



City of Richmond

Report to Committee

To: Public Works and Transportation Committee

Date: February 7, 2011

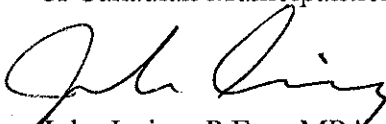
From: John Irving, P.Eng. MPA
Director, Engineering

File: 10-6340-01/2011-Vol
01

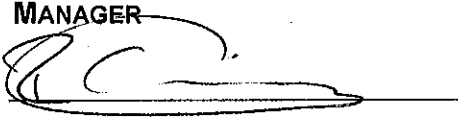
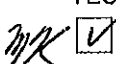
Re: Grease Reduction - Green Municipal Fund Application

Staff Recommendation

That a letter from the Mayor be sent to the Federal Minister of Environment, copied to local MPs, requesting support for the City's Grease Reduction Program application to the Federation of Canadian Municipalities (FCM) Green Municipal Fund.


John Irving, P.Eng. MPA
Director, Engineering
(604-276-4140)

Att. 1

FOR ORIGINATING DEPARTMENT USE ONLY			
ROUTED TO:	CONCURRENCE		CONCURRENCE OF GENERAL MANAGER
Intergovernmental Relations and Protocol	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		
Sewerage and Drainage	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		
Community Bylaws	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		
REVIEWED BY TAG	YES  <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	REVIEWED BY CAO YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

Staff Report

Origin

Council adopted several leading edge bylaws in 2007 and 2010 related to education and enforcement of fat, oil and grease (FOG) discharges to the City's sewer system. While the adoption of these bylaws has led to a number of successes, illegal FOG discharges remain an operational, environmental and financial burden to the City. Staff have prepared a Green Municipal Fund application (Attachment 1) that would fund improvements to the current FOG reduction program in the Leslie catchment area.

The purpose of this report is to seek demonstrated Council support and for the Green Municipal Fund Application submitted by staff by way of a letter from the Mayor to the Federal Minister of Environment.

Analysis

The discharge of fat, oil and grease to the City's sewer system presents significant operational, environmental and financial burdens to the City. To proactively address this problem, grease reduction and enforcement related bylaws were adopted by Council in 2007 and 2010 and a part-time (3 days per week) grease enforcement bylaw officer was hired. While education and enforcement through the bylaw officer remains an ongoing and successful program, illegal FOG discharges continue.

FOG discharges are a City wide problem and operational experience has shown that the largest accumulations of grease in the sewer system are primarily in areas where there are restaurants. The Leslie catchment area (see Attachment 1) contains approximately 200 restaurants and has been observed to have the largest grease accumulations in the City. The estimated annual cost associated with grease accumulations in the City's sewer system remains at approximately 2008 levels at \$310,000.

The City has submitted a Green Municipal Fund application (Attachment 1) for \$1.3 million (100% funding). Should the City's application be approved, staff will deliver a comprehensive program with a private sector team member. The proposed program includes a baseline survey of the existing sewer system, supply of an effective grease reduction product and follow-up through the City and private sector team over a period of approximately 1 year. It is proposed that the City take the lead in working with restaurants in the Leslie catchment to eliminate their FOG discharges at no additional cost to them.

It is anticipated that elimination of grease in the sewer system will lead to environmental enhancements, cost reductions and increased longevity of City infrastructure. Operational requirements associated with FOG will be minimized or eliminated altogether.

It is recommended that a letter from the Mayor be sent to the Federal Minister of Environment, copied to local MPs, requesting support for the City's Grease Reduction Program application to the Federation of Canadian Municipalities (FCM) Green Municipal Fund..

Financial Impact

The Green Municipal Fund is 100% funding so there is no financial impact at this time.

Conclusion

Although the City's current grease reduction program has experienced numerous successes, discharges of fats, oils and grease to the City's system continues to present an environmental, financial and operational burden. There is an opportunity available through the Green Municipal fund to fund a more comprehensive grease reduction program in the Leslie area. A letter from the Mayor to the Federal Minister of Environment requesting support would be of benefit to the City's application.

