

City of Guelph Water Supply Master Plan

Issue 2

March 2006

Master Plan aims to ensure water supply for the next 50 years...

To date, the City of Guelph's existing water supply system has been able to meet the needs of residents and fulfill the City's commitment to provide a safe and reliable supply of water. So why do we need a Water Supply Master Plan? Simply put, because the City needs to plan for its future. Events like droughts during summer months and the realities of climate change, contribute to the vulnerability of our present groundwater supply. Population growth in Guelph and Ontario's new drinking water requirements are two more reasons why it makes sense to plan for the City's future water supply needs.

Guelph's Water Supply Master Plan (WSMP) will provide a blueprint to meet the City's water supply needs for the next 50 years. The WSMP will set out how we will get our water and from where. It is an important step in ensuring that water – one of our most precious resources – continues to be supplied safely and reliably to Guelph residents and businesses well into the future.

Upcoming Public Forum Let Your Ideas Flow

The City of Guelph will be hosting an important public forum as part of the WSMP project to receive feedback from the community on the water supply alternatives and recommendations for the future. This is your opportunity to provide your thoughts on how and where we will get our water for the next 50 years. Your input will be critical to the successful completion of the Master Plan. Please join us!

Date: Tuesday, March 21st, 2006
Open House: 6:00 to 7:00 p.m.
Meeting: 7:00 to 9:30 p.m.
Location: Holiday Inn,
601 Scottsdale Drive, Guelph

What's New

Since the last newsletter, the project team has been hard at work evaluating the existing water supply system as well as supply options for the future. The team has:

- ✓ Confirmed population growth scenarios and how much water will be needed for the next 50 years;
- ✓ Examined the existing groundwater water supply system as well as its potential to supply more water;
- ✓ Identified a series of water supply alternatives;
- ✓ Evaluated these alternatives using an approach developed in consultation with the project's Public Advisory Committee (PAC), approval agencies and neighbouring municipalities and the general public; and
- ✓ Met with the PAC, provincial agencies and neighbouring municipalities in February to discuss proposed water supply alternatives and strategies and seek their feedback.

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Assessing Our Water Supply Needs

Before we can figure out a plan for our future water supply, we need to think about three key questions. How much water do we have now? What will our population be in the 50-year planning period? And, how much water do we think we need in the future?

How Much Water Do We Have Now?

The **Existing Water Supply System Capacity** tells us how much water is supplied in the current system. Studies have determined that the sustainable amount of water available in the current supply system is between 67,400 and 76,000 m³/day, with the lower end of the range representing available capacity without seasonal supplies.

What Will Our Population Be?

Growth scenarios estimate the size of the City's population during the 50-year planning period. With provincial initiatives underway to define growth areas across Ontario there are bound to be differences in opinion about future growth. Setting the growth debate aside for a moment, the project team assumed the projections in the City of Guelph's Development Charges Study (2004) to 2027, and then identified three possible growth scenarios to 2054 – low (1.5%), medium (2.0%) and high (2.5%). The lowest scenario uses the projection from the City of Guelph's current Official Plan while the highest is from the Provincial *Places to Grow, Better Choices, Brighter Futures 2004* document. The 2% growth scenario presents an option in the middle.

How Much Water Do We Think We Will Need?

Water Demand Projections calculate how much water we think we will need over the course of the 50-year planning period. To figure out how much water is needed, there are two key elements to consider - the **average day demand** which is how much water is required during an average 24-hour period, and the **maximum day demand** which is the average of the highest five days of water use during the year. The maximum day factor is the maximum day demand divided by the average day. Currently the maximum day factor for Guelph is about 1.2.

In Guelph the **Average Day Demand** is 300 L per equivalent population per day, which includes both residential and non-residential populations.

It also includes unaccounted for water (water that is lost from watermain leaks, water used for fire fighting, flushing of water mains, meter errors, etc.).

Maximum Day Demand Factor - The maximum day factor for the City of Guelph has ranged between 1.2 and 1.35 in recent years (1997 to present). When this information is not available for a municipality, maximum day factors are provided in the Ontario Ministry of the Environment Guidelines for the Design of Water Distribution Systems. For comparison, Guelph's maximum day factor is much lower than the MOE guideline of 1.65 for a population between 75,000 and 150,000, and 1.5 for a population greater than 150,000. Guelph's low maximum day factor is most likely credited to the water efficiency programs and periods of water restrictions.

