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UPPER YORK SEWAGE SOLUTIONS PROJECT UPDATE PROJECT 74270

The Environmental Services Committee recommends:

- 1. Receipt of the following communications:**
 - a) Carolyn Lance, Council Services Coordinator, Town of Georgina, dated July 11, 2012;**
 - b) Fernando Lamanna, Deputy Clerk, Town of East Gwillimbury, dated July 20, 2012; and**
- 2. Adoption of the recommendation contained in the following report dated August 24, 2012, from the Commissioner of Environmental Services.**

1. RECOMMENDATION

It is recommended that:

1. The Regional Clerk circulate this report to the Clerks of the Towns of Aurora, East Gwillimbury, Newmarket and Georgina, and the Lake Simcoe Region Conservation Authority.

2. PURPOSE

This report provides information on recent developments on the Upper York Sewage Solutions project related to the specific description and location of infrastructure that will be presented for public, agency and First Nations review and comment as part of the project's ongoing Environmental Assessment study.

3. BACKGROUND

Council adopted the Upper York Sewage Solutions Project Update report February 2012

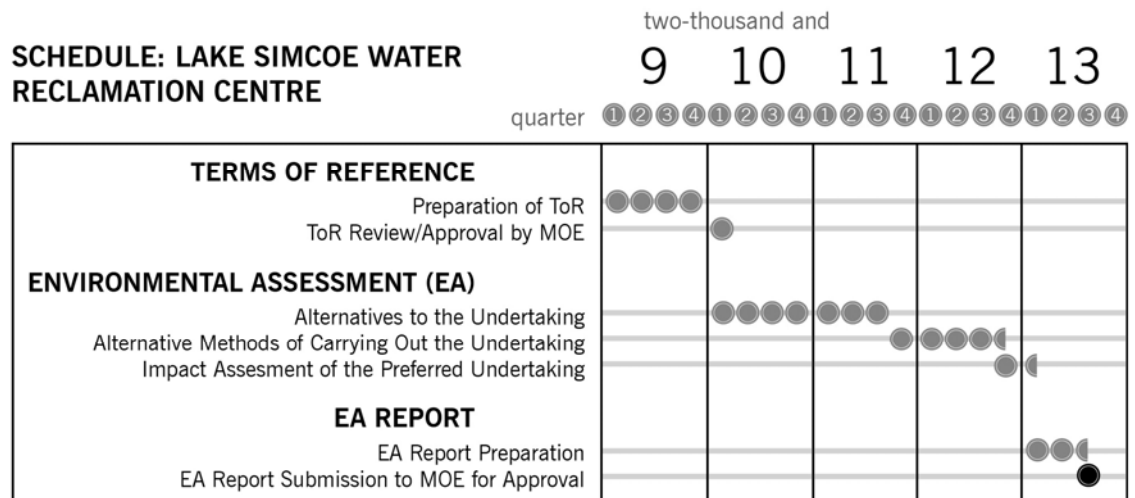
At its meeting of February 16, 2012, Council received the Upper York Sewage Solutions Project Update report (Clause 3 of Report No. 2 of the Environmental Services Committee). The purpose of the report was to provide an update on the status of the Individual Environmental Assessment and to notify Council that the Lake Simcoe Water

Reclamation Centre with York Durham Sewage System Modifications was confirmed through a comprehensive evaluation process as the preferred alternative for the Upper York Sewage Solutions project.

Upper York Sewage Solutions Environmental Assessment report scheduled to be completed by Q3 of 2013

The current schedule for the Upper York Sewage Solutions Individual Environmental Assessment study is shown in Figure 1 below. The final Environmental Assessment report is currently scheduled to be submitted to the Minister of the Environment for approval in Q3 of 2013.

Figure 1
Upper York Sewage Solutions
Individual Environmental Assessment Study Schedule



Lake Simcoe Region Conservation Authority staff confirms Lake Simcoe Water Reclamation Centre with York Durham Sewage System Modifications as least environmentally disruptive and most sustainable alternative

At its meeting of June 22, 2012, the Lake Simcoe Region Conservation Authority Board of Directors received a staff report on the Upper York Sewage Solutions (UYSS) Environmental Assessment. A copy of this report, as well as the supporting staff presentation delivered during the meeting, is provided for reference (*see Attachment 1*). The purpose of the report was to update and inform the Board of Directors regarding the status of Lake Simcoe Region Conservation Authority staff's involvement in and review of the Upper York Sewage Solutions Environmental Assessment study.

As summarized in the report, Lake Simcoe Region Conservation Authority staff confirmed that based on their review of information available to date, the Lake Simcoe Water Reclamation Centre with York Durham Sewage System Modifications alternative is the least disruptive to the natural heritage and watershed ecosystem and is the most sustainable option in regards to water management.

Advanced treatment demonstration facility at the Mount Albert Plant continues to provide excellent results on phosphorus removal

A key component of the Upper York Sewage Solutions Environmental Assessment Study is to demonstrate that the advanced technology, proposed for use in the Lake Simcoe Water Reclamation Centre, will be effective and produce anticipated results. As such, the Ministry of the Environment issued a Certificate of Approval to the Region to construct and operate a demonstration facility at the Region's Mount Albert Water Pollution Control Plant. This facility will primarily demonstrate the effective removal of phosphorus, as required by the Ministry of the Environment, through the advanced treatment stages of microfiltration (low pressure membranes) and reverse osmosis (high pressure membranes) over a 12-month period. Another key goal of the demonstration facility is to determine and verify full-scale design and operating parameters for the advanced treatment systems to be installed in the proposed Lake Simcoe Water Reclamation Centre.

At its meeting of June 28, 2012, Council received the Upper York Sewage Solutions Project Advanced Treatment Demonstration Facility Update report (Clause 4 of Report No. 6 of the Environmental Services Committee). This report detailed initial test results, with phosphorus reduced by 97 per cent after reverse osmosis treatment. Latest test results from the facility are consistent with previous results and continue to demonstrate the high-level effectiveness of reverse osmosis in removing phosphorus (see Table 1).

Report No. 7 of the Environmental Services Committee
Regional Council Meeting of September 20, 2012

Table 1
Total Phosphorus Concentrations Measured at Sampling Points

Date 2012	Secondary Effluent mg/L (A)	Reverse Osmosis Feed mg/L (B)	Reverse Osmosis Final Effluent mg/L (C)
May 17	0.140	0.017	ND**
May 18	0.190	0.100	ND
May 22	0.180	0.027	ND
May 23	0.300	0.054	0.006
May 24	0.370	0.093	ND
May 25	0.390	0.200	0.012
May 28	0.260	0.038	ND
May 30	0.190	0.033	ND
May 31	0.200	0.017	ND
Jun 01	0.180	0.024	ND
Jun 04	0.210	0.024	ND
Jun 05	0.150	0.017	ND
Jun 06	0.170	0.021	ND
Jun 07	0.130	0.016	ND
Jun 08	0.120	0.014	ND
Jun 09	1.800	0.026	ND
Jun 10	0.320	0.016	ND
Jun 11	0.140	0.013	ND
Jun 12	0.160	0.014	ND
Jun 13	0.350	0.016	ND
Jun 14	0.200	0.270*	ND
Jun 15	0.200	0.320*	ND
Jun 16	0.170	0.300*	ND
Jun 19	0.180	0.290*	ND
Jun 20	0.130	0.150*	ND
Jun 21	0.100	0.072	ND
Jun 22	0.180	0.024	ND
Jun 25	0.100	0.053	0.002
Jun 26	0.100	0.036	0.003
Jun 27	0.074	0.031	0.002
Jun 28	0.082	0.012	ND
Jul 03	0.130	0.036	ND
Jul 05	0.093	0.014	ND
Jul 06	0.076	0.018	0.004
Jul 09	0.110	0.022	ND
Jul 10	0.099	0.029	ND
Jul 11	0.090	0.020	ND
Jul 17	0.094	0.025	0.004
Jul 18	0.094	0.023	0.007
Jul 19	0.085	0.015	0.005
Jul 20	0.110	0.027	0.005
Jul 23	0.230	0.100	ND
Jul 24	0.220	0.022	ND
Jul 25	0.240	0.033	0.006
Jul 26	0.300	0.037	ND
Jul 27	0.400	0.170	ND
Jul 30	0.580	0.530	ND
Jul 31	0.430	0.310	ND
Aug 01	0.310	0.130	0.012
Average	0.227	0.078	0.002***

Notes: Units milligrams per litre (mg/L) are equivalent to parts per million,

* Stress testing period includes injecting additional phosphorus after secondary treatment (A)

**ND = non-detect: below method detection limit of 0.002 mg/L per Maxxam Analytics

***Average calculation uses 0.001 mg/L where non-detect is recorded

Removal of phosphorus is important to meet the goals of the Lake Simcoe Protection Plan and the effluent criteria as set out by the Ministry of the Environment. Allowable phosphorus loadings for the proposed water reclamation centre are the most stringent for the Lake Simcoe basin (see Table 2).

Table 2
Current and Proposed Phosphorus Limits for
Water Pollution Control Plants Discharging to Lake Simcoe

Wastewater Treatment Facility	Current (kg/yr)**	Interim* (kg/yr)**	Ultimate (kg/yr)**	Treatment Capacity (MLD)***	Ultimate Phosphorus Limit to Treatment Capacity Ratio
Uxbridge Brook WPCP	285	142	286	5.22	54.78
Beaver River #1 WPCP (Sunderland)	69	66	58	0.62	93.54
Lake Simcoe (Beaverton) WPCP	190	104	190	4.55	41.76
Beaver River #2 WPCP (Cannington)	117	128	97	1.07	90.65
Schomberg WPCP****	75	75	75	2.06	36.41
Sutton WPCP****	224	148	187	3.41	54.84
Keswick WPCP****	1,322	939	655	18.0	36.39
Mount Albert WPCP****	75	56	75	2.04	36.76
Barrie WPCP	5,001	3,133	2,774	76.0	36.50
Bradford WPCP	747	361	698	17.4	40.11
Innisfil WPCP	803	351	629	14.37	43.77
Orillia WTCC	2,993	1,438	996	27.30	36.48
Lagoon City STP	249	200	124	2.27	54.63
Silani Cheese STP	22	20	11	0.30	36.67
Holland Landing Lagoon (WPCP)****	149	149	124	1.36	91.18
Proposed Water Reclamation Centre	--	--	224	40.00	5.60

Source: Lake Simcoe Phosphorus Reduction Strategy, MOE Publication, 2011

*Enacted under the *Ontario Water Resources Act* to establish interim phosphorus limits while the *Phosphorus Reduction Strategy* was being developed

**kg/yr = Kilograms per year

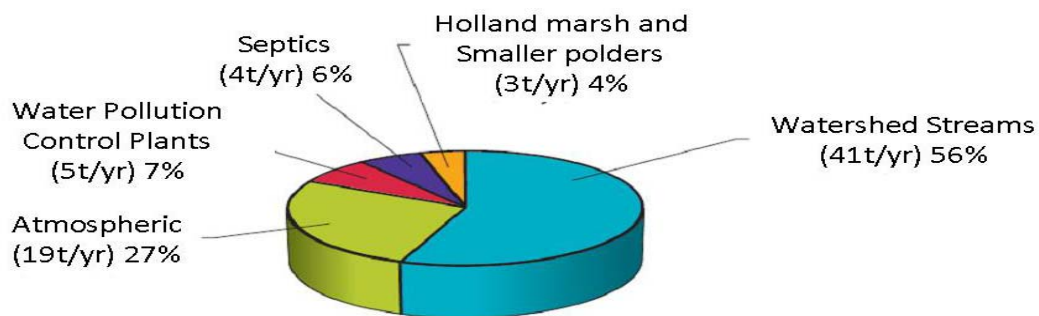
***MLD = Million litres per day

****Existing York Region facility

By comparison, the proposed Lake Simcoe Water Reclamation Centre will have an ultimate phosphorus limit of 224 kg/yr with a treatment capacity of 40 MLD. This equates to a “Phosphorus Limit to Treatment Capacity” ratio of 5.60. In other words, for every 1 million litres per day of plant capacity, only 5.6 kg/yr of phosphorus is being released to the Lake Simcoe watershed. This is by far the lowest ratio of all existing Water Pollution Control Plants discharging to Lake Simcoe and demonstrates the proposed Water Reclamation Centre’s high level of efficiency.

