

Keeping Basements Dry

It's All in the Risk



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The Big Picture

- Incidents of basement flooding and claims paid out by insurers for damages due to basement flooding continue to rise sharply.
- The same trend applies to persons and households without insurance coverage for basement flooding.
- Real costs associated with basement flooding are difficult to estimate (i.e., insurance claims, homeowner/tenant uninsured losses, all associated costs due to loss of time at work, rental income, etc.).
- Risks and history of basement flooding are not shared.
- Knowledge and appropriate technology for the prevention of basement flooding has existed for several decades.
- Why does this major disconnect continue?

People live in basements

- Today's residential basements are expected to perform the same as the upper floors of houses in terms of thermal comfort and indoor air quality.
- Increasingly, Canadians store numerous valuable possessions in their basements.
- Climate change has caused more extreme weather events and basement flooding in Canada has doubled over the past decade.



Basements experience flooding

- Incidents of basement flooding can be expected to rise sharply due to climate change.
- Basement flooding can occur due to general flooding caused by overflowing rivers and lakes, and heavy rainfalls and/or snow melting.
- Water may enter the basement through connections to the sewer system.
- Water may enter through the exterior of the building envelope.
- Most cases are preventable.



Most solutions to basement flooding already exist, are affordable, accessible and proven.

Site Grading and Drainage to Achieve High-Performance Basements

By M.C. Swinton and T.J. Kostik

Proper site grading and foundation drainage strategies are required in order to prevent water damage to basements and their contents. This Update reviews current construction practices used for basements, discusses some of the key issues and deficiencies that lead to problems, and provides practical suggestions for improving drainage and construction.

The causes of basement moisture problems are mainly external, but they can be addressed by providing diversion of water away from the building, drainage along the basement perimeter, protection of the foundation walls against moisture, as well as by effective and durable grading near the basement and over the entire lot. (See Figure 1).

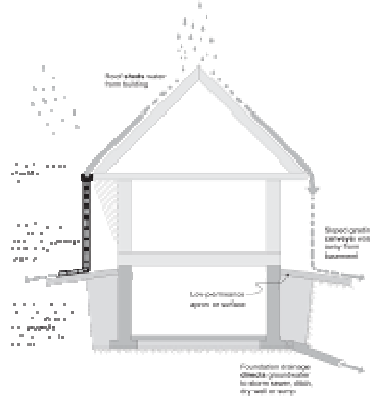


Figure 1. Key strategies that help to prevent water damage to basements

Well-considered design of foundations and their interface with surrounding soils, combined with effective site drainage, can eliminate most of the moisture problems found in basements.

Moisture in Basements

Basement moisture problems can be caused by water penetration (leakage), dampness in the form of water and water vapour migrating from the soil through the basement enclosure, and sump pump failures and sewer backups; they can also be caused by internal sources (humidity and plumbing leaks).

Leakage occurs when there is an accumulation of water outside a basement wall or floor that is adjacent to a crack or defect. Surface water that is not directed away from the building can enter the basement through unintentional openings (e.g., joint cracks) at or below grade. By providing adequate drainage around the perimeter of the basement, this situation can be avoided. Alternatively, the basement can be waterproofed (see sidebar, p. 22) to resist hydrostatic pressures and thus control leakage. A fluctuating water table that rises above the basement floor level may cause leakage unless the basement is waterproofed or the

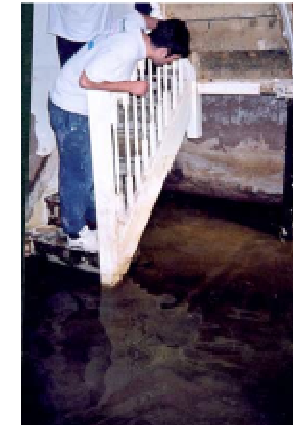
FINAL REPORT

Practical Measures for the Prevention of Basement Flooding Due to Municipal Sewer Surchage

