TORONTO

STAFF REPORT
ACTION REQUIRED

Water Meter Program - Final Report

Date:	November 2, 2015
To:	Public Works and Infrastructure Committee
From:	General Manager, Toronto Water
Wards:	All
Reference Number:	P:\2015\Cluster B\TW\PWI15023

SUMMARY

The purpose of this report is to respond to a request from City Council to provide additional status reporting for large capital projects. The Water Meter Program, also known as the Water Meter Replacement and Automated Meter Reading (AMR) System project, is a large capital project that resulted in the installation of new automated meters in almost every home and business in the city.

The project implementation period began in 2010 and is nearing final completion. The City's agreement with Neptune Technology Group (Canada) Limited to deliver the project achieved substantial performance in March 2015, approximately nine months ahead of schedule and the total projected expenditures are forecasted to be $168 million or 77% of the $219 million upset limit.

The financial benefits to the City are expected to be approximately $32.8 million per year (i.e. $27.8 million in revenue recovery and $5 million in operating savings). The benefits associated with automated meter reading technology will be the ability to monitor consumption levels on a property-by-property basis, and to use this consumption data to potentially assist in leak detection. In early 2016, the City will be launching a new on-line water use application that will provide consumers timely information that can help them better understand and manage their individual water use.

RECOMMENDATIONS

The General Manager, Toronto Water recommends that:

1. The Public Works and Infrastructure Committee receive this report for information.

Financial Impact

There are no financial implications to the City as a result of this report.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

At its meeting on June 23 and 24, 2008, during consideration of report PW16.12 entitled "Request for Proposal (RFP) 0713-08-0001: Water Meter Replacement and Automated Meter Reading System", City Council authorized:

a. the General Manager of Toronto Water and the Treasurer to negotiate and enter into an agreement, in a form satisfactory to the City Solicitor, with Neptune Technology Group (Canada) Limited in the total amount of $191,756,663.14, net of GST including provisional items for the project; and
b. An upset limit of funds required to finance the project be set at $219 million (net of GST), including contingency, provisional item and inflationary indexing for labour and materials over the implementation period of six years.

A copy of the Council decision related to this item is available at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2008.PW16.12

At its meeting on November 27, 28 and 29, 2012, during consideration of report AU9.7 entitled “A Mid-Term Review of the Union Station Revitalization: Managing Risks in a Highly Complex Multi-Year, Multi-Stage, Multi-Million Dollar Project”, City Council requested the Deputy City Manager and Chief Financial Officer to implement additional status reporting for large capital projects including:

a. Additional detail in capital budget and capital variance reports; and
b. Separate status reporting to City Council for large capital projects.

A copy of the Council decision related to this item is available at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.AU9.7

At its meeting on November 13, 14, 15 and 18, 2013, during consideration of report PW26.3 entitled "Update on the Water Meter Program", City Council adopted the report with amendments.

A copy of the Council decision related to this item is available at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PW26.3

At its meeting on December 16, 17 and 18, 2013, during consideration of report EX36.17 entitled "2014 Rate Supported Budgets - Toronto Water and 2014 Water and Wastewater

Rates and Service Fees", City Council adopted amendments to Chapter 441 – Fees and Charges, Appendix D, Schedule 2, Water Services effective July 1, 2014 to include:

a. a new manual water meter reading fee of $80 per visit for consumers with water meters refusing to allow the installation of a new automatic water meter; and
b. a new flat rate legacy fee of $1,020 per year for residential flat rate consumers who refuse to allow the installation of an automatic water meter on their property.

A copy of the Council decision related to this item is available at:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX36.17

ISSUE BACKGROUND

The City of Toronto is nearing completion of a mandatory water meter program that has replaced or installed new automated water meters in almost every home and business in the city to provide a standardized system for all Toronto Water customers. The City has provided meters to those who were previously on a flat rate system and replaced old existing meters with more efficient and up-to-date technology. As a result, those customers with the updated meter technology will benefit from improved accuracy in the measurement of the water they use and are charged for.

This new technology integrates all water meter reading, data storage and billing operations across the City of Toronto. Each water meter across the City sends data wirelessly via radio, up to four times a day in less than ¼ second transmissions, to a series of collection units. The data is then sent to a central server, which allows for fast, secure access and storage of all information. All data contains only the water meter serial number and consumption data. No identifiable property owner information is transmitted. The radio frequency used by the transmitter is a frequency licensed by the federal government on which only Toronto water meters can operate.

