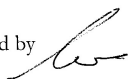


Item No. 10.1.1
Halifax Regional Council
November 16, 2010

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY:

Original Signed by



Wayne Anstey, Acting Chief Administrative Officer

Original Signed by



Mike Labrecque, Deputy Chief Administrative Officer

DATE: October 28, 2010

SUBJECT: **Case 01298: Extension of Central Water Service to Giles Drive,
Bedford**

ORIGIN

1. Motion of Halifax Regional Council, June 30, 2009:
That staff be requested to prepare a report on the possible initiation of a process to allow for extending central water service to the residents of Giles Drive in Bedford.
2. Motion of Halifax Regional Council, August 4, 2009:
 - (a) Initiate the process to consider amending the Regional Subdivision By-law to include properties on Giles Drive, illustrated on Map 2, within the Water Service Area;
 - (b) Direct staff to follow the public participation program approved by Council in February, 1997.

RECOMMENDATION

It is recommended that Halifax Regional Council:

1. Request that staff undertake the process to prepare, for Council's consideration, a Local Improvement Charge (LIC) By-law for the purpose of levying charges to property owners for the installation of central water service on Giles Drive, Bedford; and
2. Give First Reading to consider amendments to the Regional Subdivision By-law to extend the Water Service Area boundary, as set out in Attachment A of this report and schedule a Public Hearing.

BACKGROUND

Location and Context:

Giles Drive is located on the north side of Hammonds Plains Road across from Gary Martin Drive - a new entrance to the Bedford West community (see Maps 1 and 2). There are six properties involved in this water service matter, five of which contain existing single detached homes and one of which is vacant. The homes are currently serviced with on-site wells and septic tanks, and all properties are situated outside the Service Area Boundary as delineated in the Regional Subdivision By-law.

The area across Hammonds Plains Road from Giles Drive has been undergoing extensive development in recent years, with construction activities associated with the Bedford West community, the Business Campus (RIM) development, four-pad arena, seniors complex, and so on. In addition, during the Hammonds Plains Road widening project in 2009, Giles Drive was used as the detour route for much of the construction period. Further extensive land development will continue to occur in the Bedford West area over the coming years.

Water Issue:

At or about the time of the construction of the RIM project in the Bedford West Business Campus, and the associated blasting activity (2007/2008), Giles Drive residents informed staff and the area Councillor that their well water had been adversely affected, primarily relating to the issue of water quality - turbidity and higher mineral content (iron, sodium, chloride), causing heavy staining. They indicated that the quality of the water was essentially unuseable for most domestic purposes. This issue remains present today.

The residents feel that this water problem is urgent and requires resolution. Further, because of the circumstances described above, residents feel that they should not be responsible for financing the solution.

This situation led to the preparation of the staff reports and subsequent directions of Regional Council as presented in the Origin section of this report.

Bedford MPS Policy and Regional Plan Policy:

Under the Bedford MPS the Giles Drive area is designated Residential Reserve and zoned Urban Settlement, which permits single unit dwellings.

Under the Regional Plan, the area is designated Urban Settlement, meaning that within the time frame of the Plan (twenty to twenty-five years), the area is intended to become fully serviced with central wastewater and water distribution services in order to provide an urban form of development.

In considering the extension of central water service to properties on Giles Drive, Council is guided by the following Regional Plan policies:

Policy SU-14:

HRM may consider expanding existing Water Service Areas to existing communities, subject to the financial ability of HRM to absorb any costs related to the expansion, if:

- (a) the lands are in proximity to a trunk water main planned or constructed by the Water Commission to improve the performance of the water distribution system;*
- (b) a study has been prepared by a qualified person verifying that there is a water quality or quantity problem that cannot reasonably be rectified by an alternative means; or*
- (c) there are environmental concerns related to the long term integrity of on-site sewage disposal systems and a wastewater management plan is also considered in accordance with Policy SU-20.*

Policy SU-20:

To protect public health and the environment, HRM shall investigate a means to ensure that on-site sewage disposal systems are maintained. Without limiting the generality of the foregoing, consideration shall be given to adopting a maintenance by-law, establishing Wastewater Management Districts and establishing a funding mechanism with the Water Commission administering a waste water management fee as approved by HRM.

With respect to Policy SU-14 (b), and stemming from the August 4, 2009 Council report, staff retained Land Design Engineering Services to undertake the required study. The consultant's report is attached as Attachment C of this report.

DISCUSSION

Staff's analysis and advice to Council regarding an amendment to the Regional Subdivision By-law to extend the Water Service Area to Giles Drive properties (as per Regional Plan policies SU-14 and SU-20) is provided as follows:

Policy SU-14 (a) - Proximity to Trunk Water System:

Giles Drive is situated in close proximity to the main water transmission line leading from the Pockwock water treatment plant.

Policy SU-14 (b) - Water Quality/Quantity Study:

As mentioned above, a consultant was retained to provide information and advice on the nature of the water issues for the Giles Drive residents and recommendations to resolve the problems. The following are the important highlights of consultant's report:

- Resident complaints of water quality issues began shortly after site development work, road construction and associated blasting activity commenced for the Research In Motion (RIM) development, located at the Hwy. 102/Hammonds Road interchange. The water quality issues relate to turbidity and high mineral content (iron, sodium, chloride), and although not a health problem, essentially render the water supply unuseable for domestic purposes.
- It appears all blasting activity that has taken place in the Bedford West development area has been in compliance with the Blasting By-law. In the case of the RIM development, the Giles Drive properties were outside of the required radius for a pre-blast survey.
- The geology of this specific area is likely a contributing factor to residents' water quality problems. The bedrock is the Goldenville Formation, a brittle and fractured type of bedrock, high in iron content. In addition, there is the presence of an anticline, or top ridge of a bedrock fold, on a axis extending from where the blasting has occurred, directly through the Giles Drive area. The anticline is an arched layer of rock under higher tension than normal, creating a much higher degree of fracturing, and resulting in more fractured groundwater flow. Thus, while not conclusive, it is possible that well water issues on Giles Drive can be linked to blasting activities in the business campus (RIM) area.
- With the Bedford West area being one of the municipality's highest growth areas, continued heavy construction activity will be underway for many years, and given the geology, the impacts on ground water flow and risk to well water quality/quantity will continue to exist and perhaps be exacerbated.
- In the longer term, perhaps over the next couple of decades, it is intended that the larger Sandy Lake area, including the Giles Drive area, will become fully serviced with central water and sewer. It is therefore prudent to consider implementing an interim or 'temporary' water supply solution for the Giles Drive properties. This would comprise the installation of water service laterals to the five residences, rather than the more standard water main. This addresses the water supply needs of the residents and reduces installation costs. The property owners on Giles Drive and Halifax Water have endorsed this approach.
- A conclusion of the report indicates, that given the proximity of the central piped water supply, the recent and previous problems with well water for Giles Drive residents, and the long term concerns, it makes sense to extend the water service boundary to include these homes, such that they do not have to rely on what is a questionable supply.

Policy SU-14 (c) - On-Site Sewage Disposal Systems and
Policy SU-20 - Wastewater Management Districts

These policies relate to the concern that with the provision of a new unlimited supply of central water, residents may tend to use significantly more water than was the case when they relied on well

water. Should this occur, the additional hydraulic load on the on-site wastewater disposal system, if not properly maintained, may lead to its malfunction, causing potential health risks and risks to the environment.

The intent of Policy SU-20 is for HRM and Halifax Water to develop a program (administrative procedure and funding mechanism) to ensure that in such circumstances, on-site wastewater disposal systems are satisfactorily maintained, rather than it being a voluntary practice on the part of the property owner. Staff have commenced preliminary research into the establishment of wastewater management districts but are not yet at a point of having a proposed model for Council's review.

