



THE TORONTO AND REGION CONSERVATION AUTHORITY

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**Friday, October 14, 2005**

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THE TORONTO AND REGION CONSERVATION AUTHORITY

MEETING OF THE SUSTAINABLE COMMUNITIES BOARD #3/05  
October 14, 2005

The Sustainable Communities Board Meeting #3/05, was held in the South Theatre, Black Creek Pioneer Village, on Friday, October 14, 2005. The Chair Michael Di Biase, called the meeting to order at 11:20 a.m.

**PRESENT**

Glenn De Baeremaeker	Member
Michael Di Biase	Chair
Suzan Hall	Vice Chair
Colleen Jordan	Member
Glenn Mason	Member
Elaine Moore	Member
Dick O'Brien	Chair, Authority
Linda Pabst	Member
Andrew Schulz	Member
John Sprovieri	Member

**REGRETS**

Maria Augimeri	Member
Norm Kelly	Member
Gerri Lynn O'Connor	Member

**RES.#E7/05 - MINUTES**

Moved by: Colleen Jordan  
Seconded by: Elaine Moore

THAT the Minutes of Meeting #1/05 and #2/05, held on April 8, 2005 and June 3, 2005, respectively, be approved.

**CARRIED**

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**DELEGATION**

- (a) Mr. Jim Robb, Friends of the Rouge Watershed, speaking in regards to item 7.3 - York-Durham Sanitary Sewer Projects.

**RES.#E8/05 - DELEGATIONS**

Moved by: John Sprovieri  
Seconded by: Elaine Moore

**THAT above-noted delegation (a) be heard and received.**

**CARRIED**

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**PRESENTATIONS**

- (a) A presentation by Jamie James, Environmental Consultant, Tridel, in regards to Green Buildings Strategies for High-Rise Residential Development.
- (b) A presentation by Deborah Martin-Downs, Director, Ecology, Toronto and Region Conservation Authority, in regards to item 7.3 - York Durham Sanitary Sewer Projects.
- (c) A presentation by Mr. Bruce MacGregor, Commissioner, Transportation and Works, Regional Municipality of York, in regards to 16<sup>th</sup> Avenue Trunk Sewer – Project Update.

**RES.#E9/05 - PRESENTATIONS**

Moved by: Glenn De Baeremaeker  
Seconded by: Andrew Schulz

**THAT above-noted presentation (a) be heard and received;**

**THAT Tridel be congratulated on their leadership in achieving CO<sup>2</sup> savings, energy reduction and seeking LEED (Leadership in Energy and Environmental Design) certification;**

**AND FURTHER THAT staff report back to the Sustainable Communities Board on the feasibility of requesting all municipalities in Toronto and Region Conservation Authority's jurisdiction to consider requiring LEED certification in building applications.**

**CARRIED**

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**RES.#E10/05 - PRESENTATIONS**

Moved by: John Sprovieri  
Seconded by: Elaine Moore

**THAT above-noted presentations (b) and (c) be heard and received.**

**CARRIED**

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## SECTION I - ITEMS FOR AUTHORITY ACTION

**RES.#E11/05 - INDOOR AIR BIOFILTRATION SYSTEM AT HEAD OFFICE**  
Results achieved by the indoor air biofiltration system in terms of air quality and energy savings.

Moved by: Linda Pabst  
Seconded by: Glenn Mason

**THE BOARD RECOMMENDS TO THE AUTHORITY THAT Toronto and Region Conservation Authority (TRCA) staff pursue potential funding partners to continue monitoring the indoor air biofiltration system at Head Office in 2006.**

**CARRIED**

### **BACKGROUND**

TRCA, with support from Air Quality Solutions and Toronto Public Health, was awarded a \$53,700 grant from the Green Municipal Fund (GMF) to install and test an indoor air biofiltration system, also known as a "biowall", in TRCA's Head Office. The project was initiated to demonstrate the benefits of this sustainable technology as a basis for recommending adoption by others. This green technology contains an air filtration system that utilizes plants to improve indoor air quality. This reduces the need to draw on outdoor air for ventilation which helps to reduce energy costs associated with heating and cooling of the building. In the spring of 2004, the completion of the biowall was officially recognized by two unveiling events: one internally for TRCA, and one for our partners and interested parties.

At Authority Meeting #6/03, held on July 25, 2003, Resolution #A155/03 was approved, in part, as follows:

*...AND FURTHER THAT staff report to the Executive Committee in 2004 on the results achieved by the biofiltration system in terms of air quality and energy savings.*

A study for the TRCA biowall was conducted by Air Quality Solutions, which is a company in the City of Guelph that uses innovative biofiltration technology to develop environmentally friendly and energy efficient systems, capable of improving the indoor environment. This report updates the TRCA on the progress and its future direction of the biowall project.

### **Description of the Study**

The biofiltration of indoor air has been presented as an alternative means of removing indoor pollutants. Using this approach, the airborne contaminants are degraded by passing the building air through a specifically tailored biological system. The system relies on benign beneficial microbes, which consider the organic contaminants a food source. This approach reduces the need to bring outside air into the office space thereby improving energy efficiency.

Prior to implementing a full program of maintaining air quality by biofiltration, a study to determine how the population responds to air cleaned in this manner was implemented. The purpose of this study was to determine if the augmentation of the traditional ventilation system with biofilter air results in an indoor environment as good as, or better than, air maintained by traditional means only.

### ***Approach***

The impact of the biofilter was evaluated by three means as follows:

1. Occupant surveys on changes in environmental quality associated with the implementation of the biofiltration program.
2. Changes in physical characteristics of air quality with the implementation of the biofiltration program.
3. Potential energy savings to be realized with the implementation of the biofiltration program.

There are numerous studies indicating people can respond positively to the simple addition of plants into the work environment. Although the greening effect does have value, this study attempted to separate this effect from the effect of the system on air quality. To this end, an experimental design was used in which the implementation of the biofilter into a retrofitted space would separate this office greening effect from the effect of the biofilter, using three sampling periods as follows:

1. pre-installation;
2. post installation/pre-activation; and
3. activation of the biowall.

The population exposed to biofiltered air was also compared at each sampling period to a control group within the same building complex who were not regularly receiving the biofiltered air as their office environment has a separate ventilation system.

### **RESULTS OF THE STUDY**

The biofiltration of indoor air by means of TRCA's Biowall appears to be an effective means of supplying good quality air to the building occupants. The biowall reduced both the number of different compounds present in the air and their concentrations while substantially reducing the energy required to heat and cool the building.

#### ***Psychological Impact of Biowall***

TRCA employees, when surveyed about air cleansed by this technology, exhibited no negative responses when compared to a group that did not receive the treated air. The group exposed to the treated air experienced a general increase in the perceived air quality with the installation and activation of the biofilter. The treated group did not exhibit an increase in the frequency of physical symptoms, such as irritation to mucous membrane in the form of itchy eyes or runny noses, nor was there an increase in background odours associated with the operation of the biowall. This suggests that the acceptance of the biofiltered air was very high. Substantial improvement in indoor air quality was perceived with the installation and activation of the biofilter.

### ***Physical Impact of Biofilter***

Volatile Organic Compounds (VOCs) are represented by chemicals such as formaldehyde, benzene and toluene. These chemicals arise from activities that occur within the office, building materials and the occupants themselves. If not controlled, the contaminants may accumulate to the point of influencing the well-being of occupants. Estimates have placed the annual impact of poor indoor air quality on worker productivity in the USA to be between 20 and 200 billion dollars. Upon activation of the biofilter, there was a substantial impact on air quality in the area immediately adjacent to the biowall (front lobby). Passing the air through the biofilter reduced Total Volatile Organic Compounds (TVOCs) concentrations by 75% relative to the rest of the building. The air exiting the biofilter (sampled from the duct) exhibited an 80% reduction in the number of different VOCs present in the air. This is a major improvement on air quality.

Areas further away and not adjacent to the biofilter, exhibited a slight improvement in air quality although not significant. The limited impact of the biofilter on the more distant locations was likely due to the interference from enhanced ventilation during the sample period. The evaluation of the biofilter occurred during September and October when ventilation systems take advantage of cool air outside to “free cool” the building. Hence the higher volume of outside air may have diluted the impact of the biofilter in regions further from it.

The biofilter did not increase the fungal and bacterial spore loads in the spaces receiving the treated air. However, the duct system carrying air between biofilter and the central air handling system exhibited bacterial counts comparable to outdoors.

### ***Impact on Energy Consumption***

Energy required to provide required outside air to occupants:

- Peak summer energy requirement is approximately 0.36 KW of energy per occupant.
- Peak winter energy requirements are 0.62 KW per person for properly humidified air.

Energy requirement of biofilter

- The operation of the biofilter requires approximately 0.025 KW per m<sup>2</sup> or approximately 0.05 KW per building occupant.

Potential Energy Savings

- Potential savings during peak energy requirements in the heat of summer and the cold of winter are estimated to be 0.32 and 0.58 KW per occupant respectively. This translates into approximately a 5-10% annual energy savings.

