



TOWN OF AJAX
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The Honourable Jim Bradley
Minister of the Environment
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto ON
M7A 2T5

Honourable Michael Gravelle
Ministry of Natural Resources
300 Water Street
P.O. Box 7000
Peterborough ON K9J 8M5
Canada

October 25, 2012

Re: **Duffin Creek Water Pollution Control Plant Outfall Environmental Assessment-
Status Update and Next Steps**

Please be advised that the following resolution was passed by Ajax Town Council at its Meeting held September 24, 2012:

1. THAT the report to Council, entitled "Duffin Creek Water Pollution Control Plant Outfall Environmental Assessment-Status and Next Steps", dated October 22, 2012, be endorsed;
2. THAT the Regions of Durham and York be requested to:
 - a) extend the completion date for the Schedule 'C' Municipal Class Environmental Assessment being conducted to increase the permitted effluent limit of 520 MLD per day from the Duffin Creek Water Pollution Control Plant, in order to have regard for the results of the Ministry's current study of near shore water quality along the Ajax-Pickering waterfront and three other communities along the north shore of Lake Ontario designed to assess the relationship between nutrient sources and nuisance *Cladophora* algae in Lake water that is degrading water quality, fouling shorelines and beaches, and clogging intakes at the Pickering Nuclear Generating Station and water supply plants along the shoreline; and
 - b) prepare, as part of the subject EA, a comprehensive "Assimilative Capacity and Cumulative Effects Study" of Lake Ontario receiving waters in and around the mixing zone at the existing Outfall-Diffuser and mixing zones across the Ajax-Pickering waterfront, that quantifies and evaluates accumulations of nutrients (e.g., Total Phosphorus, Soluble Reactive Phosphorus, etc.) and Chemicals of Concern (CoCs) discharged from the outfall to determine the best possible preferred alternative for the outfall in order to protect and improve Lake Ontario water quality for beneficial uses (e.g., drinking, swimming, tourism, fishing, etc.);

3. THAT the Minister of the Environment be requested to:
- a) Support the Town's aforementioned request to the Regions of York and Durham and, further, ensure that data collected in 2012 and 2013 as part of the Ministry's current study be analyzed expeditiously and the study results made available to the Town, the Regions and the public in 2014 for consideration within the subject EA process;
 - b) Prevent selection of a Preferred Alternative for the Outfall-Diffuser that is "oversized" to accommodate average and peak flows from an onshore WPCP facility with rated capacity greater than 630 MLD, in order to avoid further piecemealing or incremental expansions to this WPCP and connecting infrastructure without a comprehensive assessment of potential and cumulative environmental impacts on Lake Ontario water quality and beneficial uses along the Ajax-Pickering lakefront;
 - c) Require completion of, as part of the subject EA, a thorough evaluation of the long list of Outfall-Diffuser alternatives, including the complete results of the offshore geotechnical test results to clearly explain whether subsurface and geologic conditions, glacial valleys and "vertical joints" identified along a potential route for a new Outfall pose physical/technical constraints to implementing that alternative, and also completion of geotechnical work onshore to determine the feasibility of drilling a "twin" Outfall shaft for new Outfall infrastructure (south of the new Stage 3-future Stage 4 WPCP) which is likely needed to accommodate flows from the planned future "twinning" Primary Trunk Sewer that will extend north from the WPCP to connect with the south end of the Southeast Collector (Twinned) Trunk Sewer (now under construction through Pickering to Valley Farm Road);
 - d) Support the Town's request for the Regions of York and Durham to prepare , as part of the subject EA, the aforementioned "Assimilative Capacity and Cumulative Effects Study";
 - e) Recommend that, as part of the subject EA, the cumulative impacts of effluent discharges from other WPCPs in the vicinity of the Duffin Creek WPCP be determined, including defining their respective mixing zones for SRP that may be overlapping with the Duffin Creek WPCP's mixing zone for various substances, and a remedial plan be developed for the West Durham waterfront by the Province to protect and improve local water quality;
 - f) Impose more stringent regulatory requirements on the Duffin Creek WPCP in its Environmental Compliance Application that will substantially reduce the daily loadings of nutrients (Total Phosphorus and Soluble Reactive Phosphorus) from the Duffin Creek WPCP's Outfall-Diffuser substantially below the 311 kilograms of total phosphorus per day as permitted in the current Certificate of Approval for Sewage Works;
 - g) File a Ministry-initiated Part II Order (Bump-Up) Request should a Notice of Completion for the subject EA be issued and an Environmental Study Report be filed with the Minister of the Environment that does not address the Town's recommendations, issues and concerns as well as MOE requirements;

- h) Establish new Specific Surface Water Quality Objectives (SSWQOs) for the Duffin Creek WPCP that will protect and improve water quality, the aquatic environment and nearshore conditions along the West Durham waterfront in the near term, including but not limited to:
 - i) a SSWQO for Total Phosphorus that is more protective than the existing PWQO for Total Phosphorus established for municipal sewage treatment plants in 1994;
 - ii) a SSWQO for Soluble Reactive Phosphorus that is low enough such that the growth of *Cladophora* algae in nearshore water will be substantially reduced; and,
 - iii) SSWQOs for Chemicals of Concern, including various pharmaceuticals and personal care products, identified near the existing Outfall-Diffuser by MOE researchers in 2011; and
- 4. That this staff report be sent to the Ministries of the Environment and Natural Resources, MOE Central Region Directors, Councils of the Regions of York and Durham, all municipalities in Durham Region, Ontario Power Generation, the Stakeholder Advisory Committee, the Toronto and Region Conservation Authority, the Central Lake Ontario Conservation Authority, Conservation Ontario, the Ajax Environmental Advisory Committee, the Durham Region Environmental Advisory Committee, the Council of Canadians, Durham Sustain Ability, DurhamCLEAR, Environment Canada, Health Canada, Lake Ontario Waterkeeper, Ontario Water Works Research Consortium, the Great Lakes and St. Lawrence Cities Initiative, the International Joint Commission and persons who have requested to be kept notified of the Town's actions regarding the Outfall EA.

A copy of the staff report that prompted this action has been enclosed along with a copy of a PowerPoint presentation. If you require any additional information please do not hesitate to contact Barb Hodgins, Senior Policy Planner at 905-619-2529 ext 32471 or barb.hodgins@ajax.ca

Sincerely



Nicole Wellsbury
Manager of Legislative Services/Deputy Clerk

Copy: P. Allore, Director of Planning & Development Services
B. Hodgins, Senior Policy Planner
MOE Central Region Directors
Councils of the Regions of York and Durham
All municipalities in Durham Region

Ontario Power Generation
Stakeholder Advisory Committee
Toronto and Region Conservation Authority
Central Lake Ontario Conservation Authority
Conservation Ontario
Ajax Environmental Advisory Committee
Durham Region Environmental Advisory Committee
Council of Canadians
Durham Sustain Ability
DurhamCLEAR
Environment Canada
Health Canada
Lake Ontario Waterkeeper
Ontario Water Works Research Consortium
Great Lakes and St. Lawrence Cities Initiative
International Joint Commission
and persons who have requested to be kept notified of the Town's actions regarding the
Outfall EA.

TOWN OF AJAX REPORT



REPORT TO: Council

SUBMITTED BY: Paul Allore, MCIP, RPP
Director of Planning and Development Services

PREPARED BY: Barbara Hodgins, MCIP, RPP
Senior Policy Planner

Kevin Heritage, MCIP, RPP
Policy Planning Coordinator

SUBJECT: **Duffin Creek Water Pollution Control Plant Outfall Environmental Assessment-Status Update and Next Steps**

WARD(S): All

DATE OF MEETING: October 22, 2012

REFERENCES: Capital Account No. 928211 – Duffin Creek WPCP Outfall EA
Staff Reports on Duffin Creek WPCP Outfall EA: GGC - May 5 & November 24, 2011 and June 18, 2012
Staff Reports on Duffin Creek WPCP Stage 3 Expansion: GGC – November 24, 2005; April 20, July 6 & September 21, 2006; April 17, 2007; Council – September 25, 2006
Community Action Plan: Leader in Environmental Sustainability

RECOMMENDATIONS:

1. **THAT the report to Council, entitled “Duffin Creek Water Pollution Control Plant Outfall Environmental Assessment-Status and Next Steps”, dated October 22, 2012, be endorsed;**
2. **THAT the Regions of Durham and York be requested to:**
 - a) **extend the completion date for the Schedule ,C’ Municipal Class Environmental Assessment being conducted to increase the permitted effluent limit of 520 MLD per day from the Duffin Creek Water Pollution Control Plant, in order to have regard for the results of the Ministry’s current study of near shore water quality along the Ajax-Pickering waterfront and three other communities along the north shore of Lake Ontario designed to assess the relationship between nutrient sources and nuisance *Cladophora* algae in Lake water that is degrading water quality, fouling shorelines and beaches, and clogging intakes at the Pickering Nuclear Generating Station and water supply plants along the shoreline; and**

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- b) prepare, as part of the subject EA, a comprehensive “Assimilative Capacity and Cumulative Effects Study” of Lake Ontario receiving waters in and around the mixing zone at the existing Outfall-Diffuser and mixing zones across the Ajax-Pickering waterfront, that quantifies and evaluates accumulations of nutrients (e.g., Total Phosphorus, Soluble Reactive Phosphorus, etc.) and Chemicals of Concern (CoCs) discharged from the outfall to determine the best possible preferred alternative for the outfall in order to protect and improve Lake Ontario water quality for beneficial uses (e.g., drinking, swimming, tourism, fishing, etc.);
3. THAT the Minister of the Environment be requested to:
- a) Support the Town’s aforementioned request to the Regions of York and Durham and, further, ensure that data collected in 2012 and 2013 as part of the Ministry’s current study be analyzed expeditiously and the study results made available to the Town, the Regions and the public in 2014 for consideration within the subject EA process;
- b) Prevent selection of a Preferred Alternative for the Outfall-Diffuser that is “oversized” to accommodate average and peak flows from an onshore WPCP facility with rated capacity greater than 630 MLD, in order to avoid further piecemealing or incremental expansions to this WPCP and connecting infrastructure without a comprehensive assessment of potential and cumulative environmental impacts on Lake Ontario water quality and beneficial uses along the Ajax-Pickering lakefront;
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- d) Support the Town’s request for the Regions of York and Durham to prepare , as part of the subject EA, the aforementioned “Assimilative Capacity and Cumulative Effects Study”;
- e) Recommend that, as part of the subject EA, the cumulative impacts of effluent discharges from other WPCPs in the vicinity of the Duffin Creek WPCP be determined, including defining their respective mixing zones for SRP that may be overlapping with the Duffin Creek WPCP’s mixing zone for various substances, and a remedial plan be developed for the West Durham waterfront by the Province to protect and improve local water quality;

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- f) **Impose more stringent regulatory requirements on the Duffin Creek WPCP in its Environmental Compliance Application that will substantially reduce the daily loadings of nutrients (Total Phosphorus and Soluble Reactive Phosphorus) from the Duffin Creek WPCP's Outfall-Diffuser substantially below the 311 kilograms of total phosphorus per day as permitted in the current Certificate of Approval for Sewage Works;**
 - g) **File a Ministry-initiated Part II Order (Bump-Up) Request should a Notice of Completion for the subject EA be issued and an Environmental Study Report be filed with the Minister of the Environment that does not address the Town's recommendations, issues and concerns as well as MOE requirements;**
 - h) **Establish new Specific Surface Water Quality Objectives (SSWQOs) for the Duffin Creek WPCP that will protect and improve water quality, the aquatic environment and nearshore conditions along the West Durham waterfront in the near term, including but not limited to:**
 - i) **a SSWQO for Total Phosphorus that is more protective than the existing PWQO for Total Phosphorus established for municipal sewage treatment plants in 1994;**
 - ii) **a SSWQO for Soluble Reactive Phosphorus that is low enough such that the growth of *Cladophora* algae in nearshore water will be substantially reduced; and,**
 - iii) **SSWQOs for Chemicals of Concern, including various pharmaceuticals and personal care products, identified near the existing Outfall-Diffuser by MOE researchers in 2011; and**
4. **That this staff report be sent to the Ministries of the Environment and Natural Resources, MOE Central Region Directors, Councils of the Regions of York and Durham, all municipalities in Durham Region, Ontario Power Generation, the Stakeholder Advisory Committee, the Toronto and Region Conservation Authority, the Central Lake Ontario Conservation Authority, Conservation Ontario, the Ajax Environmental Advisory Committee, the Durham Region Environmental Advisory Committee, the Council of Canadians, Durham Sustain Ability, DurhamCLEAR, Environment Canada, Health Canada, Lake Ontario Waterkeeper, Ontario Water Works Research Consortium, the Great Lakes and St. Lawrence Cities Initiative, the International Joint Commission and persons who have requested to be kept notified of the Town's actions regarding the Outfall EA.**

BACKGROUND:

The purpose of this report is three-fold:

- Provide a status update on the Schedule „C' Municipal Class Environmental Assessment (EA) being jointly undertaken by the Regions of York and Durham, to permit an increase in the amount of effluent released from the Duffin Creek Water Pollution Control Plant (WPCP) Outfall into Lake Ontario;

- Present the issues identified by staff and the Town's peer review consultants with the Outfall EA documents and process to date; and
- Recommend next steps regarding the Outfall EA process.

DISCUSSION:

a) Status Update on the Outfall EA

The Duffin Creek WPCP discharges treated effluent through an existing Outfall-Diffuser that extends a distance of approximately 1.1 kilometres offshore under the bed of Lake Ontario. The existing Outfall was designed to force effluent, at high pressure, through a series of 63 pipes called diffuser "portals", into Lake water for mixing and dilution. Regional staff advise that the existing Outfall pipe has a design lifetime of 75 to 100 years, is in good condition, and has an approximate remaining lifetime of 40-65 more years.

The Interim Report on Phase 1 of the Outfall EA (April 2012), prepared by the Regions' consultant (CH2MHill), states that the Regions' are seeking a Preferred Alternative for the Duffin Creek WPCP's Outfall-Diffuser that can accommodate future but not necessarily ultimate effluent discharges of 890 MLD to more than 1,000 MLD into Lake Ontario for mixing and dilution.

In June 2012, the Regions further revised the schedule for the Outfall EA by shortening the timetable by 3 to 6 months. At present, the evaluation of Outfall-Diffuser alternatives, selection of a Preferred Alternative, issuance of a Notice of Completion and the submission of an Environmental Study Report (ESR – a summary of the EA process, technical documents and comments) with the Ministry of the Environment is to be completed in Fall 2013 rather than in the Spring 2014.

Earlier, Durham Region staff confirmed that sufficient capacity in the WPCP and its Outfall-Diffuser has been set aside through agreements between York and Durham Regions to accommodate wastewater flows from planned growth in Ajax and Pickering, including the Seaton Community, for the foreseeable future.

In contrast, York Region has been "borrowing" from Durham Region's allocated WPCP capacity to expedite growth and development in York Region. Infrastructure status reports prepared by York Region quarterly show a "Just In Time" approach to development that hinges on tightly timed delivery of wastewater treatment facilities and sewage collection pipes. Per York Region's Vision, Official Plan and Water and Wastewater Master Plan documents, the Region's intent to continue to incrementally expand the York-Durham Sewage System (YDSS or "Big Pipe") throughout York Region communities is predicated upon the Duffin Creek WPCP and its Outfall infrastructure to mix 80% of York Region's effluent into Lake Ontario receiving waters for dilution within 1.1 km of the Ajax-Pickering shoreline.

