

**THE REGIONAL MUNICIPALITY OF NIAGARA**

**REQUEST FOR PROPOSAL**

**CONSULTING ENGINEERING SERVICES FOR THE WAINFLEET**

**WATER AND WASTEWATER SERVICING PROJECT**

**TECHNICAL REQUIREMENTS**

**1. Background**

Significant problems with contaminated wells and aging/failing septic tank systems have been identified in residences located along the Lake Erie shoreline of Wainfleet Township (“the Lakeshore Area”). Studies conducted by Niagara Region Public Health (2001), Niagara Region Public Works (2002 and 2005) and the Ministry of the Environment (2003) all concluded that a sizeable number of private wells are contaminated with water-borne bacteria (*E. coli*) and that failing septic tank systems are contributing to the deterioration of local water quality in Lake Erie.

Regional studies concluded that inadequate and failing private septic tank systems are having a detrimental impact on groundwater supplies and on Lake Erie itself. Overall, soil conditions and fractured bedrock are not suitable for the effective management of septic effluent. In many cases, even properly constructed septic systems are not environmentally sustainable in this area. In order to ensure that the community was fully aware of the potential for a serious outbreak of waterborne illness, the Medical Officer of Health issued a Boil Water Advisory (BWA) for the Lakeshore Area on April 10, 2006. The BWA will remain in effect until a permanent solution is implemented.

From a land use perspective, development along the Lake Erie shore has occurred without an understanding of the cumulative and long-term effects of development actions on private services and the lot fabric. The Lakeshore Area remains the only area of significant population concentration within the Region yet to resolve a contamination issue of this nature.

The degree of contamination in the Lakeshore Area is considerable. Overall, the fractured bedrock aquifer is close to the surface and prevailing shallow clay soils provide little or no attenuation for effluent discharged from septic tank systems. These factors have combined to create a situation destined to result in groundwater contamination. Given that the bedrock also serves as the primary water supply aquifer for most residences, high levels of bacterial contamination in local wells are inevitable and result in a public health and safety issue.

From a land use perspective, most development has taken place over an 80-year period. In the vast majority of cases, the predominance of small lots, inadequate soils and high development density precludes the possibility of replacing outdated and failing septic systems with properly designed and functioning systems that would meet today's standards, safeguard public health and safety and protect the environment. A number of seasonal cottages have been converted to permanent residences. Redevelopment of the cottages has also occurred. There are approximately 150 lots with infill development potential. The Township of Wainfleet is preparing a new Official Plan and Secondary Plan for the Lakeshore Area to determine whether any growth beyond the infill potential can occur.

## 2. **Class Environmental Assessment**

The Class Environmental Assessment (EA) process was initiated in June 2003 and after an extensive review, the Minister of the Environment did not require a Part II order for the Wainfleet Servicing EA in September 2006. The approved EA servicing solution is:

- **Wastewater:** extend municipal wastewater trunk system from Port Colborne and construct a local sewage collection system, and
- **Water:** extend municipal water supply from the existing system in Port Colborne and construct a local distribution system

The Class EA preferred solution was reviewed and confirmed in two separate technical workshops. The first workshop (the Value Analysis Workshop) was held in February 2005 and the second (the Technical Review Workshop) in April 2007, following Council's direction to further evaluate alternative technologies.

The workshop teams included Regional and Township staff, politicians, Wainfleet Public Advisory Committee members, engineering specialists, and contractors. The workshops reviewed all submissions and reached the following conclusions:

- On-site septic systems work for less than half the lots in the study area.
- The use of holding tanks is not considered viable since the Ontario Building Code dictates that tanks are only permitted where no other option is available.
- Individual water treatment devices will not eliminate the health risk.
- On-site systems have a greater life cycle cost than the Class EA recommended option of centralized systems, ultimately being more expensive for owners.
- Localized packaged treatment plants are more expensive to own, operate and maintain than connecting to the existing facilities in Port Colborne.
- The use of small bore gravity sewers or small bore low pressure sewers have the potential to reduce costs.

- The preferred option is a centralized water transmission/distribution system and wastewater collection/conveyance system connected to existing Regional treatment facilities in Port Colborne.

### **3. Enhanced Conceptual Design**

Following the workshops, a Wainfleet Lakeshore Servicing Area Enhanced Conceptual Design: Long Beach & Burnaby/Morgans's Point was completed by Hydromantis (November 2007). This conceptual design report, which forms part of the basis for the Preliminary Design in this Request for Proposal (RFP), discusses a variety of the centralized options developed in the Technical Review Workshop. All of the sanitary sewer technologies evaluated shall be carried forward in the preliminary design phase. On the water distribution side, two options, one with consideration for fire flows and one without, shall be designed.

The entire Boil Water Advisory area was initially considered in the EA; however, the final EA document focuses solely on the narrow strip of land in the vicinity of Lakeshore Road. This area to be serviced is approximately 14 km long from Long Beach in the west to Reebes Bay in the East, the entire width of Wainfleet's waterfront. Special care must be taken to identify deviation from the final EA document.

