

## ONTARIO CENTRE FOR MUNICIPAL BEST PRACTICES

200 University Ave., Suite 801, Toronto, Ontario, M5H 3C6

### BEST PRACTICE SUMMARY REPORT

February, 2008

Water and Wastewater

### BULK WATER STRATEGY

**Abstract:**

The Region of Halton has investigated opportunities to improve the delivery of the bulk water services and developed a Bulk Water Customer Service Strategy. The goals of the strategy include increased system security and customer levels of service. An additional benefit of the strategy is improved revenue from more available stations for use and better tracking of the water taken. From a water loss perspective, the Region's new bulk water stations greatly improve the tracking of the volume of water use and what the water is being used for.

**Practice Identification:** Water and Wastewater

**Case Study Municipality:**

- Region of Halton

**Municipal Profile:**

Municipality	Region of Halton <sup>1</sup>	
Population	439,200	
Water Distribution	2,051 km of integrated transmission and distribution system with 122,790 service connections, and 24 pump stations	
Wastewater Collection	1,626 km of sanitary sewers, with a total of 120,498 sewer service connections, and 80 pump stations	
Water Treatment Plant	Population Served	Average Day Demand (ADD)
Burlington WPP	164,415	107.98 ML/day from Lake Ontario
Oakville WPP	166,613	47.56 ML/day from Lake Ontario
Wells	113,700	24.63 ML/day

<sup>1</sup> Municipal Profile is based on 2006 Data

<b>Wastewater Treatment Plants</b>	<b>Population Served</b>	<b>Annual Average Flow (AAF)</b>
Acton	10,233	4.37 ML/day
Georgetown	33,251	16.98 ML/day
Milton	58,755	11.68 ML/day
Mid Halton	83,040	35.93 ML/day
Skyway	160,303	101.92 ML/day
South East	35,312	22.16 ML/day
South West	51,592	33.92 ML/day
<b>Bulk Water Filling Stations</b>	<b>Burlington:</b> 1) 3089 Harrison Court 2) 1499 Guelph Line 3) 1100 Plains Road W	
	<b>Oakville:</b> 1) 4030 Trafalgar Rd	
	<b>Milton:</b> 1) 8189 Lawson Rd. 2) 123 Nipissing Rd. 3) 785 Santa Maria Blvd.	
	<b>Georgetown:</b> 1) 51 Todd Rd.	

### **Key Words:**

- Bulk Water, Hauler, Dispensing, Smart Card Technology, Cross Contamination, Potable, Non-Potable, Inspection.

### **Related National Benchmarking Goal(s):**

- Provide reliable and sustainable water infrastructure
- Provide sufficient quantity of water
- Meet service and performance requirements at minimum sustainable costs
- Protect public health and safety and provide high quality water
- Provide a safe and productive work environment
- Have satisfied and informed customers
- Protect the environment

### **Related Performance Measures:**

- Capital Expenditures per Station
- Operating & Maintenance Cost per Megalitre Dispensed
- Megalitres of Bulk Water Dispensed Per Year
- Seasonal and Spatial Bulk Water Consumption in Megalitres
- Each Individual Station Capacity ( $m^3/min$ )
- Maximum/Minimum/Average Utilization Rate (number of trucks/hour) for Each Individual Station
- Bulk Water Rate ( $$/m^3$ )
- Amortization Period

- # of Reported System Malfunction Events per Station per Month
- # of Reported Vandalism Events per Station, per Month
- Date and Time of Equipment Disinfection for Each Potable Water Haulage Vehicle
- Date and Time of Equipment Inspection for Each Potable Water Haulage Vehicle
- Water Sample Results for Each Potable Water Haulage Vehicle
- Infrastructure Leakage Index (ILI)

## Description of Bulk Water Strategy

### **Background**

The Region has provided services to bulk water haulers for both potable and non-potable applications since the mid seventies. Initially, the bulk water stations were primarily used by potable water haulers while the hydrant meters were used for non-potable applications. The stations were accessed by using a coin or key system which could accommodate only twelve customers.