It should be noted that, of all sources of phosphorus entering Lake Simcoe, only 7% is attributed to the total treated effluent discharges from all of the water pollution control plants in the watershed (see Figure 2). In addition to the high efficiency of the water reclamation centre itself, the Lake Simcoe Water Reclamation Centre with York Durham Sewage System Modifications alternative includes a phosphorus offsetting strategy that will provide net phosphorus load reduction of 100 to 300 kilograms per year entering Lake Simcoe from these other primary sources.

Figure 2
Lake Simcoe Phosphorous Sources



4. ANALYSIS AND OPTIONS

Work on alternative methods of carrying out the preferred alternative focuses on key project elements, including siting of plant and outfall

Since determining the preferred alternative to the Upper York Sewage Solutions project in October 2011, work has been ongoing to establish alternative methods of carrying out the preferred alternative. This work primarily focused on the following key project elements:

- Location of Water Reclamation Centre
- Location of treated effluent outfall to the East Holland River

- Routing of trunk sewer pipes for conveyance of raw sewage to the Water Reclamation Centre and conveyance of treated effluent to the outfall
- Routing of new trunk sewer pipes required for modifications to the existing York Durham Sewage System

Completion of alternative methods of carrying out the preferred alternative establishes recommendations for key project elements

A net effects analysis as described in the approved Terms of Reference, along with input received from public consultation, was used to rank and support the final recommendations. A net effects analysis develops appropriate evaluation criteria and indicators based on:

- Existing environmental conditions
- Range of alternative methods being considered
- Type, scale and relative significance of potential environmental effects

Following application of these criteria and the identification of potential effects, the next step is to develop and apply appropriate avoidance, mitigation and compensation measures. The end result is the identification of net effects on the environment.

A net effects analysis was completed for all key project elements noted above to establish recommendations for alternative methods of carrying out the preferred alternative. High-level summaries of this analysis and subsequent results are outlined below.

The recommended site of the Water Reclamation Centre has been established as a portion of the 'Willing Property Owner Host' 1 site

A preliminary long list of 98 potential sites was initially generated based on meeting the technical criteria of size (minimum 30 hectares), elevation above the source sewage influent to minimize pumping, within a five-kilometre distance of potential outfall locations, and located within the municipal boundaries of the Towns of East Gwillimbury or Newmarket. Next, 12 avoidance and site suitability criteria established setback or separation distances around sensitive environmental land-use features such as Greenbelt, Oak Ridges Moraine, floodplain, wetlands, etc. Once these criteria were applied, 21 potential water reclamation centre sites emerged as meeting the technical requirements and satisfying all site suitability requirements. Public input and comments were received during a workshop on December 14, 2011 as to how these potential sites should be assessed to arrive at a short list of potential sites.

To ensure that all possible sites were being considered, a formal "Expression of Interest" was advertised in local papers to determine if single parcels of land, could be combined into larger more suitable sites by a single common property owner or group of cooperating property owners. This Expression of Interest process provided three additional potential sites that were evaluated on the same basis as the original 98 sites.

A screening of this final long list using data from field investigations resulted in four sites being short-listed for final consideration, two of which were identified by the 'Willing Property Owner Host' Expression of Interest process. All four sites are north of Queensville Sideroad with access either from 2nd Concession, Queensville Sideroad or Leslie Street. These four short-listed sites were presented to the public during two Workshops on April 11 and 12, 2012 in East Gwillimbury and Newmarket respectively.

Given the proximity of these four short-listed sites to existing and future residences, a key issue of concern noted by the local public and other stakeholders to date is the perception that offensive odours may be released by the various treatment processes at the proposed water reclamation centre. In this regard, it should be noted that the design of the water reclamation centre will adhere to all Ministry of the Environment criteria and permitting requirements for odour control and containment. Typical sources of odour associated with biosolids and headworks operations will be within fully enclosed structures equipped with odour control systems, performance instrumentation and redundant capacities.

After full consideration of technical criteria, public consultation comments, the natural, built and economic environments and the net effects analysis, a 36 hectare portion of the 'Willing Property Owner Host' 1 site, located 1,050 metres north of Queensville Sideroad with entrance off 2nd Concession, has been established as the recommended site for the Water Reclamation Centre. A map showing the location of the four short-listed sites and recommended site is provided for reference (*see Attachment 2*).

It should be noted that the existing Holland Landing Lagoon property remains a viable site for the water reclamation centre should this or any other subsequently recommended site not be ultimately approved through this Environmental Assessment study.

The recommended location of the treated water outfall to the East Holland River has been established as Queensville Sideroad Immediately south of the Queensville Sideroad Bridge

After identifying the East Holland River as the best location for discharge of clean phosphorus-reduced effluent from the water reclamation centre, water quality and quantity modelling contributed to several studies which confirmed the ability of the river to accommodate the 2031 predicted 40 million litres per day of treated water from the proposed water reclamation centre. These studies addressed:

- Ability of the East Holland River to accept the water reclamation centre treated discharge
- Impacts to the stream hydrology and potential flooding or stream bank erosion
- Effect on the aquatic ecosystem both in the river and Lake Simcoe
- Improved water quality past the point of discharge due to the phosphorus-reduced effluent
- Effect of effluent temperature on the river particularly in relation to ice formation and ice safety in winter months

These studies were key to evaluating potential outfall locations into the East Holland River. Based on this comprehensive evaluation, the recommended outfall location to discharge the treated effluent from the proposed Water Reclamation Centre is at Queensville Sideroad, surface discharge at the east side of the East Holland River immediately south of the Queensville Sideroad bridge. A map showing the location of the recommended outfall is provided for reference (*see Attachment 3*).

The recommended routing of trunk sewer pipes for conveyance of raw sewage to the Water Reclamation Centre and conveyance of treated water to the outfall has been established as 2nd Concession and Queensville Sideroad

A detailed inventory of the environment including agricultural, archaeological, cultural heritage, land use, natural environment, noise and vibration, etc. was collected from available existing information sources. These areas were reviewed and supplemented by field investigations. Ultimately, additional data was generated to carry out an impact assessment on the various potential infrastructure routes to and from the water reclamation centre. This impact assessment involved consideration of the potential for adverse environmental effects, developing appropriate avoidance / mitigation / compensation measures to address any adverse environmental effects, culminating in a description of net effects for the recommended conveyance route.

The infrastructure includes twin 900 millimetre diameter forcemains from the 2nd Concession Pumping Station and twin 600 millimetre diameter forcemains from the Queensville West Pumping Station extending approximately 1.25 kilometres north along 2nd Concession from the Queensville West Pumping Station to the recommended site. The gravity discharge pipe (1,350 millimetre diameter) will carry treated effluent from the water reclamation centre for 3.2 kilometres south on 2nd Concession then west along the south side of Queensville Sideroad to the outfall at the East Holland River from the south side of Queensville Sideroad. A map showing the recommended location of the sewer routes is provided for reference (*see Attachment 4*).

The recommended routing of trunk sewer pipes required for modifications to the existing York Durham Sewage System has been established as following the existing forcemain alignment

Several meetings with Town of Newmarket staff as well as Lake Simcoe Region Conservation Authority staff assisted in the review of existing infrastructure, easements and rights-of-way in the vicinity of the three short-listed alternative routes for sewer pipes. Additional field surveys and data collection contributed to the assessment and decision on the recommended route to connect the Newmarket, Bogart Creek and Aurora Pumping Stations with additional forcemains.

Guiding principles established to develop the York Durham Sewage System (YDSS) modifications were to:

- Maximize the use of road/utility rights-of-way and/or existing easements
- Maximize the use of existing infrastructure to avoid or minimize the need for significant upgrades to the existing Newmarket and Bogart Creek Pumping Stations
- Minimize construction impacts to traffic and to the community

The route to provide an additional connection for system security between the Newmarket and Aurora Pumping Stations will consist of a 900 millimetre diameter forcemain connecting the Newmarket Pumping Station to the 1,050 millimetre gravity sewer immediately north of the Aurora Pumping Station at St. John's Sideroad. Approximately 5.4 kilometres in length, the forcemain recommended route is within the Bayview Parkway road allowance from Newmarket to Davis Drive, crossing Davis Drive and continuing south along Charles Street to the Wesley Brooks Memorial Conservation Area. The forcemain crosses Mulock Drive and continues south in the Bailey Ecological Park and connects with the existing Aurora Pumping Station gravity sewer. There is an additional 450 millimetre diameter forcemain from Bogart Creek Pumping Station connecting to the proposed 900 millimetre diameter forcemain. Forcemains will be built using open cut and trenchless construction methods to avoid environmental impacts and minimize traffic disruption. A map showing the location of the recommended sewer route for the modifications to the existing York Durham Sewage System (YDSS) is provided for reference (*see Attachment 5*).

Further public consultation was conducted to ensure comprehensive public feedback

On May 22, 2012, a York Region Project Update was provided to the Town of East Gwillimbury Committee of the Whole. The presentation included project background, servicing strategy and site selection update for the Lake Simcoe Water Reclamation Centre. The Queensville - Holland Landing - Sharon connection project was also discussed including background and original and interim servicing strategies. Closing slides discussed working with Town staff and the local community.

In response to concerns raised by local residents, an additional community meeting was held in the community of Sharon on June 28, 2012. A presentation on a conceptual layout for the water reclamation centre as well as an explanation of the treatment processes was provided. Following this, a facilitated question and answer session provided attendees the opportunity to ask questions, express concerns and receive responses within a public open forum.

At the request of Georgina Council, an additional public meeting is planned in the Town of Georgina Council Chambers in Fall 2012, similar to other public meetings held in the local municipalities within the Environmental Assessment study service area.

Recommended alternative methods of carrying out the preferred alternative will be presented to the public and First Nations in October 2012

A detailed assessment has been completed, including a net effects analysis, on all alternative methods noted above. Based on this comprehensive assessment, the recommended site for the Lake Simcoe Water Reclamation Centre, the recommended outfall location into the East Holland River, the recommended routing of trunk sewer pipes to the water reclamation centre and the recommended YDSS Modifications Route will be presented to the public for input and comment during Public Information Forums in October 2012.

A separate meeting with First Nations will be conducted following the Public Information Forums to share and discuss the recommendations.

