City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	May 5, 2006
From:	Robert Gonzalez, P.Eng. Director, Engineering	**File:**	10-6000-01/2006-Vol 01
Re:	**Recognition for Sustainability and Innovation in Energy Management, Building and Civil Infrastructure**		

Staff Recommendation

That the "Recognition for Sustainability and Innovation in Energy Management, Building and Civil Infrastructure" report from the Director, Engineering be received for information.

Robert Gonzalez, P.Eng.
Director, Engineering
(4150)

FOR ORIGINATING DIVISION USE ONLY		
CONCURRENCE OF GENERAL MANAGER		
REVIEWED BY TAG	YES ☑	NO ☐
REVIEWED BY CAO	YES ☑	NO ☐

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Staff Report

Origin

Sustainability and innovation are a matter of course in the daily operations of the Engineering & Public Works department. The purpose of this report is to highlight to Council the recent and significant recognition received by the City as a result of staff's efforts.

Findings Of Fact

Sustainability and innovation have been engrained as concepts in the operational decisions made by staff to the extent that City has been recently been recognized in three separate publications. Copies of each article are attached.

Power of Business Magazine

The City's Manager, Facilities Operations and Maintenance, Phil Hogg, is on the magazine cover of the Power of Business magazine with BC Hydro CEO, Bob Elton. The magazine highlights the City's commitment to energy efficiency as well as the annual reduction of $26,000 in energy costs relating to the upgrades completed at the Richmond Ice Centre.

On May 3rd, 2006 the City of Richmond received an award for "Outstanding Performance" in the field of energy management at BC Hydro's Power Smart recognition event. There was only one other organization recognized for outstanding performance, once again reinforcing that Richmond takes energy management seriously and goes to great lengths to ensure that the public funds allocated by Council are spent wisely.

Canadian Facility Management and Design Magazine

The April 2006 issue of the captioned magazine includes an article entitled "Proactive management of a sustainable future". The article highlights the City's approach to a project's lifecycle from planning through implementation. Led by David Naysmith, P.Eng., Manager, Facility Planning and Construction, the integration of VFA software over the past few years has enabled the City to better understand the condition of our building infrastructure and work towards a long term sustainable solution for our building infrastructure.

Mr. Naysmith recently presented Richmond's sustainable approach to building infrastructure planning and construction to a North American audience at the 2006 National Facility Management and Technology conference.

Sewers from Hell – Journal of Commerce

In the Emerging Technology section of the latest edition of the Journal of Commerce is the article "Sewers from Hell". The article describes how City staff, led by Jim Young, P.Eng., Manager, Design and Construction, developed an innovative solution to a sinkhole located immediately behind a building at 6280 No. 3 Road. Implementation of the solution was a true team effort from Engineering & Public Works staff. Operations staff developed a unique temporary pump station while engineering staff worked towards the unique grout curtain solution

that enabled the sewer construction to occur 4 metres deep and immediately adjacent to older buildings with shallow foundations.

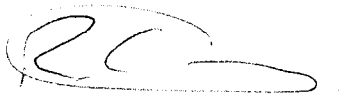
Mr. Young already presented this project at the 2006 BC Water and Waste Association's Annual General Meeting to a standing room only crowd, and Siu Tse, Manager, Engineering Planning will be doing a similar presentation later this year to a North American audience at the 2006 Water Environment Federation Annual Technical Exhibition and Conference.

Financial Impact

None.

Conclusion

Through Council's support of long term strategies surrounding City infrastructure and the Long Term Financial Management Strategy, staff have been able to develop and implement sustainable and innovative solutions and programs that will be of on-going benefit to Richmond residents. The positive magazine and newspaper articles confirm that Richmond continues to make headway in achieving our vision of being the most appealing, livable, and well managed community in Canada.