By 2003 the Region had five permanent bulk water dispensing stations situated on the fringe of the urban areas. The rapid expansion of Halton's communities has resulted in the current dispensing locations being absorbed into the new urban development, increasing the demand for the utilization of hydrant meters. This enabled access to water in close proximity to the application sites thereby reducing haulage costs.

The Ministry of Environment noticed the increasing usage of hydrant meters caused by bulk water access difficulties and expressed their concern regarding possible contamination of the water distribution system. Subsequently, the Ministry requested that the Region implement a strategy to eliminate the use of hydrants for water dispensing.

In the mean time, the demand for bulk water continued to grow and the Region began to receive complaints about the level of service being provided. The haulers asked to improve the bulk water services to meet their business needs. Haulers cited the following issues:

- Water dispensing is not fast enough
- Insufficient number of sites to access bulk water, creating more drive time
- Not enough keys to allow everyone access to the sites
- Lineups for filling were long, resulting in excessive waiting times
- Carrying quarters is inconvenient
- Safety around the sites
- Site driveways are not long enough to permit length of lineups for service
- Truck encroachment onto sideways or into streets
- Vandalism at the sites, often putting them out of service (also robbing of quarters)
- Water theft due to insufficient access created concerns regarding system security against cross contamination

- Insufficient number of hydrant meters to meet demand

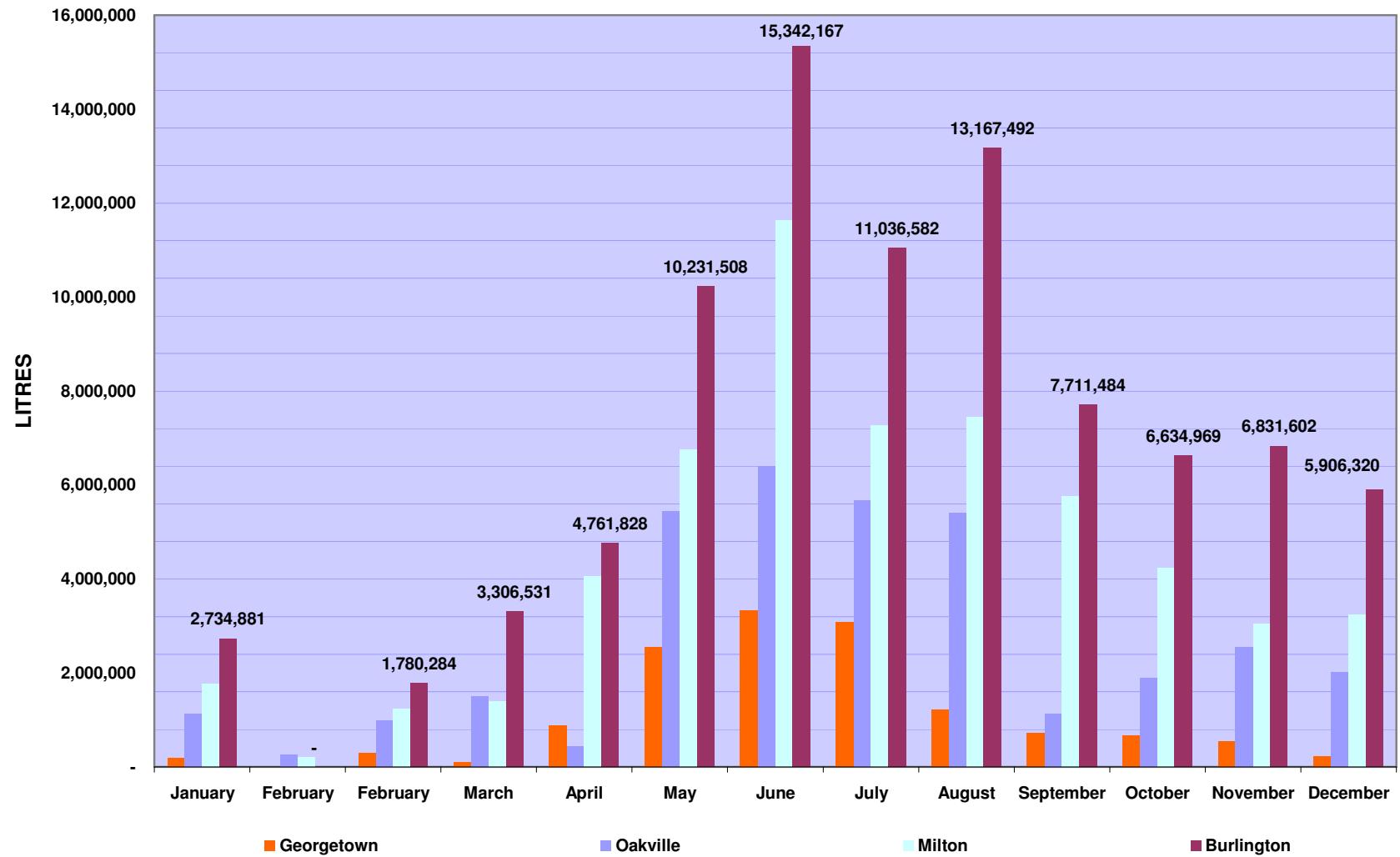
Following direction of the Ministry of Environment, to eliminate the use of hydrants as a dispensing mechanism, and based on the information and suggestions for improvements received from the haulers as well as the desire to better account for the water taken for haulage, the Region investigated the opportunities to improve the delivery of the bulk water services and developed a Bulk Water Customer Service Strategy.