The new system tracks water consumption across the city, indicates unusually high water consumption patterns which may suggest water loss at a property and eliminates the need for City staff to go into homes to obtain water meter readings. It also provides environmental benefits associated with the more efficient use of water. Being aware of water use - and therefore being able to use water more efficiently - leads to benefits for all Torontonians.

The program has been rolled out on a ward-by-ward basis over a six-year period, beginning in 2010 and ending in 2015.

At its meeting on November 27, 28 and 29, 2012, during consideration of report AU9.7 City Council requested the Deputy City Manager and Chief Financial Officer to implement additional status reporting for large capital projects. Given that the water meter program is a large capital project that is nearing final completion, Toronto Water is providing this second and final status update report.

COMMENTS

1. Overall Project Status

The scope of work under the water meter replacement program involved the installation of new automated meters for approximately 476,300 water accounts. At the start of the project, there were approximately 66,100 flat rate accounts and 410,200 accounts with existing meters that required replacement. Of the 410,200 existing metered accounts, 393,200 were associated with small meters and 17,000 with large meters. A water meter is considered large if the water supply opening diameter is 37mm or more.

The first new water meter installation occurred in April 2010. As of August 31, 2015, 469,300 water meters have been installed or retrofitted with a transmitter under the program representing 99% of the total 476,300 water accounts. There are 7,000 water meters remaining to be installed or retrofitted. Approximately 1,500 of these meters will be completed this year; 2,000 are on unoccupied properties. For those owners who have failed or refused to complete their updated automated meter installations 2,400 accounts will pay an additional fee for manual meter reading and 1,100 accounts will pay an additional charge for unmetered water service. The City's agreement with Neptune Technology Group (Canada) Limited for the project achieved substantial performance in March 2015, approximately nine months ahead of the planned completion date of December 31, 2015.

Table 1 below provides a summary of the water meter installations completed each year since the start of the project until now, as well as the remaining installations still to be completed.

Table 1: Summary of Water Meter Installation Progress

No. of Meters	Flat Rate Accounts	Metered Accounts (Small Meters)	Metered Accounts (Large Meters)	Total Water Accounts
Total to be Installed	66,100	393,200	17,000	476,300
Completed in 2010	1,700	400	300	2,400
Completed in 2011	17,000	23,700	5,700	46,400
Completed in 2012	29,300	70,100	5,400	104,800
Completed in 2013	13,000	128,500	3,800	145,300
Completed in 2014	3,500	145,300	1,100	149,900
Completed in 2015	500	19,700	300	20,500
Total Completed	65,000	387,700	16,600	469,300
Total % Completed	**98%**	**99%**	**98%**	**99%**
Total Remaining	**1,100**	**4,600**	**400**	**7,000**

The agreement with Neptune Technology Group (Canada) Limited does not expire until the end of 2016. In the interim, Neptune will maintain their call centre and a small number of field staff to allow customers to book installation appointments and to call regarding any installation warranty issues. In 2016, Toronto Water will continue to

pursue the estimated 5,500 remaining accounts in order to install new water meters. To achieve compliance, Toronto Water will employ more direct engagement, increased and pro-active by-law enforcement as well as continued application of manual meter reading fees, legacy fees and other cost recovery measures.

2. Budget / Financial Status

In 2008, the project upset limit was set at $219 million, which is comprised of $191.8 million for the agreement with Neptune Technology Group (Canada) Limited, $12 million for inflationary indexing of labour and materials, and $15.2 million for the project contingency.

As of August 31, 2015, the total project expenditures under the agreement with Neptune were $160 million or 73% of the $219 million upset limit. The remaining expenditure required to complete the project are anticipated to be $8 million, which will be used for the remaining installations, purchase of water meter inventory, data management software and close-out costs.

Therefore, the total projected expenditures are forecasted to be $168 million or 77% of the $219 million upset limit. Most of the $51 million difference between the forecasted total and the upset limit is due to less extensive installation work associated with large meters than was originally anticipated, and lower than anticipated commodity and labour prices.

Table 2 below provides a summary of the forecasted project expenditures as originally reported in 2008 when Council authorized the agreement with Neptune. The table also provides a summary of the annual expenditures since the start of the project until now and the forecasted expenditures remaining until the end of the project.

Table 2: Summary of Project Expenditures under the agreement with Neptune

Year	Projected Expenditures in 2008 ($ Million)	Actual Expenditures to Aug 31, 2015 ($ Million)	Projected Expenditures Remaining ($ Million)
2010	12.2	3.4	NA
2011	59.5	17.5	NA
2012	58.2	35.9	NA
2013	29.1	46.8	NA
2014	30.0	44.5	NA
2015	30.0	11.9	6.0
2016	0.0	NA	2.0
Total	**219.0**	**160.0**	**8.0**
% of Total	**100%**	**73%**	**4%**

Although the majority of project expenditure occurred under the agreement with Neptune Technology Group (Canada) Limited, ancillary project related expenditures outside of

this agreement were approximately $16 million. Table 3 below provides a summary of ancillary project expenditures.