Link to Key Council-approved Plans

The Upper York Sewage Solutions project is a critical component of the Region's future wastewater infrastructure, facilitating growth within the approved urban boundary of the communities within Aurora, Newmarket and East Gwillimbury. The service area includes the Newmarket Centre and the northerly Yonge Street Regional Corridor. The Council adopted urban expansion area in East Gwillimbury, through Regional Official Plan Amendment No. 1, also requires implementation of this critical long-term infrastructure.

This project also complements the significant provincial investment to extend Highway 404 to Ravenshoe Road which provides transportation capacity for approved growth in both the Town of East Gwillimbury and the Town of Georgina. The Upper York Sewage Solutions project is a key project that aligns with the Region's 2011 to 2015 Strategic Planning objectives of continuing to deliver and sustain critical infrastructure, and focusing growth along Regional Centres and Corridors. This is in keeping with the longer term Council adopted Vision 2051 and the Regional Official Plan which envision livable cities and complete communities. Implementation of the servicing solution will accommodate the planned growth within these northern municipalities.

5. FINANCIAL IMPLICATIONS

Future Development Charges Bylaw and Ten Year Capital Plans will be updated as project costs are refined

The current Development Charges Bylaw includes \$505.7 million for the Upper York Sewage Solutions project. The approved 2012 Ten Year Capital Plan includes \$25.15 million in Capital Spending Authority for Planning/Environmental Assessment and preliminary design phases of the project, as well as an identified detailed design and construction budget of \$479 million. The Development Charges Bylaw identifies \$93 million for works related to the York Durham Sewage System modifications in Newmarket. After completion of the individual environmental assessment, and as the

Upper York Sewage Solutions project progresses, project timing, cost estimates and budget will be updated and included in the next Development Charges Bylaw update as well as in future Twenty Year Capital Plans.

6. LOCAL MUNICIPAL IMPACT

The Upper York Sewage Solutions project is being conducted within defined parameters, guidelines and processes detailed in a Terms of Reference document as approved by the Minister of the Environment in March 2010. This includes extensive consultation with local municipalities. A fully documented environmental assessment report will be submitted for approval to the Minister of the Environment upon completion of this individual environmental assessment Q3 2013.

The purpose of the Upper York Sewage Solutions project, as approved by the Minister of the Environment, is to develop a local sustainable sewage servicing solution to accommodate the planned growth for complete communities of 153,000 residents and employees in the Towns of Aurora (34,500), East Gwillimbury (91,500) and Newmarket (27,000). All of these municipalities are located within the Lake Simcoe basin.

Moving forward with planning and implementation of the Lake Simcoe Water Reclamation Centre with York Durham Sewage System Modifications as the preferred alternative, York Region is focused on providing servicing for planned growth in Aurora, East Gwillimbury and Newmarket by as early as 2018. Implementation of the Water Reclamation Centre will also facilitate taking the current Holland Landing Lagoons out of service.

7. CONCLUSION

With the defined purpose of the Upper York Sewage Solutions Individual Environmental Assessment being to accommodate provincially approved growth to 2031 in the Towns of Aurora, East Gwillimbury and Newmarket, the Lake Simcoe Water Reclamation Centre and York Durham Sewage System Modifications will fulfill that purpose through construction of a wastewater conveyance system and water reclamation centre incorporating environmental performance unparalleled in Ontario.

Latest results from advanced treatment demonstration facility continue to clearly demonstrate the efficiency of reverse osmosis in removing phosphorus

Phosphorus concentrations from the advanced treatment demonstration facility continue to be below the expected total phosphorus plant discharge objective of 0.01 to 0.02 mg/L. Following reverse osmosis, the average phosphorus concentration is 0.003 mg/L, an order of magnitude below the water reclamation centre discharge objective. Having now proceeded through two full testing, stressing and monitoring cycles, these results

consistently and clearly demonstrate the efficiency of reverse osmosis in removing phosphorus.

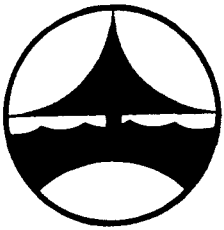
The study completed the alternative methods of carrying out the preferred alternative and is moving into the next and final stage of the Environmental Assessment process, Impact Assessment of the Preferred Method(s).

Moving forward on implementation of the Lake Simcoe Water Reclamation Centre with York Durham Sewage System Modifications as the preferred alternative is focused on providing servicing for growth by as early as 2018.

For more information on this report, please contact Daniel Kostopoulos, Director, Capital Planning and Delivery, Environmental Services at (905) 830-4444 Ext. 5070.

The Senior Management Group has reviewed this report.

(The five attachments referred to in this clause are attached to this report.)



TOWN OF GEORGINA

26557 Civic Centre Rd., Keswick, Ontario L4P 3G1

REGION OF YORK
CLERK'S OFFICE

FILE No. - P42



July 11, 2012

Town of East Gwillimbury,
19000 Leslie Street,
SHARON, Ontario
L0G 1V0

Attn: Fernando Lamanna, Deputy Clerk

Dear Mr. Lamanna:

Re: Upper York Sewage Solution project

Please be advised that Town Council considered your correspondence concerning the Upper York Sewage Solution project and passed the following motion:

"THAT TOWN COUNCIL ENDORSE THE TOWN OF EAST GWILLIMBURY'S RESOLUTION CONCERNING THE UPPER YORK SEWAGE SOLUTION PROJECT AND SUBSEQUENTLY REQUEST YORK REGION TO ESTABLISH A PERMANENT COMMUNICATION CENTRE IN THE TOWN OF GEORGINA TOWN OFFICE TO ENSURE RESIDENTS AND STAKEHOLDERS HAVE ALL ISSUES AND QUESTIONS ADDRESSED WITH REGARD TO THE UPPER YORK SEWAGE SOLUTION (UYSS) PROJECT AS WELL AS THE YORK DURHAM SEWAGE SYSTEM (YDSS), AND THAT A COPY OF THIS RESOLUTION BE FORWARDED TO ALL MUNICIPALITIES WITHIN THE LAKE SIMCOE WATERSHED."

Sincerely,
FOR THE TOWN OF GEORGINA,

Carolyn Lance
Council Services Coordinator

cc: All Municipalities within the Lake Simcoe Watershed





Town of
East Gwillimbury

Fernando Lamanna, BA

Deputy Clerk
Legal and Council Support Services
905-478-4282 x1240
flamanna@eastgwillimbury.ca

July 20, 2012

Regional Municipality of York
17250 Yonge Street
Newmarket, ON
L3Y 6Z1

Attn: Denis Kelly, Regional Clerk



**REGION OF YORK
CLERK'S OFFICE**

FILE No. - 742

Dear Mr. Kelly:

For your information and records, at its regular meeting held July 16, 2012, the Municipal Council of the Town of East Gwillimbury adopted three separate resolutions pertaining to the Upper York Sewage Solution (UYSS), which are as follows:

Moved by: Councillor Roy-DiClemente

Seconded by: Councillor Eaton

BE IT RESOLVED THAT Council of the Town of East Gwillimbury respectfully requests the Region of York communicate to the public that in addition to the advanced technology employed by the Water Reclamation Centre it also incorporates a traditional sewage treatment process; and

THAT the Council of the Town of East Gwillimbury continues to have concerns with the project with respect to chemical spillage, proximity to residents, smells, traffic and environmental concerns regarding the forthcoming data to the Lake Simcoe Region Conservation Authority; and

THAT the Council of the Town of East Gwillimbury requests that these issues be addressed before the preferred site is finalized.

Carried. C2012-360

.../2

"Our town, Our future"

19000 Leslie Street, Sharon, Ontario L0G 1V0 Tel: 905-478-4282 Fax: 905-478-2808
www.eastgwillimbury.ca

Moved by: Councillor Eaton

Seconded by: Councillor Roy-DiClemente

BE IT RESOLVED THAT further details regarding the Water Reclamation Centre and the reuse of the water be clarified, communicated and considered in the determination of the selection of the preferred site to ensure potential users of the reclaimed water are located in close proximity to the Water Reclamation Centre.

Carried. C2012-361

Moved by: Councillor Eaton

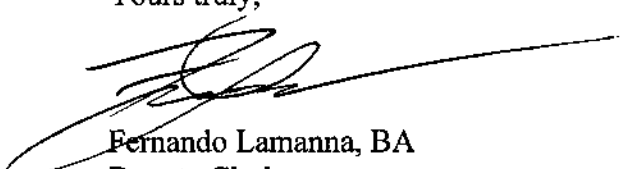
Seconded by: Councillor Roy-DiClemente

BE IT RESOLVED THAT the Regional staff representative currently working in the Town of East Gwillimbury Offices be requested to provide, for each Council meeting, details respecting contact with the public including the details of the concern raised by the members of the public and the date the concern was conveyed together with the detailed response provided and the date the response was provided.

Carried. C2012-362

If you have any further questions feel free to contact the undersigned.

Yours truly,



Fernando Lamanna, BA

Deputy Clerk

Legal and Council Support Services

cc: D. Kostopoulos, Director, Capital Planning and Delivery, York Region



Lake Simcoe Region
conservation authority

Staff Report No. 43-12-BOD
Page No. 1 of 12
Agenda Item No. 8 BOD-06-12

TO: Board of Directors

FROM: Michael Walters
General Manager, Watershed Management

DATE: June 1, 2012

SUBJECT: Upper York Sewage Solutions (UYSS) Environmental Assessment

RECOMMENDATION: THAT Staff Report 43-12-BOD regarding the Upper York Sewage Solutions Environmental Assessment be received for information; and
FURTHER THAT staff be directed to continue to participate in the Environmental Assessment Study and report back to the Board of Directors regarding the final Authority comments.

Purpose of this Staff Report:

The purpose of this Staff Report is to update and inform LSRCA's Board of Directors regarding the status of LSRCA's involvement in the Upper York Sewage Solutions (UYSS) Environmental Assessment currently being conducted by The Regional Municipality of York.

Background and Consideration:

LSRCA has been involved in commenting on the Upper York Sewage Solutions Environmental Assessment since 2010. The proposed undertaking involves providing sewage servicing to accommodate forecasted population growth in the Towns of East Gwillimbury, Aurora and Newmarket. Approximately 47 million litres per day (MLD) of sewage capacity is required by 2031. To date, two viable alternatives have been evaluated including the creation of a new pipeline over the Oak Ridges Moraine to take sewage to Lake Ontario and a Lake Simcoe Innovative Solution to discharge treated effluent into Lake Simcoe.

Based on a review of the alternatives provided to date, staff from the Authority can provide preliminary comments that the Lake Simcoe Innovative Solution is the preferred alternative resulting in the least disruptive disturbance to the natural heritage and watershed ecosystem and is the most sustainable in regards to water management. The innovative approach is also less costly than the Lake Ontario alternative as the plant expansion can be phased in over time. More significantly, this solution does not require the significant environmental disturbance to the Oak Ridges Moraine that would be associated with the construction of a tunnel to transport

the raw sewage to the Duffin Creek wastewater facility. Further, the Lake Simcoe option would not require an inter-basin transfer. The Lake Simcoe option also maintains more of a natural water balance and also involves innovative solutions which would set a high standard for wastewater servicing within the Lake Simcoe watershed. In addition, the willingness of The Regional Municipality of York to implement a new and innovative approach to sewage treatment has received a favourable response from the Province of Ontario.

