



CITY OF HAMILTON

CORPORATE SERVICES DEPARTMENT
Financial Planning and Policy Division

PUBLIC WORKS DEPARTMENT
Environment and Sustainable Infrastructure Division

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| TO: Mayor and Members General Issues Committee | WARD(S) AFFECTED: CITY WIDE |
| COMMITTEE DATE: December 2, 2011 | |
| SUBJECT/REPORT NO: Private Fire Lines (FSC11099/PW11085) (City Wide) | |
| SUBMITTED BY: Roberto Rossini General Manager Finance and Corporate Services Gerry Davis, CMA General Manager Public Works | PREPARED BY: John Savoia (905) 546-2424 Ext. 7298 Dan McKinnon (905) 546-2424 Ext. 5941 |
| SIGNATURE: | |

RECOMMENDATION

- (a) That the proposed 2012 Private Fire User Fees be approved effective July 1, 2012, as per Appendix "A" to report FCS11099/PW11085;
- (b) That the City Solicitor and Corporate Counsel be authorized and directed to prepare all necessary by-laws, for Council approval, respecting the 2012 private fire line user fees as set out in recommendation (a) of report FCS11099/PW11086;

- (c) That staff communicate with affected property owners regarding the implementation of Private Fire User Fees before the July 1, 2012 effective date.

EXECUTIVE SUMMARY

Since the late 1990's, Council has strongly supported the overall goal of achieving a sustainable level of funding to support water and wastewater activities thereby, ensuring the protection of the health of citizens, property and the environment. The concepts of user pay and full cost pricing are key elements that support this goal of financial sustainability.

Fire protection service differs from other services provided by the City's water/wastewater utility. Essentially, it is a standby service that is made available principally to Industrial/Commercial/Institutional (ICI) customers on demand. Although most fire hydrants and sprinkler connections are rarely used, the City must be ready to provide adequate water quantities and pressures, at all times, throughout the distribution system. The costs associated with maintaining the supply, treatment, pumping, storage and distribution capacity for fire protection services include annual operating and maintenance and capital costs invested in facilities that are sized larger than necessary for non fire-fighting purposes. A water system that provides reliable water at a high pressure and volume can be the difference between saving and losing a building due to fire.

A proportionate share of the public fire protection system is funded by ratepayers that use the City's water supply. The most visible part of the fire protection system to ratepayers is the street fire hydrant. Beyond that, fire hydrants are supported by a complex system of pumps, pipes and water reservoirs to provide water at sufficient pressure and quantity to that fire hydrant. This includes maintaining sufficient water treatment capacity to provide adequate amounts of treated water to supply both the domestic needs of customers but also the public fire protection needs of citizens and businesses, as well as, adequately sized water mains, booster pumps and storage facilities.

A Private Fire Protection is any fire protection system supplementing or in addition to the public fire protection system (public fire hydrants and supporting infrastructure) that relies upon the public water system for its water supply. Private fire protection can be in the form of booster pumps, sprinkler systems, private fire hydrants or any other system that relies on the public water system for supply with the designed purpose of fire protection and suppression.

The water supplied to the Private Fire Protection system can come from a separate water line that is not required to be metered, dedicated only to the private fire protection/suppression system which is simply known as a *fire line* (refer to Figure 1 under the Historical Background section of this report FCS11099/PW11085 for an illustration). The supply for private fire protection/suppression can also be in the form of

a water line that supplies both the domestic needs of the customer, as well as, the fire protection needs. This type of servicing for a fire protection/suppression system is known as a *combined fire line* and is required to be metered per the City's Waterworks Bylaw R84-026, as amended (refer to Figure 2 under the Historical Background section of this report FCS11099/PW11085 for an illustration).

Customers can rely on the Public Fire Protection system for their fire protection needs which is funded through water rates. However, currently, there is no fee where a customer requires additional fire protection for their property supplied through a dedicated unmetered fire line, in the form of a sprinkler system or other fire suppression system relying on the public water supply for its water supply. Those private fire protection systems provided through combined fire lines are metered and pay normal metered water/wastewater user fees for this service.

The recommended Private Fire Line Rates attached as Appendix "A" to Report FCS011099/PW11085 is premised on "Fairness and Equity."

