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Halifax Regional Council
November 22, 2005

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY:

A handwritten signature in black ink, appearing to read "Dan English", written over a horizontal line.

Dan English, Acting Chief Administrative Officer

A handwritten signature in black ink, appearing to read "Wayne Anstey", written over a horizontal line.

Wayne Anstey, Acting Deputy Chief Administrative Officer

DATE: November 4, 2005

SUBJECT: Assimilative Capacity Modelling, Halifax Harbour- Sole Source

ORIGIN

Based on the current population growth and settlement trends in HRM, as well as the aging sewage treatment infrastructure, there is a need to determine whether there is still sufficient assimilative capacity remaining in Halifax Harbour to support future sewage treatment effluent loading (post Harbour Solutions Implementation).

RECOMMENDATION

It is recommended that Council award a contract to Coastal Ocean Associates Ltd. on a sole-source basis, as per their attached proposal for assimilative capacity research and modelling for Halifax Harbour, in the amount of \$50,000 plus net HST from Capital Account No. CSE00389, HSP: Source Control / Pollution Prevention, with funding authorized as per the Budget Implications Section of this Report.

BACKGROUND

Coastal Ocean Associates Ltd. (COA) was a part of the consulting group hired by HRM in 1997 to provide technical expertise to the Harbour Solutions Advisory Committee during its deliberations on harbour issues. COA was also a contributor to the consultants Concept Plan which was developed based upon the Advisory Committee recommendations, and to the Environmental Screening Report developed for HRM on the Harbour Solutions Project.

COA has previously conducted a series of studies which modeled the circulation and assimilative capacity of Halifax Harbour (Oceanographic Modeling and Assimilative Capacity Study, January 2000 and Revision, March, 2000; Supplemental Modeling Study, July 2000). This work was conducted for HRM as part of the requirements for the federal environmental assessment approval of the Harbour Solutions Project, and for provincial regulatory approval of the three new advanced-primary level treatment plants and effluent criteria.

DISCUSSION

The draft Regional Plan defines population growth expectations and settlement patterns for HRM over the next 25 years. Population growth of up to 90,000 persons is expected, primarily in the urban and suburban areas surrounding Halifax Harbour. The Harbour Solutions Project provides three new sewage treatment plants which are designed to accommodate wastewater flows projected to the year 2041. However, recent flow measurements and projections based on settlement patterns have indicated that wastewater flows might exceed those which had been projected for this time frame. Should this trend continue, or should population growth concentrate in one area around the harbour, or should inflow and/or infiltration into the sewer system increase to a greater degree as the system ages, then it may become necessary to provide for an additional sewage treatment plant or plants at some location(s) on the Harbour or Bedford Basin. In order to be prepared for this eventuality, and to begin to define opportunities and constraints to siting such facilities, it is necessary to define the remaining assimilative capacity of the parts of the Harbour for future increased loads of treated sewage.

COA have extensive experience in research and modelling of coastal marine systems, and in particular for Halifax Harbour. Regulatory approvals in place for the Harbour Solutions Project have depended upon COA's analyses. In order to prepare for future regulatory processes, it is crucial to maintain consistency in the methodology, expertise and products of modelling analysis of the Harbour. At HRM's request, COA have prepared the attached proposal to undertake further research and modelling of the Harbour. The proposal consists of two related types of work. It has been some time since the original analysis of the Harbour which resulted in the recommendations of the Fournier Task Force (1990) which set the water quality objectives. Research is required to update best practises for harbour modelling and analysis, and to scan current practises in other jurisdictions. In parallel with this research, further modelling of the harbour will be undertaken to understand the impacts and assimilative capacities for placement of possible future sewage treatment facilities at various harbour locations. The treated effluent from the upcoming Harbour Solutions plants and existing Eastern Passage / Mill Cove plants will be incorporated into the modelling.

Planning for future treatment plants will require identification of prospective sites, preparation for regulatory processes, land acquisition or reservation, and coordination with ongoing municipal planning. It is also important as the available capacity for each of the existing and future plants is allocated, to understand where future options or constraints may exist.

The purchase described conforms with Administrative Order 35 - Procurement Policy 7(8)(a) (Sole Source Purchases), under which purchases >\$50,000 for which there is a single source and which require compatibility with existing services may be authorised by Council, where such purchase is in the best interests of HRM. This study will help achieve elements of the EMS Business Plan relating to harbour management and wastewater treatment, as well as fulfill long-term requirements of Regional Planning.

BUDGET IMPLICATIONS

Based on the amount of \$50,000 plus net HST, for a total cost of \$51,714.50, funding is available in Capital Account No. CSE00389 - HSP: Source Control / Pollution Prevention. The budget availability has been confirmed by Financial Services.

Budget Summary

Capital Account No. CSE00389 - HSP: Source Control/Pollution Prevention

Cumulative Unspent Budget	\$ 465,588.00
Less: Award of Contract	<u>51,714.50</u>
	\$ 413,873.50

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN


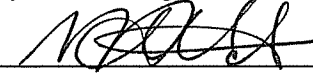
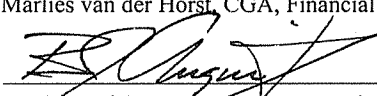
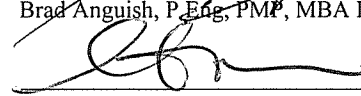
This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

None.