As part of our Planning and Development Services responsibilities, a Watershed Management staff team incorporating a variety of professional disciplines was created to review the technical reports provided by The Regional Municipality of York outlining the potential impacts associated with the Lake Simcoe Innovative Solution. The team includes:

- General Manager, Watershed Management,
- Director, Planning and Development Services,
- Manager, Environmental Science and Monitoring,
- Manager, Engineering and Technical Services,
- Limnologist,
- Water Quality Specialist,
- Hydrologist,
- Natural Heritage Ecologist, and
- Senior Fisheries Biologist.

The technology proposed by UYSS to treat the sewage involves enhanced biological secondary and tertiary membrane treatments which are relatively common technologies currently being utilized within the watershed. The innovative technology proposed to improve pollutant removal is the addition of reverse osmosis (RO) which would significantly improve the removal of a wide range of contaminants especially phosphorus. This technology is currently being used in other countries including the United States, Israel and Australia to treat sewage effluent wastewater to drinking water quality standards. It is commonly used in Canada to provide potable drinking water from surface water intakes (City of Barrie). Another innovative approach proposed by the The Regional Municipality of York is to reuse the reclaimed water for irrigation of golf courses, sod farms and other industrial uses. Reuse would not only reduce phosphorous loading to Lake Simcoe but also reduce the stress on ground/surface water resources and represents a much more sustainable approach to water management within the basin. Based on this rationale, the Region of York is referring to the new facility as a Water Reclamation Centre which reflects the innovative approach associated with this project and the objective to recycle the wastewater.

A detailed evaluation of the environmental impacts to the Holland River could not be fully completed until a point of discharge was determined that would ultimately receive the 40 MLD that the Water Reclamation Centre would produce. Recently the Region of York staff indicated

that the preferred point of impact will likely be located where Queensville Sideroad crosses the East Holland River in Holland Landing. Given this information more detailed studies examining specific environmental impacts will be reviewed by staff. This report contains the results and conclusions of staff's review of the technical reports provided in relation to our current scientific understanding of the environmental health and quality of the East Holland River and Lake Simcoe.

Issues:

The UYSS Environmental Assessment and the preferred alternative to provide future servicing and the implications for the current Holland Landing water pollution control facility has become a cause for concern for many residents within the watershed community. As a scientific organization, LSRCA is committed to maintaining a balanced approach to resource management focused on protecting and enhancing the health and quality of Lake Simcoe and its watershed.

Our primary role is in relation to the impact that the facility might have on hazard lands within LSRCA's jurisdiction and ensuring that it is physically located outside of a hazard area. This is a mandated responsibility under Section 28 of the *Conservation Authority's Act* and, through the specific provincial Ontario Regulation 179/06. In relation to this mandate, LSRCA staff has also been involved in commenting on other aspects of the UYSS environmental assessment regarding potential impacts to water quality, water quantity, and natural heritage.

A number of concerns have been raised by LSRCA Board Members and the public as part of the environmental assessment process. It is the intent of this Staff Report to address these concerns where possible and provide information that promotes a clear understanding of the proposed solution and ultimate impacts to the environment. The concerns raised to date include the following:

- Impacts on water quality to the East Holland River and Lake Simcoe due to the discharge of treated wastewater from the Water Reclamation Centre. Water quality concerns include increases to phosphorus loadings, Pharmaceuticals and Personal Care Products (PPCP), and water temperature,
- Water quantity concerns resulting from the 40 MLD discharge to the East Holland River and ultimately Lake Simcoe. Specific concerns include impacts to the stream hydrology and potential increase in flooding or streambank erosion,
- Effect of the discharge of treated wastewater from the Water Reclamation Centre on the aquatic ecosystem both in the East Holland River and Lake Simcoe.

These are the current issues staff have identified however, given that the environmental assessment process is not complete other issues could emerge as the Environmental Impact Study Report is being produced by the Region of York. Staff will continue to participate in the process and report back to the Board of Directors regarding the results.

Water Quality

Phosphorus:

The proposed UYSS plan to replace the current wastewater treatment lagoon at Holland Landing with a combined activated sludge, membrane filtration and reverse osmosis system represents a whole new standard in wastewater management in Canada. The combination of these treatment technologies would result in the wastewater being treated to drinking water quality standards. This level of treatment is a hundred times more effective at removing phosphorus than most other wastewater treatment facilities within the watershed which are already some of the most technologically advanced in Canada.

This new level of phosphorus treatment is required to meet the phosphorus water quality target set under the LSPP by the MOE for the Holland Landing waste water facility while accommodating the provincially approved population expansion for the final build out of the communities within East Gwillimbury and Towns of Newmarket and Aurora.

East Holland River

Currently the East Holland River is the most degraded river system within the Lake Simcoe watershed which has made it a priority watershed of the Authority and the focus of many watershed management and stewardship programs. The phosphorus concentration within the river always exceeds the Provincial Water Quality Objective (PWQO) of 0.03 mg/L with an average concentration of 0.14 mg/L. Sources of phosphorus inputs include; urban stormwater runoff, agricultural inputs, the existing Holland Landing Sewage Lagoon, and septic systems.

An evaluation of the potential impact that the Water Reclamation Centre will have on the phosphorus concentration in the East Holland River was completed by Conestoga-Rovers and Associates and Hutchinson Environmental Services for the Region of York. A number of modelling scenarios were completed using computer models to compare results along with empirical calculations using monitored data collected by the Authority. An important assumption of the model is the phosphorus concentration used to represent the treated effluent to be discharged. An effluent total phosphorus concentration of 0.015 mg/L was selected for modelling the Water Reclamation Centre discharge based on the use of advanced treatment technology. This effluent concentration is well below (half) the PWQO and is

reasonable given that results from the advanced treatment technology are well below this concentration.

Members of the Authority staff team have reviewed the modelling output and concur with the results. An empirical assessment of flow versus concentration is also in close agreement with the model results. In conclusion, the results demonstrate there is no negative impact on the East Holland River associated with the WRC discharge in relation to increasing the phosphorus concentration. In fact quite the opposite impact will occur. Results clearly demonstrate that the Water Reclamation Centre discharge is predicted to improve water quality conditions in the East Holland River for phosphorus, especially during summer months under low flow conditions. This occurs because the addition of the cleaner treated water from the Water Reclamation Centre acts to dilute and lower existing phosphorus concentrations within the East Holland River. This predicted reduction in phosphorus concentration will have other positive benefits to the East Holland River and will result in reduced algae and aquatic plant growth and improved fish habitat.

Lake Simcoe

Another concern raised was the increase to phosphorus loads to Lake Simcoe associated with the Water Reclamation Centre and population growth. Phosphorus loading can be defined as the amount of total phosphorus entering Lake Simcoe measured in metric tons per year. Phosphorus loading is a function of flow volume times the measured concentration of phosphorus present in the water as displayed in the equation below:

Phosphorus Load (t/yr) = Total flow volume x Total phosphorus Concentration

Under the planned population expansion as described by the Region of York the volume of sewage generated is going to increase as the population grows. If phosphorus concentrations were kept the same then the overall phosphorus load would also increase. Since the amount of sewage (volume) generated cannot be reduced then the only other option available is to reduce the concentration of phosphorus in the discharged wastewater. This has necessitated the need for enhanced treatment of the wastewater to significantly reduce phosphorus concentrations to maintain the total phosphorus load.

The allowable limit for the annual phosphorus loading from the Holland Landing Treatment Lagoon is 149 kg/yr which is about 3% of the current total phosphorus load entering Lake Simcoe from wastewater treatment facilities. The MOE through the Phosphorus Reduction Strategy (completed under The Lake Simcoe Protection Plan) have proposed a new annual limit (124 kg/yr) which is actually lower than the current allowable limit. It is important to note that even with the implementation of the advanced wastewater treatment technology a small increase to the phosphorus load of Lake Simcoe is associated with the new treatment facility.

Approximately 100 kg of additional phosphorus would be discharged into the East Holland River simply because of the large volume of waste water being discharged. To address this issue, the Region of York has agreed to implement a phosphorus reduction off-setting program. This program would involve a minimum 2:1 to 4:1 reduction of other sources of phosphorus currently contributing to the East Holland River. The result will be a reduction of 200 to 400 kg/yr from other sources of phosphorus (storm water runoff, septic systems, and agricultural runoff) which would result in a 100 to 300 kg net reduction in the overall total phosphorus load entering Lake Simcoe.

Based on the results it is the conclusion of staff that the Water Reclamation Centre will not negatively impact water quality within the East Holland River or Lake Simcoe. In fact the discharge will result in localized improvements to the East Holland River downstream of the point of discharge and a net reduction in phosphorus loading to Lake Simcoe associated with the necessary phosphorus off-set would improve the health of the lake.

Pharmaceuticals and Personal Care Products:

East Holland River and Lake Simcoe

Pharmaceuticals and Personal Care Products (PPCPs) are defined by the US Environmental Protection Agency as "any product used by individuals for personal health or cosmetic reasons or used by agribusiness to enhance growth or health of livestock. PPCPs comprise a diverse collection of thousands of chemical substances, including prescription and over-the-counter therapeutic drugs, veterinary drugs, fragrances, and cosmetics". The term "PPCPs" has only existed for a few years; however these bioactive chemicals (substances that have an effect on living tissue) have been around for decades. Their effect on the environment is largely unknown and LSRCA has recognized this as a data gap and important area of research.

PPCPs have probably been present in water and the environment for as long as people have been using them. Some sources of PPCPs include human activity, waste residual from pharmaceutical manufacturing (regulated and controlled), residues from hospitals, illicit drugs, and veterinary drug use (especially antibiotics and steroids) and agribusiness. Most of the drugs that are dispensed are not entirely absorbed by our bodies, and subsequently excreted finding their way into wastewater and surface waters. In actual fact, it has only been recently, due to advances in technology that chemical laboratory analysis methods have improved to identify PPCPs in surface waters.

A concern has been raised regarding the discharge of PPCPs from the newly proposed UYSS waste water facility. Currently, the Canadian Federal and Ontario Provincial governments do not consider PPCPs to be a water quality or human health threat due to the minute concentrations found in surface and ground waters. As a result, there are currently no water quality objectives for any PPCPs that would require any municipality engaged in operating a

wastewater facility to treat and remove these chemicals. Despite this, most municipal wastewater treatment facilities do remove some PPCPs as do drinking water treatment plants that provide potable water to residences throughout the watershed.

A review of current scientific literature to determine the ability of wastewater treatment facilities to remove PPCPs did yield a large number of peer reviewed and proofed journal papers and reports on the subject. The results of these studies¹ concluded that there is removal of Pharmaceuticals and Personal Care Products occurring in wastewater facilities with the most effective removal rates corresponding to improved wastewater treatment methods. Activated Sludge (AS) plants were found to remove moderate amounts of the PPCPs, Membrane Filtration (MF) was found to remove higher levels and reverse osmosis technology was cited to be the most effective with 97% of the PPCPs present in the wastewater effluent being removed.

Based on the literature it can be concluded that reverse osmosis technology demonstrated the best performance for removing Pharmaceuticals and Personal Care Products. As previously discussed reverse osmosis technology is routinely used to treat drinking water and represents the most efficient wastewater treatment process to reduce the risk of releasing PPCPs into the natural environment and better ensure the health of humans and wildlife.

As the first wastewater treatment facility in Ontario to propose using reverse osmosis technology the UYSS Holland Landing Water Reclamation Project would be more effective at removing PPCPs than any other wastewater management facility in the Lake Simcoe watershed if not in all of Canada. In conclusion this treatment facility would in all likelihood reduce the current loading of PPCPs to both the East Holland River and Lake Simcoe as a result of the improved treatment technology.