In the case of Giles Drive, letters have been distributed to the five property owners indicating that in the event central water service is realized, neither HRM nor Halifax Water assumes any responsibility for the wastewater disposal systems, and that the maintenance, upgrade or replacement of such systems remains the responsibility of the property owner. All property owners have agreed to this, in writing. Given these circumstances, staff advises that the Regional Plan policies have been adequately addressed.

Funding Considerations:

The recommended engineering solution to address the water supply needs for Giles Drive entails the installation of water laterals from the Pockwock transmission main to the five subject properties. The estimated cost is \$150,000, including taxes and contingencies.

PCAP Application:

Stemming from a staff report to Council in October, 2009, an application was submitted to the Province in June, 2010 from the Mayor's office, requesting consideration of a financial contribution toward the construction of the project under the Provincial Capital Assistance Program (PCAP). Unfortunately this request was not successful.

External Contribution:

West Bedford Holdings Limited, the company developing the Bedford West master plan community, has offered a contribution of \$50,000 for the project. This contribution, according to the developer, represents a gesture of good will toward the residents, and in particular, is in recognition of the fact that for several months during 2009, Giles Drive functioned as the detour route for the Hammonds Plains Road widening project.

Staff advises that these funds would be directed toward the installation of the water laterals from the street ROW to the homes.

BUDGET IMPLICATIONS

Given the above external contribution, the outstanding amount to undertake the project is \$100,000. The property owners receiving the service will be responsible for covering the cost of the project through Council's approval of an LIC By-law. Given that the number of properties to be serviced is five, the estimated amount of the LIC is \$20,000 per property. As with all LICs for water infrastructure, the property owners would have up to a twenty year period to repay this amount with interest of prime plus 2%.

Before an LIC By-law is adopted, staff will consult with the residents and will issue individual letters (surveys) to gauge the degree of support for the project and their willingness to bear the estimated cost for the work. The results of the survey will be provided to Council in the form of a future staff report, and will assist Council in its consideration of adoption of the LIC By-law.

One additional point of note respecting this LIC process is that, as described earlier in this report, the greater Sandy Lake area is anticipated to become fully serviced with central water and sewer systems within the next couple of decades. There is likely to be cost implications for existing property owners associated with this infrastructure at that time.

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

The community engagement process is consistent with the intent of the Community Engagement Strategy. The level of community engagement was consultation, achieved through a series of 'kitchen-table' meetings and direct mail-out of letters regarding the matter of wastewater disposal systems.

A public hearing(s) must be held by Council before it can consider adopting an LIC By-law and an amendment to the Regional Subdivision By-law. Should Council decide to proceed to public hearing, in addition to published newspaper advertisements, property owners in the area will be notified. The proposed amendments will impact property owners/residents in the subject Giles Drive area. _____

ALTERNATIVES

1. Regional Council may choose to undertake the LIC By-law process with property owners and then proceed to consider approval of the LIC By-law and amendments to the Regional Subdivision By-law. This is the recommended course of action.
2. Given the particular circumstances surrounding this matter, as described in this report and accompanying consultant's report, Council may choose that HRM fund a percentage, or all, of the outstanding amount required to install the water service system. This alternative is not recommended as there have been other examples where property owners have been responsible for financing servicing projects, in part or in whole, as a result of circumstances beyond their control, and also that this may be perceived as setting a precedent as it has not been a HRM practice to subsidize water service extensions from the general tax rate.

ATTACHMENTS

Map 1:	Location Map
Map 2:	Subject Properties
Attachment A:	Proposed Amendments to the Regional Subdivision Boundary
Attachment B:	Letter (sample) to Property Owners regarding On-site Disposal Systems
Attachment C:	Consultant's Report: Giles Drive, Bedford, Water Services Extension Study

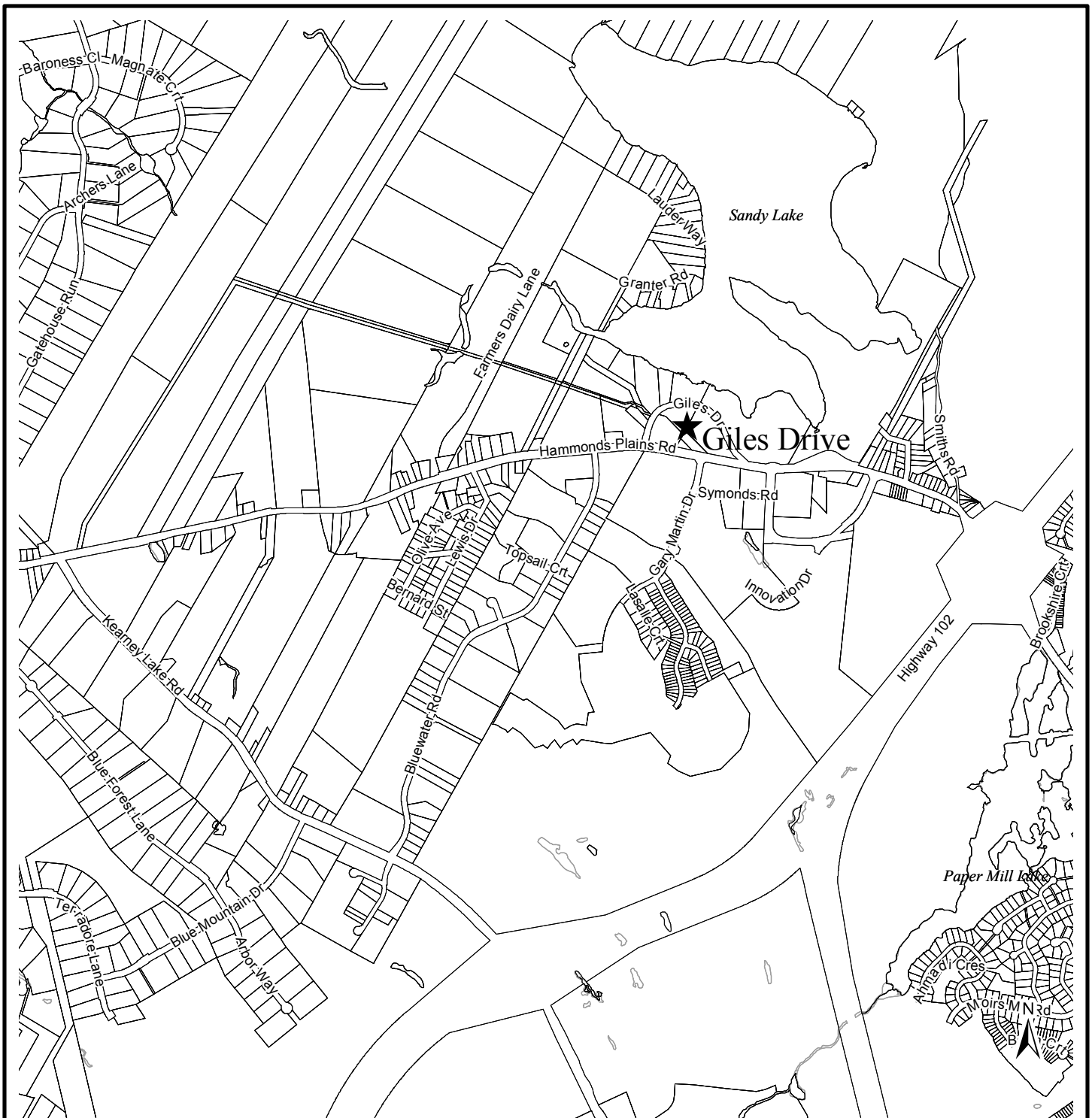
A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/cagenda.html> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Roger Wells, Supervisor, Regional & Community Planning, 490-4373