The principle of Fairness and Equity is to ensure that consumers are contributing equitably in proportion to the cost of the systems with user fees to be non-discriminating between customers and user sectors. As such, those customers with a private fire protection system supplied by an unmetered fire line should be contributing towards the costs associated with providing the available service. This should be done so that the beneficiary of the Private Fire Protection system is paying their fair share for the public water system support of their private fire protection/suppression system. Recently, there have been commercial customers who have private fire protection systems serviced by metered combined fire lines, who have raised fairness issues; specifically that competitor businesses are not paying a fee for their private fire protection system simply because their systems are serviced by unmetered fire lines for which currently there is no fee.

The proposed private fire line fees relate only to those permanent private unmetered connections which are principally ICI accounts which serve the purpose of supplying water to private fire protection systems such as automatic sprinkler systems, standpipes and private hydrants.

The private fire line fee is essentially a "readiness to serve charge" or alternatively a "fire fighting availability charge" reflecting the intent to recover costs associated with the additional capacity required to provide a standby service that is available on demand. The fee also takes into account the ultimate replacement of the related oversized infrastructure requirements. Additionally, the private fire line fee seeks to recover costs related to quantities of water used for testing sprinklers, private hydrants, check valves and other backflow prevention devices. The inspection and maintenance of street valves serving private unmetered fire lines represents an important service.

Alternatives for Consideration – See Page 9

FINANCIAL / STAFFING / LEGAL IMPLICATIONS (for Recommendation(s) only)

Financial: The recommended private fire line fees are expected to generate approximately \$420,000 annually towards the Rate Supported Budget. Given the recommended effective date of July 1, 2012, \$200,000 has been included within the 2012 Rate Supported Budget.

Staffing: No impact.

Legal: Recommendation (b) of Report FCS11099/PW11085 relates to By-laws requiring Council approval, respecting the implementation of 2012 private fire line fees set out in recommendation (a) of Report FCS11099/PW11085.

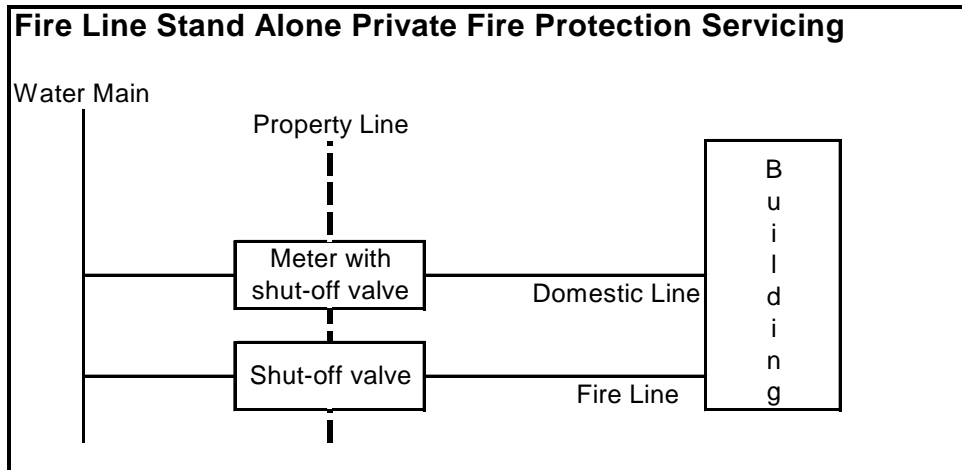
HISTORICAL BACKGROUND (Chronology of events)

The City currently provides service for some private fire protection systems by providing an unmetered fire service connection to the water main in the street currently at no charge.

A private fire protection system is any fire protection system supplementing or in addition to the public fire protection system (public fire hydrants and supporting infrastructure) that relies upon the public water system for its water supply. Private fire protection can be in the form of booster pumps, sprinkler systems, private fire hydrants or any other system that relies on the public water system for supply with the designed purpose of fire protection and suppression.