Table 3: Summary of Ancillary Project Expenditures

Expense Item	Amount ($ Million)
City Project Staff Payroll and Non-Payroll Costs	$7.0
Contract Administration (EMA Canada)	$3.7
City I&T Staff, Hardware and Software	$5.0
Communications Network (Rogers, Bell, Industry Canada)	$0.3
Total	**$16.0**

In addition, there were expenditures of approximately $18 million related to the acceleration of state of good repair work previously identified in Toronto Water's capital plan that were required in order to facilitate the water meter installations. This work consisted of approximately $14 million for the replacement and/or repair of curb stop valves and $4 million for the associated repairs to roads and sidewalks. The acceleration of this work will result in operational efficiencies that will directly benefit Toronto Water's customers.

In 2008, the anticipated financial benefits from the water meter program were expected to be approximately $32.3 million per year once the system was fully implemented. The benefits were to be realized through a combination of additional revenues ($27.3 million associated with the replacement of the City’s aging meters and the conversion of flat rate accounts) and operating efficiencies ($5 million associated with the implementation of an automated, radio frequency-based reading system).

Staff have compared the meter reading accuracy of the water meters that were replaced since 2010 with the accuracy of the new meters being installed under the project. Staff have also calculated the increase in revenue obtained from flat rate accounts that have been converted to metered accounts since 2010 and in total have determined that the City is recovering approximately $27.7 million (as of May 31, 2015) in additional annual revenue due to the new meters. The anticipated additional annual revenue due to the new meters at project completion is now expected to be $27.8 million, which is $0.5 million per year higher than the original project forecast.

Table 4 below provides a summary of the forecasted revenue recovery due to the installation of the new meters as originally reported in 2008 when Council authorized the agreement with Neptune. The table also provides a summary of the annual revenue recovery since the start of the project until now and the projected revenue recovery until the end of the project.

Table 4: Summary of Revenue Recovery

Year	Projected Revenue Recovery in 2008 ($ Million)	Revenue Recovery to May 31, 2015 ($ Million)	Projected Revenue Recovery ($ Million)
2010	1.2	0.0	NA
2011	11.5	2.7	NA
2012	22.0	9.0	NA
2013	23.7	16.0	NA
2014	25.5	23.1	NA
2015	27.3	27.7	0.1

The $5 million annual savings due to operating efficiencies associated with the implementation of the new meters were anticipated through reductions of $3.5 million in water meter reading cost and $1.5 million in call centre, billing and maintenance functions.

Toronto Water has already implemented reductions to its manual water meter reading services that were approved as part of the 2014 and 2015 Operating Budget submission. Additional reductions will be proposed as part of the 2016 Operating Budget submissions for both Toronto Water and Revenue Services in order to achieve the anticipated operating efficiencies.

In 2008, the investment in meter replacement and an automated reading system was expected to pay for itself in approximately seven years (based on projected water rate increases approved in principle by Council for the next six years). Today with the revised total projected expenditures forecasted to be $184 million (i.e. $168 million for Neptune and $16 million ancillary) and the revised financial benefits expected to be approximately $32.8 million per year (i.e. $27.8 million in revenue recovery and $5 million in operating savings), the system is now expected to pay for itself in 5.6 years.

3. Major Challenges

Gaining access to private property in order to install the new water meters was a significant challenge of the program. Providing access to install a meter is mandatory under City of Toronto Municipal Code, Chapter 851, and failure to comply may result in the imposition of manual water meter reading fees, legacy fees, fines and other remedial actions including water supply reduction or shut-off. Enforcing these remedies has been labour intensive for staff.

As part of the agreement, Neptune Technology Group (Canada) Limited, the City's contractor, is responsible for contacting all customers up to six times to arrange for an installation. Thereafter, it is deemed the responsibility of the City to enforce compliance. Following the sixth attempt, the City issues a final notice. Where owners still do not comply, their matters are transferred to City of Toronto By-law Officers for investigation and enforcement.

Approximately 5% of all customers have not provided access, resulting in a backlog of work for by-law enforcement. Of those contacted by an Officer, the majority have complied, resulting in only 40 charges to date. Approximately 3,500 (0.7%) property owners have still not provided access for the purposes of installing the new automated water meter equipment.