Robert Gonzalez, P.Eng.
Director, Engineering
(4150)

THE POWER OF

Business

2006

Meet the 2006 Power Smart Leaders

Protecting and Enhancing our Electricity Heritage

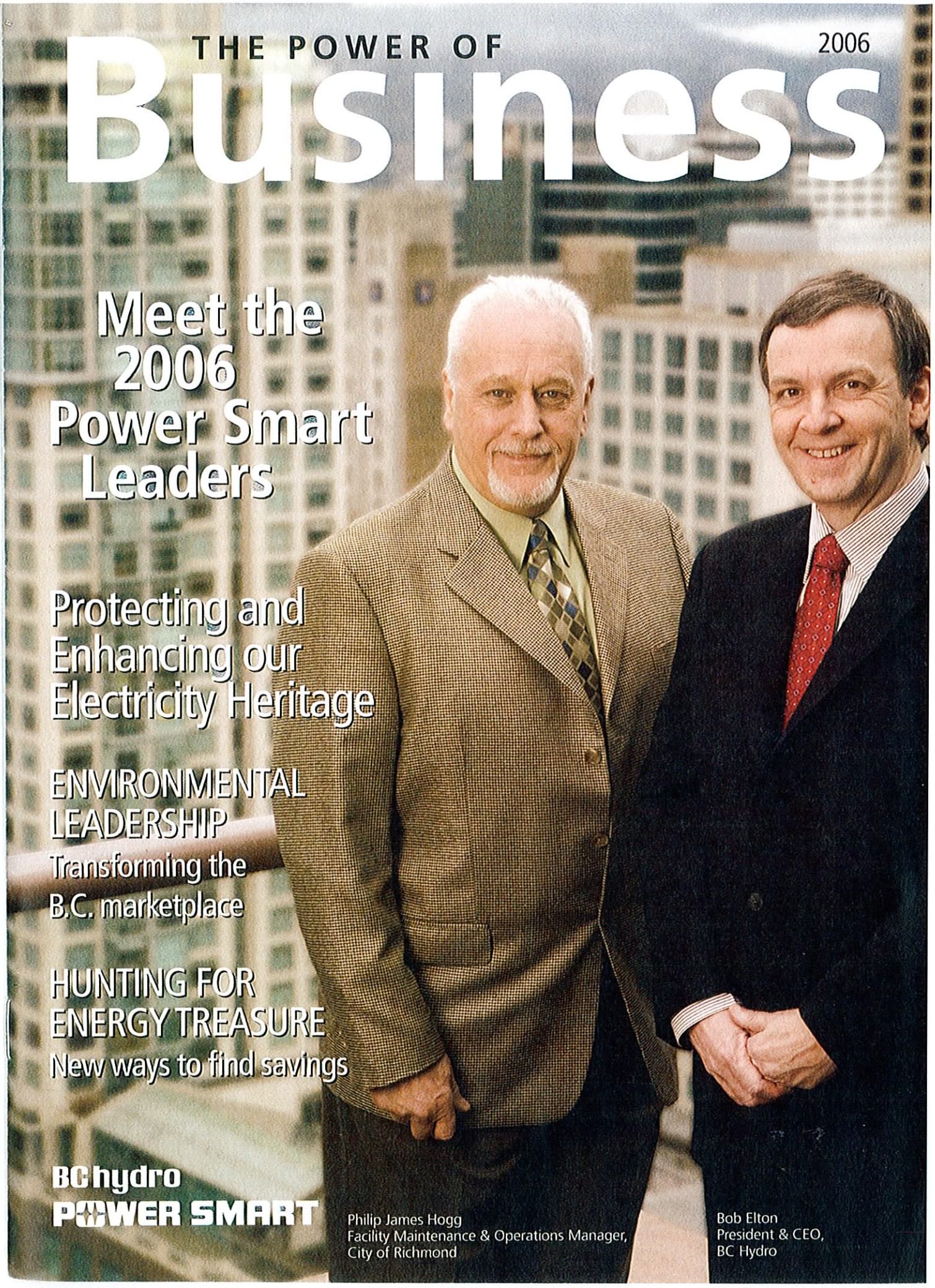
ENVIRONMENTAL LEADERSHIP

Transforming the B.C. marketplace

HUNTING FOR ENERGY TREASURE

New ways to find savings

BC hydro
POWER SMART



Philip James Hogg
Facility Maintenance & Operations Manager,
City of Richmond

Bob Elton
President & CEO,
BC Hydro

City of Richmond

B.C.'s only municipal Power Smart Certified Customer.