Report Approved by: _____
Austin French, Manager of Planning Services, 490-6717

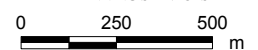
Financial Approval by: _____
Cathie O'Toole, CGA, Director of Finance, 490-6308

Report Approved by: _____
Paul Dunphy, Director of Community Development



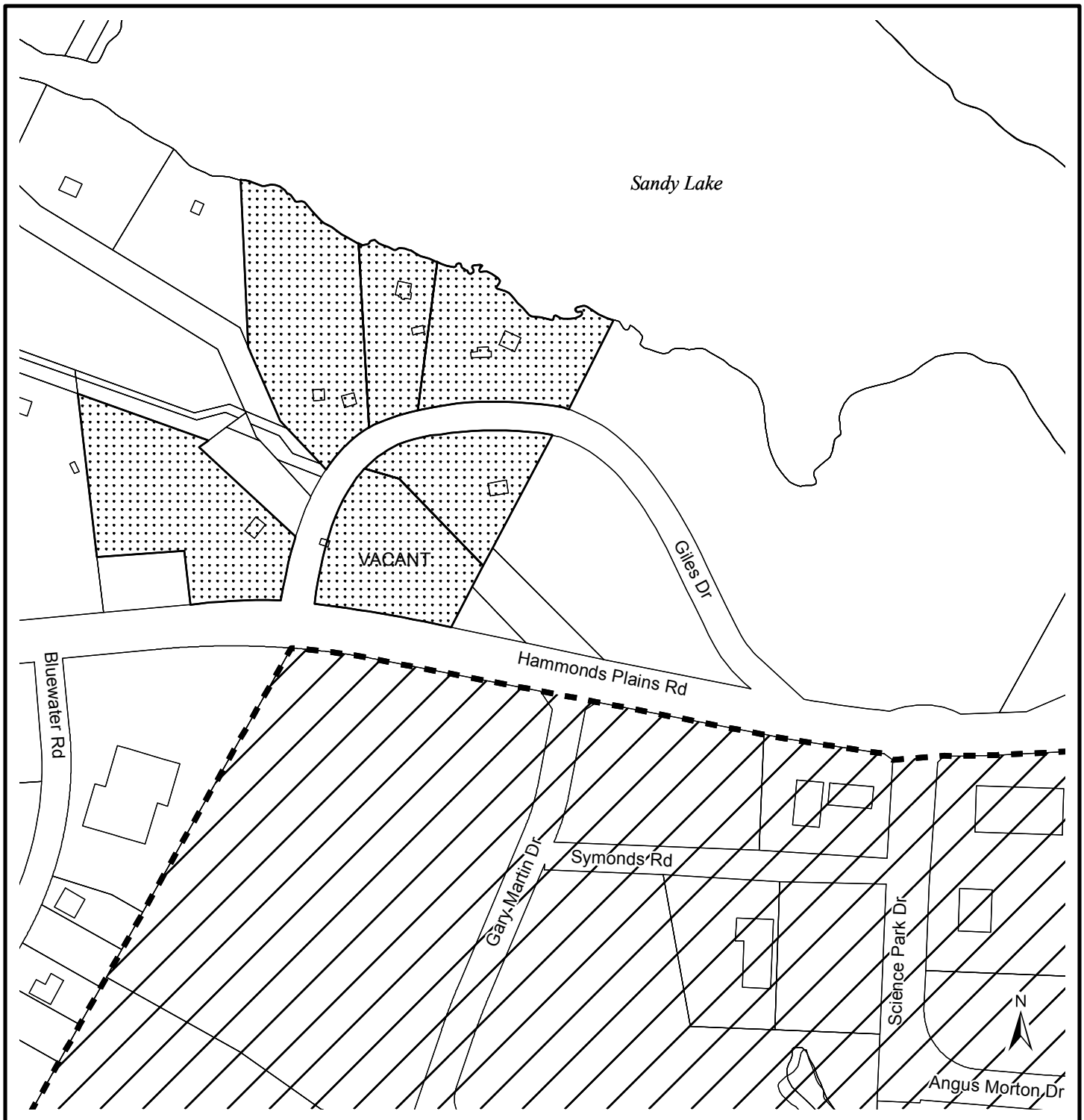
Map 1 - Location Map
Giles Drive, Bedford

HALIFAX
 REGIONAL MUNICIPALITY
 REGIONAL AND COMMUNITY
 PLANNING SERVICES

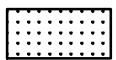


Bedford Plan Area

HRM does not guarantee the accuracy of any representation on this plan.



Map 2



Subject properties



Urban Service Area

HALIFAX
REGIONAL MUNICIPALITY
REGIONAL AND COMMUNITY
PLANNING SERVICES

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m

Attachment A
Proposed Amendments to the Regional Subdivision By-law

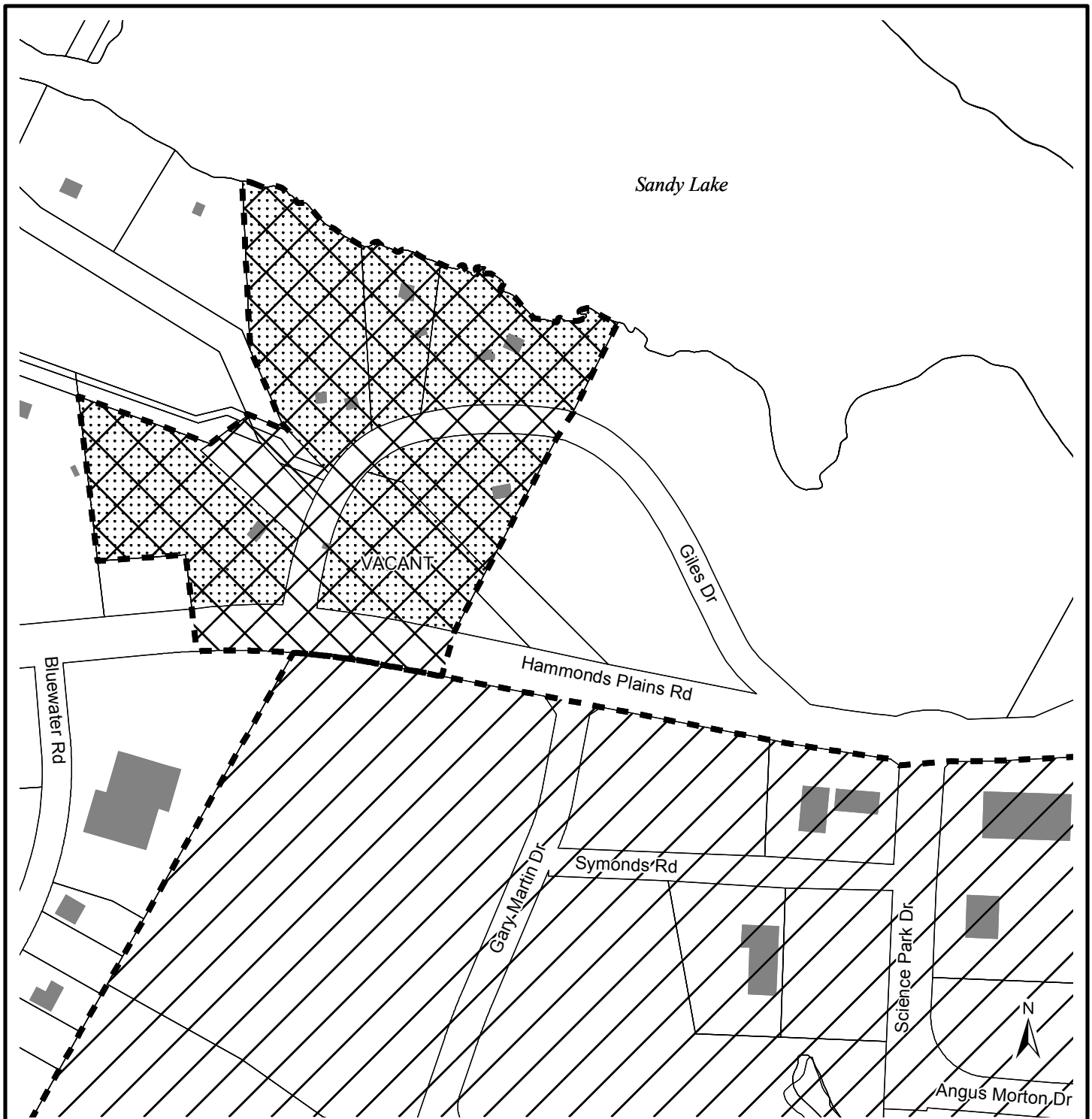
BE IT ENACTED by the Halifax Regional Council of the Halifax Regional Municipality that the Regional Subdivision By-law as enacted by the Halifax Regional Council on the 27th day of June, 2006 and approved by the Minister of Service Nova Scotia and Municipal Relations on the 26th day of August, 2006 as amended, is hereby further amended as follows;