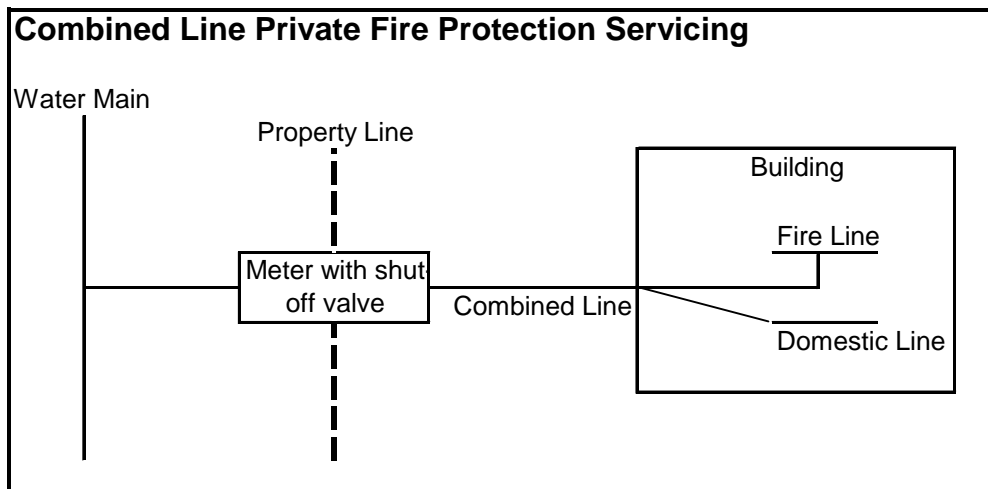
The water supplied to the Private Fire Protection system can come from a separate water line that is not required to be metered, dedicated only to the private fire protection/suppression system which is simply known as a *fire line*. Figure 1 of Report FCS11099/PW11085 provides an illustration of a typical private fire line protection system supplied by an unmetered fire line service.

FIGURE 1



The supply for private fire protection/suppression can also be in the form of a water line that supplies both the domestic needs of the customer, as well as, the private fire protection needs. This type of servicing for a fire protection/suppression system is known as a *combined fire line* and is required to be metered per the City's Waterworks Bylaw R84-026, as amended. Figure 2 of Report FCS11099/PW11085 provides an illustration of a typical private fire line protection system supplied by a combined service line.

FIGURE 2



Private fire protection systems supplied by a fire line provide the customer with enhanced benefits by having a dedicated, on-demand connection to the City's public system. This connection is in addition to the metered service and is often larger than the metered service. Private fire systems that are connected to a metered supply (combined line) would not receive a separate bill for the fire protection system as the

cost for the service is included in the existing base charge and volumetric rate for the metered connection.

The flow in unmetered private fire protection systems is not metered and customers are not billed based on quantity of water used. When activated, they are in addition to the public fire hydrants and place added demands on the water system.

The adoption of a private fire line rate would address an inequity that exists between those customers who have private fire protection systems who pay for the public water supply to their system if supplied through a metered combined line versus those customers who do not pay at all for the public water supply to their system if supplied through a unmetered fire line.

The proposed private fire line fees relate only to those permanent private unmetered connections to the main for the purpose of supplying water to private fire protection systems such as automatic sprinkler systems, standpipes and private hydrants.

The private fire line fee is intended to recover costs that may include, but may not be limited to the following:

- Operations and maintenance cost of certain portions of the City's water distribution system that support private fire protection systems such as the inspection and maintenance of street valves that support unmetered fire lines and the public portion of the unmetered fire line
- Water that is utilized for ongoing inspections of private fire systems
- Ultimate replacement of the utilities portion of the unmetered fire line service connection (many are located under City street and sidewalk infrastructure)

POLICY IMPLICATIONS

None identified.

RELEVANT CONSULTATION

Contact was made with a number of municipalities that currently have private fire line fees in order to understand the development of such a fee.

In advance of the July 1, 2012 effective date for the recommended fire line user fees, communication will occur with affected property owners.

ANALYSIS / RATIONALE FOR RECOMMENDATION

(include Performance Measurement/Benchmarking Data, if applicable)

A literature review conducted by staff, has determined that the most common method of charging for a unmetered private fire service is to base the charge on the size of the customer's fire service connection. The service size is the best measure of the demand that can be put on the City's water supply system in the case of fire. A private fire line connection is like any other connection to the system except that it most likely will have minimal water consumption.

A base charge for private fire line service is established for the smallest line size typically 25mm (1 inch). To adjust the base charge for larger service lines, it is necessary to use the relationship between pipe size and its capacity. This relationship was reviewed, based on recommendations by the American Water Works Association (AWWA) and indicated that the allocation by pipe size can be done in one of two ways:

- i) based on the basic relationship between pipe diameter and cross sectional area (area is related to the square of the diameter i.e. power of 2.0); or
- ii) one which also factors in pipe characteristics (capacity is equal to the diameter to a power of 2.63).