### **Current Status**

The Region currently operates nine bulk water stations located throughout the area municipalities. Over 205,000 cubic meters of potable water were distributed through the bulk water dispensing stations in 2006. Bulk water stations operating in Burlington provided 46% of the total volume. Oakville stations provided 18%, Milton 29%, and Georgetown 7% respectively. The largest amount of water dispensed by a single station exceeded 42,000 cubic metres. The highest water consumption rates were observed in June, slowly declining towards the end of the summer season.

The water consumption analysis indicates a wide spectrum of industries served by the bulk water stations including both businesses and private owners. The major applications are construction, landscaping, road and sewer maintenance, farming, golf courses, club houses, pools and food processing.

The following chart demonstrates seasonal bulk water consumption by area municipality.



The Region has seen steady revenue growth from the sale of bulk water since the new bulk water stations were phased in beginning in 2001. The new systems have been instrumental in meeting an increasing demand for bulk water as the Region has continued to experience growth. The 2006 bulk water consumption report indicates increasing bulk water demand from the construction industry in particular, a trend for the past several years. As urban areas expand, more bulk water is required for private residents, landscaping, road maintenance, storm/sanitary sewer maintenance and other customers. These factors, combined with improvements made to the tracking and access of bulk water, have resulted in a steady increase in revenue in recent years. The revenue data from 2000 to 2007 is summarized as follows:

<b>Year</b>	<b>Revenue from Bulk Water sales</b>
2000	\$59,616
2001	\$80,893
2002	\$121,474
2003	\$127,300
2004	\$191,910
2005	\$333,000
2006	\$367,000
2007	\$587,640

### **Bulk Water Dispensing System**

The bulk water dispensing stations are fully assembled, pre-wired, skid mounted water dispensing systems designed and built by The Birk's Company. Birk's technology was used at various municipalities across Canada before it was adopted by the Region. Each station is a self contained water dispensing system that utilizes smart swipe card technology as a prepaid system.