On June 18, 2012, staff reported to Council on the importance of extending this EA process to allow for completion and consideration of the results of an MOE water quality study. Commenced in April 2012 the study would be fully funded by the MOE and specially designed to evaluate in more detail the distribution of nutrients and physical factors influencing the growth of *Cladophora* algae along four urbanizing sections of the north shore of Lake Ontario, including the Ajax-Pickering, Scarborough, Oshawa and Cobourg waterfronts.

Typically in the Municipal Class EA process, once a proponent posts a Notice of Completion on the Project Website and files an Environmental Study Report (summarizing the phases of the EA) with MOE, any persons, agencies, municipalities and even MOE staff have a 30 calendar day period to submit a written Part II Order (Bump-Up) Request. Such a request would identify issues/concerns and recommended actions to the Minister of the Environment for consideration before MOE issues its decision on the project.

This report summarizes the information received and actions taken by the Town since June 2012, including the preliminary results of independent technical peer reviews funded by the Town and conducted this summer.

b) Issues and Process to Date

Regional Staff's Refusal to Wait for and Consider Ongoing MOE Study Confirmed

In 2009, the University of Waterloo completed a local water quality study for Ontario Power Generation (OPG) and concluded, among other matters, that current levels of nutrient loads from the WPCP are not the cause of *Cladophora* growth along the nearshore. In 2011, Dr. Martin Auer of Michigan Technological University, was retained by the Regions of Durham and York, the Toronto and Region Conservation Authority (TRCA) and Ajax to peer review the local water quality data. This peer review concluded, among other matters, that soluble reactive phosphorous being released by the WPCP is causing excessive *Cladophora* growth along the nearshore. To resolve the conflicting conclusions in the two studies and fill in missing information, Dr. Todd Howell from the MOE offered to undertake a water quality study to examine four areas along the northern Lake Ontario shoreline including the Ajax Pickering waterfront. It is anticipated that the results of this study will be released over the next three years.

From the Outfall EA's outset, Ajax Council and staff have encouraged the Works Commissioners of the Regions of York and Durham to work collaboratively with the Town and MOE to avoid similar conflicts encountered during the Stage 3 Expansion EA. Despite these efforts, staff received a letter from the Commissioners stating their refusal to wait for and consider Dr. Howell's study as part of the Outfall EA. This approach was reiterated in an October 18, 2012 Durham Region Works staff report recommending that the Outfall EA timeline not be deferred until the completion of the MOE study.

Even under present daily average outfall discharges of approximately 320 MLD of effluent, nearshore water quality and shoreline conditions are visibly deteriorating. The growth and decay of *Cladophora* algae has become a major problem in terms of aesthetics, odours and impairment of water quality for recreational use. Faced with doubling and possibly tripling of today's discharge volumes, staff reasonably anticipate that environmental conditions along Ajax's waterfront will further deteriorate.

Recent Meeting with Senior MOE Officials

On September 26, 2012, several Town staff and their consultant met with senior staff from MOE's Environmental Approval Branch to discuss the Outfall EA. Town staff presented the following:

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- the Town's goal of protecting its long-term investment in the Ajax Waterfront and Lake water quality;
 - some of the many actions taken by the Town to date to achieve its goal;
 - the problems stemming from excessive *Cladophora* algal growth that fouls the shoreline generating extremely offensive, strong odours each summer;
 - problems arising from the refusal of the Region of York and Region of Durham to wait for and consider the results of MOE's ongoing water quality study as part of the Outfall EA process; and
 - recommended actions that MOE could take in its dealings with the Regions and develop more stringent environmental standards for the Duffin Creek WPCP and other municipal WPCPs to protect and improve surface water quality at Ajax-Pickering and in urbanizing watersheds draining to Lake Ontario.

Briefly, some of the actions taken by the Town to protect and improve the Ajax waterfront and Lake Ontario water quality include:

- Preparing and submitting a Part II Order (Bump-Up) Request regarding the Duffin Creek WPCP Stage 3 Expansion EA and the subsequent imposition of 13 conditions by MOE, including requirements for odour monitoring;
- Advocating to reduce odours and waterborne emissions from the WPCP;
- Independently and jointly funding and/or participating in water quality studies to identify local pollution sources;
- Conducting peer reviews of odour-related work for all three stages of the WPCP and taking actions to reduce local pollution sources;
- Adopting and implementing updated environmental policies in the Ajax Official Plan to protect Lake Ontario nearshore water;
- Advocating for the protection of Lake Ontario-based Water Supply Plant intakes, including the intake for Durham Region's Water Supply Plant in Ajax, from the threats posed by waterborne emissions from WPCPs as part of emerging Source Protection Plans;
- Initiating and completing the South Ajax Stormwater Retrofit EA to identify Preferred Alternatives for 6 key stormwater subwatersheds and ongoing stormwater quality monitoring;
- Initiating Stormwater Public Awareness Programs including: Healthy Yards, Yellow Fish Road Student Awareness Program, Pet Care, Gardening and Lawn Care, Great Canadian Shoreline Cleanup, and a Stormwater Pollution Prevention Newsletter;

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- Continued stormwater quality monitoring to gauge improvements and confirm need for end-of-pipe storm sewer retrofits;
 - Proposing to design and construct road side curb gardens in the Long Range Capital Budget for 2013-2017;
 - Initiating and implementing a Shoreline Improvement Strategy Master Plan, which set out a strategy to "Bring Back The Beach" in the vicinity of Paradise Park, and subsequent investment in beach grooming, landscaping, dune restoration and other beach amenities;
 - Various projects with TRCA and other partners;
 - Advocating for renewed, co-ordinated "priority" actions by all levels of government to protect the Great Lakes; and
 - Participating proactively in this Outfall EA.

As part of the Town's presentation, staff outlined the following issues that MOE staff were asked to consider and, to provide explanations as to MOE's policies, guidelines and requirements for WPCP Outfall infrastructure and the protection of receiving water quality.

Issue 1 - The Regions are Entering Phase 2 of the EA, yet the Undertaking is Not Clear

The Regions have produced a problem/opportunity statement for the Outfall EA which states the following: "to identify and develop a preferred strategy to address the future capacity limitations of the existing outfall at the Duffin Creek WPCP that continues to protect the environment and human health." This statement is vague and does not offer any insight into the nature of the undertaking being considered by the Regions.

MOE staff have been asked to assist in determining specifically what are the Regions seeking - a Preferred Alternative that can accommodate 630 MLD, or 890 MLD or more than 1,000 MLD. Under all of these flow scenarios, significant potential and cumulative environmental impacts on the Town of Ajax can be reasonably predicted. Staff also asked MOE to identify the MOE policies, guidelines and any requirements applicable to this large-scale wastewater infrastructure and to avoid adverse impacts on Lake receiving water in the Ajax area.

Issue 2 - Piecemealing of Duffin Creek WPCP Stage 3 Expansion EA from the Outfall EA

According to the Municipal Class EA process, a Schedule „C' project is a project "that has the greatest potential environmental impacts". The Regions elected to follow a Schedule 'C' Class EA process for this Outfall project.

CH2MHill's Interim Report states that if a new Outfall-Diffuser is constructed, it should be built to a 2081 capacity of 890 MLD, or for a 70-year period with a rated capacity ranging from 960 MLD to 1,180 MLD, both of which far exceed the expanded onshore WPCP facility's 630 MLD rated capacity. However, the technical information provided through the Outfall EA fails to recognize and assess the environmental impacts of today's actual daily average emissions of 340 MLD and the proposed future outflows.

Any intention to “oversize” the Outfall-Diffuser infrastructure beyond 630 MLD prematurely assumes that a future expansion to the onshore WPCP facility will be approved, yet no evaluation of the environmental impacts of expansions of that magnitude or technical information has been provided in the Interim Report for review.

MOE officials have been requested to explain what MOE’s requirements are for the Regions’ evaluation of the environmental impacts on Lake Ontario receiving water at the various proposed outfall capacities identified in the Interim Report, and to determine from the Regions when that information is to be provided during the Outfall EA. It was suggested that the current average flows of 340 MLD be used as the yardstick against which the above scenarios are compared. This will ensure that any potential impacts on the Ajax-Pickering shoreline, the intake for the Ajax Water Supply Plant, and nearshore water quality is fairly represented.

Issue 3 – The Baseline Used to Determine the Size of the Mixing Zone is 520 MLD

MOE’s 1994 Surface Water Quality Goals and Policies state that “mixing zones are not to be used as an alternative to reasonable and practical wastewater treatment”. Further, MOE’s Guideline B-1-5 (from 1994) states that, in the design of mixing zones for WPCP Outfalls, “mixing zones are to be as small as possible” and “not interfere with beneficial uses” of receiving water bodies. To ensure the protection of acceptable aesthetic conditions, the Guideline states that mixing zones for WPCP Outfall-Diffusers should not contain:

- a) materials which form objectionable deposits;
- b) substances producing objectionable colour, odour, taste or turbidity;
- c) substances which produce or contribute to the production of objectionable growths of nuisance plants and animals; and,
- d) substances that render the mixing zone aesthetically unacceptable.”

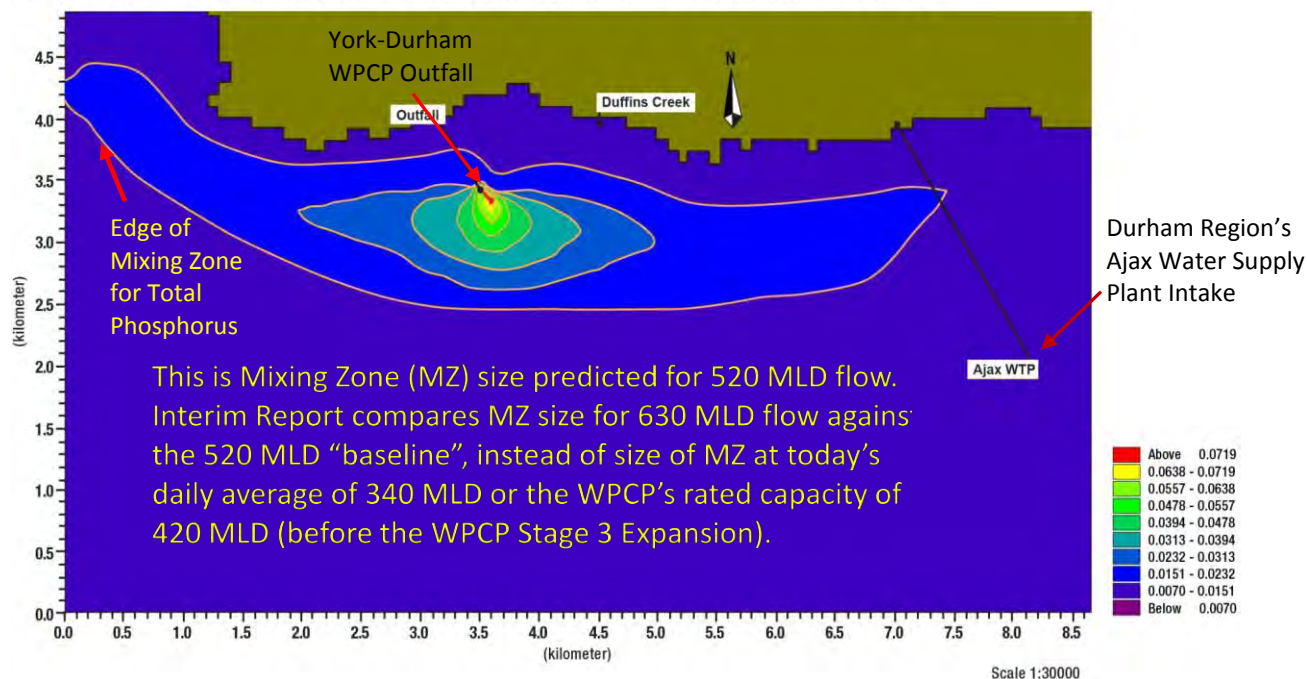
Despite these MOE provisions, the Interim Report (refer to Figure 1 of this staff report) is proposing a contrary, non-compliant approach. The proposal is to rely upon a “huge” mixing zone extending a total of 10 kms east and west and 2 kms north-south, or roughly 20 square kilometres, centred on the existing Outfall. The size of the mixing zone is being relied upon as an alternative to acquiring and installing sufficiently advanced treatment technologies to reduce the existing Outfall-Diffuser’s emissions before release from the WPCP into Lake Ontario.

Mixing zones are 3-dimensional and are as dynamic as the Lake water itself - constantly in motion, driven by Lake currents and wind action. They can move anywhere in the water column, between the lakebed and the Lake surface, can be buoyant or close to the water’s surface and readily pushed to the shoreline by onshore winds and wave action. These mixing zones can be the very locations where the public may choose to wade or swim during summer months.

The Interim Report employs an average flow “baseline” of 520 MLD as the “yardstick” against which the proposed predicted mixing zone for effluent emissions greater than 520 MLD is measured. By using a 520 MLD baseline, rather than the present discharge level of 340 MLD implies the impacts seen today are due to outflows of 520 MLD, which is untrue. In reality, as Outfall discharges increase toward 520 MLD in the future, the impacts will escalate. Increasing outflows from the WPCP to more than 1,000 MLD would triple present day flows of 340 MLD. The Town’s consultant cautions that environmental impacts are not linear – they can be exponential and cumulative.

Figure 1

FIGURE 6-8 from the CH2MHill Interim Report
Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



According to CH2MHill's modeling the predicted mixing zone, the effluent released from the Outfall will be carried west toward Pickering 50% of the year and east across Ajax's lakefront for 50% of the year. Effluent released from the Outfall can be reasonably expected to make its way to the Ajax lakefront and into Whitby, and across the Pickering waterfront towards Scarborough.

The Town's consultants peer review of the Interim Report confirms that if CH2MHill's 10-km long and 1 km wide mixing zone is accepted by MOE, (as is or with only minor adjustments), then subsequent decisions made during and after this Outfall EA process will expose nearshore Lake water and the Ajax-Pickering lakefront to significant threats rather than provide the required safeguards.

MOE staff have been asked to provide their opinion as to whether this predicted "huge" mixing zone will have negative impacts on the quality of water withdrawn through the submerged intake for treatment in the Ajax Water Supply Plant, and whether it can be expected to impair the Town's beneficial use of Lake Ontario nearshore water (for drinking, swimming, recreation/tourism and fishing).