The City of Richmond continues to set an example of how to integrate energy efficiency into a municipality's operations. Led by a sustainability commitment at the highest level, Richmond follows a broad-based plan to achieve continuous improvement. Its key elements:

Upgrade existing buildings, and operate all buildings and equipment for maximum efficiency.

This past year the City undertook a major mechanical and lighting retrofit of Richmond Ice Centre. The project has cut the facility's energy use by 18 per cent, saving nearly $26,000 each year. Richmond also achieved savings through operational improvements.

Ensure that new buildings are designed and built to higher standards.

Hamilton Fire Hall, one of two new fire halls being designed and constructed under Richmond's new high-performance building policy, is incorporating a host of energy efficiency and sustainable features. It will attempt to achieve LEED Gold certification, a first in the province for a fire hall.

The City of Richmond is also designing the Richmond Skating Oval to achieve LEED Silver certification and has applied for Power Smart High Performance building study funding. "Our goal is to build the most energy-efficient skating oval in the world," says Phil Hogg, Facility Maintenance & Operations Manager.

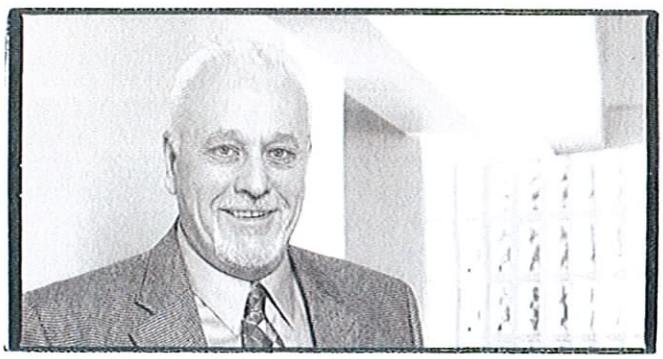
Aim high – and then do more.

In 2005 the City's top managers from a wide range of departments participated in a One-2-Five® Energy workshop offered by BC Hydro to see what they could do to improve Richmond's energy management plan. They pledged to take every opportunity to help the City reach its goal of a 15 per cent overall electricity reduction earlier than the promised four years.

In the City of Richmond, the quest for energy efficiency is all going according to plan.

Get employees and residents involved through education and outreach.

Partnering with Richmond School District, the City put on "Project Wet" to teach children the importance of water quality and conservation. In addition, Power Smart Outreach representatives helped to profile the conversion of Richmond's seasonal lighting display to LED lighting and educate the public on energy-efficient lighting.



Philip James Hogg
Facility Maintenance & Operations Manager

Proactive management of a sustainable future

The City of Richmond is realizing significant cost savings in maintenance and renovation of its buildings through use of capital planning and asset management software.

By David Naysmith, P.Eng., and Susan Anson

The City of Richmond has an ambitious vision — to be Canada's most appealing, liveable and well-managed community. Key to accomplishing that goal will be effectively managing growth. Located 20 minutes from downtown Vancouver, Richmond's population has increased significantly in recent years, growing to 180,000. The City's infrastructure has seen parallel growth with the development of the downtown area, and the pending construction of a Rapid Transit line and an 8,000-seat Olympic speed skating oval in time for the 2010 Winter Games.

However, the City recognized that its existing infrastructure, which includes 145 municipal buildings, would require significant investment to support this vision. City facilities had a large deferred backlog of maintenance requirements, fuelled by funding levels that were inadequate to address the needs of an aging portfolio. Approximately 20 per cent of Richmond's facilities are over 30 years old. Increasingly, the City found that funds set aside for preventative and routine maintenance were needed to make unscheduled capital repairs to municipal buildings.

