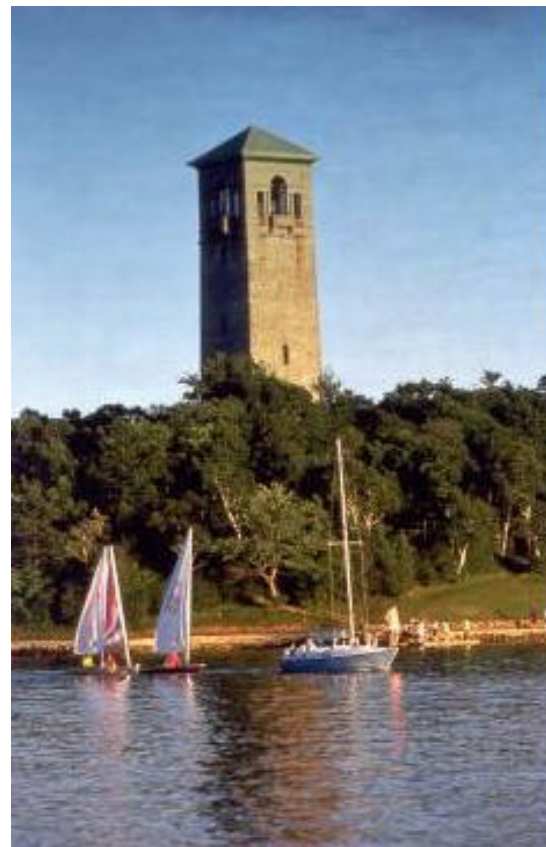




HALIFAX

REGIONAL MUNICIPALITY

HALIFAX HARBOUR SOLUTIONS PROJECT ENVIRONMENTAL SCREENING ADDENDUM 2



May 2002



Jacques Whitford
Environment Limited

**HALIFAX HARBOUR SOLUTIONS PROJECT
ADDENDUM NO. 2
RESPONSE TO FEDERAL COMMENTS**

PROJECT NO. NSD13960-6027

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REPORT TO

HALIFAX HARBOUR SOLUTIONS PROJECT

ON

**ENVIRONMENTAL SCREENING
ADDENDUM NO. 2
RESPONSE TO FEDERAL COMMENTS**

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May 30, 2002

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1 INTRODUCTION

Halifax Regional Municipality (HRM) submitted a draft Environmental Screening Report in August, 2001 to Responsible Authorities (RAs) and expert federal departments in support of the Halifax Harbour Solutions Project (HHSP, the Project) as required by the *Canadian Environmental Assessment Act* (CEAA). Comments from the draft review were addressed in the final Screening Report filed with the Canadian Environmental Assessment Agency in October, 2001. Subsequent to this filing, a contractor, Halifax Regional Environmental Partnership (HREP), was selected to enter into negotiations with HRM to form the Public-Private Partnership for the construction and operation of the HHSP. An Addendum to the Environmental Screening was filed in March 2002 to incorporate additional detail on various components of the Project and update sections of the Screening Report.

This report (Addendum No. 2) has been prepared to respond to comments provided by RAs and expert departments following their review of the Screening Report and the first Addendum. These comments were recorded by Public Works and Government Services Canada (PWGSC) at a meeting on May 3, 2002 and provided to HRM for response.

Each comment, organized by federal department, is reproduced verbatim in italics, with a corresponding response from HRM below.

2 COMMENTS ON RESPONSE TO REVIEW OF DRAFT SCREENING REPORT

The RAs felt that, in general, the responses included in the October 2001 Environmental Screening addressed the stated concerns raised from the review of the Draft Screening Report (August 2001). Those items that required further response are outlined below.

2.1 Fisheries and Oceans Canada – Habitat

2.1.1 Overflow Events

Question/Comment:

The report states that the predicted number of overflow events is 25-75 times per year and it is anticipated that this will meet guidelines. The report should state the predicted effluent quality (strength) at the CSOs. There should also be some level of commitment stated that the effluent will meet guidelines.

Response:

The combined sewer overflows (CSOs) will be designed to overflow only after the inflow exceeds 4 x average dry weather flow (ADWF) for 2021. This means that initially any discharge at the CSOs will be diluted by more than 4 times ADWF values.

CSO effluent strength would vary depending on the specific sewershed and characteristics of the storm event resulting in the discharge. Typical sewage strengths are Suspended Solids (SS) 89 mg/l and Biological Oxygen Demand (BOD) 85 mg/l (Metro Engineering, Halifax-Dartmouth Wastewater Characterization Program Phase II, May 1992). The diluted discharge strength would thus be SS 22 mg/l and BOD 21.25 mg/l, which is significantly less than the required effluent quality standards of 40 mg/l SS and 50 mg/l BOD. Fecal coliform (FC) bacteria levels would also be diluted during overflow events. These predictions are based on a simplified analysis, and on the weighted mean strength of effluent sewage as identified in the referenced report. It is also based on the assumption that the initial flush from the storm event, which would contribute additional SS and BOD, would occur prior to peak flow and would be directed to the Sewage Treatment Plant.

2.1.2 Toxic Discharge**Question/Comment:**

The Point Source Control By-Law is a thorough document, however there are concerns with the penalty for violation of this by-law. Specifically section 12(2) in which violators may pay a \$500 fine in lieu of prosecution. DFO believes that dropping the fine to 1% of the scheduled penalty is not acceptable and does not demonstrate due diligence. The financial penalty for an accidental violation is to be as a judge prescribes or a minimum of \$5000 (corrected annually for inflation) in lieu of prosecution.

Response:

HRM notes DFO's comment regarding the HRM By-Law; however, this issue is considered outside the scope of the assessment process. The following is provided for information purposes.

The monetary value of the discretionary penalty was recommended by HRM's Legal Services as being consistent with environmental fines as provided in the Provincial Gazette. The penalty of \$500 would be applied at the discretion of HRM for minor by-law infractions such as failure to submit reports, missed time lines or other compliance activities. For those direct violations of the By-Law in which environmental or operational impairment may be incurred as a result of non-compliance, the punitive amount of \$50,000 would be sought through the judicial process as well as any additional costs that may be incurred by the municipality.

2.2 Fisheries and Oceans Canada - Navigable Waters

2.2.1 NWPA Applications

Question/Comment:

No applications have been made to date under the Navigable Waters Protection Act (NWPA). PWGSC to remind HRM to start this process as soon as possible.

Response:

HRM is aware of the NWPA application process and will submit applications as soon as possible to avoid project delays.

2.3 Parks Canada

2.3.1 Point Pleasant Park

Question/Comment:

The report of the results of the archaeological field survey should be provided to Parks Canada for their records. Negative results are important for ongoing management and planning purposes.

Response:

A copy of the Archaeological Assessment of Chain Rock Pumping Station (January 2002) has been provided to Parks Canada for their records.

2.4 Department of National Defence

2.4.1 Location of Project Components

Question/Comment:

Exact location of project components on DND land is still unknown.

Response:

HREP, acting on behalf of HRM in the negotiation of easements and licenses for the HHSP project, has been negotiating with Mr. Phil M. Steeves, Manager of Real Estate Services for Maritimes Forces Atlantic, since early February 2002 for the right of way required on DND properties. As part of these discussions, HREP and DND reviewed a number of alternatives and agreed to an easement based on the requirements of both parties. A letter from Mr. Steeves dated April 19th, 2002 confirming these discussions, is provided as Appendix A.

These negotiations have included discussions on the location of the necessary sewer line required by HRM. Since then several changes have been made to the proposed routing at DND's request. The attached drawings (HX-01-C-1002 and HX-01-C-1003 in Appendix B) detail the latest version of this routing; it is HREP's understanding that this routing is mutually acceptable to both DND and HREP. Similarly, the requirements for siting the Jamieson Street Pumping Station and diversion piping are shown on attached drawing DT-01-C-2007 (amended to show only the Jamieson Street works) (Appendix B). A letter of intent between DND and HREP is presently being finalised.

2.5 Environment Canada

2.5.1 Storage Needs Within System

Question/Comment:

Report should indicate at what point in time will there be a need for increased storage. At what point will upgrades take place to accommodate greater storage needs to keep combined sewer overflows at similar frequencies as during the opening year of project completion.