For Most and Kathryn Beynon
Faculty of Architecture, Landscape and Design
University of Toronto

al&d

Orléans 2011

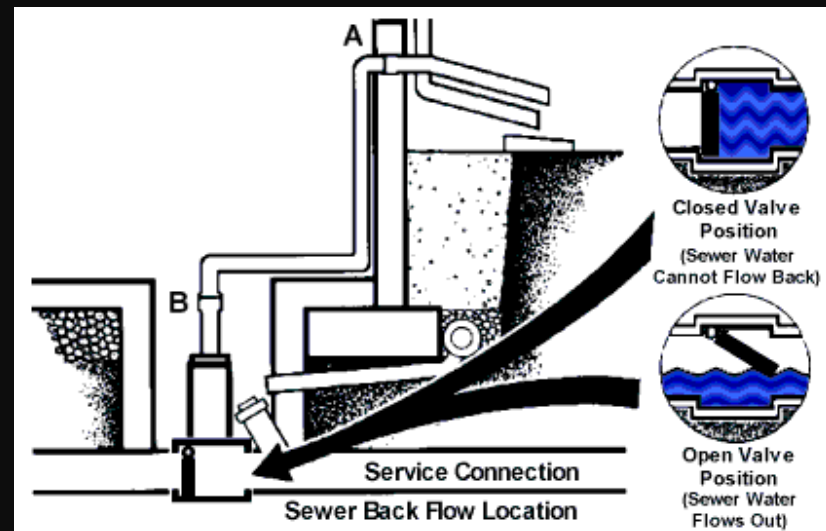
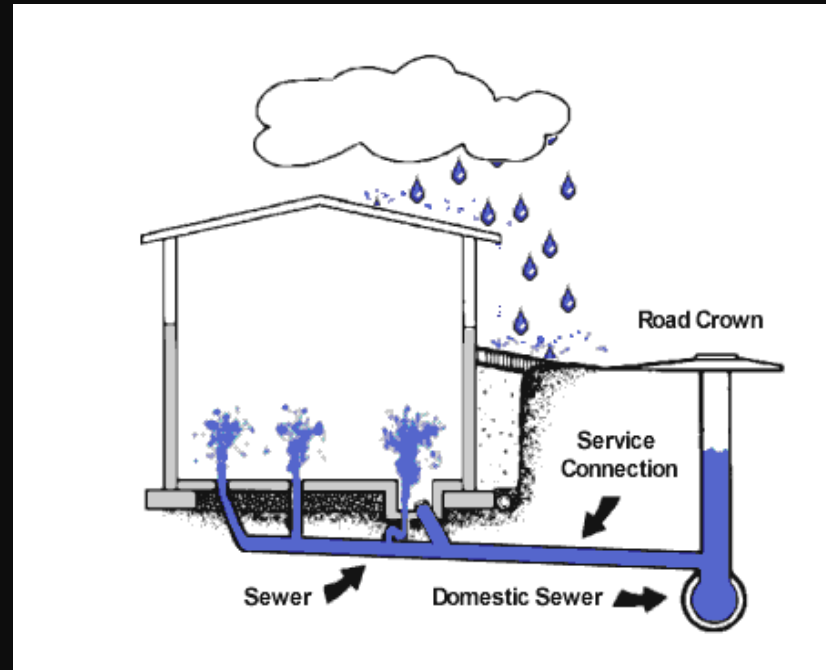


Many common types of basement flooding are easily preventable

Backflow prevention devices can eliminate sewer surcharges causing basement flooding.

Basement window wells and window sealing can be vastly improved at low cost.

Grading of lots and streets in new subdivision design to reduce local flooding is largely achievable.



