

Rehabilitation of Pits & Quarries

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 **OSSGA**
ONTARIO STONE, SAND
& GRAVEL ASSOCIATION

WHAT IS REHABILITATION?

Rehabilitation of a pit or quarry is the process of restoring the land from which aggregate has been extracted to either its former use or to a new use or condition compatible with the surrounding landscape. Aggregate extraction is an interim land use. Once aggregate is extracted from a pit or quarry, the site is rehabilitated into productive wildlife habitat, wetlands, golf courses, recreational parks, urban uses, conservation lands, forestry or agriculture.

PROGRESSIVE REHABILITATION

Rehabilitation is not completed solely at closure. Under the *Aggregate Resources Act* (ARA), producers are required to progressively rehabilitate their sites. Progressive rehabilitation means rehabilitation is done sequentially within a reasonable time after extraction of aggregate resources is complete. Typically, this occurs in phases: before proceeding to the next extraction phase, rehabilitation must be completed in the areas where aggregate reserves have been exhausted.

Progressive rehabilitation is beneficial in many ways as it: minimizes the open areas within a pit or quarry, prevents soil erosion, reduces costs, and eliminates double-handling of soil materials.

REHABILITATING PITS AND QUARRIES

The Provincial Standards of the ARA provide minimum rehabilitation standards that deal with the establishment of vegetation, importation of fill, grade of slopes and existing quarry faces. Site plans also must prescribe how a site is to be rehabilitated. Rehabilitation sequences are carefully planned during the preliminary licensing process, and become a legal requirement when the site is first licensed.

Rehabilitated slopes must be no steeper than 3:1 for pits or 2:1 for quarries. Achieving these slopes will often require backfilling and proper planning so that there is enough extracted face left to achieve the desired slope.

Rehabilitation of a pit or quarry involves the management of all of the property's natural resources during the aggregate extraction process. Topsoil, including the seed sources that it contains, and overburden are managed carefully (i.e. stripped and placed separately in a manner that reflects the original profile) throughout the life of the operation. Topsoil and overburden are then sequentially replaced during rehabilitation to prevent erosion and allow for the planting of early successional plant species, followed by trees and shrubs.

Pits and quarries below the water table will be rehabilitated differently than pits and quarries above the water table. The former will be predominantly converted to aquatic end uses (unless fill is imported), whereas the latter will have more rehabilitation opportunities for agriculture or upland forest habitat.



INNOVATION

The aggregate industry is always looking for innovative approaches to advance rehabilitation efforts and producers often participate in research that will help create more unique landforms or functional ecosystems (including species at risk habitat) after extraction is complete. One such example is the research conducted by Lafarge on reforestation techniques at the Uxbridge Pit. Rehabilitation at the Uxbridge Pit was designed to re-establish a forest linkage between the Durham Regional Forest and the Oak Ridges Moraine Core Area. Lafarge accomplished this by planting over 50,000 trees (including nodal plantings of a variety of shrubs and bushes). The company also monitored and analyzed soil conditions and fertilization to determine the most appropriate species to plant.

EXAMPLES OF AFTER USES

There are many excellent examples in Ontario of after uses. These include:

- Agriculture
- Tender fruit production and grape vineyards
- Naturalization and wildlife habitat
- Wetlands, floodplain habitat development
- Golf courses
- Recreational parks and lakes, trails and conservation lands
- Forestry
- Urban uses

FACTORS WHEN CONSIDERING AFTER USES

Factors that are considered when selecting an appropriate after use include:

- Surrounding land uses – present and future
- Surrounding ecological/natural heritage systems
- Stakeholder input (neighbours, municipalities, special interest groups, partners)
- Method of extraction (depth, proximity to water table)
- Available resources (topsoil, overburden, seed bank, transplanting opportunities)
- Relief or topography of the area
- Geology of the deposit

