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TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON DECEMBER 19, 2011
FROM:	PAT MCNALLY, P.ENG. EXECUTIVE DIRECTOR PLANNING, ENVIRONMENTAL AND ENGINEERING SERVICES
SUBJECT:	FOX HOLLOW DEVELOPMENT AREA STORMWATER MANAGEMENT FACILITY #2 DEPRESSURIZATION WELLS AND GROUNDWATER WORKS

RECOMMENDATION

That, on the recommendation of the Executive Director, Planning, Environmental and Engineering Services, the following action **BE TAKEN** with respect to the Fox Hollow Development Area Stormwater Management (SWM) Facility #2 depressurization wells and groundwater works:

- (a) the status update of the Fox Hollow Development Area SWM Facility #2 depressurization and groundwater works **BE RECEIVED**;
- (b) the Mayor and the City Clerk **BE AUTHORIZED** to execute an updated agreement with the Consultant - Stantec Consulting Limited (Consultant) 171 Queens Avenue Suite 800 London, Ontario, Canada, N6A 5J7, to increase the previously approved functional, detailed and contract administration design engineering fees by \$126,500 excluding HST, bringing the upset amount from \$1,308,430 to \$1,434,930, excluding HST for the said project in accordance with Section 14.5-single/sale source reporting, Procurement of Goods and Services Policy;
- (c) the financing for this work **BE APPROVED** as set out in the Sources of Financing Report attached hereto as Appendix "A";
- (c) the consulting fees for the project identified in (a) above, **BE IN ACCORDANCE** with the estimate on file, which are based upon the Fee Guideline for Professional Engineering Services, 2006, recommended by the Ontario Society of Professional Engineers;
- (e) the Civic Administration **BE AUTHORIZED** to undertake all the administrative acts that are necessary in connection with this work;
- (f) the approvals given herein **BE CONDITIONAL** upon the Corporation entering into a formal contract with the consultant for the work; and
- (g) the Mayor and City Clerk **BE AUTHORIZED** to execute any contract or other documents, if required, to give effect to these recommendations.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

BNEC – August 15, 2011 – Fox Hollow Development Area Stormwater Management Facility #2 Depressurization Wells and Groundwater Works

BNEC – May 2, 2011 – Contract Award – Tender No. T11-40, Fox Hollow Development Area Stormwater Management Facility No. 2 Construction Contract (ES3019)

BNEC – Feb 14, 2011 – Contract Award – Tender No. T11-13, Fox Hollow Development Area Stormwater Management Facility No. 2 Site Preparation Contract (ES3019)

ETC – May 10, 2010 – Appointment of Consulting Engineer for Engineering Services for Functional and Detailed Design of Fox Hollow Community Storm/Drainage, Stormwater Management and Sanitary Trunk Sewer Servicing Works.

ETC – April 12, 2010 – Schedule C Municipal Class Environmental Assessment Addendum for Storm/Drainage, Stormwater Management and Sanitary Servicing for the Fox Hollow Development Area

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PC – October 19, 2009 – Storm/drainage, stormwater management and sanitary Trunk Sewer Servicing Works for Fox Hollow Development Area

ETC – June 1, 2009 - the appointment of a consultant for the Functional Design of Fox Hollow Community Storm/Drainage, Stormwater Management (SWM) and Sanitary Trunk Sewer Servicing Works (ES3018 ES5236) Fox Hollow Trunk Sanitary Sewer.

ETC – September 11, 2006 – Municipal Class Environmental Assessment Report Recommendations for Proposed Storm/Drainage and Stormwater Management Servicing Works for Fox Hollow Development Area

ETC – June 13, 2005 – Approval of the Appointment of the Consulting Engineer for the Municipal Class EA, Schedule ‘C’ Study for Storm/Drainage and SWM servicing works for Fox Hollow Development Area

ETC – March 25, 2002 – Approval of the Completion of the Functional Drainage and SWM Master Plan for Fox Hollow Community Plan

ETC – February 26, 2001 – Approval of the Appointment of the Consulting Engineer for Functional Drainage and SWM Master Plan for Fox Hollow Community Plan

BACKGROUND

Purpose:

The purpose of this report is to provide a status update of the depressurization and groundwater dewatering works for the Fox Hollow SWM facility #2 project and to recommend that an increase in functional and detailed design fees be authorized to the Consultant for additional effort related to hydrogeotechnical and geotechnical components of the design (location map is shown in Appendix B).

Context:

In May 2010, the City engaged Stantec to undertake the functional and detailed design of storm/drainage, SWM and sanitary servicing works for the Fox Hollow development area in accordance with the Addendum to the Fox Hollow Development Area Municipal Class Environmental Assessment (EA Addendum) for Storm/Drainage, SWM and Sanitary Servicing works finalized in July 2010. During the functional and detailed design the extent of work for both the hydrogeotechnical and geotechnical components of the project were expanded based on the results of geotechnical investigations and soils / groundwater conditions encountered. In addition, during the regulatory authority review of the project, additional requirements associated with the EA Addendum, Certificate of Approval and Permits to Take Water were stipulated. Consequently, the extent of geotechnical / hydrogeotechnical work exceeded the work scope as presented in Stantec’s work plan proposal (April 2010) which was reviewed and approved by the City.

