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ONTARIO MUNICIPAL BOARD
Commission des affaires municipales de l'Ontario

PROCEEDING COMMENCED UNDER subsection 34(11) of the *Planning Act*, R.S.O. 1990, c. P. 13, as amended

Applicant and Appellant: James Dick Construction Limited
Subject: Application to amend Zoning By-law No. 57/1999 - Refusal or neglect of Township of Guelph/Eramosa to make a decision
Existing Zoning: Agriculture (A) and Hazard (H) .
Proposed Zoning: Extractive Industrial (M3) and Hazard (H)
Purpose: To permit a quarry
Property Address/Description: Part Lot 1, Concession 6
Municipality: Guelph Eramosa
Municipality File No.: ZBA09/12
OMB Case No.: PL150494
OMB File No.: PL150494
OMB Case Name: James Dick Construction Limited v. Guelph/Eramosa (Township)

PROCEEDING COMMENCED UNDER subsection ,11(5) of the *Aggregate Resources Act*, R.S.O. 1990, c. A.8, as amended

Referred by: Jane Ireland
Objector: Shirley Allen
Objector: Ron & Debbie Brennen
Objector: John & Ann Brophy
Objector: Dennis & Laura Campbell; and others
Applicant: James Dick Construction Limited
Subject: Application for a Class A licence for the removal of aggregate
Property Address/Description: Part Lot 1, Concession 6
Municipality: Guelph Eramosa
OMB Case No.: PL150494
OMB File No.: MM150034
OMB Case Name: James Dick Construction Limited v. Guelph/Eramosa (Township)

WITNESS STATEMENT FOR Greg Sweetnam:

A. The evidence to be presented by Greg Sweetnam will refer to the following:

Tab No.	Reports/Documents	Date
1	How Concrete is Made- Portland Cement Association	2015
2	Ministry of Natural Resources- State of Aggregate Resource in Ontario Study- Paper 3- The Value of Aggregates	18-Dec-09
3	Bedrock Geology of Southern Ontario- Ontario Geological Survey- Notated by G. Sweetnam	1999
4	Ministry of Natural Resources- State of Aggregate Resource in Ontario Study- Paper 5- Examines the availability of limestone and dolostone reserves	Nov-85
5	MTC Report EM-31 Alkali Aggregate Reaction, Concrete Aggregate Testing & Problem Aggregates in Ontario A Review	Dec. 17 2009
6	TOARC Aggregate Production Statistics 1998-2015 Halton Region	1998-2015
7	OSSGA Discussion Paper	30-Apr-15
8	3-D Renderings of Phases 1,2 and 3 Hidden Quarry	20-Jul-15

B. In addition, Greg Sweetnam, will refer to the Ministry and Agency Review Comments, the Township of Guelph-Eramosa Peer Review Comments and Witness Statements set out in the Document Books produced and provided by James Dick Construction Limited.

C. The evidence to be presented by Greg Sweetnam will consist of the following bullets:

1. Who we are.

- James Dick Construction Limited is a private Canadian company employing several hundred people in the business of aggregate production and trucking. Our operations are headquartered in Bolton, Ontario and our operations are generally within 150 km of Toronto.

2. What is aggregate?

- Aggregate is an essential building material that is used in virtually all construction.
- Roads, buildings, sidewalks and bridges all use aggregate to form base upon which the structure is built.
- Approximately 67% of the mass of concrete is made up of aggregates.
- Approximately 94% of asphalt paving is made up of aggregates.

3. Where do aggregates come from?

- Aggregate is produced from naturally occurring geological deposits. The locations of these discreet deposits are mapped in Ontario by the Ontario Geological Survey in documents known as Aggregate Resource Inventory Papers. Many municipalities, including Wellington County, identify these deposits in their respective Official Plans. Aggregates are a rural land use and pits and quarries form a part of the rural landscape of Ontario. Aggregates are produced and processed on the same site from which they are extracted. Processing of aggregates is a physical manipulation that does not require any chemical additives.

4. Why is aggregate important to the Ontario economy?

- Aggregates are required for virtually all forms of construction in Ontario.
- Aggregates are essential materials for which there is no substitute.
- Aggregates support the \$44.7 Billion dollar Construction Industry that employs approximately 245,000 people.
- Aggregate Industry in 2007 directly generated approximately 16,600 full time and contributed \$1.6 Billion to GDP.
- Every home and place of employment uses aggregates in its construction.
- The public sector consumes approximately half of all aggregates produced.
- Ontario consumes approximately 14 metric tonnes per capita per year.

5. What is the difference between a pit and a quarry?

- A gravel pit is a deposit of sand and stone that was placed by moving water, usually large rivers flowing out of glaciers at the end of the last ice age approximately 13,000 years ago. Fine particles of clay and silt were washed away leaving only the larger fractions of sand and stone. These particles were tumbled as they were placed resulting in the rounding of sharp edges and a general round particle shape. These deposits are excavated using front end loaders. Gravel Pits are important as they produce many products including the concrete sand used in high strength concrete.
- A quarry is a deposit that is made up of solid rock that must be drilled and blasted before being processed. Quarried products are angular in shape and result in better compaction. Quarries are important because they produce the high quality crushed stone required in high strength concrete and high volume or heavy traffic road base and asphalt paving.

6. Are all aggregate deposits the same?

- There are dozens of different products that are produced from pits and quarries in Ontario.
- Different products have unique physical and geological properties that are based both on the geology of the deposit and the manufacturing process used.
- Any aggregate deposit can only produce products with the physical and chemical characteristics consistent with geology of that deposit.

- Sand and Gravel resources have naturally round polished surfaces that can produce products that are non-packing in nature. Concrete of low and medium strength can be produced from gravel derived stone.
- Quarried stone has crushed surfaces and sharper edges that knit together to better distribute loads.
- Quarried stone can be used to produce all grades of concrete including high strength concrete used in the construction of high rise structures. Quarried stone also produces a durable concrete surface that can withstand freeze thaw conditions without breaking down.
- Not all quarried stone is chemically stable in concrete. Some stone reacts chemically with cement components and concrete made with these products will quickly deteriorate.
- The proposed Hidden Quarry contains both sand and gravel resources and the highest quality quarried stone in Ontario, the Amabel Formation.

7. What are the rock formations that supply concrete stone to the GTA?

- In South Central Ontario there are two bedrock formations used to produce quarried concrete quality crushed stone for the GTA Market. These are the Amabel Formation, (also referred to as the Lockport formation) and the Lower Bobcageon/Upper Gull River Formation.

8. What is special about the Amabel Formation?

- Amabel is the only bedrock aggregate source in Ontario considered to be provincially significant.
- The Amabel dolostone is the highest quality crushed stone in Ontario.
- It is a rough stone with a texture that binds well with cement paste and asphalt.
- Amabel is located very close to the market where it is consumed including the GTA.
- Amabel produces significantly stronger concrete and has superior freeze-thaw resistance than other crushed stones; this leads to greater longevity of concrete structures and pavements.
- Amabel is non-reactive in Portland cement concrete making it durable over long periods of time.

9. Where is the Amabel Formation Located?

- The Amabel Formation is bounded by the Niagara Escarpment to the east and extends off the Escarpment to the west.
- Amabel is found in south Wellington County, Halton and Peel. Of these three, it has only been quarried in Halton Region.
- It is the toughness of the Amabel stone that has caused the erosional discontinuity known as the Niagara Escarpment. Historically, large volumes of Amabel have been extracted from Halton Region quarries and it is this resource that has largely built up the GTA as we know it today.

- The Amabel Formation is located very close and adjacent to the largest construction market in Ontario, the GTA.

10. Where is the Lower Bobcageon/ Upper Gull River Formation Located?

- These formations are located north and east of Lake Simcoe. It is located approximately 100 km from the GTA development fringe.

11. What are the limitations of the Gull River Formation when used in concrete?

- Some layers of the Gull River stone are alkali-reactive and react destructively with components of Portland cement concrete. This can result in the destruction of a concrete structure over just a few years.
- The Gull River Formation is a hard, brittle, very smooth, lithographic stone that does not hold cement paste well.

12. What is the effect of location on aggregate cost?

- The transportation cost of aggregate is generally about 50% of the delivered cost. Close to market quarries such as the proposed Hidden Quarry can deliver at a significantly reduced cost and with a much lower carbon footprint than the much more distant Gull River quarries. Consumers benefit from this proximity.

13. What is the effect of low competition levels in close to market stone?

- The sale price of Amabel stone is significantly higher than stone products in other areas of Ontario where there is more competition. The taxpayer, as the consumer, pays for this.
- Concentration of the best quality stone in the hands of a few vertically integrated multinationals has affected the ability of independent concrete producers to effectively compete in the concrete sector.

14. Is Gull River and Amabel stone the same quality?

- All rocks are not created equal in Ontario. The Amabel formation is a provincially significant stone considered by producers to be the highest quality crushed stone source when compared to other formations. The Amabel is a rough stone that achieves higher concrete strengths when compared to the Gull River formation. The Amabel formation generally has very little chemical reactivity associated with it, making it an ideal stone for use in concrete. Structures utilizing the Amabel stone in a well-engineered mix design can last hundreds of years.
- The Gull River Formation is alkali reactive. Alkali Reactivity results in adverse chemical reactions in concrete that results in the destruction of the concrete over years. Also, the Gull River stone crushes with very smooth "lithographic" faces that do not adhere to cement and asphalt as well as the rougher, fossiliferous Amabel stone.
- The Amabel quarries have deep deposits of high quality stone without the need for benching to avoid poor quality materials.

- The Upper Gull River Formation (concrete quality) has a shallow depth when compared to the Amabel Formation. This results in considerably more surface disturbance compared to the deeper Amabel Formation to produce the same amount of stone.

15. What has happened to GTA Amabel production over the past 15 years?

- Production of Amabel from within the GTA has been limited to Halton Region. According to TOARC statistics, Halton Region production has fallen from over 15 Million tonnes per annum in the early 2000's to under 8 Million Tonnes from 2012 to present. This is a reduction of approximately 8 million tonnes per annum of close to market high quality stone. This has occurred due to the closing of two large facilities and the management of depleted resources by the owners of the remaining resources.
- An 8 million tonne drop in annual Halton production equates to approximately 240,000 fewer truckloads being shipped from Halton Region each year today than were shipped 15 years ago. Hidden Quarry would be adding back approximately 21,000 truckloads in a busy year to make up a portion of this deficit.

16. What are the Greenhouse Gas implications of "close to market" supply?

- Close to market quarries such as those located in the Amabel formation are the most efficient sources to service the market from a transportation perspective. The Gull River resources are many times further from market than the Amabel reserves.
- The Amabel produces a higher strength, non-reactive concrete that is highly durable, producing concrete infrastructure that lasts longer. Using the best materials in our infrastructure saves time, effort, demolition costs, tax dollars and unnecessary greenhouse gas production.
- As close to market supplies are depleted, construction activity is not affected. Projects continue to be supplied using stone supplies that are shipped in from further away. In some cases lower quality stone is imported to fill the demand gap created by a lack of local, high quality Amabel availability. This burns more fuel and results in structures that are not as high quality.
- By being located so close to the GTA, the Hidden Quarry will reduce the annual amount of kilometers driven by trucks hauling aggregate into the GTA by approximately 1.5 Million kilometers compared to importing long distance material from outside of the GTA. This is equivalent of saving approximately 2000 tonnes of Green House Gas per year.
- Our company alone has shipped millions of tonnes into the GTA from distant quarries over the past decade, primarily due to a lack of availability of local supply.

17. If the Amabel is of higher quality and is closer to market, and generates less GHG in shipping, why isn't more Amabel being brought to market?

- The barriers to extraction of Amabel are regulatory in nature. There is a large amount of Amabel resource close to the GTA, however, there are very few licenses to extract it.
- Amabel production in the GTA is also constrained due to a lack of competitive holdings. The three Amabel Quarries in the GTA are owned by two large vertically integrated multinational companies. Vertical integration means that the same company owns pits and quarries to produce aggregates, ready mix plants that consume aggregates to

produce concrete, and cement plants that produce cement powder used to bind the aggregates into concrete. Some companies are managing their supply to ensure that their own concrete divisions have access to high quality Amabel into the future.

- Recently, three major applications for Amabel quarries, in and close to the GTA, have been turned down by the Government, the OMB and the Joint Board (these are respectively the CBM Flamborough Quarry by Minister`s Zoning Order, the James Dick Rockfort Quarry and the Nelson Crushed Stone Burlington Quarry applications). This has resulted in a lack of replenishment of a dwindling resource and a lack of competition. The trend toward applications being refused has resulted in a chill on new application initiatives for close to market resources within the aggregate industry.

18. What is subaqueous extraction?

- Subaqueous extraction is like digging a pond.
- Most aggregate deposits encounter the natural water table at some depth due to the open, porous nature of sand and gravel and natural water filled cracks and bedding planes in bedrock.
- Subaqueous extraction occurs when material is mined from below the water table without dewatering. This is common practice in Ontario, primarily in Sand and Gravel deposits.
- In bedrock quarries, traditional extraction methods prescribe dewatering the quarry by establishing a sump at the lowest elevation and pumping or draining water from the quarry area to a watercourse for conveyance offsite. Rock is then mined in the dry.
- Subaqueous mining in rock quarries is different from the traditional approach and is carried out by blasting rock and allowing the blasted material to come to rest underwater on the floor of the quarry lake. The blasted rock is removed by dragline or excavator in a manner similar to sand and gravel operations. Water is left in place and no dewatering occurs.
- Subaqueous quarrying takes place in Guelph/Eramosa Township at the Guelph Quarry operated by James Dick Construction Limited. James Dick has also quarried rock subaqueously at our Brechin, Ontario quarry. Subaqueous extraction is very common in the United States and the State of Florida has many very large quarries that use this method exclusively.

19. Can the Amabel Formation be extracted using subaqueous extraction?

- Yes, the Amabel is ideally suited to subaqueous extraction because it does not have discreet layers of alkali reactive rock that require separation or extraction in separate benches.

20. Can the Gull River Formation be extracted using subaqueous extraction?

- No, the Gull River Formation is generally not suitable for subaqueous extraction as there are multiple layers of different quality rock including layers toxic to concrete. Subaqueous mining in one bench would result in contaminated stone unsuitable for use in concrete.

21. What are the operational and environmental advantages of subaqueous extraction at the Hidden Quarry?

- The primary advantage is that no dewatering needs to occur. Hidden Quarry, if approved, will not pump any water offsite. Energy is conserved, water is conserved, water resource storage onsite is increased and impacts on the natural water table are eliminated or are muted.
- Dust generated by blasting is significantly reduced or eliminated.
- Rehabilitation is instantaneous and is not reliant on long lake-filling management periods. Long post-operation lake filling periods are complicated for approvals and regulation and may involve security deposits and a long term post extraction operational presence.
- The system is simple and does not rely on expensive or complex engineering methods to avoid the impacts of drawdown caused by dewatering.

20. What is the History of the Hidden Quarry Site?

- This site has been used historically as a sand and gravel pit over the last 100 years. Our company purchased these lands back in the 1980's. The Pit was identified in the Town Official Plan as an Existing Gravel Pit Operation.
- There were three areas of gravel extraction on the site at various times.
- One old gravel pit is still visible from the sixth line and there is the old wooden wheeled crushing plant onsite along with an old gravel stockpile.
- Two areas of former gravel extraction have evolved into diverse biological communities and they have been set aside from the extraction area and have been included in the environmental buffer areas.
- We tested the property and demonstrated that there are two overlapping resources, sand and gravel on top which is underlain by Amabel dolomite.
- Over the years, while we held this property in reserve, we maintained the Official Plan status of the Aggregate Resource. In 2012 we applied to rezone the site and in 2013 we applied for an Aggregate Resources Act license to permit the quarry that is the subject of this hearing.
- The Hidden Quarry is not located in the Niagara Escarpment Planning Area unlike all other operating Amabel quarries in the GTA.

21. How will the site be operated if approved?

- Archaeology work will be completed.
- The entrance, scale house and driveway will be constructed.
- Re-construction of approximately 200m of the 6th line along with intersection improvements will be completed to Town and MTO standards.
- The hydraulic buffer and perimeter berms will be constructed.
- Sand and Gravel in the processing area will be excavated.
- Berms and setbacks will be reforested.

- The internal haul road will be constructed to Phase One.
- Phase One gravel excavation will commence
- Phase One limestone excavation will commence following gravel extraction.
- Slopes will be progressively rehabilitated and reforested as extraction is completed.
- Shallow water habitat features will be created.
- Similar process for Phase two and Phase three.

22. What can be achieved in securing these approvals at this time?

- This quarry can be operated while protecting ecological systems including natural areas features and functions.
- There has been no agricultural activity other than silviculture (managed pine plantation) on site for many years and as such agricultural resources on this site are not of provincial interest.
- The mineral resources on this site have been conserved and managed such that now is the appropriate time to bring them to market.
- There are no significant cultural, architectural, historical or areas of scientific interest on site and archaeological features are being conserved.
- This location allows supply in a way that will conserve energy and the operation has been designed without the need for dewatering that will conserve water. The proximity of this location to the market means energy will be efficiently used by reducing the transportation requirements. There will be no water taking to dewater the operating area, conserving vast amounts of water compared to most other quarries.
- This site, located right on Highway 7, will make efficient use of the existing Provincial and Regional transportation systems.
- This location, proximate to a strong market, will minimize waste as all products will be consumed. This efficient location will also reduce Green House Gas emissions.
- This location of this Mineral Resource Area is identified in the Official Plan for decades and as such is appropriate location for this type of operation, especially given its non-permanent nature.
- The overall reduction of truck kilometers travelled to supply aggregates in Ontario and highway intersection improvements proposed will contribute to a safe and healthy community.
- This site will provide employment opportunities.
- Provision of this competitive supply along with taxes, levies, employment and corporate community sponsorship will provide for the economic well-being of the Province and the Municipality. According to the Altus Report, over its proposed 20 year lifespan, the Hidden Quarry would contribute \$325 million to GDP.
- There is a strong demand and a supply shortage for these high quality products in the GTA. This site will provide a competitive supply of aggregate materials, consumed by all levels of government in large quantities, taxes, levies, employment and corporate

sponsorship that will enhance the economic well-being of the Province and the municipality.

- Rockwood, as the name implies, has a long history of quarrying and use of geologically related features such as the Rockwood Conservation Area. A quarry and ultimately the attractive rehabilitated land form will encourage a sense of place.

23. In summary, why is the proposed Hidden Quarry, in this close to market location, important to the economic well being of the Province?

- Provincially significant Amabel stone is the highest quality aggregate in Ontario and produces durable concrete that will maximize infrastructure longevity. In the long run this conserves aggregate resources.
- Hidden Quarry stone is many times closer to market than shipping from Gull River sources or from distant Amabel sources. This will conserve fossil fuel and minimize emission of Green House Gases.
- More competition in a market place is a good thing for the consumer, in this case, the taxpayer. There are only three Amabel Quarries in the GTA, owned by two vertically integrated companies. Maintaining a competitive independent concrete industry requires independent sources of stone not under the control of vertically integrated companies who currently dominate the concrete industry in the GTA.



May 17, 2016

Date

Name: Gregory C. Sweetnam, B.Sc.

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How Concrete is Made

In its simplest form, concrete is a mixture of paste and aggregates, or rocks. The paste, composed of portland cement and water, coats the surface of the fine (small) and coarse (larger) aggregates. Through a chemical reaction called hydration, the paste hardens and gains strength to form the rock-like mass known as concrete.

Within this process lies the key to a remarkable trait of concrete: it's plastic and malleable when newly mixed, strong and durable when hardened. These qualities explain why one material, concrete, can build skyscrapers, bridges, sidewalks and superhighways, houses and dams.



Proportioning

The key to achieving a strong, durable concrete rests in the careful proportioning and mixing of the ingredients. A mixture that does not have enough paste to fill all the voids between the aggregates will be difficult to place and will produce rough surfaces and porous concrete. A mixture with an excess of cement paste will be easy to place and will produce a smooth surface; however, the resulting concrete is not cost-effective and can more easily crack.

Portland cement's chemistry comes to life in the presence of water. Cement and water form a paste that coats each particle of stone and sand—the aggregates. Through a chemical reaction called hydration, the cement paste hardens and gains strength.

The quality of the paste determines the character of the concrete. The strength of the paste, in turn, depends on the ratio of water to cement. The water-cement ratio is the weight of the mixing water divided by the weight of the cement. High-quality concrete is produced by lowering the water-cement ratio as much as possible without sacrificing the workability of fresh concrete, allowing it to be properly placed, consolidated, and cured.

A properly designed mixture possesses the desired workability for the fresh concrete and the required durability and strength for the hardened concrete. Typically, a mix is about 10 to 15 percent cement, 60 to 75 percent aggregate and 15 to 20 percent water. Entrained air in many concrete mixes may also take up another 5 to 8 percent.



Other Ingredients

Almost any natural water that is drinkable and has no pronounced taste or odor may be used as mixing water for concrete. Excessive impurities in mixing water not only may affect setting time and concrete strength, but can also cause efflorescence, staining, corrosion of reinforcement, volume instability, and reduced durability. Concrete mixture specifications usually set limits on chlorides, sulfates, alkalis, and solids in mixing water unless tests can be performed to determine the effect the impurity has on the final concrete.

Although most drinking water is suitable for mixing concrete, aggregates are chosen carefully. Aggregates comprise 60 to 75 percent of the total volume of concrete. The type and size of aggregate used depends on the thickness and purpose of the final concrete product

Relatively thin building sections call for small coarse aggregate, though aggregates up to six inches in diameter have been used in large dams. A continuous gradation of particle sizes is desirable for efficient use of the paste. In addition, aggregates should be clean and free from any matter that might affect the quality of the concrete.

Hydration Begins

Soon after the aggregates, water, and the cement are combined, the mixture starts to harden. All portland cements are hydraulic cements that set and harden through a chemical reaction with water called hydration. During this reaction, a node forms on the surface of each cement particle. The node grows and expands until it links up with nodes from other cement particles or adheres to adjacent aggregates.

Once the concrete is thoroughly mixed and workable it should be placed in forms before the mixture becomes too stiff.

During placement, the concrete is consolidated to compact it within the forms and to eliminate potential flaws, such as honeycombs and air pockets.

For slabs, concrete is left to stand until the surface moisture film disappears, then a wood or metal handfloat is used to smooth off the concrete. Floating produces a relatively even, but slightly rough, texture that has good slip resistance and is frequently used as a final finish for exterior slabs. If a smooth, hard, dense surface is required, floating is followed by steel troweling.

Curing begins after the exposed surfaces of the concrete have hardened sufficiently to resist marring. Curing ensures the continued hydration of the cement so that the concrete continues to gain strength. Concrete surfaces are cured by sprinkling with water fog, or by using moisture-retaining fabrics such as burlap or cotton mats. Other curing methods prevent evaporation of the water by sealing the surface with plastic or special sprays called curing compounds.

Special techniques are used for curing concrete during extremely cold or hot weather to protect the concrete. The longer the concrete is kept moist, the stronger and more durable it will become. The rate of hardening depends upon the composition and fineness of the cement, the mix proportions, and the moisture and temperature conditions. Concrete continues to get stronger as it gets older. Most of the hydration and strength gain take place within the first month of concrete's life cycle, but hydration continues at a slower rate for many years.

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Ministry of Natural Resources

**State of the Aggregate Resource in Ontario Study
Paper 3 – The Value of Aggregates**

Report

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Ministry of Natural Resources

**State of the Aggregate Resource in Ontario Study
Paper 3 – The Value of Aggregates**

FINAL REPORT

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Project Number:

112870/60119329

Date:

December 18, 2009

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report:

- are subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represent Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- have not been updated since the date of issuance of the Report and their accuracy is limited to the time period and circumstances in which they were collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- were prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

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This Statement of Qualifications and Limitations is attached to and forms part of the Report.

December 18, 2009

Brian Hollingsworth
Aggregate and Petroleum Resources Section, 5th Floor South Tower
Ontario Ministry of Natural Resources
300 Water St.
P.O. Box 7000
Peterborough ON K9J 8M5

Dear Brian Hollingsworth:

Project No: 112870/60119329

Regarding: SAROS Paper 3 – The Value of Aggregates Draft Final Report

Please find attached the final report of the SAROS Paper 3 – The Value of Aggregates. We are providing four printed copies of our report and we have made the report available electronically to the MNR.

Please don't hesitate to contact me with any questions or if further clarification is required. This has been a highly challenging and stimulating assignment, and we thank you for the opportunity to have worked on this project.

Sincerely,
AECOM Canada Ltd.



JME Maxwell MBA, PMP
Jme.maxwell@aecom.com

JM:lb
Encl.

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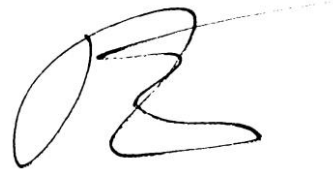
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Report Prepared By:



Andy Keir, M.Sc. (Econ), MCIP, RPP

Report Reviewed By:



JME Maxwell, MBA, PMP

Glossary

Aggregate - The *Ontario Aggregate Resources Act (ARA) and Regulation 244/97 (1990)*, defines aggregates as gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite, rock or other prescribed material

Agriculture Land Capability Class Descriptions (Agriculture and Agri-Food Canada, 2008) include -

- **Class 1** - Soils in this class have no significant limitations in use for crops;
- **Class 2** - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices;
- **Class 3** - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices;
- **Class 4** - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices;
- **Class 5** - Soils in this class have very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible;
- **Class 6** - Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible;
- **Class 7** - Soils in this class have no capacity for arable culture or permanent pasture; and
- **Class 0** - Organic Soils (not placed in capability classes).

ANSI – Area of Natural and Scientific Interests.

Biodiversity - defined by the Convention on Biological Diversity as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (United Nations 1992:Article 2).

CPCA – Canadian Portland Cement Association.

Direct Effects - Initial changes in employment, income and output resulting from production spending in a subject sector.

Downstream Effects – Effects in sectors that purchase goods and services from a subject sector where initial production spending took place.

Economic Outputs – Includes Gross Domestic Product (GDP), Labour Income, Full Time Equivalent (FTE) jobs and Gross Output.

Ecosystem Goods and Services – represent the benefits human populations derive (such as food or waste assimilation), directly or indirectly, from ecosystem functions.

Ecosystem Services – the benefits people obtain from ecosystems. They are subdivided in to five categories:

- **Supporting Service** – provide the basic ingredients that sustain all other ecosystem services;
- **Provisioning Services** – production of food, fiber, energy, genetic resources;
- **Regulating Services** – Regulation of climate, air, water quality, land stability, waste, pests, pollination;
- **Cultural Services** – Research, education, spiritual, recreational benefits; and
- **Preserving Services** – Guarding against uncertainty through the maintenance of biodiversity.

Edge Effects – occur naturally and are induced by human involvement by fractionating a natural area into smaller habitats. The fragmented habitats' new edges experience a different environment , which can change the species composition, gradients of moisture, sunlight, soil, air temperature, wind speed, etc.

FOB (Freight on Board) - Pricing a commodity to include the cost of loading onto freight vehicles at the point of sale but excluding the cost of transporting the goods from the point of sale to the buyer.

Full-Time Equivalent (FTE) Jobs - A ratio indicating the level of employment associated with a business where an FTE of 1.0 represents one person working at full time hours and an FTE of 0.5 represents one person working for half of that time.

Gross Domestic Product (GDP) – The value of all currently produced final goods and services created in a particular time period. This can be considered for the entire economy, or by industry.

Gross Output – The total value of sales related to a good or service, including the value intermediary goods or services used in their production.

Indirect Effects – Subsequent changes in employment, income, and output in all economic sectors that support sectors that are directly affected.

Induced Effects – Subsequent changes in employment, income and output in all economic sectors as a result of income spending by employees in the direct and indirect sectors.

Labour Income – the sum of wages and salaries plus supplementary income.

Model Shock – a “model shock” is the term used for commissioning Statistics Canada to run their Interprovincial Input / Output model for a specific industry account or commodity group using a specified output amount in a selected province. This calibration and subsequent model run, produce a set of multipliers that show how the specified output impacts the Canadian economy directly and indirectly across all industry sectors and commodity groups .

Multipliers - factors of proportionality that measure the effect of one variable on another. For example a \$1 million in gross output may result in \$1.3 million of GDP. The gross output to GDP multiplier is therefore 1.3.

North American Industry Classification (NAIC) – Standard classification system used by national statistical agencies to collect, analyze, code and report upon industry-related activity.

OMB – Ontario Municipal Board.

PDE – Perceived Direct Experience.

Pit - Land or land under water from which unconsolidated aggregate (usually sand and gravel) is being or has been excavated.

Quarry - Land or land under water from which consolidated rock (bedrock) is or has been excavated via blasting.

Social Value - the value (positive, negative or neutral) that people assign to their environment (building or place), a product or a service.

Statistics Canada Input / Output (Stats Can I/O) Models – Portray the economy of a geographic area for a fixed period of time. The models divide all economic activity into sectors. They initially calculate the effect of spending to produce one dollar's worth of output in a subject economic sector. Subsequently, they calculate the “rippled” effects of this first expenditure in all other sectors of the economy that support the subject sector.

Taxes – the taxes referred to in this document include the following:

Federal

- Federal trading profits on lottery and race tracks
- Federal gas tax
- Federal duty tax
- Federal air tax
- GST

Provincial

- Provincial gallon tax
- Provincial trading profits
- Provincial gas tax
- Provincial amusement tax
- P.S.T
- H.S.T

Municipal

- Municipal amusement tax
- M.S.T

TOARC – TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

TOARC has assumed, in the public interest, the responsibilities provided for in an indenture between the Minister of Natural Resources and the Corporation as of the 27th day of June 1997. Those responsibilities include the collection and disbursement of aggregate fees, the rehabilitation of abandoned pits and quarries, the rehabilitation of sites where licences or permits have been revoked, the collection and publication of production statistics and other information and the education and training of those in or interested in the aggregate industry.

Upstream Effects – Effects in sectors that supply goods and services to a subject sector where initial production spending took place.

Executive Summary

The focus of this paper is to determine the value of aggregates in the Province of Ontario. It is one of six papers commissioned by the Ministry of Natural Resources to look at the state of aggregate resources in the province of Ontario. As a collective these six papers are meant to significantly update and expand on the subject matter covered in the 1992 study, "Aggregate Resources of Southern Ontario - a State of the Resource Study" (Planning Initiatives, 1992). The terms of reference for this subject paper specified three areas of investigation.

- Economic Value
- Social Value
- Environmental Value

The economic value of aggregates in Ontario was determined by examining the upstream and downstream flows of aggregates. In the upstream analysis, sector production volumes and values were calculated and then converted later into measures of economic output (i.e. GDP, labour income, full time equivalent (FTE) jobs and gross output). In the downstream perspective assumptions were made based on primary and secondary information about the flow of mineral aggregate to end use sectors. These flows were then valued and converted to measures of economic output. In both the upstream and downstream analyses extensive use was made of information derived from \$1 billion industry sector "shocks" of Statistics Canada's Inter-provincial Input Output Model (Stats Can I/O Model). The resulting multipliers were then used as a basis for calculating upstream and downstream economic outputs.

In 2007, aggregate production in the Province of Ontario inclusive of recycling and export was in the order of 181,000,000 tonnes and new production totalled almost 164,000,000 tonnes. The economic value of this production was approximately \$1.3 billion.

The aggregate industry generates both upstream and downstream effects in the provincial economy. The upstream effects include spending by the aggregate industry on its industry supply chain and the industry itself. In 2007, taking into account direct, indirect and induced effects the sector generates approximately:

- \$1.6 billion of GDP
- \$827 million of labour income
- 16,600 fulltime jobs
- \$2.9 billion of gross output

The downstream economic effects include economic effects in sectors that purchase goods and services from a subject sector where initial production spending took place. The 2007 aggregate production volumes were tracked downstream to 16 end use sectors. These sectors were subsequently grouped into three categories: Cement and Concrete, Other Products and Construction.

Approximately 21% of the provincial aggregate production, by value, flows to industries in the cement and concrete category and 57% to various forms of construction. The remaining 22% is destined for a suite of industry sectors in the Other Products category. The economic output attributable to aggregate production in the downstream sectors is:

- \$1.6 billion of GDP
- \$940 million of labour income
- 18,300 fulltime jobs
- \$3.2 billion of gross output

In terms of the whole industry categories themselves, the majority of the value add (GDP) falls to construction (59%), The cement and concrete category accounts for 22% and the other products category 19%. The downstream industry categories and sectors referred to in this study generate the following economic outputs:

- \$22 billion of GDP
- \$13 billion of labour income
- 245,000 fulltime jobs
- \$44.7 billion of gross output

This paper concluded that aggregate plays an important role in the Ontario economy. Although it is a low price commodity, its use is in a very high volume. It is an essential ingredient for the preceding end use industry categories. And these categories in turn play a large role in the provincial economy.

Aggregate moves to a wide variety of end users and it is an essential ingredient in the industry sectors associated with construction and manufacturing. Although it is not the dominant input in most sectors in terms of value, it is nevertheless an essential input and one for which there is no obvious substitute at the present time.

To further examine the economic impacts of aggregates, case studies were identified by examining the list of 25 infrastructure projects in Ontario with the largest cost or value between 2005 and 2009. Of the 25 largest infrastructure projects the vast majority were energy and hospital/healthcare projects. Almost half of these projects took place in the Greater Toronto Area.

A short list of five infrastructure projects was selected for case studies. Once identified, project information was gathered through unstructured interviews with relevant Project Managers and other Project Contacts. These case studies were selected through a qualitative assessment to find projects that would be aggregate intensive, represent a wide range in project sizes, project types and cover a wide geographic area.

Through the assessment of the value of aggregates in five case studies selected we can conclude that the value of aggregates in infrastructure projects is a relatively small component of the total project. For each of the five case studies that were looked at, all of the projects had a readily available local source of aggregate to be used in the project. Although the value of aggregates is a relatively small component of project value, it is a product that does not have many readily available substitutes and without aggregates available it is unclear how these major projects would proceed.

The social value associated with aggregates and aggregate extraction was examined to facilitate a better understanding of its role in society in terms of the level of importance and costs and benefits. In this area of the study, two main approaches were used to understand how Ontarians value the built environment and the social costs and benefits associated with aggregate extraction. The first approach was through Public Attitude Research that was administered by telephone to 1,420 Ontario residents. The second approach was a content analysis of recorded public comments related to aggregate extraction from Ontario Municipal Board (OMB) hearings and from 31MNR licence applications. These 31 licence applications were supplied by the MNR to represent the most recent licence applications and were also used in the Environmental Value section of this paper. Approximately nine cases from the Niagara Escarpment Commission (NEC) were also reviewed, though not included in the content analysis.

The social costs and benefits of aggregate extraction were assessed through the telephone surveys of Ontario residents. From the perspective of community well-being, respondents in general do not rank development and infrastructure projects highly among the other things that they value about their community. However, when respondents were asked to rate the importance of various development and infrastructure projects, many were ranked with high importance. This leads us to conclude that respondents did not seem willing to trade the most important things that they value about their community for development and infrastructure projects.

Respondents that live near a pit or quarry were more likely to name nuisance effects as a social cost of aggregate extraction. However, respondents that live near an aggregate truck transportation route were more likely to state economic aspects of aggregate extraction as a social benefit. Based on the findings from the geographical variation study, we can conclude that respondents who live in an urban area (such as Area 4 – GTA) rate parks and trails as an important aspect of their community. Also, respondents from the GTA highlighted new institutional buildings as important. Respondents who live in the far northeast and northwest areas of the Canadian Portland Cement Association geographic

areas are most likely to name development and infrastructure projects as a benefit of aggregate extraction.

As a result of the content analyses from a combination of the MNR (31 cases) and OMB data (76 cases), it is clear that the three most frequently reported public complaints are regarding noise pollution, truck traffic and volume and air pollution and dust. These themes were also common among the case files from the NEC, though the NEC files were not coded and included in the content analysis. The content analysis represents public concerns from a specific group of people who are directly affected by the aggregate activities. However, when surveying a more statistically significant representation of the Ontario population (through the Public Attitude Research), environmental impacts emerge as the main costs to aggregate extraction. Therefore, the results from the different approaches of data collection are varied.

Finally, the base knowledge of the aggregate industry seems to be varied and respondents are not very familiar with the aggregate industry. This lack of familiarity indicates that the aggregate industry is not “top of mind” for a statistically significant representation of the Ontario population and there are opportunities to build awareness and education amongst the public.

The environmental value of aggregates was also evaluated in this paper. The importance of aggregates in achieving environmental objectives are often overlooked when contrasted to the more intuitive assessments associated with the removals of forest and wildlife habitat. A careful analysis of the less visible, but equally important, environmental uses of aggregate is important in order to balance the scale and intensity of environmental effects and to determine the net environmental value of the resource in the context of other landscape resources.

This paper presents a comprehensive list of the ecosystem services provided by the use of aggregates. This is illustrated in a matrix that details the nature of the aggregate, use and the environmental benefit accrued to catalogue the ecosystem services affected by the subject 31 licences, initial impacts, rehabilitation targets and net impacts to environmental value over a specified time frame.

The ecosystem services analyzed were examined at the level of primary services, that is, what the aggregate was used for, rather than secondary services enabled (i.e., buildings, roads, etc.). The matrix was broken down into two categories: *Processes*, in which the products of aggregate extraction are used and *Spatial*, where the extraction itself contributes ecosystem services as a consequence of the ultimate rehabilitation of extraction sites and when the aggregates are used for the creation of fixed structures.

Under the *Processes* heading the majority of the ecosystem services were categorized as regulating. This can be explained by the fact that the practices/procedures that are used by Human Land Use Change; Water Quality Treatment; Removal of Anthropogenic Pollutants; Uses in Mines; Landfills and Waste Disposals; and Maintenance of Biodiversity are used to regulate ecosystem processes. The majority of the ecosystem services provided by under the *Spatial* headings were cultural.

The bulk of the negative effects of aggregates on eco-services fall under either regulating (likely due to the associated bi-products of aggregate processing) and preserving services (likely due to the permanent human impact that buildings, roads, dams, etc. have on the developed landscape).

Of the 31 licences analysed, it was concluded that the sites were largely agricultural and environmental features were almost entirely preserved indicating that the legislation, with respect to natural environment, is having an effect on the outcomes. A small amount of good quality habitat was affected due to quarrying. If habitat was affected, on balance it was replaced through rehabilitation efforts. Across the sample of licences, the most significant losses were agricultural land, balanced between prime agricultural lands (Classes 1, 2 and 3 soils) and other agricultural lands.

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- B. Use and Environmental Benefit of Aggregate Matrix

1. Introduction

1.1 Objectives of the Study

The focus of this paper is to determine the value of aggregates in the Province of Ontario. It is one of six papers commissioned by the Ministry of Natural resources to look at the state of aggregate resources in the province of Ontario. As a collective these six papers are meant to significantly update and expand on the subject matter covered in the 1992 study, "Aggregate Resources of Southern Ontario - a State of the Resource Study" (Planning Initiatives, 1992). The terms of reference for the subject paper specified 3 areas of investigation.

- Economic Value
- Social Value
- Environmental Value

The principal objectives to be addressed in the Economic Value section were five-fold:

- 1) Estimate the annual value added of aggregate to the Province of Ontario
- 2) Estimate the current value of some existing infrastructure recently built or revitalized within the province
- 3) Determine the employment generated by aggregate production and consumption
- 4) Determine the key end use industry sectors that consume aggregate and their overall economic value.
- 5) Determine the contribution value of aggregate to these end use industry sectors.

In the Social Value section there were three primary objectives:

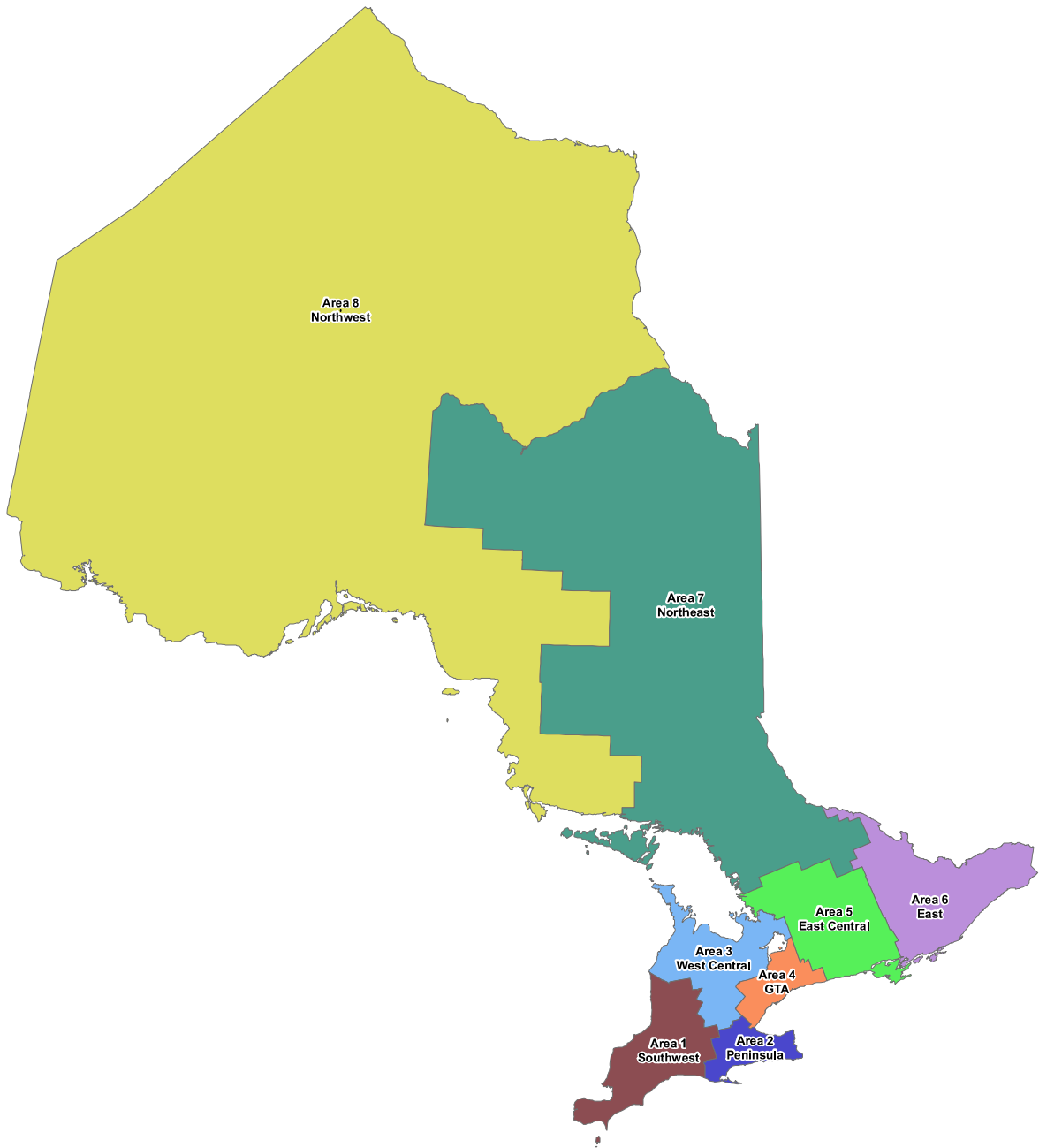
- 1) Determine how the public values the built environment
- 2) Understand the social cost if elements of the built environment were not present
- 3) Determine public attitudes with respect to aggregate extraction

The section addressing Environmental Values had two objectives:

- 1) Provide an overview of the environmental implications of aggregate extraction
- 2) Determine the environmental costs/impacts of aggregate extraction on the selected features of the natural environment in Ontario.

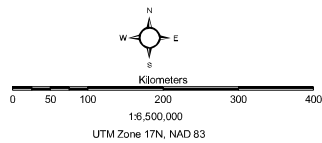
1.2 Scope of the Study

The scope of this study is province-wide. It looks at aggregate production and consumption from a variety of perspectives to assess and draw conclusions on the value of this resource within the province. Where possible, portions of the analysis are presented in terms of the Canadian Portland Cement Association (CPCA) geographic regions (Figure 1-1). This articulation provides a sense of industry scale within different areas of the province. In the discussions that immediately follow, the scope of analysis is discussed for each of the study components.



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex Chatham-Kent Lambton Elgin Middlesex Huron Perth Oxford	Niagara Brant Haldimand Norfolk Hamilton	Bruce Grey Simcoe Dufferin Wellington Waterloo	Toronto Peel York Durham Halton	Kawartha Lakes Peterborough Haliburton Northumberland Hastings Prince Edward Muskoka	Prescott & Russell Leeds & Grenville Stormont, Dundas, & Glengarry Frontenac Greater Ottawa Lanark Renfrew Lennox & Addington	Nipissing Parry Sound Timiskaming Cochrane Sudbury District Greater Sudbury Manitoulin	Algoma Thunderbay Kenora Rainy River

Basemapping from Ontario Ministry of Natural Resources



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**Canadian Portland
Cement Association
(CPCA)
Geographic Areas**

December 2009
Project 60119329



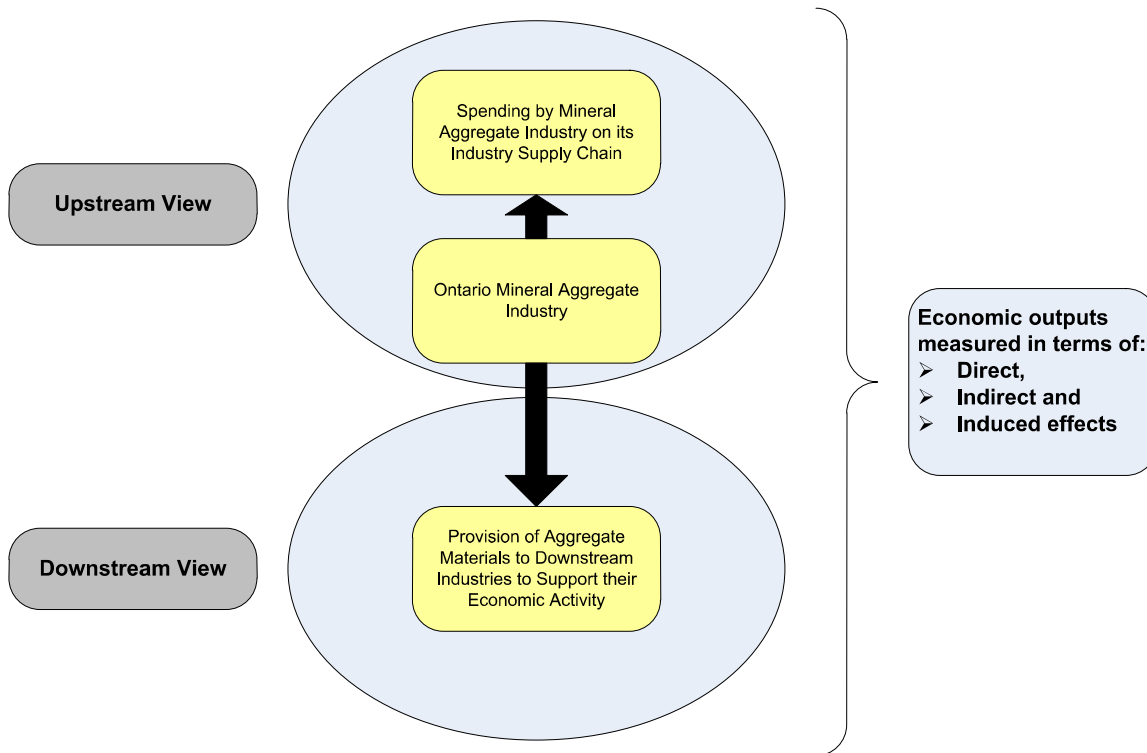
Figure 1-1

1.2.1 Economic Analysis

The economic value of the mineral aggregate industry in the Province of Ontario is derived from two views. The upstream view incorporates the industry sector itself, as well as the industry sectors that support it. The second view involves looking downstream to the industry sectors that use mineral aggregate in the production of goods and products.

Figure 1-2 illustrates the two views. For the purposes of this study we have used the terms “upstream” and “downstream” in the discussions of economic value that ensue. In combination, the values derived from these two perspectives give an overall indication of the value of the aggregate industry in the Province of Ontario.

Figure 1-2 Aggregate Upstream and Downstream Flows



Source: AECOM, 2009

1.2.2 Case Studies

A selection of case studies of aggregate-intensive projects Ontario were selected to help provide an understanding of the value of projects that are enabled through the use of readily available aggregate resources. They also provide an appreciation for the volumes and value of aggregate consumed and societal benefits that these projects enable.

1.2.3 Social Value

For the purposes of this study, social value is defined as the value (either positive, negative or neutral) that people assign to their environment (building or place), a product or a service. The purpose of assessing the social value associated with aggregates and aggregate extraction is to facilitate a better understanding of aggregates' role in society in terms of the level of importance and their costs and benefits. The social value component of this paper is presented according to three broad areas of interest. These are:

1. The Social Value of Public Places
2. The Social Costs of Not Having Available Resources for Infrastructure and Roads
3. The Social Costs of Aggregate Extraction in Ontario

1.2.4 Environmental Value

This report attempts to present a comprehensive list of the ecosystem services provided by the use of aggregates, a matrix that details the nature of the aggregate, the use and the environmental benefit accrued will be provided, and a catalogue of the ecosystem services affected by the target licences, initial impacts, rehabilitation targets and net impacts to environmental value over a specified time frame.

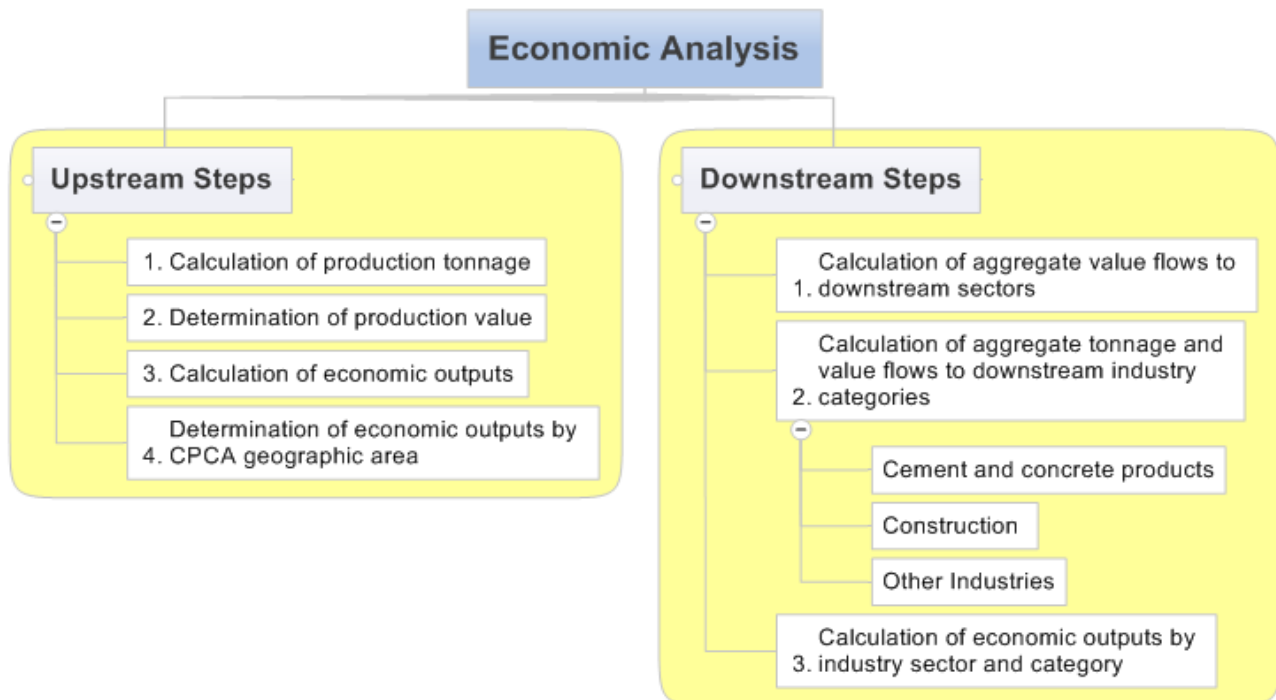
The context of this section will provide an overview of the environmental value of aggregates to the Province of Ontario through extraction and downstream use.

1.3 Study Methodology

1.3.1 Economic Analysis

As previously discussed, determining the economic value of aggregates in Ontario entailed a focus on upstream and downstream perspectives. Assessment of the value of these perspectives involved a number steps (refer to Figure 1-3). In the upstream analysis it was necessary to calculate sector production volumes and values and then convert the latter into measures of economic output (i.e. GDP, labour income, full time equivalent (FTE) jobs and gross output). In the downstream perspective assumptions were made based on primary and secondary information about the flow of mineral aggregate to end use sectors. These flows were then valued and converted to measures of economic output. In both the upstream and downstream analyses extensive use was made of information derived from \$1 billion industry sector “shocks” of Statistics Canada’s Inter-provincial Input Output Model (Stats Can I/O Model). The resulting multipliers were then used as a basis for calculating upstream and downstream economic outputs

Figure 1-3 Economic Analysis – Overview of Methodology



Source: AECOM, 2009

1.3.1.1 Upstream – Production Tonnage

The determination of mineral aggregate production in Ontario was derived by review and tabulation of information from the annual “Mineral Aggregates in Ontario” reports produced by The Ontario Aggregates Resources Corporation (1998 through 2007). In order to facilitate the analysis a model was developed to enable compilation and manipulation of the production information. The model configuration is illustrated in the figure that follows. It calculated production tonnages by CPCA geographic areas for the following four categories of mineral aggregate:

- Sand and gravel;
- Crushed stone;
- Clay shale; and
- Other.

The most recent figures (2007) were used in the subsequent analyses involving the calculation of upstream and downstream economic outputs.

Figure 1-4 Ontario Mineral Aggregate Flows

Source: AECOM, 2009

1.3.1.2 Upstream – Production Value

It was difficult to obtain information on the value of Ontario aggregate production from primary sources. The principal source of information used in this study to derive values was a report published by the Ontario Ministry of Northern Development, Mines and Forestry (2007) entitled, “Ontario Mineral Exploration Statistics”. This document provided production values for the following mineral aggregates over the period 1998 to 2007.

- Sand and gravel
- Stone
- Other material
 - Gypsum
 - Quartz
 - Lime

The values derived from the Ontario Ministry of Northern Development, Mines and Forestry (2007) in conjunction with the tonnages calculated earlier created the platforms for determining upstream and downstream economic outputs.

1.3.1.3 Upstream – Sector Economic Outputs and CPCA Geographic Area Economic Outputs

The aggregate sector outputs were produced using the information from the previous two steps and the multipliers derived from sector shocks of the Stats Can I/O Model. A purpose built model was constructed in this step to perform the calculations. It displayed economic output information in terms of direct, indirect and induced effects for the four categories of economic output previously mentioned (i.e. GDP, labour income, FTE jobs and gross output). It also calculated tax implications according for federal, provincial and municipal regimes. The model also distributed the economic outputs across the eight CPCA geographic areas.

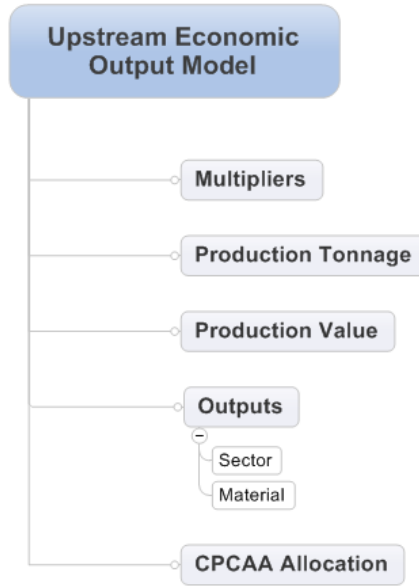
The North American Industry Classification (NAIC) System sectors shocked by Statistics Canada to derive direct and indirect multipliers for the upstream calculations were:

- 212310 – Stone Mining and Quarrying
- 212320 – Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
- 21239A - Miscellaneous Non Metallic Mineral Mining and Quarrying

A fourth shock was also performed on personal expenditures in order to derive the information needed to calculate the induced effects generated by income spending.

The model structure for this part of the analysis is illustrated in Figure 1-5.

Figure 1-5 Upstream Economic Output Model



Source: AECOM 2009

1.3.1.4 Downstream – Sector Flow

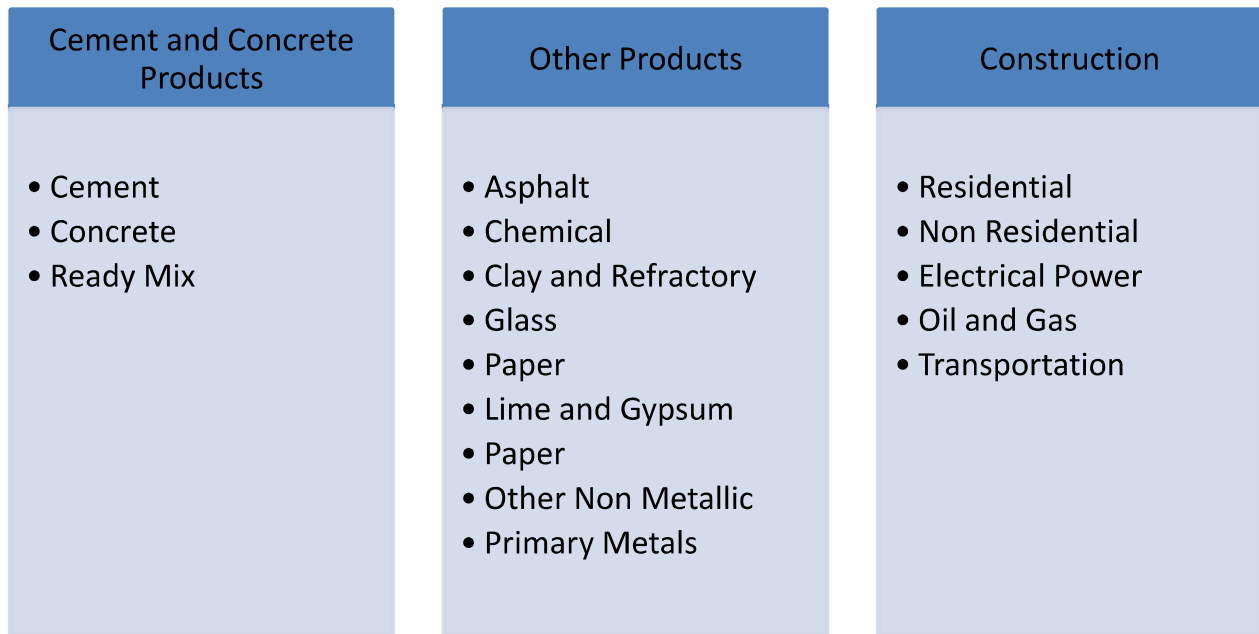
The downstream sectors addressed in this study are listed below by NAIC number and name. For the purposes of this study it was assumed that the industry sectors listed more or less accounted for all aggregate consumption. It is recognized the other industry sectors may also consume aggregate but on an order of magnitude basis it was assumed that their consumption would be relatively minor.

- 2300A0 Residential Building Construction
- 2300B0 Non-residential Building Construction
- 2300C0 Transportation Engineering Construction
- 2300D0 Oil and Gas Engineering Construction
- 2300E0 Electric Power Engineering Construction
- 322 Paper Manufacturing
- 325 Chemical Manufacturing
- 324120 Asphalt Paving, Roofing Material
- 327310 Cement Manufacturing
- 3273A0 Concrete Product Manufacturing

- 327320 Ready Mix Manufacturing
- 327100 Clay Product and Refractory Manufacturing
- 327200 Glass and Glass Product Manufacturing
- 327400 Lime and Gypsum Product Manufacturing
- 327900 Other Non-metallic Mineral Product Manufacturing
- 331 Primary Metal Manufacturing

The industry sectors were subsequently grouped into three categories for purposes of data tabulation and analysis. Figure 1-6 sets out the category groupings.

Figure 1-6 Grouped Downstream Sectors



Source: AECOM, 2009

The Stats Can I/O model was shocked with a \$1 billion output value for each of the highlighted industry sectors. The I/O commodity tables for each sector were then studied to determine the GDP value of sand and gravel, stone and other aggregates highlighted in the shock. Summing all the GDP values for aggregate across all the sectors yielded a total GDP value which in turn permitted an overall apportionment of aggregate by industry sector and aggregate category.

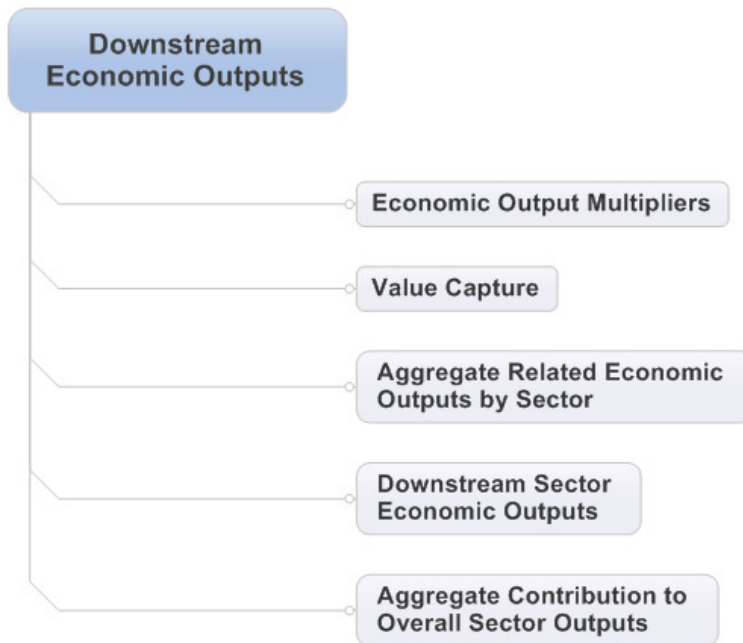
1.3.1.5 Downstream - Sector Contributions

Following on from the analysis and calculations in the preceding step the value flow of aggregate to the different downstream industry sectors was calculated. This calculation involved an apportionment of the mineral aggregate production value derived in the upstream analysis (refer to 1.3.1.2 - Upstream Production Value).

1.3.1.6 Downstream – Economic Outputs

The final part of the economics analysis entailed the calculation of downstream industry sector economic outputs. Direct indirect and induced multipliers derived from the sector shocks of the Stats Can I/O model were used, coupled with the value flow apportionments of aggregate material discussed above. As in previous steps a model was developed to help perform the calculations and manipulate the data. The model structure is set out in Figure 1-7. The end product was a determination of the percentage value of aggregate relative to the overall economic output of each industry sector.

Figure 1-7 Downstream Economic Outputs



Source: AECOM, 2009

1.3.2 Case Studies

Appropriate case studies were identified by examining the list of 25 infrastructure projects in Ontario with the largest cost or value between 2005 and 2009. To be included in the list of projects considered for case studies, projects needed to be under construction in the identified period or have had achieved financial close. From this list of 25 projects, 5 case studies were selected for in-depth examination through qualitative assessment to find aggregate intensive projects, over a wide geographic area and that were inclusive of a range of project types.

Once identified, project information was gathered through informal interviews with relevant Project Managers and other Project Contacts. These informal interviews sought to gain an understanding of the types of aggregate inputs used (or estimated for use) in these projects, their costs and sources. In some cases, not all the information was available. These data were used to calculate the economic impacts of each case study using the methodology identified in section 1.3.1.6.

1.3.3 Social Value

1.3.3.1 Overview

In this area of the study, two main approaches were used to gather and collect data from the public to understand how Ontarians value the built environment and the social costs and benefits associated with aggregate extraction. The first approach was public attitude research, through the use of a telephone survey, that was administered by telephone to 1,420 Ontario residents. The second approach was a content analysis of recorded public comments related to aggregate extraction.

1.3.3.2 Telephone Survey – Public Attitude Research

The survey instrument was designed to gain an understanding of how the Ontario public view, understand and values aggregates as well as the perceived social costs and benefits of aggregate extraction. Since “aggregate” is not a widely used or particularly common-place term, “development and infrastructure projects” was used in the survey to represent aggregate-related uses and “sand, stone and gravel” was used to represent aggregates as a resource. Background information on the aggregate industry was given to each respondent as starting points for key sections throughout the survey. A copy of the survey instrument can be found in Appendix A. The questions for the telephone survey were grouped into 6 sections.

Survey Section 1 - Perceived Engagement with Aggregate Industry

It was assumed that a respondents' perceived engagement with the aggregate industry might influence their level of social value placed on aggregate resources, and so these questions were phrased to provide a basis for cross-tabular analyses. To assess this, respondents were asked if they thought they lived near a pit or quarry, near an aggregate transportation route, or had someone in their household (including themselves) employed by the aggregate or a related industry, such as construction¹.

Survey Section 2 - Factors Contributing to Community Well-Being

Respondents were asked to describe the three things they thought were most important to the well-being of their community, and were also asked which of those three things, if any, were more or less important than development and infrastructure projects. The purpose of these questions was to understand the types of things that people value about their community, and also how they rank the relative importance of aggregate-related projects to their community's well-being.

Survey Section 3 - Value of Development and Infrastructure Projects

In this section, respondents were asked to rank the importance of different types of development and infrastructure projects. These included maintaining or repairing existing highways or roads, building new airports, institutional buildings, energy facilities, new highways or roads, railways, residential buildings and industrial buildings. These questions were rotated at random to avoid bias in response patterns. The purpose of assessing how respondents value different types of major development and infrastructure projects was to allow the study team to forecast the impact of not having the resources available for these projects.

Survey Section 4 - Knowledge of the Aggregate Industry

A subset of questions was posed to assess respondents' knowledge of the aggregate industry. These questions sought to gauge how familiar respondents were with average aggregate use in Ontario per person, generally where aggregates are extracted from, and the main modes of transportation used to move aggregates from their extraction sites to processing or end use locations. This subset of questions was used to assess how well respondents understood the aggregate industry.

¹ It should be noted that few respondents (3%) stated that they or someone in their household was employed by the aggregate or a related industry. Therefore, in the remainder of this report, perceived engagement with the aggregate industry only refers to perceived proximity to a pit, quarry, or aggregate transportation route.

Survey Section 5 - Social Costs and Benefits of Aggregate Extraction

In Section 5, two separate questions were used to ask respondents what they thought were the three main social costs and benefits of aggregate extraction. Respondents were prompted to give up to three responses, but in many cases, less than three per question were given. It should be noted that respondents were not asked to weigh the relative costs against the benefits.

Survey Section 6 - Demographic Information

Finally, the last section was used to collect general demographic information from each respondent. The type of information requested included the respondent's postal code, age, gender (by observation) and income. These demographic questions are standard survey protocol, and some of this information was used for cross-tabular analyses of the survey results in the Intellipulse report. The questions were optional and in some cases, respondents did not provide any information.

Survey Implementation

AECOM designed the survey instrument and contracted an independent firm, Intellipulse, to design the survey sample, administer the survey by telephone and compile the raw data. A copy of the full report from Intellipulse can be found in Appendix A.

Respondents were drawn from random sample of 1,420 Ontario Residents. A disproportional provincial sample allocation was developed in order to have a sufficient sample size in each of the eight CPCA geographic areas. Sample sizes in each of the eight areas ranged from 152 to 354 respondents. This sampling approach yielded a minimum accuracy level of +/- 8.1%, 19 out of 20 times, with an accuracy level of +/- 2.6%, 19 out of 20 times, for all of Ontario. A pretest was conducted under direct supervision from Intellipulse and AECOM to ensure quality control and ease of administration. The average survey duration was 15 minutes.

1.3.3.3 Content Analyses

Two sets of content analyses were undertaken to collect, numerate and code the types of concerns the public associated with aggregate operations. These public concerns provided insight to the social costs of aggregate extraction, in Ontario. The data for the two set of content analyses were taken from MNR site licence applications and from Ontario Municipal Board (OMB) hearings.

The MNR provided AECOM with public comments associated with the most recent 31 site licence applications in Ontario. In some cases, no public comments were received for some of these licences. In total, 14 licence applications had recorded public comments. All recorded public comments (e.g., petitions, letters or emails) were reviewed, numerated and coded among common themes.

OMB hearing data were obtained by searching the OMB website for relevant aggregate-related case files from 2001 to 2009. A total of 76 OMB cases were reviewed, numerated and coded for common themes in public concerns.

In addition, approximately 9 case files from the Niagara Escarpment Commission (NEC) were reviewed, though they were not numerated or coded. A more qualitative discussion of these records is provided in the following sections.

It should be noted, however, that the public comments from the OMB, MNR and NEC data are not representative for the Ontario population, but represent a specific group of public stakeholders.

1.3.4 Environmental Value

The focus of this initiative was to analyse the important environmental contributions of aggregate use in Ontario. This analysis is broken down into two sections: Environmental Uses of Aggregates and Environmental Impacts of Aggregate Extraction. The following explains the methodology for each section.

1.3.4.1 Environmental Uses of Aggregates

A literature review was undertaken, focussed on understanding how products of the aggregate industry in Ontario provide environmental value, and how aggregates are used in environmental processes such as water filtration, reduction in energy cost and emissions and the creation of wildlife habitat. The United Nations Millennium Ecosystem Assessment provides an approach to the analysis of ecosystem services that was demonstrated in *Ontario's Wealth, Canada's Future: Appreciating the Value of the Greenbelt's Eco-services* (David Suzuki Foundation 2008). Interviews with experts in the aggregate field were conducted (including the Ontario Sand and Gravel Association; Ontario Aggregate Resources Corporation; and the Ministry of Natural Resources) to fill gaps that were not found in written documents. A matrix of ecosystem services and aggregates versus the natural environment was developed based on this research. Analyses were limited to primary uses, i.e., the immediate products of extraction, and not derived benefits (secondary or indirect uses). For example, aggregates are used to build hospitals, but health care was not identified as an environmental value associated with aggregate extraction.

1.3.4.2 Environmental Impacts of Aggregate Extraction

Aggregate resources are always located in association with other land uses that generally include agriculture and natural areas. In recognition that competition for these resources can create conflicts, the Aggregate Resources Act requires that a rehabilitation plan be identified that is implemented sequentially as extraction progresses. The intent of this section of the study was to examine the existing land uses within the last 31 approved licences, and compare these uses to those identified post extraction through the rehabilitation plans. Ecosystems services provided by the natural environment (outside of benefits provided by the aggregates themselves), provide an estimate of short term impact versus the long term impact following rehabilitation and an estimate of the net change. A catalogue of the ecosystem services affected by the target licences, initial impacts, rehabilitation targets and net impacts to environmental value over a specified time frame was developed as a baseline database against which the environmental benefits of aggregate use could be compared.

The MNR provided the natural heritage reports and rehabilitation plans for the 31 most recent aggregate approvals. The net effects of these were determined by comparing site plans to the associated reporting, historical air photos and Natural Resources and Values Information System (NRVIS) layers in a GIS (Geographic Information System) environment.

Method to determine Area Data:

- Operational and Rehabilitation Plans, for each licence, were geo-referenced into GIS and Licence and Extraction Boundaries were then mapped
- Boundaries were correlated with the report for each licence natural heritage and NRVIS layers to obtain area coverage of forest, wetlands, ANSI, lakes, etc. within the extraction and licenced areas
- Rehabilitation areas were determined by the same process using the Rehabilitation Plans.
- Agricultural areas were determined by obtaining the agricultural overview of Ontario from Agriculture and Agri-Food Canada and then processed via the same manner as noted above.

Once areas were quantified into area of impact, percent of landscape affected and percent change the nature of the environmental features affected by the licences was characterized.

The valuation was limited to areas and qualitative description of the ecosystem services affected. The application of economic models to assign dollar values to the resources was outside of the scope of this report.

1.3.4.3 *Limitations of Current Aggregate and Ecosystem Service Valuation Research*

Limitations in conducting Ontario's aggregate industry and ecosystem service valuation research include:

- 1) The availability of ecosystem services information
- 2) Application of eco-services does not reflect the magnitude of the services (either positive or negative)
- 3) The data varied by scale and classification which introduced errors into the analysis (e.g. 'lake' was really 'river'; scale of soils mapping was much smaller than that of the mapping in the licences)
- 4) The NRVIS layers may have conflicted with licence natural areas due to the date of information acquired

Although these methodologies proved to be coarse, these initial steps to provide a framework for assessment of actual environmental effects of aggregate extractions as opposed to intuitive assumptions.

2. The Value of Aggregates

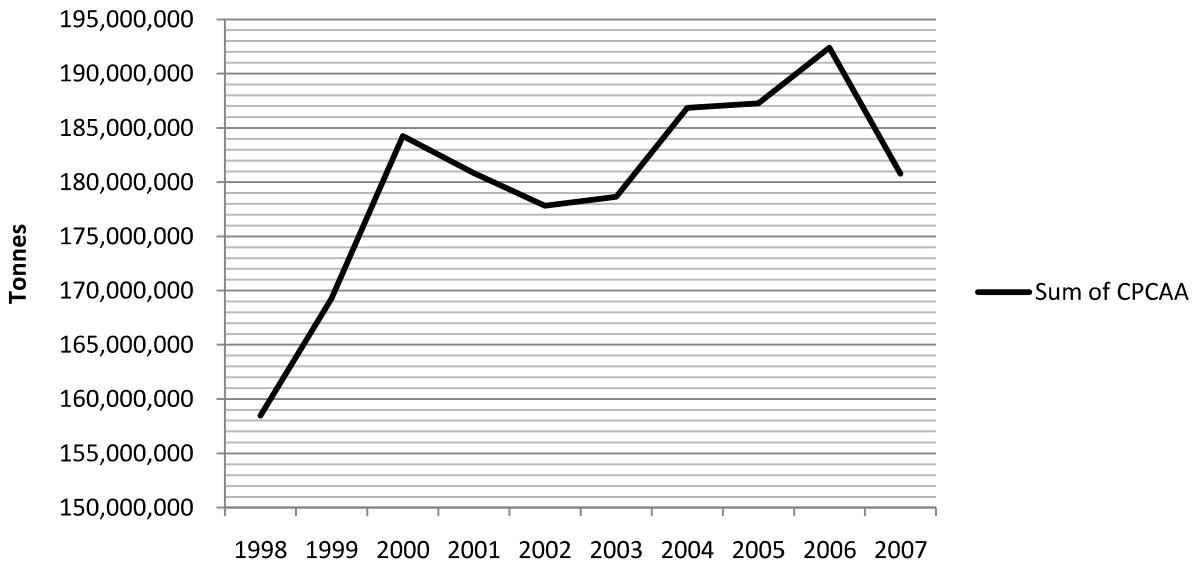
2.1 Economic Analysis – Upstream and Downstream Value

2.1.1 Upstream Value

2.1.1.1 Overall Aggregate Production

Based on the TOARC data the net tonnage of aggregate production in Ontario inclusive of new production, recycling and import of material was in the order of 181 million tonnes in 2007. Figure 2-1 illustrates the trend since 1998. The production peak for the period occurred in 2006 at 192 million tonnes.

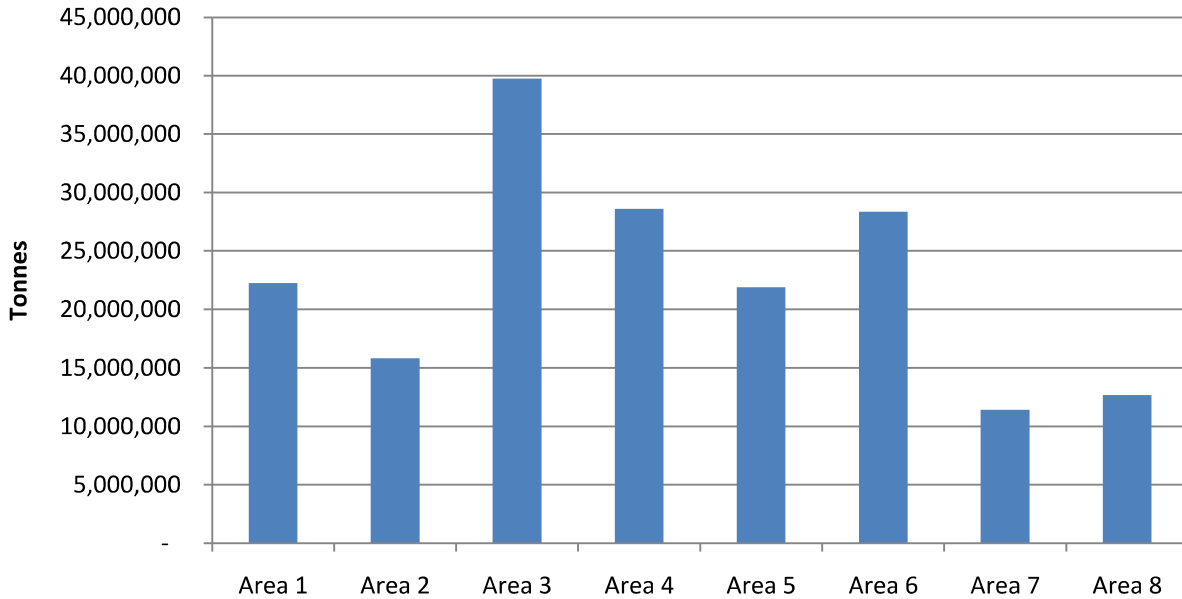
Figure 2-1 Overall Aggregate Production, 1998-2007



Source: TOARC, 1998 - 2007

The distribution of net production by CPCA geographic areas (see Figure 1-1) is set out in Figure 8. Area 4 (GTA) and Area 3 (West Central) are the dominate production areas with annual tonnage in the order of 30million tonnes. These are respectively followed by Area 6 (East) and Area 1 (Southwest) with tonnages between 21 million and 25 million tonnes. Area 2 (Peninsula) and Area 5 (East Central) fall in the 15 million to 20 million tonne range while Areas 7 (Northeast) and 8 (Northwest) fall in a 9 million to 12 million tonne bracket.

Figure 2-2 Net Production of Mineral Aggregate by CPCA Geographic Area (2007)



Source: AECOM, 2009

2.1.1.2 *New Production Tonnages and Value*

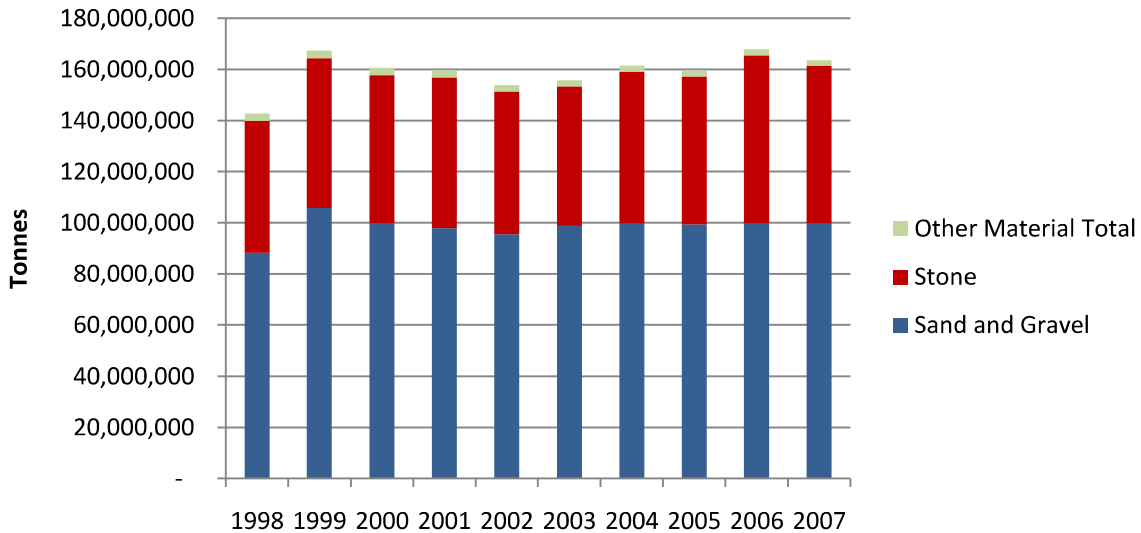
The previous section provided statistics on the overall production of aggregates in the Province including recycling and import. In this section the focus is exclusively on new production by three categories of material namely sand and gravel, stone and other (inclusive of gypsum, quartz and lime). In 2007 total production of these materials amounted to 164million tonnes. Of this total sand and gravel accounted for 61% of the volume followed by stone at 38% and other materials at 1%. Table 2-1 and Figure 2-3 provide statistics over the 1998 to 2007 period.

Table 2-1 New Aggregate Production by Material Category (1998-2009)

	Sand and Gravel	Stone	Other Material Total	Sum of Material
1998	88,186,000	51,639,000	2,859,000	142,684,000
1999	105,714,000	58,704,000	2,993,000	167,411,000
2000	99,848,000	57,969,000	2,768,000	160,585,000
2001	97,878,000	58,972,000	2,615,000	159,465,000
2002	95,464,000	55,945,000	2,514,000	153,923,000
2003	98,726,000	54,622,000	2,444,000	155,792,000
2004	99,581,000	59,584,000	2,316,000	161,481,000
2005	99,382,000	57,876,000	2,219,000	159,477,000
2006	99,671,000	65,860,000	2,325,000	167,856,000
2007	99,646,000	61,822,000	2,232,000	163,700,000

Source: AECOM, 2009

Figure 2-3 New Aggregate Production by Material Category (1998 - 2007)



Source: AECOM, 2009

Based on 2007 statistics compiled by the Province of Ontario, the value of new aggregate production totalled approximately \$1.27 billion at the pit gate before delivery (i.e. FOB). Stone accounted for 50% of this value followed by sand and gravel at 39% and other materials at 12%. Table 2-2 sets out the total value trends over the period 1998 to 2007. Table 2-3 translates these values to a per tonne basis.

Table 2-2 Value of Ontario Aggregate Production (1998 - 2007)

	Sand and Gravel	Stone	Other Material Total	Sum of Material
1998	\$408,588,000	\$437,475,000	\$166,636,000	\$1,012,699,000
1999	\$504,422,000	\$476,446,000	\$183,334,000	\$1,164,202,000
2000	\$469,494,000	\$595,367,000	\$166,651,000	\$1,231,512,000
2001	\$547,751,000	\$592,647,000	\$144,248,000	\$1,284,646,000
2002	\$470,168,000	\$584,925,000	\$153,458,000	\$1,208,551,000
2003	\$491,729,000	\$575,281,000	\$149,312,000	\$1,216,322,000
2004	\$490,915,000	\$636,714,000	\$162,825,000	\$1,290,454,000
2005	\$487,764,000	\$581,067,000	\$156,577,000	\$1,225,408,000
2006	\$505,041,000	\$681,212,000	\$155,244,000	\$1,341,497,000
2007	\$490,428,000	\$628,556,000	\$149,716,000	\$1,268,700,000

Source: AECOM, 2009

Note: These numbers reflect FOB prices

Table 2-3 Per Tonne Value of Aggregate Production (1998 - 2007)

	Sand and Gravel	Stone	Other Material Total
1998	\$4.63	\$8.47	\$145.84
1999	\$4.77	\$8.12	\$152.67
2000	\$4.70	\$10.27	\$151.44
2001	\$5.60	\$10.05	\$149.50
2002	\$4.93	\$10.46	\$156.32
2003	\$4.98	\$10.53	\$160.11
2004	\$4.93	\$10.69	\$177.05
2005	\$4.91	\$10.04	\$173.14
2006	\$5.07	\$10.34	\$175.80
2007	\$4.92	\$10.17	\$177.53

Source: AECOM, 2009

Note: These numbers reflect FOB prices

2.1.1.3 Economic Outputs of New Production

The economic outputs of new production are highlighted in the following Tables 2-4, 2-5 and Figures 2-4 to 2-6. In 2007 the \$1.27 billion of direct gross output generated by the sector created approximately \$1.6 billion of total GDP, \$ 827 million of total labour income, a total of 16,600 full time jobs and \$ 2.9 billion in total gross output. For the same year the federal provincial and municipal taxes generated by the production respectively totalled \$32 million, \$45 million and \$75,000. Tables 2-4 and 2-5 provide a view of the direct, indirect and induced outputs by material category for the total volume of production. Tables 2-6 and 2-7 convert these figures to a per tonne metric.

The numbers generated in the ensuing tables are derived through the use of Statistics Canada's Inter-provincial Input /Output Model. This model is the preeminent model in Canada for the calculation of industry account information. It is very widely used and its results are accepted by a broad spectrum of users including the Bank of Canada, Conference Board of Canada and the finance departments of the Canadian Provinces and Territories. It is large and comprehensive model designed specifically to produce account information for industry and commodity groups across the country. The model has five main outputs: GDP, labour income, full time equivalent jobs, gross output and taxes. It should be noted that for taxes, the numbers do not include income tax or property tax. The actual tax categories accounted for are listed in the glossary.

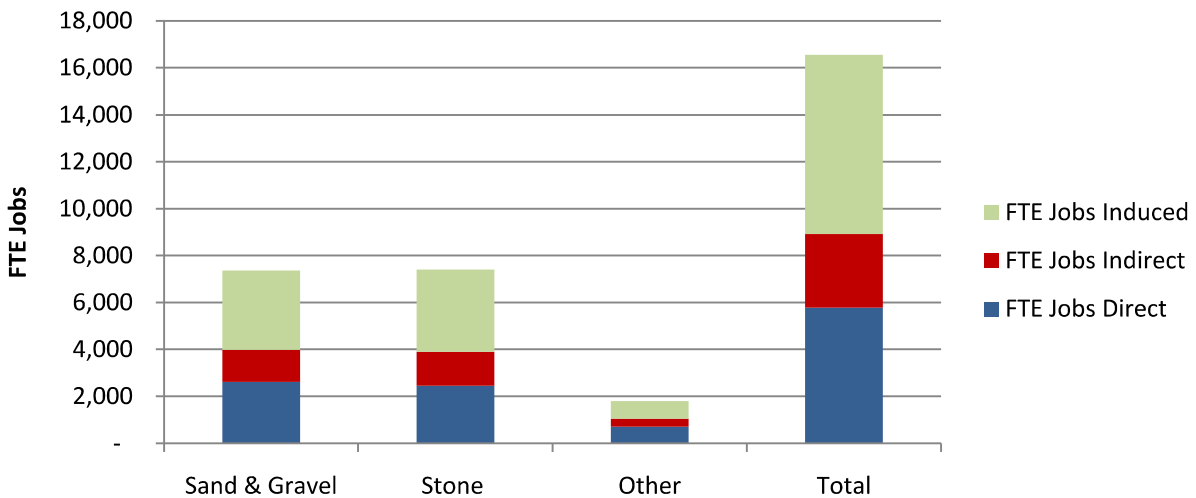
Table 2-4 Upstream Economic Outputs (2007)

		Sand and Gravel	Stone	Other Material Total	Sum of Material
GDP	Direct	\$265,290,667	\$368,639,294	\$77,537,661	\$711,467,622
	Indirect	\$125,066,971	\$138,892,019	\$35,604,367	\$299,563,358
	Induced	\$281,260,493	\$290,577,067	\$61,576,079	\$633,413,640
	Total	\$671,618,131	\$798,108,381	\$174,718,107	\$1,644,444,619
Labour Income	Direct	\$129,865,594	\$128,586,844	\$27,577,918	\$286,030,356
	Indirect	\$74,240,240	\$82,279,866	\$17,106,768	\$173,626,875
	Induced	\$163,042,190	\$168,442,858	\$35,694,664	\$367,179,712
	Total	\$367,148,025	\$379,309,568	\$80,379,350	\$826,836,943
FTE Jobs	Direct	2,615	2,451	714	5,780
	Indirect	1,358	1,446	339	3,142
	Induced	3,388	3,500	742	7,630
	Total	7,361	7,397	1,794	16,552
Gross Output	Direct	\$490,428,000	\$628,556,000	\$149,716,000	\$1,268,700,000
	Indirect	\$199,228,038	\$270,481,475	\$53,982,499	\$523,692,012
	Induced	\$468,765,380	\$484,292,933	\$102,626,336	\$1,055,684,650
	Total	\$1,158,421,418	\$1,383,330,408	\$306,324,836	\$2,848,076,662

Source: AECOM, 2009

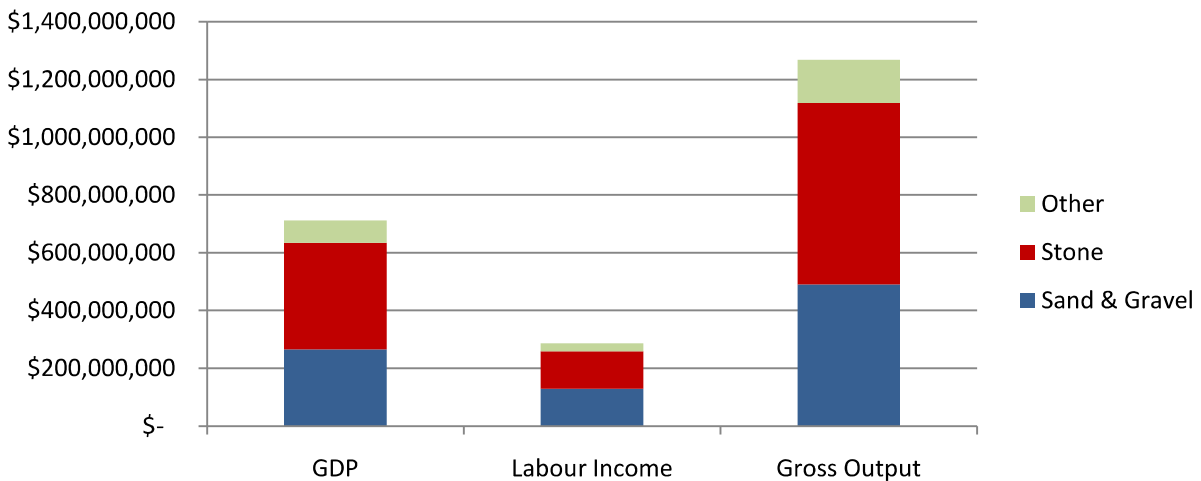
It is noted that there is sometimes confusion surrounding the terms GDP and Gross Output. Gross Output is the value of sales generated by the producing sector before subtracting the value of intermediate goods used up in production. By contrast GDP is a net measure. It is the value of production in an industry sector after the preceding subtraction has taken place. GDP is the common measure of value add.

Figure 2-4 Upstream Job Creation (2007)



Source: AECOM, 2009

Figure 2-5 Upstream Economic Outputs - GDP, Labour Income and Gross Output (2007)



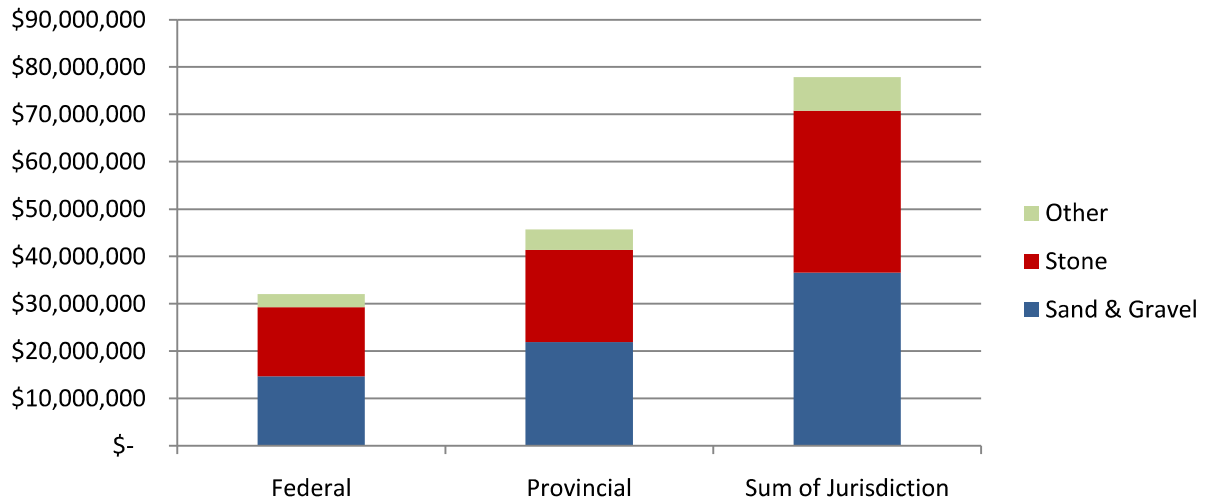
Source: AECOM, 2009

Table 2-5 Upstream Tax Outputs (2007)

	Sand and Gravel	Stone	Other Material Total	Sum of Material
Federal	\$14,675,603	\$14,566,086	\$2,799,757	\$32,041,446
Provincial	\$21,894,339	\$19,515,161	\$4,299,777	\$45,709,277

Source: AECOM, 2009

Figure 2-6 Upstream Tax Outputs (2007)



Source: AECOM, 2009

Table 2-6 Upstream Economic Outputs per Tonne (2007)

		Sand and Gravel	Stone	Other Material Total
GDP	Direct	\$2.66	\$5.96	\$91.94
	Indirect	\$1.26	\$2.25	\$42.22
	Induced	\$2.82	\$4.70	\$73.02
	Total	\$6.74	\$12.91	\$207.18
Labour Income	Direct	\$1.30	\$2.08	\$32.70
	Indirect	\$0.75	\$1.33	\$20.29
	Induced	\$1.64	\$2.72	\$42.33
	Total	\$3.68	\$6.14	\$95.31
FTE Jobs	Direct	0.00003	0.00004	0.00085
	Indirect	0.00001	0.00002	0.00040
	Induced	0.00003	0.00006	0.00088
	Total	0.00007	0.00012	0.00213
Gross Output	Direct	\$4.92	\$10.17	\$177.53
	Indirect	\$2.00	\$4.38	\$64.01
	Induced	\$4.70	\$7.83	\$121.69
	Total	\$11.63	\$22.38	\$363.24

Source: AECOM, 2009

Table 2-7 Upstream Tax Outputs per Tonne (2007)

	Sand and Gravel	Stone	Other Material Total
Federal	\$0.15	\$0.24	\$3.32
Provincial	\$0.22	\$0.32	\$5.10

Source: AECOM, 2009

2.1.1.4 Economic Outputs of new Production by CPCA Geographic Area

The economic effects of new mineral aggregate production by CPCA area are summarized in Tables 2-8 to 2-12. The numbers presented are a summation of direct, indirect and induced effects.

The mineral aggregate sector in Ontario generates \$1.6 billion of GDP. Forty-nine percent is attributable to the stone production, 41 % to sand and gravel production and 10% to the production of other materials.

The total labour income produced amounts to \$827 million and of this sum allocations are 46% to stone production, 44% to sand and gravel and 10% to other materials.

Job creation sums to approximately 16,600 fulltime positions. The sand and gravel and stone production each roughly account for 45% of the jobs and other materials make up the remaining 10%.

Gross output totals \$2.85 billion with stone accounting for 49% of this figure and sand and gravel and other materials respectively accounting for 41% and 10%.

Taxes generated by the sector amount to \$77.8 million and of this amount the federal portion is 40% provincial portion 59% and the municipal portion less than 1 %.

In terms of CPCA areas the dominant area with respect to economic output in the case of sand and gravel is Area 3 (West Central) followed by Areas 1 (Southwest) and Area 4 (GTA). When it comes to stone production Area 6 (East) comes out on top followed by Area 4 (GTA) and then Areas 2 and 5 (Peninsula and East Central). Effects associated with other materials are most strongly represented by Area 6 (East) and Area 7 (Northeast).

Table 2-8 Upstream GDP Outputs by CPCA Areas (2007)

	Sand & Gravel	Stone	Other	Sum of Sector
Area 1	\$111,437,643	\$52,344,862	\$3,034,270	\$166,816,775
Area 2	\$31,985,952	\$121,923,475	\$1,541,491	\$155,450,918
Area 3	\$200,860,127	\$88,896,158	\$10,510,697	\$300,266,981
Area 4	\$102,140,693	\$128,353,121	\$45,236,366	\$275,730,180
Area 5	\$70,104,732	\$120,638,658	\$7,878,115	\$198,621,505
Area 6	\$60,547,934	\$197,437,759	\$53,240,873	\$311,226,566
Area 7	\$25,182,291	\$68,926,422	\$51,968,870	\$146,077,583
Area 8	\$69,358,759	\$19,587,926	\$1,307,425	\$90,254,110
Sum of CPCA	\$671,618,131	\$798,108,381	\$174,718,107	\$1,644,444,619

Source: AECOM, 2009

Table 2-9 Upstream Labour Income Outputs by CPCA Areas (2007)

	Sand & Gravel	Stone	Other	Sum of Sector
Area 1	\$60,918,710	\$24,877,457	\$1,395,921	\$87,192,088
Area 2	\$17,485,500	\$57,945,439	\$709,165	\$76,140,105
Area 3	\$109,802,573	\$42,248,852	\$4,835,463	\$156,886,888
Area 4	\$55,836,423	\$61,001,198	\$20,811,064	\$137,648,684
Area 5	\$38,323,584	\$57,334,816	\$3,624,340	\$99,282,740
Area 6	\$33,099,247	\$93,834,413	\$24,493,550	\$151,427,210
Area 7	\$13,766,198	\$32,758,021	\$23,908,364	\$70,432,583
Area 8	\$37,915,789	\$9,309,372	\$601,483	\$47,826,644
Sum of CPCA	\$367,148,025	\$379,309,568	\$80,379,350	\$826,836,943

Source: AECOM, 2009

Table 2-10 Upstream FTE Job Outputs by CPCA Areas (2007)

	Sand & Gravel	Stone Mining	Other	Sum of Sector
Area 1	1,221	485	31	1,738
Area 2	351	1,130	16	1,496
Area 3	2,201	824	108	3,133
Area 4	1,119	1,190	465	2,774
Area 5	768	1,118	81	1,967
Area 6	664	1,830	547	3,040
Area 7	276	639	534	1,449
Area 8	760	182	13	955
Sum of CPCA	7,361	7,397	1,794	16,552

Source: AECOM, 2009

Table 2-11 Upstream Gross Output by CPCA Areas (2007)

	Sand & Gravel	Stone Mining	Other	Sum of Sector
Area 1	\$192,210,047	\$90,727,325	\$5,319,840	\$288,257,212
Area 2	\$55,170,059	\$211,325,247	\$2,702,622	\$269,197,928
Area 3	\$346,447,873	\$154,080,274	\$18,427,898	\$518,956,045
Area 4	\$176,174,468	\$222,469,504	\$79,310,740	\$477,954,711
Area 5	\$120,918,152	\$209,098,322	\$13,812,320	\$343,828,794
Area 6	\$104,434,381	\$342,211,237	\$93,344,656	\$539,990,274
Area 7	\$43,434,958	\$119,467,503	\$91,114,515	\$254,016,976
Area 8	\$119,631,481	\$33,950,995	\$2,292,246	\$155,874,722
Sum of CPCAA	\$1,158,421,418	\$1,383,330,408	\$306,324,836	\$2,848,076,662

Source: AECOM, 2009

Table 2-12 Taxes

	Federal	Provincial	Municipal	Sum of Jurisdiction
Area 1	\$3,438,992	\$4,987,396	\$7,901	\$8,434,289
Area 2	\$2,948,826	\$4,061,903	\$6,899	\$7,017,629
Area 3	\$6,179,868	\$8,980,251	\$14,216	\$15,174,335
Area 4	\$5,299,317	\$7,581,443	\$12,473	\$12,893,232
Area 5	\$3,859,856	\$5,429,079	\$8,997	\$9,297,931
Area 6	\$5,779,584	\$8,111,775	\$13,722	\$13,905,080
Area 7	\$2,640,992	\$3,785,244	\$6,382	\$6,432,618
Area 8	\$1,894,011	\$2,772,188	\$4,334	\$4,670,533
Sum of CPCAA	\$32,041,446	\$45,709,277	\$74,924	\$77,825,648

Source: AECOM, 2009

2.1.2 Downstream Value

2.1.2.1 Downstream Flows

The calculation of downstream flows in this study was largely accomplished via the use of the commodity tables associated with the Stats Can I/O model. As different sectors were shocked with a \$1 billion gross output value, the commodity tables chronicled the GDP contributions for aggregate resources required to underpin this figure. These contributions were summed for all of the sectors and then an apportionment was calculated for each sector. Table 2-13 presents the apportionment summary.

Table 2-13 GDP Apportionment of Aggregate by Downstream Industry Categories and Sectors

Cement and Concrete	Cement	1.54%
	Ready Mix	12.26%
	Concrete	7.44%
	Sum of Cement and Concrete	21.24%
Other Products	Asphalt	6.95%
	Chemical	0.39%
	Clay	0.95%
	Glass	2.25%
	Lime & Gypsum	1.02%
	Paper	5.38%
	Other Non Metallic	3.81%
	Primary Metal	1.20%
	Sum of Other	21.93%
Construction	Residential	20.13%
	Non Residential	10.50%
	Electrical	1.14%
	Oil & Gas	0.13%
	Transportation	24.92%
	Sum of Construction	56.82%
Total		100.00%

Source: AECOM, 2009

The construction category accounts for the majority of aggregate consumption at approximately 57%. Cement and concrete consume another 21% and other products consume the remaining 22%. There is a close tie between construction and cement and concrete products as well asphalt and clay and lime and gypsum products. When the latter are amalgamated, their total apportionment approaches 87% of aggregate consumed.

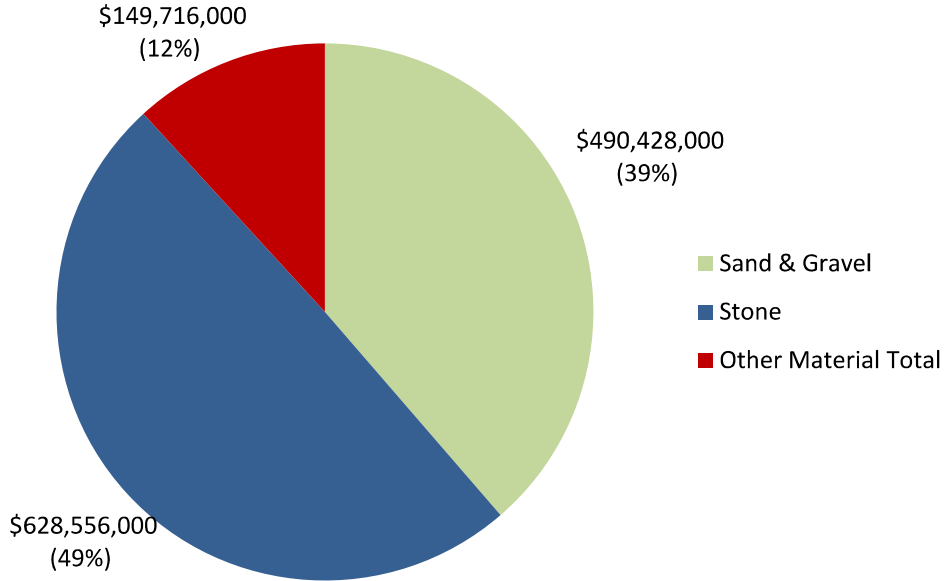
The allocation of the 2007 aggregate production value (i.e. \$1.27 billion) across the industry categories and sectors is displayed in Table 2-14 and Figure 2-7. Construction consumes \$720 million of the production, cement and concrete consume \$270 million and other products consume \$278 million.

Table 2-14 Apportionment of Aggregate Production Value by Downstream Industry Categories and Sectors

Cement and Concrete	Cement	\$19,544,755
	Ready Mix	\$155,558,342
	Concrete	\$94,413,684
	Sum of Cement and Concrete	\$269,516,781
Other Products	Asphalt	\$88,143,433
	Chemical	\$4,917,498
	Clay	\$12,007,653
	Glass	\$28,515,950
	Lime & Gypsum	\$12,958,056
	Paper	\$68,263,741
	Other Non Metallic	\$48,298,380
	Primary Metal	\$15,173,032
	Sum of Other	\$278,277,742
Construction	Residential	\$255,352,170
	Non Residential	\$133,253,813
	Electrical	\$14,423,517
	Oil & Gas	\$1,665,955
	Transportation	\$316,210,023
	Sum of Construction	\$720,905,477
Total		\$1,268,700,000

Source: AECOM, 2009

Figure 2-7 Allocation of Aggregate Production Value by Material (2007)



Source: AECOM, 2009

2.1.2.2 Economic Outputs of Downstream Aggregate Consumption

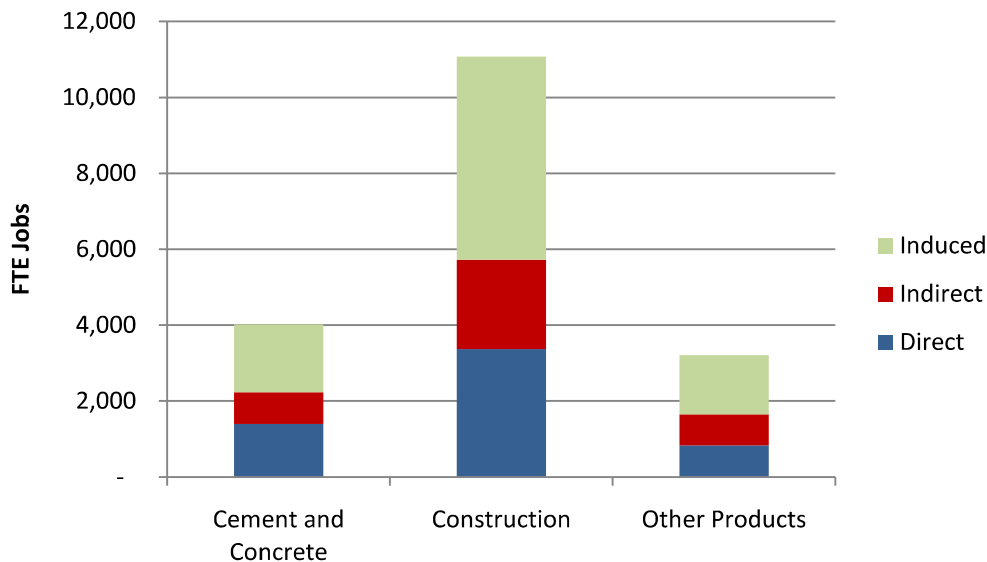
The economic output of aggregate consumption in the downstream sectors is summarized in Table 2-15 and Figures 2-8 and 2-9. The total GDP contribution is \$1.6 billion. The labour income generated is \$941 million and approximately 18,300 jobs are created. Total gross output approaches \$3.2 billion.

Table 2-15 Economic Outputs of Aggregate Consumption in Downstream Industry Sectors

		Cement and Concrete Total	Other Products Total	Construction Total	Sum of Downstream Sectors
GDP	Direct	\$113,055,245	\$102,930,564	\$299,729,046	\$515,714,855
	Indirect	\$89,325,239	\$80,570,147	\$198,694,387	\$368,589,773
	Induced	\$148,335,542	\$128,434,896	\$444,083,944	\$720,854,382
	Total	\$350,716,026	\$311,935,607	\$942,507,377	\$1,605,159,010
Labour Income	Direct	\$63,629,202	\$50,484,688	\$190,819,132	\$304,933,022
	Indirect	\$44,015,379	\$42,718,332	\$131,445,036	\$218,178,747
	Induced	\$85,981,077	\$74,445,884	\$257,408,408	\$417,835,369
	Total	\$193,625,657	\$167,648,905	\$579,672,576	\$940,947,138
FTE Jobs	Direct	1,403	833	3,369	5,605
	Indirect	828	825	2,351	4,004
	Induced	1,787	1,548	5,351	8,686
	Total	4,019	3,205	11,071	18,295
Gross Output	Direct	\$269,516,781	\$278,277,742	\$720,905,477	\$1,268,700,000
	Indirect	\$170,927,656	\$129,690,897	\$414,181,359	\$714,799,912
	Induced	\$247,225,006	\$214,057,383	\$740,137,221	\$1,201,419,610
	Total	\$687,669,443	\$622,026,022	\$1,875,224,057	\$3,184,919,521

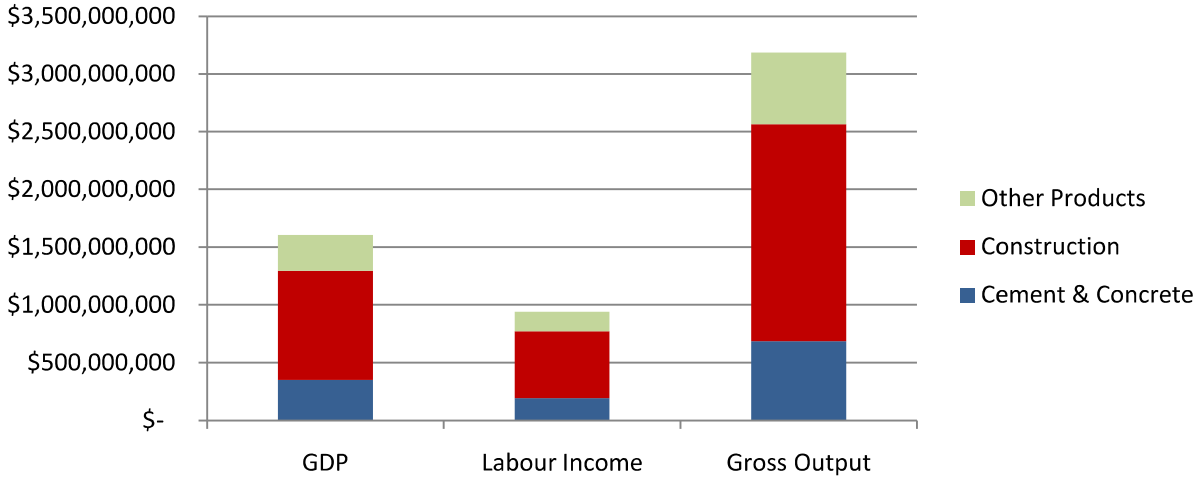
Source: AECOM, 2009

Figure 2-8 FTE Job Outputs to Aggregates Consumption in Downstream Industry Categories



Source: AECOM, 2009

Figure 2-9 Economic Outputs of Aggregate Consumption in Downstream Industry Categories



Source: AECOM, 2009

Aggregate Enabled Industries

The Provincial GDP contribution of the entire cement and concrete, other aggregate products and construction industry sectors addressed in this report exceeds \$22 billion. These industries account for labour income of \$12.7 billion and they create 246,000 jobs. The total gross output of these sectors sums to \$44.7 billion.

In terms of job creation other aggregate sector products lead the way with 111,000 jobs (45% of total) followed by construction with 88,000 jobs (36% of total) and then cement and concrete products with 46,000 jobs (19% of total).

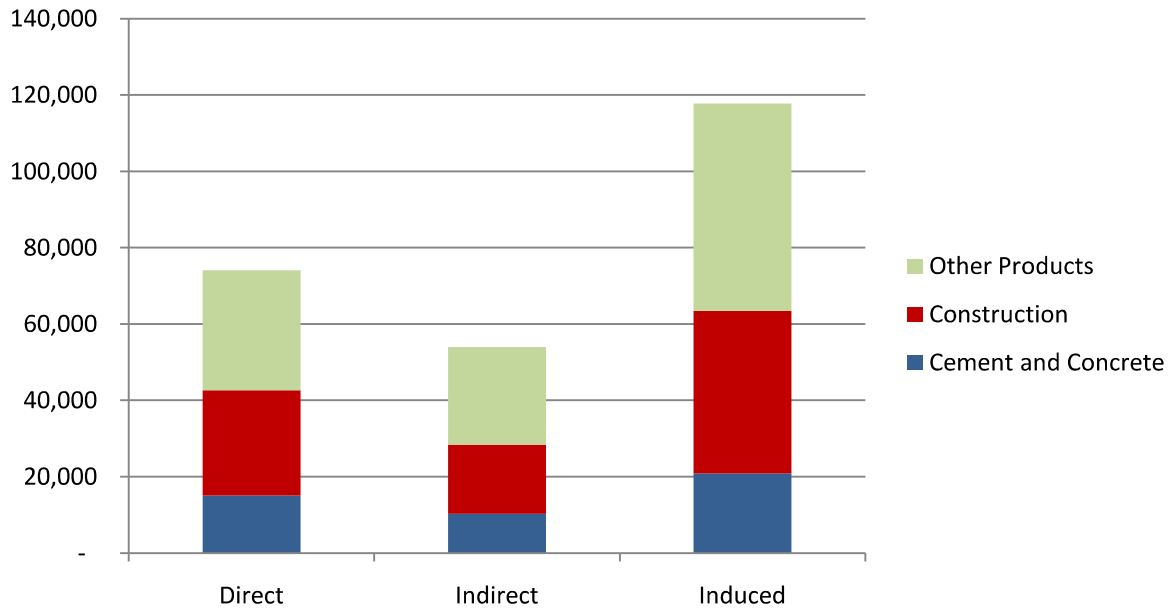
Table 2-16 presents the economic outputs of the downstream industry sectors. Figures 2-10 and 2-11 illustrate the dimensions of these outputs.