## **DETAILS OF WORK TO BE DONE**

Immediate actions include upgrading of the lighting fixtures and continued maintenance of the biowall. The system had a very large impact on the area adjacent to the biofilter and less of an impact further away. This may have been due to the enhanced amount of fresh air brought into the building during the fall. It is recommended that the impact of the biofilter be examined during peak heating and cooling seasons when ventilation is minimized and determine to what extent biofiltered air can replace outside air as a means of maintaining indoor air quality. Continued monitoring is subject to available funding. TRCA staff will be pursuing potential funding partners to continue the monitoring in 2006.

**Report prepared by: Cindy Kambeitz, extension 5336**  
**For Information contact: Glenn MacMillan, extension 5212**  
**Date: September 22, 2005**

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**RES.#E12/05 - UPDATE ON THE MAYORS' MEGAWATT CHALLENGE**  
Participation in the Mayors' Megawatt Challenge by municipalities in Toronto and Region Conservation Authority's jurisdiction.

Moved by: Glenn Mason  
Seconded by: Suzan Hall

**THE BOARD RECOMMENDS TO THE AUTHORITY THAT Members of Toronto and Region Conservation Authority (TRCA) whose municipalities are not participating in the Mayors' Megawatt Challenge be requested to encourage them to join the program;**

**AND FURTHER THAT staff report back with an update of the status of membership in the Mayors' Megawatt Challenge at the Sustainable Communities Board meeting to be held on December 2, 2005.**

**CARRIED**

## **BACKGROUND**

The Mayors' Megawatt Challenge brings municipalities together to improve energy efficiency and environmental management in their own buildings. Through the Mayors' Megawatt Challenge municipalities demonstrate leadership, inspiring other organizations and individuals to take action towards healthier, more sustainable communities.

Municipalities in Canada have long been champions of energy efficiency. Many cities, towns and regional governments have implemented projects and programs aimed at improving their energy performance. The Mayors' Megawatt Challenge takes these efforts to the next level by benchmarking performance between municipalities and sharing best practices for improvement.

The Mayors' Megawatt Challenge program helps municipalities improve the energy efficiency of their own facilities. The program provides:

- a web-based utilities management system;

- quarterly workshops to explore and assess benchmarking, action plans, best practices and actual savings;
- on-line tools for analyzing and budgeting energy use;
- collaborative projects;
- best practices checklists; and
- newsletters, awards and media releases.

Facility design, retrofits and operations in a wide range of facility types, combined with management practices and the actions of building users, all work together to achieve and sustain optimal levels of municipal energy efficiency. Sharing knowledge and experience with peers in each of these areas can yield better performance than any municipality can achieve by acting alone.

The inaugural meeting of the Mayors' Megawatt Challenge took place on June 23, 2003. Twenty-eight municipalities from the Toronto region were invited, and 12 municipalities took up the challenge, representing about 92% of the region's population (encompassing 5.3 million people). Participating municipalities for the first session of the challenge were: Barrie, Brampton, Burlington, Markham, Milton, Mississauga, Oakville, Oshawa, Richmond Hill, Toronto, Vaughan and Whitby. The pilot session ended with a final workshop at Richmond Hill City Hall on November 29, 2004.

By November of 2004, the program participants had reported savings of 640 kilowatts or 64% of the targeted megawatt in total. Based on the data gathered for 11 of the 69 buildings in the database, 2,617,000 kilowatt hours (kWh) were saved. Total gas saved was 137,000 cubic metres (m<sup>3</sup>) and total water saved was 6,000 m<sup>3</sup>. This translates to the prevention of approximately 1,400 tonnes of greenhouse gases (GHG) from being released into the atmosphere. Total energy use decreased by 4% and water savings of 7% were recorded. Cost savings from the energy and water savings were estimated to be approximately \$362,000. This is more than seven times the total program fees collected of approximately \$50,000. The program also attracted a federal grant which was used to keep municipal fees low.

In August of 2004, written surveys and phone interviews were conducted with the participants to gauge the interest in the next phase of the program and to determine the content and focus. Feedback was very positive. To support this expansion and to encourage small municipalities to join, participants suggested that a tiered fee structure be created for the 2005/2006 session.

Invitations and planning for the 2005/2006 session began in January 2005. Forty-three municipalities from around the Greater Golden Horseshoe were invited to participate in the program. As of September 2005, thirteen municipalities had joined the program, including Ajax, Barrie, Brampton, Burlington, Guelph, Kitchener, Milton, Mississauga, Oshawa, Richmond Hill, St. Catharines, Toronto and Waterloo. The Town of Markham is still considering joining, while the cities of Pickering and Cambridge have indicated that they would join in 2006.

In the current session of the program, a collaborative project has been initiated to identify energy savings and thus cost savings in the operation of arenas. Benchmarking for the Mayors' Megawatt Challenge indicates that there are major differences in energy use amongst seemingly similar single pad arenas. The single pad arenas project will involve audits of facilities, documentation of best practices and specification of building automation system installations. Municipal partners will provide input to existing operational procedures at rinks, along with ongoing energy use data. Working collaboratively and learning from the experience of others will provide support for municipalities in implementing projects that will save energy and money. By working collaboratively, economies of scale will be achieved and grants from government agencies will be received to provide municipalities with a cost effective and integrated assessment of energy and cost savings for arenas that are enrolled in the program.

### **RATIONALE**

Feedback from participants has indicated that the program adds value to existing energy efficiency programs and helps municipalities get started on their own program. In last year's program, municipalities had estimated aggregate savings of \$362,000, which is more than seven times the total fees charged to the municipal participants.

The value of the program is linked in part to the number of municipalities participating. The more participants, the more opportunity there is for sharing of knowledge, experience and peer learning. The Government of Ontario has committed to lowering energy demand by 5% province-wide and by 10% within its own buildings by 2007.

Energy savings targets for publically funded buildings are likely to be included in upcoming energy conservation regulations. The Mayors' Megawatt Challenge provides participating municipalities with the tools and access to the experience and expertise to develop appropriate energy targets.

**Report prepared by: Bernie McIntyre, extension 5326**  
**For Information contact: Bernie McIntyre, extension 5326**  
**Date: October 3, 2005**

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**RES.#E13/05 - YORK-DURHAM SANITARY SEWER PROJECTS**  
16th Avenue Phase II. Recommendation for continued staff involvement in the York-Durham Sanitary Sewer projects.

Moved by: Linda Pabst  
Seconded by: Glenn Mason

**THE BOARD RECOMMENDS TO THE AUTHORITY THAT all interested parties be advised that in the opinion of the Toronto and Region Conservation Authority (TRCA), the Environmental Management Plan and detailed works plans for the 16th Avenue Phase II York-Durham Sanitary Sewer project are being effectively implemented by York Region and their contractors;**

THAT staff be directed to continue reviewing the monitoring and mitigation reports and web site data, conducting field inspections and independent monitoring, and participating in the adaptive management program associated with the implementation of the 16th Avenue Phase II York-Durham Sanitary Sewer project;

THAT staff be directed to continue working with York Region, Fisheries and Oceans Canada, and the Ontario Ministries of Environment and Natural Resources to ensure that the environmental impacts associated with the planning, design and construction of all other York-Durham Sanitary Sewer projects in TRCAs jurisdiction are minimized;

THAT staff report back to the Sustainable Communities Board in December 2005 with a detailed presentation regarding the planning, design and construction status of all other York-Durham Sanitary Sewer projects in TRCAs jurisdiction;

THAT York Region be encouraged to continue and extend their current efforts toward sustainability planning, water budgets, natural heritage planning and environmental net gain within all municipal planning and development processes;

THAT staff be directed to continue participating in activities underway in York Region to develop a sustainability plan and positive legacies for regional residents emanating from this plan;

AND FURTHER THAT staff report back to the Sustainable Communities Board in 2006 with a detailed presentation regarding mechanisms for implementing net environmental gain practices in York region's planning and development processes.

**CARRIED**

## **BACKGROUND**

Over the past few months, considerable public criticism has been leveled at TRCA, Fisheries and Oceans Canada (DFO) and the Ministry of Environment (MOE), over the construction of the 16th Avenue Phase II sewer project and its environmental effects. Recently, the City of Toronto became concerned about the potential environmental effects of this project on the watercourses in the city. The issues raised by the public, agencies and the City of Toronto are summarized along with an assessment of conditions and potential environmental consequences.

The technical issues associated with the construction of the York-Durham Sanitary Sewer (YDSS) projects are complex. In order to fully understand these issues, background information regarding the planning history of the YDSS system, as well as an overview of the 16th Avenue Phase I project, are provided.

## **PLANNING HISTORY**

Between 1964 and 1980, water quality of the streams and rivers in the Greater Toronto Area (GTA) was poor. One of the contributing factors was the number of small sewage treatment plants (STPs) that discharged their effluent to the streams (i.e., at one time there were 31 STPs on the Don River alone). The York-Durham Sanitary Sewer was constructed during the 1970s, and many of the STPs were taken off-line. Sewage collection was centralized into a large trunk sewer from Newmarket to Lake Ontario, outletting at the Durham STP, and water quality in the GTA's streams and rivers significantly improved.