Swipe cards are updated at the Region's corporate finance by individual customers. The station records consumption data, by customer, date, time, volume dispensed and site location. This information gets downloaded by operations on a monthly basis. The station can be single or dual feed to improve access (e.g. two trucks can fill at the same time) and is made up of:

- A water meter

- Heater
- All necessary wiring
- Solenoid and valves
- Stainless steel pipes and fittings
- NEMA 3R rated load centre on the exterior
- Smart Card transaction terminal
- Internal bracing, pipe supports and lifting lugs
- 3" or 2" male cam-lock coupling with a PVC "breakaway" nipple or "drive-away" hose
- 56" x 45" concrete mounting pad that sits 3" to 10" above the ground
- 120 VAC power supply

Each station is equipped with a meter and solenoid valve, which has an integrated flow control function. The Region's operator adjusts the valve's open and close speed to prevent water hammer. A maximum flow rate is set at each station based on the conditions of the area to insure accuracy of measurement and to prevent the drawing down of the pressure in the water main, which would be caused by high flow rates.

### **Smart Card System**

Water haulers can obtain bulk water through use of an automated payment system using a “smart card”. Customers can purchase the card from the Region’s office and credit \$100, \$200 or more to the card. The credits can be redeemed at any bulk water station with automated payment service option. Operation and maintenance of the Smart Card System is implemented under the Region’s Procedure “Maintaining Bulk Water Smart Card System”.

### **Collecting and Transferring Data to Halton’s Wide Area Network (WAN)**

The current business process requires regional operational staff travelling to automated dispensing station to download transaction history information to notebook computers. The information is then forwarded to Finance for reconciliation with the smart card sales data that is generated during the purchase of bulk water dispensing credits at the Regional Center. To shorten the data reconciliation process and provide Finance with real time direct access to billing information as well as to provide remote real time error reporting and diagnostic capabilities to Plant Operations, the Region proposes to connect the existing stations to the Region’s Wide Area Network (WAN).

### **Inspection Standards**

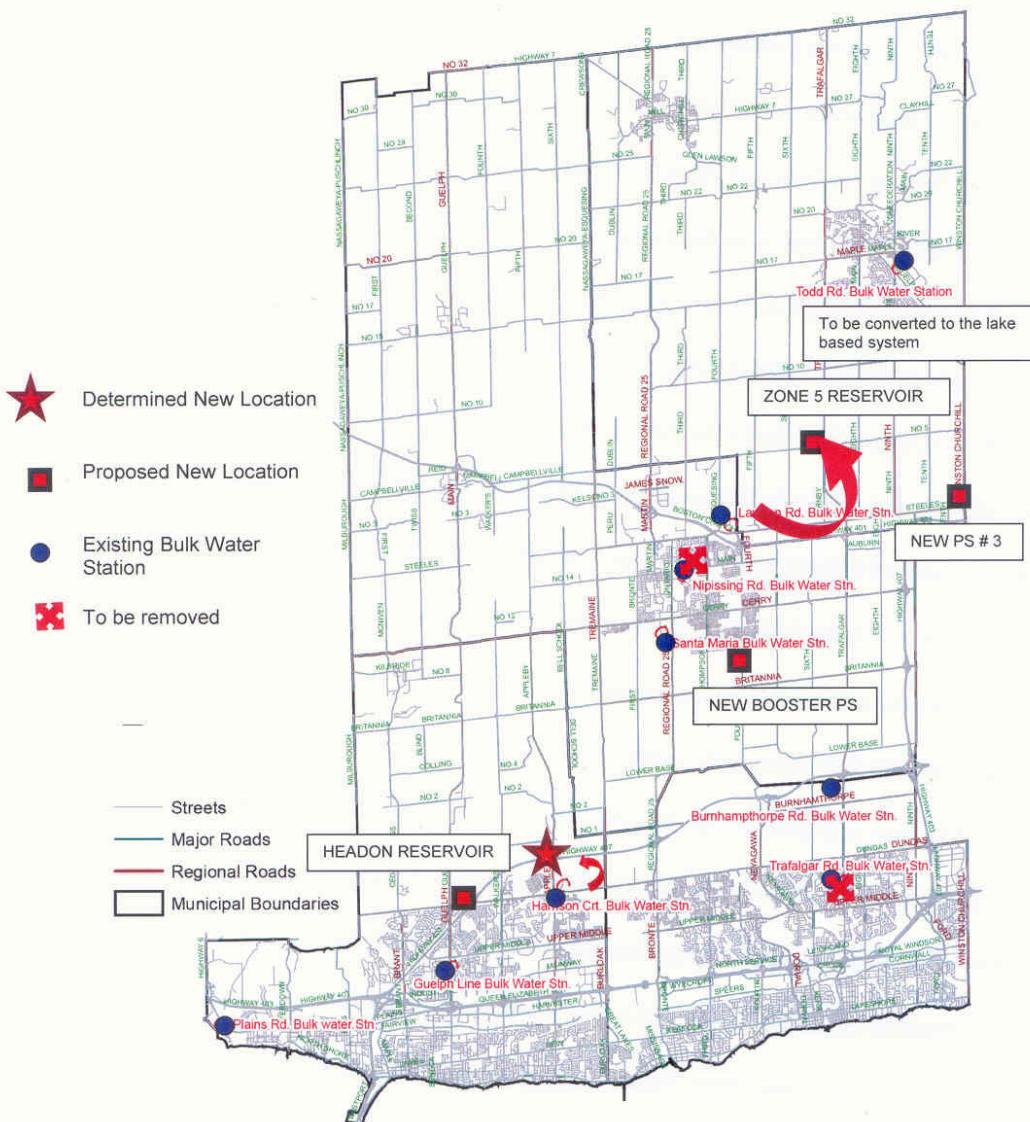
Each truck used for potable water haulage is required to be inspected regularly. The quality of the water hauled must also be tested. The requirement for inspection and water quality testing of potable water hauler trucks originates from Ministry of Health Regulated Guidelines. As of 1991 all water hauler trucks are subject to inspection in accordance with the Ministry’s Drinking Water Haulage Guidelines. As of 1992 all potable water is subject to quality testing. Since then, the Region’s Health Department has instituted a program to perform annual inspection of the trucks and regular quarterly sampling of the tanks for water quality. The Region requires all potable water haulers to