The geotechnical and hydrogeotechnical investigation determined that a portion of Fox Hollow SWM facility #2 was located in an area of saturated surficial granular (sand and gravel) soil deposits. Specifically, it was found that the groundwater elevation in the area of the SWM facility #2 is at an elevation of approximately 270 metres, which is approximately 3 m higher than the permanent pool elevation of 266.9 metres. Therefore, the Fox Hollow SWM facility #2 (3m deep) is located completely within the groundwater table elevations and extensive dewatering works were required.

In addition, due to the thin layer of clayey cover and the high groundwater level in the underlying silt at the base of the facility an uplift pressure of as much as six metres of water may be present. This condition results in high risk that if excavation to the design grade were to occur without groundwater pressure relief in the silt layer, the overlying clay layer would heave or “float” during excavation. This disturbance to the base of the excavation would cause problematic working conditions for the excavation equipment. Alternatively, if the base of the facility was to heave following construction, the floor of the facility would be disrupted, the design grade raised, resulting in loss of storage volume and uncontrolled silt migration into the facility.

Discussion:

In order to separate SWM facility #2 from the groundwater while maintaining efficiencies in constructability and on-going maintenance, the geotechnical engineer recommended clay cut-off walls be installed in the areas where the surficial saturated granular materials were

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encountered. To prevent “basal heave” the geotechnical engineer recommended that depressurization wells be installed from the base of the partially completed excavation.

Staff reported in an earlier report that the estimated cost for the depressurization works would be approximately \$290,000 and recommended that this be funded by the \$50,000 allocated for depressurization wells and \$120,000 from the contingency within this contract with the balance being funded from the money remaining in the SWM Facility #2 site preparation contract. The works have now been completed and the Contract Administrator has reported the costs associated with the depressurization wells are approximately \$136,500. Cost savings were realized with the dewatering and the Contractor’s willingness to utilize material on site rather than importing clay material for the clay cut off walls.

As this project has progressed it became clear that there were complex hydrogeotechnical and geotechnical conditions that must be assessed, which led to additional engineering review and analysis, and increased reporting with regards to the regulatory authorities and the City’s expectations and needs. These specialized designed measures including clay cut-off walls and depressurization wells as well as a Category 3 permit to take water mitigated groundwater impacts on the infrastructure and receiving water resources system. City staff authorized Stantec to proceed with these additional works, noting, that the consultant, and the City, were unable to estimate the final costs in advance of this work being done. The final engineering costs related to this additional work is \$126,500 excluding HST to cover all the additional hydrogeotechnical and geotechnical design efforts associated with this project.

The engineering fees approved to date for this project are as follows:

1.	the EA Addendum	\$122,900
2.	functional and detailed design for SWM facilities Nos. 1, 2, 3, Heard Drain and Trunk Sanitary Sewer	\$641,000
3.	contract administration, supervision and monitoring for the construction of SWM Facility No. 2	\$139,620
4.	Heard Drain Facility and Trunk Sanitary Sewer	\$404,910
	Total	\$1,308,430

The additional hydrogeotechnical and geotechnical design fees for the Fox Hollow Community SWM System are \$126,500 which make the revised total for these engineering fees \$1,434,930 excluding HST.

Conclusions:

It is recommended that status update of the Fox Hollow Development Area SWM Facility #2 depressurization and groundwater works be received and that an increase in functional and detailed design fees be authorized to the Consultant for additional effort related to hydrogeotechnical and geotechnical components of the design.

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Acknowledgements:

This report was prepared within the Planning, Environmental Engineering Services Department, Stormwater Management Unit by Billy Haklander, P.Eng., Environmental Services Engineer.

SUBMITTED BY:	RECOMMENDED BY:
BERTA KRICKER, M.Eng., F.E.C., P. Eng. MANAGER OF STORMWATER STORMWATER MANAGEMENT UNIT	RON STANDISH, P.ENG. DIRECTOR, WASTEWATER AND TREATMENT – PLANNING, ENVIRONMENTAL AND ENGINEERING SERVICES
REVIEWED & CONCURRED BY:	
PAT MCNALLY, P.ENG. EXECUTIVE DIRECTOR OF PLANNING, ENVIRONMENTAL AND ENGINEERING SERVICES	

December 13, 2011

Attach: Appendix "A" – Sources of Financing
Appendix "B" – Location Map

c.c. John Braam – City Engineer
Mary Goss – Budget Analyst
John Freeman-Manager, Purchasing and Supply
Stantec Consulting

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