In 1994, York Region developed their first official plan which identified substantial growth in the region. This growth was to be centred around existing urban centres of Aurora, Newmarket, Vaughan, Richmond Hill and Markham. Following this, the York Region embarked on a master servicing study to assess the requirements to provide for this growth.

In 1997, York Region approved the YDSS Master Plan which was designed to service this growth. The master plan was completed following the mastering plan provisions of the *Ontario Environmental Assessment (EA) Act*. The EA Act requires that master plans be approved by municipal council. There is no requirement for ministerial endorsement of a master plan.

Once approved by council, the *EA Act* requires that an environmental assessment be conducted for each project segment identified in the master plan. In accordance with the *Municipal Class Environmental Assessment* (formerly the *Class EA for Municipal Road, and Water and Wastewater Projects*), the assessments for individual sewer projects identified in the YDSS Master Plan commenced in the late 1990s. They are on-going.

### **16TH AVENUE**

The YDSS Master Plan identified the construction of the 16th Avenue trunk sewer as one project. However, as part of the approval process for the Swan Lake development in Markham, a sanitary connection to the existing YDSS sewer was required in advance of the planned construction of the new 16th Avenue sewer. Thus, the project was constructed in two phases:

#### ***16th Avenue Phase I:***

- 9th Line from Box Grove to almost Major Mackenzie Drive.
- 16th Avenue from 9th Line to just west of Stone Mason Drive.

#### ***16th Avenue Phase II:***

- 16th Avenue from just west of Stone Mason Drive to just east of Woodbine Avenue.

This decision was supported by York Region Council and incorporated into the 2002 YDSS Master Plan update. In accordance with the updated YDSS Master Plan, construction of the Phase I sewer was required by 2003 and construction of the Phase II sewer by 2005.

### **16th Avenue Phase I**

The Class EA for 16th Avenue Phase I was approved in 1998. The preferred alignment for this sewer was along 16th Avenue, and the preferred design was for a gravity sewer. These options required construction in the aquifer. Construction was completed in the summer of 2003. During the review of the Class EA and the subsequent permit applications, TRCA review included an assessment of the impacts that the sewer, or the construction of the sewer, would have on valley and stream corridors within TRCA's jurisdiction as per the policy requirements in the TRCA *Valley and Stream Corridor Management Program* (1994). As such, the only permits issued by TRCA were related to construction compounds within fill regulated areas.

While MOE reviewed the Permit to Take Water (PTTW) application required to facilitate construction of both the shafts and the tunnel, Ontario Regulation 99/380, requiring that effects to the natural environment be considered, had not come into effect. Thus, consideration for all aspects of the environment through the issuance of the PTTW was not a requirement. MOE also reviewed the detailed design of the sewer and issued a Certificate of Approval (CofA) to York Region prior to commencement of construction. It is TRCA staff's understanding that a gravity sewer is preferred over a forcemain as there is no requirement for a pumping station or emergency overflow to the creek or river. Thus the risk of environmental contamination is significantly reduced. Additionally, a pump station would consume electricity on a perpetual basis and does not facilitate sustainability goals. Associated with the issuance of the PTTW, TRCA reviewed the anticipated dewatering requirements in relation to capacities of the watercourses and stormwater management ponds, and staff determined that no TRCA permits for the associated discharge were required for Phase 1, based on these assessments.

The construction of the project began on 9th Line, with two tunnel boring machines (TBMs) simultaneously drilling the tunnel. One of the machines then turned the corner and proceeded to drill along 16th Avenue. As the drilling neared the end of the Phase I contract area, near Stone Mason Drive and Robinson Creek (at shaft C8), there was an unpredicted high permeability zone in the aquifer. Additional dewatering was required to repressurize the aquifer and to lower the water levels to facilitate construction and to ensure worker safety. As a result, the dewatering rates doubled and exceeded the limits prescribed in the PTTW in order to maintain a safe construction area. The resulting discharge rates from the pumping in spring 2003 exceeded the capacity of the Wismer Commons stormwater management pond, leading to the overflow of the pond and erosion of the Robinson Creek flood plain, streambanks and a locally significant wetland.

Without the increased dewatering, it is likely that the TBM would have been disabled or destroyed, the partially constructed tunnel and pipe would be impacted and worker safety would be compromised. The increased dewatering resulted in erosion and deposition of iron precipitates on the banks and streambed of Robinson Creek both at the dewatering site and downstream. TRCA, Ministry of Natural Resources (MNR), and DFO staff were all on site to assess the situation. DFO, MOE and Environment Canada are still investigating the incident. Private prosecution pursuant to subsection 35(2) of the *Fisheries Act* was initiated.

At their own discretion, York Region had the condition of Robinson Creek assessed both at the discharge site and downstream. York Region applied to TRCA for permits to restore Robinson Creek, its flood plain and wetland, and these permits were granted in 2004 and 2005. The restoration works will be completed this year.

As a result of the issues identified during the construction of the Phase I project, the construction of the Phase II project was substantially modified in order to better protect the natural environment. In addition, the planning and design processes related to other YDSS projects have also been substantially changed over the past two years. These changes, resulting from conditions set forth by the Ontario Minister of the Environment as well as the application of new advances in sciences, are discussed as follows.

## 16TH AVENUE PHASE II

The Class EA for 16th Avenue Phase II was approved in 2002. In the EA document, the impact to surficial features from the required dewatering was identified. Agency staff concluded that this issue was not adequately addressed in the EA, and required that these impacts be addressed through the detailed design and construction phases of the project. The agencies required substantial environmental mitigation and monitoring as part of the permit approval processes. This review took place in 2003 and 2004. All required permits and approvals were issued, and construction commenced in December 2004 after a substantial delay to develop the Environmental Management Plan (EMP). The following legislation was reviewed and addressed as part of the approval process for 16th Avenue Phase II:

### *Ontario Regulation 158*

TRCA required permits for the construction of the discharge infrastructure related to the supplementation infrastructure at or near Elgin Mills Road. Five permits were issued in the summer of 2004. Through an amendment to the work plan, an additional permit for the construction of an outlet channel from Wismer Commons stormwater management pond was issued in summer 2005. Approval of these permits was based on TRCA approval of the EMP.

### *Fisheries Act*

Approval under section 35(2) of the *Fisheries Act* is a voluntary process. TRCA has a Level 3 Agreement with DFO. As such, TRCA undertakes the fisheries review of all requests on behalf of DFO. If the project is not deemed to cause a harmful alteration, disruption or destruction (HADD) to fish habitat, TRCA issues a Letter of Advice on behalf of DFO. If a project is deemed to be a HADD, then TRCA continues to act as the agent and consults with DFO during the course of the project review. Upon request and given that the required process has been followed, DFO may issue an authorization for the project. The issuance of an authorization is a trigger for a *Canadian Environmental Assessment Act (CEAA)* review. Of significance is that subsection 35(2) of the *Fisheries Act* is a non-affirmative regulatory duty. This means that DFO does not provide an authorization unless requested by the proponent and that they are satisfied that compensation can be provided to address the harmful alteration, disruption or destruction of habitat.

As part of the TRCA Level 3 Agreement with DFO that was adopted in 2002, staff undertook a fisheries review under the auspices of the Level 3 Agreement for 16th Avenue Phase II. Prior to the development of the environmental management plan that is now in place, TRCA staff identified significant concerns with respect to the potential impact on fish or fish habitat if the project proceeded without mitigation. As mitigation was not proposed at that time, staff referred the project to DFO. As a result of agency requests, an environmental management plan was developed. This was followed by detailed work plans for each of the eight effected watercourses. The work plans outline the operational procedures, and have been in effect since March 2005. It should be noted that York Region did not request DFO to authorize the impacts to fish or fish habitat arising from the 16th Avenue Phase II project. As a result, a review under CEAA was not triggered. However, DFO staff was involved in the review of the EMP and work plans and provided advice to York Region in this regard.

### Canadian Environmental Assessment Act

There are a number of triggers for a project review under the CEAA. One of these triggers is authorization of a project under the Federal *Fisheries Act*. Because York Region did not request such an authorization for this project, CEAA was not triggered. The project therefore remains solely in the planning domain of the *Ontario EA Act* and as such, approvals and conditions are mandated by the Minister of the Environment for Ontario.

### Permit To Take Water

In 2003, York Region applied for a PTTW for the 16th Avenue Phase II project. The original application was not accompanied by a dewatering needs assessment, a monitoring plan or a mitigation plan. As required through Ontario Regulation 99/380, the effects to the natural environment had to be considered in the application. Concerns with respect to a number of issues associated with dewatering were raised by TRCA, MOE, DFO and MNR. These issues included the following:

- long term impacts of dewatering;
- size of the zone of influence;
- groundwater and wells;
- groundwater and fish habitat (including reduced baseflow, water temperature changes, and increased water volume and velocities at discharge locations);
- groundwater and wildlife habitat;
- federal EA triggers;
- comprehensive environmental planning;
- alternative methods, alignments and design.