Table 2-16 Economic Outputs of Downstream Industry Sectors

		Cement and Concrete Total	Other Products Total	Construction Total	Sum of Downstream Sectors
GDP	Direct	\$1,341,300,000	\$3,576,800,000	\$2,235,500,000	\$7,153,600,000
	Indirect	\$1,118,507,540	\$2,530,784,187	\$1,512,281,071	\$5,161,572,799
	Induced	\$1,730,926,857	\$4,512,195,921	\$3,528,240,137	\$9,771,362,914
	Total	\$4,190,734,397	\$10,619,780,108	\$7,276,021,208	\$22,086,535,713
Labour Income	Direct	\$711,086,351	\$1,906,677,346	\$1,552,449,232	\$4,170,212,928
	Indirect	\$545,017,841	\$1,367,746,519	\$1,007,934,650	\$2,920,699,010
	Induced	\$1,003,312,846	\$2,615,445,079	\$2,045,105,857	\$5,663,863,782
	Total	\$2,259,417,038	\$5,889,868,945	\$4,605,489,738	\$12,754,775,721
FTE Jobs	Direct	15,071	31,480	27,532	74,083
	Indirect	10,301	25,558	18,047	53,905
	Induced	20,858	54,373	42,516	117,747
	Total	46,230	111,410	88,095	245,735
Gross Output	Direct	\$3,298,840,344	\$9,910,959,746	\$5,441,094,146	\$18,650,894,236
	Indirect	\$2,128,824,815	\$4,536,135,041	\$3,118,473,766	\$9,783,433,621
	Induced	\$2,884,867,627	\$7,520,299,245	\$5,880,378,890	\$16,285,545,762
	Total	\$8,312,532,785	\$21,967,394,032	\$14,439,946,802	\$44,719,873,619

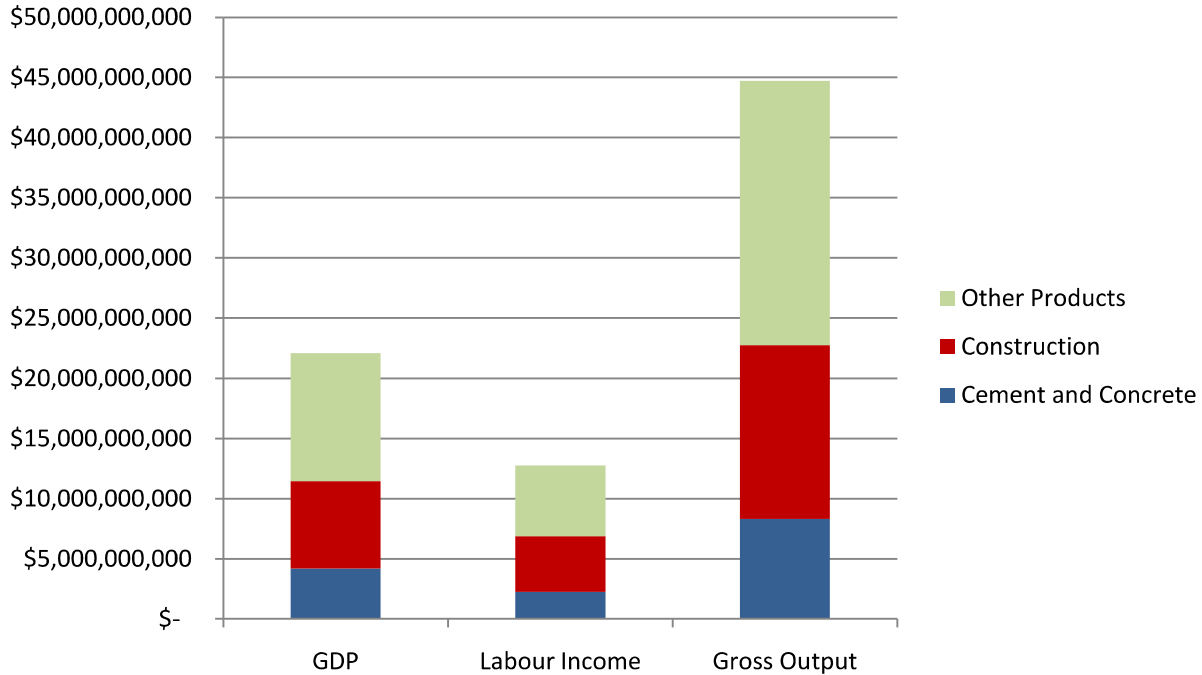
Source: AECOM, 2009

Figure 2-10 Jobs Created by Downstream Industry Categories



Source: AECOM, 2009

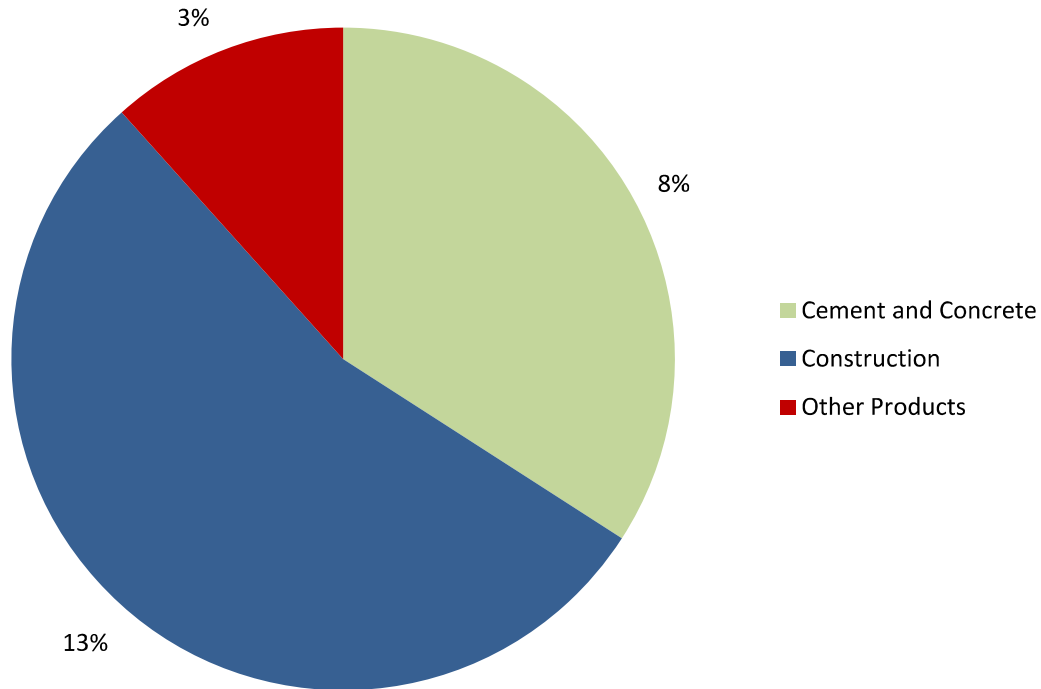
Figure 2-11 Economic Outputs from Downstream Industry Categories



Source: AECOM, 2009

In Figure 2-12 the proportion of economic outputs within these industry sectors attributable to aggregate inputs are summarized in percentage terms. Aggregate inputs accounts for approximately 8% of the economic output in the cement and concrete category, 3% in the other products category and roughly 12% in the construction category. For all three categories combined the contribution is in the order of 7%. These statistics underscore the observation that aggregate is an important ingredient for many downstream industry sectors. Although in many circumstances, not the main ingredient, it is certainly a critical one that enables and underpins the economic viability of these industry sectors.

Figure 2-12 Contributions of Aggregate to Overall Economic Output of Downstream Industry Sectors



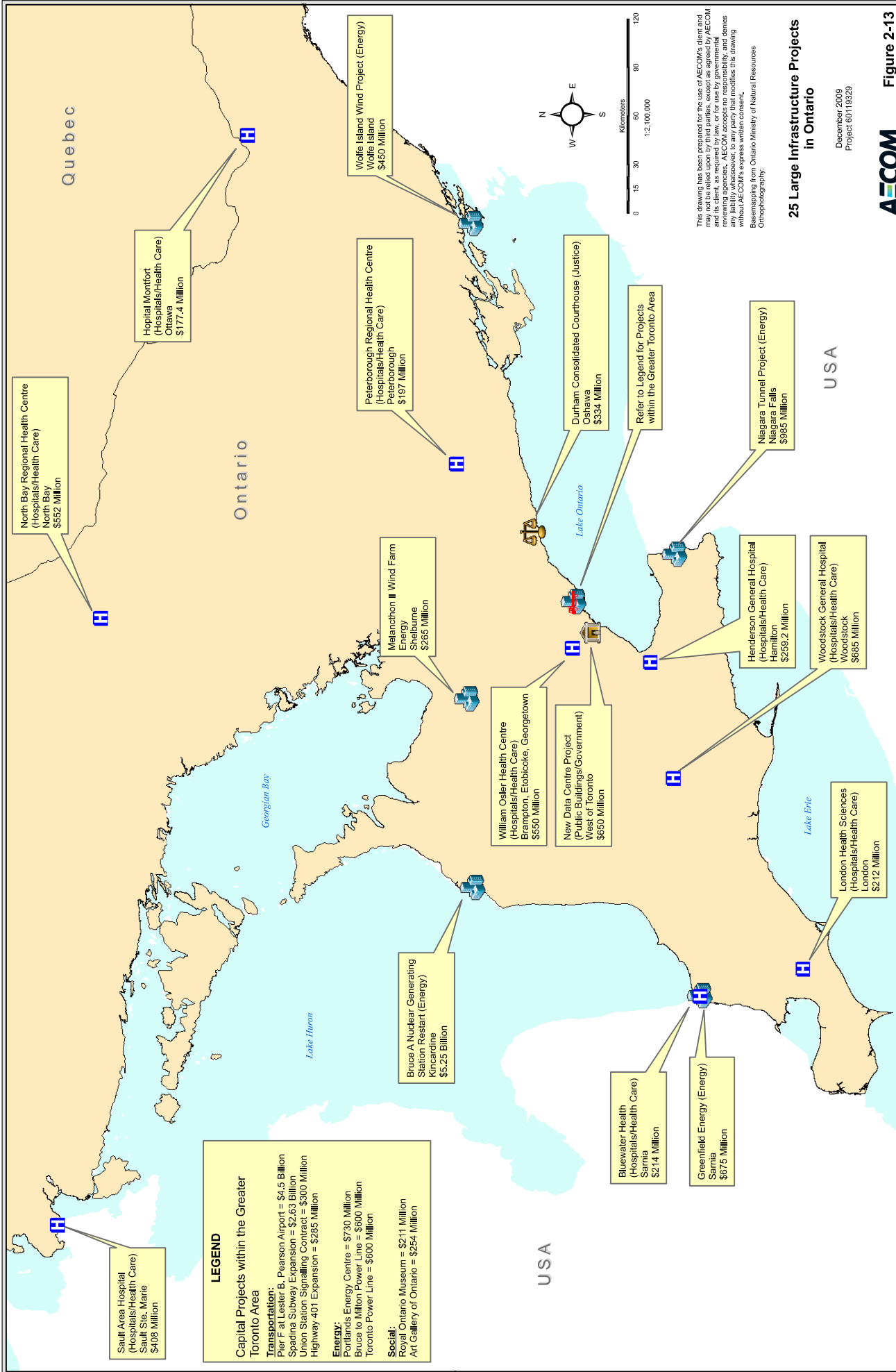
Source: AECOM, 2009

2.2 Case Studies

For a more in depth analysis, a short list of infrastructure projects was derived to select five case studies. This list was comprised of the 25 infrastructure projects in the Province of Ontario with the largest cost or value between 2005 and 2009. To be included in the list of projects considered for case studies, projects needed to be under construction in the identified period or have had achieved financial close. Table 2-17 describes the shortlist of 25 case studies and the following map indicates where they were located in the province. These are illustrated on Figure 2-13.

Table 2-17 Top 25 Infrastructure Projects in the Province of Ontario 2005 - 2009

Project	Project Type	Location	Value	Portland Cement Region
1. Bruce A Nuclear Generating Station Restart	Energy	Kincardine	\$5,250,000,000	3
2. Pier F at Lester B. Pearson International Airport	Transportation/Public Transit	Toronto	\$4,500,000,000	4
3. Spadina Subway Extension	Transportation/Public Transit	Toronto	\$2,630,000,000	4
4. Niagara Tunnel Project	Energy	Niagara Falls	\$985,000,000	2
5. Portlands Energy Centre	Energy	Toronto	\$730,000,000	4
6. Woodstock General Hospital	Hospitals/Health Care	Woodstock	\$685,000,000	1
7. Greenfield Energy	Energy	Sarnia	\$675,000,000	1
8. New Data Centre Project	Public Buildings/Government Offices	West of Toronto	\$650,000,000	4
9. Bruce to Milton Power Line	Energy	Toronto	\$600,000,000	4
10. Toronto Power Line	Energy	Toronto	\$600,000,000	4
11. North Bay Regional Health Centre	Hospitals/Health Care	North Bay	\$552,000,000	7
12. William Osler Health Centre	Hospitals/Health Care	Brampton, Etobicoke, Georgetown	\$550,000,000	4
13. Wolfe Island Wind Project	Energy	Wolfe Island	\$450,000,000	5
14. Sault Area Hospital	Hospitals/Health Care	Sault Ste. Marie	\$408,000,000	8
15. Durham Consolidated Courthouse	Justice	Oshawa	\$334,000,000	4
16. Union Station Signaling Contract	Transportation/Public Transit	Toronto	\$300,000,000	4
17. Highway 401 Expansion	Transportation/Public Transit	Greater Toronto Area	\$285,000,000	4
18. Melancthon II Wind Farm	Energy	Shelburne	\$265,000,000	3
19. Henderson General Hospital Redevelopment	Hospitals/Health Care	Hamilton	\$259,200,000	2
20. Art Gallery of Ontario	Social	Toronto	\$254,000,000	4
21. Bluewater Health	Hospitals/Health Care	Sarnia	\$214,000,000	1
22. London Health Sciences Centre North Toronto	Hospitals/Health Care	London	\$212,000,000	1
23. Royal Ontario Museum	Social	Toronto	\$211,000,000	4
24. Peterborough Regional Health Centre	Hospitals/Health Care	Peterborough	\$197,000,000	5
25. Hospital Montfort	Hospitals/Health Care	Ottawa	\$177,400,000	6



South Area Hospital
(Hospitals/Health Care)
Sault Ste. Marie
\$400 Million

North Bay Regional Health Centre
(Hospitals/Health Care)
North Bay
\$552 Million

Hopital Montfort
(Hospitals/Health Care)
Ottawa
\$177.4 Million

Melancthon II Wind Farm
Energy
Shelburne
\$265 Million

Bruce A Nuclear Generating
Station Restart (Energy)
Kincardine
\$5.25 Billion

Wolfe Island Wind Project (Energy)
Wolfe Island
\$450 Million

Peterborough Regional Health Centre
(Hospitals/Health Care)
Peterborough
\$197 Million

William Osler Health Centre
(Hospitals/Health Care)
Brampton, Etobicoke, Georgetown
\$550 Million

Durham Consolidated Courthouse (Justice)
Oshawa
\$334 Million

New Date Centre Project
(Public Buildings/Government)
West of Toronto
\$650 Million

Refer to Legend for Projects
within the Greater Toronto Area

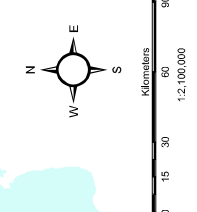
Niagara Tunnel Project (Energy)
Niagara Falls
\$985 Million

Henderson General Hospital
(Hospitals/Health Care)
Hamilton
\$259.2 Million

Woodstock General Hospital
(Hospitals/Health Care)
Woodstock
\$655 Million

London Health Sciences
(Hospitals/Health Care)
London
\$212 Million

LEGEND
Capital Projects within the Greater Toronto Area
Transportation:
Pier F at Lester B. Pearson Airport = \$4.5 Billion
Spadina Subway Expansion = \$2.63 Billion
Union Station Signalling Contract = \$300 Million
Highway 401 Expansion = \$285 Million
Energy:
Portlands Energy Centre = \$730 Million
Bruce to Milton Power Line = \$600 Million
Toronto Power Line = \$600 Million
Social:
Royal Ontario Museum = \$211 Million
Art Gallery of Ontario = \$254 Million



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Researched from Ontario Ministry of Natural Resources
Ordnance Survey

25 Large Infrastructure Projects in Ontario
December 2009
Project 60119329

AECOM

Figure 2-13

Of the projects on the short list the vast majority of them were energy and hospital/healthcare projects. Almost half of these projects were located in the GTA.

Table 2-18 Top 25 Infrastructure Projects in the Province of Ontario by Project Type

Project Type	Number of Projects	Combined Value
Energy	8	\$9,555,000,000
Transportation	4	\$7,715,000,000
Hospitals	9	\$3,254,600,000
Public Buildings/Government	1	\$650,000,000
Justice	1	\$334,000,000
Social	1	\$465,000,000

Table 2-19 Top 25 Infrastructure Projects in Province of Ontario by CPCA Geographic Area

Portland Cement Region	Number of Projects	Combined Value
Area 1 Southwest	4	\$1,786,000,000
Area 2 Peninsula	2	\$1,244,200,000
Area 3 West Central	2	\$5,515,000,000
Area 4 GTA	12	\$11,644,000,000
Area 5 East Central	2	\$647,000,000
Area 6 East	1	\$177,400,000
Area 7 Northeast	1	\$552,000,000
Area 8 Northwest	1	\$408,000,000

The following five case studies were selected for further analysis (Table 2-20). These case studies were selected through a qualitative assessment to find projects that would be aggregate intensive, represent a wide range in project sizes, project types, and cover a wide geographic area (Figure 2-14). The five case studies represent the three project types most prevalent (transportation, energy and healthcare) in the largest projects in Ontario between 2005 and 2009.

Table 2-20 Five Infrastructure Projects Selected for Case Study

Project	Project Type	Location	Project Value	Portland Cement Region	Tonnes of Aggregate Used
Spadina Subway Extension	Transportation/Public Transit	Toronto	\$2,630,000,000	4	982,573
Niagara Tunnel Project	Energy	Niagara Falls	\$985,000,000	2	632,000
Woodstock General Hospital	Hospitals/Health Care	Woodstock	\$685,000,000	1	93,540
North Bay Regional Health Centre	Hospitals/Health Care	North Bay	\$552,000,000	7	136,188
Wolfe Island Wind Project	Energy	Wolfe Island	\$450,000,000	5	88,329



**5 Case Studies
In Ontario**

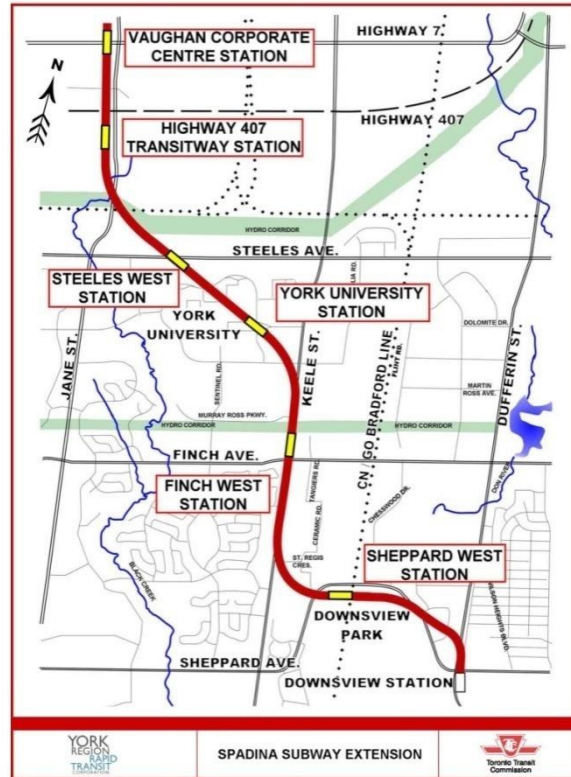
December 2009
Project 60119329



Figure 2-14

2.2.1.1 Spadina Subway Extension

Figure 2-15 Map of Spadina Subway Extension



Source: TTC, 2009

Project: Spadina Subway Extension
 Project Type: Transportation
 Project Location: Toronto, Ontario – Portland Cement Area 4 GTA

- Project Description:
- Expansion of the Toronto Transit Commission (TTC) subway network into the Region of York.
 - The addition of 8.6 kilometres of new subway line to the existing Spadina subway line.
 - The creation of 6 new TTC stations.

Size of Project: \$2.63 billion
 Aggregates used: 980,000 tonnes of aggregate to be used

- Economic Benefits:
- Will support an average of 7,500 jobs a year in Ontario through the 6 years of construction, through direct, indirect and induced economic impacts.
 - 91 of these jobs will be directly related to the economic value add

from aggregates.

- Will result in the creation of \$2.2 billion of labour income throughout the project life.
- \$87 million of worker salaries will be directly related to the aggregate input to the project.
- Will contribute \$3.4 billion to the province of Ontario's gross domestic product.
- The value added by the aggregates used in this project will be worth \$42 million to the province of Ontario, 1.22% of the total value created by the project.

Other Benefits:

- Project creates a major transit funnel between the Region of York, the City of Brampton, the City of Barrie, and Toronto.
- Project will help reduce commute times.
- Project will alleviate growth pressures on the Oakridge Moraine.
- Project will spur sustainable growth in accordance with Ontario's Places to Grow legislation.

2.2.1.2 Niagara Tunnel Project

Figure 2-16 Drill Used on Niagara Tunnel Project



Source: Panoramio, 2009

Project:	Niagara Tunnel Project
Project Type:	Energy
Project Location:	Niagara, Ontario – Portland Cement Area 2 Peninsula
Project Description:	<ul style="list-style-type: none"> • Third tunnel project in Niagara falls. • One of the largest tunnels built in North America. • The tunnel will add an additional 500 cubic metres per second through the Sir Adam Beck Power Group generating stations.
Size of Project:	\$985 million
Aggregates used:	632,000 tonnes of aggregate used
Economic Benefits:	<ul style="list-style-type: none"> • Will support e14,000 fulltime equivalent (FTE) years of employment in Ontario throughout the project life through direct, indirect and induced economic impacts. • 623 of FTE years of employment will be directly associated with the value added from aggregates. • Will result in the creation of \$755 million of labour income throughout the project life. • \$33 million of worker salaries will be directly related to the aggregate input to the project. • Will contribute \$1.3 billion to the province of Ontario’s gross

- Other Benefits:
- domestic product.
 - The value added by the aggregates used in this project will be worth \$59 million to the province of Ontario.
 - 4.43% of the total value created by the project is related to the aggregate input.
 - Project will produce an additional 580 megawatts of electricity.
 - This will increase the power produced by the Adam Beck Power Group by 28%.
 - The Tunnel Project will generate 1,600 Gigawatt hours of sustainable hydro-electricity annually.

2.2.1.3 Woodstock General Hospital

Figure 2-17 New Woodstock General Hospital



Source: Delta Elevator, 2009

Project:	Woodstock General Hospital
Project Type:	Hospital/Healthcare
Project Location:	Woodstock, Ontario – Portland Cement Area 1 Southwest
Project Description:	<ul style="list-style-type: none"> • New three story state-of-the-art replacement for the existing community hospital • Approximately 350,000 square foot building on a 25 acre greenfield site • New hospital will support a number of new regional healthcare programs
Size of Project:	\$685 million
Aggregates used:	94,000 tonnes of aggregate used
Economic Benefits:	<ul style="list-style-type: none"> • Will support an 14,000 fulltime equivalent (FTE) years of employment in Ontario throughout the project life through direct,

indirect and induced economic impacts.

- 36 of FTE years of employment will be directly associated with the value added from aggregates.
 - Will result in the creation of \$707 million of labour income throughout the project life.
 - \$1.8 million of worker salaries will be directly related to the aggregate input to the project.
 - Will contribute \$1.0 billion to the province of Ontario's gross domestic product.
 - The value added by the aggregates used in this project will be worth \$2.7 million to the province of Ontario.
 - 0.26% of the total value created by the project is related to the aggregate input.
- Other Benefits
- Creation of a 22-bed inpatient rehabilitation program.
 - Creation of 12 critical care beds, and 33 complex continuing care beds.
 - Development of a state-of-the-art diagnostic imaging capability.
 - Will have the ability to offer surgical services with 5 operating rooms.
 - Development of a new maternal/child/women's health unit with 14 beds, and 5 birthing rooms.
 - Creation of new mental health beds.

2.2.1.4 North Bay Regional Health Centre

Figure 2-18 North Bay Regional Health Center (Under Construction)



Source: Northeast Mental Health Center, 2009

Project:	North Bay Regional Health Centre
Project Type:	Hospital/Healthcare
Project Location:	North Bay, Ontario – Portland Cement Area 7 Northeast
Project Description:	<ul style="list-style-type: none">• New facilities for North Bay General Hospital and the Northeast Mental Health Centre.• The North Bay General Hospital will be housed in a new three-story building.• The Northeast Mental Health Center will be based in a village-like mental health centre.
Size of Project:	\$552 million
Aggregates used:	136,000 tonnes of aggregate used
Economic Benefits:	<ul style="list-style-type: none">• Will support 11,000 fulltime equivalent (FTE) years of employment in Ontario throughout the project life through direct, indirect and induced economic impacts.• 67 of FTE years of employment will be directly associated with the value added from aggregates.

Other Benefits:

- Will result in the creation of \$570 million of labour income throughout the project life.
- \$3.4 million of worker salaries will be directly related to the aggregate input to the project.
- Will contribute \$839.8 million to the province of Ontario's gross domestic product.
- The value added by the aggregates used in this project will be worth \$5.1 million to the province of Ontario.
- 0.60% of the total value created by the project is related to the aggregate input.
- Accommodation of 57,000 emergency room patients per year through the creation of a larger emergency department with 32 treatment stretchers.
- Capacity to treat 63,000 ambulatory care patients in a new ambulatory care centre.
- Addition of 275 acute care beds.
- Creation of 52 forensic psychiatry beds.
- Creation of 61 specialized mental health beds.

2.2.1.5 Wolfe Island Wind Project

Figure 2-19 Wolfe Island Wind Project in Spring



Source: Wikipedia, 2009

Project:	Wolfe Island Wind Farm Project
Project Type:	Energy
Project Location:	County of Frontenac, Ontario – Portland Cement Area 5 East Central
Project Description:	<ul style="list-style-type: none">• Creation of a 197.8-megawatt wind plant on Wolfe Island
Size of Project:	\$450 million
Aggregates used:	88,000 tonnes of aggregate used
Economic Benefits:	<ul style="list-style-type: none">• Will support 6,400 fulltime equivalent (FTE) years of employment in Ontario throughout the project life through direct, indirect and induced economic impacts.• 671 of FTE years of employment will be directly associated with

the value added from aggregates.

- Will result in the creation of \$345 million of labour income throughout the project life.
- \$3.5 million of worker salaries will be directly related to the aggregate input of the project.
- Will contribute \$605.1 million to the province of Ontario's gross domestic product.
- The value added by the aggregates used in this project will be worth \$3.9 million to the province of Ontario.
- 0.64% of the total value created by the project is related to the aggregate input.
- Development of Canada's second largest wind project.
- Increased the Township of Frontenac Island's green energy resources.
- Forecast to generate 594 Gigawatt hours of renewable energy annually.
- Royalties, taxes, and amenities agreement for the host community.

Other Benefits

2.3 Social Value

This section summarizes the results of the social value component of this study, including the Public Attitude Research (telephone survey) and the content analyses. The results of the Public Attitude Research are presented in the subsequent sections and the results of the content analyses are presented in the final subsection, 2.2.5 – Costs.

2.3.1 Perceived Direct Experience (PDE)

2.3.1.1 Assessment of Perceived Direct Experience (PDE)

It was hypothesized that the social value of aggregates and aggregate extraction may differ depending upon whether people have direct experience with the aggregate industry. To this end, the telephone survey sought to establish respondents’ perceived direct experience with a pit or quarry and whether a member of their household was employed by the aggregate or a related industry (for example, construction).

Respondents were asked if they lived near a pit or quarry, and also if they lived near an aggregate transportation route. As seen in Table 2-21, one-third of the respondents (33%) identified themselves as living near a pit or quarry, and one-quarter (25%) indicated that they live near a transportation route.

Table 2-21 Contact with the Aggregate Industry

	Pit or Quarry Near Their Home		Home Near Transportation Route	
	%	N	%	N
Yes	33	(473)	25	(355)
No	61	(860)	67	(945)
Don't know	6	(88)	8	(120)
<i>n</i>	100	(1420)	100	(1420)

Note: Percentages may not sum to 100% due to rounding

Source: Intellipulse, 2009

Similarly, respondents were also asked if they or someone else in their household was employed by the aggregate or a related industry. As can be seen in Table 2-22, very few respondents were, or had someone in their household, employed by the aggregate industry or related industries such as road or building construction. Those who responded affirmatively were asked how that person was employed. The types of occupations that were identified included: working at a pit or quarry and employment in the mining, construction and transportation industries.

Table 2-22 Way in Which a Household Member is Employed in the Aggregate Industry

	%	<i>n</i>
Employed in the Industry:		
Yes	3	(41)
No	97	(1375)
<i>n</i>	100	(1417)
Yes - In what way:		
Construction - general	18	(8)
Road construction	17	(7)
Gravel/pit quarry	16	(7)
Home construction/ contractor	11	(5)
Heavy equipment operator/ crush stone	9	(4)
Business owner	8	(3)
Miner/aggregate company	5	(2)
Mechanic	3	(1)
Truck driver	3	(1)
Other	23	(9)
Don't know/refused	4	(2)
<i>Total # of respondents</i>		(41)

Note: Percentages may sum to more than 100% as more than one response was accepted.

Source: Intellipulse, 2009

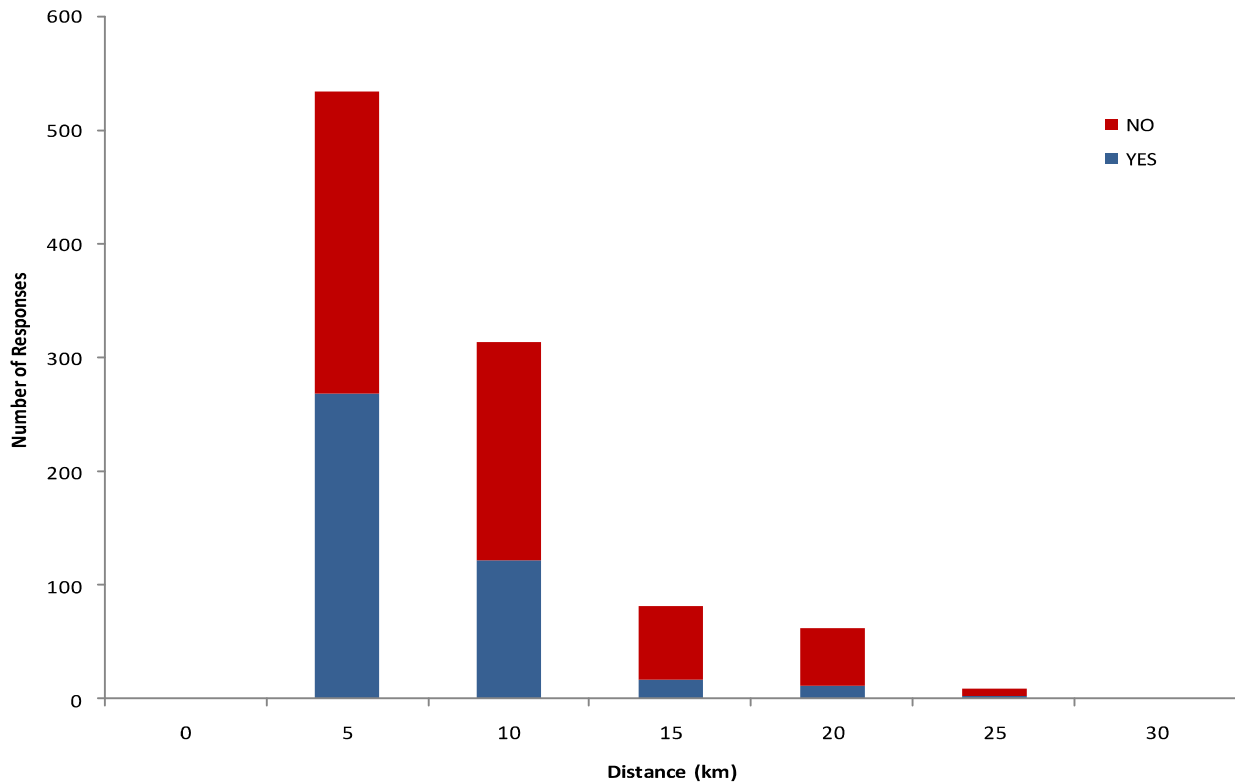
On the basis of these responses, those that answered “yes” to these two questions were considered to have a *Perceived Direct Experience* (PDE) with the aggregate industry. That is, those respondents that answered “yes” in Tables 2-21 or 2-22 are stated to have a PDE with the aggregate industry. However, because so few respondents stated that there was a relationship of employment with the aggregate industry, only physical proximity to a pit, quarry, or aggregate transportation route were used to group respondents according to PDE and used in analyses.

2.3.1.2 Subjectivity in Perceived Direct Experience (PDE)

It was also thought that a person’s PDE with the aggregate industry would be largely subjective, in that some people would state that they live in close proximity to a pit or quarry and do not, and conversely, others would state that they do not live near a pit or quarry, but in fact do. In order to test whether or not respondents had a PDE, respondent’s location (determined by their postal code and if that was not available, their Forward Sortation Area (FSA)) was cross referenced against actual locations of pits or

quarries, as obtained in a data file from the MNR (2009)². These data were used to compare individual estimates of proximity to a pit or quarry³ to the actual distances of the individual’s location to an existing pit or quarry, as defined by the MNR (2009) data file. Figure 2-18 summarizes this comparison.

Figure 2-20 Comparison of Perceived and Actual Proximity to a Pit or Quarry



Source: AECOM, 2009 based on MNR, 2009

Figure 2-18 depicts two groups of respondents: those that said they do live near a pit or quarry and those that said that they do not live near a pit or quarry. Visually, though it appears that as distance from a pit or quarry increases, more respondents are likely to say that they do not live near a pit or quarry, there is no statistically significant difference between the actual distances these two groups of respondents. Respondents that replied “yes”, statistically, do not actually live closer to a pit or quarry than those respondents that replied “no”. These results confirmed that the perceived distance to a pit or quarry is

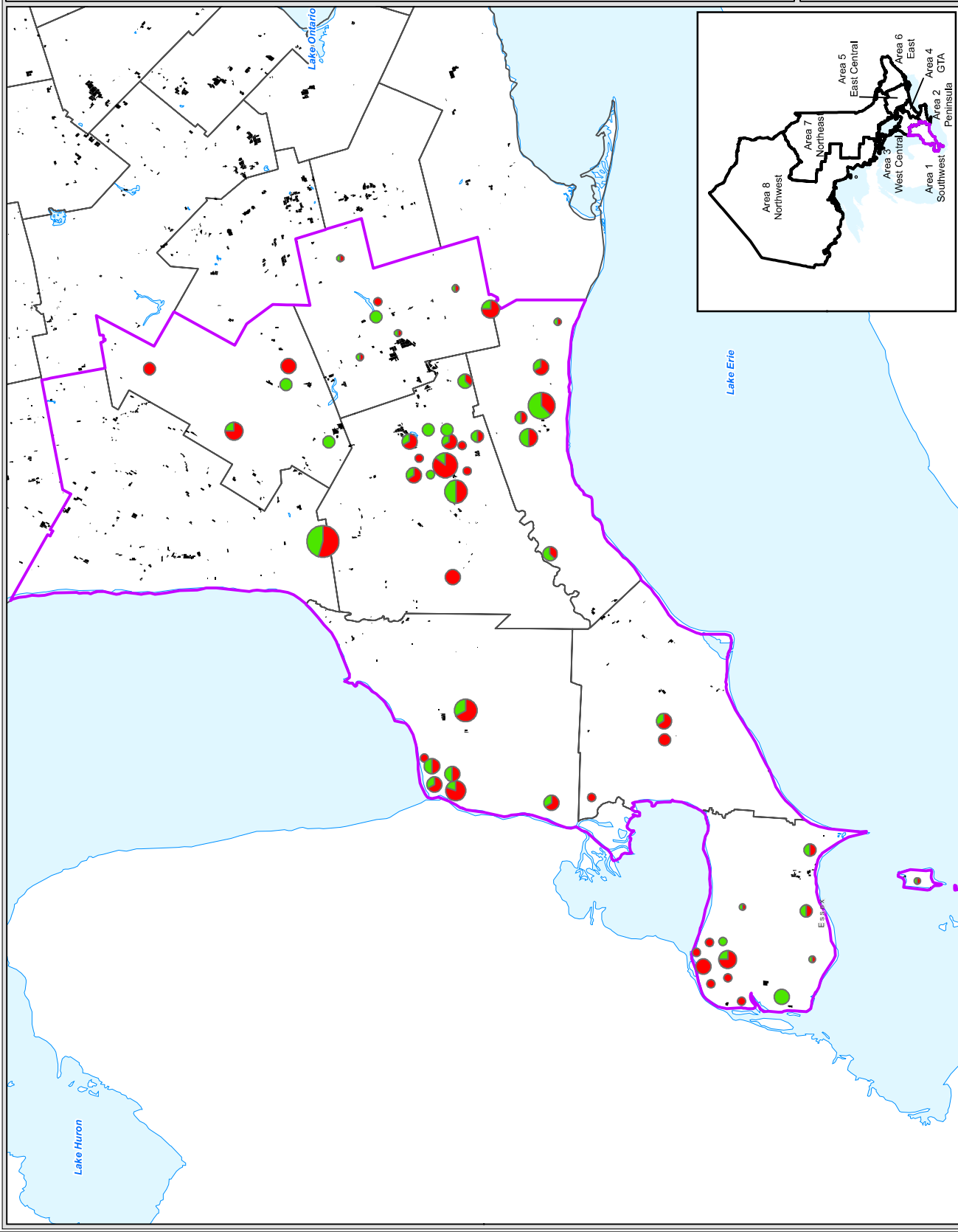
² It should be noted that the data file of existing pits or quarries was not 100% complete, though the MNR gave a rough estimate of 85% completion and accuracy for that data file.

³ Note that only “Yes” or “No” responses were used and “I don’t know” was not considered for this part of the analysis.

largely subjective, and that overall, this perception does not vary based on how close or far respondents live from a pit or quarry. The MNR (2009) data file and the survey data indicated that 53% of the respondents live within 5 km of a pit or quarry and none of the respondents live further than 25 km from a pit or quarry.

Figures 2-21 to 2-28 depict responses for perceived proximity to a pit or quarry, grouped by FSA⁴. Each map illustrates a different Portland Cement Region. Each FSA is represented by a small pie chart, illustrating the proportion of respondents in that FSA that stated they did or did not live near a pit or quarry. The locations of existing pits and quarries are indicated in these figures as well. The same variation illustrated in Figure 2-18 is also indicated in these maps.

⁴ Note that Figure 2-22, Area 4, aggregates several FSA's in the City of Toronto for ease of viewing.



Legend

- Quarry/Pit
- CPCA Geographic Area
- Municipal Division

Number of Responses

- 1
- 5
- 11

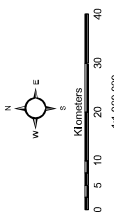
Yes/No

- Yes
- No

Basemap from Ontario Ministry of Natural Resources

UTM Zone 17N, NAD 83
1:1,000,000

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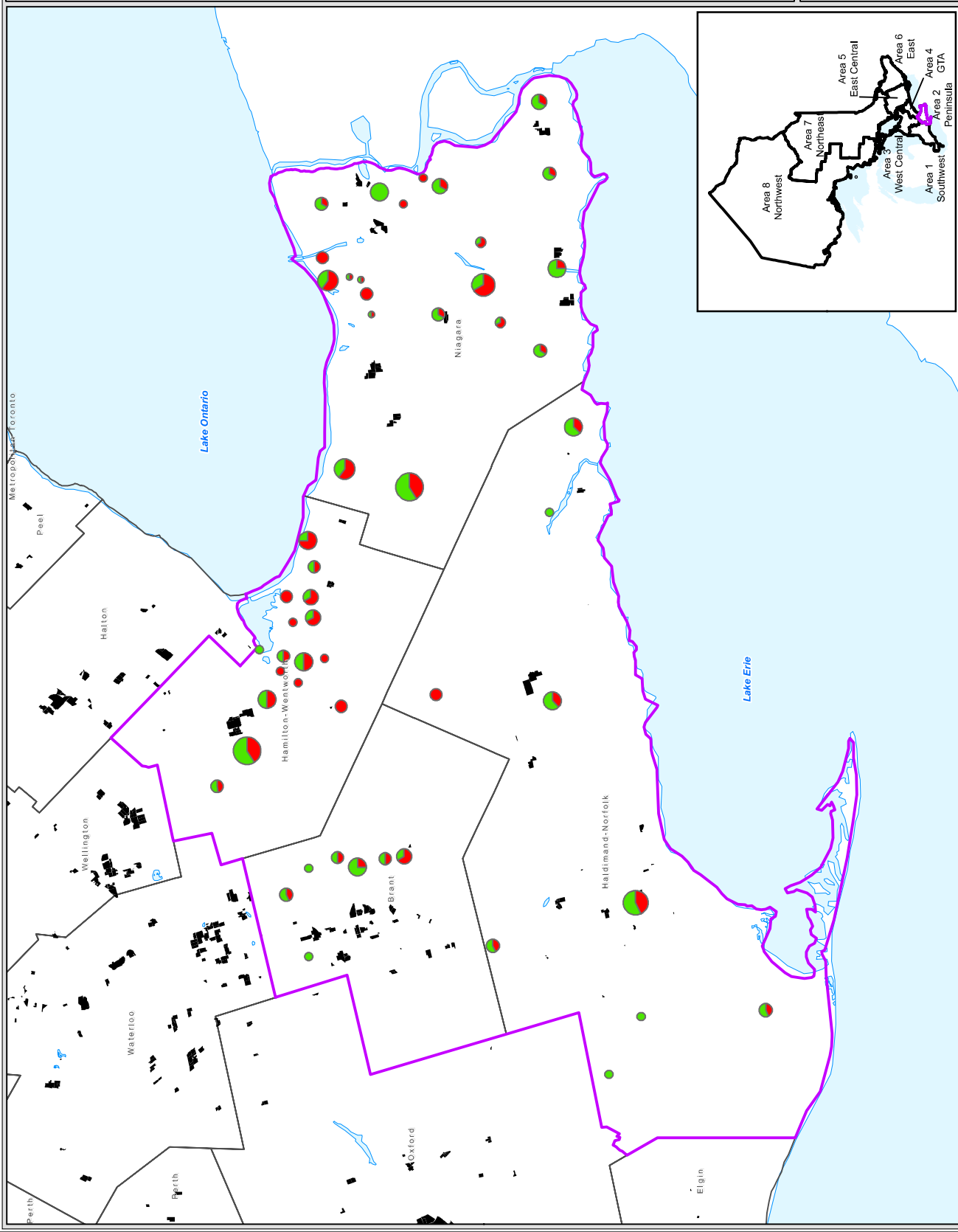
Grouped by FSA Location

Residents' Perceived Distance to a Pit or Quarry Area 1 (Southwest)

December 2009
Project 60119329



Figure 2-21



Legend

- Quarry/Pit
- Portland Cement
- Geographic Areas
- Municipal Divisions

Number of Responses

- 1
- 4
- 9
- Yes
- No

Basemapping from Ontario Ministry of Natural Resources

UTM Zone 17N, NAD 83
 1500,000
 0 2.5 5 10 15 20
 Kilometers

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Grouped by FSA Location

Respondents' Perceived Distance to a Pit or Quarry

Area 2 (Peninsula)

December 2009
 Project 60119329

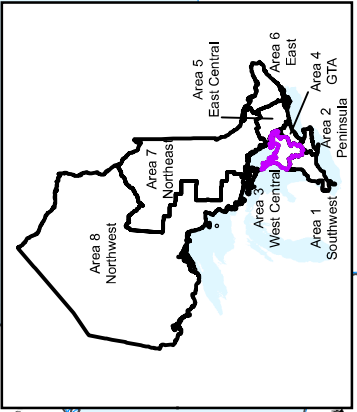
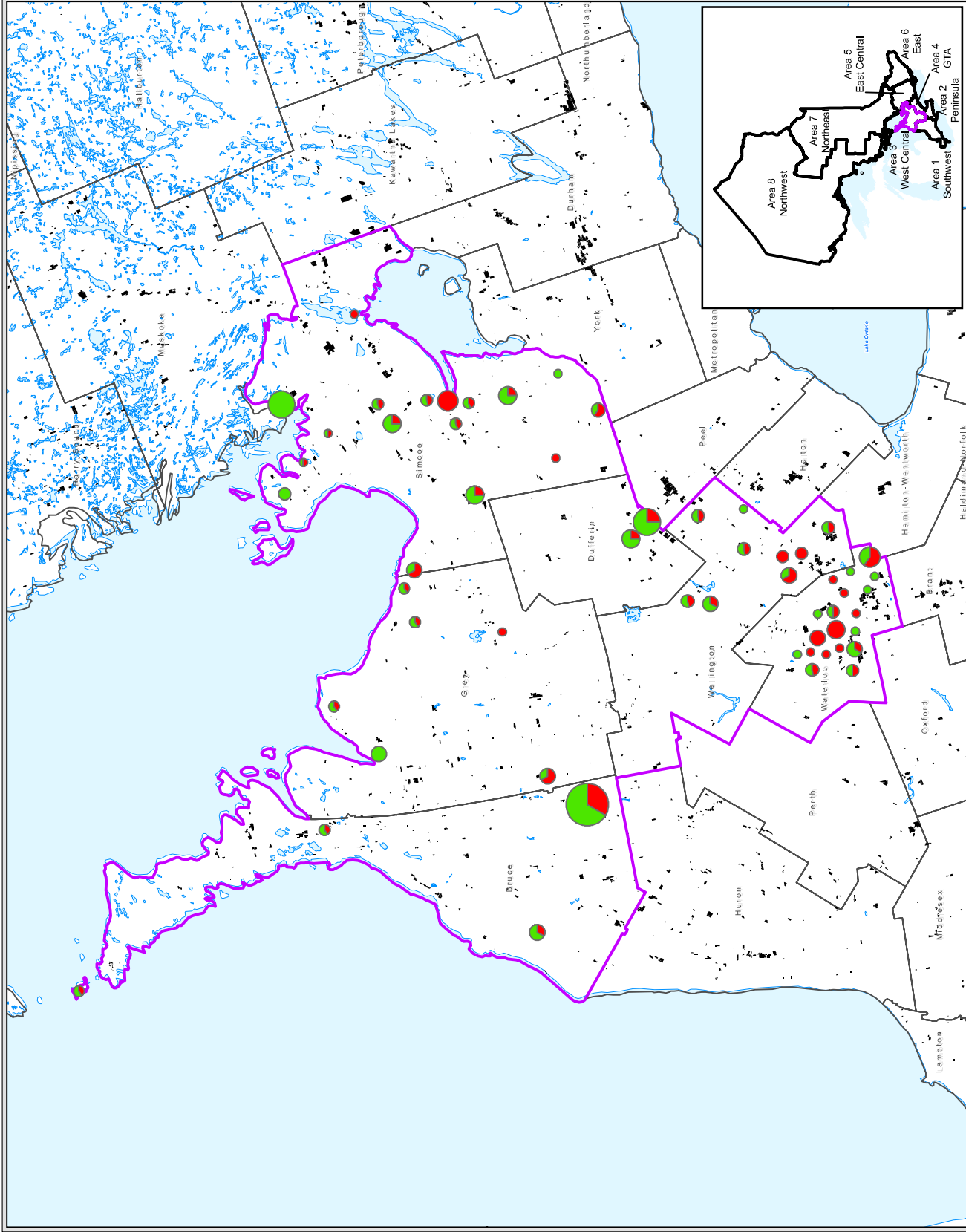
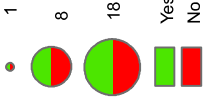
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Figure 2-22

Legend

-  Quarry/Pit
-  CPCA Geographic Area
-  Municipal Division

Number of Responses



Basemapping from Ontario Ministry of Natural Resources

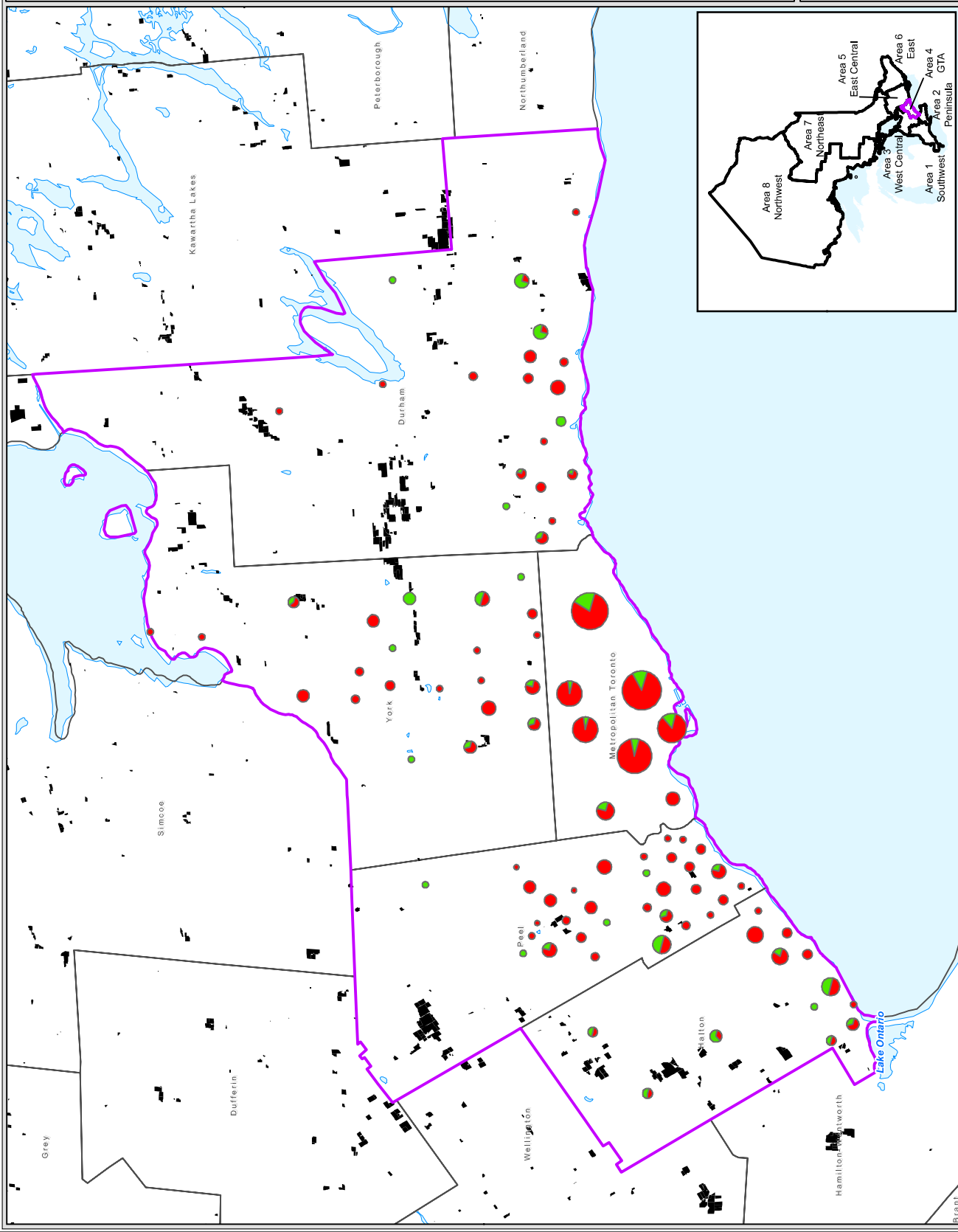


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Grouped by FSA Location
Respondents' Perceived Distance to a Pit or Quarry
Area 3 (West Central)
December 2009
Project 60119329

AECOM

Figure 2-23



Legend

- Quarry/Pit
- CPCA Geographic Area
- Municipal Division

Number of Responses

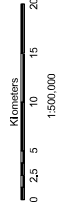
- 1
- 6
- 30

Yes No

Basemapping from Ontario Ministry of Natural Resources

UTM Zone 17N, NAD 83
1:500,000

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Grouped by FSA Location

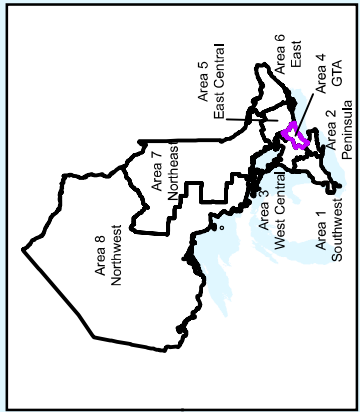
Respondents' Perceived Distance to a Pit or Quarry

Area 4 (GTA)

December 2009
Project 60119329



Figure 2-24



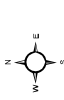
Legend

- Quarry/Pit
- CPCA Geographic Area
- Municipal Division

Number of Responses

- 1
- 3
- 7
- Yes
- No

Basemapping from Ontario Ministry of Natural Resources



0 5 10 20 30 40
Kilometers

UTM Zone 17N, NAD 83
1:1,000,000
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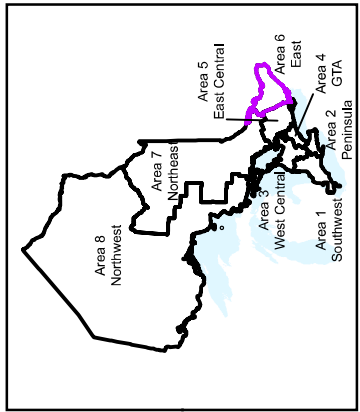
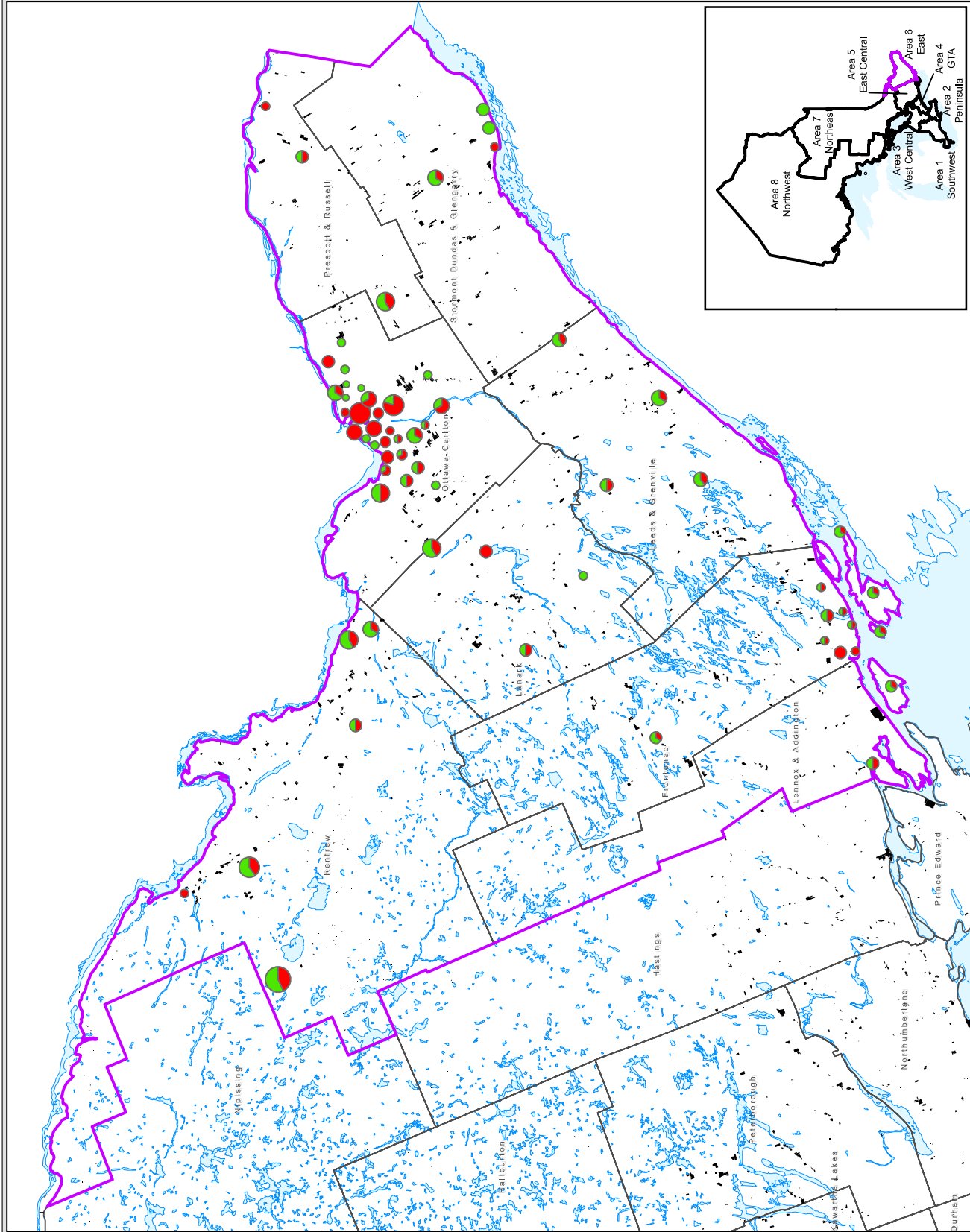
Grouped by FSA Location

Residents' Perceived Distance to a Pit or Quarry

December 2009
Project 60119329



Figure 2-26



Legend

- Quarry/Pit
- CPCA Geographic Area
- Municipal Division

Number of Responses

- 1
- 6
- 13
- Yes
- No

Basemapping from Ontario Ministry of Natural Resources



UTM Zone 17N, NAD 83
13,250,000
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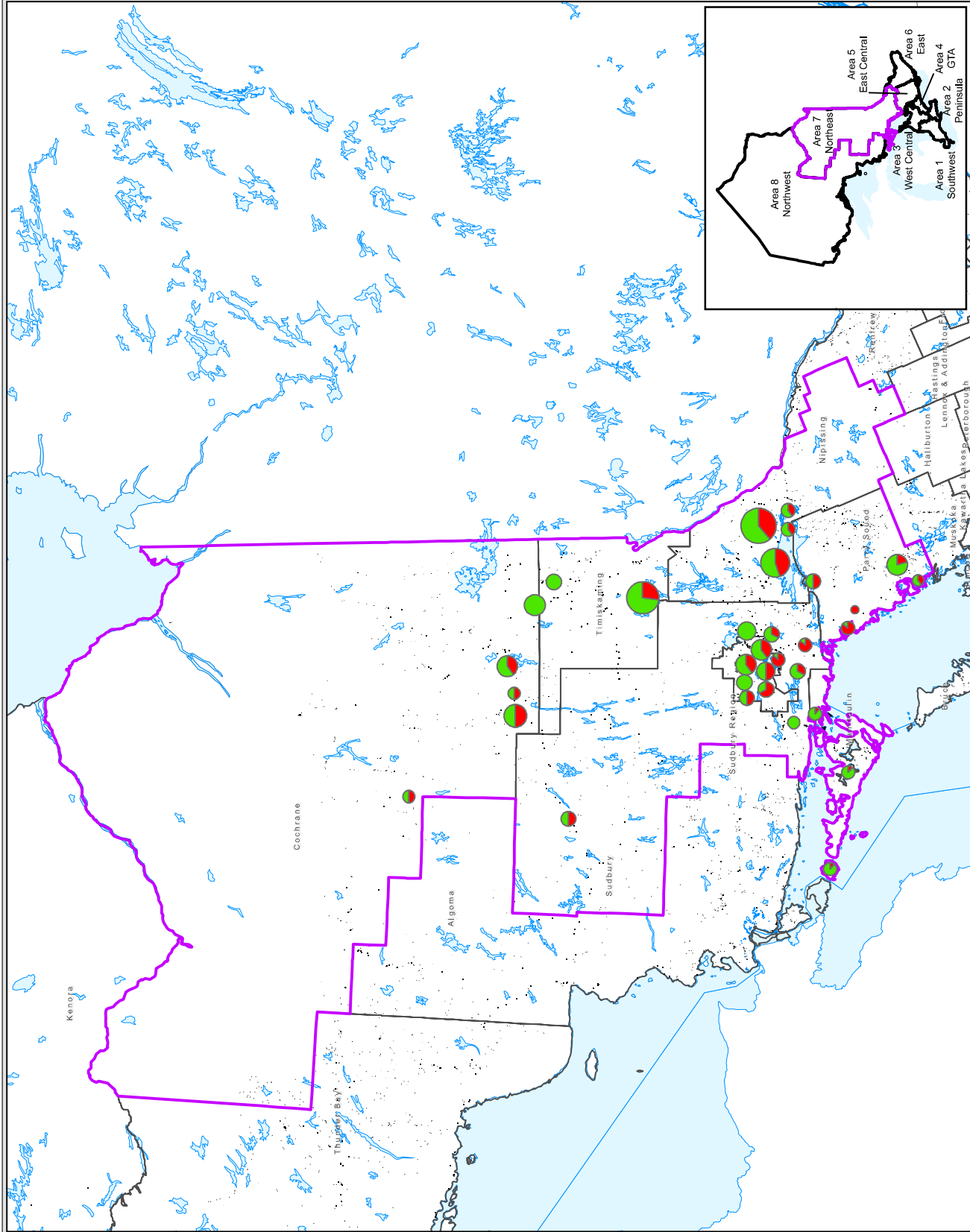
Grouped by FSA Location

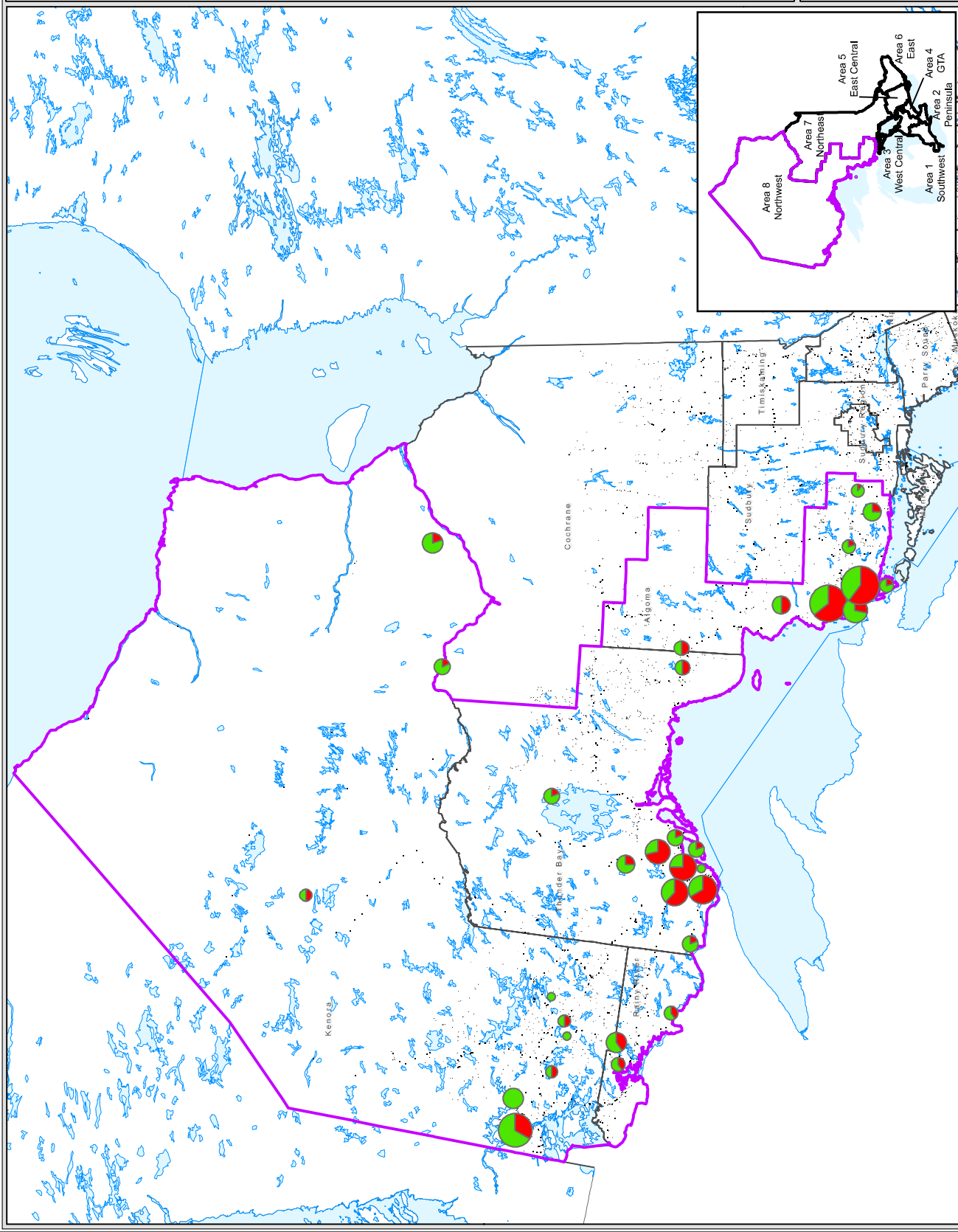
Respondents' Perceived Distance to a Pit or Quarry Area 7 (Northeast)

December 2009
Project 60119329



Figure 2-27





Legend

- Quarry/Pit
- CPCA Geographic Area
- Municipal Division

Number of Responses

- 1
- 7
- 15
- Yes
- No

Basemapping from Ontario Ministry of Natural Resources

UTM Zone 17N, NAD 83
1:5,000,000

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0 25 50 100 150 200
Kilometers

N
W E S

Grouped by FSA Location

Respondents' Perceived Distance to a Pit or Quarry

Area 8 (Northwest)

December 2009
Project 60119329

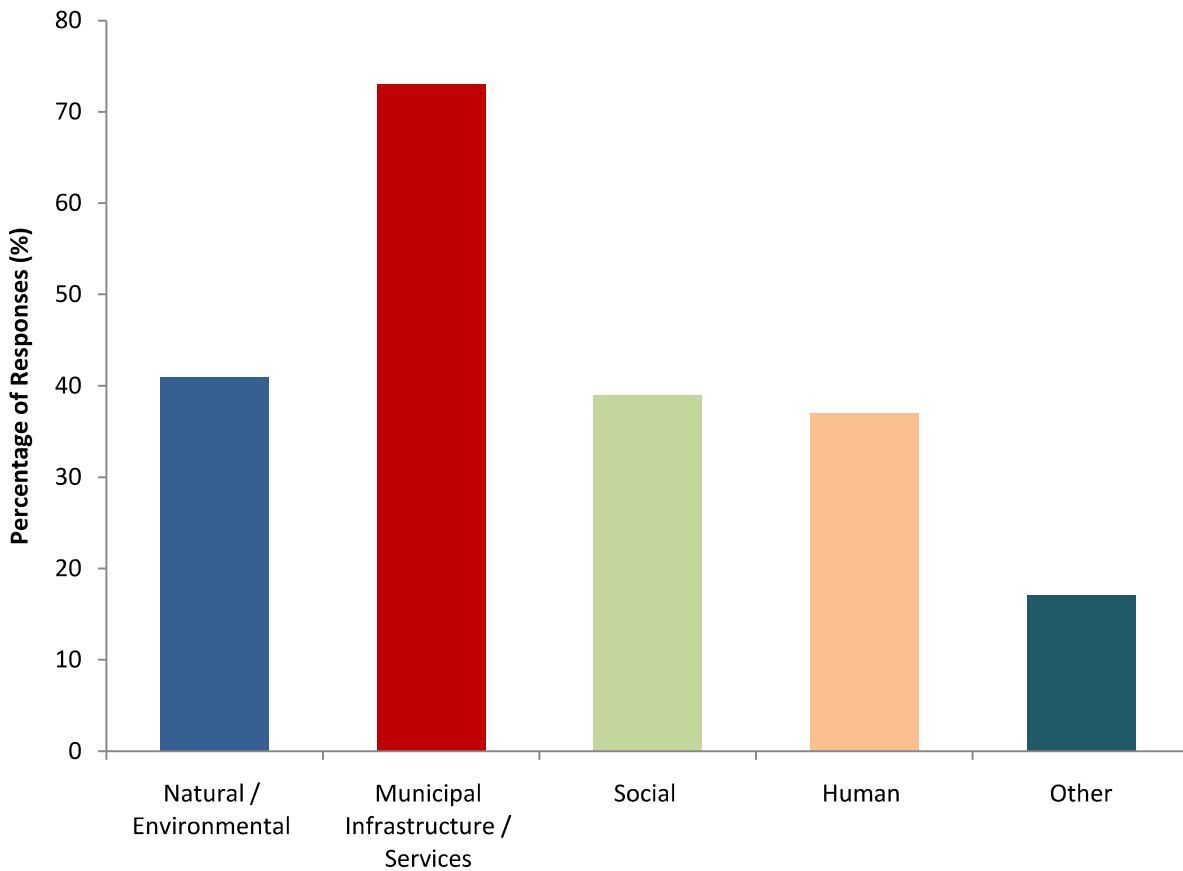
AECOM

Figure 2-28

2.3.2 Community-Well Being

In order to understand the Ontario public’s social values, respondents were asked to list the three most important things that they value about their community. A range of answers were given and grouped according to five overall themes. Figure 2-27 displays the proportion of responses, by major theme, and Table 2-23 summarizes the detailed types of responses and their proportions, by major theme.

Figure 2-29 Respondents’ Community Values, by Major Theme



Note: Percentages sum to more than 100%, since up to three responses were accepted

Source: Intellipulse, 2009

Table 2-23 Respondents' Community Values, Detailed Summary

	%	N
Municipal Infrastructure/Services Aspects:	73	
Parks/trails	19	(264)
Cleanliness/up keep of community	10	(141)
Municipal services-garbage, social services, taxes, library etc.	8	(111)
Water quality/clean water	7	(93)
Recreational/community center	7	(101)
Infrastructure/highways/roads	6	(90)
Public/transportation	6	(83)
Education/access to schools	5	(75)
Good healthcare/services/EMS, doctors etc.	5	(69)
Nature/Environment Aspects:	41	
Green space/trees/wildlife	20	(290)
Clean/fresh air/no pollution	14	(197)
Accessibility to lakes	7	(95)
Social Aspects:	39	
Quite neighbourhood/privacy	16	(229)
Community/friendly neighbours	13	(185)
Sense of community/ involvement/ multiculturalism/diversity	6	(86)
Family/family oriented community	4	(63)
Human Aspects:	23	
Public safety/personal security	14	(198)
Access to local amenities/ shopping/ entertainment	13	(178)
Small town/village feel	5	(76)
Location-proximity to work/city/others	3	(43)
Job/employment	2	(35)
Other:		
Road safety/noise/no heavy trucks	1	(15)
Other	11	(143)
Don't know/refused	4	(51)
None/No other issues	1	(55)
<i>Total # of respondents</i>		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted.

Source: Intellipulse, 2009

These responses indicate the most important community attributes that are “top-of-mind” to respondents were municipal and infrastructure services including parks and trails (19%), cleanliness of the community (10%) and municipal services (8%).

Respondents were asked to rank the relative importance of development and infrastructure projects, including highways, railways, energy facilities and airports as well as residential, commercial and industrial buildings, against the three values previously stated as important to their community’s well-being. Respondents were asked which of their stated values were more or less important than development and infrastructure projects. It should be noted that some respondents had already stated values related to development and infrastructure projects. The results indicate that:

- 30% of respondents said that none of their previously stated values were more important than development and infrastructure projects, or that development and infrastructure projects were ranked above the three most important things that affect their community well-being.
- 72%⁵ of the respondents said development and infrastructure projects were less important than all of their previously stated values, or that development and infrastructure projects were ranked least important of the things that affect their community well-being. This indicates that for this 72% of respondents, development and infrastructure projects are not as important as other things with perceived social benefits (such as cleanliness of their community, clean air, or proximity to the workplace).

In summary, respondents did not consider development and infrastructure projects highly among the things that they value about their community and the things that contribute to their community’s well-being.

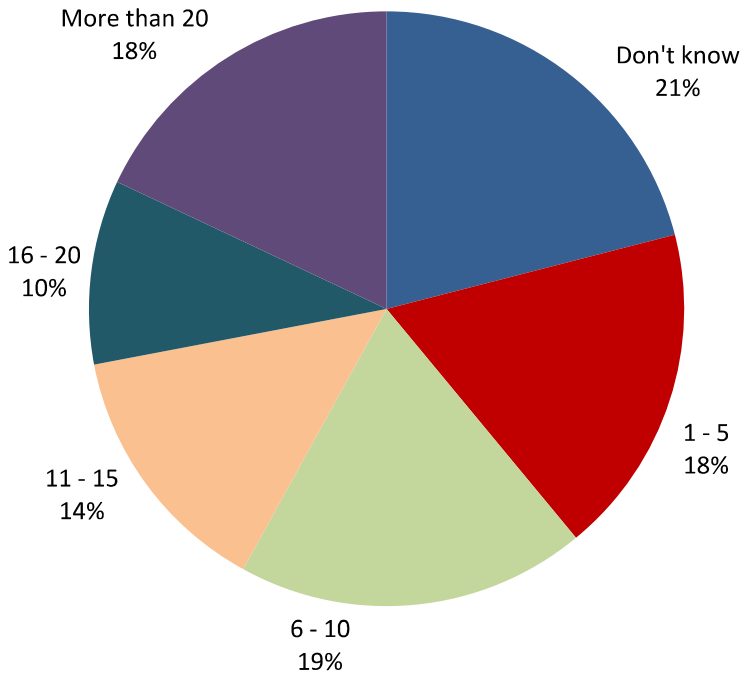
2.3.3 Knowledge of the Aggregate Industry

As demonstrated by the economic analysis, the aggregate industry is one of many important industries to the Ontario Province; however it was hypothesized that it may not be one that the Ontario public is very familiar with. To test this hypothesis, respondents were asked several questions about the industry (i.e., the amount of aggregates use in the province, where aggregates are extracted from and how they are transported). The results indicate that there is a relationship between Ontarians social values of aggregates and their familiarity with the aggregate industry. While this study did not investigate the nature of this relationship in detail, the study results shed light onto the public’s general knowledge of this industry.

⁵ Note that percentages sum to more than 100%, since some respondents may have said “none” to both questions.

According to the Ontario Stone Sand and Gravel Association (OSSGA, 2009) Ontarians consumed, on average, 14 tonnes of aggregates per person per year. Figure 2-29 demonstrates that only 14% of respondents could accurately estimate the amount of aggregate consumed by Ontarians. Most other respondents either could not provide an estimate at all (21%), or severely overestimated (18%) or underestimated (18%) the amount of aggregates consumed by Ontarians.

Figure 2-30 Respondents' Estimate of Tonnes of Aggregates Consumed Per Person, Per Year in Ontario



Source: Intellipulse, 2009

Respondents were also asked where they thought aggregates were being extracted in Ontario (i.e. the general location of pits or quarries). Table 2-24 summarizes these responses.

Table 2-24 Respondents' Perception of Aggregate Extraction Sites

	%	<i>n</i>
Within 25 km of where you live	49	(698)
Within 100 km of where you live	38	(535)
In Northern Ontario	30	(423)
In Southern Ontario	22	(318)
Outside of Ontario	13	(186)
Don't know/not sure	8	(107)
<i>Total # of respondents</i>		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted.
Source: Intellipulse, 2009

These results indicate that nearly 50% of the respondents thought that pits are located within 25 km of where they live, while MNR (2009) data indicates that all of the respondents (100%) do in fact live within 25 km of an aggregate pit or quarry.

Finally, respondents were asked to rank three modes of transportation used to transport aggregate resources, in order of frequency of use. These were sea, rail and road transport. Table 2-25 summarizes these responses.

Table 2-25 Ranking of Modes to Transport Aggregates

Transport type:	Rank:	%	<i>n</i>
Truck	1	75	(1060)
	2	13	(181)
	3	13	(178)
Rail	1	18	(263)
	2	58	(817)
	3	24	(341)
Sea or Lake	1	7	(97)
	2	30	(422)
	3	63	(901)
<i>Total</i>			(1420)

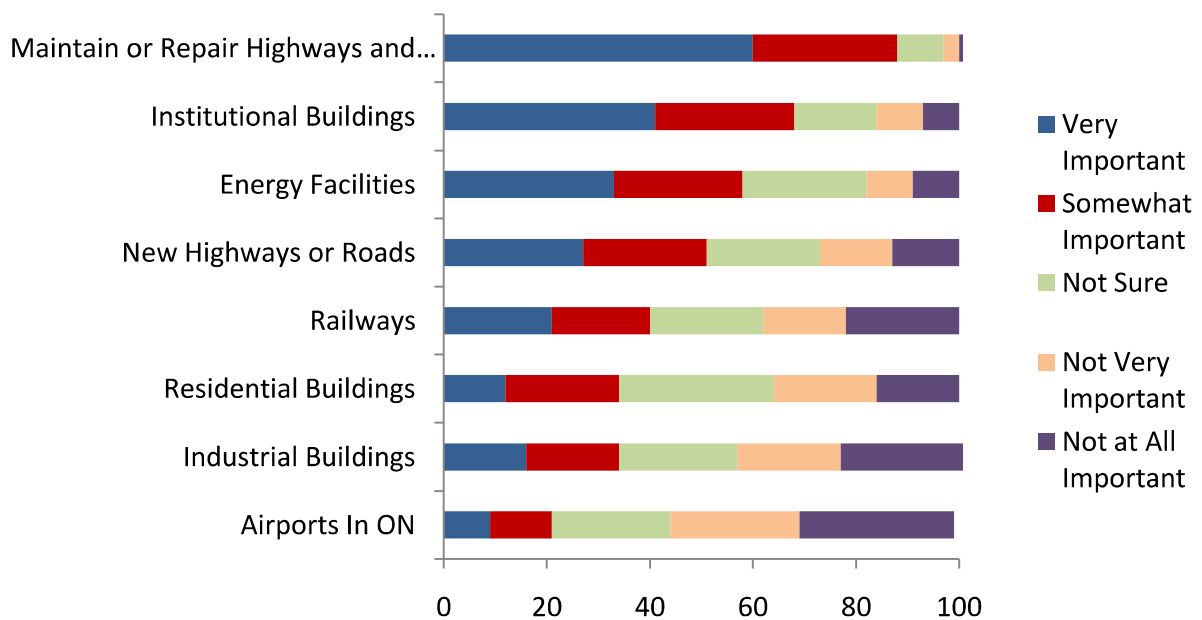
Note: Percentages may not sum to 100% due to rounding. 1 is the most commonly used transportation mode, 3 the least.
Source: Intellipulse, 2009

These results indicate that most respondents are aware that truck transport is most frequently used to transport aggregates. In summary, it can be concluded that respondents are not very familiar with the aggregate industry. Although their awareness of transport methods is largely accurate, their knowledge of the locations of pits and quarries and the amounts of aggregates used per person, per year is much less accurate.

2.3.4 Benefits

The social benefits of aggregate resources were also investigated. As previously mentioned, 72% of respondents considered development and infrastructure projects as being less important than other important things or attributes that contribute to their community’s well-being. However, when asked to rate the importance of various types of development and infrastructure projects, some were considered more important than others. These responses are summarized in Figure 2-31.

Figure 2-31 Importance of Various Development and Infrastructure Projects



Source: Intellipulse, 2009

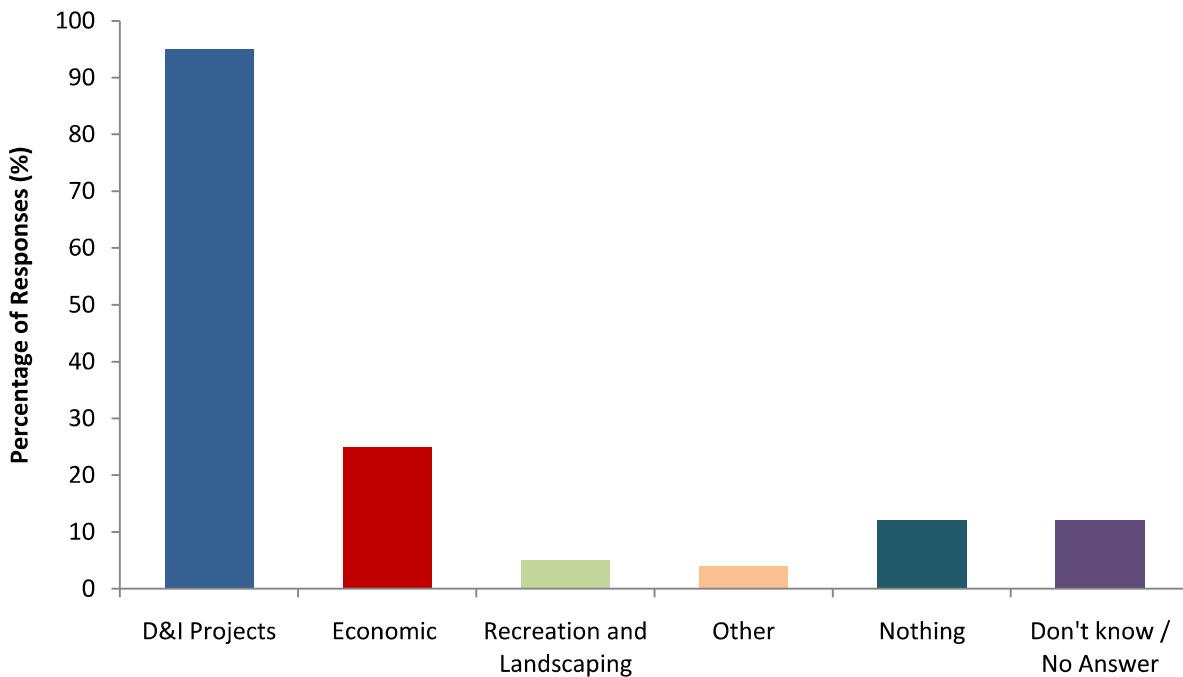
These results indicate that among the various development and infrastructure projects, maintaining or repairing highways or roads, building new institutional buildings, new energy facilities and new highways or roads were considered the most important and have the greatest social value.

The results also indicated that if the necessary resources (including aggregates) were not available for these projects, then approximately half of the respondents would consider themselves or their communities as being negatively affected.

In summary, while 72% of the respondents may have ranked development and infrastructure projects as less important than the top three things that they value about their community, approximately 50% of the respondents view some types of development and infrastructure projects as important.

Respondents were also asked to state the three main benefits of aggregate extraction in open ended responses. A wide range of answers were given, and these were grouped into 6 main themes. Figure 2-32 summarizes these overall themes and Table 2-26 summarizes these responses in more detail.

Figure 2-32 Social Benefits of Aggregate Extraction



Source: Intellipulse, 2009

Note: Percentages sum to more than 100% because more than one response was accepted

Table 2-26 Main Social Benefits of Stone, Sand & Gravel Extraction

	%	n
Infrastructure & Development Projects:	95	
Provision of materials/construction of buildings/homes	36	(513)
Improve infrastructure/better roads/highways/railway	35	(498)
Availability of materials/local	9	(129)
Use of raw materials/natural resources	7	(93)
Need it/necessary	4	(61)
Cheap materials/resources	2	(32)
Improve/development of the community	2	(23)
Economic Benefits:	25	
Job creation/employment	18	(250)
Economic development	5	(66)
Industrial growth/support the local/regional industry	2	(23)
Recreation/Landscaping Projects:	5	
Landscaping/beaches	3	(38)
Can create lakes/drainage	2	(23)
Other	4	(60)
Other - Negative:	12	
None	8	(109)
Negative impact	4	(58)
Don't know/refused	12	(168)
<i>Total # of respondents</i>		<i>(1420)</i>

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than 0.5%.

Source: Intellipulse, 2009

Table 2-26 indicates that 95% of the respondents view the value of aggregates in relation to its uses in development and infrastructure projects. These respondents view it as necessary for construction and infrastructure improvements. 25% of the respondents stated that aggregate extraction had related economic benefits, such as job creation and input to economic development and 12% of the respondents stated that there were no positive or social benefits of aggregate extraction

In summary, the respondents view many types of development and infrastructure projects as important to them, and they view the main benefits of aggregate extraction in relation to these development and infrastructure projects and in relation to the economic impacts of the industry.

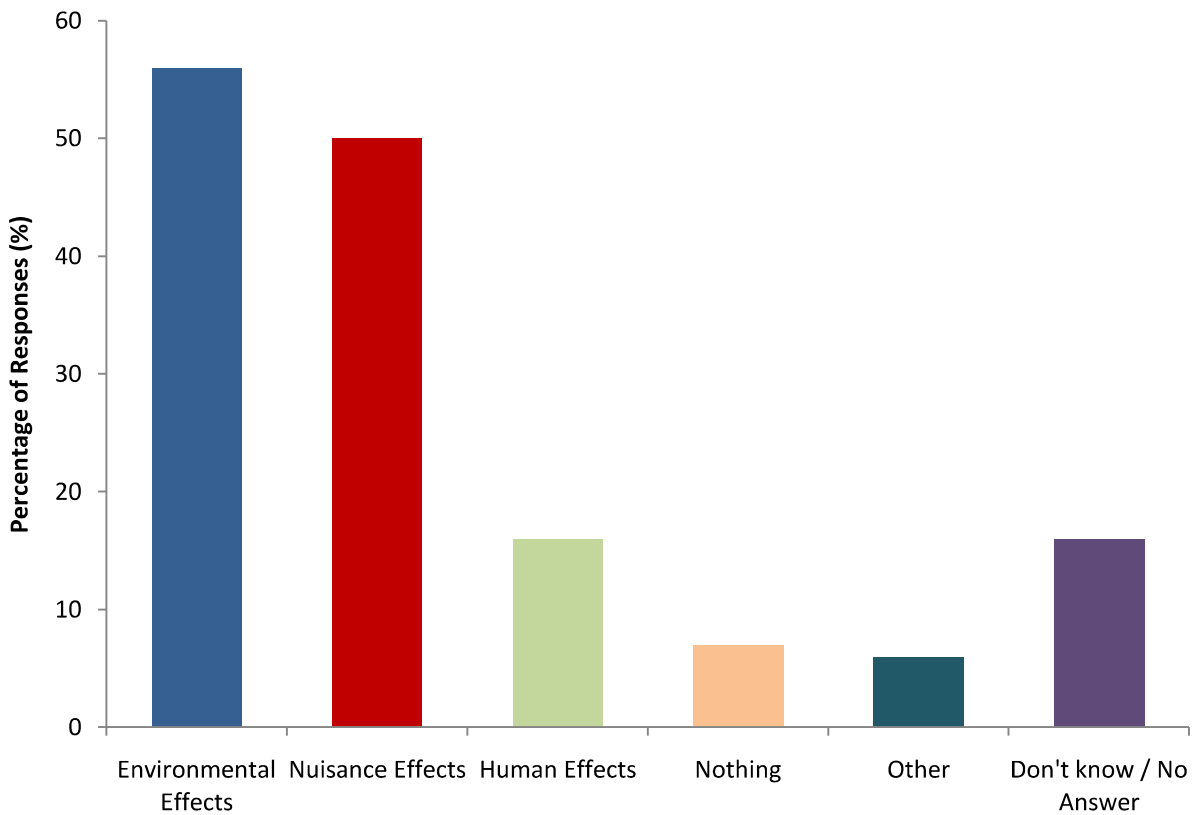
2.3.5 Costs

The views of Ontarians regarding the social costs of aggregates were determined from the telephone questionnaire and also through content analyses of public comments related to aggregate sites and licence applications. These results are presented here separately.

2.3.5.1 Results of the Telephone Survey

Respondents were asked to state the three main costs of aggregate extraction in open ended responses. A wide range of answers were given, and these were grouped into 6 main themes. Figure 2-33 summarizes these overall themes and Table 2-27 summarizes these responses in more detail.

Figure 2-33 Main Social Costs of Aggregate Extraction



Note: Percentages sum to more than 100% since more than one response was accepted

Source: Intellipulse, 2009

Table 2-27 Social Costs of Stone, Sand & Gravel Extraction

	%	<i>n</i>
Environmental Effect:	56	
Holes/pits/left behind/no rehabilitation	13	(181)
Water tables are exposed/contaminate water	9	(130)
Destruction of the natural environment	9	(126)
Disruption of wild life/animal habitat	7	(105)
Eroding of earth/digging up land	6	(87)
Blasting/destroying non-renewable resources	4	(63)
Destroys agricultural/topsoil	3	(49)
Removal of trees/forestry/greenery	3	(42)
Disruption of the ecosystem	2	(31)
Changes the climate/global warming	0	(7)
Nuisance Effect:	50	
Dust/sand/dirt	11	(158)
Noise from trucks/machinery	11	(157)
Heavy/trucks/damages the road	8	(116)
Disruption of scenery/an eye sore	8	(114)
Trucks create traffic on the road	5	(64)
Damages the surrounding communities/ residential areas	5	(68)
Trucks throw stones/gravel damaging other vehicles	2	(30)
Human Effect:	16	
Pollution/poor air quality affecting human health	13	(179)
Health risks for workers/residents	3	(48)
Nothing/none	7	(104)
Other	6	(87)
Don't know/refused	16	(230)
<i>Total # of respondents</i>		<i>(1420)</i>

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than .5%.

Source: Intellipulse, 2009

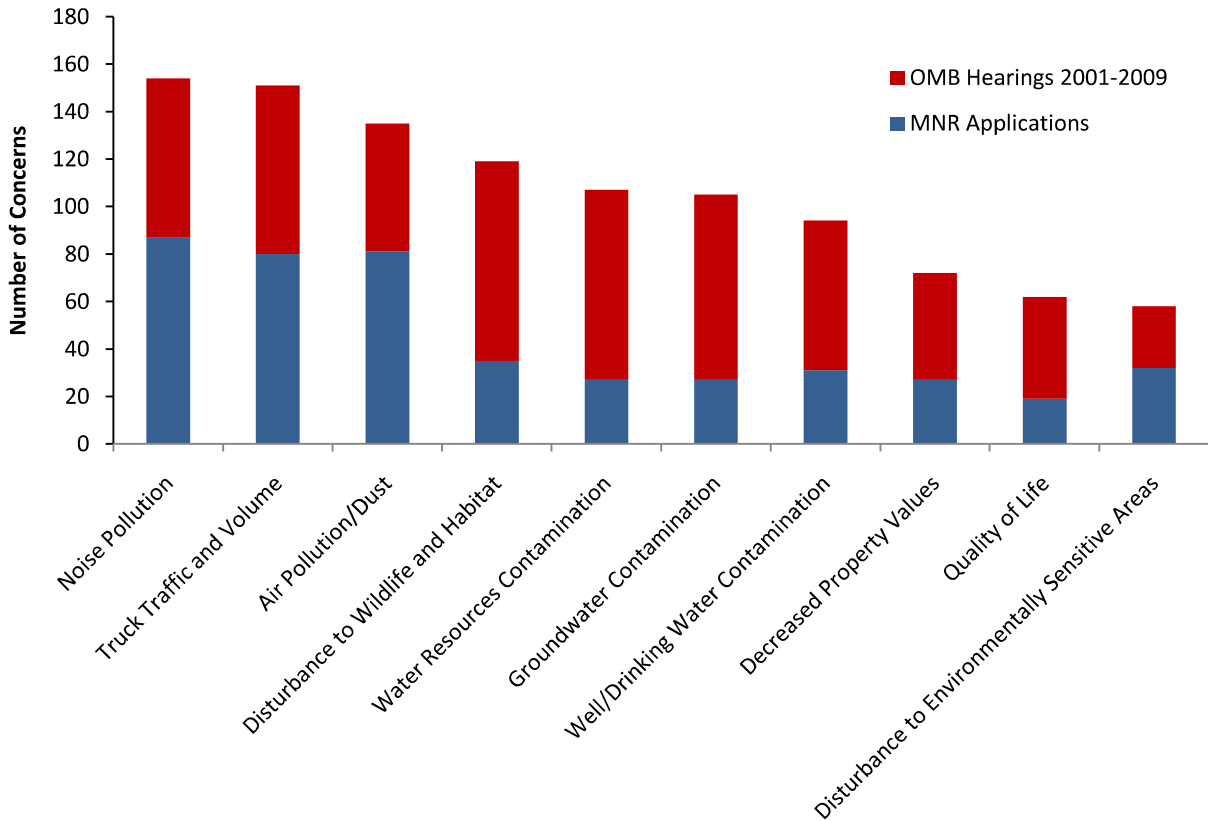
These results indicate that 56% of the respondents said that environmental effects were the main social cost of aggregate extraction. This includes a lack of site rehabilitation, water contamination and a destruction of habitat. Half (50%) of the respondents stated nuisance effects as a social cost of aggregate extraction, including dust and noise nuisance effects and 7% of the respondents said that there were no social costs of aggregate extraction.

2.3.5.2 Results of the Content Analyses of MNR and OMB Data

Public comments from MNR site licence applications and from OMB hearings (2001-2009) were reviewed and coded according to common themes. For the former, the most recent 31 site licence applications were provided to AECOM by the MNR and public comments were reviewed from these 31 files. Of those 31, 14 site licences contained public comments. All comments were reviewed and coded according to major recurrent themes. Members of the public expressed numerous concerns regarding the development and operation of proposed pits and quarries.

The OMB hearing data were retrieved from the OMB website, under a general search for "aggregate". Records were screened for relevance, yielding 76 records. Each of these were coded and numerated using the same major themes as the MNR site licence applications. In some cases, new themes were created as the types of public comments differed slightly between the MNR and the OMB data. The top three concerns for the OMB hearing data were in relation to groundwater contamination, water resources contamination and traffic/truck volume. Figure 2-32 summarizes the results of the content analyses, for the OMB and MNR data. It should be noted that only the top 10 most frequent results are noted in this figure.

Figure 2-34 Ten most Frequent Public Comments Regarding Aggregate Applications or Operations



Source: AECOM, 2009

There is a wide range of types of public complaints regarding aggregate operations and licence applications. These indicate the types of social costs associated with aggregate extraction. From a combination of the MNR and OMB data, it is clear that the three most frequently reported public complaints are regarding noise pollution, truck traffic and volume and air pollution and dust.

The MNR site licence applications also detailed proposed or actual resolutions to the public complaints. For many of the proposed development projects, the proponents held meetings in order to address the public concerns. Issues were addressed and communicated through letters and telephone calls between the proponent and members of the public. Comments were also addressed through letters, describing mitigation measures that will be put in place in order to minimize the social and environmental impacts. In some cases, attempts were made to address public concerns through a

reduction of the licenced area and creation of a greater buffer area between the licenced pit/quarry and the residential development, removing a haul road through an Environmentally Sensitive Area (ESA) and inclusion of additional noise monitoring of dust deposition around the perimeter of the Environmentally Sensitive Areas (ESA). In many cases, public concerns and proposed monitoring measures were implemented to the site plans of the proposed quarry developments and mitigation measures were included as well.

2.3.5.3 Results from the NEC Case Files

The Niagara Escarpment Commission (NEC) provided AECOM with a sample of case files, which included public comments, letters, and summaries for cases related to aggregate operations, dating back to 2001. The files were reviewed in order to understand key and recurring themes. This is not a representative sample of all of the aggregate licence applications on the Niagara Escarpment, but rather a sample of approximately 9 cases. Therefore, conclusions about the public comments from the NEC case files cannot be drawn from this small sample. However, they do highlight some (but not all) of the recurrent themes. These were:

- Environmental - relating to the use and enjoyment of the local area and the intrinsic value of nature and the surrounding environment.
- Economic – relating to impacts on economic opportunities
- Social – relating to noise, nuisance and community character issues.

A small proportion of the comments were related to the benefits of aggregate extraction in the Niagara Escarpment. These were grouped into two themes, which were:

- Social Benefits - relating to infrastructure and access to services
- Economic Benefits - relating to employment and expenditures

The majority of the comments received in support of a new quarry operation or expansion were made by local business owners or affiliates whose business would be positively affected. Overall, from these nine case files, the concerns with negative impacts were much more common than the comments that documented potential positive benefits.

2.3.6 PDE Influence on Social Values of Aggregates

Perceived Direct Experience (PDE) was one of the variables used in cross-tabular analyses. Respondents who reported that they live near a pit or quarry or near a truck transportation route formulated groups of respondents that were stated to have a PDE with the aggregate industry. Those respondents that stated they or someone in their household was employed by the aggregate or a related industry were not included as a group of respondents with a PDE since the number of respondents in this category was too low to conduct any statistical analyses.

Cross tabular analyses were run for all groups with a PDE for every question in the telephone survey. This section summarizes all of the statistically significant results, by PDE.

2.3.6.1 Respondents that Live near a Pit or Quarry

- Less likely to name parks and trails as important things they value about their community (14%).
- More likely to say they live within 25km of a pit or quarry (76%).
- More likely to rank truck transportation higher as a mode of aggregate transportation (82%).
- More likely to name nuisance effects as a social cost of aggregate extraction (61%).

2.3.6.2 Respondents that Live near an Aggregate Truck Transportation Route

- More likely to say they live within 25km of a pit or quarry (72%).
- More likely to rank truck transportation higher as the main mode of aggregate transportation (82%).
- More likely to state economic aspects as a social benefit of aggregate extraction (33%).

2.3.6.3 Respondents that do not live near a Pit or Quarry

- More likely to highly rank rail transportation higher as a mode of aggregate transportation (21%).

2.3.6.4 Respondents that do not live near an Aggregate Truck Transportation Route

- More likely to highly rank rail transportation higher as a mode of aggregate transportation (21%).

In summary, respondents that live near a pit or quarry were more likely to name nuisance effects as a social cost of aggregate extraction. However, respondents that live near an aggregate truck transportation route were more likely to state that the economic aspects of aggregate extraction as a social benefit.

2.3.7 Geographical Variation in Social Values of Aggregates

The samples for the telephone survey were drawn from the eight Portland Cement Regions of Ontario (Figure 1-1). Table 2-29 summarizes the sample sizes within each of the eight regions. The sample yielded overall results with an accuracy of +/- 2.6%, 19 out of 20 times, for all of Ontario.

Geographical location was another grouping used in cross tabular analysis for each question of the survey. This section presents all statistically significant difference, by CPCA geographic area.

2.3.7.1 Area 1 – Southwest

- More likely to name parks/trails as important aspects of their community (22%).
- More likely to rank sea transport first in terms of modes of aggregate transportation used (13%).

2.3.7.2 Area 2 – Peninsula

- More likely to state that pits and quarries are located within 25 km of where they live (71%).

2.3.7.3 Area 3 - West Central

- More likely to state that pits are quarries are located within 25 km of where they live (73%).
- More likely to rank truck transport highest in terms of modes of aggregate transportation used (86%).
- More likely to state nuisance effects as a social cost of extraction (69%).

2.3.7.4 Area 4 – GTA

- More likely to name parks/trails as important aspects of their community (22%).
- More likely to rate building new institutional buildings as high in importance (47%).
- More likely to state that pits and quarries are located in Northern Ontario (36%).

- More likely to rank rail transport higher in terms of modes of aggregate transportation used (25%).
- Less likely to say they live near a pit or quarry (18%).
- Least likely to state that pits and quarries are located within 25 km of where they live (30%).

2.3.7.5 Area 5 - East Central

- More likely to say they live near a pit or quarry (58%).
- More likely to state that pits and quarries are located within 25 km of where they live (65%).
- More likely to rank truck transport higher in terms of modes of aggregate transportation used (87%).
- Less likely to name parks/trails as important aspects of their community (7%).

2.3.7.6 Area 6 – East

- More likely to state that pits and quarries are located within 25 km of where they live (64%).
- More likely to state that D&I Projects and improvements to infrastructure are a benefit of aggregate extraction (45%).

2.3.7.7 Area 7 – Northeast

- More likely to say they live near a pit or quarry (58%).
- More likely to rate building new highways or roads as high in importance (47%).
- More likely to rate building new residential buildings as high in importance (17%).
- More likely to rate building new airports as high in importance (16%).
- More likely to state that pits and quarries are located within 25 km of where they live (68%).
- More likely to state that pits and quarries are located in Northern Ontario (34%).
- More likely to state that D&I Projects and improvements to infrastructure are a benefit of aggregate extraction (40%).

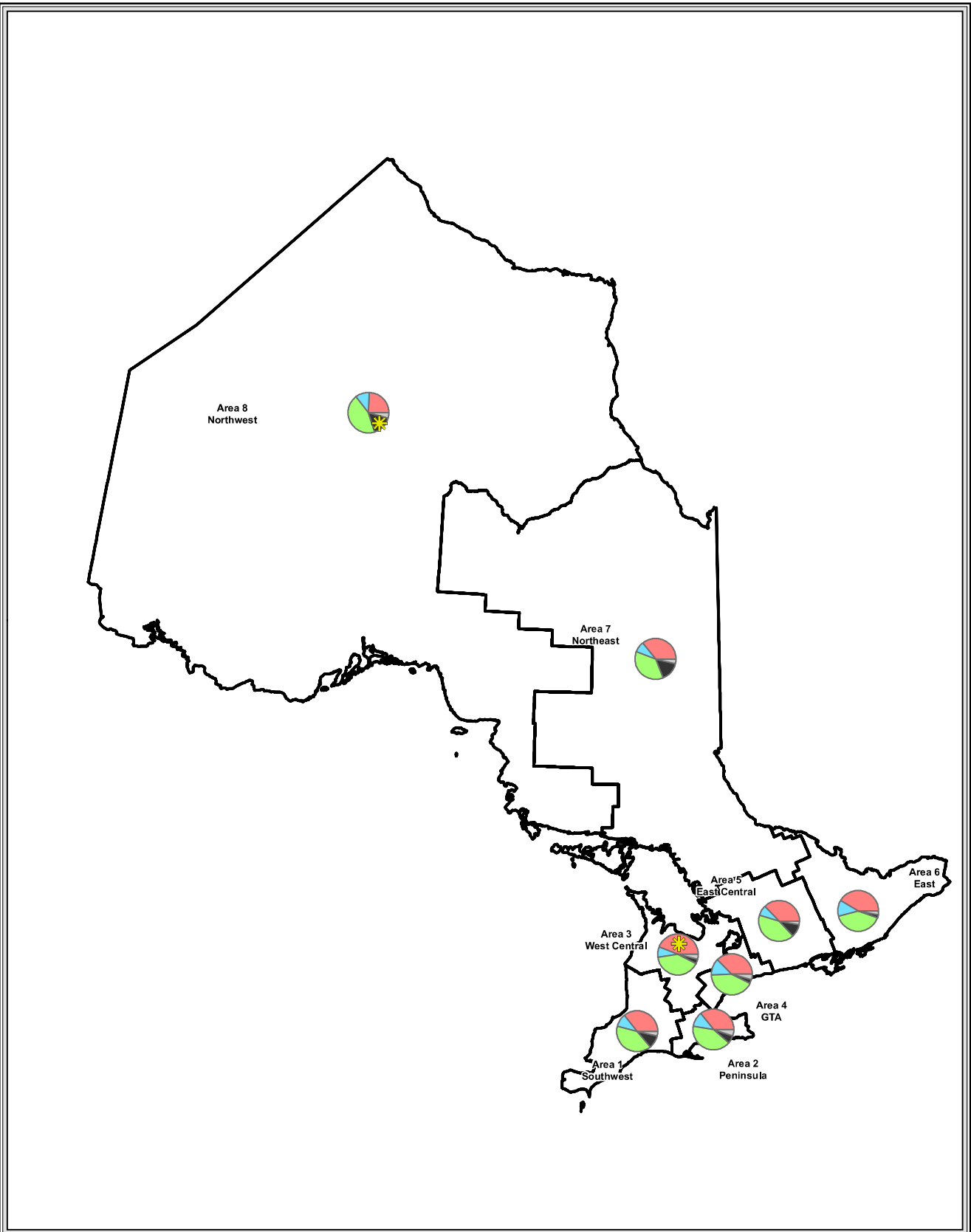
2.3.7.8 Area 8 - Northwest

- More likely to say that nature/environmental aspects are more important than D&I projects (13%).
- More likely to rate building new highways or roads as high in importance (51%).
- More likely to rate building new residential buildings as high in importance (18%).
- More likely to rate building new industrial buildings as high in importance (34%).
- More likely to rate building new airports as high in importance (18%).
- More likely to state that pits and quarries are located within 25 km of where they live (65%).
- More likely to state that pits and quarries are located in Northern Ontario (40%).
- More likely to state that there are no social costs of extraction (20%).
- Less likely to name parks/trails as important aspects of their community (5%).

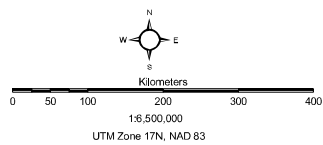
Two of the more critical questions of the survey addressed the social costs and benefits of aggregate extraction. These results were tabulated by geographic area and are illustrated in Figures 2-35 and 2-36. Those responses with significant differences are noted with an asterisk.

Based on the findings from the geographical variation study we can infer from the results that respondents who live in an urban such as Area 4 – GTA, rate parks and trails as an important aspect of their community. Also, respondents from Area 4 - GTA highlighted new institutional buildings as important. Based on these responses we can infer that respondents do not rate development and infrastructure projects, with the exception of institutional buildings, as high importance.

Respondents from Area 3 – West Central are more likely to link social costs such as nuisance effects with aggregate extraction. Respondents who live in the far northeast and northwest areas of the Portland Cement Regions such as Area 7 and 8 are most likely to name development and infrastructure projects as a benefit of aggregate extraction. It is interesting to note that residents in the Northwest, Area 8, are more likely to say there are no social costs of aggregate extraction.



Basemapping from Ontario Ministry of Natural Resources



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Legend



- Nuisance Effect
- Human Effect
- Environmental
- No Social Cost
- Other
- CPCA Geographic Areas

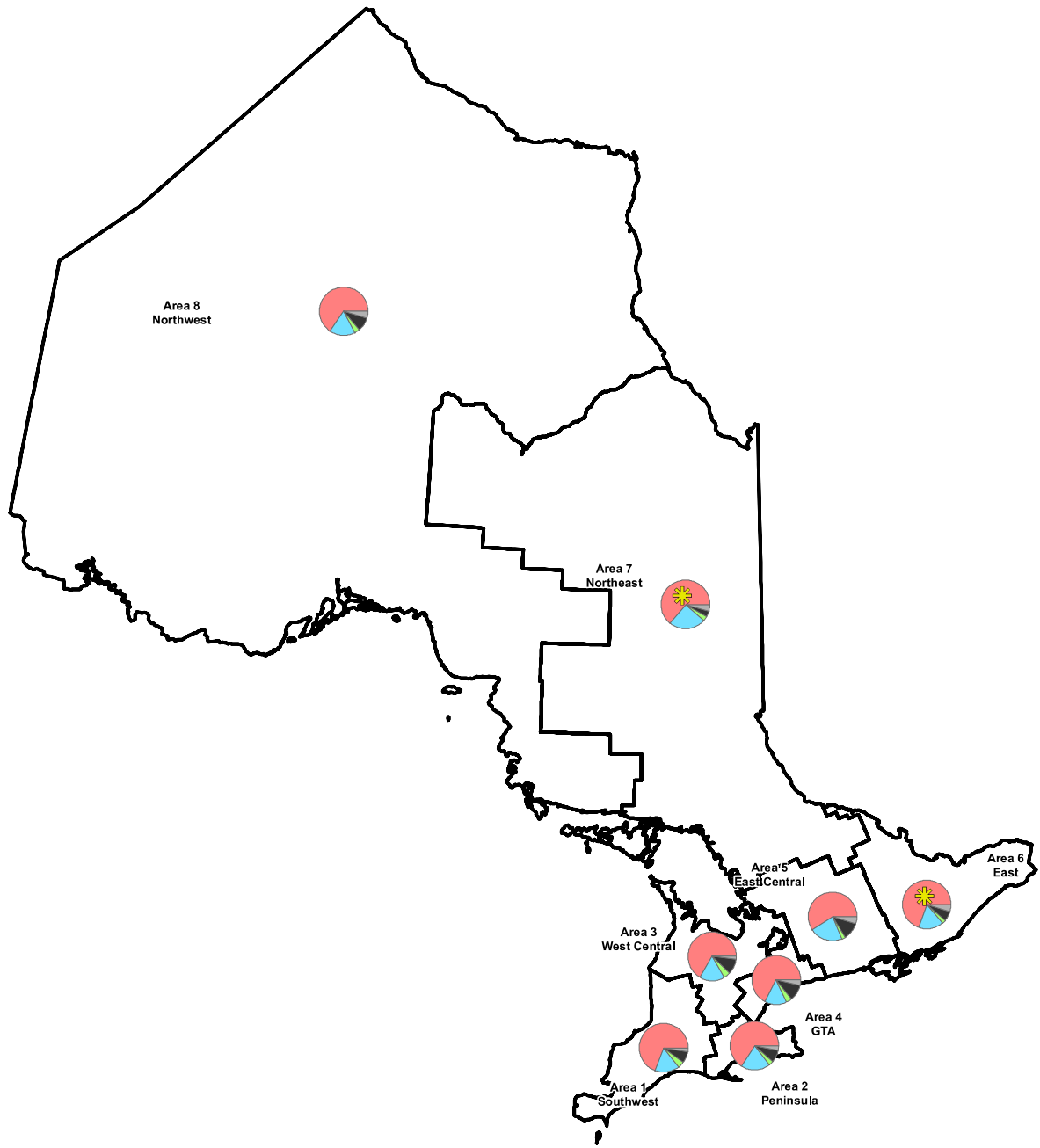
Statistically Significant

Perceived Social Costs of Aggregate Extraction by CPCA Geographic Area

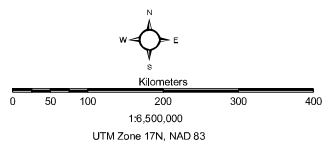
December 2009
Project 60119329



Figure 2-35











Basemapping from Ontario Ministry of Natural Resources



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Legend

- 
 -  Infrastructure & Development
 -  Economic
 -  Recreational/Landscape
 -  No Social Benefit
 -  Other
-  CPCA Geographic Areas
-  Statistically Significant

Perceived Social Benefits of Aggregate Extraction by CPCA Geographic Area

December 2009
Project 60119329



Figure 2-36

2.4 Environmental Benefits

An ecosystem is a dynamic complex of plant, animal and microorganism communities and the nonliving environment interacting as one functional unit providing services necessary for life (MA, 2005). Ecosystem services are benefits that people obtain from ecosystems and, which is categorized into four types by the Millennium Ecosystem Assessment (MA, 2005). These include:

- Provisioning Services
 - Products obtained from ecosystems (e.g. food and fuel)
- Regulating Services
 - Benefits obtained from regulation of ecosystems processes (e.g. water purification)
- Cultural Services
 - Nonmaterial benefits from ecosystem (e.g. recreation and ecotourism)
- Supporting Services
 - Services necessary for the production of all other ecosystem services (e.g. soil formation, nutrient cycling)

These ecosystem services are constantly changing due to climate, disturbance regimes and time (age of the ecosystem). Human disturbance has the greatest capacity for creating change to an ecosystem and its services in the shortest amount of time. Human modification of the environment can result in changes to the availability and efficiency of ecosystem services which will create an impact to human health and welfare and natural ecosystems. Identification of ecosystem services provides a tool that provides language to aid our understanding of these complex systems, facilitates management actions to maintain them, and provides an opportunity to apply economic models to evaluate these services in order to better quantify their importance to social and economic systems. The mining of aggregates often results in major alterations to the landscape. While extraction activities creates change to the ecosystem services provided by the overlying land uses, the aggregates themselves can be used in processes that create ecosystem value, and rehabilitation plans may ultimately replace the services removed. For example, a licence that initially provided services associated with forest and agriculture may transition through meadow and transform into services associated with lakes and meadows as a result of the identified rehabilitation plan.

Since we do not directly pay for ecosystem services it is difficult to assign a dollar value for their loss. We tend to take their benefits for granted. In the past 50 years humans have changed the Earth's ecosystems more rapidly and extensively than in any other period in human history (MA, 2005). This is a result of increased population which leads to more development which requires more resources and therefore more change to the landscape. There are indications that we no longer have the natural resources to replace forests, once thought to be renewable due to the effects of acid rain leaching essential nutrients from the

soil. Statistics Canada (2009c) has shown an average population increase of 1.1% in Ontario from 2004 to 2008 which correlates with the consumption of more and more aggregates (Stats Can, 2009c).

The *Ontario Aggregate Resources Act (ARA) and Regulation 244/97*, defines aggregates as gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite, rock or other prescribed material (ARA, 1990). Aggregates constitute the largest, by tonnage, nonfuel mineral commodities currently inventoried in North America (Poulin *et al.*, 1994). They are used to build and maintain our houses, offices, roads, schools and hospitals; provide a firm foundation for railways, used to construct factories, warehouses and shops and can protect us against flooding (BGS, 2008).

Aggregate production is one of the most important mining industries in the world; annual worldwide aggregate production totals about 16.5 billion tonnes, or more than \$70 billion (Langer *et al.*, 2004). Aggregates are necessary in today's society because they are used to build and maintain a variety of urban, suburban and rural infrastructures such as buildings, roadways, water storage, filtration and delivery systems, wastewater collection and treatment systems (BGS, 2008; Langer *et al.*, 2004).

In the province of Ontario, the demand for aggregate is ever increasing due to the affluent construction industry which requires more and more aggregate for production. In 2007 Ontario produced approximately 181 million tonnes of stone, sand and gravel (including recycling), with a large proportion of this going to construction (TOARC, 2009). The construction of a new road can consume over 15,000 tonnes of aggregate per kilometre for a local two-lane highway, and up to 48,000 tonnes for each kilometre of a six-lane asphalt freeway, not to mention the tonnage of aggregate used to rehabilitate and maintain Ontario's current provincial highway network (Environmental Commissioner of Ontario, 2002-2003). The Ontario Sand, Stone and Gravel Association (2009) predict that the consumption of aggregate in Ontario will total approximately 4 billion tonnes in the next 25 years.

Aggregates directly provide some of the supporting, provisioning, regulating and cultural services that directly affect people. The following sections provide a breakdown of the contribution of products of aggregate extraction to create ecosystem services.

2.4.1 Use and Environmental Benefit of Aggregate Matrix

Aggregates are used for a wide range of purposes. For the purposes of this paper, the identification of the ecosystem services provided by the rock, stone, gravel, etc. was confined to the first order or primary uses. The rehabilitation of a pit or quarry to a golf course was identified as a primary spatial benefit, but the health and recreation benefits (secondary or indirect benefits) associated with the use of the golf course could not be attributed to the aggregate extraction directly.

A matrix that details the nature of the aggregate, the use and the environmental benefit accrued expressed as ecosystem service, is provided in Appendix B and summarized in the following section. It is divided into two main sections: Processes to which aggregates contribute and Spatial - the places that are created as a consequence of extraction activities.

A wide range of aggregates are used in **processes** that provide an environmental benefit and include:

- Landscape Restoration and/or Rehabilitation;
- Water Quality Treatment;
- Removal of Anthropogenic Pollutants;
- Uses in Mines;
- Landfills and Waste Disposals; and
- Maintenance of Biodiversity.

