



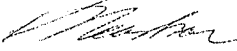
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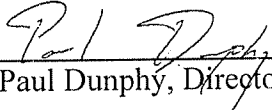
## Item No.

Environment and Sustainability Standing Committee  
February 3, 2011

**TO:** Chair and Members of the Environment and Sustainability Standing Committee

**SUBMITTED BY:**

  
\_\_\_\_\_  
Ken Reashor, P.Eng., Director, Transportation and Public Works

  
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Paul Dunphy, Director, Community Development

**DATE:** January 17, 2011

**SUBJECT:** Underground Utilities Functional Plan for New Residential Subdivisions

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### ORIGIN

The Regional Municipal Planning Strategy Underground Utilities Functional Plan states, in part:

“HRM shall, in consultation with NS Power and the communications utilities, prepare an Underground Utilities Functional Plan with recommendations to consider for adoption under the Subdivision By-law and Municipal Service Systems Specification document.”

For the last several years, the Halifax Regional Municipality has been consulting with various stakeholders and examining various aspects of undergrounding of overhead utilities in the Municipality. A number of studies have been commissioned to better understand technical feasibility, costs and benefits, common trench application and governance and ownership issues associated with a new subdivision application of this requirement.

### RECOMMENDATION

It is recommended that Halifax Regional Council initiate a community engagement process to share information and encourage input by consulting both the development community and the general public on issues relating to the implementation of a Functional Plan for undergrounding of overhead utilities in new residential subdivisions.

## **SUMMARY**

The Regional Municipal Planning Strategy identifies the need to develop an Underground Utilities Functional Plan which could be considered for adoption under the Subdivision Bylaw and Municipal Service Systems Specification document. The municipality has participated with the development community and utility stakeholders in the development of a common trench design for residential subdivision application. Studies have helped to identify costs and benefits associated with undergrounding of overhead utilities. In addition, studies have been undertaken to better understand various ownership and governance models for underground utility infrastructure.

It is now necessary to engage the development community and the general public at large, to better gauge the community's desire to improve the aesthetic value of neighbourhoods, and to more fully understand the various impacts and the benefits of such an initiative. HRM will provide clear and concise information and stakeholders will be consulted to determine the level of support for this initiative. Consultation with the development community and public meetings will be held in the region to facilitate access to information and opportunities for comment by the general public.

## **BACKGROUND**

With the advent of telecom competition has come the proliferation of telecom infrastructure within the street Right of Way. That infrastructure, when coupled with existing telecom and power infrastructure, has had a significant visual impact on the landscape. This proliferation has given added impetus to the need to review the HRM policies in respect of overhead versus undergrounding of utility structures. Given the concerns expressed by Regional Council with respect to aboveground telecommunications and power infrastructure, staff has taken a multi-faceted examination of this issue. This report deals with the issue of new residential subdivisions only. By focussing on regulating undergrounding of utilities for all new residential subdivisions, the municipality would limit the degree of overhead utility infrastructure expansion which will ensure that as the urban core grows, so will the benefits of undergrounding.

As indicated in the Regional Municipal Planning Strategy, utility practice of installing electrical and telecommunications infrastructure overhead,

“interferes with HRMs objectives relating to aesthetics, the urban forest canopy and reliability.”

Over the years, the Halifax Regional Municipality has maintained its urban forest in close proximity overhead power and telecommunications lines. This has resulted in pruning or removal of trees from the urban landscape to accommodate utility operational, safety and reliability concerns. Trees have always been highly valued in HRM for their aesthetics. In addition, trees promote healthy communities, creating cooler micro-climates, reducing storm water runoff and protecting infrastructure.

Since 2005, several studies have been commissioned to better understand the costs and benefits associated with undergrounding of overhead utilities within HRM. These reports include:

- An April 2005 Kinectrics report titled “Underground Utilities Feasibility Study for Halifax Regional Municipality”
- A March 2007 Marbek report titled “Economic Implications of Buried Electric Utilities”
- An April 2007 Stantec report titled “Engineering Study of Joint Gas, Power and Communications Trench”
- An August 2010 Dillon Engineering report titled “Underground Utilities Funding/Management Best Practices Review”

The reports and reports to which they reference, provide a number of conclusions and recommendations. Some of the significant conclusions include:

