

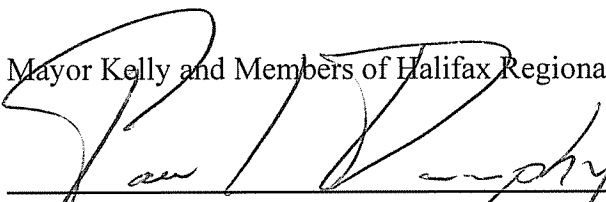


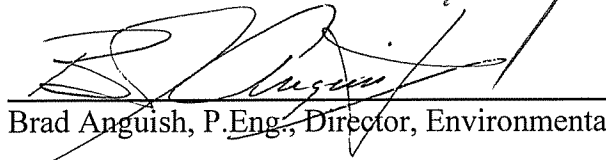
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Halifax Regional Council
August 19, 2003

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: 
Paul Dunphy, Director, Planning & Development Services


Brad Anguish, P.Eng., Director, Environmental Management Services

DATE: August 1, 2003

SUBJECT: Nine Mile River Assimilation Study

INFORMATION REPORT

ORIGIN

HRM commissioned Dillon Consulting Ltd. to conduct a study on the Nine Mile River. The study has been completed, and this report summarizes the findings.

BACKGROUND

Purpose

- The Lakeside-Timberlea Water Pollution Control Plant was built in 1982, and discharges effluent to the Nine Mile River. The plant treats sanitary sewage which is generated in the Beechville-Lakeside-Timberlea area, and the original service boundary was established to accommodate a population of 30,000 persons.
- In 1992, the Province introduced new regulatory standards for the treatment of sanitary sewage. The purpose of this study was to determine if the Nine Mile River can accept effluent from 30,000 persons under the new Provincial standards

Plant Capacity

- The existing plant was designed to accommodate a population of 10,000 persons, with staged expansions planned when the population reaches 20,000 and 30,000.
- The population currently served by the Lakeside-Timberlea Water Pollution Control Plant is 8,000, so the facility is approaching its first planned expansion.

DISCUSSION

- Based upon the new Provincial standards, and in particular low flow in the river during summer, it is unlikely that the Province would allow any expansion beyond 20,000 persons.
- The study recommended revised effluent limits to accommodate a population of 20,000 persons, and also recommended that the plant should not be expanded beyond 20,000 persons without monitoring the response of the river to the first expansion.
- The cost to expand the plant to accommodate 20,000 persons is estimated at \$ 10.2 million¹.
- However, the actual population density within the service boundary has been lower than expected. It is now estimated that between 22,000 and 25,000 persons will need to be accommodated, rather than 30,000 persons.
- Staff are currently investigating the feasibility of diverting a portion of Lakeside-Timberlea which is capable of accommodating approximately 9,000 persons, towards the Halifax Sanitary Sewer System. This analysis is being carried out in conjunction with the Master Plan Study for Governors Lake North, and it is expected that staff will present options to Council either late this year or early next year.
- It is important to note that such a diversion would have implications for the Harbour Solutions Project (HSP) and the capacity of the new Halifax WPCP. The allocation of capacity in all the new treatment plants for un-developed areas is currently being studied by CBCL Engineering Ltd². This study should be complete within the next several months, and the results will provide information for the Regional Planning Project, and will assist Council in determining future Growth Areas.

¹HRM Wastewater Treatment Upgrade Study, Draft Report, Dillon Consulting, May, 2003

²Greenfield Area Servicing Analysis, CBCL Engineering Ltd., awarded by Council May 21, 2002.

BUDGET IMPLICATIONS

None at this time

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

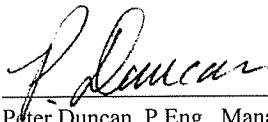
N/A

ATTACHMENTS

Executive Summary - Nine Mile River Assimilation Study, Dillon Consulting, February, 2003

Additional copies of this report, and information on its status, can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by:



Peter Duncan, P.Eng., Manager, Development Engineering 490-5449



Executive Summary

Objective: An assimilative capacity study has been undertaken for the Nine Mile River system as a proactive planning tool for the Halifax Regional Municipality (HRM) in relation to proposed upgrades at the Lakeside-Timberlea Water Pollution Control Plant (WPCP).

This plant currently services a population of approximately 8,000 people but was designed to ultimately service up to 30,000 people.

The assimilative capacity study is intended to provide guidance for setting effluent discharge criteria for the plant upgrades based on protection of water quality in the Nine Mile River as well as provide guidance to HRM related to the overall development within the service area and unserved watershed of the Nine Mile River.

The approach taken for assimilation study involved the assessment of current conditions and predicted future scenarios using project specific field data; and trophic and short-term event modelling.

Establishment of Water Quality Objectives: Water quality objectives were set for the Nine Mile River system for trophic state (maintain existing loading to maintain existing status); dissolved oxygen (≥ 6 mg/L), total suspended solids (TSS) (maximum increase of 25 mg/L from background within 24 hours/maximum increase of 5 mg/L for longer term); ammonia (3.37 mg/L assuming pH 7 and 25°C water temperature); fecal coliform (< 200 MPN/100 ml). These objectives are based on Canadian Council of Ministers of the Environment (CCME) criteria where available.

Field Data Results: The study team undertook six months of field data collection, designed to calibrate and validate modelling exercises. Field results indicated that the Nine Mile River system currently has high summer phosphorus and chlorophyll *a* levels downstream of the WPCP. Other water quality parameters associated with the WPCP did not exceed CCME guidelines for protection of aquatic life. The field data collection also confirmed the potential for exceedingly low summer flows in the river.

Trophic Status Assessment: Based on the OECD (1982) and P. Dillon et al. (1986) frameworks, the Nine Mile River System is currently at a mesotrophic to eutrophic level in terms of trophic status. There is currently no reserve capacity for assimilation of nutrients in this system. The study predicts future scenarios with increased discharge from the WPCP can meet established water quality objectives through maintenance of existing phosphorus (P) loading (via reduction in the p discharge limit in the effluent). Increasing background watershed and loading has potential to affect trophic state.

Short-term Event Assessment: Short term event effects were modelled for the Nine Mile River using a water quality analysis model (WASP). Biochemical Oxygen Demand (BOD)/dissolved oxygen, TSS and ammonia were modelled based on proposed WPCP flows and 7Q2, 7Q20 and storm flows. Modelling indicates the 15/20/3 mg/L (BOD, TSS, ammonia) discharge limits meet water quality objectives under existing conditions. However, by 1 Million Imperial Gallons Per Day (MIGD) discharges BOD loads are



at the limit and meeting the dissolved oxygen water quality at future WPCP flow requires a reduced effluent limit.

Recommendations for Effluent Discharge and Development: Using the guidance provided by model results, effluent limits are suggested for 2 MIGD as 5/10/3/0.5 mg/L (BOD, TSS, ammonia, phosphorus). It is recommended that the plant not be upgraded to 3 MIGD without additional monitoring of the river's response to the initial upgrade, and examination of alternatives to sewage treatment at the WPCP.

Continued monitoring of background and downstream water quality and flows is recommended prior and subsequent to WPCP expansion.