A handwritten signature in black ink, appearing to read 'J. V. Young', is positioned above the typed name and title.

Jim V. Young, P. Eng.
Manager, Engineering Design and Construction
(604-247-4610)

JVY:jvy

Att: 1



City of Richmond

6911 No. 3 Road
Richmond, BC V6Y 2C1
www.richmond.ca

February 4, 2011
File: 10-6340-01/2011-Vol 01

Engineering
Telephone: 604-276-4289
Fax: 604-276-4197

The Federation of Canadian Municipalities
The Green Municipal Fund
24 Clarence Street
Ottawa, Ontario
K1N 5P3

Dear Sir/Madame:

**Re: City of Richmond
Grease Reduction - Green Municipal Fund Application**

The City is an award winning, innovative municipality with many ongoing sustainability initiatives ultimately geared towards environmental enhancements and reduction of the carbon footprint.

The City's ongoing grease reduction program is comprehensive and has provided the framework for many other municipalities to follow. Briefly, the City has adopted a comprehensive set of grease enforcement bylaws and an education/enforcement program. The combination of these bylaws and enforcement is geared towards elimination of significant sewer system grease accumulations, which can have catastrophic implications to the environment, the infrastructure and the City's financial capabilities.

We have prepared a Green Municipal Fund application to allow the City to take our grease reduction program to the point where this problem is eliminated. The proposed program is thorough and comprehensive with every chance of success. We appreciate your consideration of our application.

Thank you and please contact the undersigned at 604-247-4610 if you have any questions or require further information.

Yours truly,

Jim V. Young, P. Eng.
Manager, Engineering Design and Construction

JVY:jvy

GREEN MUNICIPAL PROGRAM

City of Richmond Grease Reduction and Odour Control Program Leslie Catchment Areas

The City of Richmond has prepared a grant-funding request based on completing a comprehensive grease reduction and odour control program in the City Centre area. **The total value of the program is \$1,300,000** and is submitted through the **Green Municipal Program** based on 100% funding through the Federal Government. **The City would contribute considerable resources** over a period of approximately 1 year, valued at approximately \$30,000 to support delivery of this program.

The proposed grease reduction and odour control program considers the Richmond City Centre, Leslie catchment area. This locations have been strategically selected as it represents the area with the most significant grease/odour related issues where the City has focused educational/enforcement initiatives since 2007. Implementation of this project would create approximately **6 full time jobs** for a period of 12 months.

A successfully implemented program will produce **significant tangible financial and environmental benefits**. The City's currently spends approximately \$311,000 annually on operations and maintenance to react to grease discharges to the collections system, and approximately \$50,000 is spent by Metro Vancouver at the Lulu Island Wastewater Treatment Plant. A successful grease reduction program will immediately reduce costs and set the foundation to **eliminate this expense in its entirety**.

Grease discharges to the sewer system can ultimately end-up in the Fraser River and can cause significant damage to aquatic wildlife due to high levels of Biodegradable Oxygen Demand (BOD) and physical attachment to various aquatic and wildlife species. Sewer system blockages due to grease accumulations represent significant health and safety issues to City residents. Reduced flows in sewer systems can create high levels of methane (which is explosive) and Hydrogen Sulphide (odour) gases. A successful program will **reduce/eliminate BOD, methane gas accumulations and odour**. The reduction of grease discharges to the Fraser River will **eliminate the associated impacts to aquatic and wildlife species** and significantly **reduce the carbon footprint**.

Grease discharges to the sewer collection system have **significant destructive effects** to the associated infrastructure. Pipes can experience profound reductions in hydraulic capacity, operation of valves is compromised and general life expectancy is reduced. One of the more significant impacts resulting from grease accumulations is the need to replace or twin the Gilbert Trunk sewer pipe that services the entire City – the Metro Vancouver cost to complete construction is **budgeted at \$60 Million** commencing 2012 with design already underway. It is **critical that grease discharges** to this new system are diminished in order to preserve hydraulic capacity and life expectancy.