¹Polar, J.A. 2007. *The Fate of Pharmaceuticals after Wastewater Treatment*. Florida Water Resource Journal. P26-31.

Lee, C., Dr. K. Howe, and Dr. B. Thomson. 2009. State of Pharmaceuticals, Personal Care Products, and Endocrine Disrupting Compound Removal during Municipal Wastewater Treatment. University of New Mexico. Report to New Mexico Environment Department.

Lubliner, B., M. Redding, and D. Ragsdale. 2010. Pharmaceuticals and Personal Care Products in Municipal wastewater and their Removal by Nutrient Treatment Technologies. US EPA Publication Number: 10-03-004.

Al-Rifal, J., Khabbaz, H., and Schafer, A.I. 2011. *Removal of Pharmaceuticals and Endocrine Disrupting Compound in a Water Recycling Process using Reverse Osmosis Systems*. Journal of Separation and Purification Technology, Number 77 P60-67.

Water Temperature:

East Holland River

A review of long-term temperature records by Conestoga-Rovers and Associates showed that temperatures vary seasonally in the East and West Holland River from a low of 0 °C in the winter months to approximately 20 to 25 °C during the summer months. The proposed temperature of the Water Reclamation Centre discharge will, like other typical wastewater effluent temperatures, also follow a seasonal trend. It is predicted that the temperature of the wastewater discharge will be similar to the monthly average East Holland River temperature in August of about 20.5 °C. Therefore, given the seasonal norms it is expected that the WRC discharge will have a moderating impact on temperature during the low flow, high temperature conditions in the summer (June, July, August) period. This change is not significant and would not negatively impact the aquatic ecosystem. There is however an increase in water temperature of the East Holland predicted in the winter months which could be approximately 5 to 10 °C warmer. This will not negatively impact aquatic health within the East Holland River but could pose problems with ice formation\safety in the winter months. A more detailed analysis of winter water temperature conditions and the potential impacts of the Water Reclamation Centre discharge on the East Holland River have been requested but are not available at this time.

Lake Simcoe

There is no predicted or anticipated impact of the Water Reclamation Centre discharge on the water temperature in Lake Simcoe. The effects of the Water Reclamation Centre discharge on water temperature will be localized to the mixing zone or point of discharge. The limited volume of discharge mixing with the large flow volume of the East Holland River will negate any temperature impacts well before this discharge reaches Cooks Bay and Lake Simcoe.

Water Levels\Flood Potential

Increased risk or potential of flooding in the Holland River system is a key Authority concern in respect to the proposed project. To this end, Authority staff requested, as part of the ongoing Environmental Assessment, that the Region of York and the UYSS consultant team assess whether the discharge of the Water Reclamation Centre (40 MLD) would have any negative impact on flooding potential of the Holland River as well as water level elevations on Lake Simcoe. Authority staff requested that the UYSS team complete detailed modelling and analysis of the potential impact the addition of 40 MLD to the East Holland / Holland River system.

East Holland River

The UYSS consulting team utilized existing information and an existing hydraulic model for the East Holland River and expanded the model significantly to better assess the potential impacts. The model expansion included the addition of multiple river/valley cross sections, expanded several existing cross sections, and improved bathymetric survey data for the East Holland River, surveys of the dykes along the Holland River and other related parameters. The East Holland River at Queensville Side Road was used as the discharge point for the modelling analysis. Authority staff met with the UYSS team on several occasions during the modelling and analysis process to discuss the various technical aspects and ensure all key variables were being considered.

Results of the hydraulic modelling clearly indicate that there would be minimal increases to water levels in the East Holland River at Queensville Side Road. The maximum increase in water level in the East Holland River is ~2.3cm which would only potentially occur during low lake level periods. Water level fluctuations in the East Holland River are controlled predominantly by lake levels and the operation of the Trent-Severn Waterway (TSW). The TSW controls Lake Simcoe water levels similar to how any large reservoir is controlled with water levels being controlled by a dam or control structure which for Lake Simcoe is the dam at Washago.

Under Regional Storm flow conditions and high Lake Simcoe water levels in the East Holland River the change in water elevation of the East Holland River at Queensville Side Road would be ~0.2cm. This minor increase in water level during the regional flood event will have no impact or contribute to exasperating flood flows or water elevations.

Lake Simcoe

Concern has been raised that the discharge would significantly impact water levels in Lake Simcoe. It is important to review the potential discharge of 40 MLD in context of natural water balance in Lake Simcoe as well as existing water treatment facilities. In 2007 the discharge from the Barrie WPCP was approximately 53 MLD and this is projected to more than double to 138 MLD as Barrie grows over the next 30 years. The average volume of water leaving Lake Simcoe at the lakes outflow in Atherly is an average (2007-2010) of 3 billion MLD.

Authority staff, using the data provided by the UYSS team, was able to calculate the potential change in lake water level. The maximum daily discharge of 40 MLD to Lake Simcoe would only potentially raise water levels in Lake Simcoe by approximately 0.055 mm/day. Average daily evaporation (2007-2010) during the summer months is approximately 2.4 mm/day or 18 times more than the maximum daily discharge from the Water Reclamation Centre. Another key component in respect to lake level is that it is controlled by the Trent Severn Waterway (TSW) in accordance with their operating curve. Based on these results staff have concluded that the addition of the discharge will not have any measurable impact on Lake Simcoe water levels. Page 9

The Aquatic Ecosystem

East Holland River

A preliminary impact analysis of the Water Reclamation Centre on the aquatic ecosystem was completed by Hutchinson Environmental Ltd. for the Region of York. The consultant concluded and Authority staff is in agreement that the aquatic habitat of the East Holland River can be currently characterized as degraded. Based on monitoring data and the results of investigations to complete the East Holland River Subwatershed Plan the river is under stress from nutrient, sediment and contaminant inputs from surrounding urban and agricultural land uses, alteration and removal of riparian vegetation along the river, as well as alteration of the river channel (i.e., bank hardening and channelization).

An analysis of the potential change associated with the discharge from the Water Reclamation Centre on the aquatic ecosystem resulted in no identified negative impacts to the aquatic ecosystem. In fact quite the opposite will occur. The improved water quality resulting from the discharge from the Water Reclamation Centre will result in improved conditions for fish and other aquatic life in relation to current conditions. Another unforeseen benefit is the potential improvement in baseflow conditions within the East Holland River during summer months due to the daily discharge from the Water Reclamation Centre.

During most summers the East Holland River experiences low flow conditions from July to September, with the lowest annual flows occurring in August. This period is the most stressful time of year for any aquatic community, as water temperatures are high, dissolved oxygen concentrations are low and the amount of physical habitat available for aquatic organisms is reduced by low water levels. The increased flow provided by the Water Reclamation Centre would increase the river's water levels and help to mitigate the issues associated with water temperature and dissolved oxygen. It would also increase the available aquatic habitat allowing aquatic organisms to access areas that would be dry in the summer low-flow period. This would include areas such as higher reaches of river banks and backwaters, features that provide valuable habitat for amphibians, reptiles, young fish, minnows, and benthic invertebrates.

There is one outstanding study which staff has requested associated with the protection of aquatic habitat. Authority staff has requested a geomorphology study and streambank erosion analysis of future conditions associated with the discharge from the Water Reclamation Centre be completed to ensure that the streambanks and riparian wetlands will not be negatively impacted. The work is currently being completed but not available for comment at this time. Authority staff will comment on the reports when they are made available and provide our analysis to the Board of Directors in the next Staff Report.

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Lake Simcoe

There is no predicted or anticipated impact of the Water Reclamation Centre discharge on the aquatic ecosystem in Lake Simcoe. The effects of the Water Reclamation Centre discharge will be more localized to the East Holland River. The limited volume of discharge will not significantly affect water quality or water levels within Cooks Bay or the main basin of Lake Simcoe.

Relevance to Authority Policy:

The Authority's mission is to protect and restore the environment health and quality of Lake Simcoe and its watershed. Authority policies will be applied in the same manner and thoroughness as exists within the current practice to the UYSS. The Authority Board will be circulated the final response to the Environmental Assessment Study Report for the project for information prior to its submission to the Region of York.

Impact on Authority Finances:

There are no costs associated with undertaking the Environmental Assessment review other than staff time which has been significant due to the technical nature of the project. The review of Environmental Assessment Study Reports in relation to environmental impacts to Lake Simcoe and its watershed is part of the Watershed Management Division's role and responsibilities.

Summary and Recommendations:

Based on the review of the information provided for the preferred alternative staff has concluded that there are no negative environmental impacts associated with the creation of a Water Reclamation Centre and discharge of 40 MLD into the East Holland River at Queensville Sideroad in the Village of Holland Landing.

It is recommended that Staff Report 43-12-BOD regarding the Upper York Sewage Solutions Environmental Assessment be received for information; and THAT staff be directed to continue to participate in the Environmental Assessment study and report back to the Board of Directors regarding the final Authority comments for information.

Staff Report No. 43-12-BOD
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Pre-submission Review:

This Staff Report was reviewed by the Chief Administrative Officer.

Prepared by: Michael Walters, General Manager, Watershed Management.

Original signed by:

Michael Walters
General Manager,
Watershed Management

Original signed by:

D. Gayle Wood
Chief Administrative Officer



Presentation to the LSRCA Board of Directors

Upper York Sewage Solution (UYSS) Environmental Assessment Review

June 22, 2012

Michael Walters
General Manager
Watershed Management

Proud winner of the International Thiess Riverprize • Member of Conservation Ontario

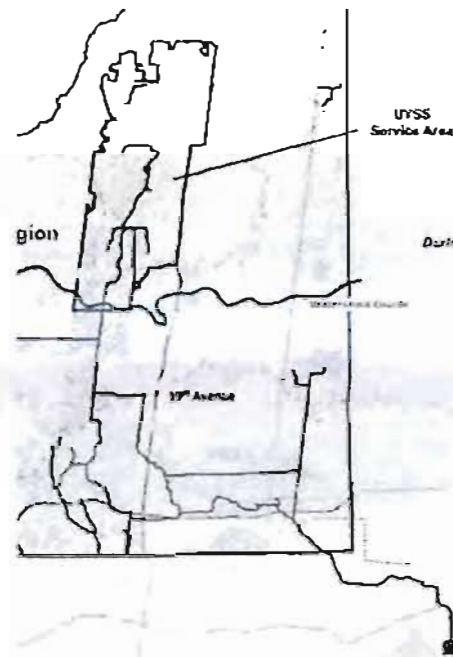
Background

- LSRCA have been involved in the commenting on the Upper York Sewage Solution (UYSS) Environmental Assessment (EA) since 2010.
- A multi-disciplinary team was assembled to review the reports including:
 - General Manager, Watershed Management
 - Director, Planning and Development Services
 - Manager, Environmental Science and Monitoring
 - Manager, Engineering and Technical Services
 - Limnologist
 - Water Quality Specialist
 - Hydrologist
 - Natural Heritage Ecologist
 - Senior Fisheries Biologist

Background

Two viable options have been assessed to service the study are:

1. A new tunnel to transfer sewage to Duffins Creek STP for treatment and effluent discharge to Lake Ontario.
2. A Lake Simcoe innovative treatment option including advanced technology and water reuse. **This is the preferred alternative as selected by York Region.**



Why the Lake Simcoe Solution?