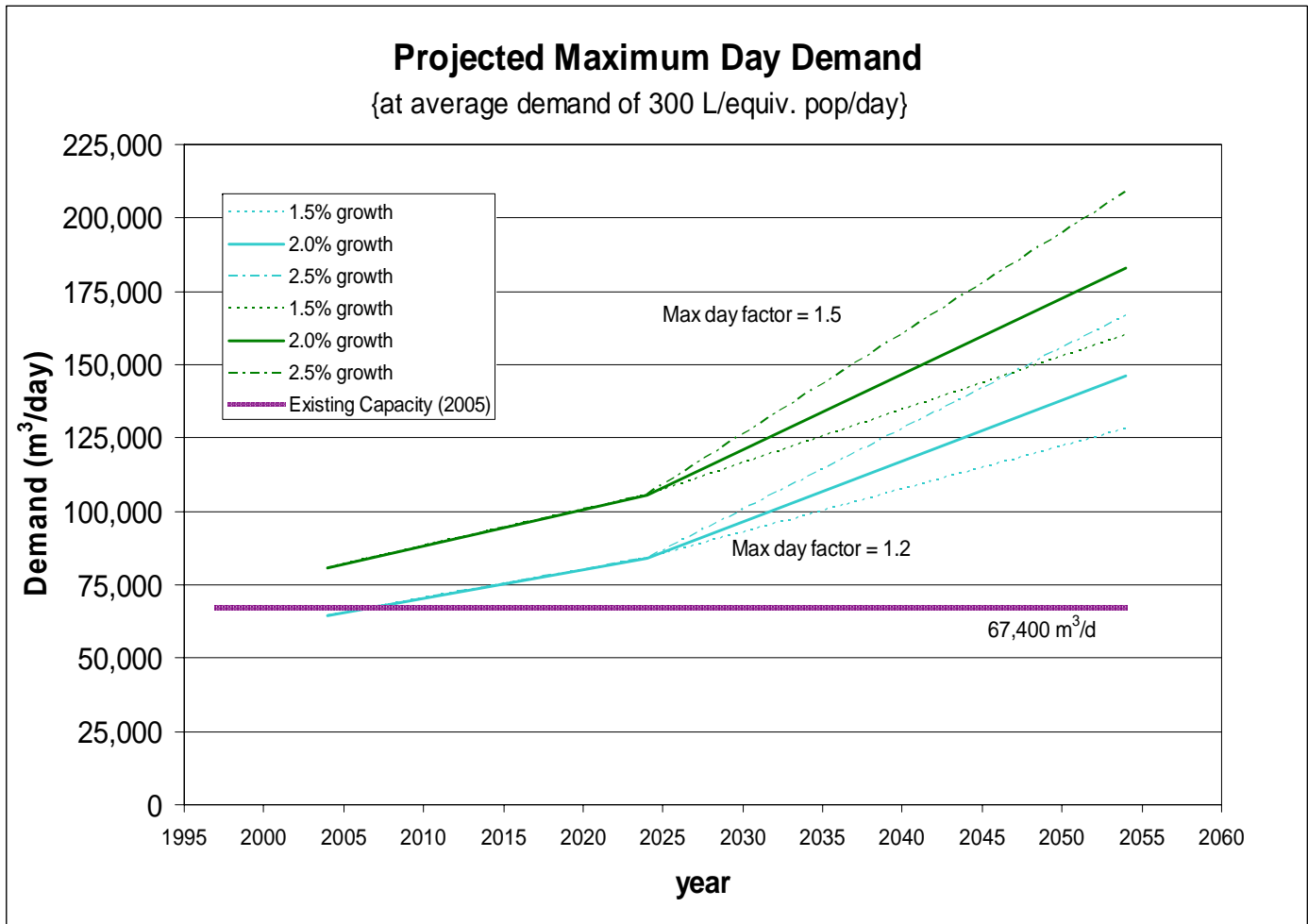
For the purposes of evaluating water supply alternatives, a maximum day factor of 1.5 is applied to projected average day demands. This conservative approach provides a built-in level of security of supply.

So Why Are These Key Components Important?