Response:

The facilities are designed to treat up to four times the 2021 ADWF. After these flows are reached, the plants will be expanded to treat up to four times the 2041 ADWF. The ADWF increase between 2021 and 2041 is approximately 10% for Halifax and about 19% for Dartmouth and is therefore relatively minor. The Herring Cove increase is significant at about 85%. However the Herring Cove collection system is primarily a separate system and is not influenced by overflows to the same extent as the other systems.

The frequency of overflows is largely a function of the frequency, duration and intensity of rainfall in the region. Because the increase in the sanitary sewage component in the Halifax and Dartmouth systems is minor, it is unlikely that the frequency of overflows will increase significantly over time unless future rainfall patterns deviate significantly from the traditional patterns. In fact it is more probable that the overflow frequency will decrease over time as HRM continues with a long term policy of separation of existing combined sewers during street and infrastructure upgrades, on a sewershed-by-sewershed basis where feasible.

2.5.2 Outfall and Diffuser Design and Construction (Section 2.7.3)

Question/Comment:

DFO raised concerns with the diffusion rate modifications as stated in the Addendum document (March 2002). The minimal initial diffusion rate was originally stated as 50:1 and has been adjusted to 20:1 (Addendum, March 2002). This area [ed. – Herring Cove] is a migration route for fish. There is no rationale as to why the location has been moved or the ratio lowered. The original rationale of moving the Herring Cove diffuser from an impacted site to a pristine site was that the new site was farther out

and in deeper water. This is no longer the case. Further clarification of potential water quality effects of these modifications is required.

Response:

HRM would like to clarify that the initial diffusion rate of 50:1 will be maintained in the case of the Herring Cove outfall. Discussion regarding the diffusion rate modification to 20:1 at the Halifax and Dartmouth outfalls is included in the response in Section 3.2.9. The outfall location and configuration was changed at Herring Cove only after modeling analyses demonstrated that a 50:1 dilution could be achieved at the new location. This new location and configuration (diffuser installed along the contour) will permit a shorter outfall at a lower capital cost and with less impact (due to the reduced length) during the construction process.

3 NEW ISSUES AND COMMENTS ON SCREENING REPORT (OCTOBER 2001) AND ADDENDUM (MARCH 2002)

The following comments relate to the document 'Halifax Harbour Solutions Project Addendum to Environmental screening, March 2002'

3.1 Halifax Port Authority

3.1.1 Fairview Cove Container Pier

Question/Comment:

Concerns with possibility of Rockingham Cove / Fairview Cove container pier interfering with outfalls. This should be addressed in this document under cumulative effects.

Response:

HRM is aware of the proposed development of the Rockingham Container Terminal. The development expansion will interfere with an existing overflow pipe in the area. HRM will work with the Halifax Port Authority and their engineering consultant to relocate or extend as necessary the overflow pipe. Therefore any future terminal development will not interfere with operation of the collector system in the area and cumulative impacts with regard to the HHSP will be avoided.

3.1.2 Location of Sewage Treatment Plant

Question/Comment:

There are concerns with the location of the Dartmouth plant. There are currently negotiations underway with land issues between 3-4 departments involved in this.

Response:

No action required.

3.1.3 Under Keel depth

Question/Comment:

With the change in outfall and diffuser design from, the issue of under keel depth above the proposed diffusers needs to be addressed.

Response:

For the CSOs and STP outfalls in Halifax Harbour, the depth of water over the outfalls (top of pipe for the CSOs, top of diffusers for the plant outfalls) at low low water based on Canadian Geodetic datum is as follows:

- North Street CSO: 21 m at the end of pipe
- Young Street CSO: Effectively no extension into the harbor, pipe outlet flush with fill slope
- Halifax STP outfall: 17.7 m
- Dartmouth STP outfall: 10.7 m

3.2 Fisheries and Oceans Canada – Habitat

3.2.1 Storage Area (p. 3)

Question/Comment:

While covered storage will provide four months capacity, there is a concern that there is not enough storage area to hold product through the winter or other periods when markets for the product are not available. How/where will excess product be stored?

Response:

Updated design for the facility is based on a 6-month storage capacity. As contingency, HREP's partners have also concluded an agreement with a soil manufacturer who would be prepared to take a substantial portion of the product. This manufacturer has space to store about an additional six months of product capacity.

3.2.2 Transportation of Bio-solids (pp 4-5)

Question/Comment:

Is there a public health aspect that has to be addressed with regards to spills etc? Is it acceptable to use dump trucks with tarp covers to transport this material? DFO, as a RA, with added responsibilities under CEAA legislation, is aware of concerns raised by citizens over odour. DFO requests text be added to assure the sludge transport trucks will be sealed to prevent odour escapement during sludge transport to the treatment facility.

- *This activity is to be scheduled so that it is not during heavy traffic flows.*
- *The issue of sludge transport may raise concerns within the community with respect to transportation times and methods, which are to be addressed.*

Response:

The trucks for transporting the bio-solids from the treatment facility will be enclosed and sealed for transportation (most likely trailers with solid lids on top and sealed tailgates to avoid potential leakage).

The hours of operation for the vehicles will be determined to coincide with the standard operating hours of the manufacturing facility and sludge generating facilities while avoiding the high volume traffic hours of the cities. It is also HREP's intention not to haul sludge on Sundays except in case of emergency.

3.2.3 Spill Events (p. 6)

Question/Comment:

Entire section is written without any commitment to actually doing anything. The proponent needs to think about what they are going to do (how and when) and make a commitment. DFO has concerns with statement stating that appropriate authorities will be notified within 24 hours of a spill. The notification should take place immediately.

Response:

A spill response plan will be prepared as part of the Emergency Response and Contingency Plan to be prepared by HREP for the operations of the sewage treatment facilities. In general, in the case of a spill event, a call will be made by the vehicle operator to the vehicle owner and the sludge facility operator immediately. The vehicle owner will immediately dispatch the required equipment to the site for immediate cleanup and transport of the sludge to the sludge facility or other appropriate location as may be required if the sludge quality is significantly affected by the spill cleanup method. The owner of the vehicle or a senior representative from his company will attend to the site without delay to ensure that a proper cleanup is carried out.

Coinciding with this action, the facility operator will immediately notify HRM, HREP, the facility owners, and NSDEL. A sludge facility owner's representative will attend at the site as soon as possible after notification.

3.2.4 Sludge Disposal (p. 13)

Question/Comment:

"Dewatered sludge will be taken to other sites for disposal". The report must indicate the location of these 'other' sites and any agreements in place that they will accept the sludge

Response:

HREP's partners have reviewed the possibilities of a long term shut down, including a review of the shut down periods of the existing similar facilities. The review has concluded that the risk of long term shutdown is minimal (mainly a dryer malfunction), however, there are a number of ways as described below to deal with the issue should an incident occur.

The required stabilization of the sludge can be achieved with the dryer out of service through addition of extra quantities of alkaline admixture. It would be relatively easy to use this alternate process for stabilization and then store the product in the facility's storage building, which will be under negative pressure and odour control. Should the storage building have excessive end product in place, it will be moved to one of the alternate storage facilities.

3.2.5 Downtime (p. 13)

Question/Comment:

Concerns with the storage capacity if something goes wrong and downtime is longer than a two-day period – will the storage capacity be adequate for such situations?

Response:

The current design of the facility allows for two days storage at the front end of the facility that are in addition to the two-day storage at the wastewater facilities.

However, should a downtime exceed these storage capacities, HREP will be able to temporarily store excess dewatered sludge in the facility's storage building since it is maintained under negative air pressure and odour control. This sludge would then be progressively processed.

3.2.6 Laboratory Certification (p. 14)

Question/Comment:

Indicate that laboratory will be (Canadian Association for Environmental and Analytical Labs) CAEAL Certified.

Response:

HREP's partners will use CAEAL certified laboratories for physical and chemical analyses of the sludge.

Page 14 Monitoring Format

What are the trigger values? What will be done when a certain trigger value is reached?

Section 2.7.1 of the Addendum states that analyses performed on the dewatered sludge leaving the wastewater facilities will be used solely for the purposes of confirming the relative quality (vis-à-vis the regulated pollutants) of the raw sludge. There is no regulatory requirement at that intermediary stage of sludge processing. In the unlikely event that one parameter appears to be out of the normal range, a more specific monitoring of the end product will be undertaken. Contingency measures are detailed subsequently in these responses (Sections 3.2.7, 3.3.4).

