




Hamilton

INFORMATION REPORT

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| TO: | Chair and Members Public Works Committee |
| COMMITTEE DATE: | May 16, 2022 |
| SUBJECT/REPORT NO: | 2021 Annual Wastewater Treatment Bypass Report (PW22036) (City Wide) |
| WARD(S) AFFECTED: | City Wide |
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| SUBMITTED BY: | Shane McCauley Acting Director, Water & Wastewater Operations Public Works Department |
| SIGNATURE: |  |

COUNCIL DIRECTION

On January 23, 2019 Council directed staff to provide the Public Works Committee with an annual report on discharges to the natural environment from the Dundas and Woodward Wastewater Treatment Plants (WWTPs).

INFORMATION

Report PW22036 details the bypass frequency and volume for the Woodward and Dundas WWTPs for 2019 to 2021 and provides the five (5) year average for each. Report PW22036 also provides similar data from other Ontario municipalities that publicly report WWTP bypass information. The City of Hamilton's (City) website houses a live map of bypass and combined sewer overflow (CSO) locations and a historical log of WWTP bypass and CSO events (<https://www.hamilton.ca/home-property-and-development/water-sewer/monitoring-wastewater-overflows-and-bypasses>).

Wastewater Treatment Plant Discharges:

The following information pertains to WWTP bypass events at the City's two (2) WWTPs. The Woodward WWTP is located at 700 Woodward Avenue, Hamilton and discharges to the Red Hill Creek. The Dundas WWTP is located at 135 King Street

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OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

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East, Dundas and discharges to the Desjardins Canal. Both discharge locations are connected to Hamilton Harbour.

The City has a large complex wastewater collection network consisting of both separated sewer systems and combined sewers. Combined sewers are found in older areas of the City and carry a combination of stormwater and wastewater in the same pipe. During periods of heavy rainfall, snowmelt, or elevated lake levels the combined sewers are inundated with large volumes of stormwater that can exceed the capacity of the pipes. This results in combined sewer overflows (CSOs) and can overwhelm the WWTPs resulting in a temporary bypass of certain treatment processes. WWTP operators monitor incoming flows and make operational adjustments to the treatment processes as required. To protect the plant from infrastructure damage, prevent flooding, and maintain compliance with the WWTP Environmental Compliance Approval (ECA) the WWTP operator will initiate a bypass event.

At the Woodward WWTP a bypass can occur at various stages in the wastewater treatment process. There are currently four (4) different levels of treatment bypass that can occur at the WWTP as described in the following table.

| Bypass Type | Treatment Processes Bypassed |
|---|--|
| Secondary treatment bypass (Secondary bypass) | Secondary treatment processes including aeration and secondary clarification. Bypasses receive disinfection between May 15 and October 15. |
| Primary treatment bypass with disinfection (Primary bypass) | Primary and secondary treatment processes including primary clarification, aeration, and secondary clarification. Bypasses receive disinfection between May 15 and October 15. |
| Primary treatment bypass without disinfection (Headworks bypass) | Primary and secondary treatment processes including primary clarification, aeration and secondary clarification. Bypasses are not disinfected. |
| Preliminary treatment bypass (Plant bypass) | All processes at the WWTP are bypassed. Bypasses are not disinfected. |

Table 1 – Levels of treatment bypass at the WWTP

Since the completion of infrastructure upgrades in 2012 most bypass events have been secondary bypasses. Occasionally, flows to the WWTP are sufficiently large that both a primary bypass and a secondary bypass must be initiated at the same time. Very rarely a headworks bypass or a plant bypass may be required where flows exceed the preliminary treatment capacity, or where flows risk flooding and damage to surrounding properties, the main pumping station or other WWTP infrastructure.

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In 2021, all bypass events at the Woodward WWTP were the result of wet weather that generated flows in excess of the WWTP's treatment capacity. All bypasses are promptly reported to the Ministry of Environment, Conservation, and Parks (MECP) Spills Action Centre and to Public Health Services as required by the regulations.