GREEN MUNICIPAL PROGRAM

City of Richmond Grease Reduction and Odour Control Program Leslie and Buswell Catchment Areas

General

The City of Richmond is part of the Greater Vancouver Regional District in British Columbia and has a culturally diverse population of approximately 195,000 in a region of overall population of approximately 2.2 million. The City is essentially flat as it is located on a floodplain with elevations ranging from approximately 0.6 metres to 2.5 metres above sea level. These physical attributes present numerous challenges and opportunities with underground utility design, construction and operation.

Design and construction of the sanitary sewage collection system is particularly challenging given the need for minimal pipe slopes that also must meet minimum hydraulic capacity standards. Illegal discharges of fats, oils and grease (FOG) to the sanitary system represents a health and safety issue to City residents, increases operational costs and poses significant environmental challenges.

In 2007 the City commenced a grease enforcement program whereby several bylaws were created related to illegal discharges of FOG. The first phases of this program were geared toward a 'soft' approach whereby education and consequences were the main focus as delivered by a dedicated bylaw officer. In 2010, the City increased its enforcement capabilities through adoption of new bylaws. It is the City's goal that the restaurants change their grease discharge practices as a result of the City's education and enforcement initiatives and through the introduction of effective grease reduction management and products.

The City has approximately 900 food establishments (mostly restaurants) which is among the highest restaurant per capita areas in Canada. The Leslie catchment area contains a high concentration of restaurants and frequently experiences operational challenges related to accumulations of fats, oils and grease and there are times where there is noticeable odour and/or accumulations of methane gas.

Methodology

A Closed Circuit Television (CCTV) program will be completed to determine the baseline condition (i.e., accumulations of grease) in all the pipes in the Leslie catchment (approximately 7500 metres). Following CCTV work, a private sector organization will be engaged to supply biological and environmentally friendly product/services to those food establishments that discharge or potentially discharge FOG to the City's sewer. The private sector work will be completed in coordination with the City's Bylaw enforcement division. Following a period of time (see Project Schedule below) CCTV work will be completed a second time as a basis for comparison with the baseline condition and to provide a means to measure the success of the program. The City will continue with an enforcement program regardless of the results.

Hydrogen Sulphide levels will be continually recorded throughout the program.

It is estimated that the carbon footprint savings on 200 stores in the Leslie area would be approximately 250,000 kg. For 900 stores, a carbon footprint savings would exceed 500,000 kg. Not included in these figures are the reductions that would occur by eliminating H₂S and Methane in the collection system.

At this time, we are planning on producing a short documentary on the study.

Project Schedule

Grant Award	February 2011
CCTV (Baseline)	February and March 2011
Engage Private Sector Firm	March 2011
Grease reduction product distribution	April to December 2011
Bylaw enforcement/education	April to December 2011
CCTV (Success)	January and February 2012
Bylaw enforcement	Continuous

Project Budget

\$1,300,000 (100% funding through the Green Municipal Program)