The **Spatial** categories include services where the extraction itself contributes ecosystem services as a consequence of the ultimate rehabilitation of extraction sites and where aggregates are used for the creation of fixed structures. These include construction and rehabilitation uses and post-quarry operations.

2.4.2 Processes

2.4.2.1 Landscape Restoration and/or Rehabilitation

Historically, humans have altered the natural landscape through agricultural activities, settlement and commercialization, in ignorance of the effect on environmental sustainability. The science of ecological restoration is built on the recognition that some of these effects can be reversed and/or controlled. The strategic use of aggregates is a key tool in rehabilitation of damaged landscapes, leading to the reaction of regulating, cultural and preserving ecosystem services.

Wetland and River/Stream Restoration

Wetland and river/stream restoration use aggregates (stone, gravel or boulders) to promote habitat creation and to prevent erosion and the associated negative effects. Erosion can cause a negative impact on the local environment by contaminating waterways from soil fertilizers and pesticides; increasing the risk of flooding; reducing the stability of river banks, reducing the ability of banks to support plant growth which

decreases biodiversity; and increases the loss of nutrients, soil organic matter and soil biota. Boulders, rocks and stone can be used for restoring diminished habitat for a variety of smaller creatures, such as crayfish, invertebrates and a variety of fish. Animals take advantage of holes and crevices within these aggregates as shelter from predators while providing more habitat niches leading to increased biodiversity. In addition, habitat connectivity can be promoted by using aggregates for building wildlife overpasses, underpasses and other connectivity structures to help maintain corridors for animals from one natural area to another.

In addition to enhancements for wildlife, both terrestrial and aquatic, enhancement of human recreation and tourism facilities (e.g. paths and arenas) often occur in association with landscape restoration. These benefits are important aesthetically and improve connectivity among neighbourhoods.

Ecosystem services identified include:

Regulating Services

- Water quality
- Water quantity
- Natural Hazard Control

Cultural Services

- Aesthetics
- Recreation and Tourism

Preserving Services

- Biodiversity
- Connectivity

Agricultural Land (soil aggregate stability)

Aggregates are used in agricultural practices through the incorporation of different types of material into the soils to change the structure and water holding capacity. Sand is essential for good drainage and clay holds water, nutrients and minerals in the soil; both necessary for good crop production. Soils can serve as a filter to prevent pollutants from contaminating groundwater (Hairston *et al.* 2001). In turn crop production leads to many supporting ecosystem services.

Ecosystem services identified include:

Supporting Services

- Soil formation
- Nutrient Cycling
- Water Cycling

Regulating Services

- Pollution Treatment
- Natural Hazard Control (wind)

2.4.2.2 Water Quality Treatment

Clean water is necessary for all living things. Aggregates are involved in the process of filtering and purifying contaminated water both in nature, and in human made procedures.

Sewage Treatment

Aggregates are used to filter water during sewage treatment to physically remove solid contaminants from sewage. In addition, sewage treatment facilities, and fixtures are comprised of aggregates. By being involved in the sewage treatment process, aggregates aid in improving water quality and controlling the spread of disease through the purification process.

Ecosystem services identified include:

Supporting Services

- Water Cycling

Regulating Services

- Water Quality
- Waste Treatment
- Disease Control

Stormwater Control

Stormwater management systems are part of the strategy to control runoff from impervious surfaces that historically would have been absorbed by vegetation and soil, with the objective of reducing export of sediments and sources of pollution to watersheds. Stormwater controls, such as stormwater management ponds, French drains, bioswales and infiltration gardens are created and maintained using aggregates. These features provide additional storage capacity for waterways to control peak flows for flood control, mitigating erosion impacts, water quality control for water quality impacts and control of suspended soils and additional nutrients in waterways. By controlling flooding, aesthetics of the surrounding environment are maintained since it is not damaged during heavy precipitation events. Stormwater control ponds in some cases provide opportunities for recreation and tourism (OSSGA 2006). These can be passive recreational opportunities such as bird watching, trail walking, and irrigation of golf courses (Rain City of Lincoln 2006); or direct recreation such as skating, boating and fishing (City of Saskatoon 2009; South Carolina Department of Health 2007). The Adopt-A-Pond program in association

with the Toronto Zoo, has established many stormwater control ponds in the GTA including the large stormwater control pond in Millikin Park, Scarborough located at Steels Avenue and McCowan Road, which is used for fishing and non-motorized boating in the summers as well as the trail systems year round (Toronto Zoo 2009).

Ecosystem services identified include:

Supporting Services

- Nutrient Cycling
- Water Cycling

Regulating Services

- Water Quality
- Water Quantity
- Pest Control (-)
- Natural Hazard Control

Cultural Services

- Aesthetics (both +/-)
- Sense of place
- Recreation and Tourism

2.4.2.3 Removal of Anthropogenic Pollutants

Some aggregates can be used to remove certain environmental pollutants; reducing the amount of stress that humans put on the environment. The most prevalent aggregate used for chemical pollutant removal is limestone because of its reactive nature with acidic contaminants.

Flue Gas Desulfurization

Limestone or lime is used for removing sulfur dioxide produced from exhaust flue gases caused by burning coal or oil, thereby cleaning the air and reducing associated pollution. This process reduces the amount of sulfur dioxide in the natural environment (air and water) contributing a variety of regulating ecosystem services (Schnelle & Brown, 2001).

Ecosystem services identified include:

Supporting Services

- Nutrient Cycling

Regulating Services

- Air Quality
- Climate Regulation

- Water Quality
- Pollution Treatment

Acid Neutralization

Limestone is also used to neutralize acidic waste and/or water caused by industrial process. Limestone (lime) has properties making it a preferred acid neutralizer; properties such as heavy, low in volume, easy to handle, easy to clarify and it is a low cost reagent in terms of neutralizing value (National Lime Association, 2000).

Ecosystem services identified include:

Supporting Services

- Nutrient Cycling

Regulating Services

- Air Quality (+/-)
- Climate Regulation (-)
- Water Quality
- Waste Treatment
- Pollution Treatment

2.4.2.4 Use in Mine Sites

Aggregates are used as a base to create new habitat for completed mining projects (SSGR, 2009).

Mine reclamation (backfill, land cover)

Like aggregate pit and quarry operations, mines are subject to rehabilitation programs. Unlike aggregate operations however, mine sites are often contaminated with the by-products of extraction and smelting, therefore the reclamation often includes using aggregates for the chemical as well as the physical rehabilitation restoring the ecological and physical integrity of the site and surrounding landscapes.

Ecosystem services identified include:

Supporting Services

- Soil Formation
- Nutrient Cycling
- Water Cycling

Regulating Services

- Water Quality
- Water Quantity
- Natural Hazard Control

Cultural Services

- Recreation and Tourism

Coal Mine Dusting to Prevent Explosions

Due to limestone's chemical composition it can be used to prevent explosions during the coal mining process. If an explosion occurs the limestone dust mixes with the coal dust inhibiting flame propagation by acting as a thermal inhibitor (Man & Teacoach, 2009).

Ecosystem services identified include:

Cultural Services

- Health and Safety

2.4.2.5 Landfills and Waste Disposal

It is important to localize anthropogenic waste so the impact to the environment is contained in a smaller area. Leachate from landfills can contain a variety of contaminants such as toxic metals, organics, high concentrations of ammonia, and pathogenic microorganisms. The leachate collection layer is comprised of washed drain gravel or crushed glass cullet and is used to drain leachate into holding tanks for treatment (NIST, 1997). Like leachate collection, aggregates are used in a similar manner to collect gas and reduce its movement throughout and out of the landfill site. Gas is collected by way of gravel filled trenches which allow upward movement of gas, which is collected and later burned off (NIST, 1997).

Aggregates, namely clay, sand and crushed stone, are used to cover landfills preventing leachate formation. Depending on the strategy for long term management of the site, landfills are covered with clay to decrease the amount of precipitation entering the site and becoming contaminated, or in some cases, covered with sands to allow infiltration which compresses the refuse and increases the life span of the landfill (e.g., Keele Valley Landfill, City of Vaughan). In this case, the leachate from the landfill must be collected and treated, a process which also relies on aggregates as part of the process. Limestone aggregate is used in the treatment of leachate to neutralize its acidity, helping to promote water and air quality.

Ecosystem services identified include:

For Leachate Collection

Supporting Services

- Water Cycling

Regulating Services

- Water Quality
- Pollution Treatment
- Disease Control

For Gas Collection

Provisioning Services

- Fuel/Energy

Regulating Services

- Air Quality
- Climate Regulation
- Pollution Treatment

For Cover and Protection

Regulating Services

- Water Quality
- Disease Control
- Natural Hazard Control

Cultural Services

- Health and Safety

For Leachate pH Adjustment

Regulating Services

- Air Quality
- Water Quality

2.4.2.6 Maintenance of Biodiversity

Provision of artificial disturbance regimes

Human activities have created waves of landscape scale disturbances, but never before have natural disturbance regimes been as controlled due to suppression of fire, control of flooding, and construction that resists the effects of severe wind. Since the 1950s the landscape of Ontario has been recovering from widespread deforestation and shifting toward extensive urbanization and away from agriculture as more and more farmers move to the cities. As landscapes stabilize and disturbance regimes (fire, wind) are controlled, habitats that are created by disturbance are declining. Grassland species are among the rarest in the landscape, and those associated with intermediate disturbance regimes, such as species that are disturbance dependant (Golden-winged Warbler; Prairie Cinquefoil; Olympia Marblewing). Aggregate production provides a controlled activity that can target the sequential restoration of habitats for disturbance-dependant species with the goal of maintaining native biodiversity.

Ecosystem services identified include:

Preserving Services

- Biodiversity
- Connectivity
- What we do not yet know

2.4.3 Spatial Benefits of Aggregate Extraction

2.4.3.1 Construction

Construction provides a direct benefit to society as it creates human infrastructure. The majority of the ecosystem services provided for direct construction (e.g. buildings, roads, etc) are cultural services, since they provide a direct influence on society and economic returns. The purpose of some of the built infrastructure directly benefits the environment (i.e. incinerators and recycling facilities).

Dams decrease erosion and associated negative impacts, aid in the use of water supply for sustainable energy by controlling flow; provide recreational uses by way of increasing flow of river for associated activities (e.g. white water sports); and allow access to created lakes and hydraulic power.

Other general benefits of construction include: roads and bridges that increase the availability of goods transported; shorelines/navigation channels prevent erosion and deterioration of the natural habitat; and during construction aggregates can prevent contamination of runoff into local water ways by redirecting flow.

Ecosystem services identified include:

Road and Highway maintenance and repair

Cultural Services

- Social Relations
- Commerce
- Recreation and Tourism

Road and Highway new construction

Cultural Services

- Social Relations
- Commerce
- Recreation and Tourism

Preserving Services

- Biodiversity (-)
- Connectivity (-)

Houses

Cultural Services

- Cultural Diversity
- Spiritual and religious values, Inspiration
- Education
- Aesthetics
- Social Relations
- Sense of Place
- Cultural Heritage
- Recreation and Tourism

Institutional Buildings

Cultural Services

- Cultural Diversity
- Spiritual and religious values, Inspiration
- Education
- Aesthetics
- Social Relations
- Sense of Place
- Cultural Heritage
- Commerce
- Recreation and Tourism

Airports

Cultural Services

- Cultural Diversity
- Social relations
- Cultural Heritage
- Commerce
- Recreation and Tourism

Preserving Services

- Biodiversity (-)

Incinerators/Recycling Facilities

Regulating Services

- Air Quality (-/+)
- Waste Treatment (-/+)
- Disease Control

Cultural Services

- Commerce

Dams

Supporting Services

- Water Cycling

Provisioning Services

- Fuel/Energy

Regulating Services

- Water Quantity
- Natural Hazard Control (+/-)

Cultural Services

- Recreation and tourism

Preserving Services

- Connectivity (-)

Dams, Reservoirs and Water Supply

Supporting Services

- Water Cycling

Provisioning Services

- Fuel/Energy

Regulating Services

- Water Quantity
- Natural Hazard Control (+/-)

Cultural Services

- Recreation and Tourism

Preserving Services

- Biodiversity (+/-)
- Connectivity (-)

Roadways/Bridges

Cultural Services

- Social Relations
- Commerce
- Recreation and Tourism

Preserving Services

- Biodiversity (-)
- Connectivity (-)

Shorelines/Navigation Channels

Regulating Services

- Natural Hazard Control

Construction Site (exits and runoff control)

Regulating Services

- Water Quality
- Water Quantity
- Natural Hazard Control

2.4.3.2 Rehabilitation Uses Post-Quarry Operations

The Aggregates Resources Act requires that the quarries be restored to appropriate end uses that range from restoration of natural habitat (terrestrial, aquatic) through provision of sites for recreation, education, agriculture and/or residential/commercial/industrial development. The 31 MNR aggregate site licences were examined and the following services were provided by the existing conditions (before extraction) and rehabilitation (subsequent to extraction) plans:

Licences - Existing conditions

Supporting Services

- Soil Formation
- Photosynthesis
- Primary Production
- Nutrient Cycling
- Water Cycling

Provisioning Services

- Food
- Genetic Resources

Regulating Services

- Air Quality
- Climate Regulation
- Water Quality
- Water Quantity
- Pollination

Cultural Services

- Depend on the site (Spiritual and religious values inspiration, aesthetics, cultural heritage)

Preserving Services

- Biodiversity

Rehabilitation- subsequent to extraction

Supporting Services

- Soil Formation
- Photosynthesis
- Primary Production
- Nutrient Cycling
- Water Cycling

Provisioning Services

- Food
- Genetic Resources

Regulating Services

- Air Quality

- Climate Regulation
- Water Quality
- Water Quantity
- Pollination

Cultural Services

- Depend on the site (Spiritual and religious values inspiration, aesthetics, cultural heritage)

Preserving Services

- Biodiversity

Post Rehabilitation Uses

As conveyed above aggregates provide various ecosystems services; moreover the sites in which they were mined also provide eco-services subsequent to the completion of the rehabilitation phase. Aggregate extraction sites can be rehabilitated to productive land uses such as:

- Arboreta
- Earth Science Study Sites
- Gardens (e.g., Royal Botanical Gardens in Burlington, ON)
- Development: residential, commercial, industrial
- Parks
- Resorts
- Golf courses
- Landfills
- Zoos
- Lakes and beaches
- Wildlife habitat: alvars; wetlands, especially fens due to unique groundwater conditions

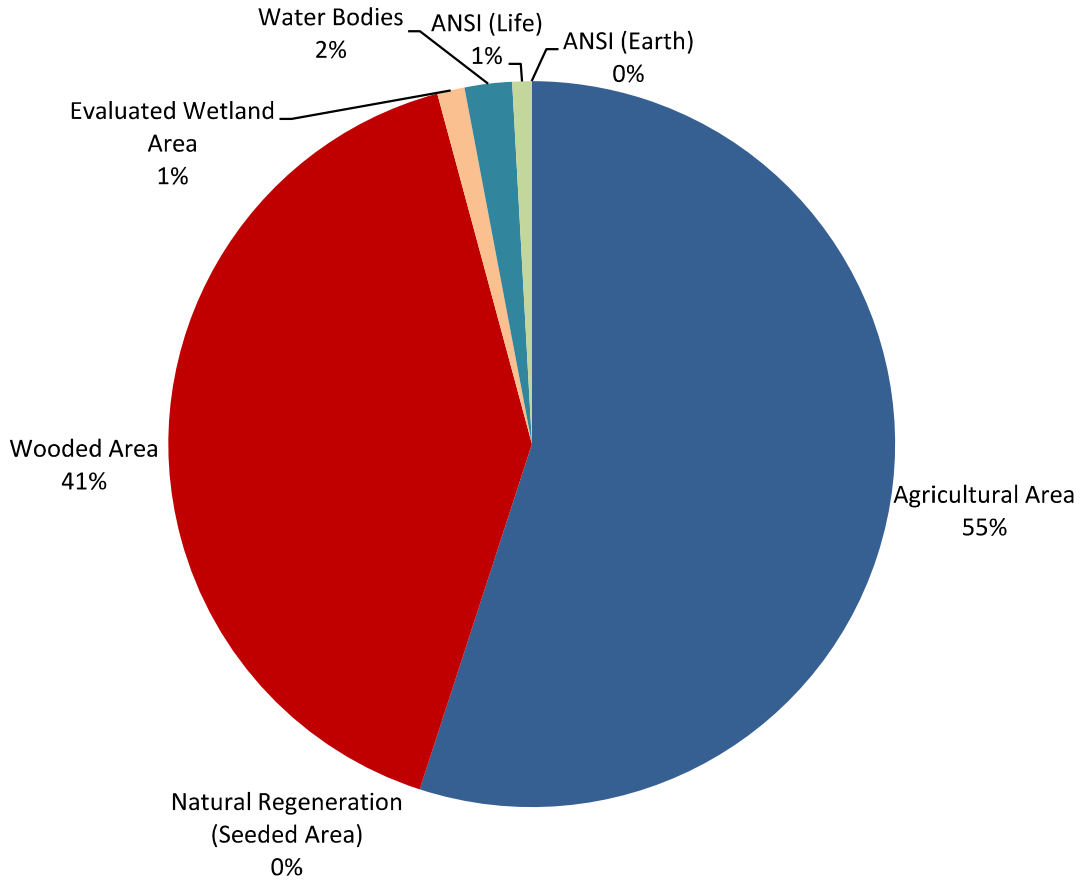
2.5 Environmental Impacts of Aggregate Extraction

Section 1.3.4 provides the methodology that was used to calculate the area of existing land uses on the most recent 31 approved aggregate licences based on the associated natural heritage reporting and comparison to relevant GIS data layers. The long term outcomes anticipated as a result of the progressive implementation of rehabilitation plans were calculated in order to compare the nature and magnitude of the change. Ecosystem services associated with pre and post extraction activities were assigned qualitatively. Assignment of dollar values to the services was beyond the scope of this project.

On average 69% of the licenced area was extracted for aggregates, while the remaining 31% was protected as watercourses, ANSIs, significant woodlands and significant wetlands and buffers to the site and/or features. The licenced area corresponds to the

limit of ownership of the sites, whereas the extraction limits are interior to this area, and defined by the constraints of the site.

Figure 2-37 Relative area of natural heritage features before extraction

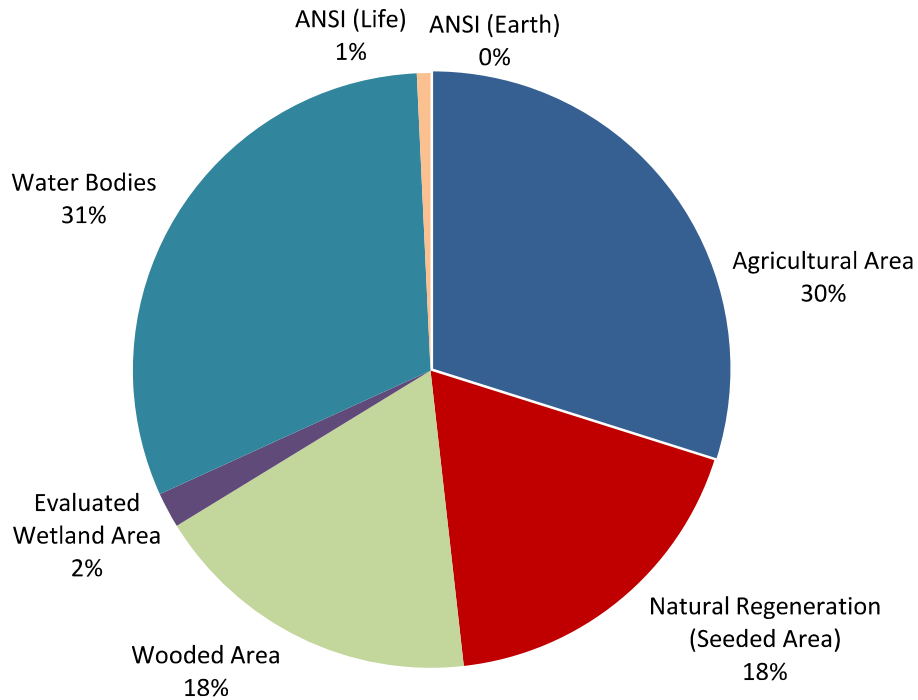


Source: AECOM, 2009

Of the 31 licences analyzed, most of the extracted area was comprised of agriculture (38% of the licenced area; 55% of the extraction limit area). Of the agricultural lands removed during extraction, 62% was returned to agricultural use while 38% were seeded and left to naturally regenerate. The natural regeneration offset the loss of agricultural land at approximately a 1:1 ratio (160 ha agriculture removed: 170 ha seeded area regenerated) (Table 2-28).

The wooded areas within the licenced areas were not significant in the context of the Provincial Policy Statement and the majority were less than 10 ha in size. Of these wooded areas, approximately half were removed and not rehabilitated directly to their former state, but rather converted to some other form of natural area. There was a net loss of 50% of the pre-extraction woodlands.

Figure 2-38 Relative area of natural heritage features after extraction



Source: AECOM, 2009

Water bodies are defined by a body of water large enough to provide potential habitat for aquatic life (pond, lake, etc). The total area of water bodies increased approximately 18 times their original amount from 17 ha to 285 ha (Table 2-28). This statistic is likely inflated as a comparison of the vegetation reported in the natural heritage reports was frequently identified as “wetland”, but the corresponding NRVIS data interpreted the communities as “water bodies”.

A small net increase of evaluated wetlands (none were provincially significant) was observed (net increase of 8 ha). Only one Life Science Area of Natural and Scientific Interest (ANSI) was situated in the licenced area, but was left undisturbed throughout the extraction, likely due to the requirements under the ARA legislation (Table 2-28).

Once quarrying was complete, the total licenced areas were rehabilitated into the following areas:

- 36% lakes (converted from agriculture)
- 28% in ecological restoration (natural rehab/woodlands/wetlands)
- 35% agriculture

The following discrepancies were observed during the analysis of the 31 licenced areas:

- Some licences leave slopes un-rehabilitated
- Two licences do not account for rehabilitation areas on drawings or natural heritage reports
- NRVIS data variable (lakes = wetlands for many licences)
- Errors in GIS measurements but not significant at this scale

Table 2-28 Environmental Changes of Licenced Areas

Extraction Limits	Before	Interim Condition	Rehabilitation Condition	Net Change
Licence Boundary Area	1170	-	-	-
Extraction Limit Area	811	-	-	-
Agricultural Area	446	0	277	-169
Natural Regeneration (Seeded Area)	0	0	170	170
Wooded Area	331	125	42	-164
Evaluated Wetland Area	10	9	9	8
Water Bodies	17	14	288	285
ANSI (Life)	7	7	0	0
ANSI (Earth)	0	0	0	0

The Canada Land Inventory (CLI) agriculture classes represent the potential of soil for the production of field crops (Agriculture and Agri-Food Canada 2008). The analysis of the licences concluded that approximately 50% of the lands within the licence boundaries were in classes four to seven, which are deemed lower quality for crop utilization. The other 50% broke down into 47.63% of classes one to three, and the remaining 2.37% as class zero, which represents organic soils and is not placed in a capability class. The specific definitions of each class are found in the Glossary. See Tables 2-29 and 2-30 for specific areas.

Table 2-29 Licenced Area Classed under the Canada Land Inventory for Agricultural Use

Class	Licence Boundary (ha)	Extraction Limit (ha)	Total (ha)
0	18	10	28
1	32	104	135
2	116	223	339
3	22	62	83
4	23	21	44
5	12	9	21
6	111	325	436
7	26	57	83
Total	360	811	1,170

Source: AECOM, 2009

Table 2-30 Percentage of Licenced Area Classed under the Canada Land Inventory for Agricultural Use

Class	Licence Boundary (%)	Extraction Limit (%)	Total (%)
0	5	1	2
1	9	13	12
2	33	27	29
3	6	8	7
4	6	3	4
5	3	1	2
6	31	40	37
7	7	7	7
Total	100	100	100

Source: AECOM, 2009

2.6 Environmental Costs

By definition, ecosystem services analysis is designed to evaluate the benefits accrued from natural heritage features and functions. However, "values" are highly subjective, and ecosystems are highly connected and non-judgemental. Therefore, while it is possible to list the environmental benefits enjoyed as a result of ecosystem services and their associated societal and economic benefits, there are also equal and opposite effects that can be interpreted as costs, at least in some circles.

It should be recognized that natural heritage provides a cohort of services that do and do not benefit human ecosystems. Reductions in some of these services can create a negative impact on human ecosystems (e.g. erosion, water quality, carbon storage), while increases can create positive impacts. The following highlights some of the primary ecosystem services that are negatively affected by the use of aggregate for human development and activity.

Extraction of limestones and dolostones triggers a release of carbon dioxide upon exposure to the atmosphere and precipitation. Carbon dioxide is one of the principle greenhouse gases that has been identified as a contributor to global change, including warming effects.

2.6.1 Processes

2.6.1.1 Stormwater Control

Contrary to the benefits provided by stormwater control ponds some become breeding grounds for mosquitoes and other pests. Mosquitoes may carry West Nile Virus that has affected not only humans but some bird cohorts (Science Daily, 2009). It should be noted that an increase in human pests will correlate to a foraging benefit for other organisms therefore the service is not all negative. These ponds can be developed to create a pleasing atmosphere but some are ill maintained and may become contaminated, aesthetically unpleasant, or they may represent a safety threat.

- Regulating Services
 - Pest Control (-)
- Cultural Services
 - Aesthetics (both +/-)
 - Health and Safety

2.6.1.2 Removal of Anthropogenic Pollutants

Some aggregates can be used to remove certain environmental pollutants but at the same time can create bi-products that are not environmentally friendly. The most prevalent aggregate for chemical pollutant removal is limestone because of its reactive nature with acidic contaminants.

Acid Neutralization

Although limestone stone is often used to remove acidic properties from water or leachate the process of limestone acid neutralization produces carbon dioxide (a greenhouse gas) as a bi-product and this contributes to climate change.

Regulating Services

- Air Quality (+/-)
- Climate Regulation (-)

2.6.2 Spatial Costs of Aggregate Extraction

2.6.2.1 Construction

The structures created with aggregates do not in themselves provide ecosystem impacts until they are located and/or managed in a manner that provides consequences. To credit aggregates with these “costs” is to speculate about secondary or indirect effects. However, as the structures with obvious benefits have been listed above, it is reasonable to discuss the possible downside of investing in these structures without an analysis of the ecosystem services that may be affected.

Although humans find roads an indispensable necessity for today’s society, the indiscriminate construction of new roads, highways, dams or bridges, made possible by relatively inexpensive aggregates, can cause negative effects to the surrounding environment. New roadways may dissect natural areas into fragments decreasing the amount of connectivity and total area of a habitat thereby creating a negative impact to biodiversity. Edges are generally good habitat for invasive and non-native species where they outcompete native species, many of which have more specialized habitat requirements. Bisecting habitats with new roads is likely one of the most significant impacts created on natural areas often affecting significant species within an area because the habitat no longer suits their needs.

Dams, although beneficial on a variety of fronts from energy production to irrigation planning and food production, also create significant negative impacts. The barrier effect alone to the migration of fish accounts for the loss of whole populations for example, the

American Eel (Environment Canada, 2009; MacGregor, 2009). This disturbance of the natural flow regimes also can create changes to spawning and nursery habitat through changes in water depths and temperature. Pulse events (sudden release of excess water) can dislodge eggs and fry as well as in-stream food sources. This concern is expressed in the research by the Ontario Water Resources into Best Management Practices for management of Sturgeon in streams where there are hydro installations within the range of this fish due to the implications of the Endangered Species Act. Sturgeon is only one of a long list of aquatic species that could be affected.

Airports decrease the biodiversity of the neighbourhood in which they are situated due to the complete change in landscape for the airport to be safe from an operations perspective (e.g. no trees, no birds or mammals to be present in aircraft area; many chemicals are present due to maintenance of vehicles and aircrafts, de-icing and anti-icing procedures, etc.). The airport campus becomes a biodiversity “black hole”.

Although incinerators and recycling facilities aid in reducing waste that ends up in landfills, the processes they use emit bi-products that can have negative effects on the environment (e.g. carbon dioxide, sulfur dioxide, heavy metals, etc.) if scrubbers and other methods to control emissions are not implemented or well maintained.

Road and Highway new construction

Preserving Services

- Biodiversity (-)
- Connectivity (-)

Airports

Preserving Services

- Biodiversity (-)

Incinerators/Recycling Facilities

Regulating Services

- Air Quality (-/+)
- Waste Treatment (-/+)

Dams, Reservoirs and Water Supply

Regulating Services

- Natural Hazard Control (+/-)

Preserving Services

- Connectivity (-)

Dams, Reservoirs and Water Supply

Regulating Services

- Natural Hazard Control (+/-)

Preserving Services

- Biodiversity (+/-)
- Connectivity (-)

2.6.2.2 Agriculture

The analysis of the 31 most recent licence approvals indicates that agricultural land composed over half of the excavated area (446 ha total; 55%). Of that, almost half (48%) was Prime Agricultural land. The rehabilitation plans anticipate that 277 ha will be returned to production (38%), however the capability of that land is not classified. One of the measureable costs of aggregate extraction appears to be the loss of agricultural land that does not discriminate between Prime and non-prime areas.

There was a concern that the losses of agricultural land would be undervalued if the resources currently forested were not included in the loss. In this study, the loss in forested area is offset by the regenerating areas. The occurrence of forest proves to be a better land use for soil conservation than agricultural uses.

3. Major Study Findings and Recommendations

3.1 State of the Aggregate Resource in Ontario

3.1.1 Economic Analysis – Upstream and Downstream Flows

This study sought to understand a range of economic impacts of aggregates, both in the upstream and downstream flows. In 2007, aggregate production in the Province of Ontario inclusive of recycling and export was in the order of 181,000,000 tonnes and new production totalled almost 164,000,000 tonnes. The primary areas of new production were CPCA geographic areas 4 and 3, the GTA and West Central respectively. The economic value of this production was approximately \$1.3 billion.

The aggregate industry generates both upstream and downstream effects in the provincial economy. The upstream effects include spending by the aggregate industry on its industry supply chain and the industry itself. In 2007, taking into account direct, indirect and induced effects the sector generates approximately:

- \$1.6 billion of GDP
- \$827 million of labour income
- 17,000 fulltime jobs
- \$2.9 billion of gross output
- \$78 million in taxes

In terms of material, stone and sand and gravel production are each responsible for approximately 45% of the economic outputs generated by the aggregate sector. Other materials are responsible for about 10% of the economic outputs. CPCA geographic Areas 3, 4 and 6 collectively account for approximately 54% of the economic outputs of the aggregate sector in the Province.

The downstream economic effects include economic impacts in sectors that purchase goods and services from a subject sector where initial production spending took place. The 2007 aggregate production volumes were tracked downstream to 16 end use sectors. These sectors were subsequently grouped into three categories:

- Cement and Concrete
- Other Products
- Construction

Approximately 21% of the provincial aggregate production by value flows to industries in the cement and concrete category and 57% to various forms of construction. The remaining 22% is destined for a suite of industry sectors in the other products category. The economic output attributable to aggregate production in the downstream sectors is:

- \$1.6 billion of GDP
- \$940 million of labour income
- 18,300 fulltime jobs
- \$3.2 billion of gross output

In terms of industry categories, the majority of the value add (GDP) falls to construction (59%), The cement and concrete category accounts for 22% and the other products category 19%. The downstream industry categories and sectors referred to in this study generate the following economic outputs.

- \$22 billion of GDP
- \$13 billion of labour income
- 245,000 fulltime jobs
- \$44.7 billion of gross output

In terms of the industry categories themselves, the contribution of aggregates to the overall economic outputs are roughly:

- Cement and concrete 8%
- Other products 3%
- Construction 13%

For all the categories combined, the contribution of aggregates to total economic output is in the order of 7%.

This paper concluded that aggregate plays an important role in the Ontario economy. Although it is a low price commodity, its use is in a very high volume. It is a 1.3 billion industry that through direct, indirect and induced means creates approximately 16,000 jobs in the provincial economy.

Aggregate moves to a wide variety of end users and it is an essential ingredient in the industry sectors associated with construction and manufacturing. Although it is not the dominate input in most sectors in terms of value, it is nevertheless an essential input and one for which there is no obvious substitute at the present time.

3.1.2 Case Studies

Through the assessment of the value of aggregates in 5 case studies selected from Ontario's major infrastructure projects we can conclude that the value of aggregates in infrastructure projects is a relatively small component of the total project. The following table indicates the value of aggregates as a percentage of the total project value for the selected case studies.

Table 3-1 Value of Aggregates as a Percentage of Total Project Value for the Selected Case Studies

Project	Aggregate / Project
Spadina Subway Extension	1.22%
Niagara Tunnel Project	4.43%
Woodstock General Hospital	0.26%
North Bay Regional Health Centre	0.60%
Wolfe Island Wind Project	0.64%

For each of the 5 case studies examined, all of the projects had a readily available local source of aggregate to be used in the project. Our assessment of case studies found aggregates to be an enabler of major infrastructure projects. Although the value of aggregates is a relatively small component of project value, it is a product that does not have many readily available substitutes and without aggregates available it is unclear how these major projects would proceed.

3.1.3 Social Value

The social costs and benefits of aggregate extraction were assessed through the telephone survey results, the content analyses of the OMB and MNR data, and also through the qualitative assessment of the case files from the NEC. From the telephone survey the following conclusions were made for the following areas of interest.

In terms of knowledge of the aggregate industry, there was no significant difference of actual distance to a pit or quarry between the two groups of respondents (those that said they do and those that said they do not live near a pit or quarry). The base knowledge seems to be varied and it can be concluded that respondents are not very familiar with the aggregate industry. This lack of familiarity indicates that the aggregate industry is not top

of mind for a statistically significant representation of the Ontario population and there are opportunities to build awareness and education amongst the public.

From the perspective of community well-being, respondents in general do not rank development and infrastructure projects highly among the other things that they value about their community and the things that contribute to their community's well-being. However, over half of the respondents did rank that certain types of development and infrastructure projects such as road and highway repair and maintenance, building new institutional buildings, new energy facilities and new highways and roads as "Somewhat Important" or "Very Important." Based on further questions to assess the benefits of aggregates, it was found that these specific projects, maintaining or repairing highways or roads, building new institutional buildings, energy facilities and new highways or roads were valuable to respondents and offered the greatest level of benefit. Respondents noted that the main benefits of these projects are the positive economic impacts associated with the aggregate industry such as job creation. This information shows that when respondents from the survey were asked to compare the attributes to their community that were valuable to them against infrastructure and development projects the data was not consistent. This leads us to conclude that respondents did not seem willing to trade the most important things that their value about their community for development and infrastructure projects.

The survey instrument focused several questions on assessing the social costs associated with the aggregate industry. Respondents perceived the main costs were the environmental effects such as lack of site rehabilitation, water contamination, and a destruction of habitat. Nuisance effects were also rated fairly high amongst respondents.

As a result of the Content Analyses from a combination of the MNR, OMB and NEC data, there was a wide range of types of public complaints regarding aggregate operations and licence applications. From an analysis of the MNR and OMB data, it is clear that the three most frequently reported public complaints are regarding noise pollution, truck traffic and volume and air pollution and dust. Likewise, the themes found in the NEC data were reflective of both the MNR and OMB data.

Respondents who reported that they live near a pit or quarry or near a truck transportation route formulated groups of respondents that were stated to have a *Perceived Direct Experience* (PDE). In our cross tabular analysis on whether a PDE has an influence on the Social Value of aggregates, we were able to infer the main costs and benefits from this group of respondents. Respondents that live near a pit or quarry were more likely to name nuisance effects as a social cost of aggregate extraction. However, respondents that live near an aggregate truck transportation route were more likely to state that the economic aspects of aggregate extraction as a social benefit.

Based on the findings from the geographical variation study, we can conclude that respondents who live in an urban area such as Area 4 - GTA rate parks and trails as an important aspect of their community. Also, respondents from Area 4 - GTA highlighted new institutional buildings as important. Based on these responses we can infer that respondents do not rate development and infrastructure projects, with the exception of institutional buildings, as high importance.

Respondents living in Area 7 and 8 overwhelmingly rated development and infrastructure projects as high importance and were more likely to state that there were no social costs of extraction. We can infer from this information that respondents living further away from urban centers recognize the benefits from aggregate extraction and are less likely to name parks and trails as important aspects of their community. Finally, the only geographical area to link social costs such as nuisance effects with regards to aggregate extraction were respondents from Area 3 – West Central.

When comparing the different approach to data collection we can make varied inferences. For example, From the Content Analysis findings it can be concluded that while the main concerns of aggregate extraction are nuisance effects, it should be noted that this comes from a sample that represents a vocal minority who are directly affected by the aggregates industry. However, when surveying a more statistical significant representation of the Ontario population, environmental impacts emerge as the main costs to aggregate extraction.

3.1.4 Environmental Value

This analysis qualitatively identified both the positive and negative aspects of ecosystem services provided by aggregates and their extraction. Reductions in some of these services can create a negative impact on human ecosystems (e.g. erosion, water quality, carbon storage), while increases can create positive impacts. Further analysis could identify trade-offs, and the ability to maximize net benefits.

The analyzed eco-services provided by aggregates were all of the first order. Secondary benefits and costs exist but they are very difficult to define and opinions on how they should be quantified vary. The environmental aggregates value matrix was broken down into the two categories of *Processes* in which the products of aggregate extraction are used and *Spatial*, where the extraction itself contributes ecosystem services as a consequence of the ultimate rehabilitation of extraction sites and the aggregates are used for the creation of fixed structures. Under the *Processes* heading the majority of the ecosystem services were categorized as “regulating”, in that they control processes that create an environmental benefit. This can be explained by the fact that the practices/procedures that are used by Landscape Rehabilitation; Water Quality Treatment; Removal of Anthropogenic Pollutants; Uses in Mines; Landfills and Waste Disposals; and Maintenance of Biodiversity are used to regulate ecosystem processes. The majority of the ecosystem services provided under the *Spatial* headings were cultural. The reason for

this is two-fold: the use of aggregate as the main source of building materials, and the rehabilitation of sites for culturally important functions that lead to secondary benefits. Aggregates have a large influence on human culture because it provides structures that reflect societal values.

The bulk of the negative effects of aggregates on eco-services fall to either regulating (likely due to the associated bi-products of aggregate processing) and/or preserving services (likely due to the permanent human impact that buildings, roads, dams, etc have on the developed landscape).

The 31 analysed licences were those of the most recent approvals, and it was established that these licences were subject to the most restrictive environmental controls. The fact that these sites were largely agricultural and environmental features were almost entirely preserved indicates that the legislation with respect to natural environment is having an effect on the outcomes. A small amount of good quality habitat was affected due to quarrying, and if it was affected, rehabilitation efforts usually replaced it.

The same perhaps cannot be said for the preservation of agricultural land, which the PPS also seeks to protect. Via this analysis, half of the agricultural resources are transformed. Within the licenced boundaries 50% of the lands extracted were of lower quality soils for crop utilization (agricultural classes four to seven, according to the CLI). However, 48% of the agricultural lands were of the classes one to three, which are good to high quality soils for crop utilization: Prime Agricultural Lands. Agricultural land is important for producing a wide range of products including food (nutrition), and energy and its consumption, for alternative purposes, particularly in the case of high quality land needs to be carefully considered.

The net shift in land use via the aggregate extraction process was from terrestrial to lake habitats, with a 50% net reduction in agricultural lands.

3.1.5 The Value of Aggregates in Ontario

This paper concludes that aggregate demand in the province of Ontario will continue to escalate and that this demand will be spurred on three fronts:

- by a growing population and concomitant need for new infrastructure and buildings
- the need to maintain existing infrastructure and buildings
- growth in the manufacturing economy and ongoing need for aggregate inputs

The key areas of demand for aggregate are in southern Ontario particularly around built-up areas. To-date, aggregate has been sourced in close proximity to these areas, keeping transportation costs and distances minimal. However, going forward as local sources are used up and development pressures expand in southern Ontario, there will be pressures to bring aggregate from further afield this will have cost implications. The industry should

optimize recycling to help offset the demand for new aggregate materials and balance the cost of supply.

Aggregate is not an inexhaustible commodity in southern Ontario and it needs to be responsibly husbanded. The vast majority of people are not significantly affected by aggregate extraction however people in close proximity to extraction areas and living along haul routes are. In addition, if transportation distances increase as resources are extracted further from their final destinations, a larger number of people will be affected by the transportation of aggregate resources.

At the moment there is no readily apparent substitute for aggregate it is an essential input for many parts of the Provincial economy. Therefore, it is imperative that efforts be sought to maximise the associated benefits and minimise costs.

3.2 Recommendations

3.2.1 Economic Analysis – Upstream and Downstream Flows

This economic analysis required the use of some assumptions to manage data gaps in available aggregate flow and pricing information. There is a need for better cooperation and transparency of data between the Ministry and the Industry. It is recommended that the Ministry, Industry Groups, and individual producers work together in a way to communicate primary data so that the flow of material may be better monitored, while still protecting confidentiality and proprietary information. To effectively manage this resource it is essential that strong data banks be constructed and maintained.

Some areas for future economic study include:

- Understanding the flow of aggregates to end users and the actual value of materials flowing need to be part of a future data assembly and management process;
- Understanding the supply cost implications of bringing aggregate from further afield;
- Understanding the implications (sensitivities) of raised aggregate costs to end users;
- End user surveys to collect primary information on significance of aggregate to construction and production processes;
- A quantitative analysis of the environmental costs and benefits of aggregate;
- Lifecycle cost analysis of pits and quarries from inception through after use; and
- Understanding the cost implications of using more recycled material and aggregate substitutes.

3.2.2 Case Studies

In order to better understand the role and impact of aggregates to major infrastructure projects, we recommend that future case studies be undertaken to look at the indirect use of aggregates on major infrastructure projects. We also recommend that MNR periodically surveys large infrastructure projects to understand quantities of aggregate used on a project, sources of aggregate and value of aggregate used.

3.2.3 Social Value

After our study, it is clear that there is some conflict between the cost and benefits society places on the aggregate industry. It is fairly clear that most of the respondents in our survey placed value on the built environment that which comes from aggregates but when faced with the idea of aggregate *extraction*, respondents clearly associate a number of social costs with this activity. However, respondents also recognize the positive economic impact that aggregate extraction and the use of aggregate materials has on job creation.

Based on this assessment it is our recommendation to conduct a more in-depth analysis to determine the net benefits or net costs specifically associated with aggregate *extraction*. In furthering our Content Analysis, we recommend a more direct analysis of community groups that are directly affected by aggregate operations including residents that live on or near major haul routes and residents that live near a pit or quarry. As seen in our assessment many of these residents raised their concerns to such bodies as the OMB, MNR and NEC but in order to obtain more in-depth information we would recommend a continuation of interviews and focus groups.

It would be beneficial to do more in-depth cross-tabular analysis with the existing telephone survey data, to locate case studies of major pits and quarries (or also the 31 recent MNR site licence applications) in Ontario and test if proximity to these sites affects respondents' views on the social costs and benefits of aggregates.

It is also necessary to gauge the level of benefits and costs experienced by aggregate operators. Again, interviews with the businesses that are operating and applying for aggregate licences as well as business that are indirectly connected to the industry will help to determine some of the net benefits and costs.

3.2.4 Environmental Value

The environmental value section of this study has highlighted a number of important environmental contributions of aggregate use however the relative contribution to values and costs are speculative. The quantification of these contributions is outside of the scope of this study, however undertaking the application of economic models to designate dollar values would improve not only the magnitude of contributions from the various features

and functions, but would also provide a tool to better correlate the natural environment values with societal and economic factors.

The environmental cost of transportation increases the negative impact on the environment and should be studied further to understand how to reduce this cost and to deal with the paradox that the constant, predictable need for aggregates conflicts with the community's desire that mining operations are conducted far from its boundaries (Poulin *et al.* 1994).

There is a further need to research changes in the landscape due to extraction and rehabilitation of aggregates, which in turn change species composition in the area, and how that affects the ecosystem.

The valuation of aggregate use and the environment would likely benefit from a cradle to grave analysis, which would not only analyze primary uses, but also secondary, transportation impacts, mining impacts, etc.

Studies on the affect of quarrying on the soil overburden should be conducted to determine the impact of extraction on the soil quality of the site to assess if it does or does not result in less fertile land after rehabilitation.

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Appendix A

Intellipulse Report and
Telephone Questionnaire



Ministry of Natural Resources
Social Value of the Aggregate Industry
To the Ontario Public

August 2009

Prepared for:
AECOM

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1 RESEARCH OVERVIEW AND KEY FINDINGS

1.1 RESEARCH OBJECTIVES

AECOM was contracted by the Ministry of Natural Resources (MNR) to examine the Value of Aggregates, as part of a larger body of work entitled, the State of the Aggregate Resources in Ontario Study (SAROS). The Value of Aggregates Study examined the social, economic, and ecological values of aggregates (i.e. stone, sand and gravel) in Ontario. AECOM retained IntelliPulse Inc. to undertake a public opinion survey on the social values associated with the aggregate industry. In Ontario, aggregates are used to repair and maintain the current infrastructure and as the province's population increases; to expand current and build new infrastructure and development projects. It was anticipated that Ontarians would have various opinions regarding the social costs and benefits related to the aggregate industry and that the public's knowledge of the aggregate industry could vary widely.

The overall purpose of this study was to determine the social value placed by the public on the aggregate component of Ontario's development and infrastructure needs and to gain some understanding of the public's knowledge of the aggregate industry. The specific objectives of this study were to gather data regarding:

- The relative importance of development and infrastructure projects to things the public value about their community that contribute to quality of life;
- The importance assigned to various types of new development and infrastructure projects in relation to their community's well-being;
- Knowledge of the Ontario aggregate industry; and
- Public opinion regarding the social costs and benefits of aggregate extraction.

IntelliPulse is pleased to present the results of this survey of social values of the aggregate industry among the Ontario public. The following sections provide the frequency responses to each question. Crosstabular analysis was undertaken to examine whether there are significant differences by three categories. The first, **Geography**, defines respondents by their location within one of the eight Portland Cement Association Geographic Areas (see Appendix 6.4 for figure). The second, **Demographic Characteristics**, defines respondents by their stated age as grouped into one of 6 age categories and by their gender, as identified by the interviewer. The third, **Perceived Direct Experiences (PDE)**, defines respondents by the perceived geographical proximity of a stone, sand or gravel pit or quarry to their home or a perceived geographical proximity of their home to a stone, sand or gravel transportation route. Significant differences are noted in the text.

1.2 STUDY AREAS AND APPROACH

In order to fulfill these research objectives a questionnaire was developed by AECOM for telephone administration, a copy of which is included in the Technical Appendix Section 6.3. IntelliPulse Inc. developed a sample design within the eight Portland Cement Regions to achieve a target level of confidence in the information collected.

The findings provided in this report are based on a random sample of Ontario residents. A total of 1420 interviews were conducted. A sample of this size yields results that are accurate within $\pm 2.6\%$, 19 out of 20 times.

A disproportional provincial sample allocation was developed in order to have a sufficient sample size in each of the eight Portland Cement Association geographic areas to examine whether there are significant differences in responses by area. A minimum of 150 interviews were allocated per area to achieve a minimum accuracy level of $\pm 8.1\%$, 19 out of 20 times. The geographic area samples were weighted to ensure proportional representation for reporting the total Ontario results. The weighting procedure is presented in the Technical Appendix. The following table summarizes the geographic area sample sizes and their respective confidence intervals.

Table 1.2 Ontario Sample Allocation

Geographic Area	Sample		Confidence Interval, $\pm 19 / 20$ times
	Actual	Weighted	
Area 1 - Southwest	153	161	8.1
Area 2 - Peninsula	153	136	8.1
Area 3 - West Central	153	154	8.1
Area 4 - GTA	354	651	5.3
Area 5 - East Central	151	57	8.1
Area 6 - East	152	169	8.1
Area 7 - Northeast	154	51	8.1
Area 8 - Northwest	150	41	8.1
Ontario Total	1,420	1,420	2.6

The telephone survey was administered by The Logit Group Inc. (Toronto, Ontario) under the direct supervision of IntelliPulse Inc. and AECOM. A pre-test was conducted on July 28, 2009. Interviewing dates were July 28 to August 6, 2009. The survey's average duration was 15 minutes.

1.3 KEY FINDINGS

Contact with the industry

- A core group of respondents reported some perceived direct experience with various aspect of the aggregate industry. One-third of the respondents (33%) claimed to live near a stone, sand and

gravel pit or quarry, and one-quarter (25%) claimed to live near a stone, sand and gravel transportation route. Three percent (3%) reported that they themselves or someone in their household was employed in the aggregate or an associated industry (i.e. road or building construction).

Values attributed to their community

- A variety of things were valued in the respondents' community that contribute to their quality of life. When asked to name up to three things, the most frequently reported were those related to municipal infrastructure/services (73%) including parks and trails, and cleanliness and up-keep of the community.
- Respondents were asked to rate the importance of development and infrastructure projects relative to other valued things in their community that contribute to quality of life:
 - 30% of respondents indicated that there are no other things in their communities that were more important than development and infrastructure projects. 29% stated that nature and the environment were more important, 21% name social aspects of their community and 20% name municipal characteristics as being more important. 17% name the human aspects (i.e. public safety/personal security, small town/village feel).
 - 72% of respondents stated that development and infrastructure projects were less important than the three things they value about their community. The remaining 28% of respondents stated that natural/environmental aspects, municipal infrastructure and services aspects and social aspects were less important than infrastructure and development projects.

Contributors to Community Well-being

- Respondents were asked about the importance of eight types of development and infrastructure projects in respect to their contribution to community well-being. Of these, the highest rated in importance was maintaining or repairing existing highways or roads (60% "very important").
- Fewer than half rated the remaining projects as "very important". However, more than half the respondents rated building new institutional buildings (68% "very" and "somewhat" important), new energy facilities (57%) and new highways or roads (51%) as important.
- Fewer than half the respondents stated it is important to build new railways (40%), new residential buildings (34%), and new industrial buildings (34%).

- The least important type of project is building new airports in Ontario. Approximately 21% stated that building new airports was important to their community's well-being.

Knowledge

- Despite a core group of respondents that stated they were geographically located near an aggregate pit or quarry or located near an aggregate transportation route, respondents appeared to have limited knowledge about the aggregate industry. For example, there was no common understanding on the amount of stone, sand and gravel consumed per person each year. Roughly 10% to 20% of respondents provided each of the 5 answer categories or stated "don't know".
- When asked to rank modes used to transport these aggregate resources, 75% ranked trucking as the most commonly used, 58% ranked rail as second, and 63% ranked sea or lake transport as third.

Social Costs and Benefits

- Respondents identified a variety of social costs related to stone, sand and gravel extraction. 56% identified "Environmental Effects" including the remaining pits, exposure of the water table, and disruption to nature; 50% named "Nuisance Effects" such as dust, and noise or damage from truck; and 16% volunteered "Human Effects" such as the impact on air quality affecting human health.
- In terms of social benefits, almost everyone (95%) identified "Infrastructure and Development Projects" including materials used in construction and improvements to roads; 25% named "Economic Benefits" such as job creation; and 5% named "Recreation / Landscaping Projects" such as creating beaches and lakes.

2 ENGAGEMENT WITH THE AGGREGATES INDUSTRY

At the outset of the survey, respondents were asked whether they reside near a stone, sand and gravel quarry or a transportation route, and whether they or anyone in their household is employed in the aggregate or related industry (such as construction). These questions helped to set a potential for Perceived Direct Experiences (PDE) with the aggregate industry that may have an influence on respondents' answer to other questions.

As can be seen in Table 2-1, one-third of the respondents (33%) claimed to live near a stone, sand and gravel pit or quarry, and one-quarter (25%) claimed to live near a stone, sand and gravel transportation route.

Table 2-1: Contact with the Aggregate Industry

	Pit or Quarry Near Their Home		Home Near Transportation Route	
	%	<i>N</i>	%	<i>N</i>
Yes	33	(473)	25	(355)
No	61	(860)	67	(945)
Don't know	6	(88)	8	(120)
<i>n</i>	100	(1420)	100	(1420)

Note: Percentages may not sum to 100% due to rounding. Q1, 2

As is to be expected, there was a relationship between these two industry contact questions. Half of the respondents (53%) who lived near a quarry also claimed to live near a transportation route; one-in-ten respondents (11%) who stated they do not live near a quarry claimed to live near a stone, sand and gravel transportation route. In total, 24% of all respondents claimed to live near a quarry or a transportation route. PDE refers to residents that either said that they lived near a pit or quarry or near to a transportation route.

In terms of statistically significant differences by respondent characteristics:

GEOGRAPHY

- Respondents in Areas 5 East Central (58%) and 7 Northeast (58%) were more like to say they live near a pit or quarry, and Area 4 GTA (18%) respondents are least likely.

DEMOGRAPHIC CHARACTERISTICS

- Men (37%) and older respondents (45 to 54 years of age, 38%) were more likely to say they lived near a quarry or pit. Men (29%) and older respondents (55 to 64 years of age, 30%) were more likely to say they lived near a stone, sand and gravel transportation route.

As can be seen in Table 2-2, very few respondents were themselves or have someone in their household employed by the aggregate industry or related industries such as road or building construction. Those who were employed in the industry were asked "In what way is that person employed in the aggregate industry?" The types of occupations are listed in the second portion of Table 2-2. A variety of occupations are named, although each category has few respondents.

Table 2-2: Way in Which a Household Member is Employed in the Aggregate Industry

	%	<i>n</i>
Employed in the Industry:		
Yes	3	(41)
No	97	(1375)
<i>n</i>	100	(1417)
Yes - In what way:		
Construction - general	18	(8)
Road construction	17	(7)
Gravel/pit quarry	16	(7)
Home construction/ contractor	11	(5)
Heavy equipment operator/ crush stone	9	(4)
Business owner	8	(3)
Miner/aggregate company	5	(2)
Mechanic	3	(1)
Truck driver	3	(1)
Other	23	(9)
Don't know/refused	4	(2)
<i>Total # of respondents</i>		(41)

Note: Percentages for q4 sum to more than 100% as more than one response was accepted. Base: Household member works in the industry in Q3. Q3, 4

There are too few respondents who themselves or a household member is employed in the aggregate industry to examine responses by geographic area or demographic characteristics. Due to the low number of respondents in this category, these respondents were not considered as part of the PDE characteristics.

3 COMMUNITY WELL-BEING

3.1 WHAT PEOPLE VALUE ABOUT THEIR COMMUNITY

Prior to a discussion about the value of aggregates to Ontario the survey asked, "There are many things that people value about their community that contribute to their quality of life. In your opinion, what are some of the things that you value?"

A variety of volunteered responses were obtained, and for simplicity they have been grouped into four main categories. As can be seen in Table 3.1 (next page), a number of values were identified, summarized as follows:

- **Municipal Infrastructure/Services Aspects** - Almost three-quarters of the respondents (73%) valued various aspects of living in their municipality. The most frequent mentions were parks/trails (19%) and the cleanliness and up-keep of their community (10%). Notably, 6% mentioned infrastructure projects including highways and roads. The remaining values are named by fewer than 10% of respondents each.
- **Natural/Environmental Aspects** - Four-in-ten respondents (41%) mentioned green space/trees/wildlife (20%), clean, fresh air/no pollution (14%) or access to lakes (7%).
- **Social Aspects** - One-third of the respondents (39%) also volunteered a social characteristic contributing to quality of life. The most frequent mentions were quiet neighbourhood (16%) and community / friendly neighbours (13%).
- **Human Aspects** - One-third of the respondents (37%) mentioned a human aspect that they value, including public or personal security (14%) and access to amenities (13%).

Table 3.1: Value About Their Community

	%	N
Municipal Infrastructure/Services Aspects:	73	
Parks/trails	19	(264)
Cleanliness/up keep of community	10	(141)
Municipal services-garbage, social services, taxes, library etc.	8	(111)
Water quality/clean water	7	(93)
Recreational/community center	7	(101)
Infrastructure/highways/roads	6	(90)
Public/transportation	6	(83)
Education/access to schools	5	(75)
Good healthcare/services/EMS, doctors etc.	5	(69)
Nature/Environment Aspects:	41	
Green space/trees/wildlife	20	(290)
Clean/fresh air/no pollution	14	(197)
Accessibility to lakes	7	(95)
Social Aspects:	39	
Quite neighbourhood/privacy	16	(229)
Community/friendly neighbours	13	(185)
Sense of community/ involvement/ multiculturalism/diversity	6	(86)
Family/family oriented community	4	(63)
Human Aspects:	37	
Public safety/personal security	14	(198)
Access to local amenities/ shopping/ entertainment	13	(178)
Small town/village feel	5	(76)
Location-proximity to work/city/others	3	(43)
Job/employment	2	(35)
Other:		
Road safety/noise/no heavy trucks	1	(15)
Other	11	(143)
Don't know/refused	4	(51)
None/No other issues	1	(55)
Total # of respondents		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted. Q5

For the most part the things that people valued about their community were similar across the geographic areas, demographic characteristics, and PDE. The following respondent segments are significantly different in what they value from the average:

GEOGRAPHY

- Respondents in Areas 1 Southwest (22%) and 4 GTA (22%) named parks/trails. This value was less likely to be named by respondents in Areas 5 East Central (7%) and 8 Northwest (5%).

- Green space was more likely to be named by respondents in Area 8 Northeast (30%) and least likely in Area 7 Northeast (14%).
- Respondents in Area 8 Northeast were more likely to name Nature Environment Aspects (52%).

DEMOGRAPHIC CHARACTERISTICS

- Older respondents (65 years of age or older, 16%) were more likely to name clean/fresh air/no pollution, and overall were more likely to name Natural Environment Aspects (44%). Respondents under 25 years of age were more likely to state “no other”.
- Women (22%) and younger respondents (25 to 34 years of age, 34%) were more likely to name parks/trails.

PDE

- Parks and trails were less likely to be named by respondents who claimed live near a quarry or pit (14%).

3.2 RELATIVE IMPORTANCE OF THEIR VALUES

To gauge the relative importance of the things valued about their community, respondents were asked which of the things they named was more important and which was less important than development and infrastructure projects that happen in their community.

Table 3.2-1 (next page) presents the things respondents valued **more** than development or infrastructure projects. By way of a summary:

- Notably, 30% of respondents considered Municipal Infrastructure / Services Aspects to be most important to their community well-being – more important than any other aspect.
- Of the remaining respondents, 21% stated that Nature and Environment was more important than development or infrastructure projects.
- Approximately 19% of respondents named Social Aspects of their community. Slightly fewer (17%) name the Human Aspects that they value most.

Table 3.2-1: Values Stated as More Important Than Development or Infrastructure Projects

	%	N
None	30	(419)
Municipal Infrastructure/Services Aspects:	30	
Parks/trails	8	(109)
Cleanliness/up keep of community	5	(70)
Water quality/clean water	3	(48)
Education/access to schools	3	(37)
Municipal services-garbage, social services, taxes, library etc.	3	(44)
Recreational/community center	2	(32)
Good healthcare/services/EMS, doctors etc.	2	(37)
Public/transportation	2	(28)
Infrastructure/highways/roads	2	(26)
Nature/Environment Aspects:	21	
Green space/trees/wildlife	11	(155)
Clean/fresh air/no pollution	7	(107)
Accessibility to lakes	3	(38)
Social Aspects:	19	
Quite neighbourhood/privacy	8	(114)
Community/friendly neighbours	5	(67)
Family/family oriented community	3	(39)
Sense of community/ involvement/ multiculturalism/diversity	3	(38)
Human Aspects:	17	
Public safety/personal security	8	(108)
Access to local amenities/ shopping/entertainment	5	(68)
Small town/village feel	2	(27)
Location-proximity to work/city/others	1	(17)
Job/employment	1	(11)
Other:		
Road safety/noise/no heavy trucks	1	(9)
Other:	4	(55)
Don't know/refused	1	(12)
Total # of respondents		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than .5%. Q6

There were only two significant difference by respondent characteristics in volunteered values more important than development or infrastructure projects:

GEOGRAPHY

- Area 8 Northwest respondents (31%) were more likely to mention Nature / Environment Aspects.

DEMOGRAPHIC CHARACTERISTICS

- Women (18%) were more likely to name Human Aspects.

The findings in Table 3.2-2 summarize the values stated as **less** important than development or infrastructure. 72% of respondents stated that development and infrastructure projects were less important than the things they stated contribute to their community well-being. 11% or fewer stated that Municipal Infrastructure/Services, Nature / Environment, Social, or Human aspects were less important than development or infrastructure projects.

Table 3.2-2: Values Stated as Less Important Than Development or Infrastructure Projects

	%	n
None	72	(1020)
Municipal Infrastructure/Services Aspects:	11	
Parks/trails	3	(41)
Cleanliness/up keep of community	2	(22)
Infrastructure/highways/roads	2	(22)
Municipal services-garbage, social services, taxes, library etc.	1	(20)
Public/transportation	1	(12)
Water quality/clean water	1	(11)
Recreational/community center	1	(18)
Education/access to schools	0	(6)
Good healthcare/services/EMS, doctors etc.	0	(5)
Social Aspects:	6	
Quite neighbourhood/privacy	2	(38)
Community/friendly neighbours	2	(32)
Sense of community/ involvement/ multiculturalism/ diversity	1	(15)
Family/family oriented community	1	(7)
Human Aspects:	5	
Access to local amenities/ shopping/ entertainment	3	(40)
Small town/village feel	1	(20)
Public safety/personal security	1	(17)
Job/employment	0	(6)
Location-proximity to work/city/others	0	(6)
Nature/Environment Aspects:	4	
Green space/trees/wildlife	2	(35)
Accessibility to lakes	1	(20)
Clean/fresh air/no pollution	1	(13)
Other:		
Road safety/noise/no heavy trucks	0	(1)
Other	1	(26)
Don't know/refused	1	(9)
Total # of respondents		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than .5%. Q7

There were no significant differences in each response category by geographic area, demographic characteristics, or PDE either on their own or grouped, other than the response “none”:

DEMOGRAPHIC CHARACTERISTICS

- Older respondents (65 years of age or older) were more likely to say “none” (i.e. that development and infrastructure projects were less important than the other things they value about their community well-being) (78%).

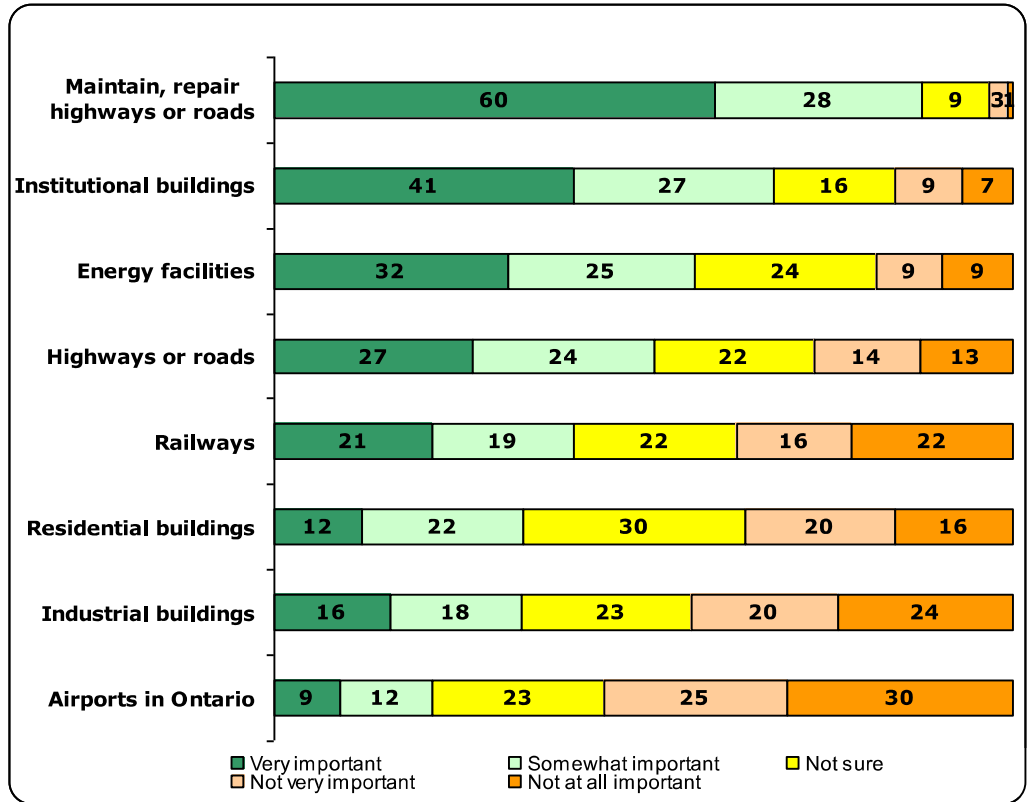
4 DEVELOPMENT AND INFRASTRUCTURE PROJECT NEEDS

4.1 CONTRIBUTION OF PROJECTS TO COMMUNITY WELL-BEING

Respondents were asked to rate the importance of some types of development and infrastructure projects with respect to their contribution to their community's well-being. There were clear demarcations as to which types of projects the public believed to be more and less important to community well-being. By way of summarizing the findings in Figure 4.1:

- The most important type of project was maintaining or repairing existing highways or roads. Not only did 88% of the respondents state that this type of project was important, but 60% stated it was "very important".
- Approximately 68% of respondents stated that building new institutional buildings (such as schools or hospitals) was important, with 41% stating "very important".
- Approximately half of the respondents stated that building new energy facilities (57%) and new highways or roads (51%) was important. Notably, almost as many volunteered that they were "not sure" how important these projects were or stated they were "somewhat" important.
- Fewer than half the respondents (40%) stated it is important to build new railways.
- There was little agreement among respondents about the importance new railways given the similar proportions of respondents distributed across all answer categories.
- One-third of respondents stated that building new residential buildings (34%) and new industrial buildings (such as factories or repair shops) (34%) was important.

Figure 4.1: Importance of Various Development and Infrastructure Projects
(% of respondents)



- A higher proportion of respondents stated building new residential buildings (36%) and new industrial buildings (44%) were not important.
- The least important type of project was building new airports in Ontario. Less than one-quarter (21%) stated it was important to their community’s well-being while 55% stated it is not important.

There are several project types where segments of respondents are more likely than the average to state that a development or infrastructure project is important:

GEOGRAPHY

- Building new institutional buildings – was rated higher in importance among respondents in Area 4 GTA (47%).
- Building new highways or road – was rated higher in importance in Areas 7 Northeast (47%) and 8 Northwest (51%).
- Building new residential buildings – was rated higher in importance in Areas 7 Northeast (17%) and 8 Northwest (18%).

- Building new industrial buildings – was rated higher in importance in Area 8 Northwest (34%).
- Building new airports – was rated higher in importance in Areas 7 Northeast (16%) and 8 Northwest (18%).

DEMOGRAPHIC CHARACTERISTICS

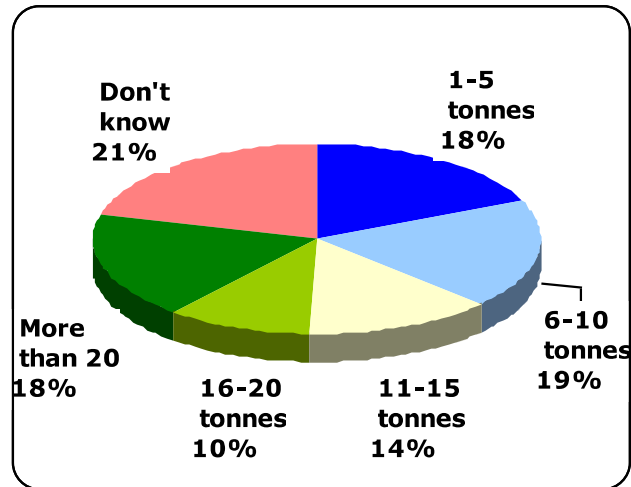
- Maintaining or repairing existing highways or roads – was rated higher in importance by older respondents (65 years of age or older, 68% “very important”).
- Building new energy facilities – was rated higher in importance by men (36%).
- Building new highways or road – was rated higher in importance by men (30%).
- Building new railways - was rated higher in importance by older respondents (65 years of age or older, 31%).
- Building new industrial buildings – was rated higher in importance by men (19%), and respondents who are older (55 years of age or older, 21%).

4.2 KNOWLEDGE ABOUT THE AGGREGATE INDUSTRY

Several questions were asked to gauge the public’s knowledge about the aggregate industry. First, respondents were asked “If you have to guess how many tonnes of stone, sand and gravel do you think are consumed per person each year?”

As can be seen in Figure 4.2, the range of responses was similar across most of the answer categories. It should be noted that according to the Ontario Stone, Sand and Gravel Association (OSSGA, 2009) the average Ontarian uses 14 tonnes of aggregate per year.

Figure 4.2: Amount of Stone, Sand and Gravel Consumed per Person Each Year
(% of respondents)



Moreover, there were no significant differences by geographic area, PDE, and by almost all demographic characteristics. The one exception is based on gender:

DEMOGRAPHIC CHARACTERISTICS

- Men (22%) were more likely than women (14%) to state each person consumes more than 20 tonnes each year and hence overestimate the amounts of aggregates used.

These findings suggest that respondents did not understand the amount of aggregates consumer per person each year.

Respondents were then asked "Where do you think the pits and quarries used to extract stone, sand and gravel resources are located?" As can be seen in Table 4.2-1, approximately 50% of the respondents stated that the pits and quarries were located within 25 km of where they live. 38% state within 100 km, 30% in Northern Ontario, and 22% in Southern Ontario.

Table 4.2-1: Location of Pits & Quarried to Extract Stone, Sand and Gravel

	%	<i>n</i>
Within 25 km of where you live	49	(698)
Within 100 km of where you live	38	(535)
In Northern Ontario	30	(423)
In Southern Ontario	22	(318)
Outside of Ontario	13	(186)
Don't know/not sure	8	(107)
<i>Total # of respondents</i>		(1420)

Note: Percentages sum to more than 100% as more than one response was accepted. Q17

In terms of significant differences in responses by respondent characteristics:

GEOGRAPHY

- Respondents in Areas 3 West Central (73%), 2 Peninsula (71%), 7 Northeast (68%), 8 Northwest (65%), 5 East Central (65%), and 6 East (64%) were more likely to state within 25 km of where they live. Area 4 GTA (30%) was least likely to provide this response.
- Northern Ontario was more likely to be named in Areas 8 Northwest (40%), 4 GTA (36%) and 7 Northeast (34%).

DEMOGRAPHIC CHARACTERISTICS

- Men (52%) and older respondents (45 years of age or more, 59%), were more likely to state within 25 km of where they live.
- Northern Ontario was more likely to be named by women (33%).
- Women (11%) and respondents with a household income of less than \$20,000 (19%) were more likely to state "don't know".

PDE

- Respondents who claimed to have a pit or quarry where they lived (76%) or had a transportation route near them (72%) were more likely to say they live within 25 km of a pit or quarry.

Respondents were asked then to rank order three modes of transporting stone, sand and gravel resources from the pits and quarries to where they are needed. Table 4.2-2 presents the ranking distribution for each mode. Findings indicate that:

- Three-quarters of the respondents (75%) mentioned truck as the most commonly used form of transportation.
- Rail was the second most commonly used transportation mode with over half giving it a 2 ranking (58%).
- The least commonly used mode was sea or lake transport, although one-third rate it first or second (37%).

Table 4.2-2: Ranking of Modes to Transport Aggregates

		%	<i>n</i>
Transport type:	Rank:		
Truck	1	75	(1060)
	2	13	(181)
	3	13	(178)
Rail	1	18	(263)
	2	58	(817)
	3	24	(341)
Sea or Lake	1	7	(97)
	2	30	(422)
	3	63	(901)
<i>Total</i>			(1420)

Note: Percentages may not sum to 100% due to rounding. 1 is the most commonly used transportation mode, 3 the least. Q18

In terms of significant differences in answers by respondent characteristics:

GEOGRAPHY

- Truck transport was more likely to be ranked higher in Areas 5 East Central (87%) and 3 West Central (86% provide a 1 ranking).
- Rail transport received a higher ranking than the average by Area 4 GTA respondents (25%).
- Sea or lake transport was ranking higher among respondents in Area 1 Southwest (13% rate it as first).

DEMOGRAPHIC CHARACTERISTICS

- Truck transport was more likely to be ranked higher by older respondents (65 years of age or older, 80%).
- Rail transport received a higher ranking than the average among younger respondents (under 25 years of age, 35% rate it as first), and women (21%).

PDE

- Truck transport was more likely to be ranked higher by those who said they lived near a pit or quarry (82%) or transportation route (82%).
- Rail transport received a higher ranking than the average by those who said they did not live near a pit or quarry (21%) or a transportation route (21%).

5 SOCIAL COSTS AND BENEFITS OF AGGREGATE EXTRACTION

5.1 SOCIAL COSTS

Respondents were asked to identify what they considered to be the most adverse or negative effects of stone, sand and gravel extraction. As can be seen in Table 5.1, respondents identified a variety of negative effects, with fewer than 15% volunteering each response category. The highest single response was "don't know" (16%). When responses were grouped, 56% mentioned Environmental Effect, and 50% named Nuisance Effect.

Table 5.1: Social Costs of Stone, Sand & Gravel Extraction

	%	<i>n</i>
Environmental Effect:	56	
Holes/pits/left behind/no rehabilitation	13	(181)
Water tables are exposed/contaminate water	9	(130)
Destruction of the natural environment	9	(126)
Disruption of wild life/animal habitat	7	(105)
Eroding of earth/digging up land	6	(87)
Blasting/destroying non-renewable resources	4	(63)
Destroys agricultural/topsoil	3	(49)
Removal of trees/forestry/greenery	3	(42)
Disruption of the ecosystem	2	(31)
Changes the climate/global warming	0	(7)
Nuisance Effect:	50	
Dust/sand/dirt	11	(158)
Noise from trucks/machinery	11	(157)
Heavy/trucks/damages the road	8	(116)
Disruption of scenery/an eye sore	8	(114)
Trucks create traffic on the road	5	(64)
Damages the surrounding communities/ residential areas	5	(68)
Trucks throw stones/gravel damaging other vehicles	2	(30)
Human Effect:	16	
Pollution/poor air quality affecting human health	13	(179)
Health risks for workers/residents	3	(48)
Nothing/none	7	(104)
Other	6	(87)
Don't know/refused	16	(230)
<i>Total # of respondents</i>		<i>(1420)</i>

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than .5%. Q19

There were differences in responses to the grouped categories by respondent characteristics:

GEOGRAPHY

- Area 8 Northeast was more likely to state “nothing” (20%).
- Area 3 West Central was more likely to name Nuisance Effect (69%).

DEMOGRAPHIC CHARACTERISTICS

- Younger respondents (under 25 years of age, 27%) and women (19%) were more likely to name Human Effects.
- Men (64%) and those 45 to 54 years of age (65%) were more likely to name Environmental Effects.
- Seniors 65 or more were more likely to state “nothing) (14%).

PDE

- Respondents who claimed to live near a stone, sand and gravel pit were more likely to name Nuisance Effect (61%).

5.2 SOCIAL BENEFITS

Respondents were asked to identify what they considered to be the main benefits or positive effects of stone, sand and gravel extraction. As can be seen in Table 5.2 (next page), over two-third of the respondents identified the provision of materials for construction of buildings and homes (36%) and improving the provinces infrastructure including road, highways and railways (35%). Almost 2-in-10 named job creation and employment (18%). Less than 10% named each of the remaining positive effects. Overall, 95% named some element of Infrastructure and Development Projects.

Table 5.2: Main Social Benefits of Stone, Sand & Gravel Extraction

	%	<i>n</i>
Infrastructure & Development Projects:	95	
Provision of materials/construction of buildings/homes	36	(513)
Improve infrastructure/better roads/highways/railway	35	(498)
Availability of materials/local	9	(129)
Use of raw materials/natural resources	7	(93)
Need it/necessary	4	(61)
Cheap materials/resources	2	(32)
Improve/development of the community	2	(23)
Economic Benefits:	25	
Job creation/employment	18	(250)
Economic development	5	(66)
Industrial growth/support the local/regional industry	2	(23)
Recreation/Landscaping Projects:	5	
Landscaping/beaches	3	(38)
Can create lakes/drainage	2	(23)
Other	4	(60)
Other - Negative:	12	
None	8	(109)
Negative impact	4	(58)
Don't know/refused	12	(168)
<i>Total # or respondents</i>		<i>(1420)</i>

Note: Percentages sum to more than 100% as more than one response was accepted. 0% indicates less than .5%. Q20

In terms of differences in responses by answers:

GEOGRAPHY

- Respondents in Areas 7 Northeast (40%) and 6 East (45%) are more likely to name improvements to the infrastructure.

DEMOGRAPHIC CHARACTERISTICS

- Men (21%) are more likely than women (14%) to name job creation. Men (28%) are also more likely to name the overall category of Economic Benefits than women (20%).
- Men (40%) are more likely than women (32%) to name materials for construction. Overall, men (100%) are more likely to name Infrastructure and Development Projects than women (88%).
- Older respondents (65 years of age or older, 40%) are more likely to name improvements to the infrastructure.
- Respondents with a lower household income (under \$20,000, 20%) are more likely to reply that there are no benefits.

PDE

- Respondents who claimed to live near a stone, sand and gravel transportation route were more likely to name Economic Benefits (33%).

6 TECHNICAL APPENDIX

6.1 SURVEY OVERVIEW

The survey was undertaken by telephone among a random sample of residents in Ontario who are 18 years of age and older; the sample was split between men and women. Interviews were conducted from July 28 to August 6, 2009, and the average length was 15 minutes.

For this study IntelliPulse established a sample requirement such that each of the 8 Portland Cement Association Geographic Areas had a minimum confidence interval of $\pm 8.1\%$, 19 times out of 20. This resulted in a disproportional sample allocation by area as presented in Table 6.1. The confidence interval for the area samples of approximately 150 interviews is $\pm 8.1\%$, Area 4 GTA is $\pm 5.3\%$, and the weighted Ontario sample is $\pm 2.6\%$.

Table 6.1: Sample Allocation by Area

	Population Count	% of Population	Proportional Sample Allocation	Interviews	Weight
Area 1 - SouthWest	1,374,304	0.113	161	153	1.0517
Area 2 - Peninsula	1,164,891	0.096	136	153	0.8914
Area 3 - West Central	1,312,946	0.108	154	153	1.0047
Area 4 - GTA	5,555,912	0.458	651	354	1.8376
Area 5 - East Central	486,189	0.040	57	151	0.3770
Area 6 - East	1,447,655	0.119	169	152	1.1151
Area 7 - Northeast	433,783	0.036	51	154	0.3298
Area 8 - Northwest	352,507	0.029	41	150	0.2751
Grand Total	12,128,187	1	1,420	1,420	

6.2 RESPONDENT PROFILE

At the conclusion of the survey respondents were assured of confidentiality and asked several questions about their personal and family characteristics. As is evident throughout this report, these characteristics were important in the analysis of the study results.

As can be seen in Table 6.2:

- A mix of age groups is represented in the sample. The smallest cohorts are under 25 years of age and 25 to 34.
- The largest single household income category is \$100,000 or more.
- By the nature of the sample selection, respondents are split by gender.

Table 6.2: Demographic Profile of Respondents

		%	<i>n</i>
Age	Under 25 years of age	6	(83)
	25 - 34	12	(173)
	35 - 44	18	(253)
	45 - 54	24	(332)
	55 - 64	20	(283)
	65 years of age or older	20	(280)
	<i>Total</i>	<i>100</i>	<i>(1404)</i>
Total household income	Under \$20,000	8	(83)
	\$20,000 - \$39,999	13	(132)
	\$40,000 - \$59,999	18	(178)
	\$60,000 - \$79,999	17	(167)
	\$80,000 - \$99,999	13	(129)
	\$100,000 or more	30	(298)
	<i>Total</i>	<i>100</i>	<i>(987)</i>
Gender	Male	50	(708)
	Female	50	(712)
	<i>Total</i>	<i>100</i>	<i>(1420)</i>

Note: Percentages may not sum to 100% due to rounding. Q21-23

6.3 QUESTIONNAIRE

Part 1 – Introductory Script and Participant Information

Hello, I'm _____ of IntelliPulse Research, a national survey research firm. We're talking to people today on behalf of the Ontario Ministry of Natural Resources about resources like stone, sand and gravel in Ontario and how the management of these resources may affect you and your community. We are not selling anything, and your responses are confidential to IntelliPulse. This survey should take less than 15 minutes of your time.

A. Are you 18 years of age or older and an Ontario resident?

- Yes (SKIP TO C) 1
No 2
WATCH FOR GENDER QUOTAS 50/50

B. IF NO ASK: May I please speak to someone in the household who is?

- Yes REPEAT INTRODUCTION 1
No, not available, ASK; What would be a good time to call back? RECORD..... 2
Date: _____ Time: _____

IF NECESSARY: This survey is registered with the Marketing Research and Intelligence Association who can confirm that it is a legitimate market research survey. Their number is 1-800-xxxxx and the identification Number of the study is _____.

C. Have I reached you at your home telephone number, that is (READ TELEPHONE NUMBER)?

- No (THANK AND TERMINATE, RECORD INCIDENCE) 1
Yes (CONTINUE) 2

1. Is there a stone, sand and gravel pit or quarry near where you live?

- Yes1
No2
Don't know / Not sure (volunteered)3

2. Do you live near a stone, sand and gravel transportation route?

- Yes1
No2
Don't know / Not sure (volunteered)3

3. Are you or someone in your household, employed by the aggregate industry (that is a company which extracts stone, sand or gravel) or related-industries such as road or building construction?

- Yes (CONTINUE).....1
No (SKIP TO Q5)2
Don't know / Not sure (volunteered) (SKIP TO Q5).....3

4. In what way is that person employed in the aggregate industry?

Part 2 – Community Well-Being

Thank you. Now I'm going to ask you some questions about the things that you value in your community.

5. There are many things that people value about their communities that contribute to their quality of life. In your opinion, what are some of the things that you value? (Accept up to three responses) And what else do you value? And what else?
- a)
 - b)
 - c)

Thank you for your ideas. This survey is trying to understand how the people of Ontario value stone, sand and gravel resources in the context of community well-being. These resources are used for development and infrastructure projects such as highways, railways, energy facilities and airports, as well as residential, industrial, and commercial buildings.

6. Now thinking back to the things that you value about your community, which you previously stated [*remind participant of responses from Q5*], which of those, if any, are **more** important than development or infrastructure projects that happen in your community? **SELECT ALL THAT APPLY...ACCEPT UP TO 3 MENTIONS**

None (Volunteered) 1

- a)
- b)
- c)

7. Which of those values you named, if any, are **less** important than development or infrastructure projects that happen in your community? **SELECT ALL THAT APPLY...DO NOT READ THOSE SELECTED IN Q6**

None (Volunteered) 1

- a)
- b)
- c)

Part 3 – Social Attitudes towards Different Types of Development and Infrastructure Projects

Next, I am going to name some types of development and infrastructure projects, and I'd like you to rate their importance in relation to your community's well-being. Using a scale of 1 to 5, a score of 5 is **very** important, and 1 is **not at all** important. **ROTATE Q8 – 15 REPEAT SCALE FOR EVERY OTHER QUESTION**

8. Building new highways or roads
- Not at all important1
 - Not very important2
 - Not sure (Volunteered)3
 - Somewhat important4
 - Very important5

9. Maintaining or repairing existing highways or roads

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

10. Building new railways

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

11. Building new energy facilities

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

12. Building new airports in Ontario

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

13. Building new residential buildings

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

14. Building new industrial buildings (such as factories or repair shops)

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

15. Building new institutional buildings (such as schools or hospitals)

- Not at all important1
- Not very important2
- Not sure (Volunteered)3
- Somewhat important4
- Very important5

Part 4 – Respondent Knowledge about Inputs into Infrastructure Projects

Thank you for your answers. There are many requirements for these types of development and infrastructure projects to occur. These include skilled labour, raw materials, and public demand.

16. In Ontario, if you had to guess how many tonnes of stone, sand and gravel do you think are consumed per person, each year? READ RESPONSE CODES

- 1-5 tonnes per person1
- 6-10 tonnes per person2
- 11-15 tonnes per person3
- 16-20 tonnes per person4
- More than 20 tonnes per person5
- Don't know (Volunteered).....6

17. Where do you think the pits and quarries used to extract stone, sand and gravel resources are located? Please state all that apply. READ RESPONSE CODES. IF NEEDED: Extraction refers to removing the stone, sand or gravel out of the earth.

- Within 25 km of where you live.....1
- Within 100 km of where you live.....2
- In Northern Ontario3
- In Southern Ontario4
- Outside of Ontario.....5
- Don't know/not sure (volunteered).....6

18. Stone, sand and gravel resources need to be transported from the pits and quarries where they are extracted, to where they are needed. Please rank the following modes used to transport these resources where 1 is the **most** commonly used mode of transportation and 3 is the **least** commonly used. READ ALL THREE ... Which one is the most commonly used? Which one is second most common? Last leaves (READ LAST ONE) as the least commonly used.

Mode	Ranking (response)
A. Rail Transport	
B. Sea or Lake Transport	
C. Truck Transport	

Part 5 – Social Costs and Benefits of Aggregate Extraction

19. What do you think are the most adverse or negative effects of stone, sand and gravel extraction? These can be at a local or regional scale. ACCEPT UP TO 3 RESPONSES. Is there another adverse or negative effect? Any other effect?

- a)
- b)
- c)

20. What do you think are the main benefits or positive effects of stone, sand and gravel extraction? These can be at a local or regional scale. ACCEPT UP TO 3 RESPONSES. Is there another benefit or positive effect? Any other effect?

- a)
- b)
- c)

Part 6 – Respondent Information

Thank you for your answers. Now I am going to ask you some demographic questions to help our analysis. Your responses will be grouped with those of other respondents. Please be assured your responses are confidential to IntelliPulse only.

21. What is your age please? Are you ...?

- Under 25 years of age 1
- 25 - 34 2
- 35 - 44 3
- 45 - 54 4
- 55 - 64 5
- 65 years of age or older 6

22. What is your total household income, before taxes from all sources for all members of your household? Is it ...

- Under \$20,000 1
- \$20,000 - \$39,999 2
- \$40,000 - \$59,999 3
- \$60,000 - \$79,999 4
- \$80,000 - \$99,999 5
- \$100,000 or more 6

23. Gender (By Observation)

- Male 1
- Female 2

24. What is your postal code?

- a)

25. Date of interview (RECORD)

- a)

Thank you for your time today. Your answers are important to the future planning of resources in Ontario. Do you have any questions or comments?

6.4 PORTLAND CEMENT GEOGRAPHIC AREAS



6.5 QUALITY ASSURANCE

The procedures used for this social values study are standard procedures used in public affairs and sociological research. They conform to the Marketing Research and Intelligence Association standards (MRIA). As part of the standards, the survey was registered with the MRIA; the project leader (Ms. Margaret Buhlman) and the Field Director (Mr. Sam Pisani) are members of the Marketing Research and Intelligence Association and abide by its standards for conducting the research (www.mria-arim.ca).

The sampling and drawing of telephone numbers was undertaken by The Logit Group. The Logit Group imported the sample into the CATI programming that contained the questionnaire. The Logit Group then undertook all CATI programming of the questionnaire, interviewing, coding, and production of the SPSS data file.

The backbone of the research infrastructure at The Logit Group is a fully monitored 70 station CATI facility located in Toronto, Ontario. It is equipped with the state-of-the-art *Voxco Interviewing* CATI platform. *Voxco's* CATI platform integrates sample management, quota and call-back management, interviewing and real-time on-screen monitoring. As well, the set-up allows for interviewers to be directly monitored by supervisors at all times.

Remote monitoring is a standard feature of the quality assurance protocols employed for this study, allowing clients (i.e., AECOM) direct access to both on-going interviews, as well as supervisors for constant feedback. Ms. Margaret Buhlman (IntelliPulse Inc.) monitored each interviewer on the first night. AECOM monitored the survey on the same evening.

Several management procedures were taken to ensure quality. These included:

- *Interviewers* - Only experienced interviewers who were fully fluent in English were assigned to the study.
- *Briefing* - Prior to 'live' interviewing the interviewers were trained and briefed by the Logit Group supervisor. The session included a question-by-question review, role-playing, and the opportunity to ask questions. Interviewers who were new to the project after this time undertook the interviewer training.
- *Ensuring Response Rates* – Based on experience with a wide range of public attitude research surveys, there is a general downward trend in response rates. Consequently, constant attention was placed on methods to ensure the highest response rates possible. Extensive interviewer training was used to help to reduce refusal rates and increase response rates, including teaching interviewers the necessary, although often overlooked "soft skills" needed to engage respondents at the outset of the interview.

As well, multiple call attempts were made to records, and spread across different days and times, to ensure the highest possible "connect rate" on

randomly selected records. Requests by respondents for appointments or call-backs at more convenient times were respected. All our contact records made provision for follow-up calls and appointments with respondents. Response rates are presented in Technical Appendix 6.5.

- *Ensuring the quality of CATI screens* –The correct and accurate programming of a questionnaire into CATI is one of the first, and one of the most fundamental aspects of overall quality management – ensuring that all questions are programmed accurately, including streaming and skip patterns, valid ranges and fields, and correct interviewer instructions are presented. All programming was undertaken by The Logit Group’s lead programmer.

To ensure the highest quality level possible, the following steps were undertaken:

- The programmed CATI questionnaire was tested first by the programmer, and then independently by the Project Manager and a senior supervisor to ensure that the questionnaire logic and answer choices are correct.
- Next, a CATI simulation was performed, whereby randomly generated “dummy data” was written to a test file. The data processing department also checked for inconsistencies in base totals and logic within the test data file itself.

Interviewing – The Ontario Ministry of Natural Resources was identified as the sponsor of the survey. The time frame for the survey was kept long (July 28 to August 8, 2009) in order to make the best use of the sample and to retain a small cadre of interviewers.

Quality of data accuracy - On-site supervision was provided on a regular basis. One supervisor was on duty for every 10 interviewers. Supervisory staff monitored 30% of all contacts, using a DEES-based voice and data-monitoring unit (exceeding MIRA’s 10% requirement). The unit combined standard audio monitoring of the interview with remote monitoring of CATI workstation screen. In this way, supervisors did not only hear responses, they also ensured that they had been correctly recorded.

In addition to the monitoring, a further 15% of all completed interviews were validated via a call-back methodology. Respondents were randomly selected from the pool of recently completed interviews. Selected respondents were contacted within 24 hours of the original interview and the survey restarted at a random point. If no inconsistencies were encountered, the validation consisted of only a few questions. If unusual changes were noted, the interview would have been re-conducted in its entirety or removed from the dataset.

The available audio-based monitoring system allowed AECOM, regardless of location, to remotely monitor the study in progress.

To ensure the highest level of data accuracy, a “confirmation-based” procedure to its CATI platform was utilized. This meant that after

entering a response during an interview, interviewers saw a “Response Confirmation Screen” that quickly ensured that they recorded the appropriate response. This screen was not read to the respondent, but rather it was used as an internal phone room check to ensure that any mis-keyed responses by interviewers were caught quickly, without impeding the actual flow of the interview at all.

- *Open-end coding* - Code lists and verbatim responses were provided to IntelliPulse for review and modification. The code list/verbatim processes were as follows.
 - undertaking a preliminary coding of the responses based on 50% of the completed questionnaires.
 - Supplying code lists (Word) and verbatims (Excel) to IntelliPulse electronically.
 - review of the code list and the verbatims for each question, and highlighting changes and additions so that The Logit Group could use the changes as a guide to complete the coding.
 - Once code lists were revised by IntelliPulse, code lists and all coding were revised to reflect any applicable revisions. Any additional codes after the approval list were provided to IntelliPulse for acceptance.
- *Sample Weighting* –It is standard survey research procedure when dealing with a disproportional sample selection, where some areas are over-represented in the sample, and others are under-represented to have a sufficient sample size for area analysis, to weight the data into their proportion proportions for reporting results for the entire area. Technical Appendix 6.1 provides a detailed description of the sample selection by Geographic Area and the weighting procedures.
- *SPSS data file* - Fully documented data file in labelled SPSS format was sent electronically to IntelliPulse. SPSS was used to produce the frequencies for the tables. All questions were crosstabulated against the demographic questions, and by area. The chi-square statistic and correlation statistics (Person’s r, and Gamma) were used to determine whether there is a correlation between survey responses and demographic questions. Significant differences are noted in the report.

6.6 RECORD OF CALL

Table 6.6: Record of Call

Total	26315
No Answer	5908
Busy	500
Answering machine	4708
Callback	2503
Fax/modem	342
Not In Service	236
Business / Not Residential	115
Operator intercept	3360
Language Barrier	525
Quota full	122
Line answered	1084
Default value	1
No one is available for duration of survey	208
Call back later to finish the survey	82
NOT HOME PHONE	40
Household Refusal	1489
Respondent Refusal	3511
Refusal (Mid-survey)	153
Local / Long Distance Autodialer Error	8
COMPLETED	1420

Appendix B

Use and Environmental Benefit of Aggregate Matrix

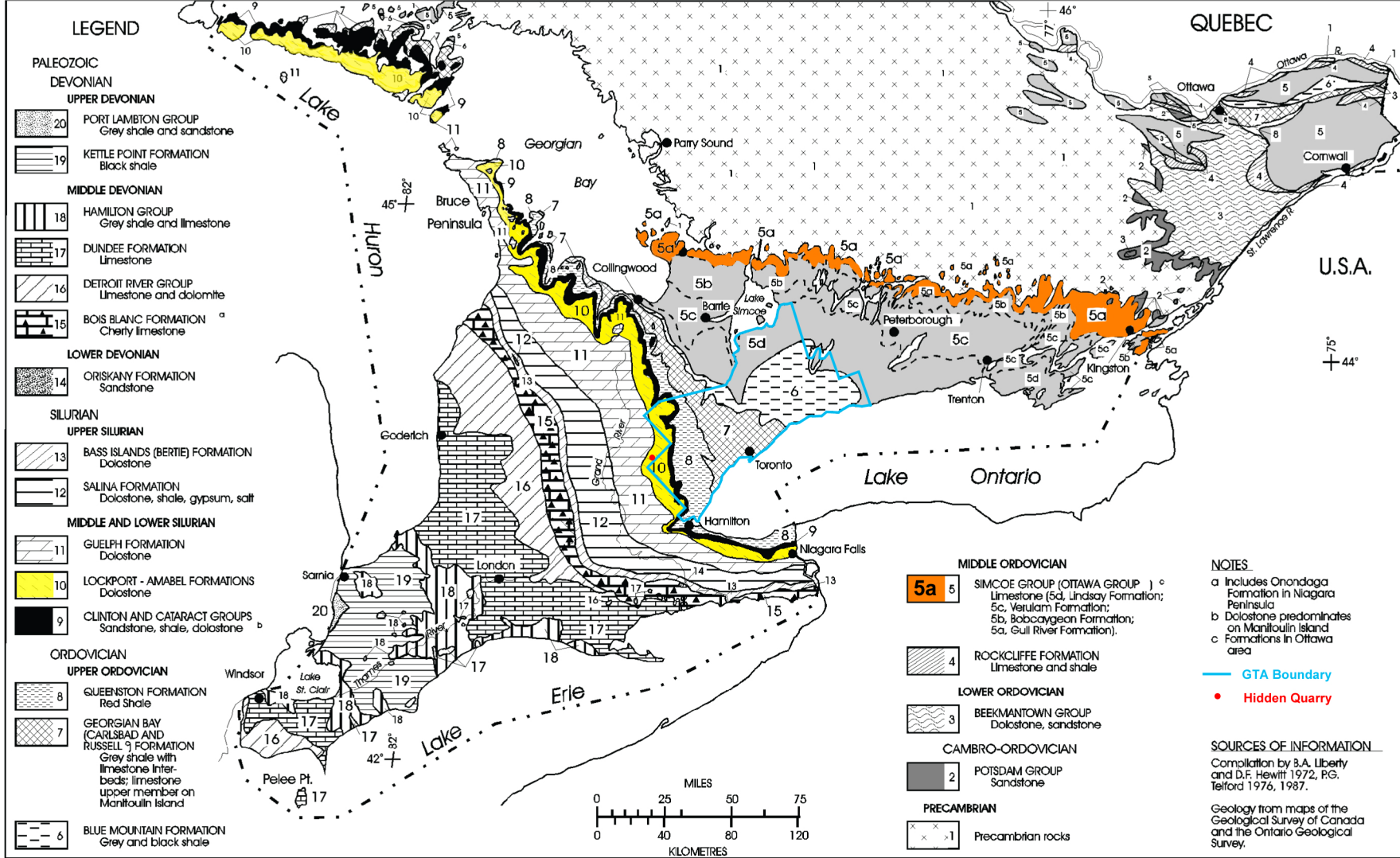


Figure D1. Bedrock geology of southern Ontario.



December 17, 2009

ONTARIO MINISTRY OF NATURAL RESOURCES

State of the Aggregate Resource in Ontario Study (SAROS) Paper 5 - Aggregate Reserves in Existing Operations

Submitted to:

Ontario Ministry of Natural Resources
300 Water Street
P.O. Box 7000
Peterborough, Ontario
K9J 8M5

Attention: Mr. Brian Hollingsworth

This report has been prepared in conjunction with
MHBC Planning

REPORT

Report Number: 09-1112-0064

Distribution:

4 Copies - Ministry of Natural Resources
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Executive Summary

Mineral aggregate, which includes gravel, sand, clay earth, shale, stone, limestone, dolostone, sandstone, granite and other similar deposits, is one of the most vital commodities to the economy of Ontario. It is used to construct homes, schools, hospitals, offices, sewers, bridges and highways, with public infrastructure consuming the largest proportion. It is also used as an additive in the production of a wide variety of everyday materials, such as steel and glass. The consumption rate per capita has remained relatively constant in Ontario at approximately 14 tonnes/person/year. Aggregates are non-renewable and have few viable substitutes.

The aggregate demand and resulting consumption in the Greater Toronto Area (GTA) has remained relatively consistent over the years. However, the licencing of replacement reserves has not kept pace with this consumption, resulting in a 2.5 to 1 consumption to replacement ratio between the years of 1991 to 2009. In addition, more than two thirds of the licenced reserves supplying the GTA are more than 35 years old with reserve bases becoming depleted rapidly.

While the Aggregate Resources Act (ARA) offers some level of protection to licenced reserves, it is important to have an understanding of the relative amounts (volumes and/or tonnages) of those protected reserves in relation to the overall supply/demand relationship within the Province. To answer this question, the Ministry of Natural Resources (MNR) determined that a study on the availability of reserves within existing licenced properties was needed to address the question: what is the status of the licenced reserves in the central portion of southern Ontario? The State of the Aggregate Resource in Ontario Study (SAROS) was initiated and divided into six separate papers. The paper addressing the question related to the existing licenced limestone/dolostone reserve base (amount of reserves) in the central portion of southern Ontario is Paper 5 – Aggregate Reserves in Existing Operations. The scope of work for Paper 5 is comprised of the following tasks:

- determine the current estimated reserves of limestone/dolostone in licenced aggregate operations in selected geographic areas;
- determine areas of relative abundance and scarcity of construction limestone/dolostone aggregate reserves;
- map the current reserves and indicate location relative to potential market demand areas; and
- describe opportunities to maximize resource use within existing licences.

A total of 97 licenced aggregate quarries were evaluated with respect to their remaining reserves as of the end of 2008. These included all quarries within Areas 2, 3, 4 and a portion of Area 5 that have a licenced area of 20 hectares or greater.

The process for estimating the reserves at a particular property included a detailed examination of available imagery, site plans and other available site specific information, which would contribute to a reasonably accurate calculation of remaining reserves on the property. However, it should be noted that the volume and tonnage calculations are based on dimensions, distances and elevations provided on the Site Plan, and these calculations assume that all material is extracted and in turn is viable for aggregate production, and that no reserves are used for construction of internal haul roads, ramps or left in place as benches for rehabilitation.



Utilizing this method of analysis, it was found that the calculated licenced reserves of stone in the 97 limestone and dolostone quarries evaluated within the Study Area, total approximately 3.44 billion tonnes of variable quality. It is important to note that this total includes the full volume of rock found on these properties, both high and lower quality stone, and does not account for unusable by-products (silt sized fines) that are generated through the process, which can be as much as 10% of the total.

High quality stone is required for concrete and asphalt aggregates, and as such, are particularly important. Of the 97 quarries, only 30 quarries evaluated within the Study Area had site-specific geological information, of varying degrees of detail, available for review. The 30 quarries represent approximately 818 million tonnes, or 24% of the overall stone reserves evaluated. Of this total (818 million tonnes) approximately 62% or 505 million tonnes was estimated to be of 'high' quality (concrete and/or asphalt). The remainder of those reserves are considered to be of 'acceptable' (road base), 'low' or 'unknown' quality. Subject to a number of limitations with the remaining 67 quarries, for which site-specific geological information is not available, 968 million tonnes, or 37% of the overall stone reserves was estimated to be of 'high' quality. The remainder are considered to be of 'acceptable', 'low' or 'unknown' quality. As such, the total estimated amount of 'high' quality reserves is approximately 1.47 billion tonnes. It should be noted that of this total amount of 'high' quality reserves only a maximum of about two thirds, or 987 million tonnes, would be available for inclusion in concrete and asphalt grade products in the form of stone and manufactured sand. The remaining reserves would, through the process of generating concrete and asphalt grade stone, create a by-product such as granular road base.

As part of the evaluation of existing reserves in the Province, a limited assessment of the relative abundance and scarcity of those reserves was also carried out, both in relation to each of the CPCA Areas and with respect to a major market demand area of the GTA, specifically the Vaughan Corporate City Center (VCCC). The VCCC was selected as a reference point for the GTA due to its identification as a growth centre in the Province's Place to Grow Plan. It was found that approximately 2.41 billion tonnes of the 3.44 billion tonne total, is considered to be abundant, located within quarries where the reserve base is greater than 55 million tonnes. These data are summarized as follows:

CPCA Area	Reserve Totals (million tonnes)											
	Abundant				Moderate				Scarce			
	H*	A	L	U	H	A	L	U	H	A	L	U
2	206.9	55.6	0.0	0.0	117.1	108.4	69.1	62.6	55.9	19.9	5.9	4.4
3	191.8	286.3	237.0	77.8	141.4	25.8	25.6	0.0	62.7	14.3	10.8	1.2
4	65.0	0.0	0.0	0.0	37.6	4.9	0.0	0.6	10.1	1.0	0.0	0.0
5	447.1	427.0	348.5	65.7	104.1	34.4	0.0	35.6	33.5	27.2	10.6	6.1
Total	910.9	768.9	585.5	143.4	400.2	173.5	94.7	98.8	162.2	62.4	27.3	11.8

*H – High Quality, A – Acceptable Quality, L – Low Quality, U – Unknown Quality

Interestingly, these 'abundant' reserves are found within only 15 quarries, 12 of which are located more than 75 km from the Vaughan Corporate City Center. This indicates that approximately 70% of the reserve base that is considered to be 'abundant' is found in only 15% of the total number of quarries evaluated. The remaining 85% of the quarries have either a scarce or moderate reserve base. As such, it is clear that the majority of the reserves supplying the GTA market are coming either from moderate or scarce reserves. In addition, when



annual tonnage limits and internal customer demand from these quarries are taken into consideration, annual available supply to the general market is further limited.

With the knowledge that the existing reserve base is being depleted at a greater rate than new licences are being granted in the Province, the question then becomes, how can the reserves that are currently licenced be maximized to the greatest extent possible? An evaluation of various options with respect to maximizing the existing reserves was also carried out as part of this paper.

The four options worthy of consideration are:

- 1) to reduce or eliminate regulatory setbacks;
- 2) remove road allowances where possible;
- 3) to extract to a greater depth; and
- 4) to maximize the importation of material for rehabilitation of the properties rather than using on-site reserves.

While not the answer to the demand/supply question, maximizing the reserves on an existing licenced property is a responsible method for resource management, to the extent that the surrounding natural environment and social receptors are not increasingly affected.

While the total resource base of 3.44 billion tonnes, appears to be a large number, it is important to understand that the majority of these reserves are not high quality stone and are located at greater distances from the market areas that are demanding them, with only approximately 902 million tonnes within 75 km of the Vaughan Corporate City Center. Only approximately 1.47 billion tonnes, of high quality reserves appears to be available to the Greater Toronto Area market, a maximum two thirds (approximately 987 million tonnes) of which would be available for concrete and asphalt grade stone and manufactured sand. Of this total only approximately 476 million tonnes, are located within 75 km of the Vaughan Corporate City Center. Considering that a maximum production of about two thirds of the total high quality reserves is achievable for production of concrete/asphalt grade stone and manufactured sand, this translates into approximately 317 million tonnes, available within a 75 km distance of the Vaughan Corporate City Center. This is provided graphically below:



Reserves that are considered to be 'abundant' are located within relatively few operations located at greater distances from the largest market demand area, the GTA. The supply to the GTA market area is coming from sites that are considered to have scarce to moderate reserves, which are being exhausted at a greater rate than they are being replenished through the granting of new licences by the Province. There will be an increasing reliance on the supply of aggregate from sources at greater distances as reserves close to the market are exhausted.



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APPENDICES

APPENDIX A

Confidential Information (To Be Removed From Public Report)



1.0 INTRODUCTION

On March 25, 2009 the Ontario Ministry of Natural Resources (MNR) issued a Request for Proposal (RFP) for the purpose of evaluating the current status of the aggregate resources in the Province of Ontario. The study, labelled the *State of the Aggregate Resource in Ontario Study* (SAROS), was divided into six separate papers in order to examine this complex question. On April 30, 2009 the MNR selected Golder Associates Ltd. (Golder) in association with MHBC Planning Ltd. (MHBC) to carry out a portion of this study.

This report is focused on Paper 5 of the SAROS project and addresses the aggregate reserves in existing licenced limestone/dolostone operations in geographic Areas 2, 3, 4 and a portion of 5 as identified by the MNR (see Figure 1). The issue of remaining reserves on an individual property is a confidential topic that requires care when reporting the results of a study such as this. As such, detailed information on reserves for individual licences have been reported in Appendix A, which is to be removed prior to delivery to the general public. The MNR has provided the following explanation with respect to the selection of only limestone/dolostone quarries in Areas 2, 3, 4 and portions of 5 and also the confidential nature of the reserve information contained in this report:

Due to the short timeframe available for the completion of the SAROS report, it was necessary to scope down the parameters of the research. With respect to the reserve base examined as part of Paper 5, the approved Terms of Reference state: Reserve estimates will be scoped to Class 'A' licenced quarries and specifically to limestone/dolostone quarries in the Geographic Areas # 2, 3, and 5. Geographic Area # 4 was later included, and these four areas together constitute the predominant production region of the province.

and

As per Procedure No. A.R. 5.00.22 - Section 7.0 (Aggregate Resources Program: Policies and Procedures Manual): Certain types of an individual licensee's information are withheld under FIPPA (Freedom of Information and Protection of Privacy Act), Section 17 – Third-Party Information, and this includes: Production Data, Annual Licence Fee, etc. A detailed listing for each licenced property in their respective municipality is provided in Appendix A, and this appendix will be kept confidential by the Ministry of Natural Resources.

Resource information has been summarized per Canadian Portland Cement Association (CPCA) Area and provided within the report. It should be noted that the Canadian Portland Cement Association is now known as the Cement Association of Canada (CAC).

The requirements of the RFP, which have been summarized below, are addressed in the following sections of the report.

1.1 Objectives

The general objectives for the SAROS project, as summarized from the RFP, are to:

- Provide updated base information about current licenced aggregate resources in Ontario;



- Provide information to support provincial, regional and municipal strategic planning for aggregate supply to meet long term demand;
- Provide a more definitive understanding of current supply and future aggregate resource constraints that may affect long term supply; and
- Provide a credible source book of information on aggregate resources available to the general public online.

These objectives were to be met following the scope of work outlined below in Section 1.2 for Paper 5.

1.2 Scope of Work for Paper 5

The detailed scope of work for Paper 5, as stated in the RFP, is comprised of the following tasks:

- Determine the current estimated resource reserves by selected commodity in licenced operations in selected geographic areas:
 - Reserve estimates will be scoped to Class 'A' licenced quarries and specifically to limestone/dolostone quarries in the CPCA Geographic Areas 2, 3, 4 and part of 5.
 - Provide discussion regarding licenced area versus extractable area and reduction in total available reserves due to setbacks, roads, processing area and benches in quarries.
 - Provide discussion on the factors affecting the process of estimating remaining reserves in licenced sites. Explain why sand and gravel deposits are the most difficult to estimate reserves.
- Determine areas of relative abundance and scarcity of construction aggregate reserves by the selected commodity for limestone/dolostone reserves.
- Map the current reserves and indicate location relative to potential market demand areas.
- Determine and describe opportunities to maximize resource use within existing licences (e.g., reduced setbacks, deeper extraction, import of stone/blending).

As part of the scope of work, MNR requested that a literature review be completed to compare the practices of other jurisdictions with those of Ontario. This literature review was to be completed with respect to comparing the level of protection afforded for licenced reserves and those that should be protected from sterilization in order to supply future demand.

1.3 Report Format

The report is divided into seven sections, the first being the introduction. Section 2 provides a background review of information that was available which discussed the protection of aggregate resources and reserves. This section describes examples of aggregate resource protection from Queensland Australia, the United Kingdom and California. Section 3 describes the process used for deriving the estimated reserves of licenced quarries in the central portion of southern Ontario, broadly defined as the 'Greater Golden Horseshoe' (GGH)



surrounding the Greater Toronto Area (GTA) and the associated limitations. A summary of the results is provided in Section 4.

Section 5 is a survey of the areas of relative abundance and scarcity of aggregate reserves and resources in southern Ontario, while Section 6 provides a description of the mapping of reserves relative to market demand areas. Section 7 describes a number of opportunities to maximize resource use within Licenced areas, and Section 8 provides conclusions and recommendations.

1.4 Acknowledgements

The assistance of the following members of MNR staff is gratefully acknowledged:

- Brian Hollingsworth
- Stuart Thatcher
- John Friberg
- Josh Annett

and the Aggregate Resource Officers in the District offices.

2.0 LITERATURE REVIEW

This section provides a review of some of the available information related to the protection of aggregate resources and reserves in various jurisdictions outside of Ontario. This review was included in order to provide context with respect to the level of protection offered in the Province of Ontario. Within the broader scope of the SAROS project (see Section 1.1), developing an understanding of a variety of processes used in other jurisdictions to identify and classify resources, and more importantly, permitted reserves, is important in any discussion of determining levels of protection of aggregate resources and reserves in Ontario. At present, the Province of Ontario provides a degree of protection to licenced reserves under provisions of the Aggregate Resources Act (ARA). However, some jurisdictions outside of Ontario have extended a level of protection to identified, but currently non-permitted, resources as well.

While licenced reserves are somewhat protected in Ontario, it is important to determine the amounts (volumes and/or tonnages) of the licenced reserves protected in order to have a sound understanding of the overall supply/demand relationship, and to provide a basis on which to consider a level of protection of non-licenced resources. A primary purpose of Paper 5 is to calculate licenced reserves of limestone and dolostone quarries within defined geographic segments of southern Ontario. However, to gain an understanding of various methods of protecting licenced reserves and non-licenced aggregate resources, it is prudent to review resource and reserve identification and protection strategies in other jurisdictions outside of Ontario, particularly as they relate to defining amounts of resources and reserves.



2.1 Overview

Four components or key policy objectives of aggregate resources planning and regulation are:

- recognition of primary aggregate resources as valuable, and the identification and protection of those resources;
- protection of surrounding environmental and cultural communities;
- rehabilitation of extractive operations; and
- efficient utilization of primary resources and the recycling / re-use of secondary resources.

(British Geological Survey, 2005; Baker & Hendy, B., 2005)

The first component of aggregate resources planning, the recognition, identification and protection of the resource, is the focus of this overview. Furthermore, the importance of a strong geoscience basis, on which this component is developed and implemented, is essential for its success (Stevens & Langer, 2005; Commission of the European Communities, 2008).

There is a considerable amount of literature discussing the safeguarding or protection of aggregate resources from sterilization. For example, Langer (2002) summarized attempts in a number of U.S. States and elsewhere, although they are limited in number and resulted in mixed success. However, Queensland Australia, California and the United Kingdom (U.K.) have been cited as having some success and, as such, are the focus of the following sections.

2.2 Aggregate Resource Planning Examples

The following examples of resource planning in jurisdictions outside of Ontario are provided in the following sections.

2.2.1 Queensland Australia

One response to the resource sterilization issue, brought on in part by a lack of coordination in land-use planning decision-making, is the concept of the identification of “Key Resource Areas” (KRAs), which has been implemented in Queensland Australia for the protection of resources identified as having regional significance (Stevens & Langer, 2005). Applicable primarily in rural areas, KRAs protect not only the reserves of existing operations and identified resources, and transportation corridor or haul routes, but also delineate a separation area or buffer around both. The separation distances are variable and are used as a trigger for evaluating potentially incompatible development. Examples of these separation distances/buffers are:

- 1000 m from the boundary of an existing operation or known resources where blasting or crushing is or would be involved;
- 200 m from the boundary of an existing operation or known resources where no blasting or crushing would be involved; and



- 100 m from each side of a transportation corridor or haul route.

These distances can be modified based on site-specific conditions such as topography or proximity to residential settlements as site specific studies warrant.

A formal policy recognizing KRAs was adopted by the State of Queensland in 2007 as State Planning Policy 2/07 Protection of Extractive Resources, as a statutory instrument under the Integrated Planning Act (Queensland Government, 2007), and states in part:

“The Policy outcome is to identify those extractive resources of State or regional significance where extractive industry development is appropriate in principle, and protect those resources from developments that might prevent or severely constrain current or future extraction when the need for the resource arises.”

The locations of a total of 100 KRAs are identified in the Policy, and large-scale mapping of each of the individual KRAs is included in the document. The Resource Processing Area, the Separation Area and the Transportation Route are delineated for each KRA. Also identified in the State Planning Policy 2/07 document are the KRAs with State biodiversity values (Queensland Government, 2007).