There have been no costs directly associated with the clean-up of a WWTP bypass to date. The Woodward WWTP outfall is inspected regularly and after every significant wet weather event and/or bypass event. Any abnormal materials (e.g., floatables) that are present are removed by staff or a City contractor. It is important to note that the existing Woodward WWTP outfall discharges a combination of fully treated effluent from the WWTP, bypass flows (if a bypass is initiated), and flows from the Dunn Avenue CSO location. This outfall has a floating containment boom installed and if/when abnormal materials (e.g., floatables) are present, it is highly probable that they originated from the Dunn Avenue CSO unless a plant bypass occurred.

The 2021 Woodward WWTP data is presented in the following table along with the 2019, 2020 and five (5) year average for comparison.

| | 5 Year Average (2017 - 2021) | 2019 | 2020 | 2021 |
|--------------------------|---------------------------------|-------|-------|-------|
| Number of Bypass Events | 21 | 34 | 12 | 23 |
| Total Bypass Volume (ML) | 2,294 | 3,067 | 1,387 | 2,404 |

Table 2 - Woodward WWTP Bypass Frequency and Volume Comparison (Million Litres - ML)

2021 has a slightly higher number of bypasses than the typical year. The majority of the bypass volume (over 2,000ML of the 2,404ML) occurred over the last four (4) months of the year during what was a very wet fall. Two (2) large storm events on September 22 and 23 and October 3 and 4 contributed 665ML of bypass. The September 22 and 23 storms resulted in a headworks bypass for 3.7 hours. The October 3 and 4 storms combined with a failure of two (2) of the four (4) WWTP bar screens which required a plant bypass for 5.8 hours until equipment repairs could be completed and was then transitioned to a headworks bypass for 4.1 hours. Outside of these two (2) storms all bypasses were secondary bypasses.

Temporary capacity restrictions are currently imposed at the Woodward WWTP resulting from the Woodward Upgrades Program construction. While these restrictions do not affect the rated dry weather WWTP capacity it does impact the capacity at which the WWTP can operate during wet weather events. These temporary capacity restrictions will be in place until construction is complete in late 2022.

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Flows from the Dundas WWTP are carefully controlled and flows exceeding the plant's capacity are directed to the Woodward WWTP rather than initiating a bypass at Dundas. A bypass could occur at Dundas, however, if the WWTP operators are unable to divert flow quickly enough. In these instances, any resulting bypass would be a tertiary bypass. A tertiary bypass means the wastewater has been almost fully treated including the removal of large solids, grit, and floatable material, chemicals have been added to assist with phosphorus removal, biological treatment has been completed to break down organic material and nutrients, and most of the remaining solids have been removed. Between May 15 and October 15 each year, any tertiary bypasses that would occur would also receive chlorine disinfection but would not have the chlorine removed prior to discharge to the natural environment.

The Dundas WWTP had no bypass events in 2021 and has not had a bypass in the last five (5) years.

Municipal Comparison:

Council verbally requested at the January 13, 2020 Public Works Committee meeting, that available WWTP bypass volumes for comparable municipalities be presented along with the bypass data for the Hamilton WWTPs. The table below provides the requested data with information from other Ontario municipalities that publicly report WWTP bypasses.

| Municipality | No of WWTPs | Total Bypass Volume (ML) | |
|-----------------|-------------|--------------------------|------|
| | | 2020 | 2021 |
| Hamilton | 2 | 1387 | 2404 |
| Kingston | 3 | 4 | NA |
| London | 3 | 145 | 101 |
| Greater Sudbury | 1 | 580 | NA |
| Niagara Region | 11 | 923 | 1085 |
| Region of Peel | 3 | 508 | NA |
| Toronto | 2 | 3580 | 1622 |

Table 2 - WWTP Bypass Volume Comparison for Hamilton and Other Municipalities (Million Litres - ML) (NA - Data is not available)

The City along with the City of Kingston are the only municipalities in Ontario who report overflows and bypasses publicly in real-time. The City's webpage (<https://www.hamilton.ca/home-property-and-development/water-sewer/monitoring-wastewater-overflows-and-bypasses>) which provides real-time and historical data on our overflows and bypasses was launched in June 2020 and has proven to be an effective means of communicating these events to the public.

APPENDICES AND SCHEDULES ATTACHED

Not Applicable