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IE17.5 REPORT FOR ACTION

2020 Basement Flooding Protection Program Update

Date: October 21, 2020To: Infrastructure and Environment CommitteeFrom: General Manager, Toronto WaterWards: All

SUMMARY

This report provides an update on the Basement Flooding Protection Program (BFPP) including a review of the prioritization approach and rules for recommended BFPP infrastructure improvement projects to proceed to implementation. This report also responds to Council direction concerning intergovernmental funding for the BFPP, the state of good repair program, and the feasibility of a localized Basement Flooding study in the sewer catchment area near the Humber River Hospital.

Since its inception in 2006, the BFPP has made tremendous progress in completing Basement Flooding studies across the city. These studies have identified a significant number of sewer system improvement projects required to help reduce urban flooding risks. While many recommended BFPP projects have been implemented, many more projects have not proceeded to design and/or construction because they have not met the Council adopted prioritization rules for BFPP project implementation.

Due to the large number, cost, and scale of the Basement Flooding improvement projects, it will take several decades to implement all the recommended projects. While the current \$32,000 cost per benefitting property threshold has become a constraint in advancing recommended projects to implementation, a prioritization approach for implementation remains a critical requirement due to the large number of projects that remain to be implemented.

This report recommends that the cost per benefitting property threshold be increased to \$68,000. Also recommended is a further prioritization approach, for the time after the cost per benefitting property threshold has been applied across the whole City, which will sequence projects for implementation based on the project's impact.

RECOMMENDATIONS

The General Manager, Toronto Water, recommends that:

1. City Council direct that projects identified through completed Basement Flooding studies proceed to detailed design and construction, if the cost per benefitting property, as determined during the preliminary design phase, is less than \$68,000.

2. City Council direct that Basement Flooding Protection Program projects that exceed the threshold of \$68,000 per benefitting property, at the preliminary design phase, be sequenced in accordance with the principle of implementing projects that achieve the greatest impact, with the greatest impact to be determined considering the following criteria:

a. Hazard, projects that mitigate a greater extent of flooding and/or a higher probability of flooding;

b. Exposure, projects that are more likely to have residential basements and/or other critical infrastructure;

c. Vulnerability, where consideration is given to the Ontario Marginalization Index, and;

d. Project capital cost that considers a lower cost per benefitting property.

3. City Council direct that Basement Flooding Protection Program projects that meet the \$68,000 per benefitting property threshold be scheduled for implementation first, and that projects that exceed the \$68,000 per benefitting property threshold be scheduled for implementation after the Basement Flooding studies for the 67 study areas have been substantially completed.

FINANCIAL IMPACT

There are no direct financial implications to the Toronto Water Capital Budget arising from the adoption of the recommendations in this report.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

On December 17, 2019, City Council adopted Toronto Water's 2020 Water and Wastewater Consumption Rates and Service Fees and its rate-supported budget. This item was amended through a motion that requested the General Manager, Toronto

Water, report back to the Infrastructure and Environment Committee by the third quarter of 2020 on:

a. options to increase the effectiveness of the Basement Flooding Protection Program's prioritization rules for project implementation;

b. options to move projects into implementation where there is missing or grossly substandard infrastructure and where the scope is beyond the parameters of the Basement Flooding Protection Program, including consideration of how such projects could be funded outside the Basement Flooding Protection Project, including but not limited to provincial and/or federal funding programs; and

c. how neighbourhoods such as Thorncrest Village, which do not meet the Basement Flooding Protection Program criteria, would be considered in a. and b. above. Link: <u>http://app.toronto.ca/tmmis/viewAgendaltemHistory.do?item=2019.EX11.2</u>

On October 29, 2019, City Council requested the General Manager, Toronto Water report to the Infrastructure and Environment Committee by the first quarter of 2020 with a formula to modify the current cost per benefitting property threshold of \$32,000, and allow for exemptions and sensible flexibility, when proceeding with detailed design and construction estimates related to basement flooding protection programs. Link: http://app.toronto.ca/tmmis/viewAgendaltemHistory.do?item=2019.IE8.5

On September 16, 2019 North York Community Council requested the General Manager, Toronto Water, report back on the feasibility and cost of conducting a localized Basement Flooding Environmental Assessment Study of the area bounded by Petherhill Avenue to the east, Highway 401 to the south, Jane Street to the west and Wilson Avenue to the north; commencing no later than January 2020. Link: http://app.toronto.ca/tmmis/viewAgendaltemHistory.do?item=2019.NY8.44