The agencies, York Region and their contractors worked together to develop the EMP. In the meantime, the Minister of the Environment received a request for a Part II Order for a number of the YDSS projects, including 16th Avenue Phase II. Typical of environmental assessment planning in the late 1990s and early 2000s, sewers were generally considered to be appropriate projects for review under the *Municipal Engineer's Association, Class EA for Municipal Infrastructure* document. As stipulated in the EA Act, however, any individual or agency can request the Minister review the class designation of a particular project and if appropriate, order an Individual EA to be conducted.

While this request was denied, the Minister did establish additional conditions for approval of a number of the YDSS projects as outlined in a letter dated October 1, 2004. In terms of 16th Avenue Phase II, the following is a summary of the conditions which were applied:

- That monitoring and mitigation measures be developed and applied to the natural features and wells that could be impacted by the dewatering activities associated with the project.
- That public consultation be undertaken regarding the monitoring and mitigation plan.
- That a well complaint review committee be maintained.
- That all technical studies, reports and other documents be made available for review by the public.
- That a habitat improvement plan be developed and implemented for each section of a stream where water is discharged for the purpose of this project.
- That an annual report be submitted to the MOE.

These conditions have been, or will be, addressed as requirements of the PTTW. The EMP developed by York Region includes a comprehensive mitigation and monitoring plan. This plan was reviewed by TRCA, MOE, MNR and DFO. MOE subsequently issued the required PTTW and construction of the project was allowed to proceed in December 2004.

### **Certificate of Approval**

MOE has issued a Certificate of Approval for this project which permits the construction of a gravity sewer in the aquifer, as recommended in the EA and as supported by the Minister of the Environment in her response to the request for a Part II Order related to this EA. It is staff's understanding that gravity sewers are environmentally safer than forcemains. The pressure of the aquifer works to contain any leaks in the pipe. Thus, there is a greater chance of the groundwater leaking into the pipe than there is of sewage leaking out into the aquifer. With forcemains and pumping stations, emergency overflows to the streams and rivers are a design requirement to prevent surcharge into basements. These options are reviewed as part of the EA review.

### **PROJECT DELAYS AND IMPACTS TO THE ENVIRONMENT**

The phasing of the Phase I and Phase II projects was not based on environmental factors. It was based largely on timing of development and financial implications and synergies. Environmental issues associated with dewatering of the Phase I project included not only the aforementioned impacts on Robinson Creek, but impacts on private wells, stream baseflow and possibly forests and wetlands. The full impact that this project had on the natural environment will likely never be known because the collection of baseline information was not a requirement of any agency's approval process for either the EA or their permits, nor was detailed monitoring required during construction.

The original PTTW application for Phase II did not take into account the surficial environmental impacts that were associated with the required dewatering or discharge. Discussions between York Region, their contractors, and the agencies (MOE, MNR, DFO and TRCA) ensued. However, from August 2003 when the tunneling required for Phase I ended, to April 2005 when tunneling required for Phase II commenced, the TBM remained in the ground and dewatering continued at a rate of approximately 15,000 L/m. Potential impacts that this dewatering may have had on the environment while construction was stopped and the environmental management plan was developed are not known. MOE granted a one year extension to the Phase I PTTW to allow this dewatering to occur. Had it been stopped, the pressure in the aquifer would have likely caused the completed Phase I tunnel to collapse.

With some of the direct impacts of Phase I identified (i.e., the impacts to Robinson Creek), none of the agencies were prepared to issue approvals for the Phase II project without an environmental management plan. York Region and their contractors applied for the required PTTW for Phase II in 2003, and the Ontario Regulation 158 permits in 2004. York Region committed to mitigating all adverse impacts to fish and fish habitat, and as such did not apply for *Fisheries Act* authorization.

### **ISSUES ASSOCIATED WITH DEWATERING**

There are two fundamental aspects of the dewatering which concern TRCA staff: the rate and duration of dewatering, and the impacts of the dewatering on the surficial environment.

The current dewatering rate for the sewer brings between 15,000 and 20,000 litres per minute of 9.5°C groundwater to the surface to be discharged. This groundwater has a significantly different temperature than that of the ambient watercourses in the summer and winter, as well as different chemistry (e.g., higher iron content). The rate and duration of groundwater withdrawals can be mitigated, in part, through construction methodologies. Staff spent considerable time researching and discussing the potential for changing the construction methods associated with the 16th Avenue Phase II pipe.

Agency staff recognized that:

- the pipe was over half built;
- the TBM was in the ground;
- the elevations had been determined; and
- the shaft construction had been applied or the design had been finalized based on conditions in the aquifer.

As such, agency staff concurred that changing the construction methodologies associated with the construction of the Phase II was not practical given that the Phase I project was complete. As such, the completion of an effective mitigation and monitoring plan, the EMP, became the primary requirement of agency staff during the review and approval of the required PTTW and Ontario Regulation 158 permits, as well as the review of DFO and MNR staff regarding their respective interests.

#### **ENVIRONMENTAL MANAGEMENT PLAN**

The main issues addressed in the EMP are:

- interference to existing water wells;
- loss of groundwater contributions to natural streams, wetlands and ESAs; and
- discharge of excess volumes of water and its potential to change the natural regime of the receiving watercourses.

The EMP predicts zones of effect and identifies targets to be maintained (e.g., baseflow). The EMP is divided into two major parts:

- a proactive well mitigation and monitoring plan to address adversely affected private wells and specialized groundwater uses, including golf courses and farms; and
- an EMP to manage stress to the natural features and functions of the ecosystem during the dewatering operation and associated recovery period of the aquifer.

The proactive well mitigation and monitoring plan was reviewed by MOE as part of the region's PTTW application. The EMP was reviewed by TRCA staff for permits under Ontario Regulation 158; MOE for the PTTW; and MNR and DFO. Only MOE and TRCA formerly approved the plan.

Key considerations associated with the EMP included:

- complexity of the natural ecosystem;
- deficiency in historic baseline information;
- deficiency of documented effects from projects of this type and scale; and
- flexibility to address conditions not anticipated or predicted through the EMP process.

To assess the potential zone of impact (ZOI) associated with the water-takings during the dewatering operation, a three-dimensional groundwater flow model developed as part of the York-Peel-Durham-Toronto (YPDT) Groundwater Model was used. The results obtained from this modelling were used to define an area where a 0.5 metre drawdown in the shallow aquifer would occur. Because unimpaired baseline data was not available at a comprehensive level, the use of this model, which became available in 2002, was considered acceptable by all agencies. The YPDT Groundwater Model has been developed in partnership with the City of Toronto, York Region, Peel Region, Durham Region and conservation authorities.

The predicted ZOI defines the cone of potential groundwater level decrease. Within this cone some surficial features may be affected depending on soil permeability properties. The shallow aquifer zone of influence was modelled to predict the impact on shallow aquifer wells. A conservative buffer zone was added to the predicted ZOI in order to reduce the level of uncertainty associated with the predicted ZOI. Because the definition of the ZOI was based on a model versus baseline data, a buffer was deemed essential for this project. The YPDT Groundwater Model was also used to predict sections of streams which may be impacted through the anticipated reductions in shallow aquifer levels.

Within the predicted ZOI and its buffer, all environmentally significant areas (ESA), wetlands and watercourses were identified and an analysis of these ecosystem receptors was carried out for fish and fish habitat, wetlands and ESAs, critical stream erosion rates and capacity, woodlots, and agriculture. A comprehensive monitoring and mitigation plan was developed for all of these features, including recognition that adaptive management must be used as required due to the complexities of the system. The systems that have been defined are being mitigated and monitored as required. They include:

#### **Fish and Fish Habitat**

- Piping dewatering discharge upstream to supplement stream baseflows within the ZOI.
- Releasing the discharge through splash pads and channels to remove iron.
- Establishing holding tanks within the ZOI to supplement stream baseflows within the ZOI.
- Dispersing dewatering discharge to alternate waterbodies.
- Thermal regulation of dewatering discharge.
- An extensive temperature, flow and groundwater monitoring system.

#### **Wetlands and ESAs**

- An extensive species and groundwater monitoring system in select areas.
- Piping water to supplement soil moisture.
- Plant additional species.

#### **Critical Stream Capacity**

- A fluvial geomorphological assessment of creeks that may be physically impacted was conducted to determine maximum discharge velocities.

#### **Woodlots**

- Soil moisture conditions and tree growth is monitored in sample plots.

All rates and triggers are established in the EMP and are intended to be adjusted through the adaptive management process if appropriate. It is recognized that because sufficient baseline data was unavailable, the triggers were based on modelled conditions. Inaccuracies in the modelling will occur due to the input data and conservative nature of such models, and as a result adjustments to the EMP are expected. The rates and triggers established in the EMP were considered conservative enough to mitigate adverse impacts to the environment. This approach is essential to ensuring that environmental impacts are minimized and effectively mitigated. There have been some issues in the implementation of the EMP. These issues are currently being reviewed by the agencies and addressed by York Region and their contractors.

The adaptive management approach allows York Region or the contractors to react in a timely manner to results from continuous monitoring of environmental trigger parameters and values, and operational rules. Any adjustments to the EMP are to be done in consultation with the YDSS Environmental Mitigation and Monitoring Coordinator and the respective agency staff. For example, the McCowan Road shaft has been added in order to reduce the rates and duration of withdrawals. By adding this shaft, access will be provided to the tunnel to the east of C8. As a result, the contractors will be able to proceed with lining the tunnel and Shaft C8 ahead of schedule. Once lined, the area will be secured and the wells can be decommissioned. It is anticipated that dewatering at this critical location can be stopped about six months ahead of schedule, thus conserving about 10 million litres of groundwater.