1. Schedule "B", Service Requirement Map, shall be amended by creating a new Water Service Area to include certain properties on Giles Drive, Bedford as illustrated on the attached Schedule A.

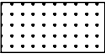
I HEREBY CERTIFY that the amendments to the Regional Subdivision By-law as set out above, were passed by a majority vote of the Halifax Regional Council held on the _____ day of _____, 2010.

GIVEN under the hand of the Municipal Clerk and under the Corporate Seal of the Halifax Regional Municipality this _____ day of _____, 2010.

Cathy Mellett
Municipal Clerk



Schedule A - Proposed Amendment to the Regional Subdivision By-law (Schedule B - Service Requirement Map)

-  Subject properties
-  Urban Service Area Boundary
-  Proposed Water Service Area Boundary Extension

HALIFAX
REGIONAL MUNICIPALITY
REGIONAL AND COMMUNITY
PLANNING SERVICES

0 50 100
m



P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

August 31, 2010

Dear

Re: Maintenance of On-Site Wastewater Disposal Systems

As you are aware, HRM, with input from Halifax Water, have been attempting to address issues related to potable water for property owners on Giles Drive. We feel a workable solution has been found, that being the installation of underground water laterals to each of the homes.

A staff report will be provided to Regional Council in the near future, which will describe this matter, the by-law amendments required for implementation of the water system and cost implications. The process will include a Public Hearing before Halifax Regional Council to amend the Regional Subdivision By-law to include the properties on Giles Drive within a Water Service area. At the public hearing, residents have an opportunity to address Council on this matter, and you are encouraged to do so.

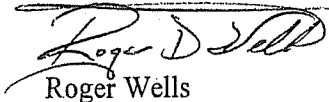
In advance of Council's decision on the project, staff of HRM and HW wish to make property owners aware that it entails the installation of central water service only, and does not include any work related to the on-site wastewater disposal systems. These systems have, in the past, and continue to be, the responsibility of the property owner, and are regulated by the NS Department of Environment.

As stated in HRM's Regional Municipal Planning Strategy, improperly maintained on-site sewage disposal systems cause bacteria and other contaminants to enter groundwater and surface water which may pose health risks and cause environmental degradation of lakes and watercourses. This matter may be worsened in cases where a central water system is in place, since the unlimited supply of water may cause hydraulic overloading of the sewage disposal system. It is the responsibility of the property owner to monitor the use of water accordingly.

The purpose of this letter, then, is to advise Giles Drive property owners that neither HRM nor Halifax Water assumes any responsibility for your current wastewater disposal system, and further advises that any maintenance, upgrade, or replacement of these systems following the installation of central water remains the sole responsibility of the property owner.

Should you have questions or wish to discuss this matter further, please contact me.

Yours truly



Roger Wells
Supervisor, HRM Regional and Community Planning
Phone: 490-4373
FAX: 490-3976
E-mail: wellsr@halifax.ca

I have read this letter and agree that I, as property owner, am responsible for maintaining a properly functioning on-site wastewater disposal system on my property.

Signature of property owner

Date

Please return this form to my attention no later than September 13, 2010.

LandDesign
Engineering Services

May 25, 2010

File: 09-478

Halifax Regional Municipality
PO Box 1749
Halifax, B3J 3X5

Attention: Mr. Roger Wells, MCIP

Re: Giles Drive, Bedford - Water Services Extension Study

Dear Mr. Wells,

We are pleased to provide you with a draft version of our report on the above project for your review.

This report summarises the Giles Drive water supply concerns, reviews the local geology and posits reasons for the problems some of the residents have experienced. It also includes observations and recommendations on the individual on-site sewage disposal systems currently serving the homes.

Finally, it presents a recommendation for addressing the water quality concerns of the residents on Giles Drive.

This report is intended to inform you and assist you in your review of the service boundary extension. We trust it clearly presents the information intended. Should questions arise, please contact our office.

Sincerely,



Jeffrey A. Pinhey, M.A.Sc., P.Eng.