1. The incremental cost to underground wires utilities utilizing a common trench approach ranges from \$450.00 to \$600.00 (2010 \$) per metre frontage.
2. Property value increases, resulting from undergrounding cables, range from 0% to 5% with increases tied to quality of view and value of the lot.
3. The removal of overhead lines can provide an opportunity for as much as 35% increase in tree cover. People are prepared to pay between 3% and 7% more for treed properties versus those with few or no trees.
4. Of the 17 cities surveyed, 16 require undergrounding of overhead utilities for new residential subdivisions. St. John, New Brunswick has required undergrounding, through by-law since the 1980s.
5. While some examples of utility pay exist, the most widespread cost model for undergrounding overhead infrastructure is to require developers to assume the cost and pass that cost on to lot/house purchasers.
6. Of the jurisdictions identified, only one provided funding to transition from overhead to underground utility requirement for residential subdivisions. For five years, the Municipality of Gatineau provided 100% subsidy for the cost difference between overhead and underground utility installation. In 2008, the subsidy was reduced to 50% and completely removed in 2009. The costs were recovered through a local improvement tax charge.
7. Many jurisdictions use the development approval process as a means to underground overhead utilities. Others make the requirement official through by-law modification.
8. The common trench approach to installing underground infrastructure could provide as much as a 50% saving in installation costs.
9. For the most part, utilities assume ownership and responsibility for maintenance and long term replacement liability.
10. Modest improvements to reliability are realized unless an entire circuit is undergrounded.
11. The costs to underground overhead utilities exceed the measurable benefits by 5 to 15 times.

## DISCUSSION

### Functional Plan

In part, the Regional Municipal Planning Strategy states that an underground utilities functional plan should consider:

- The development, in conjunction with Nova Scotia Power Inc. and telecommunications utilities, of a joint trench standard that defines the management and ownership responsibilities of the underground electrical and telecommunication system. In that regard:
  - Stakeholder utilities and the development community participated in the development of a common trench design in conjunction with the Engineering report submitted to HRM in 2007 by Stantec Engineering.
  - The standard has general acceptance from both HRM and utilities(See Attachments 2,3 and 4).
  - A pilot project is being developed by Clayton Developments for Bedford West, in conjunction with gas, power and telecom utilities. This is scheduled for early 2011 construction.
  - Nova Scotia Power have confirmed (see attached Attachment 2) that they agree to take ownership of their portion of the underground infrastructure associated with residential subdivisions and recognize associated long term maintenance and replacement responsibility.
- Requiring underground electrical and telecommunication systems in new developments as a condition of subdivision approval in the Urban Settlement Designation.
  - Based on stakeholder and general public feedback, HRM will identify the most appropriate vehicle for implementing a requirement for undergrounding in new residential subdivisions.

To conclude these aspects of the Underground Utilities Functional Plan, HRM needs to engage all stakeholders, in particular, the development community, to focus on impacts and process for implementing this initiative.

### Costs/Benefits of Undergrounding

Based on studies commissioned by the Halifax Regional Municipality, the incremental cost of undergrounding overhead power and communication lines in a new residential subdivision will be in the range of \$6,800.00 to \$9,000.00 (2010 \$) per 50 foot lot. As the lot size and conditions change, this number will also be expected to change. This estimate assumes that 25% to 50% of the trenching requires blasting. The costs have also been adjusted to reflect trenching cost savings due to the fact that the street will be excavated at the same time to install water/waste

water/sewer pipes. These costs are demonstrated to be about four times more expensive than an overhead installation.

The benefits which accrue from undergrounding overhead utilities are numerous and have been quantified and compared to the costs to achieve such an initiative. Studies suggest that, generally speaking, costs will outweigh benefits by a margin of 5 to 15 times, depending on the application. However, not all studies conclude that costs exceed benefits.

Benefits include:

- **Reliability Improvement** – A completely underground system could eliminate outages caused by tree contact, lightning, adverse environmental conditions (wet snow, salt fog, high wind, etc.) as well as accidents. This represents about 50% of customer interruptions and 60% of the hours of interruption. The key consideration is “complete circuit” because with parts of circuits exposed as overhead system, the effectiveness of undergrounding is lessened. So, while local improvements in service will be experienced, the overall impact on the power utility’s system reliability will not measurably improve. However, as the underground system grows, overall system reliability should improve, as well.