The adaptive management program will continue to be in effect for at least three years after the works are completed, or until the aquifer has rebounded to 80 per cent and shows a steady rate of gain as stipulated in the approved PTTW. As construction activities are completed, there will be less need to continue dewatering and the flow supplementation will be adjusted or discontinued in consultation with the agencies. To coordinate the inter-agency review of the monitoring program, TRCA has hired a staff person on behalf of ourselves, MNR, DFO and MOE. Funding for this position has been committed by York Region.

#### **ISSUES ASSOCIATED WITH CONSTRUCTION OF THE 16TH AVENUE PHASE II PROJECT**

A variety of public statements have been made over the past few months regarding the impacts of the project. These issues mirror those considered by agency staff in the development and review of the EMP. They are summarized as follows:

##### ***Cease Project to Apply for Authorization***

In accordance with conditions in the PTTW, the proponent was able to begin taking water for the project in December 2004, and increase pumping capacities as of April 1, 2005, thus enabling the TBM to commence drilling. The requirements set forth for mitigation and monitoring had been installed, and the tunnel boring machine began to move toward McCowan Road. Pumping rates have been substantially less than those permitted in the PTTW (the dewatering rate allowed is 38,000 litres per minute while the actual rate is between 15,000 and 20,000 litres per minute).

Shaft C8 continues to be the point of greatest dewatering requirements and therefore the greatest impact to the environment. Efforts to complete the required tunneling and lining of the tunnel and shaft, and therefore decommission the wells and stop or reduce dewatering at or near Shaft C8 are underway. It is anticipated that this will be done by January 2006, thus significantly reducing the groundwater withdrawal rates and duration at this sensitive location by approximately six months.

Should the project be stopped again, dewatering would still be required to maintain the system that has been constructed to date. Any delays to the construction timing will cause continued impacts to the aquifer, and to the surficial environmental features. At this point in the construction process the best alternative to reduce environmental impacts is to minimize the duration and rates of groundwater withdrawals through modifications to the detailed design of the project, such as the construction of an additional shaft at McCowan Road.

### *Sewage Pipes in Aquifers*

The issue has been raised that the pipe should not be located in the aquifer in order to protect drinking water supplies. TRCA staff understand from discussions with York Region staff that long term contamination of the aquifer through the construction of a gravity sewer in the aquifer is highly unlikely. The pressure of the groundwater against the pipe is greater than the pressure within the sewer. Therefore there is little potential for an outward leakage of sewage. Thus the issue of potential contamination of the drinking water resource is minimal. Inward leakages of groundwater into the pipe may occur. However, TRCA staff are of the understanding that in the existing sewers, (also located in the aquifer) this is monitored and maintained through a comprehensive operational program at York Region and this would be extended to deal with the new YDSS system as well. Additionally, the 16th Avenue sewer features thick, continuous concrete walls that are far superior to the regular open cut sewers which are constructed of smaller jointed pipe sections.. The only joints are at the shafts.

### *Long Term Impacts of Dewatering*

The aquifer impacts from dewatering are anticipated to last for approximately 18 months post construction. Monitoring and mitigation will continue for up to three years or until the aquifer has rebounded to 80 per cent and is showing a steady rate of increase.

Staff calculate that there are approximately 1.3 trillion litres of water in the Thorncliffe aquifer within the impact and buffer zone, and that the total volume of extracted water will be between 32 billion and 53 billion litres (15,000 to 25,000 L/min for 4 years). Therefore, this project will extract about 2-4% of the water in the Thorncliffe Aquifer in this area.

This calculation is conservative, since it does not allow for aquifer recharge, which is a combination of groundwater inflow from the aquifer outside of the buffer zone (5.5 billion L/yr), vertical leakage downward through the Newmarket Till (8.5 million L/yr), and vertical flow upwards through the Sunnybrook Aquitard (1.2 million L/yr).

The time required for the aquifer to recover to pre-pumping levels will depend on the average rate of recharge from all sources and has been estimated at 0.4 to 1.4 years, depending on the actual total volume of water extracted over the estimated four year construction period and the actual recharge rates from all sources. It is anticipated that there will be a short exponential (i.e., rapid) recovery period initially after the pumping ceases, followed by a longer, linear recovery to pre-pumping conditions. Recovery of the aquifer around the 9th Line has already been noted.

The groundwater in the Thorncliffe Aquifer in this area comprises some young (i.e., less than 50 years) water from leakage through the Newmarket Till, a small fraction of very old (i.e., thousands of years) water from upward vertical movement through the Sunnybrook Aquitard, and mostly middle aged (i.e., hundreds of years) water from lateral movement within the aquifer itself.

### *Size of the Zone of Influence*

There are two zones of influence that need to be considered - the shallow aquifer and the deep aquifer. The shallow aquifer ZOI is more limited, and modelled predictions show that there could be impacts as far north as almost 19th Avenue and as far south as almost 14th Avenue. The predicted ZOI for the shallow aquifer does not extend into the City of Toronto. All impacted natural features are being mitigated.

The deep aquifer ZOI has been combined with the ZOI for the production wells for the Town of Stouffville, and thus extend to that area. These impacts are being mitigated. The southern limit of the predicted deep ZOI extends to approximately Highway 7. This aquifer outcrops in the Rouge and Little Rouge rivers just north of Finch Avenue in the City of Toronto. However, because these aquifer outcrops are outside of the ZOI, no effects to baseflow, fish or fish habitat, or forests and wetlands are anticipated in the City of Toronto. Because there are no noted impacts within the buffer zone, the assumption that there are no impacts outside of the buffer zone is presumed correct. This has been supported by an analysis of stream flow data at 14th Avenue which show summer volumes within the normal range.

### *35 years of Urban Sprawl*

The Rouge Watershed Task Force is currently looking at growth projection scenarios for the watershed which take into account the Greenbelt Plan and Oak Ridges Moraine Conservation Plan boundaries, the Rouge Park and Rouge Park North boundaries, and the Terrestrial Natural Heritage System Strategy boundaries. The YDSS Master Plan and its updates are required to include areas identified as potential developable land, as determined by the policies of the federal, provincial and regional governments. Areas of urban growth are determined as set forth in the municipal official plan.

The 16th Avenue project services growth that was approved in the 1995 official plan. This plan is updated every five years, as are the municipal servicing plans. When the servicing plans are next reviewed, TRCA staff will request that a regional water budget be prepared. It is anticipated that with the Lake Ontario water servicing to be provided to Aurora and Newmarket from the York Peel Feedermain, and the decommissioning of the municipal production wells in these municipalities, that there will be an increase in groundwater and that this increase could result in improved baseflow to the TRCA watersheds. The form of growth is also prescribed in the municipal official plan. York Region has initiated development of a sustainability plan and it is anticipated that this plan will also address issues related to the form of development and protection of the environment.

### *Groundwater and Wells*

Groundwater and wells are addressed through a comprehensive well mitigation program that York Region administers. The approval and management of this program is done under the auspices of the PTTW and guidance is provided at the discretion of MOE.

### *Groundwater and Fish Habitat*

Three issues have been identified by the public: reduced baseflow; water temperature changes; and effects on fish.

### *Reduced Baseflow*

The EMP set triggers for stream baseflow to be maintained in the various creeks, should stream flow be reduced due to pumping. The trigger levels were based on calculations, as there was no baseline information available at the time the EMP was developed (due to the construction of the Phase I project, the conditions in some of the creeks were considered to be already impacted). TRCA, MOE and DFO reviewed this information and with the proposed adaptive management plan, assumed that the triggers levels were a reasonable approach.

The shallow aquifer is experiencing draw down due to pumping of the deep aquifer. As a result, it is expected that the streams are experiencing some reductions in flow. The EMP includes a flow dispersion plan at 26 points throughout the potential impact zone and its buffer. The plan supplements flow in the creeks from the headwaters and at points downstream, provides water to mitigate potential effects at ESAs or wetlands, provide contingency to address flow loss where none it expected, and distributes water to two golf courses to reduce their ground water taking. A portion of the flow is directed into storm ponds and into ditches for eventual discharge into the creeks to allow it to come to ambient temperature and reduce the infrastructure needed for discharges. Some of the excess water is discharged to the YDSS pipe. Of the eight discharge points to streams, the August data finds that baseflow targets were met always at 6 streams, about half of the time at one and does not meet the target for minimum flow at the Little Rouge River at Elgin Mills Road. These targets were not based on measured values however and were determined by calculation, which may account for the difference from target.

TRCA has historic flow data in the Little Rouge River at Locust Hill (around 14th avenue). This data shows that flows in the Little Rouge River over the summer of 2005 are among the lowest recorded over the period of record (1968 - 2005), but lower water flows have been measured in 1991 and 1999, before construction of the 16th Avenue Sewer began. Geologic survey of Canada baseflow data from 1996/97 can be used to provide a picture of summer stream flows in the Rouge Watershed pre-construction. The headwaters of Robinson Creek were found to be dry up to 16th Avenue, with minimal flows (<5 L/s) below 16th Ave. Mount Joy Creek was also dry above Mount Joy pond north of 16th Avenue.