Gateway Theatre lobby, old (above) and new: maintenance and renovations were bundled into one project

The City was relying on staff at each building to rate the facility on a subjective scale that did not necessarily illustrate building condition, nor detail lifecycle renewal needs. The City's Facility Planning group, which plans major renovations and construction projects and manages building systems lifecycle renewal, had limited ability to proactively manage the lifecycle of building systems and components, both due to the sparse data available and the tools it had to support cost modeling. An Excel spreadsheet developed for this purpose proved labour intensive and difficult to keep current. This static information was stored in multiple locations and made it difficult to analyze trends across the portfolio or model lifecycle costs.

The Facility Planning group looked for a solution that would allow it to effectively collect and manage information about the condition of all its buildings, prioritize needed renewal and repair, and model the impact of different funding alternatives. The City wanted to be able to prioritize maintenance and lifecycle renewal projects based not only on their impact on overall portfolio condition, but also taking into account priorities put forward by the City Council.

Recognizing that having up-to-date, consistent information about conditions across its facility would be critical to making optimal choices about capital investments, Richmond selected a solution for facility planning that encompassed both assessment services and a software system. The City selected VFA, Inc. to implement a solution that would lay the foundation for proactively planning for its maintenance and renewal needs, and demonstrating how these investments support the City's long-term goals. The solution included detailed facility condition assessments and VFA.facility software to centrally house facility and building system condition and lifecycle information and

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David Naysmith P.Eng. is Manager of Facility Management Planning & Construction for the City of Richmond, B.C. He has over 25 years of experience related to the maintenance and construction of complex buildings. He can be reached at dnaysmith@richmond.ca.

Susan Anson is General Manager of VFA Canada Corporation (www.vfa.com)., provider of software and services for facilities capital planning and asset management. She can be reached at sanson@vfa.com.

One of the fire halls to be renewed, old (left) and proposed: analysis convinced city council to make the investment

support sophisticated portfolio analysis and capital planning. Aside from the capabilities the software gave the City, the fact that it was Web-based and did not require IT support was an important factor. Facility Planning estimates that it is saving $30,000 to $50,000 per year in IT salaries by not having the application installed on desktops.

Lifecycle renewal budget

With its new system, the City's Facility Planning group has been able to demonstrate the impact that requested funding will have on infrastructure condition over the long-term, as well as the impact of deferring those investments. Presented with hard data on declining infrastructure condition, the City Council acknowledged the need for greater investment, and the Facilities Planning group began to receive small incremental percentage increases in its maintenance budget and lifecycle funding allocation each year. Today, the City funds an annual lifecycle renewal budget of $2.4-million, increased from $1.96 million last year, and an operating and maintenance budget totalling $3-million.

With community safety one of the top priorities of the City Council, the Facilities Planning group used the new system to identify the City's fire halls as a target for a major overhaul. Of seven existing fire stations, most were obsolete or inadequate for their function. Based on analysis of existing infrastructure and systems, the Facilities Planning group determined which facilities could be effectively modernized and upgraded, and which needed to be replaced. They developed a plan to upgrade or replace five of the fire halls by 2008, and convinced the City Council of the need for immediate investment. The value of fire hall projects to be completed in 2006, including the construction of two new fire halls and upgrade of two others, will total $11-million.

The capital planning and management system Richmond put in place has also resulted in significant cost savings for the City-from reducing emergency repair costs to cutting material and procurement costs. Because Richmond's Facility Planning group can now analyze different categories of requirements across its portfolio, they can better identify opportunities to group or bundle various projects. By combining multiple projects with the same specifications, such as roofs that need to be replaced on four different buildings, the City can often receive more competitive bids from contractors than if it bid each project individually. Similarly, by bundling renovation projects within a single building, the City can complete a comprehensive renovation of a facility at one time, achieving a greater overall impact at a comparable cost to completing individual renovations one by one.

An example of the success of this strategy is a 2004 renovation of the City's 560-seat Gateway Theatre. The Facility Planning group bundled various theatre maintenance and renovation projects together — new flooring, walls, millwork, heat pumps, and more energy efficient lighting — all within the budget they would have spent for one-off replacement. By looking at the big picture, the Facilities Planning group was able to both maximize its dollars and please its customer, the theatre.

