



# INFORMATION REPORT

<b>TO:</b>	Chair and Members Public Works Committee
<b>COMMITTEE DATE:</b>	February 27, 2017
<b>SUBJECT/REPORT NO:</b>	Woodward Avenue Wastewater Treatment Plant Digester Gas Methane Sphere Recoating (PW17013) - (Ward 4)
<b>WARD(S) AFFECTED:</b>	Ward 4
<b>PREPARED BY:</b>	Anne McArthur (905) 546-2424, Extension 1223
<b>SUBMITTED BY:</b>	Andrew Grice Director, Water & Wastewater Operations Public Works Department
<b>SIGNATURE:</b>	

**Council Direction:** Not applicable

## Information:

This report summarizes the Methane Sphere Upgrade Project which includes maintenance and recoating in a like-for like condition, as the globe.

The Digester Gas Methane Sphere at the Woodward Wastewater Treatment Plant was manufactured in 1970 by Horton Steel Works Limited, and is classified by the Technical Standards and Safety Authority (TSSA) as a pressure vessel for the storage of methane gas, a bi-product of anaerobic sludge digestion. The sphere is constructed of carbon steel and is 24.4 m diameter with a volume of 7600 m<sup>3</sup>. The sphere is rated for 344.7 kpa (50 psig) with a working pressure of 296.5 kpa (43 psig).

The sphere was inspected by Superior Boiler Works in 2010 for structural and coating integrity both internally and externally. The inspection concluded that the sphere was structurally sound with some minor welding pitting noted that should be monitored in the future. The report also concluded that there was little or no plate thickness deterioration. On the exterior surface of the sphere, delamination and surface rusting were noted particularly where the paint spot repairs were previously completed. At this time the coating was tested confirming the presence of lead in the paint and it was recommended that the exterior coating be replaced.

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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.*

*OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.*

The Hamilton Water Division requested a second visual inspection and assessment of the Digester Gas Methane Sphere in July 2016 which was completed by consultant GHD. This inspection was prompted by the imminent upgrades to the Woodward Wastewater Treatment Plant as the sphere will be inaccessible due to other Capital Works on the Woodward site for the next 5 to 7 years. The report concluded that:

- The concrete piers are in good shape, but are in need of repair/replacement of the top grout caps;
- The degree of corrosion observed on the 24.4 m diameter spherical methane storage tank is surficial at this point in time and does not appear to have significantly deteriorated the metal substrate or welds;
- The condition of the paint coating on the sphere has deteriorated significantly since the last inspection in 2010 and is in need of replacement.

With the completed assessment by GHD Hamilton Water Division scoped a project to replace the coating of the Digester Methane Sphere in a like-for-like condition as a globe. Recoating will extend the life of the sphere for another 20 to 30 years.

The \$4.4M Methane Sphere Upgrades Project (ID# 5161766421) was incorporated into the 2017 Rate Supported Budget which received Council approval in November 2016. The project was also included in the list of projects submitted under the Clean Water Wastewater Fund (CWWF) that offers 75% funding towards eligible project costs with the Federal government providing 50% and the Provincial government 25% (refer to Report FCS16083). The Project is eligible for \$3.0M in funding translating into \$2.0M Federal funding and \$1.0M Provincial funding. The CWWF requires projects to be completed with eligible costs being incurred between April 1, 2016 and March 31, 2018.

The Capital Delivery Section within the Hamilton Water Division will be delivering this project and are in the process of initiating design. It is estimated that the construction for the recoating of the sphere will be 20 weeks in duration.

The recoating of the sphere will impact the cogeneration plant at the Woodward Wastewater Treatment Plant. The cogeneration plant, which was constructed in 2006, converts methane (a wastewater treatment process by product) into electricity and usable heat. The sphere plays a pivotal role in the cogeneration process as it stores the methane gas prior to conversion. The electricity output is sold back to Ontario Power Authority, under a 20 year agreement, and the heat is used for facility space heating and a part of the wastewater treatment process. The 1.6MW capacity cogeneration process is owned by Hamilton Renewable Power Inc. and operated by Hamilton Community Energy. The revenue from the cogeneration unit is approximately \$2,500 per day or \$910,000 annually and reduces the volume of natural gas that would be purchased to support the operation of the wastewater treatment process. With an

estimated 20 week construction schedule there is a potential revenue loss of \$350,000 from the cogeneration process and added operational costs to the Woodward Wastewater Treatment Plant for natural gas.

The City of Hamilton has received accolades from other municipalities and industries for the successful implementation of the cogeneration plant. Regular maintenance and capital rehabilitation including recoating are essential for reliable operation of the cogeneration process.