### **4. Objectives**

The purpose of this undertaking is to retain the services of a consulting engineering firm to provide preliminary engineering designs associated with both the water and sanitary sewer components of the Wainfleet Servicing Project. The servicing area is that identified in the previous EA plus additional components identified in the Township of Wainfleet's Visioning Exercise (January, 2009). An updated Official Plan will be provided prior to any detailed design assignment so any deviation from the Visioning Exercise shall be incorporated into that final design.

Two different water distribution designs are required in this proposal: one with consideration for fire flows and one without. Three distinct sanitary sewer designs are required: traditional gravity system, small bore pressure and small bore gravity.

Projects shall incorporate measures to enhance energy efficiency and conservation wherever possible. This shall include reference to LEED (Leadership in Energy and Environmental Design) standards where appropriate.

## **PROJECT TASKS**

The general approach should follow the tasks outlined below:

### **5. Review of Documentation**

The Consultant will carry out a review of previous documents and drawings respecting the Wainfleet Servicing Project in order to identify any further technical analyses and additional data required. Based on this review, the Consultant will identify any impacts or propose revisions to the scope of the Wainfleet Servicing Project.

### **6. Geotechnical and Geoenvironmental Investigation**

The Consultant/Proponent shall review any available geotechnical information and confirm scope of any additional geotechnical investigation work; prepare Terms of Reference (TOR) for geotechnical investigation and forward to consultant(s) for quotation; review quotation(s) and make recommendation to Region; and schedule meeting(s) with consultant. Do not allow for cost of geotechnical investigation work as the consultant will be retained directly by the Region.

If geoenvironmental services, such as: materials testing, CCTV inspections and Subsurface Utility Engineering (SUE), are required by this RFP, or are identified during the course of a project, Consultant shall review any available relevant information, confirm scope of any additional investigation and testing work and prepare the TOR for this work. Consultant shall ensure that the geoenvironmental testing guidelines described in Appendix "B" are fulfilled, as a minimum.

Note that the Region has retained a consultant to prepare and maintain a property inventory database, which includes items like: frontage, area, setback and ownership.

### **7. Environmental Assessment Process**

The Region has completed a Schedule 'C' Environmental Assessment (EA) as defined in the Municipal Engineers Association/MOE document for Class Environmental Assessment for Municipal Water and Wastewater projects (Class EA) and is currently satisfying conditions imposed by the Minister. The Consultant shall identify in their proposal any amendments to the EA that they anticipate will be required based on their assessment of the project. The Consultant shall submit a provisional cost to provide their services to amend the EA for each design direction.

### **8. Preliminary Engineering Design**

The Consultant will prepare a preliminary engineering design of the proposed works. Sufficient preliminary engineering detail must be provided and must include all relevant design criteria, and supporting documentation necessary to allow the Region to subsequently proceed with detailed design.

Wainfleet servicing policy is currently under development and it is anticipated that the resulting documents will not be finalized until after this assignment has been initiated; consequently, consideration must be given to being able to handle additions or deletions to the serviceable area.

The Township of Wainfleet is undertaking a visioning exercise in order to better define the service area for this RFP and an official plan update will take place concurrent to this exercise.

**a. Linear Works**

Consultant shall carry out a field survey along the alignment of the proposed water mains and sewers.

Special attention shall be paid to drainage and private/public road issues.

The Preliminary Engineering Design and associated report shall include and address the following items:

- Confirmation/modification of conceptual design basis and criteria
- Investigation/testing requirements (e.g. geotechnical investigations), a summary of the results of such investigations, and the requirement for any further investigations
- Diameter and material of water main/sewer, and reasons for their selection
- Plan and profile drawings, at 1:500 horizontal scale, which include the following information
  - Existing and proposed road and water main/sewer alignments and grades, water main/sewer diameter, slopes/profile, manholes, drop structures, etc.
  - Key elevations and connectivity of the proposed works
  - Existing detail and terrain
  - Existing and proposed sidewalks, grading, swales and drainage features
  - Existing and proposed road allowances and property/easement requirements
  - Existing and proposed structures such as bridges and culverts
  - Limits of additional required property
  - Existing and proposed surface/underground utilities
  - Adjacent property owner information
  - Existing and proposed intersections and entrances, traffic islands/markings/signs/etc.
- Detailed property acquisition requirements (purchases and easements), including digital coordinates for preparation of survey reference plan(s)
- Typical cross-sections as required to detail the water main/sewer (incl. crossings at roads, utilities, etc.)
- Existing and proposed intersection/entrance operation and the need for temporary traffic signals during construction
- Natural environmental issues such as impacts to regulated areas, vegetation, fisheries, wildlife habitat, hydrology, and groundwater (the Region is hiring an Environmental consultant to cover this task; however, some interaction with the preliminary design team is anticipated.)

