



LAVAL

Understanding risk to support future adaptive actions

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Source: City of Laval

THE SCIENCE

Understanding climate risks faced by critical municipal infrastructure is instrumental in planning future rehabilitation initiatives and having data available when opportunities arise to secure funding. The PIEVC protocol was created in 2005 to allow for engineering assessment of the vulnerability of Canada's public infrastructure to the impacts of current and future climate risks. The collaborative approach promoted by the PIEVC enables stakeholders from various lines of work to share their respective perspectives on key challenges and opportunities faced by infrastructure assets or systems, with the objective to gather a comprehensive picture of climate risks at play and their associated risk reduction recommendations.

THE TRIGGER

In 2011, the City of Laval was among the early adopters of the PIEVC protocol and used the PIEVC approach to further understand the vulnerabilities to climate change faced by the combined and partially separated sewers of the tribute Basin of the Belgrand overflow structure. At the time, funding had been made available through the Centre of Expertise and Research in Urban Infrastructure (Centre d'expertise et de recherche en infrastructures urbaines – CERIU) for municipalities to conduct PIEVC assessments of vulnerabilities to climate change and the City of Laval leveraged this opportunity to apply the protocol to the Belgrand overflow structure, which is a key component of the City's stormwater system. This structure was designed to control overflow of rainwaters and constitutes a major component of the wastewater collection system in the La Pinière watershed, a 45 km² largely urbanized territory served by combined, pseudo-separate and pluvial sewers.

THE APPROACH

In an effort to further understand the various risks and vulnerabilities faced by the Belgrand overflow structure, the City of Laval partnered with consulting firm Genivar (now known as WSP) and Ouranos to gather the diverse expertise needed around the table. This involved recruiting the right stakeholders from various municipal departments including public works, engineering and environment to understand the infrastructure as a whole. Having the right stakeholders at the table during workshop sessions allowed the municipality and its partners to look at questions that went beyond the calculation of the infrastructure's performance and touched on topics such as instrumentation, maintenance, controls management, and vulnerabilities induced by extreme heat and severe rainfalls.

One of the key findings of the study was the necessity to design new structures within the Belgrand overflow structure catchment area that would promote stormwater management at the source and reduce some of the pressure faced by the Belgrand overflow structure. Unfortunately, the lack of an overall master plan for the City's water department did not allow the City to fund and undertake these initiatives. Fast forward several years, the PGDEP (Programme de soutien aux municipalités dans la mise en place d'infrastructures de gestion durable des



Figure 6: *The Belgrand overflow structure is a major component of the wastewater collection system in Laval. (Source: City of Laval)*

eaux de pluie à la source) funding program was created to support municipalities in the implementation of sustainable rainwater management at the source. In order to receive funding, the City of Laval had to present a project that would tackle adaptation to a climate risk and demonstrate technically how the proposed project would improve the performance of existing infrastructure. The PIEVC report highlighting the risks and vulnerabilities of the Belgrand overflow structure and opportunities to mitigate these risks was instrumental in supporting the proposal and contributed to a favourable decision from the funder.

Laval chose to focus initially on a pilot study to better understand the risk and test potential solutions. Sometimes communities find greater access to initial funding through smaller scale initial projects. If proven effective, successful pilot projects may help provide a strong foundation to secure funding for larger scale initiatives.

THE OUTCOME

The City of Laval received nearly \$500,000 to build a pilot project of stormwater infiltration features built alongside municipal sidewalks within two different areas of the Belgrand catchment area. The first site was built within an industrial area and the second one in a residential neighbourhood, for a total of 34 stormwater infiltration features. The municipality partnered with researchers from INRS (Institut National de la Recherche Scientifique) to track and measure water quality and quantity following the construction of the infiltration features and evaluate how it impacted the Belgrand overflow structure. The monitoring period will soon end and will allow

the City to establish if the pilot project is worth being replicated on a larger scale, and what would be its optimal design.

The work undertaken by the City of Laval over the last decade highlights the importance for municipalities to understand their infrastructure risk, even when capital funding isn't currently available to build or rehabilitate public infrastructure. "The PIEVC report on the Belgrand overflow structure was an important piece of the puzzle when submitting our proposal for the design of new stormwater infrastructure. It also demonstrated that we had done our due diligence to identify what actions could be taken to mitigate current and future risks," said Martine Galarneau, engineer with the City of Laval.

A WORD FROM LAVAL

When asked what advice she would offer to other municipalities interested in deepening their understanding of their infrastructure vulnerabilities, Ms. Galarneau mentioned that she would highly recommend using the PIEVC protocol to get a comprehensive analysis. "The protocol allowed us to highlight specific risks and vulnerabilities that we may have otherwise missed without the multi-disciplinary approach that was used," said Ms. Galarneau. She added that larger municipalities can have a tendency to work in silos within individual departments and the approach promoted by the protocol allowed to foster strong collaboration between various groups. The work that the City of Laval undertook to identify the specific challenges faced by the Belgrand overflow structure enabled the municipality to start planning for future projects and act quickly once capital funding became available.