Water Services Extension Study

Giles Drive, HRM

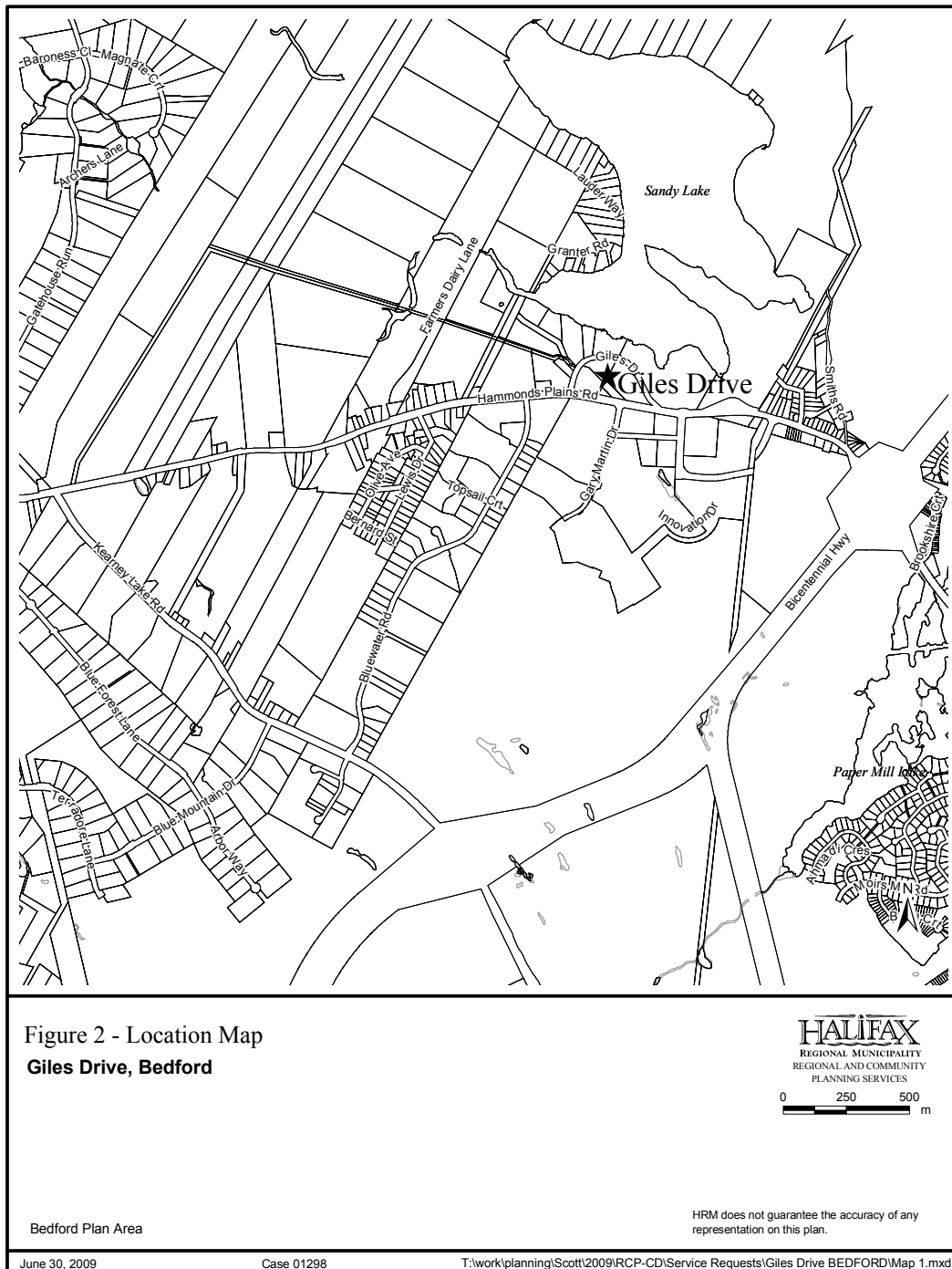


Figure 1 -STUDY AREA

Prepared by: Land Design Engineering Services
2325 Clifton Street
Halifax, NS
B3K 4T9

1.0 INTRODUCTION

Giles Drive is a loop road, off the Hammonds Plains Road in the former Town of Bedford (Map 1, below, see the star). Properties on one side of the road front on Sandy Lake, a relatively shallow body of water, with some history of water quality problems related to urban development. Type to enter text



This Giles study was commissioned by Halifax Regional Municipality in accordance with the requirements of Policies SU-13 and SU-14 of the Regional Planning Strategy. The issue arose in response to a number of issues raised by local residents, and their councillor, as to the impact on the well water quality related to what was described as significant uphill, nearby, development of a large centrally serviced mixed use community.

The Giles Drive loop, which was once the main path of the Hammonds Plains Road, represents a fairly discrete pocket of residential development that is not serviced with central water or sewer.

The study area, as shown in Figure 1 earlier, is immediately north, and downslope from, lands that are currently under development impact via rock excavation, land reshaping, and urbanisation of a former rockland type of landscape to a business park and residential development.

This report is intended to examine the impact on the water supplies of these homes by the nearby development, to determine if the homes should be included in the nearby water servicing boundary.

2.0 BACKGROUND

This section is presented to provide the reader with some basic background as to how this part of HRM developed, and how recent development here is directly related to the availability of central water and sewer.

The Hammonds Plains part of Halifax County, and this edge of the Town of Bedford, experienced little in the form of growth pressure until the early 1990's, when an extension to the water servicing district to the Kingswood on the Lakes subdivision triggered a development boom for what was then Halifax County. This occurred despite the fact that lots were kept much larger than centrally serviced development due to limitations on lot size posed by The Nova Scotia Department of Environment On-site Sewage Disposal Guidelines and Regulations.

This type of low to medium density development has triggered the development of new planning standards and goals for increasing density in a more environmentally responsible and efficient manner. One of those goals, as stated in the HRM Regional Plan, is the encouragement of development of lands by allowing central services extensions in areas proximal to existing piped services, and in infill areas.

The native soils in the area cannot be considered as ideal for development relying on on-site sewage disposal, as there is a significant amount of silt and clay based till comprising

the surficial geology in the area, where there is soil cover. In much of the remaining lands, bedrock is at, or not far below the ground surface.

Prior to the regional municipal amalgamation, the Town of Bedford maintained a policy intended to limit development in this area by mandating a minimum 5 acre lot size for residential development, until central services became available.

The servicing boundaries, recently amended to include the large Bedford West development, shown below on Figure 3, are shown on the following page (Figure 4). Note that neither Giles Drive, homes on the north side of Hammonds Plains Road, or even Bluewater Drive are included in the formal boundary. HRM advises that there are housekeeping works in progress to address some of these anomalies.