Figure 2

FIGURE 6-8
Peak TP Levels as defined by the 90th percentile (without flows from Duffins Creek)

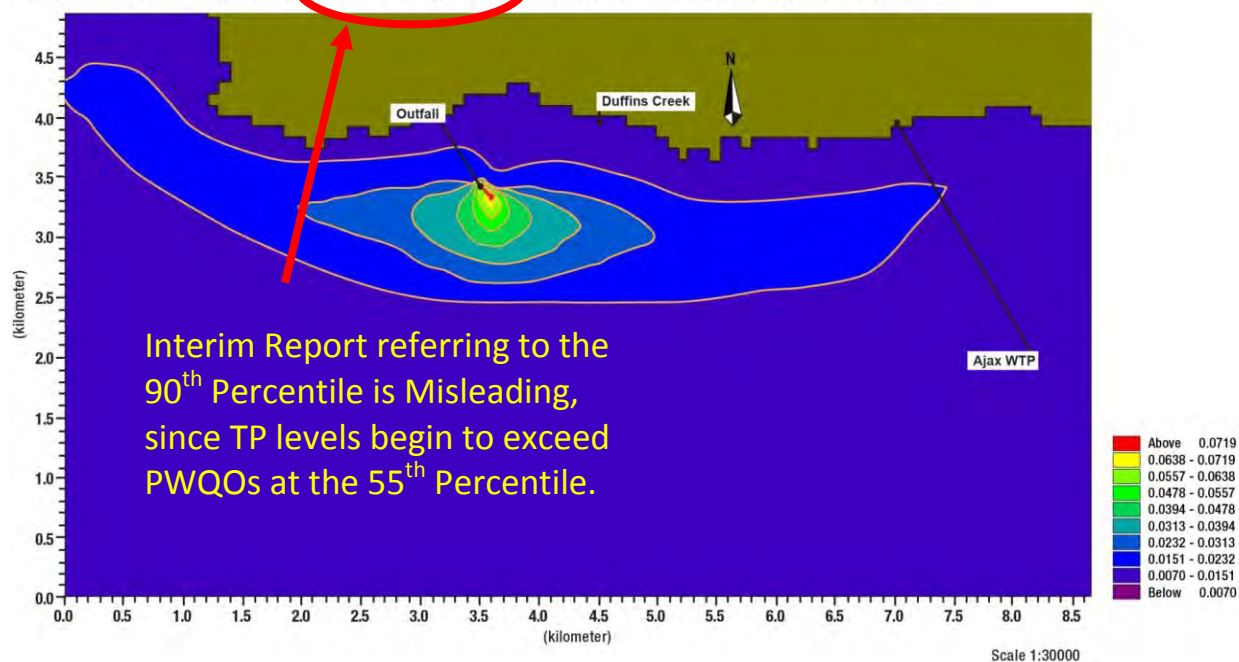


Figure 2, of this staff report presents Figure 6-8 from the Interim Report, entitled “Peak TP Levels as defined by the 90th Percentile”. However, Figure 6-8 from the Interim Report is misleading. Exceedences of the PWQO for TP levels begin at the 55th percentile, as illustrated in Figure 3 (taken from the Interim Report). This would imply an exceedance of the PWQO of every other day whereas the Provincial objective is not to have an exceedance of not more than once every 20 years.

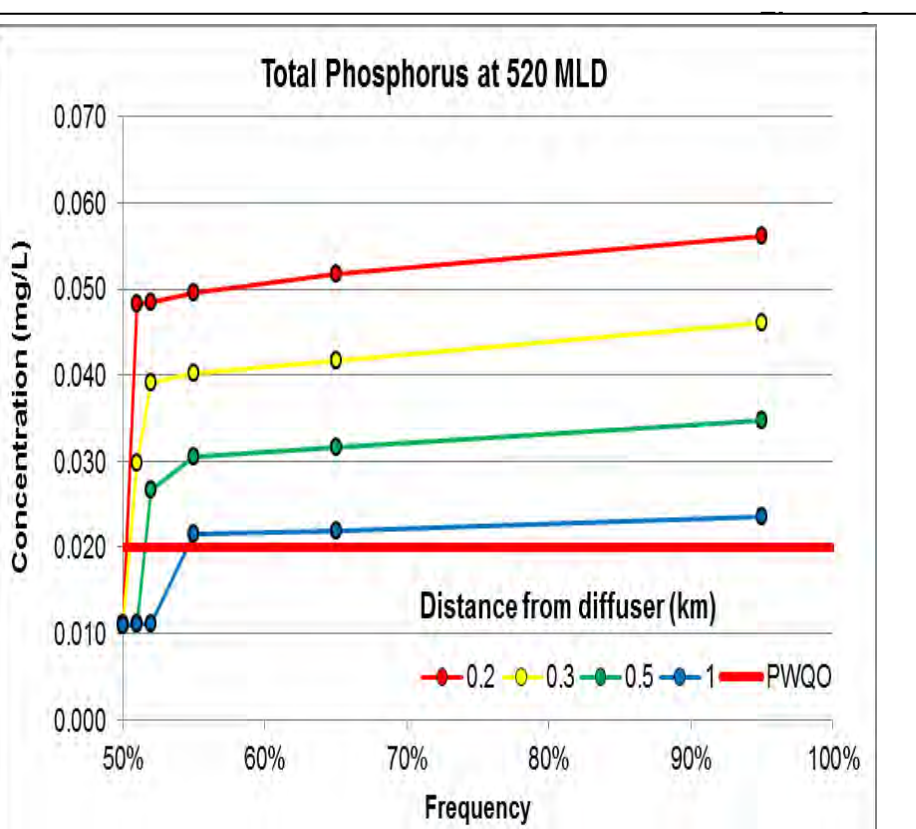


Figure 4

FIGURE 6-8 from the CH2MHill Interim Report
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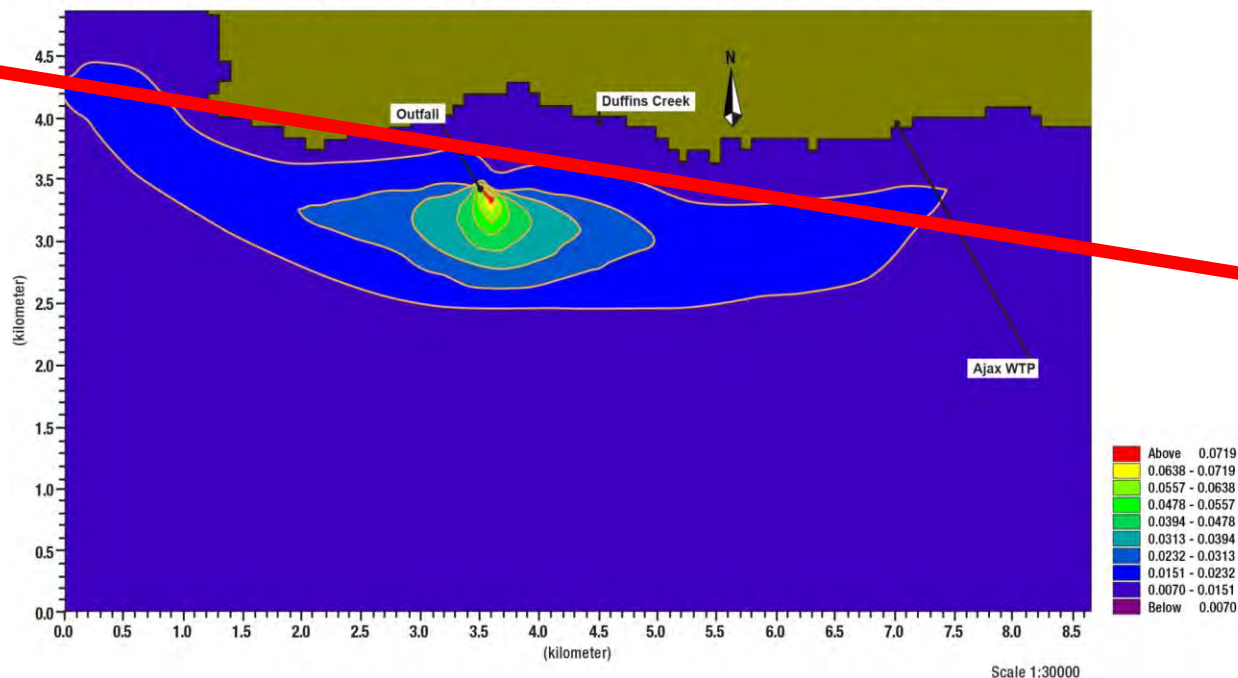
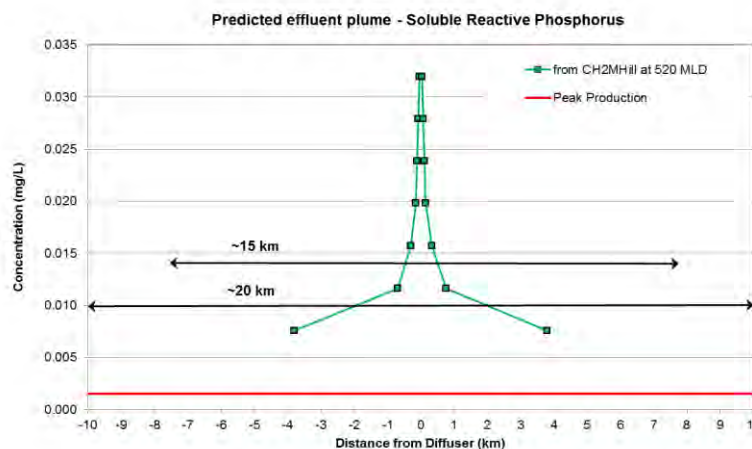


Figure 5



The Town's peer reviewers advise that the mixing zone for Soluble Reactive Phosphorus that promotes the growth of nuisance *Cladophora* algae could extend as much as 15-20 km across the Ajax-Pickering Waterfront which is represented by the red lines on Figures 4 and 5. Figure 5 represents a cross-section of the predicted effluent plume for soluble reactive phosphorus.

Issue 4 – Reliance on Regulatory Dilution Ratio Criteria

The 20:1 dilution criterion is a MOE regulatory performance requirement for Outfall Diffusers. However, the achievement of a 20:1 dilution criterion does not ensure protection of the environment.

CH2MHill used the CORMIX model to predict the level of dilution to be achieved at 520 MLD. The CORMIX model itself warns users that “hydrodynamic modeling by any technique is not an exact science. Field and lab data has shown CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for majority of cases with a +/- 50% accuracy rate”. Therefore, the predicted dilution criteria (for 520 MLD flows from the Outfall-Diffuser) set out in the Interim Report can actually range in accuracy as widely as from approximately 10:1 to 40:1.

CH2MHILL defends existing discharge of 420 MLD based on a predicted achievement of 22:1 dilution, yet 22:1 still causes exceedence of the PWQO for Total Phosphorus (TP). Total Phosphorus is an indicator of Soluble Reactive Phosphorus which is a nutrient that causes excessive growth of nuisance algae. In the Interim Report, CH2MHILL concludes that achieving 20:1 dilution at effluent discharges averaging 560 MLD is unacceptable. The Town's consultant agrees that 20:1 is unacceptable. However, since there is no practical difference between 22:1 and 20:1, 22:1 dilution at today's average discharge of 340 MLD is also unacceptable.

The Regions of York and Durham need to employ a more effective approach to improving the quality of treated effluent discharged than continuing to rely on dilution in Lake water. To do so, much greater removal of TP is needed that required by the WPCP's present Certificate of Approval, as well as SRP and Ammonia levels within the WPCP facility itself – to prevent these substances from entering Lake water via the Outfall-Diffuser.

Issue 5 – Substances in Effluent in the Mixing Zone Impair Water Quality

The Town's consultant has advised that substances in the Outfall's mixing zone impair nearshore water quality and shoreline conditions, as proven by scientific studies in the U.S. and Canada, and interfere with beneficial uses of Lake Ontario at Ajax (e.g., drinking water, swimming, wading, etc.). The Duffin Creek WPCP releases large quantities of Total Phosphorus and Soluble Reactive Phosphorus, as confirmed by the independent peer review completed in July 2011 by Dr. Auer.

As explained in detail in the June 2012 staff report, Dr. Auer's peer review of the study conducted by the University of Waterloo, was funded by the Regions, the Town, Ontario Power Generation and TRCA in 2010 to identify local sources of substances that adversely affect nearshore water quality, including but not limited to *E. Coli* bacteria, Total Phosphorus (TP), Soluble Reactive Phosphorus (SRP) and Ammonia.

Figure 6: *Cladophora* Algae on Ajax's Shoreline East of Existing Outfall - Summer 2012



Phosphorus specifically the SRP form, has been clearly identified by the broad scientific community as the nutrient whose concentrations must be controlled in nearshore waters if production of *Cladophora* algae is to be controlled. Today, there is no PWQO for SRP.

In fall 2010, Dr. Auer's draft report on his findings was distributed to the Regions, the Town, TRCA and OPG, during Phase 1 of the Outfall EA (before the long list of alternatives had been finalized), clearly indicating the following:

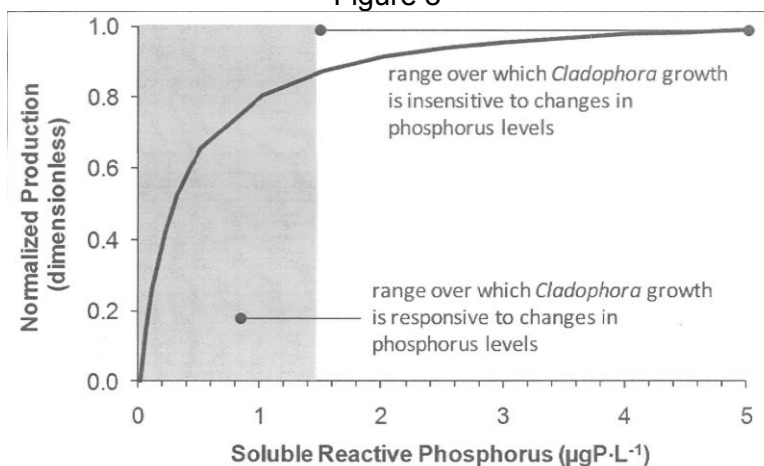
- the Duffin Creek WPCP is the overwhelmingly dominant yet controllable point source of discharged SRP;
- the Duffin's Creek tributary is the primary source of *E. Coli* bacteria to the Ajax-Pickering waterfront; and,
- other local sources, such as stormwater system discharges and surface runoff, are contributing to poor water quality but to a much lesser extent compared to discharges from the Duffins Creek watershed and Outfall at the Duffin Creek WPCP.

Figure 7: Duffin Creek WPCP



Cladophora “mats” harbour freshwater shrimp and other food that attracts and sustains expanding flocks of Canada Geese and other waterfowl and birds year-round in nearshore water (e.g., each Canada Goose excretes up to 2 pounds of feces carrying *E. Coli* every day directly into Lake water, on beach sand and on the waterfront). While the Town has been rounding up and relocating Canada Geese from the Ajax shoreline for several years with the Canadian Wildlife Service, it is not surprising that reports across the GTA have observed larger populations of Canada Geese than in past years.

Figure 8



Dr. Auer's findings indicate that there is a range for SRP ($0-0.8 \text{ ugPL}^{-1}$) in nearshore Lake Ontario water within which *Cladophora* growth will be reduced if P levels are reduced, and that existing background water conditions along the Ajax shoreline are such that reduced P emissions from the WPCP's Outfall can lead to improvement.

Issue 6 – Odorous, Slippery Algae is Fouling Ajax's Shoreline

According to MOE's 1994 requirements for effluent "substances that impair water and sediment quality are a major problem ... Substances such as nutrients, when present in excess, can upset the natural balance of the ecosystem ... others can impair use of water by producing tastes and odours."

MOE Policy for deriving receiving-water based, point-source effluent requirements extends well beyond the simple 20:1 dilution criteria used by CH2MHill, and includes consideration of mixing zones, protection of beneficial uses, and limiting the release of substances that produce objectionable tastes and odours or contribute to objectionable growths of nuisance plants.