3.2.7 Sludge Testing (p. 15)**Question/Comment:**

"Composites will be prepared on a monthly basis for metal analysis etc." There is no discussion regarding virus/bacterial levels? Even though the bacterial levels should be zero after lime addition, testing should be carried out to be certain product is safe. The final soil product is to be sampled for bacteria, viruses and pathogens of potential concern to human. Passing levels will be similar to typical soil background levels. Sampling will continue for the life of the project.

Response:

HREP's partners intend to analyze metals, physical properties and microbiological levels (faecal coliform and salmonella) on a quarterly frequency. Once a year, viable helminth ova and enterovirus will be checked. This practice is currently undertaken at other similar facilities where, after several years of experience, no non-compliance of pathogens has been reported. It should be noted that the sludge treated at these locations is not digested (same situation as in Halifax) so pathogen reduction is fully accomplished through the proposed process.

3.2.8 MSDS Sheets (p. 16)**Question/Comment:**

How will MSDS sheets be prepared if they don't have control as to what's going into the system?

Response:

The only addition to sludge in the process is alkaline admixture, for which MSDS sheets will be provided by the supplier.

The composition of the end product will be labelled under the requirements of the *Fertilizers Act* and Regulations and so remain within a predefined range of values. We also anticipate that the quality of the incoming sludge will be relatively consistent, as is the experience in other municipalities where the treated wastewater is predominantly domestic. The treatment of combined sewage (with means variable pollution concentration in the wastewater flow) does not impact the quality of sludge.

3.2.9 Diffusion Rate (p. 19)

Question/Comment:

Why has this been reduced from 50:1 to 20:1. The message to the public to this point has been that the diffusion rate was going to be 50:1. Model plumes showing that the reduction to 20:1 will not make a significant difference to justify this change are requested.

Response:

Modeling of contaminant levels in Halifax Harbour has been conducted in the context of a near-field and mid-field analysis. Far-field "box modeling" of overall capacity was conducted previously by the Halifax Harbour Task Force (HHTF). Modeling for the mid-field was undertaken for the HHSP through a gridded two-layer hydrodynamic/advection/diffusion model which reflected tidal, estuarine and anti-estuarine processes as revealed in ADCP data obtained in 1989. This mid-field model assumes spatial averaging over the grid resolution, and temporal averaging including loads, fecal coliform (FC) bacteria die-off, turbulence, etc. The result is that the surface waters near the treated flows from outfall diffusers, for example, will be affected by FC to a level of the order 10's of bacteria/100ml. This prediction implies that the near-field processes around the discharge diffuser are such that mixing into a surface layer with thickness of approximately 10 m is assured.

Near-field modeling was conducted using standard plume software (UPLUMES). Input to the program includes typical stratification profiles (derived from Jordan surveys) flow rates and diffuser length (and hence initial dilution).

In all cases, the actual performance of a diffuser varies with conditions so that the definition of a particular "initial dilution" is somewhat arbitrary. The proposed revised diffusers are to be shorter than originally anticipated in order to reduce overall capital cost. This will result in somewhat less initial dilution (2.5 times less), which is the difference between the 50:1 initial dilution originally proposed and the currently proposed 20:1 initial dilution.

Overall, the spatial and temporal average results from the mid-field model presented in the Environmental Screening will still apply; albeit, near the outfall, the actual plume may be smaller than the resolution of the model. That is, where the mid-field model indicated that the average FC concentration was low over the diffuser, actual measured values may be higher depending on specific sample, flows and oceanographic conditions. Based on near-field modeling, it is anticipated that, despite the shorter diffusers, these higher levels will not exceed the water use guidelines established for

the harbour. It is also given that the treated effluent, prior to dilution, will meet the NSDEL regulated standards for TSS, BOD and FC.

It should be noted that that the proposed diffusers giving 20:1 initial dilution under typical conditions provide less initial dilution than recommended by the HHTF and adopted for the previous HHCI project (50:1). The HHTF recommendation however, was presented in the context of a single large outfall and diffuser in the inner harbour. The currently proposed two outfalls and diffusers in the inner harbour will improve the overall dispersion characteristics of the treated effluent compared to a single source.

It is anticipated that this change will result in a plume of treated effluent that will tend to surface more often and will retain its buoyancy signal longer. The latter could result in the plume meandering at the surface in response to wind and current for a longer period than would be the case with a longer diffuser.

3.3 Environment Canada

Environment Canada (EC) has reviewed the revised environmental screening document on the Halifax Harbour Solutions Project (HHSP) dated October 2001, as well as the Addendum to the screening dated March 2002. Further to our July 2001 review comments, the following information requests are put forward for attention in the environmental assessment. In fulfilling these information requests, the proponent is reminded of its responsibility for compliance with applicable federal legislation including the Canadian Environmental Protection Act and Section 36 of the Fisheries Act.

3.3.1 Pollution Prevention Program (Source Control Strategy)

Question/Comment:

It is understood that a Pollution Prevention Program (PPP), formerly referred to as a Source Control Strategy, was initiated by the Halifax Regional Municipality (HRM) in 1996. EC is pleased that the PPP was strengthened through the enactment of a revised Wastewater Discharge By-law (W-101) on July 21, 2001. This by-law prohibits specific discharges to wastewater facilities and storm sewers as described in Appendix D of the screening document. As recognized by the proponent in Section 2.6.1 of the October 2001 screening, “the implementation and continued maintenance of this program is key to the

The current status of the PPP should be clarified. For example, there are several statements in the assessment documentation indicating that activities in relation to the PPP (i.e. compiling a database of all industrial, commercial and institutional (ICI) locations (requiring approximately 3.5 years to complete), developing best management practices for industrial and commercial sectors, preparing educational material for the residential sector, developing a detailed phased approach to the implementation of the program) are either in preparation or will be at some point in the future.

The timetable and provisions for implementation of these initiatives leading to a PPP which is in full force should be identified. The timetable should be reconciled with the claim that “compliance audits will be initiated in August, 2001” (p. 8) as necessary.

Given its importance to the success of the HHSP, the proponent should also clarify how PPP effectiveness will be evaluated. For example, the data in Appendix G, which sets out the analytical characterization of the wastewater discharges to Halifax Harbour, could be used as a “baseline” against which overall effectiveness of the PPP could be measured. Similarly, the composition of the biosolids could also be used in this regard.

Finally, the proponent should clarify the resources which will be made available to the PPP considering the importance of the program to the overall success of the HHSP.

Response:

HRM notes EC’s comment regarding the HRM Pollution Prevention Program; however, this issue is considered outside the scope of the assessment process. The following is provided for information purposes.

Section 2.6.1 of the Environmental Screening (October 2001) describes HRM’s Pollution Prevention Program (P2 Program). The following has been prepared to update and elaborate on information contained in the Screening.

Quarterly reports are prepared for the information of HRM Council regarding the P2 Program. The next quarterly report is being prepared for submission to Council at its meeting scheduled for May 28, 2002.

It is estimated that 5,000 businesses within the serviced area of HRM are subject to the provisions of By-Law W-101. Staff have undertaken to compile a data base of these locations from various sources to permit the initiation of case management activities. Currently, 3,329 business locations have been identified. This data base permits access to the business name, civic address, contact information, business sector, wastewater discharge characteristics, correspondence history, inspections, sampling, compliance issues and other attributes regarding site specific P2 management.

It is important to note that businesses which discharge wastewater to municipal sewer systems in HRM have previously not been subject to active wastewater quality controls. Other municipalities across Canada have had active source control programs in some cases for over twenty years. Staff of HRM recognize that for many businesses the requirement for wastewater management is a new operational issue and will impact on financial and process considerations on a site by site basis. As such, education has been identified as a critical component of the P2 Program.

The P2 Program has been and will continue to be promoted through a number of available media. These have included the Naturally Green Newsletter, water billing inserts, Burnside News, Enviro-Connect,

Nova Scotia's Environmental News, Maritime Water and Wastewater publication, HRM's web site as well as the Canadian Centre for Pollution Control web site.

