The Waterloo Waste Management Centre first opened as a landfill in 1972. Today, the entire site covers 126 hectares, with 71 hectares dedicated for landfilling operations that are expected to continue until at least 2030. The landfill will reach capacity at 15 million cubic metres of waste.

Based on recommendations from public consultation in the 1980s, and more recently in 2013, the Region has completed a Waste Management Master Plan. The Region’s waste management strategy focused on maximizing use of our existing landfill through expansions to avoid the need to establish new sites. The Waterloo Waste Management Centre has grown to fulfill this responsibility. The site now includes a recycling centre, environmental education centre, public drop-off area and green bin transfer area. The Region continues to reduce the amount of waste that reaches the landfill and is focused on continuing to ensure environmentally responsible waste disposal.

**Environmental controls and programs at the Waterloo landfill site**

The design and operation of the Waterloo Waste Management Centre has been developed to reduce the environmental impacts of landfilling operations.

The site is operated under guidelines and regulations established by the Ontario Ministry of the Environment (MOE).

The Waterloo landfill uses the following environmental safeguards to protect the surrounding ecosystem:

- leachate collection system
- clay liner installed at the base of new landfill cells
- landfill gas collection and utilization system
- litter control fencing
- daily and intermediate cover systems
- clay capping and site naturalization programs, and
- environmental monitoring programs.

This was the design standard at that time. As technology and new standards developed, a perimeter collection system was installed between 1987 and 2004 around the OLA.

Since 1994, any new expansion areas are fully underdrained at the bottom and are sloped to collect leachate. A network of pipes and pumping stations take the leachate from the entire landfill site to the sanitary sewer, and then to the local wastewater treatment plant for final treatment.

**Leachate collection system**

Some of the water from rain or snow filters through the waste in the landfill creating a liquid called leachate. This leachate must be collected and treated to prevent it from reaching the groundwater, so the Region has developed an extensive leachate collection system at the site.

The original landfill area (OLA) at the Waterloo landfill was constructed by the County of Waterloo in 1972 without a bottom leachate collection system in place.
How we protect the environment

**Clay liner**

A clay liner is installed under each expansion area of the landfill as it is built. The clay liner is a barrier to protect the groundwater that is below the landfill site. Clay is very effective in keeping water and contaminants from seeping into the surrounding environment.

**Landfill gas collection and utilization system**

Inside the landfill, buried waste decomposes and produces landfill gas, which includes methane as the main component. In 1993, the Region developed a strategy to collect landfill gas from both the older portions of the landfill as well as new areas of the landfill as waste is placed.

The main goal of this system is to minimize:
- landfill gas (greenhouse gas) emissions to the atmosphere,
- underground migration of landfill gas, and
- off-site odours from the landfill gas.

The gas is collected through an extensive system that consists of:
- vertical gas extraction wells
- horizontal collection trenches
- several kilometers of piping that connect the collection wells and trenches
- valve chambers, mechanical blowers, and
- landfill gas flares.

Since the initial installation of the landfill gas collection system in 1995, the Region has partnered with Toromont Energy to use the landfill gas to generate electricity.

The project is managed through a three-way partnership between the Region, Toromont Energy and Ontario Power Generation. The Region owns and operates the gas collection system and supplies the landfill gas to Toromont Energy. Toromont owns and operates an electrical generating station and sells the power and emission credits under Ontario’s Pilot Emission Reduction Trading (PERT) program to Ontario Power Generation (OPG). OPG then provides green electricity to residents within the community.

The Waterloo landfill gas collection system uses state-of-the-art automated features. The system provides for the long-term use of the landfill gas to generate a valuable energy source for residents of the region. Currently, between 4,000 and 6,000 houses are provided with electricity from this renewable power source. The power plant is expected to operate 24 hours a day for the next 50 years.

**Litter control fencing**

Perimeter litter control fences are installed all around the active areas of the Waterloo landfill site. Portable litter screens on rollers are moved around the tipping face as needed to provide extra litter control.
Daily and intermediate cover

Daily cover is the cover placed over the garbage at the end of the working day. The daily cover is intended to prevent blowing litter, discourage pests from getting into the garbage, and reduce odours.

The Waterloo landfill is approved to use three different types of daily cover:
- 15 centimeters of soil,
- a reusable plastic tarp, and
- a spray-on mulch cover system.

The use of the tarp and spray-on mulch saves space in the landfill, and have extended the life of the landfill by over one year so far.

Intermediate cover consists of about 30 centimeters of soil placed in inactive areas of the landfill where waste was placed, and will continue to be placed in the future. The intermediate cover provides a temporary cover over the waste until garbage is placed in the area again.

Clay capping and seeding

Final cover is the final layer placed over top of the waste to seal the garbage once the maximum height is reached on the slope of the landfill. Final cover consists of a low permeable soil (clay) and then a layer of topsoil that is seeded with grass.

As an area of the landfill site is finished, final cover is placed and the area is seeded/planted.

Environmental monitoring programs

Stormwater management & monitoring

To reduce leachate, the penetration of water from rain or snow is limited in the closed section of the landfill by the clay cover and topsoil layer over the waste.

Surface water is directed into ditches which then drain into on-site stormwater ponds. These ponds are monitored on a regular basis to ensure provincial surface water quality objectives are met. Silt that builds up is removed when required and used as daily cover. The ponds are naturalized to blend with the existing wetlands in the area.

The Waterloo landfill currently has five stormwater ponds on-site to handle surface water run-off.
The new cells of the landfill are fully clay lined and have an underdrain to prevent leakage through the base.

### Air quality monitoring

The Region monitors the air quality down-wind of the landfill and compares it to the up-wind air quality as well as against criteria set out by the Ministry of the Environment. The results are published annually as part of the Waterloo Landfill Annual Progress Report.

### Noise monitoring

Audits have been conducted to ensure noise levels at the Waterloo landfill do not exceed acceptable levels. Monitoring and modeling are used to ensure that off-site noise levels are within provincial limits.

### Environmental monitoring programs

#### Groundwater monitoring and extraction system

Detailed assessments have taken place at the Waterloo landfill to evaluate the groundwater conditions. Over 180 monitoring wells are regularly sampled and tested. As a result of the monitoring, groundwater containing leachate has been detected in a section of the original landfill. The original section of the landfill is not fully lined at the base, as this was not the common practice at the time of construction in the 1970s.

To prevent the impacted groundwater from moving off-site, an extraction system was installed. This system pumps the affected groundwater to a surface water ditch and pond. Impacted groundwater is treated as it reacts with the oxygen in the air, resulting in surface water that meets applicable provincial guidelines.

### Annual Landfill Progress Report

Each year the Region prepares a comprehensive report on the landfilling environmental control and monitoring activities. The report discusses construction projects, summarizes leachate and gas production volumes, and the results from environmental monitoring programs (groundwater, surface water and ambient air).

This annual report is submitted to the Ministry of the Environment and is also available on our website.

### Additional information

Public Involvement: The Region has established the Waterloo Region Landfill Liaison Committee to discuss operational impacts of the landfill on the surrounding community. These meetings are held quarterly and are open to the public and any interested resident is welcome to attend.

Further details are available by visiting our website at www.regionofwaterloo.ca/waste, by emailing waste@regionofwaterloo.ca or calling 519-575-4400, TTY 519-575-4608.

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@WasteWR  
Region of Waterloo Waste Management

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