



# Corporate Report

NO: 251

COUNCIL DATE: December 4, 2006

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## REGULAR COUNCIL

TO: Mayor & Council DATE: November 29, 2006  
FROM: General Manager, Engineering FILE: 4703-106  
SUBJECT: Bridgeview Vacuum Sewer Replacement Strategy

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## RECOMMENDATION

The Engineering Department recommends that Council:

1. Adopt the replacement strategy for the Bridgeview Vacuum Sewer System (Option 5) as documented in this report;
2. Adopt the policy that no new connections to the existing Vacuum Sewer System be allowed; and
3. Authorize staff to develop and recommend a financial strategy for implementing the replacement of the Vacuum Sewer System which includes, as the opportunity arises, applying to the Green Infrastructure Fund, or other similar funding sources, for funds to assist in sewer replacement.

## INTENT

The purpose of this report is to seek Council approval regarding a replacement strategy for the Bridgeview vacuum sewer system.

## BACKGROUND

The City constructed the vacuum sewer system in the late 70s in response to the health concerns arising from the malfunctioning of residential septic systems. Because a conventional gravity sewer was cost prohibitive in this flat area with soft soil conditions, a vacuum sewer system was chosen over a conventional gravity pipe system. However, the vacuum system has been problematic since the mid 1980s. At the time of installation the technology for vacuum sewer system was in its infancy, the supplier of the system has since ceased operations, and the design standards for vacuum sewer systems have changed over time. As a result, the system had become costly to maintain and prone to

service disruptions. The City's data show that on a per connection basis, the vacuum sewer system is approximately 20 times more expensive to operate and maintain than the rest of the City sewer system. Furthermore, the capacity of this type of system is limited. These limitations greatly hinder development and redevelopment in the area, a significant portion of which is industrial land.

Despite attempts to increase the reliability, such as replacing the interface valves with a more reliable product in 1988, the operations and maintenance cost has remained very high. Consequently, in 1990 a plan was developed to replace this system with a steep-grade multi-pump system. However, because this system would require a total of 14 pump stations, each of which is costly, together with the need to construct a new replacement sewer system, overall replacement was uneconomic.

## DISCUSSION

In view of the ongoing difficulties, a new study was initiated to re-evaluate the replacement system by considering new technology combined with Low Pressure System (LPS) standards introduced recently and successfully implemented. With regard to new technology, significant advancements have been made in last 15 years in Horizontal Directional Drilling (HDD), a trenchless technology.

### Financial Analysis:

The study reviewed various replacement alternatives, and an economic comparison of the alternatives based on net present value is provided in the following table:

Options	Descriptions	Net Present Value <sup>1</sup>	Remarks
1.	Maintain and replace existing system (O&M and replacement cost included)	\$40M	Need to replace the Vacuum Sewer System in the next few years.
2.	Steep Grade Sewer System	\$39M	Requires significant upfront financing
3.	Steep Grade Sewer System with HDD	\$37M	Requires significant upfront financing
4.	Low Pressure System (LPS)	\$36M	Requires 100 mini pump stations
5.	<b>Hybrid LPS with Steep Grade and HDD</b>	<b>\$32M</b>	<b>Is the most practical and most economical option to implement</b>

#### Notes:

1. The Net Present Values (NPV) is based on a 50 years life cycle analysis. The NPVs in the table include both the capital costs, and the operations and maintenance costs for each option.

The study concludes that Option 5 – A Hybrid of Low Pressure Sewers (LPS) with Steep Grade and Horizontal Directional Drilling (HDD) is the most economical and practical replacement system for the Vacuum Sewer System. In this option, the steep grade sewer system using HDD technology, a proven system that has been used in Queensborough, will replace the vacuum sewer in the residential areas, while the LPS will replace the vacuum sewer in the industrial/commercial areas, as shown in the attached Appendix 1.

LPS is recommended for the industrial/commercial areas because it facilitates the phasing of developments by deferring the cost until the individual lots are developed. Under this system, the City will own and maintain a system of force mains on City roadways, while the industrial commercial property owners will own and operate their respective on-site pumping facilities.

#### Implementation Strategy:

To facilitate the decommissioning of the Vacuum Sewer System, it is proposed that no new connections to the existing vacuum system be allowed. Allowing additional ad-hoc connections to this existing system will simply perpetuate the Vacuum Sewer System. This creates a difficult situation where costs would be prohibitive for the City to maintain two parallel systems longer than necessary. Council has previously adopted the policy that no extension to the vacuum sewer system be constructed.

