# REGION OF WATERLOO

# WATER EFFICIENCY MASTER PLAN (2015-2025)

## APRIL 2014

*This report was prepared by Lura Consulting and Econics on behalf of the Region of Waterloo. If you have any questions or comments regarding the information included in this report, please contact:*

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# Water Efficiency Master Plan (2015-2025): An Overview

## VISION:

The Region of Waterloo Water Efficiency Program contributes to sustaining a clean and reliable drinking water supply for the future; a supply that draws primarily from our groundwater and river water sources.

### GOALS

- To engage municipalities, residents, businesses, and institutions in actions and behaviours that promote water efficiency and conservation;
- To positively impact our communities, environment and economy through the benefits that result from water efficiency and conservation;
- To defer large capital infrastructure projects decades into the future, and focus on a sustainable water supply with groundwater and river sources;
- To effectively monitor and report on the measurable benefits of the water efficiency program; and
- To be recognized as innovative leaders in water efficiency.

### OBJECTIVES

- To further reduce indoor and outdoor water demand in the residential sector.
- To reduce total system demand for water (i.e. metered residential and commercial, institutional and industrial sectors).
- To keep summer peak demands ratios at or below existing levels.
- To avoid increases to Water Efficiency Program budget and staff levels.

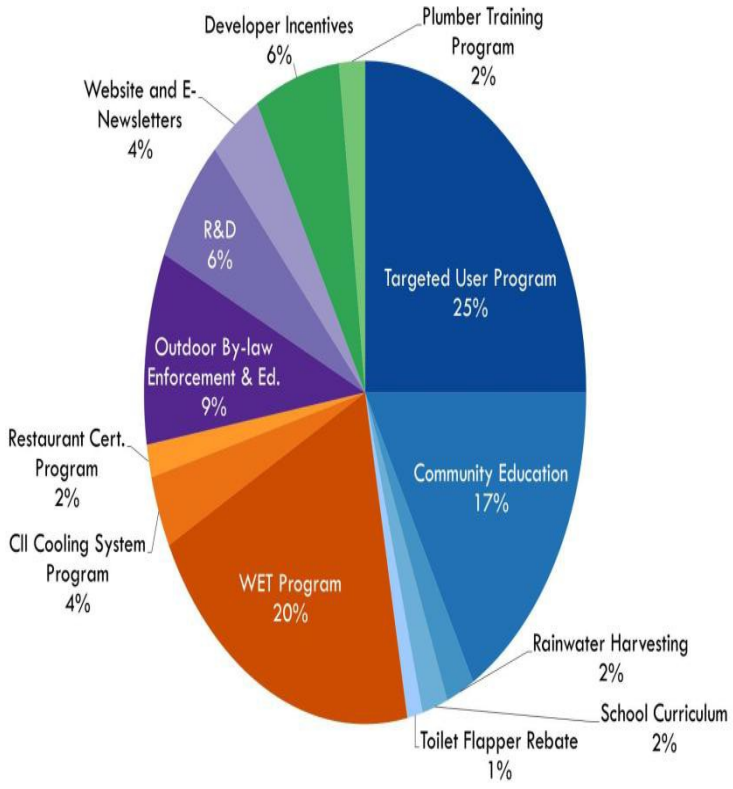
### RECOMMENDED WATER EFFICIENCY PROGRAM: 2015-2025

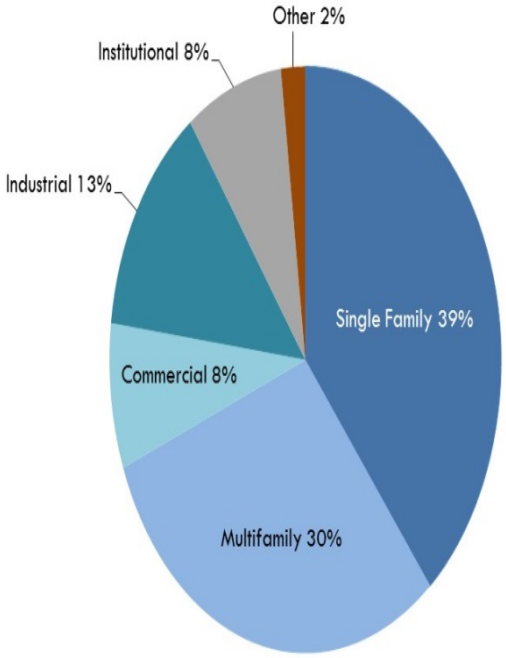
| Sector | Continuing Activities | New or Enhanced Activities |
|---|---|---|
| **Residential Sector** | General Education and Awareness | Residential Water Savings Assistance Program<br>Toilet Flapper Program<br>Rainwater Harvesting Program |
| **Commercial, Industrial and Institutional (CII) Sectors** | Water Efficient Technology (W.E.T.) Program | CII E-newsletter<br>Restaurant Certification Program<br>Cooling System Program |
| **Partner Profession** | Trades Training | New Home Building Incentives<br>Plumber Sustainability Training |
| **Community-Wide** | Water Conservation By-Law<br>Pressure and Leakage Management | Enhanced Interactive Website and Communications |
| **Research and Development** | Water Softener Research | Residential Hot Water Recirculation System Research<br>Commercial Sub-Metering Education and Advocacy<br>Landscape Topsoil Depth Advocacy |

**RECOMMENDED ALLOCATION OF EFFORT AND BUDGET**

The recommended programs were screened from a long list of industry best practices. The estimated implementation cost for the proposed WEMP is $800,000 per year in capital, which matches current budget allocations. The benefits of the proposed WEMP 2015 – 2025 are listed below.

It is recommended that the available capital budget be allocated roughly in proportion to sectoral demand (see below).


Developer Incentives
6%
Plumber Training
Program
2%
Website and E-
Newsletters
4%
R&D
6%
Targeted User Program
25%
Outdoor By-law
Enforcement & Ed.
9%
Restaurant Cert.
Program
2%
CII Cooling System
Program
4%
WET Program
20%
Community Education
17%
Rainwater Harvesting
2%
School Curriculum
2%
Toilet Flapper Rebate
1%


Other 2%
Institutional 8%
Industrial 13%
Single Family 39%
Commercial 8%
Multifamily 30%

This amounts to the following allocation by program sector in the table below. Note that these allocations will be revised on an annual basis to match program priorities for that year.

| SECTOR | ALLOCATION |
|---|---|
| Residential | 47% |
| CII | 26% |
| Community Wide | 19% |
| Partner Professions | 8% |
| **TOTAL** | **100%** |

**EXPECTED BENEFITS**

- In the year 2025, the program will be saving 1370 million litres (ML) a year
- Over the ten years of the program, the cumulative total water savings will be 9023 ML
- Residential water consumption decrease from 202 to 168 litres per capita per day by 2025
- Cumulative water and wastewater operating cost savings of $2.5 million by 2025
- Deferral of a Great Lakes displacement pipeline from 2035 to beyond 2051
- Estimated 7700 tonnes of $CO_2e$ avoided from release into atmosphere

The continued water use reductions and deferred water supply infrastructure is also projected as part of the 2013 Water Supply Master Plan Update (Report E-13-123).

## An Updated Water Efficiency Master Plan for the Region

The Region of Waterloo has been actively engaged in water efficiency programs since 1974. The Region is a recognized leader in water efficiency and conservation and has taken proactive measures to foster behaviour change in water use. Utilities across North America view many of the water efficiency activities in the Region as best practices in the field.

A key component of the Region's overall strategic approach to water conservation planning is the Water Efficiency Master Plan (WEMP). The first WEMP was approved by Council in 1998, with the goal of reducing water consumption by 1.5 million gallons per day (MGD) by 2009. With the approval of the Region's Long Term Water Strategy in 2000 (LTWS), designed to supply water to the Region until 2041, the 1998 WEMP was enhanced in 2001 to include a subsidized rain barrel distribution program, the Ayr Water Efficiency Program, a new Water Conservation By-Law, and increased public education.

The WEMP was updated again in 2006 for the period between 2007 and 2015 (WEMP 2007-2015). This most recent WEMP has already achieved significant water savings – 42% ahead of the target for 2011, and has exceeded the 2015 WEMP target of 8146 $m^3$/day. These water savings have resulted in reduced costs, lower greenhouse gas emissions, and most importantly, have contributed to the deferral of large water infrastructure projects.

While the Region's current water efficiency program has achieved success, there is a pressing need to continue to improve water efficiency across all sectors. The Region's population is growing faster than projected, requiring plans to ensure water demands can be met. While large capital projects such as the Great Lakes Pipeline are an option, they represent a significant cost to taxpayers. The Water Supply and Distribution Master Plan proposes that large capital work projects for water supply can be deferred decades into the future – at cost savings of more than $100 million dollars – if water demand declines to below 160 litres per person per day by 2031, driven in part by water conservation measures[1]. Currently, the Tri-City average single family residential daily per capita demand sits at 202 litres per person per day, indicating we have a ways to go to reach that target.

An updated water efficiency program will provide financial and ecological benefits to the Region. Modelling indicates that annual system production will be lower as a result of savings across community sectors, and single family residential consumption will fall to 168 litres per capita per day by 2025. In addition, the program will save an estimated total of 7,705 tonnes of $C0_2e$, and help to reduce environmental impacts from water extraction and wastewater outflows. The community will also benefit through improved customer service and regulatory compliance, as well as reduced water risks during drought.