The flow supplementation plan is important to continuing to maintain stream flow and habitat in the streams in the study area.

#### *Water Temperature Changes*

The EMP requires that temperature in the creeks at the discharge points be maintained within three degrees of the average mean daily temperature 100 metres downstream of the discharge points, as compared to the immediate upstream conditions. It is expected that there will be a range of temperature within a given day, and this occurs in a natural system as well. Fish have the ability to move from unsuitable areas, and over time, will adapt to changes in condition. Regardless, York Region and their contractors have acknowledged being out of compliance with this aspect of the EMP on some days, and have filed incident reports with the MOE. Enforcement staff at MOE and DFO are investigating this issue.

Those streams that have minimal flow (e.g Robinson and Eckhardt) will receive more discharge water than they are capable of assimilating from a temperature perspective. For these streams, boilers and chillers have been purchased to further mitigate the temperature differential. Although there were some initial issues with the temperature and water volumes noted in Robinson Creek at the beginning of August, they have been corrected through monitoring and modifications. The temperatures downstream of the discharge points are matching upstream temperatures very closely.

#### *Fish and Fish Habitat*

The issue then becomes, has the change in temperature or baseflow affected the fish communities present in the various streams along 16th Avenue? No incidents of dead fish have been reported. The effects on the fish community may be more subtle and include shifts from certain species to others more tolerant of warmer or colder conditions. Fishing to assess community composition has been undertaken by the consultants for York Region as well as DFO and MNR as part of their enforcement investigations. The results are comparable. The fish community present at each of the 15 sites sampled by DFO are essentially the same as that present in earlier sampling dates (pre-construction of the 16th Avenue Project). Those species that are indicative of cold water (e.g. rainbow trout) or known to be sensitive (e.g. redbreast dace) have been located where they were previously. Therefore, it is our assessment, that the mitigation plan has protected the fish communities. Additional analysis is required to identify shifts effects on reproduction.

### *Increased Water Volume and Velocities at Discharge Locations*

In June, the Town of Markham was cleaning the ditches along Elgin Mills Road and broke the supplementation pipe at Elgin Mills Road and the Little Rouge River. The flow went unchecked to the river through an unplanned route. There was some ditch erosion and the sediments were transported to the creek. The YDSS Coordinator investigated the site and worked with the agencies and York Region/contractors to fix the problem. The dispersal system has been changed so that a perforated pipe now discharges into the river.

### *Groundwater and Wildlife Habitat*

The wetlands mitigation via sprinkler system on Robinson Creek Local ESA south of 16th Avenue continued up to June 30, 2005 to cover the most critical period. This measure was undertaken in discussion with the TRCA and the MNR and is documented in the work plan for Robinson Creek, as well as the monthly monitoring reports. No impacts to the wetlands in the study area have been observed and there is currently no active mitigation system in any wetlands.

### *Federal EA Triggers*

There are four main triggers for a federal environment assessment: the need for federal permits; the development of federal Land; the investment of federal funding; or other areas of federal interest e.g. native land claims. Since none of these triggers applied to 16th Avenue, there was no trigger for CEAA and a federal assessment was not required.

### *Comprehensive Environmental Planning*

Once the YDSS Master Plan was approved by York Region Council, the next step in the process was to commence the environmental assessment for each of the project components identified in the plan. The first project to go through this assessment was 16th Avenue. While one of the lessons learned in this project has been effective communication with the public, it is important to recognize that each stage of the project – from the OP Review to the EA review, required and offered considerable opportunity for public input. Once the EA was approved, the next steps were detailed design and permitting, followed by construction, mitigation and monitoring. When issues arose with the Phase I project, the Phase II project was not permitted until the issues were addressed in a comprehensive, \$30 million, mitigation and monitoring plan – the EMP. This plan and its work plans are now being implemented.

### *Alternative Methods, Alignments and Design*

For 16th Avenue Phase II, there was very little opportunity to change the alternative methods, alignments and design that had been identified in the EA because the project was already half built (Phase I was completed). However, there was opportunity to modify the design by adding the shaft at McCowan Road, and thus reduce the dewatering requirements substantially. In terms of other projects, the EAs are underway for sections north of the Oak Ridges Moraine, and for the Southeast Collector. Design details have been substantially modified for the Interceptor sewer in order to decrease or eliminate the need for dewatering when this project moves to the construction phase.

Overall, all issues that have been identified by York Region, the agencies and the contractors have been effectively addressed.

## OTHER YDSS PROJECTS

There are several other YDSS projects proceeding through the planning and approvals. There are three projects that are of specific note: King City Sewer, Interceptor Sewer and Southeast Collector. Each project was identified in the YDSS Master Plan. Each has a comprehensive baseline monitoring program, public consultation and agency review consultation forums. Each will require that a comprehensive dewatering impact assessment be conducted and that environmental impacts be minimized, mitigated and monitored. To preclude that a project cannot be in an aquifer will circumvent the purpose of the *EA Act* and the Minister's October 1, 2004 letter regarding the request for a Part II Order. The *EA Act* and the letter require that an unrestricted assessment of alternatives be conducted to determine the preferred alignment and design. Each of these projects is briefly discussed below.

### *King City*

The Class EA was completed and a request for a Part II Order was denied, with conditions, by the Minister of the Environment. One of the conditions was that the sewer be constructed in compliance with the Oak Ridges Moraine Conservation Plan. This report has been completed and submitted to the MOE. Permits from TRCA to construct two sections of the sewer have been issued and staff understand that the work is nearly complete. This sewer is designed as a gravity sewer, however in order to connect with existing subdivision elevations the use of a forcemain system is also required. This pipe is being built near the ground surface, and little or no groundwater dewatering is anticipated. To date there has been no requirement for a PTTW to dewater during construction, although MOE has issued a CofA. The need for this sewer, as stipulated in the EA, was to eliminate contamination to the East Humber River from poorly maintained private septic systems. During the review of the EA, MNR expressed concern that the removal of the septic effluent would disrupt the baseflow contributions to the creek. MNR referred this issue to DFO for their review. To address MNR's concerns, York Region commissioned a study to examine the effects on baseflow and the resulting impacts to fish habitat. The study concluded that sewage effluent should not be considered baseflow and that the amounts to be removed were insignificant. DFO and MNR reviewed this report and supported its findings. At that time TRCA was not responsible for fisheries review and therefore did not review the documents. However, all agencies did concur that the water quality impairments to the East Humber River from the septic systems would be eliminated if they were discontinued, resulting in an overall environmental benefit.

### *Interceptor (19th Avenue) Sewer*

The Class EA is complete, however the Minister's letter of October 1, 2004 regarding the request for a Part II Order that was denied with conditions required that the preferred route and design alternatives be re-evaluated. TRCA has reviewed and commented on the draft report which details a comprehensive review of route and design alternatives; peer review by an external team of experts is being undertaken as per the Minister's letter; and an extensive public consultation process is underway. York Region has selected construction methodologies that virtually eliminate dewatering requirements such that the potential for impacts to the environment will be significantly reduced. Extensive baseline data has been collected, and an extensive monitoring program has been initiated. Staff understand that the final report has been submitted to MOE. MOE will consult with the Ministry of Municipal Affairs and Housing regarding compliance with the Oak Ridges Moraine Conservation Plan. This decision has not yet been made.

### *Southeast Collector*

York Region chose to upgrade the EA for this project from a Schedule C to an Individual EA. The Terms of Reference for the EA is final, and is in the Minister's office for review and approval. The study area, as per the Minister's letter has been expanded beyond that proposed in the master plan to encompass areas within the Region of Durham, and Durham is now a partner in the project. At this time it is the intent of York Region to coordinate the provincial and federal EA processes. Baseline data is being collected in both York and Durham regions to ensure that an assessment of impacts can be undertaken. Extensive monitoring is occurring, and will be tied to the TRCA Regional Watersheds Monitoring Network in the long term.

### **CONCLUSION**

The approval process for the permits associated with the 16th Avenue Phase II project required that the project be stopped for 18 months while a comprehensive mitigation and monitoring plan was developed, and contingency measures were installed. During this time dewatering continued in order to secure the partially constructed pipe associated with the 16th Avenue Phase I project. Approximately 15,000 L/min of water was removed from the aquifer during this time.

The most sensitive area in terms of groundwater withdrawals and surface connections is at or near Shaft C8, located near Stone Mason Drive and Robinson Creek. Through the current construction of an additional shaft at McCowan Road, York Region and their contractors will be able to line the tunnel and seal Shaft C8, thus enabling the pumping at these sensitive wells to stop in advance of initially proposed timelines. This will result in a decreased rate and duration of pumping of the aquifer by approximately 6 months, and correspondingly less impacts to the surficial environment.

A comprehensive mitigation and monitoring program has been developed -- the Environmental Management Plan. This document has been approved by MOE and TRCA. *Fisheries Act* and *CEAA* approvals are not required for this project. MOE has issued a PTTW and has considered a request for a Part II Order on the EA.

