Attachment 3: Background – Don River and Central Waterfront Project

Combined Sewer Overflows and the Wet Weather Flow Master Plan

In 1987, the International Joint Commission (IJC), a bi-national organization established by the governments of the United States and Canada to prevent and resolve disputes under the Boundary Waters Treaty of 1909, identified Toronto's waterfront along Lake Ontario as one of 43 polluted Areas of Concern (AOC) in the Great Lakes Basin, largely because of impaired water quality conditions in the Don River and the Toronto's Inner Harbour.

A main source of pollution was identified to be CSOs (a mixture of untreated sewage and stormwater) and stormwater discharges from sewer outfalls along the Don River and directly to the Inner Harbour, which occur in greater volumes during heavier rainfall events. These discharges contain harmful bacteria, pathogens, heavy metals, oils, and pesticides that degrade the health of Toronto's waterways.

In 2003, City Council adopted the Wet Weather Flow Master Plan (WWFMP) - a long-term plan to mitigate the adverse impacts of stormwater and combined sewer overflows (CSO) on Toronto's environment. The WWFMP identified a series of projects for implementation with the ultimate goal of improving water quality conditions and ecosystem health in all six watersheds across the City, and along the waterfront.

The most significant water quality improvement works recommended in the WWFMP to advance the delisting of Toronto as an Area of Concern (AOC) in the Great Lakes Basin were a series of tunnels, storage shafts and treatment facilities to address CSOs and stormwater discharges from sewer outfalls to the Lower Don River, Taylor Massey Creek and Toronto's Inner Harbour.

As Toronto Water's priority water quality improvement project for implementation under the Wet Weather Flow Management Program, this priority was identified in the report entitled "2017 Wet Weather Flow Master Plan Implementation Status Update Report" considered by Public Works and Infrastructure Committee in May 2017. (The link to this report is provided in the decision history section of the attached staff report.)

Environmental Assessment and Stakeholder Support

In 2008, the City commenced the Don River and Central Waterfront Municipal Class Environmental Assessment (EA), as a priority study to advance the WWFMP's recommended works to address CSOs and stormwater discharges from all combined sewer outfalls to the Don River and central waterfront.

After four years of study and extensive consultation with the public and other stakeholders, the EA study report recommended a conceptual design for the project (now the DR&CW) comprising an integrated wet weather flow management system with three interconnected tunnels, underground vertical storage shafts, offline storage tanks at remote locations, a centralized wet weather flow high-rate treatment facility, a centralized wet weather flow pumping station, and other components. In 2011, City

Council approved the finalization of the EA study report to be posted for a mandatory 30 day public review period, which was completed in 2012.

During the EA study process, letters of support for the DR&CW EA and the project's implementation were received from the co-chairs of the Canada-Ontario Agreement Respecting the Great Lakes Basin (COA) Annex Implementation Committee, Toronto and Region Conservation Authority, and the Don Watershed Regeneration Council, among others. The letters submitted to Public Works and Infrastructure Committee on the DR&CW EA are available at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.PW7.6.

DR&CW Components and Related Projects

The DR&CW is an integrated wet weather flow management system that will capture, store, transport and treat CSOs and stormwater discharges from 46 sewer outfalls (including all 43 outfalls that discharge CSOs) along the Lower Don River, Taylor Massey Creek and Toronto's Inner Harbour. The DR&CW also upgrades the Don and Waterfront Sanitary Trunk System to meet future servicing needs and enhance the operational safety of the system. It consists of five substantial infrastructure projects, that are designed to work together as one integrated system to significantly improve water quality (see video on City website that describes the project):
https://www.toronto.ca/services-payments/water-environment/managing-rain-melted-snow/what-the-city-is-doing-stormwater-management-projects/lower-don-river-taylor-massey-creek-and-inner-harbour-program/

1. Don River & Central Waterfront Wet Weather Flow System
2. Ashbridges Bay Landform Project/Site of Future High-Rate Treatment Facility
3. New Integrated Pumping System (ABTP Upgrade)
4. New Outfall (ABTP Upgrade)
5. Future work (not included in this report) New UV (ultraviolet) Disinfection Wastewater Treatment System (ABTP Upgrade)

Attachment 2 presents a map showing the location of the project's components, which includes:

- **Tunnels and Storage Shafts - three interconnected tunnels (22 km in total) with 12 vertical storage shafts** that will capture and store (over 600,000 m^3 of storage capacity) CSOs and stormwater and transport them for treatment. The tunnel system includes:
  - *Lower Don Tunnel/Coxwell Bypass* - 10.5 km long, 6.3 m diameter tunnel with five connected underground vertical storage shafts; intercepts CSOs and stormwater discharges from 23 sewer outfalls and provides redundancy for the existing Coxwell Sanitary Trunk Sewer (STS) and North Toronto STS to allow for the rerouting of sanitary flows during periods of routine inspection and maintenance of these critical sanitary trunk sewers;
  - *Taylor-Massey Creek Tunnel* - 6 km long, 4.4 metre diameter tunnel with four connected underground vertical storage shafts; intercepts CSOs and stormwater discharges from 14 sewer outfalls;

