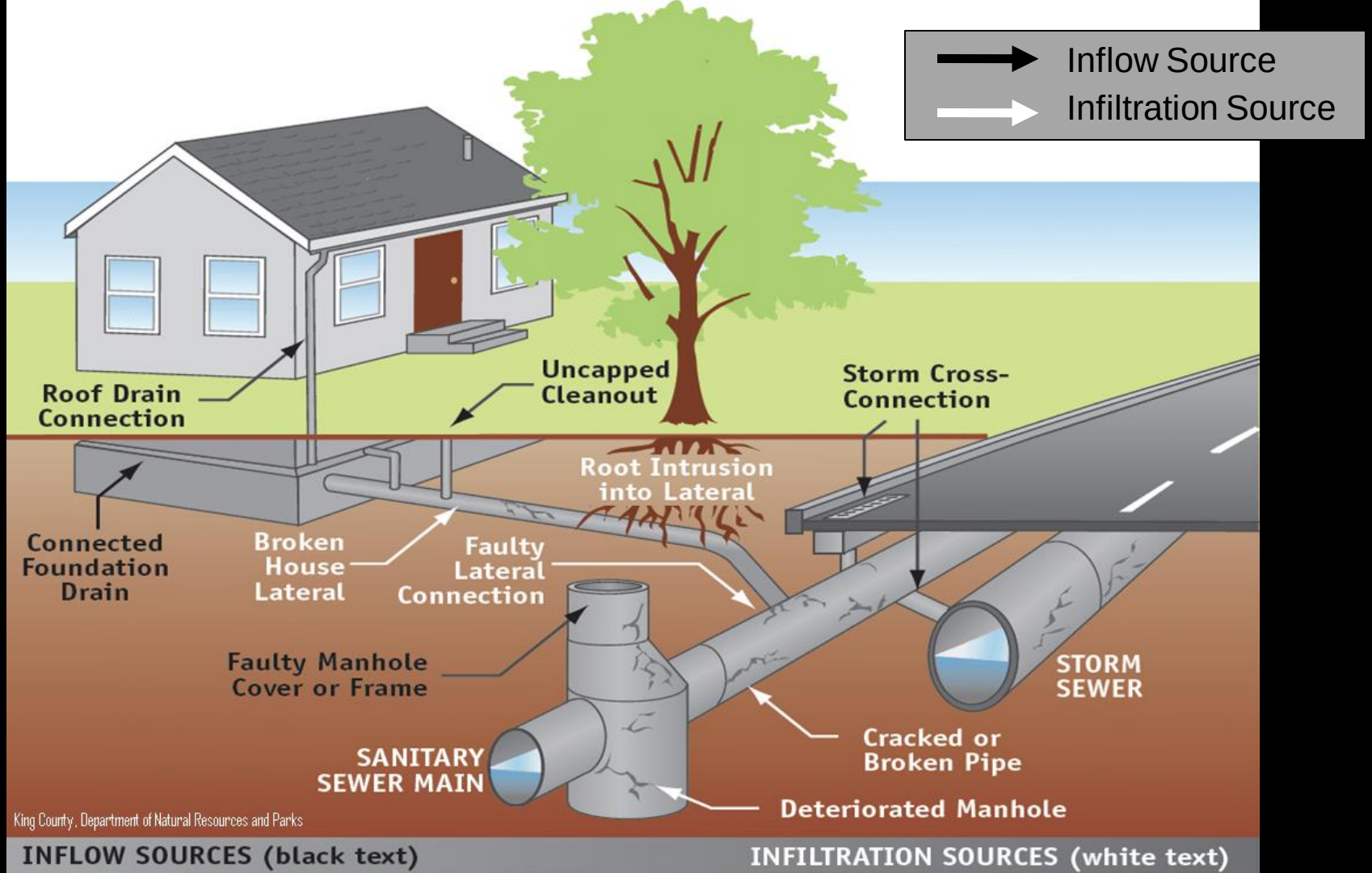


~73% of the City of Mississauga has no SW quantity control

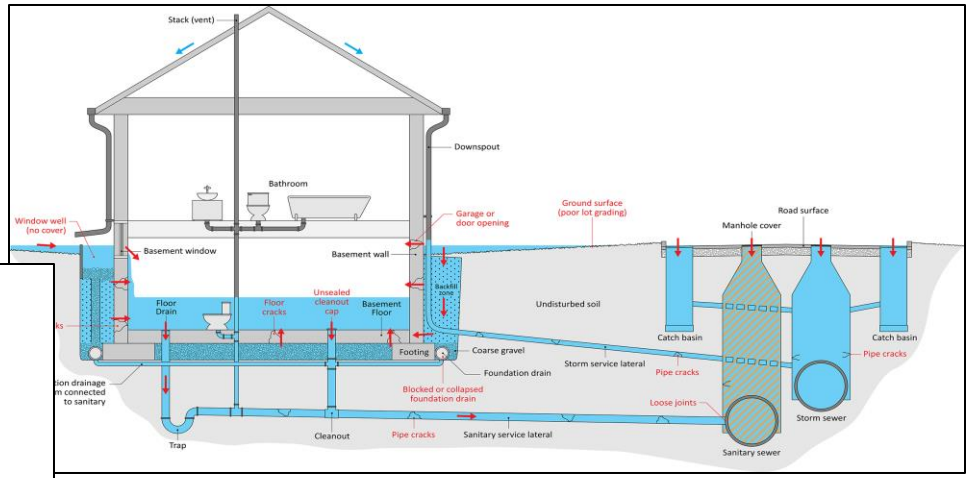
65% of GTA

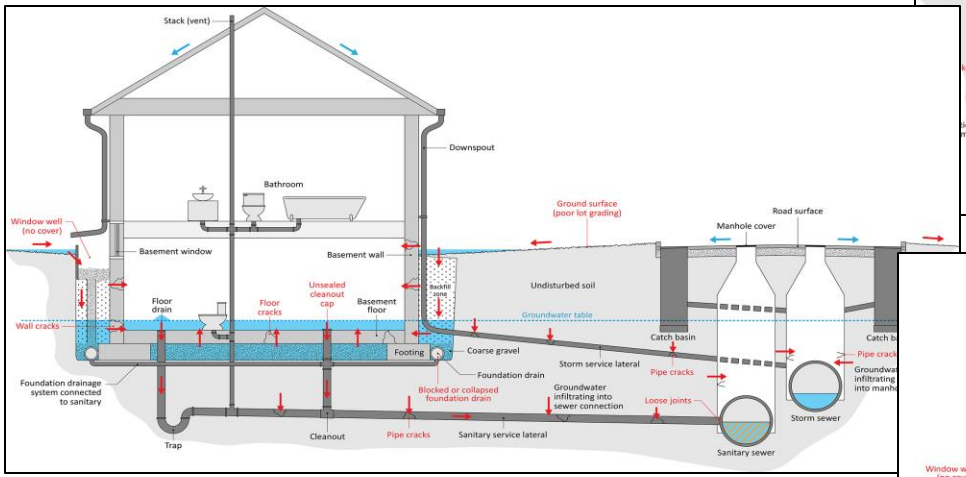
Hulley et al. 2008; Watt et al. 2003; Watt and Marsalek 2013

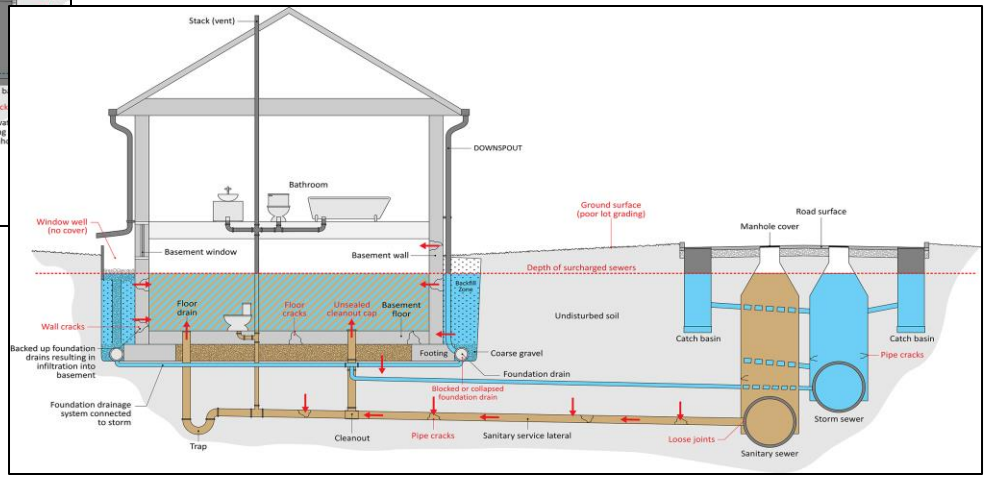
Pers. Comm., Chris Despins, Credit Valley Conservation, May 2014; TRCA/CVC


Inflow Source
Infiltration Source
Roof Drain Connection
Uncapped Cleanout
Storm Cross-Connection
Root Intrusion into Lateral
Connected Foundation Drain
Broken House Lateral
Faulty Lateral Connection
Faulty Manhole Cover or Frame
STORM SEWER
Cracked or Broken Pipe
SANITARY SEWER MAIN
Deteriorated Manhole
King County, Department of Natural Resources and Parks
INFLOW SOURCES (black text)
INFILTRATION SOURCES (white text)