City Council on March 10 and 11, 2015 adopted recommendations in a staff report titled "Basement Flooding Protection – Infrastructure Upgrades New Study Areas and Progress Update" to initiate and expedite the completion of new Basement Flooding Protection EA studies for the remainder of the City on a prioritized basis. Link: <u>http://app.toronto.ca/tmmis/viewAgendaltemHistory.do?item=2015.EX3.1</u>

City Council on September 21 and 22, 2011 adopted the recommendations in a staff report titled "Wet Weather Flow Master Plan and Basement Flooding Protection Program Update". The staff report noted that the costs of implementing works identified in Environmental Assessments completed among the 32 Chronic Basement Flooding Study Areas far exceed the availability of funding. The report provided an update to the criteria for the prioritization of recommended improvement works coming from BFPP studies and preliminary designs, including the criteria of a \$32,000 per benefitting property threshold. Link:

http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.PW7.6

COMMENTS

Basement Flooding Protection Program

The Basement Flooding Protection Program (BFPP) is an infrastructure and subsidy program with the goal of improving the City's resilience to severe storm events by mitigating flooding resulting from the back-up of sewers and excessive overland flow.

The city is divided into 67 Basement Flooding study areas. As of September 2020, Basement Flooding studies have been completed for 42 study areas and 25 study areas have studies underway (see Figure 1). All underway studies are scheduled for completion by 2023. Each study determines locations where the sewer and drainage systems do not provide a targeted level of service and recommends sewer system changes to improve or meet the targeted level of service.



Figure 1: Basement Flooding Study Status

The scope of these projects may include the construction of larger diameter storm or sanitary sewers, underground and above-ground storage facilities, storm sewer tunnels, catch basins, sealed sanitary manhole covers, and inlet control devices, which slow the entry of water into the sewer system. Projects are conceptualized during a Basement Flooding study and refined through preliminary and detailed design.

Basement Flooding Protection Program Project Prioritization

In 2011, City Council directed that the prioritization of Basement Flooding Protection Program projects be consistent with the principle that the greatest number of properties are protected as soon as possible within approved funding envelopes and coordinated with other City capital programs. Projects identified through completed Basement Flooding Studies proceed to detailed design and construction if the cost per benefiting property, as determined during the preliminary design phase, is less than or equal to \$32,000.

Undertaking projects with a high cost that benefit relatively few properties utilizes resources that could otherwise be used to serve a larger number of residents through the implementation of lower cost projects. The concept was embedded in the program in 2008 when the threshold value was set to \$25,000 per benefitting property. To account for construction cost escalation, this value was increased to \$32,000 in 2011.

By the end of 2020, approximately \$535 million will have been spent on the construction of recommended solutions and the activities supporting construction efforts (i.e. engineering, design, studies, and flow monitoring). A further \$653 million is planned for construction in 2021 to 2023. Due to construction cost escalation over time, the number of projects able to meet the \$32,000 cost per benefitting property threshold declines each year. Since 2011, the number of Deferred projects exceeding the prioritization threshold has increased and will continue to increase as studies are completed. Currently, the cumulative total of Deferred projects exceeds \$2.2 billion.

The 10 year capital budget for basement flooding is projected at \$2.1 Billion. Using the current \$32,000 threshold will preclude many projects from proceeding to construction and will result in some of the budget not being used. Currently, about \$900M of projects are scheduled for implementation and based on past experience it is projected that the studies to be completed will provide an additional \$500M in projects that meet the threshold. This would result in \$700M of the projected 10 year capital budget being unallocated. Increasing the cost per benefitting property threshold will allow more of the projects identified by the studies to be implemented thereby reducing the unallocated capital budget within the ten year program. Based on an analysis of historical construction costs, a new cost per benefitting property threshold value of \$68,000 is recommended for the studies currently underway.

The \$68,000 value was determined by applying an average city of Toronto construction cost escalation rate to the original \$32,000 value that was set in 2011. As construction pricing varies considerably across different types of construction, from site to site, year to year, and many other factors, the use of an average construction cost escalation rate is appropriate for the calculation of a new cost per benefitting property threshold. Figure 2 illustrates both a 6% and 7% escalation rate from 2011 and extrapolated into the future. \$68,000 represents the approximate midpoint in 2023, which is when all 67 studies are anticipated to be completed.

To ensure equitable application between previously identified and yet to be identified projects, previously estimated project costs will be adjusted for construction cost escalation and tested against the \$68,000 threshold.



Figure 2: Cost per Benefitting Property Cost Escalation

The cost per benefitting property threshold will be applied as follows:

- For all Basement Flooding studies that are not yet complete, \$68,000 will be applied at the completion of preliminary design to determine which projects should advance to detailed design and construction.
- All project costs that in previously completed studies exceeded the cost per benefitting property threshold of \$32,000 will be adjusted based on construction cost escalation, tested against the new \$68,000 cost per benefitting property threshold, and introduced in the 2022 Toronto Water Capital Budget, if they meet the new cost per property threshold. If not, they will remain on the Deferred list.