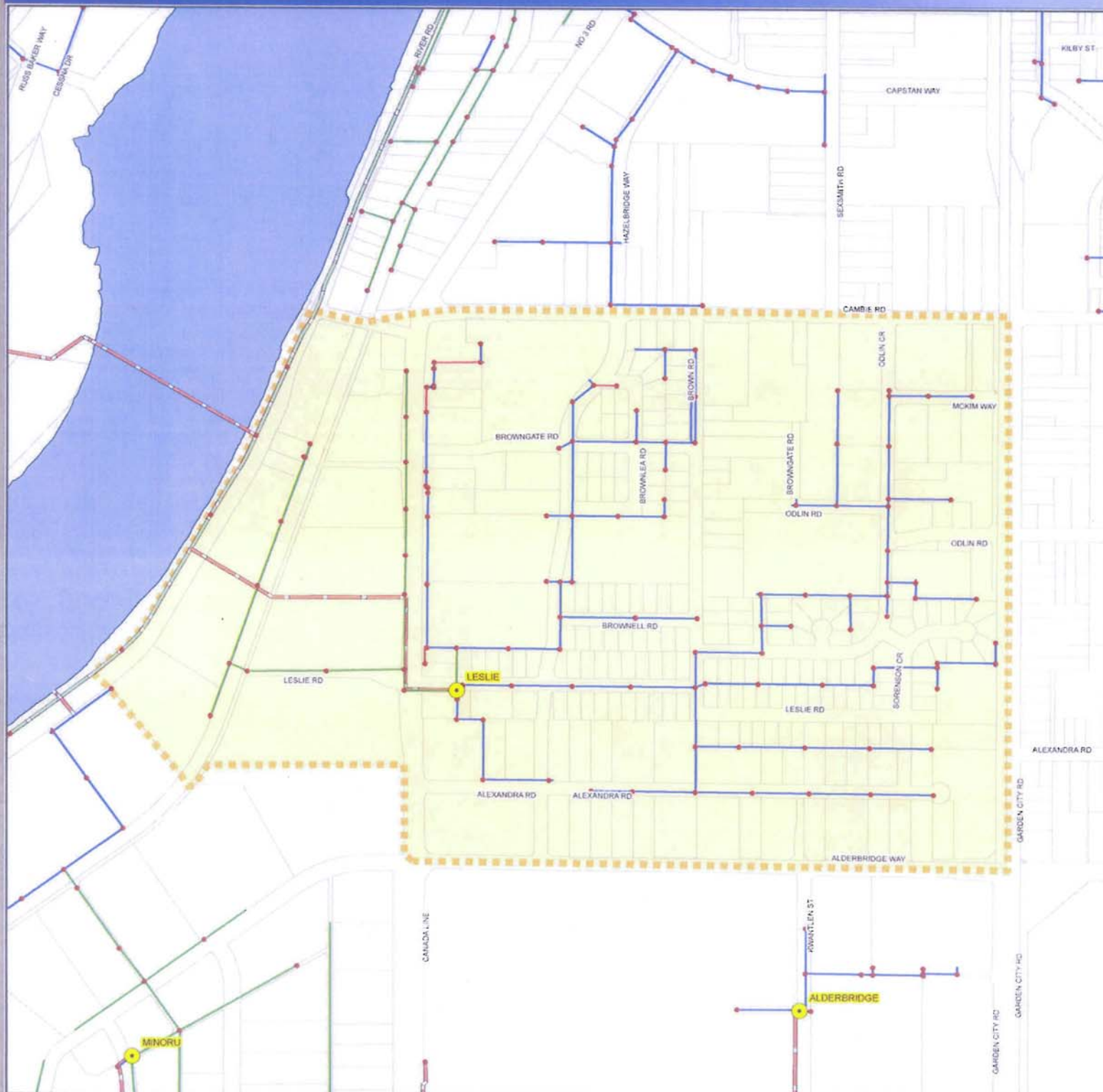
○ CCTV Phase I	\$ 60,000
○ Infrastructure Repairs	\$ 160,000
○ Private Sector Firm costs (product/service)	
○ Product	\$ 625,000
○ Project Management	\$ 100,000
○ Monitoring	\$ 100,000
○ H ₂ S testing	\$ 15,000
○ Laboratory work	\$ 50,000
○ Training	\$ 50,000
○ Disbursements	\$ 10,000
○ Educational materials (throughout City)	\$ 10,000
○ Intermediate CCTV Phase II	\$ 60,000
○ Final CCTV Phase III	\$ 60,000

TOTAL	\$1,300,000
--------------	--------------------

City in-kind costs include a project manager, CCTV video interpretation specialist, minimum two sanitary operations staff members and a dedicated (3 days/week) grease enforcement bylaw officer.