When you look at maximum day demands and the growth scenario together as seen in figure on the right, you can see that as the population increases, the demand for water supply also increases. The faster the community grows, the more pressure is placed on the water supply system, meaning the City will have to not only consider which water supply alternatives to pursue, but how urgently they will need to be implemented.



Water Street well house, Guelph, ON



Factors Considered In Evaluating Water Supply Alternatives and Developing Implementation Plan

Growth Scenarios Considered:

- Low growth scenario: 1.5%
- Medium growth scenario: 2.0%
- High growth scenario: 2.5%

Water Demand Projections:

Average day demand: 300 L per equivalent capita per day
(Equivalent population includes residential plus industrial/commercial and institutional sector)

Maximum day demand factors:

- MOE guideline of 1.5 (for future population greater than 150,000)
- City of Guelph recent records of 1.35

Existing Water Supply Capacity:

Water supply currently available:
67,400 – 76,000 m³/day

Community Input Helped Shape Alternatives and Evaluation

The project team developed a preliminary list of evaluation criteria that was presented to the PAC, agencies, neighbouring municipalities and the community at large early in the process. Comments received from these consultations helped to refine the evaluation approach and criteria for project use.

The Water Supply Alternatives

Here is a snapshot of the alternatives being considered:

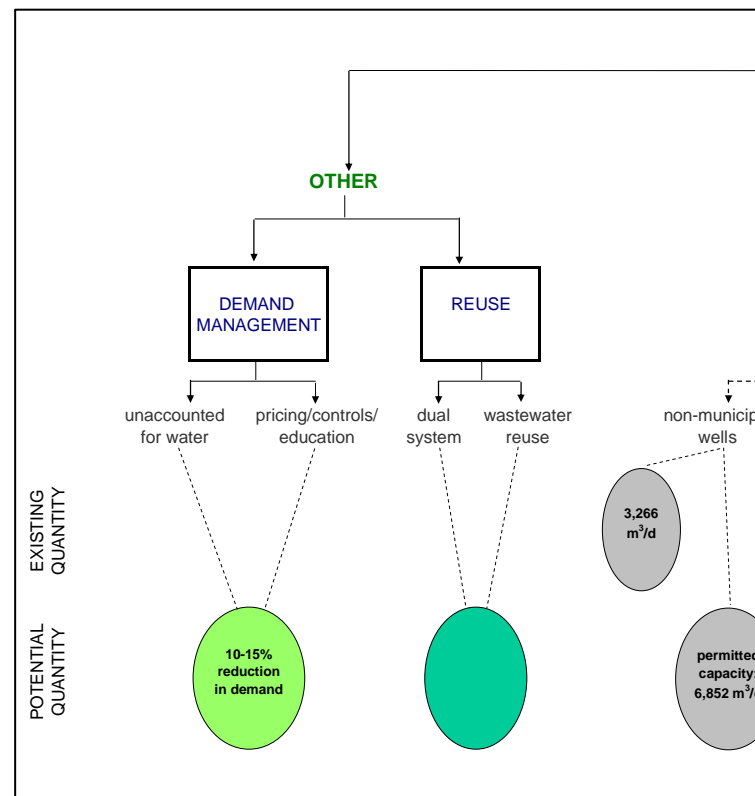
Water Conservation, Demand Management & Reuse

Thanks to Guelph residents, our water conservation efforts have placed the City among the best when compared to 28 other Canadian cities. In comparison to other countries, Canadians are still consuming water at a much higher rate. Of 22 Organization for Economic Co-operation and Development (OECD) countries, the average per capita consumption is about 176 L/capita/day, which is 22% less than Guelph's current residential water consumption. While Guelph is doing well in comparison to other Canadian cities, there is clearly the potential to use less water. The City itself has a role to play in conservation efforts, as there is an opportunity to reduce water demand by up to 10% in the next 5 years by addressing water loss (unaccounted for water) in the system and continuing to promote water conservation efforts, ongoing water efficiency education campaigns, and reuse. A target of 15% reduction in consumption should be achievable in the mid-term (5-15 years), as per the City's Water Conservation and Efficiency Strategy.