Once all 67 Basement Flooding studies have been completed, and once all of the projects that cost less than the \$68,000 cost per benefitting property threshold, as estimated at the preliminary stage of design, have been assigned for implementation, a method will be needed for moving the Deferred projects into Toronto Water's capital plan for implementation, subject to funding availability.

It is recommended that, once all studies are substantially completed, and it is determined that available funding remains after all projects that satisfy the \$68,000 threshold are dealt with, Deferred projects be ranked based on achieving the greatest impact. Prioritizing projects that achieve the greatest impact will reduce the city's flooding risks and increases the city's resilience to extreme weather.

Deferred projects will be prioritized based on the analysis of a project's hazard, vulnerability and exposure, as well as a project's estimated capital cost as per the following criteria:

- Hazard is the probability that an area will experience flooding. It is measured by the number of benefitting properties and the probability of flooding for those properties.
- Exposure represents tangible, physical conditions that increase flood impact. It is measured by the number of benefitting properties with basements, with an emphasis on residential properties where residents may dwell, and/or locations where critical infrastructure can benefit.
- Vulnerability represents the conditions that affect the ability to cope with and recover from flooding. It is measured by the Ontario Marginalization Index.
- Estimated construction cost for a project against the number of properties benefiting.

A project prioritization list will be established that accounts for all projects that exceed the cost per benefitting property threshold with projects that achieve the greatest impact being sequenced for design and construction first. This information will be available to City Council through the annual capital budget process.

Basement Flooding Protection Program Funding Opportunities

Council requested the General Manager, Toronto Water to report on potential funding opportunities, including consideration of how BFPP projects could be funded outside the program, including but not limited to provincial and/or federal funding programs.

In 2019, Toronto Water was successful in securing \$110.36 million from the Government of Canada's Disaster Mitigation and Adaptation Fund (DMAF) to fund a portion of the construction of the Midtown Toronto Relief Storm Sewer (Project 17-15) and the Fairbank-Silverthorn Trunk Storm Sewer System (Project 03-03). This funding program was targeted towards large projects, and required that a minimum return on investment against natural hazards be achieved.

Toronto Water continuously monitors opportunities for funding and pursues available external funding programs, including federal and provincial infrastructure programs as they become available. All potentially eligible BFPP projects are considered for these opportunities, within the parameters of the available funding programs. Currently there are no funding programs available for application for the BFPP.

Basement Flooding Protection Program and State of Good Repair

Council requested the General Manager, Toronto Water to report on options to move projects into implementation where there is missing or grossly substandard infrastructure, and where the scope is beyond the parameters of the BFPP.

Through the BFPP's studies, existing infrastructure may be found to be in need of repair. When this happens, repairs to those existing systems are pursued within one or more of the City's various state of good repair programs

Parts of the Thorncrest Village area, in Ward 2, and many other communities in the City, were designed and constructed to function with a ditch based drainage system rather than that of a storm sewer system. Following the completion of the Area 8 Basement Flooding study in 2012, preliminary design efforts were initiated for the Thorncrest Village area. These efforts identified that a significantly greater new infrastructure than what the Basement Flooding study had identified was needed, such that the \$32,000 per benefitting property threshold was not met. As a result, the project was deferred and entered into the list of Deferred projects, and will be considered under the impact criteria.

In accordance with the principle that state of good repair improvements are pursued when needed, a number of improvements within the Thorncrest Village are scheduled to commence construction in 2022. These works include replacement of sections of sanitary sewer by Toronto Water and the resurfacing of roads and the restoration of the ditch drainage system, which are in the jurisdiction of Transportation Services.

Review of Previous Study Areas

Council requested the General Manager, Toronto Water, report back on the feasibility and cost of conducting a localized Basement Flooding Environmental Assessment Study of the area bounded by Petherhill Avenue to the east, Highway 401 to the south, Jane Street to the west and Wilson Avenue to the north; commencing no later than January 2020.

The area set out above includes the Humber River Hospital and existing residential community which is located within Basement Flooding Study Area 16. This study was completed in 2012. The hospital, new roads, sewers and a stormwater management pond were constructed subsequent to the completion of the study, and are currently in the subdivision process.

A schedule exists for the completion of all 67 Basement Flooding study areas in the city. Basement Flooding studies have been completed in sequence in accordance with Council direction, and are scheduled for completion in 2023. Once studies for all the remaining study areas have been completed, the necessity such as due to changes to land-use, to revisit previously completed study areas, including Area 16, will be evaluated.

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SIGNATURE

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