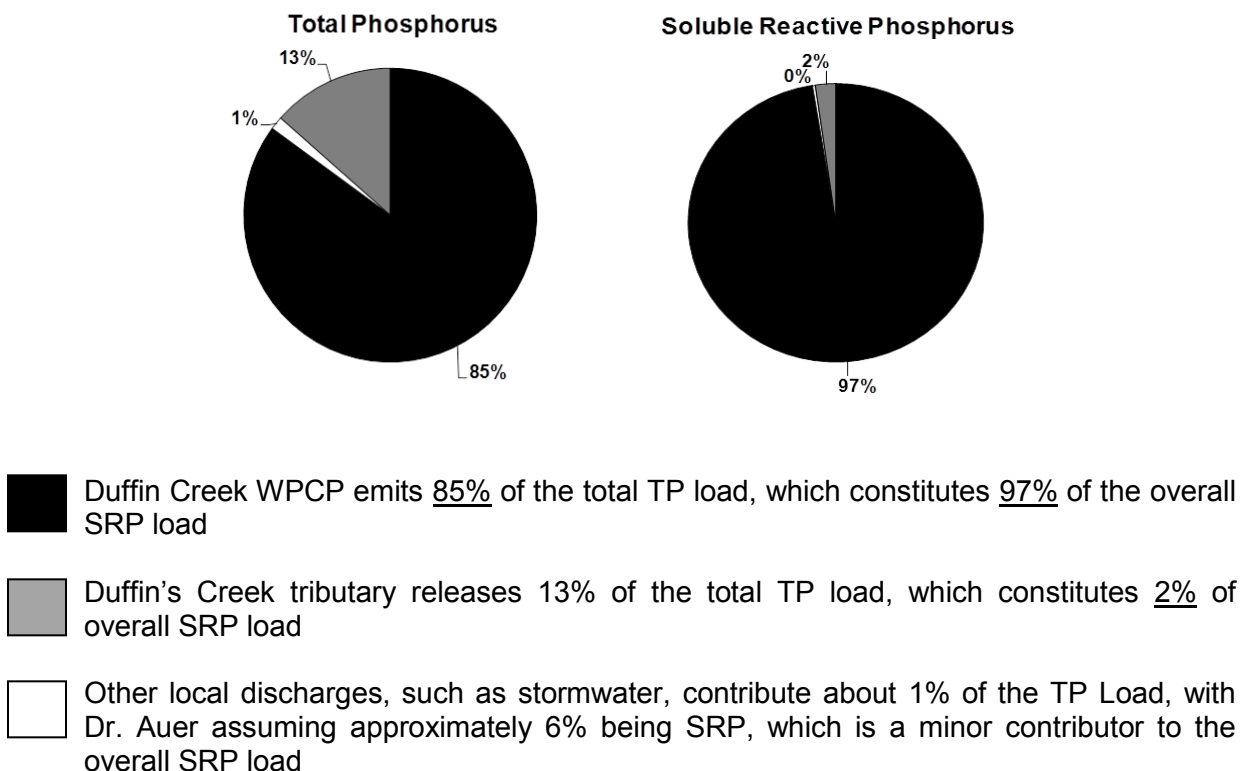
For example, Ajax residents have advised Council and staff that strong "sewage" odours from the WPCP have been experienced in residential areas of South Ajax, along the Ajax waterfront and, particularly, as they cycle along the Waterfront Trail toward the WPCP. This summer, the sewage odours were described as being so "overpowering" and offensive those residents using the Trail had to turn back as they approached the vicinity of the WPCP. Staff and other residents experienced very offensive "rotting" smell from decaying algae along the shoreline, so strong that the public could not remain to experience the waterfront.

Issue 7 – Dr. Auer's Work Identified the WPCP's Effluent as the Overwhelmingly Dominant Local Source of Nutrients

In July 2011, Dr. Auer's independent final peer review was released as a final report. As indicated by subsequent Durham Region staff reports, including the October 18, 2012 Durham Works Report on the Outfall EA and Water Quality, the Regions have chosen to ignore Dr. Auer's report and its findings. The Town's consultant describes the Auer report as clearly pinpointing local sources of substances degrading water quality in the vicinity of the Ajax waterfront.

More specifically, Dr. Auer measured the percentage of Total Phosphorus (TP) and the percentage of TP in "Soluble Reactive Phosphorus" (SRP) released into the Lake from sources in vicinity of Ajax's waterfront (SRP "feeds" the growth of *Cladophora* algae). The pie graph in Figure 9 of this staff report, taken from the Auer report, summarizes his findings:

Figure 9: Distribution of TP and SRP



As indicated above, discharges from the WPCP's Outfall-Diffuser at today's average daily flow of 340 MLD carry enormous loads of phosphorus.

Any preferred solution for the Outfall should incorporate the acquisition, installation and operation/maintenance of advanced treatment technologies that will do a better job of removing both nutrients and Chemicals of Concern from sewage - before effluent is released into Lake Ontario – than the technologies presently to be used in Stages 1, 2 and 3 of this WPCP. Staff are aware that the City of Hamilton is known as Ontario's leader in this field, having invested in installing membrane filtration to reduce the release of substances from WPCP into Hamilton Harbour, which ultimately discharges into Lake Ontario.

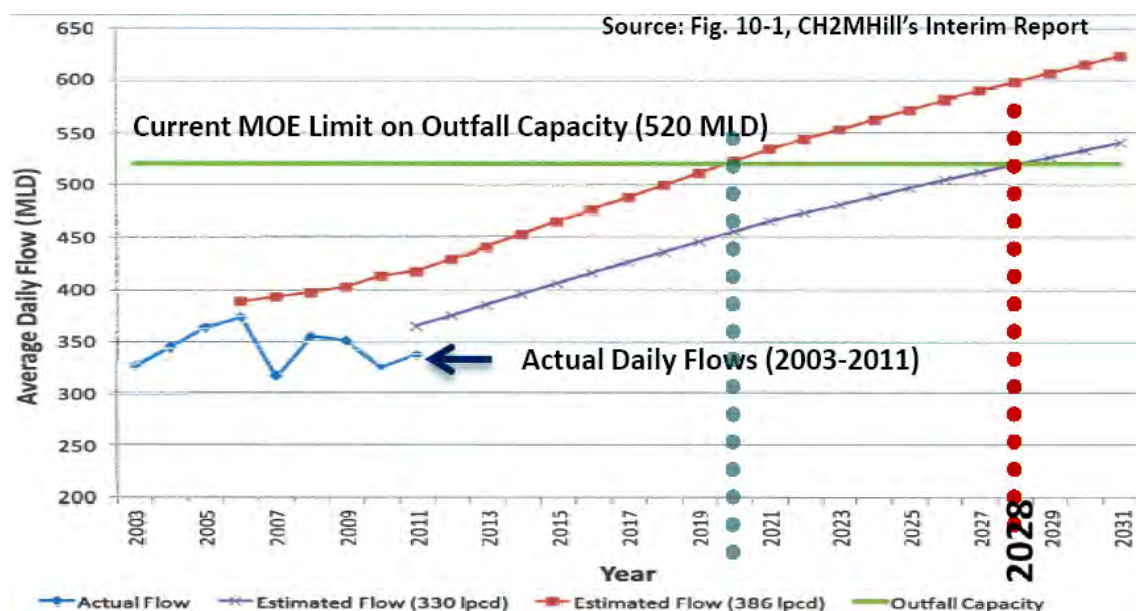
Durham Works staff report on the Outfall EA, dated October 18, 2012, states that when the Stage 3 Expansion and upgrades to older Stages 1 and 2 are complete, the Duffin Creek WPCP will be "one of the best WPCPs discharging to open waters of Lake Ontario". For several years, WPCPs in Halton Region and elsewhere on Lake Ontario have been monitored as out-performing the "After Expansion" Effluent Limit of 0.8 mg/L for TP set out in the current CofA for the Duffin Creek WPCP, reducing TP discharges well below 0.5 mg/L.

When 200 Provincial Water Quality Objectives (PWQOs) were established by MOE in 1994, the Province decided to apply the majority to private WPCPs and only a few to municipal WPCPs. It is reasonable to expect that many of the substances limited by the PWQOs are passing unchecked into Lake Ontario via the existing Outfall based on the present site-specific Certificate of Approval for Sewage Works. MOE should apply more Site Specific Water Quality Objectives to this WPCP.

Issue 8 – There is No Urgent Need for an Immediate Outfall Solution

In April 2012, staff retained McNaughton Hermesen Britton Clarkson (MHBC) Planning Consultants to determine if York Region's population forecasts used to identify projected short to mid-term wastewater flows to the WPCP to 2051 are reasonable. MHBC found that the wastewater generation rates of 386 litres per capita per day (lpcd) prior to 2005 have been reduced to an average rate of 330 lpcd from 2006 to 2011. If the more current actual average wastewater generation rate of 330 lpcd is used, the time until the WPCP would reach 520 MLD (MOE's present limit on effluent discharges from the existing Outfall-Diffuser) would be extended by 9 to 10 years to 2028. According to MHBC's analysis, there is ample time available to undertake and complete a more comprehensive, thorough Outfall EA process, integrating Dr. Howell's study and conducting a comprehensive "Assimilative Capacity and Cumulative Effects Study" well before approaching the existing Outfall's capacity threshold date.

Figure 10 – Estimated Year When Flows to WPCP Will Reach 520 MLD



CH2MHill's Interim Report included the above figure, which based on recent wastewater flows, indicates that the WPCP would reach 520 MLD in approximately 2028.

Issue 9 – The Lack of a Provincial Nutrient Management Policy

There is no protective Provincial Nutrient Management Policy, applicable to the Duffin Creek WPCP and surrounding nearshore area (Ajax-Pickering Waterfront), or associated regulatory requirements that must be met by the Regions as part of the Outfall EA.

Ajax has submitted several reports and Council resolutions to MOE seeking area-specific effluent limitations on the Duffin Creek WPCP's waterborne emissions as crucial to resolving deteriorating environmental conditions in the West Durham Waterfront area. Council's resolution to the Province in this regard has the support of the 90+ members of the Great Lakes and St. Lawrence Cities Initiative.

Issue 10 – No Finite Maximum Limit on the Capacity of the Duffin Creek WPCP and its Outfall-Diffuser

When the Duffin Creek WPCP was originally established in the 1970's, the WPCP was to be expanded in four stages to a rated capacity of 747 MLD. As noted, the Regions seem to intend to far exceed that rated capacity by doubling or possibly tripling existing flows to the WPCP.

The absence of a finite "maximum limit" on the capacity of the WPCP and its Outfall-Diffuser – appears to allow the Regions to "overbuild" this infrastructure so as not to have to re-examine the Preferred Alternative or local Lake conditions for 70 years or more.

Recommendations for MOE's Consideration

At the September 26, 2012 meeting with senior MOE officials, the following recommendations based on the Town's review of the CH2MHill's Interim Report were presented to the MOE for consideration.

1. Direct the Regions of York and Durham to modify the Outfall EA to:
 - a) Extend the EA timeline to permit MOE's current water quality study to inform the EA to help address the Town's issues;
 - b) Prepare a comprehensive "Assimilative Capacity and Cumulative Effects Study" evaluating the accumulating levels of nutrients and chemicals of concern (CoC) discharged from the Outfall, in order to identify and implement:
 - More stringent specifications for reducing the WPCP's nutrient emissions into Lake Ontario;
 - The best available technologies for nutrient/CoC removal in the WPCP; and
 - Technical justification for an optimum Outfall location and design that will protect Ajax's nearshore water quality (e.g., for drinking purposes, recreational use and tourism);
 - c) Require evaluation of the present and predicted future cumulative impacts of discharge from the WPCP's existing outfall and how they are to be reduced;
 - d) Require assessment of the cumulative impacts of discharge from neighbouring Water Pollution Control Plants;
 - e) Require Total Phosphorous and Soluble Reactive Phosphorous loadings be substantially reduced (below the 311 kg/day limit in the present TP); and
 - f) Require thorough technical evaluation of the long list of Outfall alternatives;
2. Establish and implement Site Specific Water Quality Objectives (SSWQOs) that apply to the Ajax lakefront:

-
- a) A SSWQO for Total Phosphorous that is much more restrictive than the existing PWQO;
 - b) A SSWQO for Soluble Reactive Phosphorous that is low enough such that the growth of *Cladophora* will be limited (i.e., reduced); and
 - c) A SSWQO for Chemicals of Concern, including pharmaceuticals and personal care products;
3. Develop a more comprehensive list of SSWQOs and apply them to the Duffin Creek WPCP and other WPCPs (e.g., for TP, SRP and CoC);
 4. Prevent “over-sizing” of the WPCP’s Outfall-Diffuser through this EA process (that is, not beyond 630 MLD); and
 5. Require the Regions to evaluate advanced treatment technologies in the Duffin Creek WPCP to protect and enhance water quality.

Senior MOE officials were requested to provide a written response to the aforementioned issues and recommendations prior to Council considering this staff report. Should a satisfactory reply not be received, staff have been asked to arrange a meeting between Mayor Parish and the Honourable Jim Bradley, the Minister of the Environment, to discuss the Town’s unresolved issues and possible MOE actions to protect Ajax’s interests.

c) Next Steps

Next Public Information Forum in Ajax - January 2013

As part of the Outfall EA, a third Public Information Forum (PIF #3) will be held in Ajax in January 2013. Details regarding location and time for PIF #3 will follow.

Evaluating Alternatives and Selecting the Preferred Alternative

York Region staff indicate during this Class EA that there is opportunity to revisit existing and expanding wastewater treatment technologies in the Duffin Creek WPCP, but not in as much detail as when the future WPCP’s Stage 4 Expansion EA is initiated. At the recent SAC meeting, tertiary treatment was on the short list.

The Regions have prepared a Short List of Alternatives for the Outfall as outlined in their October 18, 2012 Report as follows:

- Optimized operations;
- Modify existing outfall diffuser;
- Provide tertiary treatment;

- Extend existing outfall diffuser; and,
- New outfall

The above noted report does not describe in any detail the short list of alternatives.

FINANCIAL IMPLICATIONS:

In April 2012, staff retained McNaughton Hermesen Britton Clarkson (MHBC) Planning Consultants to review York Region's population forecasts to determine if the forecasts used to identify projected short- to mid-term wastewater flows to the WPCP to 2051 are reasonable. The total cost of the contract was \$11,272.88, inclusive of HST and disbursements, which was funded from the Planning & Development Services 2012 Consulting Budget.

In June 2012, staff recommended at Council's direction, that the amount of \$55,000, (exclusive of HST and disbursements) in Unbudgeted Funds be allocated to retain three consultants to conduct peer reviews of the EA process and technical documents, which was expected to be sufficient to cover estimated costs through to March 2014. The estimated cost did not include the potential future cost of retaining outside legal counsel and extending contracts with the recommended consultants to prepare and submit a Bump-Up Request to the Minister of the Environment (within 30 days of the Regions' issuance of a Notice of Project Completion for the Outfall EA process and posting of a Final Environmental Study Report).

By the end of October 2012, staff will have expended the aforementioned Unbudgeted Funds, due to the extent and complexity of the Town's issues arising from the peer review of CH2MHill's Interim Report and technical appendices regarding the Lake environment, modeling of the predicted Mixing Zone and representation of CH2MHill's results in the Interim Report.

Should Council endorse the staff recommendations, staff will bring forward a further report requesting additional funding to advance the review process.

COMMUNICATION ISSUES:

The Regions have a standalone Project Website for the Outfall EA: www.durham.ca/OutfallEA that can be accessed on both Regions' websites: www.durham.ca and www.york.ca.

The Town's staff reports and Council resolutions submitted formally to the Regions as part of Phases 1 and 2 of the Outfall EA process have been posted to the Project Website as "Other Correspondence". All 3 staff reports are listed as being received during Phase 2; although the Town's first staff report was submitted well within Phase 1, based on the Regions' past and present Project Timetables. To date, unlike the approach taken with submissions from the public, CH2MHill has not posted any comments in response to the Town's issues and concerns raised in any of the Town's reports or recommendations.

To conduct an open, transparent and traceable EA process with clear documentation, the Interim Report, which CH2MHill is writing as a chapter for the final Environmental Study Report to be submitted to the Minister of the Environment at the conclusion of this EA process, be revised to include all input from Council, staff, residents, the Ajax Environmental Advisory Committee and interested parties – and provide clear, direct responses to all issues and concerns.