2.2.2 California

As required under provisions of the State's Surface Mining and Reclamation Act (SMARA) of 1975 (California Department of Conservation, 2007), the California Geological Survey and its predecessor organization have published a series of open file reports to classify aggregate and other mineral resources in California Counties (Dupras, 1999; Busch, 2001; etc.). SMARA mandated a two-phase 'classification-designation' process, with the objective of ensuring that aggregates and other construction materials are available when needed, and are not made inaccessible during land-use decision-making actions (Dupras, 1999). The classification phase includes the determination of study boundaries, establishment of Mineral Resource Zones (MRZ), identification of Aggregate Resource Areas (ARAs), calculation of resource tonnages within ARAs, a forecast of 50-year needs and the life-expectancy of current permitted reserves and identification of alternate resources. Upon receipt of the classification information, the open file reports, lead agencies (Counties, Cities, Towns, federal and state departments owning lands, etc) have 12 months to recognize the information (including mapping), and incorporate mineral resource management policies into their planning documents (Busch, 2001). SMARA also requires periodic review, every 10 years following the census, for updating as required (Kohler, 2006b).

Maps included in each open file report typically include (Dupras, 1999):

- Plate 1: Generalized Geologic Map – including both bedrock and surficial features;
- Plate 2: Selected Historic and Active Mining Operations – with a listing of name, current activity, operator, commodities produced and acreage, and areas of portland cement concrete (PCC) and asphaltic concrete (AC), grade of the aggregate operations, base aggregate operations, construction sand operations, fill material operations and clay operations identified;
- Plate 3: Mineral Land Classification of PCC – grade of the Aggregate Resources with a series of 'Mineral Resource Zones (MRZ) identified:



- MRZ-1 – areas where no significant mineral deposits are present and areas of mined-out PCC-grade aggregate resources
- MRZ-2 – areas where significant mineral deposits are present or a high likelihood of presence exists
- MRZ-3 – areas containing mineral deposits (unevaluated)
- MRZ-4 – areas that cannot be assigned to another MRZ
- Plate 4: Areas Zoned MRZ-2 for PCC-grade Aggregate with:
 - MRZ-1 – mined-out PCC-grade aggregate resources
 - MRZ-2 – areas where significant mineral deposits are present or a high likelihood of presence exists (urbanized areas and other constraints have not been excluded from the MRZ-2 zoning)
- Plate 5: Areas Zoned MRZ-2 for PCC-grade Aggregate with:
 - MRZ-1 – mined-out PCC-grade aggregate resources
 - MRZ-2a – areas where PCC-grade aggregate is currently being mined
 - MRZ-2b – areas where significant mineral deposits are present or a high likelihood of presence exists (urbanized areas and other constraints have not been excluded from the MRZ-2b zoning)
- Plate 6: Aggregate Resource Area (ARA) Map and Active PCC-grade Aggregate Operators with a series of individual 'Aggregate Resource Areas' (ARA) identified:
 - ARA (red) - MRZ-2b areas with land-use and other constraints applied
 - ARA (blue) – MRZ-2a areas with an active PCC-grade aggregate operator

with a listing of operator and operation names, acreage and estimated tonnage of resources for (ARA (blue) areas, acreage is listed but permitted reserves are identified as “proprietary data”
- Plate 7: ARA Resources Within 100-year FEMA Floodplain Areas, with:
 - ARA (red) identified
 - ARA (blue) identified
 - FEMA Areas identified as being within a 100-year Floodplain

with a listing of operator and operation names, acreage and estimated tonnage of resources within the 100-year floodplain; for ARA (blue) areas, acreage is listed but permitted reserves within 100-year floodplain are identified as “proprietary data”
- Plate 8: Mineral Land Classification for Kaolin Clays, with:
 - MRZ-2a – areas where kaolin clays resources are measured or indicated as being present and are of prime importance



- MRZ-2b – areas where kaolin clays resources are inferred as being present, and may be upgraded to MRZ-2a through further exploration or changes in technology or economics
- MRZ-3 – areas where kaolin clays resources are inferred as being present, but of undetermined significance, and may be upgraded to MRZ-2a or 2b

While PCC-grade aggregate resources are identified specifically, AC-grade aggregates are also included in this category. Where other mineral resources are present, mapping of those resources is included, as in Plate 8 above. For example, gold is a significant resource in some Counties, and such resources are identified (Busch, 2001). To be considered 'significant' (i.e., MRZ-2), a mineral deposit must meet established marketability and threshold value criteria adjusted for inflation. For construction aggregates, the threshold value in 1999 dollars (US) was \$12,776,000 (Dupras, 1999; Busch, 2001).

Each ARA identified on the mapping (some under 40 ha) is described in some detail in the supporting open file report, including estimated overburden depth, estimated minable thickness, and estimated waste material (silt, clay, etc.) proportion. Estimated tonnages are then calculated using an appropriate density factor. ARA tonnages are then reduced where the ARAs fall within the 100-year flood plain.

In one particular County (Dupras, 1999), and based on 50-year demand forecasting that is beyond the scope of this report (Paper 5), it was estimated that permitted reserves of PCC-grade aggregate would be depleted by 2004. Further, assuming that all aggregate resources identified in the ARAs was mined, there would be enough aggregate to meet demand until 2017.

The regional open file reports have provided the basis for development of the map of *Aggregate Availability In California: Fifty-Year Demand Compared to Permitted Aggregate Resources – "Map 52"* (Kohler, 2006a) and the accompanying report, *Map Sheet 52 (Updated 2006) Aggregate Availability In California* (Kohler, 2006b). Each study area for which an open file report has been completed is categorized on the basis of the proportion of permitted reserves compared to the estimated 50-year demand. Study areas with less than 10 years of potential resources and less than five years of permitted reserves remaining are flagged (Kohler, 2006a), but it is noted that such estimates can quickly change. For example, if a 'depleted' County starts to import aggregate from another region (Kohler, 2006b) the California supply - demand structure is designed such that if a nearby County becomes depleted, it will change the scenario of the first County, because it must now provide materials to the second County as well as meet its own needs. Therefore the supply is used up more quickly than would be forecasted by the in-County demand.

A total of 31 study areas are included covering about 25% of the State, however this area accounts for about 90% of the population (Kohler, 2006b). Within the context of Map Sheet 52, 'aggregate' refers to reserves of the higher quality PCC-grade and AC-grade materials. A total of about 3.9 billion tonnes (approximately 4.3 billion tons) of permitted reserves is identified within the 31 study areas, but 25 of these areas have less than one-half of the permitted reserves they are projected to need to meet the 50-year demand (Kohler, 2006b). In addition, a total of about 67 billion tonnes (approximately 74 billion tons) of non-permitted resources has been identified within the 31 study areas, but it is noted that it is unlikely that these resources would be utilized due to social, environmental or economic factors (Kohler, 2006b).

Between the release of the first Map Sheet 52 in 2002 and the 2006 update, permitted reserves declined by 2.3 billion tonnes (approximately 2.5 billion tons), about one-half of which was consumption with the remainder



due to revised rehabilitation plans, mine closures, new regulations, haulage restrictions and natural changes in deposit quality. The proportion of permitted reserves relative to overall demand did increase over the 2002 to 2006 period; however only one of the 31 study areas has enough permitted reserves to meet or exceed its projected 50-year demand as of 2006, down from six areas in 2002 (Kohler, 2006b).

2.2.3 United Kingdom

Unlike other jurisdictions, the government of the United Kingdom (U.K.) has national objectives and national policies for minerals planning, including the definition and protection of Mineral Safeguarding Areas (MSAs) and associated storage, handling and processing facilities for bulk transport of minerals (McEvoy, et al, 2007). MSAs are defined as areas of known mineral resources that are of sufficient economic or conservation value to warrant protection for generations to come, so that they are not needlessly sterilized (McEvoy, et al, 2007). While applicable to all minerals, aggregates are most frequently identified as MSAs. National and Regional Guidelines for Aggregates Provision in England have been published and updated since 1994 (Office of the Deputy Prime Minister, 2006; Dept. of Communities and Local Government, 2008), and provide information to planning authorities in order to effectively address geographical imbalances between the supply of, and demand for, aggregates at the national level.

McEvoy, et al (2007) suggests the following approach, to be undertaken by Mineral Planning Authorities, in order to safeguard mineral resources in the U.K.:

- 1) evaluate the best geological and resource information available;
- 2) decide which minerals are, or may become, of economic importance in the foreseeable future;
- 3) decide on how the physical extent of resource areas to be safeguarded should be determined (based on robust and credible scientific evidence);
- 4) incorporate the results of steps 1 to 3 into a planning policy in which MSAs are identified and designated in a planning document;
- 5) decide how MSAs will be effectively used to safeguard mineral resources, including identifying potential scenarios for exemption; and
- 6) decide whether Mineral Consultation Area (MCAs) will be established to protect storage, handling and processing facilities for bulk transport of minerals.

In evaluating development proposals, MSAs are considered with other environmental and cultural designations. The provision for buffers around MSAs, to protect nearby residents and protect the resource from sterilization, is encouraged by the policy. For example, one jurisdiction agreed upon minimum buffer limits and incorporated them into its plan (McEvoy, et al, 2007):

- 500 m for quarries (blasting required);
- 250 m for quarries (no blasting required) and sand & gravel pits;
- 50 m for brick clay pits; and



- 0 m for underground gypsum mines.

The concept of 'landbanks' is an integral component of mineral resources planning in the U.K. Landbanks are areas of mineral resources for which approvals have been gained, and are available for extraction (Dept. of Communities and Local Government, 2006). U.K. Landbanks are analogous to Mineral Resource Zones (MRZ-2a) in California, Key Resource Areas (KRAs) of existing operations in Queensland Australia and licenced reserves in Ontario.

2.3 The Ontario Comparison

A comparison of California's Mineral Resource Zones (MRZs) and Aggregate Resource Areas (ARAs), Queensland's Key Resource Areas (KRAs) and the U.K.'s 'landbanks' and Mineral Safeguarding Areas (MSAs) to Ontario's Aggregate Resource Inventory Papers (ARIPs) is an informative one. The ARIPs provide a basis for including aggregate resource mapping in Official Plans, and the Provincial Policy Statement (PPS) of 2005 states that aggregate resource planning and management policies in Official Plans 'shall be consistent with' the PPS. Distribution of the California Mineral Land Classification (MLC) reports, for example, triggers a time limit within which to recognize the classification information (including mapping), and incorporate mineral resource management policies into planning documents prepared by the lead agencies. This includes both permitted reserves and non-permitted resources.

As previously noted, the Province of Ontario provides a degree of protection to known deposits under the provisions of the ARA and PPS.

Existing licenced reserves can be affected by incompatible surrounding land uses. The encroachment of incompatible land uses to areas surrounding existing licenced reserves can limit the operation and potential expansion of existing operations. The PPS contains policy intended to limit incompatible land uses in areas surrounding existing licenced reserves:

Mineral aggregate operations shall be protected from development and activities that would preclude or hinder their expansion or continued use or which would be incompatible for reasons of public health, public safety or environmental impact. Existing mineral aggregate operations shall be permitted to continue without the need for official plan amendment, rezoning or development permit under the Planning Act. When a licence for extraction or operation ceases to exist, policy 2.5.2.5 continues to apply. (Policy 2.5.2.4)

The establishment of new operations can also be affected by incompatible development. Incompatible land uses located within areas of known deposits or adjacent to these deposits can preclude or hinder the development of the aggregate resource. The PPS contains policy intended to limit the development of incompatible land uses in areas of known deposits:

In areas adjacent to or in known deposits of mineral aggregate resources, development and activities which would preclude or hinder the establishment of new operations or access to the resources shall only be permitted if:

- A) resource use would not be feasible; or



- B) the proposed land use or development serves a greater long-term public interest; and
- C) issues of public health, public safety and environmental impact are addressed. (Policy 2.5.2.5)

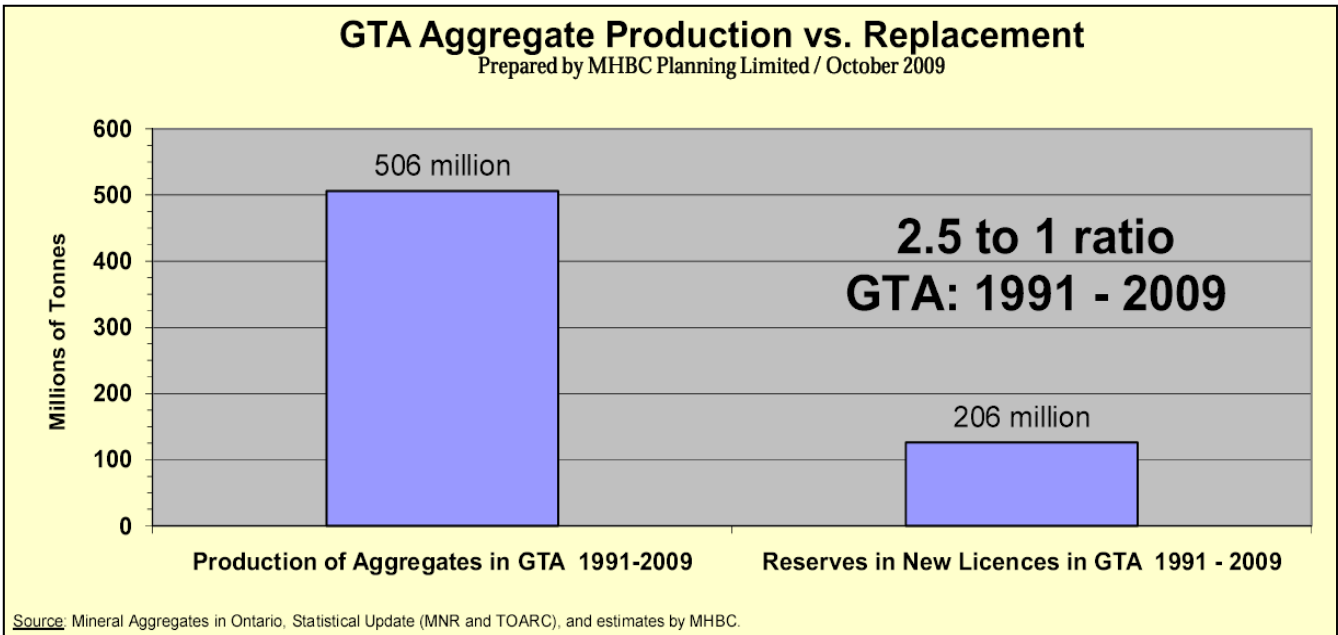
As described in Section 2.2, other jurisdictions have recognized the strategic value of aggregate resources, and have provided a degree of protection to non-permitted resources. The protection of resources in Ontario would be enhanced by the following:

- formal recognition of identified 'high priority' aggregate resource areas of known quantity and quality (based on sound geoscientific investigation); and
- formal acceptance of high priority aggregate resource areas within which licence applications would be encouraged (or at least not unduly hindered), and the linkage of such high priority areas to market demand areas.

It is important to determine the amounts (volumes and/or tonnages) of the licenced reserves protected in order to define the overall supply/demand relationship. Section 3.0 provides a detailed process for the estimation of licenced reserves and the calculations undertaken for limestone and dolostone quarries within specific geographic areas of southern Ontario based on sound geoscientific principles. In the section below (Section 2.4) a discussion on the seriousness of the depletion of reserves in comparison to new licences being granted in the GTA is outlined in order to provide context with respect to the literature review provided above.

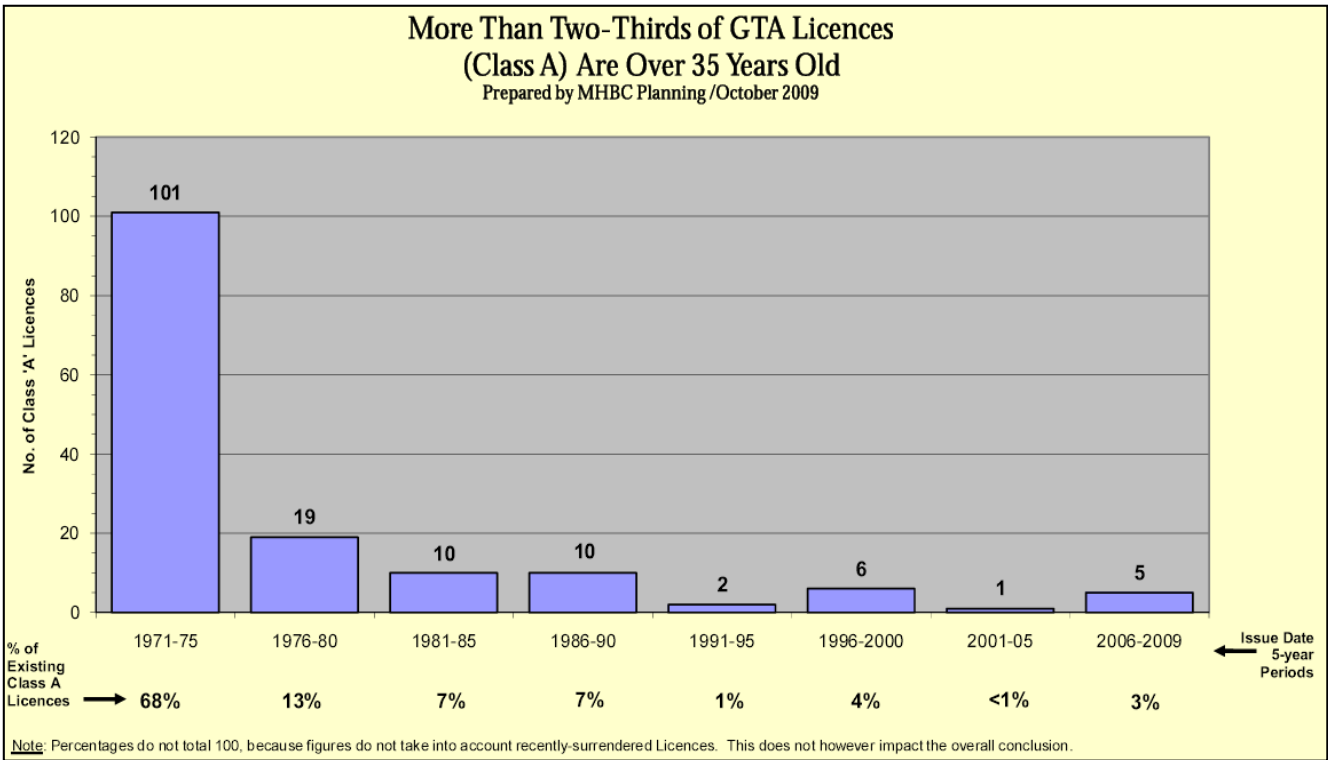
2.4 Aggregate Production versus Replacement in the GTA

The aggregate demand and resulting consumption in the GTA has remained relatively consistent over the years, averaging approximately 14 tonnes per person per year; however, the licencing of replacement reserves has not matched pace with this consumption, resulting in a 2.5 to 1 consumption to replacement ratio between the years of 1991 to 2009. The following graphic depicts the issue clearly (source - MNR/TOARC, 1991-2008: Statistical Updates; MHBC, 2009: historical/ongoing review of file information at MNR Aurora office and personal communications with MNR Aurora staff):



This issue has been ongoing for almost 20 years and is only increasing in seriousness as the regulatory environment in Ontario becomes increasingly difficult with respect to licencing new resources.

To emphasize this point, more than two thirds of the licenced reserves supplying the GTA are more than 35 years old, with reserves having become depleted rapidly in comparison to licences that have recently been granted. This is displayed graphically below (source - MHBC, 2009: historical/ongoing review of file information at MNR Aurora office and personal communications with MNR Aurora staff):



This information provides the context for the following sections on remaining reserves in the majority of the quarries that were assessed as part of this study.

3.0 METHODOLOGY FOR ESTIMATING RESOURCE RESERVES

A main component of the study for Paper 5 included the estimation of remaining reserves in licenced limestone/dolostone quarries in the central portion of southern Ontario, broadly defined as the 'Greater Golden Horseshoe' (GGH) surrounding the Greater Toronto Area (GTA). All quarries located within Areas 2 and 3 were included in the study in addition to those located in Area 4 at the request of the MNR. A portion of Area 5 was also included and together these areas comprised the Study Area for the purpose of this report (see Figure 1). It should be noted that a total of 97 licenced sites were evaluated with areas greater than 20 ha. Individual quarries of less than 20 ha were not evaluated.

3.1 Overview

A total of 97 licenced aggregate quarries were subject to evaluation of licenced reserves (see Figure 2). These included all quarries within Areas 2, 3 and a portion of Area 5 with a licenced area of 20 hectares or greater. In addition, five licenced quarries in Area 4 (one quarry has two Licences combined on one Site Plan, and is considered a single operation) were also included in the evaluation due to their proximity to the GGH market



area. With regard to Area 5, only the quarries in the southern portion were included in the Study Area (see Figure 2). A large portion of Area 5 was designated under provisions of the Aggregate Resources Act (ARA) on January 1, 2007. As such, the generation of Site Plans for each of the licences is incomplete at this time. The evaluations were undertaken using the approved Site Plans for each of the quarries (as supplied by MNR), recent ortho-photo imagery of each of the quarries from 2006 to 2008 and annual production data from 2006 to 2008. Production data were used to reduce licenced reserves to a common time period for all of the quarries to the end of the 2008 operating season. The process and the results are described in greater detail in the following sections.

It should be noted that the volume and tonnage calculations are based on dimensions, distances and elevations provided on the Site Plan. The calculations assume that all material is extracted and, in turn, is viable for aggregate production. No allowance for structural geological disruptions such as faults, undulating top of bedrock surface or contact between beds of different quality has been accounted for. This information is very site specific and would require a detailed geological evaluation of the reserves on a site by site basis. In addition, waste factors that are inherent with processing of aggregate have not been accounted for in this process. Also, the requirement for retention of aggregate material on a property for the purpose of rehabilitation has not been addressed and has not been removed from the total reserve estimate.

3.2 Process of Reserve Estimation

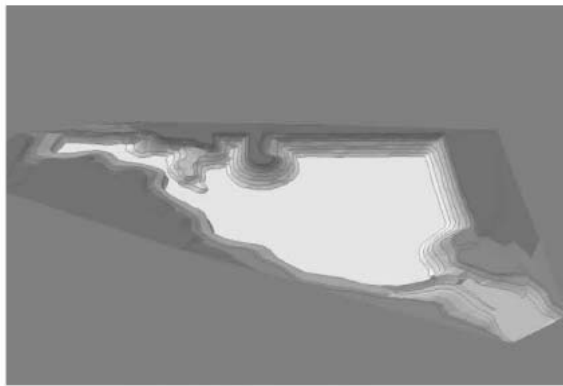
The process for estimating the reserves at a particular property included a detailed examination of available imagery, site plans and other information which would contribute to a relatively accurate calculation of remaining reserves on the property. The steps taken during the evaluation of the quarries is summarized on the following series of diagrams:



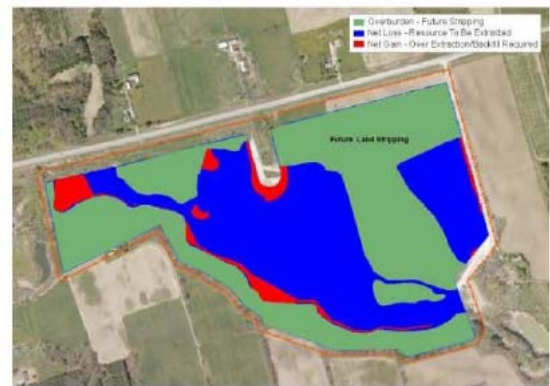
A) Site Plan - post-extractive topography



B) Imagery with features



C) Digital terrain model



D) Digital model - licensed reserves

This process is described in detail in Section 3.2.4.

3.2.1 Imagery

Recent orthophoto imagery, the dates of which ranged from 2006 to 2008, for each of the quarries in the Study Area was supplied by MNR in digital format. The imagery was used to capture identifiable features such as roads, boundary lines and quarry faces and was compared to the Site Plans for the property, which, in general, predated the date of the image supplied for the property.

3.2.2 Site Plans

The 'current' Site Plans, as required for each licenced aggregate property in Ontario under provisions of the ARA, are on file at MNR District offices, and were provided by MNR for use in the study. It should be noted that the Site Plans ranged in age from 1992 to 2009, thus resulting in a wide range of 'current' conditions as well as a range in the evolution of site planning development practices.



The pages of each Site Plan were digitized for use in the study using a large format scanner. The digital Site Plan images were then georeferenced to exact locations and overlaid on the imagery in order to delineate the Licence boundaries, setback limits, and other features, usually from the Existing Features sheet. Georeferencing was based on roads, lots/concession, property boundaries, and identified features from MNR's Natural Resources and Values Information System (NRVIS) data sets using Universal Transverse Mercator (UTM) grid coordinates.

Where overburden depths were identified on a particular Site Plan, the average of such depths was used to calculate volumes. If such information was not available, other sources (i.e., drift thickness mapping, water well records, OGS mapping etc.) were used.

3.2.3 Other Information

For sites where overburden depths were not available, the Ontario Geological Survey's (OGS) 'drift thickness' data (OGS, 2007) was used as an approximation. This data set was created from NRVIS Digital Elevation Model (DEM) and OGS interpolated bedrock surfaces, and overburden thicknesses for sites within the Study Area were found to range from 0.5 m to 22 m.

For a limited number of the Licenced properties, notably newer operations, hydrogeological, planning and development and/or resource inventory reports were provided. Information from these sources was used to identify water table elevations and specific rock formations being extracted.

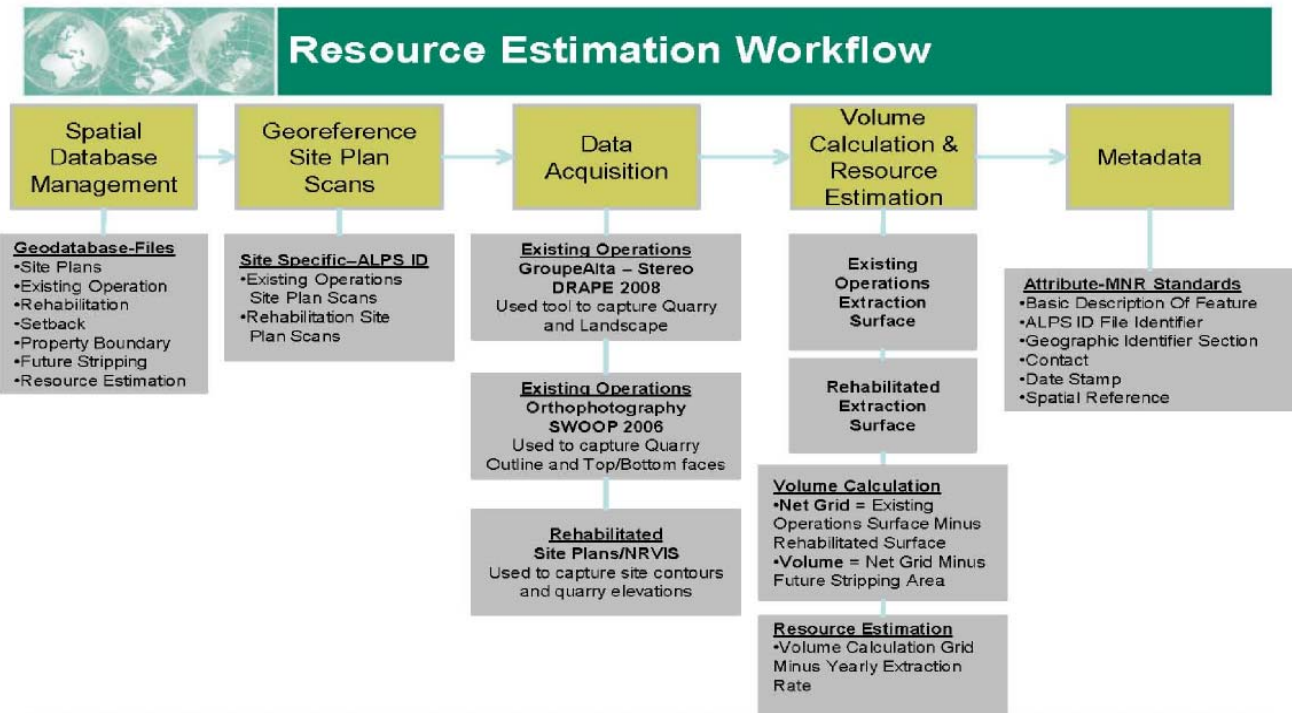
3.2.4 Information Processing

An example of the process of incorporating the spatial information described in the above sections (see Section 3.2) is summarized below:

- A) a portion of the Site Plan was digitized, including the Existing Features and Final Rehabilitation sheets with topography;
- B) imagery with georeferenced Site Plan features – Licence boundaries (brown), setback boundaries (blue) and post-extractive contours (red);
- C) creation of the Digital Terrain Model (DTM) based on Site Plan's post-extractive contours exclusive of backfilling representing the maximum extent of extraction; and
- D) creation of the Digital Model of Licenced Reserves with Green representing land to be extracted after stripping (less volume of overburden); Blue representing land extracted; and Red representing land to be backfilled as part of rehabilitation.

Reference can also be made to the series of diagrams in Section 3.2 above as an example of a particular site.

This process is also provided graphically as follows:



Calculations were then carried out for the volume of overburden to be stripped, and the volume of stone to be extracted to the depths specified on the Site Plan.

3.2.5 Calculations of Remaining Reserves

The net volume of licenced reserves (gross volume of the solid stone less overburden volume) for each of the sites in the Study Area was calculated using the process described in Section 3.2.4 above. However, since these volumes were derived from imagery spanning several years (2006, 2007 and 2008), it was necessary to update the volumes to a common time period and, as such, the end of the 2008 operating season was chosen and termed the ‘2008 Remaining Reserves’. Tonnages extracted in 2006, 2007 and 2008 for each aggregate quarry in the Study Area were supplied by MNR and used to reduce the calculated net volumes to the 2008 Remaining Reserve volumes. Since the imagery was acquired in the spring of each year, either before or soon after the start of the operating season, the production for that year, plus any succeeding year(s), was deducted.

The production tonnages were converted to volumes using a constant density factor value of 2.75 tonnes per cubic metre of solid stone. This constant value is an approximate average of the densities of dolostone and limestone, and is a generally accepted value for solid limestone/dolostone density in the absence of site specific values. For example, to derive the 2008 Remaining Reserve volumes using 2006 imagery, the 2006, 2007 and 2008 production tonnages were converted to cubic metres of solid stone and subtracted from the net volume of unextracted solid stone calculated from the imagery.



Thus, the total 2008 Remaining Reserve volumes represent estimates of licenced stone resources remaining in the aggregate quarries within the Study Area at the end of the 2008 operating season, essentially as of January 01, 2009.

3.3 Field Verification and DTM Test Sites

To verify the validity of the reserve estimation process used, a sample of 11 quarries, generally of 60 hectares or more in licenced area, was subjected to field verification visits. These properties were labelled internally as 'field verification sites' to distinguish the extra work that was carried out on them. The intent of the visits was to verify that features, such as the active quarry face(s), captured using the process, based on Site Plans and imagery as augmented by the GroupeAlta DTM tool, were correct. The quarries were selected on the basis of geographic area, production activity and size in order to provide as broad a cross-section of licenced quarries as possible. The sites were located in the Niagara, Hamilton, Halton, Simcoe-Kawartha and Peterborough areas. Those quarries visited are identified in Table A.1 by a symbol after the Licence Number and the general locations are provided on Figure A.2 in Appendix A.

The field verification teams, consisting of two experienced professionals, used Trimble TDS Recon hand-held GPS units to delineate the active face(s) of the quarries. This field work was carried out over a period in early September of 2009. The GPS units were loaded with the imagery and Site Plan for each individual quarry for reference purposes. After the field verification visits, the GPS units were downloaded by those who were carrying out the volume calculations. The active quarry face(s) were then compared to those identified on the imagery.

Based on the results gathered at the field verification sites, it is clear that the data obtained using hand-held GPS units significantly improved the timeliness of reserves calculations over use of the Site Plans and imagery alone, particularly with regard to delineation of active faces. The major limitation of GPS verification is that, while the level of horizontal (x,y) accuracy is relatively high, vertical (z) accuracy is not. Thus, determination of elevations of unstripped and stripped areas (for overburden calculations) and quarry floors (for reserve calculations) is not substantially improved.

A sample of 15 quarries in the Study Area, primarily in Area 5, was also used to test a recently developed process of determining pre-and post-extractive topography by remote means. To complete this exercise, Golder contacted GroupeAlta to gain access to their digital terrain modelling (DTM) tool using recent imagery for the fifteen sites. These properties were then labelled internally as the 'DTM test sites'. It is important to note that two licenced quarries were subject to both field verification and DTM processing which allowed for a comparison of all three methods of evaluation.

The DTM test sites, primarily in the eastern portion of the Study Area, are identified in Figure A.2. The imagery used for the test was originally flown for MNR in 2008 (DRAPE 2008) and has stereo capabilities. Measurement accuracy is dependent on the imagery specifications, but ranges from 50 cm to 65 cm vertically, and ± 20 cm horizontally.

For each DTM test site, the following data were acquired:

- Location of 'current' (2008), but not necessarily active, faces;



- Spot elevations on unextracted portions of the quarry; and
- Spot elevations on the quarry floor.

Based on the results at the DTM test sites, use of the DTM tool was found to significantly improve the accuracy of reserves calculations over just the use of the Site Plans and imagery alone. It was also determined that the DTM tool identified errors in the topographic information depicted on some of the Site Plans. The major limitation of the DTM tool is that it is based on imagery that may be out of date, particularly with regard to a high level of extractive activity.

3.4 General Limitations of Reserve Calculations

There are a number of limitations that have to be considered when calculating reserves based on a desktop review process, as was conducted for this study. The varied age, formats and content of the Site Plans for the licenced properties that were used in the study, created a number of issues requiring resolution on an individual site basis. As well, variable imagery dates were also considered to be limiting factors, although these were able to be rectified to a large degree through the use of production data to update the volumes to a common time period at the end of the 2008 production season.

A number of Site Plans for quarries in the Study Area used only elevation data (spot elevations, contour lines) relative to a given benchmark, and not to an established geodetic datum (i.e., metres above sea level). This created difficulties in determining overburden depths and quarry floor or post-extractive elevations, and thus volumes of reserves, particularly if the given benchmark was not at ground level. In such examples, an assumption had to be made regarding the height of the benchmark above ground level. This only occurred when the benchmark was referenced to be the fencepost on the property and, as such, the height of the fence post was assumed to be 1.5 m.

In the absence of other, more reliable, elevation data (i.e., a DTM test site), an approximate geodetic elevation was derived by comparing a relative spot elevation or contour line on the Site Plan to a NRVIS geodetic elevation, and relating the remaining relative elevations to that NRVIS elevation.

Both relative elevations and assumed benchmark elevations on the Site Plans used for reserve calculations will reduce the accuracy of those calculations, particularly in comparison to other Site Plan elevation data that is based on more accurate geodetic data.

In several instances, the quarry boundaries, as indicated on the Site Plans, did not conform to the NRVIS data provided by MNR. In these cases, a professional judgment decision was made on the basis of the source of the boundary data. In the case of one quarry, the boundaries on the Site Plan were determined by an Ontario Land Surveyor using bearings and distances, and planted iron bars. In this instance, the Site Plan boundaries were used instead of the NRVIS boundaries. In some other instances, the NRVIS boundaries were used instead of the Site Plan boundaries. A list of the assumptions per site is included in the Metadata provided in the digital files accompanying this report as part of Appendix A.

A lack of consistency in the age, format and content of the Site Plans may have lead to some inaccuracies in reserve calculations. Any such inconsistencies could be rectified by field verification, use of a DTM tool or a



combination of both in any future reserve verification process. For maximum accuracy and reliable comparison to actual production data, field verification site visits should be undertaken either after the end of annual production (mid- to late December) or prior to commencement of the next production season (late March to mid-April). Due to the time constraints of this study, the field verification site visits were limited to late August, with about one-half of the 2009 production season having been completed.

3.5 Issues Related to Aggregate Quality

The necessity for aggregate reserves to meet a number of standardized specifications for use in such products as concrete and asphalt provides a context to discuss issues related to aggregate quality. These issues can be reconciled with detailed site-specific geological information, but in many cases, such information is not generally available. An exception would be in cases of more recently developed quarries where detailed resource inventories and/or hydrogeological investigations can provide the information as part of the licence application package.

A detailed differentiation of reserve quality was not made due to a lack of site-specific geological information for the limestone and dolostone quarries. However, a limited evaluation of reserve quality was completed for a sample of 30 quarries (out of the total of 97) for which some site-specific geological information was available from a number of sources. Quality estimates for the remaining 67 quarries was based on their location within known geological formations and the accompanying descriptions of those formations and their expected quality within the Aggregate Resource Inventory Paper (ARIP) mapping.

For all of the quarries, the overall calculated reserves of stone were divided into four categories including 'high' (concrete and asphalt stone), 'acceptable' (for road base), 'low' (backfill only), and 'unknown' based on stone quality. For example, high quality stone was based on the proportions (or depths) of generally recognized high quality geologic strata, such as the Amabel, Guelph, Upper Bobcaygeon, units of the Gull River, units of the Lockport, units of the Bertie, etc. formations. Lower quality stone (e.g., Verulam, Bois Blanc, etc. Formations) were categorized as acceptable or low quality. However, it should be noted that blending (where local regulations allow), selective extraction and/or beneficiation by further processing can enable lower quality stone to meet higher specifications in some cases. A general description of these formations and the quality issues associated with them is provided on the following table. More detailed descriptions can be found in Appendix D of the various Aggregate Resource Inventory (ARIP) reports published by OGS.



Summary of Geological Formations in Relation to Aggregate Production

Formation Name	Brief Description	Quality Issues	Expected End Products
Bertie	Medium to massive bedded brown dolostone with shale partings up to 18 m thick.	Shaly intervals are unsuitable for use as high specification aggregate because of low freeze-thaw durability. Certain units can make higher end-products.	Granular road base products and certain units can make concrete and asphalt grade aggregate
Bois Blanc	Brownish grey, medium-crystalline, medium to thin-bedded cherty limestone, commonly fossiliferous with shaley, partings and minor interbedded dolostones. Typically ranges between 3 and 40 m in thickness.	Unsuitable for concrete aggregate due to high chert content.	Road base granular aggregates.
Lockport (Eramosa)	Bituminous dolostone with shale partings and variable chert bands and lenses.	Some areas are soft and unsuitable for use in the production of load-bearing aggregate, requiring additional testing. Certain units will make higher end products.	Certain units suitable for concrete and asphalt grade stone while others just suitable for granular road base and lime.
Gull River	Upper Member is thin to thickly bedded, interbedded, grey argillaceous limestone and buff to green dolostone up to 136 m thick. Lower Member is dense limestone with microcrystalline, interbedded dolostone	Certain layers are considered alkali-reactive	Concrete and asphalt grade aggregate.
Amabel	Massive, fine crystalline dolostone with reef facies and occasional shale partings and variable chert bands and lenses. Up to 40 m thick.	None	Lime, concrete and asphalt aggregate, building dimension stone.
Guelph	Medium crystalline, thickly bedded to massive, porous, vuggy, fossiliferous dolostone up to 122 m thick.	None	Lime, chemical uses
Manitoulin	Thin-bedded dolomitic limestones and dolostones.	None	Concrete and asphalt grade aggregate, building dimension stone.



Summary of Geological Formations in Relation to Aggregate Production (continued)

Formation Name	Brief Description	Quality Issues	Expected End Products
Bobcaygeon	Thin to medium bedded, fine-grained crystalline limestone with the middle member containing numerous argillaceous and shaly partings. Up to 87 m thick.	Certain layers are considered alkali-reactive.	Granular road base aggregate, with some units being suitable for concrete and asphalt grade aggregate.
Verulam	Interbedded fossiliferous varying fine to coarse limestone and shale. Up to 10 cm thick for limestone and 5 cm for shale. Rarely utilized.	Unsuitable for use as concrete and asphalt quality aggregate in some areas due to high shale content.	Lime, cement grade in some areas. Granular road base.
Lindsay	Coarse to fine bedded, nodular, crystalline limestone, overlain by 10m of petroliferous, calcareous, fossiliferous shale. Up to 100 m thick.	Some quality issues in some areas but generally suitable for use as concrete and asphalt aggregate	Lime, granular road base, concrete and asphalt grade aggregate, cement production in some areas.
Onondaga	Medium bedded, biostromal and biohermal, argillaceous and fossiliferous limestone with occasional chert nodules. Up to 25 m thick.	High chert content makes much of the material unsuitable for concrete aggregate, asphalt	Granular road base, building dimension stone.

Sources: Appendix D (OGS, 2004); Figure 2-2 (Planning Initiatives, State of the Resource Study 1992)

3.6 Issues Related to Estimation of Sand and Gravel Reserves

Since approximately one-half of aggregates production in Ontario (The Ontario Aggregate Resources Corporation, TOARC, annual statistical updates) is sand and gravel, it is important to consider licenced reserves of sand and gravel in the overall context of aggregate resources supply in the province. However, there is considerable difficulty in defining reserves in sand and gravel deposits with the same degree of certainty as reserves of limestone and dolostone.

The highly variable nature of sand and gravel deposits is a significant impediment to calculating reserves. Even within a spatially well-defined deposit, such as a well-sorted and relatively homogeneous outwash, the mode of deposition, being a glacial and/or periglacial process can result in highly varied strata. Depending on the velocity of the water currents depositing the materials, the contents of an outwash deposit may vary from fine sands to cobbles, and any combination thereof. Ice contact deposits, such as kames and moraines, are even more variable in composition, possibly including silt and/or clay fractions.

By their nature, sand and gravel pits may have fewer operational, environmental and social barriers to overcome than quarries. For example, only limited processing (e.g., screening) may be necessary to produce basic road base materials. Indeed, an end-product known as 'pit run' requires no processing at all; it is excavated and



loaded for transport to a job site. Therefore, capital costs for processing equipment are usually lower, and may not be necessary at all if portable custom processing equipment is hired on a temporary basis. Operating costs can be lower as well; only a loader operator is required in some cases. Sand and gravel pits also tend to serve a more localized market, and sophisticated procedures for loading, weighing and billing may not be necessary. Ultimately, this means that the typical sand and gravel pit tends to be a smaller and more informal operation than a typical quarry, however they still require a licence under the ARA and must meet some minimum standards prior to licencing and during operation.

To include valid estimates of reserve volumes from sand and gravel pits in a combined estimate of reserve volumes, it would be necessary to incorporate a high level of field verification into such a project, or some broad based assumptions that would render the conclusions suspect. In this context, field verification would need to include analyses of all open faces within any particular pit, as well as a review of all available geological information. However, given the high variability of sand and gravel deposits, even field verification would have its limits, particularly if the area of remaining reserves was aerially extensive. Further, a number of sand and gravel pits, due to a high water table, are ‘wet’ extractive operations, using a clamshell or dragline as part of their practice for removing the below water reserves. As a result, the difficulty in evaluating licenced sand and gravel reserves is compounded, since the operating face is located below the water table, unless site-specific resources inventory documents were available.

4.0 RESULTS OF ESTIMATED REMAINING RESERVE CALCULATIONS

The following summarizes the results of the reserve calculations that were completed as part of this study using the methodology described above in Section 3.

4.1 Reserve Estimate Calculations

Using the methodology described above in Section 3, estimated reserves were calculated for each of the quarries in the study area. A summary of the results is provided below.

CPCA Area	Licensed Area (Hectares)	Extractable Area (Hectares)	Extractable Area as a Percentage of Licensed Area	Net Volume Estimate (million m ³)	Tonnage Estimate (million tonnes)	Average Tonnes (million) per Extractable Hectare
2	2,478.4	1,986.4	80.1%	256.7	705.9	0.4
3	3,032.7	2,578.2	85.0%	390.9	1,074.7	0.4
4	908.7	575.6	63.3%	43.4	119.2	0.2
5	2,578.1	2,037.0	79.0%	559.9	1,539.9	0.8
Total	8,997.9	7,177.2	79.8%	1,250.9	3,439.7	0.5



As noted above, a total estimated reserve volume of approximately 1.25 billion m³, or 3.44 billion tonnes was determined through the mapping exercise. It should be noted that a total volume of approximately 1.28 billion m³, or 3.52 billion tonnes, was initially calculated, but once the numbers from TOARC were used to adjust the production, which occurred subsequent to the date of the air photos, this total, as of the end of 2008, was found to decrease by approximately 24 million m³, or 66 million tonnes. A density factor of 2.75 tonne/m³ was used to calculate the total potential tonnage remaining in the 97 quarries.

It is important to note that this total includes the full volume of rock found on these properties, both high and lower quality stone, and does not account for unusable by-products (silt sized fines) that are generated through the process, which can be as much as 10% of the total. Also, the volume and tonnage calculations are based on dimensions, distances and elevations provided on the Site Plan, and these calculations assume that all material is extracted and, in turn, is viable for aggregate production, and that no reserves are used for construction of internal haul roads, ramps or left in place as benches for rehabilitation.

A confidential breakdown per licence is provided in Table A.1 of Appendix A. This Table is a summary of the 2008 Remaining Reserves for each of the evaluated quarries in the Study Area, and is provided in ascending order according to the licence (or ALPS) number of the individual quarries. The spreadsheet includes all quarries within the Study Area with a licenced area of 20 hectares or more that were subject to evaluation. Individual quarries of less than 20 hectares were not evaluated, and are not included in the spreadsheet. However, in cases where extensions to existing quarries were found to be less than 20 hectares, evaluations were completed. These are identified on the spreadsheet as 'Combined Licences – Single Operation'. A total of 11 licenced properties were in this category.

There is one quarry with a municipality listed as the Licensee. Since this operation would provide aggregate materials for the needs of the municipality only, and not to other customers, no entry in the 'Estimated Stone' and the 'Volume of Overburden' was provided. A limited number of revisions to the calculations were based on the use of the DTM tool described above in Section 3.

A comparison of the licenced area (i.e., lands within the licence boundaries) with the extractable area (i.e., lands within the setback boundaries), for the 97 quarries evaluated within the Study Area determined that an average total of about 80% of the licenced area was available for extraction (i.e., all lands within the boundaries of the licenced property, but exclusive of setback and other constraints applied), as indicated from data supplied by MNR.

4.2 Quality of Estimated Reserves

As outlined in Section 4.1 above, the reserve calculations that were carried out for the 97 quarries evaluated in this study are total volume/tonnage of stone remaining on site that is licenced within the current extraction envelope of each of the properties. This volume/tonnage calculation includes all ranges of quality, which requires some clarification with respect to the availability of higher quality reserves versus lower quality reserves. As outlined in Section 3.6, there were only 30 quarries of the 97 evaluated that had varying degrees of information discussing the quality of reserves on the specific property. It should be noted that the remaining 67 sites had no available site specific quality information available for review. As such, the quality estimates for their reserves is based solely on their location with respect to available geological mapping from ARIPs, OGS



mapping and the generalized description of quality with respect to aggregate production provided in those documents. Considering this, a greater level of confidence in reserve quality is afforded to the 30 properties, while the quality of reserves at the remaining 67 sites is considered to be more uncertain. A summary of the estimated breakdown of quality proportions per site is provided in Table A.2, of Appendix A.

The summary provided on this table indicates that, for the sample of 30 quarries for which site-specific geological information is available, approximately 62% of the overall stone reserves were determined to be of 'high' quality. Of the remaining 67 quarries where the site-specific geological information is not available and more generalized information from available mapping was used, an estimate of about 37% of the overall stone reserves in these sites was calculated to be of 'high' quality. The remainder of the reserves in all quarries are considered to be of 'acceptable', 'low' or 'unknown' quality.

It should be noted that this total also includes volume and tonnage estimates for dimension stone quarries. It is important to note this in the context of available supply to the various markets, particularly the GTA where construction aggregates would be in greater demand than dimension stone.

The 30 quarries with additional quality information represent approximately 298 million m³/818 million tonnes, or 24% of the overall stone reserves evaluated. Of this total (298 million m³/818 million tonnes) approximately 62% or 184 million m³/505 million tonnes was estimated to be of 'high' quality (concrete and/or asphalt). The remainder of those reserves are considered to be of 'acceptable' (road base), 'low' or 'unknown' quality. Subject to a number of limitations with the remaining 67 quarries, for which site-specific geological information is not available, 352 million m³/968 million tonnes, or 37% of the overall stone reserves was estimated to be of 'high' quality. The remainder are considered to be of 'acceptable', 'low' or 'unknown' quality. As such, the total estimated amount of 'high' quality reserves is approximately 536 million m³/1.47 billion tonnes. It should be noted that of this total amount of 'high' quality reserves only a maximum of about two thirds, or 359 million m³/987 million tonnes, would be available for inclusion in concrete and asphalt grade products in the form of stone and manufactured sand. The remaining reserves would, through the process of generating concrete and asphalt grade stone, create a by-product such as granular road base.

It is important to consider the actual available volume and tonnage of material for higher end products, such as concrete/asphalt grade stone and manufactured sand, and the process that is involved to generate those products. While there is very little to no 'waste' generated in most sites that produce higher end products, such as concrete and asphalt grade stone, there is a high percentage of lower value/end use by-products that result. One of the by-products resulting from this process is a 'screening' product that has been used by many producers to generate a manufactured sand that can also be included in the production of concrete and asphalt, giving it a 'high' quality value with respect to this study. Between the actual production of concrete/asphalt grade stone and manufactured sand, a maximum two-thirds (67%) of a single tonne of 'high' quality stone can be considered for use in higher end applications. The remaining third (33%) will create a lower end by-product such as granular road base.

Considering the total resource base of 1.25 billion m³, or 3.44 billion tonnes that was calculated, it is important to understand that the majority of these reserves are not comprised of high quality stone. Only approximately 536 million m³, or 1.47 billion tonnes, of high quality reserves appears to be available to the Greater Toronto Area market (discussed further in Section 6), a maximum two thirds (approximately 359 million m³/987 million



tonnes) of which would be available for concrete and asphalt grade stone and manufactured sand due to the by-product generation resulting from those end products.

5.0 DETERMINATION OF AREAS OF RELATIVE ABUNDANCE AND SCARCITY

It is important to understand when reviewing remaining reserves in licenced properties that consideration should be given as to where the sites are located with respect to market demand. This is discussed further in Section 6, but is also important to note with respect to describing the reserves on a property, or grouped in an area, as being considered either abundant or scarce.

5.1 Background/Overview

In order to determine areas within the Study Area as having a relative abundance or scarcity of licenced reserves, individual licenced properties with 20 million m³/55 million tonnes or more of reserves were defined as having ‘abundant’ reserves. Those licenced properties with less than 5 million m³/14 million tonnes of reserves were defined as having ‘scarce’ reserves. Those with reserves between 14 million tonnes and 55 million tonnes are considered to have ‘moderate’ reserves remaining. The choice of 55 million tonnes and 14 million tonnes as the dividing lines was arbitrary, but is considered to be reasonable considering the wide range of licenced areas and annual tonnage limits for the sites examined. Further, it provides an indication of the number of quarries contributing to the relative levels of abundance and scarcity, and those which are approaching the point of scarcity (i.e., those identified as having moderate reserve estimates).

5.2 Results

The licenced reserves of the ‘abundant’, ‘moderate’ and ‘scarce’ quarries were each grouped according to the CPCA Area in which they were located, a summary of which is provided below. It should be noted that a confidential breakdown per upper tier municipality is provided in Table A.3 of Appendix A.

The following summarizes the relative ‘abundance’ and ‘scarcity’ of reserves for each of the market areas.

CPCA Area	Reserve Totals			Number of Sites	Total (million tonnes)
	Abundant (>55 million tonnes)	Moderate (14 to 55 million tonnes)	Scarce (<14 million tonnes)		
2	262.6	357.2	86.1	35	705.9
3	792.8	192.8	89.1	32	1,074.7
4	64.9	43.2	11.1	4	119.2
5	1,288.4	174.1	77.4	26	1,539.9
Total	2,408.7	767.3	263.7	97	3,439.7



As summarized above, there are an estimated 876 million m³/2.41 billion tonnes of reserves located in quarries within the study area that would be considered to have abundant reserves using the classification described above. In addition, there are approximately 279 million m³/767 million tonnes of reserves located within quarries that would be considered to be in a moderate reserve situation and an additional approximate 96 million m³/264 million tonnes of reserves located within quarries where the resource situation would be considered scarce. Interestingly this table would appear to suggest that each of the market areas benefit from an abundant reserve base. However, when this is examined in greater detail, by number of sites for instance, some further conclusions can be drawn and are summarized on the table provided below.

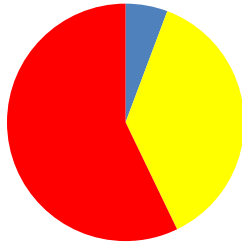
CPCA Area	Total # of Sites	Reserve Total		Abundant		Moderate		Scarce	
		Volume	Tonnage	# of Sites	Total Tonnage	# of Sites	Total Tonnage	# of Sites	Total Tonnage
2	35	256.7	705.9	2	262.6	13	357.2	20	86.1
3	32	390.9	1,074.7	5	792.8	6	192.8	21	89.1
4	4	43.4	119.2	1	64.9	2	43.2	1	11.1
5	26	559.9	1,539.9	7	1,288.4	6	174.1	13	77.4
Total	97	1,250.8	3,439.7	15	2,408.7	27	767.3	55	263.7

From this summary table it is clear that approximately 70% of the reserve base that is considered to be 'abundant' is found in only 15 quarries, or 15% of the total number of quarries evaluated. The remaining 82 quarries, or 85% of the number evaluated, have either scarce or moderate reserves. It should be noted that the abundance and scarcity of reserves is a relative matter. This classification is not meant to reflect annual production capabilities within the various sites assessed as part of the study. For instance, if a quarry is producing millions of tonnes of product per year and has reserves of 55 million tonnes (classified as the 'abundant' cut-off), it would be considered a relatively scarce situation since the remaining reserves would not last as long as if the annual production was less than a million tonnes per year. Similarly, if an operation currently operates at a smaller scale and produces less than a million tonnes per year, a resource that has been classified as scarce may, in fact, last many years.

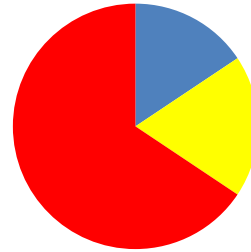
The relative abundance and scarcity of licenced reserves, within the context of the number of sites evaluated in each CPCA Area, has been summarized graphically in Figure 4 and provided below.



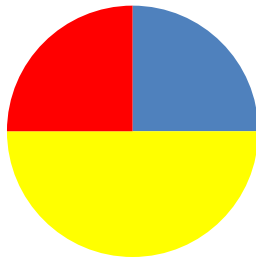
Area 2 - PENINSULA



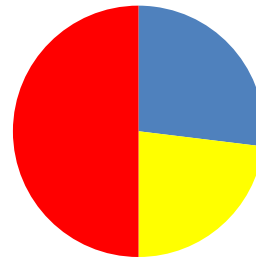
Area 3 – WEST CENTRAL



Area 4 - GTA



Area 5 – EAST CENTRAL



Number of Sites

Abundant
Moderate
Scarce

It is clear from reviewing Figure 4 and the charts above that each of the market areas are relying on sites with moderate to scarce reserve bases. For example, the chart for Area 2 indicates that the majority of the sites located in this area have reserves that are considered to be scarce (i.e., quarries with less than 5 million m³/ 14 million tonnes of reserves). Areas 3 and 5 also have more than 50% of the sites considered to have ‘scarce’ reserves, while the reserves in Area 4, which are reliant on only 4 licences, is nearly depleted in comparison to the other areas. It could be concluded that, without new licenced reserves being added, a large number of the quarries in each of these areas will reach depletion within the next couple of decades, depending on the annual rate of extraction at each of the sites.



5.3 Quality Context

It is important to note the context of quality with respect to abundance and scarcity of the overall reserves. As such, the reserves for each of the 30 sites that had additional information were broken down with respect to the categories described in Section 3.6 ('high', 'acceptable', 'low' and 'unknown') and as outlined in Section 4.2 above. The 30 sites that had more detailed quality information available for review accounted for approximately 24%, or 298 million m³ (818 million tonnes) of the total of 1.25 billion m³ (3.44 billion tonnes). Of this total (298 million m³/818 million tonnes), it is estimated that approximately 62% or 184 million m³ (505 million tonnes) are remaining of higher quality aggregate. It should be noted that the quality of the reserves in the remaining 67 quarries was estimated using ARIP mapping and professional judgement for the split between quality classifications. Of the total reserves remaining that had limited information to review (totalling 953 million m³/2.62 billion tonnes) approximately 352 million m³, or 968 million tonnes, was considered to be of high quality. In the context of relative abundance or scarcity, for the various categories of quality, a summary is provided below combining both the more detailed examination of reserve quality and that which is more general:

CPCA Area	Reserve Totals (million tonnes)											
	Abundant				Moderate				Scarce			
	H*	A	L	U	H	A	L	U	H	A	L	U
2	206.9	55.6	0.0	0.0	117.1	108.4	69.1	62.6	55.9	19.9	5.9	4.4
3	191.8	286.3	237.0	77.8	141.4	25.8	25.6	0.0	62.7	14.3	10.8	1.2
4	65.0	0.0	0.0	0.0	37.6	4.9	0.0	0.6	10.1	1.0	0.0	0.0
5	447.1	427.0	348.5	65.7	104.1	34.4	0.0	35.6	33.5	27.2	10.6	6.1
Total	910.9	768.9	585.5	143.4	400.2	173.5	94.7	98.8	162.2	62.4	27.3	11.8

*H – High Quality, A – Acceptable Quality, L – Low Quality, U – Unknown Quality

NOTE: Totals have been rounded and are therefore approximate

Of the 'abundant' reserves remaining, it is estimated that only about 331 million m³, or 911 million tonnes, of the total is considered to be of higher quality. Considering that the 'abundant' reserves are located within only 15 of the quarries evaluated, the ability to supply the demand of higher quality aggregate in various market areas will continue to become increasingly difficult. In addition, when annual tonnage limits and internal customer demand from these quarries are taken into consideration, annual available supply to the general market is further limited.

6.0 MAPPING OF RESERVES RELATIVE TO MARKET DEMAND AREAS

While a market demand analysis is not considered to be part of the scope of this paper (Paper 5), some general conclusions can be drawn with respect to the location of the identified reserves relative to the Greater Toronto Area, which consumes approximately one third of Ontario's total aggregate production. It should be noted that Paper 1 provides a more detailed examination of market demand with respect to aggregate supply.



6.1 Methodology

It is important to examine the question of the location of remaining reserves with respect to the GTA market. As such, the quarries that were categorized into having ‘abundant’, ‘moderate’ or ‘scarce’ resources, as outlined above in Section 5.2, were compared to the distance from the Vaughan Corporate City Center (VCCC), in order to examine the distribution of the reserves relative to the major consumer of aggregate in the province, the GTA. Travel distance rings of 25 km, 50 km, 75 km, 100 km, 125 km and 150 km were highlighted on Figure 3 relative to the VCCC. This provides seven categories of travel distances to the Toronto market; within 25 km, between 25 km and 50 km, between 50 km and 75 km, between 75 km and 100 km, between 100 km and 125 km, between 125 km and 150 km, and greater than 150 km. Once these travel distance rings were highlighted, the categorized quarries discussed in Section 5 as having ‘abundant’, ‘moderate’ or ‘scarce’ reserves were placed on the figure and their locations highlighted with respect to the travel distances from the VCCC. The results are provided in Section 6.2 below.

6.2 Results

As noted on Figure 3, there are no reserves located within 25km of the VCCC. Within the 25 km to 50 km ring around the VCCC there is an approximate reserve base of 108 million tonnes, of which approximately 103 million tonnes is considered to be higher quality and approximately 69 million tonnes of that total is available for concrete stone and manufactured sand, when assuming the two thirds breakdown discussed in Section 4.2. This is summarized for each of the rings as follows:

Distance Ring	Overall Reserves (million tonnes)	Total High Quality Reserves (million tonnes)	Available High Quality Reserves (million tonnes)
0 to 25 km	0	0	0
25 to 50 km	108	103	69
50 to 75 km	794	373	250
75 to 100 km	691	296	198
100 to 125 km	896	398	267
125 to 150 km	191	130	87
Greater than 150 km	695	175	117
Total	3,375	1,473	988

A total reserve base of approximately 328 million m³, or 902 million tonnes, is located within 75 km of the VCCC. However, of this total only approximately 173 million m³, or 476 million tonnes, are considered to be ‘high’ quality. Considering that a maximum production of about two-thirds of the total high quality reserves is achievable for production of concrete/asphalt grade stone and manufactured sand, this translates into approximately 116 million m³, or 317 million tonnes, available within a 75 km distance of the Vaughan Corporate City Center.



The reserve base that lies within the 50 km to 75 km ring is located to the west, southwest of the VCCC. Between 75 km and 100 km the majority of the reserve base is located to the north of the VCCC, with some of the reserves also located in the Niagara area to the southwest. The remaining reserves of those that were evaluated are located at greater distances than 100 km from the VCCC and are more sporadically located.

It is important to note that these distances are generally based on a straight line measurement from the VCCC. Travel distances along approved trucking routes would increase these travel distances, in some cases substantially. As such, it is important to view these 'rings' as straight line distance rings and not travel distance rings.

The location of each of the quarries and their individual classification with respect to their reserve base (i.e., abundant, moderate or scarce) is provided in Appendix A. This information is considered to be confidential, however in reviewing the proximity of the reserves in relation to the GTA (VCCC) it is clear that the majority of the reserves that supply the GTA demand are originating from scarce to moderate reserve bases. A detailed listing for each licenced property in their respective municipality is also provided in Appendix A (see Table A.3) along with a figure (see Figure A.2) showing the locations of each property with their licence number.

7.0 OPPORTUNITIES TO MAXIMIZE RESOURCE USE WITHIN EXISTING LICENCES

The purpose of this component of Paper 5 is to describe various opportunities that exist to maximize resource use within existing licences. Increased resource availability will extend the life of existing pit and quarry sites and contribute to meeting societal demand for aggregate materials.

The 1992 State of the Resource Study (Planning Initiatives, 1992) identified that some areas of Southern Ontario (Sarnia/Windsor/Chatham, Greater Toronto Area, Brantford/Hamilton/ Niagara) were moving towards a critical shortage of aggregate supply due to difficulty and the length of time to obtain new approvals. One response was revisions to the Aggregate Resources Act (ARA) licence application process: the Province issued Aggregate Resources of Ontario Provincial Standards (AROPS) under the ARA, in 1997. AROPS was intended to provide all stakeholders with greater certainty and streamline the approvals process.

Since the 1992 Study, for the key Greater Toronto Area (GTA) market, resource replacement has not kept up with resource depletion. Currently, the depletion to replacement ratio is in the order of 2.5:1. This reflects that a significant number of existing licences that serve the GTA are 'grandfathered' licences, and were issued under the Pits and Quarries Control Act in the 1970's. It is also apparent that new resource supply in the GTA has occurred primarily through expansions or extensions to existing approvals, as opposed to greenfield applications.

As close to market supplies continue to decline, there will be increasing pressure to maximize resource use within existing licenced operations. The quantities potentially available cannot replace or significantly delay the need for new licenced supply. Regardless, it is prudent to consider the potential for additional resource from existing licenced sites and how those reserves may be maximized in the future.



7.1 Various Methods

A range of possible methods for maximizing the amount of aggregate reserves in existing operations are described in the summary table in Section 7.5. In general, these methods include, or relate to:

- varying excavation setbacks to increase extraction area;
- increasing excavation depth;
- extraction of road allowances;
- importation of material for blending purposes; and
- varying standard rehabilitation requirements.

Pit and quarry sites licenced under the Aggregate Resources Act (ARA) are characterized primarily by the type of operation, pit or quarry (or both), whether they extract from above or below the water table, and their geographic extent or licenced area. In terms of how much aggregate is potentially made available at these sites, the key parameters are the extent (size) of the extraction area and the depth to which extraction can occur. These parameters are controlled by ARA standard operating requirements and individual Site Plans that regulate the operations of pits and quarries. In general, regulatory and policy provisions exist to permit variations to excavation setbacks and standard rehabilitation requirements, as considered appropriate by MNR at the local level in accordance with Aggregate Resources Program policies and procedures.

To maximize the amount of aggregate that is available from existing sites, the most readily available means are to increase the amount of extraction area and/or, increase the depth. However, there are several considerations which must be addressed when assessing an increase to the extraction envelope (area and depth); and there are limits to how much increase can be realized.

Resource maximization is also enhanced if on-site aggregate material is used for aggregate product, and not utilized in the rehabilitation of the site. A key provision of the ARA is that rehabilitation be carried out on a progressive, and ultimately final, basis. The operator is required to use material retained on-site to complete the rehabilitation obligations. Given the dimensions of the excavation area, significant quantities of material can be required for rehabilitation, beyond the material that is available from stripping of overburden. This can be reduced where material available from off-site sources can be imported for rehabilitation as permitted by the site plan; or, through varying the rehabilitation requirements that reduce the volume of material required.

7.2 Varying Excavation Setbacks

The AROPS requires each Site Plan to indicate how much area may be extracted (to a maximum) and to what depth (or elevation). In simple terms, the extraction area is the licenced area less areas not to be extracted, which would include excavation setbacks. These regulatory excavation setbacks (AROPS) are:

- 15 m from the boundary of a site;
- 30 m from the boundary of site that abuts a highway, land in use or zoned for residential purposes; and
- 30 m from a body of water, except for on-site extraction related ponds.



The definition of highway in the ARA includes an unopened road allowance.

MNR's Aggregate Resources Program Policies and Procedures (ARPPP) manual describes the intent of excavation setbacks as follows:

"Property owners adjacent to licenced sites are entitled to the buffers provided by the setback provisions of the operational standards. Their interests and concerns must be considered when dealing with variations in setback widths".

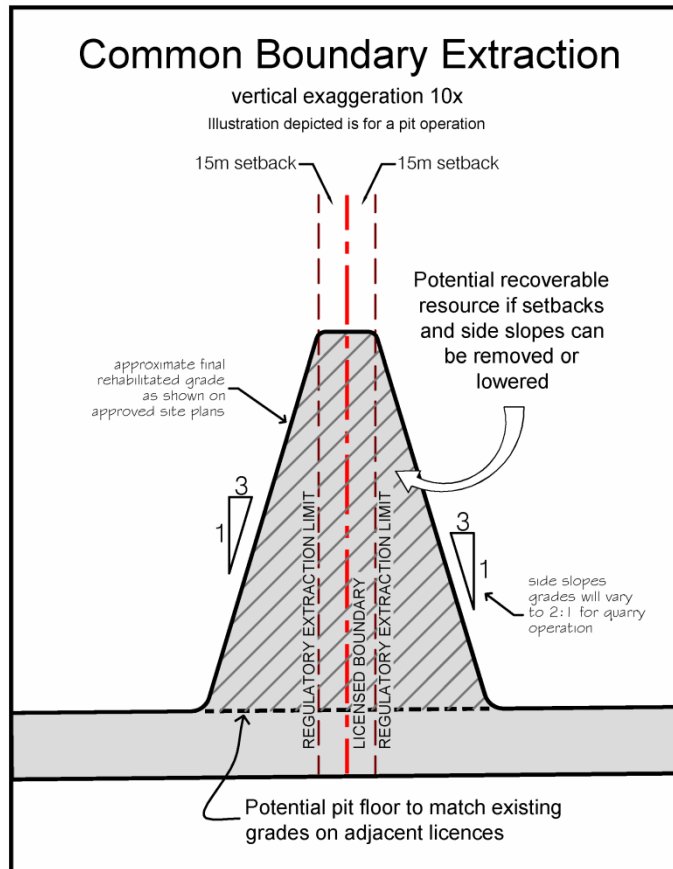
Given the nature of the pit or quarry land use, which involves the physical excavation of land, usually in below grade situations, the need to protect adjacent property from physical impacts of extraction such as erosion and, in general, slope failure is readily apparent. In addition, setbacks have been implemented in order to further protect the surrounding land uses from environmental and social impacts. Permission of the adjacent landowner is usually required if setbacks are to be reduced.

The AROPS prescribed setback locations and distances have been compared with setback provisions, known usually as ordinances, in the United States and other parts of Canada. The Ontario prescribed distances are in excess of those prescribed in British Columbia, which requires a minimum setback of 5 m from the property line of an aggregate operation (British Columbia, 2007); and, Alberta, where the recommended setback from the property line is 3 m in pits (Alberta, 2004). The Ontario prescribed distances are generally representative of those in the U.S., although given the very local level of regulation in the U.S., there is a wide variation in setback (ordinance) distances. There is further commonality between Ontario and U.S. jurisdictions in that setback distances can be varied (i.e., reduced or eliminated) under certain conditions.

Excavation setbacks also result from site specific studies that are completed as part of the licence application process. Commonly, the recommendations of reports in natural environment, ground or surface water, noise, blasting (quarries only), and archaeology may require excavation setbacks to be put in place to protect the subject environmental or social features from unacceptable impacts or to ensure impacts on adjacent land uses (noise, vibration) are within specified limits.

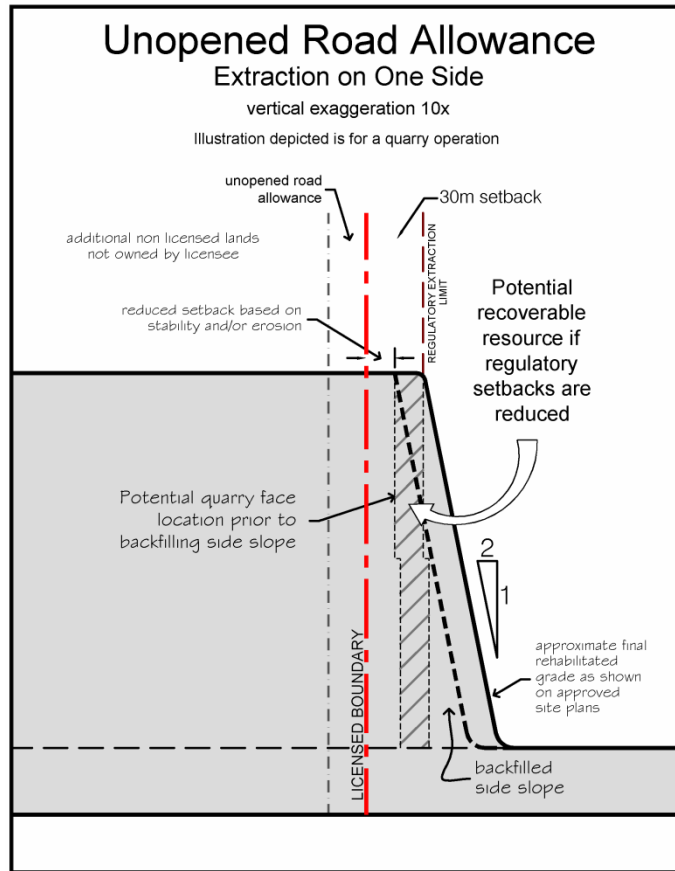
Variations to these types of setbacks could be applied for with the support of monitoring data or impact evaluation, carried out by professionals. Should the data indicate the actual effects from extraction on the feature are less than what was anticipated at the time the setback was determined, it would give cause to re-evaluate the setback distance and reduce it to something more appropriate.

MNR policies do allow for the variation in excavation setbacks under appropriate circumstances. The most common type of variation is to eliminate the setback between two licenced operations. These are known as common boundary agreements. However, reaching this type of agreement does require the agreement of both operations, including an agreement to mine the deposit to a common elevation in the area of the former setback. This is depicted below.



It should be noted that the graphics provided are for illustrative purposes only and are not to scale.

Another common setback variation is alongside an unopened road allowance. Provided there is no intent on behalf of the municipality to construct a road, the road allowance limits are treated more as a private property boundary, and the setback can be reduced from 30 m to 15 m or less with the consent of the road authority. This is depicted on the following illustration.



7.3 Increasing Excavation Depth

Under AROPS, the depth of extraction at a licenced site is specified by the Site Plan through an indication of specific final elevations for extraction and rehabilitation. These elevations will be a reflection of the extent of the deposit and whether the site is to be operated above or below the water table.

Aggregate resources in pit sites can be quite variable. It is usually the presence of non-viable materials such as thick sequences of till, clay or silt that will limit the depth of extraction at a pit site. For limestone/dolostone quarries, the depth of extraction is limited by the presence of rock formations that are less suitable for aggregate purposes. The appearance and characteristics of these formations are well documented in the scientific literature. Accordingly, opportunities to deepen existing sites may be limited by these geological factors; and, most operators would ensure that no viable resource that is available for extraction by their Site Plan is left unextracted.

The above discussion may be considered as generalizations that would apply to most sites. However, there will be some sites where the resource does exist below the Site Plan prescribed floor elevation, or where the water table is lower; and that is where the potential exists to increase the depth to gain additional reserves. Specific MNR policies and procedures that would provide for certainty and consistency in Site Plan amendments to



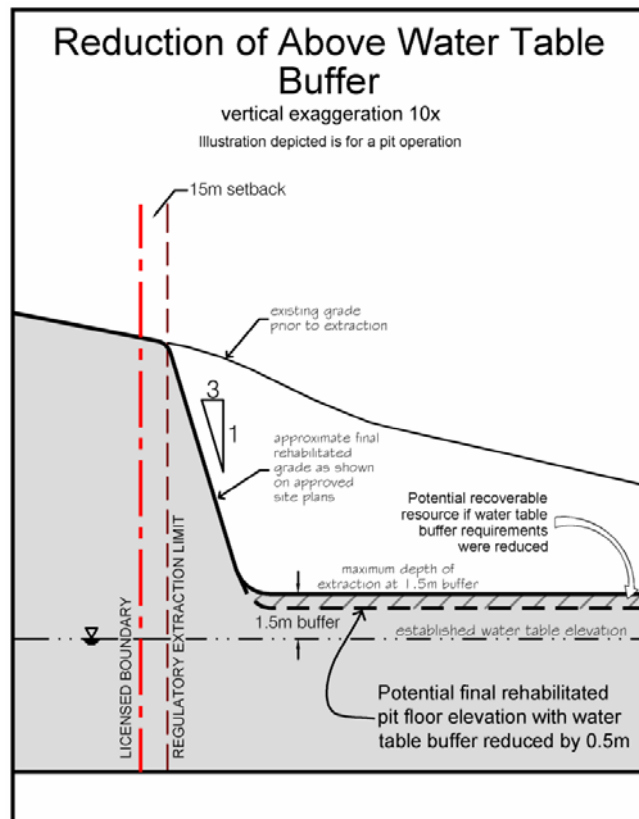
increase the depth of extraction in these circumstances would facilitate a more complete use of licenced reserves.

A significant feature of AROPS is that it includes a buffer or separation distance for sites that are above water table. The AROPS requirement is that an above water table pit must remain at least 1.5 m from the established groundwater table, and an above water table quarry must remain 2 m above. The potential exists, therefore, to increase reserves for sites above the water table by reducing the amount (vertical thickness) of buffer to which the operation must adhere. It is recognized that a hydrogeological assessment may be required as part of this process.

These buffer distances were developed as part of the AROPS standardized approach to regulating extraction operations. The premise behind the buffer is to recognize that the water table does fluctuate over time, and to facilitate rehabilitation. For example, water tables are typically higher in the spring time due to snow melt and precipitation (commonly referred to as the seasonally high water table). Conversely, the water table may be lowest in the summer, particularly if precipitation has been minimal for that year or for previous summers. In the case of limestone/dolostone quarries, geotechnical factors such as quarry floor buckling (pop-ups) are also a consideration.

Other jurisdictions were checked for similar buffer provisions. Distances of between 1.5 m and 3 m were found for Australia and the United States, indicating the Ontario setbacks are not atypical.

An illustration of the reduction of the above water table buffer is provided below.





A revision of AROPS could allow for a decrease in the buffer requirement. An approval to reduce the buffer could be granted on the basis of:

- reliable monitoring data to indicate the water table is stable;
- assessment for potential additional incremental effects on other water or natural heritage resources or water supply wells;
- geotechnical/rock stability issues in the case of quarries; and
- availability of sufficient overburden and topsoil to allow removal of the resource materials from the pit/quarry floor.

It should be noted that the question of the ability of the remaining material to act as a filter for contamination is a common question that is asked in relation to above water table pits and quarries.

7.4 Extraction of Road Allowances

More significant volumes of material can be made available for extraction where municipal road allowances on one side of a licenced operation or between licenced operations are excavated. The material in the road allowance and the adjacent excavation setback(s) would then become available. Additional benefits include reduced rehabilitation requirements, and for a road allowance between two licenced areas, a gentler, more natural looking rehabilitated landscape.

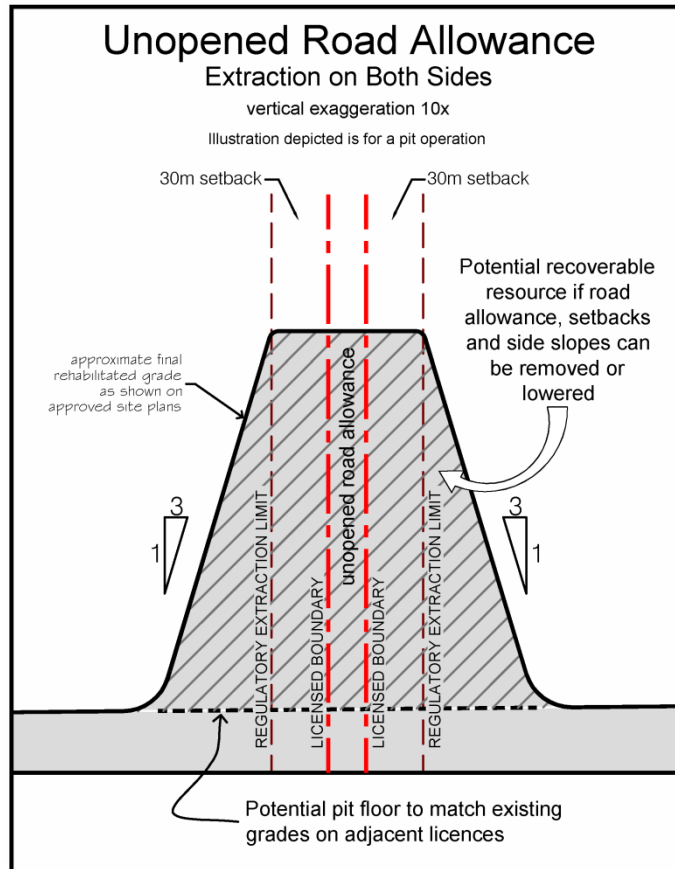
Extraction of road allowances in Ontario must have approval of the public agencies having jurisdiction, and generally requires an ARA licence, but has occurred, on occasion, without the requirement of a licence in order to improve the road. In some cases, travelled roads are temporarily closed by the municipality and lowered, thereby allowing for the reduction and lowering of the abutting excavation setback. This type of practice can provide, or be associated with improved road usage and safety, if for example a road is particularly steep.

In other cases, the road allowances involved are unopened and not publicly travelled. In another variation, where adjacent lands are already licenced and the municipality retains ownership of the road allowance, then extraction is permitted without a licence.

Road allowance extraction would realize benefits to the municipality as the material within the road allowance belongs to it. In cases where this type of extraction has occurred, the aggregate operator makes arrangements with the municipality concerning the quantity of resource and its extraction and disposition. It is common that the operator may make available an equivalent amount of material to the municipality for their use. In some cases, there may be outright payment for the excavated volume of material, with additional considerations to address extraction, processing, stockpiling and haulage.

Where road allowances are officially closed under the Municipal Act, they are no longer considered road allowances. These former road allowances can be sold to the adjacent landowner, being the aggregate operator/licensee. For extraction to occur, licences are required.

Again, an illustration of this example is provided below.



7.5 Imported Material For Blending Purposes

An opportunity exists to increase reserves from some pit or quarry sites by carrying out blending. This is the mixing of different types of somewhat deficient aggregate material, either naturally occurring or resulting from a processing operation, to produce a more viable product, and increase marketability for the operator.

Pit sites would generally be the focus of this approach, due to the inherent variability that exists in some types of surficial deposit areas, based on local geological variations. Limestone/dolostone quarry sites are generally more homogeneous with more uniform physical characteristics.

Surficial geological material would exhibit changes in bedding, particle size/shape/soundness and constituent minerals. For example, a large surficial deposit may be comprised of stone rich aggregate in one area and fine sand aggregate in another. These factors play an important role in determining the aggregate potential of a deposit. For the pit operator, they have ramifications to efficient extraction, processing requirements, and the ultimate end-use of the material.

Crushed stone quarries could also be relevant to the blending process (i.e., multiple bench quarries extracting more than one geological formation with varying quality), but for this Paper, the more specific process to produce manufactured sand was reviewed.



The Ontario Provincial Standard Specification (OPSS) defines “manufactured sand” as sand produced by the crushing and further processing (i.e., washing, grading, classifying, of quarried rock, boulders, cobbles, or gravel) from which the natural fine aggregate has been removed.

Manufactured sand is produced using fine materials left-over from a crushed stone aggregates processing operation, which is often considered part of the waste stream. Manufactured sand, produced in a dedicated, quality-controlled processing stream, has historically been used as fine aggregate in asphalt and concrete manufacturing and the creation of mortar sand. Accordingly, the use of manufactured sand would reduce reliance and need for natural sands for these uses, thereby extending the life of natural sand deposits and using a product in the quarries that would otherwise be treated as a by-product and in most cases left on site.

However, in order to improve the handling and usability of manufactured sand from quarries, it is often mixed, or blended, with natural sand aggregates from pits.

Dedicated government policy concerning the transfer of materials between pit/quarry sites for blending purposes will facilitate the practice. This will allow for more complete utilization of resource material at extraction sites. Coupled with this would be an initiative to research the regional opportunities for blending in established surficial deposit areas. This in turn could lead to the development of dedicated blended aggregate specifications for certain applications.

7.6 Varying Standard Rehabilitation Requirements

A discussion on reduced slope requirements for rehabilitation and the potential for importation of off-site material is provided in the following sections.

7.6.1 Reduced Slope Requirements

Rehabilitation of pit/quarry faces is usually carried out by ensuring the final pit or quarry face is sloped to the required gradient, and covered with soil such that a permanent vegetation cover (trees or grass) can be established. AROPS Site Plan standards require an indication as to how the slope is to be constructed. Floor rehabilitation is also required, except where below water.

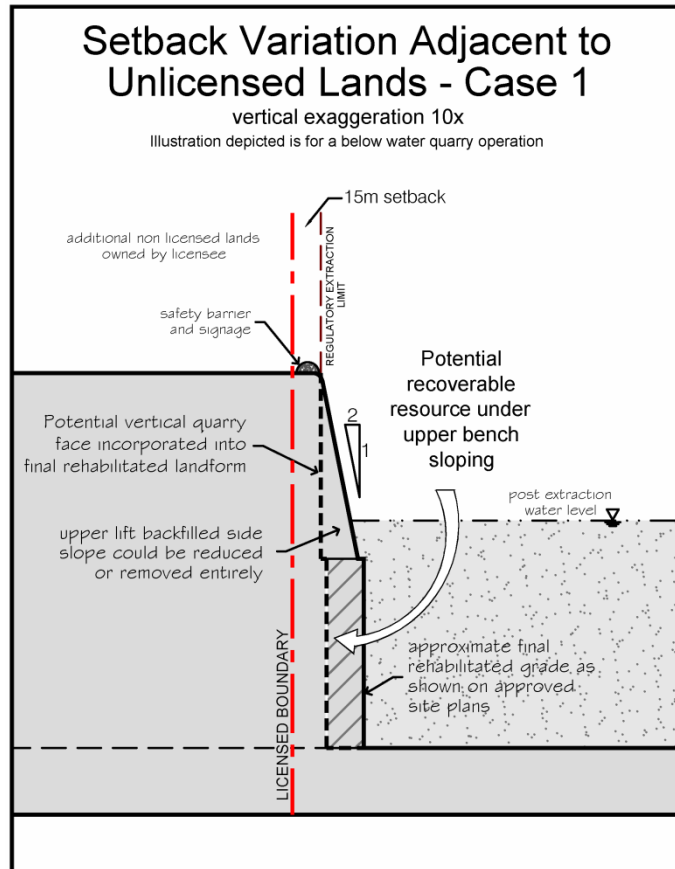
For pits, faces are to be sloped to a minimum gradient of 3 to 1 (horizontal to vertical). For quarries, the slope requirement is 2 to 1. MNR policy permits on an individual site by site basis, that sloping requirements can be varied such that complete sloping is not required. It should be noted that for quarry faces below the water table, it is established practice to allow vertical faces provided public safety issues are taken into consideration in the design.



Slopes can be varied when benefits are recognized to having a more diverse post-extractive landscape, and where that is not necessarily achieved by strict adherence to the AROPS requirements.

The benefit to the operation from a reserves point of view is that less material is required to be retained for sloping purposes, and aggregate availability is correspondingly increased.

Vertical bedrock faces are a common feature of the environment in escarpment terrains. Allowing quarry slope rehabilitation to include full or partial sheer walls would result in more bedrock being available for extraction, and this technique has been implemented at several quarry sites including within the Niagara Escarpment Plan Area to complement natural escarpment faces. An example of this is depicted below.



7.6.2 Importation of Fill for Rehabilitation

MNR’s general practice is that rehabilitation be accomplished through the use of on-site material. Importation of fill material is permitted in some operations; for example, where it can be proven that on-site material is insufficient to complete the rehabilitation, as approved by the Site Plan. MNR policy requires that material imported from off-site for rehabilitation purposes (complete or partial backfill) shall be “clean and inert” according to Environmental Protection Act (EPA) criteria, or that the material not be classified as a “waste”. It should be noted that achieving the criteria for “inert fill” is particularly challenging as native soils around the Province typically exceed various parameters listed on the MOE Table 1 Acceptance Guidelines, by which inert fill is regulated. Consideration should be given to the acceptance of Table 2 material in order to increase the potential for finding suitable volumes of material for rehabilitation.

In accordance with the on-site material practice, MNR’s default position is that sloping be accomplished by retaining material adjacent to (i.e., prior to extraction reaching) the regulatory excavation setback. This is known as the “cut and fill” method. The width of material to be retained would vary based on the height of the face that is to be sloped, and on the slope gradient. Such a practice results in the use of otherwise extractable aggregate and results in a loss of that material to the production stream. Depending on the individual geometry of a pit or quarry excavation that requires sloping, the amount of material lost from production can be quite significant.



MNR has recognized the fact that using aggregate material for rehabilitation is not the best use of the material. As a result, policies are in place that allow for sloping to occur by other means. If there is sufficient material elsewhere on the site, of inferior quality or not suitable for aggregate, then it can be used as complete or partial backfill for the slope that is to be created. This eliminates the need to retain aggregate material for sloping purposes, and the higher cost of rehabilitation (trucking and handling) is off-set by the additional product that is gained. However, this policy is still predicated on the use of on-site material.

Reliance on on-site material helps to ensure that material exists to complete the rehabilitation and that it occurs in a timely manner. However, it does commonly necessitate the use of aggregate reserve materials for rehabilitation purposes.

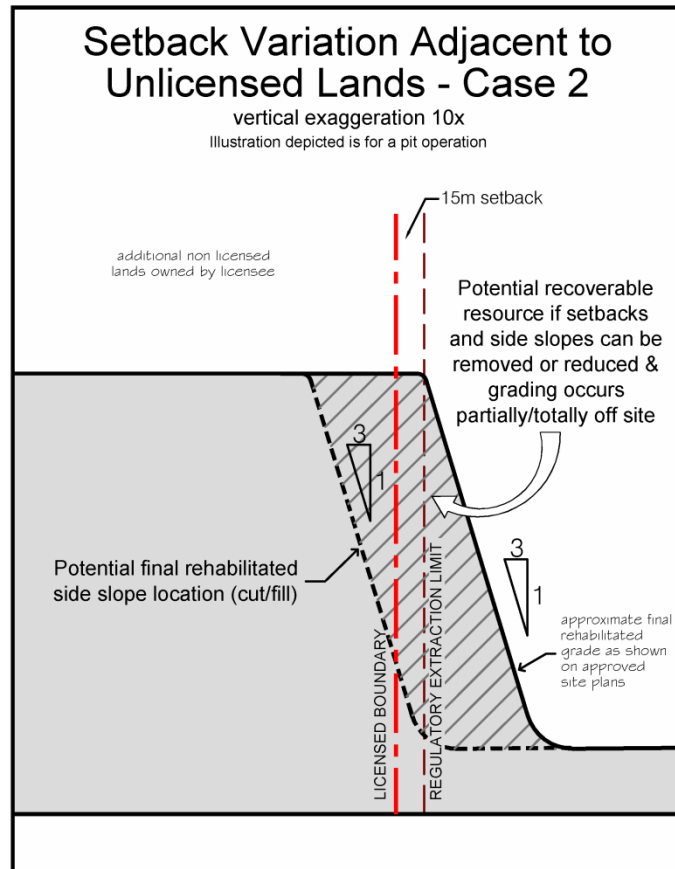
Considerable aggregate material could be added to the production stream if more off-site, clean and inert fill material was allowed for use in rehabilitation. In addition, having locations where backfill material can be taken would be of benefit to the construction industry, which must dispose of inert fill generated by a variety of construction projects.

A cautionary note is that the current “brownfield” legislative framework may discourage an operator from accepting clean inert fill into an ARA licence. This should be researched further as part of any comprehensive solution.

7.6.3 Use of Setback Areas or Adjacent Lands for Sideslope Rehabilitation

If rehabilitation of extraction faces can be accomplished using material within the setback or even adjacent lands, then additional material becomes available for extraction. The volume of material available would vary based on the length and depth of the subject face, and whether material is available from other sources (on-site or off-site) to supplement material at the pit or quarry face.

A variation to this theme that would permit total extraction of the setback in cases where the unlicensed land/material adjacent to the extraction site could be used to supply material for sloping purposes. This is illustrated below.



This type of arrangement would be possible only in certain situations, most likely where the licensee owns the adjacent lands. Given that the unlicensed material is being excavated for sloping purposes, MNR would have to take the position that the primary purpose is not the production of aggregate, and, as a result, the licencing provisions do not apply. However, municipal zoning by-laws would need to be addressed. Given the subject lands necessary for sloping would not be licenced, they would not be under an extractive zoning. Use of the lands for sloping would be considered as site grading which normally falls within the definition of development, and is something that could require a zoning change.

7.7 Quantification of Additional Resource Availability

A range of possible methods to maximize the amount of aggregate reserves in existing operations have been discussed in the previous sections and are summarized in the following table.

In the 'Comments' section of the table, each technique is identified as a potential opportunity (+), constraint (-) or neutral which does not have a symbol attached to it.



Option	Description	Comments
1	<i>Extraction (lowering) of municipal untravelled/unimproved road allowances</i>	<ul style="list-style-type: none"> ■ where no potential exists for a road to be constructed or where municipality can use material (+) ■ licenced area on both sides or abutting one side of road allowance (+) ■ contractual/financial arrangements between licensee and municipality may be necessary to address compensation for material to be extracted (-)
2	<i>Total or partial extraction of regulatory excavation setbacks</i>	<ul style="list-style-type: none"> ■ setbacks may be adjacent to road allowances, owned or non-owned private land, watercourses, other environmental feature, where degree (width) of setback may be in excess of what is required to protect the feature ■ there may be opportunities to relocate the feature so that setback is not required (+) ■ ARA Section 66 to address conflict with municipal side-yard provisions in Zoning By-law (+)
3	<i>Reduction in widths of regulatory excavation setbacks</i>	<ul style="list-style-type: none"> ■ in bedrock versus sand/gravel on basis of stability or erosion characteristics of material ■ different setback widths based on type of adjacent land use ■ may conflict with municipal side-yards provisions in Zoning By-law and necessitate an amendment (-)
4	<i>Use of non-licenced land adjacent to licenced boundary for purposes of providing material for sloping which would occur either on-site or partially/totally off-site</i>	<ul style="list-style-type: none"> ■ agreement required with adjacent landowner (-) ■ sloping would occur either on-site or partially/totally off-site (+) ■ material for rehabilitation only, not production (-) ■ compensation may be required between licensee and landowner (-) ■ issues of compliance with municipal zoning by-laws could result (-)
5	<i>Greater flexibility in importation of material for rehabilitation purposes or production purposes</i>	<ul style="list-style-type: none"> ■ could 'free-up' a substitute for aggregate material retained on-site for rehabilitation ■ could supplement on-site material for production purposes if blended with on-site poor material (+) ■ clean and inert fill requirements (MOE) (-) ■ MOE and municipal criteria ■ testing at source of fill ■ would be of benefit to construction industry (+)
6	<i>Steeper rehabilitated slope gradients (i.e. 2:1 and 3:1) and/or greater use of total/partial vertical faces during quarry rehabilitation</i>	<ul style="list-style-type: none"> ■ requires less on-site material for rehabilitation (+) ■ can result in reduced loss of otherwise extractable reserves under upper bench sloping (+)



Option	Description	Comments
7	<i>Decrease above water table buffer requirements (1.5 m or 2.0 m)</i>	<ul style="list-style-type: none"> ■ possibility of reduction in areas where water table elevation variability is not high or high water table situations (above floor) are only short-term (+) ■ may require a higher level of monitoring, etc (-) ■ small increase in extractive depth over large floor area could result in significantly increased reserve availability (+) ■ requires revision of AROPS (-)
8	<i>Increased use of requirement for detailed sub-surface geological data technology in pit/quarry design, operation (improved beneficiation e.g., wash plant processes)</i>	<ul style="list-style-type: none"> ■ allows for optimal blending qualities, size distributions, particle strengths and other qualitative and quantitative measures that otherwise lead to wastage (+) ■ identifies areas where suitable materials (poor quality) exist on-site for backfilling needs, thereby eliminating the need to keep higher quality aggregate for sloping purposes (+) <p>NOTE: may only be applicable to specialized operations such as metallurgical stone, lime, cement and, silica sand (-)</p>
9	<i>Extraction (lowering) of traveled road allowances</i>	<ul style="list-style-type: none"> ■ may require detouring for existing traffic (-) ■ may require entirely new traffic route (-) ■ contractual/financial arrangements between licensee and municipality may be necessary to address compensation for material to be extracted (-) ■ formal municipal approvals (under Municipal Act, Planning Act) may be required (-) ■ may require licence application under ARA (-) ■ effective method to deal with unsafe or poor road geometry (+)

To provide some indication of the type of increase that could be achieved with the implementation of these techniques, the following table includes an assessment of tonnage and percent gain for a hypothetical extraction site, with a licenced area of 40 hectares and an extraction depth of 20 metres. Both a pit site and a quarry site are considered.



Based on a representative 40 ha site (861 m x 470 m) and an extraction depth of 20 m, the following additional reserves of sand/gravel (s/g) and bedrock could be realized.

Method	Potential Gain				Comments
	Thousand Tonnes		Percent Gain		
	Bed.	S&G	Bed.	S&G	
1. Reduce all setbacks by 5 m	633	390	4%	4%	Potential gain would increase corresponding to reduction of setback.
2. Reduce road allowance setback by 15 m	18	11	0.1%	0.1%	With permission of road authority. Setback could be reduced to nil if road is not "open".
3. Remove setbacks and road allowance between licenced areas	2,592	1,808	16%	19%	Includes gains from extraction areas on both side of the road allowance, by: elimination of rehabilitation requirement; extraction of material in (former) setbacks; extraction of material in road allowance.
4. Reduce floor to water table buffer by 0.5 metres	414	244	2.5%	2.5%	Where monitoring data and assessment indicate a stable water table.
5. Increased depth with/without extraction below water table	4,145	2,442	25%	25%	Assumes a 5 m increase in depth. Will only be applicable at those sites where resource deposit extends below approve depth of extraction.
6. Complete side-slope rehabilitation without use of on-site material	2,598	2,440	14%	25%	For example, use of imported fill, allowance for vertical faces and/or creation and extension of slopes in adjacent land.

7.8 Summary

The most productive/expedient techniques to maximize the amount of aggregate reserves at typical existing licenced operations are:

- to vary (reduce/eliminate) excavation setbacks;
- extract to a greater depth;



- to rehabilitate the site through the use of imported material, which will substitute, in part or in full, the material that would have to be retained on-site to undertake rehabilitation; and
- extraction of road allowances between licenced sites.

These techniques are considered good candidates for enhanced implementation at existing pit/quarry sites taking into account issues raised and the potential significance of additional aggregate availability.

Benefits would extend beyond the immediate increase in aggregates availability, and would include improved/accelerated rehabilitation, municipal revenue (in material or monetary compensation) and locations for placement of excess fill.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations for Paper 5 of the SAROS project, which was carried out to evaluate existing reserves on currently licenced properties in Areas 2, 3, 4 and portions of 5, are provided below.

8.1 Conclusions

A detailed examination of the remaining reserves in limestone and dolostone quarries located in CPCA Areas 2, 3, 4 and a portion of 5 was carried out under Paper 5 of the SAROS project. Conclusions of the study have been provided below:

- 1) A total of 97 licenced sites with areas greater than 20 ha were evaluated. Individual quarries of less than 20 ha were not evaluated.
- 2) Determining quality of remaining resources is particularly challenging without site specific information. Generalizations with respect to expected quality of reserves had to be made. Based on this experience, it would be even more difficult to carry out a similar assessment of sand and gravel reserves due to the variability of sand and gravel deposits, even with a high level of field verification, particularly for a licenced property in which a large proportion remains unextracted.
- 3) The 97 quarries evaluated comprise approximately 9,000 hectares of licenced reserves, however only approximately 7,200 hectares is permitted for extraction. This represents, on average, approximately 80% of the licenced reserves.
- 4) A reserve estimate totalling approximately 1.25 billion m³, or 3.44 billion tonnes of stone, was calculated for the 97 properties, indicating an average of approximately 0.5 million tonnes per extractable hectare.
- 5) Of the total reserve estimate of 1.25 billion m³, or 3.44 billion tonnes, only about 536 million m³, or 1.47 billion tonnes, or about 43%, is considered to be of high quality, suitable for use in concrete or asphalt. The remaining reserves are of lower or unknown quality. Of this, a maximum of approximately 359 million m³, or 987 million tonnes would be directly available for concrete/asphalt grade stone and manufactured sand.



- 6) There are an estimated 876 million m³/2.41 billion tonnes of reserves located in quarries within the study area that would be considered to have 'abundant' reserves. In addition there is approximately 279 million m³/767 million tonnes of reserves located within quarries that would be considered to be in a moderate reserve situation and an additional approximate 96 million m³/264 million tonnes of reserves located within quarries where the resource situation would be considered scarce. Approximately 70% of the reserve base that is considered to be 'abundant' is found in only 15 quarries, or 15% of the total number of quarries evaluated. The remaining 82 quarries, or 85% of those evaluated, have either a 'scarce' or 'moderate' reserve base.
- 7) Approximately 68% of the calculated reserves are located at straightline distances of greater than 75 km from the Vaughan Corporate City Center (VCCC), which represents a high growth area of the GTA. If travel distances were considered, based on available haul routes from the individual sources, the total reserve base located greater than 75 km from the VCCC would be greatly increased. A total reserve base of approximately 328 million m³, or 902 million tonnes, is located within 75 km of the VCCC. However, of this total only approximately 173 million m³, or 476 million tonnes, are considered to be 'high' quality. Considering that a maximum production of about two-thirds of the total high quality reserves is achievable for production of concrete/asphalt grade stone and manufactured sand, this translates into approximately 116 million m³, or 317 million tonnes, available within a 75 km distance of the VCCC.
- 8) The most productive/expedient techniques to maximize the amount of aggregate reserves in existing operations are: to reduce/eliminate the width of excavation setbacks, allow for deeper excavation, remove road allowances where available and to rehabilitate the site through the use of imported material, which will substitute in part or in full, the material that would have to be retained on-site to undertake rehabilitation.

While the total reserve base of 1.25 billion m³, or 3.44 billion tonnes, appears to be a large number, it is important to understand that:

- only about 43% of this total is considered to be of high quality;
- the majority of these reserves are being located at greater distances from the markets that are demanding them, as the 'close to market' sources continue to become depleted;
- the reserves that are considered to be 'abundant' are located within relatively few operations (only 15 of the 97 sites), the majority (11 of the 15 sites) of which are located at greater distances from the largest market demand area, the GTA; and
- the supply to the GTA market area is coming from sites that are considered to have scarce to moderate reserve bases, which are being exhausted at a greater rate than they are being replenished through the granting of new licences by the Province.

The result of this will be an increasing supply of aggregate coming from sources at greater distances, as those which are currently located close to the market are being exhausted.



8.2 Recommendations

The following recommendations are made based on the findings of the Paper 5 study on the remaining reserves in existing licences within CPCA Areas 2, 3, 4 and portions of 5.

- 1) An extension of the study of existing reserves to include all quarries in CPCA Market Areas 1 to 6 in order to provide a more comprehensive understanding of the reserve situation in Ontario relative to the other market demand areas.
- 2) Considering the contribution of sand and gravel resources to the overall supply of aggregate in Ontario, a comprehensive study of the licenced reserves of sand and gravel pits within the GGH (CPCA Areas 2, 3, 4 and the southern portion of 5) is recommended in the short-term, despite the difficulties identified, in order to provide a complete understanding of aggregate supply in southern Ontario. If it is decided to proceed with a project to determine reserves in sand and gravel pits in an efficient and cost-effective manner, the following suggestions are made:
 - a) a licence area of not less than 40 hectares be the minimum area for evaluation; and
 - b) Category 3 (Class “A” pit above water) operations only be considered for evaluation, unless resources inventory or other geoscience-based documents are available for Category 1(Class “A” pit below water) operations.

In the longer term, a study of licenced reserves of sand and gravel within CPCA Areas 1 and 6 would also be an important contribution.

- 3) A more formal recognition of identified aggregate resource deposits, similar to KRAs or MRZs in Australia and California, should be considered, particularly for sources of aggregate that are considered to be of provincial significance.
- 4) The Province of Ontario should consider the following:
 - a) formal recognition of identified ‘high priority’ aggregate resource areas of known quantity and quality (based on sound geoscientific investigation); and
 - b) formal acceptance of these high priority aggregate resource areas where licence applications would be encouraged (or at least not unduly hindered), with the recognition that such high priority areas be as close to market areas as possible.
- 5) In order to improve any future evaluation of licenced reserves, the following changes to Site Plan requirements would be beneficial:
 - a) that all Licence boundaries, setback limits and other significant features be accurately delineated by recognized survey methods and coordinates (e.g., UTM);
 - b) that all rock strata being extracted be clearly identified, including below the quarry floor where possible, for example on cross-sections;
 - c) that all spot elevations and contour lines be tied to a recognized geodetic datum; and



- d) that unambiguous elevations of the quarry floor (i.e., maximum depth of extraction), prior to rehabilitation, be identified.
- 6) In order to maintain and enhance the licenced reserve estimates, as provided in this report, the following are suggested:
- a) that all calculations be updated annually on the basis of production tonnages provided to TOARC; and
 - b) that CPCA Areas 1 and 6 be included in any subsequent study of limestone and dolostone reserves.
- 7) That portions of CPCA Areas 7 and 8, and in particular, Manitoulin Island and areas in the vicinities of North Bay, Sudbury and Thunder Bay, be included in any subsequent study of limestone and dolostone reserves.

9.0 LIMITATIONS

This report was prepared for the exclusive use of the Ontario Ministry of Natural Resources for the purpose of identifying remaining reserves in selected quarries in certain market areas in the Province of Ontario. The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and geosciences professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

In preparing the report, Golder and MHBC have assumed that the information provided by other parties was factual and accurate. To the extent that Golder and MHBC relied on the information provided by others, Golder and MHBC disclaim any responsibility for errors resulting there from. Golder and MHBC also accept no responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of omissions, misinterpretations.

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Report Signature Page

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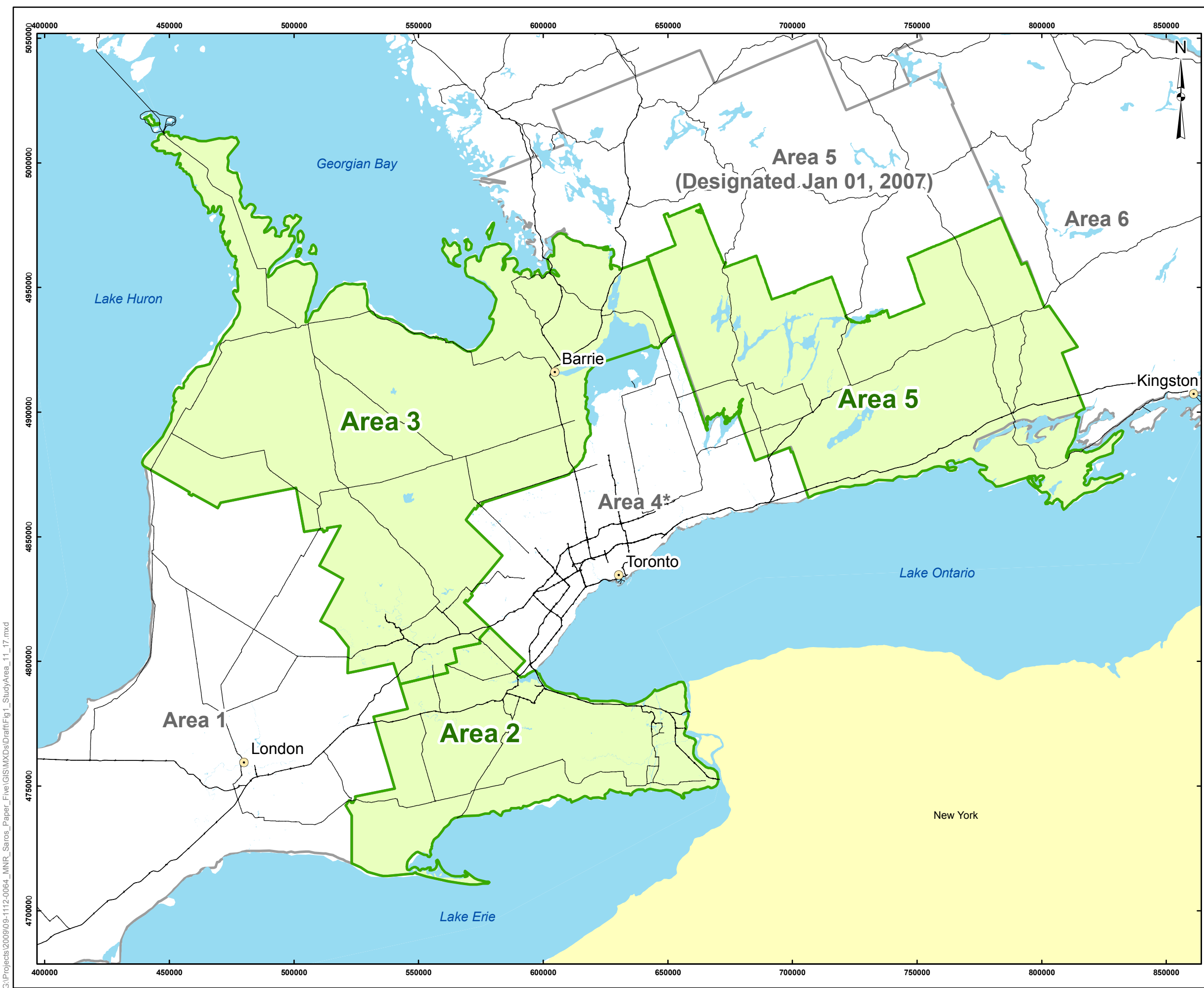
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WC/DH/lo/wlm



FIGURES



LEGEND

- Highway
- ▭ Study Area Boundary
- ▭ Study Area
- ▭ C.P.C.A. Boundary
- ▭ Waterbody

NOTE

* Reserves Of Quarries Located In Area 4 Were Included In Calculations At The Request Of The MNR

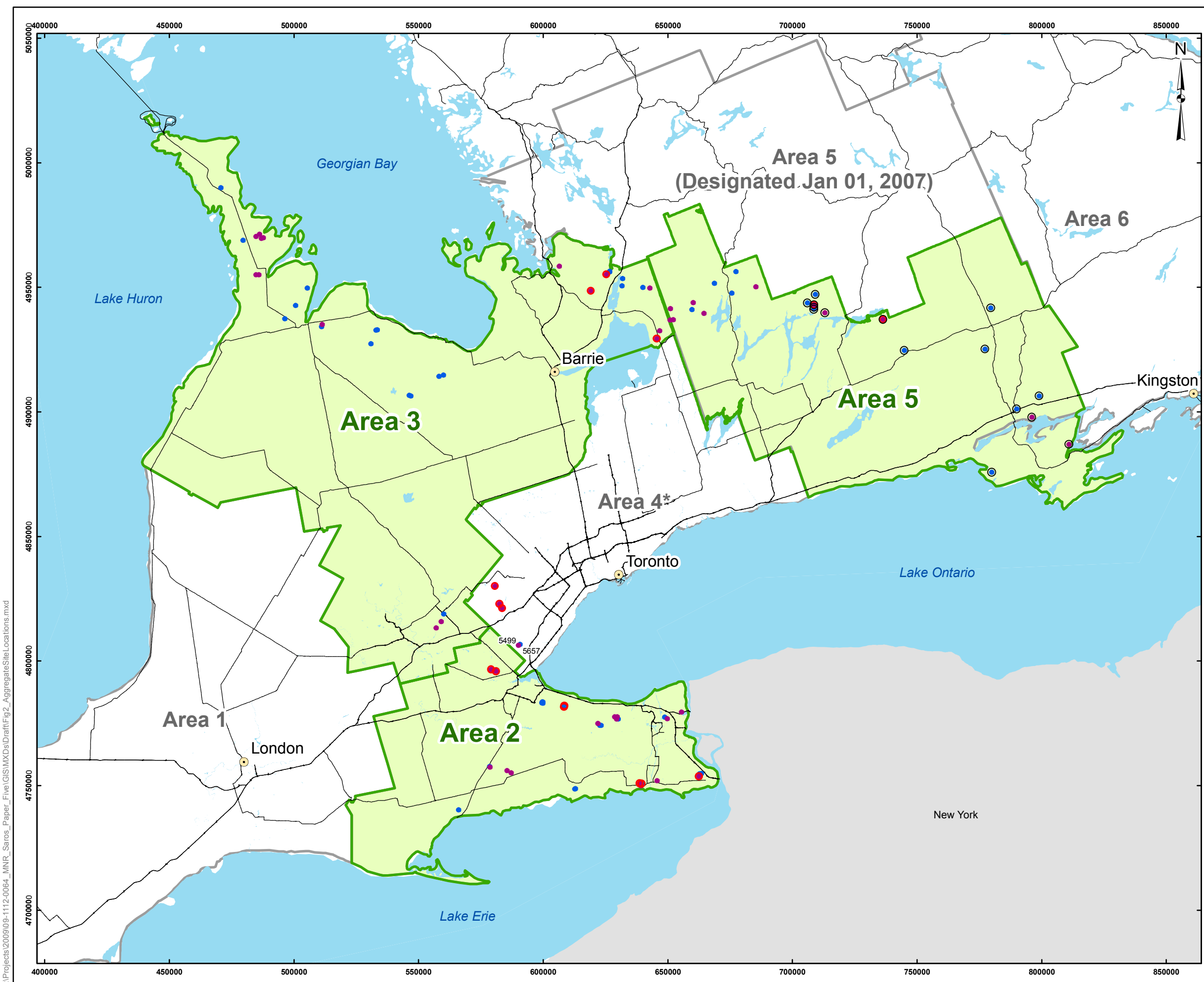
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PROJECT	STATE OF THE AGGREGATE RESOURCE IN ONTARIO STUDY (SAROS) - PAPER FIVE		
TITLE	STUDY AREA		
 Golder Associates Mississauga, Ontario	PROJECT NO. 09-1112-0064	SCALE AS SHOWN	REV. 0.0
	DESIGN PP 30 Oct. 2009		
	GIS PP 01 Nov. 2009		
	CHECK JMC 01 Nov. 2009		
REVIEW WC 01 Nov. 2009			FIGURE: 1

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LEGEND

- DTM Test Site
- Site Verification Visit
- Aggregate Property Size
- 20 - 60 ha
- > 60 ha
- Highway
- ▭ Study Area Boundary
- ▭ Waterbody
- ▭ C.P.C.A. Boundary
- ▭ Study Area

NOTE

* Reserves Of Quarries Located In Area 4 Were Included In Calculations At The Request Of The MNR

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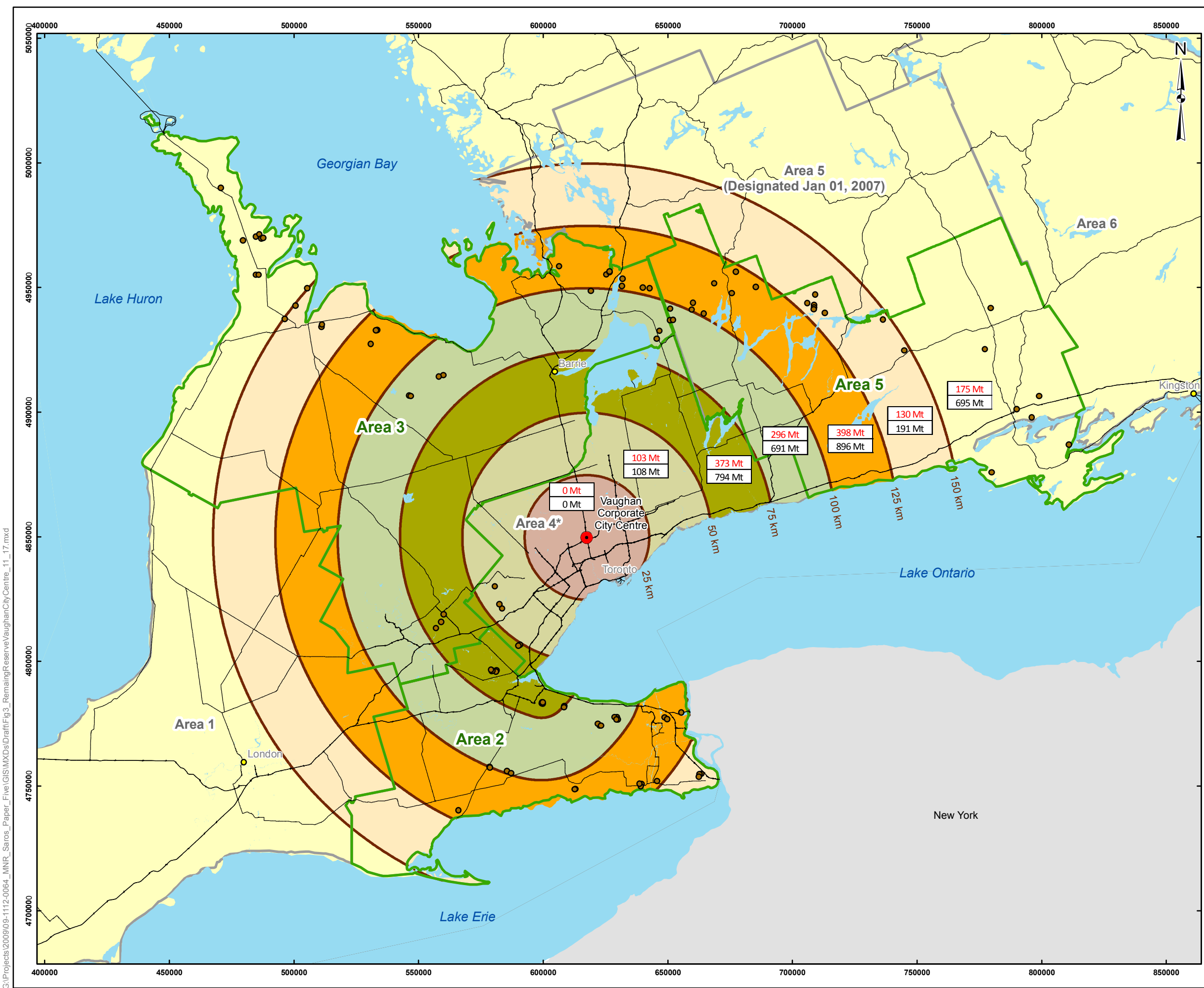
PROJECT		STATE OF THE AGGREGATE RESOURCE IN ONTARIO STUDY (SAROS) - PAPER FIVE	
TITLE		AGGREGATE SITE LOCATIONS	
 Mississauga, Ontario	PROJECT NO.	09-1112-0064	SCALE AS SHOWN
	DESIGN	PP 30 Oct. 2009	REV. 0.0
	CHECK	JMC 01 Nov. 2009	
	REVIEW	WC 01 Nov. 2009	

FIGURE: 2

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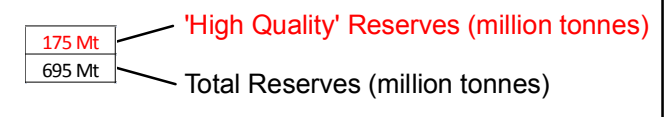


LEGEND

- Vaughan Corporate City Centre
- Aggregate Site
- Highway
- ▭ Study Area Boundary
- ▭ Waterbody
- ▭ C.P.C.A. Boundary

Distance From Vaughan Corporate City Centre

Distance (km)	Overall Reserves (million tonnes)	'High Quality' Reserves (million tonnes)
0 - 25 km	0	0
25 - 50 km	108	103
50 - 75 km	794	373
75 - 100 km	691	296
100 - 125 km	896	398
125 - 150 km	191	130
> 150 km	695	175
Total	3,375	1,473



NOTE

* Reserves Of Quarries Located In Area 4 Were Included In Calculations At The Request Of The MNR

'Distance From Vaughan City Centre' is approximate road distance.