Looking specifically at lifecycle renewal requirements across its portfolio, Richmond found an opportunity to reduce the 'squeaky wheel' syndrome that results in a short-term solution that won't be effective over the long-term, or a replacement that isn't necessary. For example, close analysis revealed that many investments in HVAC systems were being made when the system had already exceeded its useful life. On the flip side, when a request was made to replace a 10-year-old moveable partition wall at a cost of $14,000, it was found that the asset had an expected lifecycle of 25 years and had previously received no repairs or preventative maintenance. By completing repairs totalling $3,000 and putting a preventative maintenance program in place, the Facilities Planning group avoided unnecessary spending while ensuring the asset will likely meet or exceed its anticipated lifecycle. Because a strict lifecycle view doesn't always accurately represent an asset's condition, the City balances this information with data gained in detailed condition inspections, which could indicate, for example, that a roof scheduled for replacement has another two years or more of useful life.

Long-term sustainable policy

Repairing and replacing city infrastructure will be an ongoing process in Richmond, but one the City is prepared to undertake. The Facilities Planning group believes it now has credible and defensible information about its facilities and the analytic tools it needs to support and implement a long-term sustainability policy. As part of a long-term financial management strategy, the City recently enacted legislation that allows municipal taxes to be increased annually at the rate of inflation plus an additional percentage point which will fund infrastructure replacement. Over time, the cumulative effect of this initiative, coupled with that of other funding programs, will continue to be seen in Richmond's buildings and parks, and in the Facility Management group's efforts to support the City's vision to be Canada's most appealing, livable and well-managed community.

Journal of Commerce
Wednesday, April 26, 2006

EMERGING TECHNOLOGY

Sewers from hell

Richmond engineer and Golder Associates shows off new wastewater pump at this weekend's water and waste conference in Whistler

WARREN FREY
STAFF WRITER

For the city of Richmond, a "sewer from hell" turned into a chance to create a new way of dealing with wastewater.

Richmond experienced a local state of emergency in January 2005, when a sinkhole opened up on the No. 3 Road, causing structural damage to nearby buildings.

Since then, city engineers have been hard at work on a way to prevent another such disaster, and they've come up with a tiny and portable solution.

Jim V. Young, an engineer for the City of Richmond and Naresh Koirala, from Golder Associates, will elaborate on their innovative use of technology at an upcoming seminar on emerging technologies.

They're making a presentation entitled "Another Sewer from Hell – the Richmond Perspective" on May 1, during the British Columbia Water and Waste Association's annual general meeting in Whistler.

"It's basically a portable pump station that fits right in a manhole. It's built, and it's ready to go, "Young said.

With the new system, a blocked sewer anywhere in Richmond can be brought back into operation quickly, and the pump is easily operated remotely from a central location.

The device consists of a five-horsepower pump installed inside a can the size of a manhole lid.

The pump then rests on the manhole bench at the bottom of the sewer, and the pump is hooked into the piping system.

"From there we can bypass sewage to different parts of the system. It took us years to come up with the idea and work on it, but only a week to actually build," Young said with a chuckle.

Currently, Richmond has three of the units ready for deployment.

Though the conventional wisdom is that since Richmond is below sea level, sewer problems are more difficult to deal with, the truth is that it's a blessing in disguise, Young said.

"When you have a blocked sewer, the system essentially becomes a big storage reservoir, which we couldn't do if we were above sea level. In someplace like North Vancouver, where there's a lot of elevation, that just wouldn't be possible," he said.

The pump system isn't the only innovation Richmond has introduced to the wastewater management world.

Richmond's engineering department has also created a "grout curtain," which replaces sheet piling and dewaters the ground without causing structural damage to surrounding buildings, Young said.

This system works by injecting holes in the ground, filling them with grout, and continuing the process until a "wall" is created.

"It's essentially a matter of creating an impenetrable barrier between where the building is being retained and where excavation must take place. The grout curtain stops water movement from one side to the other, which would cause the building to settle as we lower the water table," Koirala said.

He said he used the grout curtain system extensively while based in Hong Kong, but "other than Richmond, it hasn't been used anywhere else, though we are getting expressions of interest."