[1] Stantec (2011). Water Supply And Distribution Operations Master Plan Water Demand Forecasting. Prepared for the Region of Waterloo, Project No. 1611 10918, September 2011.

The new program will ensure the Region of Waterloo continues to be an innovative leader in water efficiency. The current water efficiency program is broad and comprehensive, and has already achieved deep market penetration in several areas because of its maturity – notably with toilet rebates and rainwater barrel sales. There is a need now to put forward creative and innovative programming to reach beyond the "low hanging fruit".

## How this Report is Organized

This Water Efficiency Master Plan for the period of 2015 to 2025 consists of four sections:

- **Section 1: Background** – provides the background and context for the Plan, including how the Plan was developed, where we are today, and key findings from the research;
- **Section 2: Water Efficiency Master Plan 2015-2025** – outlines the Plan itself, including:
    - a Vision for water efficiency in the Region of Waterloo;
    - Specific Goals and Targets for the time period; and
    - Recommended water efficiency program activities across all sectors to reach the Vision. These include both current activities that should be continued and proposed new activities.
- **Section 3: Program Benefits** – outlines the estimated water savings and financial, ecological and social benefits from the water efficiency program activities; and
- **Section 4: Implementation** – provides an approach for how the Plan will be implemented, including budget implications.

**Scope of the Water Efficiency Master Plan**

Activities included in the Water Efficiency Master Plan are specifically targeted at entities connected to a municipal water supply (e.g. residents, businesses, institutions, etc.). Because agricultural producers are typically not on a municipal supply, measures for the agricultural sector are not included in this Plan. Other organizations are doing extensive research and work with the agricultural community in water efficiency, for example programs through the Grand River Conservation Authority.

It should also be noted that detailed exploration of water rates and their role in managing water demand was outside the scope of this project. Water rates are set by individual local municipalities throughout the Region and are developed based on each city or township's specific drivers and context. The reader can find information on rates throughout the region in Technical Memo #1.

# Section 1: Background

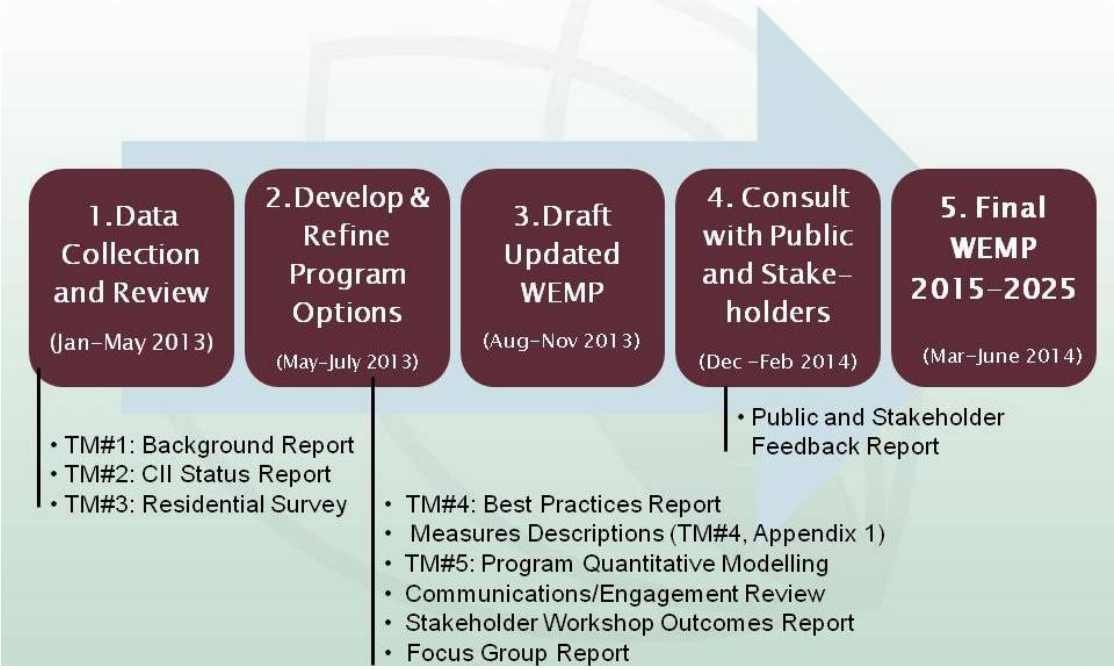
## WEMP Update Process

The WEMP Update process began in January 2013 and involved five key phases (Figure 1). The key objectives of the process were to:

- *Understand:* Further understand program achievements and developments in water efficiency to date;
- *Improve:* Update the current water efficiency goals and targets in light of past and new program achievements, perspectives of stakeholders, and advances in technology;
- *Advance:* Develop a water efficiency program for the period 2015 to 2025 that is sustainable, well-received by stakeholders and residents, embraces new approaches and innovations where appropriate, and supports other initiatives in the Region; and
- *Be Accountable:* Ensure all requirements in relevant legislation are met, such as the *Water Resources Act* (1990) and the *Water Opportunities and Water Conservation Act* (2010).

Activities conducted at each phase have been documented in separate reports, a list of which can be found in the Appendix and copies are available on the Region's website. A brief description of each of the key phases, and the resulting reports, can be found below.

**Figure 1: Water Efficiency Master Plan Update Process**



**Phase 1: Data Collection and Review**

Phase 1 involved collecting baseline and background information to support the development of the updated WEMP. This included the following activities:

- *Baseline information collection* – including quantitative historical water demand trends, implementation of water conservation programs to date, and the impact of these programs on the community's sustainability objectives *(Technical Memo #1: Background Report);*
- *Improving our understanding of water use and perspectives in the Commercial, Industrial and Institutional (CII) Sectors* – through: 1) a quantitative analysis of available water use data using Municipal Property Assessment Corporation (MPAC) codes; 2) 15 exploratory telephone interviews with representatives from commercial, industrial and institutional sectors on successes, challenges and opportunities in implementing water efficiency measures in each sector; and 3) a literature review of best practices in water efficiency in the CII sector from select jurisdictions in North America and Australia (*Technical Memo #2: CII Sector Status);* and
- *Gaining an in-depth understanding of residential water conservation activities and perspectives* – through a 10 minute telephone survey, randomly administered to 1000 Region of Waterloo residents (*Technical Memo #3*: *2013 Residential Telephone Survey).*

**Phase 2: Develop and Refine Program Options**

With the background information in hand, Phase 2 involved researching and selecting Water Efficiency Program measures for the 2015 to 2025 WEMP and refining these options based on feedback and additional information. The WaterWorth™ Measures Assessment Tool (MAT Tool) was used to narrow down the potential water efficiency measures most suitable and relevant to the Region of Waterloo moving forward. Specific steps conducted during this phase included:

- *Selecting potential new water efficiency measures* – this started with a coarse screening of program options from a list of 137 fully researched water efficiency measures documented in the MAT Tool. Screening criteria customized to suit the context of the Region were developed and applied to this list to qualitatively evaluate and assess current and potential new program measures. A staff workshop was held to refine and rank these measures. The result was 14 potential new water efficiency measures for the Region *(see Technical Memo #4: Best Practices Report, including Appendix 1: Potential Measures Description)*.
- *Obtaining feedback on the 14 potential new water efficiency measures* – the 14 measures were presented to stakeholders at a ½ day workshop in June 2013. The feedback from stakeholders was used to make further refinements to the potential new measures. As a result of this meeting, the level of effort for some measures was reduced. Feedback on select new measures was also obtained from residents during 3 focus groups held in July 2013 *(*see *June 19th Stakeholder Meeting Outcomes Report; WEMP Focus Group Report)*.

- *Quantitative modelling of potential new measures* – the Alliance for Water Efficiency's (AWE) Water Conservation Tracking Tool was used to model water savings, budget implications, and other indicators of the proposed new measures. Three budget allocation scenarios were also modelled for water savings potentials (see *Technical Memo #5: Quantitative Modelling).*
- *Reviewing current water efficiency communication and engagement activities* – current communication and engagement activities related to water conservation were reviewed, and a desktop review of best practices in using social media for water conservation was conducted. From these analyses, recommendations for enhancing existing communication efforts were provided (see *Technical Memo #4 Appendix 2: Review of Communication and Engagement Activities*).

Waterloo Region staff and members of the Region's Water Efficiency Advisory Committee were involved throughout the new measures selection and refinement process.

**Phase 3: Draft WEMP Update Report**

The information compiled in Phase 1 and Phase 2 – including technical analysis, consumer feedback, and other relevant information – was integrated into a recommended Water Efficiency Program. This proposed program was documented in the Draft Water Efficiency Master Plan 2015 to 2025, as a basis for stakeholder and community consultation.

**Phase 4: Consult with Public and Stakeholders**

Feedback on the Draft WEMP 2015 to 2025 was obtained between December 2013 and February 2014 through a variety of mechanisms to ensure extended reach. This feedback is summarized in the *Consultation Feedback Report*. Consultation activities included:

- Public Information Centre Places and Spaces Conversations – held at The Museum's Surface Tension exhibit during Christmas Break, and at the three area malls. Project Team representatives engaged passersby in conversations about the updated WEMP and asked for their feedback.
- Comment Cards/On-line survey – interested individuals provided their feedback about the updated WEMP through three focused questions on a paper comment card. The same three questions were available as an on-line survey on the Region's website;
- Stakeholder survey – with 7 detailed questions e-mailed to a stakeholder list; and
- Web updates – a dedicated WEMP page with supporting documents and the online surveys. The link was shared through Facebook, Twitter, e-mail and other means.