REFERENCE

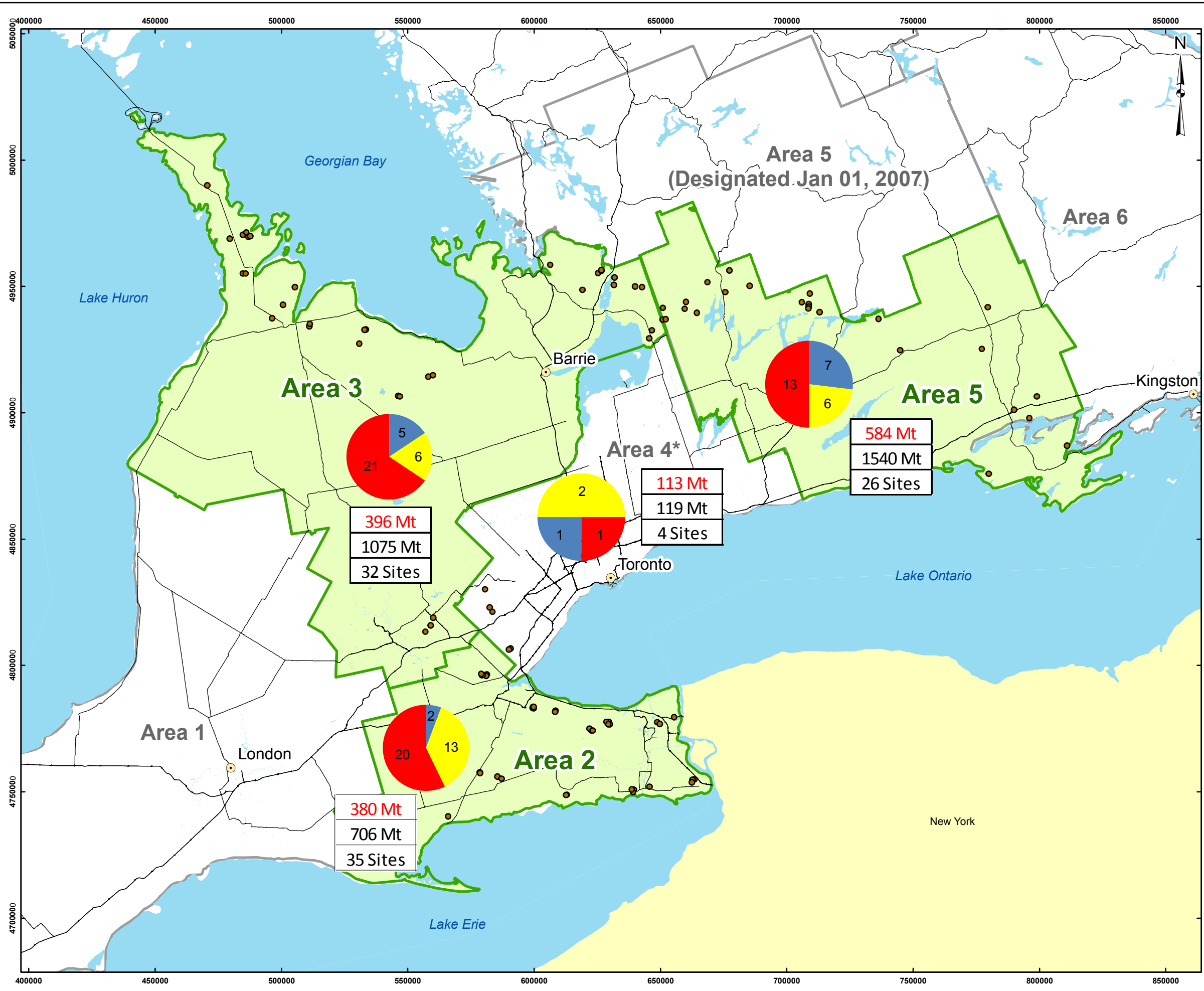
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PROJECT			
STATE OF THE AGGREGATE RESOURCE IN ONTARIO STUDY (SAROS) - PAPER FIVE			
TITLE			
REMAINING RESERVES IN RELATION TO VAUGHAN CORPORATE CITY CENTRE			
 Golder Associates Mississauga, Ontario	PROJECT NO.	09-1112-0064	SCALE AS SHOWN
	DESIGN	PP	30 Oct. 2009
	CHECK	DH	23 Nov. 2009
	REVIEW	WC	23 Nov. 2009
			FIGURE: 3

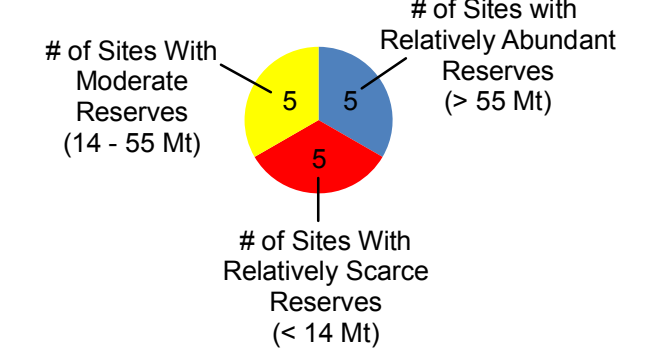
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LEGEND

- Aggregate Site
- Highway
- ▭ Study Area Boundary
- ▭ Study Area
- ▭ C.P.C.A. Boundary
- ▭ Waterbody



380 Mt	Total High Quality Aggregate
706 Mt	Total Aggregate Tonnage In Area
35 Sites	Total Number of Aggregate Sites In Area

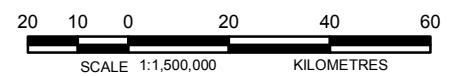
CPA Area	Abundance (> 20 million m ³)	Moderate (5-20 million m ³)	Scarcity (< 5 million m ³)
Area 2	2	13	20
Area 3	5	6	21
Area 4	1	2	1
Area 5	7	6	13
Total	15	27	55

NOTE

* Reserves Of Quarries Located In Area 4 Were Included In Calculations At The Request Of The MNR

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PROJECT		STATE OF THE AGGREGATE RESOURCE IN ONTARIO STUDY (SAROS) - PAPER FIVE	
TITLE		REMAINING RESERVES AND THEIR RELATIVE ABUNDANCE AND SCARCITY	
Golder Associates Mississauga, Ontario	PROJECT NO.	09-1112-0064	SCALE AS SHOWN
	DESIGN	PP 30 Oct. 2009	REV. 0.0
	CHECK	JMC 24 Nov. 2009	
	REVIEW	WC 24 Nov. 2009	

FIGURE: 4

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Ministry of
Transportation and
Communications

REPORT EM-31

**ALKALI AGGREGATE REACTIONS ,
CONCRETE AGGREGATE TESTING
& PROBLEM AGGREGATES IN ONTARIO
A REVIEW**

**Engineering
Materials
Office**

ALKALI AGGREGATE REACTIONS,
CONCRETE AGGREGATE TESTING
AND PROBLEM AGGREGATES IN ONTARIO
A REVIEW

by
C.A. Rogers
Petrographer

ONTARIO
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
ENGINEERING MATERIALS OFFICE
SOILS & AGGREGATES SECTION
September, 1979

Fifth Revised Edition, November, 1985.

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It is recommended that reference to this document be made in the following form:

ROGERS, C.A., 1985; Alkali Aggregate Reactions, Concrete Aggregate Testing and Problem Aggregates in Ontario - A Review; Ontario Ministry of Transportation and Communications, Engineering Materials Office, Report EM-31, 5th Revised Edition, November, 44p.

ALKALI AGGREGATE REACTIONS,
CONCRETE AGGREGATE TESTING
AND PROBLEM AGGREGATES IN ONTARIO
A REVIEW

PREFACE

This publication is based on lecture notes written for the annual MTC concrete technology courses. The descriptions of the various alkali aggregate reactions and aggregate tests are brief. Interested readers are referred to other, more detailed descriptions and discussions of the various problems. It is hoped that publication of these short notes will help to develop an awareness of aggregate durability problems in Ontario.

ACKNOWLEDGEMENT

The aggregate testing chapter is based on lecture notes written by Grant McCutcheon for the MTC concrete technology courses.

THIS REPORT IS PUBLISHED WITHOUT PREJUDICE AS TO THE APPLICATION OF THE FINDINGS.

CHEMICAL REACTIONS BETWEEN CEMENT ALKALIES AND AGGREGATE

INTRODUCTION

At one time, it was thought that all aggregates were inert. In California in the early 1940's, a reaction between the alkalis (Na_2O & K_2O) in cement and certain aggregates was discovered. This reaction produced highly expansive alkali-silica gel. The expansion of the gel and aggregate under moist conditions caused expansion, cracking and deterioration of concrete.

Cracking of concrete is undesirable for a number of reasons. Cracking reduces the strength of the concrete. Cracks also act as channels for water movement in the concrete leading to an increased degree of saturation and reduced freeze-thaw durability. Increased water movement in the concrete results in more rapid dissolution or leaching of the cement paste (white deposits often seen on concrete surfaces). The actual cracking associated with an alkali-aggregate reaction may not, in itself, be the main reason for concern. The major deterioration is often caused by secondary processes after the reaction has cracked the concrete.

In the past forty years, extensive research has shown that many different rocks can react with alkalis and cause deleterious expansion of concrete. The reactions can be grouped into three broad types (1) alkali carbonate, (2) alkali silica, and (3) alkali silicate. All three of these reactions have been found in Ontario.

In general, the higher the alkali content of the cement, the greater the chance that a reaction and subsequent expansion may take place. Cement with an alkali content of less than 0.6 percent (Na_2O equivalent) is considered low alkali. Generally, the reaction between low alkali cement and aggregate is negligible. In Ontario, low alkali cement is of limited availability, and is expensive.

In recent years, the alkali content of cement has been increasing. This has been caused by changes in the method of cement manufacture. Environmental constraints have resulted in the recycling of alkali enriched flue dust back into the kiln. This has resulted in decreased energy costs because the cement clinker firing temperatures is reduced when the alkali content is raised. Gratten-Bellew et al (15) reported that, in the U.S., a changeover to coal fired plants was also causing an increase in alkali content. Type 10 Cement produced in Ontario has an alkali content that ranges, depending on source, from about 0.8 - 1.2 percent (Chojnacki, 2). The alkali content may be as high as 1.35 percent. This is considerably higher than was found twenty years ago. Then, an alkali content of about 0.9 percent was considered high. With this increase in alkali content, there has been an increase in concern about the effect of these high alkali contents on the durability of concrete.

This general increase in alkali content could result in currently non-reactive aggregates becoming unacceptable because of excessive expansion.

Alkali-aggregate reactions are generally slow, and may not be recognized for many years. Recent work has shown that some rocks in Ontario previously thought to be unreactive are, in fact, reactive; see Berard and Lapierre (1) and Dolar-Mantuani, (7, 8, 9). It is quite possible that structures are being built which will have to be replaced prematurely because of excessive expansion caused by alkali-aggregate reactions. It is most important that potentially reactive aggregates are recognized, and are properly investigated before they are used in expensive engineering work. In this publication, the types of reaction that have been recognized in Ontario are briefly described. The areas where these potentially reactive aggregates are found are also outlined.

Petrographic examination, as it is performed by MTC, does not identify potentially reactive aggregate. Petrographic examination only takes physical durability into account. It is hoped to revise the present petrographic system to recognize potentially reactive aggregate. In the meantime, everyone concerned with concrete construction should be aware of the potential for alkali-aggregate reactions.

It takes about a year to properly investigate the potential alkali reactivity of an aggregate. This factor should be remembered when structures are to be built in areas where potentially reactive aggregates are found.

ALKALI-CARBONATE REACTION

Rocks of the Gull River Formation (Lake Ontario Basin) and the Ottawa Limestone (Ottawa-St. Lawrence Lowlands) are alkali reactive. The general area of occurrence of these rocks is shown in Figure 1. Only certain beds are reactive. These are beds of fine grained dolomitic limestone with a significant clay mineral content. These beds are generally found in the lower and middle members of the Gull River Formation and the lower beds of the Ottawa limestone known as the Pamela Formation. The rocks are perfectly durable when used as building stone or in asphalt. When they are used in Portland cement concrete, they expand and cause cracking and deterioration of the concrete (Figures 2 & 3). In a recent example in Lancaster, concrete sidewalks expanded up to 1.2 percent after 3 years.

The cause of the expansion is not properly understood at present. Gillott (14) has suggested the dedolomitization of the dolomite crystals opens channels allowing moisture to be adsorbed on previously dry clay surfaces. The swelling caused by water adsorption causes irreversible expansion of the rock and the subsequent expansion and cracking of concrete. For a detailed discussion of this reaction and the possible mechanism causing it, see Walker (36).

If a quarry is suspected to contain alkali-carbonate reactive rock, a number of different techniques may be used to identify the reactive beds and those beds that may be safely used in concrete. The quarry face is sampled at about 0.3m intervals and examined microscopically to see if the texture characteristic of reactive rocks is present (Figure 5). The rock cylinder expansion test (ASTM C586) is also conducted. Rock cylinders (35x9mm) are prepared from the hand specimens used for the microscopic examination. These are stored in sodium hydroxide solution. Expansion in excess of 0.1% after 4 weeks or 0.2% after 16 weeks usually indicates alkali-carbonate reactivity (See Figure 6).

When the non-reactive beds have been identified and a suitable working face established, aggregate is tested in the concrete prism expansion test (CSA A23.2-14A). Concrete prisms are made with the suspect aggregate and normal Portland cement. These prisms are stored in a moist room for a period of at least one year and the expansion measured. Most concrete used by MTC is in a moist environment and exposed to de-icing salts. Aggregate for use in this environment is tested with normal Portland cement fortified by the addition of NaOH to give a cement alkali content of 1.25% Na₂O equivalent. An expansion of the concrete, of greater than 0.025% at 1 year is considered excessive (See Figure 4). If the prisms show excessive expansion, petrographic examination may be conducted to check for the development of reaction rims (Figure 7). The detection of these rims on crushed stone generally confirms the presence of a reaction. The absence of reaction rims, however, does not necessarily demonstrate that a reaction is not taking place.

Waiting a year for approval to use an aggregate is regarded by many engineers as unreasonable. As a result, a quick chemical test has been developed in Ontario (MTC LS-615). A sample of aggregate is submitted for chemical analysis. The CaO:MgO ratio and alumina (Al₂O₃) content is determined. These results are plotted on a graph (Figure 8). Depending on the area of the graph in which the results plot, the sample may either be accepted without further testing or cannot be accepted until the concrete prism expansion test is conducted. In this way, the majority of carbonate rocks can be approved relatively quickly.

When alkali-carbonate reactive rock has been identified, the solution is to exclude the reactive beds from use by selective quarrying. Alternatively, the reactive rocks can be diluted with non-reactive aggregates. It is possible to use a low alkali cement to slow the reaction, but migration of solutions within the concrete will result in areas of increased alkali content. De-icing salt (NaCl) will also add alkalis to the concrete, and increase the rate of reaction (See Smith, 31)

Papers by Smith (31, 32) and Rogers (29) contain a summary of this Ministry's experience with this problem. A paper by Swenson and Gillott (35) is a review of research conducted by the National Research Council on the reaction in the Kingston area. A paper by Dolar-Mantuani (9) outlined those formations that are likely to be reactive, and described the mechanism of reaction. Papers by Ryell et al (30), Emery and Drysdale (13), and Koniuszy and Rogers (23) described the procedures used in investigations of alkali-carbonate reactivity.

ALKALI-SILICA REACTION

All forms of amorphous and microcrystalline silica are potentially alkali-silica reactive. The main alkali-silica reactive minerals found in Ontario are chalcedony and optically strained quartz. Cherts, cherty limestones, sandstones and granites from Ontario have all been found to be alkali-silica reactive. Artificial glass may also be alkali-silica reactive. Reaction between the silica and alkalis from the cement results in the formation of alkali-silica gel. The formation and expansion of this gel in the presence of water results in the generation of internal stress. Subsequent expansion may cause cracking and disruption of concrete. For a detailed discussion on the nature and mechanism of this reaction, see a paper by Diamond (3).

Concrete aggregates should be subjected to detailed petrographic examination. This may often require study under a polarizing microscope to look for chalcedony in cherts and cherty limestones or highly strained quartz in sandstones and granites. The mortar bar test (ASTM C227) is employed with aggregate suspected to be alkali-silica reactive (Figure 9). MTC practice is to test the aggregate with normal Portland cement fortified by the addition of NaOH to give a cement alkali content of 1.25% Na₂O equivalent. An expansion of greater than 0.05% at three months or 0.1% at six months is considered excessive. The quick chemical test (ASTM C289) is not practical when the aggregate contains significant amounts of carbonate minerals. In Northern Ontario, where igneous gravels are contaminated with small amounts of chert, with little or no carbonate, this test may be more useful.

Sandstones and granites are slowly alkali-silica reactive, and may give unreliable test results. With these rock types, acceptance should be based on past field performance and petrographic examination. For instance, aggregates containing large proportions of sandstone or granite, such as obtained in quarrying operations, should not be used unless there are many years of good field performance of concrete exposed under similar conditions to those intended. Alternatively, a thorough petrographic examination and exhaustive testing may show the aggregate to be innocuous.

Once an alkali-silica reactive rock has been identified, the use of either a low alkali cement or a pozzolan to replace some of the cement could be investigated. It would, however, generally be preferable not to use reactive rocks in concrete. The risk of using a reactive or a potentially reactive concrete aggregate is usually too great in view of the relatively small cost of aggregate compared to the value of the structure in which it is used.

Chert

Chert is found in gravel pits and quarries throughout most of Southwestern Ontario and in parts of Northern Ontario (see Figures 34 and 35). These cherts of Palaeozoic age contain silica in three forms: ultrafine microcrystalline quartz (opal-like), chalcedony, and coarse microcrystalline quartz. The first two forms are alkali-silica reactive. The coarse microcrystalline variety appears to be less reactive.

Chert, in addition to being alkali-silica reactive, may also have poor resistance to freezing and thawing, depending on its type. Leached, porous chert is especially susceptible to frost action, and commonly causes popouts on concrete surfaces and, when abundant, may cause severe deterioration of concrete. Unleached chert and cherty carbonate may also cause popouts by a combination of alkali-silica reaction and frost action. Incidentally, both types of chert also cause popouts in asphalt pavement surfaces. Leached chert absorbs the asphalt cement, weakening the bond with the matrix. The particle is subsequently removed from the surface by frost action (Rogers, 28). Unleached chert has a poor bond with asphalt cement, and is easily lost from the surface. Cherts are easily recognized in petrographic examination, and the quantity permitted in any aggregate is severely limited. A study by MTC of the cherts of Southwestern Ontario is that of Ingham and Dunikowska-Koniuszy (22).

On Highways 11 and 101 between Long Lac and Timmins, and also in the vicinity of Sioux Lookout (Figure 10), many structures are deteriorating because of a combination of frost action and alkali-silica reactions. These structures were built in the late 1930's and 1940's using local gravels which contain chert from the Palaeozoic rocks of the James Bay Lowlands. In the early 1950's, the detrimental nature of chert was recognized. Chert-free aggregate has been used for concrete in most structures built since then. There has, as a result, been a considerable improvement in durability and a reduction in maintenance and repair costs.

On Highway 17 between Nipigon and White River, some of the concrete structures, built in the 1950's, show minor cracking caused by very small amounts of chert (less than 1 percent) found in the local sands. A C.N.R. bridge east of Thunder Bay has also been found to be deteriorating because of the use of alkali-silica reactive sand in repairs to the structure in the late 1950's. The sand contained small amounts of Palaeozoic chert probably imported from a gravel pit near Nipigon.

In the Windsor and Sarnia area, several concrete structures and a pavement are deteriorating because of an alkali-silica reaction. These structures and pavement were built in the early 1970's with a sand imported from the west coast of Michigan. This sand contained about 5% leached chert. This was sufficient to cause extensive cracking of concrete structures and disruption and deterioration of the concrete pavement after 10 years (Figures 11, 12 and 13).

The bridge over the Englehart River on Hwy. 66, west of Kirkland Lake was built in 1969. The coarse aggregate for the concrete was waste rock from the Adams Iron Mine. The aggregate was composed of some cherty iron formation of Precambrian age. The chert was a coarse mosaic of microcrystalline quartz with abundant fluid inclusions and disseminated magnetite. This structure had its bridge deck extensively repaired within six years. The remainder of the structure shows extensive cracking caused by an alkali-silica reaction between the chert and alkalis from the cement paste (Figure 14).

Cherty Limestone

Recent work by MTC and the National Research Council has shown that some slightly cherty Palaeozoic limestones in the Ottawa area are alkali-silica reactive. The work is incomplete, and much study

remains to be done. The reactive rock is found in quarries near Ottawa in the Bobcaygeon Formation, also known as the Rockland Member of Lower Trenton age. The reactive aggregate contains small amounts of black chert (3% or less), as well as microscopic chalcedony in the limestone. The reactive beds are found in the same sequence, but stratigraphically above the alkali-carbonate reactive rocks described earlier. Testing of aggregate from two Ottawa quarries has shown that mortar bars made with 1.25% Na₂O equivalent alkalies expand excessively (Figure 9).

At present, those quarries that contain beds of this cherty limestone produce satisfactory concrete aggregates by selective quarrying. In one case the upper bench is alkali-reactive, in another, the upper bench is the only non-reactive rock in the quarry. In these operations care is required to ensure that concrete stone does not become contaminated with alkali-silica reactive rock.

About twenty-five structures have been built with these reactive aggregates. Those parts of the structures exposed to moisture and de-icing salt (NaCl) show pattern cracking after about ten years (Figures 15 and 16). Those parts not exposed to direct moisture show little or no cracking at present. The initial alkali content of the cement was about 0.9 to 1.1% Na₂O equivalent (3.0-3.9 Na₂O kg/m³). MTC experience is that the type and amount of cracking shown by these structures will result in increased maintenance and repair costs at an age of 30 to 40 years compared with structures not exhibiting this cracking.

In Montreal and Three Rivers areas, work by J. Berard (personal communication, 1982) has shown that limestones of Lower Trenton age, similar to those found in Ottawa, are alkali-silica reactive.

A structure in Lindsay, Ontario, built in 1954, has recently been found to be deteriorating because of an alkali-silica reaction. The reactive aggregate is a quarried limestone with small amounts of chalcedony. The microscopic appearance of the rock and the nature of the reaction appears identical to that found in the Ottawa area. The source of the aggregate has yet to be found.

The reaction of these cherty limestones is treacherous because the reaction is relatively slow, and may go unrecognized for some years. Furthermore, the nature of the deterioration is such that it can often be assigned to other causes such as frost action or distress caused by rusting of reinforcing steel. Microscopic examination of suspect concrete is necessary to detect the presence of alkali-silica gel in order to determine the cause of distress.

Sandstone

The Potsdam sandstone has been found to be alkali-silica reactive. Berard and Lapierre (1) have described this reaction which has caused deterioration of several structures southwest of Montreal (see Figure 17). The Potsdam sandstone is found in both pits and quarries in the general area outlined in Figure 33 by Sandstone (No. 4). A bridge on Highway 2, west of Kingston, contains a small amount of this sandstone which shows characteristic reaction rims. The quantity of sandstone in the concrete was too small to have caused disruption of the concrete (Figure 18).

In the area north of Lake Huron, sandstones and feldspathic sandstones of the middle Precambrian, Huronian Supergroup have been found to be slowly alkali-silica reactive (Figure 19 and 20). Argillites and greywackes of this same group of rocks are also alkali-silicate reactive (see next section). The general area of occurrence of these rocks is the same as that of the argillite and greywacke shown in Figure 34. These rocks may be found in gravel pits throughout this area. The reactivity of these sandstones appears to be related to the high degree of strain shown by the quartz under cross polarized light.

Granite

Recent study of two bridges in the City of Toronto has shown an alkali-silica reaction with crushed granite from two quarry sources. The structures were built shortly before 1918. The granite was used to give a decorative exposed aggregate finish to the parapets. The remainder of the structures were built using local gravel, and are in excellent condition. A reaction has taken place between highly strained quartz in the granite and alkalies from the cement. This slow reaction has been aggravated by exposure to sodium chloride solutions splashed onto the parapets during the winter. Pattern cracking (Figure 21) is common. Examination of concrete cores showed that the pattern cracking only penetrated the concrete to a depth of 5 cm. Below this, the concrete was extensively microfractured, and contained deposits of alkali-silica gel lining microfracture surfaces and filling air voids (Figure 22).

Expansion of the concrete has caused bending of some elements and severe cracking. This expansion was recognized at some time in the past, and drilling conducted in some joint areas to provide additional expansion space. These joints are now closing due to continued expansion. Other bridges built using the same parapet design at about the same time, but using dolomitic marble as the coarse aggregate are undamaged and in excellent condition. The granite used in the two structures is similar petrographically to granites of Grenville age from Eastern Ontario and Quebec.

Petrographic examination of concrete from old bridges in Parry Sound and Kingston (Figure 23) has shown dark, clarified rims on the periphery of granite aggregate particles. This is normally taken as indicative of a reaction between aggregate and the cement. In both cases, the quantity of granite in the concrete was small, and had not adversely affected the integrity of the structure.

Glass

Man-made glass may also be alkali-silica reactive. Contamination of concrete aggregate sources or stockpiles with broken bottles should be avoided. Two cases are known in Ontario, of damage to concrete caused by inclusion of artificial glass in concrete aggregate. In one case, glass fragments found in sand from the Niagara River caused small popouts on the surface of a concrete slab. This slab was indoors and was covered with vinyl tiles. The cement alkalies were about 0.7% Na₂O equivalent. The popouts occurred within about 2 1/2 years (Woda and Hussel, 37). In the other example, artificial glass is reported to have been used in decorative, exposed aggregate concrete panels.

ALKALI-SILICATE REACTION

Argillites and greywackes of the Huronian Supergroup are alkali-reactive (Dolar-Mantuani, 7). These metamorphosed sedimentary rocks are found in Northern Ontario from Blind River through Sudbury to New Liskeard (Figures 34 and 35). Gravel deposits in this area and to the south (vicinity of French River) may contain these rocks together with alkali-silica reactive sandstones of the same age described above. These rocks react with alkalies from cement paste to cause expansion and cracking of concrete (Figures 24 and 26).

A field survey of highway structures in the Sudbury area has shown that twenty six structures are affected by this reaction. They range in age from four to forty-six years (Figure 27 and 28). The coarse aggregate was gravel from the airport area or similar gravels. The percentage of reactive rock types (argillite, greywacke, sandstone and/or arkose) was between about 65 and 90 percent. Pattern cracking, reaction rims on the coarse aggregate and alkali-silica gel formation was common in all elements exposed to moisture and de-icing salt (NaCl). Three older structures have been replaced (Figure 27) as a result of deterioration of concrete promoted by this alkali-aggregate reaction. Many of the others require or will require extensive repairs. The alkali content of the cement used in 16 structures built since 1967 varied from about 0.8 to 1.2% Na₂O equivalent. Many sidewalks built in the past fifteen years show pattern cracking. From the results of this survey it is concluded that some of the gravels from the Sudbury area are alkali reactive and cause premature deterioration of concrete.

In the New Liskeard area, the content of reactive rock types in the gravels is lower (40-55%), but there is a higher proportion of argillite and greywacke compared with the sandstone and arkose. Also in this area the sands contain trace amounts of alkali-silica reactive Palaeozoic chert. This makes it difficult to judge the damage caused by the alkali-silicate reaction alone. The Lady Evelyn Lake Dam built in 1925 was replaced in 1972 because of damage caused by this reaction (Dolar-Mantuani, 7), see Figures 24 and 26. There are at least four highway structures in this area that show pattern cracking and associated deterioration due to the reaction between argillite and greywacke with cement alkalies (Figure 29).

The reaction of these rocks with alkalies is generally slow, and is not properly understood. Dolar-Mantuani (7) showed that these rocks slowly expand in the rock cylinder expansion test (ASTM C586) normally used for alkali-carbonate reactive rocks. They also caused expansion of mortar bars (ASTM C227) with the generation of alkali-silica gel. Gratten-Bellew (17) found that expansivity was related to porosity and the percentage of microcrystalline material present in the rock. The greater the amount of microcrystalline material, the greater the expansion. Argillites, which are very fine grained, are probably deleteriously expansive; the greywackes, which are coarser, are less expansive. He concluded that expansion of concrete was mainly due to expansion of the individual rocks although, in one case, expansion was partly attributed to the formation of alkali-silica gel.

The expansion of these argillites and greywackes in concrete is termed the alkali-silicate reaction. While there are similarities with the alkali-silica reaction, the expansion of individual rock particles suggests absorption of water on previously 'dry' alumino-

silicate surfaces in the microcrystalline portion of the rock. Furthermore, the results of the diagnostic tests used for detecting the alkali-silica reaction may be misleading. Both the quick chemical test (ASTM C289) and the mortar bar test (ASTM C227) may give unreliable results (Gratten-Bellew, 17).

Current MTC practice, in the area of Ontario where these rocks are found, is to conduct petrographic examination of the aggregate. If the quantity of potentially reactive rock types (argillite, greywacke, sandstone and/or arkose) is less than about 15%, the aggregate may be used in concrete without further testing. If there is greater than 15% reactive particles, then the aggregate should not be used until testing shows it to be satisfactory. At the present time, a high temperature concrete prism expansion test (CSA A23.2-14A) is the best method of evaluation. The prisms are stored in a 100 percent humidity atmosphere at 38°C rather than the 23°C normally used for the alkali-carbonate reaction. Unfortunately, reliable maximum expansion values to separate deleterious from satisfactory aggregates have not been developed. Preliminary work suggests an expansion in excess of 0.04% after one year indicates that the aggregate is likely to cause cracking in highway structures.

Work by Ontario Hydro (34) has shown that the use of low alkali cement or fly ash replacement of the cement considerably reduces expansion due to this reaction. At the Lower Notch Dam on the Montreal River, 20% fly ash replacement was used successfully to prevent cracking of concrete containing argillite and greywacke. At present, MTC prefers not to use either low alkali cement or fly ash substitution as a corrective measure. This is due to the difficulties of ensuring that low alkali cement is actually in the concrete delivered on the construction site and because of the variable air-entraining characteristics of fly ash.

APPROVAL OF CONCRETE AGGREGATES

Clearly, the alkali-reactivity testing of concrete aggregates is time consuming and calls for specialized equipment. Some way had to be found to rapidly approve concrete aggregates. The approach taken by MTC has been to publish a list of approved concrete aggregate sources in each region of Ontario (Figure 30). For a source to be included on this list it has to either have passed all applicable tests or to have a good record of past field performance in highway structures. The aggregate source is placed on the list together with any restrictions. For instance, in quarries, the approved level is specified since other levels may be alkali-reactive.

The concrete aggregates sources list is used as part of the contract documents. The concrete aggregates must come from the approved sources. It is the job of the construction staff to ensure that the aggregates actually delivered on the job site are from these sources. As a further check, samples are taken once or twice a year from the various deposits and tested to confirm that they meet the requirements.

A word of caution. It is the responsibility of individuals who use MTC approved concrete aggregate sources to ensure that the aggregate actually meets the requirements. Just because a source is shown on the list does not mean that the aggregate in any one stockpile is acceptable.

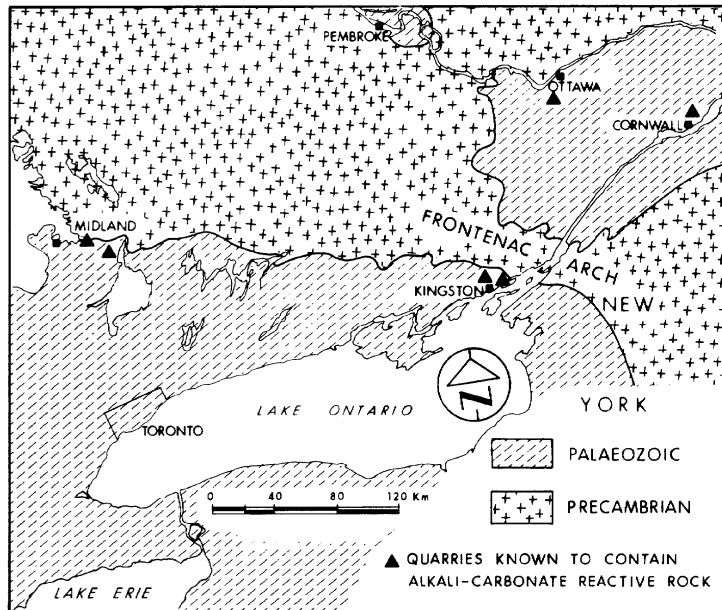


Figure 1 Location of known sources of alkali-carbonate reactive dolomitic limestone in Ontario.

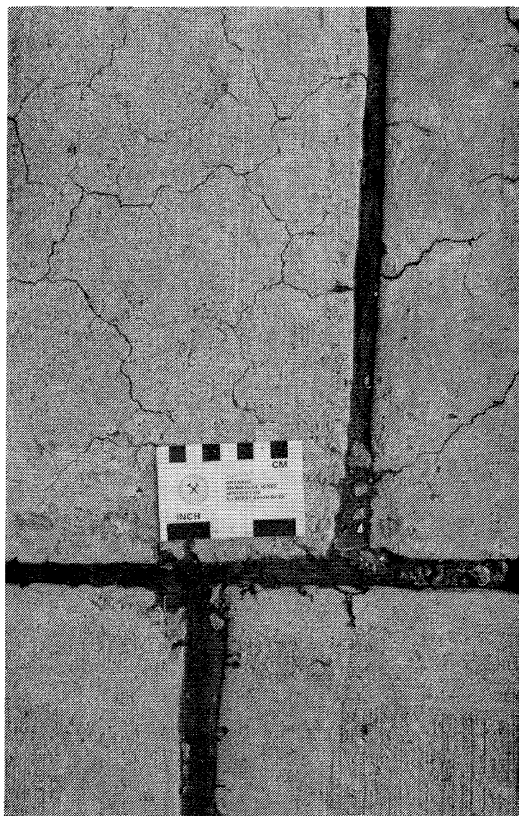


Figure 2

Alkali carbonate reaction Lancaster, reactive concrete (upper part of photo) has moved 9 cm to the right compared with non reactive concrete (lower part of photo). Expansion was measured as 1.2 percent in 3 years.



Figure 3 Alkali carbonate reaction, Lancaster. Expansion of sidewalk from left to right has pushed curb about 6 cm into pavement, causing shoving of the asphalt.

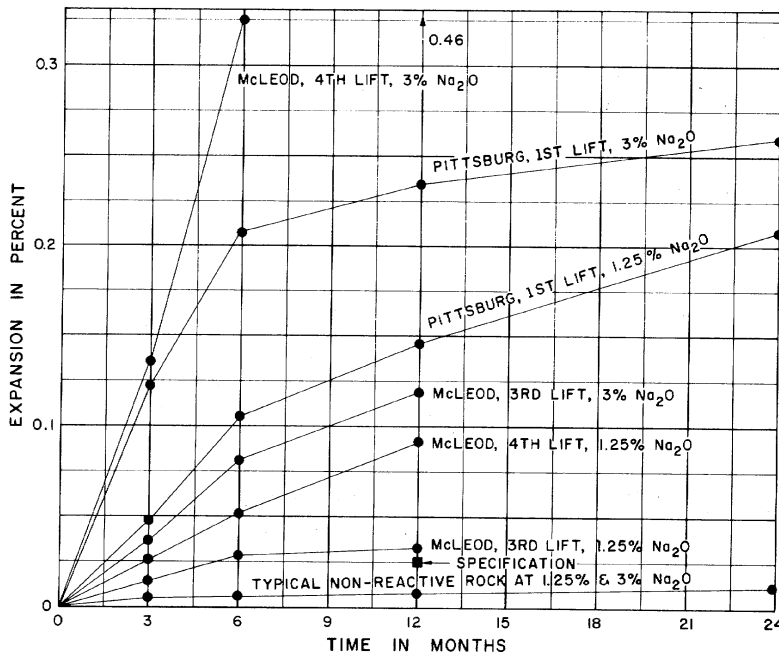


Figure 4

Concrete prism expansion data (CSA A23.2 - 14A) for some typical Alkali-carbonate reactive dolomitic limestones.

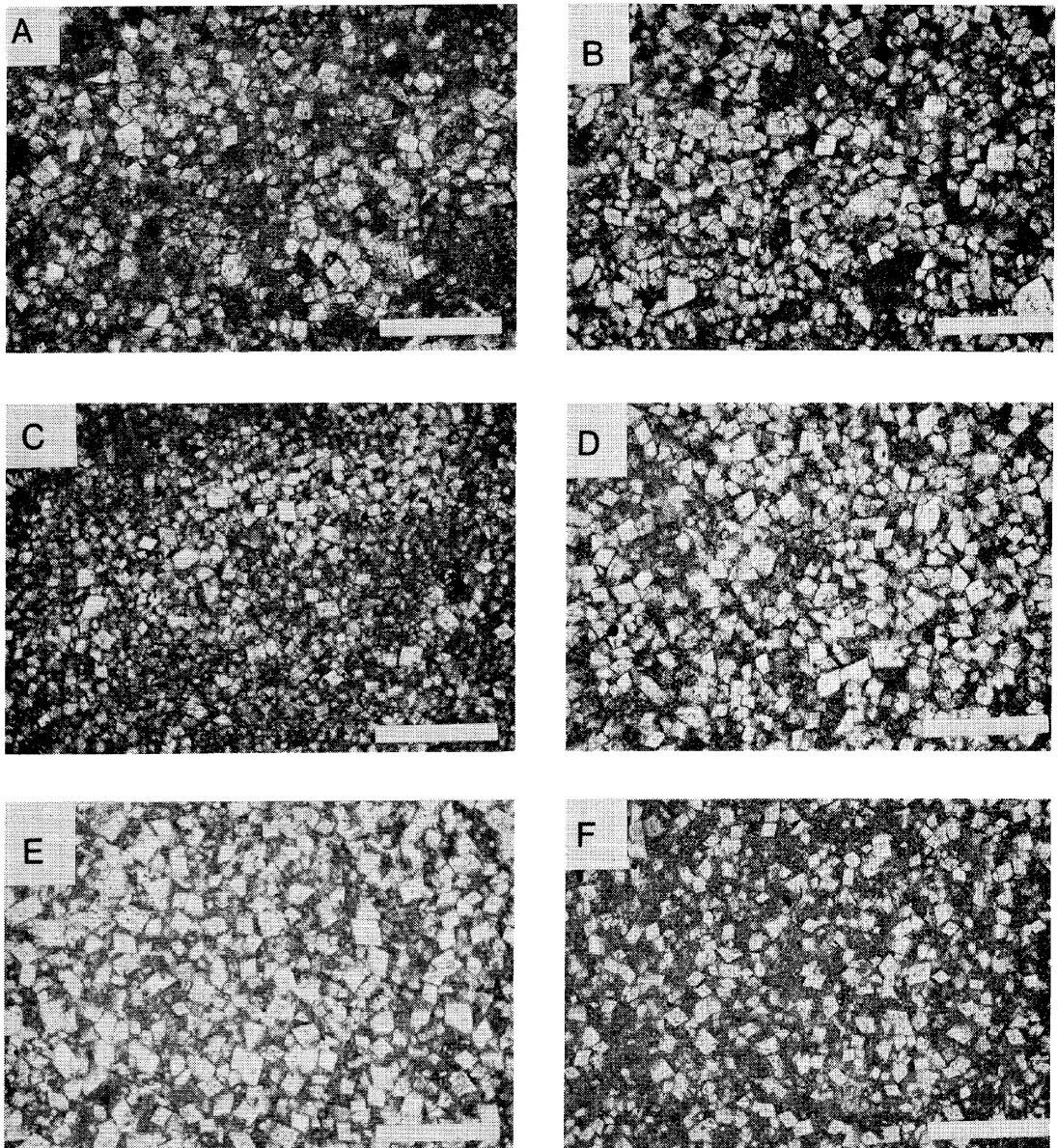


Figure 5 Microphotographs of thin sections of alkali-carbonate reactive dolomitic limestones. Scale bar represents 0.25 mm. A. McLeod Quarry, Cornwall; B. Cooke Quarry, Waubaushene; C. Pittsburgh Quarry, Kingston; D. Uhthoff Quarry, Orillia, U1 bed; E. Uhthoff Quarry, UB bed; and F. Uhthoff Quarry, U1 bed.

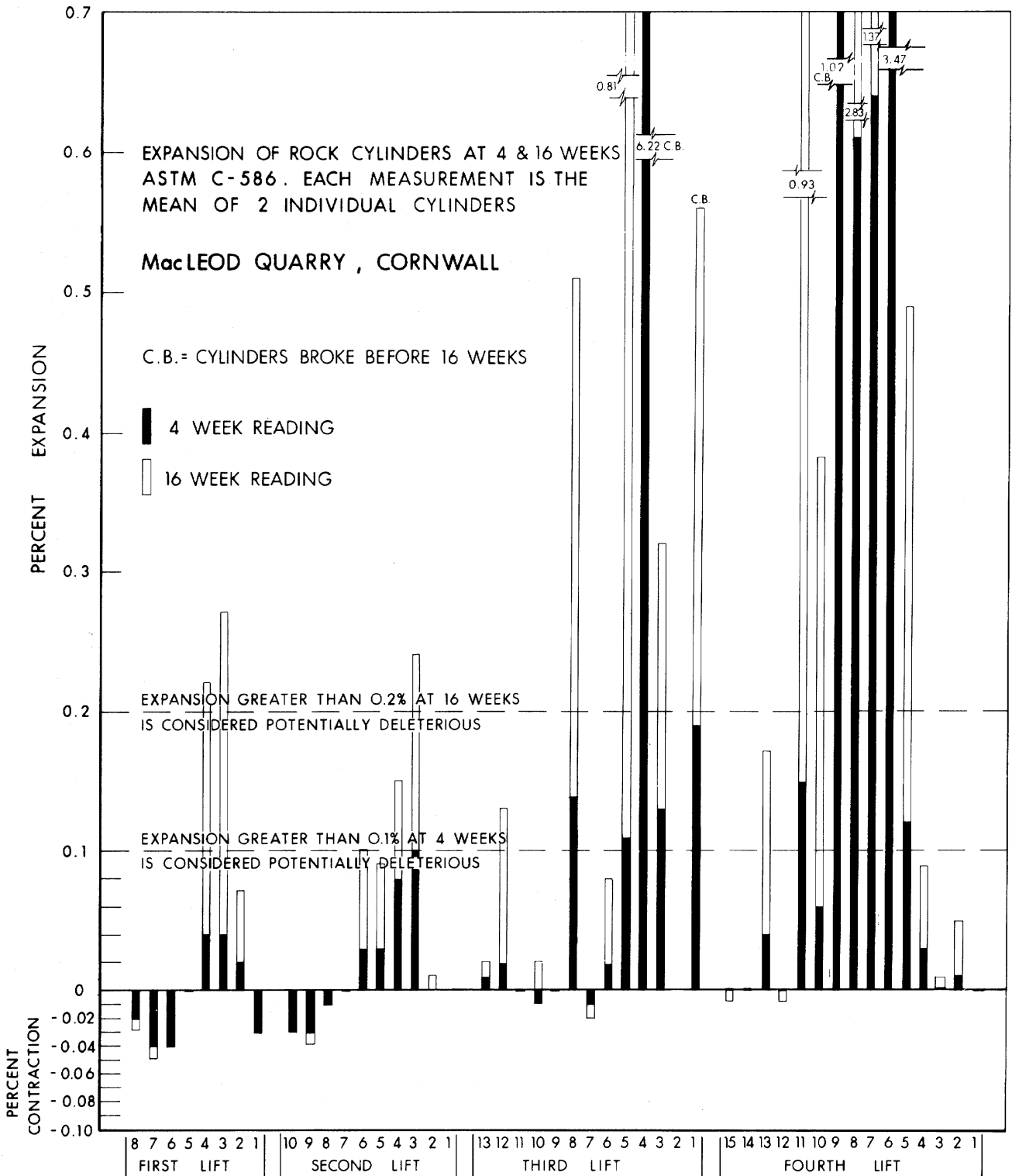


Figure 6 The rock cylinder expansion test can be used to identify alkali-carbonate reactive beds. In this case, the first and second lifts are non-reactive, the third and fourth lifts are reactive.

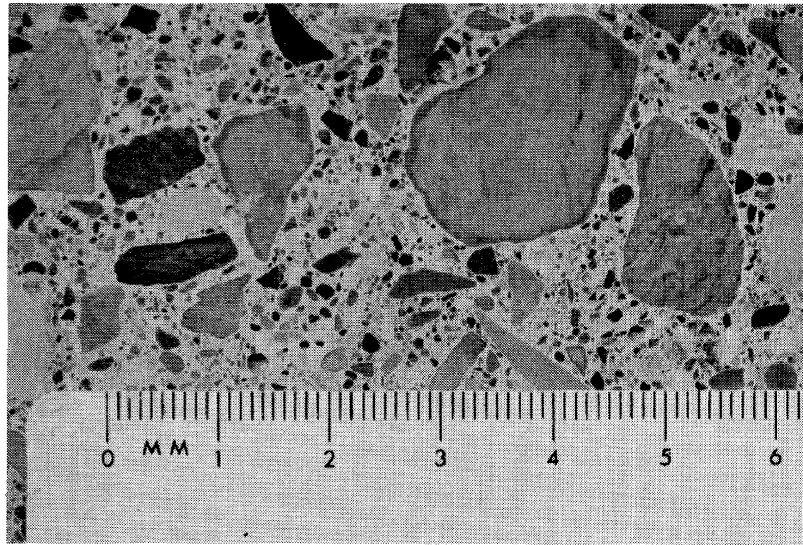


Figure 7 Reaction rims on crushed carbonate coarse aggregate due to alkali carbonate reaction.

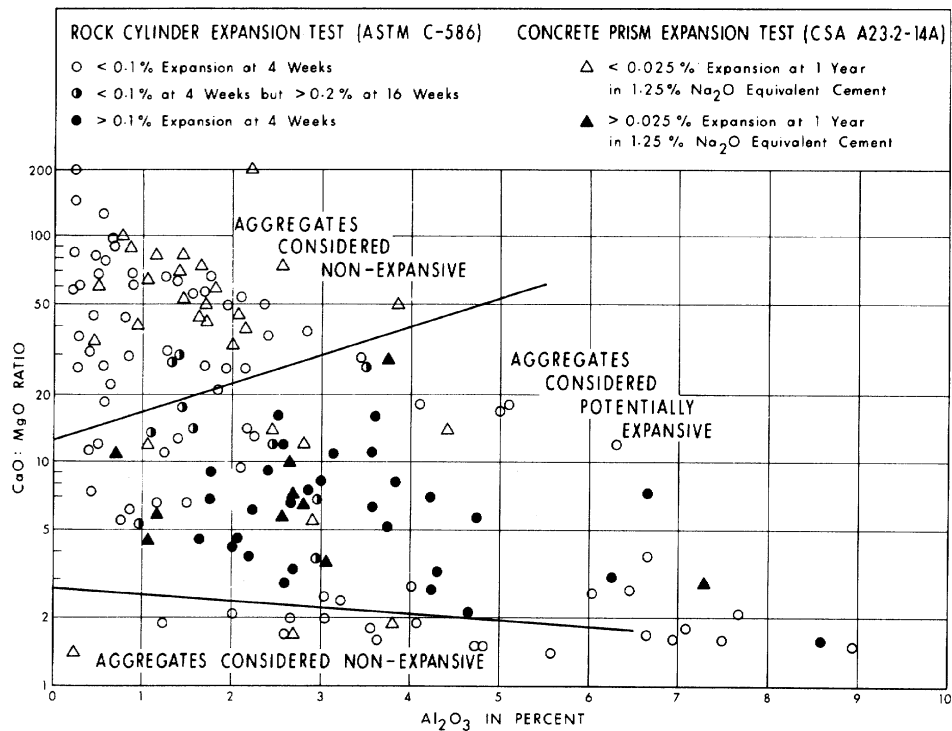


Figure 8 Graph used for determining the potential expansivity of quarried carbonate rocks in the chemical test used by MTC (MTC LS-615).

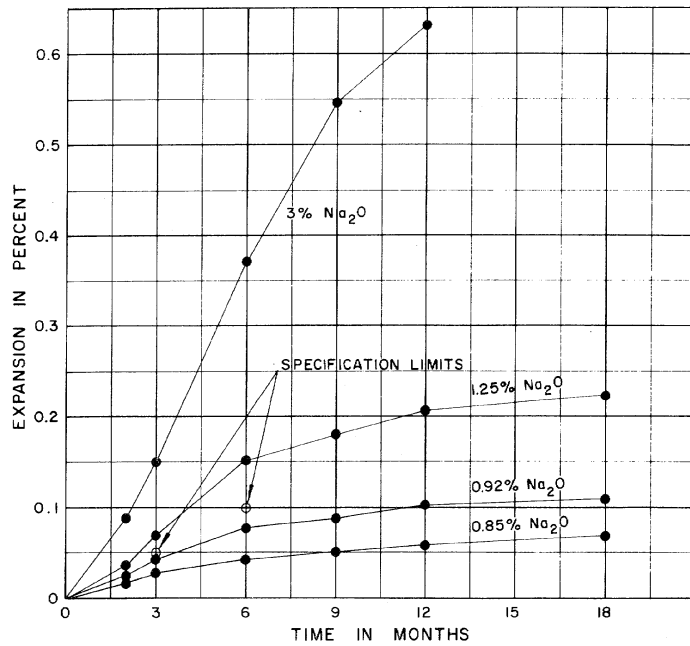


Figure 9

Mortar bar expansion Test data (ASTM C-227) for typical alkali-silica reactive cherty limestone from the Ottawa area.



Figure 10

Alkali-silica reaction, Frog Rapids Bridge, Hwy. 72 near Sioux Lookout. This structure was built in 1938 using a local gravel containing small amounts of leached Palaeozoic chert.

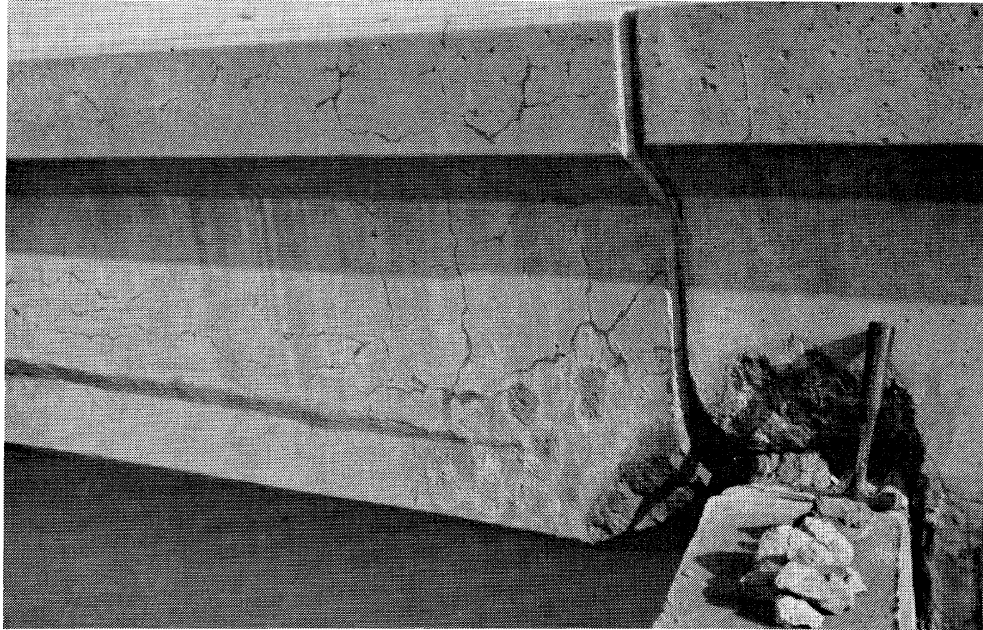


Figure 11 Alkali-silica reaction, Dougall Avenue Structure, E.C. Row Expressway, Windsor. Note cracking and associated failure in joint area caused by about 5% leached chert in fine aggregate, 12 years old.

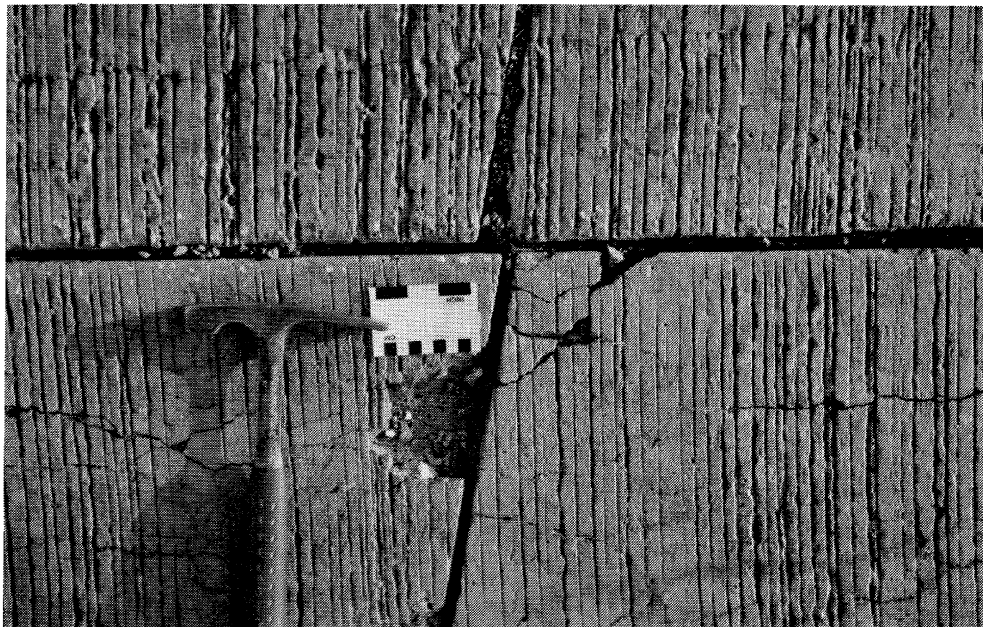


Figure 12 Alkali-silica reaction, E.C. Row Expressway, Windsor. Note cracking and failure after 12 years. Also, note relative displacement of joints due to expansion caused by about 5% leached chert in fine aggregate.

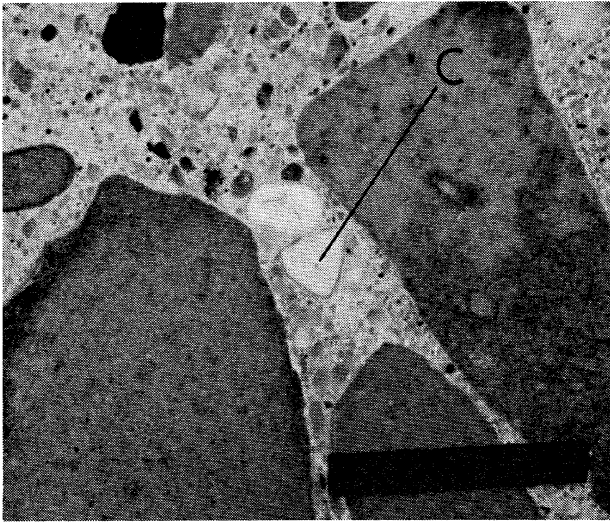


Figure 13

Alkali-silica reaction, E.C. Row Expressway, Windsor. Cut and polished surface of pavement concrete shows air void filled with alkali-silica gel adjacent to leached chert particle (c) in fine aggregate. 3x magnification.



Figure 14 Alkali-silica reaction, Englehart River Bridge, Hwy. 66, built 1969. Cracking is due to a reaction with Precambrian chert which was waste rock from a local mine.

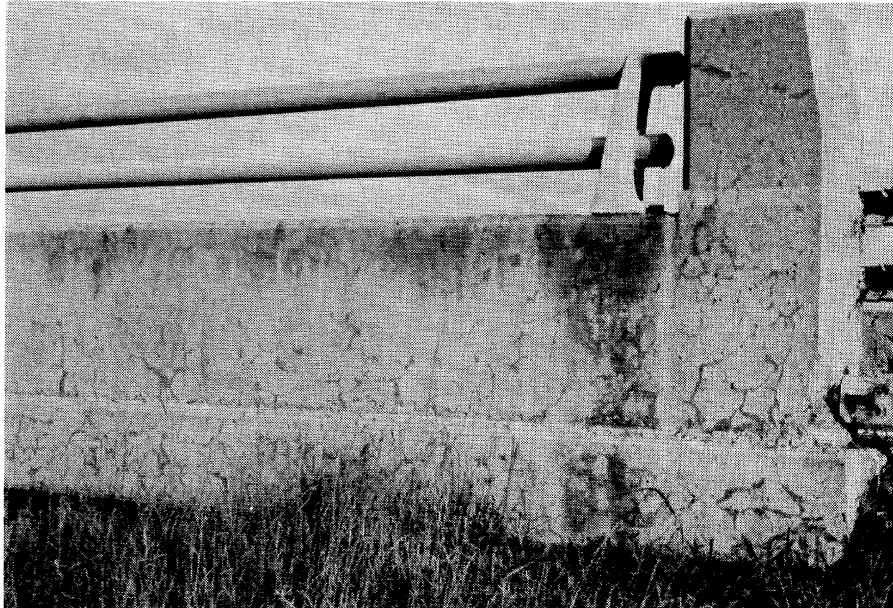


Figure 15 Alkali-silica reaction, Hwy. 417, eastbound, over Russel Road, near Ottawa. Built 1969, appearance after 16 years. Reactive coarse aggregate contained less than 3% chert. Limestone of the Bobcaygeon Formation.

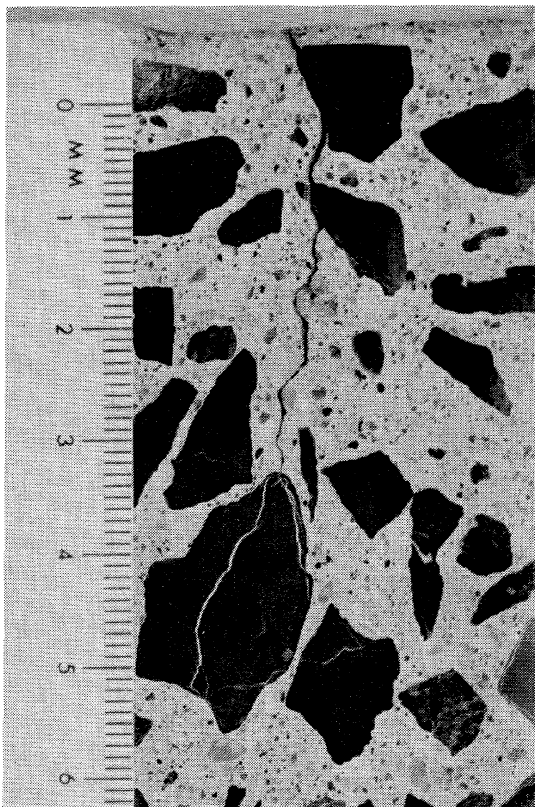


Figure 16

Alkali-silica reaction, Hwy. 417, eastbound, over Bear Brook. Built 1969. Cut and polished surface of concrete from from curb shows pattern cracking which penetrates about 4 cm. Note gel filled cracks in coarse aggregate particle. Concrete below a depth of about 5 cm is extensively microfractured. 16 years old. Coarse aggregate is limestone of the Bobcaygeon Formation.

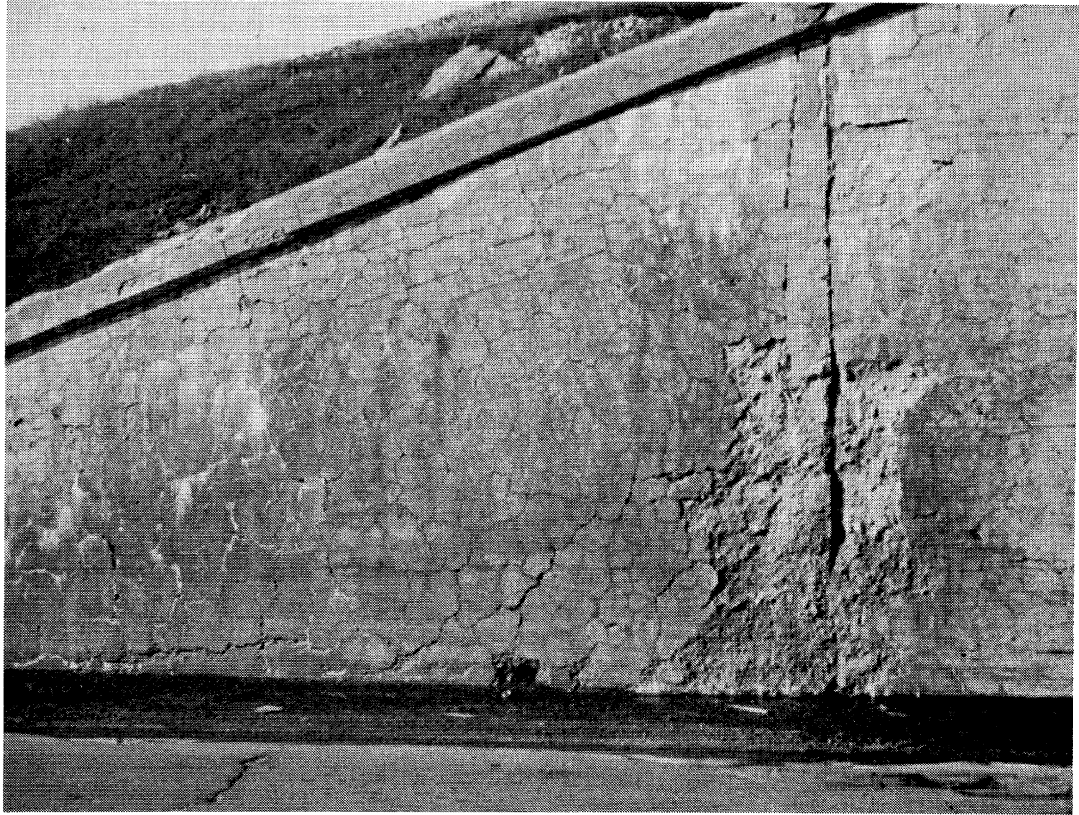


Figure 17 Map or pattern cracking of wing wall and bridge abutment, Valleyfield, P.Q. This is caused by alkali-silica reaction with Potsdam sandstone. Note leaching of cement and spalling due to compression at construction joint (built about 1930).

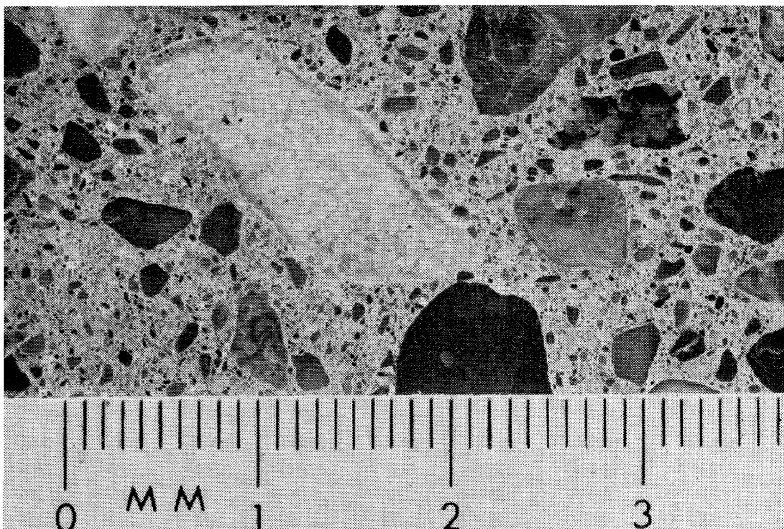


Figure 18
Reaction rim on
Potsdam sandstone
due to alkali-
silica reaction
- bridge deck on
Hwy. 2 near
Kingston (built
about 1920).



Figure 19

Alkali-silica and alkali-silicate reaction. Serpent River Bridge, Hwy. 17. This structure, built in 1938, shows extensive cracking and deterioration. Initial cracking due to reactions has been aggravated by frost action and leaching of cement.

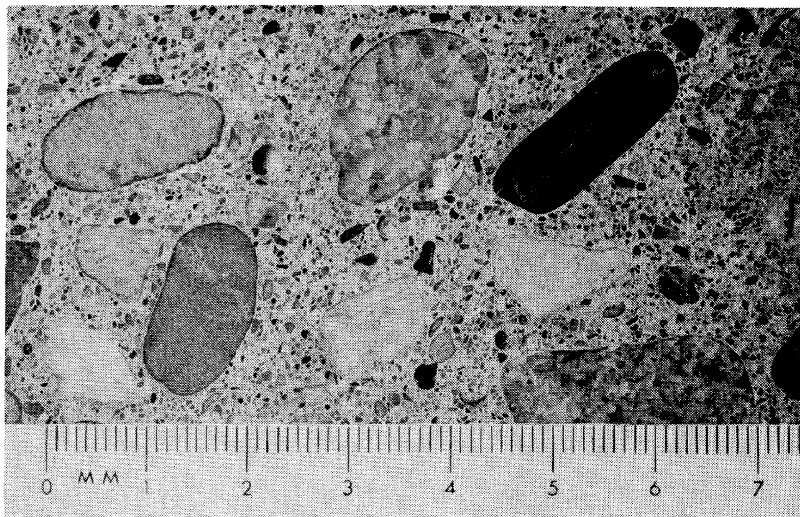


Figure 20 Serpent River Bridge. Cut and polished concrete surface shows dark, clarified 'reaction' rims on alkali-silica reactive sandstones. A dark particle of greywacke in upper right is cracked due to the alkali-silicate reaction.

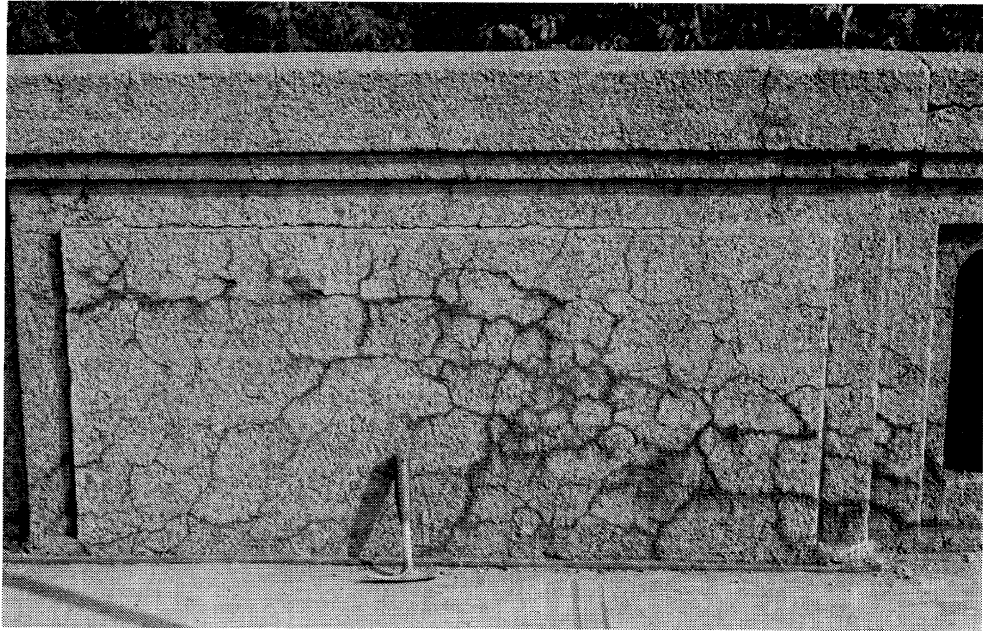


Figure 21 Alkali-silica reaction, Prince Edward Viaduct, Toronto, built before 1918. Cracking is due to a reaction with granite used as coarse aggregate for a decorative finish.

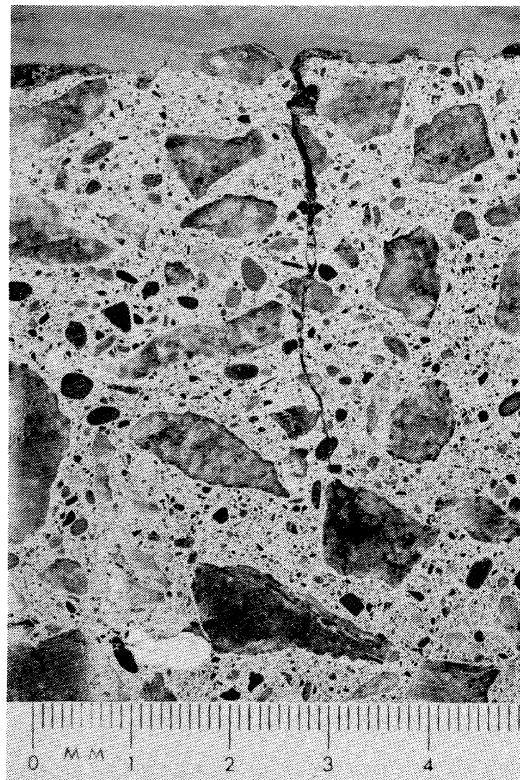


Figure 22

Alkali-silica reaction, Rosedale Ravine, Toronto, built before 1918. Note dark, clarified rims on some granite particles and air void filled with white alkali-silica gel (bottom left). Crack from surface only penetrates about 5 mm into concrete, but note microfractures in the lower part of concrete.

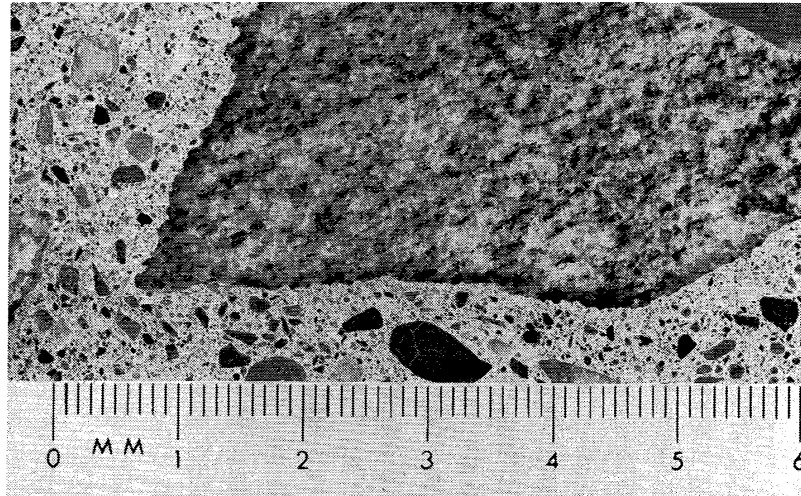


Figure 23 Alkali-silica reaction, Millhaven Creek Bridge, Hwy. 2, near Kingston, built 1920. Note dark clarified rim on this foliated granite indicative of a reaction.

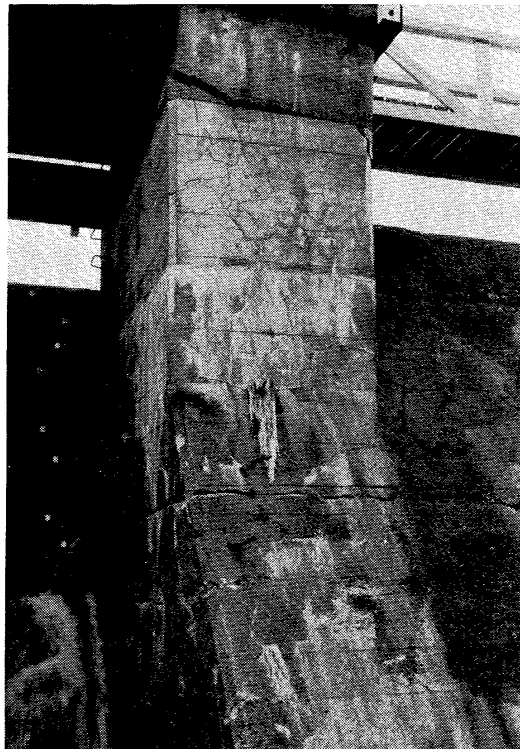


Figure 24

Alkali-silicate reaction. Lady Evelyn Lake Dam, built 1925, replaced 1972. Cracking and displacement (see major crack at top centre) is due to the use of argillite and greywacke in the coarse aggregate and alkali-silica reactive palaeozoic chert in the fine aggregate.

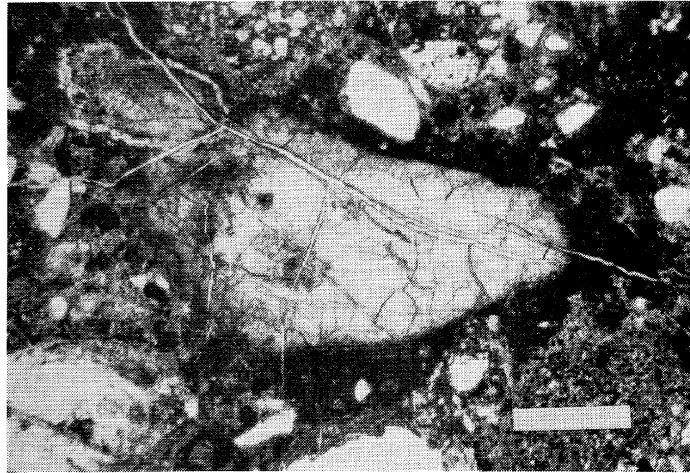


Figure 25 Palaeozoic chert particle in fine aggregate of Lady Evelyn Lake Dam (1925). Alkali-silica gel has replaced much of the original chert. Note cracking associated with this gel. Length of scale bar = 0.5 mm. Sample courtesy of Ontario Hydro.

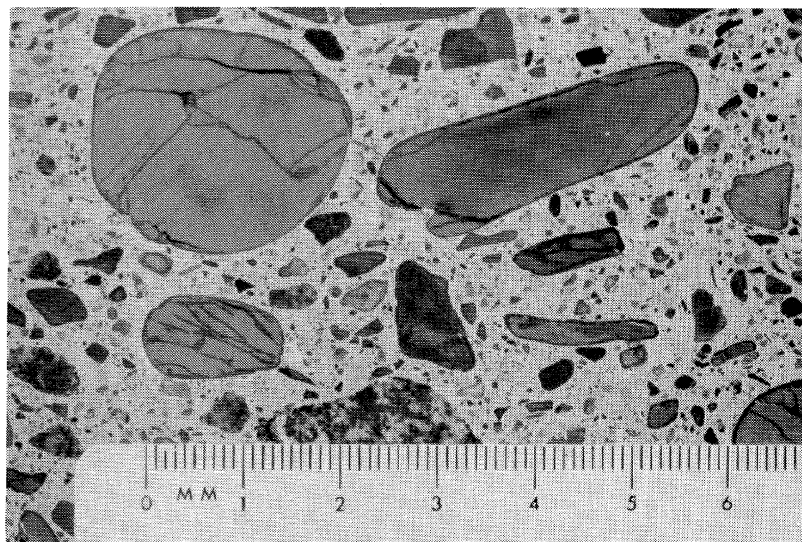


Figure 26 Alkali-silicate reaction. Lady Evelyn Lake Dam (1925). Note extensive microfractures (up to 0.3 mm) in argillite coarse aggregate. Many fractures and voids are filled with alkali-silica gel.



Figure 27

Alkali-silicate and alkali-silica reactions. Wanapitei River Bridge, Hwy. 17, built 1940, replaced 1974. Note areas of pattern cracking and major cracks due to movement caused by expansion of the concrete which contained reactive argillite, greywacke and sandstone.

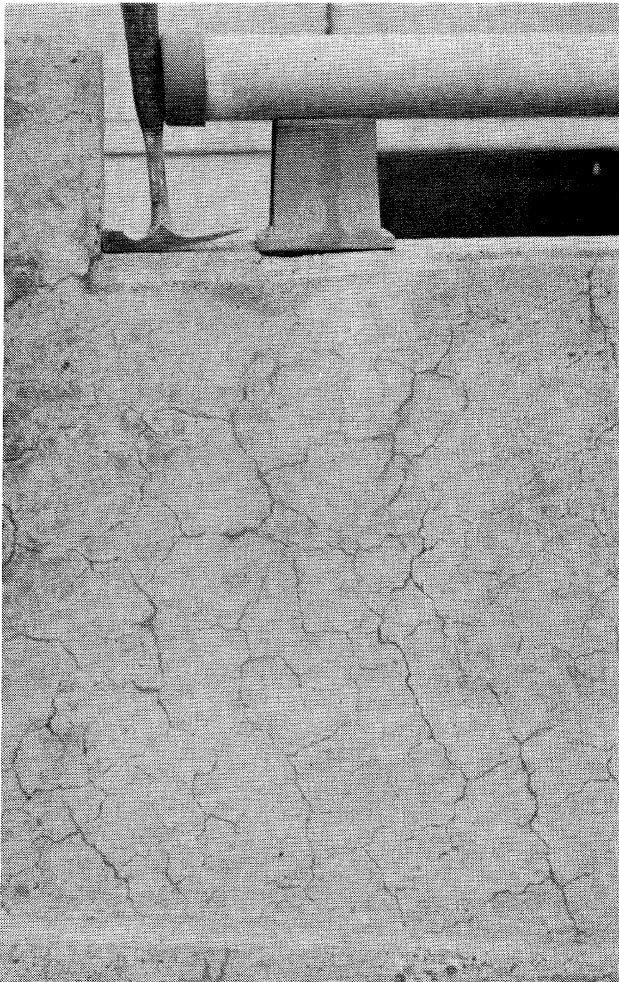


Figure 28

Alkali-silicate and alkali-silica reactions, north parapet wall, eastbound Regional Road 55 over Hwy. 17 at Liveley (Sudbury). About 70% argillite, greywacke and sandstone in the coarse aggregate. Appearance after 4 years.

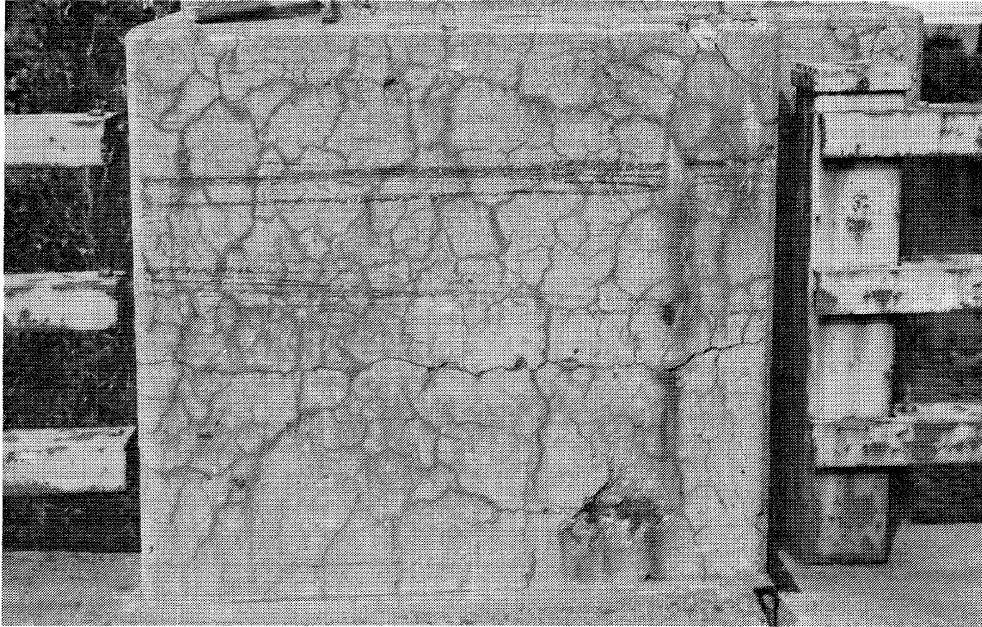


Figure 29 Alkali-silicate reaction, Montreal River Bridge, Hwy.11, Latchford, built 1959. Cracking is due to a reaction with about 30% argillite and greywacke in the coarse aggregate from a local gravel source.

AGGREGATE SOURCES LIST
 CONCRETE FINE AND COARSE AGGREGATE

Condition of Information

M.T.C. Contract No. _____

The coarse and fine aggregates produced from sources shown on this list can meet current OPSS physical and alkali reactivity requirements. Final approval of aggregates will be based on test results of the products according to OPSS Forms 1001 and 1002 and/or any special provisions or other requirements included in this contract.

Page ___ of ___

F.A. - Fine Aggregate
 C.A. - Coarse Aggregate
 X - Acceptable
 P - Pit
 Q - Quarry

Rock screenings from quarries and sands from natural sand and gravel deposits can meet OPSS physical and alkali reactivity requirements, unless otherwise indicated, but will require suitable processing and/or blending to meet gradation requirements.

Final approval of concrete will be dependent on satisfactory test results at the mix design stage according to OPSS Form 1350 and on previous field performance. Sources that are not shown on this list may be accepted by the Authority after they meet the appropriate physical and alkali reactivity requirements of OPSS Forms 1001 and 1002.

Mineral Aggregate Inventory Number	P or Q	Source Name and Location	F.A.	C.A.	Remarks
05-72	Q	Armbro Aggregates, Hwy. # 31, S. Gloucester	X	X	Only Beekmantown dolomitic rock, above elevation 96 metres (rock above sandstone) is acceptable. Licensed.
05-67	Q	Bertrand Concrete Products Ottawa Inc. Doncaster Road, South Gloucester (Operated by Beaver Asphalt Comp. Ltd.)		X	Only Beekmantown dolomitic rock, above elevation 89 metres (rock above sandstone) is acceptable. Licensed.
A2-139	Q	Bertrand et Freres Const. Co. Ltd., Hwy. 417, Exit 51, St. Isidore de Prescott		X	Only bedrock from 2nd lift (from approx. 5.5 m to 11.5 m) is acceptable. Licensed.
H4-16	Q	Bertrand et Freres Const. Co. Ltd., 5.5 km S.W. of L'Original, Highway 17		X	Only bedrock from upper part, 2nd lift (from approx. 6.1 to 12.1 m) is acceptable. Licensed.
W7-34	Q	A.L. Blair Construction Co. Ltd. 4.5 km N.W. of Crysler, Twp. of Finch		X	Only bedrock from 2nd lift (from approx. 4.5 to 12.5 m, S.W. Face and from approx. 6.0-14.0 m N.E. area of quarry) is acceptable. Licensed.
05-70	Q	Dibblee Construction Co. Ltd. Highway 31 & Rideau Road, S. Gloucester		X	Only Beekmantown dolomitic rock, above elevation 91 metres (rock above sandstone) is acceptable. Licensed.
05-05	Q	Francon (Div. of Canfarge Ltd.) Highway # 17, Orleans		X	Only bedrock from the 1st lift, between elevations 94 to 108 metres (0-14 m from ground surface) of the north quarry is acceptable. Licensed.
05-99	Q	Deschenes Const. Comp. Ltd. S.E. Corner at Klock & Pink Roads Aylmer P.Q.		X	Only bedrock from 1st lift (from approx. 0 - 7 m at S.W. Corner to approx. 0 to 9.5 m at S.E. Corner) is acceptable.
05-10 [05-94]	Q P	Dufferin Aggregates and Asphalt Div. Vanier Avenue, Aylmer P.Q.	X X	X	Only bedrock from 1st lift of quarry (from approx. 0 to 12.5 m) is acceptable for Concrete C.A. and F.A. Concrete F.A. is produced from Quarry screenings and natural sands.
05-09	P Q	Spratt Sand and Gravel Ltd. Highway 417, Exit 144, Stittsville	X	X	Only concrete F.A. produced from natural sand and/or gravel deposits is acceptable. Only concrete C.A. produced from upper 0 - 6.0 m of quarry is acceptable.
C13-78	Q	Cornwall Gravel Co. Ltd. Twp. of Cornwall, 3.7 km N.E. of Jct. Hwy's 401 and 138		X	Only bedrock from the 1st lift (from approx. 0 to 14 m) is acceptable. Licensed.
C13-29	Q	Permanent Concrete Twp. of Cornwall, 5.2 km W. of Jct. Hwy's 401 and 138		X	Bedrock from 1st lift (from approx. 0 to 15 m) is acceptable. Licensed.
B15-39	Q	Permanent Concrete Highway # 2, East of Brockville		X	Only Beekmantown dolomitic rock (above the sandstone) is acceptable.

Figure 30 Typical concrete aggregate sources list used in Ontario.

TESTING OF CONCRETE AGGREGATES FOR PHYSICAL PROPERTIES

This chapter gives a brief description of each test method and a short description of the significance of each of these tests. The test methods are described in detail in the MTC Laboratory Testing Manual*. The MTC number in the title refers to the appropriate test in the manual.

The testing of aggregates can be divided into two types:

DURABILITY TESTING

Testing of a source to predict its durability and suitability for use in concrete. This testing has to be done in one of the five MTC regional laboratories.

QUALITY ASSURANCE TESTING

Testing of a source on a routine basis to determine that the aggregate delivered on a contract meets specifications for gradation and fines content, etc. This testing is usually done in mobile or field laboratories where the results are immediately available for the construction inspector.

1. DURABILITY TESTING

Introduction

Aggregate and concrete may deteriorate by either freezing and thawing or wetting and drying. There are several tests routinely used by this Ministry to determine if aggregates are likely to deteriorate by either of these two mechanisms. They are:

- Magnesium Sulphate Soundness Test [See Dolar-Mantuani (10)]
- Los Angeles Abrasion and Impact Test [See Meininger (23)]
- Petrographic Examination [See Mielenz (24)]
- Absorption [See Mullen (25) and Dolch (11)]

The authors' names after each test refer to papers describing the application and limitations of the various test methods. These papers are recommended reading for anyone using data from these test methods.

* Available from Information Management Office, Ministry of Transportation and Communications, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8.

Magnesium Sulphate Soundness Test (MTC LS-606)

This test is designed to simulate the action of freezing and thawing on aggregates. Those aggregates which are susceptible to freezing and thawing will usually breakdown and give high losses in this test. It is not infallible and the results must be interpreted by someone with a thorough knowledge of the mechanisms of deterioration of aggregates.

A weighed sample of aggregate is placed in a wire mesh basket and is submerged in a saturated solution of magnesium sulphate (Epsom salts) for 16 hours. The sample is then drained and placed in a drying oven for about 6 hours at a temperature of 110°C. This alternate wet-dry cycle is repeated five times. During each cycle the salt is absorbed into the microscopic openings in the aggregate and crystalizes during the drying period. The salt crystal growth causes internal stresses in the aggregate which will breakdown any unsound particles in the sample. After five cycles the sample is washed to remove the salt. This takes about 36 hours in a hot water bath. The sample is oven dried and regraded on the original sieves. The amount of aggregate passing the original sieve size is expressed as a percentage of the original mass of the sample.

For coarse aggregates MTC sets a specification limit of 12 percent. Only those aggregates with a loss of less than 12 percent in this test are considered suitable. There are exceptions however; aggregates with losses of up to about 20 percent have been accepted if they have satisfactory field performance in concrete. The limit for fine aggregates is 16 percent loss.

Los Angeles Abrasion and Impact Test (MTC LS-603)

This test measures the resistance to abrasion and the impact strength of aggregate. This gives an idea of the breakdown that can be expected to occur when an aggregate is stockpiled, transported and placed.

The Los Angeles machine closely resembles a ball mill. A large closed drum rotates at 33 revolutions a minute. A steel shelf in the drum picks up the aggregate and a charge of steel balls and drops them. A 5000 g sample of graded coarse aggregate is placed in the drum and the drum is rotated for 500 revolutions. The sample is removed and screened on a 1.70 mm sieve. The amount of sample passing the sieve is expressed as a percentage of the original mass of the sample.

The maximum loss permitted by MTC is 35 percent. Some granites and gneisses found in Northern Ontario give much higher losses in this test than is warranted by their performance. In some areas if an aggregate is granitic or gneissic up to 50% loss may be permitted for use in asphaltic concrete.

This test is only done on coarse aggregate.

Petrographic Examination (MTC LS-609)

Petrographic examination is the most useful and quickest quality test. A great deal of operator experience is needed, however, to perform the test correctly.

About 200 particles of each aggregate size are examined using a stereoscopic microscope, a pen knife and a bottle of weak hydrochloric acid. The particles are separated into different groups depending on their rock type and quality. A sample may contain as many as 25 different rock types (Figure 30). Four quality categories are recognized: Good aggregate, (Factor 1), Fair aggregate (Factor 3), Poor aggregate (Factor 6) and Deleterious aggregate (Factor 10).

A Petrographic Number (P.N.) is calculated by multiplying the percentages of each group by the appropriate factor. The products are then added up to arrive at the Concrete P.N. When aggregate is used in granular base, different factors are applied because of the different conditions under which these aggregates are used.

The higher the Petrographic Number, the poorer the quality of the aggregate. For concrete paving, MTC only uses aggregates with a P.N. of 125 or less. For structural concrete the maximum allowable P.N. is 140.

The factors applied to each rock type are based on laboratory studies and in-service performance for the intended use and the prevailing conditions in Ontario. These factors may not apply under other conditions and in other areas. The factors are subject to periodic review and are changed when necessary to reflect current experience.

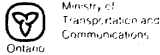
The Petrographic Number may be used as the sole quality assurance test provided that previous test and performance data have established the quality of the source and that any change in quality will be apparent in petrographic analysis.

This test is only normally done on coarse aggregates. In special cases, it may be done on fine aggregate.

Absorption (MTC LS-604)

The absorption test measures the pore space in aggregate particles. The larger the pore space (higher absorption), the greater the chance that the aggregate is not durable.

The absorption is determined by placing a 3000 g sample of aggregate in water for 24 hours. Then it is surface dried with a towel and weighed. The sample is then oven dried and reweighed. The dry mass is subtracted from the saturated surface dry mass and the difference expressed as a percentage of the dry mass.

		COARSE AGGREGATE PETROGRAPHIC ANALYSIS				
PIT NAME <u>UNKNOWN</u>		LAB. NO. <u>84-40051</u>				
DATE <u>May 18 1985</u>		FRACTION <u>19.0 - 9.5 mm</u>		ANALYST <u>D. Hanna</u>		
TYPE NO.	TYPE	MASS	%	GRANULAR & 16.0 mm TYPE B CORRECTION		
1	CARBONATES (hard)					
20	CARBONATES (slightly weathered)					
2	CARBONATES (sandy, hard)					
21	CARBONATES (sandy, medium hard)					
23	CARBONATES CRYSTALLINE (hard)					
3	SANDSTONE-ARKOSE (hard)	307	22.1			
22	SANDSTONE-ARKOSE (medium hard)					
4	GNEISS - SCHIST (hard)	359	25.8			
5	QUARTZITE (coarse and fine grained)	140	10.1			
6	GREYWACKE - ARGILLITE (hard)	211	15.2			
7	VOLCANIC (hard and slightly weathered)	59	4.3			
8	GRANITE - DIORITE - GABBRO	205	14.8			
9	TRAP	26	1.9			
TOTAL GOOD AGGREGATE			94.2			
24	CARBONATES CRYSTALLINE (slightly weathered)			x 2		
40	CARBONATES (soft; slightly shaley)			x 2		
41	CARBONATES (sandy, soft and soft pitted)			x 2		
42	CARBONATES (deeply weathered)					
25	GNEISS(brittle) SCHIST (medium hard)	25	1.8	x 2	3.6	
26	CHERT - CHERTY CARBONATES			x 2		
27	GRANITE - DIORITE - GABBRO (brittle)			x 2		
28	VOLCANIC (soft)			x 2		
52	ENCRUSTATION			x 2		
29	GREYWACKE - ARGILLITE (medium hard)	36	2.6	x 2	5.2	
30	SANDSTONE-ARKOSE (brittle)					
TOTAL FAIR AGGREGATE			4.4			
43	CARBONATES (shaley or clayey)					
44	CARBONATES (ochreous)					
45	CHERT - CHERTY CARBONATES (leached)			x 5		
46	SANDSTONE-ARKOSE (friable)			x 3		
48	VOLCANIC (very soft, porous)	4	0.3	x 3	0.9	
49	CARBONATES CRYSTALLINE (soft)			x 3		
50	GNEISS (friable)	10	0.7	x 3	2.1	
51	GRANITE - DIORITE - GABBRO (friable)			x 3		
53	CEMENTATIONS			x 3		
54	CEMENTATIONS (total)			x 3		
55	SCHIST (soft)	5	0.4	x 3	1.2	
56	SILTSTONE (friable)			x 3		
TOTAL POOR AGGREGATE			1.4			
60	OCHRE					
61	SHALE					
62	CLAY					
63	VOLCANIC OR SCHIST (decomposed)	2	0.1			
TOTAL DELETERIOUS AGGREGATE			0.1			
		TOTALS		1389	100.1	13
% GOOD <u>94.2</u> x 1 = <u>94.2</u>						
% FAIR <u>4.4</u> x 3 = <u>13.2</u>						
% POOR <u>1.4</u> x 6 = <u>8.4</u>						
% DELETERIOUS <u>0.1</u> x 10 = <u>1.0</u>						
HOT MIX, SURF. TREAT. AND CONCRETE P.N.		116.8		CORRECTED GRANULAR AND 16.0 mm TYPE B P.N.		103.8
				EST. PERCENT CRUSHED		60
				EST. PERCENT FLATS & ELONGATED		5

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Figure 31 Form used by MTC for calculating P.N. during petrographic examination.

MTC allows only those coarse aggregates with an absorption of less than two percent to be used in concrete. As in the Magnesium Sulphate Soundness test, there are cases where aggregate with an absorption of more than two percent is used because of its satisfactory field performance.

The absorption and relative density of fine aggregate is determined using a different test method (MTC LS-605). The results are not used for accepting or rejecting aggregate but for mix design calculations.

Organic Impurities Test (MTC LS-610)

A natural sand may be durable from a freeze-thaw point of view, however, if the sample contains an excessive amount of organic material, it is then unsuitable for concrete. The organic impurities found in sand usually consist of products of decayed vegetable matter and appear in the form of black humus or dark brown to yellowish brown loam. Most of the time this organic matter is restricted to overburden, however, occasionally it may appear in lenses or stringers in a deeper part of the deposit. Organic impurities tend to interfere with the hydration of the cement, reduce the bond strength and also affect the air entrainment. All overburden covering granular deposits containing organic impurities must be removed. If the organic matter is present throughout the deposit, washing of the aggregate may remedy the situation.

The test used to determine the amount of organic material present in concrete sand is called the Sodium Hydroxide Colorimetric Test. The test is done with a medicine bottle. The bottle is filled with a representative sample of sand to the 150 mL level. A 3% solution of sodium hydroxide is added and topped up to the 200 mL level. The sample is shaken vigorously and then left to stand for 24 hours. The colour of the solution is then compared to that of a standard colour plate which determines the amount of the organic content. The numbers 1 and 2 indicate acceptability, 3 indicates a borderline material and a need for further testing, i.e., a mortar strength test, 4 and 5 indicate a failure.

It should be noted, however, that some sands found in the Canadian Shield have been reported to cause excessive air-entrainment and low strength concrete even though they pass this test. McNaughton and Herbich (24) reported that sand found in Sault-Ste-Marie, Sudbury, Chalk River and other parts of the shield gave problems of excessive air. This resulted in low strength concrete. It should be noted that heating the aggregate to 100°C, preparatory to a concrete mix design, removes the organic material. Thus the problem of excessive air may not show up in the mix design stage. Prolonged mixing of concrete containing these aggregates will increase rather than decrease the amount of entrained air.

Doell (4) reported that mix water containing algae also increased air in concrete, resulting in reductions in compressive strength.

2. QUALITY ASSURANCE TESTING

The tests described above are not usually done in field laboratories either because of the need for specialized equipment or because of their specialized nature. The tests described below can all be easily done in field laboratories. The results of such tests as, gradation and fines content are usually needed very quickly and so are normally done in the field where immediate action may be taken if the sample does not meet the specifications.

Gradation Test (MTC LS-602)

A sample of aggregate is dried in an oven to constant mass. The material is then screened on a mechanical sieve shaker for a fixed time. The material retained on each sieve is weighed and the grading curve is calculated.

The mass of sample depends on the maximum aggregate particle size and is specified in the test manual. It is worth noting that the test method must be strictly followed and the screens should be clean and in excellent condition. If these precautions are not followed, major errors will occur.

The ability of an aggregate to meet the MTC grading requirements does not mean that workable concrete can be made with it. In a recent example, a Ready-Mix supplier in southern Ontario was unable to obtain workable concrete. There was excessive harshness, bleeding and segregation of his concrete. This poor workability was due to the use of a coarse sand. This sand, however, still met the MTC grading requirements (see Figure 32).

Fines Content Test (MTC LS-601)

A high percentage of fines on coarse aggregate is undesirable because it forms a coating on the aggregate particles and prevents a good bond with cement paste. A large number of dust particles also increase the water requirement for a given slump, thereby increasing the water/cement ratio and decreasing the strength and durability of the concrete.

This test should be done on all samples of concrete coarse aggregate submitted for testing because any attempt to visually assess the presence of fines in a stockpile, truck, bin or even a sample bag is almost impossible. The test is performed by splitting off approximately 3000 g of the oven dried coarse aggregate and washing this sample in a pan of water by agitating and decanting through a 75 um sieve. This procedure is repeated several times until the aggregate and the wash water appear totally clean. The sample is then dried to a constant mass and reweighed. The loss in mass is expressed as a percentage of the original mass.

The maximum loss allowed for crushed gravel is 1 percent while the maximum for quarried aggregate is 2 percent. The extra amount allowed for quarried aggregate is because the

nature of the fines has proven less detrimental than natural or gravel fines which often have a significant clay content.

Flat and Elongated Particle Test (MTC LS-608)

A flat or elongated particle is one which has a ratio of the longest dimension to the shortest dimension equal to or larger than 4 to 1. Those particles that are obviously cubical are separated by eye from those that appear to be flat or elongated. The doubtful pieces are measured with a set of doubled ended calipers locked in a 4:1 ratio.

MTC limits the maximum amount of flat and elongated particles to 20 percent by mass. A large number of these particles in an aggregate will result in poor workability of the mix and may reduce the strength of the concrete.

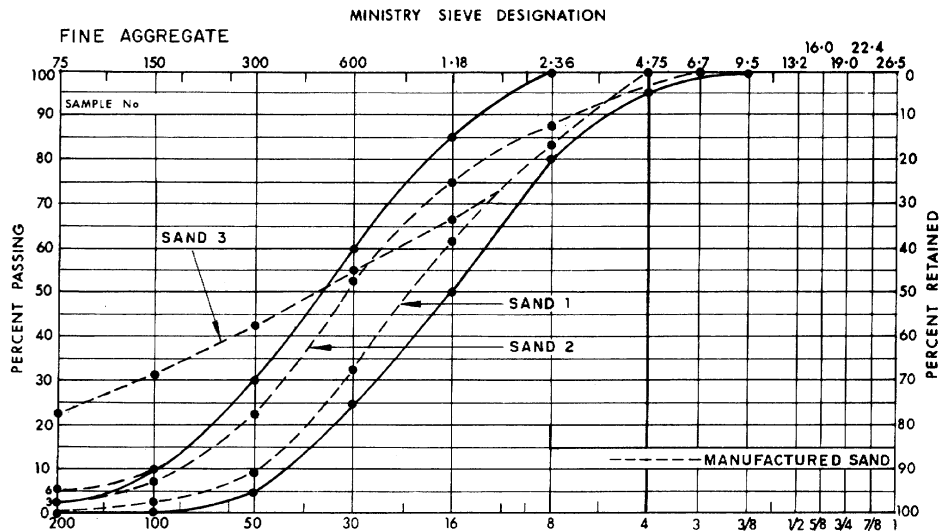


Figure 32. Sand 1 gave concrete with excessive segregation and poor workability. Sand 2 was made by adding a blending sand to No. 1 with excellent results. Sand 3 caused a high water demand, leading to a high W/C ratio with a reduction in concrete strength from 35MPa to 24MPa.

SOME SPECIFIC PROBLEM AGGREGATES

The aggregates mentioned below have been known to cause durability problems or give misleading test results. They are not necessarily restricted to the area of occurrence shown on the maps (Figure 34 and 35).

Shale (No. 5)

Shale particles when they are close to the surface of concrete will breakdown by freezing and thawing and cause conical popouts in the overlying mortar. Shales are also detrimental when used in asphalt and granular base.

Some shales are suitable for use in embankment and swamp backfills. Durability testing is necessary before they are used, see Hudec, (20) and Franklin (14).

A study, sponsored by this Ministry, of the Blenheim moraine, investigated the mechanism of breakdown of shale and ways in which it may be removed during processing to improve the quality of the final product (Holubec and DeLory, 19). Another study by the Ministry on the removal of deleterious particles (beneficiation) is that of Ingham (21).

Shale is found over much of Southern Ontario and also near Thunder Bay.

Siltstone (No. 6)

Siltstones found in gravel pits in the Caledon area, cause popouts when used in asphalt surface course. These aggregate particles do not appear to affect the performance of structural concrete.

Porous Dolomite (No. 7)

Porous dolomites are found in parts of Southwestern Ontario. They often have absorption values greater than 2 percent (MTC specification limit). Their performance in concrete is usually satisfactory. They usually have low resistance to abrasion and should not be used in asphalt surface course.

The satisfactory performance of these porous dolomites in structural concrete, despite the high absorption values shows that service records are more important than test results.

Weathered Dolomite (No. 8)

This rock, found in gravel pits and the top layers of quarries in this area, is unsuitable for use in concrete. The rock also causes severe popouts when used in asphalt surface course. See Dolar-Mantuani (5) and (8).

Gneiss (No. 9)

This is found in the Huntsville and Parry Sound areas and gives high Los Angeles Abrasion losses. These rocks give good field performance when used in asphalt pavements and, as a result, MTC specifications permit a loss of up to 50 percent for this material instead of the normal 35 percent for all others. Gneiss is found over much of the Laurentian Shield.

Chert (No. 10)

This is found from Sioux Lookout easterly to Timmins and as far south as the Ranger Lake area. This chert has been transported south from sedimentary rocks of the James Bay Lowlands by glacial action. These cherts are alkali-silica reactive and also have poor freeze-thaw durability.

Weathered Gneiss (No. 11)

Biotite (mica) gneisses found in this area give high Magnesium Sulphate Soundness test losses. Careful examination by an aggregate petrographer may show that they are suitable for use in concrete. See Dolar-Mantuani (6) and (8).

Sibley (No. 12)

These rocks with a distinctive red colour are found in the region surrounding Thunder Bay. Difficulty is found in classifying them for Petrographic Examination because their performance varies from good to extremely poor.

Brittle Granite (No. 13)

Brittle granites with some weathering of the feldspars are found in the Dryden/Ignace area of Northwestern Ontario. These rocks sometimes give high Los Angeles Abrasion test losses. Despite the high losses in this test they make perfectly durable concrete.

Carbonaceous Limestone (No. 14)

The Ottawa limestone has a characteristically dark grey colour. This dark colour is sometimes due to the presence of

carbonaceous films and partings in the limestone. Despite the dark grey shaley or clayey appearance, these limestones may be perfectly durable. This is because absorptive clay minerals are often absent. The clay minerals originally deposited at the time the limestone was formed have been changed to authigenic feldspars by moderate metamorphism. As a result the rock is stable from a freeze-thaw point of view.

Shaley Limestone (No. 15)

Shaley limestone from the Simcoe Group is often found in gravel pits to the north of Toronto. Particles of this shaley limestone will often produce popouts when close to the surface of concrete. Unless the quantity of shaley limestone is large, deep seated deterioration will not occur. Aggregate that passes all the MTC durability tests may contain particles of shaley limestone and produce popouts when used in concrete. This is a cosmetic problem, the integrity of the concrete will not be affected.

The ability of an aggregate to pass all the MTC durability tests is no guarantee that popouts will not occur from time to time.

Lithographic Limestone (No. 16)

Very fine grained, cream coloured limestones found in gravel pits and quarries in the Midland/Orillia area are unsuitable under certain conditions. These limestones are perfectly durable from a freeze-thaw point of view. When they are used in asphalt surface course and Portland cement concrete they often crack and fracture, see Koniuszy and Rogers (23). This fracturing is probably caused by a number of factors. They often have micro-fractures formed by the forces generated by blasting and crushing. However, specimens have been found to form irregular cracks and fractures as a result of thermal cycling (heating and cooling). If the number of fractures is great enough, the bond between the aggregate particle and asphalt will decrease and sometimes result in the loss of the aggregate from the road surface. These rocks are also very susceptible to polishing by vehicle tires and, as a result, are not desirable for skid resistant road surfaces.

Micaceous Diorite

A diorite quarried near Kenora has been found to have a poor bond with Portland cement. As a result, it was not possible to make 35 MPa concrete and difficulty was found in making a consistent 30 MPa concrete. The bond with cement paste

was sufficiently poor that 20 MPa concrete scaled excessively in a laboratory freeze-thaw test. The poor bond was traced to the high biotite and chlorite mica content of the rock. The mica mineral content of about 15-20 percent gave the rock a green colour and a soapy feel between the fingers.

Oxford Dolostone

Soles (33) found that a normally sound dolostone was unstable in concrete heated continually at 150°C. This dolostone from the Oxford Formation, found in quarries in the Ottawa-St. Lawrence Lowlands is perfectly durable when used at normal temperatures and has been extensively used by MTC. The cause of the deterioration is oxidation of small amounts of iron sulphide present in the rock to iron sulphate. This caused expansion and deterioration of the aggregate and consequent destruction of the concrete (See Figure 33). MTC has tested concrete prisms made with this aggregate. The prisms were stored at 150°C. An expansion of 0.45% was found after 1 year and 0.67% at 18 months.

Gypsum

Some limestone quarries in the Niagara Peninsula contain nodules of gypsum. Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) is a soft, white mineral, commonly used as a retarder in portland cement. Gypsum can react with the C₃A component of portland cement to cause expansion and disintegration of concrete. No cases of deterioration have been recorded due to the presence of gypsum in these aggregates. The amount of gypsum in concrete aggregate should, however, be severely restricted.

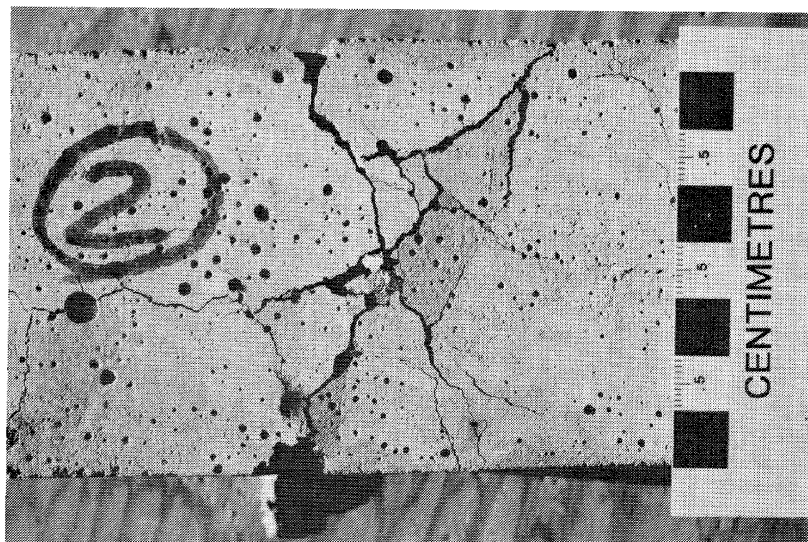


Figure 33 Oxidation of sulphides. Appearance of concrete prism made with Oxford dolostone after storage for about a year at 150°C.