- Archaeological/heritage issues (the Region is hiring an Archaeological consultant to cover this task; however, some interaction with the preliminary design team is anticipated.)
- Roadway drainage and storm water management
- Utility impacts and relocation requirements. Consultant shall circulate base plans to the appropriate utilities for marking their existing and proposed infrastructure
- Structural issues such as required modifications to existing bridges, culverts and retaining walls, proposed structures, and foundation requirements
- Short and long term mitigation measures
- Construction issues including construction method alternatives, traffic control, staging and costs
- Regulatory/reviewing agency approval/permit issues and requirements
- Operation and maintenance aspects including access, odour control, cleaning, and impact on adjacent landowners/users
- Specific issues to be addressed during detailed design
- SCADA requirements
- Cost estimate to +20% to -10%
- Project implementation schedule.

Consultant will conduct two (2) half-day linear workshops with project staff and key members of the Consultant's team at a suitable point during the Preliminary Design. The objective of the workshop is to allow affected parties an opportunity to review and comment on the project. Consultant will lead the workshop and prepare notes of the discussion and conclusions. The Region will provide a location for the workshop.

Consultant will arrange and attend review meetings at the 40% completion and 90% completion stages. The Consultant shall submit draft documents a minimum of two (2) weeks prior to the meetings.

The consultant is to submit a draft Preliminary Design Report to the Region for review. Consultant will meet with the Region to review the Preliminary Design Report and will then finalize the report.

A key objective of this assignment is to confirm the optimal size of the watermains and sanitary sewers by use of hydraulic models. The Region has standardized on the following modeling software:

Water distribution	InfoWater (MWHSoft Inc.)
Wastewater collection	InfoSWMM (MWHSoft Inc.)
Transient analysis	InfoSurge (MWHSoft Inc.)

Upon completion of the assignment, the Consultant will return to the Region a model which incorporates the final preliminary designs from the project. All documentation shall be complete and sufficient to be incorporated as metadata in the Regional GIS system.

Note that two different water models and three different sanitary models are required.

## **b. Stations**

Technical assessments must consider all factors including capital and lifetime costs. Assessments must also address operation and maintenance aspects including access, odour control, cleaning, impact on adjacent landowners/users, power supply, standby power, security, etc. The technical assessment should be compatible with a staged implementation approach.

The Preliminary Engineering Design and associated report shall include and address the following items:

- Confirmation/modification of conceptual design basis and criteria
- A summary of the design data and parameters that would be required for a Design Brief, for the relevant type of project, as described in Part III, Section 3.1.2 of the MOE 'Guide for Applying for Approval of Municipal and Private Water and Sewage Works' August 2000.
- List of major equipment
- Electrical system
- Emergency Standby Power
- Instrumentation and Control (provide process control narratives for each process unit describing how each unit process is intended to be operated.)
- SCADA System
- Ancillary Systems
- Building design
  - Architectural elevations, description of internal and external architectural finishes including special finishes as appropriate (e.g., waterproofing between tanks and building, etc)
  - Specialties (include description and location)
  - Area Classification (in schedule form, the design occupation and classification of each room or building area)
  - Hazardous/Confined Areas
  - HVAC Requirements
- Operation and maintenance aspects including odour control and impact on adjacent landowners/users
- Investigation/testing requirements (e.g. geotechnical investigations), a summary of the results of such investigations, and the requirement for any further investigations
- Detailed property acquisition requirements (purchases and easements), including digital coordinates for preparation of survey reference plan(s)
- Natural environmental issues such as impacts to regulated areas, vegetation, fisheries, wildlife habitat, hydrology and groundwater (the Region is hiring an Environmental consultant to cover this task; however, some interaction with the preliminary design team is anticipated.)
- Utility impacts and relocation requirements
- Project implementation schedule
- Construction issues including construction method alternatives, traffic control, staging and costs
- Cost estimate to +20% to -10%

- Regulatory/reviewing agency approval/permit issues and requirements
- Drawings
  - Location Plan
    - Show land to be acquired if required
    - Site services (existing and required)
    - Access/egress
  - Preliminary layout plans
    - Show location and orientation of equipment and tanks including major ventilation units, electrical transformer(s), switchgear and motor control centres
  - Process Flow Diagrams (PFD)
    - Schematic depiction of equipment, piping, valves, in-line measurement devices etc
    - Show in-line measuring devices
    - Show all piping >150 mm and routing
  - Hydraulic Profile
    - Indicate preliminary hydraulic profile and identify all major unit operating liquid levels
  - SCADA system architecture
  - Building architectural elevations and floor plans

Consultant will conduct two (2) half-day station workshops with project staff and key members of the Consultant's team at a suitable point during the Preliminary Design. The objective of the workshop is to allow affected parties an opportunity to review and comment on the project. Consultant will lead the workshop and prepare notes of the discussion and conclusions. The Region will provide a location for the workshop.

Consultant will arrange and attend review meetings at the 40% completion and 90% completion stages. The Consultant shall submit draft documents a minimum of two (2) weeks prior to the meetings.

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