**Phase 5: Final WEMP 2015 to 2025**

Public and stakeholder feedback was analyzed and used to refine the final Water Efficiency Master Plan 2015 to 2025. The final WEMP will be presented to the Water Efficiency Advisory Committee and subsequently to Regional Council for approval in June 2014.

| Key Water Efficiency Program Milestones in the Region of Waterloo | |
|---|---|
| 1974 | First water efficiency programs delivered |
| 1994 | First Region-wide Toilet Rebate Program |
| 1998 | First Water Efficiency Master Plan released |
| 1999 | Water efficiency web site launched |
| 2001 | Rain barrel distribution program launched |
| 2005 | Water Conservation By-Law launched Region-wide |
| 2006 | Water Efficiency Master Plan updated for 2007 to 2015 |
| 2008 | Water Efficient Technology (W.E.T.) Funding Program for businesses launched |

## Where We are Today – A Snapshot

The Region of Waterloo has had a long and successful history with encouraging water efficiency and conservation. The first programs were delivered in the 1970s – including a lawn watering restriction in Kitchener and Waterloo well before similar initiatives were in place in other municipalities.

Since that time, the Region has added water efficiency education and incentive programs for indoor and outdoor water use, material for children and schools, programs for businesses, the Water Conservation By-Law and other activities to produce the broad and comprehensive program seen today (see Table 1).

These programs have resulted in significant water savings across the Region. From 2007 to 2011, the base residential and CII programs achieved an estimated combined water savings of 8,504 $m^3$ per day. This was 42% ahead of the target for that year (5,988 $m^3$ per day), and also exceeded the 2015 target (8,146 $m^3$ per day). Savings attributed to the outdoor water use program are conservatively estimated at an additional 795 $m^3$ per day on average. Benefits associated with these water savings include:

- Low program costs compared to the cost of new supply side measures;

- Reduced operating costs associated with less energy and chemical use and other variable cost savings;
- Reduced seasonal peaking factors; and
- Reduced greenhouse gas emissions from lower demands for electricity and/or gas to pump, treat, and heat water, with an estimated cumulative annual GHG savings from 2007 to 2011 of 496.7 tonnes equivalent carbon dioxide ($CO_2e$).[2]

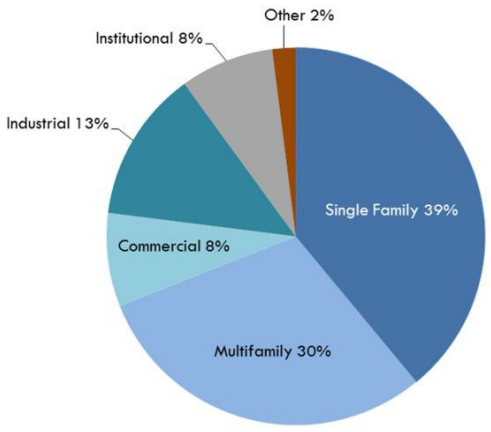
Water demand by sector in the Region is displayed in Figure 2. Figure 3 provides an illustration of how water is allocated to various end-uses inside the average home in the Region.

[2] Equivalent carbon dioxide, or CO2e, quantifies the combined radiative forcing of all greenhouse gasses emitted for a given activity using carbon dioxide as the reference.

**Table 1: Current Water Efficiency Program Elements in the Region of Waterloo by Sector**

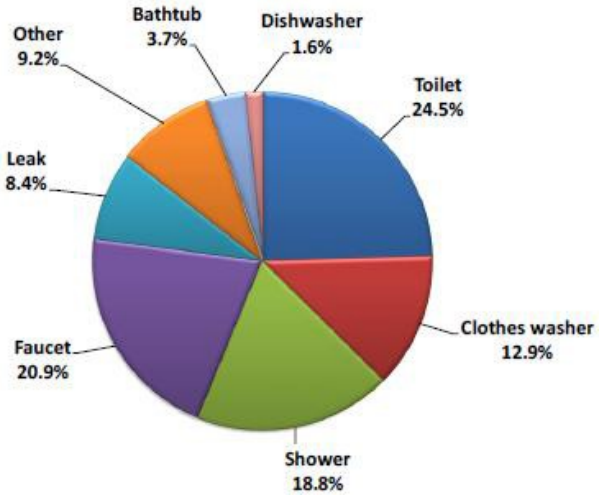
| Residential Sector | Commercial, Industrial, Institutional Sector |
|---|---|
| • Broad education program including:<br>o School and teacher resources<br>o Display booths and attendance at community events<br>o Public presentations and seminars<br>o Print material on specific topics (e.g. water efficiency in your garden, pools, etc.)<br>o Dedicated website and print material to promote efficiency in water softeners<br>o Articles in EnviroNews<br>o Promotion of programs in media<br>o Region of Waterloo's Water Efficiency Website<br>• Toilet Rebate Program<br>• Giveaways such as shower timers, by-law reminders, aerators etc. | The primary water efficiency program for businesses, institutions and multi-unit residences is the Water Efficient Technology (W.E.T.) Program, which offers:<br>• On-site services for free to conduct simple water use reviews, install data-logging equipment, and retrofit small fixtures (e.g. showerheads, aerators)<br>• Rebates (e.g. toilets, commercial-grade front load clothes washers)<br>• A spray valve replacement program<br>• Cost sharing for in-depth water audits<br>• Funding opportunities for a broad range of proven water efficiency technologies (e.g. rainwater harvesting)<br>• Water efficiency training resources<br>• Water Efficiency Excellence Awards |
| **Professionals Sector** | **Community-Wide** |
| • Trade training projects including meeting with gardeners and landscapers, plumbing retailers and others | • Water Conservation By-Law<br>• Pressure and leakage management in partnership with local municipalities<br>• Research and development |

**Figure 2: Water Demand in the Region of Waterloo by Sector (2011)**




**Source:** Econics and Lura Consulting (2013), Technical Memo #1

**Figure 3: Average Allocation of Indoor Water Use (Residential) (2012)**




**Source:** Aquacraft and NRC (2013). Residential End Uses of Water Study Update: Region of Waterloo Site Report

## Key Findings from the Research

Background research to inform the development of the updated WEMP occurred between January and July of 2013. Key highlights from this research are described below. For further details, please refer to the individual reports listed in the Appendix.

1. **Water demand in the Region is on the decline even when the influence of climate is controlled, indicating that the Region's Water Efficiency Program is contributing positively to water savings.** The research shows that by virtually every measure, and over the past decade in particular, water demand in the Region has been steadily declining. This in part can be explained by the small decline in large manufacturing companies, but the falling demand is seen across the community in aggregate total water demand, total water demand per capita, summer peak demand periods, residential capita demand and indoor residential demand. This decline has been consistent despite variations in climate during the period. Also, timing of reductions in overall demand (and declines in the magnitude of summer peak periods) correlate closely with the introduction of new conservation measures (e.g., changes to the Water Conservation By-law) (see *Technical Memo #1*).

2. **Water efficiency gains have been made in the Commercial, Industrial and Institutional (CII) sectors, motivated largely by cost savings. There are opportunities for further improvements by working with the unique water needs of different companies and institutions.** There is a wide diversity of water uses and consumption rates across 99 identified sub-sectors of the broader CII sector. For example, the sub-sectors of Standard Industrial, Neighborhood Shopping, and Heavy Manufacturing show preliminary potential for targeted water efficiency program measures because these sectors are high water consumers, have a large number of water accounts, have high average demands per account and/or have a strong upward trend in water use over the past 5 years. Key barriers to improving water efficiency in the CII sector include cost and lack of knowledge about practices or technologies appropriate for different sub-sectors. Information about water efficiency in the CII sector is shared primarily through word-of-mouth and CII representatives were supportive of direct one-to-one contact from the Region to explore water efficiency suited to unique needs. Improved communication mechanisms – to share best practices, benchmarks, and promote existing programs – was identified as a key opportunity for improved water efficiency in the CII sector (see *Technical Memo #2*).

3. **Region of Waterloo residents are supportive of water efficiency and conservation.** In the 2013 Residential Telephone Survey, 98% of respondents considered water conservation to be "important" or "very important", a perception that is increasing compared to past surveys. Focus group participants similarly expressed the importance of water conservation for a variety of reasons, including the fact that local water may become a non-renewable resource, the Region's supply is groundwater-based, and because of the higher cost of water. Support for the Water Conservation By-Law was

also high, with 87% of telephone respondents aware of the By-law and 67% reporting they "strongly agree" it is needed (see *Technical Memo #3* and *Focus Group Report*).