Not all basement flooding is preventable

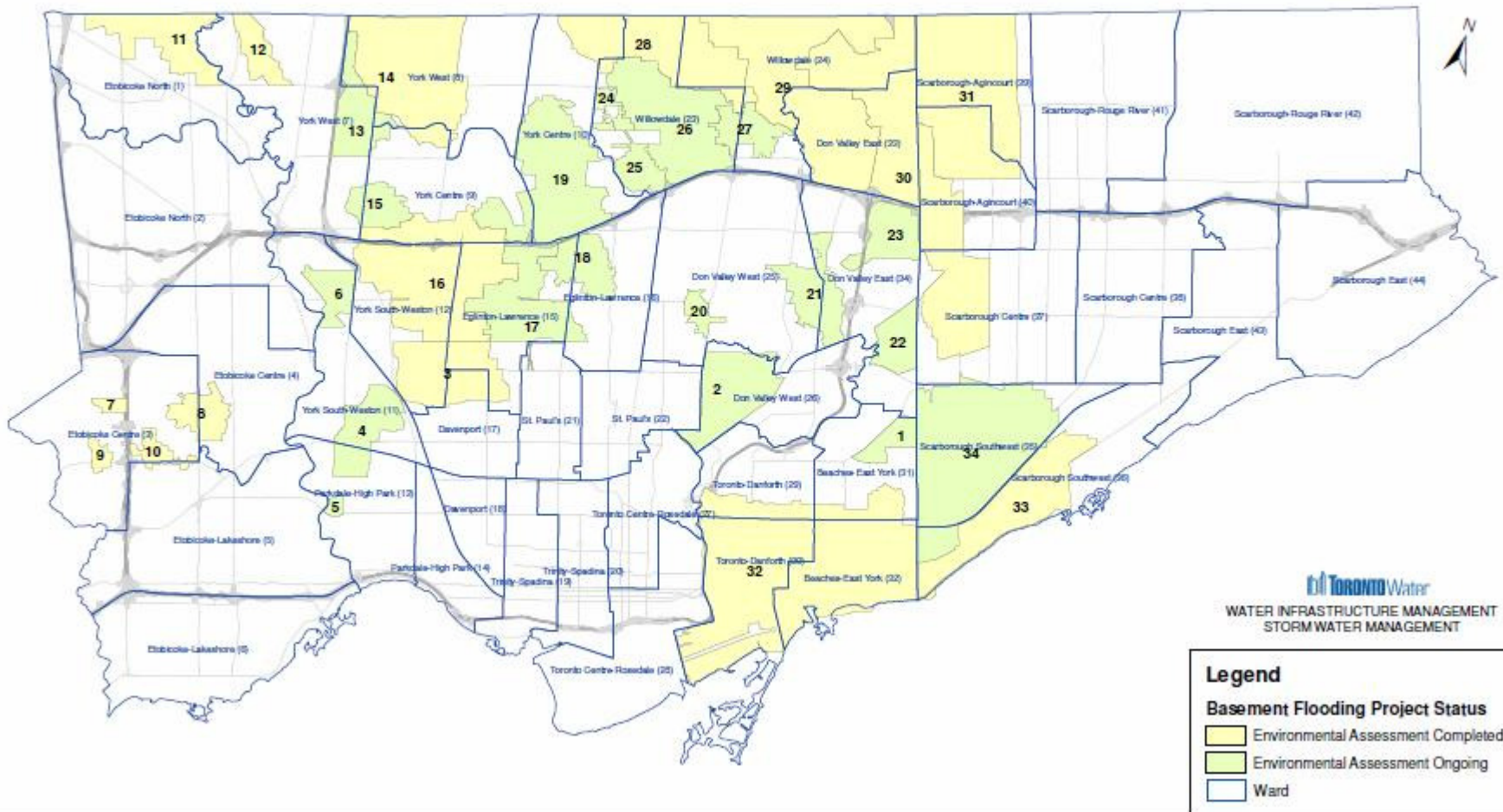
Events in Calgary and Toronto this past summer are difficult to mitigate.

Losses could be minimized in future, but not completely eliminated.