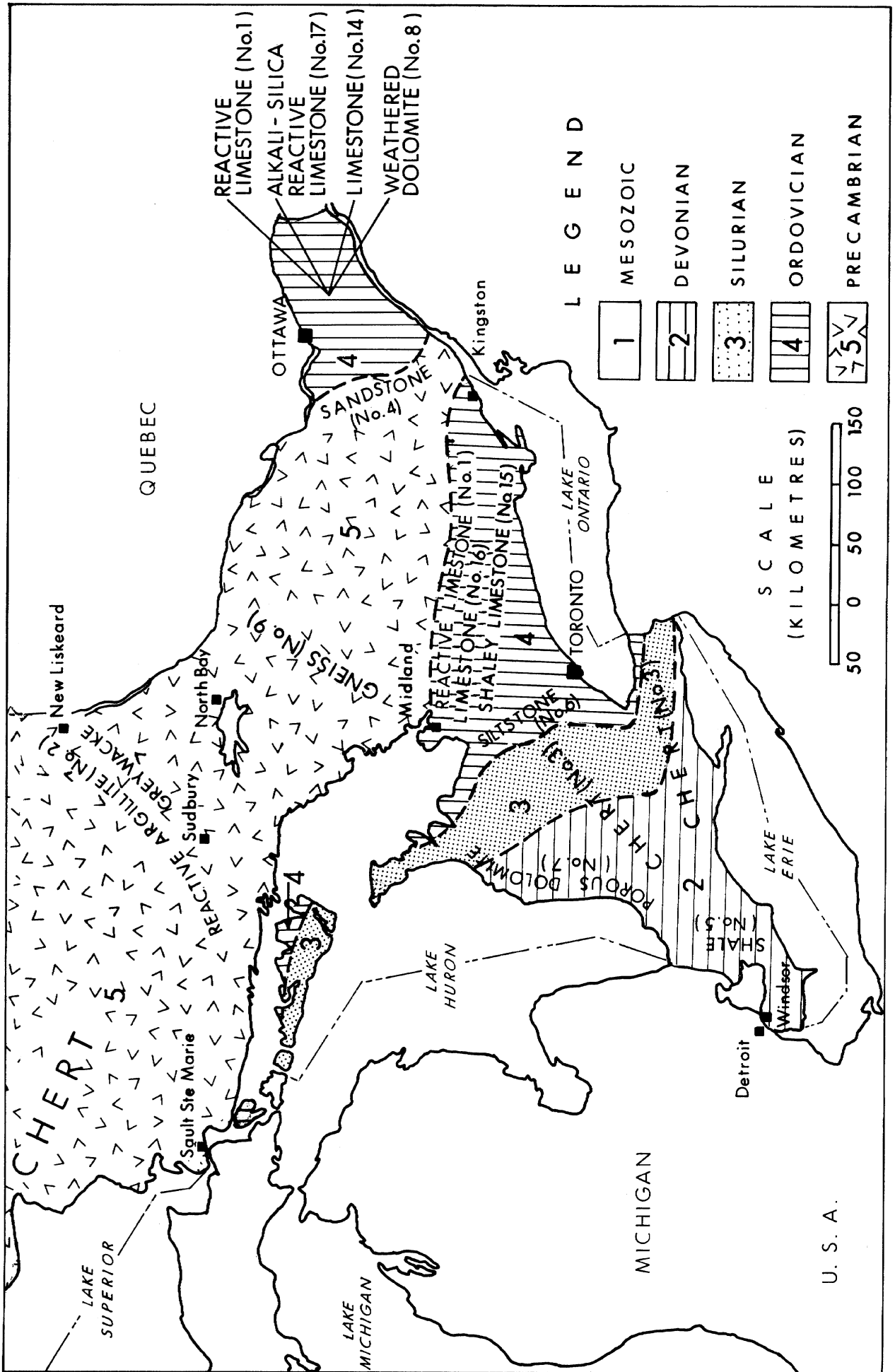
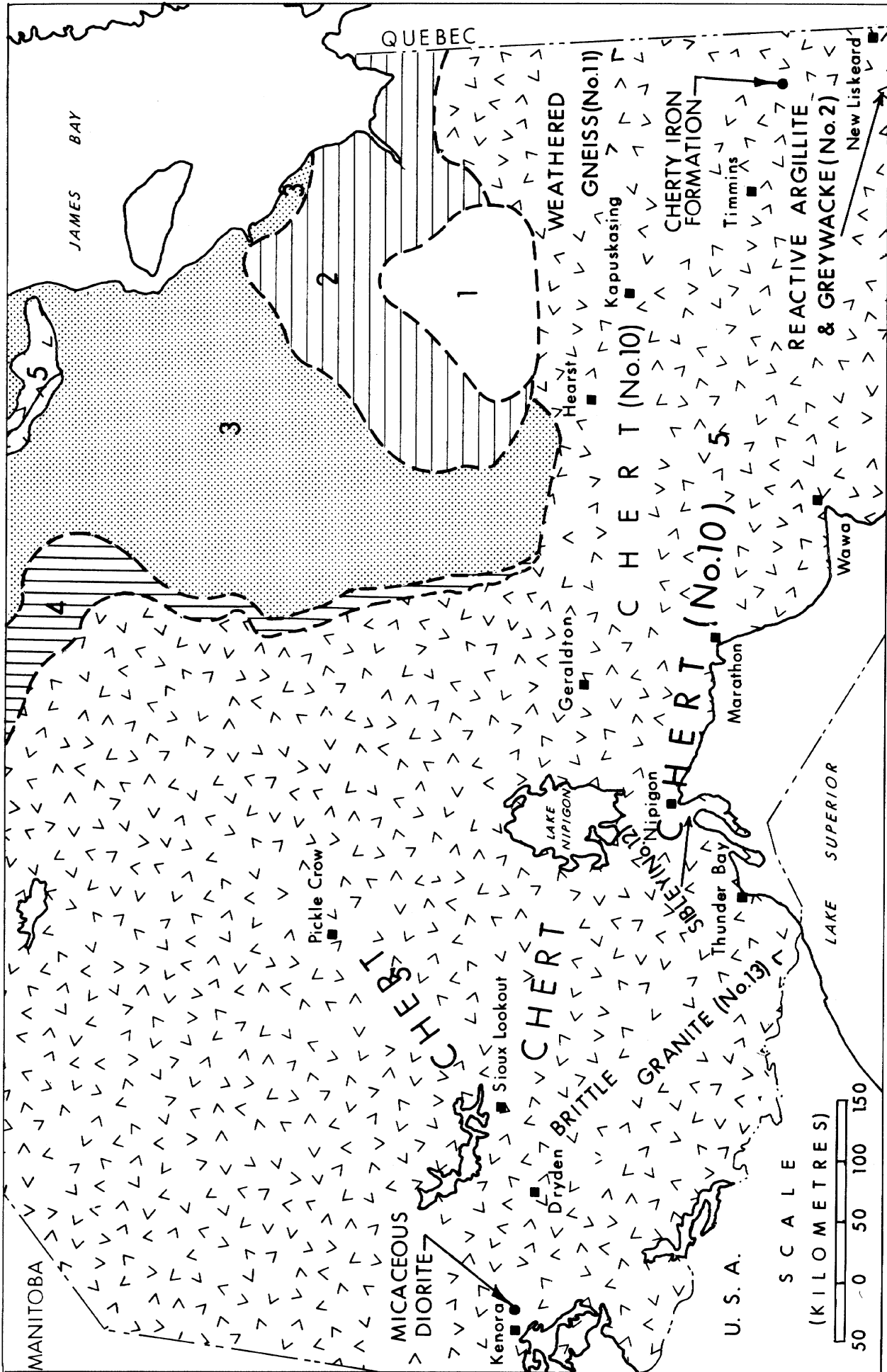


FIGURE 35



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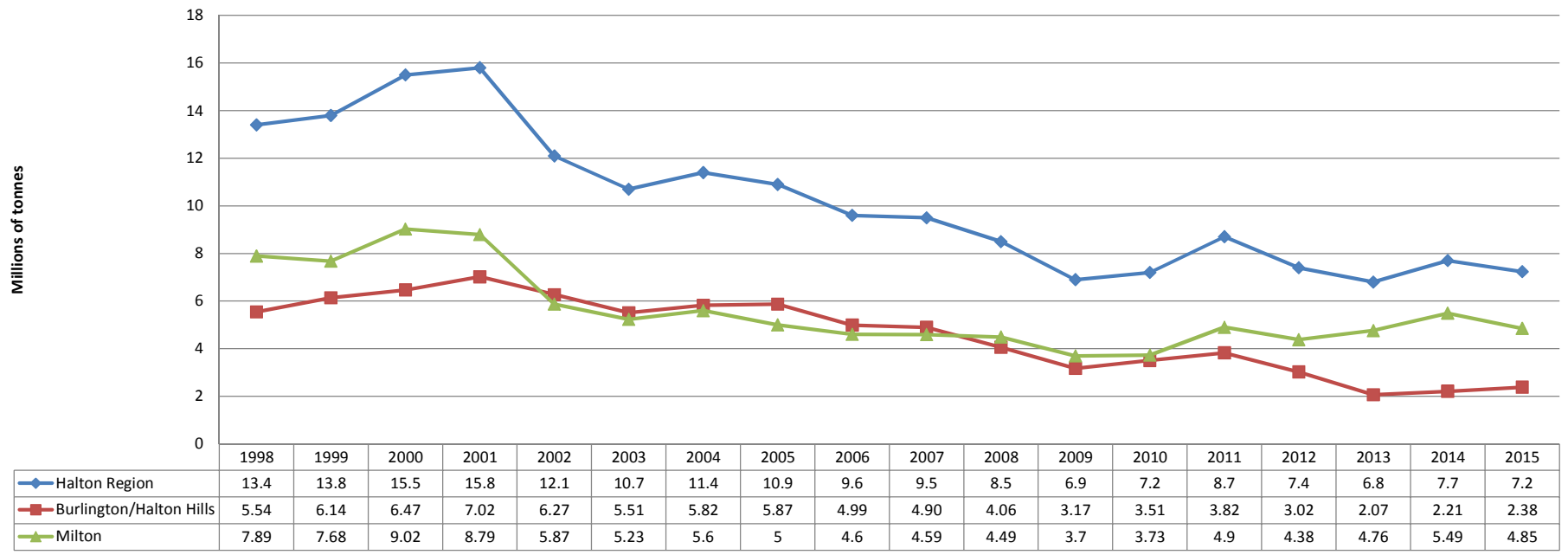
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Halton Region Annual Aggregate Production in millions tonnes reported by TOARC





• MINERAL • AGGREGATES • IN ONTARIO

Statistical Update

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Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS & REVIEW

1998

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 1998, this basic non-renewable resource was supplied from 2,798 licensed aggregate sites on private land in designated parts of the Province and 3,160 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. An indenture signed in June of 1997 between the Aggregate Producers' Association of Ontario (APAO) and the MNR established the Aggregate Resources Trust and appointed The Ontario Aggregate Resources Corporation (TOARC) to act as trustee.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is owned by the APAO as the single shareholder, but is directed by a multi-stakeholder board of directors. The seven-member Board is composed of APAO directors and representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC is arms-length from APAO in terms of separate office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon developing systems for the efficient collection and disbursement of aggregate resource charges, the rehabilitation of abandoned pits & quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.
- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.

- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - N Standards and policy development
 - N Technical approvals
 - N Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - N Compliance reporting
 - N Financial management
 - N Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Non-Renewable Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Non Renewable Resources Section, Lands and Natural Heritage Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

The production of mineral aggregates in 1998 totaled approximately 146 million tonnes, up slightly from the previous year. Production from licensed operations remained unchanged from 1997 at 124 million tonnes. Production from wayside pits and from permitted sites on Crown Land both showed a modest increase over 1997.

Economic Outlook

The production of mineral aggregates tends to rise and fall with general economic cycles. For example, growth in the GDP is usually followed by an increase in aggregate production and the reverse is also true. However the movement between aggregate production and the GDP is not always the same order of magnitude nor follows immediately. A report prepared by Clayton Research Associates Limited (Clayton Research) in 1999 for the APAO suggested that “when forecasting future aggregate production, it is more important to focus on expected trends in construction spending” as a more accurate predictor of future activity. Within the general category of ‘construction spending’, if it is possible to isolate future trends in road construction, it is possible to make an even better predictive model of aggregate demand. Road construction accounts for less than 10% of total construction spending yet accounts for approximately 50% of aggregate used each year.

According to Clayton Research, construction spending is some function of population growth, employment levels, the interest rate environment, vacancy rates and the general ‘mood’ of government with respect to such things as housing policy and the need for fiscal restraints.

For the period 2000 – 2003, Clayton Research sees some positive indicators for increased construction spending in Ontario.

- Over 150,000 people are expected to be added each year to the province’s population base.
- On average, the economy is expected to grow by 3 to 3.5 percent per year, and employment by 2 to 2.5 percent. About 125,000 new jobs are expected to be created each year on average during this period.
- Interest rates are expected to remain relatively low over the projection period, which is favourable for continued buoyant housing demand, as well as business investment.
- Vacancy rates have been declining in both the commercial and industrial sectors.
- Some moderate increase in rental construction will help to keep total housing starts buoyant as ownership demand subsides somewhat from its recent strong levels.
- As government fiscal problems are brought more firmly under control, there is likely to be modest increases in spending on infrastructure.

The above factors combined should result in increased construction spending over the period and stimulate aggregate demand. Clayton Research suggests that aggregate demand could exceed 160 million tonnes per annum during the forecast period.

Setting aside the marginal swings in demand for aggregate based on economic activity, it is important to note that aggregate demand, even during the severest of economic downturns is very significant. In the early 1990's when employment growth was in negative territory and non-residential building starts were barely noticeable, the need for aggregate was maintained at a level of 130 million tonnes per annum. This inelastic portion of aggregate demand attests to its importance as a basic commodity for the maintenance and development of our infrastructure.

Table 1

AGGREGATE PRODUCTION IN ONTARIO 1986 - 1998
(rounded to nearest million tonnes)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Licences	128	149	154	154	135	107	101	105	113	109	114	124	124
Wayside Permits *	6	5	5	4	3	2	2	2	2	2	2	1	2
Aggregate Permits	19	18	24	25	11	14	13	12	10	9	9	8	9
Private Land Non-Designated (estimated)	12	13	14	14	12	12	12	12	11	10	11	11	11
ONTARIO TOTAL	165	185	197	197	161	135	128	131	136	130	136	144	146

o * Wayside Permit production is reported as the total tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known

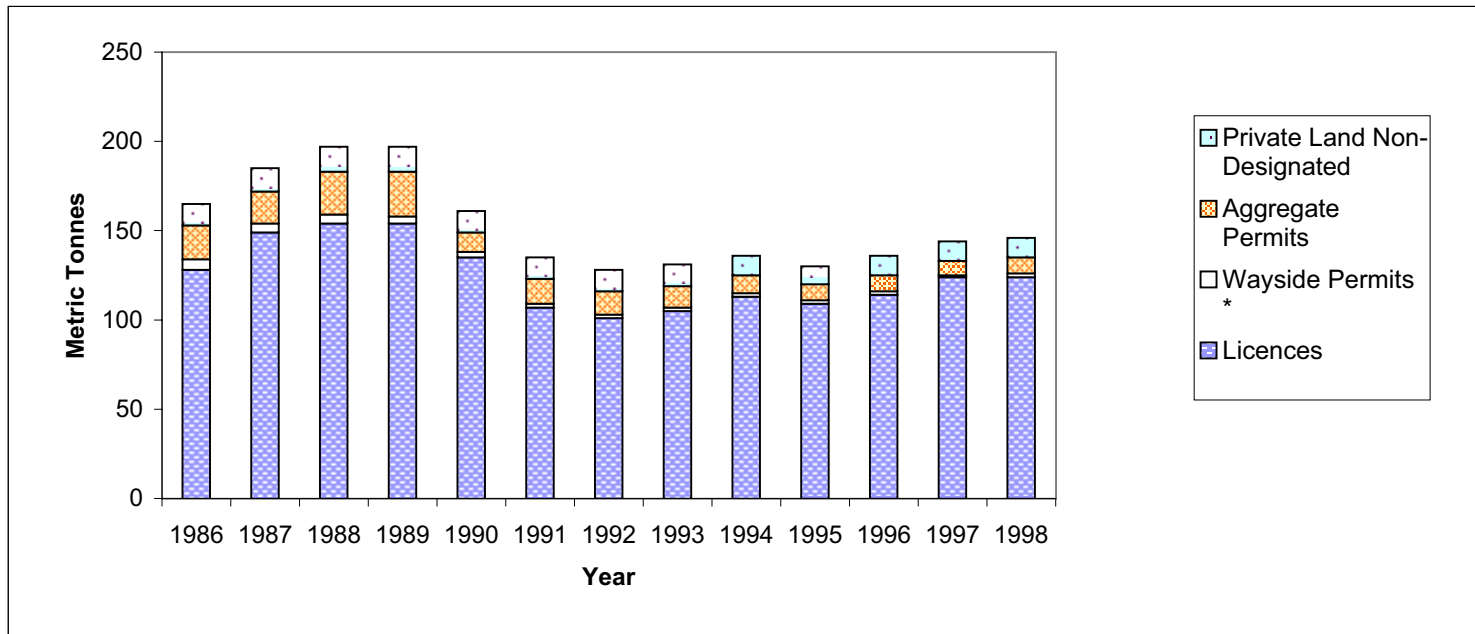


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Algoma D			
Sault Ste. Marie	552,949.64		552,949.64
Sub-Total	552,949.64	0.00	552,949.64
Brant			
Brantford	90,742.00		90,742.00
Brantford Tp	906,787.82		906,787.82
Burford	157,064.23		157,064.23
South Dumfries/Paris	390,924.00		390,924.00
Sub-Total	1,545,518.05	0.00	1,545,518.05
Bruce			
Albemarle Tp	42,001.36		42,001.36
Amabel Tp	186,660.65		186,660.65
Arran Tp	27,827.68		27,827.68
Eastnor Tp	37,048.84		37,048.84
Elderslie	85,256.42		85,256.42
Brant Tp/Bruce	100,751.50		100,751.50
Greenock Tp	108,769.72		108,769.72
Kincardine	1,768.00		1,768.00
Huron	80,062.53		80,062.53
Kinloss	123,232.19		123,232.19
Lindsay Tp	76,076.00		76,076.00
Mildmay-Carrick Tp	248,097.20		248,097.20
Saugeen	264,314.40		264,314.40
St. Edmunds Tp	35,871.16		35,871.16
Teeswater-Culross Tp	136,808.60		136,808.60
Sub-Total	1,554,546.25	0.00	1,554,546.25
Chatham-Kent			
Chatham-Kent	387,371.65		387,371.65
Sub-Total	387,371.65	0.00	387,371.65
Dufferin			
Amaranth	91,809.41		91,809.41
East Garafraxa	672,851.59		672,851.59
East Luther Grand Valley	56,859.22		56,859.22
Melancthon	178,717.50		178,717.50
Mono	371,080.25		371,080.25
Mulmur	466,319.28		466,319.28
Sub-Total	1,837,637.25	0.00	1,837,637.25
Durham			
Brock/Whitby	1,325,576.00		1,325,576.00
Clarington	2,986,784.12		2,986,784.12
Pickering/Oshawa/Scugog	350,881.91		350,881.91
Uxbridge	3,185,994.78		3,185,994.78
Sub-Total	7,849,236.81	0.00	7,849,236.81

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
<i>Elgin</i>			
Central Elgin	286,992.06		286,992.06
Dutton-Dunwich/Bayham/Malahide	63,871.88		63,871.88
West Elgin	72,347.20		72,347.20
Sub-Total	423,211.14	0.00	423,211.14
<i>Essex</i>			
Amherstburg/Leamington	1,141,313.00		1,141,313.00
Gosfield South Tp	541,456.00		541,456.00
Mersea	186,933.27		186,933.27
Windsor/Pelee	96,934.02		96,934.02
Sub-Total	1,966,636.29	0.00	1,966,636.29
<i>Frontenac</i>			
Frontenac Islands Tp	33,176.19		33,176.19
Kingston	907,096.94		907,096.94
South Frontenac Tp	224,464.11		224,464.11
Sub-Total	1,164,737.24	0.00	1,164,737.24
<i>Grey</i>			
Artemesia Tp	160,917.08		160,917.08
Bentinck Tp	217,619.34	14,300.00	231,919.34
Blue Mountains	180,931.81		180,931.81
Derby Tp	57,213.00		57,213.00
Egremont Tp/Euphrasia Tp	153,471.10		153,471.10
Glennelg Tp	116,160.61		116,160.61
Holland Tp	110,871.62		110,871.62
Keppel Tp	252,199.23		252,199.23
Normanby Tp	73,658.89		73,658.89
Osprey Tp	123,087.38		123,087.38
Proton Tp	80,647.30		80,647.30
Sarawak Tp/St. Vincent Tp	79,553.50		79,553.50
Sullivan Tp	236,169.40		236,169.40
Sydenham Tp	215,232.10		215,232.10
Sub-Total	2,057,732.36	14,300.00	2,072,032.36
<i>Haldimand-Norfolk</i>			
Delhi Tp	15,924.03		15,924.03
Dunnville/Simcoe	225,830.46		225,830.46
Haldimand, Town of	1,266,916.00		1,266,916.00
Nanticoke	251,270.22		251,270.22
Sub-Total	1,759,940.71	0.00	1,759,940.71
<i>Halton</i>			
Burlington	2,271,033.60		2,271,033.60
Halton Hills	3,272,669.60		3,272,669.60
Milton	7,890,888.83		7,890,888.83
Sub-Total	13,434,592.03	0.00	13,434,592.03
<i>Hamilton-Wentworth</i>			
Ancaster/Stoney Creek	644,340.40		644,340.40
Flamborough	4,088,573.00		4,088,573.00
Sub-Total	4,732,913.40	0.00	4,732,913.40

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Hastings			
Belleville	348,030.38		348,030.38
Centre Hastings	53,123.84		53,123.84
Madoc Tp	685,834.93		685,834.93
Marmora & Lake Tp	32,349.40		32,349.40
Quinte West	498,635.83		498,635.83
Stirling-Rawdon Tp	9,928.00		9,928.00
Tweed	55,243.45		55,243.45
Tyendinaga Tp	260,350.79		260,350.79
Sub-Total	1,943,496.62	0.00	1,943,496.62
Huron			
Ashfield Tp	155,882.89		155,882.89
Colborne Tp	352,365.95		352,365.95
East Wawanosh Tp	137,991.21		137,991.21
Goderich Tp	318,398.73		318,398.73
Grey Tp	552,580.69		552,580.69
Hay Tp	11,230.00		11,230.00
Howick Tp	255,427.09		255,427.09
Hullett Tp	127,817.12		127,817.12
McKillop Tp	257,090.23		257,090.23
Morris Tp	60,775.78		60,775.78
Stanley Tp/Turnberry Tp	32,906.00		32,906.00
Tuckersmith Tp	121,615.04		121,615.04
Usborne Tp	86,275.28		86,275.28
West Wawanosh Tp	139,790.34		139,790.34
Sub-Total	2,610,146.35	0.00	2,610,146.35
Lambton			
Bosanquet	195,029.71		195,029.71
Enniskillen Tp	14,665.00		14,665.00
Plympton Tp	219,813.30		219,813.30
Warwick Tp	193,779.12		193,779.12
Sub-Total	623,287.13	0.00	623,287.13
Lanark			
Bathurst, Burgess, Sherbrooke Tp	54,072.88		54,072.88
Beckwith Tp	111,562.47		111,562.47
Drummond-North Elmsley Tp	98,111.66		98,111.66
Lanark Highlands Tp	945,271.28		945,271.28
Mississippi Mills	16,515.26		16,515.26
Montague Tp	114,565.36		114,565.36
Sub-Total	1,340,098.91	0.00	1,340,098.91
Leeds & Grenville			
Augusta Tp	98,173.53		98,173.53
Edwardsburgh Tp	700,525.26	744,890.00	1,445,415.26
Elizabethtown Tp	610,816.29		610,816.29
Front of Escott Tp/Front of Yonge	4,605.16		4,605.16
Front of Leeds & Lansdowne Tp	62,374.24		62,374.24
Merrickville-Wolford/Kitley Tp	142,226.39		142,226.39
North Grenville Tp	913,791.73	405,689.00	1,319,480.73
Rear of Leeds & Lansdowne Tp	365,053.76		365,053.76
Rear of Yonge & Escott Tp/Rideau Lakes Tp	194,283.56		194,283.56
Sub-Total	3,091,849.92	1,150,579.00	4,242,428.92

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Lennox & Addington			
Greater Napanee	317,967.56		317,967.56
Loyalist Tp	1,470,394.82		1,470,394.82
Stone Mills Tp	114,698.00		114,698.00
Sub-Total	1,903,060.38	0.00	1,903,060.38
Middlesex			
Adelaide Tp/Biddulph Tp	79,124.53		79,124.53
Caradoc Tp/East Williams Tp	33,819.42		33,819.42
London	2,884,012.96		2,884,012.96
McGillivray Tp	6,985.04		6,985.04
Middlesex Centre Tp	912,824.35		912,824.35
North Dorchester Tp	1,167,294.99		1,167,294.99
West Nissouri Tp	927,035.69		927,035.69
West Williams Tp	66,239.07		66,239.07
Sub-Total	6,077,336.05	0.00	6,077,336.05
Niagara			
Fort Erie/Niagara-on-the-Lake	690,833.89		690,833.89
Lincoln/Pelham	1,465,866.00		1,465,866.00
Niagara Falls	1,155,841.75		1,155,841.75
Port Colborne/Wainfleet	1,279,471.92		1,279,471.92
Sub-Total	4,592,013.56	0.00	4,592,013.56
Northumberland			
Alnwick Tp	17,360.29		17,360.29
Brighton Tp	589,061.83		589,061.83
Campbellford-Seymour	110,447.24		110,447.24
Cramahe Tp	1,664,577.40		1,664,577.40
Haldimand Tp	154,568.51		154,568.51
Hamilton Tp	250,327.97		250,327.97
Hope Tp	64,140.70	190,497.00	254,637.70
Percy Tp	116,533.96		116,533.96
Sub-Total	2,967,017.90	190,497.00	3,157,514.90
Ottawa-Carleton			
Cumberland Tp	426,992.31		426,992.31
Gloucester	1,917,177.30		1,917,177.30
Goulbourn Tp	440,412.62		440,412.62
Nepean	2,134,391.75		2,134,391.75
Osgoode Tp	333,586.04		333,586.04
Rideau Tp	2,387.00		2,387.00
West Carleton Tp	1,835,115.16		1,835,115.16
Sub-Total	7,090,062.18	0.00	7,090,062.18
Oxford			
Blandford-Blenheim Tp/Woodstock	158,211.52		158,211.52
East Zorra-Tavistock Tp/Ingersoll	70,475.18		70,475.18
Norwich Tp	47,004.00		47,004.00
South-West Oxford Tp	809,280.12		809,280.12
Zorra Tp	3,771,527.68		3,771,527.68
Sub-Total	4,856,498.50	0.00	4,856,498.50

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Peel			
Brampton/Mississauga	274,141.76		274,141.76
Caledon	3,898,691.70		3,898,691.70
Sub-Total	4,172,833.46	0.00	4,172,833.46
Perth			
North Perth	21,654.24		21,654.24
Perth East Tp	333,891.45		333,891.45
Perth South Tp	1,189,414.24		1,189,414.24
St. Mary's/West Perth Tp	187,392.84		187,392.84
Sub-Total	1,732,352.77	0.00	1,732,352.77
Peterborough			
Asphodel-Norwood Tp	175,640.25		175,640.25
Cavan-Millbrook-North Monaghan Tp	74,388.13		74,388.13
Douro-Dummer Tp	442,790.38		442,790.38
Galway-Cavendish-Harvey Tp	194,935.76		194,935.76
Havelock-Belmont-Methuen Tp	343,912.38		343,912.38
Otonabee-South Monaghan Tp	226,586.00		226,586.00
Smith-Ennismore Tp	348,521.73		348,521.73
Sub-Total	1,806,774.63	0.00	1,806,774.63
Prescott & Russell			
Alfred & Plantagenet Tp	173,006.86		173,006.86
Champlain Tp	309,631.84		309,631.84
Clarence-Rockland	214,267.52		214,267.52
East Hawkesbury Tp	45,982.88		45,982.88
Russell Tp	263,002.28		263,002.28
The Nation	136,698.87		136,698.87
Sub-Total	1,142,590.25	0.00	1,142,590.25
Prince Edward Co			
Prince Edward Co	2,007,390.55		2,007,390.55
Sub-Total	2,007,390.55	0.00	2,007,390.55
Renfrew			
Alice & Fraser Tp	307,870.54		307,870.54
Bagot-Blythfield-Brougham Tp/Bromley Tp	93,199.60		93,199.60
Horton Tp	346,792.72		346,792.72
McNab-Braeside Tp	213,234.76		213,234.76
Petawawa	198,709.87		198,709.87
Renfrew/Ross Tp	29,719.32		29,719.32
Stafford & Pembroke Tp	57,471.32		57,471.32
Westmeath Tp	71,131.19		71,131.19
Sub-Total	1,318,129.32	0.00	1,318,129.32

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Simcoe			
Adjala-Tosorontio Tp	746,817.53		746,817.53
Bradford-West Gwillimbury/Barrie/Collingwood	13,100.43		13,100.43
Clearview Tp	1,173,218.12		1,173,218.12
Essa Tp	182,091.83		182,091.83
Innisfil	111,391.07		111,391.07
Midland	268,133.72		268,133.72
New Tecumseh	93,373.67		93,373.67
Oro-Medonte Tp/Orillia	2,266,539.08		2,266,539.08
Ramara Tp	1,666,826.44		1,666,826.44
Severn Tp	1,047,273.27		1,047,273.27
Springwater Tp	1,052,480.59		1,052,480.59
Tay Tp	141,134.17		141,134.17
Tiny Tp/Wasaga Beach	191,771.37		191,771.37
Sub-Total	8,954,151.29	0.00	8,954,151.29
Stormont, Dundas & Glengarry			
North Dundas Tp	576,236.09		576,236.09
North Glengarry Tp	97,378.76		97,378.76
North Stormont Tp	360,751.69		360,751.69
South Dundas Tp	276,758.05		276,758.05
South Glengarry Tp	273,706.96		273,706.96
South Stormont Tp	851,622.16		851,622.16
Sub-Total	2,436,453.71	0.00	2,436,453.71
Sudbury			
Nickel Centre	988,137.62		988,137.62
Onaping Falls	756,491.99		756,491.99
Rayside-Balfour	15,332.00		15,332.00
Sudbury	298,721.41		298,721.41
Valley East	158,416.46		158,416.46
Walden	56,133.34		56,133.34
Sub-Total	2,273,232.82	0.00	2,273,232.82
Sudbury District			
Sudbury D	233,362.43		233,362.43
Sub-Total	233,362.43	0.00	233,362.43
Victoria			
Bexley Tp/Bobcaygeon/Dalton Tp	6,901.36		6,901.36
Carden Tp	1,236,872.80		1,236,872.80
Eldon Tp	190,125.02		190,125.02
Emily Tp	403,902.97		403,902.97
Fenelon Tp	176,380.04		176,380.04
Laxton, Digby, & Longford Tp	56,983.86		56,983.86
Manvers Tp	3,665,686.76		3,665,686.76
Mariposa Tp/Ops Tp	444,725.39		444,725.39
Somerville Tp	337,966.10		337,966.10
Verulam Tp	52,246.04		52,246.04
Sub-Total	6,571,790.34	0.00	6,571,790.34

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Waterloo			
Cambridge/Kitchener	800,494.93		800,494.93
North Dumfries Tp	2,507,810.25		2,507,810.25
Wellesley Tp	1,016,830.92		1,016,830.92
Wilmot Tp	655,078.07		655,078.07
Woolwich Tp	838,114.01		838,114.01
Sub-Total	5,818,328.18	0.00	5,818,328.18
Wellington			
Arthur Tp	95,036.88		95,036.88
Eramosa Tp	129,982.51		129,982.51
Erin Tp	1,152,010.97		1,152,010.97
Guelph Tp	270,628.78		270,628.78
Mapleton Tp	40,891.98		40,891.98
Maryborough Tp	46,610.56		46,610.56
Minto Tp	331,118.46		331,118.46
Pilkington Tp	631,590.35		631,590.35
Puslinch Tp	3,774,538.27	247,053.00	4,021,591.27
West Garafraxa Tp	111,653.37		111,653.37
West Luther Tp	27,541.25		27,541.25
Sub-Total	6,611,603.38	247,053.00	6,858,656.38
York			
East Gwillimbury	383,822.08		383,822.08
Georgina/King Tp	74,999.69		74,999.69
Markham/Richmond Hill/Vaughan	245,302.87		245,302.87
Whitchurch-Stouffville	1,533,973.00		1,533,973.00
Total	2,238,097.64	0.00	2,238,097.64
GRAND TOTAL	123,678,981.09	1,602,429.00	125,281,410.09

Note: Some Wayside Contracts may not have been completed at the time of this report and hence do not show up in Table 2

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1990	1991	1992	1993	1994	1995	1996	1997	1998
Algoma, District of	0.8	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.6
Brant Co.	2.6	1.9	1.4	1.1	1.3	1.6	1.7	2.1	1.5
Bruce Co.	2.4	2.5	2.0	2.0	1.8	1.5	1.2	1.3	1.6
Chatham-Kent, R. M. of	0.4	0.4	0.3	0.4	0.5	0.5	0.4	0.5	0.4
Dufferin Co.	1.7	1.6	1.1	1.3	1.6	1.4	1.5	1.5	1.8
Durham, R. M. of	8.1	5.8	5.7	6.6	7.1	7.2	7.6	8.7	7.8
Elgin Co.	0.7	0.6	0.5	0.6	0.5	0.4	0.5	0.7	0.4
Essex Co.	2.7	2.5	2.7	2.8	2.7	2.4	2.2	2.7	2.0
Frontenac, Management Board	2.0	1.6	1.6	1.4	1.5	1.2	1.6	1.5	1.2
Grey Co.	3.2	2.7	2.6	2.4	2.7	2.4	2.0	2.1	2.1
Haldimand-Norfolk, R. M. of	2.5	1.7	1.7	1.8	1.9	1.9	1.7	2.1	1.8
Halton, R. M. of	12.0	7.5	7.0	9.2	9.7	10.7	12.3	14.4	13.4
Hamilton-Wentworth, R. M. of	5.1	3.7	3.6	3.4	3.9	4.0	4.0	5.2	4.7
Hastings Co.	1.6	1.4	1.6	1.5	1.2	1.4	1.6	2.0	1.9
Huron Co.	2.9	3.1	2.9	2.1	2.9	2.8	2.8	2.4	2.6
Lambton Co.	0.7	0.5	0.5	0.4	0.6	0.6	0.4	0.5	0.6
Lanark Co.	1.2	1.1	1.2	0.9	1.1	1.3	1.2	1.2	1.3
Leeds & Grenville Co.'s	2.5	2.1	2.0	2.0	2.4	2.3	2.0	2.1	4.2
Lennox & Addington Co.	ND	ND	1.4	1.9	1.7	2.0	1.8	1.7	1.9
Middlesex Co.	6.9	4.5	4.4	5.0	4.9	4.5	4.5	5.3	6.1
Niagara, R. M. of	6.1	4.0	3.3	3.5	4.1	3.6	4.7	4.9	4.6
Northumberland Co.	4.5	3.1	3.3	3.0	3.0	2.6	3.0	3.2	3.2
Ottawa-Carleton, R. M. of	9.4	8.6	8.7	9.2	9.3	8.4	6.1	6.7	7.1
Oxford Co.	5.3	4.0	4.5	4.9	4.6	5.0	4.6	5.3	4.9
Peel, R. M. of	4.4	3.3	2.7	2.9	3.1	3.7	3.8	4.3	4.2
Perth Co.	2.1	1.6	1.3	1.4	1.7	1.6	1.9	1.7	1.7
Peterborough Co.	2.7	2.5	2.4	2.6	2.2	1.8	1.8	1.8	1.8
Prescott & Russell Co.'s	1.7	1.4	1.5	1.7	1.9	1.3	1.2	1.4	1.1
Prince Edward Co.	2.2	1.8	1.7	1.5	1.9	2.2	1.8	2.1	2.0
Renfrew Co.	ND	ND	ND	ND	1.1	1.3	1.5	1.2	1.3
Simcoe Co.	11.0	8.1	8.0	6.9	6.2	6.8	7.4	7.6	9.0
Stormont, Dundas & Glengarry Co.'s	2.6	2.5	2.4	2.6	2.6	2.3	2.1	2.4	2.4
Sudbury, District of	0.7	0.4	0.5	0.5	0.5	0.3	0.3	0.2	0.2
Sudbury, R. M. of	2.9	2.9	2.7	2.2	2.9	2.9	2.7	2.5	2.3
Victoria Co.	6.7	5.6	4.7	5.1	5.4	4.9	6.0	6.5	6.6
Waterloo, R. M. of	5.6	5.1	4.1	4.7	5.8	5.8	5.8	5.6	5.8
Wellington Co.	6.5	5.6	4.9	5.5	5.6	4.9	6.0	6.4	6.9
York, R. M. of	3.3	2.6	1.6	1.4	1.9	2.2	2.0	2.6	2.2
TOTAL	137.7	108.8	103.0	106.8	114.3	112.2	114.3	125.0	125.2

ND: Not Designated under the Aggregate Resources Act

Table 4

**LICENCE PRODUCTION IN 1998
THE TOP TEN PRODUCING MUNICIPALITIES**

Municipality	County/Region	1998 Production	Production				
			1997	1996	1995	1994	1993
1 Town of Milton	Halton Region	7.9	9.6	8.6	5.6	3.6	3.8
2 Town of Flamborough	Hamilton-Wentworth	4.1	4.2	3.2	3.3	3.1	2.7
3 Town of Caledon	Peel Region	3.9	4.0	3.5	3.6	3.0	2.8
4 Puslinch Township	Wellington County	3.8	3.5	3.2	2.0	2.7	2.4
5 Zorra Township	Oxford County	3.8	3.8	3.3	3.6	3.1	3.1
6 Township of Manvers	Victoria County	3.7	3.7	3.6	2.8	3.1	2.9
7 Town of Halton Hills	Halton Region	3.3	3.2	2.4	3.9	5.6	4.5
8 Township of Uxbridge	Durham	3.2	3.1	3.3	3.1	2.9	2.6
9 Clarington	Durham	3.0	3.9	3.1	3.0	2.9	2.8
10 City of London	Middlesex	2.9	2.4	2.0	1.8	1.8	1.9
Total		39.6	41.4	36.2	32.7	31.8	29.5

Note: Municipalities ranked in order of their licenced production for 1998

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
AS OF DECEMBER 31, 1998**

District	No. of Licences	Category		Type of Operation		
		Class A	Class B	Pit	Quarry	Pit & Quarry
Aurora (GTA)	184	155	29	167	17	0
Aylmer	329	231	98	313	10	6
Bancroft	36	12	24	18	13	5
Guelph (Cambridge)	476	378	98	442	31	3
Kemptville	523	259	264	386	116	21
Midhurst	478	341	137	441	34	3
Pembroke	120	51	69	108	6	6
Peterborough (Tweed)	514	269	245	414	86	14
Sault Ste. Marie	38	25	13	33	1	4
Sudbury	100	75	25	87	4	9
TOTAL	2798	1796	1002	2409	318	71

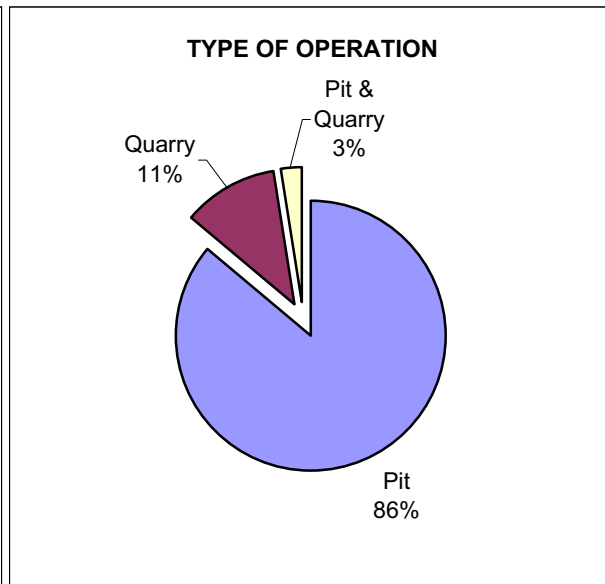
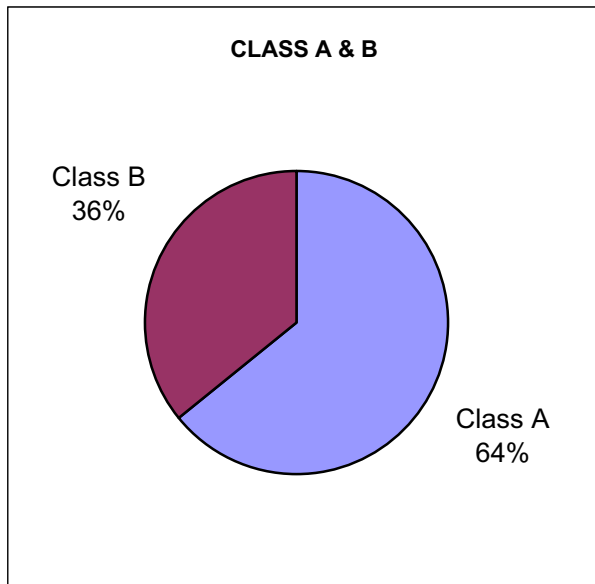
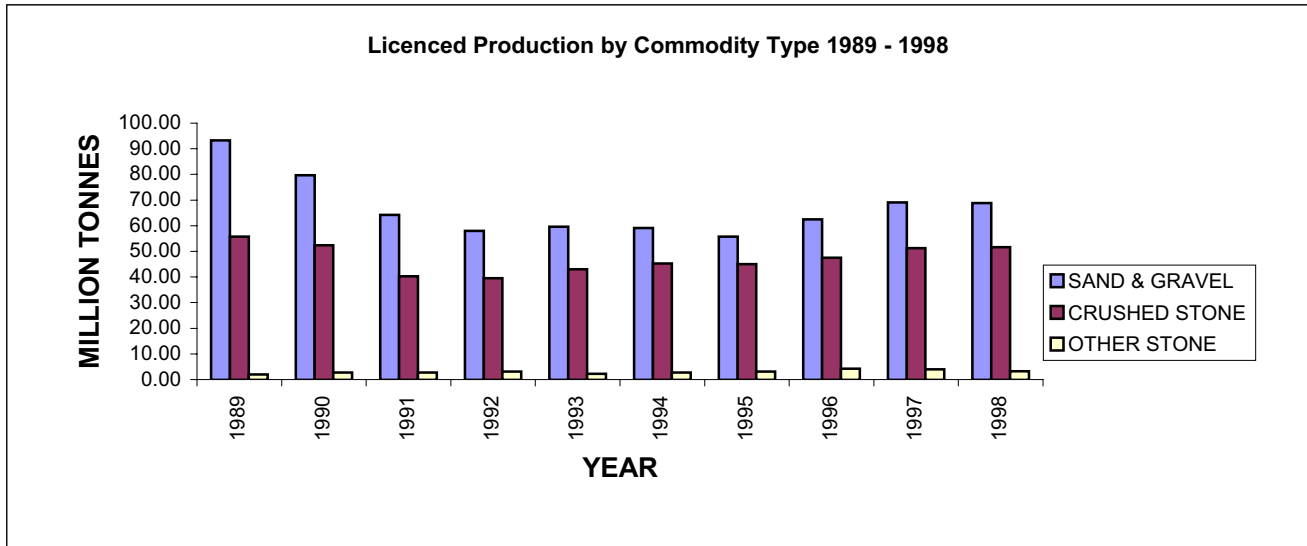


Table 6

**1998 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	27,694,760	13,229,996	13,379,429	1,081,031	4,304
Aylmer	14,665,997	10,483,383	4,173,901	8,713	0
Bancroft	1,785,611	115,629	1,657,778	0	12,203
Guelph (Cambridge)	29,128,019	17,948,048	11,104,552	73,571	1,848
Kemptville	15,101,055	4,039,111	10,373,765	102,490	585,689
Midhurst	14,347,208	10,559,478	3,667,223	24,138	96,369
Pembroke	1,318,129	1,179,326	137,771	0	1,033
Peterborough (Tweed)	16,578,657	8,588,867	6,805,885	45,114	1,138,791
Sault Ste. Marie	552,950	525,315	6,189	0	21,446
Sudbury	2,506,595	2,166,550	336,284	3,761	0
TOTAL	123,678,981	68,835,703	51,642,778	1,338,817	1,861,683

Note: Totals may not equal due to rounding
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Sand & Gravel	Crushed Stone	Other
1989	93.23	55.76	1.95
1990	79.62	52.42	2.74
1991	64.24	40.26	2.78
1992	57.99	39.52	3.15
1993	59.62	43.04	2.19
1994	59.07	45.28	2.76
1995	55.7	45.01	3.09
1996	62.52	47.48	4.27
1997	69.05	51.23	4.01
1998	68.84	51.64	3.20

Table 7

**1998 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	115,491.43	115,242.79	-	-	248.64
Cochrane	467,319.44	320,812.68	145,614.00	-	892.76
Hearst	794,878.47	445,312.65	347,747.98	-	1,817.84
Kirkland Lake	265,038.44	265,038.44	-	-	-
North Bay	515,366.39	500,814.47	11,380.00	-	3,171.92
Sault Ste. Marie	679,606.32	304,702.32	-	374,904.00	-
Sudbury	193,278.22	176,660.40	11,486.82	957.44	4,173.56
Timmins	151,161.80	98,971.14	-	52,190.66	-
Wawa	793,471.98	756,971.98	-	36,500.00	-
Sub-Total	3,975,612.49	2,984,526.87	516,228.80	464,552.10	10,304.72
NORTHWEST					
Dryden	762,550.74	524,151.52	238,127.25	-	271.97
Fort Francis	369,948.53	363,886.53	-	-	6,062.00
Kenora	290,088.09	266,745.85	7,398.00	-	15,944.24
Nipigon	1,476,125.58	1,465,210.64	9,768.20	363.20	783.54
Red Lake	280,278.29	279,072.29	-	599.00	607.00
Sioux Lookout	344,182.54	341,271.34	2,000.00	-	911.20
Thunder Bay	329,791.58	325,275.08	-	-	4,516.50
Sub-Total	3,852,965.35	3,565,613.25	257,293.45	962.20	29,096.45
SOUTHCENTRAL					
Algonquin Park	56,099.00	56,099.00	-	-	-
Aurora (GTA)	0.00	-	-	-	-
Aylmer	613.13	613.13	-	-	-
Bancroft	278,627.22	123,556.34	153,454.00	1.00	1,615.88
Guelph (Cambridge)	400.00	400.00	-	-	-
Kemptville	490,897.06	301,716.17	189,180.89	-	-
Midhurst	8,367.00	8,367.00	-	-	-
Parry Sound	210,073.10	90,499.60	116,520.00	-	3,053.50
Pembroke	51,197.86	51,197.86	-	-	-
Peterborough (Tweed)	0.00	-	-	-	-
Sub-Total	1,096,274.37	632,449.10	459,154.89	1.00	4,669.38
TOTAL	8,924,852.21	7,182,589.22	1,232,677.14	465,515.30	44,070.55

Table 8

**1998 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	613.13	613.13	0.00	0.00	0.00
Peninsula (2)	400.00	400.00	0.00	0.00	0.00
West Central (3)	8,367.00	8,367.00	0.00	0.00	0.00
GTA (4)	0.00	0.00	0.00	0.00	0.00
East Central (5)	349,382.34	94,465.96	253,234.00	1.00	1,681.38
East (6)	543,638.88	354,457.99	189,180.89	0.00	0.00
Northeast (7)	2,746,709.66	2,150,288.04	532,968.80	957.44	62,495.38
Northwest (8)	5,275,741.20	4,573,997.10	257,293.45	412,366.20	32,084.45
TOTAL	8,924,852.21	7,182,589.22	1,232,677.14	413,324.64	96,261.21

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

*CPCA - Canadian Portland Cement Association

**1998 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,668,127.27	13,773,866.09	4,846,250.00	46,162.94	1,848.24
Peninsula (2)	12,639,098.33	2,360,220.23	10,264,060.50	14,817.60	0.00
West Central (3)	26,833,998.71	22,856,822.49	3,835,366.38	45,440.85	96,368.99
GTA (4)	27,694,759.94	13,229,996.19	13,379,429.00	1,081,030.80	4,303.95
East Central (5)	15,296,470.04	8,418,358.44	6,852,272.69	6,492.60	19,346.31
East (6)	19,486,981.91	5,504,575.29	12,122,926.19	141,111.24	1,718,369.19
Northeast (7)	2,506,595.25	2,166,549.83	336,284.27	3,761.15	0.00
Northwest (8)	552,949.64	525,314.64	6,189.00	0.00	21,446.00
TOTAL	123,678,981.09	68,835,703.20	51,642,778.03	1,338,817.18	1,861,682.68

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

*CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 1998
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	184	9,610.04	3,602.22	145.44	47.50	3,700.16
Aylmer	329	8,737.49	3,228.57	151.44	152.00	3,228.01
Bancroft	36	1,453.12	216.27	18.60	1.00	233.87
Guelph (Cambridge)	476	16,521.22	4,133.74	217.97	140.38	4,211.33
Kemptville	523	14,390.38	3,679.62	126.11	71.41	3,734.32
Midhurst	478	13,515.16	338.10	171.15	96.86	412.39
Pembroke	120	3,159.52	355.54	31.87	0.50	386.91
Peterborough (Tweed)	514	13,732.59	3,174.12	125.43	75.53	3,224.02
Sault Ste. Marie	38	1,102.38	217.06	3.34	1.20	219.20
Sudbury	100	7,210.01	752.57	29.54	10.80	771.31
TOTAL	2798	89,431.91	19,697.81	1,020.89	597.18	20,121.52

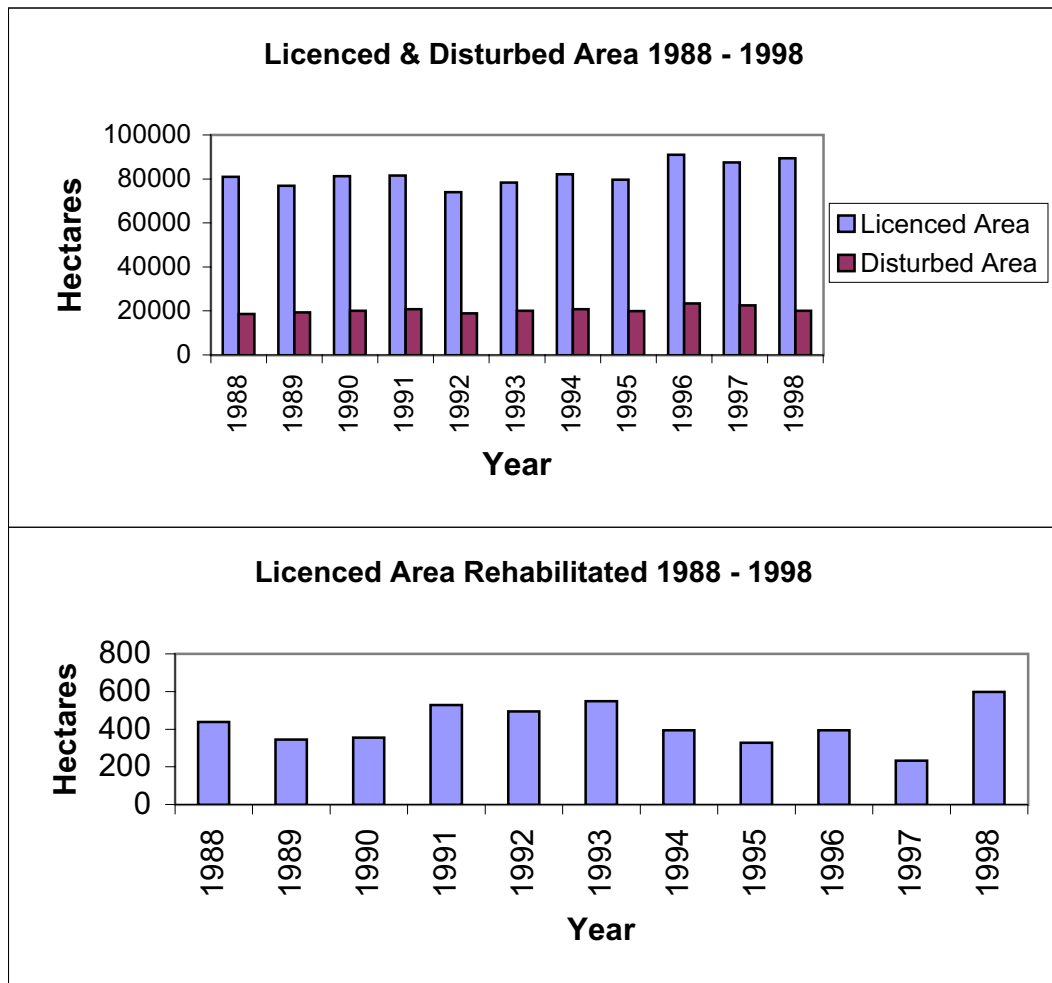


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	464.19	191	191	0	0	0
Cochrane	2,215.27	111	99	7	5	0
Hearst	16,069.81	157	140	16	1	0
Kirkland Lake	392.23	98	97	1	0	0
North Bay	11,504.89	218	204	12	2	0
Sault Ste. Marie	551.28	123	121	1	1	0
Sudbury	3,515.45	196	174	16	6	0
Timmins	1,361.82	160	156	4	0	0
Wawa	1,868.41	295	294	1	0	0
Sub-Total	37,943.35	1,549	1,476	58	15	0
NORTHWEST						
Dryden	975.86	164	161	3	0	0
Fort Francis	1,633.97	257	253	2	2	0
Kenora	1,581.70	204	188	15	1	0
Nipigon	3,501.86	375	359	12	4	0
Red Lake	525.14	85	85	0	0	0
Sioux Lookout	740.19	70	70	0	0	0
Thunder Bay	1,119.02	163	152	11	0	0
Sub-Total	10,077.74	1,318	1,268	43	7	0
SOUTHCENTRAL						
Algonquin Park	13.62	24	24	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	519.28	92	86	6	0	0
Guelph (Cambridge)	657.10	3	1	0	0	2
Kemptville	274.58	7	4	2	0	1
Midhurst	9.09	2	1	0	0	1
Parry Sound	453.17	120	96	13	1	10
Pembroke	99.51	44	43	1	0	0
Peterborough (Tweed)	0.00	0	0	0	0	0
Sub-Total	2,026.45	293	255	22	1	15
TOTAL	50,047.54	3,160	2,999	123	23	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

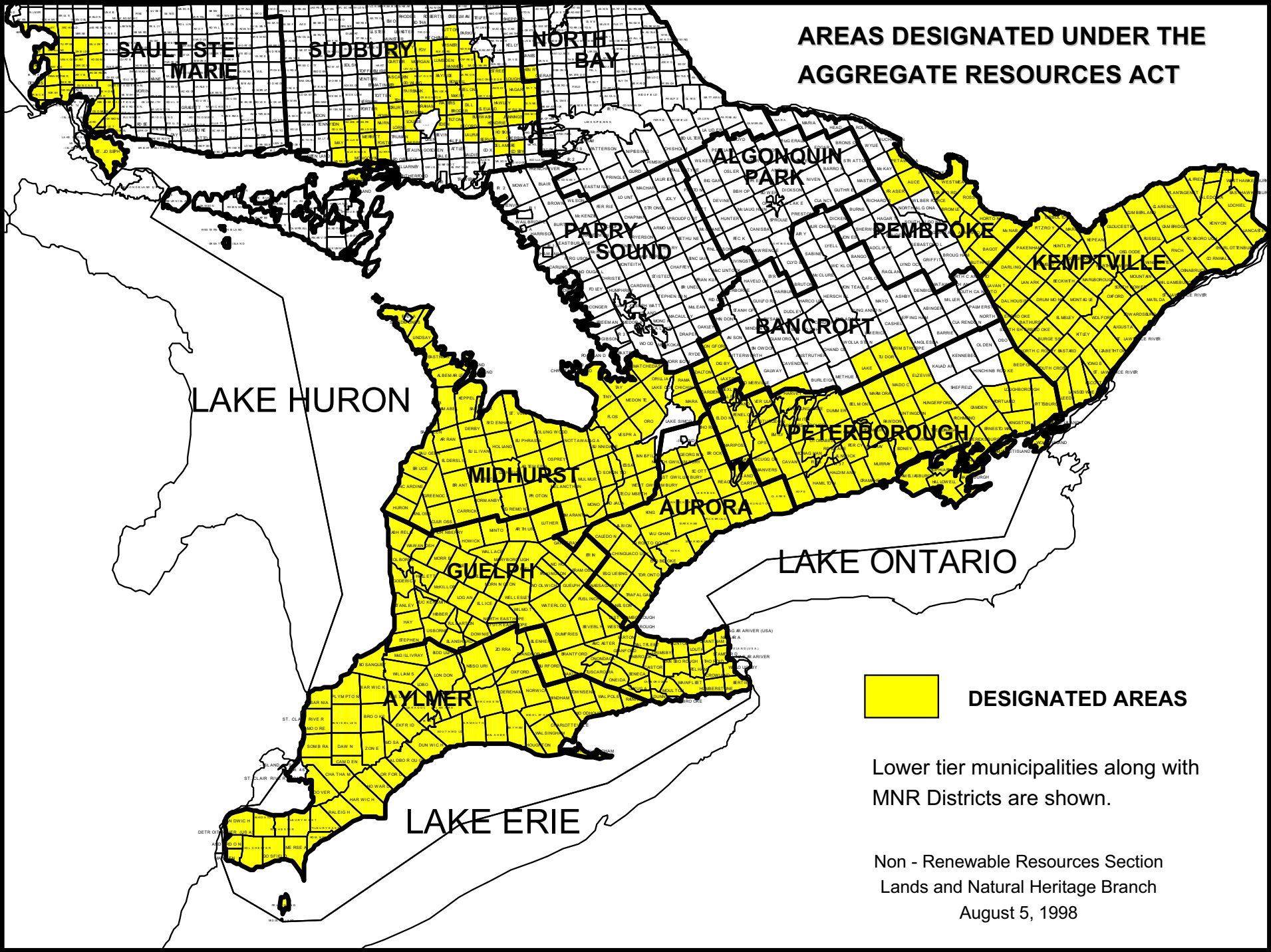
Village of Hilton Beach

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	TIMISKAMING	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

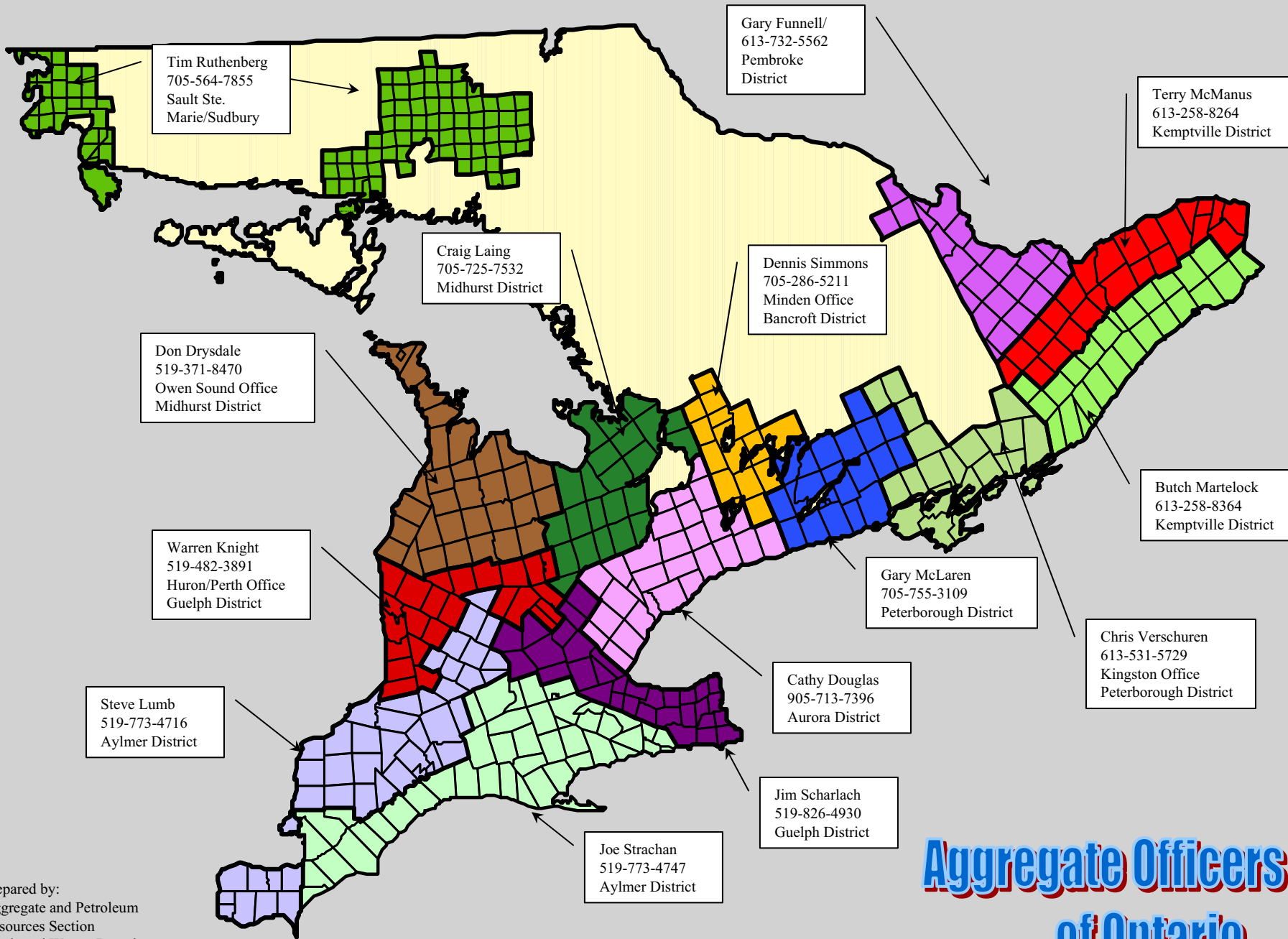
AREAS DESIGNATED UNDER THE AGGREGATE RESOURCES ACT



 **DESIGNATED AREAS**

Lower tier municipalities along with
MNR Districts are shown.

Non - Renewable Resources Section
Lands and Natural Heritage Branch
August 5, 1998



Aggregate Officers of Ontario

Prepared by:
Aggregate and Petroleum
Resources Section
Lands and Waters Branch
July 31, 2001

● MINERAL ● AGGREGATES ● IN ONTARIO

Statistical Update

1 9 9 9

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

1999

Prepared by

The Ontario Aggregate Resources Corporation

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or fax (905) 319-7423

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 1999, this basic non-renewable resource was supplied from 2,807 licensed aggregate sites on private land in designated parts of the Province and 2,909 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. An indenture signed in June of 1997 between the Aggregate Producers' Association of Ontario (APAO) and the MNR established the Aggregate Resources Trust and appointed The Ontario Aggregate Resources Corporation (TOARC) to act as trustee.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is owned by the APAO as the single shareholder, but is directed by a multi-stakeholder board of directors. The seven-member Board is composed of APAO directors and representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC is arms-length from APAO in terms of separate office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon developing systems for the efficient collection and disbursement of aggregate resource charges, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.
- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.

- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Non-Renewable Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Non Renewable Resources Section, Lands and Natural Heritage Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

The production of mineral aggregates in 1999 totaled approximately 157 million tonnes, up 7.5% from the previous year. Production from licensed operations increased by 7 million tonnes in 1999 to 131 million tonnes. Production from wayside pits was down while production from aggregate permits on Crown Land increased by approximately 2 million tonnes compared to 1998.

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1987 - 1999
(rounded to nearest million tonnes)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Licences	149	154	154	135	107	101	105	113	109	114	124	124	131
Wayside Permits*	5	5	4	3	2	2	2	2	2	2	1	2	1
Aggregate Permits	18	24	25	11	14	13	12	10	9	9	8	9	11
Category 14 (Forest Industry)	-	-	-	-	-	-	-	-	-	-	-	-	2
Private Land Non-Designated (estimated)	13	14	14	12	12	12	12	11	10	11	11	11	12
ONTARIO TOTAL	185	197	197	161	135	128	131	136	130	136	144	146	157

*Wayside Permit production is reported as the total applied tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

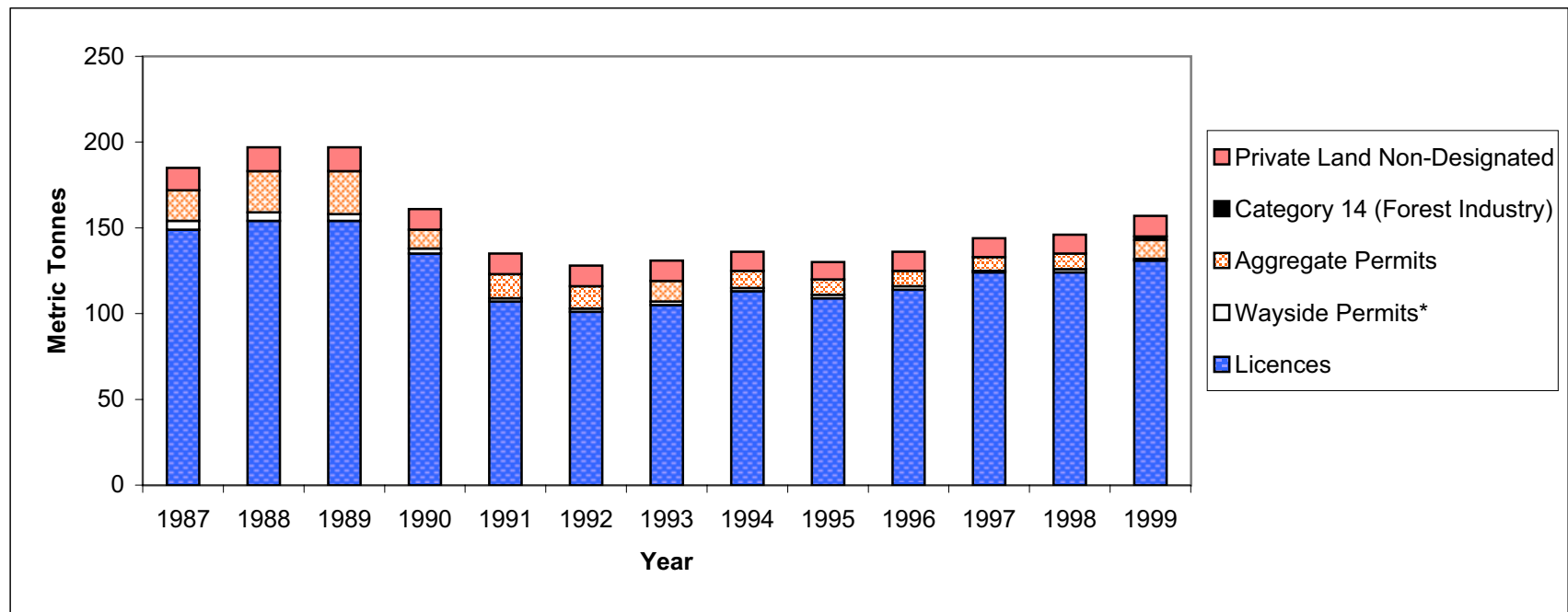


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Algoma District			
Algoma District, Unorganized	46,801.60		46,801.60
Hilton Tp	36,312.00		36,312.00
Jocelyn Tp	30,706.84		30,706.84
Johnson/St. Joseph/Tarbutt & Tarbutt Add'l Tp	35,697.20		35,697.20
Laird Tp	3,309.20		3,309.20
Macdonald, Meredith & Aberdeen Add'l	2,695.64		2,695.64
Sault Ste. Marie, City of	636,324.61		636,324.61
Sub-Total	791,847.09	0.00	791,847.09
Brant			
Brant, County of/Brantford, City of	1,472,112.90		1,472,112.90
Sub-Total	1,472,112.90	0.00	1,472,112.90
Bruce			
Arran-Elderslie, Municipality of	153,558.04		153,558.04
Brockton, Municipality of	197,298.80		197,298.80
Huron-Kinloss Tp	194,303.48		194,303.48
Kincardine, Municipality of	114,330.21		114,330.21
Northern Bruce Peninsula, Municipality of	143,642.14		143,642.14
Saugeen Shores, Town of	213,086.92		213,086.92
South Bruce, Municipality of	304,491.80		304,491.80
South Bruce Peninsula, Town of	205,192.51		205,192.51
Sub-Total	1,525,903.90	0.00	1,525,903.90
Chatham-Kent			
Chatham-Kent, Municipality of	464,272.33		464,272.33
Sub-Total	464,272.33	0.00	464,272.33
Dufferin			
Amaranth Tp	90,894.32		90,894.32
East Garafraxa Tp	720,376.12		720,376.12
East Luther Grand Valley Tp	82,782.80		82,782.80
Melancthon/Mono Tp	654,983.03		654,983.03
Mulmur Tp	558,375.62		558,375.62
Sub-Total	2,107,411.89	0.00	2,107,411.89
Durham			
Brock Tp	1,515,678.95		1,515,678.95
Clarington, Municipality of	3,756,306.42		3,756,306.42
Clark Tp		70,000.00	70,000.00
Oshawa, City of/Whitby, Town of/Scugog Tp	438,533.38		438,533.38
Uxbridge Tp	3,392,643.31		3,392,643.31
Sub-Total	9,103,162.06	70,000.00	9,173,162.06
Elgin			
Bayham, Municipality of/Malahide Tp	61,825.74		61,825.74
Central Elgin, Municipality of	418,580.78		418,580.78
West Elgin, Municipality of	159,003.03		159,003.03
Sub-Total	639,409.55	0.00	639,409.55

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg, Town of/Pelee Tp	1,057,236.03		1,057,236.03
Kingsville, Town of/Windsor, City of	315,797.40		315,797.40
Leamington, Municipality of	529,952.11		529,952.11
Sub-Total	1,902,985.54	0.00	1,902,985.54
Frontenac			
Frontenac Islands Tp	22,222.12		22,222.12
Kingston, City of	1,002,320.93		1,002,320.93
South Frontenac Tp	284,188.32		284,188.32
Sub-Total	1,308,731.37	0.00	1,308,731.37
Grey			
Artemesia Tp	211,274.55		211,274.55
Bentinck Tp	231,899.88	15,000.00	246,899.88
Blue Mountains, Town of	216,290.76		216,290.76
Derby Tp	69,651.60	96,634.00	166,285.60
Egremont Tp	159,306.32		159,306.32
Euphrasia/St. Vincent/Sarawak Tp	93,385.61	150,000.00	243,385.61
Glenelg Tp	125,672.12		125,672.12
Holland Tp	87,705.85		87,705.85
Keppel Tp	469,642.39	6,360.00	476,002.39
Normanby Tp	88,220.75		88,220.75
Osprey Tp	147,572.94		147,572.94
Proton Tp	130,140.59		130,140.59
Sullivan Tp	272,132.53		272,132.53
Sydenham Tp	268,366.30		268,366.30
Sub-Total	2,571,262.19	267,994.00	2,839,256.19
Haldimand-Norfolk			
Delhi Tp/Dunnville, Town of	224,992.05		224,992.05
Haldimand/Simcoe, Town of	1,467,683.00		1,467,683.00
Nanticoke, City of	279,774.99		279,774.99
Sub-Total	1,972,450.04	0.00	1,972,450.04
Halton			
Burlington, City of/Halton Hills, Town of	6,135,761.06		6,135,761.06
Milton, Town of	7,679,491.44		7,679,491.44
Sub-Total	13,815,252.50	0.00	13,815,252.50
Hamilton-Wentworth			
Flamborough, Town of/Stoney Creek, City of	4,633,300.59		4,633,300.59
Sub-Total	4,633,300.59	0.00	4,633,300.59

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Hastings			
Belleville, City of	344,878.80		344,878.80
Centre Hastings, Municipality of	33,895.83		33,895.83
Madoc Tp	680,743.05		680,743.05
Marmora & Lake Tp	15,156.20		15,156.20
Quinte West, City of	688,744.44		688,744.44
Stirling-Rawdon/Tyendinaga Tp	352,134.71		352,134.71
Tweed, Municipality of	79,519.06		79,519.06
Sub-Total	2,195,072.09	0.00	2,195,072.09
Huron			
Ashfield Tp	105,240.30		105,240.30
Colborne Tp	306,650.27		306,650.27
East Wawanosh Tp	312,753.20		312,753.20
Grey Tp	379,530.96		379,530.96
Goderich Tp	393,990.94		393,990.94
Hay/Stanley/Turnberry Tp	53,200.16		53,200.16
Howick Tp	261,897.50		261,897.50
Hullett Tp	112,149.99		112,149.99
McKillop Tp	320,544.66		320,544.66
Morris Tp	147,217.04		147,217.04
Tuckersmith Tp	72,035.00		72,035.00
Usborne Tp	110,366.40		110,366.40
West Wawanosh Tp	210,613.47		210,613.47
Sub-Total	2,786,189.89	0.00	2,786,189.89
Lambton			
Bosanquet, Town of	75,151.58		75,151.58
Enniskillen/Plympton/Warwick Tp	521,330.64		521,330.64
Sub-Total	596,482.22	0.00	596,482.22
Lanark			
Bathurst, Burgess, Sherbrooke Tp	48,031.08		48,031.08
Beckwith Tp	99,357.24		99,357.24
Drummond-North Elmsley Tp	193,717.11		193,717.11
Lanark Highlands Tp	1,129,967.97	15,340.00	1,145,307.97
Mississippi Mills, Town of	3,982.00		3,982.00
Montague Tp	57,043.91		57,043.91
Sub-Total	1,532,099.31	15,340.00	1,547,439.31
Leeds & Grenville			
Augusta Tp	142,212.69		142,212.69
Edwardsburgh Tp	337,510.15		337,510.15
Elizabethtown Tp	583,196.93		583,196.93
Front of Escott/Front of Yonge/Rear of Yonge & Escotte/Kitley Tp	136,462.73		136,462.73
Front of Leeds & Lansdowne Tp	33,201.13		33,201.13
Merrickville-Wolford, Village of	135,167.30		135,167.30
North Grenville Tp	419,303.76		419,303.76
Rear of Leeds & Lansdowne Tp	395,473.70		395,473.70
Rideau Lakes Tp	62,805.12		62,805.12
Sub-Total	2,245,333.51	0.00	2,245,333.51

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Lennox & Addington			
Greater Napanee, Town of	1,400,007.02		1,400,007.02
Loyalist/Stone Mills Tp	304,594.97		304,594.97
Sub-Total	1,704,601.99	0.00	1,704,601.99
Middlesex			
Adelaide/East Williams/Lucan Biddulph Tp	56,677.22		56,677.22
Caradoc Tp	21,765.00		21,765.00
London, City of	2,478,829.09		2,478,829.09
McGillivray Tp	34,335.60		34,335.60
Middlesex Centre Tp	994,831.84		994,831.84
North Dorchester Tp	918,148.21		918,148.21
West Nissouri Tp	1,033,237.17		1,033,237.17
West Williams Tp	85,857.05		85,857.05
Sub-Total	5,623,681.18	0.00	5,623,681.18
Niagara			
Fort Erie/Port Colborne, City of/Wainfleet Tp	1,371,337.20		1,371,337.20
Lincoln/Niagara-on-the-Lake/Pelham, Town of	1,962,994.29		1,962,994.29
Niagara Falls, City of	996,541.83		996,541.83
Sub-Total	4,330,873.32	0.00	4,330,873.32
Northumberland			
Alnwick/Hope Tp	82,187.86		82,187.86
Brighton Tp	391,090.80		391,090.80
Campbellford-Seymour, Municipality of	107,126.70		107,126.70
Cramahe Tp	2,192,725.72		2,192,725.72
Haldimand Tp	310,946.14	142,711.00	453,657.14
Hamilton Tp	192,313.39		192,313.39
Percy Tp	149,060.05		149,060.05
Sub-Total	3,425,450.66	142,711.00	3,568,161.66
Ottawa-Carleton			
Cumberland Tp	424,052.01		424,052.01
Gloucester, City of	2,386,207.68		2,386,207.68
Goulbourn Tp	677,881.53		677,881.53
Nepean, City of	2,226,832.68		2,226,832.68
Osgoode Tp	489,390.60		489,390.60
Rideau Tp	4,519.00		4,519.00
West Carleton Tp	1,899,531.11		1,899,531.11
Sub-Total	8,108,414.61	0.00	8,108,414.61
Oxford			
Blandford-Blenheim Tp	226,358.13		226,358.13
East Zorra-Tavistock Tp/Woodstock, City of	67,919.14		67,919.14
Norwich/South-West Oxford Tp	764,485.91		764,485.91
Zorra Tp	4,068,007.89		4,068,007.89
Sub-Total	5,126,771.07	0.00	5,126,771.07

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Peel			
Brampton/Mississauga, City of	296,777.09		296,777.09
Caledon, Town of	4,207,954.74		4,207,954.74
Sub-Total	4,504,731.83	0.00	4,504,731.83
Perth			
North Perth, Town of/St. Marys, Separated Town of	87,698.35		87,698.35
Perth East Tp	233,734.30		233,734.30
Perth South Tp	1,178,250.31		1,178,250.31
West Perth Tp	54,917.50		54,917.50
Sub-Total	1,554,600.46	0.00	1,554,600.46
Peterborough			
Asphodel-Norwood Tp	68,953.72		68,953.72
Douro-Dummer Tp	420,286.12		420,286.12
Galway-Cavendish-Harvey Tp	147,779.83		147,779.83
Havelock-Belmont-Methuen Tp	256,031.61		256,031.61
Cavan-Millbrook-North Monaghan Tp	93,229.66		93,229.66
Otonabee-South Monaghan Tp	469,111.60		469,111.60
Smith-Ennismore Tp	380,052.88		380,052.88
Sub-Total	1,835,445.42	0.00	1,835,445.42
Prescott & Russell			
Alfred & Plantagenet Tp	164,540.50		164,540.50
Champlain Tp	317,455.56		317,455.56
Clarence-Rockland, City of	221,880.03		221,880.03
East Hawkesbury Tp	33,611.36		33,611.36
The Nation, Municipality of	231,148.78		231,148.78
Russell Tp	241,189.69		241,189.69
Sub-Total	1,209,825.92	0.00	1,209,825.92
Prince Edward Co			
Prince Edward, County of	1,982,541.69		1,982,541.69
Sub-Total	1,982,541.69	0.00	1,982,541.69
Renfrew			
Alice & Fraser Tp	414,383.54		414,383.54
Bagot-Blythfield-Brougham/Stafford & Pembroke Tp	67,199.92		67,199.92
Bromley Tp	119,436.27		119,436.27
Horton Tp	276,960.39		276,960.39
McNab-Braeside Tp	253,521.81		253,521.81
Petawawa, Town of	237,407.35		237,407.35
Ross Tp	24,694.47		24,694.47
Westmeath Tp	92,483.30		92,483.30
Sub-Total	1,486,087.05	0.00	1,486,087.05

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Simcoe			
Adjala-Tosorontio Tp	572,381.12		572,381.12
Bradford West Gwillimbury/Midland/Wasaga Beach, Town of	302,507.84		302,507.84
Clearview Tp	1,481,299.93		1,481,299.93
Essa Tp	86,811.70		86,811.70
Innisfil, Town of	104,409.57		104,409.57
New Tecumseh, Town of	112,560.71		112,560.71
Oro-Medonte Tp	2,041,050.42		2,041,050.42
Ramara Tp	1,636,627.84		1,636,627.84
Severn Tp	1,023,826.50		1,023,826.50
Springwater Tp	1,189,964.17		1,189,964.17
Tay Tp	124,366.09		124,366.09
Tiny Tp	262,518.41		262,518.41
Sub-Total	8,938,324.30	0.00	8,938,324.30
Stormont, Dundas & Glengarry			
North Dundas Tp	560,532.91		560,532.91
North Glengarry Tp	62,523.38		62,523.38
North Stormont Tp	473,235.02		473,235.02
South Dundas Tp	224,908.24		224,908.24
South Glengarry Tp	517,488.44		517,488.44
South Stormont Tp	1,005,452.99		1,005,452.99
Sub-Total	2,844,140.98	0.00	2,844,140.98
Sudbury			
Nickel Centre, Town of	1,205,367.27		1,205,367.27
Onaping Falls, Town of	709,009.32		709,009.32
Rayside-Balfour, Town of/Sudbury, City of	429,320.54		429,320.54
Valley East, City of	146,646.41		146,646.41
Walden, Town of	82,603.12	330,000.00	412,603.12
Sub-Total	2,572,946.66	330,000.00	2,902,946.66
Sudbury District			
Baldwin/Nairn & Hyman Tp	46,837.32		46,837.32
French River, Municipality of	17,134.81		17,134.81
Markstay-Warren/Sables Spanish Rivers, Municipality of	31,875.75		31,875.75
St. Charles, Municipality of	6,131.12		6,131.12
Sudbury District, Unorganized	280,538.22		280,538.22
Sub-Total	382,517.22	0.00	382,517.22

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Victoria			
Bobcaygeon, Village of/Bexley/Langton, Digby & Longford Tp	71,352.22		71,352.22
Carden Tp	1,172,960.23		1,172,960.23
Eldon Tp	87,470.37		87,470.37
Emily Tp	465,130.35		465,130.35
Fenelon Tp	194,913.04		194,913.04
Manvers Tp	3,181,774.64		3,181,774.64
Mariposa Tp	476,539.45		476,539.45
Somerville Tp	237,407.06		237,407.06
Verulam Tp	41,058.36		41,058.36
Sub-Total	5,928,605.72	0.00	5,928,605.72
Waterloo			
Kitchener, City of	1,182,929.00		1,182,929.00
North Dumfries Tp	3,227,841.46		3,227,841.46
Wellesley Tp	1,012,808.25		1,012,808.25
Wilmot Tp	922,118.75		922,118.75
Woolwich Tp	932,449.51		932,449.51
Sub-Total	7,278,146.97	0.00	7,278,146.97
Wellington			
Centre Wellington Tp	857,825.69		857,825.69
Erin, Town of	1,334,470.87		1,334,470.87
Guelph-Eramosa Tp	740,222.90	152,134.00	892,356.90
Mapleton Tp	60,844.84		60,844.84
Minto, Town of	337,218.20		337,218.20
Puslinch Tp	3,909,711.79		3,909,711.79
Wellington North Tp	135,514.85		135,514.85
Sub-Total	7,375,809.14	152,134.00	7,527,943.14
York			
East Gwillimbury, Town of	425,684.09		425,684.09
Georgina, Town of	42,220.24		42,220.24
King Tp/Vaughan, City of	442,440.63		442,440.63
Whitchurch-Stouffville, Town of	1,757,097.00		1,757,097.00
Sub-Total	2,667,441.96	0.00	2,667,441.96
GRAND TOTAL	130,544,237.12	978,179.00	131,522,416.12

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1991	1992	1993	1994	1995	1996	1997	1998	1999
Algoma, District of	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.8
Brant Co.	1.9	1.4	1.1	1.3	1.6	1.7	2.1	1.5	1.5
Bruce Co.	2.5	2	2	1.8	1.5	1.2	1.3	1.6	1.5
Chatham-Kent, R. M. of	0.4	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.5
Dufferin Co.	1.6	1.1	1.3	1.6	1.4	1.5	1.5	1.8	2.1
Durham, R. M. of	5.8	5.7	6.6	7.1	7.2	7.6	8.7	7.8	9.2
Elgin Co.	0.6	0.5	0.6	0.5	0.4	0.5	0.7	0.4	0.6
Essex Co.	2.5	2.7	2.8	2.7	2.4	2.2	2.7	2	1.9
Frontenac, Management Board	1.6	1.6	1.4	1.5	1.2	1.6	1.5	1.2	1.3
Grey Co.	2.7	2.6	2.4	2.7	2.4	2	2.1	2.1	2.8
Haldimand-Norfolk, R. M. of	1.7	1.7	1.8	1.9	1.9	1.7	2.1	1.8	2
Halton, R. M. of	7.5	7	9.2	9.7	10.7	12.3	14.4	13.4	13.8
Hamilton-Wentworth, R. M. of	3.7	3.6	3.4	3.9	4	4	5.2	4.7	4.6
Hastings Co.	1.4	1.6	1.5	1.2	1.4	1.6	2	1.9	2.2
Huron Co.	3.1	2.9	2.1	2.9	2.8	2.8	2.4	2.6	2.8
Lambton Co.	0.5	0.5	0.4	0.6	0.6	0.4	0.5	0.6	0.6
Lanark Co.	1.1	1.2	0.9	1.1	1.3	1.2	1.2	1.3	1.5
Leeds & Grenville Co.'s	2.1	2	2	2.4	2.3	2	2.1	4.2	2.2
Lennox & Addington Co.	ND	1.4	1.9	1.7	2	1.8	1.7	1.9	1.7
Middlesex Co.	4.5	4.4	5	4.9	4.5	4.5	5.3	6.1	5.6
Niagara, R. M. of	4	3.3	3.5	4.1	3.6	4.7	4.9	4.6	4.3
Northumberland Co.	3.1	3.3	3	3	2.6	3	3.2	3.2	3.6
Ottawa-Carleton, R. M. of	8.6	8.7	9.2	9.3	8.4	6.1	6.7	7.1	8.1
Oxford Co.	4	4.5	4.9	4.6	5	4.6	5.3	4.9	5.1
Peel, R. M. of	3.3	2.7	2.9	3.1	3.7	3.8	4.3	4.2	4.5
Perth Co.	1.6	1.3	1.4	1.7	1.6	1.9	1.7	1.7	1.6
Peterborough Co.	2.5	2.4	2.6	2.2	1.8	1.8	1.8	1.8	1.8
Prescott & Russell Co.'s	1.4	1.5	1.7	1.9	1.3	1.2	1.4	1.1	1.2
Prince Edward Co.	1.8	1.7	1.5	1.9	2.2	1.8	2.1	2	2
Renfrew Co.	ND	ND	ND	1.1	1.3	1.5	1.2	1.3	1.5
Simcoe Co.	8.1	8	6.9	6.2	6.8	7.4	7.6	9	9
Stormont, Dundas & Glengarry Co.'s	2.5	2.4	2.6	2.6	2.3	2.1	2.4	2.4	2.8
Sudbury, District of	0.4	0.5	0.5	0.5	0.3	0.3	0.2	0.2	0.4
Sudbury, R. M. of	2.9	2.7	2.2	2.9	2.9	2.7	2.5	2.3	2.9
Victoria Co.	5.6	4.7	5.1	5.4	4.9	6	6.5	6.6	6
Waterloo, R. M. of	5.1	4.1	4.7	5.8	5.8	5.8	5.6	5.8	7.3
Wellington Co.	5.6	4.9	5.5	5.6	4.9	6	6.4	6.9	7.5
York, R. M. of	2.6	1.6	1.4	1.9	2.2	2	2.6	2.2	2.7
TOTAL	108.8	103.0	106.8	114.3	112.2	114.3	125.0	125.2	131.5

ND: Not Designated under the Aggregate Resources Act.

Table 4

**LICENCE PRODUCTION IN 1999
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality	County/Region	1999 Production	Production				
			1998	1997	1996	1995	1994
1 Town of Milton	Halton Region	7.7	7.9	9.6	8.6	5.6	3.6
2 Town of Halton Hills	Halton Region	4.4	3.3	3.2	2.4	3.9	5.6
3 Town of Caledon	Peel Region	4.2	3.9	4.0	3.5	3.6	3.0
4 Zorra Township	Oxford County	4.1	3.8	3.8	3.3	3.6	3.1
5 Puslinch Township	Wellington County	3.9	3.8	3.5	3.2	2.0	2.7
6 Town of Flamborough	Hamilton-Wentworth	3.9	4.1	4.2	3.2	3.3	3.1
7 Municipality of Clarington	Durham	3.8	3.0	3.9	3.1	3.0	2.9
8 Township of Uxbridge	Durham	3.4	3.2	3.1	3.3	3.1	2.9
9 Township of North Dumfries	Waterloo, R. M. of	3.2	2.5	2.4	2.9	2.5	2.4
10 Township of Manvers	Victoria County	3.2	3.7	3.7	3.6	2.8	3.1
Total		41.8	39.2	41.4	37.1	33.4	32.4

Note: Municipalities are ranked in order of their licenced production for 1999

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
AS OF DECEMBER 31, 2000**

District	No. of Licences	Category		Type of Operation		
		Class A	Class B	Pit	Quarry	Pit & Quarry
Aurora (GTA)	183	154	29	166	17	0
Aylmer	324	227	97	307	11	6
Bancroft	37	13	24	18	14	5
Guelph (Cambridge)	469	376	93	436	30	3
Kemptville	509	259	250	372	116	21
Midhurst	474	341	133	437	34	3
Pembroke	116	51	65	104	6	6
Peterborough (Tweed)	502	269	233	404	85	13
Sault Ste. Marie	68	31	37	62	1	5
Sudbury	125	87	38	105	5	15
TOTAL	2807	1808	999	2411	319	77

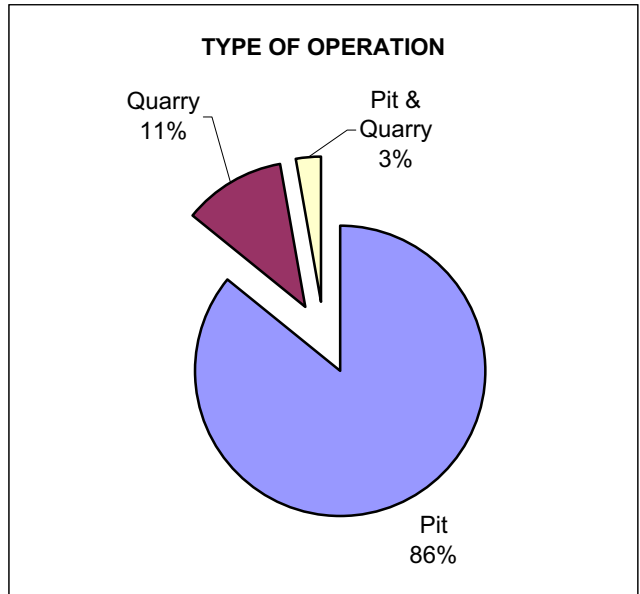
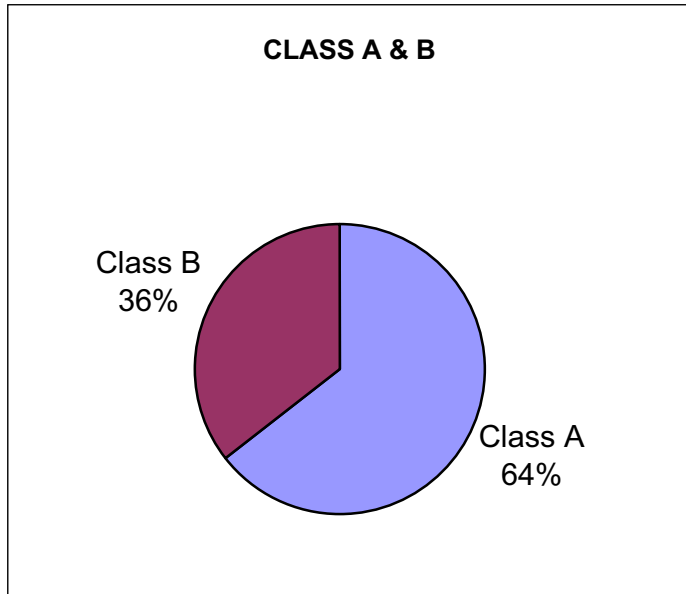


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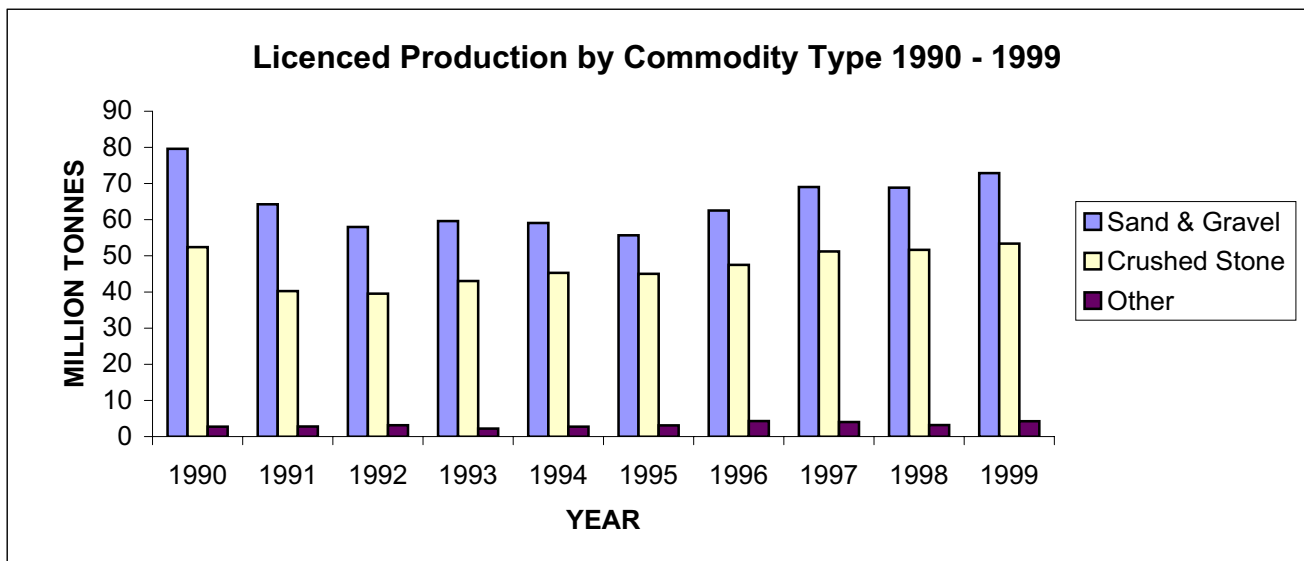
**1999 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	30,090,588.35	14,559,257.29	15,023,080.00	504,157.86	4,093.20
Aylmer	14,788,491.81	10,681,373.80	4,104,461.70	1,156.31	1,500.00
Bancroft	1,593,128.91	118,085.54	1,464,966.11	665.00	9,412.26
Guelph (Cambridge)	31,051,376.19	19,781,680.42	10,228,719.39	992,862.38	48,114.00
Kemptville	15,939,814.33	4,358,986.49	10,575,933.83	257,189.17	747,704.84
Midhurst	15,060,119.48	10,693,895.04	4,230,652.00	22,223.95	113,348.49
Pembroke	1,486,087.05	1,264,443.83	221,621.46	0.00	21.76
Peterborough	16,787,320.03	8,529,039.10	7,058,034.73	33,609.71	1,166,636.49
Sault Ste. Marie	791,847.09	729,479.35	34,547.37	0.00	27,820.37
Sudbury	2,955,463.88	2,161,869.94	461,265.24	22,135.22	310,193.48
TOTAL	130,544,237.12	72,878,110.80	53,403,281.83	1,833,999.60	2,428,844.89

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Sand & Gravel	Crushed Stone	Other
1990	79.62	52.42	2.74
1991	64.24	40.26	2.78
1992	57.99	39.52	3.15
1993	59.62	43.04	2.19
1994	59.07	45.28	2.76
1995	55.70	45.01	3.09
1996	62.52	47.48	4.27
1997	69.05	51.23	4.01
1998	68.84	51.64	3.20
1999	72.87	53.40	4.26

Table 7

**1999 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	226,377.59	226,377.59	-	-	-
Cochrane	556,145.64	481,890.64	73,847.00	-	408.00
Hearst	629,164.91	461,534.41	95,000.00	33,918.00	38,712.50
Kirkland Lake	499,261.38	499,261.38	-	-	-
North Bay	603,274.00	590,549.70	11,787.00	-	937.30
Sault Ste. Marie	389,679.32	375,512.32	-	13,926.00	241.00
Sudbury	160,688.45	152,232.47	4,411.00	382.50	3,662.48
Timmins	227,743.76	194,376.96	-	-	33,366.80
Wawa	1,439,203.42	1,238,800.42	68,102.00	132,301.00	-
Sub-Total	4,731,538.47	4,220,535.89	253,147.00	180,527.50	77,328.08
NORTHWEST					
Dryden	765,759.22	644,407.16	121,094.00	-	258.06
Fort Frances	240,560.63	240,172.63	-	163.00	225.00
Kenora	853,151.66	816,634.66	20,400.00	-	16,117.00
Nipigon	1,414,602.53	1,347,429.83	65,185.00	253.00	1,734.70
Red Lake	284,236.48	280,252.48	-	590.00	3,394.00
Sioux Lookout	344,802.73	344,219.97	-	-	582.76
Thunder Bay	402,580.45	401,700.95	-	-	879.50
Sub-Total	4,305,693.70	4,074,817.68	206,679.00	1,006.00	23,191.02
SOUTHCENTRAL					
Algonquin Park	52,048.00	52,048.00	-	-	-
Aurora (GTA)	0.00	-	-	-	-
Aylmer	620.00	620.00	-	-	-
Bancroft	397,717.95	245,631.36	148,162.00	1,904.00	2,020.59
Guelph (Cambridge)	1,200.00	1,200.00	-	-	-
Kemptville	1,686,595.56	955,669.56	730,926.00	-	-
Midhurst	6,115.00	6,115.00	-	-	-
Parry Sound	197,975.55	168,928.10	28,648.00	-	399.45
Pembroke	52,433.58	52,433.58	-	-	-
Peterborough (Tweed)	0.00	-	-	-	-
Sub-Total	2,394,705.64	1,482,645.60	907,736.00	1,904.00	2,420.04
TOTAL	11,431,937.81	9,777,999.17	1,367,562.00	183,437.50	102,939.14

Note: Amounts shown are in metric tonnes

Table 8

**1999 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	620	620	0	0	0
Peninsula (2)	1,200	1,200	0	0	0
West Central (3)	6,115	6,115	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	449,766	297,679	148,162	1,904	2,021
East (6)	1,739,029	1,008,103	730,926	0	0
Northeast (7)	3,100,631	2,775,151	213,693	34,301	77,487
Northwest (8)	6,134,576	5,689,130	274,781	147,233	23,432
TOTAL	11,431,937	9,777,998	1,367,562	183,438	102,939

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

**1999 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,694,392	13,839,198	4,799,386	54,282	1,526
Peninsula (2)	12,408,737	2,354,630	9,117,162	936,945	0
West Central (3)	29,796,858	24,963,122	4,647,285	25,015	161,436
GTA (4)	30,090,588	14,559,257	15,023,080	504,158	4,093
East Central (5)	15,367,116	8,340,305	6,979,043	31,810	15,958
East (6)	20,439,235	5,930,250	12,341,514	259,654	1,907,818
Northeast (7)	2,955,464	2,161,870	461,265	22,135	310,193
Northwest (8)	791,847	729,479	34,547	0	27,820
TOTAL	130,544,237	72,878,111	53,403,282	1,833,999	2,428,845

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 1999
(Reported by MNR District)**

District	Total No. of Licences	Total Licence Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	183	9,620.69	3,665.08	83.75	115.46	3,633.37
Aylmer	324	8,609.59	3,135.31	128.22	111.01	3,152.52
Bancroft	37	1,482.78	233.87	23.86	3.60	254.13
Guelph (Cambridge)	469	16,434.32	4,201.56	207.20	133.43	4,275.32
Kemptville	509	14,102.02	3,639.35	116.30	55.23	3,700.42
Midhurst	474	13,510.07	3,162.28	116.41	76.94	3,201.76
Pembroke	116	3,128.97	378.69	13.98	7.36	385.31
Peterborough (Tweed)	502	13,497.84	3,211.72	99.08	51.76	3,259.03
Sault Ste. Marie	68	2,935.46	295.33	10.14	6.59	298.88
Sudbury	125	9,373.23	794.92	20.44	24.42	790.94
TOTAL	2,807	92,694.97	22,718.11	819.38	585.81	22,951.68

Note: Areas shown are in hectares

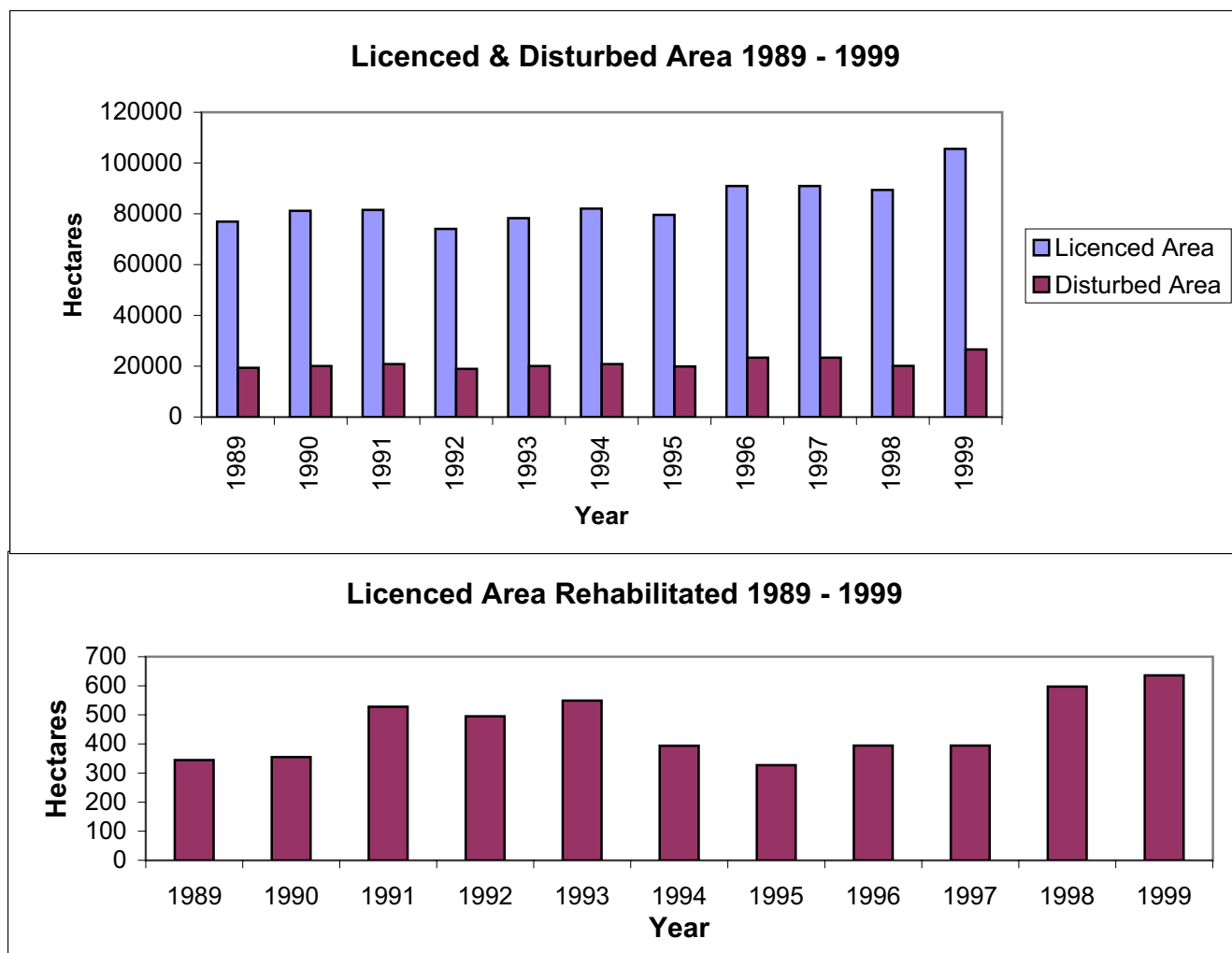


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	490.15	183	183	0	0	0
Cochrane	2,188.77	111	99	7	5	0
Hearst	1,826.35	154	137	16	1	0
Kirkland Lake	486.80	95	94	1	0	0
North Bay	1,785.15	204	190	12	2	0
Sault Ste. Marie	533.80	114	111	1	2	0
Sudbury	3,472.59	180	157	16	7	0
Timmins	1,375.04	149	145	4	0	0
Wawa	1,894.17	263	262	1	0	0
Sub-Total	14,052.82	1,453	1,378	58	17	0
NORTHWEST						
Dryden	1,034.97	160	156	3	1	0
Fort Frances	1,666.95	252	245	4	3	0
Kenora	1,957.33	184	167	14	3	0
Nipigon	2,841.54	301	284	13	4	0
Red Lake	664.90	82	82	0	0	0
Sioux Lookout	719.85	63	63	0	0	0
Thunder Bay	1,170.74	148	137	11	0	0
Sub-Total	10,056.28	1,190	1,134	45	11	0
SOUTHCENTRAL						
Algonquin Park	11.72	20	20	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	464.31	85	79	6	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	274.58	7	4	2	0	1
Midhurst	9.09	2	1	0	0	1
Parry Sound	485.38	107	83	12	2	10
Pembroke	98.96	42	41	1	0	0
Peterborough (Tweed)	0.00	0	0	0	0	0
Sub-Total	1,964.64	266	228	21	2	15
TOTAL	26,073.74	2,909	2,740	124	30	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

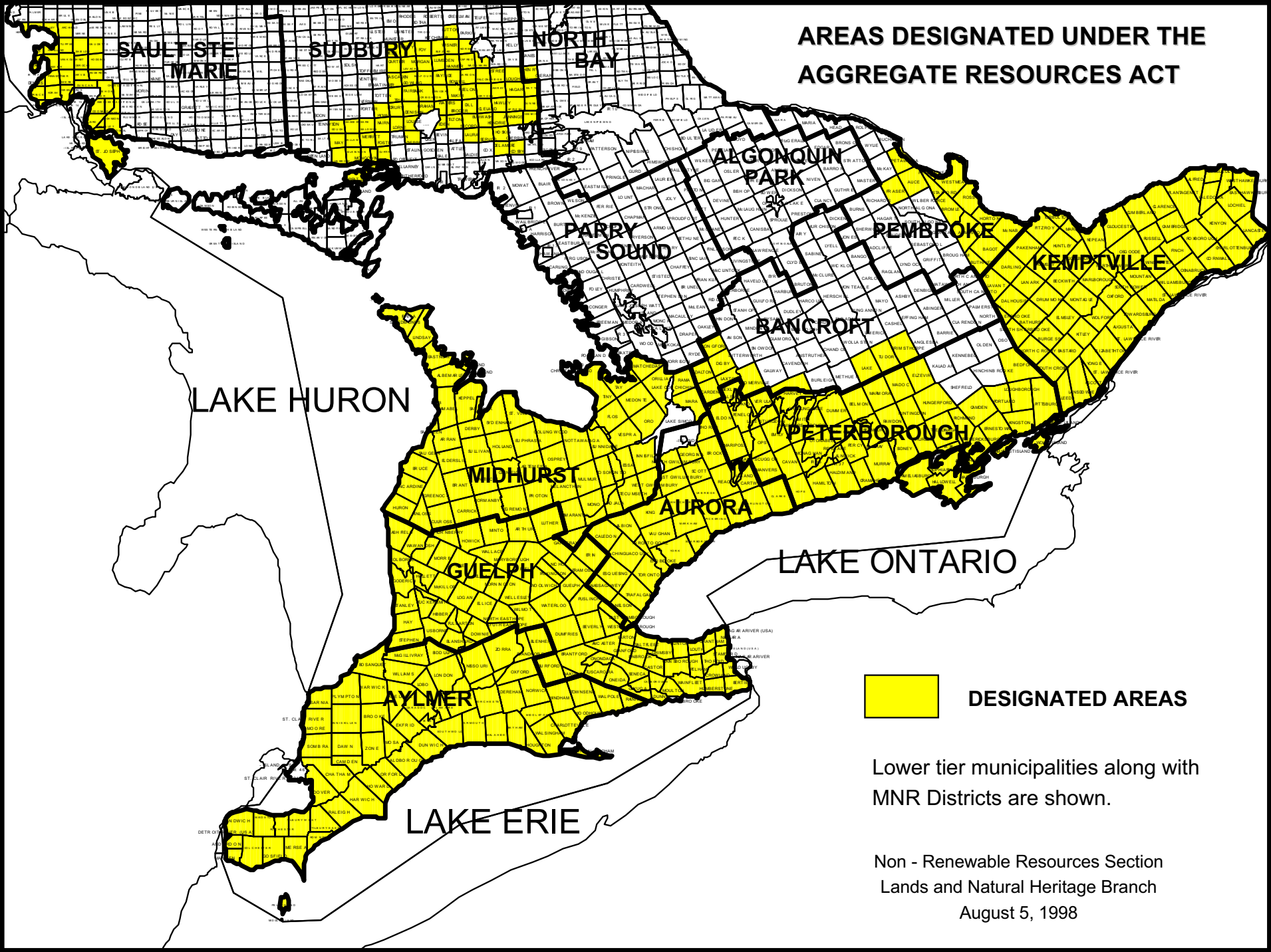
Village of Hilton Beach

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	TIMISKAMING	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

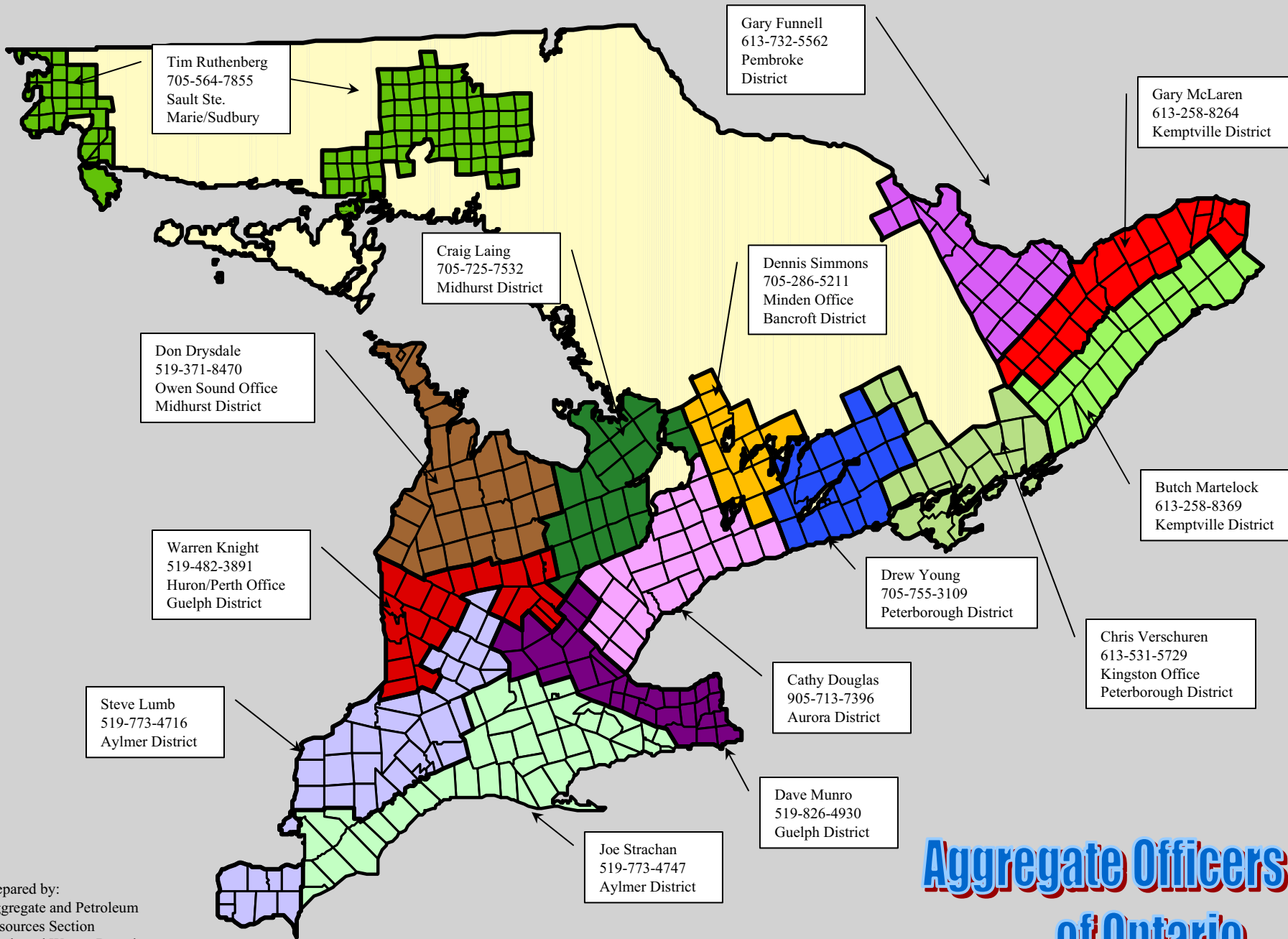
AREAS DESIGNATED UNDER THE AGGREGATE RESOURCES ACT



 **DESIGNATED AREAS**

Lower tier municipalities along with
MNR Districts are shown.

Non - Renewable Resources Section
Lands and Natural Heritage Branch
August 5, 1998



Aggregate Officers of Ontario

Prepared by:
Aggregate and Petroleum
Resources Section
Lands and Waters Branch
July 31, 2001



- **MINERAL**
- **AGGREGATES**
- **IN ONTARIO**

Statistical Update

2 0 0 0

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2000

READER'S NOTE

The information in this document is based on production statistics reported from January 1, 2000 to December 31, 2000.

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 2000, this basic non-renewable resource was supplied from 2,799 licensed aggregate sites on private land in designated parts of the Province and 2,963 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. An indenture signed in June of 1997 between the Aggregate Producers' Association of Ontario (APAO) and the MNR established the Aggregate Resources Trust and appointed The Ontario Aggregate Resources Corporation (TOARC) to act as trustee.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is owned by the APAO as the single shareholder, but is directed by a multi-stakeholder board of directors. The seven-member Board is composed of APAO directors and representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC is arms-length from APAO in terms of separate office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon developing systems for the efficient collection and disbursement of aggregate resource charges, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.
- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.

- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Aggregate and Petroleum Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

The production of mineral aggregates in 2000 totaled approximately 171 million tonnes, up 8.9% from the previous year. Production from licensed operations increased by 14 million tonnes in 2000 to 145 million tonnes. Wayside Permit production remained substantially unchanged from last year while production from Aggregate Permits on Crown Land decreased by approximately 1 million tonnes compared to 1999.