Common flood types

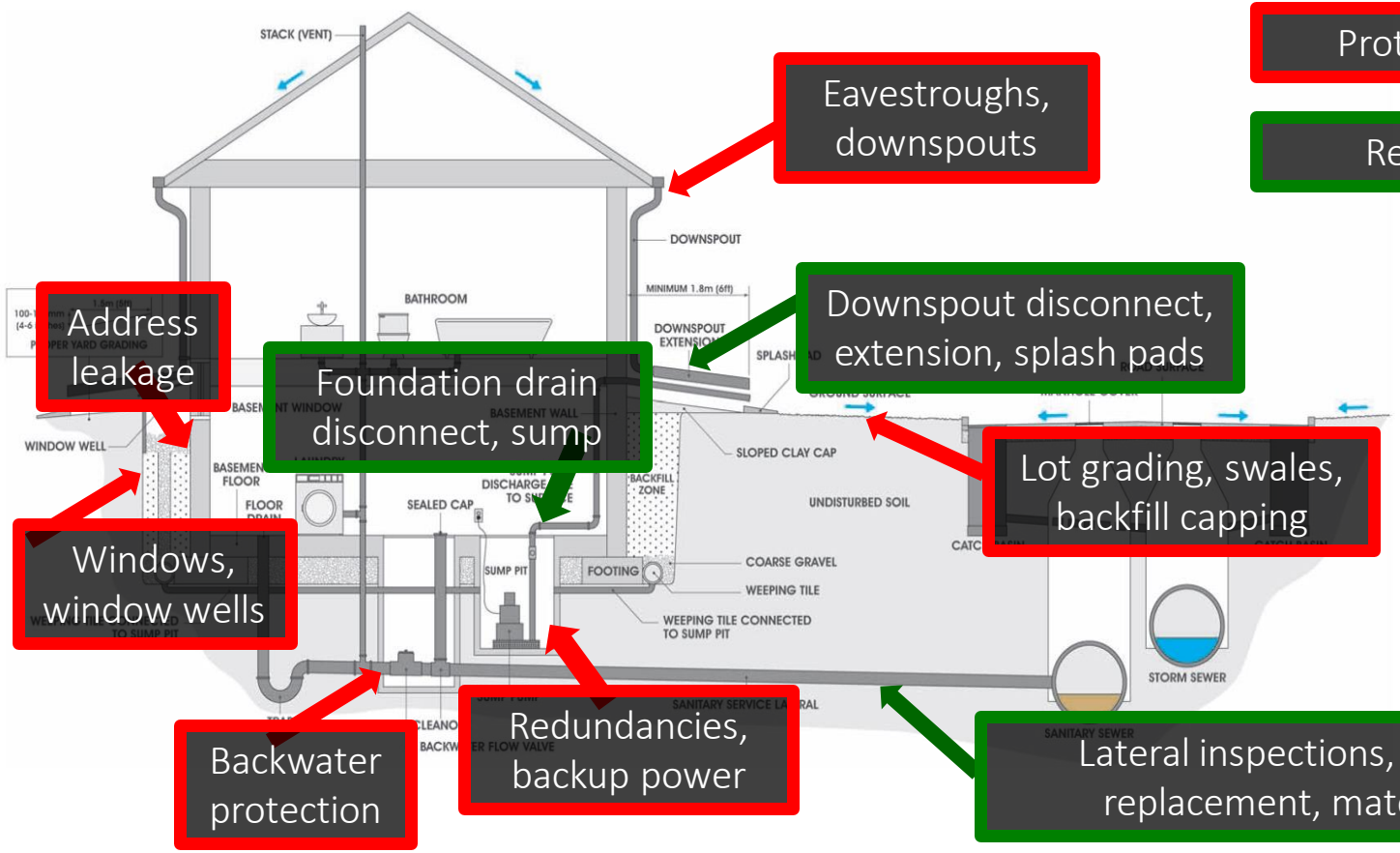






CSA Z800-18/ICLR 2009

Private-side protection, I/I (examples - physical)