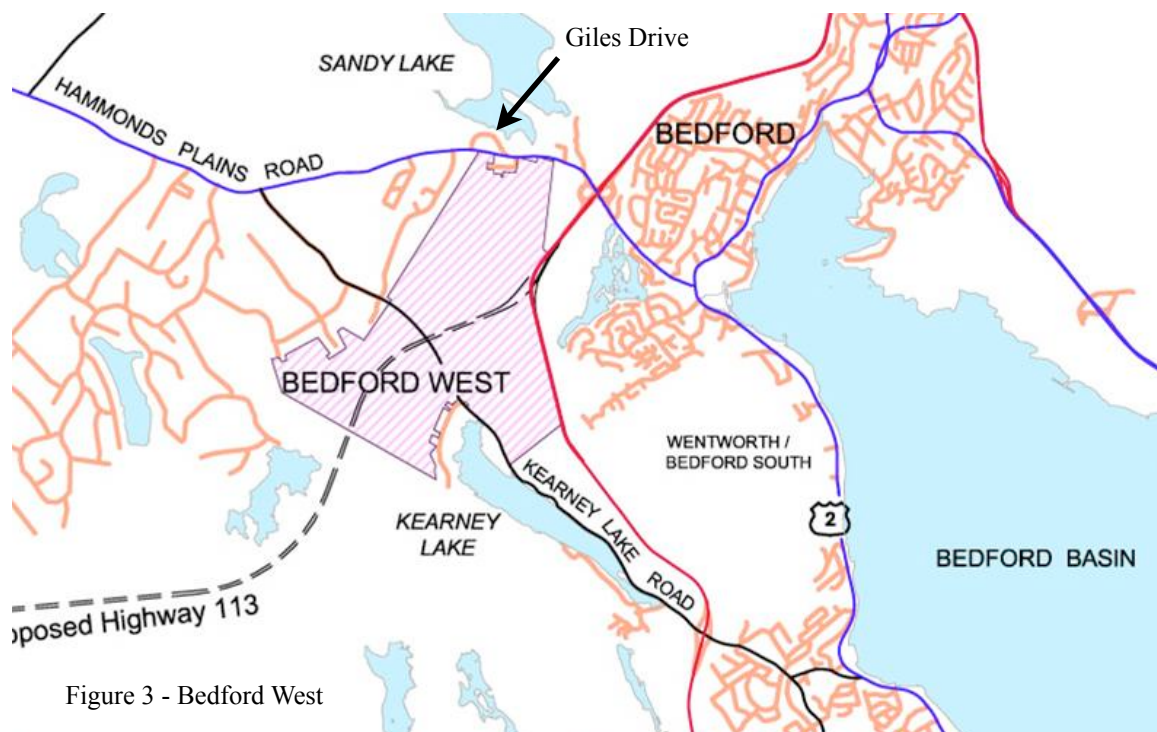


Figure 3 - Bedford West

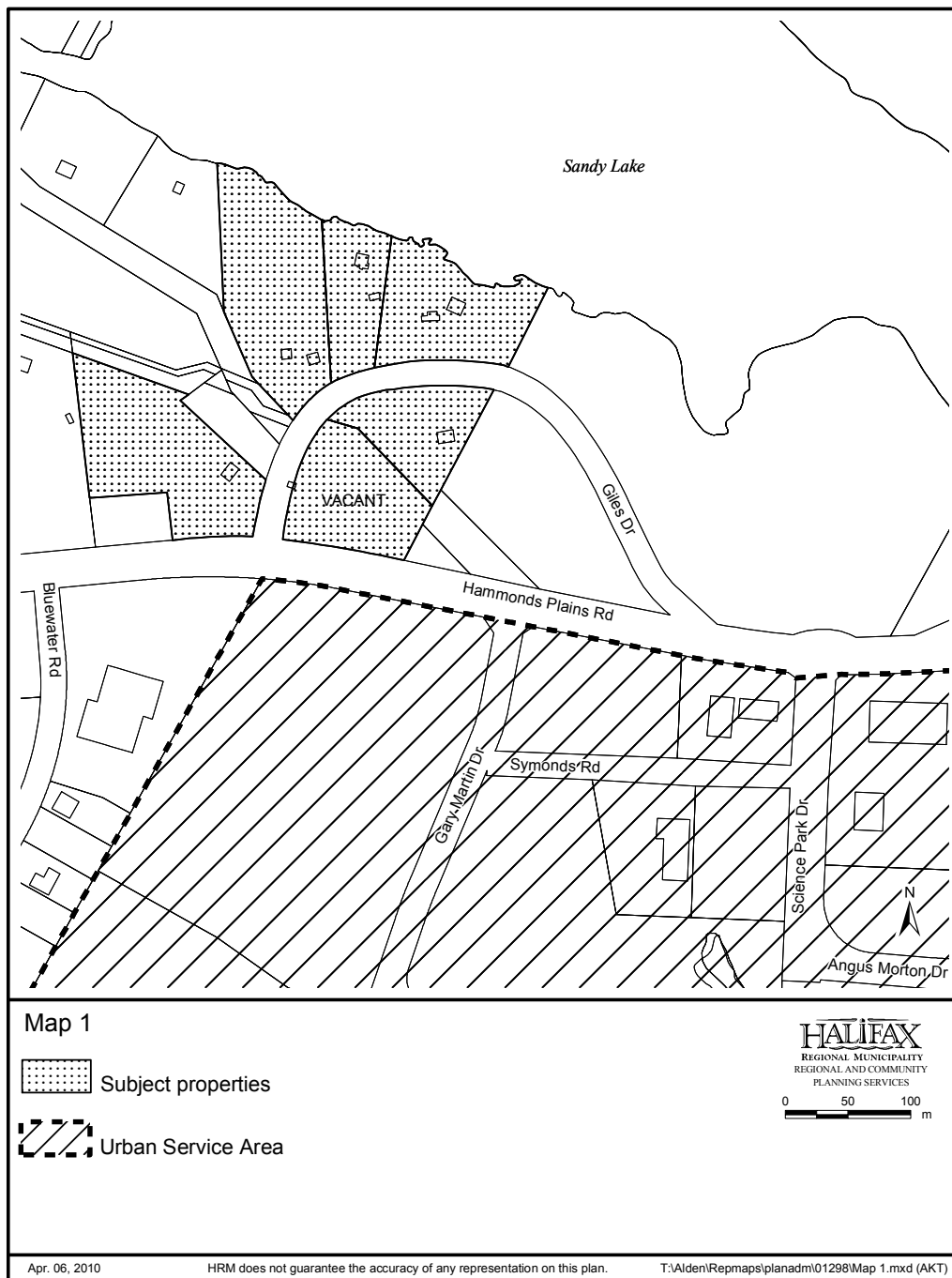
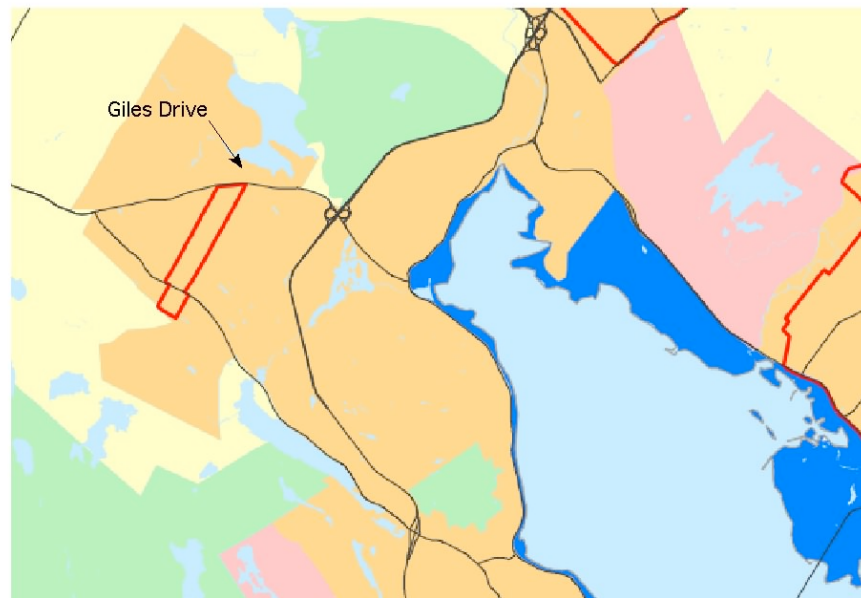


Figure 4 - Service Boundary

The study area is part of the lands designated as Urban Settlement under the Regional Plan, Generalized Future Land Use that is intended to be serviced to support urban growth over the next 25 years. Figure 5 shows detailed mapping, with Giles Drive indicated on it.

**Legend****Primary Designations**

- Urban Settlement
- Urban Reserve
- Harbour
- Rural Commuter
- Rural Resource
- Open Space and Natural Resources
- Agricultural

Secondary Designations

- Capital District
- Business / Industrial Park

From the HRM Regional Plan,
Generalized Future Land Use
Effective August 2006

Figure 5

3.0 BLASTING ACTIVITY

The development of what is now referred to as the Research in Motion site, the triangle of land in the southwest corner of the Hammonds Plains Road/Highway 102 Interchange, heralded the beginning of urban, centrally serviced type of modern development in the area. When Research in Motion decided to locate on those lands, significant heavy construction activity was required to create access, a useable site, and internal roads and parking. Blasting began here in late 2006 and continued into 2008. Exhibit 1, which summarizes blast monitoring activity in the area since 2006 (provided by HRM), indicates that no pre-blast surveys were undertaken for Giles Drive before 2009, and that one seismograph setup was done which showed very small measured results.

The Bedford West development began road preparation work late in 2007 and is still in the process of construction. This construction activity required a substantial amount of blasting of the bedrock, shaping it for future large building sites (a four-plex arena, and a large new seniors care facility are under construction now).

Due to the horizontal clearance distances and blast strengths used, Giles Drive was not within the regulated radius for pre-blast inspections as required under HRM's Blasting By-Law until work near the Hammonds Plains Road in March of 2009. Note that the maximum allowable velocity is 50 mm/s, and the highest measured in the Giles Drive area was 17.7 mm/s.

It appears that blasting in the area was done in compliance with the Blasting By-Law - where required, pre-blast surveys were done, and seismographs were monitored that indicated velocities less than the regulated limits.

HRM advises that there has been no formal complaint registered in such a manner as to initiate a post-blast inspection.

The following Exhibit lists all recorded blasting activity from 2006 until July 2009 including whether monitoring took place at Giles Drive.

2006

R.I.M. Property – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

2007

R.I.M. Facility parking lot and site services – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

R.I.M. access road and service trench to property – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Service Easement off Bluewater Rd – no pre-blast surveys on Giles Dr. 10 seismograph readings taken on properties of Giles Dr from Dec 12/07 and Feb 6/08 with max reading of 2.3mm/s

2008

Duct bank trench @ 400 Hammonds Plains Rd – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Lots WB 04 & 05 Innovation Dr – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Lots WB 02 & 03 – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

2009

Innovation Dr extension – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

West Bedford Ph 1B – pre-blast surveys completed on 5 properties of Giles Dr. 41 seismograph readings taken on properties of Giles Dr from Mar 12 to Apr 17/09 with max reading of 17.7mm/s at 144m from shot.

Hammonds Plains Rd rehab – pre-blast surveys completed on 3 properties of Giles Dr. 88 seismograph readings taken on properties from May 7 to July 15/09 with max reading of 17.7mm/s at 105m from shot.