The Town's website continues to provide links under "Environmental Assessments" to other information and studies relevant to the subject Outfall EA from Ajax's perspective, such as the Town's Part II Order (Bump-Up Request) regarding the Duffin Creek WPCP Stage 3 Expansion and Dr. Martin Auer's Independent Peer Review Report and photos of the WPCP and Ajax waterfront:

<http://www.ajax.ca/en/doingbusinessinajax/environmentalassessments.asp>

Communications staff will ensure the community is advised of the next Public Information Forum (PIF#3) to be held in January 2013 to encourage members of the public and other interested parties to attend, sign in and submit comments/questions to the Regions during and after the Forum.

CONCLUSION:

This EA process offers the only opportunity for the Town and the public to contribute to decisions being made by the Regions regarding the WPCP and its Outfall – decisions that will have ramifications and consequences for Ajax residents and their living environment for many generations.

Ajax's goal has been, and continues to be, to work co-operatively with the Regions' to promote the selection of a Preferred Alternative for the Outfall-Diffuser serving the Duffin Creek WPCP that may better protect Lake Ontario nearshore water quality.

The Town's outstanding issues, as identified through peer reviews conducted this summer, and recommended actions that the Province could take, as part of the Outfall EA and in the near term, to help the Town were presented to senior MOE officials at a meeting in late September.

Staff have a positive working relationship with MOE staff. MOE's Central Region Director will be providing a written response to the Town's issues and recommendations, but it had not been received as of the writing of this staff report.

In staff's view, the Outfall EA needs to be conducted at a slower pace - not only to allow for receipt of the results of MOE's ongoing water quality study and a comprehensive "Assimilative Capacity and Cumulative Effects Study" but, just as importantly, to ensure that the potential environmental impacts of this WPCP facility and its Outfall are mitigated to the fullest extent possible – impacts on receiving water quality used for drinking purposes and recreation, and lived in by fish and other aquatic species - are fully evaluated and accurately presented.

The present Interim Report and appended technical documents are inadequate and only present a fraction of the information needed to make the right decision regarding the Duffin Creek WPCP's Outfall-Diffuser and onshore WPCP facility to substantially reduce effluent emissions to nearshore Lake Ontario and mitigate its negative long-term consequences to shoreline communities in Durham Region.

From the Town's review of York Region's growth forecasts, it is evident that there is an ongoing trend to reduced average daily sewage flows to the Duffin Creek WPCP, even while population growth continues, likely attributable to increased water conservation and possible improvements in reducing inflow and infiltration to the YDSS. This would suggest that a review of the 2018-2019 capacity threshold date (the date at which average daily flows of 520 MLD are presently

expected) and the timing of required Outfall construction should be revised. The Outfall solution does not need to be constructed and operating in 2016.

As a result, the Regions have ample time to slightly extend the Project Timeline for the Outfall EA in order to receive and consider the findings of MOE's water quality study presently underway along the Ajax-Pickering (West Durham) waterfront, to make the best possible management decision regarding this critical, large-scale infrastructure project.

Following Council's consideration of this staff report, a meeting will be arranged for Mayor Parish to discuss the Town's issues and recommendations with the Honourable Jim Bradley, Minister of the Environment, and determine what actions will be taken to require the Regions to extend the Outfall EA process, etc.

Staff will continue to provide Committee and Council with status updates on the Outfall EA.

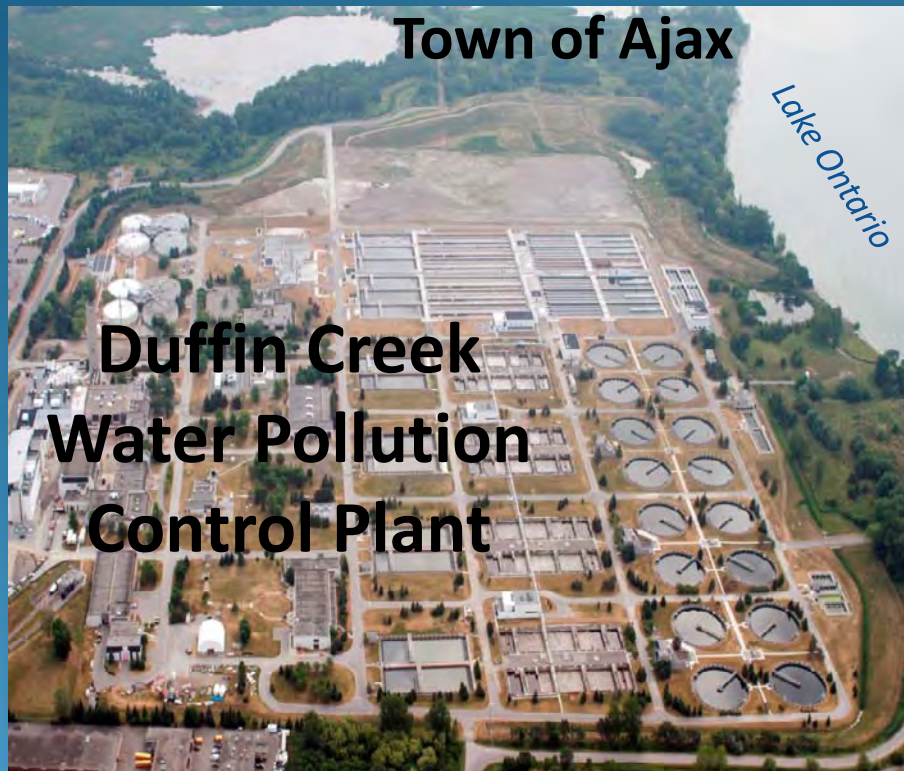
Barbara Hodgins, MCIP, RPP
Senior Policy Planner

Kevin Heritage, MCIP, RPP
Policy Planning Coordinator

Gary Muller, MCIP, RPP
Manager of Planning

Paul Allore, MCIP, RPP
Director of Planning and Development Services

Duffin Creek Water Pollution Control Plant Outfall Environmental Assessment Process (Outfall EA) - Status Update and Next Steps



Presentation to Town of Ajax Council – October 22, 2012

Overview of Outfall EA

- Plant discharges effluent through an Outfall extending approx. 1 kilometre into Lake Ontario that services the majority of homes and businesses in York Region and West Durham.
- Regions of York and Durham are seeking a solution to discharge 630,000,000 litres of effluent per day (630 MLD) and possibly more than 1,000 MLD into the Lake for mixing and dilution.
- Staff Report summarizes the EA process to date and the issues identified by staff with the Regions' Interim Report.

Durham Region Joint Committee's Recent Decision re Outfall EA

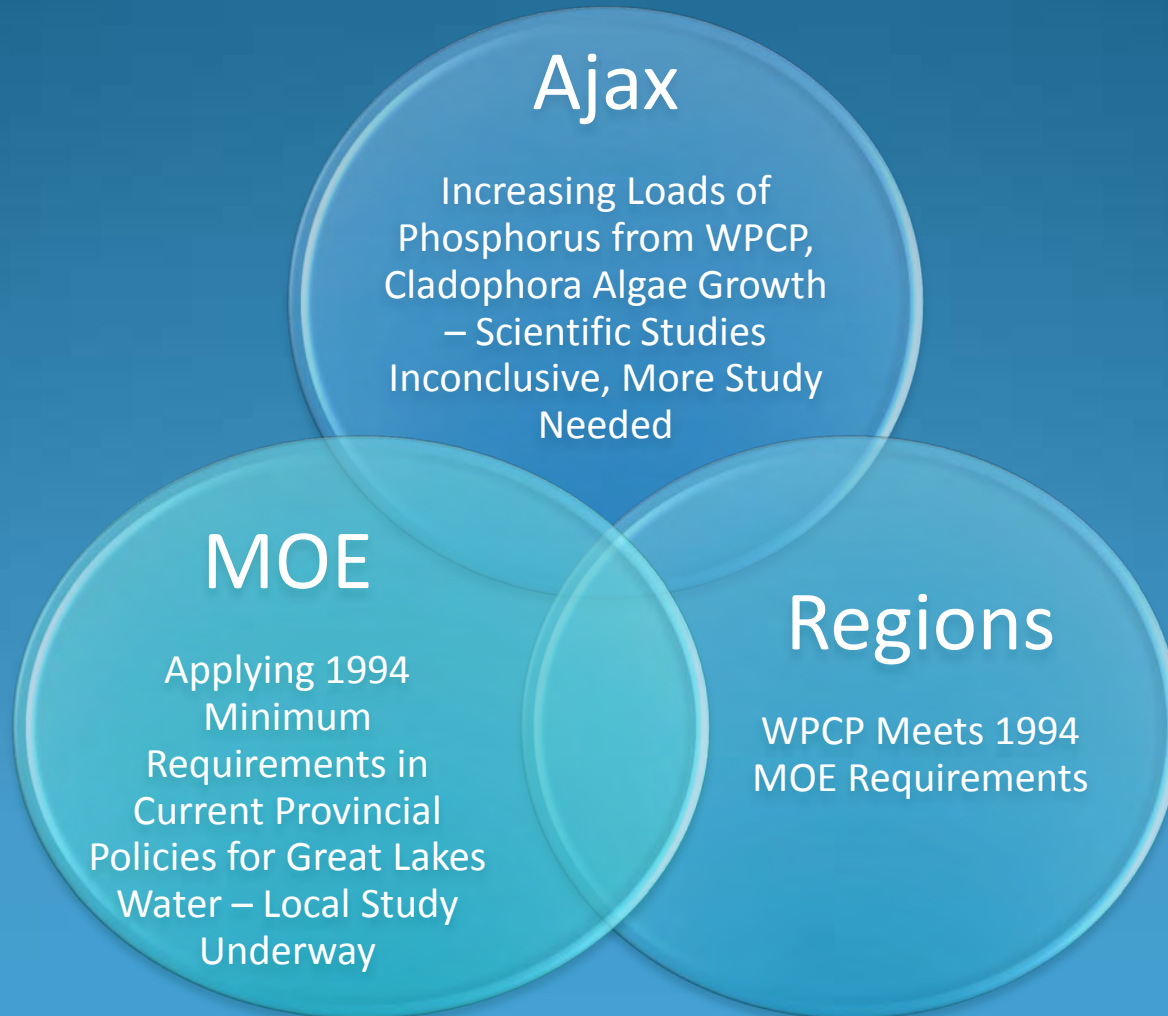
On Thursday October 18, 2012, the Committee passed the following motion:

THAT Regional staff continue to meet with representatives of the Town of Ajax and City of Pickering to try to reach an agreeable approach to resolving the Town's issues with the Duffin Creek WPCP Outfall Environmental Assessment and report back to Joint Committee before the end of February 2013.

Also, the Committee deferred the following motion until February 13, 2013:

THAT the Outfall EA timeline be extended to ensure that the Ministry of the Environment's current water quality study and the preparation of a comprehensive "Assimilative Capacity and Cumulative Effects Study" be completed and that these findings be used to determine the best scientifically possible Preferred Alternative for the Duffin Creek WPCP's Outfall-Diffuser.

Current Viewpoints



Existing & Predictable Environmental Conditions Along the Ajax-Pickering Lakefront

- More frequent beach postings (Rotary Park posted 100% in Summer 2005)
- Excessive *Cladophora* algae growth in water & decaying on the shoreline
- *Cladophora* growth is fed by nutrients (e.g. Soluble Reactive Phosphorus)
- Algae mats host food for waterfowl year-round = higher *E. Coli* levels
- Lost recreation/tourism/investment, more shoreline grooming
- More clogging of Pickering Nuclear Plant's submerged water intake



Ajax Waterfront, 2006

The Town of Ajax is Taking an Active Role to Solve these Problems



DUFFIN CREEK

Rotary Park Beach

Town of
Ajax

Waterfront Park

Finsco Rd

Stage 3

Future
Stage 4

Stage 1

Stage 2

Duffin Creek Water
Pollution Control
Plant

YDSS BIG PIPE

Joadrel Rd

McKay Rd

Lake Driveway W
Simon St

O'Connell Dr

Image © 2012 DigitalGlobe
Image © 2012 TerraMetrics
© 2012 Google

Google earth

Images Date: 8/21/2009

42°48'06.60" N, 79°02'21.52" W, elev: 246 ft

Image at: 6106 ft

Concerns About Cladophora Algae

- It is well known that Cladophora is fouling shorelines in Ajax & Durham Region
- Scientists have determined the primary cause of Cladophora algae growth is **Soluble Reactive Phosphorus** or **SRP**

FACT - **MORE SRP** means **MORE Cladophora**

Best possible science related to Cladophora growth is needed to determine effect of SRP in WPCP Effluent on Lake Ontario before finalizing Outfall EA.



Ajax Waterfront (September 2012)

Relevant Water Quality Studies

2009 University of Waterloo Study

- 2009 levels of nutrient loads from WPCP are not the cause of Cladophora growth

2011 Peer Review by Dr. Martin Auer of Local Water Quality Data (Auer Report)

- Funded by Regions of Durham and York, TRCA and Ajax
- SRP being released by WPCP is causing excessive Cladophora growth

THE ISSUE

- Conflicting studies need to be resolved
- Both studies recommend review of local sources contributing to excessive Cladophora growth

THE SOLUTION

- Integrate MOE's 2012-2013 study of Lake Ontario (Scarborough, Ajax-Pickering, Oshawa & Cobourg) to affirm environmental impacts of WPCP's effluent emissions
- Conduct a separate "Assimilative Capacity and Cumulative Effects Study" to evaluate levels of nutrients and chemicals discharged from WPCP

MOE's Surface Water Quality Policy & Guideline

MOE Policy states that “**mixing zones are not to be used as an alternative to reasonable and practical wastewater treatment**”.

Further, MOE's Guideline B-1-5 (from 1994) states that, in the design of mixing zones for WPCP Outfalls, “**mixing zones are to be as small as possible**” and “**not interfere with beneficial uses**” of receiving water bodies. To ensure the protection of acceptable aesthetic conditions, the Guideline states that **mixing zones for WPCP Outfall-Diffusers should not contain:**

- materials which form objectionable deposits;
- substances producing objectionable colour, odour, taste or turbidity;
- substances which produce or contribute to the production of objectionable growths of nuisance plants and animals; and,
- substances that render the mixing zone aesthetically unacceptable.