Expansion of the Existing Groundwater Supply System

There are a number of possibilities to expand the existing groundwater supply system in Guelph to assist in addressing long-term water supply needs. These include:

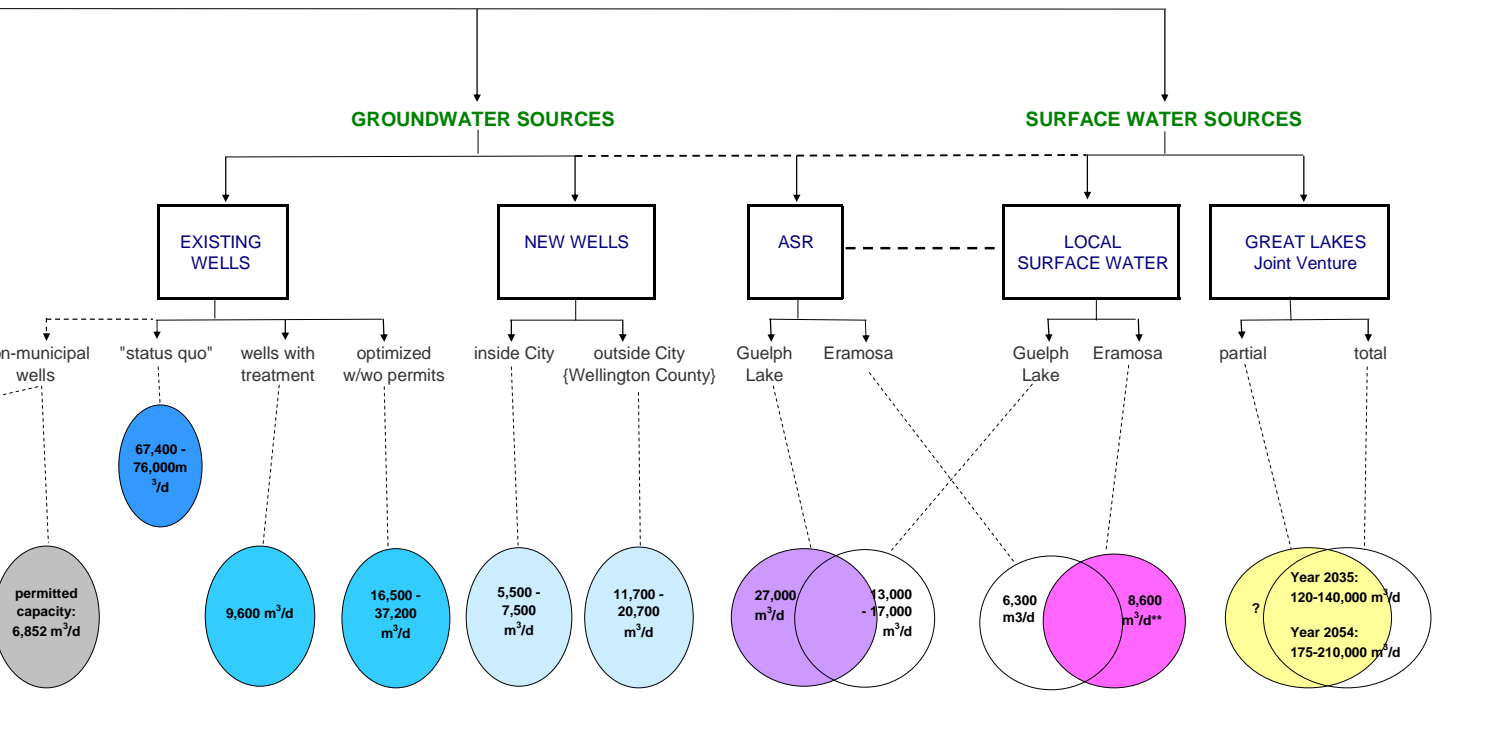
- 1. Treating existing wells – potential for an additional 9,600 m³ of water per day**
 There are a number of wells including Scout Camp, Edinburgh, Clyde Creek, Sacco, and Smallfield that currently have Permits to Take Water but are not currently being used in the City because these wells contain natural or man-made contaminants that prevent their use. These wells could be re-integrated into the water supply system with treatment upgrades through the Class Environmental process.
- 2. Optimizing existing wells – potential for 16,500 to 37,200 m³ of water per day**
 Optimizing operational existing wells (Downey, Membro, and Water Street) involves upgrades and/or modifications that improve overall performance, water quality and source security. The City is also considering using a number of test wells that have been constructed in the past. The wells under consideration include McCurdy Road, Fleming, Logan, Hauser, Arkell wells 14A and 15A, including improvements to the Arkell Glen collector system.