4. **There are opportunities to further improve water efficiency in the residential sector, bridging the gap between the existing 202 *litres per capita per day* (Lcd) use and the targeted 160 Lcd.** Opportunities identified in the research include addressing leakage within the home, particularly the small minority of households with large water losses; working directly with the minority of households that consume disproportionally larger volumes of water than their neighbours in the community; finding new ways to promote efficient water softener purchases (given that up to 87% of single family homes indicate that they have a water softener); and providing incentive programs for new housing development to incorporate water efficiency into new projects (see *Technical Memo #1, Technical Memo #4*).
5. **There are opportunities to extend education about and engagement in water efficiency through on-line resources and tools**. Best practice reviews in both the CII and residential sectors show that web-based resources and tools are being used more and more to inform and engage residents, businesses and institutions in water conservation. Resources range from on-line calculators to benchmarking data to "how-to" videos and blogs. This is supported by evidence in the 2013 Residential Telephone Survey which shows that more Region of Waterloo residents are visiting the Region's water efficiency website (37%, up from 12% in 2009).

# Section 2: Water Efficiency Master Plan 2015 to 2025

## Vision Statement

The Region of Waterloo Water Efficiency Program contributes to sustaining a clean and reliable drinking water supply for the future; a supply that draws primarily from our groundwater and river water sources.

## WEMP Goals

- To engage municipalities, residents, businesses, and institutions in actions and behaviours that promote water efficiency and conservation;
- To positively impact our communities, environment and economy through the benefits that result from water efficiency and conservation;
- To defer large capital infrastructure projects such as the Great Lakes Pipeline decades into the future, and focus on a sustainable water supply with groundwater and river sources;
- To effectively monitor and report on the measurable benefits of the water efficiency program, including key indicators of participation, water and energy savings, and other environmental benefits; and
- To be recognized as innovative leaders in water efficiency.

## Objectives and Targets

| OBJECTIVES | 2011 STATUS | 2025 TARGET<br>*(Desired end state the Plan is aiming for)* |
|---|---|---|
| • **To further reduce indoor and outdoor water demand in the residential sector.**[3] | 202 Litres per capita per day (Lcd) (Tri-City average, single family residential). | 160 Litres per capita per day (Lcd), in line with the documented assumptions in the Water Supply Master Plan Forecast |
| • **To further reduce total system per capita demand.**[4] | 285 Litres per capita per day (Lcd). | 235 Litres per capita per day (Lcd). |
| • **To keep summer peak demands at or below existing levels.** | Peaking factor (ratio of maximum day demand to average day demand) averaged 1.28 from 2006 to 2010. | Peaking factor remains same or less than 1.28. |

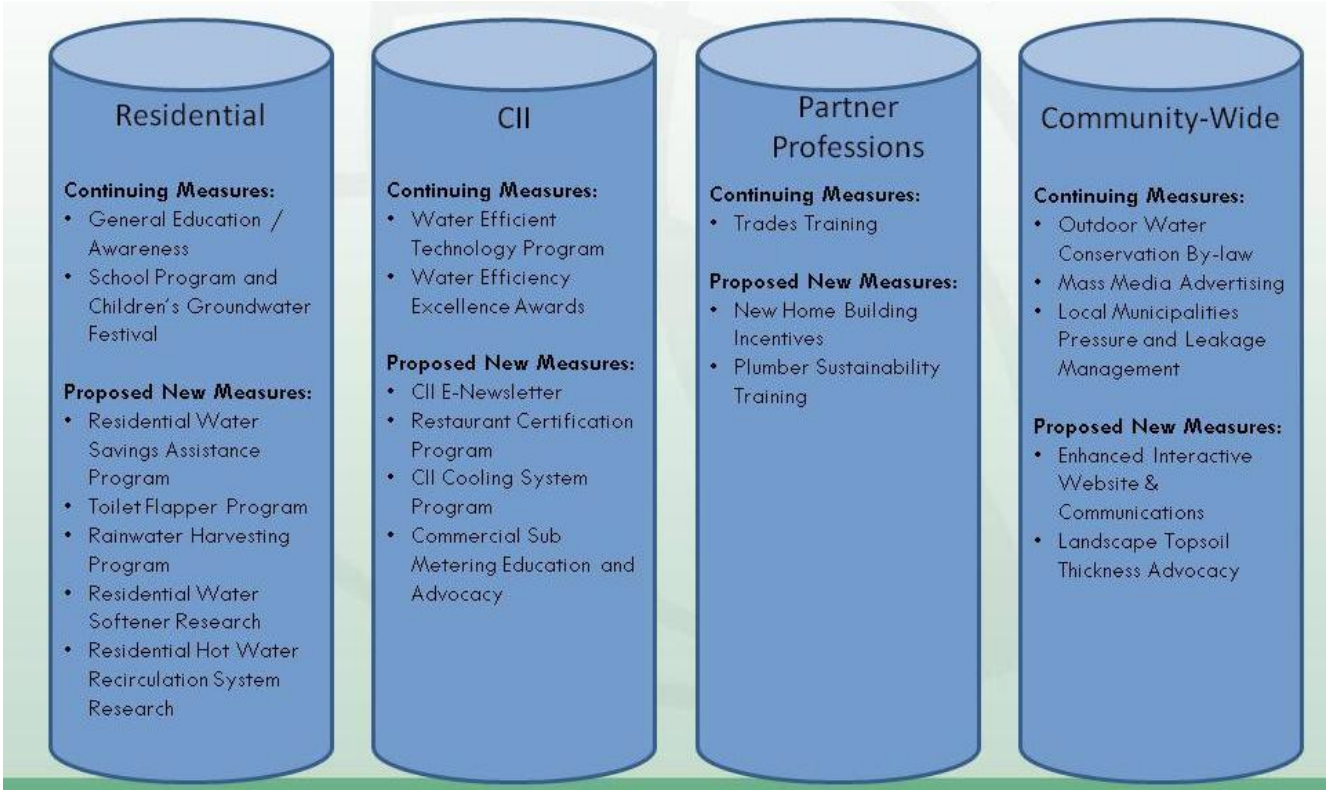
[3] This is daily single family residential consumption in Litres divided into the population living in single family homes for 2011, which includes indoor and outdoor use.
[4] This is the daily total system production in Litres divided by total population.

## Proposed Water Efficiency Program 2015 to 2025

This section provides brief descriptions of the recommended continuing and new measures for the 2015 to 2025 WEMP, separated under 5 categories: 1) Residential Programming; 2) Commercial, Institutional and Industrial (CII) Programming; 3) Partner Profession Programming; 4) Community-Wide Programming; and 5) Research and Development (Figure 4 – note, research and development are included in their respective sectors).

The proposed Water Efficiency Program has been designed to be broad and distribute risk evenly across sectors and activities. Specific implementation details will be determined as part of more detailed plans developed for individual initiatives upon approval of the WEMP 2015 to 2025. Further information about these continuing and proposed new measures can be found in *Technical Memo #4*, including Appendices 1 and 2.

**Figure 4: Summary of Proposed Water Efficiency Program for WEMP 2015-2025**



In the 2013 Residential Telephone Survey, Environews was rated by respondents as the most preferred communication mechanism for information about water conservation (7.34 on a 10-point scale). Print media continues to be an important source of information about environmental issues for Waterloo residents – 47% cited newspaper as a primary information source; 43% cited Environews.

g and strong water efficiency program in the residential sector. It ogramming in the residential sector continue assisting residents d outdoor water use through the general education activities schools and children) and incentives such as giveaways. To reach r demand, extra effort should be placed towards helping tionately large amount of water reduce their water use.

## Recommended Continuing Activities

### General Education and Awareness

The Region has implemented extensive communication and outreach activities associated with the Water Efficiency Program since 1974 – including use of print material, mass media to raise public awareness around specific program elements, talks and workshops, and promotional giveaway items (water fixtures, shower timers, etc.). The Region has also taken proactive measures to foster behaviour change to reduce water use through public presentations and seminars and other activities. These activities have proven successful, have been well received, and should continue.

Areas where general education and awareness could be further enhanced include:

- Coordinating the look of communication material to convey that various program elements are working together towards the broader Water Efficiency Program goals;
- Increasing personal contact at public booths/displays to engage the public in conversation and seeking commitments to change;
- Targeting communication to specific audiences; and
- Enhancing and promoting the Region's water efficiency website (see *Technical Memo #4*, Appendix 2).

**Region of Waterloo's Toilet Replacement Program**

The Region of Waterloo's Toilet Replacement Program has had a long and successful history. Since it began in 1994, 73,778 rebates have been issued, and by 2011 the estimated cumulative water savings from this program was 6500 $m^3$/day. At the same time, there have been changes in both building code and consumer preferences towards higher efficiency toilets – increasing the number of these toilets in the Region and decreasing the attractiveness of a rebate. Given the major changes in the toilet marketplace and regulatory environment, there is an opportunity to shift Water Efficiency Program resources away from cash rebates and into new and more innovative education and incentive programs to promote toilet replacement. The role of toilet replacement as a strategy for water efficiency will be redefined in the Implementation Plan for the updated WEMP, with the goal of ensuring high efficiency toilets are going to the homes that need them the most to save water. A natural fit would be including toilet replacement incentives and education under the Residential Water Savings Assistance Program.