Town's Concerns About Outfall EA

- Tonight's staff report sets out results of peer review by Town's consultants
- Peer reviews identified 10 key issues requiring more study/collaboration

7 Phosphorus-Related Issues:

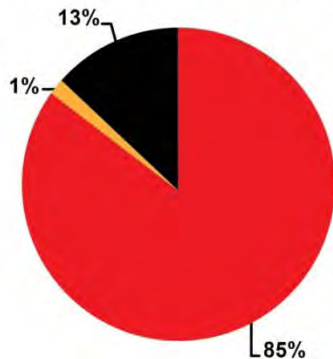
1. WPCP Effluent is the Dominant Local Source of Phosphorus (Auer Study)
2. Mixing Zone Model – “Baseline”
3. Reliance on 20:1 Dilution Ratio Criteria
4. Substances in Effluent in Mixing Zone Impair Water Quality
5. Odorous, Slippery Algae Fouling Shoreline
6. No Provincial Nutrient Management Policy
7. No Finite “Maximum Limit” on Capacity of WPCP

3 EA Process-Related Issues:

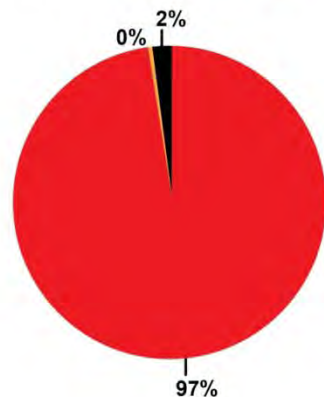
8. No Urgent Need to Finalize Outfall EA
9. Piecemealing of EA
10. EA “Undertaking” is Not Clear

1. WPCP Effluent is Dominant Local Source of Phosphorus (Dr. Auer's 2011 Review Findings)

Total Phosphorus (TP)



Soluble Reactive Phosphorus (SRP)



PRIMARY CAUSE OF CLADOPHORA GROWTH:

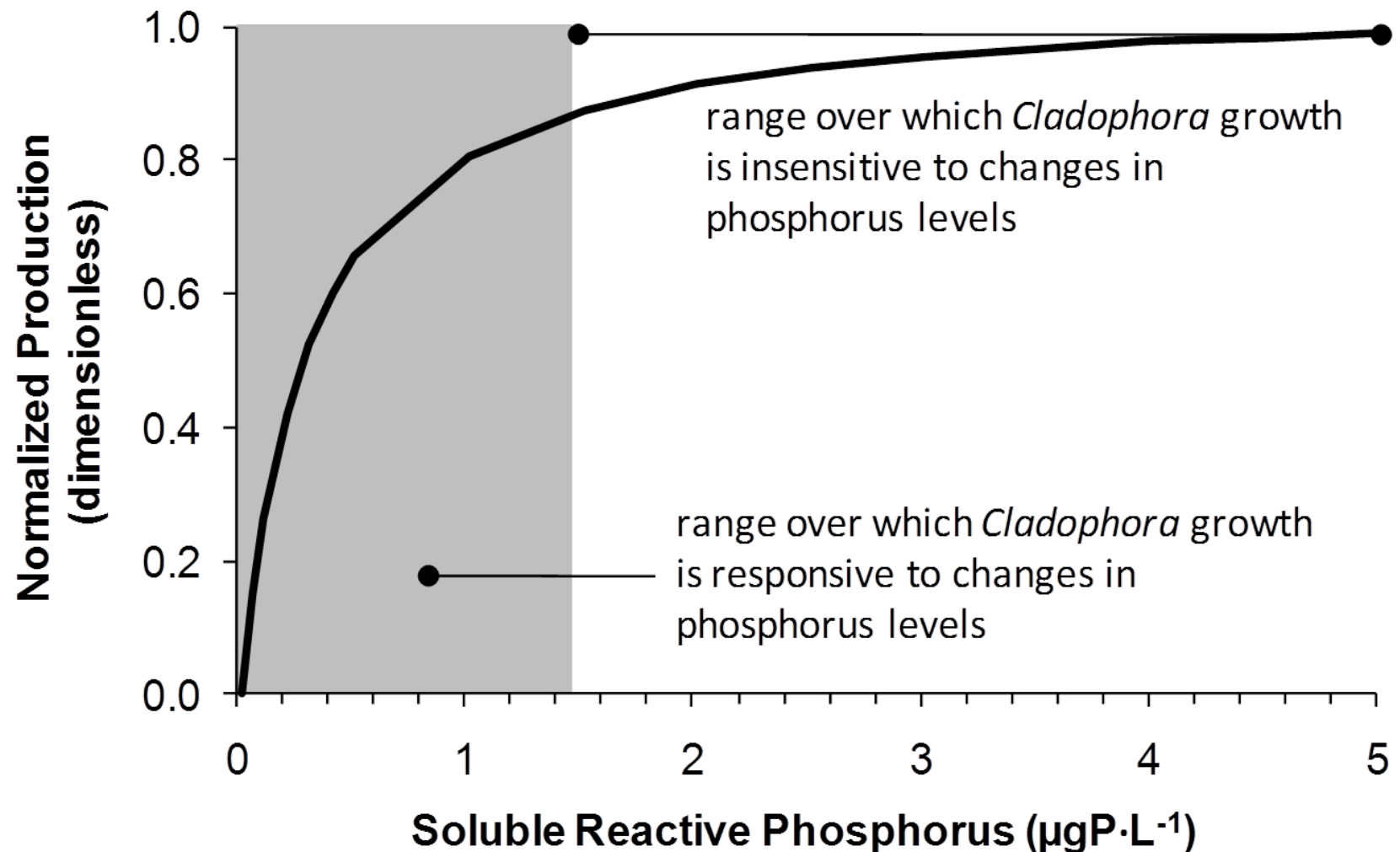
-  Duffin Creek WPCP's Outfall emits **85%** of Total Phosphorus (TP) Load
97% of Total SRP Load

SECONDARY CAUSES OF CLADOPHORA GROWTH:

-  Duffin's Creek emits **13%** of Total Phosphorus (TP) Load
2% of Total SRP Load
-  Other Sources (e.g. Stormwater discharges) emit **1% of the Total Phosphorus (TP) Load**
Negligible Contribution to SRP Load

Dr. Auer indicates *Cladophora* Algae Growth is Controllable

– Solution is to Keep SRP Levels in Low Range



2. Physical Size of Outfall's Mixing Zone

Interim Report – Mixing Zone based on 520 MLD is not “as small as possible”. It's huge, extending to the Ajax Water Supply Plant intake and across a portion of the Pickering lakefront

In the Stage 3 Expansion EA to 630 MLD, the Regions' modelling of Mixing Zone conditions appeared to show discharges at 420 MLD met MOE's requirements. The reality, in 2006 and today, is that discharge at the current baseline of 340 MLD causes excessive growth of nuisance algae.

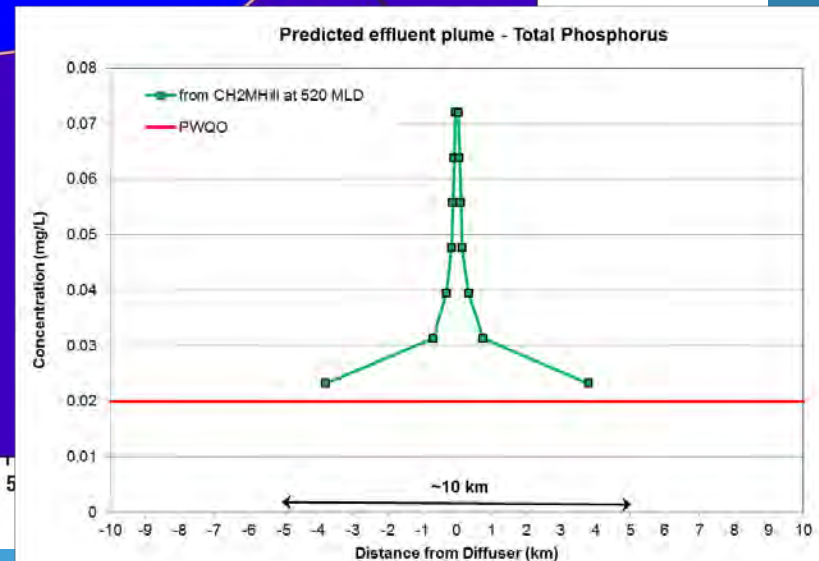
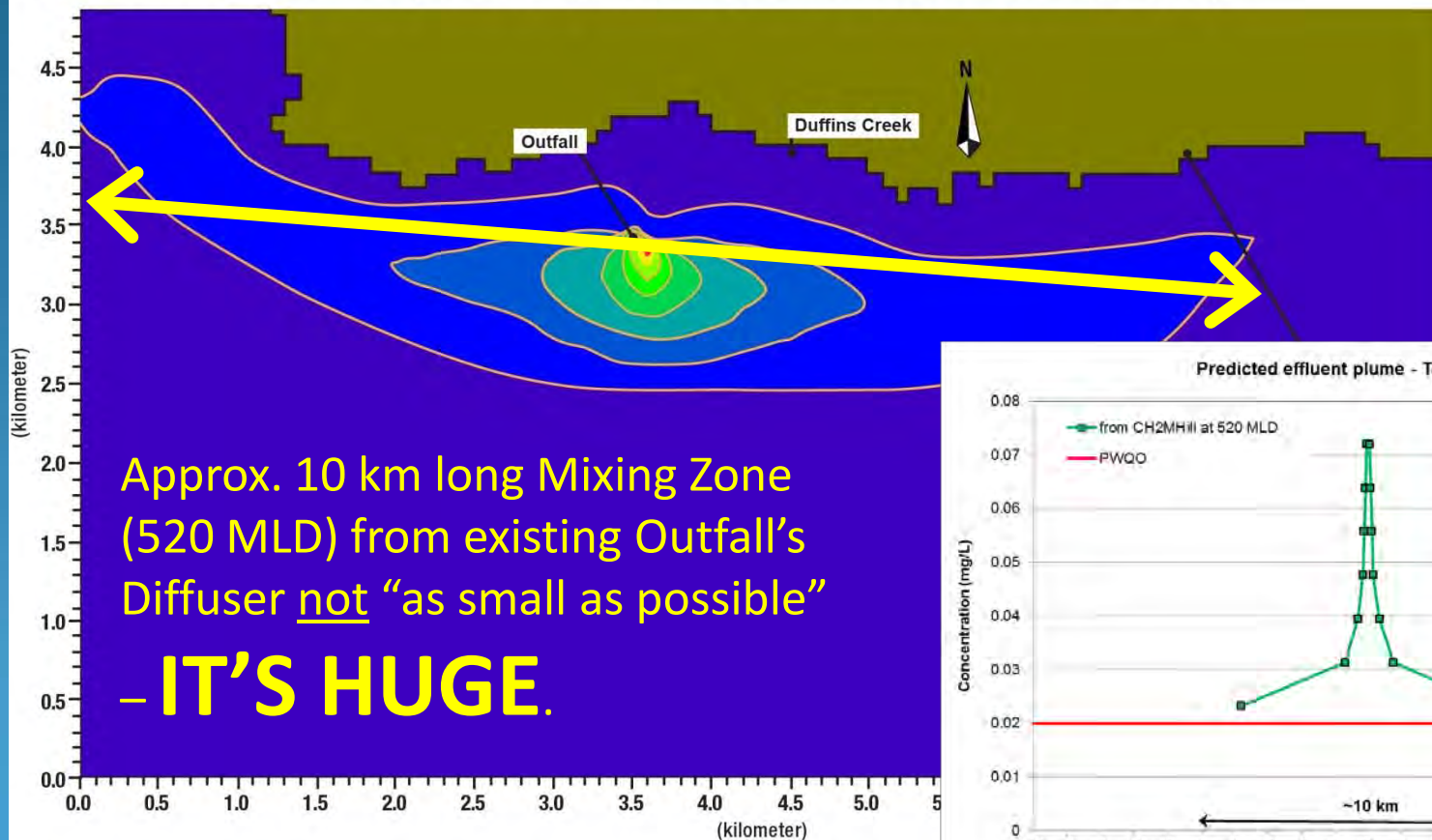
Knowing this, in 2007, the Ministry allowed an increase discharge to 520 MLD, and possibly 540 MLD!

Will this huge Mixing Zone have impacts on the Town's water intake? Will this impair beneficial uses?

Huge Mixing Zone is NOT “As Small As Possible”

FIGURE 6-8

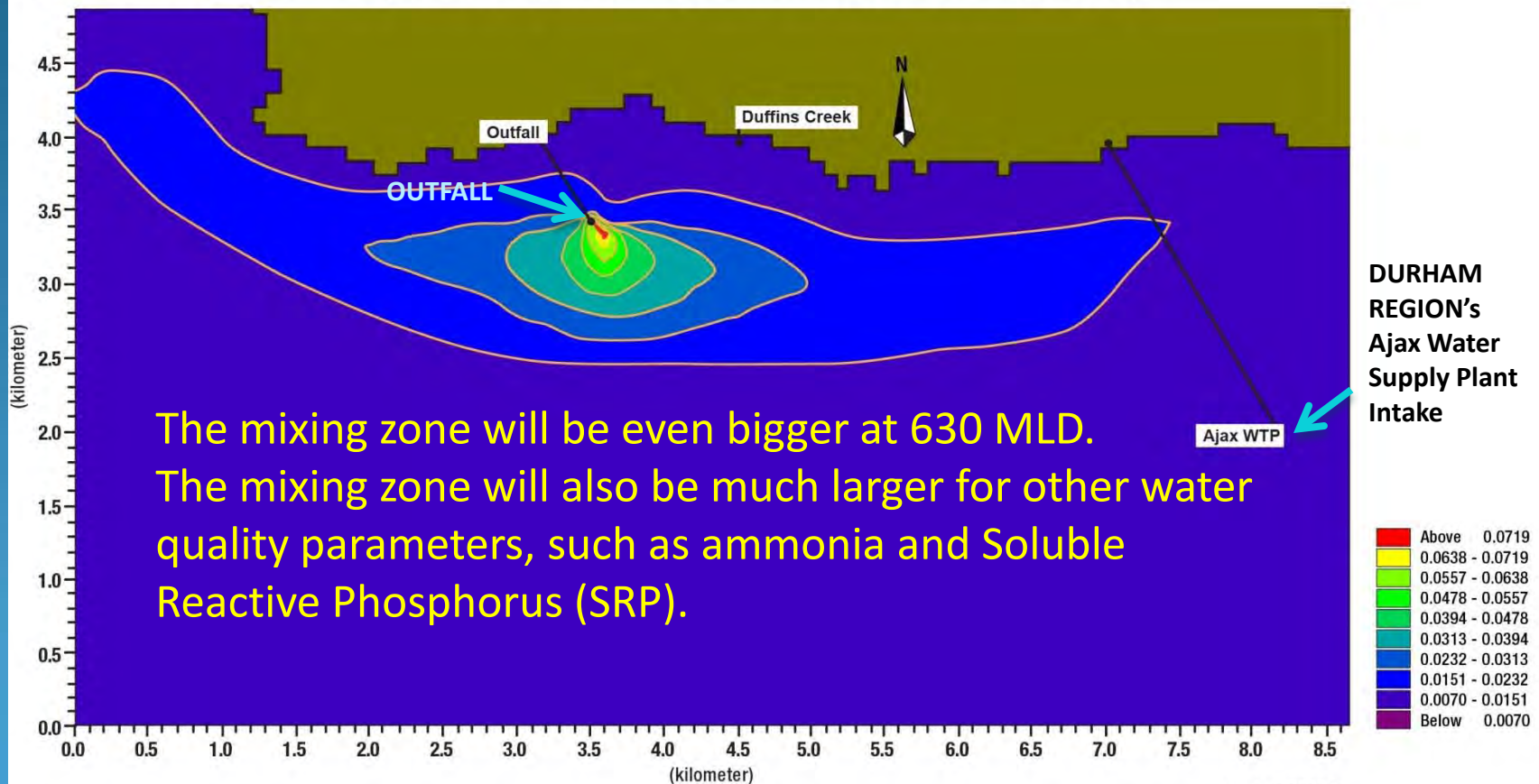
Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