Lot WB-2R1 Gary Martin Dr (rink site) – pre-blast survey on 1 property on Giles Dr. No seismograph set up on Giles Dr.

West Bedford, Ph 1F – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Lot WB 2R2 Gary Martin Dr – no pre-blast surveys on properties of Giles Dr. 23 seismograph readings taken on Giles Dr between June 30 and July 13 with max reading of 2.3mm/s at 178m from shot.

West Bedford, Ph 2 – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Lot WB-3R1 Gary Martin Dr – no pre-blast surveys or seismograph set-ups on properties on Giles Dr.

Lot WB-2R1 Gary Martin Dr – no pre-blast surveys. 5 seismograph readings taken on properties on Giles Dr with max reading of 5.21mm/s at 123m from shot between July 13 and July 16.

Exhibit 1 Blast Monitoring Activity in Vicinity of Giles Drive, 2006-2009

4.0 LOCAL GEOLOGY AND WATER QUALITY

Residents on Giles Drive have complained about negative impacts from blasting on lands upgrade from them for some time. Both noise, vibration and water quality impacts were noted. It is important to note that in our interviews with the residents, there was a very common understanding that their problems with blasting began not with the recent work on the vertical realignment of Hammonds Plains Road, or the lands directly across Hammonds Plains Road, but from the site development works related to the new Research in Motion offices and the road network completed at that time.

The local geological conditions are particularly interesting inasmuch as they tend to suggest that there would be a more direct impact on water quality in drilled wells on

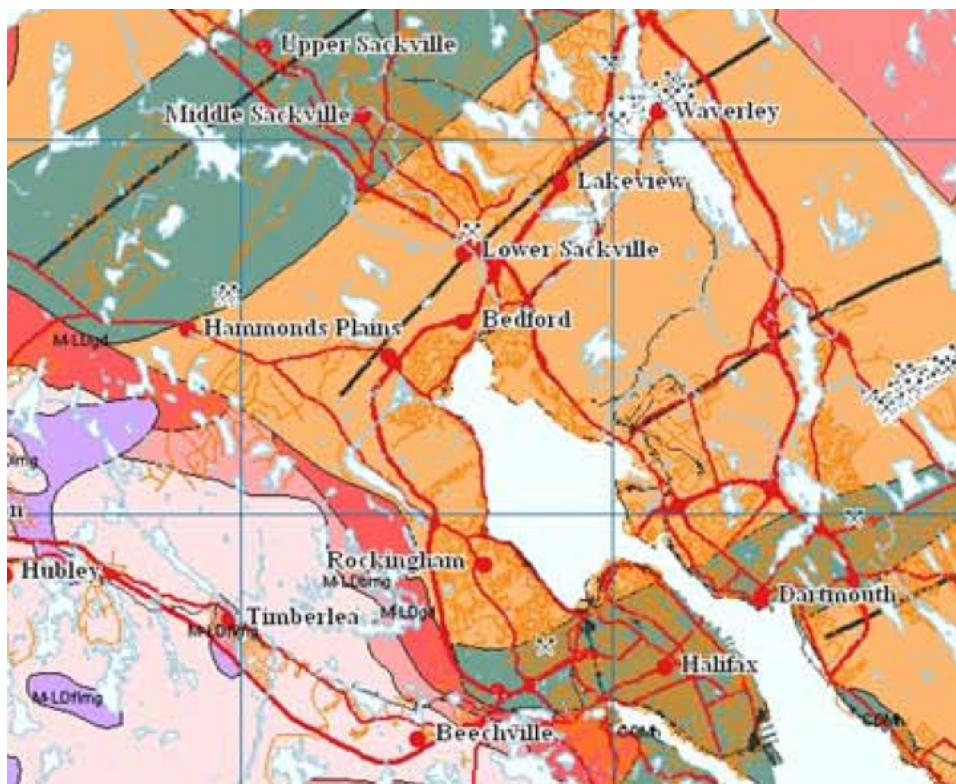


Figure 6 - Bedrock Geology

Giles Drive from development on lands to the southwest than one might normally expect. Figure 6 is a bedrock geology map of the local area. Giles Drive is located basically below the text “Plains” in Hammonds Plains. The orange colour background indicates that the local bedrock is the Goldenville Formation, a fractured and brittle type of bedrock. One that would be sensitive to blasting impacts by increasing its permeability. This rock is also one that can propagate vibrations fairly efficiently.

This bedrock would generally mean that blasting would be expected to affect fracture based groundwater flow, probably resulting in an increase in that flow, and an increase in the mineral content of the water as new fractures were flushed by higher velocity and more flow volume. This would be considered to be normal in this type of geology.

What is not normal, or average about this specific location, however, is the presence of an anticline, or top ridge of a bedrock fold, right on an axis from where the blasting has occurred, though the Giles Drive area, and on to other parts of HRM already known for having groundwater quality issues. An anticline is an arched layer of rock, and the line represents the place where it is near the surface, and arched the most. This places the bedrock in tension, typically creating a much higher degree of fracturing than in less stressed parts of the formation, resulting in more fractured groundwater flow. The location of the anticline is represented by the black line leading away from Giles Drive in both directions, extending to the northeast through known former mining areas in Lower Sackville and Waverley. To the southwest, it passes into the Bedford West lands that are under development.

Given that the bedrock is high in Iron, and that upstream development has existed for some time with road salting for highway maintenance, it is not surprising that the water quality results for wells along Giles Drive exhibit high levels of iron, sodium and chloride. None of these elements are listed as public health concerns in the Canadian Drinking Water Guidelines, but in at least two of the properties on Giles Drive, they have reached levels where they have rendered the water basically unusable for domestic purposes, as illustrated by the picture from 35 Giles Drive below.

Of the five residences along Giles Drive, only three complained to us about their own water. One of the homes is a part time residence, and has what the owners describe as good water - they bottle it and take it home to Moncton, where they choose to use it over Moncton City water. This indicates that the water in the area can be good, and probably has been good. That home is, however, the farthest from the mapped anticline of the five we visited.



Another homeowner did not believe their water is bad, although they have recently drilled a new well.

Figure 7 - Discoloured water, after running a minute, Sept.10/09

Two of the remaining homes complain of quality problems like that shown in the photo, one of which has since addressed the problem with a filter. The third owner's complaint is related to a reported change in the volume of water they can now get from their well.

We reviewed water quality tests taken as part of the pre-blast inspection earlier in 2009, that appear to confirm that the water quality problems are related to mineralization, mostly Iron. Sodium and Chloride are also above normal.

There are three conclusions we can draw from this background information.

1. The Giles Drive area is naturally susceptible to the types of water quality problems two of the residents claim they have experienced.
2. There is a water quality issue with at least two drilled wells on Giles Drive.
3. Water quality problems that were experienced were generally not related to public health issues, but more related to the practical use of the water.

In some circumstances, it would be common to wait, and expect these problems to stabilize. However, in this location there is reason to consider that even if the immediate problems do subside, there will remain a risk that may be worse than that currently experienced.

The nature of the development uphill from Giles Drive represents a complete change in land use. From what may have been a source of safe groundwater recharge (the wetland areas between the rock ridges in the area suggest that), there will soon be paved streets, parking lots, roofs and landscaped areas. And there will be roads cut into rock, storm sewers draining them, sanitary sewers in trenches, and waterlines in trenches. Almost all of those trenches will be, or already have been, blasted into the top part of the already highly fractured bedrock, that is probably up-gradient from the wells on Giles Drive.

The development proposed uphill is almost completely automobile and truck dependent, with fuel storage and possible fuel spills.