Because Phase I of the project had been completed, the design details (vertical and horizontal alignments, shaft depths and construction technologies) for the Phase II section of the 16th Avenue pipe were predetermined. These were discussed in the development of the EMP, and agency staff understood from York Region staff and their contractors that such changes were not practical. Staff therefore concentrated on ensuring that monitoring and mitigation mechanisms were in place before construction was allowed to continue.

Other YDSS projects have been redesigned to take into account the lessons learned through the 16th Avenue project. These lessons include the following:

- Choose the right planning process (e.g., the Southeast Collector project is being planned as an Individual EA).
- Choose the right study area (e.g., the Southeast Collector project has been expanded into Durham Region to avoid a phased construction of this system).

- Collect baseline data of all natural features, including detailed geotechnical and hydrogeological studies, within a large study area using current science and technologies (e.g., Interceptor Sewer and Southeast Collector have extensive monitoring programs and have been collecting data on the surface and subsurface environments for over a year).
- Evaluate all potential environmental impacts for each route and construction methodologies and select the alternative and design accordingly (e.g., the Interceptor Sewer project has re-evaluated the preferred alternative and design that was selected through the Class EA process based on extensive data collection and public consultation).
- Use an ecological approach and strive toward sustainability (e.g., the Terms of Reference for the Southeast Collector stipulates that alternative measures for sewage treatment and disposal must be evaluated).
- Set realistic triggers based on science and baseline monitoring (e.g., for the Interceptor Sewer project there is recognition that construction activities may result in impacts to the natural environment. As such, design details must ensure that the impacts are minimized and there must be a mitigation and monitoring program established).
- The importance of provincial and federal governments to fund and maintain their monitoring systems (e.g. ongoing discussions to maintain monitoring stations at the TRCA level are occurring). Municipal support would be of benefit.
- Tie the project monitoring to the TRCA Regional Watersheds Monitoring Network in the long term (e.g. discussions with York Region regarding the long term maintenance and integration of data and system into the monitoring network are ongoing).
- Meet with the agencies and the public on a regular basis to present project details and solicit advice (e.g., meetings occur at least monthly).

As such, in TRCA's opinion the projects are proceeding using the best available and practical sciences and technologies. The implementation of the 16th Avenue Phase II EMP has a total estimated cost of \$30 million. While implementation of the plan has its challenges, it has been designed to monitor and mitigate adverse environmental impacts. With few exceptions, staff find that the plan is effective at mitigating predicted effects. In the long term, the Thorncliffe aquifer will rebound; the water table, baseflows and discharges will be re-established; and provincial growth objectives as identified in York Region's OP will be achieved. TRCA will continue to ensure through regulatory and consultative processes that environmental impacts that may occur through the design and implementation of sewer infrastructure will be addressed.

**Report prepared by: Beth Williston, extension 5217**  
**For Information contact: Beth Williston, extension 5217**  
**Date: October 11, 2005**

## SECTION IV - ITEMS FOR THE INFORMATION OF THE BOARD

**RES.#E14/05** -       **ARCHITYPE: SUSTAINABLE HOUSE COMPETITION**  
Status report outlining the progress of the Architype Sustainable House Competition.

Moved by:               Suzan Hall  
Seconded by:           Elaine Moore

**IT IS RECOMMENDED THAT the status report on the Architype Sustainable House Competition be received.**

**CARRIED**

### **BACKGROUND**

#### **Project Overview**

Toronto and Region Conservation Authority (TRCA), in partnership with the Design Exchange (DX), are hosting a sustainable house competition. This competition is based on the premise that in the 21st century, sustainable design is no longer a luxury but a necessity. The innovation of Canadian designers and their ability to adapt to the changing needs of contemporary society is now being called on to explore the application of sustainable design technology for the residential housing market in Southern Ontario.

As a part of The Living City initiative, we are issuing the Architype for The Living City: Sustainable House Competition. This presents a challenge for design teams to create a demonstration centre in the form of a detached single family home that creates awareness and builds understanding of sustainable technologies and building processes. Using a holistic and interactive approach to design, and measuring progress with the Leadership in Energy and Environmental Design (LEED) for homes green building rating system, the demonstration centre will stimulate community transformation towards sustainable living. The winning home design will be built at The Living City Campus at Kortright, north of Toronto and used as an archetype - or leading example - for building professionals and the general public. The winning design will address The Living City's objective to engage and educate through the following mechanisms:

#### Design Competition

The primary intent of the sustainable house competition is to:

- maximize public awareness for TRCA initiatives, programs, The Living City Campus;
- maximize media presence;
- develop professional interest via partnerships and training workshops;
- raise funds and product donations required to build the house; and
- showcase professionals leading the way with green design.

#### Home Construction

The primary intent of the sustainable demonstration house is to:

- educate and demonstrate new technologies, materials and processes for residential mass construction;
- provide training for product installation and systems management;
- provide equal opportunities for the demonstration and application of products;

- encourage a holistic approach to sustainable design (not just energy efficiency);
- engage municipal leaders and serve as a model home for new subdivisions being planned in municipalities throughout our regions; and
- work as an information centre for consumers looking to incorporate elements of sustainable design into their own home building projects.

### **Update on activities**

On August 25, 2005 TRCA and the Design Exchange hosted a half day workshop with 35 community leaders from various related industry sectors to review the criteria for the competition before the public launch scheduled for September 30, 2005.

The competition was publicly launched on September 30 through the Design Exchange website, press releases and association engagement.

The Royal Architectural Institute of Canada has approved the competition for national roll out and offers full support and membership engagement.

Judges have now been selected and make up a team of 9 professionals.

Media interest is growing. To date, there have been articles in the *Globe & Mail* and *Building Magazine*. Articles in *Canadian Architecture*, and *The Toronto Star* are currently under development.

### **Sponsorship**

Sponsorship dollars raised will go towards the costs associated with the competition, the construction of the house on site at the Kortright Centre for Conservation and the educational programming and exhibits. Sponsorship is also being sought in the form of in-kind contributions. In-kind contributions will include products and technology, trades and skilled help for the construction process, exhibit design and installation. Current committed sponsors have already assured in writing that in-kind efforts will be in place. Ozz Corporation and the Greater Toronto Home Builders Association (GTHBA) will be committing trades to ensure the house is constructed on schedule.

### Competition

The required budget to fulfill our obligation to the Design Exchange is \$61,000. To date, sponsorship in the amount of \$65,000 has been committed toward the competition. An additional \$40,000 will be raised to cover TRCA staff time, promotions and events applied to the competition. If the money is not raised, our external commitments to the Design Exchange will be covered. Internal commitments would not be covered and the construction of the house would be delayed indefinitely.

### House Construction

\$900,000 is the estimated budget to build the house, design the exhibits and develop training curriculum. This budget number is only a place holder. It is expected that the house will be built for \$0 dollars through in-kind sponsorship (trades, products and materials), partnership support of PowerStream, Environment Canada, the Canada Green Building Council, Seneca College and through marketing opportunities the house will provide for programs and product demonstrated on site.

Committed sponsors to date include:

PowerStream	\$30,000
Osram Sylvania	\$10,000
Enbridge	\$20,000
Ozz Corporation	\$5,000
<b>TOTAL</b>	<b>\$65,000</b>

Tentative sponsors to date Include:

<b>Sponsor Name</b>	<b>Proposed Contribution</b>	<b>Update</b>
Greater Toronto Home Builders Association	\$60,000	Dollar figure suggested from GTHBA September 29 meeting to be confirmed. In-kind trades for construction also under consideration
Canada Mortgage Housing Corporation (CMHC)	\$25-40,000	Firm commitment on funding will be set at a meeting on October 4, 2005
Hydro One	\$30,000	Of a greater overall funding request for The Living City Programs
<b>TOTAL</b>	<b>\$115,000 - \$130,000</b>	

Additional interested sponsors to date include:

<b>Sponsor Name</b>	<b>Proposed Contribution</b>	<b>Update</b>
Honda Canada	\$100,000	
Home Hardware	\$10,000	
Cement Association	\$40-60,000	Reviewing October 7 for final commitment
Environment Canada	\$30,000	Plus introduction to other potential sponsors
<b>TOTAL</b>	<b>\$180,000 - \$200,000</b>	

\* Construction of the house will commence when all funding is in place.

#### **DETAILS OF WORK TO BE DONE**

A workshop for competing design teams will be held at Kortright on October 18, 2005. Competitors from across Canada will review the criteria and the site and have an opportunity to ask detailed questions before they begin creating designs.

Development of web pages and placement on the TRCA website is under construction. The goal for website presence is to document activity and events in chronological order.

The *Nature of Things* will be filming a 1 hour documentary on the competition and the building process. Final confirmation and coordination is ongoing.

Staff continue to develop and firm up sponsorships for the competition and house construction.

Report prepared by: Andrew Bowerbank, extension 5343  
For Information contact: Andrew Bowerbank, extension 5343  
Date: September 16, 2005

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**RES.#E15/05 - EASTERN POWER - GREENFIELD SOUTH LIMITED**  
Environmental Screening and Review Report Comments. Receipt of the staff report on the Environmental Screening and Review Report for the Greenfield South Power Project.