Mixing Zone Too Big, Even When Under-Represented

FIGURE 6-8

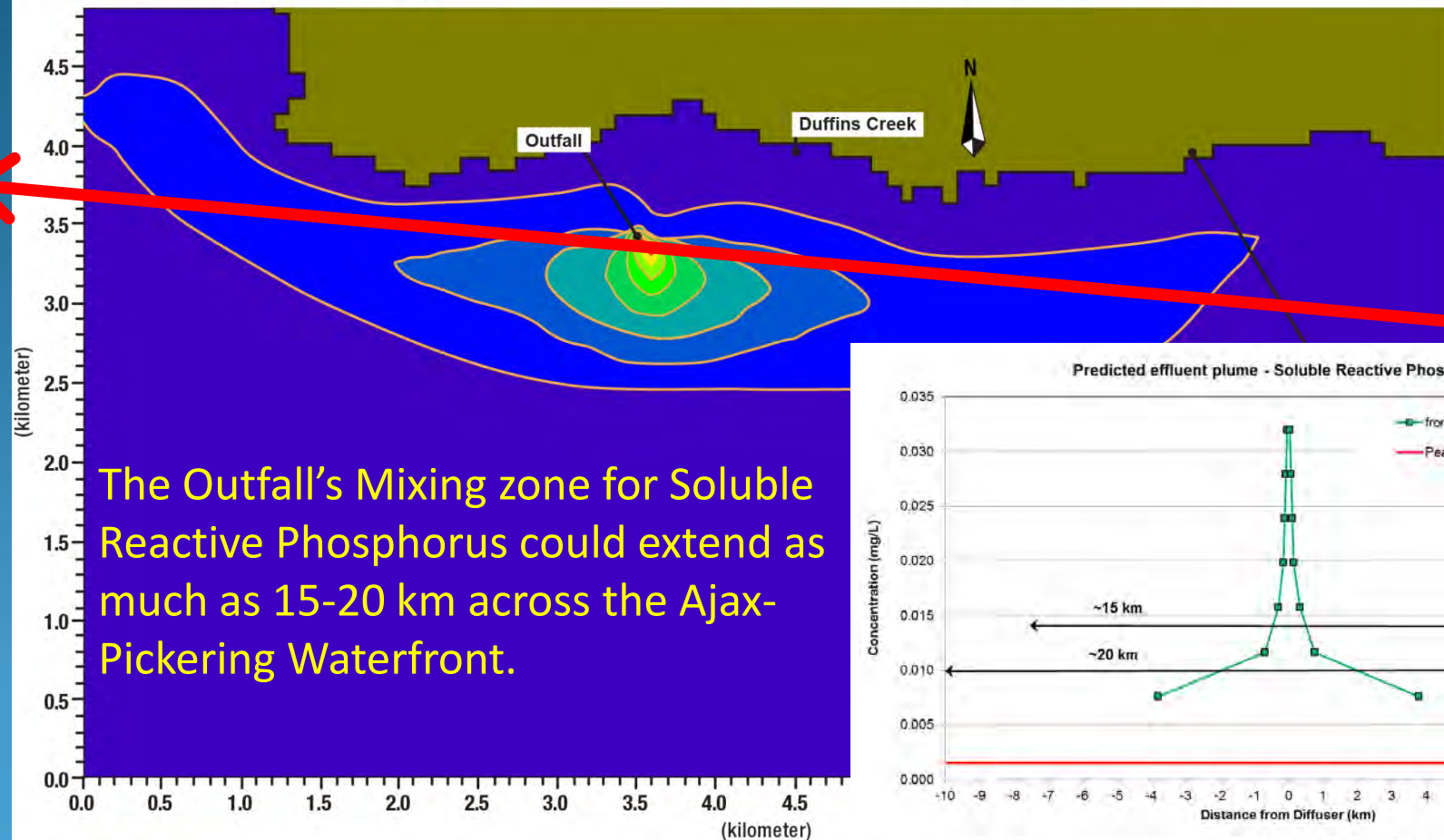
Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



Nutrients (SRP) in Effluent Enlarging Mixing Zone

FIGURE 6-8

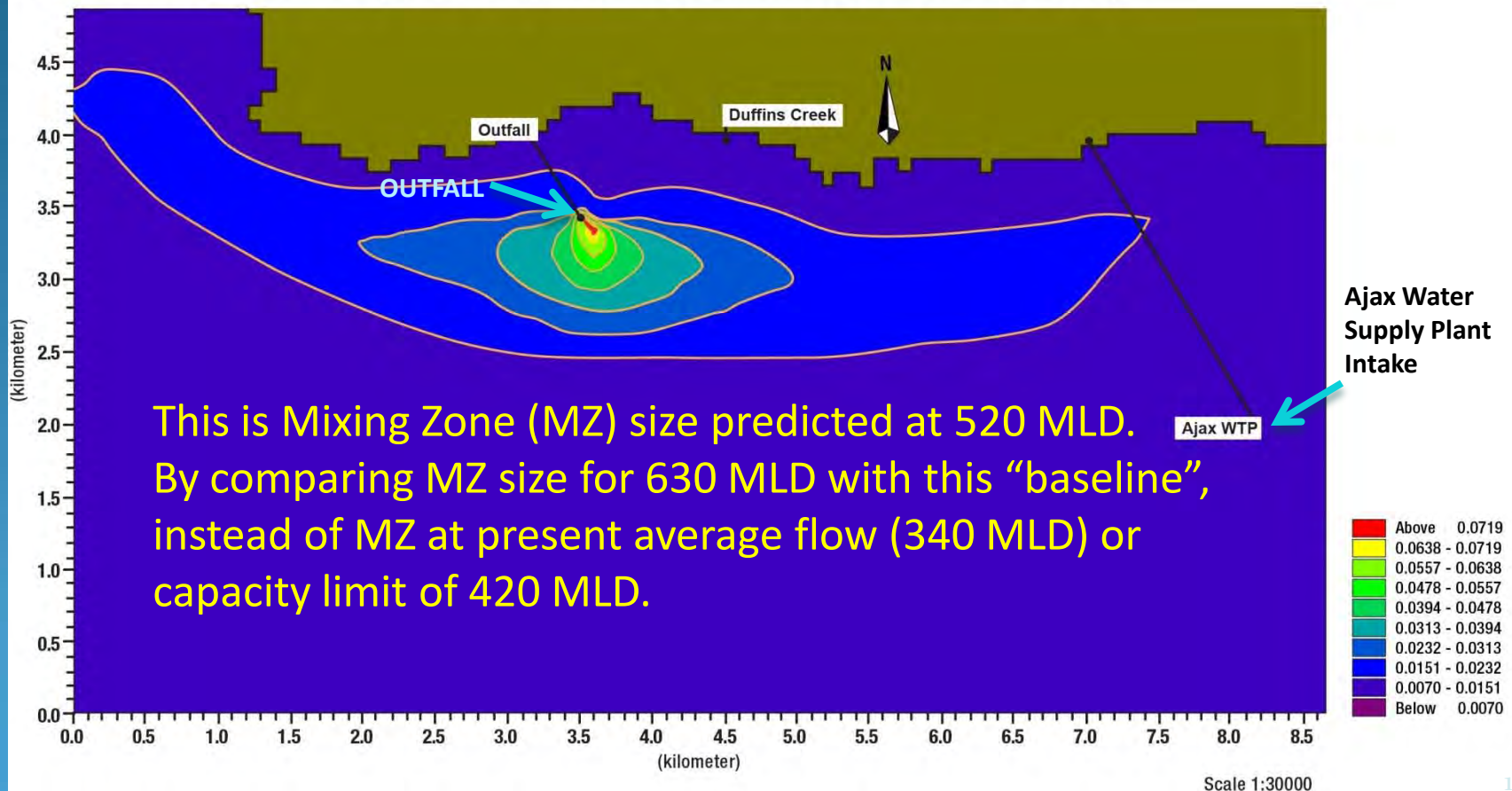
Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



Mixing Zone Model “Baseline” Used is 520 MLD, Not Present Average Discharge of ~340 MLD

FIGURE 6-8

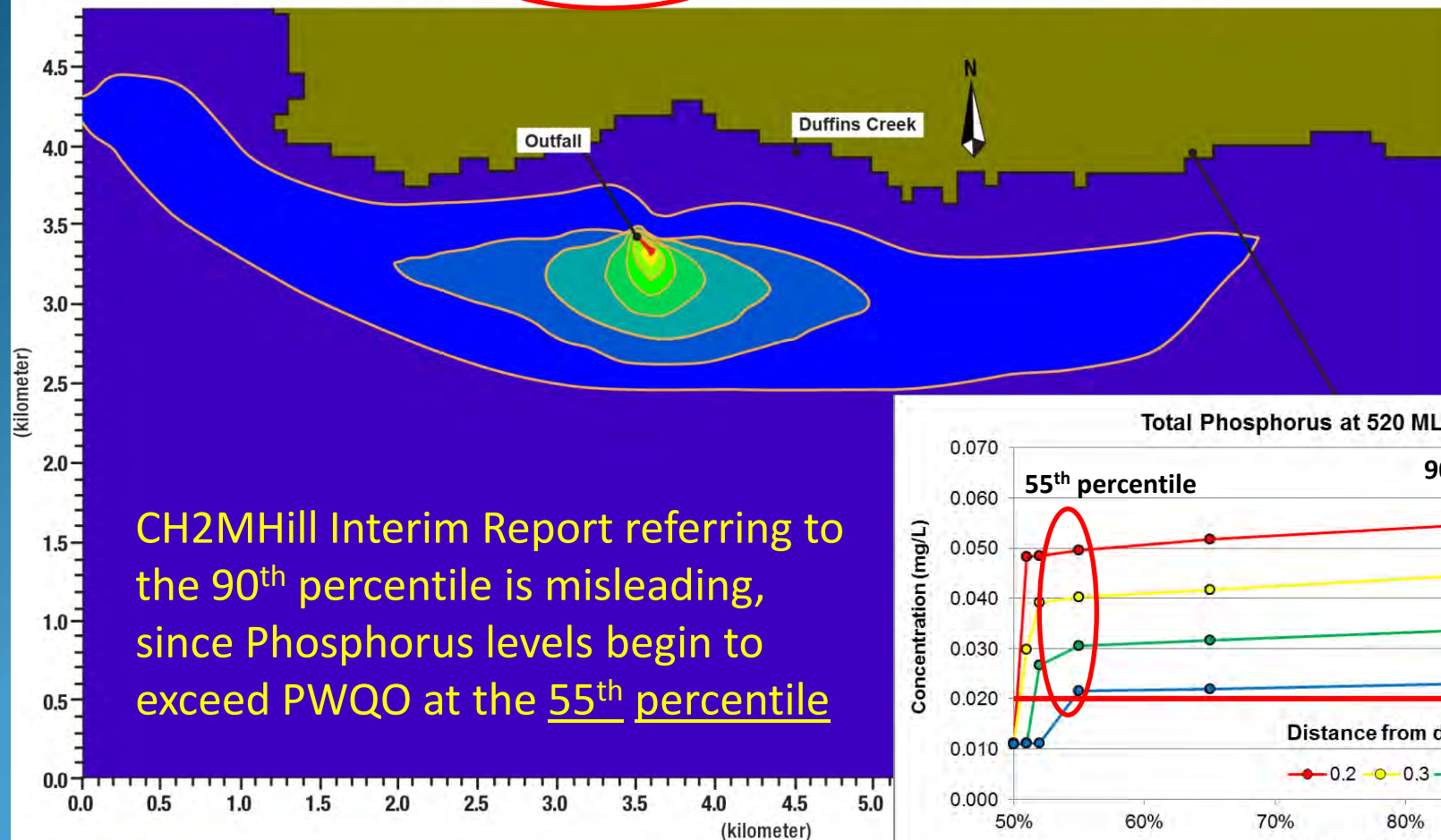
Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



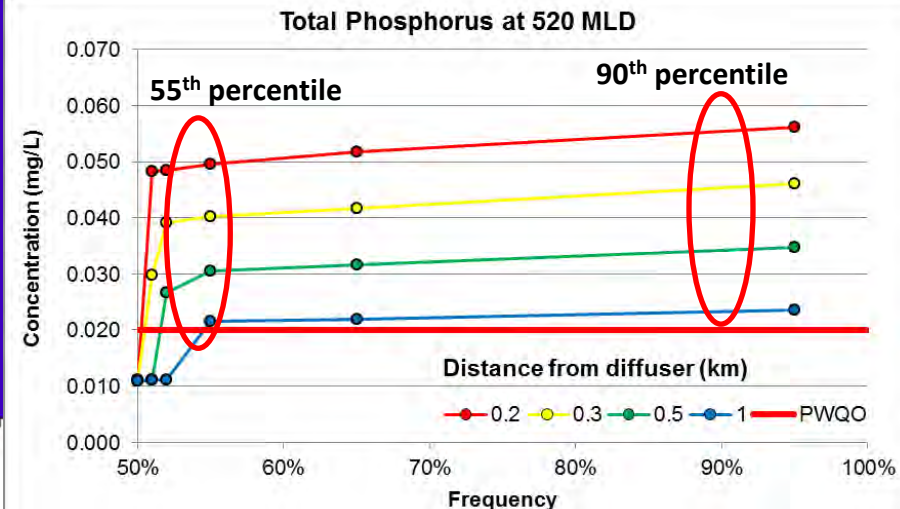
Frequency of PWQO Exceedence is Misleading

FIGURE 6-8

Peak TP Levels as defined by the 90th percentile (without flows from Duffins Creek)



CH2MHill Interim Report referring to the 90th percentile is misleading, since Phosphorus levels begin to exceed PWQO at the 55th percentile



3. Reliance on 20:1 Dilution Ratio Criteria

20:1 Dilution Criteria is a performance requirement for Outfall's Diffuser - It does not ensure protection of the environment.

CH2MHILL defends existing discharge of 420 MLD based on 22:1 dilution, yet 22:1 still causes exceedence of the PWQO for Total Phosphorus and the Town still experiences impacts from excess growth of nuisance algae.

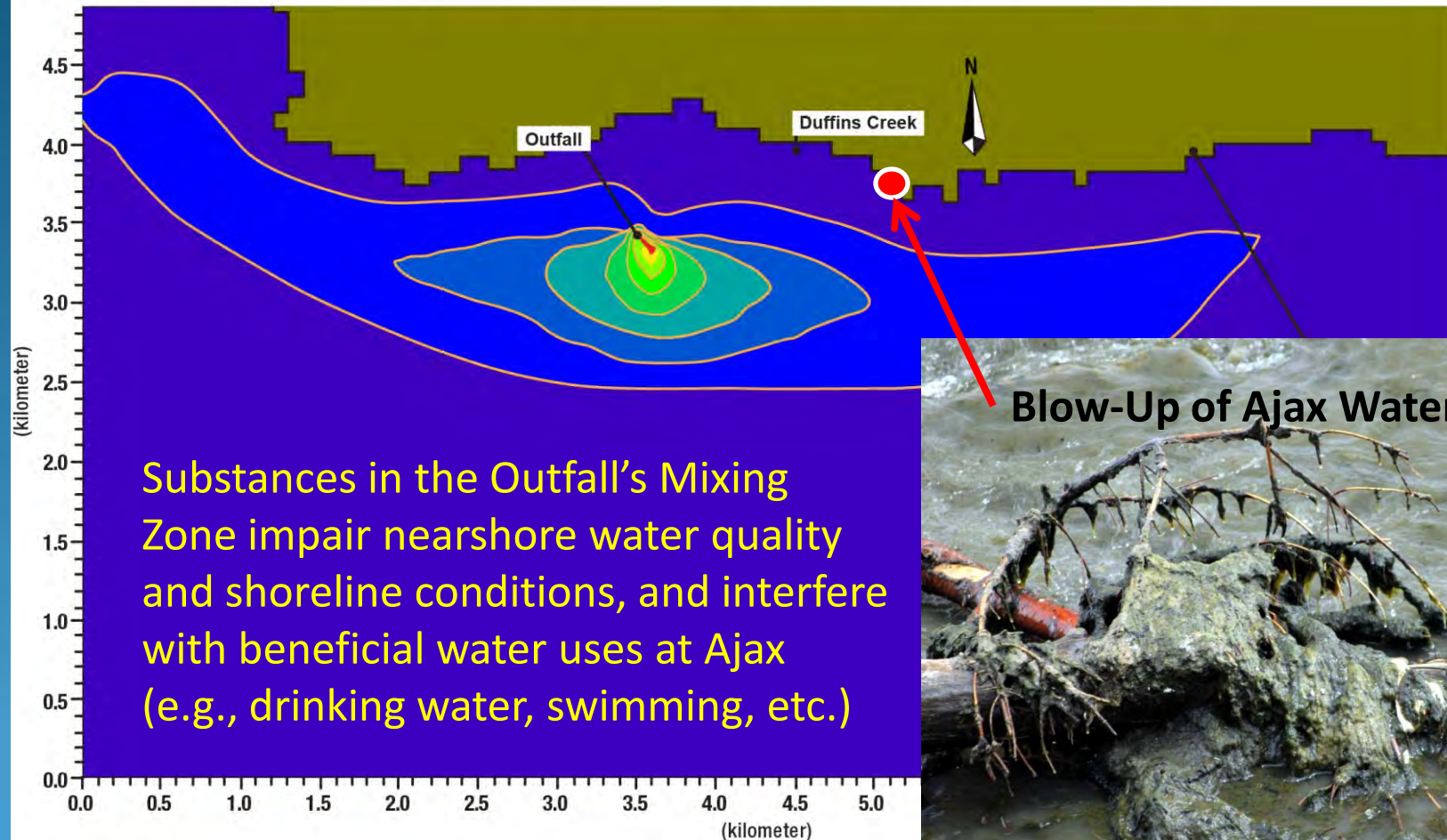
CH2MHILL concludes 20:1 dilution at discharge of 560 MLD is unacceptable. The Town agrees – 20:1 is unacceptable. But, since there is no practical difference between 22:1 and 20:1, the Town believes 22:1 dilution and existing discharge of 340 MLD are also unacceptable.