Related to reliability measures, is the ability of the distribution system to “weather” significant natural disturbances. The 2007 Marbek report concluded that extreme weather events, which system designers considered to be once in 100 years, i.e. Hurricane Juan, should now be considered 50 year events due to impacts from global warming. The reality today is that extreme events such as weather bombs, severe flooding, and hurricane force winds, appear to be much more prevalent than past years for which impacts of weather on reliability are based, and are likely not isolated phenomena. Global warming impacts may place more stress on overhead infrastructure, possibly impacting power lines to a much greater degree.

- **Increased Tree Cover** – Increased tree cover has a number of quantifiable benefits. They include:
  - Increased cleaning of the air,
  - Reduction to ground water treatment,
  - Improved appearance(aesthetic qualities),
  - Increased shading of buildings resulting in reduced heating and cooling costs,
  - Increased pavement life and reduced maintenance costs.

It has been determined that overhead power lines are directly responsible for about a 35% reduction in the tree canopy.

- **Improved Safety** – Reducing the number of wooden power and telecom poles translates into a decrease in the number and seriousness of accidents. While poles are not

eliminated, the quantity and design contribute to reductions in the damage claims resulting from such accidents.

A reduced risk of electrical contact accidents is another benefit associated with underground power lines. Industrial contact, utility contact associated with tree trimming, residential contact and recreational contact are examples of potential opportunities for contacting power lines. This, of course, would be off-set by contact resulting from excavation or drilling. There is no body of evidence which allows a conclusion to be made one way or the other.

- **Aesthetics** – The visual appearance of municipal street space is often identified as the factor which contributes the largest benefit to its residents. Removing overhead wires, in itself, improves appearance, but also creates more space for tree planting. One study has determined that overhead lines reduce tree potential by 35%. An effect of increased tree cover is a change in the character of the community. As indicated in the Kinectrics study,

“The ambiance is more natural, less man-made or technical. People become less stressed, more relaxed.”

In addition, trees reduce noise in neighbourhoods, provide shade and screen unwanted views and provide a degree of privacy which can be appreciated by residents in fairly dense communities.

Studies comparing sales prices of residential properties with different levels of tree resources indicate that people are willing to pay between 3% and 7% more for properties with trees. The average price for single family detached house in HRM (CMHC, August, 2010) is \$358,000, with a range from \$230,000 to \$466,000. Based on the potential aesthetic impact, this could amount to between \$7,000 to \$33,000, depending on maturity and types of trees.

The cost/benefit ratio has significant variation, depending on the study. A range of cost/benefit ratios, quoted by the Kinectrics Study for urban/suburban installations, identifies the costs to exceed benefits by a factor of 7 to 10. On the other hand, the Marbek Study which recognizes a positive property value impact, concludes that based on a 40 year timeframe, the benefits outweigh the costs by a factor of 3.5. Without a property value increase, the anticipated cost/benefit ratio is in the 1.8 range.

## **Options**

The planned change will require developers to underground power cabling and communications cabling associated with a subdivision development. The financial model for this requirement shall be that the developer pays for all associated costs which are incremental to an equivalent overhead design. The developer will be responsible for installing all infrastructure in accordance with utility and the Regional Municipality Standards and Regulations.

HRM has developed, in conjunction with stakeholder utilities and the development community, an acceptable four party common trench design which will be made available for developer use through its addition to the HRM Municipal Design Guideline. Utilities shall take ownership of developer installed infrastructure and shall be responsible for long term maintenance and replacement.

Options to consider include:

1. **Require New Developments to be Fully Undergrounded**

This will require developers to underground primary and secondary power and telecom cabling in all new residential subdivisions.

Risks include:

- Increased cost to developer could result in a slow down or refocus of development outside the area for which the undergrounding requirement applies. This could result in a decrease in projected tax revenue. Because undergrounding costs are relatively fixed, the impact will be felt most by lower cost developments.
- Undergrounding of power cable requires HRM taking ownership of subdivision street lighting systems. This increased load on the Street Lighting Department could be difficult to anticipate and accommodate. In addition to increased maintenance obligations, street lighting design expertise could be required.

2. **Require New Developments to be Partially Undergrounded (Local Streets Only)**

This will require developers to underground primary and secondary power and telecom cabling in all local residential subdivision streets. Larger primary circuits which supply power to an area would be allowed on collector streets only. This could realize a 15% to 20% decrease in cost to the developer.