In some situations the existing plumbing material was lead or corroded galvanized piping that was not adequate to enable meters to be installed. In these situations customers were requested to update their plumbing. Most customers recognized the need for the plumbing upgrades and were able to do so. In some cases, customers had difficulty with the cost of the upgrades, which caused delay in the meter installation. In other situations installers had difficulty accessing the water meter due to physical obstructions caused by basement renovations, heavy equipment, electrical safety hazards and asbestos insulation. Almost all customers with known problems have made the necessary changes.

In 2012, the project effort was partially diverted to North York in response to commitments to the City's Ombudsman to address issues arising from customers who were responsible for reading their own meters. These customers were not reading the meter reliably enough to avoid billing and payment issues. By redirecting effort to North York, the operating efficiencies expected by the planned reduction in meter reading services anticipated earlier in the program was delayed by approximately one year from the original plan. By finishing installations nearly one year earlier than planned, the effect of redirecting the installation plan was overcome.

4. Project Risk Mitigation

Project quality control measures were implemented at the beginning of the project to require that the contractor ensure that all information associated with the new meters is accurate and that work is done to City standards.

A key initiative of the water meter program was the establishment of a dedicated project team. The project team is co-located at 275 Merton Street and comprised of staff from all key City stakeholder divisions (i.e. Toronto Water, Revenue Services and Information & Technology). The project team inspected the work and monitored key performance indicators (KPI) on a daily basis, which allowed them to identify trends quickly and implement corrective action. As a result, the project team was able to minimize expenditures, stay ahead of schedule, minimize customer complaints and mitigate risk to the City.

The contract with Neptune contained provisions for the City to carry the financial risk for factors deemed outside of the control of the contractor. These provisions were necessary to attract enough potential contractors to bid on the project to get competitive pricing. The provisions allowed for adjusting unit prices based on increases in commodity pricing (copper), the US-Canadian Dollar exchange rate, cost of living and cost of manufacturing. Due to these provisions, the project capital budget was established with a $14 million (7%) contingency dedicated to financial risk. To date the changes made to unit rates amount to approximately $6.8 million (4% of the original contract amount). In

the summer of 2010, unit prices were adjusted to remove embedded GST in the cost of products used in the project. As a result of this change, the total amount of work invoiced on the project has been $4.4 million less than in the original budget net of taxes.

On July 1, 2014 the City implemented two fees that affected customers, in City Wards that were substantially complete, who failed or neglected to allow access to their property to permit the installation of a new automated water meter to be installed. For customers with existing meters, a manual meter reading fee of $80 per visit was applied to the customer's account to recover the City's cost of making a special visit to the property to take a reading. For flat rate customers, a legacy fee of $1,080 per year was applied to recover the City's estimated loss in revenue from these accounts. In 2015, these fees were increased to $82.55 per visit and $1,101 per year, respectively. The introduction of these fees for non-compliance with this mandatory program have had a positive effect on gaining access to private properties and as a result only about 3,500 (0.7%) property owners have still not provided access for the purposes of installing the new automated water meters.

5. Customer and Stakeholder Relations

Toronto Water has used a variety of communication tools to educate customers on the Water Meter Program, which have been continuously updated to address new questions and concerns as they arise. This includes the creation of a dedicated program website, several direct mail letters, automated phone calls, messaging in utility bill statements, and articles in several City publications. Before entering a Ward, staff also met with Councillors to explain the program and held Community meetings (where needed).

Staff also met regularly with stakeholders internal to the City, including Revenue Services, Information & Technology, Internal Audit and 311 to gather feedback, address issues, plan next steps and to explain project status. As a result, complaints from customers regarding the program have been very low with only 500 complaints (0.10% of all accounts) received to date.

As the program concludes, Toronto Water is working closely with Revenue Services and 311 to ensure new procedures are created to address ongoing meter investigations, maintenance and repair.

One concern raised by some customers has been the use of radio frequencies (RF) to transmit water consumption data to the City's servers. To address this concern, the City has worked closely with Toronto Public Health, who has concluded that the RF levels from the City's water meters are below the City's prudent avoidance policy and therefore do not pose a health risk. The City held a community meeting, along with Toronto Public Health, to communicate this information to concerned residents and has featured this information on its website. The City also worked with Public Health Ontario to have its meters tested to ensure RF levels meet specifications listed by the manufacturer.