- 3. Installing new wells inside City boundaries – potential for 5,500 to 7,500 m³ of water per day**
 The team used the Guelph-Puslinch Groundwater Flow Model to assess the potential for new wells inside the City boundaries. Potential supplies were identified in three possible areas; at the Hanlon and Stone Road intersection, Gordon and St. Clair Road, and Edinburgh Road North.
- 4. Installing new wells outside City boundaries – potential for 11,700 to 20,700 m³ of water per day**
 There is potential to take additional water from the Amabel aquifer, located under and near Guelph. Four possible locations include:
 - Area A – vicinity of County Roads 34 and 41 south of Arkell;
 - Area B – vicinity of County Roads 35 and 34;
 - Area C – vicinity of Country Roads 29 and Third Line between Guelph Lake and Rockwood; and
 - Area D – located near the intersection of Eramosa and Watson Roads (considered to be within City boundaries).

All of these options would require further study to confirm their feasibility and discussions with the adjacent municipalities where they are located.

WATER SUPPLY ALTERNATIVES



Establishing New Surface Water Supply Locally – potential for 33,400 m³ of water per day

The team evaluated two locations for surface water taking in the Guelph area – the Guelph Lake reservoir and the Eramosa River. The City is considering two approaches – a supply directly from the surface water year round and an additional taking at times of high flows in the river. In the second approach, the City takes surface water when available, at various times throughout the year, treats it to potable drinking water quality standards, and then stores it underground in the natural aquifer system. This approach is called **aquifer storage recovery (ASR)** and has the advantage that potable water can be stored for extended periods of time. The water is taken from the aquifer through wells and disinfected before being distributed into the system. ASR has been widely implemented in the U.S., Europe and most recently in the Region of Waterloo.

At Guelph Lake, implementation of ASR has the potential to provide an average of 27,100 m³ of water per day, while at Eramosa River, use of ASR has the potential to provide an average of 6,300 m³ of water per day.

Establishing New Surface Water Supply from the Great Lakes – Lake Erie

Surface water can also be supplied to Guelph from Lake Erie. This alternative consists of a Lake Erie water intake at the existing Nanticoke Water Treatment Plant and a pipeline servicing several municipalities from the County of Haldimand to the Region of Waterloo. It is assumed that some existing infrastructure could be re-used, and a new water treatment plant would be required. With a pipeline option, the City would have two choices: using the pipeline to supplement existing groundwater or using it to supply all of its water in the future. The Region of Waterloo is seriously considering this option as part of its Long Term Water Supply Strategy.

Limit Community Growth - This option consists of reducing the water supply needs by limiting the density, type or location of all growth in the City to below current levels.

Do Nothing - The Do Nothing option is where no improvements or changes would be made. The City is required to look at this alternative as part of the Master Plan process.

A 50-Year Implementation Plan for Our Water Supply

The project team has developed a 50-year implementation plan to address future water supply in Guelph. This plan combines many of the alternatives identified above over three timeframes – short, medium and long-term – resulting in a series of phased recommendations.

Short-Term Recommendations – 2006 - 2010

1. Continue to promote **water conservation** measures and encourage further water efficiencies as a first step in the process with the objective of a 10% reduction in the average day demand immediately;
2. Begin a process to **expand the existing groundwater supply system** by investigating and confirming added supply capacity and/or treatment requirements of **existing wells**, and conducting the investigations and environmental assessments needed to bring **new wells** on line;
3. **Initiate discussions with neighbouring municipalities** and relevant agencies to discuss the feasibility of developing new wells outside of the City and/or **new local surface water supplies**; and
4. **Participate in discussions with municipalities in the Grand River watershed** as well as provincial and federal agencies regarding the **viability of a Great Lakes Water supply**.

Mid-Term Recommendations – 2010 - 2025

1. **Continue water conservation efforts** with an objective of achieving a 15% average day reduction;
2. **Expand the existing water supply system** by adding existing wells that require treatment upgrades, adding new wells inside the City boundaries, and adding new wells outside the City boundaries that have been agreed upon with neighbouring municipalities; and
3. Begin to **put in place infrastructure to support new local and/or Great Lake surface water supplies**.