Contact: Jim V. Young, P. Eng.
Manager Engineering Design and Construction
604-247-4610

Grease Reduction Study Area (Leslie Sanitary Catchment)



Legend

- Manhole (126)
- Asbestos Concrete (25m)
- FRP (1319m)
- PVC (5904m)
- Unknown (138m)
- Forcemain
- Trunk Sewer
- Sanitary Pumpstation Catchment

Data Snapshot Date: January 19, 2011
Map Created By: spung
Print Date: January 19, 2011
Printed By: spung

Note:

The information shown on this map is compiled from various sources and the City makes no warranties, expressed or implied, as to the accuracy or completeness of the information. Users are reminded that lot sizes and legal description must be confirmed at the Land Title office in New Westminster. This IS NOT a legal document, and is published for information and convenience purposes only.
© City of Richmond, 2011. All rights reserved. Not to be reproduced or distributed without permission.



Richmond, B.C.'s innovative grease discharge initiative

By Penh Tov, P.Eng



Minoru Park, Richmond, BC.

This year, restaurants in Richmond, British Columbia, can expect to be visited by a dedicated sanitary sewer bylaw enforcement officer, offering in-depth educational materials – and a friendly warning. If a restaurant continues to improperly dispose of grease, City Council will consider rescinding its business license.

This coastal city's innovative grease reduction plan also includes exploring a Grease Recycling Program to send grease to a facility that can recycle it into various end-products such as animal feed and biodiesel fuel.

"Our approach is focused on the long-term environmental sustainability of Richmond, the region, and the coastline,"

says Jim Young, the City's Manager of Engineering Design and Construction.

The cost of grease

Sanitary sewer overflows are a significant threat to public health and the environment. Essentially, liquid grease (often from restaurants) enters the sewer system, cools and solidifies in the sewer pipe. This leads to a reduced hydraulic capacity, and grease attaches to the pipe walls – the "arteries" of the system. Removal of the grease is expensive but necessary. Without removal, the system will experience blockages, resulting in flooding, a serious hazard for the municipality.

In coastal regions, there is additional concern. Grease-related overflows can end up in the Pacific Ocean and compromise fragile ecosystems.

"Proper grease control can help prevent overflows from happening in the first place," notes Young. "We want food establishments to understand that they are accountable, and that sustainability is a necessary part of their business practices."

Sustainable business practices not only protect the environment, they save taxpayers money. The City of Richmond estimates that removal of grease from sanitary sewers has been costing approximately \$311,000 annually in operations and maintenance. In addition, the Greater Vancouver Regional District (GVRD) has been spending \$40,000 to \$50,000 annually to remove grease from Richmond that ends up at the GVRD wastewater treatment plant.

The City is taking a preventative approach that targets food establishments, as it seeks new recycling options that benefit the community and the environment.

Sustainability on the coast

Located in Metro Vancouver (20 minutes from downtown), Richmond is comprised of 17 islands at the mouth of the Fraser River. With a population of more than 185,000 (and more than 750 restaurants) it has been experiencing rapid growth. Once a rural community, it is now an international centre, comprised of urban spaces, bedroom communities and surviving rural lands including many family farms.

It is where the river meets the ocean. Here is the Pacific Flyway, where birds migrate between the Arctic and South

continued overleaf...

LONE WORKER SAFETY

The wireless GEM system from Grace Industries, monitors workers and if they are rendered unconscious or incapacitated will automatically call for help.


- Sewage Treatment Plants • Water Treatment Plants
- Pumping Stations • Reservoirs
- Municipal Dump Sites
- ... Anywhere Anyone Works Alone

CALLS FOR HELP WHEN YOU CAN'T

Easily Connects To Existing Alarm Systems

CANADIAN SAFETY EQUIPMENT LTD.

For a Demonstration or More Information
800-265-0182 www.cdnsafety.com



America. The shores are an estuary border, essential for fish, birds and protected wildlife. When it comes to stormwater and wastewater management, the habitat hangs in the balance. And development is always a challenge.