follow the directives provided by the Health Department and operating standards outlined in the Ministry of Health Drinking Water Haulage Guidelines.

## **Development of Bulk Water Customer Service Strategy**

The Bulk Water Customer Service Strategy was developed to enable the cost effective provision of bulk water services, meet stakeholder requirements and ensure protection of human health and the environment. The projected demand for bulk water dispensing is based on Regional historical water distribution data and includes spatial (area municipality) and temporal (time of day, seasonality) distributions. The following map shows existing bulk water stations and proposed new locations.

## **Existing Bulk Water Stations and Proposed New Locations**



The strategy provides a customer base that includes:

- Industries serviced (potable water, construction, landscape, agriculture, etc.)
- The percentage use by industry (annual and seasonal),
- Planning estimates for future demand through 2031
- A map of the current and planned distribution of bulk water dispensing demands including current and proposed bulk water dispensing sites.

The preferred bulk water dispensing sites have been proposed based on the distribution of demand, capability of existing facilities and associated distribution systems, customer requirements, administrative and operational issues, land use, and the social, economic and environmental conditions including traffic, pollution, and costs to the customers.

Design requirements and cost estimates are recommended for a phased implementation of the preferred solution considering preferred locations, permanent or temporary status of each dispensing station, security and accessibility of the stations, identification of bulk water haulers, monitoring of bulk water volumes, on-site containment for spilt water.

As mentioned above, the Region currently operates nine bulk water dispensing stations. Seven existing stations utilize a pre-paid card reader technology and two remaining stations operate on coins. Permanent stations, are aligned with other assets such as elevated tanks, reservoirs, linear infrastructure, access roads and power supply, while temporary stations have been constructed on the ‘right of way’ of area roads. Temporary stations have been used to deliver services during the build out of the urban envelope and removed when occupancy begins in these areas.

The customer requirements for bulk water servicing are tied to development related activities, namely construction, and are tied to the location of suitable water distribution infrastructure, as such aligning the bulk water servicing strategy with the Master Plan.