Long-Term Recommendations – 2025 - 2054

The long-term measures depend on the decisions made in the next few years about the future supplies of water for the City. Once these decisions are made, infrastructure improvements can begin during the mid-term phase to be ready for implementation in the longer term.



Eramosa River, Guelph, Ontario

The alternatives and proposed implementation plan are recommendations put forward by the project team to the Guelph community. We encourage you to provide your thoughts on the proposed Water Supply Master Plan so that the final version reflects the priorities and needs of local citizens.

Waterworks Tours A Success

During the summer of 2005, the City's Waterworks Department ran a tour for residents and City staff to answer the question *How does our water supply system work?* The event was such a great success that the team is considering offering the tour again this year!

The objective of the day was simple - to introduce tour participants to the basic components of the City's water supply system by visiting local water supply facilities. The tour provided participants with a hands-on opportunity to better understand how the water supply system works and to discuss the opportunities and constraints in developing new water supplies.

It is important to the Waterworks Department that residents understand the complexity of water supply issues, challenges, and work with us to make informed decisions about future water supply choices.

Please join us for this year's tour. To sign up, please contact Dave Belanger (dave.belanger@guelph.ca)



City of Guelph staff, Dave Belanger (above), and Vince Suffoletta, (below) explain issues associated with water supply to participants on the Water tour.



... An Integrated Approach Linking Water Supply and Wastewater

The City of Guelph is taking an integrated approach to water management by undertaking the water supply and wastewater treatment master plans. It makes sense to look at water supply and wastewater treatment options concurrently, allowing the City to:

- Understand and address capacity issues (e.g. wastewater treatment capacity limitations will ultimately limit the amount of water supply that can be added to the system);
- Engage the public and stakeholders in a comprehensive plan for water services and continue the momentum generated by the WSMP;
- Address common issues of population growth, demand management, water conservation, and rates assessment/determination; and
- Develop viable solutions for both water supply and wastewater.

The Wastewater Treatment Master Plan is a critical initiative that will support and define wastewater infrastructure requirements as it relates to the City's Long Term (2055) Growth Management Strategy. Both projects, along with an infrastructure review of the City's water distribution and sanitary sewage collection systems, are all being initiated in early 2006.

Stay tuned for your opportunity to take part in these initiatives!

Next Steps

After meeting with the public in March, the project team will review all the feedback received from the PAC, provincial agencies, neighbouring municipalities, and the general public to develop the final WSMP.

City staff will put forward the final WSMP to City Council for comment and approval.

Once approval is received, the team will publish a notice of Master Plan Study completion.

Every Drop of Water Counts!

One of the key objectives of the Water Supply Master Plan implementation plan is to achieve a 15% reduction in water demands. You can do your part to help protect our water and at the same time, help teach your friends and neighbours to be waterwise. Every drop of water saved is one less drop we need to remove from our aquifer.



Water Supply Master Plan

Consultation Reports Available on the City Website

Check out the WSMP project webpage at www.guelph.ca to download project information and previous consultation reports.

Tips to Conserve Water

Here are a few tips to help conserve water at home.

Kitchen

Install a faucet aerator. Aerators mix air with the water, reducing water flow and minimizing splashing. Water-efficient devices can save you up to 5% of your total indoor water usage!

Shower

Take a shower instead of a bath – showers with low-flow showerheads often use less water than taking a bath. To compare, put the plug in while you shower, to see how much the tub fills up.

Toilet

Save money, save water. Stop flushing it all away! Replace your old, inefficient toilets with an efficient 6-litre or 3-litre/6-litre dual-flush toilet. You can reduce household water consumption by 20-30%, and can reduce your water bill by up to an average of 20%. For more information check out the Guelph's Royal Flush Program at www.guelph.ca

Outdoors

Practice water conservation in your yard and use rainwater harvested with a rainbarrel to water you gardens. Water collected in rainbarrels can be used to water outside plants and wash cars, even during a watering ban. For more information check out the Guelph International Resource Centre website (www.girc.org).

How to Contact Us

If you have any questions, or would like more information regarding the WSMP, please contact:

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