Continuing development of the City, as well as construction for the 2010 Winter Olympics (including Rapid Transit and a Speed Skating Oval), have necessitated that Richmond take lasting action to prevent wastewater-related pollution. During the games, food establishments will be inundated with leftover oil, grease and solids, the leading cause of sanitary sewer overflows.

The Vancouver 2010 Committee's Sustainability Report calls upon communities to "develop wastewater management plans that focus on leading-edge technologies and practices." As a result, food establishments throughout the region have been replacing their traditional grease traps with more comprehensive grease interceptor systems that use gravity separation technologies to segregate oil, grease and sediment from wastewater.

A city's "triple bottom line"

Richmond's Grease Discharge Edu-

cation and Enforcement initiative has been developed in alignment with its Corporate Sustainability Initiative, which "promotes, facilitates and coordinates action by departments that will help create a more sustainable Richmond at the corporate and community level."

The City has been working towards "a triple bottom line", where all planning, new projects and existing practices consider environmental, social and economic impacts, rather than the "single bottom line" – immediate economics – which has tended to dominate politics in most cities.

It has developed a central sustainability team and embraced new and emerging green technologies. Richmond's goal is to become a municipal leader in sustainability, with the participation of the community, business and other sectors. Dealing with grease discharge is a big part of that equation.

Preventative education

With their budgets stretched tight, many cities do not allocate the resources to adequately monitor grease disposal and provide information on grease control. As a result, restaurants do not have

regular contact with enforcement officers, and they may pay little attention to their environmental impact. Furthermore, many restaurants are equipped with under-sized and ineffective grease trap systems, which could be replaced with high-capacity grease interceptors.

Richmond is in the process of hiring a dedicated sewer bylaw enforcement officer. The officer will be trained and equipped with educational resources, presented in a non-confrontational, easy-to-understand style. And the officer has plenty of time to answer questions and provide resources.

"The goal is not to penalize, but to educate," says Young. "Many food establishments say they want to do the right thing but they need the information. We're providing it."

A broader public education campaign is another component of the program. The City will be educating the public through a series of creative advertisements which address the proper disposal of household grease, as well as grease in the workplace.

A radical enforcement model

Many cities levy fines on non-com-

DYNASAND®

Continuous Backwash Sand Filter

For over 19 years, both municipalities and industry have chosen Parkson's DynaSand Filter over all other filters. It's a clear favourite due to its lack of moving parts, ability to handle plant upsets, and low levels of operator attention and maintenance required.

Parkson has the process know-how and experienced staff to support your filtration needs. We're the leader in continuous-cleaning sand filtration technology, with over 4,000 installations throughout North America. Call us.



PARKSON CORPORATION

...the environmental technology company

www.parkson.com • Canada@parkson.com

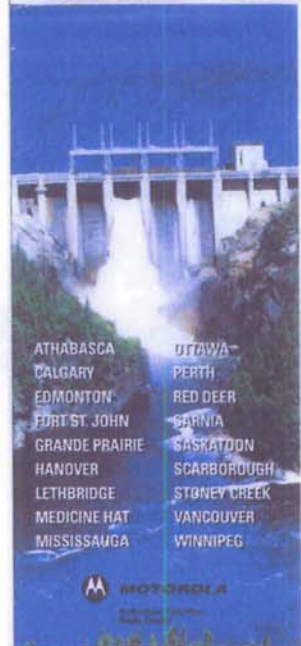
Tel 514-636-8712 • Fax 514-636-9718

205-1000 St-Jean • Pointe-Claire, QC H9R 5P1

An Axel Johnson Company



Reflecting the wireless SCADA needs of our clients.



Glentel's established VSAT network provides reliable SCADA (Supervisory Control and Data Acquisition) based monitoring and control services to the environmental engineering sector – including water and waste management.