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1988 - 2000
(rounded to nearest million tonnes)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Licences	154	154	135	107	101	105	113	109	114	124	124	131	145
Wayside Permits*	5	4	3	2	2	2	2	2	2	1	2	1	1
Aggregate Permits	24	25	11	14	13	12	10	9	9	8	9	11	10
Category 14 (Forest Industry)	-	-	-	-	-	-	-	-	-	-	-	2	3
Private Land Non-Designated (estimated)	14	14	12	12	12	12	11	10	11	11	11	12	12
ONTARIO TOTAL	197	197	161	135	128	131	136	130	136	144	146	157	171

*Wayside Permit production is reported as the total applied tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

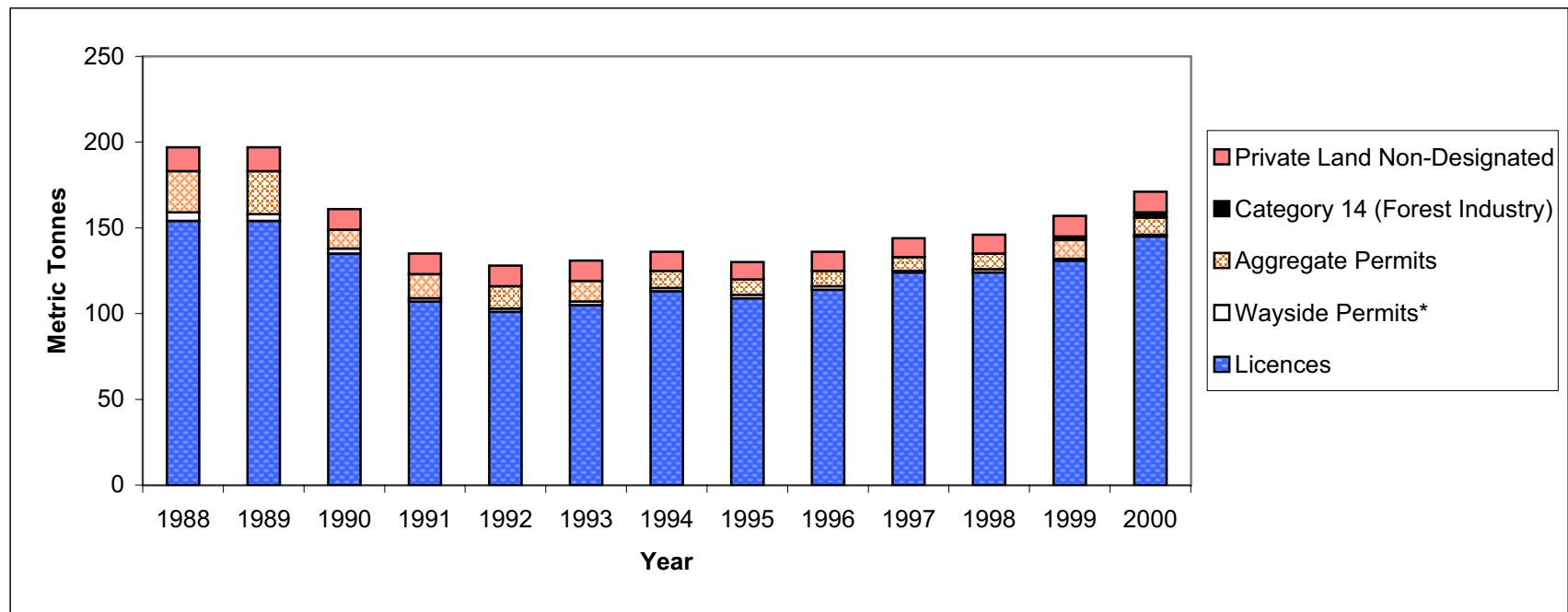


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Algoma District			
Algoma District, Unorganized	71,403.55		71,403.55
Hilton Tp	58,463.48		58,463.48
Jocelyn Tp	54,977.92		54,977.92
Johnson/Tarbutt & Tarbutt Add'l Tp	44,199.92		44,199.92
St. Joseph/Laird Tp	29,002.88		29,002.88
Macdonald, Meredith & Aberdeen Add'l Tp	2,155.80		2,155.80
Sault Ste. Marie, City of	544,116.27		544,116.27
Sub-Total	804,319.82	0.00	804,319.82
Brant			
Brant, County of/Brantford, City of	2,119,960.77		2,119,960.77
Sub-Total	2,119,960.77	0.00	2,119,960.77
Bruce			
Arran-Elderslie, Municipality of	127,209.06		127,209.06
Brockton, Municipality of	227,276.31		227,276.31
Huron-Kinloss Tp	189,954.94		189,954.94
Kincardine, Municipality of	70,036.38		70,036.38
Northern Bruce Peninsula, Municipality of	125,924.30		125,924.30
Saugeen Shores, Town of	196,680.33		196,680.33
South Bruce, Municipality of	531,972.33	30,000.00	561,972.33
South Bruce Peninsula, Town of	189,955.34		189,955.34
Sub-Total	1,659,008.99	30,000.00	1,689,008.99
Chatham-Kent			
Chatham-Kent, Municipality of	474,298.36		474,298.36
Sub-Total	474,298.36	0.00	474,298.36
Dufferin			
Amaranth/East Luther Grand Valley Tp	255,062.32		255,062.32
East Garafraxa Tp	954,373.72		954,373.72
Melancthon Tp	186,166.48	95,000.00	281,166.48
Mono Tp	546,650.04		546,650.04
Mulmur Tp	514,308.76		514,308.76
Sub-Total	2,456,561.32	95,000.00	2,551,561.32
Durham			
Brock Tp	1,324,980.73		1,324,980.73
Clarington, Municipality of	4,350,266.87		4,350,266.87
Oshawa, City of/Whitby, Town of/Scugog Tp	453,180.71		453,180.71
Uxbridge Tp	4,078,236.83		4,078,236.83
Sub-Total	10,206,665.14	0.00	10,206,665.14

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Elgin			
Bayham, Municipality of/Malahide Tp	67,146.04		67,146.04
Central Elgin, Municipality of	440,032.99		440,032.99
West Elgin, Municipality of	144,521.15		144,521.15
Sub-Total	651,700.18	0.00	651,700.18
Essex			
Amherstburg/Kingsville, Town of/Pelee Tp	1,543,588.16		1,543,588.16
Leamington, Municipality of	482,048.79		482,048.79
Sub-Total	2,025,636.95	0.00	2,025,636.95
Frontenac			
Frontenac Islands Tp	48,748.34		48,748.34
Kingston, City of	1,054,419.52		1,054,419.52
South Frontenac Tp	300,827.93		300,827.93
Sub-Total	1,403,995.79	0.00	1,403,995.79
Grey			
Artemesia Tp	102,662.19		102,662.19
Blue Mountains, Town of	207,817.15		207,817.15
Chatsworth Tp	348,533.07		348,533.07
Derby Tp	200,441.70		200,441.70
Euphrasia/St. Vincent/Sarawak Tp	175,738.90		175,738.90
Keppel Tp	270,173.79	20,000.00	290,173.79
Osprey Tp	176,519.70		176,519.70
Southgate Tp	285,005.76		285,005.76
Sydenham Tp	301,666.25		301,666.25
West Grey Tp	416,563.44		416,563.44
Sub-Total	2,485,121.95	20,000.00	2,505,121.95
Haldimand-Norfolk			
Delhi Tp/Dunnville, Town of	263,208.55		263,208.55
Haldimand/Simcoe, Town of	1,478,527.00		1,478,527.00
Nanticoke, City of	296,302.68		296,302.68
Sub-Total	2,038,038.23	0.00	2,038,038.23
Halton			
Burlington, City of/Halton Hills, Town of	6,465,166.90		6,465,166.90
Milton, Town of	9,024,127.53		9,024,127.53
Sub-Total	15,489,294.43	0.00	15,489,294.43

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Hamilton-Wentworth</i>			
Flamborough, Town of/Stoney Creek, City of	6,285,547.00		6,285,547.00
Sub-Total	6,285,547.00	0.00	6,285,547.00
<i>Hastings</i>			
Belleville, City of	350,522.67		350,522.67
Centre Hastings, Municipality of	120,739.88		120,739.88
Madoc Tp	694,223.01		694,223.01
Marmora & Lake Tp	4,426.51		4,426.51
Quinte West, City of	543,644.08		543,644.08
Stirling-Rawdon/Tyendinaga Tp	253,711.94		253,711.94
Tweed, Municipality of	16,440.13		16,440.13
Sub-Total	1,983,708.22	0.00	1,983,708.22
<i>Huron</i>			
Ashfield Tp	101,416.87		101,416.87
Colborne Tp	362,074.35		362,074.35
East Wawanosh Tp	69,563.51		69,563.51
Grey Tp	321,121.10		321,121.10
Goderich Tp	523,574.54		523,574.54
Hay/Stanley/Turnberry Tp	50,937.84		50,937.84
Howick Tp	160,595.56		160,595.56
Hullett Tp	126,047.28		126,047.28
McKillop Tp	474,905.53		474,905.53
Morris Tp	206,000.52		206,000.52
Tuckersmith Tp	72,789.00		72,789.00
Usborne Tp	76,299.88		76,299.88
West Wawanosh Tp	190,743.24		190,743.24
Sub-Total	2,736,069.22	0.00	2,736,069.22
<i>Lambton</i>			
Bosanquet, Town of	98,773.45		98,773.45
Enniskillen/Plympton/Warwick Tp	408,873.44		408,873.44
Sub-Total	507,646.89	0.00	507,646.89
<i>Lanark</i>			
Bathurst, Burgess, Sherbrooke Tp	34,874.90		34,874.90
Beckwith Tp	47,281.77		47,281.77
Drummond-North Elmsley Tp	130,689.87		130,689.87
Lanark Highlands Tp	1,271,406.79		1,271,406.79
Mississippi Mills, Town of	13,154.10		13,154.10
Montague Tp	96,061.38		96,061.38
Sub-Total	1,593,468.81	0.00	1,593,468.81

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Leeds & Grenville			
Augusta Tp	193,867.16		193,867.16
Edwardsburgh Tp	471,777.24		471,777.24
Elizabethtown Tp	681,423.93		681,423.93
Front of Escott/Front of Yonge/Rear of Yonge & Escott/Kitley Tp	163,317.18		163,317.18
Front of Leeds & Lansdowne Tp	72,407.12		72,407.12
Merrickville-Wolford, Village of	145,993.99		145,993.99
North Grenville Tp	474,074.64		474,074.64
Rear of Leeds & Lansdowne Tp	706,820.02		706,820.02
Rideau Lakes Tp	78,045.38		78,045.38
Sub-Total	2,987,726.66	0.00	2,987,726.66
Lennox & Addington			
Greater Napanee, Town of	354,895.13		354,895.13
Loyalist/Stone Mills Tp	1,482,968.50		1,482,968.50
Sub-Total	1,837,863.63	0.00	1,837,863.63
Middlesex			
Adelaide/Lucan Biddulph Tp	135,084.26		135,084.26
Caradoc Tp	23,139.00		23,139.00
London, City of	2,957,874.88		2,957,874.88
McGillivray Tp	39,936.52		39,936.52
Middlesex Centre Tp	1,016,547.50		1,016,547.50
North Dorchester Tp	1,193,139.36		1,193,139.36
West Nissouri Tp	978,975.07		978,975.07
West Williams Tp	94,543.75		94,543.75
Sub-Total	6,439,240.34	0.00	6,439,240.34
Niagara			
Fort Erie, Town of/Port Colborne, City of/Wainfleet Tp	1,492,470.60		1,492,470.60
Lincoln/Niagara-on-the-Lake/Pelham, Town of	1,948,593.80		1,948,593.80
Niagara Falls, City of	1,173,473.81		1,173,473.81
Sub-Total	4,614,538.21	0.00	4,614,538.21
Northumberland			
Alnwick/Hope Tp	93,141.18	150,000.00	243,141.18
Brighton Tp	396,739.16		396,739.16
Campbellford-Seymour, Municipality of	125,240.03		125,240.03
Cramahe Tp	1,871,566.32		1,871,566.32
Haldimand Tp	180,677.72		180,677.72
Hamilton Tp	287,140.19		287,140.19
Percy Tp	89,842.99		89,842.99
Sub-Total	3,044,347.59	150,000.00	3,194,347.59

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Ottawa-Carleton</i>			
Cumberland Tp	660,270.18		660,270.18
Gloucester, City of	1,997,712.30		1,997,712.30
Goulbourn Tp	750,432.48		750,432.48
Nepean, City of	3,534,503.25		3,534,503.25
Osgoode Tp	324,582.22		324,582.22
Rideau Tp	4,276.00		4,276.00
West Carleton Tp	3,390,600.02		3,390,600.02
Sub-Total	10,662,376.45	0.00	10,662,376.45
<i>Oxford</i>			
Blandford-Blenheim Tp	310,450.77		310,450.77
East Zorra-Tavistock/Norwich Tp/Woodstock, City of	160,880.10		160,880.10
South-West Oxford Tp	1,072,675.80		1,072,675.80
Zorra Tp	3,762,162.87	115,247.00	3,877,409.87
Sub-Total	5,306,169.54	115,247.00	5,421,416.54
<i>Peel</i>			
Brampton/Mississauga, City of	315,436.18		315,436.18
Caledon, Town of	4,851,394.46		4,851,394.46
Sub-Total	5,166,830.64	0.00	5,166,830.64
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	143,122.08		143,122.08
Perth East Tp	335,151.90		335,151.90
Perth South Tp	1,501,850.77		1,501,850.77
West Perth Tp	154,542.03		154,542.03
Sub-Total	2,134,666.78	0.00	2,134,666.78
<i>Peterborough</i>			
Asphodel-Norwood Tp	192,715.45		192,715.45
Douro-Dummer Tp	550,659.76		550,659.76
Galway-Cavendish-Harvey Tp	203,821.06		203,821.06
Havelock-Belmont-Methuen Tp	322,630.33		322,630.33
Cavan-Millbrook-North Monaghan Tp	97,831.51		97,831.51
Otonabee-South Monaghan Tp	362,092.80		362,092.80
Smith-Ennismore Tp	478,137.26		478,137.26
Sub-Total	2,207,888.17	0.00	2,207,888.17
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	159,620.76		159,620.76
Champlain Tp	364,594.94		364,594.94
Clarence-Rockland, City of	326,108.29		326,108.29
East Hawkesbury Tp	74,226.00		74,226.00
The Nation, Municipality of	206,182.09		206,182.09
Russell Tp	283,887.13		283,887.13
Sub-Total	1,414,619.21	0.00	1,414,619.21

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Prince Edward Co			
Prince Edward, County of	2,110,052.49		2,110,052.49
Sub-Total	2,110,052.49	0.00	2,110,052.49
Renfrew			
Admaston/Bromley Tp	65,399.79		65,399.79
Bagot-Blythfield-Brougham Tp	9,510.00		9,510.00
Horton Tp	354,673.81		354,673.81
Laurentian Valley Tp	256,462.42		256,462.42
McNab-Braeside Tp	291,460.81		291,460.81
Petawawa, Town of	341,843.08		341,843.08
Ross Tp/Renfrew, Town of	68,492.92		68,492.92
Westmeath Tp	118,325.97		118,325.97
Sub-Total	1,506,168.80	0.00	1,506,168.80
Simcoe			
Adjala-Tosorontio Tp/Collingwood, Town of/Barrie, City of	541,826.35		541,826.35
Bradford West Gwillimbury/Midland/Wasaga Beach, Town of	208,160.15		208,160.15
Clearview Tp	1,313,587.03		1,313,587.03
Essa Tp	126,619.65		126,619.65
Innisfil, Town of	144,331.93		144,331.93
New Tecumseth, Town of	70,231.20		70,231.20
Oro-Medonte Tp	1,986,819.69		1,986,819.69
Ramara Tp	2,086,360.58		2,086,360.58
Severn Tp	1,346,462.97		1,346,462.97
Springwater Tp	1,152,545.68		1,152,545.68
Tay Tp	97,213.46		97,213.46
Tiny Tp	191,118.13		191,118.13
Sub-Total	9,265,276.82	0.00	9,265,276.82
Stormont, Dundas & Glengarry			
North Dundas Tp	679,136.92		679,136.92
North Glengarry Tp	74,398.52		74,398.52
North Stormont Tp	660,171.65		660,171.65
South Dundas Tp	216,844.81		216,844.81
South Glengarry Tp	508,128.36		508,128.36
South Stormont Tp	886,881.36		886,881.36
Sub-Total	3,025,561.62	0.00	3,025,561.62
Sudbury			
Nickel Centre, Town of	1,131,655.87		1,131,655.87
Onaping Falls, Town of	680,004.00		680,004.00
Rayside-Balfour, Town of/Sudbury, City of	184,065.39	77,466.00	261,531.39
Valley East, City of	249,269.88		249,269.88
Walden, Town of	16,407.96		16,407.96
Sub-Total	2,261,403.10	77,466.00	2,338,869.10

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Sudbury District			
Baldwin Tp/ St. Charles, Municipality of	20,617.66		20,617.66
French River, Municipality of/Nairn & Hyman Tp	103,944.72		103,944.72
Markstay-Warren, Municipality of	41,855.88		41,855.88
Sables Spanish Rivers Tp	13,353.44	2,335.00	15,688.44
Sudbury District, Unorganized	245,988.78		245,988.78
Sub-Total	425,760.48	2,335.00	428,095.48
Victoria			
Bexley/Laxton, Digby & Longford Tp	81,317.54		81,317.54
Bobcaygeon/Verulam, Municipality of	76,514.66		76,514.66
Carden/Dalton Tp	1,730,769.72		1,730,769.72
Eldon Tp	156,559.67		156,559.67
Emily Tp	572,294.17		572,294.17
Fenelon Tp	236,767.33		236,767.33
Manvers Tp	3,373,389.86		3,373,389.86
Mariposa Tp	694,678.81		694,678.81
Somerville Tp	194,561.99		194,561.99
Sub-Total	7,116,853.75	0.00	7,116,853.75
Waterloo			
Cambridge/Kitchener, City of	1,268,718.23		1,268,718.23
North Dumfries Tp	3,520,907.89		3,520,907.89
Wellesley Tp	1,184,977.20		1,184,977.20
Wilmot Tp	853,468.93		853,468.93
Woolwich Tp	855,625.65		855,625.65
Sub-Total	7,683,697.90	0.00	7,683,697.90
Wellington			
Centre Wellington Tp	1,047,893.32		1,047,893.32
Erin, Town of	1,708,772.43		1,708,772.43
Guelph-Eramosa Tp	752,733.35	100,000.00	852,733.35
Mapleton Tp	91,392.66		91,392.66
Minto, Town of	394,775.17		394,775.17
Puslinch Tp	4,133,573.61		4,133,573.61
Wellington North Tp	151,631.60		151,631.60
Sub-Total	8,280,772.14	100,000.00	8,380,772.14
York			
East Gwillimbury, Town of	483,053.05		483,053.05
Georgina, Town of	100,993.56		100,993.56
King Tp/Vaughan, City of	296,435.27		296,435.27
Whitchurch-Stouffville, Town of	2,192,206.00		2,192,206.00
Sub-Total	3,072,687.88	0.00	3,072,687.88
GRAND TOTAL	145,485,544.27	590,048.00	146,075,592.27

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1992	1993	1994	1995	1996	1997	1998	1999	2000
Algoma, District of	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Brant Co.	1.4	1.1	1.3	1.6	1.7	2.1	1.5	1.5	2.1
Bruce Co.	2.0	2.0	1.8	1.5	1.2	1.3	1.6	1.5	1.7
Chatham-Kent, R. M. of	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5
Dufferin Co.	1.1	1.3	1.6	1.4	1.5	1.5	1.8	2.1	2.6
Durham, R. M. of	5.7	6.6	7.1	7.2	7.6	8.7	7.8	9.2	10.2
Elgin Co.	0.5	0.6	0.5	0.4	0.5	0.7	0.4	0.6	0.7
Essex Co.	2.7	2.8	2.7	2.4	2.2	2.7	2.0	1.9	2.0
Frontenac, Management Board	1.6	1.4	1.5	1.2	1.6	1.5	1.2	1.3	1.4
Grey Co.	2.6	2.4	2.7	2.4	2.0	2.1	2.1	2.8	2.5
Haldimand-Norfolk, R. M. of	1.7	1.8	1.9	1.9	1.7	2.1	1.8	2.0	2.0
Halton, R. M. of	7.0	9.2	9.7	10.7	12.3	14.4	13.4	13.8	15.5
Hamilton-Wentworth, R. M. of	3.6	3.4	3.9	4.0	4.0	5.2	4.7	4.6	6.3
Hastings Co.	1.6	1.5	1.2	1.4	1.6	2.0	1.9	2.2	2.0
Huron Co.	2.9	2.1	2.9	2.8	2.8	2.4	2.6	2.8	2.7
Lambton Co.	0.5	0.4	0.6	0.6	0.4	0.5	0.6	0.6	0.5
Lanark Co.	1.2	0.9	1.1	1.3	1.2	1.2	1.3	1.5	1.6
Leeds & Grenville Co.'s	2.0	2.0	2.4	2.3	2.0	2.1	4.2	2.2	3.0
Lennox & Addington Co.	1.4	1.9	1.7	2.0	1.8	1.7	1.9	1.7	1.8
Middlesex Co.	4.4	5.0	4.9	4.5	4.5	5.3	6.1	5.6	6.4
Niagara, R. M. of	3.3	3.5	4.1	3.6	4.7	4.9	4.6	4.3	4.6
Northumberland Co.	3.3	3.0	3.0	2.6	3.0	3.2	3.2	3.6	3.2
Ottawa-Carleton, R. M. of	8.7	9.2	9.3	8.4	6.1	6.7	7.1	8.1	10.7
Oxford Co.	4.5	4.9	4.6	5.0	4.6	5.3	4.9	5.1	5.4
Peel, R. M. of	2.7	2.9	3.1	3.7	3.8	4.3	4.2	4.5	5.2
Perth Co.	1.3	1.4	1.7	1.6	1.9	1.7	1.7	1.6	2.1
Peterborough Co.	2.4	2.6	2.2	1.8	1.8	1.8	1.8	1.8	2.2
Prescott & Russell Co.'s	1.5	1.7	1.9	1.3	1.2	1.4	1.1	1.2	1.4
Prince Edward Co.	1.7	1.5	1.9	2.2	1.8	2.1	2.0	2.0	2.1
Renfrew Co.	ND	ND	1.1	1.3	1.5	1.2	1.3	1.5	1.5
Simcoe Co.	8.0	6.9	6.2	6.8	7.4	7.6	9.0	9.0	9.3
Stormont, Dundas & Glengarry Co.'s	2.4	2.6	2.6	2.3	2.1	2.4	2.4	2.8	3.0
Sudbury, District of	0.5	0.5	0.5	0.3	0.3	0.2	0.2	0.4	0.5
Sudbury, R. M. of	2.7	2.2	2.9	2.9	2.7	2.5	2.3	2.9	2.3
Victoria Co.	4.7	5.1	5.4	4.9	6.0	6.5	6.6	6.0	7.1
Waterloo, R. M. of	4.1	4.7	5.8	5.8	5.8	5.6	5.8	7.3	7.7
Wellington Co.	4.9	5.5	5.6	4.9	6.0	6.4	6.9	7.5	8.4
York, R. M. of	1.6	1.4	1.9	2.2	2.0	2.6	2.2	2.7	3.0
TOTAL	103.0	106.8	114.3	112.2	114.3	125.0	125.2	131.5	146.0

ND: Not Designated under the Aggregate Resources Act.

Table 4

**LICENCE PRODUCTION IN 2000
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2000 Production	Production				
				1999	1998	1997	1996	1995
1	Town of Milton	Halton Region	9.0	7.7	7.9	9.6	8.6	5.6
2	City of Burlington/ Town of Halton Hills	Halton Region	6.5	6.1	5.5	4.7	3.7	5.1
3	City of Stoney Creek/ Town of Flamborough	Hamilton-Wentworth	6.3	4.6	4.7	5.1	4.0	4.0
4	Town of Caledon	Peel Region	5.0	4.2	3.9	4.0	3.5	3.6
5	Municipality of Clarington	Durham	4.3	3.8	3.0	3.9	3.1	3.0
6	Puslinch Township	Wellington County	4.1	3.9	3.8	3.5	3.2	2.0
7	Township of Uxbridge	Durham	4.1	3.4	3.2	3.1	3.3	3.1
8	Zorra Township	Oxford County	3.8	4.1	3.8	3.8	3.3	3.6
9	City of Nepean	Ottawa-Carleton, R. M. of	3.5	2.2	2.1	2.1	2.0	2.5
10	Township of North Dumfries	Waterloo, R. M. of	3.5	3.2	2.5	2.4	2.9	2.5
Total			50.1	43.2	40.4	42.2	37.6	35.0

Note: Municipalities are ranked in order of their licenced production for 2000

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
AS OF DECEMBER 31, 2001**

District	No. of Licences	Category		Type of Operation		
		Class A	Class B	Pit	Quarry	Pit & Quarry
Aurora (GTA)	176	151	25	160	16	0
Aylmer	319	229	90	302	11	6
Bancroft	37	13	24	18	14	5
Guelph (Cambridge)	475	383	92	441	31	3
Kemptville	509	266	243	371	117	21
Midhurst	465	340	125	428	34	3
Pembroke	113	52	61	101	6	6
Peterborough (Tweed)	503	270	233	405	85	13
Sault Ste. Marie	69	31	38	63	1	5
Sudbury	133	92	41	112	5	16
TOTAL	2799	1827	972	2401	320	78

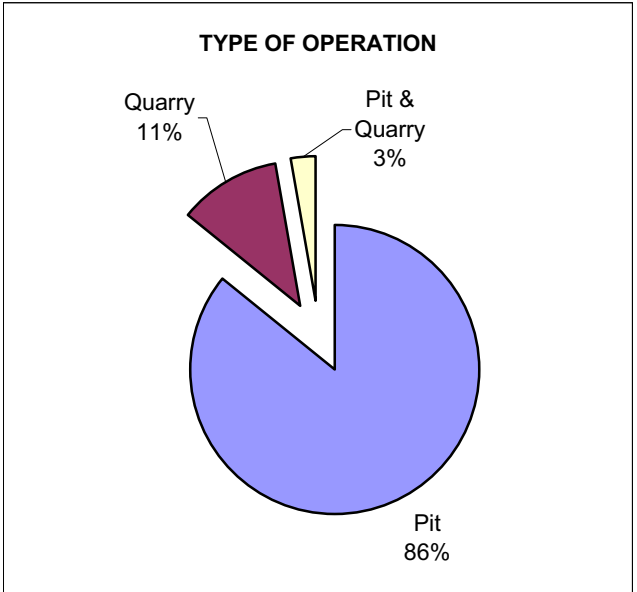
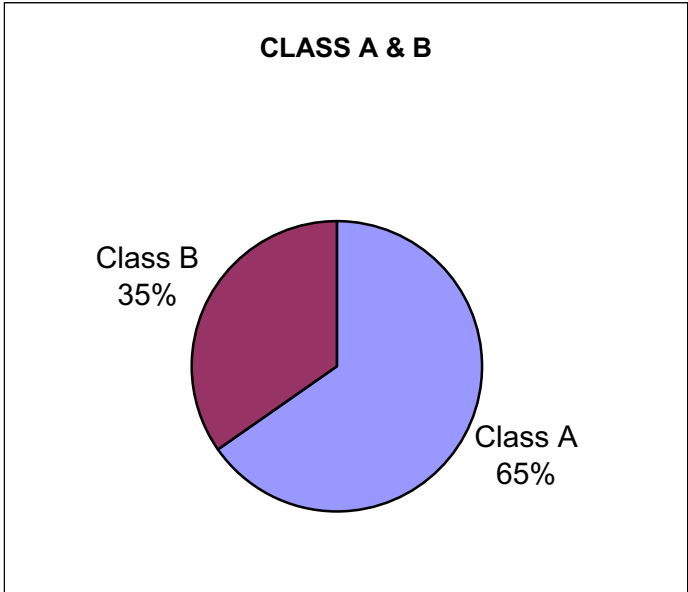


Table 6

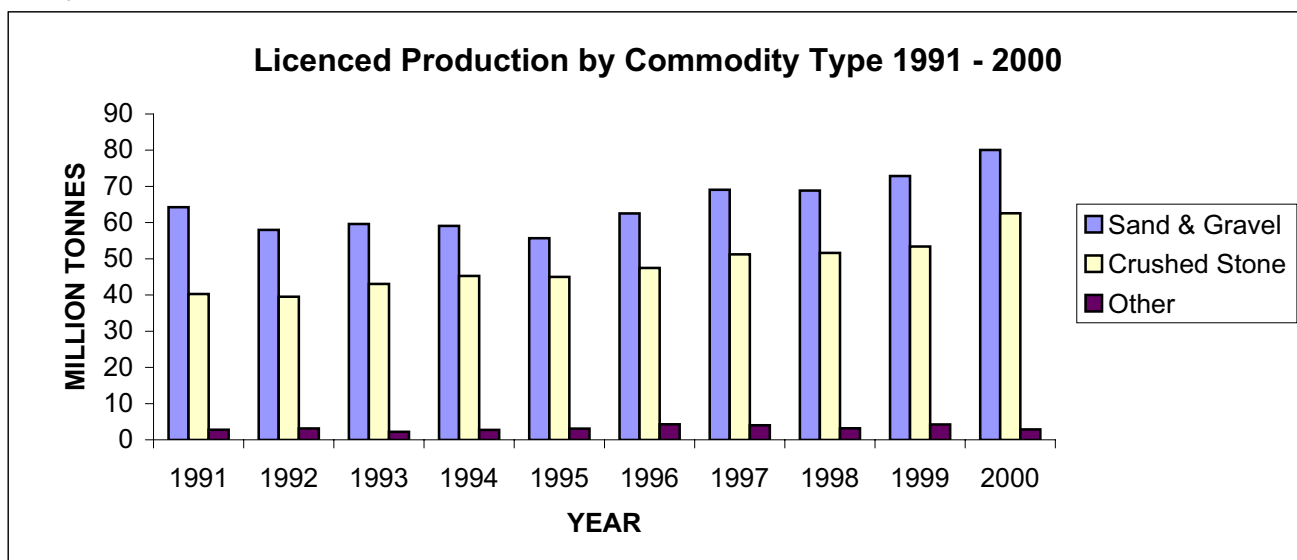
**2000 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	33,935,478.09	15,849,306.88	17,259,588.00	822,443.71	4,139.50
Aylmer	15,849,009.62	11,572,555.66	4,274,794.34	1,325.00	334.62
Bancroft	2,148,224.69	73,788.21	2,053,780.08	0.00	20,656.40
Guelph (Cambridge)	35,633,207.30	21,947,801.68	13,152,649.01	160,249.34	372,507.27
Kemptville	19,683,752.75	6,250,269.30	12,420,377.06	158,372.30	854,734.09
Midhurst	15,681,734.67	10,789,936.25	4,511,981.12	94,010.73	285,806.57
Pembroke	1,506,168.80	1,255,198.66	250,845.02	0.00	125.12
Peterborough	17,556,484.95	9,139,858.10	8,370,888.02	38,045.04	7,693.79
Sault Ste. Marie	812,279.82	728,330.78	55,867.70	0.00	28,081.34
Sudbury	2,679,203.58	2,460,144.64	214,840.85	3,687.69	530.40
TOTAL	145,485,544.27	80,067,190.16	62,565,611.20	1,278,133.81	1,574,609.10

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Sand & Gravel	Crushed Stone	Other
1991	64.24	40.26	2.78
1992	57.99	39.52	3.15
1993	59.62	43.04	2.19
1994	59.07	45.28	2.76
1995	55.70	45.01	3.09
1996	62.52	47.48	4.27
1997	69.05	51.23	4.01
1998	68.84	51.64	3.20
1999	72.87	53.40	4.26
2000	80.07	62.57	2.85

Table 7

**2000 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	320,755.16	320,755.16	-	-	-
Cochrane	296,455.00	158,017.60	138,111.00	-	326.40
Hearst	307,413.96	224,981.06	59,146.45	-	23,286.45
Kirkland Lake	781,722.68	744,367.68	-	37,355.00	-
North Bay	1,143,931.76	1,110,804.62	31,101.00	-	2,026.14
Sault Ste. Marie	347,489.38	347,489.38	-	-	-
Sudbury	369,930.84	178,230.36	187,497.75	-	4,202.73
Timmins	293,905.14	293,905.14	-	-	-
Wawa	896,285.76	883,773.76	-	12,512.00	-
Sub-Total	4,757,889.68	4,262,324.76	415,856.20	49,867.00	29,841.72
NORTHWEST					
Dryden	652,831.24	438,731.24	214,000.00	-	100.00
Fort Frances	1,053,378.45	959,697.65	93,333.00	1.00	346.80
Kenora	303,509.50	288,621.54	-	-	14,887.96
Nipigon	823,319.67	772,480.77	44,783.00	-	6,055.90
Red Lake	481,093.68	480,083.48	-	87.00	923.20
Sioux Lookout	531,875.66	531,145.00	-	-	730.66
Thunder Bay	436,296.73	436,284.98	-	-	11.75
Sub-Total	4,282,304.93	3,907,044.66	352,116.00	88.00	23,056.27
SOUTHCENTRAL					
Algonquin Park	31,217.00	31,217.00	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	586.75	586.75	-	-	-
Bancroft	239,978.72	108,272.04	125,655.43	-	6,051.25
Guelph (Cambridge)	-	-	-	-	-
Kemptville	192,186.28	92,186.28	100,000.00	-	-
Midhurst	-	-	-	-	-
Parry Sound	237,456.27	218,889.10	17,120.17	-	1,447.00
Pembroke	55,663.38	55,663.38	-	-	-
Peterborough (Tweed)	61.90	-	-	-	61.90
Sub-Total	757,150.30	506,814.55	242,775.60	0.00	7,560.15
TOTAL	9,797,344.91	8,676,183.97	1,010,747.80	49,955.00	60,458.14

Note: Amounts shown are in metric tonnes

Table 8

**2000 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	587	587	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	240,041	108,272	125,655	0	6,113
East (6)	247,850	147,850	100,000	0	0
Northeast (7)	4,130,277	3,628,657	432,976	37,355	31,289
Northwest (8)	5,178,591	4,790,819	352,116	12,600	23,056
TOTAL	9,797,345	8,676,184	1,010,748	49,955	60,458

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

**2000 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	20,275,428	15,160,732	5,010,313	103,688	695
Peninsula (2)	15,058,084	3,223,290	11,783,763	51,032	0
West Central (3)	31,830,439	25,926,272	5,145,348	100,866	657,954
GTA (4)	33,935,478	15,849,307	17,259,588	822,444	4,140
East Central (5)	16,462,850	8,797,197	7,630,597	10,726	24,330
East (6)	24,431,781	7,921,917	15,465,293	185,691	858,880
Northeast (7)	2,687,164	2,468,105	214,841	3,688	530
Northwest (8)	804,320	720,371	55,868	0	28,081
TOTAL	145,485,544	80,067,190	62,565,611	1,278,134	1,574,609

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2000
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	176	9,433.41	3,597.85	109.25	61.14	3,645.96
Aylmer	319	8,583.13	3,122.76	88.88	107.48	3,104.16
Bancroft	37	1,482.78	254.13	8.60	1.50	261.23
Guelph (Cambridge)	475	16,701.82	4,274.51	241.25	132.24	4,383.53
Kemptville	509	14,149.97	3,689.33	111.46	29.12	3,771.67
Midhurst	465	13,407.44	3,173.79	155.90	85.22	3,244.46
Pembroke	113	3,172.90	382.31	33.09	0.00	415.40
Peterborough (Tweed)	503	13,430.52	3,236.77	68.99	35.57	3,270.19
Sault Ste. Marie	69	2,977.06	297.58	13.82	5.48	305.92
Sudbury	133	9,907.09	800.15	10.04	10.90	799.29
TOTAL	2,799	93,246.12	22,829.18	841.29	468.66	23,201.81

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

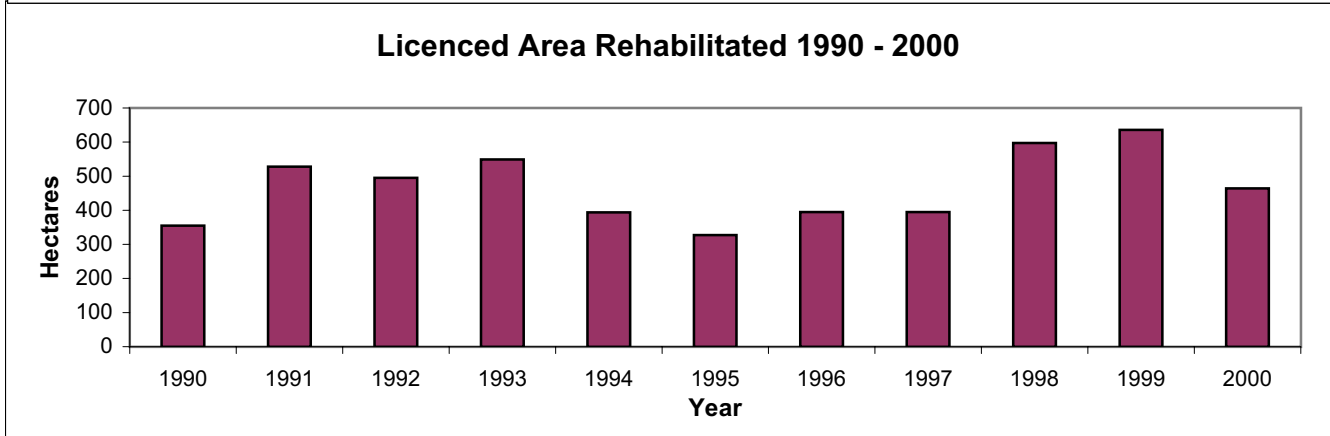
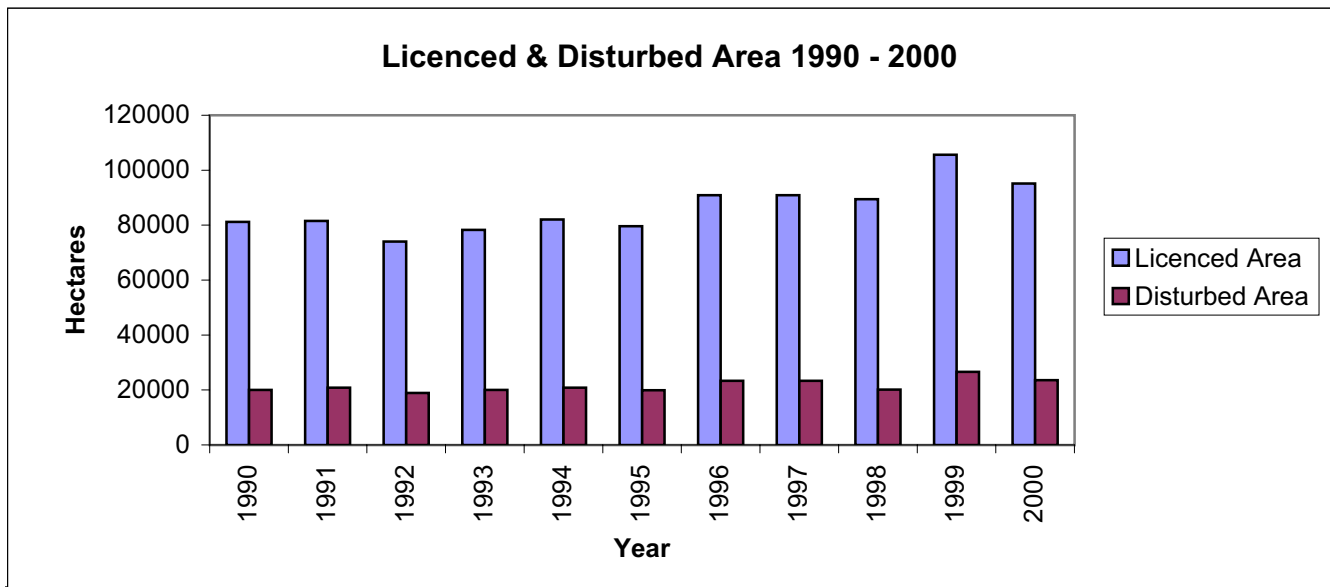


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	524.83	186	186	0	0	0
Cochrane	2,432.17	108	96	7	5	0
Hearst	2,544.82	158	143	14	1	0
Kirkland Lake	1,079.55	113	113	0	0	0
North Bay	2,146.13	198	183	12	3	0
Sault Ste. Marie	515.41	105	102	2	1	0
Sudbury	3,460.98	180	157	16	7	0
Timmins	1,411.10	142	138	4	0	0
Wawa	1,946.81	252	250	2	0	0
Sub-Total	16,061.80	1,442	1,368	57	17	0
NORTHWEST						
Dryden	1,239.71	171	165	3	3	0
Fort Frances	1,962.76	262	252	4	6	0
Kenora	2,030.10	181	162	15	4	0
Nipigon	2,961.35	309	296	12	1	0
Red Lake	851.13	97	97	0	0	0
Sioux Lookout	993.32	73	73	0	0	0
Thunder Bay	1,434.03	166	152	14	0	0
Sub-Total	11,472.40	1,259	1,197	48	14	0
SOUTHCENTRAL						
Algonquin Park	10.72	19	19	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	751.50	82	73	9	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	147.58	5	2	2	0	1
Midhurst	1.00	1	0	0	0	1
Parry Sound	607.57	107	83	12	2	10
Pembroke	116.92	44	43	1	0	0
Peterborough (Tweed)	121.06	1	0	1	0	0
Sub-Total	2,376.95	262	220	25	2	15
TOTAL	29,911.15	2,963	2,785	130	33	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

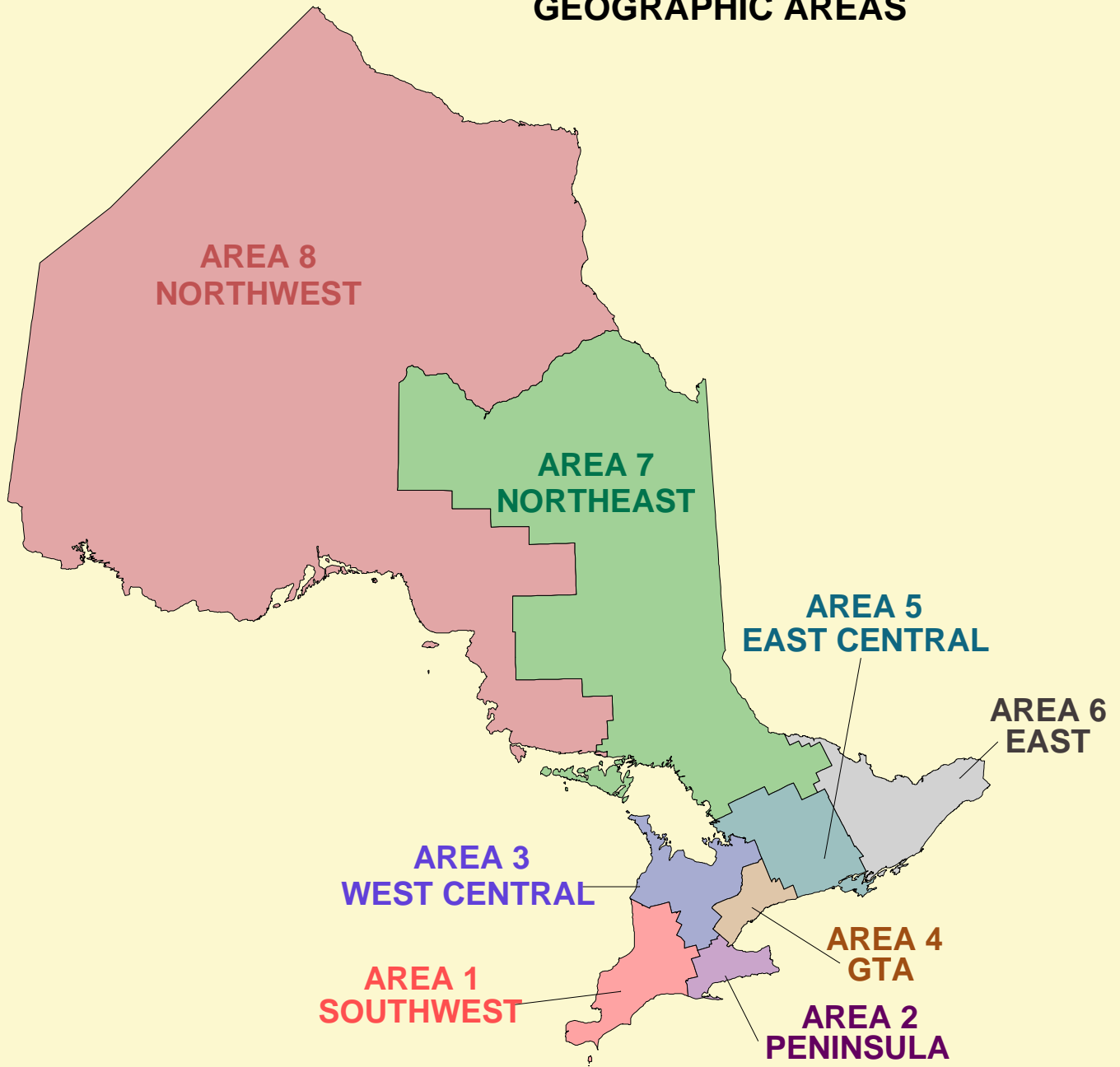
JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

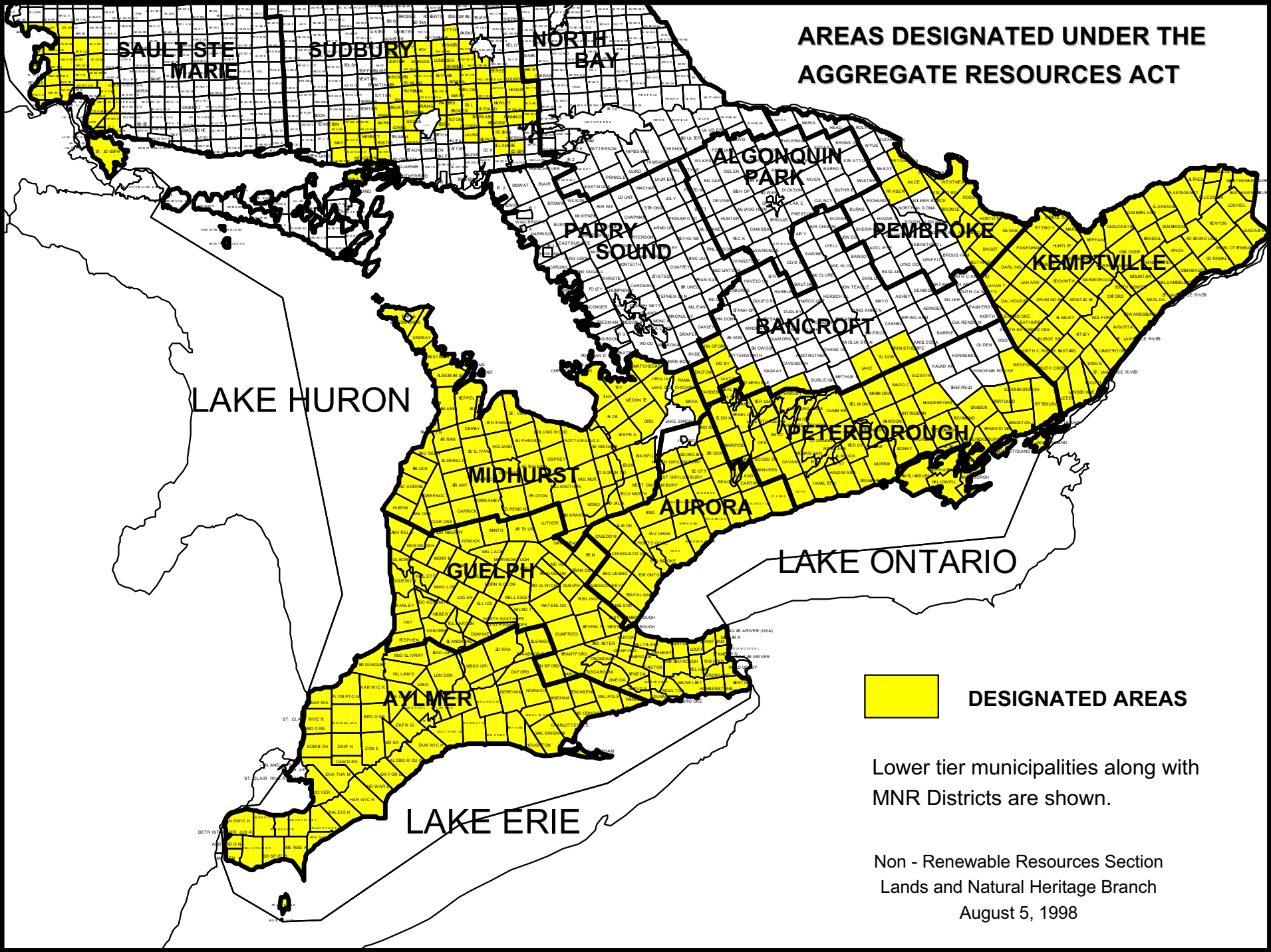
Village of Hilton Beach

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	TIMISKAMING	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

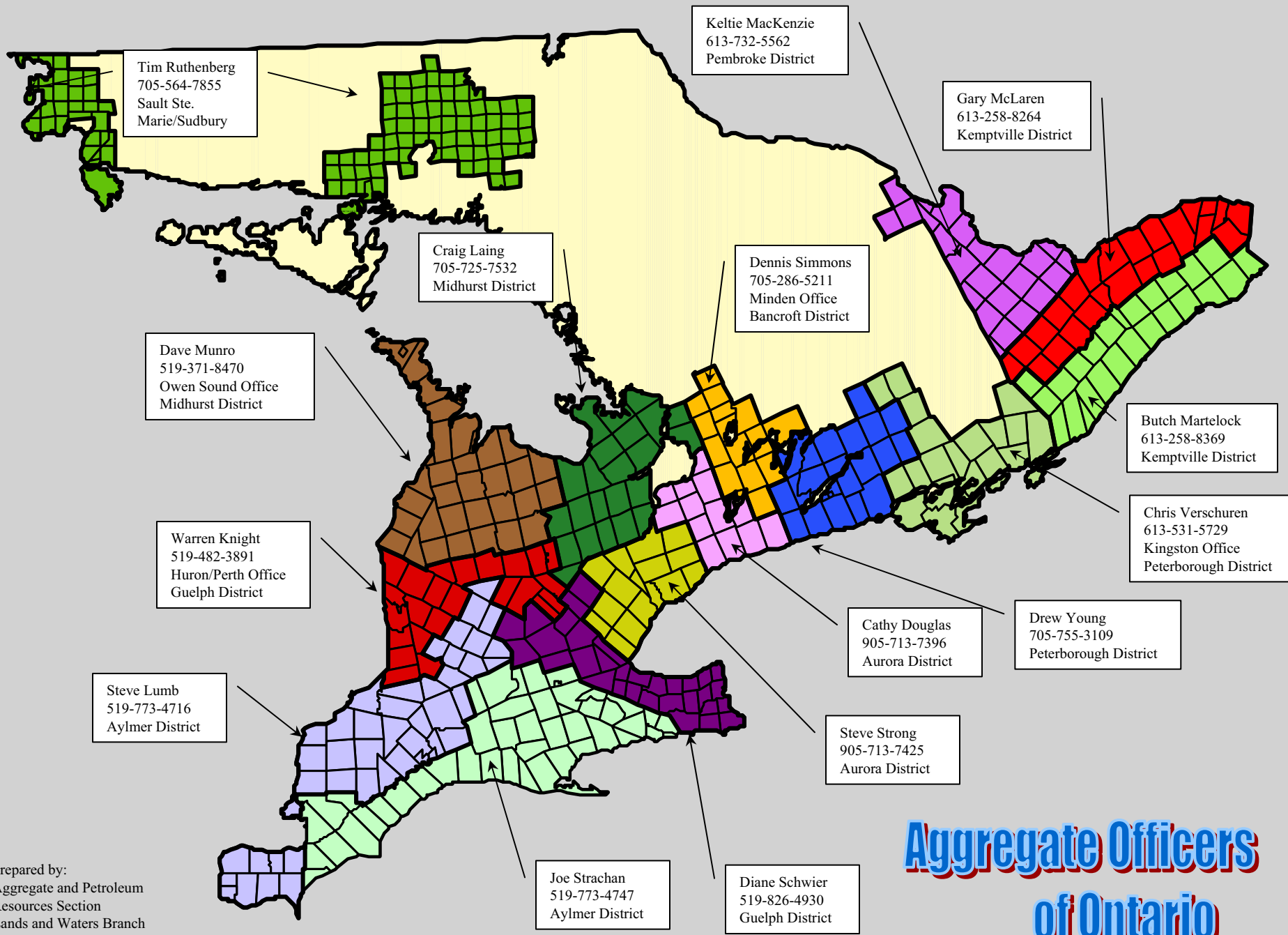
AREAS DESIGNATED UNDER THE AGGREGATE RESOURCES ACT



 **DESIGNATED AREAS**

Lower tier municipalities along with
MNR Districts are shown.

Non - Renewable Resources Section
Lands and Natural Heritage Branch
August 5, 1998



Aggregate Officers of Ontario

Prepared by:
Aggregate and Petroleum
Resources Section
Lands and Waters Branch
Feb 08, 2002

● MINERAL ● AGGREGATES ● IN ONTARIO

Statistical Update

2 0 0 1

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2001

Prepared by

The Ontario Aggregate Resources Corporation

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Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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or Fax (905) 319-7423

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern ‘built environment’. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 2001, this basic non-renewable resource was supplied from 2,787 licensed aggregate sites on private land in designated parts of the Province and 3,100 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario’s Mineral Aggregate Resources

At the Provincial level, the management of Ontario’s aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the “Act”), gave the Minister the power to create the Aggregate Resources Trust (the “Trust”) and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is owned by the APAO as the single shareholder, but is directed by a multi-stakeholder board of directors. The seven-member Board is composed of APAO directors and representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC is arms-length from APAO in terms of separate office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has developed systems for the efficient collection and disbursement of aggregate resource charges including an audit program to ensure production is reported properly. On behalf of the Trust, TOARC continues with the rehabilitation of abandoned pits and quarries through the MAAP program, the general management of the Trust assets and has undertaken the rehabilitation and monitoring of sites where licenses have been revoked.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Non-Renewable Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Non Renewable Resources Section, Lands and Natural Heritage Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2001 totaled approximately 167 million tonnes, down 2.4% from the previous year. Production from licensed operations remained relatively unchanged from 2000, at approximately 145 million tonnes. Wayside Permit production was down substantially, 64% from 2000 but on a small overall tonnage (.6 million in 2000 compared to .2 million in 2001.) Production from Aggregate Permits on Crown Land was also down 30% but on much larger tonnage, decreasing by approximately 2.5 million tonnes to 7 million tonnes compared to 10 million tonnes in 2000.

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1989 - 2001
(rounded to nearest million tonnes)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Licences	154	135	107	101	105	113	109	114	124	124	131	145	145
Wayside Permits*	4	3	2	2	2	2	2	2	1	2	1	1	0
Aggregate Permits	25	11	14	13	12	10	9	9	8	9	11	10	7
Category 14 (Forest Industry)**	-	-	-	-	-	-	-	-	-	-	2	3	3
Private Land Non-Designated (estimated)	14	12	12	12	12	11	10	11	11	11	12	12	12
ONTARIO TOTAL	197	161	135	128	131	136	130	136	144	146	157	171	167

*Wayside Permit production is reported as the total applied tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

**Actual production for Wayside Permits in 2001 was just over .2 million tonnes.

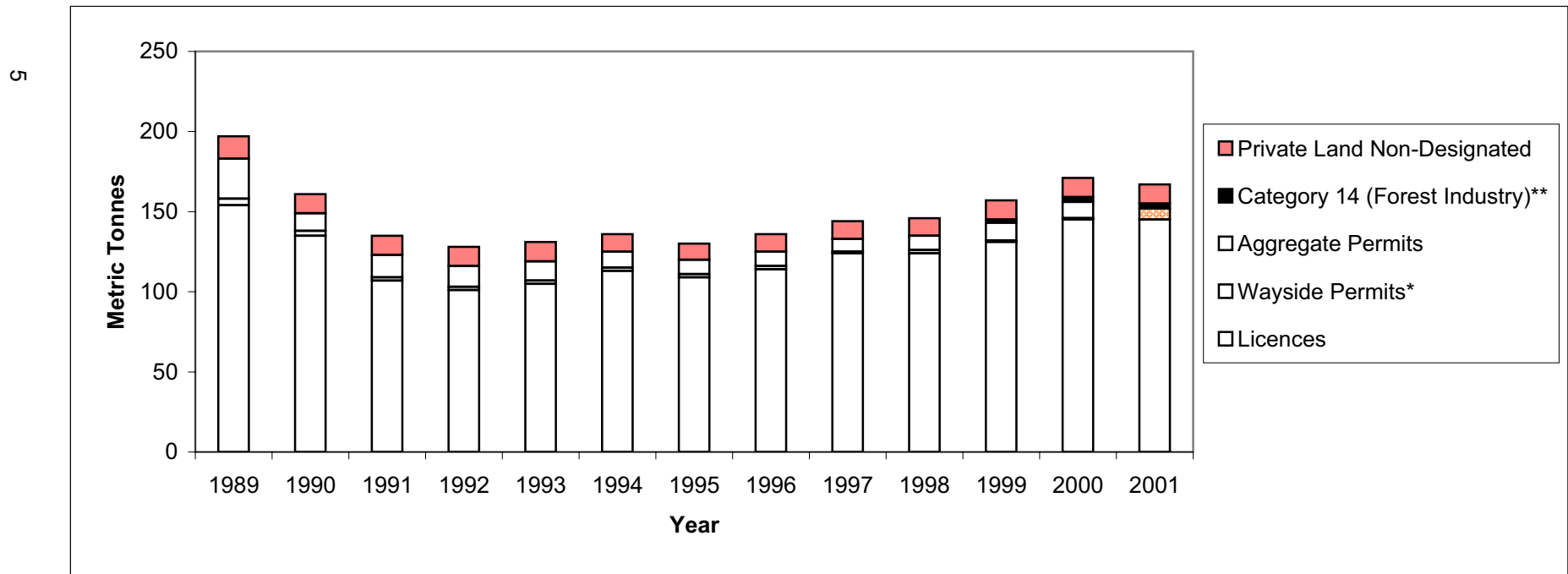


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	22,303.24		22,303.24
Hilton Tp	17,486.60		17,486.60
Jocelyn Tp	10,548.54		10,548.54
Johnson/Tarbutt & Tarbutt Add'l Tp	33,502.50		33,502.50
St. Joseph/Laird/Macdonald, Meredith & Aberdeen Add'l Tp	29,113.54		29,113.54
Sault Ste. Marie, City of	476,628.37		476,628.37
Sub-Total	589,582.79	0.00	589,582.79
<i>Brant</i>			
Brant, County of/Brantford, City of	2,061,950.18		2,061,950.18
Sub-Total	2,061,950.18	0.00	2,061,950.18
<i>Bruce</i>			
Arran-Elderslie, Municipality of	129,719.18		129,719.18
Brockton, Municipality of	155,396.04		155,396.04
Huron-Kinloss Tp	189,990.15		189,990.15
Kincardine, Municipality of	46,312.47		46,312.47
Northern Bruce Peninsula, Municipality of	158,909.09		158,909.09
Saugeen Shores, Town of	233,155.94		233,155.94
South Bruce, Municipality of	454,181.53		454,181.53
South Bruce Peninsula, Town of	199,095.42		199,095.42
Sub-Total	1,566,759.82	0.00	1,566,759.82
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	350,349.24		350,349.24
Sub-Total	350,349.24	0.00	350,349.24
<i>Dufferin</i>			
Amaranth/East Luther Grand Valley Tp	325,379.57		325,379.57
East Garafraxa Tp	906,012.68		906,012.68
Melancthon Tp	267,620.20		267,620.20
Mono Tp	539,092.00		539,092.00
Mulmur Tp	406,341.77		406,341.77
Sub-Total	2,444,446.22	0.00	2,444,446.22
<i>Durham</i>			
Brock Tp	1,307,678.58		1,307,678.58
Clarington, Municipality of	4,683,869.13		4,683,869.13
Oshawa, City of/Whitby, Town of/Scugog Tp	333,090.48		333,090.48
Uxbridge Tp	5,070,812.04		5,070,812.04
Sub-Total	11,395,450.23	0.00	11,395,450.23
<i>Elgin</i>			
Bayham, Municipality of/Malahide Tp	56,202.94		56,202.94
Central Elgin, Municipality of	399,009.30		399,009.30
West Elgin, Municipality of	97,711.12		97,711.12
Sub-Total	552,923.36	0.00	552,923.36

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg Tp/Leamington, Municipality of/Pelee Tp	1,848,822.87		1,848,822.87
Kingsville, Town of	390,446.58		390,446.58
Sub-Total	2,239,269.45	0.00	2,239,269.45
Frontenac			
Frontenac Islands Tp	32,792.32		32,792.32
Kingston, City of	907,927.47		907,927.47
South Frontenac Tp	358,314.27		358,314.27
Sub-Total	1,299,034.06	0.00	1,299,034.06
Grey			
Blue Mountains, Town of	279,116.06	32,000.00	311,116.06
Chatsworth Tp	327,002.69	68,000.00	395,002.69
Georgian Bluffs, Tp	540,672.99	20,000.00	560,672.99
Grey Highlands, Municipality of	335,971.39	56,240.00	392,211.39
Meaford, Municipality of	303,459.69		303,459.69
Southgate Tp	218,682.22	33,247.00	251,929.22
West Grey Tp	356,583.37		356,583.37
Sub-Total	2,361,488.41	209,487.00	2,570,975.41
Haldimand			
Haldimand, County of	1,496,605.30		1,496,605.30
Sub-Total	1,496,605.30	0.00	1,496,605.30
Halton			
Burlington, City of/Halton Hills, Town of	7,022,388.69		7,022,388.69
Milton, Town of	8,791,180.61		8,791,180.61
Sub-Total	15,813,569.30	0.00	15,813,569.30
Hamilton			
Hamilton, City of	5,987,892.06		5,987,892.06
Sub-Total	5,987,892.06	0.00	5,987,892.06
Hastings			
Belleville, City of	358,874.39		358,874.39
Centre Hastings, Municipality of	137,350.45		137,350.45
Madoc Tp	693,962.80		693,962.80
Marmora & Lake Tp	9,908.72		9,908.72
Quinte West, City of	592,844.84		592,844.84
Stirling-Rawdon/Tyendinaga Tp	184,138.22		184,138.22
Tweed, Municipality of	53,349.45		53,349.45
Sub-Total	2,030,428.87	0.00	2,030,428.87

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	720,022.18		720,022.18
Bluewater, Municipality of	7,255.00		7,255.00
Central Huron, Municipality of	609,643.62		609,643.62
Howick Tp	196,695.84		196,695.84
Huron East, Municipality of	1,214,244.48		1,214,244.48
Morris-Turnberry, Municipality of	176,089.54		176,089.54
North Huron Tp	96,989.48		96,989.48
South Huron, Municipality of	53,887.56		53,887.56
Sub-Total	3,074,827.70	0.00	3,074,827.70
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,358,258.15		6,358,258.15
Sub-Total	6,358,258.15	0.00	6,358,258.15
<i>Lambton</i>			
Lambton Shores, Municipality of	112,693.42		112,693.42
Enniskillen/Warwick Tp/Plympton-Wyoming, Town of	376,269.91		376,269.91
Sub-Total	488,963.33	0.00	488,963.33
<i>Lanark</i>			
Bathurst, Burgess, Sherbrooke/Beckwith Tp	96,426.50		96,426.50
Drummond-North Elmsley Tp	131,106.90		131,106.90
Lanark Highlands Tp	1,308,063.35		1,308,063.35
Mississippi Mills, Town of	118,168.88		118,168.88
Montague Tp	85,076.53		85,076.53
Sub-Total	1,738,842.16	0.00	1,738,842.16
<i>Leeds & Grenville</i>			
Augusta Tp	80,958.59		80,958.59
Athens/Front of Yonge Tp	151,349.10		151,349.10
Edwardsburgh/Cardinal Tp	254,753.69		254,753.69
Elizabethtown-Kitley Tp	566,049.88		566,049.88
Leeds and the Thousand Islands	684,039.97		684,039.97
Merrickville-Wolford, Village of	133,079.58		133,079.58
North Grenville Tp	339,041.65		339,041.65
Rideau Lakes Tp	90,120.12		90,120.12
Sub-Total	2,299,392.58	0.00	2,299,392.58
<i>Lennox & Addington</i>			
Greater Napanee, Town of	236,162.03		236,162.03
Loyalist/Stone Mills Tp	1,574,347.87		1,574,347.87
Sub-Total	1,810,509.90	0.00	1,810,509.90

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Middlesex			
Adelaide Metcalfe/Lucan Biddulph Tp	27,526.35		27,526.35
London, City of	2,669,253.08		2,669,253.08
Middlesex Centre Tp	841,634.69		841,634.69
North Middlesex, Municipality of	143,227.35		143,227.35
Strathroy-Caradoc Tp	24,377.20		24,377.20
Thames Centre, Municipality of	2,289,041.04		2,289,041.04
Sub-Total	5,995,059.71	0.00	5,995,059.71
Niagara			
Fort Erie/Pelham, Town of/Port Colborne, City of/Wainfleet Tp	1,832,248.79		1,832,248.79
Lincoln/Niagara-on-the-Lake, Town of	1,564,156.90		1,564,156.90
Niagara Falls, City of	1,179,128.10		1,179,128.10
Sub-Total	4,575,533.79	0.00	4,575,533.79
Norfolk			
Norfolk, County of	393,462.94		393,462.94
Sub-Total	393,462.94	0.00	393,462.94
Northumberland			
Alnwick/Haldimand Tp/Port Hope and Hope, Town of	249,787.60		249,787.60
Brighton, Municipality of	332,744.03		332,744.03
Cramahe Tp	1,975,810.56		1,975,810.56
Hamilton Tp	354,626.94		354,626.94
Trent Hills, Municipality of	168,152.51		168,152.51
Sub-Total	3,081,121.64	0.00	3,081,121.64
Ottawa			
Ottawa, City of	10,121,104.14		10,121,104.14
Sub-Total	10,121,104.14	0.00	10,121,104.14
Oxford			
Blandford-Blenheim Tp	395,688.07		395,688.07
East Zorra-Tavistock/Norwich Tp	160,803.86		160,803.86
South-West Oxford Tp	832,072.74		832,072.74
Zorra Tp	3,534,377.09		3,534,377.09
Sub-Total	4,922,941.76	0.00	4,922,941.76
Peel			
Brampton/Mississauga, City of	303,267.75		303,267.75
Caledon, Town of	4,930,982.73		4,930,982.73
Sub-Total	5,234,250.48	0.00	5,234,250.48
Perth			
North Perth, Town of/St. Marys, Separated Town of	238,580.42		238,580.42
Perth East Tp	298,843.31		298,843.31
Perth South Tp	1,335,242.14		1,335,242.14
West Perth Tp	190,473.60		190,473.60
Sub-Total	2,063,139.47	0.00	2,063,139.47

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp	223,793.28		223,793.28
Douro-Dummer Tp	473,481.76		473,481.76
Galway-Cavendish-Harvey Tp	248,320.78		248,320.78
Havelock-Belmont-Methuen Tp	331,609.31		331,609.31
Cavan-Millbrook-North Monaghan Tp	85,163.59		85,163.59
Otonabee-South Monaghan Tp	448,625.31		448,625.31
Smith-Ennismore-Lakefield Tp	635,972.25		635,972.25
Sub-Total	2,446,966.28	0.00	2,446,966.28
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	167,042.59		167,042.59
Champlain Tp	456,078.50		456,078.50
Clarence-Rockland, City of	302,900.97		302,900.97
East Hawkesbury Tp	47,253.40		47,253.40
The Nation, Municipality of	185,385.49		185,385.49
Russell Tp	231,017.86		231,017.86
Sub-Total	1,389,678.81	0.00	1,389,678.81
<i>Prince Edward Co</i>			
Prince Edward, County of	2,015,881.79		2,015,881.79
Sub-Total	2,015,881.79	0.00	2,015,881.79
<i>Renfrew</i>			
Admaston/Bromley Tp/Renfrew, Town of	48,213.65		48,213.65
Horton/Greater Madawaska Tp	330,363.59		330,363.59
Laurentian Valley Tp	245,073.28		245,073.28
McNab-Braeside Tp	241,702.23		241,702.23
Petawawa, Town of	228,119.87		228,119.87
Whitewater Region Tp	122,446.27		122,446.27
Sub-Total	1,215,918.89	0.00	1,215,918.89
<i>Simcoe</i>			
Adjala-Tosorontio Tp/Collingwood, Town of/Barrie, City of	830,557.26		830,557.26
Bradford West Gwillimbury/Midland/Wasaga Beach, Town of	222,022.36		222,022.36
Clearview Tp	1,219,245.40		1,219,245.40
Essa Tp	100,763.45		100,763.45
Innisfil, Town of	91,415.83		91,415.83
New Tecumseth, Town of	45,582.91		45,582.91
Oro-Medonte Tp	2,121,761.07		2,121,761.07
Ramara Tp	2,510,118.81		2,510,118.81
Severn Tp	1,737,873.30		1,737,873.30
Springwater Tp	1,441,308.88		1,441,308.88
Tay Tp	132,028.16		132,028.16
Tiny Tp	219,630.81		219,630.81
Sub-Total	10,672,308.24	0.00	10,672,308.24

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	617,270.08		617,270.08
North Glengarry Tp	260,777.28		260,777.28
North Stormont Tp	679,691.79		679,691.79
South Dundas Tp	257,517.21		257,517.21
South Glengarry Tp	199,332.13		199,332.13
South Stormont Tp	656,121.89		656,121.89
Sub-Total	2,670,710.38	0.00	2,670,710.38
<i>Sudbury</i>			
Greater Sudbury, City of	1,811,141.83		1,811,141.83
Sub-Total	1,811,141.83	0.00	1,811,141.83
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	39,820.44		39,820.44
French River, Municipality of/Nairn & Hyman Tp	146,184.26		146,184.26
Markstay-Warren, Municipality of	81,705.16		81,705.16
Sables Spanish Rivers Tp/Espanola, Town of	41,662.18		41,662.18
Sudbury District, Unorganized	673,861.58		673,861.58
Sub-Total	983,233.62	0.00	983,233.62
<i>Waterloo</i>			
Cambridge/Kitchener, City of	1,729,447.95		1,729,447.95
North Dumfries Tp	3,700,932.40		3,700,932.40
Wellesley Tp	1,201,799.99		1,201,799.99
Wilmot Tp	932,436.94		932,436.94
Woolwich Tp	652,636.34		652,636.34
Sub-Total	8,217,253.62	0.00	8,217,253.62
<i>Wellington</i>			
Centre Wellington Tp	975,670.74		975,670.74
Erin, Town of	1,552,158.13		1,552,158.13
Guelph-Eramosa Tp	139,277.83		139,277.83
Mapleton Tp	98,677.80		98,677.80
Minto, Town of	498,306.59		498,306.59
Puslinch Tp	5,486,359.20		5,486,359.20
Wellington North Tp	152,862.33		152,862.33
Sub-Total	8,903,312.62	0.00	8,903,312.62
<i>York</i>			
East Gwillimbury, Town of	399,987.06		399,987.06
Georgina, Town of	59,257.26		59,257.26
King Tp/Vaughan, City of	343,037.87		343,037.87
Whitchurch-Stouffville, Town of	1,641,397.00		1,641,397.00
Sub-Total	2,443,679.19	0.00	2,443,679.19
GRAND TOTAL	145,117,242.31	209,487.00	145,326,729.31

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1993	1994	1995	1996	1997	1998	1999	2000	2001
Algoma, District of	0.4	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.6
Brant Co.	1.1	1.3	1.6	1.7	2.1	1.5	1.5	2.1	2.0
Bruce Co.	2.0	1.8	1.5	1.2	1.3	1.6	1.5	1.7	1.6
Chatham-Kent, R. M. of	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.3
Dufferin Co.	1.3	1.6	1.4	1.5	1.5	1.8	2.1	2.6	2.4
Durham, R. M. of	6.6	7.1	7.2	7.6	8.7	7.8	9.2	10.2	11.4
Elgin Co.	0.6	0.5	0.4	0.5	0.7	0.4	0.6	0.7	0.6
Essex Co.	2.8	2.7	2.4	2.2	2.7	2.0	1.9	2.0	2.2
Frontenac, Management Board	1.4	1.5	1.2	1.6	1.5	1.2	1.3	1.4	1.3
Grey Co.	2.4	2.7	2.4	2.0	2.1	2.1	2.8	2.5	2.6
Haldimand Co.	----	----	----	----	----	----	----	----	1.5
Haldimand-Norfolk, R. M. of	1.8	1.9	1.9	1.7	2.1	1.8	2.0	2.0	----
Halton, R. M. of	9.2	9.7	10.7	12.3	14.4	13.4	13.8	15.5	15.8
Hamilton-Wentworth, R. M. of	3.4	3.9	4.0	4.0	5.2	4.7	4.6	6.3	6.0
Hastings Co.	1.5	1.2	1.4	1.6	2.0	1.9	2.2	2.0	2.0
Huron Co.	2.1	2.9	2.8	2.8	2.4	2.6	2.8	2.7	3.1
Kawartha Lakes	----	----	----	----	----	----	----	----	6.4
Lambton Co.	0.4	0.6	0.6	0.4	0.5	0.6	0.6	0.5	0.5
Lanark Co.	0.9	1.1	1.3	1.2	1.2	1.3	1.5	1.6	1.7
Leeds & Grenville Co.'s	2.0	2.4	2.3	2.0	2.1	4.2	2.2	3.0	2.3
Lennox & Addington Co.	1.9	1.7	2.0	1.8	1.7	1.9	1.7	1.8	1.8
Middlesex Co.	5.0	4.9	4.5	4.5	5.3	6.1	5.6	6.4	6.0
Niagara, R. M. of	3.5	4.1	3.6	4.7	4.9	4.6	4.3	4.6	4.6
Norfolk Co.	----	----	----	----	----	----	----	----	0.4
Northumberland Co.	3.0	3.0	2.6	3.0	3.2	3.2	3.6	3.2	3.1
Ottawa-Carleton, R. M. of	9.2	9.3	8.4	6.1	6.7	7.1	8.1	10.7	10.1
Oxford Co.	4.9	4.6	5.0	4.6	5.3	4.9	5.1	5.4	4.9
Peel, R. M. of	2.9	3.1	3.7	3.8	4.3	4.2	4.5	5.2	5.2
Perth Co.	1.4	1.7	1.6	1.9	1.7	1.7	1.6	2.1	2.1
Peterborough Co.	2.6	2.2	1.8	1.8	1.8	1.8	1.8	2.2	2.4
Prescott & Russell Co.'s	1.7	1.9	1.3	1.2	1.4	1.1	1.2	1.4	1.4
Prince Edward Co.	1.5	1.9	2.2	1.8	2.1	2.0	2.0	2.1	2.0
Renfrew Co.	ND	1.1	1.3	1.5	1.2	1.3	1.5	1.5	1.2
Simcoe Co.	6.9	6.2	6.8	7.4	7.6	9.0	9.0	9.3	10.7
Stormont, Dundas & Glengarry Co.'s	2.6	2.6	2.3	2.1	2.4	2.4	2.8	3.0	2.7
Sudbury, District of	0.5	0.5	0.3	0.3	0.2	0.2	0.4	0.5	1.0
Sudbury, R. M. of	2.2	2.9	2.9	2.7	2.5	2.3	2.9	2.3	1.8
Victoria Co.	5.1	5.4	4.9	6.0	6.5	6.6	6.0	7.1	----
Waterloo, R. M. of	4.7	5.8	5.8	5.8	5.6	5.8	7.3	7.7	8.2
Wellington Co.	5.5	5.6	4.9	6.0	6.4	6.9	7.5	8.4	9.0
York, R. M. of	1.4	1.9	2.2	2.0	2.6	2.2	2.7	3.0	2.4
TOTAL	106.8	114.3	112.2	114.3	125.0	125.2	131.5	146.0	145.3

ND: Not Designated under the Aggregate Resources Act.

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.

As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.

Table 4

**LICENCE PRODUCTION IN 2001
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2001 Production	Production				
				2000	1999	1998	1997	1996
1	City of Ottawa ⁽¹⁾	City of Ottawa	10.1	10.6	8.1	7.1	6.7	6.1
2	Town of Milton	Halton	8.8	9.0	7.7	7.9	9.6	8.6
3	City of Burlington/ Town of Halton Hills	Halton	7.0	6.5	6.1	5.5	4.7	3.7
4	City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.4	7.1	6.0	6.6	6.5	6.0
5	City of Hamilton ⁽³⁾	City of Hamilton	6.0	6.3	4.6	4.7	5.2	4.0
6	Puslinch Township	Wellington County	5.5	4.1	3.9	3.8	3.5	3.2
7	Township of Uxbridge	Durham	5.0	4.1	3.4	3.2	3.1	3.3
8	Town of Caledon	Peel	4.9	5.0	4.2	3.9	4.0	3.5
9	Municipality of Clarington	Durham	4.7	4.3	3.8	3.0	3.9	3.1
10	Township of North Dumfries	Waterloo, R. M. of	3.7	3.5	3.2	2.5	2.4	2.9
Total			62.1	60.5	51.0	48.2	49.6	44.4

Note: Municipalities are ranked in order of their licenced production for 2001

Production statistics for 1996 - 2000 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
AS OF JUNE 30, 2001**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	176	153	23	160	16	0	0
Aylmer	320	234	86	303	11	6	0
Bancroft	37	13	24	18	14	5	0
Guelph (Cambridge)	463	375	88	429	31	3	0
Kemptville	506	269	237	368	116	21	1
Midhurst	462	339	123	423	36	3	0
Pembroke	113	55	58	100	7	6	0
Peterborough (Tweed)	504	272	232	405	86	13	0
Sault Ste. Marie	69	31	38	63	1	5	0
Sudbury	137	95	42	115	5	17	0
TOTAL	2787	1836	951	2384	323	79	1

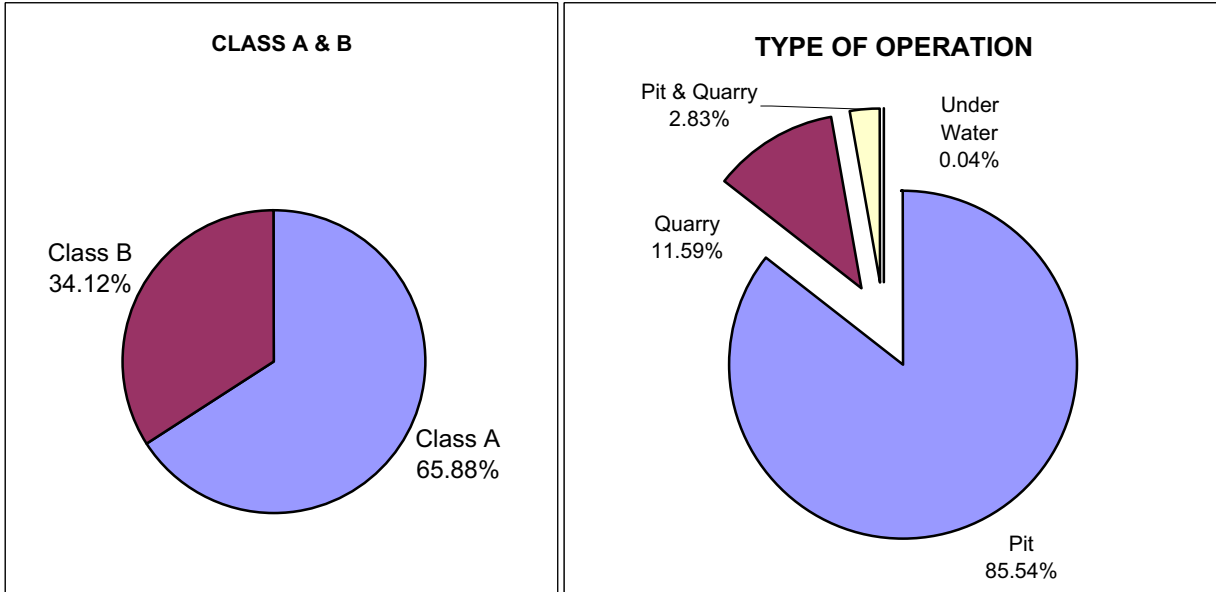


Table 6

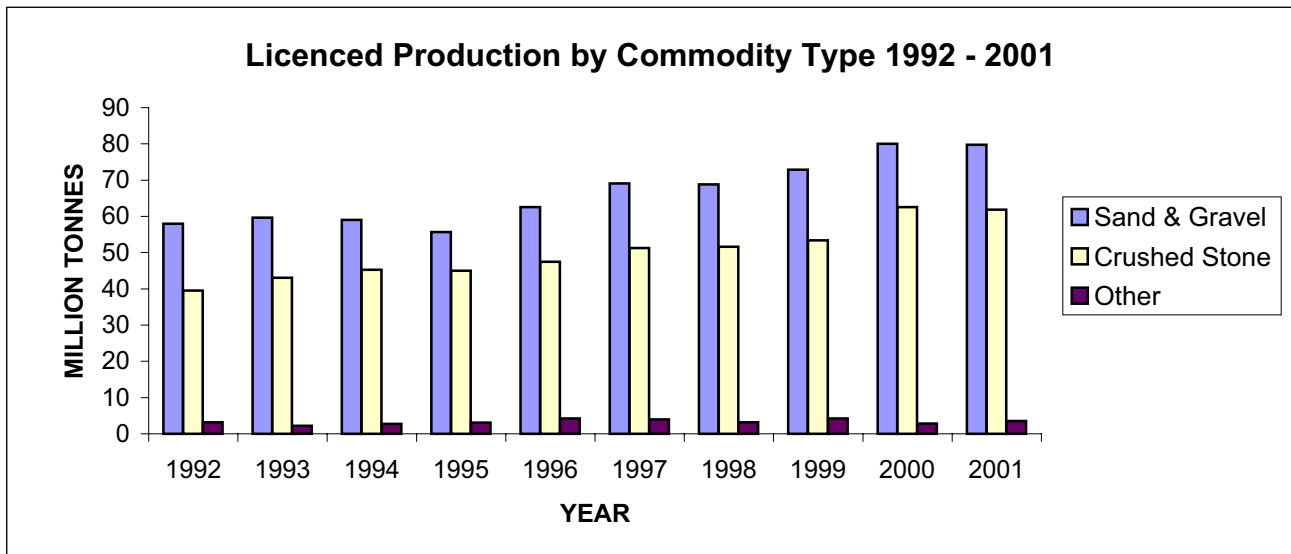
**2001 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	34,886,949.20	15,707,530.07	17,135,820.42	1,290,465.12	753,133.59
Aylmer	14,949,239.79	10,824,181.55	4,122,444.24	2,614.00	0.00
Bancroft	2,260,978.05	97,889.72	2,141,443.55	176.91	21,467.87
Guelph (Cambridge)	36,588,090.81	24,042,927.49	12,351,430.70	193,668.62	64.00
Kemptville	18,210,039.07	5,358,565.03	11,900,724.12	132,667.16	818,082.76
Midhurst	16,831,156.62	11,224,027.05	5,387,696.21	72,828.92	146,604.44
Pembroke	1,225,607.89	1,042,689.69	182,835.84	0.00	82.36
Peterborough	16,781,222.64	8,433,703.79	8,287,131.00	26,770.50	33,617.35
Sault Ste. Marie	589,582.79	515,137.02	44,432.60	0.00	30,013.17
Sudbury	2,794,375.45	2,483,803.52	289,436.09	20,074.84	1,061.00
TOTAL	145,117,242.31	79,730,454.93	61,843,394.77	1,739,266.07	1,804,126.54

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Sand & Gravel	Crushed Stone	Other
1992	57.99	39.52	3.15
1993	59.62	43.04	2.19
1994	59.07	45.28	2.76
1995	55.70	45.01	3.09
1996	62.52	47.48	4.27
1997	69.05	51.23	4.01
1998	68.84	51.64	3.20
1999	72.87	53.40	4.26
2000	80.07	62.57	2.85
2001	79.73	61.84	3.54

Table 7

**2001 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	151,909.21	151,909.21	-	-	-
Cochrane	387,729.16	311,661.16	75,296.00	-	772.00
Hearst	248,327.30	168,572.29	79,101.00	-	654.01
Kirkland Lake	622,170.42	621,896.26	274.16	-	-
North Bay	528,357.53	520,972.90	7,147.00	-	237.63
Sault Ste. Marie	90,548.38	86,690.38	-	3,800.00	58.00
Sudbury	164,943.71	91,868.45	62,674.94	-	10,400.32
Timmins	958,953.29	948,321.73	10,631.56	-	-
Wawa	624,451.55	598,162.55	-	26,289.00	-
Sub-Total	3,777,390.55	3,500,054.93	235,124.66	30,089.00	12,121.96
NORTHWEST					
Dryden	570,001.28	428,131.28	141,847.00	-	23.00
Fort Frances	504,597.34	484,221.74	19,832.00	-	543.60
Kenora	332,243.33	302,155.94	20,400.00	-	9,687.39
Nipigon	491,833.61	480,988.61	8,441.00	-	2,404.00
Red Lake	410,412.42	408,516.42	600.00	-	1,296.00
Sioux Lookout	221,532.00	220,777.20	-	-	754.80
Thunder Bay	287,371.85	287,126.52	-	-	245.33
Sub-Total	2,817,991.83	2,611,917.71	191,120.00	0.00	14,954.12
SOUTHCENTRAL					
Algonquin Park	46,046.00	46,046.00	-	-	-
Aurora (GTA)	0.00	-	-	-	-
Aylmer	562.00	562.00	-	-	-
Bancroft	182,746.05	92,433.26	68,809.45	1,904.00	19,599.34
Guelph (Cambridge)	0.00	0.00	-	-	-
Kemptville	96,304.84	96,304.84	-	-	-
Midhurst	2,441.00	2,441.00	-	-	-
Parry Sound	394,843.56	207,903.44	185,865.12	-	1,075.00
Pembroke	39,084.58	39,084.58	-	-	-
Peterborough (Tweed)	80.20	-	-	-	80.20
Sub-Total	762,108.23	484,775.12	254,674.57	1,904.00	20,754.54
TOTAL	7,357,490.61	6,596,747.76	680,919.23	31,993.00	47,830.62

Note: Amounts shown are in metric tonnes

Table 8

**2001 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	562	562	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	2,441	2,441	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	182,826	92,433	68,809	1,904	19,680
East (6)	135,389	135,389	0	0	0
Northeast (7)	3,593,829	3,155,842	420,990	3,800	13,197
Northwest (8)	3,442,443	3,210,080	191,120	26,289	14,954
TOTAL	7,357,491	6,596,748	680,919	31,993	47,831

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

**2001 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	19,687,474	14,740,752	4,827,778	118,880	64
Peninsula (2)	14,515,444	2,868,781	11,596,235	50,429	0
West Central (3)	34,165,569	28,481,604	5,437,558	99,803	146,604
GTA (4)	34,886,949	15,707,530	17,135,820	1,290,465	753,134
East Central (5)	15,932,657	8,119,699	7,771,349	12,757	28,852
East (6)	22,545,191	6,813,150	14,740,785	146,858	844,398
Northeast (7)	2,794,375	2,483,804	289,436	20,075	1,061
Northwest (8)	589,583	515,137	44,433	0	30,013
TOTAL	145,117,242	79,730,455	61,843,395	1,739,266	1,804,127

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2001
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	176	9,440.34	3,627.40	173.44	95.64	3,705.20
Aylmer	320	8,561.82	3,117.72	112.86	140.41	3,090.17
Bancroft	37	1,482.78	239.03	26.59	7.35	258.27
Guelph (Cambridge)	463	16,413.54	4,364.89	199.61	125.22	4,439.28
Kemptville	506	14,121.53	3,739.30	169.38	38.27	3,870.42
Midhurst	462	13,342.49	3,247.05	149.90	95.62	3,301.33
Pembroke	113	3,252.83	408.96	31.67	3.52	437.11
Peterborough (Tweed)	504	13,474.14	3,294.51	103.39	45.73	3,352.16
Sault Ste. Marie	69	2,939.66	309.86	4.64	2.18	312.32
Sudbury	137	9,982.02	786.96	14.28	14.96	786.28
TOTAL	2,787	93,011.15	23,135.69	985.76	568.91	23,552.55

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

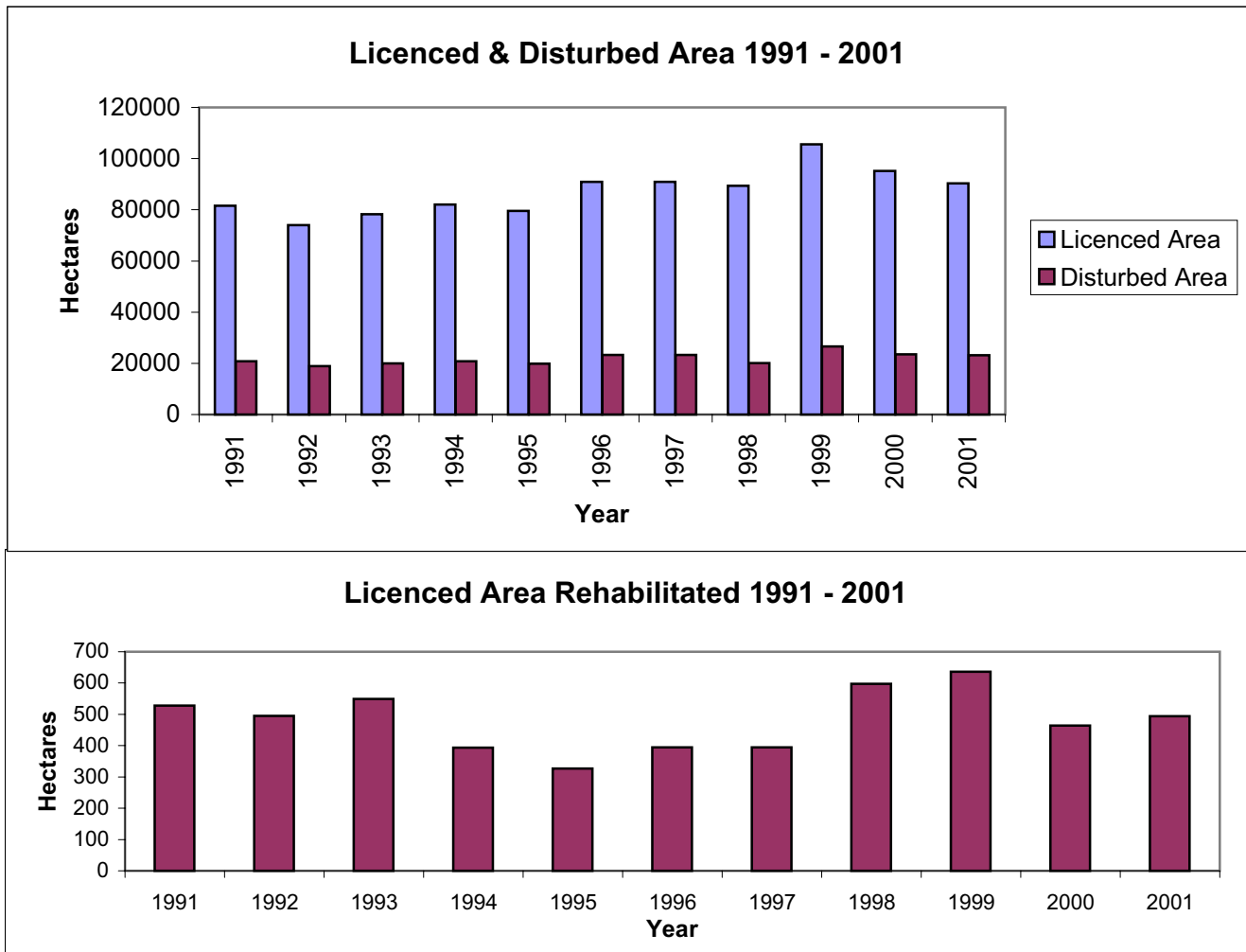


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	615.07	187	187	0	0	0
Cochrane	2,527.14	114	103	6	5	0
Hearst	2,919.40	161	145	15	1	0
Kirkland Lake	1,570.03	140	137	1	2	0
North Bay	2,069.54	195	177	13	5	0
Sault Ste. Marie	606.66	107	104	2	1	0
Sudbury	3,815.65	177	150	17	10	0
Timmins	1,541.82	147	141	6	0	0
Wawa	2,098.47	265	261	2	2	0
Sub-Total	17,763.78	1,493	1,405	62	26	0
NORTHWEST						
Dryden	1,505.20	195	189	3	3	0
Fort Frances	2,084.45	273	263	4	6	0
Kenora	2,082.03	191	169	16	6	0
Nipigon	3,037.07	318	304	13	1	0
Red Lake	1,046.52	104	103	1	0	0
Sioux Lookout	1,061.23	70	70	0	0	0
Thunder Bay	1,683.33	185	170	13	2	0
Sub-Total	12,499.83	1,336	1,268	50	18	0
SOUTHCENTRAL						
Algonquin Park	10.72	19	19	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	762.25	93	84	9	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	130.98	4	2	1	0	1
Midhurst	1.00	1	0	0	0	1
Parry Sound	624.02	105	80	12	3	10
Pembroke	119.96	45	44	1	0	0
Peterborough (Tweed)	121.06	1	0	1	0	0
Sub-Total	2,390.59	271	229	24	3	15
TOTAL	32,654.20	3,100	2,902	136	47	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

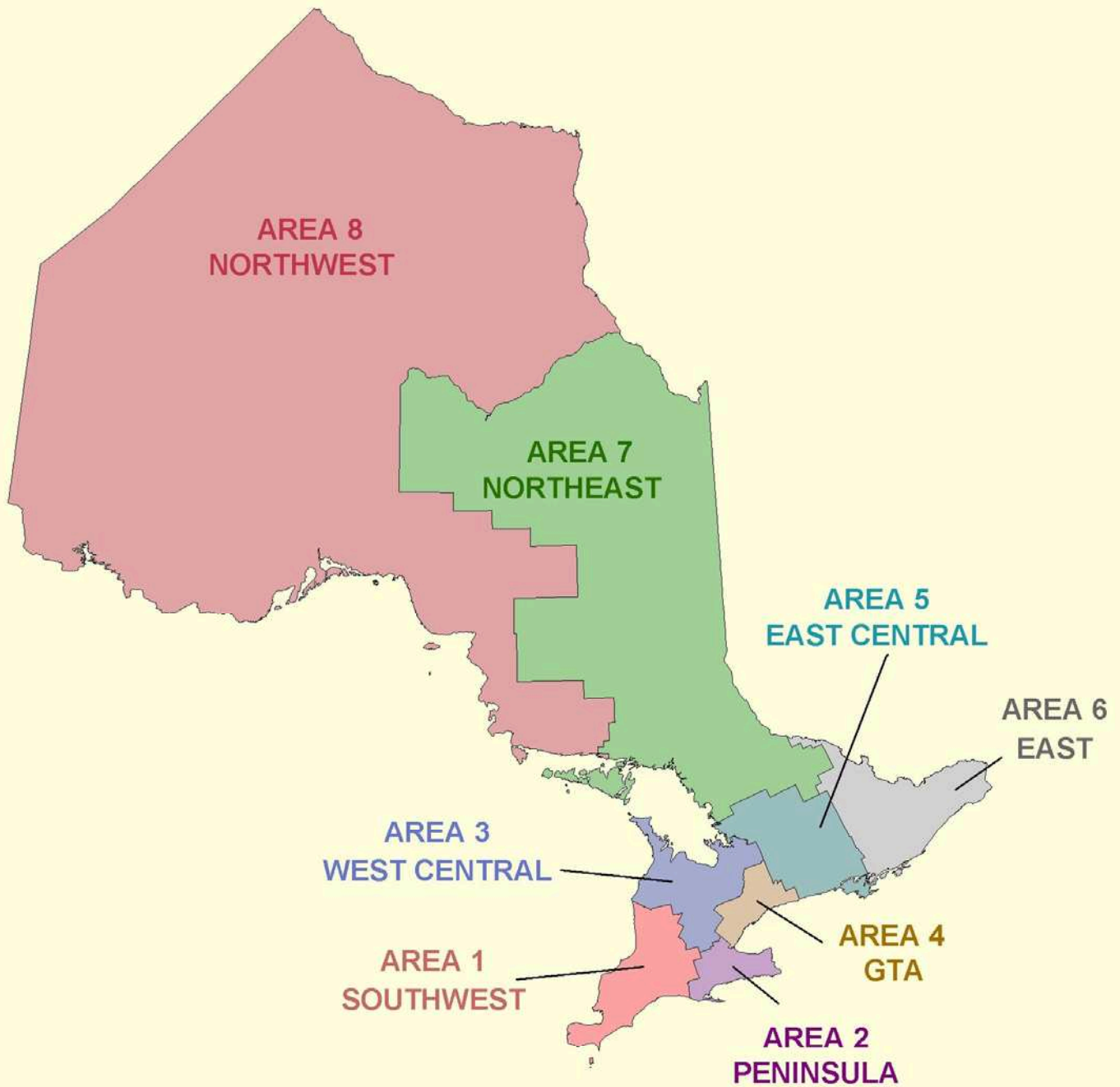
JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

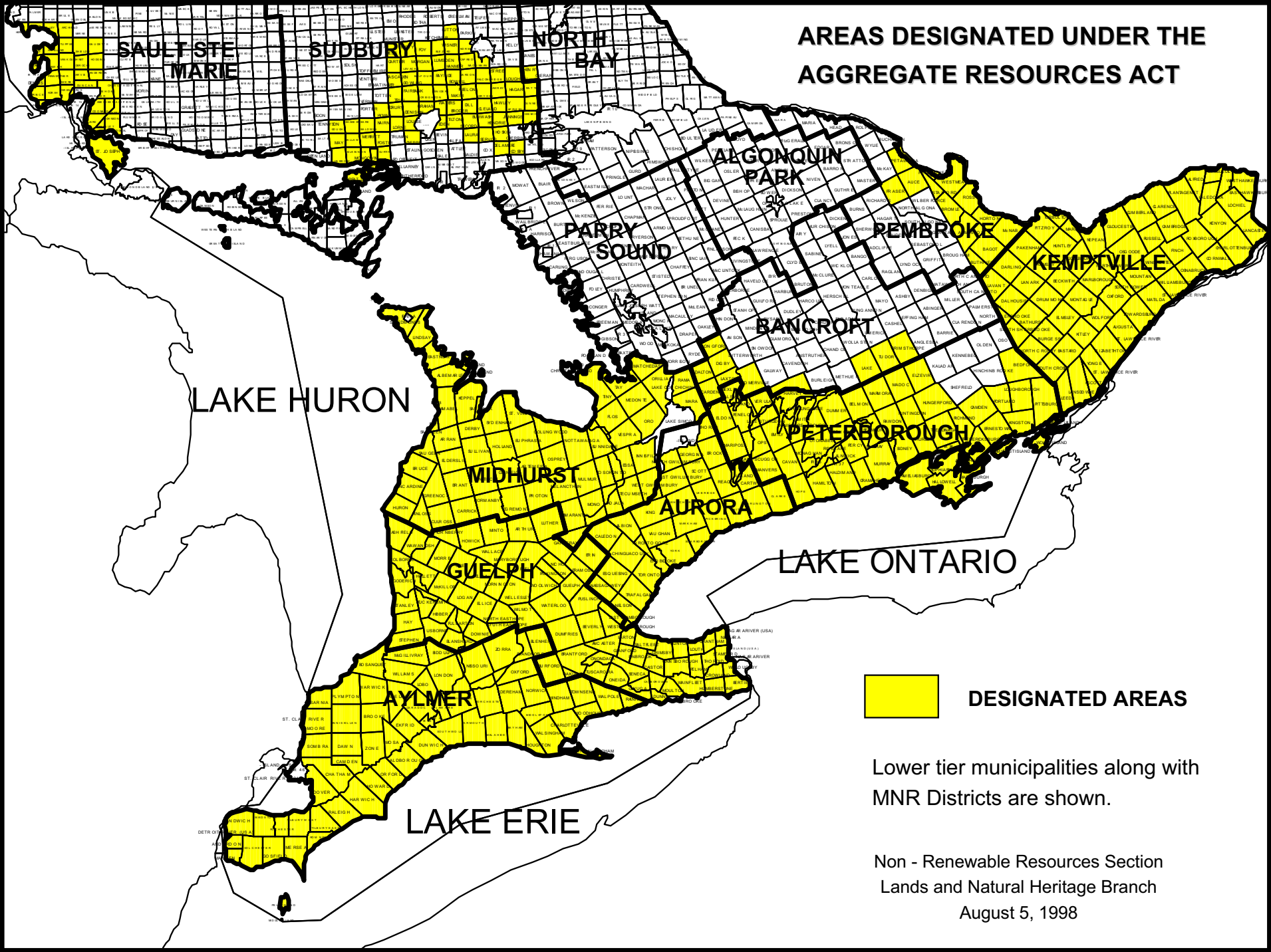
Village of Hilton Beach

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

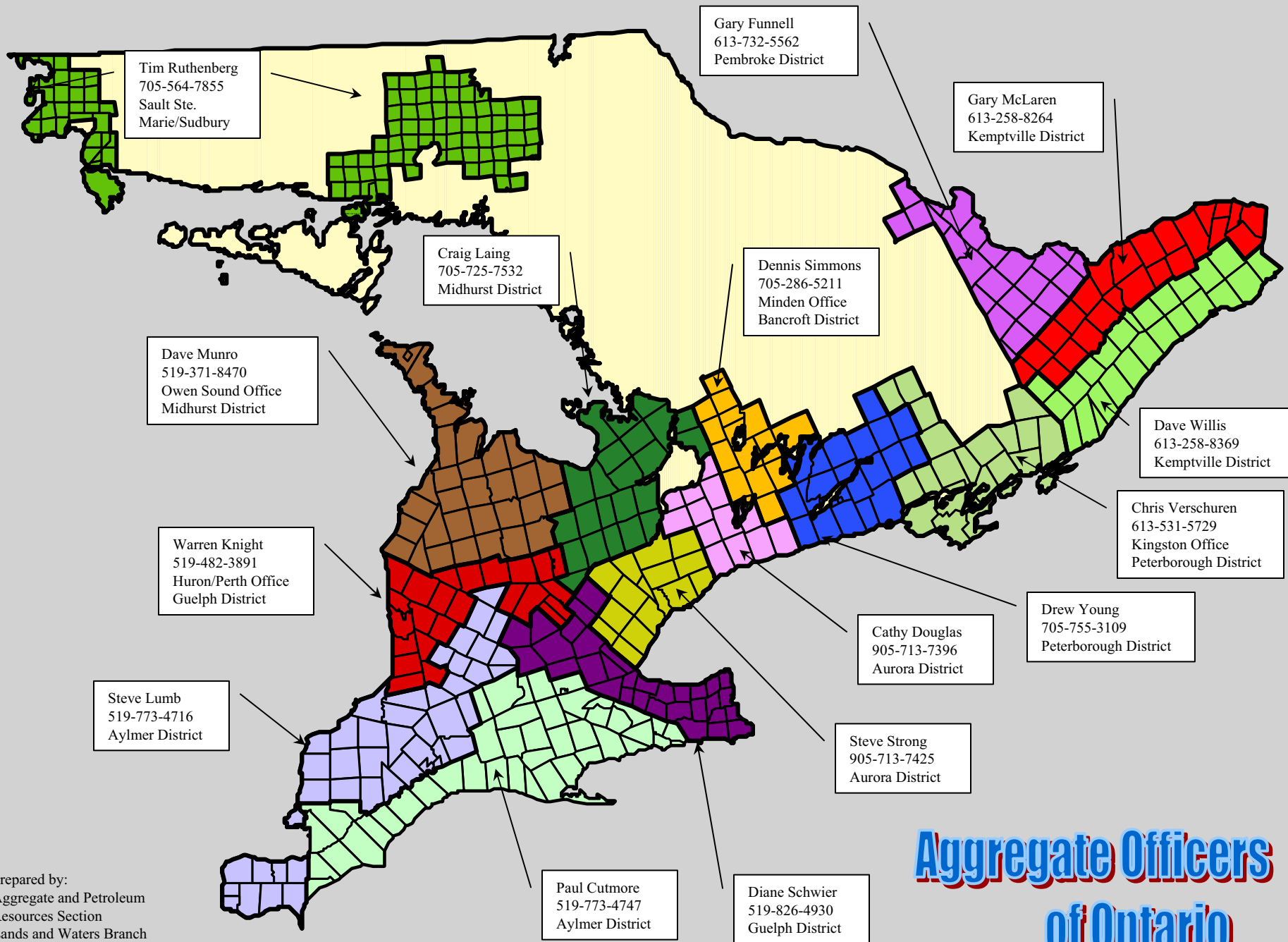
AREAS DESIGNATED UNDER THE AGGREGATE RESOURCES ACT



 **DESIGNATED AREAS**

Lower tier municipalities along with
MNR Districts are shown.

Non - Renewable Resources Section
Lands and Natural Heritage Branch
August 5, 1998



Aggregate Officers of Ontario

Prepared by:
Aggregate and Petroleum
Resources Section
Lands and Waters Branch
June 30, 2002



● MINERAL

● AGGREGATES

● IN ONTARIO

Statistical Update

2 0 0 2

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2002

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern ‘built environment’. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 2002, this basic non-renewable resource was supplied from 2,776 licensed aggregate sites on private land in designated parts of the Province and 3,215 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario’s Mineral Aggregate Resources

At the Provincial level, the management of Ontario’s aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the “Act”), gave the Minister the power to create the Aggregate Resources Trust (the “Trust”) and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Aggregate Producer's Association of Ontario (APAO), representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.
- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.

- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Non-Renewable Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Non Renewable Resources Section, Lands and Natural Heritage Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2002 totaled approximately 165 million tonnes, down 1.2% from the previous year. Production from licensed operations was down 3.6 million tonnes compared to 2001, a drop of 2.5%. Wayside permit production tripled but on very small tonnages (.2 million in 2001 to .6 million in 2002). Production from aggregate permits on Crown Land decreased marginally from 2001 (7.4 million to 7.1 million tonnes).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1990 - 2002
(rounded to nearest million tonnes)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Licences	135	107	101	105	113	109	114	124	124	131	145	145	141
Wayside Permits*	3	2	2	2	2	2	2	1	2	1	1	0	1
Aggregate Permits	11	14	13	12	10	9	9	8	9	11	10	7	7
Category 14 (Forest Industry)	-	-	-	-	-	-	-	-	-	2	3	3	4
Private Land Non-Designated (estimated)	12	12	12	12	11	10	11	11	11	12	12	12	12
ONTARIO TOTAL	161	135	128	131	136	130	136	144	146	157	171	167	165

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for 2001 Wayside Permits was just over .2 million tonnes.