- Least disruptive to natural heritage features within the watershed (does not cross the Oak Ridges Moraine).
- Improves the watershed's water balance and is least disruptive to groundwater resources.
- Water reuse can potentially address water stresses within the East Holland River and potentially the Maskinonge River subwatersheds.
- Provides a showcase to demonstrate the advanced technology.
- It is ultimately more sustainable.

Current Issues to be Addressed

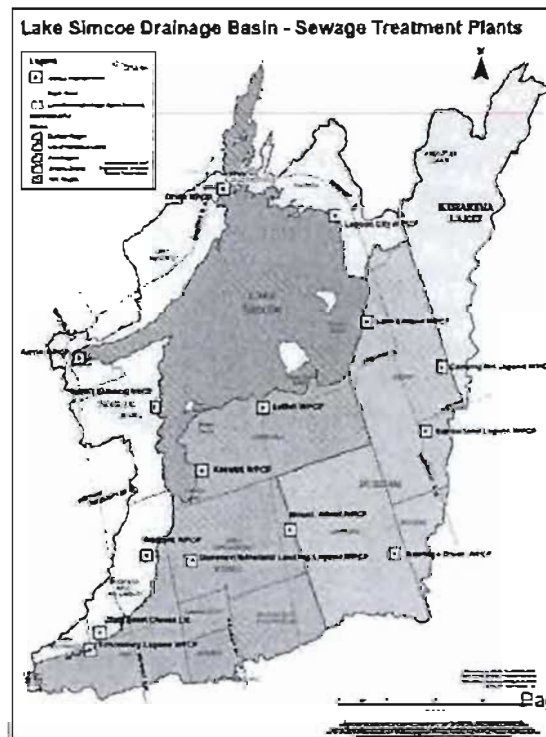
- Impacts on water quality to the East Holland River and Lake Simcoe (phosphorus loadings, Pharmaceuticals and Personal Care Products (PPCPs), and water temperature).
- Water quantity impacts to the stream hydrology and potential flooding or stream bank erosion.
- Effect on the aquatic ecosystem both in the river and Lake Simcoe.



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Water Quality: Phosphorus

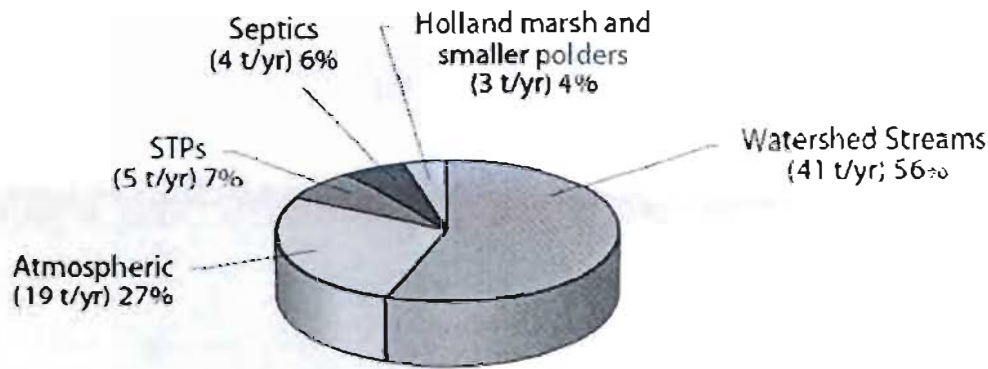
- There are 15 waste water treatment facilities (sewage treatment plants) within the watershed.
- Of these, 7 discharge directly to Lake Simcoe and the remaining 8 to tributaries draining into the lake.
- The operation of all these facilities is closely regulated by the MOE.



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Water Quality: Phosphorus

Lake Simcoe Phosphorus Sources



(Source: Lake Simcoe Region Conservation Authority and Ministry of the Environment Data sets on phosphorus loading for 2002 to 2007)

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Water Quality: Phosphorus (Kg/y)

Current and Proposed Phosphorus Limits for Waste Water Treatment Plants (C of A's)

Waste Water Treatment Facility	Current	Interim	Future (2015)
Uxbridge Brook WPCP	285	142	286
Beaver River # 1 WPCP (Sunderland)	69	66	58
Lake Simcoe (Beaverton) WPCP	190	104	190
Beaver River # 2 WPCP (Cannington)	117	128	97
Schomberg WPCP	75	75	75
Sutton WPCP	224	148	187
Keswick WPCP	1322	939	655
Mount Albert WPCP	75	56	75
Queensville / Holland Landing Lagoon WPCP	149	149	124
Barrie WPCP	5001	3133	2,774
Bradford WPCP	747	361	698
Innisfil WPCP	803	351	629
Orillia WCC	2993	1438	996
Lagoon City STP	249	200	124
Silani Cheese STP	22	20	11
TOTAL	11,646	7,310	6,979

Source: Lake Simcoe Phosphorus Reduction Strategy, MOE Publication, 2011

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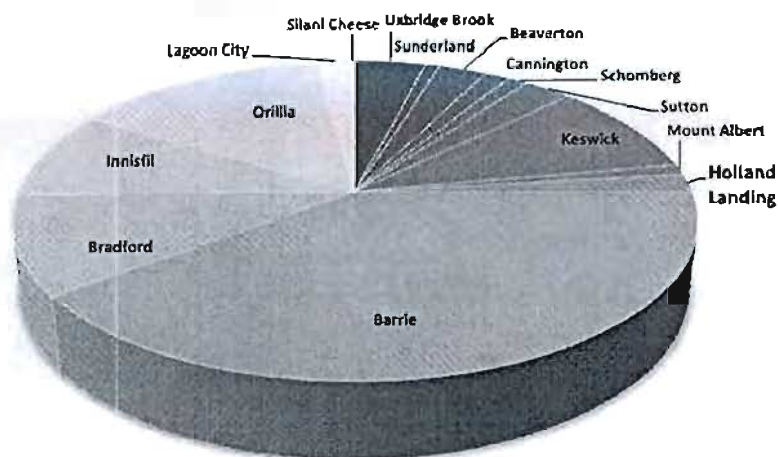
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Lake Water Quality: Phosphorus

Water Reclamation Centre will contribute 3% of the total STP load and about 0.3% of the total phosphorus load to Lake Simcoe (based on 72 T/y).

Future STP Phosphorus Loading Contributions to Lake Simcoe



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Lake Water Quality: Phosphorus

- The UYSS projected load is about 224 Kg/y which would be 100 Kg/y, over the future allowed MOE Certificate of Approval.
- MOE recommended that phosphorus off-setting be required to meet the future target of 124 Kg/y.
- An offset for 100 Kg/y at a ratio of 2:1 to 4:1 would result in a reduction in the phosphorus load to the lake of 200 to 400 Kg/y.
- **Therefore, there will be a net reduction of 100 to 300 Kg/y in the phosphorus load entering the lake to accommodate the UYSS.**

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Holland River Water Quality: Phosphorus

- Water quality in the East Holland River is characterized as poor which has made it a focus for LSRCA science and stewardship activities.
- From 2007 to 2009 the average annual phosphorus concentration was 0.14 mg/L almost 5 times the PWQO of 0.03 mg/L.



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Holland River Water Quality: Phosphorus

- Water quality models were used to assess the impact the WRC could have on phosphorus concentrations in the River.
- Based on an assumed WRC discharge of 0.015 mg/L phosphorus concentrations within the river decrease due to dilution.
- The net result is improved water quality in the East Holland River past the point of discharge due to the clean water from the reclamation centre.



East Holland River WQ (mg/L)

Average Phosphorus	= 0.14
PWQO Phosphorus	= 0.03
WRC Phosphorus	= 0.015

Holland River Water Quality: Phosphorus

- The net result is improved water quality in the East Holland River past the point of discharge due to the clean water from the Water Reclamation Centre.
- Improvements will be more pronounced during low flow periods like the summer and winter months.
- This will have a positive impact on the aquatic ecosystem.

Table 3 Predicted phosphorus concentrations and percentage improvement for the East Holland River immediately downstream of proposed outfall (top) and ~7km downstream (bottom).

Scenario	TP Concentration (mg/L) for East Holland River Flow Condition		
	Typical (2.29 cms)	March High Flow (21.6 cms)	August Low Flow (2.082 cms)
Existing	0.173	0.173	0.243
No Discharge	-	-	0.166
Proposed URC	0.135	0.170	0.035
% Improvement	22%	2%	87% (78%)

Scenario	TP Concentration (mg/L) for East Holland River Flow Condition		
	Typical (2.29 cms)	March High Flow (21.6 cms)	August Low Flow (2.082 cms)
Existing	0.173	0.173	0.171
No Discharge	-	-	0.116
Proposed URC	0.135	0.170	0.041
% Improvement	22%	2%	76% (54%)

Source: Hutchinson Environmental Ltd. East Holland River: Existing Conditions and Response to Discharge from Proposed UYSS Water Reclamation Centre, 2011.

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Water Quality: Pharmaceuticals and Personal Care Products (PPCPs)

PPCPS are defined as:

“any product used by individuals for personal health or cosmetic reasons or used by agribusiness to enhance growth or health of livestock. PPCPs comprise a diverse collection of thousands of chemical substances, including prescription and over-the-counter therapeutic drugs, veterinary drugs, fragrances, and cosmetics”

(Source: US Environmental Protection Agency)

Water Quality: Pharmaceuticals and Personal Care Products (PPCPs)

- The Federal and Provincial government currently do not consider PPCPs to be a human health threat in our waters.
- Why? PPCPs have only been found in minute concentrations (parts per billion) and it would take the consumption of millions of litres of water to receive any significant concentration.
- There are no water quality objectives for PPCPs, and no requirements to remove PPCPs during wastewater treatment.

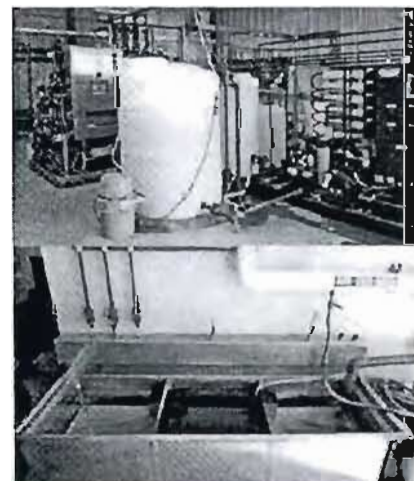


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Water Quality: Pharmaceuticals and Personal Care Products (PPCPs)

- Current waste water treatment practices do remove some PPCPs, and some practices are better than others.
- Scientific studies show that reverse osmosis is the most effective method to remove PPCPs followed by membrane filtration systems.
- The WRC is the first facility to employ both of these technologies.
- In addition, all potable drinking water undergoes additional treatment before being distributed.



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Holland River Water Quality - Temperature

Conestoga-Rovers and Associates (CRA) reviewed long-term temperature records and concluded the following:

- The proposed temperature of the Water Reclamation Centre discharge will follow a seasonal trend.
- Wastewater discharge will have a moderating impact on temperature during the low flow, high temperature conditions in the summer (June, July, August) period.
- An increase in water temperature of the East Holland is predicted in the winter months which could be approximately 5 to 10 °C warmer.