For ease of understanding, the relationships are calculated so that a 1-inch pipe (25-mm) has a factor of 1 and the other sizes are calculated relative to this using the power relationship. The factors based on the two methods are as shown below:

Pipe Flow Factors for Allocating Fire Protection Costs by Service Size

| Fire Line Size | | Pipe Flow Factor | |
|-----------------------|-----|-------------------------|-----------|
| inches | mm | Power 2.63 | Power 2.0 |
| 1 | 25 | 1.0 | 1.0 |
| 1.5 | 38 | 3.0 | 2.3 |
| 2 | 50 | 6.2 | 4 |
| 3 | 75 | 18.0 | 9 |
| 4 | 100 | 38.3 | 16 |
| 6 | 150 | 111.3 | 36 |
| 8 | 200 | 237.2 | 64 |
| 10 | 250 | 426.6 | 100 |

It is recommended that the alternative of Power = 2.0 method be used. It has the advantage of being based on a well-understood principle that flow is directly related to the area of the pipe.

Table 1 of Report FCS11099/PW11085 provides the fixed fire line monthly charge progressive based on size of connection that is being recommended. For services that

200mm or larger, a cap has been recommended so that those services are charged the same rate with the most common size of 100mm equating to an annual cost of \$576.

TABLE 1

| 2012 City of Hamilton Private Fire Line Rates - Unmetered | | | | | | |
|--|--------|-------------------------|---------------------|--------------------------------|---------------------------------|-----------------------------------|
| Size of Connection | | Pipe Flow Factor | Monthly Rate | Number of Connections * | Projected Annual Revenue | Annual Cost Per Connection |
| mm | inches | | | | | |
| 25 | 1 | 1 | \$ 3.00 | 0 | \$ - | \$ 36 |
| 38 | 1.5 | 2.3 | \$ 6.90 | 0 | \$ - | \$ 83 |
| 50 | 2 | 4 | \$ 12.00 | 0 | \$ - | \$ 144 |
| 75 | 3 | 9 | \$ 27.00 | 45 | \$ 14,580 | \$ 324 |
| 100 | 4 | 16 | \$ 48.00 | 201 | \$ 115,776 | \$ 576 |
| 150 | 6 | 36 | \$ 108.00 | 20 | \$ 25,920 | \$ 1,296 |
| 200 | 8 | 64 | \$ 192.00 | 97 | \$ 223,488 | \$ 2,304 |
| 250 | 10 | 100 | \$ 192.00 | 7 | \$ 16,128 | \$ 2,304 |
| 300 | 12 | 144 | \$ 192.00 | 10 | \$ 23,040 | \$ 2,304 |
| | | | Total | 380 | \$ 418,932 | |

* Based on current Hansen inventory

In some cases, the fire line data inventory within the Hansen system will have to be verified to ensure accuracy and, as such, it is recommended that the Private Fire Line Rate be effective as of July 1, 2012. Based on the current inventory data, a review was completed to identify by customer type that have unmetered private fire lines with Table 2 of Report FCS11099/PW11085 providing this break-down:

TABLE 2

| Unmetered Private Fire Line by Customer Type | Typical Connection Size |
|---|--------------------------------|
| Commercial/Industrial | 45% 100mm Com/150-300mm Ind |
| Multi-residential | 26% 150mm |
| Institutional | 16% 150-200mm |
| City facilities | 13% 150-300mm |
| Total | 100% |

In developing the base charge, consideration is given that the unmetered fire service line would have no meter related costs (reading and repair/replacement of meters) and that providing an unmetered service line to the customer is with the anticipation that minimal water will be used only for testing sprinklers, private hydrants, check valves and

other backflow prevention devices. Additionally, staff did review unmetered private fire line fees in other jurisdictions where they exist.

Table 3 of Report FCS11099/PW11085 provides comparisons of the recommended unmetered private fire line fee to the City’s metered fixed charge (progressive base on meter size) and to private fire line fees in some other jurisdictions. Notably with the exception of Durham, most utilities appear to not have fully considered AWWA guidelines to adjust their base private fire line charge by service line size. It should also be noted, that some municipalities do not have a private fire line charge but require all service lines to be metered. The option to meter dedicated fire line services is reviewed further under the Alternatives for Consideration section of this report.