Staff have made presentations to various groups and organizations including the various Watershed Advisory Boards, Nova Scotia Environmental Industry Association, Canadian Petroleum Products Association, open houses hosted by HRM. A presentation was made at "Preserving the Environment of Halifax Harbour" sponsored by Fisheries and Oceans Canada, and most recently at two separate Pollution Prevention workshops hosted by the NSDEL and Environment Canada.

Staff have been requested to provide a presentation on the P2 program at conferences in Ottawa and Newfoundland. Additionally, staff are currently participating in the development of Best Practices for national circulation as part of the National Guide to Sustainable Municipal Infrastructure. A similar participation is ongoing with a national benchmarking strategy, which will permit upon completion, comparisons of P2 programs across the nation and identify efficient program component deliverables as well as respond to emerging issues. Dalhousie University has requested that HRM provide a monthly presentation of P2 as part of their core Engineering Program. Three presentations have been provided to date.

HRM's P2 program has received national and regional attention. Staff from Environment Canada (Atlantic Region) as well as NSDEL have expressed interest in partnering or participating in various strategies of current and future P2 initiatives to develop successful templates for other municipal P2 initiatives in the Maritimes. These opportunities will continue to be reviewed and explored to insure that HRM remains successful in achieving and maintaining the objectives as identified for this program.

In the past quarter of this year, staff have responded to 163 telephone inquiries from business operators, owners or representatives. Typically, these calls are a request for clarification of the information that has been made available and the individuals seek to have the by-law explained and put into the context of their specific business activity. It should be recognized that each business even those that have similar processes within industry sectors are unique. As such, the wastewater characteristics and subsequent sampling, monitoring, and abatement activities that will be required by each business is site specific in order to obtain compliance with the provisions of By-Law W-101. Through the extension of education, an awareness of the by-law and the requirements for compliance will be achieved.

As they are entered into the database, businesses are subject to a wastewater process review, inspection and unannounced monitoring to determine if compliance with the by-law is being achieved. Contravention of the by-law will indicate a need for self-monitoring, process wastewater abatement activities and reporting to HRM. These compliance initiatives will be documented with time lines of implementation to prove and insure continual improvement until compliance is achieved. Additionally, this documentation is critical to provide a preponderance of evidence for possible litigation should any business continue to not undertake compliance activities to meet the by-law criteria. For many businesses, improved housekeeping, redirection of waste streams, alternative products, raw material

substitution, or recycling activities will insure compliance with the requirements of the by-law and may be accomplished in a short time period. For others, significant process changes, capital expenditures, staff training and the services of consultants or waste treatment specialists will be required. These remedial works will require longer time lines for completion and possible the expenditure of financial resources. It is the intention of staff to recognize these variables and to work in a cooperative manner on a site specific basis with business to achieve compliance with the by-law and the objectives of the P2 program. The by-law provides for a compliance program where business will undertake their wastewater abatement actions. Staff will monitor the achievements to the time lines and non-compliance will be regarded as a violation of the by-law and enforced with the assistance of HRM's Legal Services.

It is recognized that wastewater discharged from residential locations represents a significant component to the characteristics of wastewater chemistry. Educational material has been developed and will continue to be provided to the residential sector of HRM to allow for the direct participation of the public in the reduction of contamination to the municipal sewer systems. Currently, many households discharge hazardous wastes such as cleaning fluids, solvents, oils, paints and personal care products and expired or unused pharmaceutical products. It is the intent to encourage the public's sense of stewardship and environmental responsibility that many residents do embrace and allow them to extend this same responsibility into the various workplaces and businesses of HRM.

The Wastewater Discharge By-law will be reviewed and periodically updated to address emerging priority pollutants that become a concern for biological treatment systems and related conveyance components of municipal systems. Cooperation with staff from Environment Canada, NSDEL, Fisheries and Oceans as well as educational and research institutes and agencies is maintained to insure that HRM's P2 Program remains current and employs the best practices to meet our objectives.

The P2 program has been staffed by one Pollution Prevention Coordinator, which was initially a term position. This position was reclassified as a permanent position, and successfully filled on April 8, 2002.

It is HRM's objective to have each ICI location reviewed, inspected, and entered into compliance initiatives as may be required to meet the provisions of the by-law in advance of the completion of the Harbour Solutions Project. HRM anticipates a 3-4 year objective of all ICI locations being aware of the provisions of the by-law and wastewater discharges being subject to representative monitoring and compliance activities.

3.3.2 Inflow/Infiltration Reduction Plans

Question/Comment:

It is understood that the proponent is in "the early planning stages" of developing Inflow/Infiltration Reduction Plans. A description of these plans and a timetable for implementation should be provided. The proponent should also indicate how this effort will contribute to the success of the HHSP particularly in reducing the risk of overflow events.

Response:

HRM notes EC's comment regarding the HRM I&I Plans; however, this issue is considered outside the scope of the assessment process. The following is provided for information purposes.

In the year 1999/2000 HRM initiated an Infiltration/Inflow Reduction Program (I/I) to address the problem of excessive infiltration and inflow into the municipality's wastewater collection system. It is not a new initiative and has been attempted by the former municipalities in one form or the other, however, to a limited success.

Funding in an amount of \$250,000/year has been provided on an ongoing basis in the capital budget for the implementation of the program starting with the fiscal year 1999/2000. Following the approval of the Capital Budget, a list of the areas considered to be contributing a high rate of infiltration/inflow in the order of priority was prepared with tentative schedule for implementation. It should be noted that the implementation of an I/I program is a two step process. First step includes study and investigation to determine the sources and the location of infiltration/ inflow. Second step is the implementation of corrective and remedial works. Depending on the findings from the investigation, corrective and/or remedial works may include from minor repairs to major piping works. Major works has to be included in the Capital Budget for Council's approval

The list of the areas under study and the current status is included in Appendix C. Studies and investigation for the first six locations are complete and the corrective works are underway. Terms of reference for the additional areas for consultant studies are being prepared. An RFP for the Sackville Area Phase I was closed recently with an award decision pending. In addition to the consultant studies and the remedial works performed by the contractors, staff have completed investigations for the North Preston area and have undertaken remedial works in this area.

It should be emphasized that HRM video inspects its sewer on an ongoing basis in the range of 40,000 to 50,000 meters/year. From this inspection, sewers requiring repairs and /or replacement are identified and the remedial works are undertaken. These works have net impact on the reduction of infiltration and inflow on the overall system. HRM also has an ongoing flow monitoring program to monitor the flow during wet conditions. Flow monitoring is also intended to check the reduction in the rates of I/I and the performance of the corrective works after an area has gone through an I/I reduction phase. Recently HRM has awarded a pricing agreement with a contractor who specializes in the manhole sealing and grouting to reduce the I/I from deteriorated manholes. Manholes are major source of infiltration/inflow.

3.3.3 Sewage Collection and Treatment Systems

Question/Comment:

As described in the EA documentation, design options for minimizing overflow events include incorporating tunnels with excess capacity, increasing the receiving flow volume of the sewage treatment plant (STP), increasing the storage capacity of pumping-station wet wells and reducing the

pumping rate to the STP. Other design options include provisions for diesel back-up generators in case of power failures. The proponent should describe how it will verify that all feasible design measures have been identified and implemented to minimize the risk of overflow events.

Provisions for accommodating the expansion of STPs are noted in the EA documentation (e.g., facility design, land availability). The management strategy that will guide decision-making on the timing and nature of upgrades to STP capacity and treatment level should also be described. Such a strategy should take into account the need to understand and anticipate changes to inflow quality and volumes, the potential influence of climate change over the life span of the project (e.g., increased precipitation) and changes in regulatory requirements.

Response:

Trigger for STP capacity expansion:

The initial plant design for each STP must accommodate 4 x ADWF projected to year 2021 for that STP. These projections have been based upon Statistics Canada projections for population growth within each sewershed. Plant design must be able to easily accommodate a capacity expansion to provide additional treatment capacity for projected 4 x ADWF levels to year 2041. The trigger for such expansion will be the same for each of the three STPs. The determining factor is not the date, but rather the actual flow levels. At such time as any of the STPs begin consistently receiving, during dry weather flow conditions, flow levels approaching that projected for 2021 ADWF for that STP, then the capacity expansion for that STP will be triggered. The resulting expansion will increase the capacity of that STP to accommodate the defined 4 x ADWF projected for 2041.