****Recommended New Program Activities**

**Residential Water Savings Assistance Program**

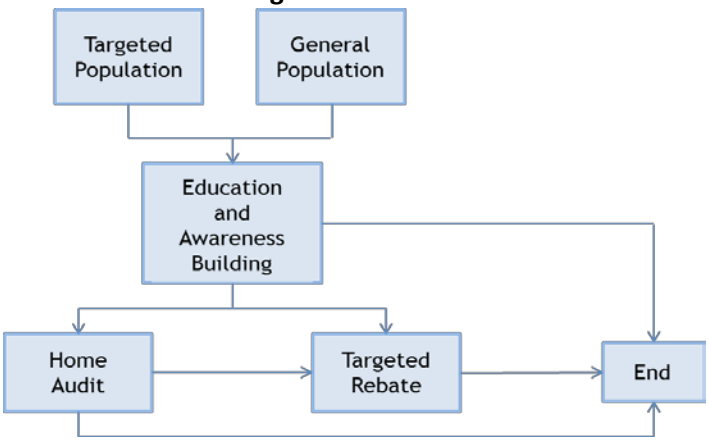
This program involves providing a suite of tools to help residents reduce their water use. It is available to all residents, and those who are known to have especially high household water use will be actively contacted and encouraged to participate in the program. This program will help address the challenge shown frequently in market research that many residents are unaware that their consumption is markedly higher than the norm. The program design will be equitable, acknowledging that residents have varying reasons for high water use which may not be amenable to large changes – for example high occupancy households. The program involves building relationships with a segment of residents and offering a range of tools until each participant has found a water conservation approach that works with their particular life context, ideally in a way that saves them money or complements their lifestyles.

The suite of tools can be considered under three components:

1. *Education and Awareness* – tools could include personalized communication through inserts in water bills or special letters and/or customized savings plans through questionnaires, online tools, self-assessment forms, and other means. This may involve use of a Customer Relationship Management (CRM) information system. The objective at this stage is to create mindfulness about personal water use and facilitate ongoing communication between the Region and participating households.
2. *Detecting Inefficiencies* – done through free home audits, to assist residents in understanding which appliances and activities use the most water in their home, and how they can be more water efficient. Leak repair and low-cost fixture replacements (e.g. toilet flapper replacement, see below) would be a key part of this component.
3. *Incentives through Targeted Product Rebates* – building on the success of the Toilet Replacement Program, this component would include offering various types of rebates on a short-term basis (e.g., "this month only", "while supplies last"). Rebates could be offered for fixtures such as high efficiency toilets, toilet flappers, rainwater harvesting systems, etc. and would require an assessment to ensure eligibility.

All participants would start with the first component of education, and other elements could be delivered sequentially over a number of months or years. Participation in all components is voluntary. A flowchart of how participants might move through the program is shown in Figure 5.

**Figure 5: Flow Chart of the Residential Water Savings Assistance Program**




**Toilet Flapper Program**

Assuming an average loss of 20 litres per leaking toilet per day, it is possible to achieve potential savings of 7m$^3$ (= 7000 L) per year by replacing a toilet flapper.

Toilet flappers can be a large source of leaks in a residential setting. This program uses a combination of measures to encourage people to replace toilet flappers. Details will be determined upon the development of an implementation plan, but could include: online tutorials and buying guides; print material distributed through hardware stores or plumbing wholesalers; rebates against the purchase prices of new flappers (e.g., $5/unit); flapper giveaways; and direct installation by Region-hired contractors (e.g., as part of a home audit program in the Water Savings Assistance Program above).

**Residential Rainwater Harvesting Program**

Given that significant market penetration has already been achieved in the Region for smaller rain barrels, this program uses a combination of education and incentives for using larger systems (e.g., >1000 litres) that capture rainwater for reuse. An example includes large tanks to irrigate outdoor areas. The program would be aimed at single family residences and designed to complement the stormwater fee credit programs already being implemented in Kitchener and Waterloo. The details will be determined upon the development of an implementation plan.

## COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL PROGRAMMING

The Region's current CII program is strong and diverse by national standards. It is recommended that the Water Efficient Technology (W.E.T.) program continue, with new measures to enhance the existing program and achieve higher results for inputs.

### Recommended Continuing Activities

**W.E.T. Program**

Out of the 15 interviews with CII sector representatives (*Technical Memo #2*), only 5 were aware of the Region's W.E.T. program.

The Water Efficient Technology (W.E.T.) Program has been a successful flagship program for the CII sector. It includes subsidies on a case-by-case basis for technology enhancement at 40 cents per litre of water saved per day up to a maximum of 50% of capital costs for proven water saving measures (up to $100,000). The program is primarily advertised through word of mouth and various promotions. A recommended enhancement of the program is to enhance communication and promotion of the program – e.g., through e-mail networks, the website, new measures promoted below – to increase awareness about what is currently offered.

### **Recommended New Program Activities

**CII E-newsletter**

This measure focuses on building a community of practice in the CII sector and awareness for efficiency measures. An e-newsletter allows for rapid, periodic communication. It can be used as a promotional tool to market existing and new programs and to provide updates on best practices, new technology, and case studies. To make it stand out, the e-newsletter could include success stories, weblinks, small "bytes" of information or relevant water conservation facts, and images or photos. For the most effective outcome, separate publications could be developed for specific user-groups to provide specific information related to each field and end-use (e.g., irrigators, restaurants, manufacturers).

**Restaurant Certification Program**

This program focuses on reducing consumption of water in restaurants and providing them with certification or recognition for water conservation efforts. Rebates can be used as incentives to encourage replacement of inefficient toilets, urinals, pre-rinse spray valves, ice machines, and walk-in cooling systems with more efficient models. An outreach coordinator would visit establishments to promote the program and provide information and guidance to

those interested. Additional recognition might include program decals for the establishment's front door, menu stickers, a logo that can be included in advertisements, or a promotional listing on the Region's website.

**Cooling System Program**

Once-through cooling systems, also known as single-pass cooling systems, remove heat by transferring it to a supply of cold municipal drinking water that is discharged directly to the sewer. Examples of such equipment include commercial and industrial air conditioners ("cooling towers"), refrigerators, coolers, and ice machines. This program would involve a systematic and efficient approach to encouraging more efficient options which are readily available (e.g., closed loop piping or air cooled equipment). Activities could include: targeted rebates, preparing and distributing best management practices, methodically targeting facilities that are known to have cooling towers and providing audits at low cost or no cost. It could also include working with local municipalities and other stakeholders to prohibit installation of new once-through cooling systems through bylaws.

Water savings will vary from facility to facility depending on factors such as cooling system sizing and the type of technology in place. However, as an example, if an 800-ton cooling tower operating at five cycles of concentration received upgrades to increase its cycles of concentration to eight, it could save more than 1,275 $m^3$ (= 1.28 million Litres) of water per year.

## PARTNER PROFESSION PROGRAMMING

The Region currently delivers some programs under this category on an ad hoc basis – for example outreach to retailers about rebates. It is recommended that the Region be more targeted and systematic with programming delivered to trades and professions that have significant influence over the purchase decisions and behaviours of both residential and business customers (e.g., plumbing and appliance retailers, plumbers, and property developers).

**Recommended Continuing Activities**

**Trades Training**

This measure includes continuing activities such as meeting with gardeners and landscapers, face-to-face meetings and workshops with plumbing retailers about fixture rebates, and efforts to catalyze national plumber sustainability training with the Canadian National Water Efficiency Network.

****Recommended New Program Activities**

**New Home Building Incentives**

A development incentive program provides grants or other incentives to those who construct

high performance buildings. Low-impact development features are not always implemented due to poor awareness or fear of trying something new, and such programs can be used to foster water efficiency. Incentives under this program could include both direct and indirect market-driven incentives. The Region will work with local municipalities to investigate incentives that would support the building of new, water efficient homes. Specific details will be determined in the implementation plan.

**Plumber Sustainability Training**
Plumbers currently receive only a few hours of training in the area of sustainability at the apprentice level and have almost no opportunities for extension training after basic certification. In partnership with the Canadian National Water Efficiency Network, the Region recently completed a pilot project using the GreenPlumbers® program with 25 plumbers from the Region of Waterloo and the City of Guelph. Along with national market research completed in parallel, this work is helping inform development of an ongoing plumber sustainability training program for the Region. GreenPlumbers® is a training and accreditation program for professional plumbers focused on developing water efficiency awareness, upgrading skills, and bolstering their role in addressing sustainability challenges.[5]

## COMMUNITY-WIDE PROGRAMMING

Measures in this fourth category affect the wider Region of Waterloo community. There is strong evidence from the 2013 Residential Telephone Survey that the community is on board with the Water Conservation By-Law, and water demand analysis indicates that the by-law is working and reducing peak demand. It is recommended that current activities continue, with enhancement of web-based tools and resources to further inform and engage water consumers.

### Recommended Continuing Activities

**Water Conservation By-Law and Education**
This includes the By-Law (#07-069 and amendments) with one day per week lawn watering, up to six by-law officers as well as three summer students hired each year, and associated education and promotion activities.

**Pressure and Leakage Management**
The Region is looking across the integrated urban system to ensure there is appropriate pressure in the appropriate zone, and if not, how modifications can be made to reach that pressure. This program is ongoing, and includes partnering with and providing funding to cities and townships to improve their water distribution system leak programs. Additionally, as part of the research informing the update of this WEMP, water audits based on the International Water Association's best practice framework were conducted in Wellesley and North Dumfries. These analyses used water system data to calculate a range of operational and financial indicators, such as the infrastructure leakage index. These indicators are useful for assessing system efficiency and highlighting where the Region should place effort to improve system management. It is recommended that this type of analysis be conducted in other municipalities within the Region of Waterloo, with each municipality setting up their own targets for reducing water leakage.