TABLE 3

| Proposed Fire Line Rate Comparisons | | | | | | | | |
|-------------------------------------|--------|--------------------------------|---------------------|--|-----------|-------------|-----------|------------|
| Size of Connection | | Hamilton Fixed Monthly Charges | | Comparator Unmetered Private Fire Line Rates (Monthly) | | | | |
| mm | inches | Metered | Unmetered Fire Line | Durham | Hanover | Thunder Bay | Cleveland | Newark, NJ |
| 25 | 1 | \$ 44.55 | \$ 3.00 | \$ 9.51 | \$ 15.75 | \$ 7.14 | \$ 10.39 | \$ 10.84 |
| 38 | 1.5 | \$ 49.49 | \$ 6.90 | \$ 12.79 | \$ 15.75 | \$ 10.86 | \$ 10.39 | \$ 10.84 |
| 50 | 2 | \$ 58.85 | \$ 12.00 | \$ 24.76 | \$ 31.50 | \$ 14.29 | \$ 10.39 | \$ 10.84 |
| 75 | 3 | \$ 101.95 | \$ 27.00 | \$ 43.50 | \$ 31.50 | \$ 21.43 | \$ 10.39 | \$ 20.65 |
| 100 | 4 | \$ 130.58 | \$ 48.00 | \$ 87.02 | \$ 47.25 | \$ 28.58 | \$ 28.27 | \$ 36.71 |
| 150 | 6 | \$ 231.06 | \$ 108.00 | \$ 116.82 | \$ 110.25 | \$ 42.86 | \$ 40.74 | \$ 77.60 |
| 200 | 8 | \$ 398.98 | \$ 192.00 | \$ 160.67 | \$ 157.50 | \$ 57.15 | \$ 72.75 | \$ 133.52 |
| 250 | 10 | \$ 614.22 | \$ 192.00 | \$ 427.20 | \$ 157.50 | \$ 71.44 | \$ 113.91 | \$ 196.96 |
| 300 | 12 | N/A | \$ 192.00 | \$ 602.33 | \$ 236.25 | \$ 85.73 | \$ 155.48 | \$ 290.42 |

ALTERNATIVES FOR CONSIDERATION

(include Financial, Staffing, Legal and Policy Implications and pros and cons for each alternative)

Alternative – Meter All Water Service Lines

Requiring all service lines (domestic, fire service or combined) to be metered would represent an alternative to allowing unmetered fire service lines. One major concern for water utilities is the possibility of a customer making a connection to the private unmetered fire service line either by mistake or intentionally, and taking water from the fire service. Unauthorized connections to unmetered fire lines do exist and pose an enforcement problem to water utilities. By installing a meter on the dedicated fire line then all water usage is measured and typically billed at regular metered water rates with the provision to adjust volumetric billings where water is used for actual fire fighting purposes.

The option of metering fire service lines is not recommended for the following reasons:

- (1) To require metering for existing fire suppression systems located inside a building would create significant issues as these systems have been designed to operate at existing operating pressures. To meter such existing situations would involve re-engineering the entire private system posing prohibitive costs for affected property owners. To meter an existing fire service that only consists of fire hydrants would not create such issues. Requiring metering for all fire suppression systems at the design stage on new construction would be a more acceptable alternative but not recommended at this time per items (2) and (3) below.
- (2) Fire rated water meters are generally more expensive than regular water meters and the cost to install them (often in chambers at the property line as is done with some meters for domestic or combined water service lines) would be costly even for new development situations that could alleviate the issue raised in item (1) above.
- (3) The City is actively reviewing the adoption of electronic read metering (commonly referred to as an automated meter reading (AMR) system) that would incorporate sub-metering within the distribution system in a manner that would allow enhanced monitoring of water consumption so that unauthorized use would be easier to detect.

CORPORATE STRATEGIC PLAN (Linkage to Desired End Results)

Focus Areas: 1. Skilled, Innovative and Respectful Organization, 2. Financial Sustainability, 3. Intergovernmental Relationships, 4. Growing Our Economy, 5. Social Development, 6. Environmental Stewardship, 7. Healthy Community

Financial Sustainability

- ◆ Financially Sustainable City by 2020
- ◆ Delivery of municipal services and management capital assets/liabilities in a sustainable, innovative and cost effective manner
- ◆ Full life-cycle costing for capital

APPENDICES / SCHEDULES

Appendix “A” to Report FCS11099/PW11085 – 2012 Private Fire Line Rates

City of Hamilton 2012 Private Fire Line Rates

Unmetered Service

| Size of Connection | | Monthly Rate |
|--------------------|--------|--------------|
| mm | inches | |
| 25 | 1 | \$ 3.00 |
| 38 | 1.5 | \$ 6.90 |
| 50 | 2 | \$ 12.00 |
| 75 | 3 | \$ 27.00 |
| 100 | 4 | \$ 48.00 |
| 150 | 6 | \$ 108.00 |
| 200 | 8 | \$ 192.00 |
| 250 | 10 | \$ 192.00 |
| 300 | 12 | \$ 192.00 |