### **Site Screening Criteria**

The preferred dispensing sites for future bulk water installations are identified based on the bulk water usage and demand, capacity of the distribution system, close proximity to the existing lake based water mains, customer requirements, operational and maintenance requirements, land usage, environmental conditions including traffic, pollution and costs to the customers. The site screening criteria are:

- Impact on the existing water supply system during the peak hour operations.
- Suitably sized services to prevent excessive pressure drop.
- Existing and planned adjacent land usage (farm land, industrial, residential, obstructions).
- Access roads.
- Suitable to permit 24/7 operation of heavy trucks during operating season.
- Suitable for traffic volumes anticipated.
- Storm sewer availability and capacity.
- Spilt chlorinated water containment released during truck filling operation.
- Power and Wide Area Network availability.
- Suitable services to permit remote data acquisition, and provide for electrical supply.
- “Dead End” watermains.

- Consideration of the need and benefit of using temporary or permanent stations to promote water demand at large dead-end.
- Seasonal demand and usage variations.
- Consideration of a mix of seasonal and year-round sites, due to significant seasonality shown in consumption data.
- Determine a need for both temporary and permanent stations.

### **Dispensing System Screening Criteria**

The bulk water dispensing system is required to meet the following design criteria:

- Fully assembled, pre-wired, and skid mounted water dispensing system.
- Smart Card technology with remote access for data acquisition via the Region's Wide Area Network.
- Provisions for spillage collection and containment during cold and normal weather conditions.
- Provisions to prevent freezing of spilt water to address operational and safety issues at year round sites.
- Provisions to eliminate the potential for cross contamination of potable and non-potable water connections.
- Provisions for at least two vehicles to be simultaneously serviced, considering staging of vehicles onsite.
- Provisions for fencing, signage, lighting, points of failure.
- Capital and Operating Cost Estimate.
- Preliminary site design, including footprint, layout, and budget estimates for construction, maintenance and operation to be included.

### **Relation to the Master Plan**

The Master Plan determines the anticipated bulk water demand, usage, required funding, potential revenue, property acquisition requirements and other resources that might be needed to provide cost effective services to the public. The data are grouped by geographic areas, municipal subdivisions and industry type for the whole Region throughout the planning period.

### **Liaison with Bulk Water Users**

A number of options such as mail, phone line or internet are available to the bulk water users should they require further information on the current status of the bulk water program. The Region's web site includes technical details, location map, hours of operation, payment options and rates, inspection and testing requirements, as well as contact information and customer feedback hot line. Technical support is provided by the Region's Operation staff during normal business hours.

## **Benefits**

- Reductions in potential cross contamination.
- Automatic billing through a card system.
- Bulk water supply closer to the demand.
- Reduction in unauthorized use and theft of water as hydrants are not used for bulk water draws on the system.
- Increased revenue from the sale of bulk water.
- Public satisfaction.

## **Effectiveness**

The Region's Bulk Water Customer Strategy is a valuable tool in providing cost effective solution while delivering high-quality, efficient and effective services to the public. The strategy strengthens the Region's accountability, improves the planning and budget process and assures that customer expectations have been met. The strategy assures both economic and environmental sense. From a water loss perspective, the Region's new bulk water stations greatly improve the tracking of water used from bulk water haulers and better manage what the water is being used for.

## **Community or Environmental Outcomes**

The public is being informed about the Region's strategy in delivering bulk water services and bulk water services are available to those that require them for a variety of community needs. By implementing new bulk water stations throughout the Region and moving away from the use hydrants for water dispensing, the potential for cross contamination of the water distribution system was removed and the efficiency of delivering bulk water was improved.

## **Replication of the Case Study**

The Bulk Water Customer Service Strategy can be adopted by municipalities that experience growing demand in bulk water services and are looking for an effective customer service tool as well as a means to better manage and account for the volumes of water that are being designated for bulk water use.

## **Other OMBI Members that have implemented this practice:**

Municipalities that have implemented bulk water strategies include the Cities of Thunder Bay, Greater Sudbury, and the Region of Peel.

## **Contacts**

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