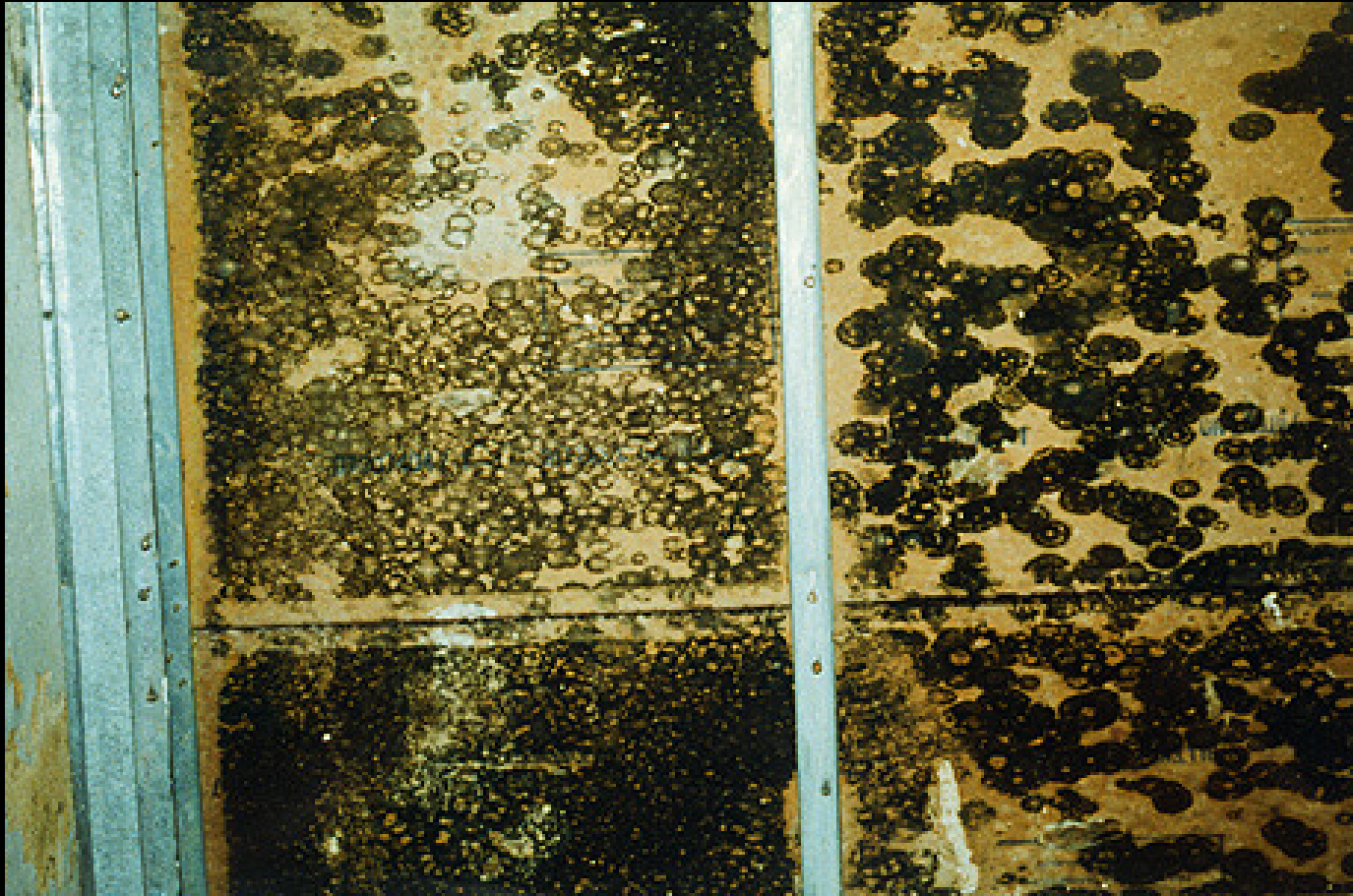


Municipalities and insurers know areas prone to basement flooding.