The main drawbacks/risks of this alternative are:

- Any reliability improvements are largely reduced because the main feeder circuits are still exposed to the elements.
- Aesthetics are locally improved, but the area will still have overhead presence, and there could be a tendency to overload this overhead access resulting in no net benefit.

3. **Require New Developments to be Partially Underground (Secondary Power/Telecom only)**

This will require developers to underground secondary power circuits and telecom circuits. Primary power wires and transformers would be located on poles, as they are at present. This design is becoming more prevalent with developments and is likely market driven. Aesthetics will improve with the removal of the more visual

obtrusive communications lines and infrastructure. An estimate cost impact to the developer is about 70% of the full undergrounding cost.

Concerns about this approach include:

- Developers invest more than 2/3 the full undergrounding cost with little or no impact on reliability, and limited aesthetic improvement.
- Street light ownership and control would likely revert to the power utility which limits municipal influence on street light design and standardization.

#### 4. Status Quo

This option will leave things the way they are with developers deciding whether undergrounding of wire utilities should be part of the subdivision design.

Potential risks include:

- Increased congestion on overhead lines as telecom utilities become more competitive and insist on increases to and separate ownership of infrastructure.
- Restrictions to urban forest expansion due to reliability concerns by utilities.
- Continued deterioration of aesthetic appeal and resulting in pressure to move to underground after the fact, as is the case in the Capital District.

#### Government Imposed Costs (GICs)

A recent CMHC research paper dated February 2009 titled “Government-imposed Charges on New Housing in Canada”, indicated that HRM’s total municipal charges for new house construction, using a single detached dwelling for reference, remained flat between 2002 and 2006, even though the house value increased by 70%. The total charges, \$6,753.00 were on the low side of municipalities examined (less than ½ the average of \$14,283.00), where charges ranged from a low of \$1,461.00 in Charlottetown, Prince Edward Island to a high of \$39,821.00 in Vaughn, Ontario. In addition, infrastructure charges required by HRM amount to \$3,060.00, while the national average was around \$8,600.00. However, with the addition of provincial charges such as HST and registry transfer, as well as federal HST charges, HRM’s total GISs jump to \$39,173.00, or 16.3% of the price of the house. Where the total cost as a percentage of house price ranges from a low of 4.5% in Yellowknife, Northwest Territories, to a high of 17.4% in Surrey, British Columbia, the total government imposed charges on new houses in HRM is one of the nation’s highest.

#### BUDGET IMPLICATIONS

With the exception of possible participation in the common trench pilot project, there will be no budget impact, unless the cost for undergrounding of utilities results in a slowing in residential development, which could affect timing of anticipated tax revenue, because this By-law change is anticipated to be fully funded by the developers of subdivision projects.



## **FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN**

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

## **COMMUNITY ENGAGEMENT**

Over the past several years, utility and development stakeholders have discussed underground power and communications cabling associated with subdivision development through participation in the common trench design initiative. Discussions and presentations have taken place at the Halifax Utilities Coordinating Committee (HUCC) and the Nova Scotia Home Builders Association meetings. The next step in this process will be to engage the development community and public at large by providing clear and concise information to determine the level of support for this initiative. Information sharing will occur using a "Frequently asked Questions" document accessible online and in hard copy upon request. Stakeholders will also be consulted on possible approaches (options) to better understand the impacts. Consultation with the development community will take place at future meeting(s). In addition, at least three public meetings will be held in the region to facilitate access to information and opportunities for comment by the general public.

## **ALTERNATIVES**

Regional Council may choose not to initiate a consultation process regarding the potential undergrounding of overhead services. This alternative is not recommended, for the reasons described in the report.