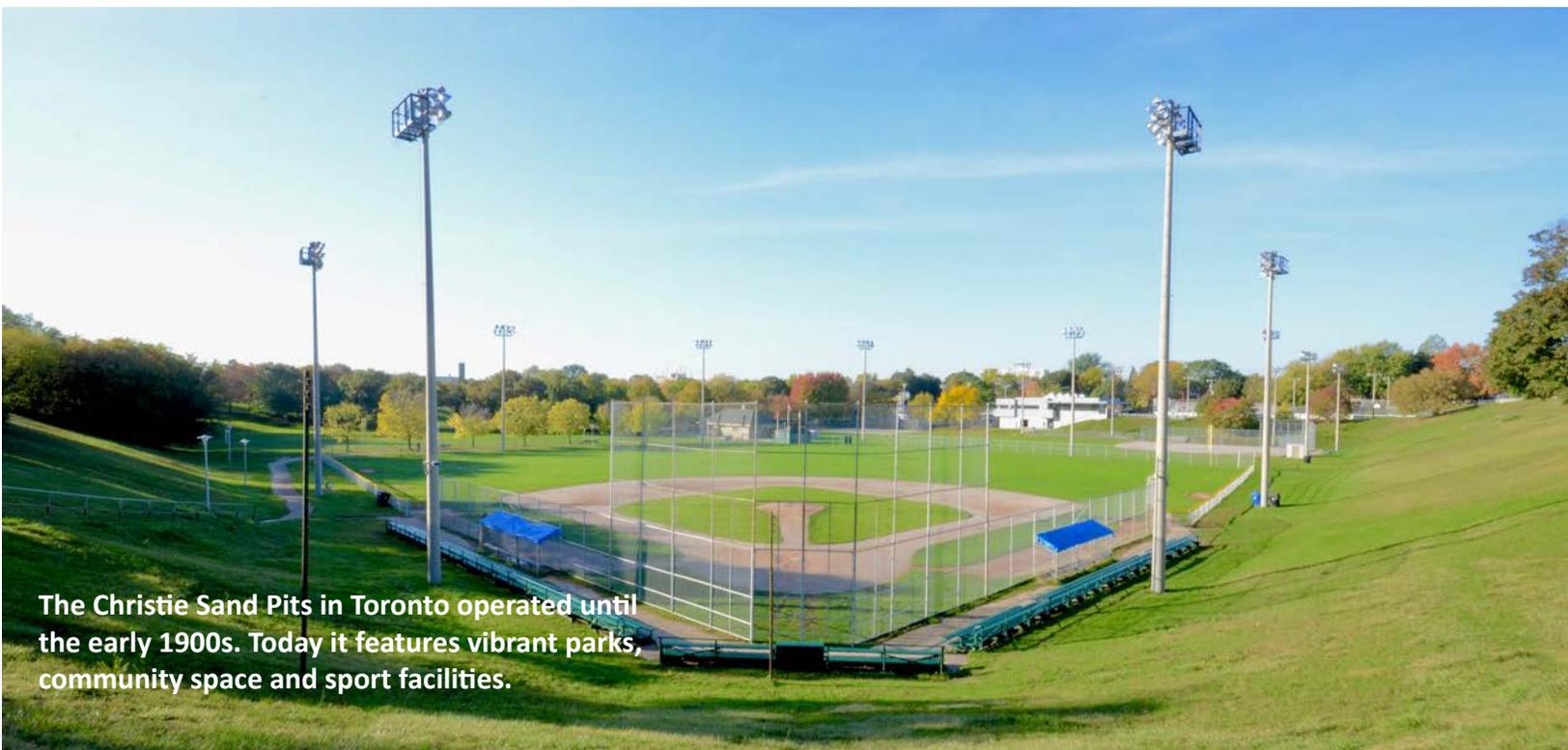


Capital Paving's Wellington Pit



Walker Aggregates' Vineland Quarries

CBM Aggregates' McMillan Pit, a former pit converted to an aquaculture facility which is now home to thousands of rainbow trout.



The Christie Sand Pits in Toronto operated until the early 1900s. Today it features vibrant parks, community space and sport facilities.

Under the Management of Abandoned Aggregate Properties Program (MAAP), the Ontario Aggregate Resources Corporation (TOARC) rehabilitates former pits and quarries deemed to be abandoned at no cost to the property owner (rehabilitation work is paid for from a portion of the licence fee collected from aggregate producers). This program includes an online reporting tool to allow for easy access to information on legacy pits and quarries across the province³. TOARC also contains an electronic database of surrendered aggregate licences and permits in Ontario, which provides photos and information on rehabilitated land uses of formerly licenced pits and quarries⁴. Additionally, TOARC undertakes a number of research projects and publishes rehabilitation guidance for the aggregate industry.

AGGREGATE REHABILITATION IN ONTARIO

In 2009, the Province of Ontario released SAROS Paper 6¹: Rehabilitation (the sixth part in a series of studies that helped to better define the State of the Aggregate Resources in Ontario). The SAROS study found that at many sites in Ontario, rehabilitation is occurring, with land being converted to productive agriculture or forestry. Aggregate sites rehabilitated to naturalized landscapes also have increasing levels of biodiversity.