Basement Flooding Protection Program - Priority Study Areas

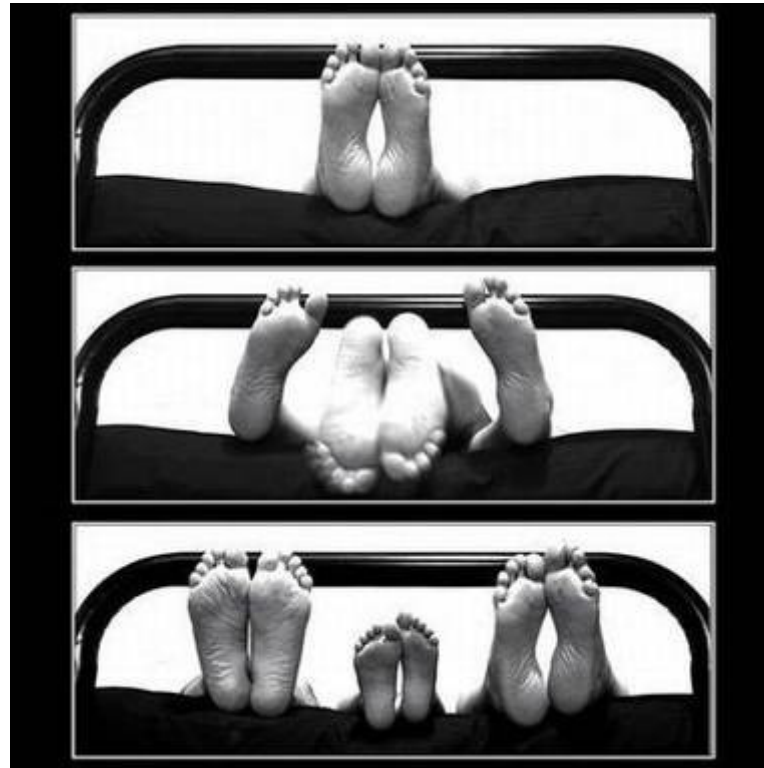


Basement flooding causes mold growth



having serious health implications.

Volenti non fit injuria.



Insurers and municipalities are potentially liable for damages suffered by inhabitants of basements that are not provided with ***basement flooding risk and history information.***

Consumers have a right to basement flooding risk and history.