ATTACHMENTS

Coastal Ocean Associates Ltd. proposal to HRM.

Report Prepared by:	Tony Blouin, Manager, Environmental Performance, 490-4610 
	
Financial Review:	Marlies van der Horst, CGA, Financial Consultant, 490-4446
	
Report Approved by:	Brad Anguish, P.Eng, PMP, MBA Director, Environmental Management Services, 490-4825
	
Report Approved by:	Catherine Sanderson, CMA, Senior Manager, Financial Services, 490-1562

ATTACHMENT

Proposal - Assimilative Capacity Study of Halifax Harbour

Prepared for:
Halifax Regional Municipality

Prepared by:
COA Coastal Ocean Associates

5 October 2005

1. Background

Current plans for the clean up of Halifax Harbour are based in part on a numerical model of wastewater mixing and dispersion. The model was developed to help ensure that the proposed treatment levels and outfall site locations will result in acceptable water quality as defined in the water quality objectives of the Fournier Task Force and related reports. Such a solution can be said to respect the 'assimilative capacity' of the harbour. The present cleanup efforts are a very positive step in the development of world-class infrastructure in HRM.

However, the work of the Fournier Task Force is now dated and no longer provides an adequate basis for long-range planning purposes. On-going review and research into water quality issues will be required. This is especially true in light of preliminary evidence suggesting minor oxygen depression in the harbour. Updated estimates of nutrient loading, both present and projected, need to be considered in view of modern dynamical models to determine if the potential for eutrophication is present particularly in Bedford Basin.

Our situation is not unlike that posed by similar issues throughout the developed world where a management 'practice' has been sought that reflects the best scientific understanding and modeling results available. For example, a current EU directive requires secondary treatment levels for estuarine discharges with p.e.¹ > 10,000 and coastal discharges with p.e. > 150,000. Smaller discharges require only primary treatment. However, cost estimates for the implementation of this directive in some EU countries is prohibitive and the relative merit of remediation of existing discharges is debated on a case-by-case basis². Their situation is familiar and important to HRM for variety of reasons. The science that goes into their formulation in many cases is more

¹ EU water quality documents refer to population equivalent (p.e.) based on an average daily BOD input of 0.17 pounds per capita. Industrial and domestic loads are thus converted to the corresponding p.e. For HRM, p.e. is expected to closely parallel actual population.

² Interestingly, HRM discharges generally fall within the range defined by these limits. However, even this simple directive would need to be supported by an oceanographic analysis to distinguish areas that are primarily estuarine from those that are primarily coastal. Also, a site-specific application of the directive would beg development of a sliding limit depending on the relative amount of estuarine versus coastal nature of sites within the harbour.

advanced than presently available locally for the reason that their problems are often more extreme and hence have been the focus of greater research efforts.

An effort by HRM to update the scientific basis of the existing model should include a review of the modern global experience. In particular, those advances that directly reflect the situation in Halifax Harbour need to be scrutinized. These will include advances that might help identify any weaknesses in the existing model plus potentially identify improvements that could or should be made. Simultaneously, the existing model should be updated with new load estimates and run in a mode that would help identify any remaining assimilative capacity within the harbour. COA staff have been involved with virtually all aspects of water quality modeling in Halifax Harbour and are hence uniquely qualified to conduct this study.

2. Proposed Scope

The study is based on an effort extending over 3 months and will include two avenues of research: a modeling study and a literature research study, in addition to the formulation of recommendations.

2.1 Modeling study –

The study will include updated assimilative capacity modeling using the existing model. Dilution and dispersion patterns will be determined for updated loading scenarios based on existing present and presently proposed outfall sites. In addition, hypothetical discharges at various other sites will be modeled in an effort to investigate any regional variation in capacity. These efforts will be supported by analytical oceanographic analysis into the expected variation in dispersion/dilution patterns. The analytical analysis will be based in part on new data collected over the past many months by HRM.

2.2 Literature research study –

Current global practice will be reviewed and summarized. A key element of this component of the study will be to identify scientific improvement that could or should be made to the present model. We expect that such improvements will primarily involve nutrient dynamics – an area the present model only deals with indirectly. The main focus will be the European and North American experience.

2.3 Recommendations –

Modeling results will help identify areas, if any, for further consideration as additional outfall locations with implications for loading limits and treatment levels. Any improvements that should be made to the model will be identified and a recommended path for improvement will be suggested. In addition, the existing sampling program will be reviewed in light of the requirements for further water quality modeling.

3. Schedule

We propose to complete the bulk of the study within the year with report delivery in January 2006. The reason for this limited time line is to help ensure that the client has an opportunity to review and evaluate the merit of the study results while limiting the commitment to the particular approach proposed. That is, we are not suggesting that the study will be completely comprehensive – for example, there will not be an opportunity to implement any significant new dynamical components into the existing model. The objective is primarily to provide an indication of a direction for further, perhaps on-going, studies and the scope of effort that will be required to remain up-to-date in this evolving field.

4. Costs

Costs are based on the proposed time line and include a modeler and oceanographer commitment of approximately 20 and 40 days, respectively. Total study cost will be \$50,000.00 plus applicable tax.