One of the benefits associated with automated meter reading technology is the ability to monitor consumption levels on a property-by-property basis, and to use this consumption

data to potentially assist in leak detection. The new meters have enabled Revenue Services to alert flat rate customers if their water use is higher than the City average within 30 days of a meter being installed. Since January 2013, 3,500 of these letters have been sent. Revenue Services has also been able to monitor average daily consumption patterns and to alert customers when their water use is three times higher than normal, sending approximately 16,000 of these letters since January 2013.

To further educate customers on their water use, help detect leaks and encourage water efficient behaviour, the City of Toronto has developed an on-line consumption tool where customers will be able to view their water consumption data on-line. The tool includes the ability to view current and past water use by day, month and year, and maps the information against temperature and precipitation for context. Future updates include an automated message to alert customers of higher than normal water use. The on-line application is currently going through usability testing and risk assessment, and is scheduled to launch in early 2016.

CONTACT

Richard Noehammer
Director, Operational Support
Toronto Water
Tel: 416-397-7296
RNoeham@toronto.ca

Carlo Casale
Manager, Water Meter Program
Toronto Water
Tel: 416-392-8279
CCasale@toronto.ca

SIGNATURE

Lou Di Gironimo
General Manager, Toronto Water

ATTACHMENTS

Appendix A: Water Meter Installation Progress by Ward Account Status at August 31, 2015

Appendix A: Water Meter Installation Progress by Ward
Account Status at August 31, 2015

Ward	Flat-Rate	AMR	Metered	Totals	% AMR	Remaining	WMP Status
1		8,113	156	8,269	98.1%	156	Substantially Complete
2	1	10,469	134	10,604	98.7%	135	Substantially Complete
3	2	10,580	150	10,732	98.6%	152	Substantially Complete
4		11,009	177	11,186	98.4%	177	Substantially Complete
5		14,816	416	15,232	97.3%	416	Substantially Complete
6	12	13,330	125	13,467	99.0%	137	Substantially Complete
7		10,028	112	10,140	98.9%	112	Substantially Complete
8		4,891	72	4,963	98.5%	72	Substantially Complete
9		8,229	93	8,322	98.9%	93	Substantially Complete
10		9,071	94	9,165	99.0%	94	Substantially Complete
11	23	11,638	325	11,986	97.1%	348	Substantially Complete
12	2	9,477	169	9,648	98.2%	171	Substantially Complete
13	42	12,042	60	12,144	99.2%	102	Substantially Complete
14	68	8,458	46	8,572	98.7%	114	Substantially Complete
15	2	11,493	198	11,693	98.3%	200	Substantially Complete
16	35	13,385	160	13,580	98.6%	195	Substantially Complete
17	88	13,621	96	13,805	98.7%	184	Substantially Complete
18	45	10,190	35	10,270	99.2%	80	Substantially Complete
19	85	11,763	59	11,907	98.8%	144	Substantially Complete
20	67	8,854	92	9,013	98.2%	159	Substantially Complete
21	32	8,984	151	9,167	98.0%	183	Substantially Complete
22	69	9,695	111	9,875	98.2%	180	Substantially Complete
23		11,909	211	12,120	98.3%	211	Substantially Complete
24		10,751	107	10,858	99.0%	107	Substantially Complete
25	47	12,784	206	13,037	98.1%	253	Substantially Complete
26		5,252	103	5,355	98.1%	103	Substantially Complete
27	61	6,289	155	6,505	96.7%	216	Substantially Complete
28	38	4,700	44	4,782	98.3%	82	Substantially Complete
29	26	11,500	82	11,608	99.1%	108	Substantially Complete
30	137	14,522	79	14,738	98.5%	216	Substantially Complete
31	12	11,856	183	12,051	98.4%	195	Substantially Complete
32	170	16,065	130	16,365	98.2%	300	Substantially Complete
33		7,196	40	7,236	99.4%	40	Substantially Complete
34		7,656	59	7,715	99.2%	59	Substantially Complete
35		11,495	161	11,656	98.6%	161	Substantially Complete
36		12,074	195	12,269	98.4%	195	Substantially Complete
37		13,409	236	13,645	98.3%	236	Substantially Complete
38		10,473	137	10,610	98.7%	137	Substantially Complete
39		8,595	115	8,710	98.7%	115	Substantially Complete
40		8,441	88	8,529	99.0%	88	Substantially Complete
41		13,972	106	14,078	99.2%	106	Substantially Complete
42		14,804	264	15,068	98.2%	264	Substantially Complete
43		9,210	114	9,324	98.8%	114	Substantially Complete
44		16,163	118	16,281	99.3%	118	Substantially Complete
Totals	**1,064**	**469,252**	**5,964**	**476,280**	**98.5%**	**7,028**	