[5] See Link to Green Plumbers Training website

It is important to note that local municipalities are responsible for managing their own distribution networks and that there are many different approaches to managing system loss and non-revenue water. How to go about doing so, and what level of resources to invest in these kinds of initiatives, is a local decision that must be informed by site specific data and operational considerations. Participation by local municipalities in the Region's efforts in this area is entirely voluntary and elective on their part.

In the 2013 Residential Telephone Survey, more residents are visiting the Region of Waterloo website for information about water conservation – 37% of respondents, up from 12% in 2009. Participants in all three focus groups felt an on-line tracking tool is an essential first step for encouraging improved water efficiency in the Region's households.

****Recommended Program Enhancements**

**Enhanced Interactive Website and Communications**
This measure involves enhancing the existing Region of Waterloo water efficiency website and associated communications in order to increase engagement of the broader Region of Waterloo community. This could include elements such as a Water Conservation Blog to distribute information, videos, interesting articles, and links to events or other organizations to followers; adding short "how-to" videos or videos of water conservation success stories featuring residents, community leaders, and businesses; or using an interactive on-line calculator and tools to help residents become more informed about and track their household water use.

## RESEARCH AND DEVELOPMENT (ONGOING)

**Water Softener Research – Sector: Residential**
Research commissioned by the Region in 2013 found that over 87% of single and semi-detached homes have water softeners that consume water[6]. These appliances remove hard minerals that are typically found in groundwater. For homeowners, the benefits include reduced scale build up in fixtures and appliances, more efficient water heaters and more pleasing water for washing. Most water softeners use ion-exchange technology, which uses resin beads and a brine solution to remove hard elements. While these types of systems are quite effective at softening, they consume substantial volumes of water when they recharge day after day. Cumulatively across many households, they also add significant discharges of salt to the wastewater system (and subsequently to the receiving environment).

The Region has collaborated with the City of Guelph to help people make informed decisions when choosing a more efficient system. This includes educational materials such as pamphlets and a dedicated website (Link to Water Softener Facts website). These tools provide guidance on how to measure water hardness, estimate household consumption, and calculate required system size.[7]

[6] Aquacraft and NRC Inc. (2013). Residential End Uses of Water Study Update - Site Report. Prepared for the Region of Waterloo. Boulder CO, May 2013.

[7] Region of Waterloo and City of Guelph. (2012). Water Softener Facts. Accessed 13 September 2013. Accessed atLink to water softener facts website

In order to continue to improve the efficiency of water softeners in homes, this program involves maintaining or increasing efforts in the following areas: continued education and provision of information to retailers and homeowners on water softener best practices; support for research and development into new technology alternatives; and, advocacy for improved product performance standards.

**Water Softeners: A Water Consumer**

For every 1000 litres of soft water produced using ion-exchange, an average of 73 litres of regeneration water is expelled down the drains. It is estimated that there are over 111,500[8] systems currently in use in single detached and semi-detached homes throughout the Region, each producing 12m$^3$ of regeneration water on average per year. This equates to over 1.3 megalitres entering the sewer systems annually. In fact, this figure is conservative because it does not include contributions from additional water softeners found in low-rises and condominiums.

While educational efforts will certainly result in greater efficiency, most of the models available on the local market still use ion-exchange technology, and will therefore continue to consume water. Emerging systems, such as electromagnetic treatment and template assisted crystallisation, may prove to be effective alternative technologies that consume no water or salt at all. Although these technologies have limited domestic-scale testing and are not yet widely available, they offer great potential for reducing demand in the future. Hypothetically, if ion-exchange units in single-detached and semi-detached homes in the Region were phased out or replaced with "waterless" systems over a fifteen-year period starting in 2015, annual consumption of up to 1.7 megalitres could be avoided by 2030[9]. Savings would be even greater if systems in low rises, condominiums and other multi-family developments were also retrofitted or removed.

**Hot Water Recirculation System Research – Sector: Residential**

Homes with hot water recirculation systems have a pump that constantly circulates a small amount of hot water through the pipes from the heater to the farthest fixture and back to the heater. This way, water in the pipes is always hot, creating convenience for residents and no water is wasted while waiting for it to heat up. Newer systems include features such as programmable timers so that the pump only operates during selected hours, minimizing energy lost when hot water is in low demand (e.g., at night; mid-day). This measure involves conducting research into the effectiveness of these systems, similar to the work the Region has sponsored on water softener systems. Depending on the outcomes of the research, the Region may decide to offer rebates or other measures to promote installation of such systems.

[8] Number of homes was calculated using population projections from: Region of Waterloo (2013). Year end 2012 population and household estimates for the Region of Waterloo. Prepared by Planning, Housing and Community Services. Accessed at: http://www.regionofwaterloo.ca/en/doingBusiness/resources/2013_YEAR_END_2012_POPULATION_AND_HOUSEHOLD_ESTIMATES_FOR_THE_REGION_OF_WATERLOO.pdf (Accessed on 24 September 2013).

[9] This estimate takes additional savings from not installing into housing stock growth into account and is based on savings in the year at the end of the period. Average annual savings over a 15-year phase out period equals approximately 1.1 m$^3$/year.

**Commercial Sub-Metering Education and Advocacy – Sector: CII**
When individual organizations are billed based on actual consumption, they are more likely to reduce demand to lower their costs. Monitoring businesses and multi-family residential units individually also yields data that are useful for billing by consumption, highlighting high-volume users, designing education and awareness campaigns, and providing incentives to reduce consumption. Installation of sub meters in individual CII establishments, such as stores and restaurants in strip malls, is already being implemented in new developments, where the infrastructure can be more easily incorporated into building design. Ideally, all existing and new establishments with multiple independent businesses would be sub-metered, with a meter for each business. However, retrofitting existing infrastructure to install sub-meters is a costly endeavour that may not be practical in all situations. This measure involves working with local municipalities to identify opportunities where sub-metering of buildings such as strip malls can practically be retrofitted. It can also include encouraging large industrial complexes to sub-meter according to different segments of their plant, allowing identification of which areas in the plant are using the most water – an activity that can be cost-shared under the W.E.T. Program.

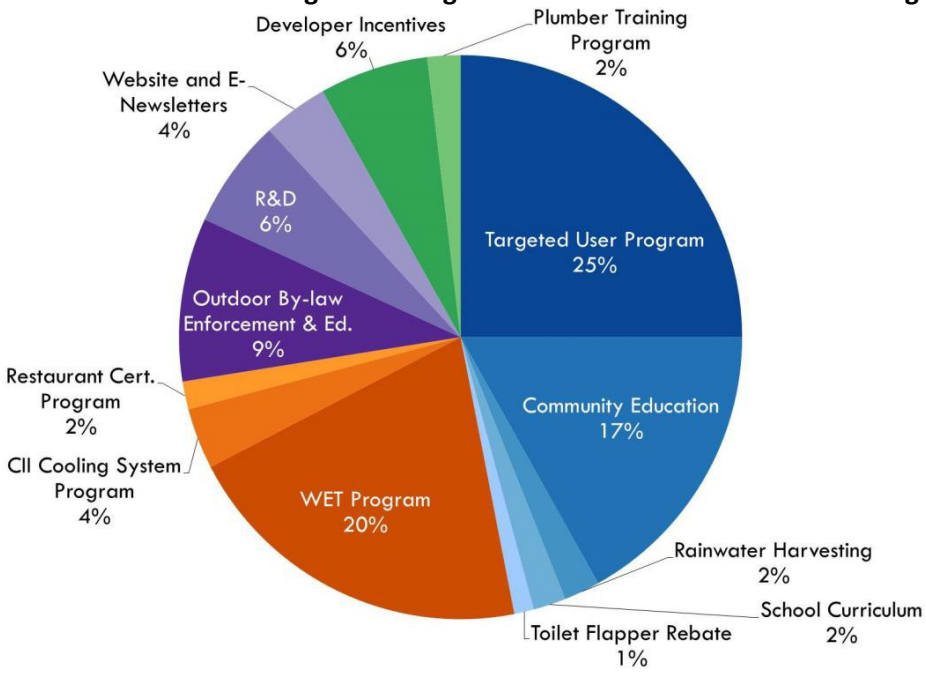
In some cases, these kinds of meters can be installed within customers' properties and be used for internal data collection and cost apportionment purposes. However, it should be noted that management of CII customer meters used for billing purposes is typically a responsibility of local municipalities. As a result, any efforts in this area will need to be undertaken in partnership with the responsible cities and townships.

**Landscape Topsoil Depth Advocacy – Sector: Community-Wide**
If topsoil is too shallow, poor root development hinders a plant's ability to access water and the soil's storage capacity is reduced, resulting in the need for more frequent irrigation. Research shows that deeper topsoil (e.g., 12 inches) can lead to a lower watering frequency and reduced storm-water runoff. Regulating topsoil thickness would ensure that all new developments implement best practices in soil management. By-laws regulating topsoil thickness would benefit the Region most during the annual peak demand period, where it would help to reduce consumption from irrigation. Most local municipalities within the Region will already have some regulatory provisions around topsoil, and they would be responsible for implementation and enforcement of this measure. As such, this research program's first task would be to inventory current implementation across the Region and the receptiveness of cities, townships, developers and residents to a topsoil thickness code.