It is proposed that the replacement program would proceed first in the western residential area that is experiencing high inflow and infiltration rates. The eastern residential area would be part of Phase II. After these areas, pre-servicing with LPS force mains would begin in the industrial/commercial areas where there are existing service connections. The industrial property owners would be responsible to install their respective pumping facilities and force mains when they apply for a subdivision plan, strata plan, development permit, building permit, development variance permit, or a new sewer connection. After a grace period of five years, the remaining lots that have not transferred their services to the LPS could be potentially mandated to transfer to the new LPS system.

#### Financial Approach:

As the replacement system is very expensive, staff will review funding opportunities and cost impacts. One opportunity is to seek funding from the “Green Infrastructure Fund” and other Provincial cost sharing programs. The City will apply for such funding when opportunity arises. This program would be a good candidate for potential selection because the replacement system would reduce the high inflow and offer a proven technical approach as the resolution to an existing problem area.

Recently, the Federal and Provincial Government announced a new Canada-BC Municipal Rural Infrastructure Program (MIRF). The program is primarily targeted at smaller rural municipalities with a minimum of 80% of the funding going to municipalities of less than 250,000 people. We have identified Phase 1 of this Vacuum Sewer Replacement System (estimated at \$6.0 million) to be one of the potential candidates for this MIRF.

Another approach is cost sharing by the property owners through a Council-initiated Local Area Service. Even though most properties are currently serviced by the Vacuum Sewer System, the replacement system will appreciate the property values – by an estimated amount of up to \$100,000 per hectare for industrial and commercial lots, and \$10,000 to \$20,000 per single family residential lot. This increase in value would be realized once the more reliable, flexible and robust replacement sewer system is in place.

As the property owners would benefit from this appreciation, there could be a level of support from property owners to fast track replacement through a Local Area Service charge.

## **CONCLUSION**

It is recommended that a Hybrid Low Pressure System combined with Steep Grade System using HDD technology be implemented as a replacement system for the Vacuum Sewer System in Bridgeview. Such a system will minimize costs and facilitate development of the area. It is also recommended that Council direct that no new connections be allowed to the existing Vacuum Sewer System in order not to burden the system with additional loading, and to reduce the cost to transfer over to a replacement sewer system. This is a refinement of the existing Council policy of no extensions to the vacuum sewer system.

Should Council support the recommendations of this report, staff will seek “green infrastructure” or other Provincial grant program funding and will complete a comprehensive analysis of the financial opportunities and submit a financial strategy for Council’s consideration.

Based on a preliminary financial analysis, it is clear that spending a significant amount of money on sewer replacement will save money in the long term through operation and maintenance savings. The added significant benefit of the sewer replacement strategy is that it will facilitate redevelopment of the entire area that has been impaired by the lack of an adequate sewer system.

Paul Ham, P.Eng.  
General Manager, Engineering

MD/VL/RL/kd2:rdd  
Attachments



124 ST.

125A ST.

126A ST.

128 ST.

130 ST.

132 ST.

FRASER RIVER

CN RAILWAY

APPENDIX 1

116 AVE.

114 AVE.

112A AVE.

INDUSTRIAL ROAD

BRIDGEVIEW DRIVE

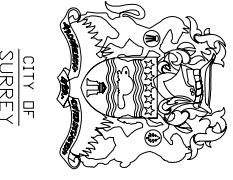
GYRD TRUNK SEWER

KING GEORGE HIGHWAY

LEGEND

- AREAS TO BE REPLACED WITH LOW PRESSURE SYSTEM
- AREAS TO BE REPLACED WITH STEEP GRADE & HDD
- PROPOSED 200mm SANITARY GRAVITY SEWERS
- FUTURE 200mm SANITARY GRAVITY SEWERS
- PROPOSED SANITARY FORCEMAINS
- PROPOSED 200 HDD SEWER SECTION
- PROPOSED PUMP STATIONS (CITY OWNED LOT)
- PROPOSED PUMP STATIONS (LAND REQUIRED)
- FUTURE SOUTH PERIMETER ROAD ROW
- GVRD TRUNK SEWER

**EarthTech**  
 A Tyco International Ltd. Company  
 1901 Rosser Avenue  
 Burnaby, B.C. V5C 6S3  
 PROJECT 84907 (02d)



**BRIDGEVIEW VACUUM SEWER STUDY  
 OPTION 6: HYBRID LPS WITH STEEP  
 GRADE AND HDD SECTIONS**

DRAWN	MTC	SCALE	N.T.S.	SHEET No.
CHECKED	SBN	DATE	AUG 2005	<b>APPENDIX 1</b>