Holland River Water Quality: Temperature

- The increase in water temperature could pose problems with ice formation and ice safety in the winter months.
- A more detailed analysis of winter water temperature conditions and the potential impacts of the Water Reclamation Centre discharge on the East Holland River have been requested by LSRCA staff.
- CRA is completing the work as requested but results are not available at this time.

Lake Simcoe Water Quality: Temperature

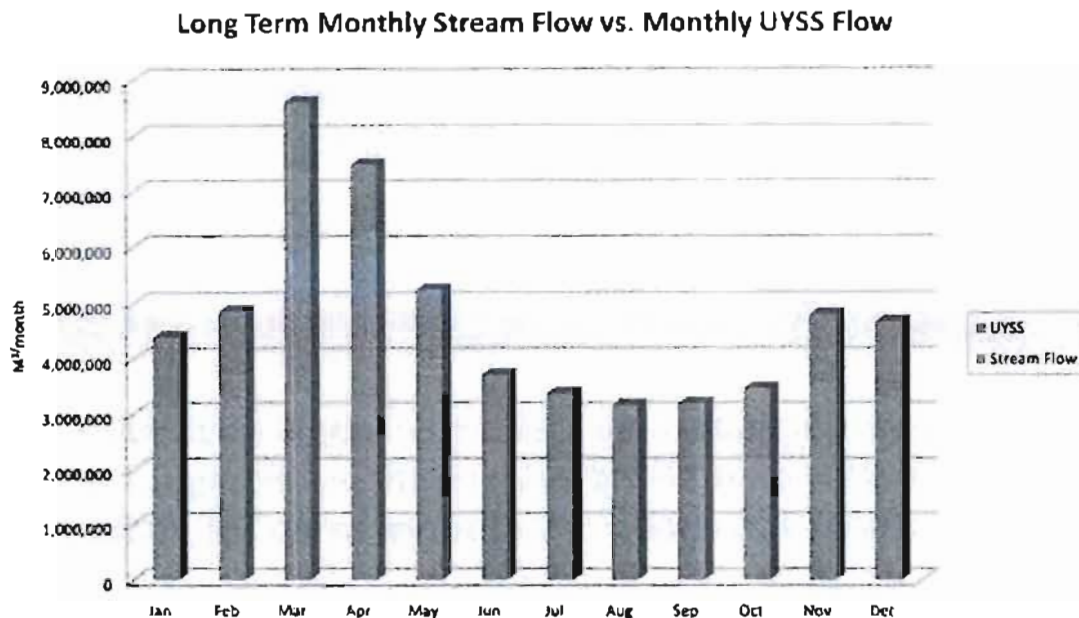
- There is no anticipated impact of the WRC discharge on the water temperature in Lake Simcoe.
- The effects of the WRC discharge on water temperature are localized in proximity to the point of discharge.
- The limited volume of discharge mixing with the large flow volume of the East Holland River will negate any temperature impacts before reaching Cooks Bay.
- These conclusions will be verified once the results from the detailed temperature modelling is provided.

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East Holland River Water Quantity: Hydrology

- Contextually 40 million litres a day (MLD) is not a huge volume when dealing with river systems.
- Currently the City of Barrie is discharging 58 MLD from their STP and plans are to expand to 76 MLD.
- Flow volume is measured in cubic metres per second (m^3/sec) in streams:
 - 1 m^3 = 1000 litres
 - 1 minute of flow @ 1 m^3/sec = 60,000 litres
 - 1 hour of flow @ 1 m^3/sec = 3,600,000 litres
 - 1 day of flow @ 1 m^3/sec = 86,400,000 litres
- The East Holland River has an average daily flow volume of 1.4 m^3/sec or 121 MLD.

East Holland River Water Quantity: Hydrology



June 22, 2012

Lake Simcoe Region Conservation Authority • A Watershed for Life

Lake Simcoe Water Quantity: Hydrology

- Lake Simcoe is a massive body of water (11.6 billion m³), the average volume of water leaving Lake Simcoe at Atherly is an average (2007-2010) of 3 billion MLD.
- The max daily discharge of 40 MLD to Lake Simcoe would only potentially raise water levels in Lake Simcoe by approximately 0.055mm/day.
- Average daily evaporation (2007-2010) is estimated at approximately 2.4mm/day.
- It can be concluded the discharge from the WRC will have little or no impact on water levels of Lake Simcoe.

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June 22, 2012

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East Holland River Water Quantity: Water Levels

- Based on the daily maximum discharge from the WRC water levels within the Holland River were predicted by CRA using the LSRCA hydraulic models.
- Information used as input to the model was updated and expanded significantly to better assess the potential impacts.
- Additional data collected included multiple river/valley cross sections, improved bathymetric soundings, and multiple spot elevations of the dykes along the Holland River.

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East Holland River Water Quantity: Water Levels

- Results of the model show that the maximum increase in water level associated with the WRC is estimated at 2.3 cm or just less than an inch.
- This increase in level would occur during low water/lake conditions.
- During high water conditions the increase would equate to < 2 mm and would not have any significant impact on flood levels.
- It is concluded based on the model results that the discharge from the WRC will not impact flooding in the East Holland River.

The Aquatic Ecosystem: East Holland River

- The aquatic habitat of the East Holland River can be currently characterized as degraded based on monitoring data and the results of investigations to complete the East Holland River Subwatershed Plan.
- Results demonstrate that the river is under stress from nutrient and sediment inputs from urban and agricultural land uses, removal of riparian vegetation and alteration of the river channel.
- Based on current data the discharge from the WRC will not have any negative impacts to the aquatic ecosystem.
- Improved water quality from the WRC discharge will result in improved conditions for fish and other aquatic life in relation to current conditions.

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The Aquatic Ecosystem: East Holland River

- Another benefit to the aquatic system is the potential improvement in baseflow conditions within the East Holland River during summer months due to the daily discharge from the Water Reclamation Centre.
- High water levels during summer months will help to mitigate water temperature, and dissolved oxygen, while increasing the available aquatic habitat allowing aquatic organisms to access areas that would be dry in the summer low-flow period.
- Higher water levels during summer months would provide valuable habitat for amphibians, reptiles, young fish, minnows, and benthic invertebrates.

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The Aquatic Ecosystem: East Holland River

- There is an outstanding study which staff has requested involving a streambank erosion analysis of future conditions associated with the discharge from the WRC.
- This needs to be completed to ensure that the streambanks and riparian wetlands will not be negatively impacted.
- Staff has been assured by the UYSS team that the work is being completed but simply not available for comment at this time.
- Authority staff will comment on the reports when they are made available and provide our analysis to the Board of directors in our next staff report.

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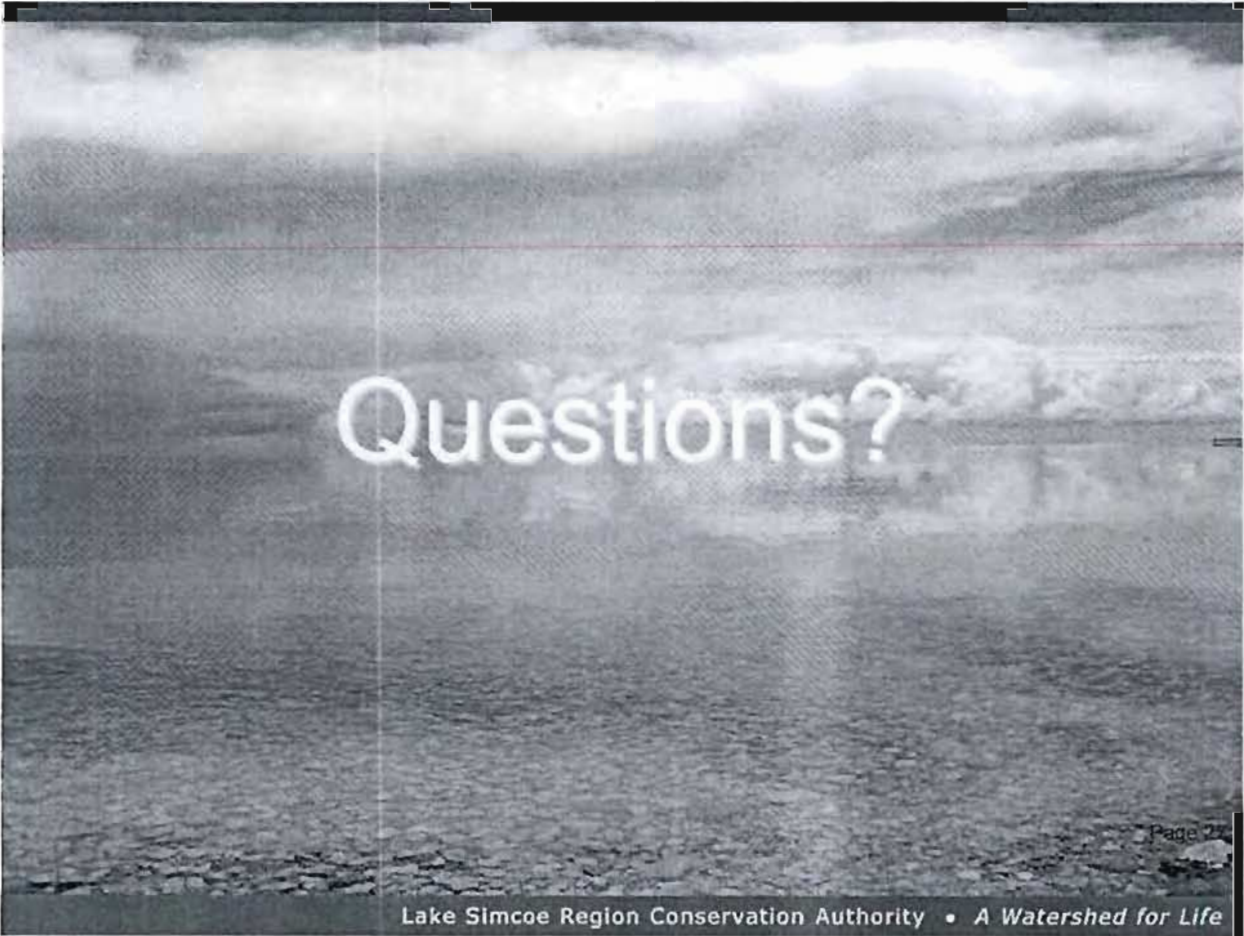
Conclusion and Recommendations

- Based on staffs review of the information available at this time it can be concluded that there are no negative environmental impacts associated with the creation of a Water Reclamation Centre and discharge of 40 MLD into the East Holland River at Queensville Sideroad in the Village of Holland Landing.
- Two additional studies are outstanding and will be reviewed once they are received.
- Authority staff will provide an update to the Board of Directors in our next staff report regarding the final outcome of our review.