Between 2010 and 2014, OSSGA assessed the condition of 701 pits and quarries across southern Ontario to identify rehabilitation trends in Ontario². The results for common land uses for rehabilitated aggregate sites were determined to be Natural (25%), Agriculture (21%), Open Space, (15%) and Water (10%). Results showed that former aggregate sites can be successfully integrated into their surrounding environments after extraction operations are completed. The data also demonstrated that rehabilitated sites tend to be compatible with surrounding land uses, aggregate extraction is a temporary land use, and in protected areas, many rehabilitated aggregate sites have reverted back to appropriate land uses.



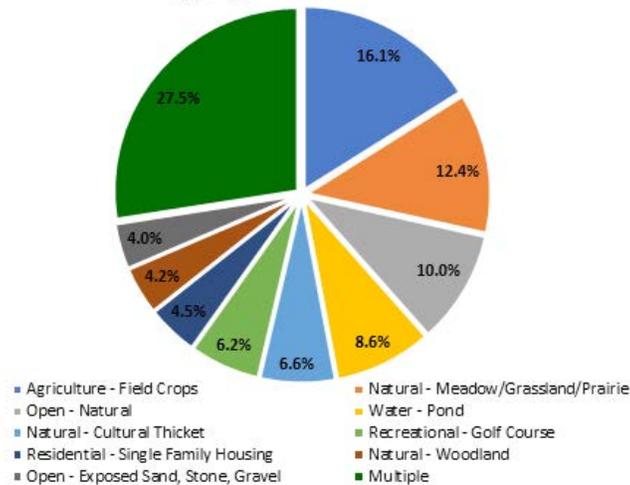
Capital Paving's Wellington Pit, returned to agricultural use.

DID YOU KNOW?

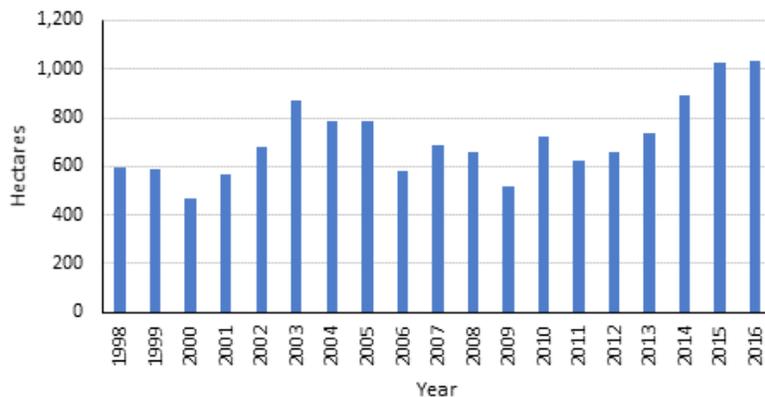
1 In 2015, at Synder’s Flats – a rehabilitated gravel pit near the village of Bloomingdale in Woolwich, 949 fish (including small and largemouth bass, yellow perch, pumpkin seed, black crappie and common carp) were caught during an ecological survey conducted by the GRCA and MNRF.

2 In 2016 alone, there was over 1,033 ha of former licenced aggregate land rehabilitated. From 1998 to 2016, there was over 13,000 ha of former licenced aggregate land rehabilitated.

Current Rehabilitated Land Use of Surrendered Aggregate Sites in Ontario



New Rehabilitated Area (1998-2016)



Source of data: www.toarc.com

3 The Brampton Esker Park consisted of 12 former sand and gravel pit operations that have now been transformed into a series of interconnected linear parks stretching over 7 kilometres throughout the City of Brampton.

4 Christie Pits and Don Valley Brickworks are rehabilitated aggregate sites located within the City of Toronto.

5 At Walker’s Vineland Quarry in Vineland, Ontario, over 8 ha of a former extraction area has been rehabilitated to a successful vineyard. The first grapes were harvested in 2002 and the vineyard continues to produce a variety of wines!



REFERENCES

- Paper 6: Rehabilitation State of the Aggregate Resource in Ontario Study. Prepared for the Ontario Ministry of Natural Resources by Skelton Brumwell & Associates and Savanta (2009).
- OSSGA Study of Aggregate Site Rehabilitation in Ontario, Part I (2010-2011), Part II (2010-2013) and Part II Addendum (2014).
- www.toarc.com/maap-1/about-maap.html
- www.toarc.com/ssrt/index.html



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