    - *Inner Harbour West Tunnel* - 5.6 km long, 6.3 metre diameter tunnel with three connected underground vertical storage shafts; intercepts CSOs and stormwater discharges from 9 sewer outfalls;
- **Wet Weather Flow Connections** - 27 diversion and drop structures that will connect the existing sewer outfalls to the tunnels;
- **Offline Storage Tanks** - three underground storage tanks to intercept CSOs at remote locations and four sanitary sewage storage tanks to provide additional sanitary sewer capacity by intercepting flows during rainfall events;
- **Real Time Control for the Mid-Toronto Interceptor** - implementation of a computerized Real Time Control system to better manage flows based on real-time monitored conditions in order to minimize CSO volumes and maximize existing storage and treatment capacity; and,
- **Wet Weather Flow High-Rate Treatment (HRT) Facility** - facility to provide high-rate treatment for combined sewer overflows and stormwater collected by the DR&CW wet weather flow tunnel system; the HRT will be constructed on a new landform to be built on the water lot south of the ABTP which is described below.
- **Wet Weather Flow Pumping Station** - now integrated with the ABTP M&T Pumping Station Rebuild project (see below);

The DR&CW wet weather flow management system will utilize infrastructure upgrade projects in and around the ABTP. These connected projects include:

- **Ashbridges Bay Landform Project** - City Council has authorized Toronto Water to proceed with the construction of the landform, in accordance with the detailed design completed by the TRCA in 2018, on the water lot south of the ABTP. This project will provide erosion and sediment control and reduce dredging requirements at Coatsworth Cut and will also provide the land base for the future construction of the proposed HRT facility (noted above);
- **Integrated Pumping Station** - a large new pumping station next to the ABTP that will replace two existing wastewater pumping stations (M&T Buildings); the IPS will receive and pump flows from the DR&CW wet weather flow system to the wet weather flow HRT facility; and,
- **New ABTP Outfall** - new outfall for the ABTP, seven metres in diameter and extends 3.5 kilometres into Lake Ontario; the new outfall will provide the necessary capacity for the ABTP and will include added capacity for the new HRT facility.

DR&CW Benefits

As explained below, the DR&CW will provide multiple long-term benefits for the city's environment, sewer infrastructure and City-building initiatives along Toronto's waterfront that supports the City's economic vitality and quality of life. The DR&CW also supports efforts by the governments of Canada and Ontario to clean-up the Great Lakes.

Cleaner Environment and Waterfront Revitalization

Once fully implemented, the DR&CW will achieve significant water quality improvements in the Don River and Toronto's central waterfront by significant reduction of CSOs and polluted stormwater discharges from all combined sewer outfalls to the Lower Don River, Taylor-Massey Creek and Toronto's Inner Harbour.

The DR&CW has been designed to intercept and control the discharge of CSOs to an average of one overflow per year per outfall location, compared to approximately 40 today. The complete elimination of all CSOs is not achievable, especially during extreme storm events, however, this significant reduction achieves long-term benefits and improvements while providing an even higher level of control than prescribed in the Province's guidelines for CSO discharge.

The significant reduction of CSOs will reduce harmful bacteria, pathogens, heavy metals, oils and pesticides, as well as nutrient levels that cause excessive algae growth in the Lower Don River and Inner Harbour, which will enhance recreational opportunities such as boating and fishing, and improve aquatic habitat for fish and other wildlife.

A cleaner Lower Don River and central waterfront supports City-building initiatives to redevelop and revitalize Toronto's waterfront such as:

- *Port Lands Flood Protection and Don Mouth Naturalization Project* - project to reconfigure and naturalize the mouth of the Don River mouth to provide flood protection, improve aquatic habitat, and reconnect the Don River to Lake Ontario and support development to revitalize Toronto's eastern waterfront;
- *Port Lands Renewal* - one of the most significant urban renewal opportunities in Toronto to transform 325 hectares of underutilized lands, including the Keating Channel and Lower Don Lands (at the mouth of the Don River) into sustainable mixed-use communities with renewed connections to the water and natural environment; and,
- *West Don Lands* - ongoing development of this sustainable mixed-use community on 32 hectares of former industrial lands near the mouth of the Don River.

Delisting Toronto as a Polluted Area of Concern

The DR&CW significant reduction of CSOs and the water quality improvements to be achieved in the Lower Don River and central waterfront will be a major step towards the delisting of Toronto as polluted AOC in the Great Lakes Basin. This was noted in a 2011 letter of support for the DR&CW EA from the co-chairs of the Canada-Ontario Agreement Respecting the Great Lakes Basin (COA) Annex Implementation Committee to the Chair of the Public Works and Infrastructure Committee.