Trigger for STP treatment level increase:

The initial plant design for each STP must provide a minimum of advanced primary treatment in order to meet the NSDEL end-of-pipe discharge limits. Plant design must be able to easily accommodate upgrades to secondary level treatment. Triggers for treatment level increase would be: regulatory changes (more stringent end-of-pipe limits by NSDEL, or marine municipal effluent quality regulation by the federal government under CEPA); or a unilateral decision by HRM to increase treatment levels as a result of Council decision.

HRM has considered all feasible design measures to minimize the risk of overflow events. Diesel back-up generators will be used at all new pumping stations.

3.3.4 Sludge Management Program

Question/Comment:

It is understood that dewatered sludge cake will be mixed with alkaline admixtures, possibly including by-products such as fly ash and steel-making fines. The proponent should indicate whether this practice will affect the soil amendment quality by contributing heavy metals to the product. Section 2.5.1 indicates that heavy metals are converted to insoluble forms through the mixing process and that no

leaching of metals occurs. This claim should be substantiated, especially considering that the product will likely be spread on acidic soils subject to acid rain.

As this sludge management process is currently in use in Canada, the United States and other countries (Section 2.1), the proponent should provide information on its effectiveness, upset frequency and acceptability of the end product to target customers.

The proponent indicates that the final product must be in compliance with the requirements of the Fertilizers Act and Regulations, NSDEL and generally USEPA regulations at 40 CFR Part 503.

Aside from references to nine unidentified metals and a Class A pathogen reduction, the standards against which this product will be judged for acceptability are unknown. These standards should be clearly identified together with the respective predicted parameters of this product. A contingency plan in the event that the product fails to meet the required standards should also be identified.

Response:

Metals converted in an insoluble form and impact of acid rain/acidic soil

HRM's P2 Program and the Wastewater Discharge By-law should assure metal levels that will comply with those under the Federal Fertilizers Act and Regulations (Chapter 3, table III of the Guidelines to the Fertilizers Act and Regulations). Municipalities that have enacted and enforced similar sewer-use bylaws invariably have sludges that meet regulatory requirements.

The dewatered sludge cake in the case of Halifax will be mixed with cement kiln dust (CKD) along with a small quantity of quicklime. The levels of the metals in the admixture are generally lower than the sludge itself (in most cases significantly lower), resulting in an overall reduction of metals levels. The addition of the admixture will not, therefore, "affect the soil amendment quality by contributing heavy

One of the main uses of the end product in virtually every jurisdiction is as an ag-lime substitute for soil pH adjustment. It is applied at rates sufficient to raise the pH toward neutral so that there will be no acid leaching effect. It has been used extensively in the USA on farm soils with pH in the 4 to 5.3 range with full regulatory approval.

In a study related to agricultural use of the end product, tests were done to determine if trace elements (metals) were susceptible to groundwater leaching. Metals extracted with the USEPA hazardous waste leaching test were no different or were lower in soil that had received 9 tonnes per acre of end product (more than 2 times that contemplated for the Halifax area) than in unamended soil (Bennett, 1989), even when soil pH was lowered to 5 before the test. It shows that metals are stable in a soil amended with end product even after the end product liming effect is removed.

Effectiveness and acceptability of the end product in other Canadian and/or US contracts

The end product is bought in Canada by farmers that are up to 150 miles away from the source facility. Heinz Foods, Leamington, has endorsed the product generated by a similar facility to the one to be constructed in Halifax as the only biosolids product that can be applied to lands on which produce purchased by Heinz is grown

Standards against which acceptability is defined

The standards against which acceptability is defined are:

- The Federal Fertilizers Act and Regulations.
- The USEPA regulation (40 CFR part 503) relating to the specific aspect of pathogen reduction.

There is currently no specific Federal or Provincial microbiological criteria covering biosolids or biosolids-derived products. The reference to USEPA regulations is common practice by the Canadian Food Inspection Agency.

A contingency plan has been developed and included as an integral part of the contract between HRM and HREP. In case of non-compliance with the stated standards (which may occur in case of change in law or abnormal influent), the use of an HRM-owned landfill has been secured. The sludge would be first stabilized at the facility then transferred to the landfill where it would be either used as cover or landfilled.

3.3.5 Disposal at Sea

Question/Comment:

It is understood from Section 3.0 in the Addendum, that construction activities associated with the installation of outfalls and diffusers has changed from that originally proposed. Specifically, trenching, backfilling and underwater blasting will no longer be carried out. Instead, outfalls and CSO extensions in Halifax will be installed by laying the pipe on a granular mattress and backfilling over the pipe with granular material. At Herring Cove, the outfall will be laid on the bottom and secured with anchors. Based on this description, it does not appear that a Disposal at Sea Permit would be required. Nevertheless, the proponent should be aware that activities such as sidecasting or disposing of material from one location to another would necessitate a permit. The proponent should also be reminded that a minimum of nine weeks is required to obtain an Disposal at Sea Permit from the date of application. If there are any questions concerning the need for an Disposal at Sea Permit, the proponent should contact Mr. Victor Li at 426-8305.

Response:

HRM notes Environment Canada's comment regarding Disposal at Sea Permit. If the construction activities change from that described in the Addendum and there is a question regarding the necessity of a Disposal at Sea Permit, Environment Canada will be contacted for consultation.

3.4 Transport Canada

3.4.1 Transfer of Land

Question/Comment:

There are still outstanding issues concerning the transfer of land. Transport Canada is uncertain if they will be an RA.

Response:

No action required.

3.5 Department of National Defence

3.5.1 Project Components on DND Land

Question/Comment:

Currently DND is negotiating an agreement with HRM for access to DND land for both the collection system and the combined sewer overflow. As HRM have indicated that they wish to have the EA finalized soonest and the exact locations for the infrastructure are unknown at this time, DND requires that the EA evaluate all possible options prior to sign off.

Response:

Refer to response included in Section 2.4.1.

3.5.2 Unexploded Ordnance

Question/Comment:

Regarding the overall project, potential concern with respect to unexploded ordnance depending on the final site of the Dartmouth outfall. As well, if the project requirements change again for the construction of the outfall and dredging is necessary, an EOD rep may be required on site.

Response:

HRM and HREP will continue to consult with DND on this issue as design and construction proceed in order to meet any requirements in regard to unexploded ordnance.

3.6 Parks Canada

Parks Canada would like a formal meeting with the proponent and/or their contractor to explore the details of their plans for undertakings in Point Pleasant Park.

Parks Canada is the federal authority responsible for lands in Point Pleasant Park that we expect will be required for parts of this project as outlined in the March 27, 2002 Addendum to the Environmental Screening for the Halifax Harbour Solutions Project (the Addendum). Ultimately I believe that Parks Canada will have to provide a legal agreement for the project to proceed as planned. Therefore Parks Canada is highly likely to be a responsible authority for this project by virtue of a land trigger under Section 5 (1) (c) of the CEA Act. As such we offer the following comments on the project environmental assessment dated Oct. 2001 and the Addendum to that document dated March 27, 2002.

In general we are encouraged by the revised plans for the Point Pleasant Park area outlined in the Addendum as the overall level of intervention on park lands appears to be reduced. That said, we have the following comments about the way that the Environmental Assessment and the Addendum address certain factors in the scope of the assessment for this project.

Parks Canada's interest in this proposed project relates to the manner in which it will interact with the cultural resources on federal lands. Parks Canada is also interested in the manner in which the project affects the public use and enjoyment of the Point Pleasant Park. Within the scope identified for this assessment specific factors referred to as Valued Ecosystem Component (VEC) have been identified. The VECs associated with Parks Canada's interests are 1) Heritage and Archaeological Resources, 2) Land Use, 3) Atmospheric Resources and 4) Transportation Infrastructure. I address each of these separately in the sections that follow.

3.6.1 Heritage & Archaeological Resources

Question/Comment:

The addendum provides inadequate description of the work proposed for Chain Rock area of Point Pleasant Park and the methods to be employed to build the proposed facilities e.g. the mostly buried pumping and screening station, associated sewer and power lines, and the new access road needed to service the pumping station). Parks Canada will require a more detailed description of the work itself, including a better spatial representation of the proposed works in the Chain Rock area. Without these it is not possible for us to fully evaluate the acceptability of the proposals. We expect that these facilities can be accommodated in a manner that would not do undue damage to archaeological and heritage resource in the area but will require more details before a final determination can be made.