The Regions need to use a more effective approach to safeguard Ajax's lakefront from this project's harmful impacts.

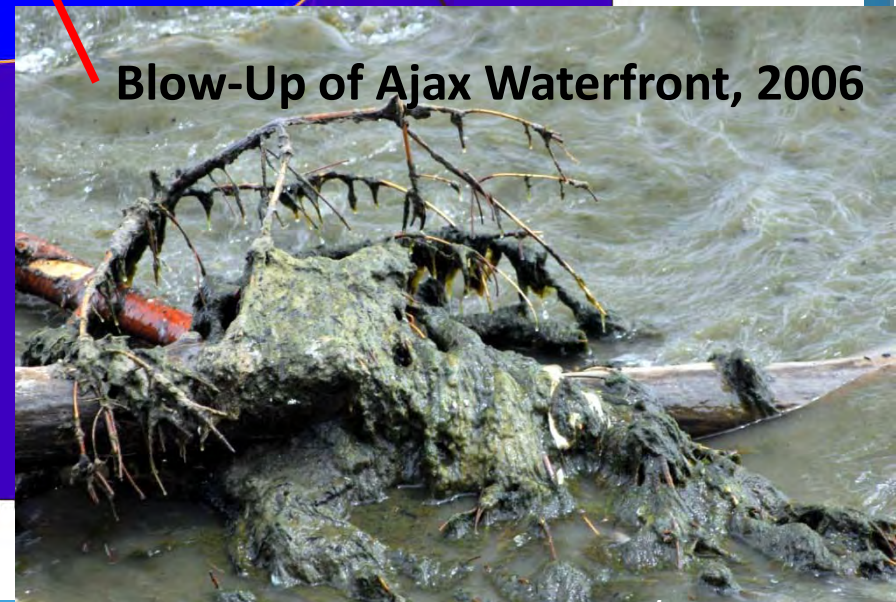
4. Substances in Effluent Mixing Zone Impair Water Quality

FIGURE 6-8

Peak TP Levels as defined by the 90TH percentile (without flows from Duffins Creek)



Substances in the Outfall's Mixing Zone impair nearshore water quality and shoreline conditions, and interfere with beneficial water uses at Ajax (e.g., drinking water, swimming, etc.)



Source: 2006 Ajax Bump-Up Request/WPCP Expansion

5. Odorous Algae Fouling Our Shoreline

Mixing Zone for existing Outfall-Diffuser contains loadings of nutrients (TP, SRP) attributed to objectionable growth of nuisance plants, specifically *Cladophora*



Ajax Waterfront (September 2012)

6. No Provincial Nutrient Management Policy for Impacted Ajax Lakefront

Lack of protective Provincial Nutrient Management Policy for the Duffin Creek WPCP and surrounding nearshore area (Ajax-Pickering Waterfront) and associated regulatory requirements to be met by Regions as part of this Outfall EA



7. No Finite “Maximum Limit ” on the Capacity of the Duffin Creek WPCP and its Outfall

Lack of finite “maximum limit” on the capacity of the WPCP and its Outfall-Diffuser allows the Regions to “overbuild”.

Fueling the Town’s concern about how much worse nearshore conditions will be as the size of the WPCP and the volume of the Outfall’s discharges increase in the future.



8. Piecemealing of EA

Regions' Interim Report states if new Outfall constructed, should build to 2081 capacity (890 MLD) or for 70-year period (960-1180 MLD), which is far beyond 630 MLD rated capacity of expanded onshore WPCP, but does not assess environmental impacts of present (340 MLD) and proposed future outflows

Interim Report is based on an average flow “baseline” of 520 MLD, rather than present discharge of 340 MLD, which is causing the negative impacts we see today (Cladophora growth). A baseline of 520 MLD implies impacts seen today are due to outflows of 520 MLD, which is untrue.

Increasing outflows to +1 Billion LD would triple the 340 MLD baseline flows. Environmental impacts are exponential and cumulative.

What are MOE's requirements for the Regions' evaluation of the environmental impacts on Lake Ontario receiving water at the proposed WPCP capacities, and when will that evaluation be provided to the Town and MOE?

9. EA “Undertaking” is Not Clear, Yet Regions are into Phase 2 of the Outfall EA

No information produced by the Regions’ or their consultants to date clearly describes the undertaking, which is a requirement of a Municipal Class EA, even their letter to CEAA.

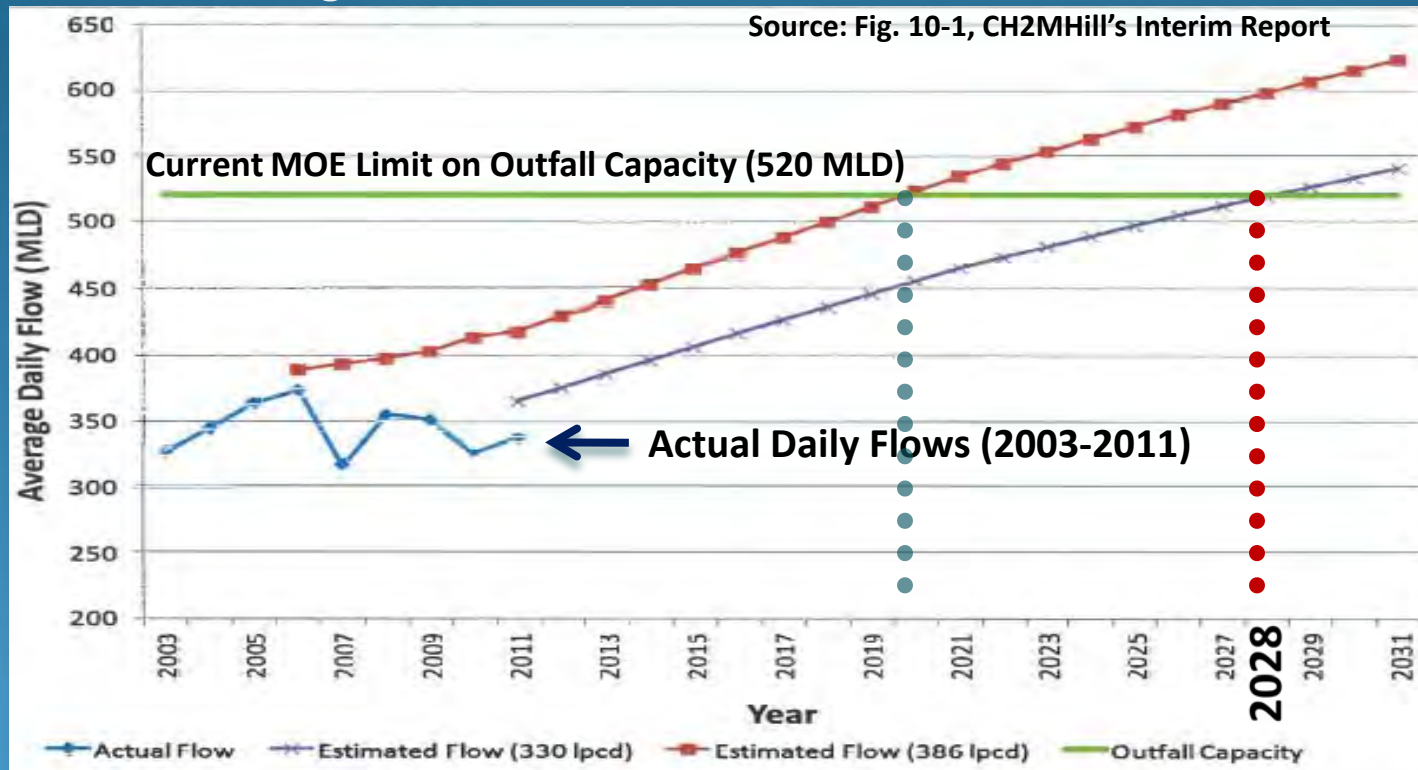
There is contradictory information in Interim Report on Outfall EA.

What are the Regions seeking - a Preferred Alternative that can accommodate 630 MLD, or one that will convey 890 to +1 Billion LD?

There will likely be significantly different potential and cumulative environmental impacts on the Town of Ajax under these scenarios – none have been evaluated at this time.

10. No Urgency to Finalize EA-There is Sufficient Time

Regions' Interim Report indicates
Forecasted Sewage Flows will not Reach MOE's Limit of 520 MLD until **2028**.



There is ample time (15 years) available to extend Outfall EA process to receive and consider further water quality studies.

Recommendations to the Regions of Durham & York in Tonight's Staff Report:

- a) Extend the Outfall EA's completion date in order to have regard for MOE's current study;

and

- b) As part of the Outfall EA, prepare a comprehensive "Assimilative Capacity and Cumulative Effects Study"

Assimilative Capacity & Cumulative Effects Study

- Details of Cumulative Effects Study

- Cumulative Effects refer to changes to the environment caused by an action in combination with other past, present and future human actions (CEAA, 1999);
- Cumulative Effects are considered by MOE when allocating assimilative capacity and should be completed as part of the Assimilative Capacity Study;
- CH2MHill has already developed a suitable 3-dimensional mathematical model for the Regions that can support the Cumulative Effects Assessment;
- The Lake model (R. Dewey) developed in the CTC Source Protection process can provide a solid supplementary model for the study; and
- The model used needs to address, as a *minimum*, discharges from the Duffin Creek WPCP, Duffin's Creek, local storm sewers, and neighbouring WPCPs.

Assimilative Capacity & Cumulative Effects Study

- Details of Assimilative Capacity Study

- Assimilative Capacity - the capacity of the waterfront to receive wastewater without deleterious effects;
- An Assimilative Capacity Study is a common requirement of the MOE to support the environmental assessment of any discharge to any water body in Ontario;
- MOE Procedure B-1-5 (MOE, 1994) describes the basic requirements, *but these requirements must extend beyond a simple 20:1 dilution criteria!*
- The Region has already developed a suitable 3-dimensional mathematical model that can form the foundation of the Assimilative Capacity Study; and
- The model may require further effort to address, as a **minimum**, Soluble Reactive Phosphorus (SRP) and growth kinetics for Cladophora.

Assimilative Capacity & Cumulative Effects Study

- Details of Environmental Effects Monitoring

- Environmental Effects Monitoring provides a rational basis to evaluate the effectiveness of effluent quality standards in protecting fish and fish habitat;
- Environment Effects Monitoring provides a comparative assessment between exposure areas and reference areas; and
- It includes measures of fish health, benthic indices, sediment quality and water quality.

Estimated Cost for Assimilative Capacity & Cumulative Effects Study

\$100,000-\$300,000

Recommendations to MOE in Tonight's Report:

- a) Support the Town's request to Regions and ensure 2012 and 2013 data collected during MOE's current study be analyzed expeditiously, with results available to Town, Regions and public in 2014 for consideration as part of this Outfall EA;
- b) Prevent selection of Preferred Alternative "oversized" to accommodate average and peak flows from the WPCP greater than 630 MLD to avoid piecemealing or incremental expansions to WPCP and connecting infrastructure without comprehensive assessment of potential and cumulative impacts on Lake water quality and uses of Ajax-Pickering lakefront;

Recommendations to MOE:

- c) Require completion of thorough evaluation of long list of Outfall-Diffuser Alternatives, such as results of offshore geotechnical test results, and completion of onshore geotechnical work to determine feasibility of drilling new shaft for new offshore Outfall-Diffuser infrastructure;
- d) Support Town's requests for Regions to prepare "Assimilative Capacity and Cumulative Effects Study" as part of Outfall EA;
- e) Recommend cumulative impact of effluent discharges from other WPCPs in vicinity of Duffin Creek WPCP be determined, including SRP mixing zones that might overlap this WPCPs mixing zone and prepare West Durham Waterfront Remedial Plan with MOE;

Recommendations to MOE:

- f) Impose more stringent regulatory requirements on Duffin Creek WPCP that will substantially reduce daily nutrient loadings (Total Phosphorus, Soluble Reactive Phosphorus) from the Outfall-Diffuser substantially below 311 kilograms per day permitted in current Certificate of Approval;
- g) File a MOE-initiated Part II Order (Bump-Up) Request should Regions complete the Outfall EA in a manner that does not address the Town's recommendations, issues and concerns as well as MOE requirements;

Recommendations to MOE:

- h) Establish new Specific Surface Water Quality Objectives (SSWQOs) for Duffin Creek WPCP, including but not limited to:
 - i. A SSWQO for Total Phosphorus that is more protective than the existing PWQO for Total Phosphorus established for municipal sewage treatment plants in 1994;
 - ii. A SSWQO for Soluble Reactive Phosphorus that is low enough such that growth of *Cladophora* will be substantially reduced); and
 - iii. A SSWQO for Chemicals of Concern, including pharmaceuticals and personal care products identified near the existing Outfall-Diffuser by MOE researchers in 2011.



Thank you

Ajax's Actions to Improve Water Quality

1. Conducted Stormwater Retrofit EA for Southwest Ajax
2. Initiated Comprehensive Public Awareness Program – Healthy Yards, Yellow Fish
3. Continue to Monitor Stormwater Quality through Testing
4. Construction of Roadside Curb Gardens planned for 2013 – 2017
5. Seeking Funding to Implement Retrofits for 6 Storm Sewersheds
6. Our work has inspired us to bring back a beach to the Ajax Waterfront. Our goal is to make the Paradise Beach area an “International Blue Flag” Beach
7. Ajax is one of a few communities in Canada recognized as a “Blue Community” for our position that “water is central to all human activity”
8. Advocacy for Renewed Actions to Protect the Great Lakes: Updated Water Policy in Ajax Official Plan; Great Lakes and St. Lawrence Cities Initiative; Source Protection Planning; Renewal of Canada-Ontario Agreement Respecting Great Lakes Basin Ecosystem; Revised Canada-U.S. Great Lakes Water Quality Agreement