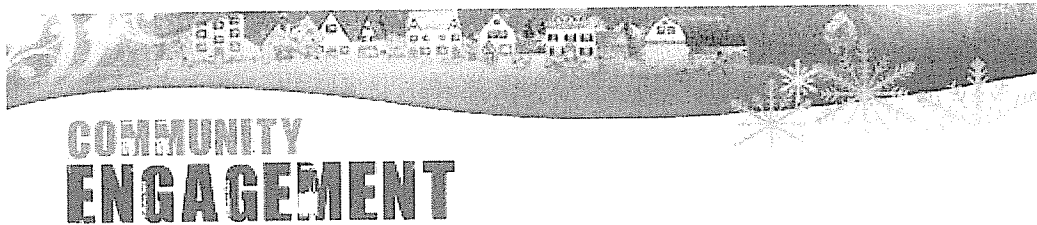
## **ATTACHMENTS**

- 1 Community Engagement Outline
- 2 NSPI – HRM Subdivision Undergrounding Initiative
- 3 BellAliant - HRM Subdivision Undergrounding Initiative
- 4 Heritage Gas – Natural Gas Distribution System – HRM Joint Trench

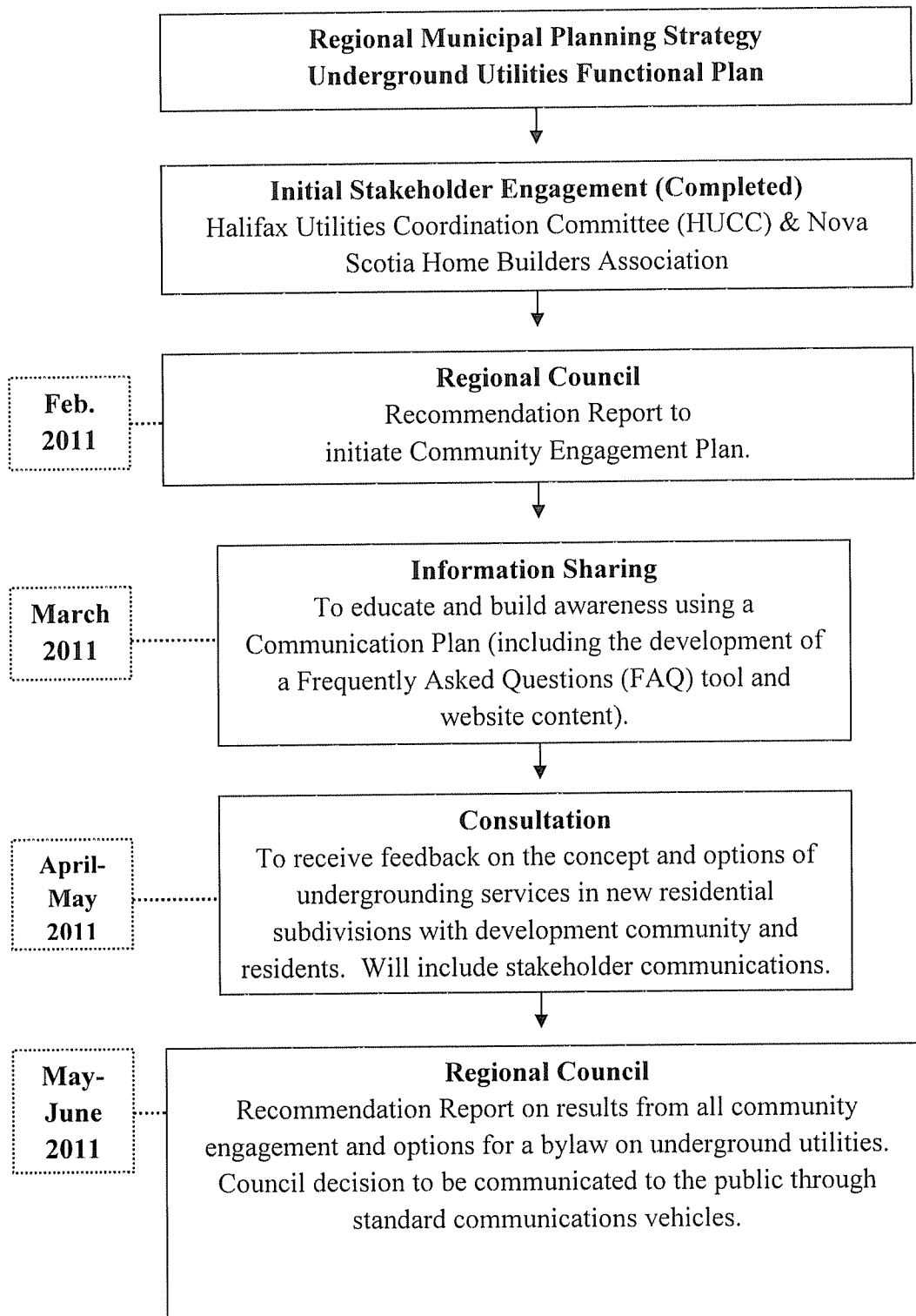
A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/cagenda.html> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Angus Doyle, P. Eng. Manager Utilities Coordination, 490-5019