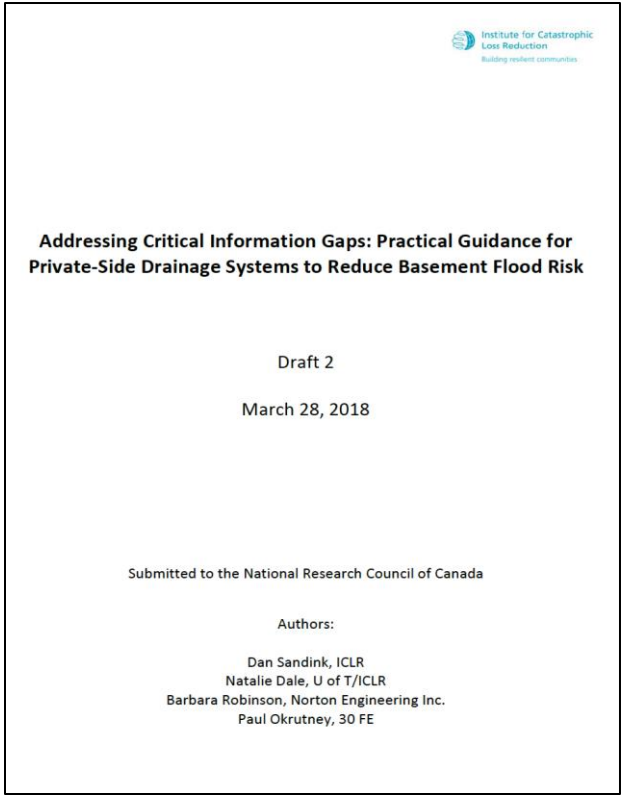


Behavioural (examples)

- Information hierarchy
- Recording and reporting of relevant information during, after event
- Drainage investigations, CCTVing, etc.
- Insurance coverage issues
- Routine testing and maintenance
- Routine use of plumbing, etc.

Unknowns

- Lifespans, effective maintenance for:
  - BWVs
  - Sump pumps and backup systems
  - Foundation drainage systems
  - Sewer lateral connections
- How will site-scale LIDs interact with drainage systems (e.g., FD, leaky laterals?)
- Construction, installation quality & inspection issues



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Addressing Critical Information Gaps: Practical Guidance for Private-Side Drainage Systems to Reduce Basement Flood Risk

Draft 2

March 28, 2018

Submitted to the National Research Council of Canada

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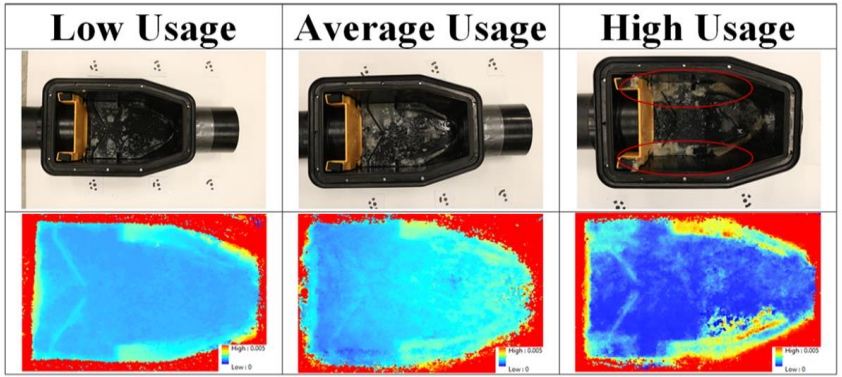
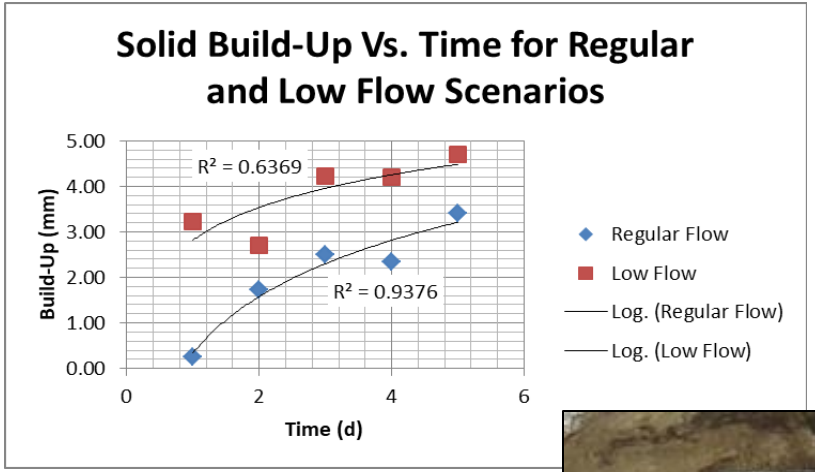
Unknowns: BWV performance

Fullport Valve Solid Deposition over Five Days





GUELPH ENGINEERING

NSERC CRSNG

S. Dusolt, 2018

Considerations…

- Effective retrofits often iterative, complex, expensive
- Uptake of voluntary programs, subsidies (typically) very low
- Poor installations may create new flood hazards:
  - What actually caused flooding?
  - Groundwater
  - “Lost” backwater valves, transfer of ownership issues
  - Poor operation may enhance flood hazards (e.g., draining groundwater via backwater valves)

Thank you!

Basement flood educational resources, videos, websites: www.iclr.org

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