## Recommended Allocation of Effort

The recommended level of programming effort is to apply the available capital budget to measures roughly in proportion to sectoral demand (see Figure 2, this document, and *Technical Memo #5*). This is the most equitable approach, and spreading resources more evenly across sectors minimizes risk from failure in any one program area. Figure 6 shows the recommended percent budget allocations for Water Efficiency Program elements. Allocation is generally proportionate to the total potential savings – e.g., programs with large savings potential receive significantly more funding while activities or programs with relatively smaller potential savings receive less.

**Figure 6: Budget Allocations for Recommended Program**




More information about how this budget was derived (and some alternative scenarios that were also explored) can be found in *Technical Memo #5*.

# Section 3: Program Benefits

## Water Savings

The following water savings analysis is based on the level of programming effort described in the previous section. Modelling estimates indicate that by the end of the water efficiency program in 2025, the annual savings will reach 1,370 megalitres[10] (ML) per year (Figure 7), which equates to 3,754 $m^3$ saved per day.

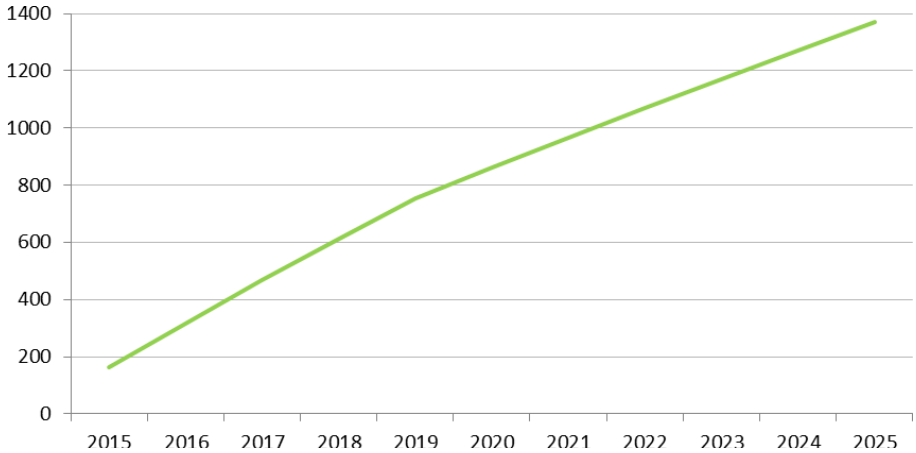
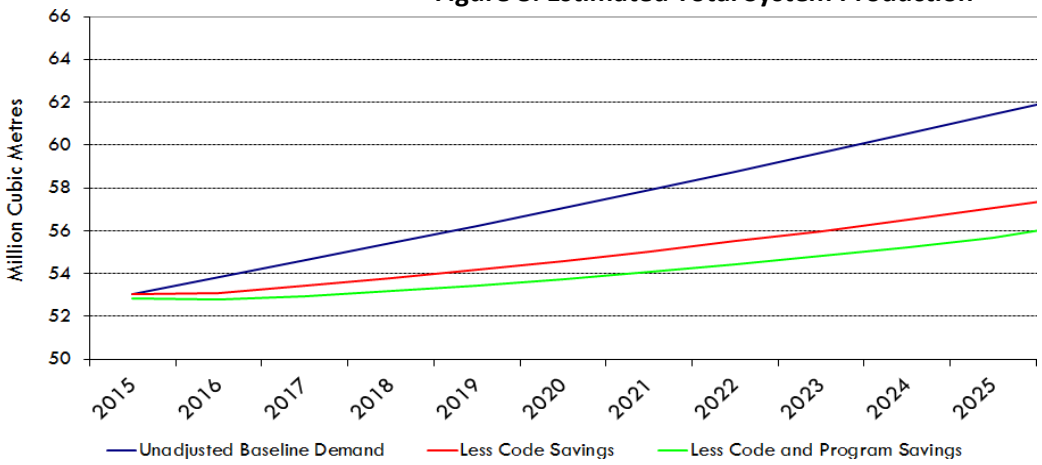



**Figure 7: Estimated Annual Program Savings**

Savings from the conservation program and building code will lead to lower total system production in the future. In Figure 8, the three lines represent production estimates for: the unadjusted baseline (blue); baseline minus savings from the Ontario Building Code and natural replacement of fixtures and appliances with more efficient models (red); and, additional savings from the conservation program (green). By 2025, the program will have achieved an estimated cumulative total savings of 9,023 ML.

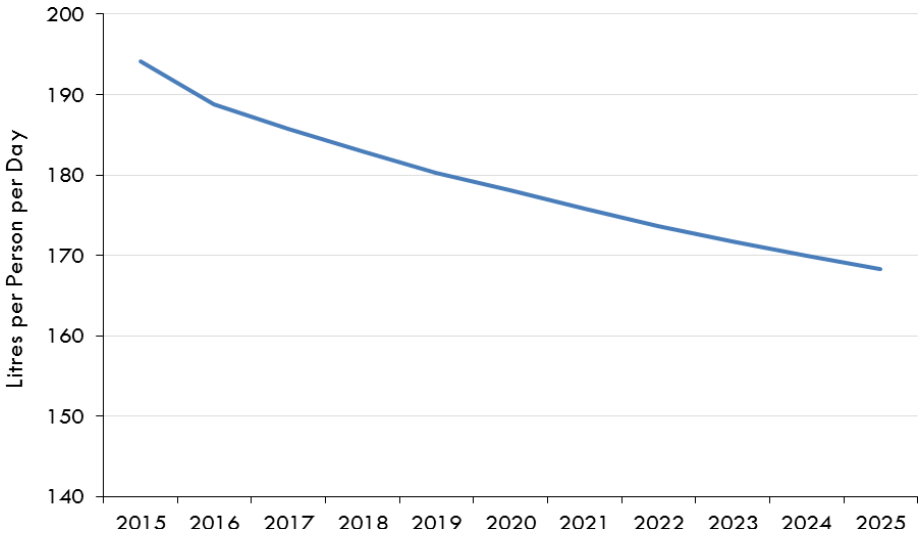
**Figure 8: Estimated Total System Production**




[10] One megalitre is equal to one million litres.

According to modelling estimates, per capita consumption in single family residences will consistently decrease each year to 168 Lcd by 2025 (Figure 9).

**Figure 9: Estimated Residential Litres per Capita per Day**




## Financial Benefits

The program will achieve a number of financial benefits for both the Region and retail water service providers, and in turn for the community. Most notably, it will allow for the deferral of future capital investment in new bulk supplies. It is estimated that, in simple least cost planning terms, the 2015 to 2025 program cost will equate to $1.81 per litre per day.[11] This compares favourably to the 2006 estimated cost of $2.00 per litre per day for the Ayr Drinking Water Supply Expansion (Region of Waterloo, 2012).[12] The same cost comparison for conservation efforts made between 2007 and 2011 contributed to the deferral of approximately $100 million in water capital expansion projects. Savings from the future program will continue to defer this need for capital expansion, making demand-side management an attractive investment.

Specifically, program water savings will reduce operating costs through lower demands for energy used in pumping and chemicals used for treatment. Financial modelling shows that by 2025, the Region will achieve a cumulative savings of approximately $1 million (2015 dollars) for avoided supply and $1.5 million (2015 dollars) for avoided wastewater. This equates to a total cumulative operational savings of $2.5 million (2015 dollars) for the entire program.

[11] This reflects the initial program cost and may vary slightly over time due to factors such as free ridership and decay in education related savings.

[12] Region of Waterloo (2012). Water Efficiency Master Plan Progress: 2007 – 2011. Prepared for Water Efficiency Advisory Committee. Report E-12-031. 28 March 2012.

## Ecological Benefits

### Greenhouse Gas Mitigation

Water use in the Region results in greenhouse gas emissions from activities in three areas:

- Supply – pumping and treating water that is supplied to customers;
- Wastewater – pumping and treating wastewater that is used by customers; and,
- Heating – e.g., hot water used in the home.

The volume of water saved in each of these three areas was determined using results from the water savings model. Total greenhouse gas (or $CO_2e$) savings by activity were then calculated using latest research on emissions factors and energy intensities for Ontario by the Polis Project on Ecological Governance (Maas, 2009).[13]

By 2025, it is estimated that the Region's program will be saving 1,176 tonnes of $CO_2e$ per year (Figure 10). The sum of the annual savings over the 11 year period equates to 7,700 tonnes of $CO_2e$, which is a significant contribution for the Region towards reaching its 2019 emissions targets.