The delisting of Toronto as an AOC supports efforts and commitments by Canada and Ontario concerning the Great Lakes:

- *Canada-U.S. Great Lakes Water Quality Agreement (GLWQA 1972, 1987, 2012)* - agreement between the United States and Canada to restore and protect the waters of the Great Lakes; the GLWQA provides a framework for identifying bi-national priorities and implementing actions to improve water quality and includes 13 articles, setting out objectives and responsibilities and 10 issue-specific annexes; Annex 1 reaffirms the commitment of Canada and the United States to clean-up and restore designated AOCs including the Toronto AOC;
- *Canada Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA*) - agreement between Ontario and federal government that provides a framework with goals, results and commitments by both orders of government to help Canada meet commitments under the GLWQA; and,

- *Toronto and Region Remedial Action Plan (RAP)* - established in 1985 by Environment Canada and the Ontario Ministry of the Environment (MOE) to clean-up Toronto's waterfront and restore all impaired beneficial uses. The Toronto RAP is led by the TRCA under agreement with the Environment and Climate Change Canada (ECCC) and the Ministry of Environment, Conservation and Parks (MECP) and works with partners to implement remedial and restoration actions.

Sanitary Sewer Infrastructure Improvements and Servicing Growth

The DR&CW upgrades to the City's Don and Waterfront Sanitary Trunk System will provide long-term benefits for capacity and operation of this trunk sewer system as follows:

- Coxwell Sanitary Trunk Sewer and North Toronto Sanitary Trunk Sewer - provides for the safe operation of these critical sanitary trunk sewers, which service 750,000 residents and businesses and currently have no redundancy (i.e., City cannot reroute sanitary flows) to allow for routine maintenance and repair;
- Waterfront Sanitary Interceptor System - increases the system's capacity to service population growth along the central waterfront without increasing CSOs; and,
- Don Sanitary Trunk System - increases the system's capacity to service population growth.

DR&CW - Work Underway, Approved Toronto Water Capital Plan, Current Implementation Plan & Construction Schedule

Work Underway

Since 2012, the Engineering and Construction Services divsion has led the delivery of the engineering (preliminary and detailed) design work and construction of the DR&CW. Major progress has been made in advancing the DR&CW:

- The hydraulic and geotechnical work (100%) and preliminary engineering design (30% design level) for all components of the DR&CW wet weather flow collection and storage system (does not include the high-rate treatment facility) was completed in 2015; and,
- Detailed design of the critical first phase of the DR&CW, the Lower Don Tunnel/Coxwell Bypass was completed in 2017 and construction began in 2018.

Approved DR&CW 2019-2028 Capital Plan

The current approved Toronto Water 2019 Capital Budget and 2019-2028 Capital Plan allocates $1.022 billion for the DR&CW implementation over the next 10 years.

Table 1 below presents the implementation status and planned construction schedule of the DR&CW phases and components, as well as the connected projects at the ABTP.

The implementation schedule for DR&CW components beyond 2028 is forecasted as these components are not funded in the approved Toronto Water 2019-2028 Capital Plan. Pending future Toronto Water budget approvals, construction of all components of the DR&CW is currently projected to be completed in 2038 at the earliest.

Table 1: Current Project Phases & Components, Implementation Status & Construction Schedule

Project Phase and Components	Implementation Status	Construction Schedule - Planned Start and Completion Year (Schedule for construction years beyond 2028 is forecasted and is not funded in the Toronto Water 2019-2028 Capital Plan)
Phase 1		
Lower Don Tunnel/Coxwell Bypass	Contact Awarded - Construction in Progress	2018-2024
Offline Storage Tank (Sheppard Ave. E. at Leslie St.)	Not Yet Tendered - Detailed Design and Construction Planned	2021-2023
Outfall connections to Lower Don Tunnel	Not Yet Tendered - Detailed Design and Construction Planned	2025-2029
Phase 2		
Taylor Massey Creek Tunnel and outfall connections	Not yet tendered - Detailed Design and Construction Planned	2026-2031
Phase 3		
Six Offline Storage Tanks	Not yet tendered - Detailed Design and Construction Planned	Post 2028 (Forecast 2032-2038)
Phase 4		
Inner Harbour West Tunnel and outfall connections	Not yet tendered - Detailed Design and Construction Planned	Post 2028 (Forecast 2032-2038)
Other Critical Project Components		
Real Time Control System - Mid-Toronto Interceptor	Not yet tendered - Detailed Design and Construction Planned	2022-2024
High-Rate Treatment Facility (HRT) and Force main to Integrated Pumping Station	Not yet tendered - Detailed Design and Construction Planned	Force main: 2024-2025 HRT: 2025-2029

Project Phase and Components	Implementation Status	Construction Schedule - Planned Start and Completion Year (Schedule for construction years beyond 2028 is forecasted and is not funded in the Toronto Water 2019-2028 Capital Plan)
Connected Infrastructure Upgrade Projects at ABTP *(Not for acceleration - Projects Underway)*		
Ashbridges Bay Landform Project	Not yet tendered - Detailed Design Completed and Construction Planned	2019-2025
New ABTP Outfall	Contract Awarded - Construction in Progress	2018-2024
Integrated Pumping Station	Three phases: Phase 1 - Contact Awarded and Construction in Progress Phase 2 - Not yet tendered - Construction Planned Phase 3 - Not yet tendered - Construction Planned	2018-2029