Glentel – Communicating on a Higher Level™

- Two-Way Wireless
- Satellite Voice and Data
- Remote Monitoring
- Repeater Systems
- Broadband System Design
- Mesh Networking
- Cellular
- Tower Sites
- SCADA

SALES | RENTALS
SERVICE | 1.800.GLENTEL

GLENTEL
WIRELESS MADE SIMPLE™

www.glentel.com

MOTOROLA and the Stylized M Logo are registered in the U.S. patent and Trademark Office. All other products or service names are the property of their respective owners.

pliers (and gain revenue from these fines). But while the non-compliers pay, they don't necessarily clean up their act.

In contrast, Richmond's approach to enforcement reflects the triple bottom line approach. "We're not interested in using fines as a revenue-generating strategy," says Young. "Our goal is to increase long-term compliance."

The City has implemented a four-step model:

Step 1: The sewer bylaw officer visits the business, providing easy-to-understand information and the opportunity to ask questions.

Step 2: Follow-up inspection. The bylaw officer provides verbal warning if no grease interceptor is on the premises or if the existing interceptor is not maintained.

Step 3: After the food establishment has an opportunity to make changes, the officer follows up again. In the case of non-compliance, the City issues progressive fines.

Step 4: If all else fails, the City Council may refuse to renew the non-complier's business license.

Step 4 is a more serious penalty than

most municipalities' enforcement structures, and it serves as a powerful deterrent strategy. It sends a clear message to non-compliers: when it comes to cleaning up and enacting sustainable business practices, it's now or never.

Recycling: biodiesel and animal feed

The City is investigating the recycling and reuse opportunities for restaurant grease — often called "yellow grease" — to include recycling it into biodiesel and mixing it into animal feed. The City's goal is to establish a Grease Recycling Program where grease collected from grease interceptors can be picked up and re-used as various other end-products. A report on recycling options has been drafted and is scheduled for presentation to City Council.

In standard municipal grease recycling, yellow grease is sent to rendering plants, where it is processed and used for animal feed and other products. Some municipalities also use anaerobic "digesters" to break organic material down into biogas that can be burned to produce energy.

Richmond is one of the first cities in

Canada to explore recycling some of its yellow grease into biodiesel. Biodiesel is made by converting resources such as animal fats and plant oils into methyl esters, the chemical term for biodiesel. According to a joint US Department of Energy and Department of Agriculture study, biodiesel reduces net CO₂ emissions by 78 percent compared to petroleum diesel. It is becoming an increasingly popular alternative energy source worldwide.

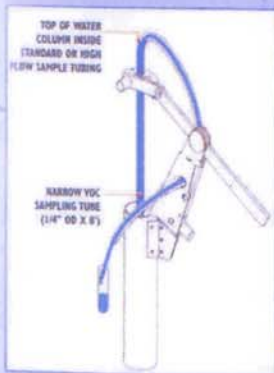
Grease recycling is a sensible solution from both an environmental and an economic standpoint. Many private recycling stations pay top dollar for grease; in a sense, dollars are being dumped down the drain when municipalities don't recycle grease. As the North Carolina Department of Environment and Natural Resources states: "Fats, oils, and greases are commodities and should be treated as valuable resources that can and should be recycled whenever possible."

Penh Tov, P.Eng., is with Green Turtle Technologies.

E-mail: infoca@greenturtletech.com

LEVER PUMP—INERTIAL PUMP ACTUATOR portable mechanical advantage

The Waterra Lever Pump — provides operators with a convenient, portable mechanism which provides some mechanical advantage when manually operating the Inertial Pump, as well as facilitating the collection of samples with this system.



- fastens onto most above ground well completions quickly and easily
- adjustable handle accommodates various casing diameters and desired stroke lengths
- tubing clamp is designed to accept both Standard Flow and High Flow tubing
- weighs approximately 7 pounds.

This actuator is the best choice for the occasional light duty user of the Inertial Pumping System.



waterra

Groundwater Monitoring Equipment & Supplies

(Canada) Waterra Pumps Limited waterra@direct.com • tel: 905.238.5242 (USA) Waterra USA Inc. waterra@openaccess.org • tel: 360.738.3366

pumps • filters • tubing • www.waterra.com • bailers • water level sensors