Response:

HREP-amended drawing No. HX-01-C-1012 (Appendix B) contains a site plan of the proposed pumping station. This small pumping station will only handle flows generated below the main pumping station at the Atlantic School of Theology. This facility will be a submersible pumping station with integral screening chamber consisting of a combined underground wetwell and screen chamber with an associated above ground building. The building will have a small footprint and be architecturally designed so as to be compatible with the ambiance in the park while providing the utility required for the pumping station. Power will be drawn from a 120-volt source within the park (and close to the station) and run underground to the station. An access road, consistent with in-park roads, will be constructed to link the existing park road network to the station. A water supply line will also be installed underground and at a shallow depth of burial to service the station. All design plans, as they are developed, will be reviewed with Parks Canada and the PPP Advisory Committee to seek input and approval.

Question/Comment:

We assume that the mitigation measures (e.g. pre-construction assessment and monitoring during construction) with respect to the Chain Rock area outlined in Table 5.6 will apply to the new proposal. Confirmation of this would be appreciated, as would copies of the assessments when they have been completed.

Response:

Archaeological monitoring will be conducted during construction activities for the pumping station in the Chain Rock area. The survey monument on the cove will be protected to prevent it from being inadvertently disturbed by any proposed development. If archaeological resources are encountered, the Nova Scotia Museum will be contacted to provide notice under the Special Places Protection Act and to obtain guidance regarding appropriate mitigation. Construction of the pipeline route in this area will also be monitored by a qualified archaeologist. A copy of the Archaeological Assessment of Chain Rock Pumping Station (January 2002) will be provided to Parks Canada for their records.

Question/Comment:

The Environmental Assessment Report indicates that archaeological assessment - including testing for unrecorded archaeological resources was done in the vicinity of the proposed Chain Rock pumping station (pg 120). Although no archaeological resources were encountered (page 122) Parks Canada would like to review the written report that documents this archaeological testing. This report should be referenced in the addendum and copies made available to the interested public.

Response:

A copy of the Archaeological Assessment of Chain Rock Pumping Station (January 2002) has been provided to Parks Canada for their records.

3.6.2 Land Use

Question/Comment:

Negative public reaction to the conversion of additional Point Pleasant park land to road use can be expected. It would be appropriate to engage the public on this question. At very least this proposal should be reviewed with the Point Pleasant Advisory Committee. Has the Point Pleasant Advisory Committee been advised of the revised plans for the extension of the road and the use of the existing road network within the park to service this pumping/screening station? The Oct 2001 Environmental Assessment report indicates on page 195 that they had been contacted with respect to the earlier proposal, yet the addendum remains silent on the views of this group with respect to the new proposal, including the new road and use of the park roads by service vehicles.

Response:

HRM will meet with the Point Pleasant Park Advisory Committee on an ongoing basis to keep them informed on current plans, and to seek their input on plans for facilities within the Park.

Question/Comment:

Cutting of trees within the park is also a sensitive matter give recent problems in the park related to pest infestations. Route selection for power lines and sewer lines to minimize disturbance to natural vegetation is important to the public.

Response:

HRM recognizes the sensitivity of cutting of trees in the park area and therefore it is our intent to waive our normal design standard in terms of width and slope of the access road in order to minimize the impact. The intent is to have a driveway that would also serve as a walking trail with appearance similar to the existing trails within the park. The route selection for underground power lines will follow the walking trail and therefore will minimize disturbance to natural vegetation.

3.6.3 Transportation Infrastructure

Question/Comment:

No information has been provided about the frequency and timing of use of the park road network to access the proposed pumping/screening station in Point Pleasant Park. Truck use to remove material screened at the station will be necessary. Without this it is not possible to gauge the significance of impacts on park users.

Response:

The proposed pumping station is relatively small in size and capacity. The frequency of use of the Park road network to access the proposed pumping station/screening station in Point Pleasant Park for routine maintenance would be once per week with a one ton service truck. The duration of the routine maintenance is about 15 minutes per visit. The pumping station screen is designed in such a way that all screenings will automatically be routed into the sewage flow being pumped, and there is no requirement to remove screenings from the station.

Twice per year, the station will be cleaned to remove any solids built up within the wet well. A vacuum truck will carry out this maintenance. The duration of the cleaning by the vacuum truck is 2 hours per occurrence.

3.6.4 Atmospheric Resources

Question/Comment:

The spatial boundaries outlined in section 4.1.1 do not appear adequate for the unique situation that would exist given the proposal for a pumping/screening station within such a well used place as the Point Pleasant Park. The effects of the pumping station emissions on users of Point Pleasant Park do not appear to have been addressed. Specifically effects beyond the property boundary may not be adequate for this unique situation. Follow-up & Monitoring does not include provisions related to odour problems in this sensitive environment.

Response:

The RFP specification stipulates that “pumping stations shall be equipped with odour and noise control systems to absolutely minimize odour and noise effects in the area of the pumping station”, and further odours off site, i.e. beyond the physical limits of the pumping stations and of the CSO chambers.” The Point Pleasant Park pumping station will adhere to this standard, which was devised for pumping stations in close proximity to residences. The odour control equipment will draw air from the wet well, and the air will be treated to remove odour before discharge to the atmosphere.

Question/Comment:

Similarly noise from operation of the pumping/screening in the park is not adequately addressed in Section 4.1. Equipment design that considers acoustic effects is not a precise enough mitigation. Greater focus on monitoring of negative public reaction and a strong commitment to take appropriate corrective action would be more appropriate.

Response:

The RFP specification stipulates that “pumping stations shall be equipped with odour and noise control systems to absolutely minimize odour and noise effects in the area of the pumping station.” The pumps being proposed in Point Pleasant Park are submersible pumps, which are located underground as well as being submerged. Therefore, the noise generated by the pumps will be extremely low level and may not be detectable.

4 LITERATURE CITED

Bennett, G.F. 1989. Effects of cement kiln dust on the mobility of heavy metals in treatment of wastewater treatment plant sludge. Rep. to the Thomas Edison Prog. for Innov. Technol., Ohio Dept. Develop., Columbus, OH.

Metro Engineering Inc. 1992. Halifax-Dartmouth Wastewater Characterization Program Phase II, May 1992. Report to Halifax Harbour Cleanup Inc.

APPENDIX A

CORRESPONDENCE BETWEEN HREP AND PHIL STEEVES (DND)



National Defence Défense nationale

Maritime Forces Atlantic
Formation Construction Engineering
P.O. Box 99000 Stn Forces
Halifax NS B3K 5X5

MARL: 7800-H17 (Mgr RES)

19 April 2002

Mr. Remi Couineau
Halifax Regional Environmental Partnership
United Water Services Canada
1801 Hollis Street, Suite 1000
Halifax NS B3J 3N4

Dear Mr. Couineau:

**HALIFAX HARBOUR SOLUTIONS
PROJECT (THE "PROJECT")**

I wish to confirm our discussions that the Department of National Defence is negotiating the compensation, terms and conditions of the right of way required by the Halifax Regional Municipality for the installation of a sewer line for the above noted project through HMC Dockyard at CFB Halifax and, subject to the successful completion of negotiations, we may proceed to complete this matter.

Thank you for your attention.