Financial Approval by:   
Cathie O'Toole, CGA, Director of Finance, 490-6308



**Underground Utilities Functional Plan for New Residential Subdivisions  
~ Community Engagement Outline ~**



January 17, 2011

Angus Doyle  
Traffic & Right of Way  
Transportation & Public Works  
PO Box 1749, Halifax, NS  
B3J 3A5

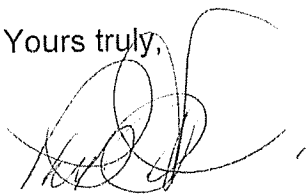
Dear Angus:

Re: HRM subdivision Undergrounding Initiative

NS Power (NSPI) agrees with the financing/ownership model you presented on behalf of HRM where developers will be responsible for all incremental costs associated with undergrounding. NSPI will take ownership of the electrical infrastructure up to the point of service and will be responsible for the long-term maintenance and eventual replacement of this infrastructure subject to the construction being to NSPI approved standards.

We agree in principle with the common trench design presented by Stantec in the 2007 Engineering Study. We are currently working on a pilot project with other utilities and HRM to ensure a detailed design will meet everyone's requirements.

Yours truly,



Phil Stevens  
Operations Manager, Central Territory



Bell Aliant  
155 Chain Lake Drive  
Halifax, Nova Scotia B3S 1B3

January 27, 2011

Angus Doyle  
Traffic & Right of Way  
Transportation & Public Works  
PO Box 1749, Halifax, NS  
B3J 3A5

**Re: New HRM Subdivisions - Undergrounding Initiative**

Dear Angus,

This letter is to confirm that Bell Aliant supports, in principal, the proposed financing/ownership model you presented on behalf of HRM, under which developers would be responsible for all incremental costs associated with building out facilities underground. Under this proposal, Bell Aliant would assume ownership of the common telecommunications infrastructure within the public right of way and would be responsible for the long-term maintenance and eventual replacement of this infrastructure. Bell Aliant's assumption of ownership and maintenance obligations is subject to the initial construction being completed to the common trench design and approved standards, including all required easements, as confirmed by inspection and audit undertaken by Bell Aliant. Bell Aliant reserves final review and acceptance of this model until it has been ratified, including documentation.

We fully support the common trench design concept presented by Stantec in the 2007 Engineering Study and will participate in an upcoming pilot project with other utilities and HRM to test and validate this proposed model.

Yours truly,

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

Stephen Prevost BSc.; P.Eng.  
Atlantic Regional Manager - Access Engineering  
902-487-5623

January 17, 2011

Call Before You Dig  
1-866-313-3030

Mr. Angus Doyle  
Manager, Utilities Coordination  
Halifax Regional Municipality  
PO Box 1749  
Halifax, NS B3J 3A5

Dear Mr. Doyle:

**Re: Natural Gas Distribution System – HRM Joint Trench**

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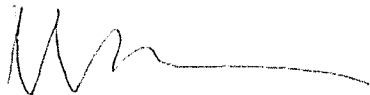
Heritage Gas supports HRM's efforts towards the development of common standards and instruments in support of the undergrounding of all 'shallow' infrastructure (i.e., natural gas, electrical power and telecommunications) in one common trench. We understand this will apply to new subdivisions and as long as Heritage Gas plans to participate in the construction of said subdivision, we would be pleased to participate in this initiative. This is based on the premise that cost efficiencies will accrue to all utilities and will be of benefit to Heritage Gas in particular. We are particularly interested in reviewing the final trench details prepared by HRM to ensure they meet Heritage Gas's requirements.

Heritage Gas has long advocated that natural gas installation must be considered during the planning stages of new subdivisions and as part of Development Permit applications. This would greatly facilitate the joint planning of infrastructure, whether in a common trench or not; it may require an amendment to the Regional Subdivision By-law.

If you have any questions please do not hesitate to call me at 466-2029.

Sincerely,

**Heritage Gas Limited**



Michel Sarrouy, P. Eng.  
Vice President, Engineering & Construction

cc: Dave Hubley, Manager Design & Construction  
Phil Francis, Manager Right-of-Way