Moved by: Dick O'Brien  
Seconded by: John Sprovieri

**IT IS RECOMMENDED THAT the staff report on the Environmental Screening and Review Report for the Greenfield South Power Project be received.**

**CARRIED**

**BACKGROUND**

At Authority Meeting #6/05, held on July 22, 2005, Resolution #A156/05 was approved as follows:

*THAT the Authority advises that the outcome of the environmental assessment (EA) process, including the application of criteria and establishment of an appropriate building envelope, shall take precedent with respect to the development of this particular project;*

*THAT TRCA staff be directed to work with the proponent to establish a satisfactory environmental impact study which will:*

- (a) allow for a suitable building envelope to be established such that the natural heritage of the site is protected,*
- (b) provide for a net environmental gain, either on-site or in close proximity to the project area, and*
- (c) provide for site servicing which will not adversely impact the valley corridor or TRCA property;*

*THAT TRCA staff be directed to report back to the Authority regarding the recommendations of the environmental impact study and conformance with the TRCA's conditions of approval;*

*THAT TRCA staff be authorized to use provisions within the Environmental Assessment Act to ensure that the above conditions for this environmental assessment application are achieved;*

*AND FURTHER THAT the proponent, the ministries of Environment and Energy, the City of Mississauga, the Credit Valley Conservation Authority and the Etobicoke-Mimico Watersheds Coalition be so advised.*

## **PROJECT DETAILS**

Through a review of the final Environmental Screening and Review Report for the Greenfield South Power Project, staff confirmed that a building envelope to the satisfaction of Toronto and Region Conservation Authority (TRCA) has been established on site, thus enabling the construction of the power generating facility.

### **Natural Heritage Protection:**

- The preliminary site plan included in the Environmental Screening and Review Report increased the setback from the top-of-bank from 10 metres to 35 metres; details of the setback and valley stability will be confirmed through staff review of the site plan application; confirmation of TRCA permit requirements in relation to fill placement in a regulated area will occur at the site planning stage.
- Vegetation removal will be minimized as the tree and shrub species to be removed are non-native and in the view of the TRCA ecologist, found to not be contributing to the habitat of the area; details of the vegetation to be removed will be confirmed through staff review of the site plan application.
- The fuel storage area was relocated from the eastern side of the property (adjacent to the valley) to the northern section of the property (perpendicular to the property); details regarding the fuel containment as related to potential spills will be reviewed as part of the site plan application. The Ministry of the Environment (MOE) is responsible for ensuring that the proposal for storage meets provincial requirements.

### **Net Environmental Gain:**

- TRCA has requested a commitment from the proponent to restore and augment the area adjacent to the valley, as well as the area noted on the attached plan as "construction laydown yard" with native, non-invasive species; the site specific details will be reviewed as part of the site plan application.
- There is commitment from the proponent to include sustainable technologies in the design of the facility and the site plan, including an investigation of the applicability of the Leadership in Energy and Environmental Design (LEED) building system for site design, and implementation of pollution prevention measures.

### **Site servicing which will not adversely impact the valley corridor or TRCA property;**

- Most of the stormwater will be contained on site and recycled into the cooling system for the facility, thus reducing requirements for municipal water use; details regarding stormwater management will be refined during the site planning stage; TRCA permit requirements as related to fill placement in a regulated area, construction in the flood plain, or alteration to a watercourse will be made during the review of the site plan application.
- There is a commitment from the proponent to investigate in the future, with the City of Mississauga, opportunities for cogeneration and tie into the local grid system so that the heat loss from the facility could be recaptured and tied into the heating requirements of the local area.

### **Position from City of Mississauga**

- On Monday, September 19, 2005 at a Special Meeting of Council, the city recommended that the a Part II Order be requested from the Minister of the Environment and that an Individual EA be completed for this application. It was Mississauga staff's conclusion that in order to address outstanding concerns, the project must be elevated to an Individual EA. Outstanding technical concerns include fire and safety as related to water supply and pressure within the local neighbourhood, and health as related to air quality.
- TRCA staff has completed our initial review and commenting on the issues of immediate regulatory requirements related to the EA process, however, we will continue to maintain dialogue with City of Mississauga staff related to broader issues of air quality with MOE, and issues related to immediate neighbourhood impacts.

### **DETAILS OF WORK TO BE DONE**

- Staff comments in support of the project as related to the review of the Environmental Screening and Review Report have been released;
- Staff comments on requirements related to the site plan application have been released;
- Staff review of the required plans and documentation related to comments on the site plan will be undertaken once this information has been received;
- Staff will confirm Ontario Regulation 158 permit requirements once appropriate information has been received through the site plan review;
- Staff may or may not be required to review such permit applications.

**Report prepared by: Beth Williston, extension 5217 or Chris Barber, extension 5715**

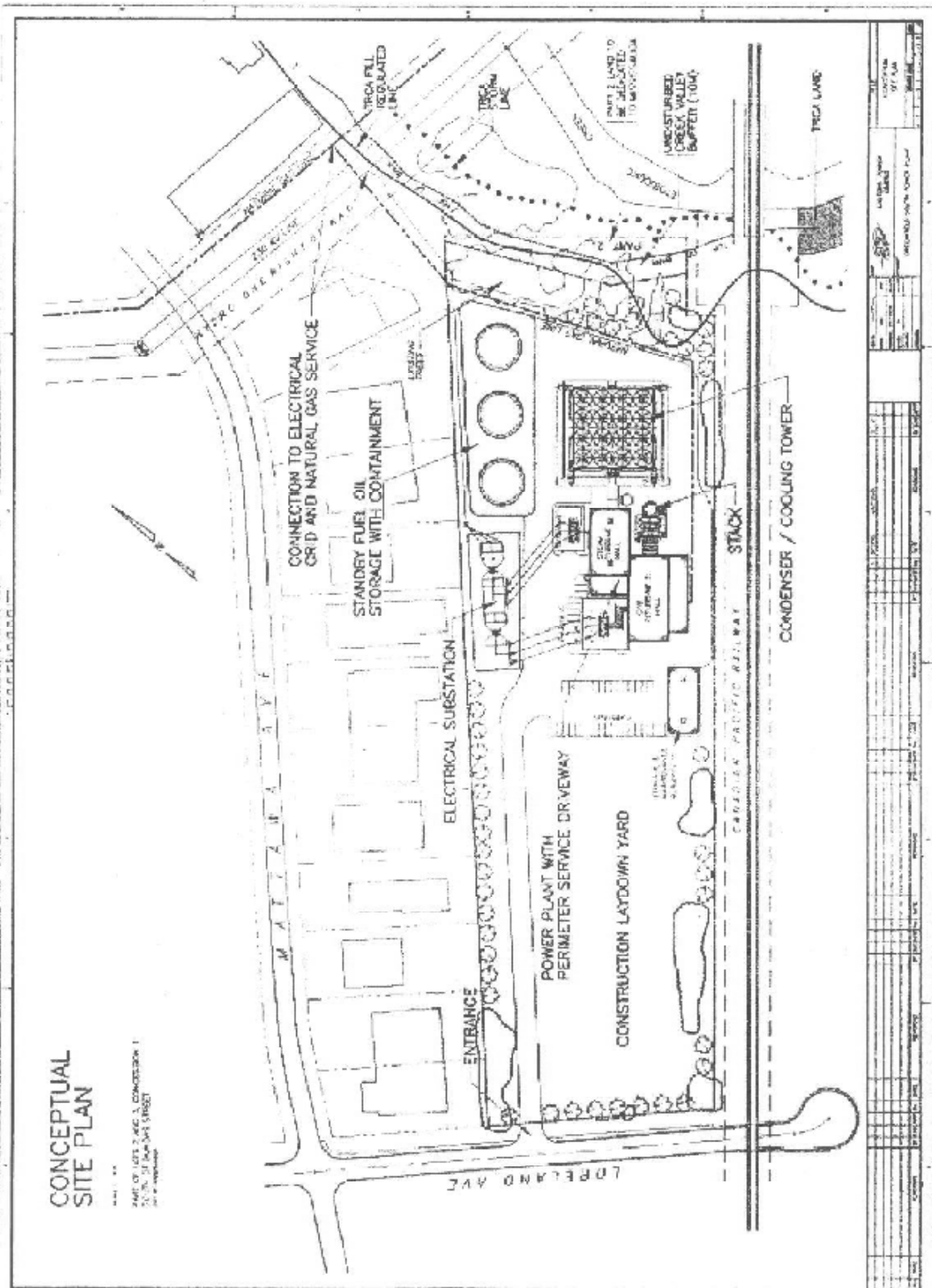
**For Information contact: Beth Williston, extension 5217**

**Date: October 3, 2005**

**Attachments: 1**

Attachment 1

Figure 3.2 - Preliminary Conceptual Project Layout Drawing



**TERMINATION**

ON MOTION, the meeting terminated at 1:24 p.m., on Friday, October 14, 2005.

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Michael Di Biase  
Chair

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Brian Denney  
Secretary-Treasurer

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