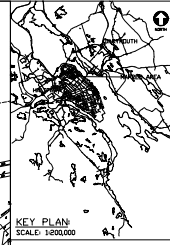
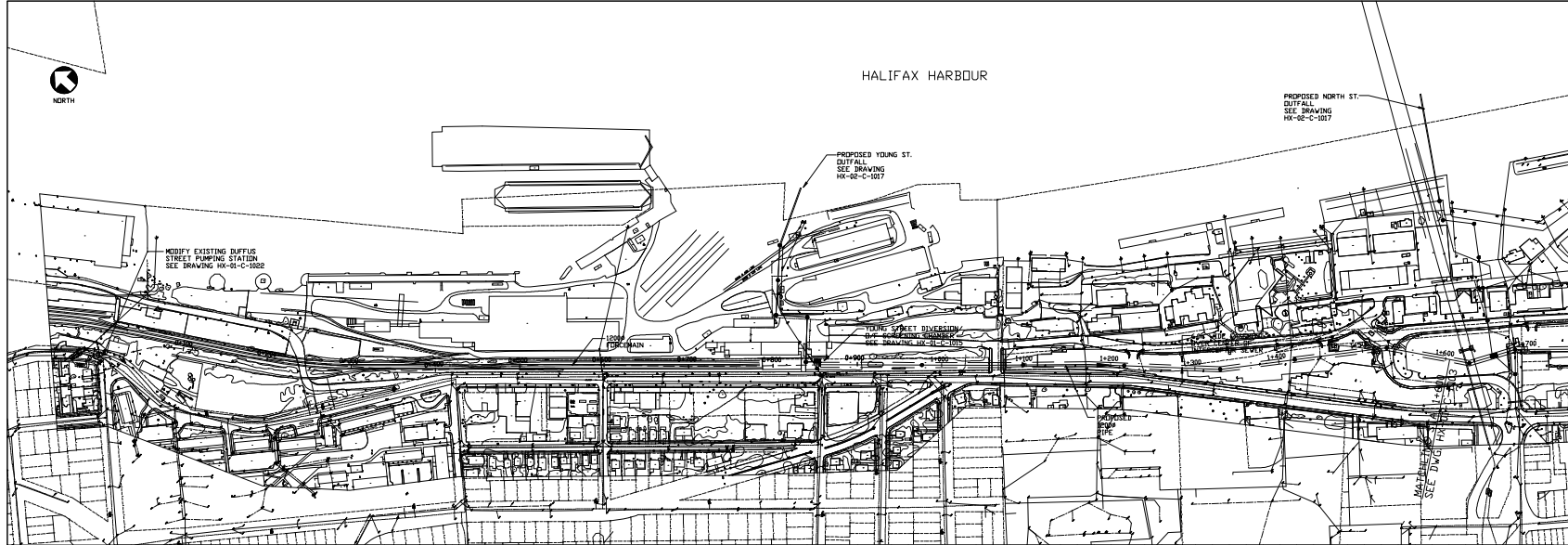
Yours truly,

Mr. Phil M. Sleeves, SR/WA
Manager
Real Estate Services
for Commander

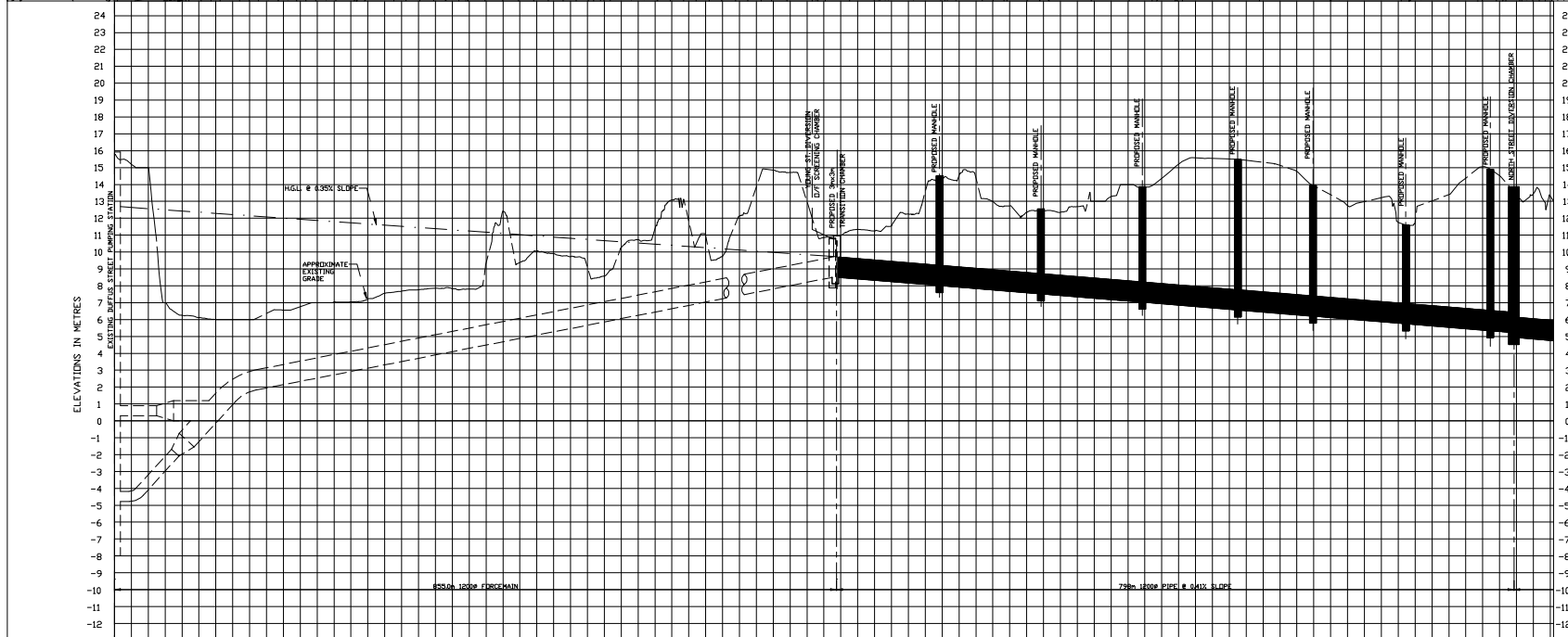


APPENDIX B

DRAWINGS

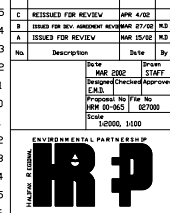


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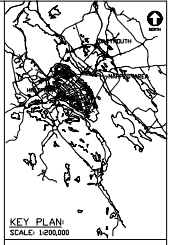
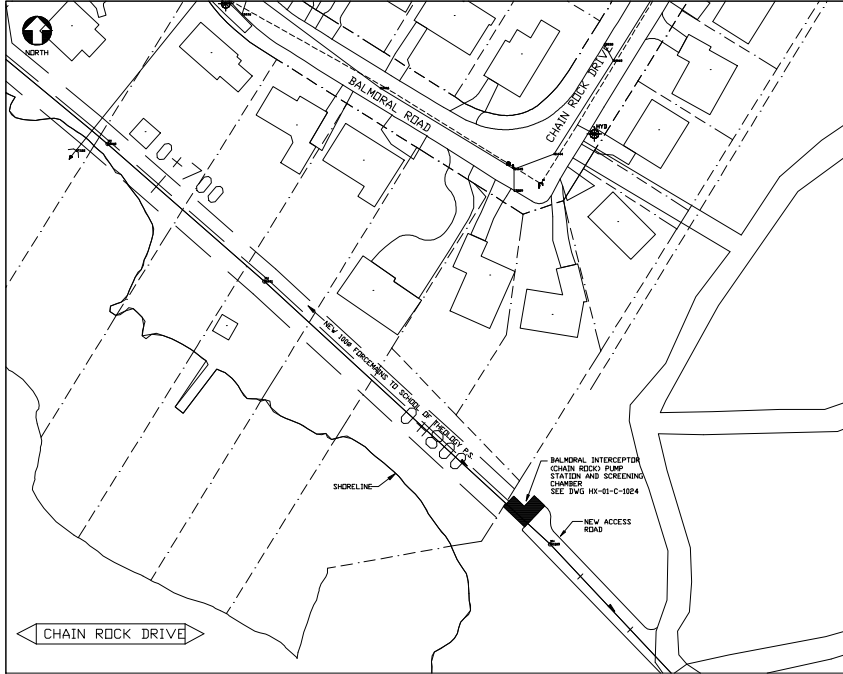
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ELEVATION ALONG C. OF PIPE ROUTE																		

C	REVISIONS FOR REVIEW	DATE	BY
B	ISSUED FOR REVIEW	15/02/03	MS
A	ISSUES FOR REVIEW	15/02/03	MS
No	Description	Date	By
	Drawn		
	Checked		
	Approved		
	Project No / File No		
	Scale		
	1:5000, 1:1000		



HALIFAX SEWAGE COLLECTION SYSTEM

BARRINGTON STREET
PLAN / PROFILE
STA. 0+000 TO STA. 1+700
Drawing No
HX-01-C-1002



- NOTES:**
- EXISTING INFRASTRUCTURE LOCATIONS, SIZES, DEPT. ELEVATIONS AND ANGLES OF ALL ELEVATIONS HAVE BEEN PROVIDED BY THE HALIFAX REGIONAL MUNICIPALITY (HARMO) SEE SYSTEM UNDER ENGINEER'S ASSUMED RESPONSIBILITY FOR THE ACCURACY OF THIS DATA. UNDER ENGINEER'S PRESUMED RESPONSIBILITY THE DESIGN IS BASED UPON THIS INFORMATION.
 - INTERCEPTOR FACILITY SITE PLANS AND MAIN INTERCEPTOR SCHEDULES AND FORCEMAINS PROVIDED SEET PRELIMINARY LOCATIONS ONLY FOR THE PROPOSED INFRASTRUCTURE WORKS. FINISHED LOCATIONS, GRADES AND DEPT. ELEVATIONS WILL BE ESTABLISHED UPON RECEIPT OF DETAILED FIELD SURVEY INFORMATION.