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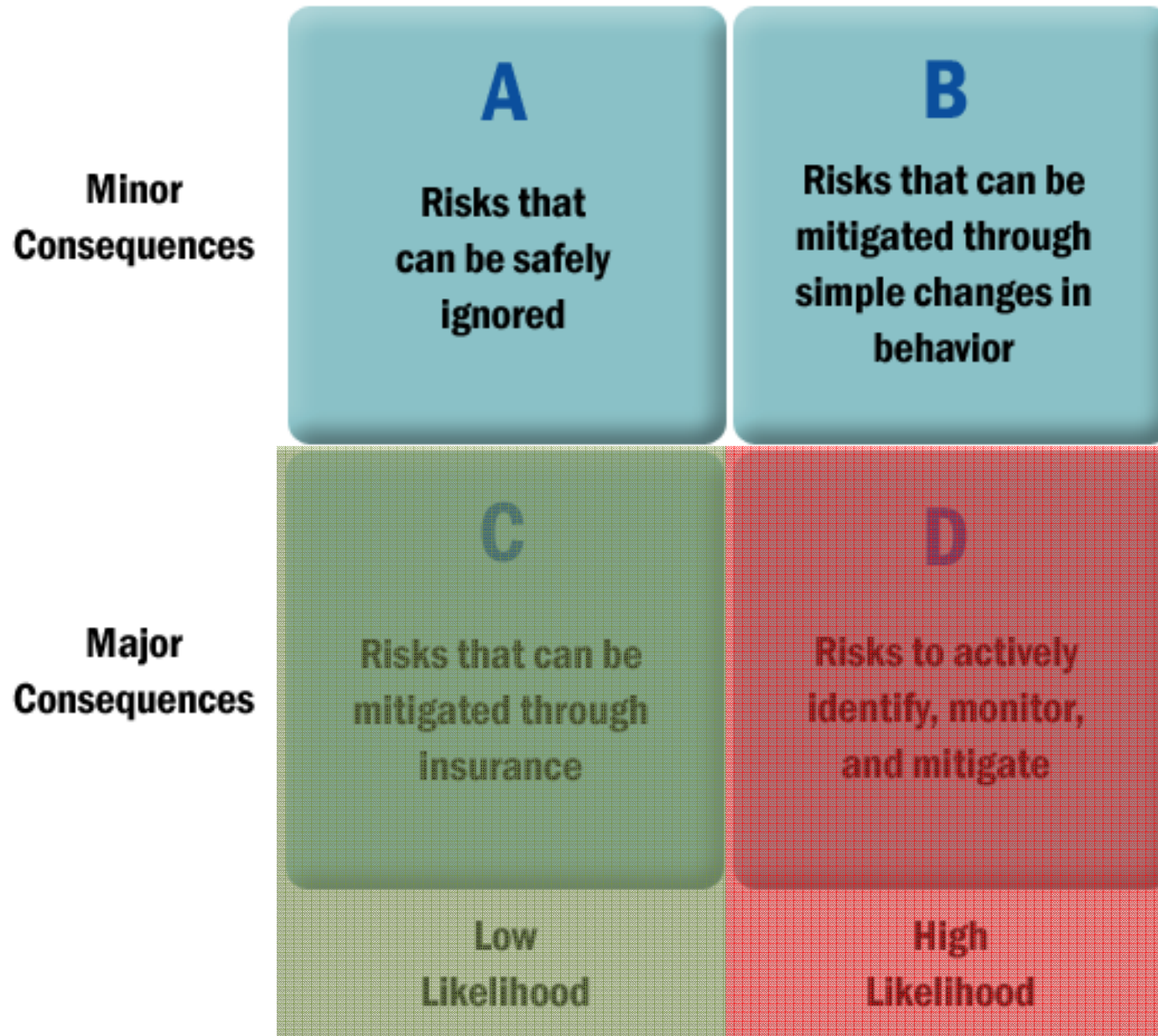
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Where's the R & D?

In an average year the Canadian insurance industry pays approximately \$1.7 billion in claims due to water damage. For more information, homeowners can also call the **Insurance Bureau of Canada Consumer Information Centre at 1-800-387-2880.**

- In Canada, expenditures on R&D represents 1.6 % of GDP.
- A progressive and innovative insurance industry would be annually investing a minimum \$27.7-million on water damage related R&D.
- Leading industries spend an average of 8.3% of total revenues – some \$143.7-million annually would be invested by Canada's insurance industry to improve the protection of life and property.
- A comprehensive online research survey could not identify any publicized investments in R&D by Canada's insurance industry.
- At minimum, Canada's insurance industry could afford to develop and maintain an online basement flooding risk and history registry.

Risk and Consequences



Digging Ourselves Out of Basement Flooding

- Basement flooding is a health and safety issue that needs to be addressed in codes, standards and local bylaws.
- Designers, developers, builders and code officials need to be properly trained and educated in basement flooding prevention and mitigation.
- Consumers have a right to know about the risks and history of basement flooding, both as homebuyers and tenants.
- Insurance rate guidelines must reflect the level of risk and the degree of prevention and mitigation measures.
- Research and development and the management of data and statistics need to be improved if basement flooding is to be responsibly addressed by all stakeholders.
- Insurers, governments, municipalities, health organizations, design & construction professions, the real estate industry and academia must work together to better manage basement flooding.

Thank you.



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