Even if the aesthetic problems with the water on Giles Drive dissipate, the work uphill, and the disruption to the groundwater flow regime that it may have caused, places these people at a greater risk of what may be a more serious well water contamination, or public health concern, that they were at before the development work began. Lands in the recharge area that are developed will probably provide less recharge to the groundwater, which might affect water quantity.

These concerns would apply in any undeveloped area downslope from lands being serviced, in this case they are exacerbated by the local bedrock geology.

Given the proximity of the central piped water supply, the recent and previous problems with their well water, and the long term concerns, it makes sense to extend the water

service boundary to include these homes, such that they do not have to rely on what is a questionable supply.

5.0 IMPACT OF CENTRAL WATER ON EXISTING ON-SITE SEWAGE DISPOSAL SYSTEMS - A WASTEWATER MANAGEMENT PLAN

5.1 Planning and Policy Direction

Policy SU-14, in the Regional Planning Strategy states the following:

HRM may consider expanding Water Service Areas to existing communities, subject to the financial ability of HRM to absorb any related costs related to the expansion, if:

- (a) the lands are in proximity to a trunk water main planned or constructed by the Water Commission to improve the performance of the water distribution system;*
- (b) a study has been prepared by a qualified person verifying that there is a water quality or quantity problem that cannot reasonably be rectified by an alternative means; or*
- (c) there are environmental concerns related to the long-term integrity of on-site sewage disposal systems and a wastewater management plan is also considered in accordance with Policy SU-20.*

Policy SU-20 states:

To protect public health and the environment, HRM shall investigate a means to ensure that on-site sewage disposal systems are maintained. Without limiting the generality of the foregoing, consideration shall be given to adopting a maintenance by-law, establishing Wastewater Management Districts and establishing a funding mechanism with the Water Commission administering a waste water management fee as approved by HRM.

Based on our conclusions above, the stipulations of paragraph (b) appear to have been met, although we do caution that the evidence we rely on is deductive and therefore somewhat circumstantial. Drilling new wells will likely not solve the problem, but there is a chance it might. A new deep well, cased though the shallow fractured rock, might encounter suitable supply at greater depth. At the same time, the proximity of an unlimited supply of good water, in the form of the 300 mm watermain already in Giles Drive, is impossible to ignore.

5.2 On-Site Sewage Disposal

It is a common phenomenon to observe a significant increase in on-site sewage disposal malfunctions when central water is extended to an area without the accompaniment of central sewer. The policies above recognize this and require that some action or plan be in place prior to extending water services.

In the case of the homes on Giles Drive, and based on our experience in the identification and remediation of on-site sewage disposal system malfunctions, we believe that only two of the the 5 homes currently existing on Giles Drive would have some reasonable capability of managing any increase in water usage as a result of the extension of central water service. The three others do not have what would be termed to be an on-site sewage disposal system, in any modern sense of the term.

This opinion would, we believe, be accepted by the Nova Scotia Department of Environment, based on our opinion, and our experience in this field.

There are two recommended engineering options available to address the shortcomings of the on-site sewage disposal systems. First, even the two systems we believe have a chance at managing a full single family home's worth of water use are still not what could be considered to be "modern systems". Therefore, if they are all to be provided with central water, a solution that provides a new means of wastewater management for all five homes is recommended.

One option is to replace all the on-site systems on the properties in question with new on-site sewage disposal systems. The properties all have ample room in which to accomplish this without too much difficulty. In most cases a sloping sand filter with a properly sized downslope buffer will fit, and provide the peak flow capacity warranted when connected to central water. This should be possible with an average budget (design, installation, contingencies) of \$17,000 per home, or \$85,000 for all five.

The other option is to connect these homes up to the nearest central sewage collection system. Depending on the means taken to accomplish this, this cost could be in the order of \$200,000, or it could be much less. This option is hindered by the fact that two and maybe three of the homes are below the road enough that they would require pumping of their domestic sewage to the public right of way.

Constructing new on-site sewage disposal systems means the lots stay the same size, and the cost is probably lower. Considering what we know about the local geology, the proximity of central sewage collection, and the vulnerability of Sandy Lake (a shallow lake already under some development pressure), it may simply be more prudent, and a more lasting a solution, to include this area in a service district for water and sanitary sewer and eliminate the possibility of on-site sewage disposal effluent contributing to increased Phosphorous loadings in the lake.

5.3 Water Servicing

A standard, permanent water service extension to Halifax Water standards would entail an extension of a full size water main to the far end of the frontage of the last property in the extended area. In this case, that work would be very complex, and expensive. HRM has

already developed a conceptual level design and cost estimate for this option, of approximately \$200,000. This does not include the cost of providing service laterals to the homes, which would add roughly \$75,000 to this figure.

A more minimalist type of action can be taken, one that recognizes the wishes of the homeowners, but is not a full scale municipal servicing project. In this approach, the water could be extended to the homes from the existing 300 mm distribution water main in the southwest end of Giles Drive, or from a short extension of that watermain. HRM's estimate for this approach is about \$150,000, which includes an allowance of \$31,000 for taxes and contingencies.

6.0 SUMMARY

The long term risk to ground water quality in the study area posed by uphill development, and the possible exacerbation of that risk by construction activity on those uphill lands, suggest that water quality will be unreliable over time in the study area. Water quality continues to be very poor in at least two of the homes. Current problems are not related to direct public health risk, however they indicate a vulnerability of the water supply.

Considering how it is designated in the Generalized Future Land Use Mapping in the Regional Plan (Urban Settlement Area), how it is surrounded by centrally serviced lands, yet bounded in a very definitive manner by a lake, industrial development, and lands that are already serviced, it makes sense to favour inclusion of the lands in some form of a central servicing boundary, rather than allow it to remain as a pocket of unserviced land.

We understand that there are implications to extending services to these five homes that are beyond what we have discussed here (development of neighbouring lands, potential densification and re-subdivision of existing large lots, and concerns of precedent setting for other communities). Development restrictions might best be placed on the land to be added to the service boundary, as past work on the health of Sandy Lake^{1,2} and especially its nearshore environs has suggested that it is in a vulnerable state, and requires careful development planning and environmental control on lands in its catchment area.

We repeatedly heard in our discussions with residents that they want the existing character of their neighbourhood to remain. Central servicing that then enabled large developments on neighbouring lands would therefore not be acceptable to them.

This problem is a very small one. It is difficult to recommend significant investment in the area if only one or two homes require new water.

Based on the scale of this problem, and the desire of the residents not to have the solution to the problem at hand be a part of creating a perception of a greater long term commitment to more intense development in the Sandy Lake watershed, we recommend that temporary water service laterals be extended to the homes who want central water. However, it is in the best interests of the local environment and public health that the on-site sewage disposal systems serving these homes work properly. If a new water supply changes the amount of water residents can use, the benefit of having more and better water will have accrued to the homeowner, and the cost of managing the impacts of that benefit, particularly on their on-site sewage disposal systems, should therefore be the responsibility of the homeowner. According to HRM estimates, the cost of providing temporary water service laterals to the five subject homes is approximately \$150,000, including property reinstatement, taxes and contingencies.

1. Koval, Krista; Sandy Lake-Marsh Lake Lands and Jack Lake Land Assembly: An Environmental Inventory and Analysis, Environmental Planning, NSCAD, Halifax, NS, Fall 2001
2. Conrad, Damon, Hany Sidhom, Steve Matthews; Sandy Lake Development Impact Assessment, Biological Engineering Department, Dalhousie University, Halifax, NS, April 19, 2002
3. Thompson, Kate; Sandy Lake-Marsh Lake Lands and Jack Lake Land Assembly: an Environmental Inventory, Analysis and Synthesis, Environmental Planning Studio 1, NSCAD [under direction of Patricia Manuel and John Zuck], Fall 2001
4. Halifax Regional Municipality - Regional Municipal Planning Strategy, August 2006, Certified as in effect as of March 2009.