- LEGEND:**
- PROPOSED GRAVITY SEWER
 - PROPOSED TWIN FORCEMAINS
 - PROPOSED MANHOLE
 - ⊥ DROP SHAFT
 - ⊙ ACCESS SHAFT

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B	ISSUED FOR REVIEW	APR 04/02
A	ISSUED FOR REVIEW	APR 15/02

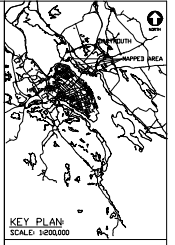
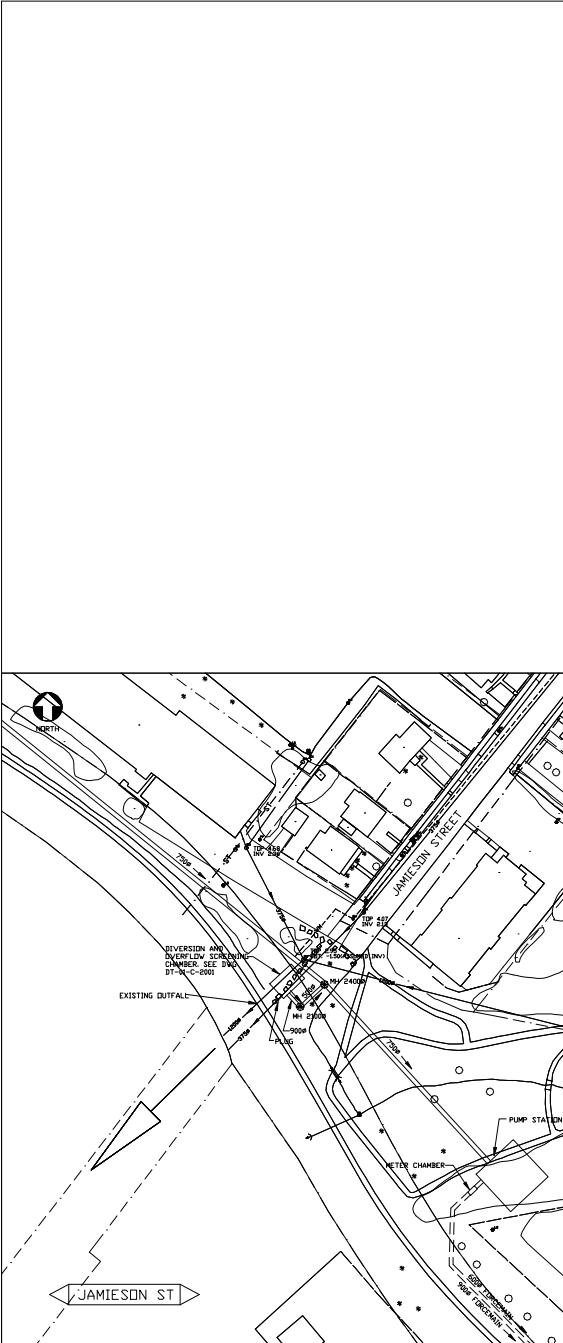
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	DATE	DATE	DATE



HALIFAX
SEWAGE COLLECTION SYSTEM

SITE PLANS
CHAIN ROCK DRIVE,
SCHOOL OF THE DLDGY

Drawn No
HX-01-C-1012



KEY PLAN
SCALE: 1:200,000

NOTES:

- EXISTING INFRASTRUCTURE LOCATIONS, SIZES, INVERT ELEVATIONS AND MANHOLE TOP ELEVATIONS HAVE BEEN PROVIDED BY THE HALIFAX REGION MUNICIPALITY CONCEPT SITE PLAN NUMBER 2006-01-001. THE USER ASSUMES ALL RESPONSIBILITY FOR THE ACCURACY OF THIS DATA. INSURE ENGINEERING'S PROPOSED INFRASTRUCTURE DESIGN IS BASED UPON THIS INFORMATION.
- INTERSECTION FACILITY SITE PLANS AND MAIN SURVEYS OF ALL UTILITIES AND STRUCTURES ADJACENT TO THE PROPOSED INFRASTRUCTURE WORKS FROM DESIGN LOCATIONS, GRADES AND INVERT ELEVATIONS SHALL BE OBTAINED UPON RECEIPT OF ALL RELEVANT FIELD SURVEY INFORMATION.

LEGEND:

- PROPOSED GRAVITY SEWER
- PROPOSED TWIN FORCEMAIN
- PROPOSED MANHOLE
- ⌋ DROP SHAFT
- ⊙ ACCESS SHAFT

No.	Description	Date	By
1	ISSUED FOR REVIEW - AMENDMENT REVIEW	27/03/07	
2	ISSUED FOR REVIEW - FINAL DESIGN	28/03/07	

Drawn: MHR 2007
 Checked: J. P. 2007
 Project No / File No: HRR 00-065 / 027000
 Scale: 1:500



DARTMOUTH SEWAGE COLLECTION SYSTEM

CIVIL
SITE PLANS
FERGUSON ROAD,
WALLACE STREET EXTENSION,
GRDVE STREET,
JAMIESON STREET,
LYLE STREET AND
BEST STREET

Drawing No: DT-01-C-2007

APPENDIX C

**STUDY AREAS FOR INFLOW/INFILTRATION
REDUCTION PROJECTS**

Study Areas for Inflow/Infiltration Reduction Projects

Area Number	Area	Region	Study Area (ha)	Study and Investigation	Implementation	Capital Budget
1	Walker St.	Dartmouth	13.6	1999/2000	2001/2002	X
2	Anderson St. PS	Dartmouth	47 (235) *	1999/2000	2002	
3	Port Wallace	Dartmouth	300	1999/2000	2001	
4	Humber Park **	Westphal	13	1999/2000	2002	X
5	Springfield Lake Rd STP	Upper Sackville	82	1999/2000	2002	
6	Lockview Rd STP	Fall River	82	1999/2000	2002	
7	Sackville (Phase 1)	Sackville	400	2002/2003	To follow	
8	North Preston	North Preston	100	2000/2001	2001	
9	Caldwell Road	Cole Harbour	39	2002	2003	
10	Beaver Crescent PS	Cole Harbour	9	2002	2003	
11	Plymouth Rd PS	Dartmouth		2002/2003	To follow	
12	Gaston Rd PS	Dartmouth		2002/2003	To follow	
13	Belmont Avenue PS and STP	Dartmouth	8.2	2002/2003	To follow	
14	Williams Lake PS	Mainland South, Hal.	110	2002/2003	To follow	
15	Stewart Harris PS	Dartmouth	7.8	2002/2003	To follow	
16	Lively Subdivision STP	Middle Sackville	17	2002/2003	To follow	
17	Wellington Dr.	Wellington	5	2002/2003	To follow	
18	Frame Subdivision STP	Waverley	6.7	2002/2003	To follow	
19	Portland Estates	Dartmouth		2003/2004	To follow	
20	Carlisle Drive	Cole Harbour	107	2003/2004	To follow	
21	Balsam Street	Lakeside	5.7	2003/2004	To follow	
22	Uplands Park	Hammonds Plains	10	2003/2004	To follow	
23	Roaches Pond PS	Mainland South, Hal.	350	2004/2005	To follow	
24	India St. PS	Dartmouth				

* 47 acres - immediate sewershed, (235) - complete sewershed

** Additional sewersheds in Humber Park being Studied in 2002