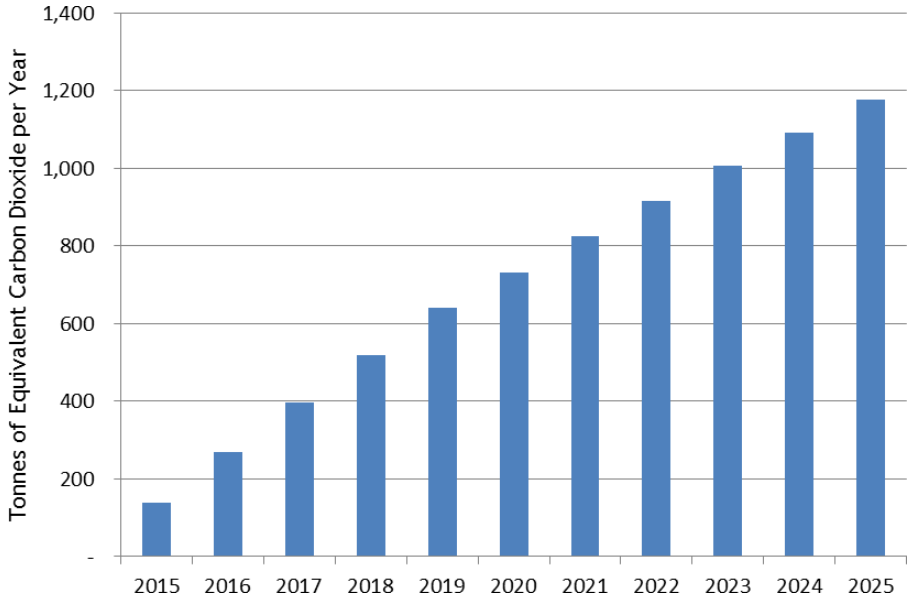



**Figure 10: Estimated Equivalent Carbon Dioxide Annual Savings**

[13] Maas, C. (2009). Greenhouse Gas and Energy Co-Benefits of Water Conservation. *POLIS Research Report 09-01, March 2009.* Accessed at Link to Polis Water project website/default/files/maas_ghg_.pdf Accessed on 29 October 2013. These supply activity energy intensities are comparable to results in an independent study carried out for the Region by Stantec. (Stantec. (2011). Water Demand Forecasting Report. Prepared for the Region of Waterloo for the Water Supply and Distribution Operations Master Plan. Report Number 1611 10918 Kitchener ON, September 2011.)

**Other Ecological Benefits**

Other ecological benefits associated with the program include:

- Avoided environmental impacts from construction of new bulk supply infrastructure;
- Reduced aquifer withdrawals, resulting in greater water availability downstream for fish and aquatic ecosystems;
- Reduced chemical use in water treatment;
- Reduced point source wastewater disposal to the environment;
- Benefits for stormwater attenuation and improved groundwater recharge from rainwater harvesting; and
- Reduced salt discharges to wastewater systems, and ultimately the receiving environment, from reducing use of ion exchange water softeners.

## Social and Community Benefits

**Enhanced Customer Service**

The program is a vehicle to improved relationships between water service providers and customers. It also provides opportunities for residents to gain an improved understanding of where their water comes from. Between 2003 and 2012, program staff had direct contact with over 25,773 residents through various forums and will maintain this level of community engagement in the new program.

These direct communication channels, as well as indirect contact points through print media, mass media and the internet, operate with the following objectives:

- Promote the intrinsic value of water as a resource to be conserved and protected;
- Educate audiences about water conserving behaviours;
- Educate audiences about Region-specific plans, programs and incentives; and,
- Trigger actions that result in measurable water savings (Region of Waterloo, 2012)[14].

**Enhanced Regulatory Compliance**

Delivery of the program also ensures that the Region and local municipalities maintain their social licences by complying with relevant regulatory requirements (see box below). Having a robust water efficiency program in place enhances compliance with requirements under all of these Acts.

[14] Region of Waterloo (2012). Water Efficiency Master Plan Progress: 2007 – 2011. Prepared for Water Efficiency Advisory Committee. Report E-12-031. 28 March 2012.

**Ontario Regulations Relevant to Water Supply and Conservation**

The *Ontario Water Resources Act (1990)* Water Taking and Transfer Regulation – requires permit applicants to submit a list of best management measures and practices in water conservation that they have or will be undertaking. [15]

The *Water Opportunities and Water Conservation Act (2010)* – requires municipalities to prepare water sustainability plans that include an asset management plan, a financial plan, a water conservation plan, strategies for maintaining and improving the service, a risk assessment and other prescribed information. [16]

The *Places to Grow Act (2005)* and resulting *Growth Plan for the Greater Golden Horseshoe* – has a policy (Policy 3.2.5 (4a)) that states construction or expansion of municipal or private communal water and wastewater systems should only be considered when strategies for conservation and other demand management initiatives are being implemented.

**Other Social and Community Benefits**

Other social benefits associated with the program include:

- Stimulation of innovation – for example, through the Region's support for nationally relevant R&D projects including the water softener testing facility, the Residential End Use Study, and the plumber sustainability training;
- Improved resiliency to drought;
- Greater retention of water in reservoirs in summer for firefighting and other emergency needs; and
- Promotion of a broader environmental stewardship ethic in the community.

[15] Ontario Ministry of Environment (2005). Green Facts: New Water Conservation Requirements for Permits to Take Water. October 2005. Accessed at http://www.ene.gov.on.ca/stdprodconsume@resources/documents/resource/std01_079464.pdf. Accessed on 28 October 2013.

[16] Province of Ontario (2012). Water Conservation and Efficiency Goals, Objectives and Programs. Prepared by the Ministry of the Environment, Land and Water Policy Branch and Ministry of Natural Resources Biodiversity Branch, Toronto, ON. Accessed at Link to ministry of energy websiteresource/stdprod_101247.pdf Accessed on 1 May 2013.

# Section 4: Implementation

## Budget Implications

For modelling purposes, it was assumed the Region's Water Efficiency Program had a fixed budget of $1,300,000 (in 2013 dollars) for the 2015 to 2025 period. Of this, $500,000 is allocated to operational expenditures, such as staffing, and the remaining $800,000 would be available for capital investments in specific conservation initiatives, measures, and programs in the community. These figures were based on historical budget availabilities and allocations provided by the Region.

Recommended budget allocations for the four program categories in the WEMP (20015-2025) are displayed in Table 2 (budget for the research and development program is included within its relevant sector). This allocation will likely vary on an annual basis depending on the planned program focus for a given year. Budget reports will be brought forward on an annual basis by staff for any allocation adjustments needed while keeping within budget parameters.

**Table 2: Budget Implications for Proposed Water Efficiency Program**

| SECTOR | ALLOCATION |
|---|---|
| Residential | 47% |
| CII | 26% |
| Community Wide | 19% |
| Partner Professions | 8% |
| **TOTAL** | **100%** |

## Roles and Responsibilities

The Water Efficiency Advisory Committee (WEAC) will continue its advisory role at key stages of the Water Efficiency Master Plan implementation, from 2015 to 2025. Staffing at the Region's Water Efficiency Department will remain consistent with key roles that include:

- Manager, Water Efficiency
- Technologist, Water Efficiency (Commercial, Industrial, Institutional Programs)
- Communications Coordinator, Water Efficiency (all programs)
- Coordinator, Water Efficiency (residential programs)
- Program Assistant Water Efficiency (support all programs)
- Student, Water Efficiency (3 seasonal by-law)

The Region of Waterloo is committed to continuing its position as a leader and innovator in water efficiency. Partnerships and cooperation will be essential to achieve the goals outlined in the WEMP (2015 to 2025), with both partner professions and across the two levels of the Region's municipal system. The formation of a CII Advisory Board with CII representatives could help advance programming in the Commercial, Institutional and Industrial sectors.

## Schedule and Tasks

Detailed implementation plans for each proposed new measure will be required after approval of the Water Efficiency Master Plan. These will clearly identify the specific target audiences, desired messages and behaviours, general approach, implementation tasks and responsibilities, timing, and measures to assess progress. Feedback from participants at the Stakeholder Workshop (June 2013) and focus groups (July 2013) will be important in developing these more detailed plans. Other approaches, such as Community-based Social Marketing, could be useful in the implementation of many new measures proposed in the Residential sector (see *Technical Memo #4*, Appendix 2).

The Water Efficiency Master Plan will be reviewed annually, with performance measured against the desired targets documented in the Plan.

## Looking Forward

What is documented in this Plan is the beginning, not the end, of our journey to improved water efficiency across the Region of Waterloo. This WEMP is a "living" document – one that is flexible, adaptable, and responsive to changes in technology, awareness, and other factors that will occur during the 10 year implementation period. Throughout the 10 years of this Plan, we will continually be looking forward as to where the WEMP needs to evolve. We will continue to explore up-and-coming areas of water efficiency, such as the feasibility of variable water rates, best-practices in residential rainwater harvesting systems and water softeners as technology evolves and costs decrease, and areas for further education and awareness. At the end of the 10 year period of the WEMP 2015-2025 we will be well positioned for the next phase to reach even stronger water efficiency targets in the future.

# Appendices

## Technical Memos:

Technical Memo #1 (TM#1): Background Report (May 2013)

Technical Memo #2 (TM#2): Commercial, Industrial and Institutional Status Report (May 2013)

Technical Memo #3 (TM#3): Residential Survey Report (June 2013)

Technical Memo #4 (TM#4): Best Practices Review (June 2013)

Measures Descriptions: Potential New Water Efficiency Measures (TM#4, Appendix 1)

Technical Memo #5 (TM#5): Program Quantitative Modelling (September 2013)

**Consultation Reports:**

June 19th Stakeholder Workshop Outcomes Report (July 2013)

Focus Group Report (August 2013)

Review of Communication and Engagement Activities (TM#4, Appendix 2)

Public and Stakeholder Consultation Feedback Report