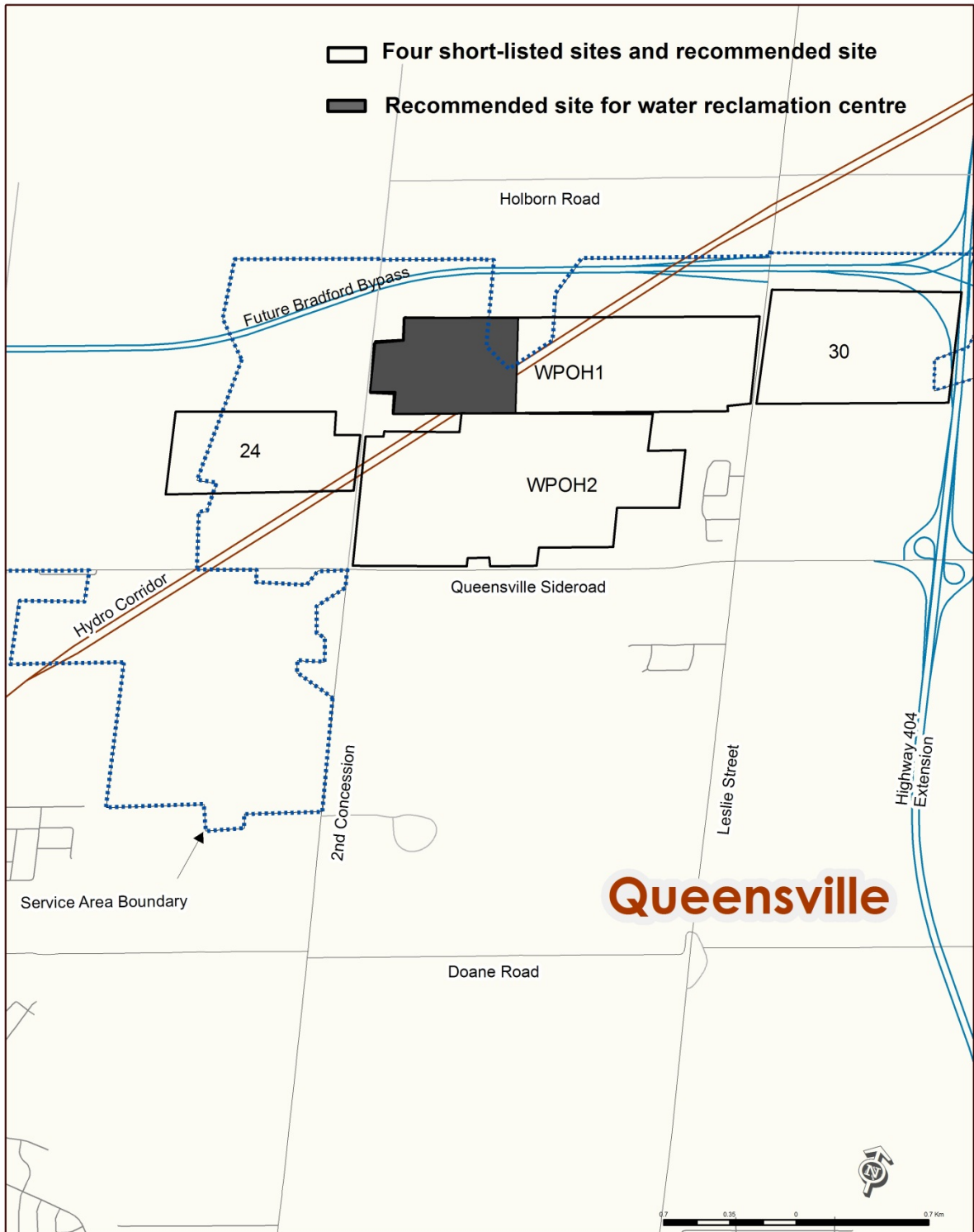
28

Resolution

THAT Staff Report 43-12-BOD regarding the Upper York Sewage Solutions Environmental Assessment be received for information; and FURTHER THAT staff be directed to continue to participate in the Environmental Assessment Study and report back to the Board of Directors regarding the final Authority comments.



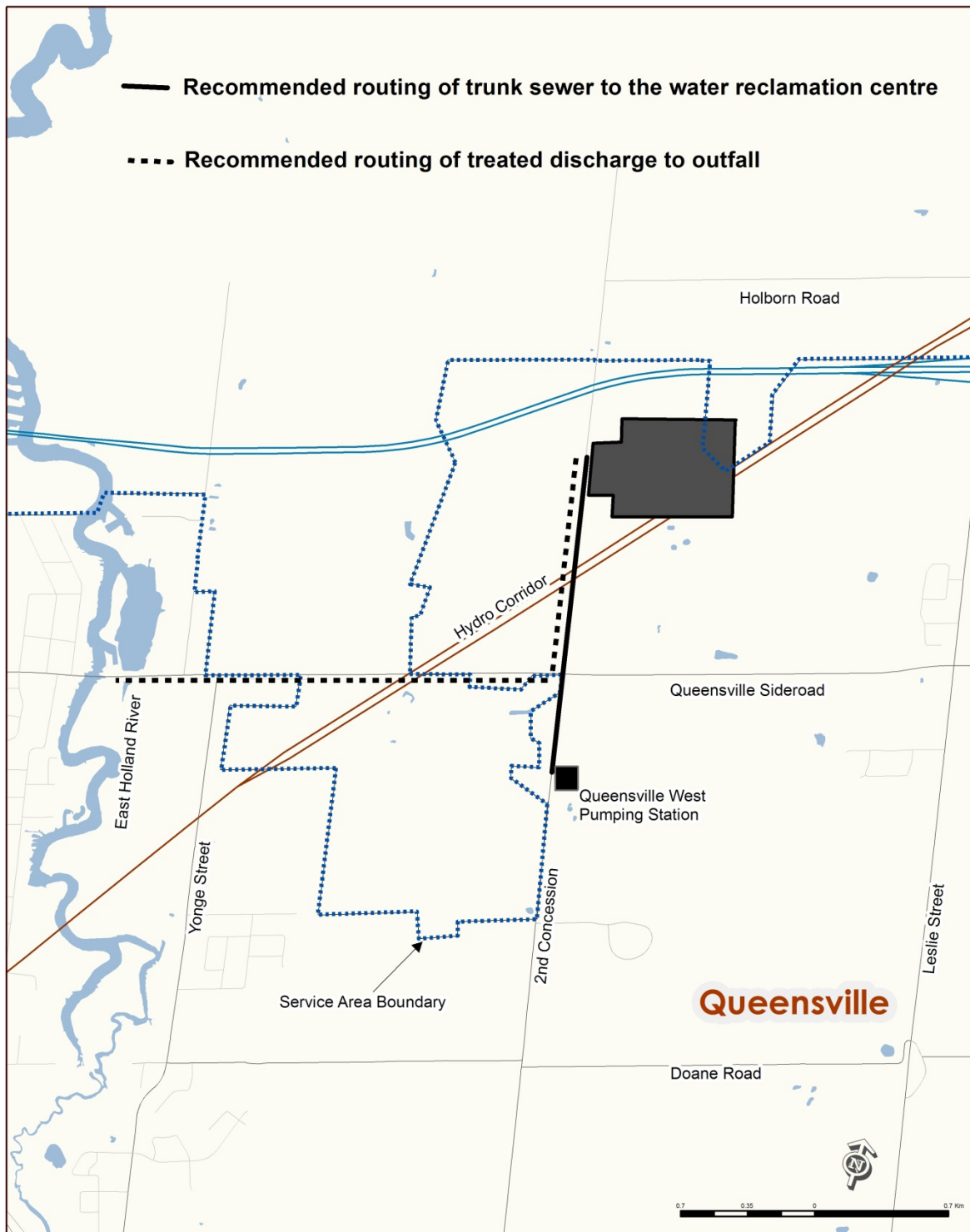
Questions?



Upper York Sewage Solutions Project Update – Project 74270
Four short-listed sites and recommended site

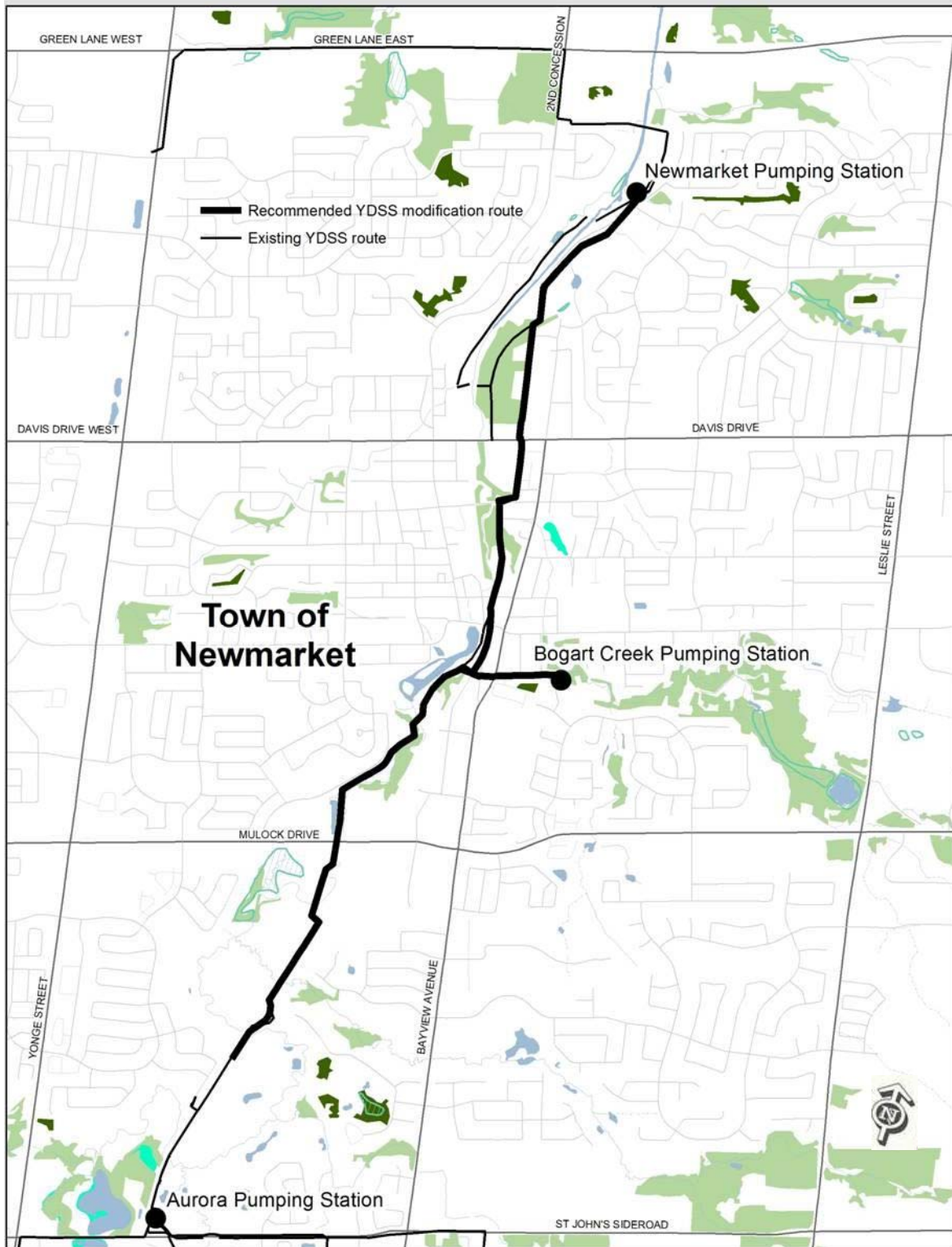


Upper York Sewage Solutions Project Update - Project 74270
Recommended outfall location



R:\UtilitiesComm\2011\20111117_UYSSBaseMap

Upper York Sewage Solutions Project Update – Project 74270 Recommended sewer routes



Upper York Sewage Solutions Project Update - Project 74270
YDSS modifications route