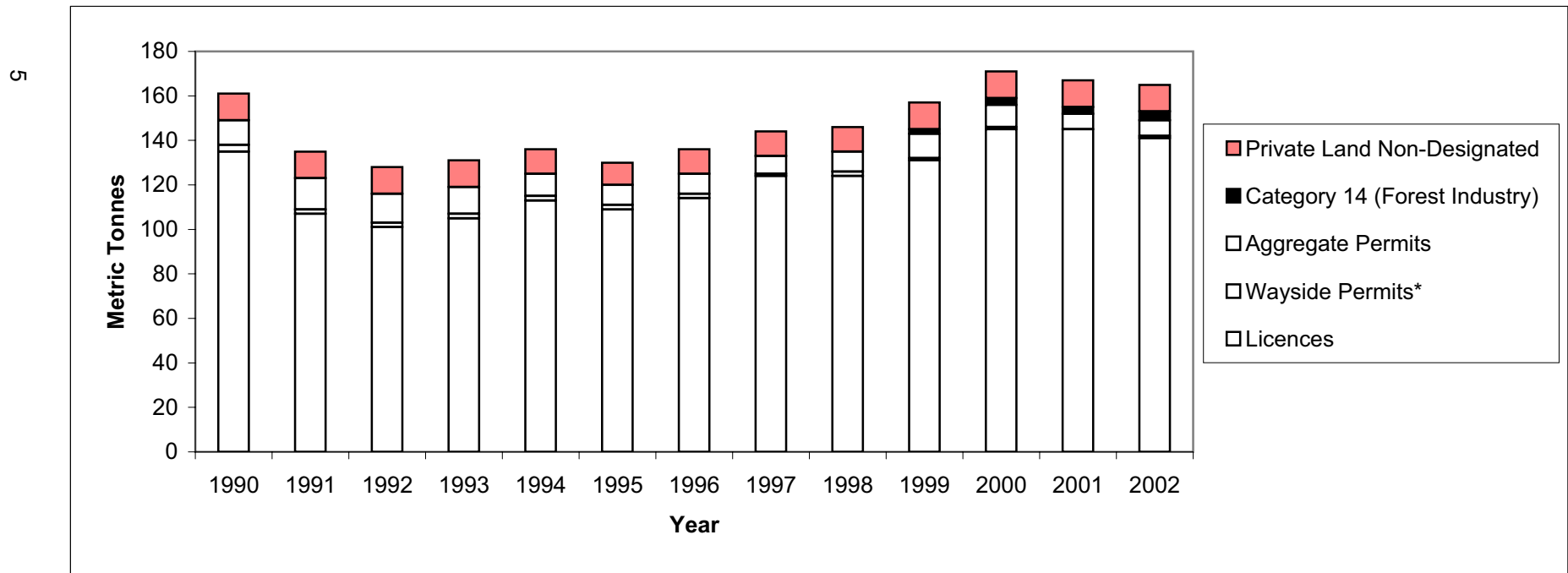


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	33,694.32		33,694.32
Hilton Tp	27,471.70		27,471.70
Jocelyn Tp	36,475.71		36,475.71
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	40,443.60		40,443.60
Laird Tp/St. Joseph Tp	26,753.38		26,753.38
Macdonald, Meredith & Aberdeen Add'l Tp	4,665.34		4,665.34
Sault Ste. Marie, City of	658,639.29		658,639.29
Sub-Total	828,143.34	0.00	828,143.34
<i>Brant</i>			
Brant, County of/Brantford, City of	1,807,057.29		1,807,057.29
Sub-Total	1,807,057.29	0.00	1,807,057.29
<i>Bruce</i>			
Arran-Elderslie, Municipality of	135,347.84		135,347.84
Brockton, Municipality of	142,742.16		142,742.16
Huron-Kinloss Tp	210,533.10		210,533.10
Kincardine, Municipality of	49,805.05		49,805.05
Northern Bruce Peninsula, Municipality of	246,439.54		246,439.54
Saugeen Shores, Town of	304,136.74	35,000.00	339,136.74
South Bruce, Municipality of	393,703.22		393,703.22
South Bruce Peninsula, Town of	197,648.94		197,648.94
Sub-Total	1,680,356.59	35,000.00	1,715,356.59
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	505,204.15		505,204.15
Sub-Total	505,204.15	0.00	505,204.15
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	357,916.57		357,916.57
East Garafraxa Tp	942,458.48		942,458.48
Melancthon Tp	239,361.56		239,361.56
Mono Tp	411,638.18		411,638.18
Mulmur Tp	391,377.46		391,377.46
Sub-Total	2,342,752.25	0.00	2,342,752.25
<i>Durham</i>			
Brock Tp	1,405,900.95		1,405,900.95
Clarington, Municipality of	4,661,002.36		4,661,002.36
Oshawa, City of/Scugog Tp/Whitby, Town of	231,139.24		231,139.24
Uxbridge Tp	4,740,955.06		4,740,955.06
Sub-Total	11,038,997.61	0.00	11,038,997.61
<i>Elgin</i>			
Bayham, Municipality of/Malahide Tp	38,753.96		38,753.96
Central Elgin, Municipality of	343,448.29		343,448.29
West Elgin, Municipality of	103,202.60		103,202.60
Sub-Total	485,404.85	0.00	485,404.85

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,496,731.33		1,496,731.33
Kingsville, Town of	377,315.58		377,315.58
Sub-Total	1,874,046.91	0.00	1,874,046.91
Frontenac			
Frontenac Islands Tp	31,776.46		31,776.46
Kingston, City of	1,180,843.46		1,180,843.46
South Frontenac Tp	423,219.36		423,219.36
Sub-Total	1,635,839.28	0.00	1,635,839.28
Greater Sudbury			
Greater Sudbury, City of	2,277,094.18		2,277,094.18
Sub-Total	2,277,094.18	0.00	2,277,094.18
Grey			
Chatsworth Tp	362,156.99		362,156.99
Georgian Bluffs, Tp	596,334.42		596,334.42
Grey Highlands, Municipality of	486,173.21		486,173.21
Meaford, Municipality of	265,507.56		265,507.56
Southgate Tp	253,078.02		253,078.02
The Blue Mountains, Town of	223,362.63		223,362.63
West Grey, Municipality of	341,840.39	99,680.00	441,520.39
Sub-Total	2,528,453.22	99,680.00	2,628,133.22
Haldimand			
Haldimand, County of	1,944,181.19		1,944,181.19
Sub-Total	1,944,181.19	0.00	1,944,181.19
Halton			
Burlington, City of/Halton Hills, Town of	6,273,404.54		6,273,404.54
Milton, Town of	5,871,513.08		5,871,513.08
Sub-Total	12,144,917.62	0.00	12,144,917.62
Hamilton			
Hamilton, City of	5,411,479.23	124,600.00	5,536,079.23
Sub-Total	5,411,479.23	124,600.00	5,536,079.23
Hastings			
Belleville, City of	460,789.36		460,789.36
Centre Hastings, Municipality of	79,702.82		79,702.82
Madoc Tp	639,661.19		639,661.19
Marmora & Lake, Municipality of	5,600.80		5,600.80
Quinte West, City of	630,464.16		630,464.16
Tyendinaga Tp	179,561.22		179,561.22
Tweed, Municipality of	79,706.08		79,706.08
Sub-Total	2,075,485.63	0.00	2,075,485.63

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	740,111.58		740,111.58
Bluewater, Municipality of/South Huron, Municipality of	51,830.20		51,830.20
Central Huron, Municipality of	673,397.30		673,397.30
Howick Tp	193,009.21		193,009.21
Huron East, Municipality of	829,231.48		829,231.48
Morris-Turnberry, Municipality of	189,785.69		189,785.69
North Huron Tp	58,490.07		58,490.07
Sub-Total	2,735,855.53	0.00	2,735,855.53
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,425,046.64		6,425,046.64
Sub-Total	6,425,046.64	0.00	6,425,046.64
<i>Lambton</i>			
Enniskillen Tp/Plympton-Wyoming, Town of	182,752.91		182,752.91
Lambton Shores, Municipality of	186,066.69		186,066.69
Warwick Tp	348,565.78		348,565.78
Sub-Total	717,385.38	0.00	717,385.38
<i>Lanark</i>			
Beckwith Tp	74,650.19		74,650.19
Drummond-North Elmsley Tp	113,990.96		113,990.96
Lanark Highlands Tp	1,375,468.74		1,375,468.74
Mississippi Mills, Town of	191,996.97		191,996.97
Montague Tp	162,096.90		162,096.90
Tay Valley Tp	37,070.84		37,070.84
Sub-Total	1,955,274.60	0.00	1,955,274.60
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	194,136.98		194,136.98
Augusta Tp	126,639.64		126,639.64
Edwardsburgh-Cardinal Tp	165,869.66		165,869.66
Elizabethtown-Kitley Tp	537,279.94		537,279.94
Leeds and the Thousand Islands Tp	430,916.85		430,916.85
Merrickville-Wolford, Village of	20,316.72		20,316.72
North Grenville Tp	399,439.79		399,439.79
Rideau Lakes Tp	78,863.09		78,863.09
Sub-Total	1,953,462.67	0.00	1,953,462.67
<i>Lennox & Addington</i>			
Greater Napanee, Town of	241,340.15		241,340.15
Loyalist Tp/Stone Mills Tp	1,441,870.55		1,441,870.55
Sub-Total	1,683,210.70	0.00	1,683,210.70

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Middlesex			
Adelaide Metcalfe Tp/Lucan Biddulph Tp	41,703.99		41,703.99
London, City of	2,100,543.32		2,100,543.32
Middlesex Centre Tp	895,106.69		895,106.69
North Middlesex, Municipality of	114,241.07		114,241.07
Strathroy-Caradoc Tp	33,229.70		33,229.70
Thames Centre, Municipality of	2,235,957.98		2,235,957.98
Sub-Total	5,420,782.75	0.00	5,420,782.75
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	2,198,375.19		2,198,375.19
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,427,414.81		1,427,414.81
Niagara Falls, City of	1,268,892.04		1,268,892.04
Sub-Total	4,894,682.04	0.00	4,894,682.04
Norfolk			
Norfolk, County of	369,408.01		369,408.01
Sub-Total	369,408.01	0.00	369,408.01
Northumberland			
Alnwick-Haldimand Tp	349,125.06		349,125.06
Brighton, Municipality of	263,473.68		263,473.68
Cramahe Tp	1,874,366.96		1,874,366.96
Hamilton Tp	280,165.22		280,165.22
Port Hope, Municipality of	42,463.07		42,463.07
Trent Hills, Municipality of	171,769.18		171,769.18
Sub-Total	2,981,363.17	0.00	2,981,363.17
Ottawa			
Ottawa, City of	10,729,635.36		10,729,635.36
Sub-Total	10,729,635.36	0.00	10,729,635.36
Oxford			
Blandford-Blenheim Tp	414,137.94		414,137.94
East Zorra-Tavistock Tp/Norwich Tp/Woodstock, City of	115,870.81		115,870.81
South-West Oxford Tp	751,036.63		751,036.63
Zorra Tp	3,429,588.97		3,429,588.97
Sub-Total	4,710,634.35	0.00	4,710,634.35
Peel			
Brampton, City of/Caledon, Town of/Mississauga, City of	4,251,954.06		4,251,954.06
Sub-Total	4,251,954.06	0.00	4,251,954.06
Perth			
North Perth, Town of/St. Marys, Separated Town of	161,196.62		161,196.62
Perth East Tp	315,603.30		315,603.30
Perth South Tp	1,426,261.74		1,426,261.74
West Perth Tp	199,346.50		199,346.50
Sub-Total	2,102,408.16	0.00	2,102,408.16

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp	528,446.64	375,000.00	903,446.64
Cavan-Millbrook-North Monaghan Tp	223,820.67		223,820.67
Douro-Dummer Tp	746,926.95		746,926.95
Galway-Cavendish-Harvey Tp	245,584.49		245,584.49
Havelock-Belmont-Methuen Tp	110,380.10		110,380.10
Otonabee-South Monaghan Tp	313,275.82		313,275.82
Smith-Ennismore-Lakefield Tp	650,593.16		650,593.16
Sub-Total	2,819,027.83	375,000.00	3,194,027.83
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	226,488.42		226,488.42
Champlain Tp	280,217.44		280,217.44
Clarence-Rockland, City of	353,178.20		353,178.20
East Hawkesbury Tp	64,776.52		64,776.52
Russell Tp	227,926.63		227,926.63
The Nation, Municipality of	168,439.19		168,439.19
Sub-Total	1,321,026.40	0.00	1,321,026.40
<i>Prince Edward Co</i>			
Prince Edward, County of	2,082,506.88		2,082,506.88
Sub-Total	2,082,506.88	0.00	2,082,506.88
<i>Renfrew</i>			
Admaston-Bromley Tp/Greater Madawaska Tp/ Renfrew, Town of	154,606.53		154,606.53
Horton Tp	367,411.45		367,411.45
Laurentian Valley Tp	307,133.20		307,133.20
McNab-Braeside Tp	667,646.25		667,646.25
Petawawa, Town of	206,654.25		206,654.25
Whitewater Region Tp	97,032.23		97,032.23
Sub-Total	1,800,483.91	0.00	1,800,483.91
<i>Simcoe</i>			
Adjala-Tosorontio Tp/Barrie, City of/Collingwood, Town of	844,411.88		844,411.88
Bradford West Gwillimbury, Town of/Midland, Town of/ Wasaga Beach, Town of	436,394.84		436,394.84
Clearview Tp	1,278,811.75		1,278,811.75
Essa Tp	51,238.37		51,238.37
Innisfil, Town of	64,304.31		64,304.31
New Tecumseth, Town of	24,399.51		24,399.51
Oro-Medonte Tp	2,714,622.34		2,714,622.34
Ramara Tp	2,474,934.08		2,474,934.08
Severn Tp	1,786,986.80		1,786,986.80
Springwater Tp	1,352,619.48		1,352,619.48
Tay Tp	96,461.87		96,461.87
Tiny Tp	229,205.37		229,205.37
Sub-Total	11,354,390.60	0.00	11,354,390.60

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	520,471.00		520,471.00
North Glengarry Tp	178,784.30		178,784.30
North Stormont Tp	669,287.66		669,287.66
South Dundas Tp	199,214.45		199,214.45
South Glengarry Tp	298,937.99		298,937.99
South Stormont Tp	723,439.39		723,439.39
Sub-Total	2,590,134.79	0.00	2,590,134.79
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	28,278.00		28,278.00
French River, Municipality of/Nairn & Hyman Tp	44,925.82		44,925.82
Markstay-Warren, Municipality of	80,253.41		80,253.41
Sables Spanish Rivers Tp/Espanola, Town of	61,174.24		61,174.24
Sudbury District, Unorganized	358,458.83		358,458.83
Sub-Total	573,090.30	0.00	573,090.30
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	1,426,491.32		1,426,491.32
North Dumfries Tp	3,336,657.95		3,336,657.95
Wellesley Tp	1,440,948.82		1,440,948.82
Wilmot Tp	1,011,651.12		1,011,651.12
Woolwich Tp	593,436.98		593,436.98
Sub-Total	7,809,186.19	0.00	7,809,186.19
<i>Wellington</i>			
Centre Wellington Tp	1,106,995.45		1,106,995.45
Erin, Town of	1,720,546.91		1,720,546.91
Guelph-Eramosa Tp	129,256.00		129,256.00
Mapleton Tp	83,939.88		83,939.88
Minto, Town of	414,571.93		414,571.93
Puslinch Tp	5,286,800.52		5,286,800.52
Wellington North Tp	167,720.97		167,720.97
Sub-Total	8,909,831.66	0.00	8,909,831.66
<i>York</i>			
East Gwillimbury, Town of	284,604.45		284,604.45
Georgina, Town of	48,793.94		48,793.94
King Tp/Vaughan, City of/Whitchurch-Stouffville, Town of	2,072,499.04		2,072,499.04
Sub-Total	2,405,897.43	0.00	2,405,897.43
GRAND TOTAL	141,176,092.75	634,280.00	141,810,372.75

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1994	1995	1996	1997	1998	1999	2000	2001	2002
Algoma, District of	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.6	0.8
Brant Co.	1.3	1.6	1.7	2.1	1.5	1.5	2.1	2.0	1.8
Bruce Co.	1.8	1.5	1.2	1.3	1.6	1.5	1.7	1.6	1.7
Chatham-Kent, R. M. of	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.5
Dufferin Co.	1.6	1.4	1.5	1.5	1.8	2.1	2.6	2.4	2.3
Durham, R. M. of	7.1	7.2	7.6	8.7	7.8	9.2	10.2	11.4	11.0
Elgin Co.	0.5	0.4	0.5	0.7	0.4	0.6	0.7	0.6	0.5
Essex Co.	2.7	2.4	2.2	2.7	2.0	1.9	2.0	2.2	1.9
Frontenac, Management Board	1.5	1.2	1.6	1.5	1.2	1.3	1.4	1.3	1.6
Greater Sudbury, City of	2.9	2.9	2.7	2.5	2.3	2.9	2.3	1.8	2.3
Grey Co.	2.7	2.4	2.0	2.1	2.1	2.8	2.5	2.6	2.6
Haldimand Co.	----	----	----	----	----	----	----	1.5	1.9
Haldimand-Norfolk, R. M. of	1.9	1.9	1.7	2.1	1.8	2.0	2.0	----	----
Halton, R. M. of	9.7	10.7	12.3	14.4	13.4	13.8	15.5	15.8	12.1
Hamilton, City of	3.9	4.0	4.0	5.2	4.7	4.6	6.3	6.0	5.5
Hastings Co.	1.2	1.4	1.6	2.0	1.9	2.2	2.0	2.0	2.1
Huron Co.	2.9	2.8	2.8	2.4	2.6	2.8	2.7	3.0	2.7
Kawartha Lakes, City of	----	----	----	----	----	----	----	6.4	6.4
Lambton Co.	0.6	0.6	0.4	0.5	0.6	0.6	0.5	0.5	0.7
Lanark Co.	1.1	1.3	1.2	1.2	1.3	1.5	1.6	1.7	2.0
Leeds & Grenville Co.'s	2.4	2.3	2.0	2.1	4.2	2.2	3.0	2.3	2.0
Lennox & Addington Co.	1.7	2.0	1.8	1.7	1.9	1.7	1.8	1.8	1.7
Middlesex Co.	4.9	4.5	4.5	5.3	6.1	5.6	6.4	6.0	5.4
Niagara, R. M. of	4.1	3.6	4.7	4.9	4.6	4.3	4.6	4.6	4.9
Norfolk Co.	----	----	----	----	----	----	----	0.4	0.4
Northumberland Co.	3.0	2.6	3.0	3.2	3.2	3.6	3.2	3.1	3.0
Ottawa, City of	9.3	8.4	6.1	6.7	7.1	8.1	10.7	10.1	10.7
Oxford Co.	4.6	5.0	4.6	5.3	4.9	5.1	5.4	4.9	4.8
Peel, R. M. of	3.1	3.7	3.8	4.3	4.2	4.5	5.2	5.2	4.3
Perth Co.	1.7	1.6	1.9	1.7	1.7	1.6	2.1	2.0	2.1
Peterborough Co.	2.2	1.8	1.8	1.8	1.8	1.8	2.2	2.4	3.2
Prescott & Russell Co.'s	1.9	1.3	1.2	1.4	1.1	1.2	1.4	1.4	1.3
Prince Edward Co.	1.9	2.2	1.8	2.1	2.0	2.0	2.1	2.0	2.1
Renfrew Co.	1.1	1.3	1.5	1.2	1.3	1.5	1.5	1.2	1.8
Simcoe Co.	6.2	6.8	7.4	7.6	9.0	9.0	9.3	10.6	11.4
Stormont, Dundas & Glengarry Co.'s	2.6	2.3	2.1	2.4	2.4	2.8	3.0	2.7	2.6
Sudbury, District of	0.5	0.3	0.3	0.2	0.2	0.4	0.5	1.0	0.6
Victoria Co.	5.4	4.9	6.0	6.5	6.6	6.0	7.1	----	----
Waterloo, R. M. of	5.8	5.8	5.8	5.6	5.8	7.3	7.7	8.2	7.8
Wellington Co.	5.6	4.9	6.0	6.4	6.9	7.5	8.4	8.9	8.9
York, R. M. of	1.9	2.2	2.0	2.6	2.2	2.7	3.0	2.4	2.4
TOTAL	114.3	112.2	114.3	125.0	125.2	131.5	146.0	144.9	141.8

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.
As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.

Table 4

**LICENCE PRODUCTION IN 2002
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2002 Production	Production				
				2001	2000	1999	1998	1997
1	City of Ottawa ⁽¹⁾	City of Ottawa	10.7	10.1	10.6	8.1	7.1	6.7
2	City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.4	6.4	7.1	6.0	6.6	6.5
3	City of Burlington/ Town of Halton Hills	Halton	6.3	7.0	6.5	6.1	5.5	4.7
4	Town of Milton	Halton	5.9	8.8	9.0	7.7	7.9	9.6
5	City of Hamilton ⁽³⁾	City of Hamilton	5.4	6.0	6.3	4.6	4.7	5.2
6	Puslinch Township	Wellington County	5.3	5.5	4.1	3.9	3.8	3.5
7	Township of Uxbridge	Durham	4.7	5.0	4.1	3.4	3.2	3.1
8	Municipality of Clarington	Durham	4.7	4.7	4.3	3.8	3.0	3.9
9	Cities of Brampton/Mississauga/ Town of Caledon	Peel	4.3	5.2	5.2	4.5	4.2	4.3
10	Zorra Township	Oxford	3.4	3.5	3.8	4.1	3.8	3.8
Total			57.1	62.2	61.0	52.2	49.8	51.3

Note: Municipalities are ranked in order of their licenced production for 2002

Production statistics for 1997 - 2000 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

NUMBER AND TYPE OF AGGREGATE LICENCES

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	175	151	24	159	16	0	0
Aylmer	310	231	79	293	11	6	0
Bancroft	42	17	25	23	14	5	0
Guelph (Cambridge)	464	377	87	429	32	3	0
Kemptville	506	270	236	367	117	21	1
Midhurst	463	339	124	421	38	4	0
Pembroke	111	56	55	98	7	6	0
Peterborough (Tweed)	496	269	227	397	84	15	0
Sault Ste. Marie	69	31	38	63	1	5	0
Sudbury	140	97	43	116	6	18	0
TOTAL	2,776	1,838	938	2,366	326	83	1

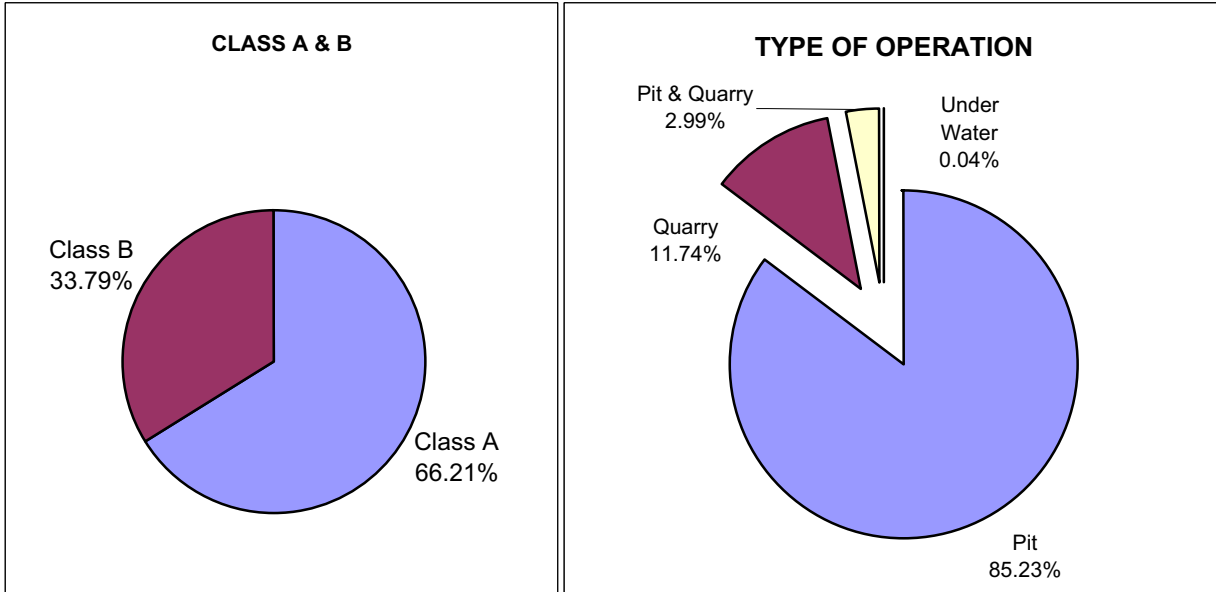


Table 6

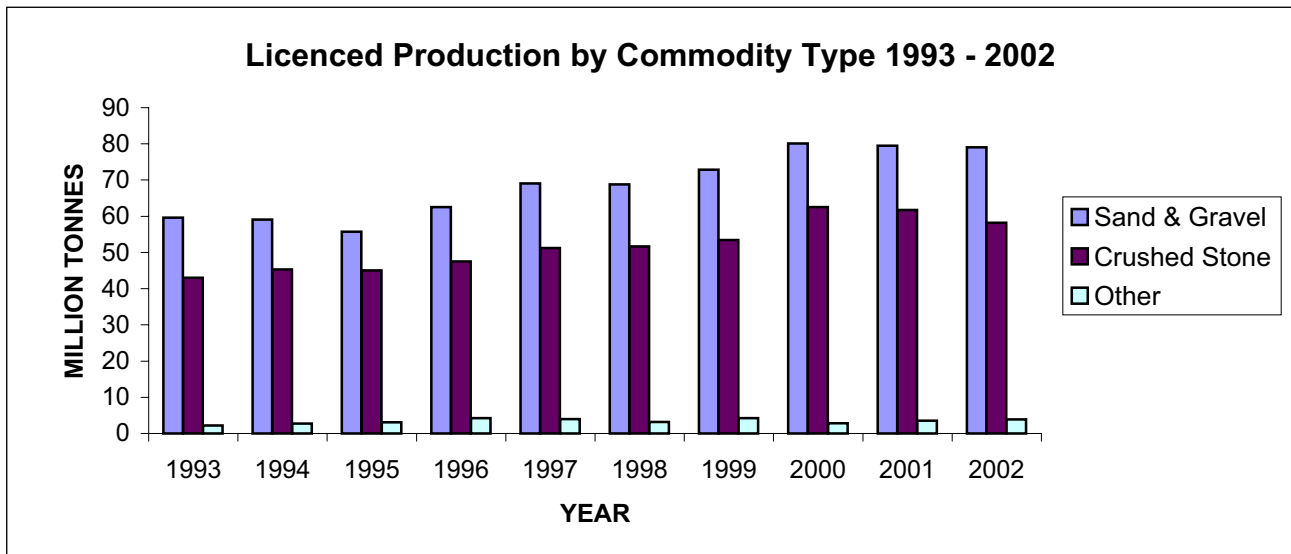
**2002 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	29,841,766.72	14,820,163.97	13,208,989.26	1,276,508.58	536,104.91
Aylmer	14,082,866.40	10,315,487.97	3,757,527.86	1,720.57	8,130.00
Bancroft	2,294,702.29	115,826.69	2,134,217.23	7,584.24	37,074.13
Guelph (Cambridge)	35,831,121.17	23,169,403.43	12,526,462.53	131,683.37	3,571.84
Kemptville	18,465,824.82	5,888,725.89	11,617,941.25	107,727.62	851,430.06
Midhurst	17,689,512.78	11,989,243.95	5,413,397.96	109,312.70	177,558.17
Pembroke	1,884,192.91	1,262,495.49	210,039.05	0.00	411,658.37
Peterborough	17,407,777.84	8,446,785.48	8,905,719.79	40,654.73	14,617.84
Sault Ste. Marie	828,143.34	777,740.11	32,923.86	0.00	17,479.37
Sudbury	2,850,184.48	2,305,399.76	387,166.66	64,641.92	92,976.14
TOTAL	141,176,092.75	79,091,272.74	58,194,385.45	1,739,833.73	2,150,600.83

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1993	104.85	59.62	43.04	2.19
1994	107.11	59.07	45.28	2.76
1995	103.80	55.70	45.01	3.09
1996	114.27	62.52	47.48	4.27
1997	124.29	69.05	51.23	4.01
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89

Table 7

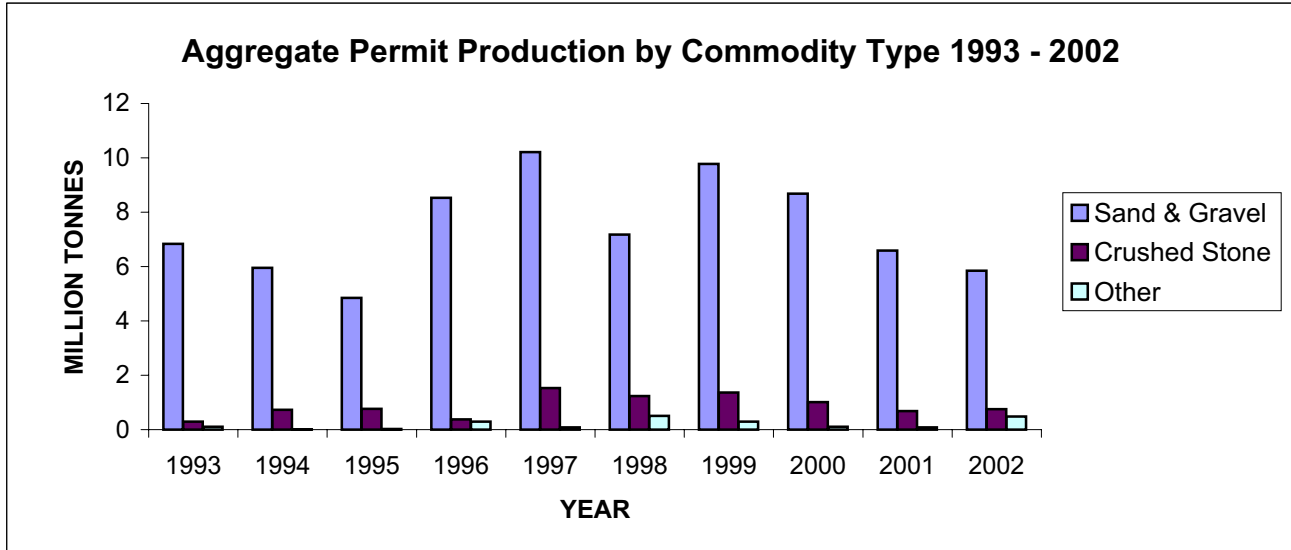
**2002 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	130,881.05	130,881.05	-	-	-
Cochrane	665,035.93	526,949.61	127,689.32	-	10,397.00
Hearst	250,088.00	243,482.00	6,606.00	-	-
Kirkland Lake	218,564.84	218,433.84	131.00	-	-
North Bay	362,777.69	351,595.44	10,626.00	-	556.25
Sault Ste. Marie	145,691.90	142,881.66	-	2,600.00	210.24
Sudbury	340,474.29	227,216.50	107,118.42	-	6,139.37
Timmins	333,959.85	244,626.34	-	-	89,333.51
Wawa	691,883.71	536,763.71	59,593.00	95,527.00	-
Sub-Total	3,139,357.26	2,622,830.15	311,763.74	98,127.00	106,636.37
NORTHWEST					
Dryden	617,343.42	430,764.04	-	-	186,579.38
Fort Frances	615,169.18	569,342.10	622.88	-	45,204.20
Kenora	155,897.18	143,697.67	-	-	12,199.51
Nipigon	619,441.38	556,670.90	59,110.00	1,600.00	2,060.48
Red Lake	221,034.44	218,819.24	1,107.00	-	1,108.20
Sioux Lookout	349,949.91	349,503.83	-	-	446.08
Thunder Bay	370,156.85	370,141.54	-	-	15.31
Sub-Total	2,948,992.36	2,638,939.32	60,839.88	1,600.00	247,613.16
SOUTHCENTRAL					
Algonquin Park	83,695.00	83,695.00	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	821.01	821.01	-	-	-
Bancroft	199,849.38	56,885.78	120,101.90	265.20	22,596.50
Guelph (Cambridge)	-	-	-	-	-
Kemptville	101,285.81	101,285.81	-	-	-
Midhurst	4,668.00	4,668.00	-	-	-
Parry Sound	473,148.54	236,845.91	235,414.18	-	888.45
Pembroke	104,866.00	104,866.00	-	-	-
Peterborough (Tweed)	25,370.00	-	25,370.00	-	-
Sub-Total	993,703.74	589,067.51	380,886.08	265.20	23,484.95
TOTAL	7,082,053.36	5,850,836.98	753,489.70	99,992.20	377,734.48

Note: Amounts shown are in metric tonnes

Table 7

**2002 LICENCED AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1993	7.24	6.83	0.30	0.11
1994	6.69	5.95	0.73	0.01
1995	5.63	4.85	0.76	0.02
1996	9.21	8.53	0.38	0.30
1997	11.82	10.21	1.53	0.08
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48

Table 8

**2002 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	821	821	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	4,668	4,668	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	225,219	56,886	145,472	265	22,597
East (6)	206,152	206,152	0	0	0
Northeast (7)	3,004,317	2,406,607	487,585	2,600	107,525
Northwest (8)	3,640,876	3,175,703	120,433	97,127	247,613
TOTAL	7,082,053	5,850,837	753,490	99,992	377,734

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

**2002 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,551,722	13,924,131	4,538,398	80,383	8,810
Peninsula (2)	14,426,808	2,628,194	11,745,592	53,021	0
West Central (3)	34,624,971	28,921,810	5,413,398	109,313	180,450
GTA (4)	29,841,767	14,820,164	13,208,989	1,276,509	536,105
East Central (5)	16,383,430	8,113,338	8,191,070	37,673	41,349
East (6)	23,669,068	7,600,496	14,676,847	118,294	1,273,431
Northeast (7)	2,850,184	2,305,400	387,167	64,642	92,976
Northwest (8)	828,143	777,740	32,924	0	17,479
TOTAL	141,176,093	79,091,273	58,194,385	1,739,834	2,150,601

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2002
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	175	9,414.74	3,693.40	126.64	146.88	3,673.16
Aylmer	311	8,360.20	3,069.73	102.50	105.40	3,066.83
Bancroft	36	1,597.06	291.77	8.12	2.20	297.69
Guelph (Cambridge)	463	16,547.33	4,489.75	180.29	151.92	4,518.12
Kemptville	506	14,138.45	3,883.42	161.55	73.36	3,971.61
Midhurst	463	13,263.24	3,321.39	158.50	108.77	3,371.12
Pembroke	110	3,282.57	420.23	41.43	6.53	455.13
Peterborough (Tweed)	503	13,286.81	3,332.23	124.82	61.72	3,395.33
Sault Ste. Marie	69	2,939.66	326.62	6.59	5.54	327.67
Sudbury	140	10,018.88	784.58	35.93	19.05	801.46
TOTAL	2,776	92,848.94	23,613.12	946.37	681.37	23,878.12

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

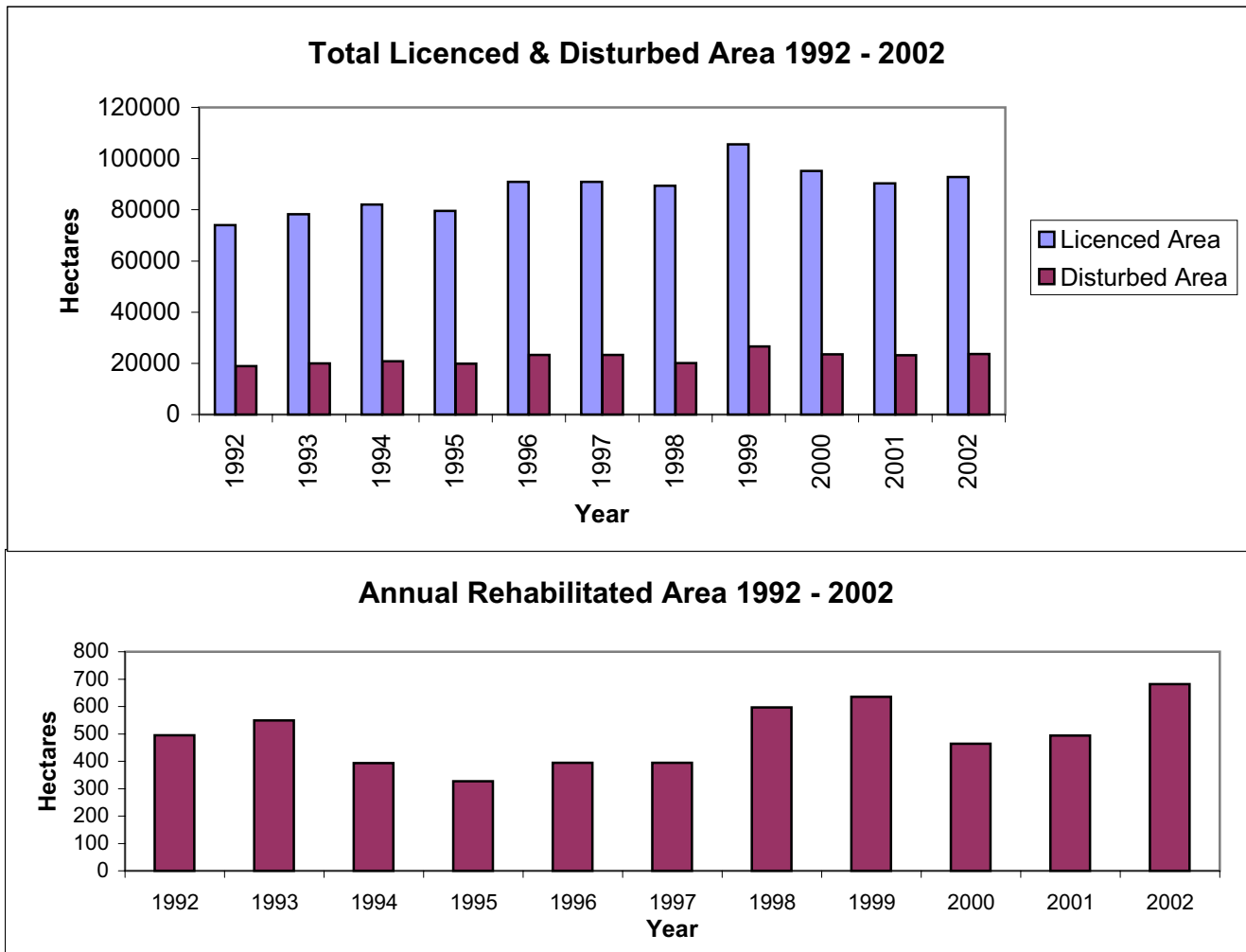


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	717.47	194	194	0	0	0
Cochrane	2,560.24	117	105	7	5	0
Hearst	2,987.16	161	144	16	1	0
Kirkland Lake	1,696.64	157	151	4	2	0
North Bay	2,199.76	205	185	15	5	0
Sault Ste. Marie	753.01	112	109	2	1	0
Sudbury	4,019.35	182	155	17	10	0
Timmins	1,697.62	163	155	7	1	0
Wawa	2,100.81	255	251	2	2	0
Sub-Total	18,732.06	1,546	1,449	70	27	0
NORTHWEST						
Dryden	1,891.83	226	215	7	4	0
Fort Frances	2,084.55	275	264	5	6	0
Kenora	2,619.92	191	163	22	6	0
Nipigon	3,236.33	321	306	14	1	0
Red Lake	1,243.21	113	112	1	0	0
Sioux Lookout	1,222.95	79	79	0	0	0
Thunder Bay	1,833.08	197	184	11	2	0
Sub-Total	14,131.87	1,402	1,323	60	19	0
SOUTHCENTRAL						
Algonquin Park	21.72	32	32	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	871.21	79	69	10	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	7.00	2	1	0	0	1
Midhurst	1.00	1	0	0	0	1
Parry Sound	640.17	105	79	13	3	10
Pembroke	119.60	44	43	1	0	0
Peterborough (Tweed)	5.00	1	0	0	1	0
Sub-Total	2,286.30	267	224	24	4	15
TOTAL	35,150.23	3,215	2,996	154	50	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

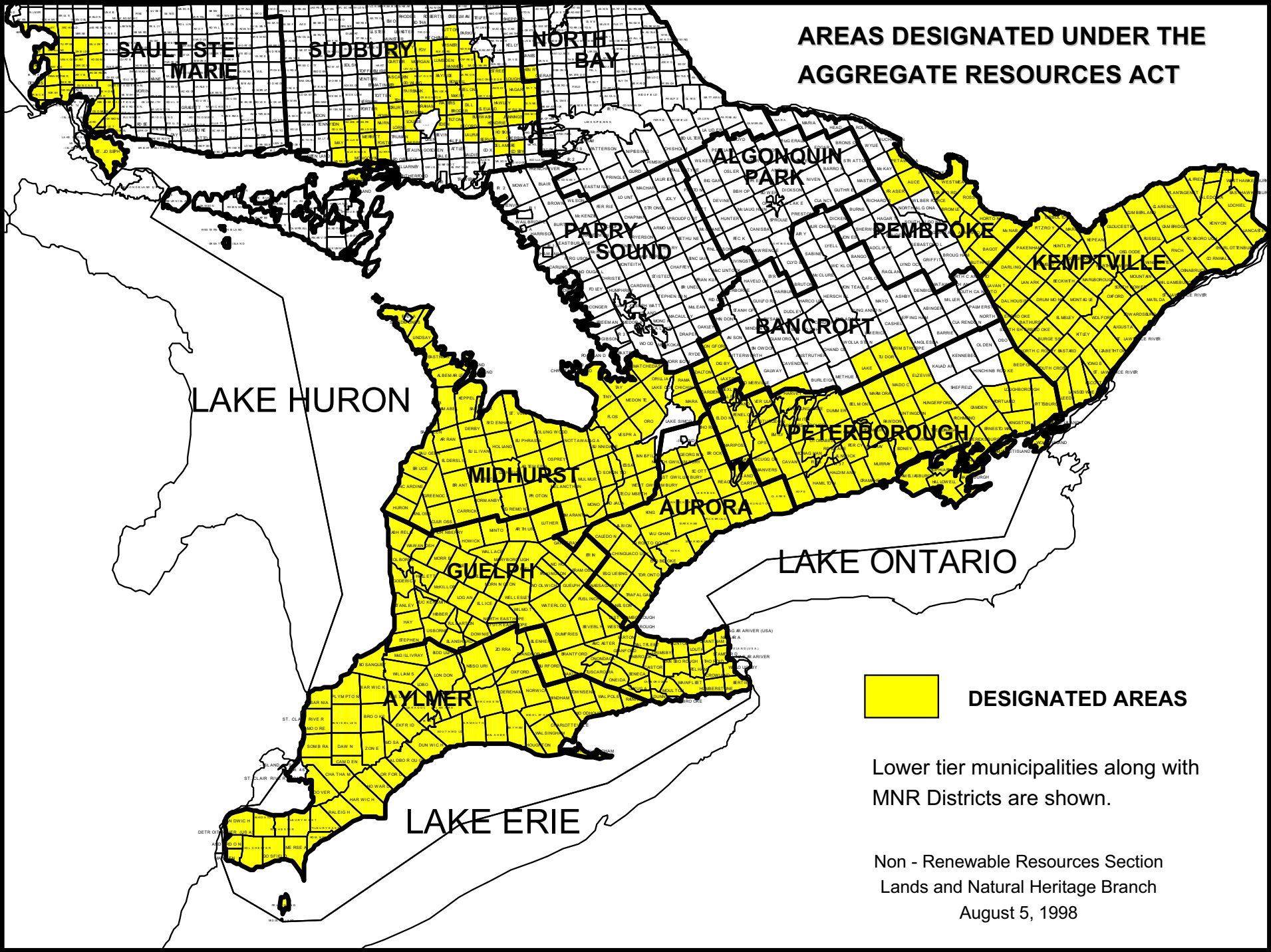
Village of Hilton Beach

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

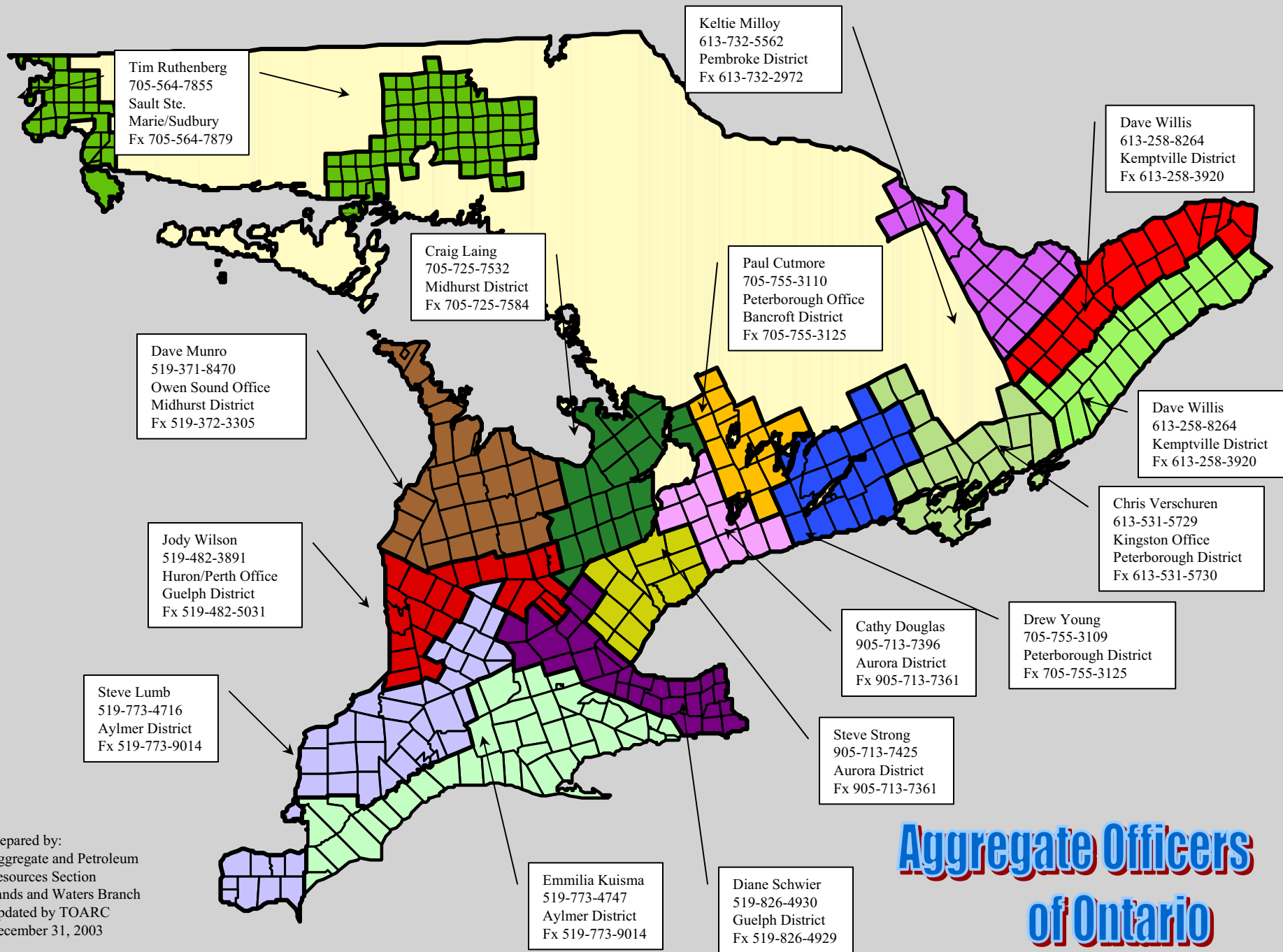
AREAS DESIGNATED UNDER THE AGGREGATE RESOURCES ACT



 **DESIGNATED AREAS**

Lower tier municipalities along with
MNR Districts are shown.

Non - Renewable Resources Section
Lands and Natural Heritage Branch
August 5, 1998



Prepared by:
 Aggregate and Petroleum
 Resources Section
 Lands and Waters Branch
 Updated by TOARC
 December 31, 2003

Aggregate Officers of Ontario



- **MINERAL**
- **AGGREGATES**
- **IN ONTARIO**

Statistical Update

2 0 0 3

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2003

Prepared by

The Ontario Aggregate Resources Corporation

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Aggregate Production	4

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- B. Historical Designation of Private Land under the Pits and Quarries Control Act and the Aggregate Resources Act
- C. CPCA Geographic Areas
- D. Map of Areas Designated under the Aggregate Resources Act
- E. Map of Aggregate Licence Officers of Ontario

Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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or Fax (905) 319-7423

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email, lpeterson@toarc.com

MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$30 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment.

In 2003, this basic non-renewable resource was supplied from 2,782 licensed aggregate sites on private land in designated parts of the Province and 3,232 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;
6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Aggregate Producer's Association of Ontario (APAO), representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.
- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.

- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

Regional technical committees have been established that provide continuous feedback and solutions to technical issues in the delivery of the Aggregate Resources Program. The Non-Renewable Resources Section provides coordination and leadership to these committees.

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Non Renewable Resources Section, Lands and Natural Heritage Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2003 totaled approximately 165 million tonnes, up 0.6% from the previous year. Production from licensed operations was up 1.7 million tonnes compared to 2002, an increase of 1.2%. Wayside permit production remained virtually unchanged at 299,075 tonnes (.3 million in 2002 compared to .3 million in 2003). Production from aggregate permits on Crown Land increased marginally from 2002 (7.1 million in 2002 to 7.5 million tonnes in 2003).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1990 - 2002
(rounded to nearest million tonnes)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Licences	107	101	105	113	109	114	124	124	131	145	145	141	143
Wayside Permits*	2	2	2	2	2	2	1	2	1	1	0	0	0
Aggregate Permits	14	13	12	10	9	9	8	9	11	10	7	7	7
Category 14 (Forest Industry)**	-	-	-	-	-	-	-	-	2	3	3	4	3
Private Land Non-Designated (estimated)	12	12	12	11	10	11	11	11	12	12	12	12	12
ONTARIO TOTAL	135	128	131	136	130	136	144	146	157	171	167	164	165

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

**Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002 and .3 million tonnes for 2003.

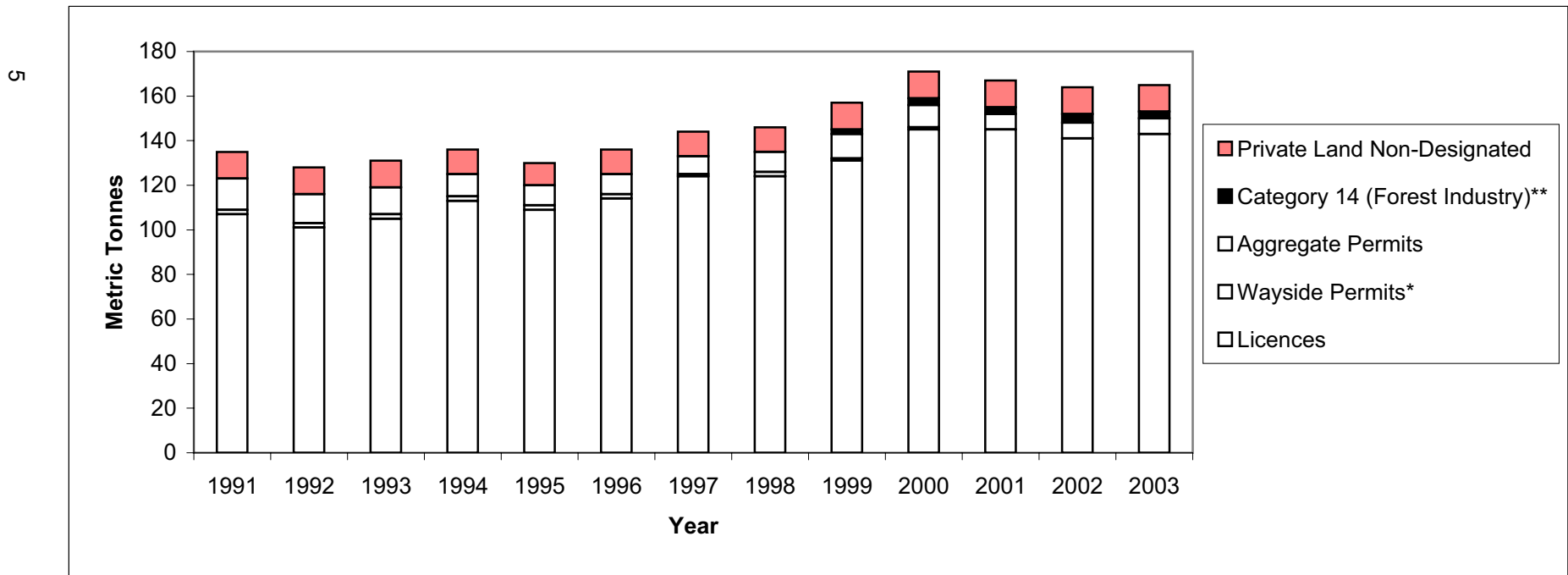


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	56,335.46		56,335.46
Hilton Tp	36,906.54		36,906.54
Jocelyn Tp	11,135.68		11,135.68
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	28,093.70		28,093.70
Laird Tp/St. Joseph Tp	22,385.60		22,385.60
Macdonald, Meredith & Aberdeen Add'l Tp	4,039.20		4,039.20
Sault Ste. Marie, City of	476,737.70		476,737.70
Sub-Total	635,633.88	0.00	635,633.88
<i>Brant</i>			
Brant, County of/Brantford, City of	2,049,951.59		2,049,951.59
Sub-Total	2,049,951.59	0.00	2,049,951.59
<i>Bruce</i>			
Arran-Elderslie, Municipality of	160,841.76		160,841.76
Brockton, Municipality of/Kincardine, Municipality of	113,162.47		113,162.47
Huron-Kinloss Tp	319,289.00		319,289.00
Northern Bruce Peninsula, Municipality of	154,012.43		154,012.43
Saugeen Shores, Town of	362,715.52		362,715.52
South Bruce, Municipality of	303,620.11	15,800.00	319,420.11
South Bruce Peninsula, Town of	284,623.53		284,623.53
Sub-Total	1,698,264.82	15,800.00	1,714,064.82
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	437,934.66		437,934.66
Sub-Total	437,934.66	0.00	437,934.66
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	371,288.73		371,288.73
East Garafraxa Tp	1,513,343.67		1,513,343.67
Melancthon Tp	230,996.03		230,996.03
Mono Tp	513,947.42		513,947.42
Mulmur Tp	351,186.16		351,186.16
Sub-Total	2,980,762.01	0.00	2,980,762.01
<i>Durham</i>			
Brock Tp	1,227,937.68		1,227,937.68
Clarington, Municipality of	5,552,468.70		5,552,468.70
Oshawa, City of/Scugog Tp/Whitby, Town of	172,657.03		172,657.03
Uxbridge Tp	4,887,546.28		4,887,546.28
Sub-Total	11,840,609.69	0.00	11,840,609.69
<i>Elgin</i>			
Bayham, Municipality of/Malahide Tp	76,521.04		76,521.04
Central Elgin, Municipality of	325,296.79		325,296.79
West Elgin, Municipality of	227,803.95		227,803.95
Sub-Total	629,621.78	0.00	629,621.78

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,522,906.77		1,522,906.77
Kingsville, Town of	364,142.75		364,142.75
Sub-Total	1,887,049.52	0.00	1,887,049.52
Frontenac			
Frontenac Islands Tp	33,183.00		33,183.00
Kingston, City of	1,546,474.96		1,546,474.96
South Frontenac Tp	381,062.98		381,062.98
Sub-Total	1,960,720.94	0.00	1,960,720.94
Greater Sudbury			
Greater Sudbury, City of	1,718,987.02		1,718,987.02
Sub-Total	1,718,987.02	0.00	1,718,987.02
Grey			
Chatsworth Tp	493,530.48		493,530.48
Georgian Bluffs, Tp	641,442.71	7,000.00	648,442.71
Grey Highlands, Municipality of	555,729.93		555,729.93
Meaford, Municipality of	294,350.90		294,350.90
Southgate Tp	332,584.33		332,584.33
The Blue Mountains, Town of	385,148.25		385,148.25
West Grey, Municipality of	435,739.05		435,739.05
Sub-Total	3,138,525.65	7,000.00	3,145,525.65
Haldimand			
Haldimand, County of	1,809,374.01		1,809,374.01
Sub-Total	1,809,374.01	0.00	1,809,374.01
Halton			
Burlington, City of/Halton Hills, Town of	5,511,750.62		5,511,750.62
Milton, Town of	5,233,213.28		5,233,213.28
Sub-Total	10,744,963.90	0.00	10,744,963.90
Hamilton			
Hamilton, City of	5,922,444.58	97,355.00	6,019,799.58
Sub-Total	5,922,444.58	97,355.00	6,019,799.58
Hastings			
Belleville, City of	595,743.64		595,743.64
Centre Hastings, Municipality of	110,673.33		110,673.33
Madoc Tp	624,390.53		624,390.53
Marmora & Lake, Municipality of	10,798.28		10,798.28
Quinte West, City of	824,480.92		824,480.92
Stirling-Rawdon Tp/Tyendinaga Tp	164,645.18		164,645.18
Tweed, Municipality of	111,445.75		111,445.75
Sub-Total	2,442,177.63	0.00	2,442,177.63

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	797,372.51		797,372.51
Bluewater, Municipality of	19,587.26		19,587.26
Central Huron, Municipality of	581,829.23		581,829.23
Howick Tp	256,257.73		256,257.73
Huron East, Municipality of	824,416.28		824,416.28
Morris-Turnberry, Municipality of	145,860.19		145,860.19
North Huron Tp	31,309.50		31,309.50
South Huron, Municipality of	78,562.38		0.00
Sub-Total	2,735,195.08	0.00	2,735,195.08
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,716,483.30		6,716,483.30
Sub-Total	6,716,483.30	0.00	6,716,483.30
<i>Lambton</i>			
Enniskillen Tp/Plympton-Wyoming, Town of	40,554.62		40,554.62
Lambton Shores, Municipality of	101,894.27		101,894.27
Warwick Tp	206,111.01		206,111.01
Sub-Total	348,559.90	0.00	348,559.90
<i>Lanark</i>			
Beckwith Tp	67,003.97		67,003.97
Drummond-North Elmsley Tp	270,454.66		270,454.66
Lanark Highlands Tp	1,416,596.82		1,416,596.82
Mississippi Mills, Town of	249,683.17		249,683.17
Montague Tp	322,306.52		322,306.52
Tay Valley Tp	30,519.98		30,519.98
Sub-Total	2,356,565.12	0.00	2,356,565.12
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	155,319.46		155,319.46
Augusta Tp	129,626.69		129,626.69
Edwardsburgh-Cardinal Tp	167,913.89		167,913.89
Elizabethtown-Kitley Tp	439,865.96		439,865.96
Leeds and the Thousand Islands Tp	490,016.93		490,016.93
Merrickville-Wolford, Village of	41,136.85		41,136.85
North Grenville Tp	360,855.53		360,855.53
Rideau Lakes Tp	77,850.19		77,850.19
Sub-Total	1,862,585.50	0.00	1,862,585.50
<i>Lennox & Addington</i>			
Greater Napanee, Town of	292,971.64		292,971.64
Loyalist Tp/Stone Mills Tp	1,573,168.04		1,573,168.04
Sub-Total	1,866,139.68	0.00	1,866,139.68

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Middlesex			
Adelaide Metcalfe Tp/Lucan Biddulph Tp	80,663.68		80,663.68
London, City of	2,186,275.05		2,186,275.05
Middlesex Centre Tp	907,190.64		907,190.64
North Middlesex, Municipality of	102,129.94		102,129.94
Strathroy-Caradoc Tp	36,583.20		36,583.20
Thames Centre, Municipality of	2,244,426.26		2,244,426.26
Sub-Total	5,557,268.77	0.00	5,557,268.77
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,997,960.65		1,997,960.65
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,282,250.97		1,282,250.97
Niagara Falls, City of	1,314,647.48		1,314,647.48
Sub-Total	4,594,859.10	0.00	4,594,859.10
Norfolk			
Norfolk, County of	416,679.03		416,679.03
Sub-Total	416,679.03	0.00	416,679.03
Northumberland			
Alnwick-Haldimand Tp	227,836.27		227,836.27
Brighton, Municipality of	293,423.30		293,423.30
Cramahe Tp	2,288,145.58		2,288,145.58
Hamilton Tp	305,723.58		305,723.58
Port Hope, Municipality of	55,927.80		55,927.80
Trent Hills, Municipality of	201,912.55		201,912.55
Sub-Total	3,372,969.08	0.00	3,372,969.08
Ottawa			
Ottawa, City of	9,976,123.05		9,976,123.05
Sub-Total	9,976,123.05	0.00	9,976,123.05
Oxford			
Blandford-Blenheim Tp	325,356.34		325,356.34
East Zorra-Tavistock Tp/Norwich Tp/Woodstock, City of	166,868.67		166,868.67
South-West Oxford Tp	900,206.01		900,206.01
Zorra Tp	3,531,554.83		3,531,554.83
Sub-Total	4,923,985.85	0.00	4,923,985.85
Peel			
Brampton, City of/Caledon, Town of/Mississauga, City of	4,496,215.70		4,496,215.70
Sub-Total	4,496,215.70	0.00	4,496,215.70
Perth			
North Perth, Town of/St. Marys, Separated Town of	113,117.90		113,117.90
Perth East Tp	384,686.44		384,686.44
Perth South Tp	1,295,464.11		1,295,464.11
West Perth Tp	154,255.85		154,255.85
Sub-Total	1,947,524.30	0.00	1,947,524.30

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp/Havelock-Belmont-Methuen Tp	158,169.12		158,169.12
Cavan-Millbrook-North Monaghan Tp	153,943.51		153,943.51
Douro-Dummer Tp	805,188.25		805,188.25
Galway-Cavendish-Harvey Tp	225,447.37		225,447.37
Otonabee-South Monaghan Tp	519,310.41		519,310.41
Smith-Ennismore-Lakefield Tp	669,803.63		669,803.63
Sub-Total	2,531,862.29	0.00	2,531,862.29
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	198,720.44		198,720.44
Champlain Tp	378,506.36		378,506.36
Clarence-Rockland, City of	261,389.88		261,389.88
East Hawkesbury Tp	69,466.12		69,466.12
Russell Tp	241,875.27		241,875.27
The Nation, Municipality of	275,308.33		275,308.33
Sub-Total	1,425,266.40	0.00	1,425,266.40
<i>Prince Edward Co</i>			
Prince Edward, County of	2,240,402.17		2,240,402.17
Sub-Total	2,240,402.17	0.00	2,240,402.17
<i>Renfrew</i>			
Admaston-Bromley Tp/Greater Madawaska Tp/ Renfrew, Town of	185,774.28		185,774.28
Horton Tp	381,870.16		381,870.16
Laurentian Valley Tp	467,024.82		467,024.82
McNab-Braeside Tp	306,978.04		306,978.04
Petawawa, Town of	172,182.84		172,182.84
Whitewater Region Tp	135,645.36		135,645.36
Sub-Total	1,649,475.50	0.00	1,649,475.50
<i>Simcoe</i>			
Adjala-Tosorontio Tp/Barrie, City of/Collingwood, Town of Bradford West Gwillimbury, Town of/Midland, Town of/ Wasaga Beach, Town of	780,544.18		780,544.18
Clearview Tp	344,158.24		344,158.24
Essa Tp	1,214,958.49		1,214,958.49
Innisfil, Town of	50,112.99		50,112.99
New Tecumseth, Town of	251,885.92		251,885.92
Oro-Medonte Tp	48,828.70		48,828.70
Ramara Tp	2,717,556.09		2,717,556.09
Severn Tp	2,520,076.35		2,520,076.35
Springwater Tp	1,797,298.34		1,797,298.34
Tay Tp	1,546,755.37		1,546,755.37
Tiny Tp	185,309.15		185,309.15
Sub-Total	11,776,759.56	0.00	11,776,759.56

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	616,590.41		616,590.41
North Glengarry Tp	119,225.66		119,225.66
North Stormont Tp	724,390.74		724,390.74
South Dundas Tp	164,341.05		164,341.05
South Glengarry Tp	234,463.10		234,463.10
South Stormont Tp	815,638.32		815,638.32
Sub-Total	2,674,649.28	0.00	2,674,649.28
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	56,531.13		56,531.13
French River, Municipality of/Nairn & Hyman Tp	36,114.79		36,114.79
Markstay-Warren, Municipality of	83,847.79		83,847.79
Sables Spanish Rivers Tp/Espanola, Town of	62,658.96		62,658.96
Sudbury District, Unorganized	368,349.86		368,349.86
Sub-Total	607,502.53	0.00	607,502.53
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	1,305,106.47		1,305,106.47
North Dumfries Tp	3,854,058.96		3,854,058.96
Wellesley Tp	1,371,469.94		1,371,469.94
Wilmot Tp	959,107.49		959,107.49
Woolwich Tp	549,587.78		549,587.78
Sub-Total	8,039,330.64	0.00	8,039,330.64
<i>Wellington</i>			
Centre Wellington Tp	1,315,249.56		1,315,249.56
Erin, Town of	1,542,072.94		1,542,072.94
Guelph-Eramosa Tp	215,884.00		215,884.00
Mapleton Tp	77,181.08		77,181.08
Minto, Town of	479,751.12		479,751.12
Puslinch Tp	5,102,067.78		5,102,067.78
Wellington North Tp	173,471.16	178,920.00	352,391.16
Sub-Total	8,905,677.64	178,920.00	9,084,597.64
<i>York</i>			
East Gwillimbury, Town of	213,864.71		213,864.71
Georgina, Town of	65,228.11		65,228.11
King Tp/Vaughan, City of/Whitchurch-Stouffville, Town of	1,709,889.30		1,709,889.30
Sub-Total	1,988,982.12	0.00	1,988,982.12
GRAND TOTAL	142,908,083.27	299,075.00	143,207,158.27

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1995	1996	1997	1998	1999	2000	2001	2002	2003
Algoma, District of	0.5	0.6	0.6	0.6	0.8	0.8	0.6	0.8	0.6
Brant Co.	1.6	1.7	2.1	1.5	1.5	2.1	2.0	1.8	2.1
Bruce Co.	1.5	1.2	1.3	1.6	1.5	1.7	1.6	1.7	1.7
Chatham-Kent, R. M. of	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.5	0.4
Dufferin Co.	1.4	1.5	1.5	1.8	2.1	2.6	2.4	2.3	3.0
Durham, R. M. of	7.2	7.6	8.7	7.8	9.2	10.2	11.4	11.0	11.8
Elgin Co.	0.4	0.5	0.7	0.4	0.6	0.7	0.6	0.5	0.6
Essex Co.	2.4	2.2	2.7	2.0	1.9	2.0	2.2	1.9	1.9
Frontenac Co.	1.2	1.6	1.5	1.2	1.3	1.4	1.3	1.6	2.0
Greater Sudbury, City of	2.9	2.7	2.5	2.3	2.9	2.3	1.8	2.3	1.7
Grey Co.	2.4	2.0	2.1	2.1	2.8	2.5	2.6	2.6	3.1
Haldimand Co.	-----	-----	-----	-----	-----	-----	1.5	1.9	1.8
Haldimand-Norfolk, R. M. of	1.9	1.7	2.1	1.8	2.0	2.0	-----	-----	-----
Halton, R. M. of	10.7	12.3	14.4	13.4	13.8	15.5	15.8	12.1	10.7
Hamilton, City of	4.0	4.0	5.2	4.7	4.6	6.3	6.0	5.5	6.0
Hastings Co.	1.4	1.6	2.0	1.9	2.2	2.0	2.0	2.1	2.4
Huron Co.	2.8	2.8	2.4	2.6	2.8	2.7	3.0	2.7	2.8
Kawartha Lakes, City of	-----	-----	-----	-----	-----	-----	6.4	6.4	6.7
Lambton Co.	0.6	0.4	0.5	0.6	0.6	0.5	0.5	0.7	0.4
Lanark Co.	1.3	1.2	1.2	1.3	1.5	1.6	1.7	2.0	2.4
Leeds & Grenville Co.'s	2.3	2.0	2.1	4.2	2.2	3.0	2.3	2.0	1.9
Lennox & Addington Co.	2.0	1.8	1.7	1.9	1.7	1.8	1.8	1.7	1.9
Middlesex Co.	4.5	4.5	5.3	6.1	5.6	6.4	6.0	5.4	5.6
Niagara, R. M. of	3.6	4.7	4.9	4.6	4.3	4.6	4.6	4.9	4.6
Norfolk Co.	-----	-----	-----	-----	-----	-----	0.4	0.4	0.4
Northumberland Co.	2.6	3.0	3.2	3.2	3.6	3.2	3.1	3.0	3.4
Ottawa, City of	8.4	6.1	6.7	7.1	8.1	10.7	10.1	10.7	10.0
Oxford Co.	5.0	4.6	5.3	4.9	5.1	5.4	4.9	4.8	4.9
Peel, R. M. of	3.7	3.8	4.3	4.2	4.5	5.2	5.2	4.3	4.5
Perth Co.	1.6	1.9	1.7	1.7	1.6	2.1	2.0	2.1	2.0
Peterborough Co.	1.8	1.8	1.8	1.8	1.8	2.2	2.4	3.2	2.5
Prescott & Russell Co.'s	1.3	1.2	1.4	1.1	1.2	1.4	1.4	1.3	1.4
Prince Edward Co.	2.2	1.8	2.1	2.0	2.0	2.1	2.0	2.1	2.2
Renfrew Co.	1.3	1.5	1.2	1.3	1.5	1.5	1.2	1.8	1.6
Simcoe Co.	6.8	7.4	7.6	9.0	9.0	9.3	10.6	11.4	11.8
Stormont, Dundas & Glengarry Co.'s	2.3	2.1	2.4	2.4	2.8	3.0	2.7	2.6	2.7
Sudbury, District of	0.3	0.3	0.2	0.2	0.4	0.5	1.0	0.6	0.6
Victoria Co.	4.9	6.0	6.5	6.6	6.0	7.1	-----	-----	-----
Waterloo, R. M. of	5.8	5.8	5.6	5.8	7.3	7.7	8.2	7.8	8.0
Wellington Co.	4.9	6.0	6.4	6.9	7.5	8.4	8.9	8.9	9.1
York, R. M. of	2.2	2.0	2.6	2.2	2.7	3.0	2.4	2.4	2.0
TOTAL	112.2	114.3	125.0	125.2	131.5	146.0	144.9	141.8	143.2

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.
As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.

Table 4

**LICENCE PRODUCTION IN 2003
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2003 Production	Production				
				2002	2001	2000	1999	1998
1	City of Ottawa ⁽¹⁾	City of Ottawa	10.0	10.7	10.1	10.6	8.1	7.1
2	City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.7	6.4	6.4	7.1	6.0	6.6
3	City of Hamilton ⁽³⁾	City of Hamilton	5.9	5.4	6.0	6.3	4.6	4.7
4	Municipality of Clarington	Durham	5.6	4.7	4.7	4.3	3.8	3.0
5	City of Burlington/ Town of Halton Hills	Halton	5.5	6.3	7.0	6.5	6.1	5.5
6	Town of Milton	Halton	5.2	5.9	8.8	9.0	7.7	7.9
7	Puslinch Township	Wellington County	5.1	5.3	5.5	4.1	3.9	3.8
8	Township of Uxbridge	Durham	4.9	4.7	5.0	4.1	3.4	3.2
9	Cities of Brampton/Mississauga/ Town of Caledon	Peel	4.5	4.3	5.2	5.2	4.5	4.2
10	Township of North Dumfries	Waterloo	3.9	3.3	3.7	3.5	3.2	2.5
Total			57.3	57.0	62.4	60.7	51.3	48.5

Note: Municipalities are ranked in order of their licenced production for 2003

Production statistics for 1998 - 2001 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

NUMBER AND TYPE OF AGGREGATE LICENCES

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	171	147	24	155	16	0	0
Aylmer	312	234	78	294	12	6	0
Bancroft	42	19	23	23	14	5	0
Guelph (Cambridge)	458	372	86	422	33	3	0
Kemptville	514	276	238	372	120	21	1
Midhurst	467	346	121	422	41	4	0
Pembroke	111	56	55	98	7	6	0
Peterborough (Tweed)	495	268	227	396	84	15	0
Sault Ste. Marie	70	31	39	64	1	5	0
Sudbury	142	98	44	117	6	19	0
TOTAL	2,782	1,847	935	2,363	334	84	1

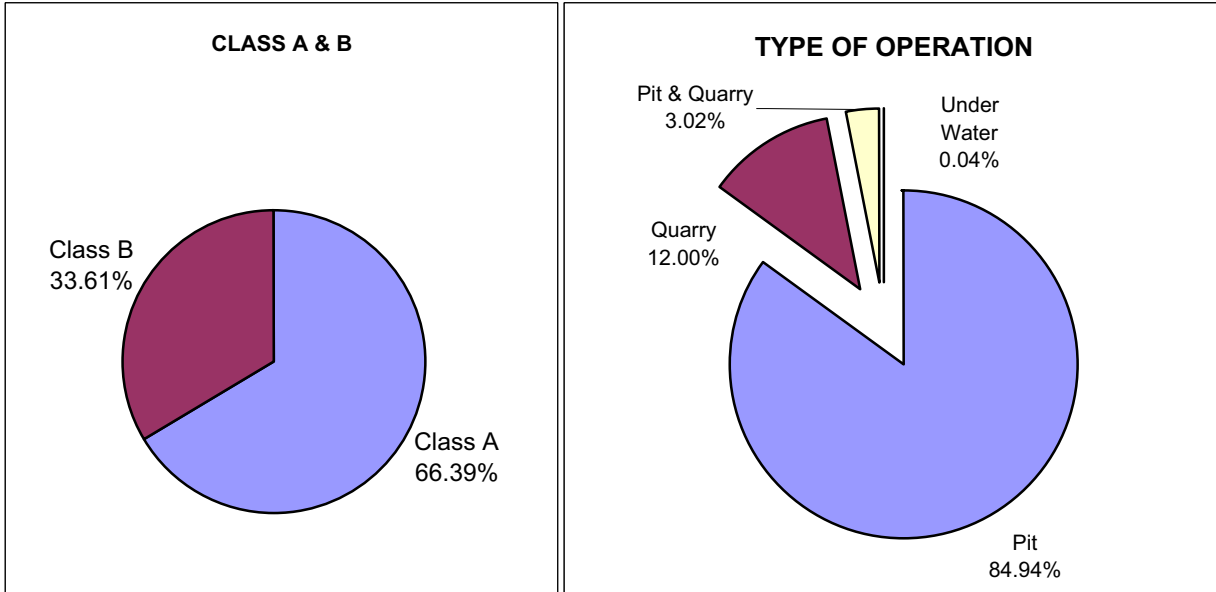


Table 6

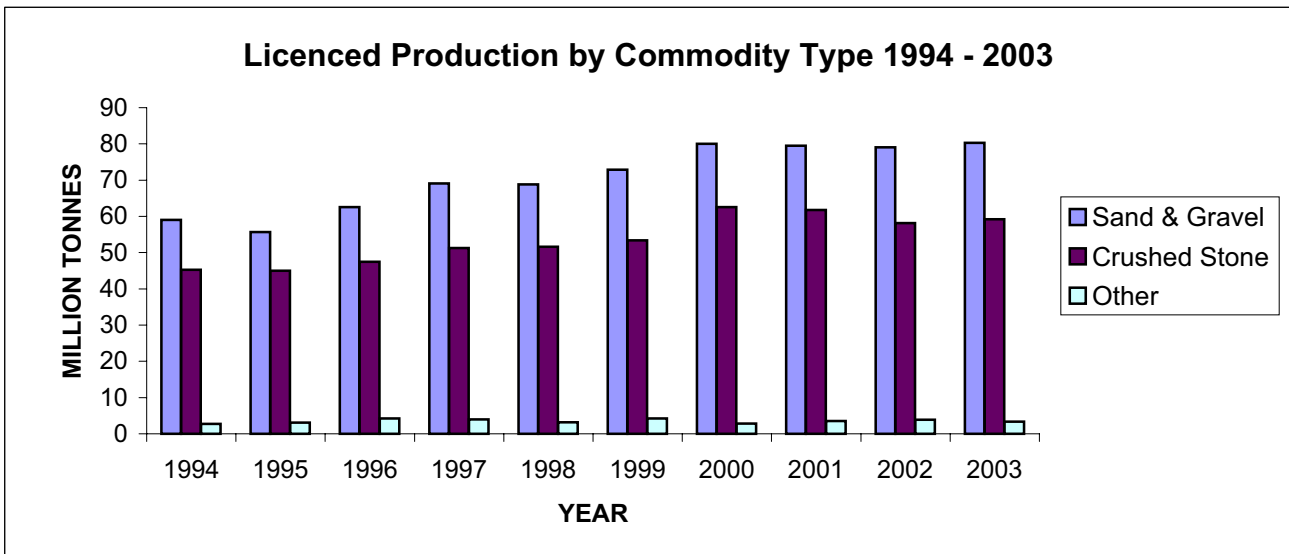
**2003 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	29,070,771.41	14,510,488.16	12,867,652.49	1,301,758.80	390,871.96
Aylmer	14,203,342.51	10,186,654.91	4,012,389.89	4,297.71	0.00
Bancroft	2,244,114.96	118,995.50	2,073,242.00	7,947.44	43,930.02
Guelph (Cambridge)	36,179,246.03	23,479,570.00	12,498,781.93	183,675.42	17,218.68
Kemptville	18,158,169.35	5,422,611.37	11,711,904.17	119,429.60	904,224.21
Midhurst	19,417,179.95	13,468,337.55	5,601,440.02	137,384.71	210,017.67
Pembroke	1,786,495.50	1,537,950.27	248,545.23	0.00	0.00
Peterborough	18,886,640.13	8,930,785.99	9,928,346.97	11,678.46	15,828.71
Sault Ste. Marie	635,633.88	615,122.18	17,693.22	0.00	2,818.48
Sudbury	2,326,489.55	2,030,197.28	289,382.43	4,693.00	2,216.84
TOTAL	142,908,083.27	80,300,713.21	59,249,378.35	1,770,865.14	1,587,126.57

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1994	107.11	59.07	45.28	2.76
1995	103.80	55.70	45.01	3.09
1996	114.27	62.52	47.48	4.27
1997	124.29	69.05	51.23	4.01
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36

Table 7

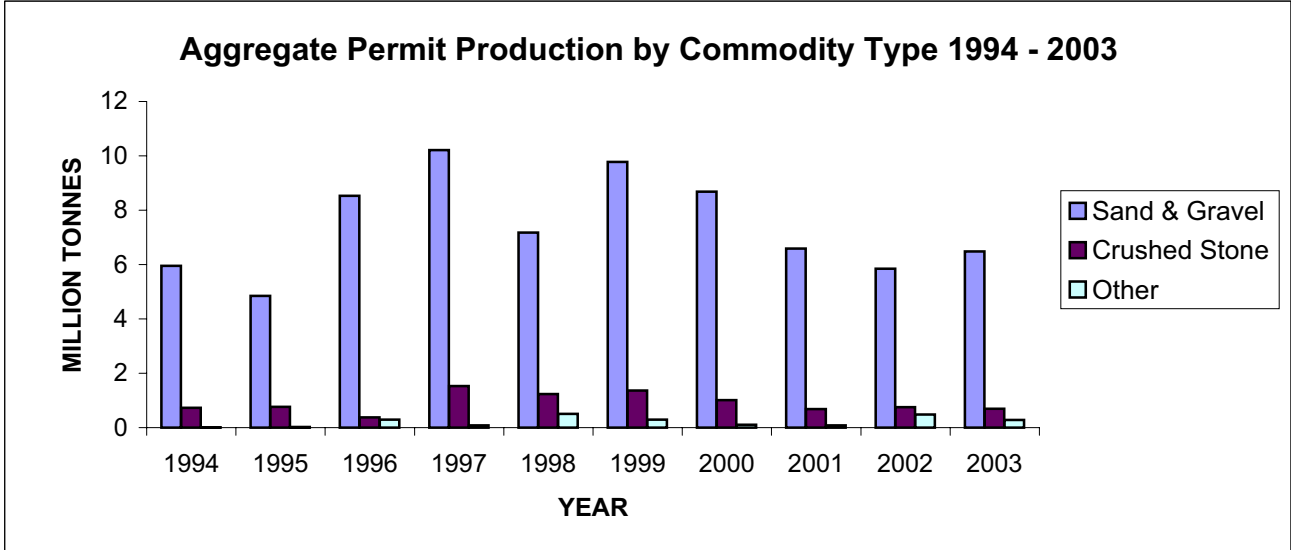
**2003 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	241,410.49	241,410.49	-	-	-
Cochrane	393,376.51	362,337.51	31,039.00	-	-
Hearst	219,074.70	206,571.24	9,399.00	2,149.46	955.00
Kirkland Lake	182,468.00	180,790.00	1,678.00	-	-
North Bay	317,982.61	291,110.03	26,244.33	-	628.25
Sault Ste. Marie	314,360.58	314,266.72	-	40.00	53.86
Sudbury	304,925.78	238,708.03	60,468.55	102.00	5,647.20
Timmins	470,006.44	393,385.42	2,986.74	-	73,634.28
Wawa	633,665.37	362,972.56	270,532.81	160.00	-
Sub-Total	3,077,270.48	2,591,552.00	402,348.43	2,451.46	80,918.59
NORTHWEST					
Dryden	867,092.11	728,164.11	-	-	138,928.00
Fort Frances	471,974.11	469,789.95	-	-	2,184.16
Kenora	258,865.78	243,941.88	-	-	14,923.90
Nipigon	684,652.82	609,168.82	74,836.00	-	648.00
Red Lake	305,986.58	305,214.76	525.82	-	246.00
Sioux Lookout	401,949.95	399,821.54	-	-	2,128.41
Thunder Bay	324,954.73	306,193.16	18,741.00	-	20.57
Sub-Total	3,315,476.08	3,062,294.22	94,102.82	0.00	159,079.04
SOUTHCENTRAL					
Algonquin Park	50,548.00	50,548.00	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	476.28	476.28	-	-	-
Bancroft	265,200.69	90,218.29	136,700.59	380.80	37,901.01
Guelph (Cambridge)	-	-	-	-	-
Kemptville	33,730.57	33,730.57	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	353,684.23	296,746.71	55,653.34	-	1,284.18
Pembroke	354,854.24	354,854.24	-	-	-
Peterborough (Tweed)	-	-	-	-	-
Sub-Total	1,058,494.01	826,574.09	192,353.93	380.80	39,185.19
TOTAL	7,451,240.57	6,480,420.31	688,805.18	2,832.26	279,182.82

Note: Amounts shown are in metric tonnes

Table 7

**2003 LICENCED AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1994	6.69	5.95	0.73	0.01
1995	5.63	4.85	0.76	0.02
1996	9.21	8.53	0.38	0.30
1997	11.82	10.21	1.53	0.08
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28

Table 8

**2003 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	476	476	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	265,201	90,218	136,701	381	37,901
East (6)	388,585	388,585	0	0	0
Northeast (7)	2,847,837	2,575,874	187,469	2,291	82,203
Northwest (8)	3,949,141	3,425,267	364,636	160	159,079
TOTAL	7,451,241	6,480,420	688,805	2,832	279,183

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

**2003 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,467,140	13,680,804	4,732,724	53,572	41
Peninsula (2)	14,793,308	2,925,879	11,778,448	88,981	0
West Central (3)	36,539,320	30,527,880	5,601,440	182,805	227,196
GTA (4)	29,070,771	14,510,488	12,867,652	1,301,759	390,872
East Central (5)	17,303,894	8,583,861	8,659,712	13,098	47,224
East (6)	23,771,525	7,426,482	15,302,326	125,958	916,759
Northeast (7)	2,326,490	2,030,197	289,382	4,693	2,217
Northwest (8)	635,634	615,122	17,693	0	2,818
TOTAL	142,908,083	80,300,713	59,249,378	1,770,865	1,587,127

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

Table 9

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2003
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	171	9,334.66	3,645.12	142.85	175.67	3,612.30
Aylmer	312	8,466.19	3,064.65	119.89	152.10	3,032.44
Bancroft	42	2,019.40	296.64	17.66	0.00	314.30
Guelph (Cambridge)	458	16,382.94	4,489.13	248.50	306.08	4,431.55
Kemptville	514	14,299.91	3,971.06	107.71	78.19	4,000.58
Midhurst	467	13,715.08	3,380.42	147.75	85.93	3,442.24
Pembroke	111	3,384.18	457.64	29.60	2.64	484.60
Peterborough (Tweed)	495	13,269.29	3,340.99	105.09	40.74	3,405.34
Sault Ste. Marie	70	2,882.36	327.68	7.52	3.45	331.75
Sudbury	142	10,220.75	817.56	16.80	25.12	809.24
TOTAL	2,782	93,974.76	23,790.89	943.37	869.92	23,864.34

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

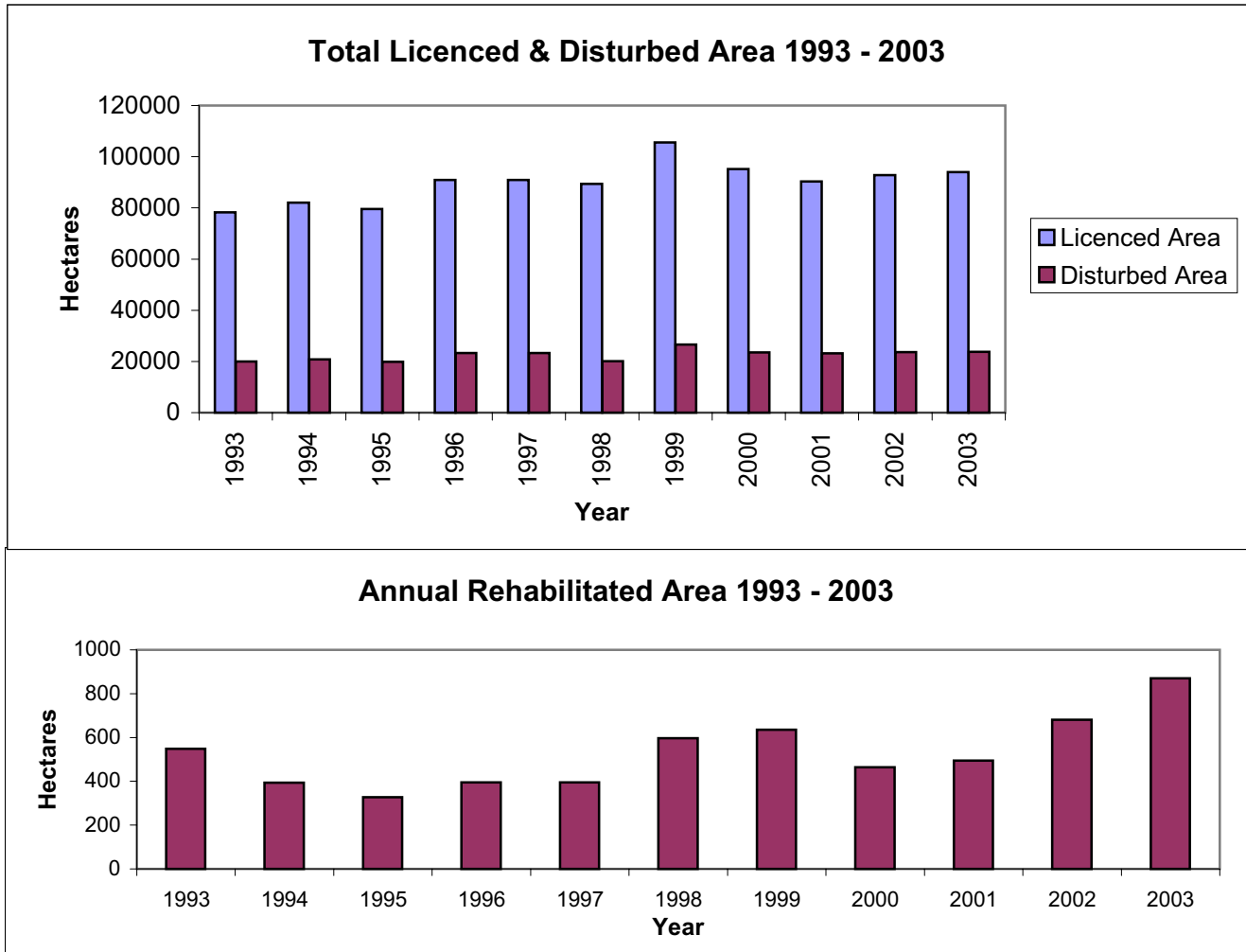


Table 10

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	762.13	188	188	0	0	0
Cochrane	2,569.54	119	107	7	5	0
Hearst	3,256.52	167	145	18	4	0
Kirkland Lake	1,781.83	162	154	6	2	0
North Bay	2,239.20	199	178	16	5	0
Sault Ste. Marie	897.15	111	107	3	1	0
Sudbury	4,059.15	179	151	18	10	0
Timmins	1,860.57	161	152	7	2	0
Wawa	2,303.61	257	247	3	7	0
Sub-Total	19,729.70	1,543	1,429	78	36	0
NORTHWEST						
Dryden	2,006.94	233	221	7	5	0
Fort Frances	2,340.72	296	285	4	7	0
Kenora	2,726.88	192	159	22	11	0
Nipigon	3,359.95	322	305	15	2	0
Red Lake	1,215.78	112	111	1	0	0
Sioux Lookout	1,177.58	79	79	0	0	0
Thunder Bay	1,881.83	194	179	11	4	0
Sub-Total	14,709.68	1,428	1,339	60	29	0
SOUTHCENTRAL						
Algonquin Park	20.82	31	31	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	868.31	77	67	10	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	7.00	2	1	0	0	1
Midhurst	1.00	1	0	0	0	1
Parry Sound	649.77	101	75	13	3	10
Pembroke	120.61	44	44	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,319.51	261	218	24	4	15
TOTAL	36,758.89	3,232	2,986	162	69	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

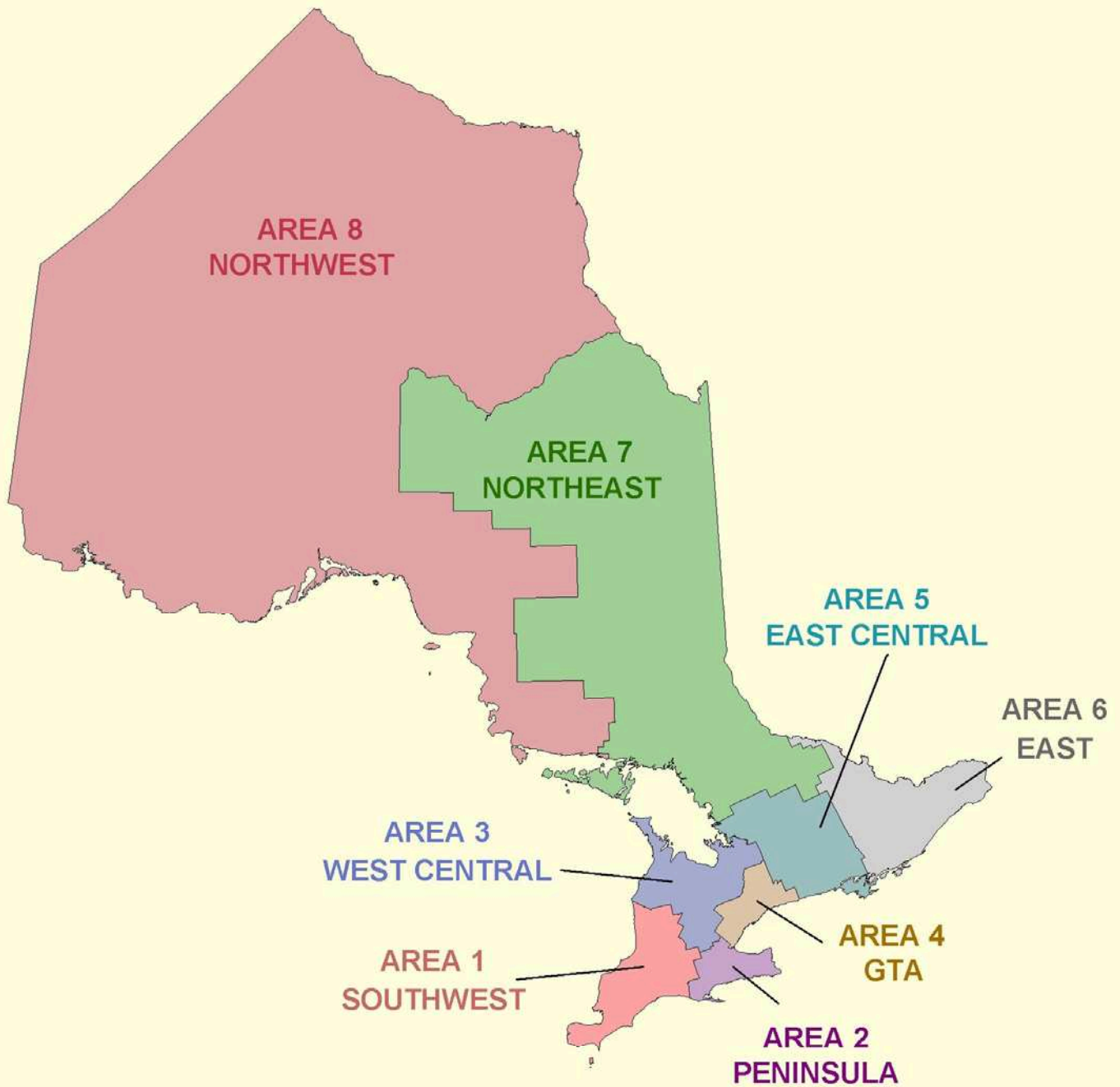
Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Please refer to the Revised Regulations of Ontario for accuracy.

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



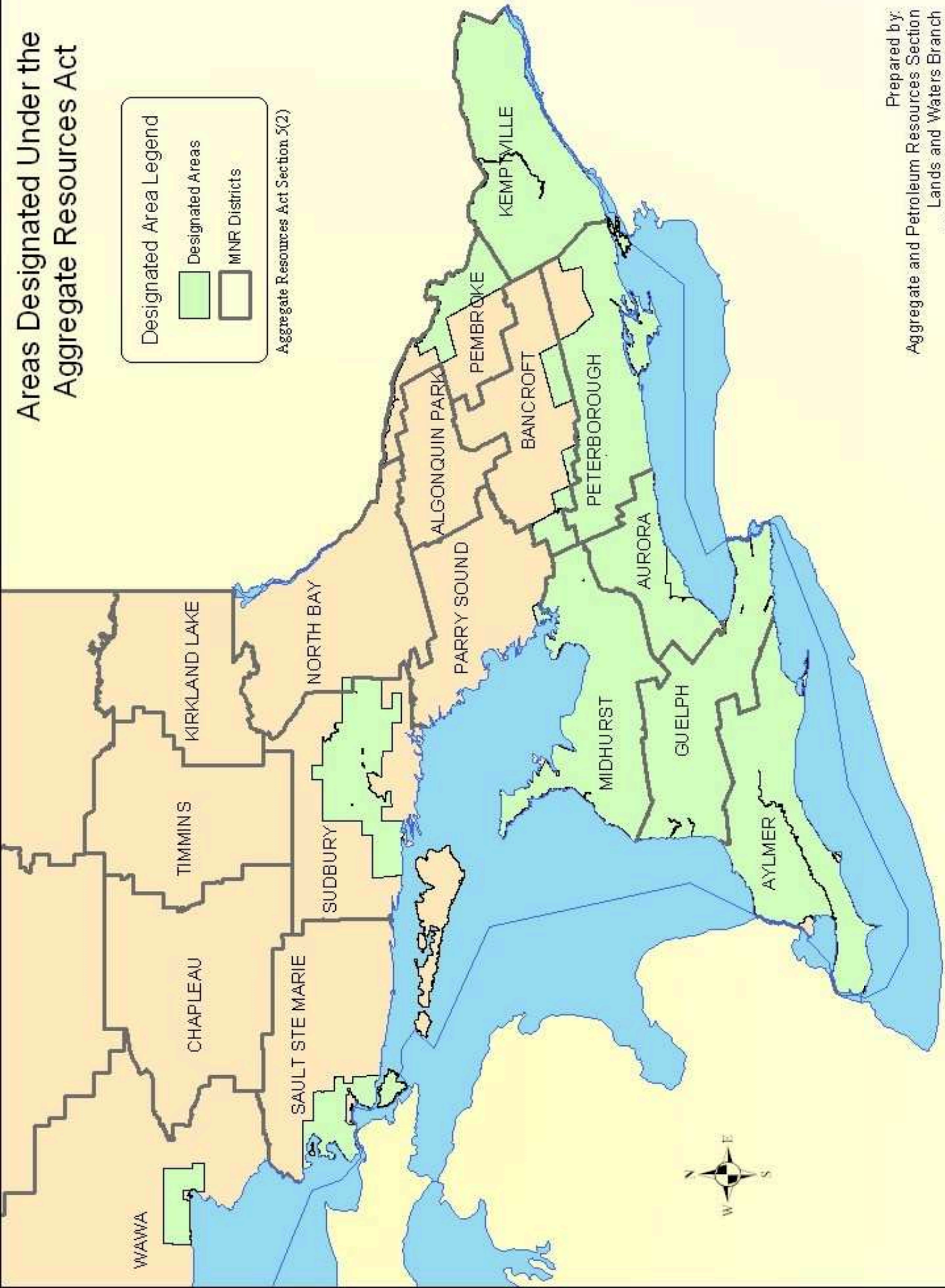
Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Areas Designated Under the Aggregate Resources Act

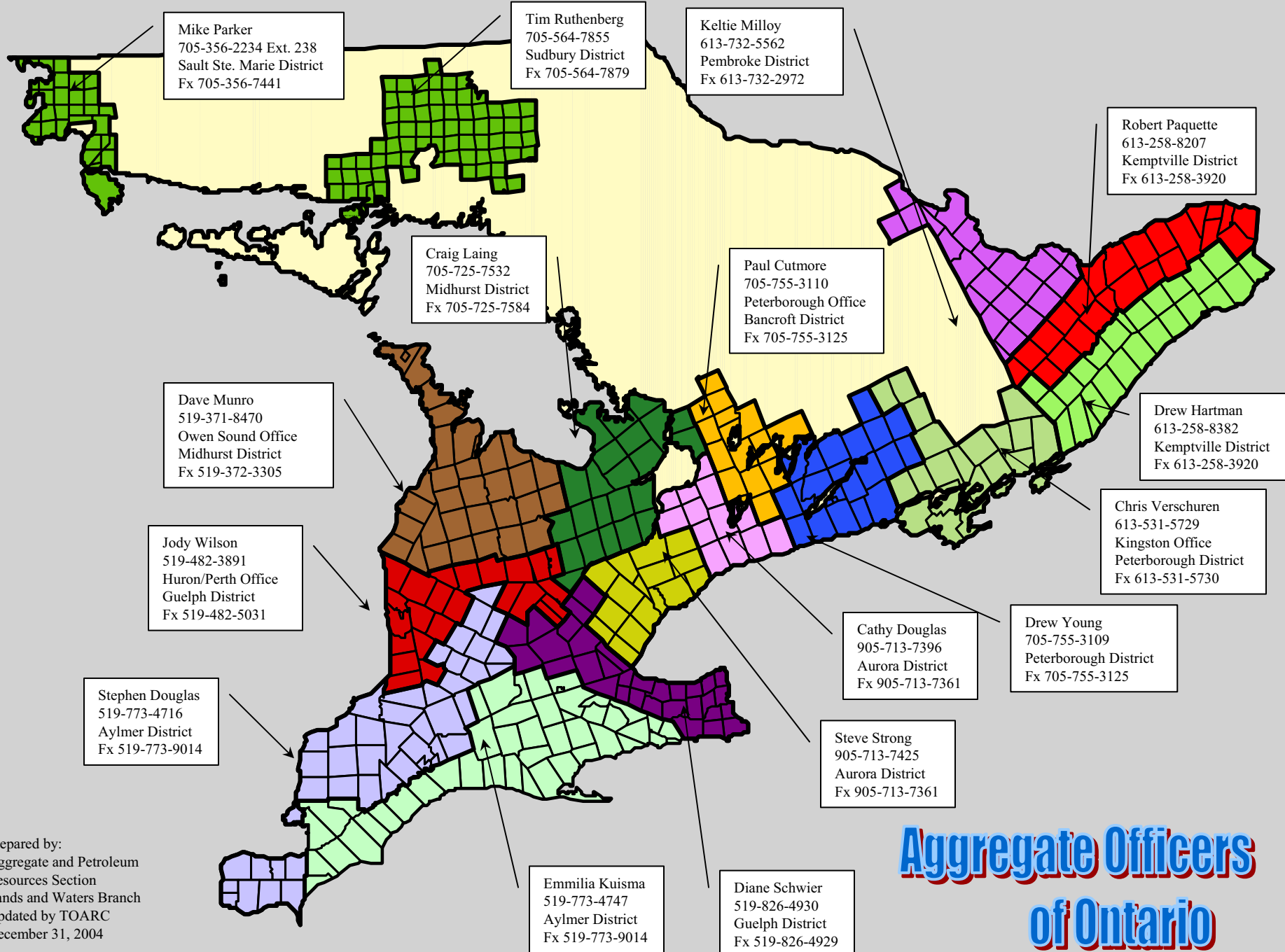
Designated Area Legend

- Designated Areas
- MNR Districts

Aggregate Resources Act Section 5(2)



Prepared by:
Aggregate and Petroleum Resources Section
Lands and Waters Branch
Ministry of Natural Resources
September 14, 2004



Prepared by:
 Aggregate and Petroleum
 Resources Section
 Lands and Waters Branch
 Updated by TOARC
 December 31, 2004

Aggregate Officers of Ontario



● MINERAL ● AGGREGATES ● IN ONTARIO

Statistical Update

2 0 0 4

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2004

Prepared by

The Ontario Aggregate Resources Corporation

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- E. Map of Aggregate Licence Officers of Ontario

Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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at the above address or fax number or contact her directly via email,
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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern ‘built environment’. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2004, this basic non-renewable resource was supplied from 2,752 licensed aggregate sites on private land in designated parts of the Province and 3,314 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario’s Mineral Aggregate Resources

At the Provincial level, the management of Ontario’s aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the “Act”), gave the Minister the power to create the Aggregate Resources Trust (the “Trust”) and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Aggregate Producer's Association of Ontario (APAO), representatives from environmental groups, municipalities and non-APAO member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2004 totaled approximately 173 million tonnes, up 4.3% from the previous year. Production from licensed operations was up 6.8 million tonnes compared to 2003, an increase of 4.7%. Wayside permit production decreased by 69.5% from 2003 but on a small overall tonnage (.3 million in 2003 compared to .1 million in 2004). Production from aggregate permits on Crown Land decreased marginally from 2003 (7.5 million in 2003 to 7.4 million tonnes in 2004).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1992 - 2004
(rounded to nearest million tonnes)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Licences	101	105	113	109	114	124	124	131	145	145	141	143	150
Wayside Permits*	2	2	2	2	2	1	2	1	1	0	0	0	0
Aggregate Permits	13	12	10	9	9	8	9	11	10	7	7	7	7
Category 14 (Forest Industry)	-	-	-	-	-	-	-	2	3	3	4	3	4
Private Land Non-Designated (estimated)	12	12	11	10	11	11	11	12	12	12	12	12	12
ONTARIO TOTAL	128	131	136	130	136	144	146	157	171	167	164	165	173

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002 and .3 million tonnes for 2003, .1 million tonnes for 2004

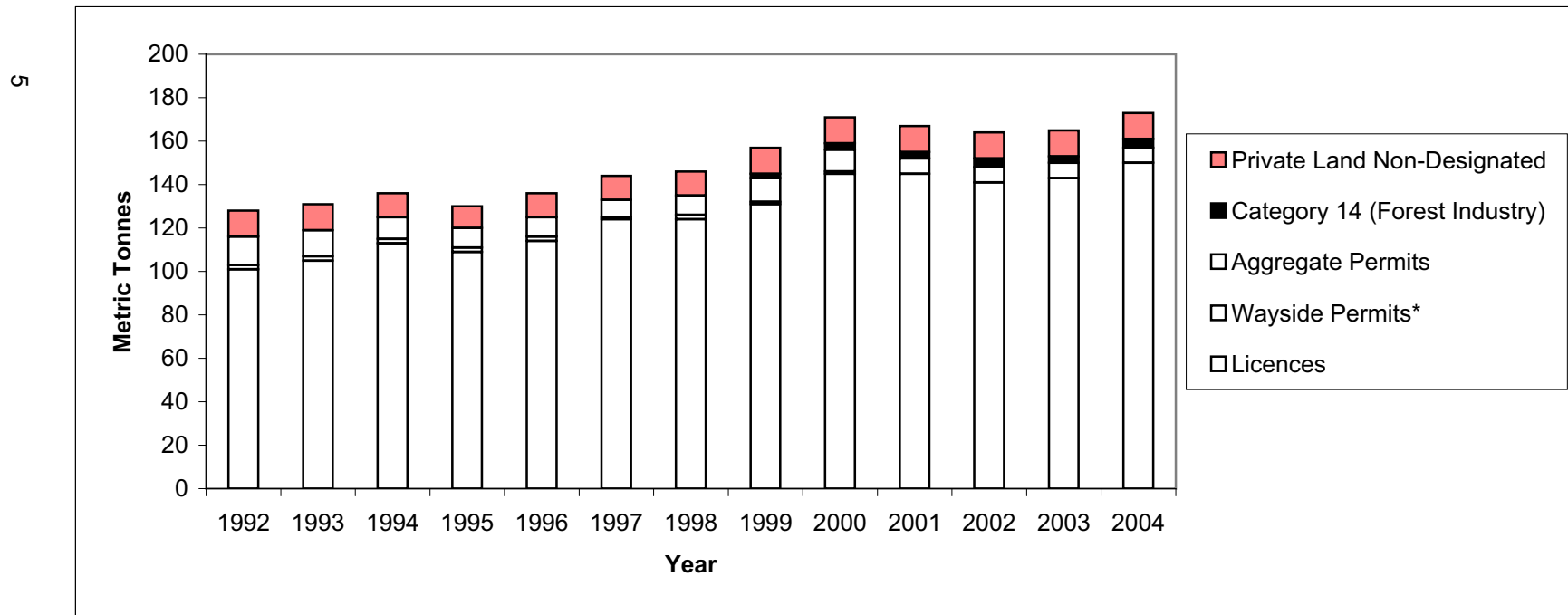


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	71,980.73		71,980.73
Hilton Tp	48,654.21		48,654.21
Jocelyn Tp	11,819.64		11,819.64
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	27,043.10		27,043.10
Laird Tp/St. Joseph Tp	40,131.72		40,131.72
Macdonald, Meredith & Aberdeen Add'l Tp	67,214.30		67,214.30
Sault Ste. Marie, City of	541,785.48		541,785.48
Sub-Total	808,629.18	0.00	808,629.18
<i>Brant</i>			
Brant, County of/Brantford, City of	2,002,679.25		2,002,679.25
Sub-Total	2,002,679.25	0.00	2,002,679.25
<i>Bruce</i>			
Arran-Elderslie, Municipality of	151,639.01	17,175.00	168,814.01
Brockton, Municipality of	101,232.78		101,232.78
Huron-Kinloss Tp	325,601.77		325,601.77
Kincardine, Municipality of	61,925.56		61,925.56
Northern Bruce Peninsula, Municipality of	200,478.89		200,478.89
Saugeen Shores, Town of	307,683.91		307,683.91
South Bruce, Municipality of	382,692.71		382,692.71
South Bruce Peninsula, Town of	364,139.86		364,139.86
Sub-Total	1,895,394.49	17,175.00	1,912,569.49
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	304,718.76		304,718.76
Sub-Total	304,718.76	0.00	304,718.76
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	223,912.27		223,912.27
East Garafraxa Tp	1,287,485.81		1,287,485.81
Melancthon Tp	363,835.37		363,835.37
Mono Tp	462,164.86		462,164.86
Mulmur Tp	309,812.29		309,812.29
Sub-Total	2,647,210.60	0.00	2,647,210.60
<i>Durham</i>			
Brock Tp	1,485,387.48		1,485,387.48
Clarington, Municipality of	5,307,092.70		5,307,092.70
Oshawa, City of/Scugog Tp/Whitby, Town of	296,473.38		296,473.38
Uxbridge Tp	5,548,825.07		5,548,825.07
Sub-Total	12,637,778.63	0.00	12,637,778.63
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	274,168.90		274,168.90
Central Elgin, Municipality of	414,115.65		414,115.65
Sub-Total	688,284.55	0.00	688,284.55

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,460,523.97		1,460,523.97
Kingsville, Town of	458,351.90		458,351.90
Sub-Total	1,918,875.87	0.00	1,918,875.87
Frontenac			
Frontenac Islands Tp	35,868.44		35,868.44
Kingston, City of	1,747,592.34		1,747,592.34
South Frontenac Tp	431,163.68		431,163.68
Sub-Total	2,214,624.46	0.00	2,214,624.46
Greater Sudbury			
Greater Sudbury, City of	2,157,959.67		2,157,959.67
Sub-Total	2,157,959.67	0.00	2,157,959.67
Grey			
Chatsworth Tp	294,752.17		294,752.17
Georgian Bluffs, Tp	692,848.32		692,848.32
Grey Highlands, Municipality of	620,446.12		620,446.12
Meaford, Municipality of	402,525.40		402,525.40
Southgate Tp	320,317.59		320,317.59
The Blue Mountains, Town of	433,217.96		433,217.96
West Grey, Municipality of	403,478.15		403,478.15
Sub-Total	3,167,585.71	0.00	3,167,585.71
Haldimand			
Haldimand, County of	1,561,178.26		1,561,178.26
Sub-Total	1,561,178.26	0.00	1,561,178.26
Halton			
Burlington, City of/Halton Hills, Town of	5,820,222.01		5,820,222.01
Milton, Town of	5,604,902.96		5,604,902.96
Sub-Total	11,425,124.97	0.00	11,425,124.97
Hamilton			
Hamilton, City of	6,273,185.24	73,945.00	6,347,130.24
Sub-Total	6,273,185.24	73,945.00	6,347,130.24
Hastings			
Belleville, City of	581,640.24		581,640.24
Centre Hastings, Municipality of	148,950.13		148,950.13
Madoc Tp	607,302.94		607,302.94
Marmora & Lake, Municipality of/Stirling-Rawdon, Tp	27,382.60		27,382.60
Quinte West, City of	714,233.72		714,233.72
Tyendinaga Tp	153,762.62		153,762.62
Tweed, Municipality of	28,657.80		28,657.80
Sub-Total	2,261,930.05	0.00	2,261,930.05

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	784,297.07		784,297.07
Bluewater, Municipality of/South Huron, Municipality of	37,475.12		37,475.12
Central Huron, Municipality of	586,200.58		586,200.58
Howick Tp	165,990.47		165,990.47
Huron East, Municipality of	741,642.68		741,642.68
Morris-Turnberry, Municipality of	124,172.34		124,172.34
North Huron Tp	50,841.17		50,841.17
Sub-Total	2,490,619.43	0.00	2,490,619.43
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,803,719.72		6,803,719.72
Sub-Total	6,803,719.72	0.00	6,803,719.72
<i>Lambton</i>			
Enniskillen/Warwick Tp/Plympton-Wyoming, Town of	350,225.89		350,225.89
Lambton Shores, Municipality of	110,328.43		110,328.43
Sub-Total	460,554.32	0.00	460,554.32
<i>Lanark</i>			
Beckwith Tp	84,437.74		84,437.74
Drummond-North Elmsley Tp	190,310.04		190,310.04
Lanark Highlands Tp	1,621,376.69		1,621,376.69
Mississippi Mills, Town of	147,476.41		147,476.41
Montague Tp	243,761.30		243,761.30
Tay Valley Tp	21,476.92		21,476.92
Sub-Total	2,308,839.10	0.00	2,308,839.10
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	153,994.94		153,994.94
Augusta Tp	131,460.15		131,460.15
Edwardsburgh-Cardinal Tp	156,260.86		156,260.86
Elizabethtown-Kitley Tp	675,722.59		675,722.59
Leeds and the Thousand Islands Tp	572,809.02		572,809.02
Merrickville-Wolford, Village of	110,482.29		110,482.29
North Grenville Tp	310,486.33		310,486.33
Rideau Lakes Tp	93,538.54		93,538.54
Sub-Total	2,204,754.72	0.00	2,204,754.72
<i>Lennox & Addington</i>			
Greater Napanee, Town of	309,657.86		309,657.86
Loyalist Tp/Stone Mills Tp	1,497,099.53		1,497,099.53
Sub-Total	1,806,757.39	0.00	1,806,757.39

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Middlesex			
Adelaide Metcalfe Tp	18,794.00		18,794.00
London, City of	2,180,361.94		2,180,361.94
Lucan Biddulph Tp	22,685.56		22,685.56
Middlesex Centre Tp	624,682.33		624,682.33
North Middlesex, Municipality of	164,572.24		164,572.24
Strathroy-Caradoc Tp	23,988.00		23,988.00
Thames Centre, Municipality of	3,160,415.61		3,160,415.61
Sub-Total	6,195,499.68	0.00	6,195,499.68
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,948,669.84		1,948,669.84
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,456,416.70		1,456,416.70
Niagara Falls, City of	1,330,539.64		1,330,539.64
Sub-Total	4,735,626.18	0.00	4,735,626.18
Norfolk			
Norfolk, County of	526,035.50		526,035.50
Sub-Total	526,035.50	0.00	526,035.50
Northumberland			
Alnwick-Haldimand Tp	197,039.77		197,039.77
Brighton, Municipality of	316,166.86		316,166.86
Cramahe Tp	2,181,716.24		2,181,716.24
Hamilton Tp	323,131.23		323,131.23
Port Hope, Municipality of	38,227.04		38,227.04
Trent Hills, Municipality of	238,489.59		238,489.59
Sub-Total	3,294,770.73	0.00	3,294,770.73
Ottawa			
Ottawa, City of	9,873,354.66		9,873,354.66
Sub-Total	9,873,354.66	0.00	9,873,354.66
Oxford			
Blandford-Blenheim Tp	317,500.01		317,500.01
East Zorra-Tavistock Tp/Norwich Tp/Woodstock, City of	271,865.58		271,865.58
South-West Oxford Tp	589,117.67		589,117.67
Zorra Tp	3,593,808.51		3,593,808.51
Sub-Total	4,772,291.77	0.00	4,772,291.77
Peel			
Caledon, Town of/Mississauga, City of	5,272,675.30		5,272,675.30
Sub-Total	5,272,675.30	0.00	5,272,675.30
Perth			
North Perth, Town of/St. Marys, Separated Town of	79,553.73		79,553.73
Perth East Tp	347,807.25		347,807.25
Perth South Tp	1,373,230.72		1,373,230.72
West Perth Tp	233,876.78		233,876.78
Sub-Total	2,034,468.48	0.00	2,034,468.48

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp	295,165.00		295,165.00
Cavan-Millbrook-North Monaghan Tp	132,570.40		132,570.40
Douro-Dummer Tp	843,945.98		843,945.98
Galway-Cavendish-Harvey Tp	379,280.55		379,280.55
Havelock-Belmont-Methuen Tp	17,865.95		17,865.95
Otonabee-South Monaghan Tp	198,860.86		198,860.86
Smith-Ennismore-Lakefield Tp	584,294.64		584,294.64
Sub-Total	2,451,983.38	0.00	2,451,983.38
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	265,491.20		265,491.20
Champlain Tp	427,661.88		427,661.88
Clarence-Rockland, City of	282,958.16		282,958.16
East Hawkesbury Tp	76,112.92		76,112.92
Russell Tp	159,641.73		159,641.73
The Nation, Municipality of	153,174.26		153,174.26
Sub-Total	1,365,040.15	0.00	1,365,040.15
<i>Prince Edward Co</i>			
Prince Edward, County of	2,236,954.78		2,236,954.78
Sub-Total	2,236,954.78	0.00	2,236,954.78
<i>Renfrew</i>			
Admaston-Bromley Tp/Greater Madawaska Tp/ Renfrew, Town of	140,067.13		140,067.13
Horton Tp	396,451.08		396,451.08
Laurentian Valley Tp	248,425.30		248,425.30
McNab-Braeside Tp	639,971.85		639,971.85
Petawawa, Town of	141,305.48		141,305.48
Whitewater Region Tp	172,042.65		172,042.65
Sub-Total	1,738,263.49	0.00	1,738,263.49
<i>Simcoe</i>			
Adjala-Tosorontio Tp/Barrie, City of	475,372.10		475,372.10
Bradford West Gwillimbury, Town of/ Wasaga Beach, Town of/Orillia, City of	7,985.60		7,985.60
Clearview Tp	1,675,358.19		1,675,358.19
Essa Tp	51,448.71		51,448.71
Innisfil, Town of	57,937.79		57,937.79
Midland, Town of/Penetanguishene, Town of	232,619.57		232,619.57
New Tecumseth, Town of	61,378.78		61,378.78
Oro-Medonte Tp	2,835,568.15		2,835,568.15
Ramara Tp	3,135,260.15		3,135,260.15
Severn Tp	2,204,523.46		2,204,523.46
Springwater Tp	1,455,843.47		1,455,843.47
Tay Tp	167,556.74		167,556.74
Tiny Tp	292,793.04		292,793.04
Sub-Total	12,653,645.75	0.00	12,653,645.75

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	603,257.17		603,257.17
North Glengarry Tp	316,530.18		316,530.18
North Stormont Tp	1,051,658.52		1,051,658.52
South Dundas Tp	276,096.88		276,096.88
South Glengarry Tp	321,743.18		321,743.18
South Stormont Tp	964,054.48		964,054.48
Sub-Total	3,533,340.41	0.00	3,533,340.41
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	37,885.50		37,885.50
French River, Municipality of/Nairn & Hyman Tp	11,361.85		11,361.85
Markstay-Warren, Municipality of	51,170.44		51,170.44
Sables Spanish Rivers Tp/Espanola, Town of	53,781.54		53,781.54
Sudbury District, Unorganized	464,121.51		464,121.51
Sub-Total	618,320.84	0.00	618,320.84
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	1,114,006.07		1,114,006.07
North Dumfries Tp	4,413,179.04		4,413,179.04
Wellesley Tp	2,044,689.11		2,044,689.11
Wilmot Tp	1,241,470.73		1,241,470.73
Woolwich Tp	662,867.26		662,867.26
Sub-Total	9,476,212.21	0.00	9,476,212.21
<i>Wellington</i>			
Centre Wellington Tp	1,130,464.64		1,130,464.64
Erin, Town of	1,926,880.04		1,926,880.04
Guelph-Eramosa Tp	126,214.23		126,214.23
Mapleton Tp	81,124.00		81,124.00
Minto, Town of	391,236.71		391,236.71
Puslinch Tp	5,233,905.56		5,233,905.56
Wellington North Tp	205,970.67		205,970.67
Sub-Total	9,095,795.85	0.00	9,095,795.85
<i>York</i>			
East Gwillimbury, Town of	239,478.11		239,478.11
Georgina, Town of	73,992.14		73,992.14
King Tp/Vaughan, City of/Whitchurch-Stouffville, Town of	1,532,601.53		1,532,601.53
Sub-Total	1,846,071.78	0.00	1,846,071.78
GRAND TOTAL	149,760,755.31	91,120.00	149,851,875.31

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1996	1997	1998	1999	2000	2001	2002	2003	2004
Algoma, District of	0.6	0.6	0.6	0.8	0.8	0.6	0.8	0.6	0.8
Brant Co.	1.7	2.1	1.5	1.5	2.1	2.0	1.8	2.1	2.0
Bruce Co.	1.2	1.3	1.6	1.5	1.7	1.6	1.7	1.7	1.9
Chatham-Kent, R. M. of	0.4	0.5	0.4	0.5	0.5	0.3	0.5	0.4	0.3
Dufferin Co.	1.5	1.5	1.8	2.1	2.6	2.4	2.3	3.0	2.7
Durham, R. M. of	7.6	8.7	7.8	9.2	10.2	11.4	11.0	11.8	12.6
Elgin Co.	0.5	0.7	0.4	0.6	0.7	0.6	0.5	0.6	0.7
Essex Co.	2.2	2.7	2.0	1.9	2.0	2.2	1.9	1.9	1.9
Frontenac Co.	1.6	1.5	1.2	1.3	1.4	1.3	1.6	2.0	2.2
Greater Sudbury, City of	2.7	2.5	2.3	2.9	2.3	1.8	2.3	1.7	2.2
Grey Co.	2.0	2.1	2.1	2.8	2.5	2.6	2.6	3.1	3.2
Haldimand Co.	----	----	----	----	----	1.5	1.9	1.8	1.6
Haldimand-Norfolk, R. M. of	1.7	2.1	1.8	2.0	2.0	----	----	----	----
Halton, R. M. of	12.3	14.4	13.4	13.8	15.5	15.8	12.1	10.7	11.4
Hamilton, City of	4.0	5.2	4.7	4.6	6.3	6.0	5.5	6.0	6.3
Hastings Co.	1.6	2.0	1.9	2.2	2.0	2.0	2.1	2.4	2.3
Huron Co.	2.8	2.4	2.6	2.8	2.7	3.0	2.7	2.8	2.5
Kawartha Lakes, City of	----	----	----	----	----	6.4	6.4	6.7	6.8
Lambton Co.	0.4	0.5	0.6	0.6	0.5	0.5	0.7	0.4	0.5
Lanark Co.	1.2	1.2	1.3	1.5	1.6	1.7	2.0	2.4	2.3
Leeds & Grenville Co.'s	2.0	2.1	4.2	2.2	3.0	2.3	2.0	1.9	2.2
Lennox & Addington Co.	1.8	1.7	1.9	1.7	1.8	1.8	1.7	1.9	1.8
Middlesex Co.	4.5	5.3	6.1	5.6	6.4	6.0	5.4	5.6	6.2
Niagara, R. M. of	4.7	4.9	4.6	4.3	4.6	4.6	4.9	4.6	4.7
Norfolk Co.	----	----	----	----	----	0.4	0.4	0.4	0.5
Northumberland Co.	3.0	3.2	3.2	3.6	3.2	3.1	3.0	3.4	3.3
Ottawa, City of	6.1	6.7	7.1	8.1	10.7	10.1	10.7	10.0	9.9
Oxford Co.	4.6	5.3	4.9	5.1	5.4	4.9	4.8	4.9	4.8
Peel, R. M. of	3.8	4.3	4.2	4.5	5.2	5.2	4.3	4.5	5.3
Perth Co.	1.9	1.7	1.7	1.6	2.1	2.0	2.1	2.0	2.0
Peterborough Co.	1.8	1.8	1.8	1.8	2.2	2.4	3.2	2.5	2.5
Prescott & Russell Co.'s	1.2	1.4	1.1	1.2	1.4	1.4	1.3	1.4	1.4
Prince Edward Co.	1.8	2.1	2.0	2.0	2.1	2.0	2.1	2.2	2.2
Renfrew Co.	1.5	1.2	1.3	1.5	1.5	1.2	1.8	1.6	1.7
Simcoe Co.	7.4	7.6	9.0	9.0	9.3	10.6	11.4	11.8	12.7
Stormont, Dundas & Glengarry Co.'s	2.1	2.4	2.4	2.8	3.0	2.7	2.6	2.7	3.5
Sudbury, District of	0.3	0.2	0.2	0.4	0.5	1.0	0.6	0.6	0.6
Victoria Co.	6.0	6.5	6.6	6.0	7.1	----	----	----	----
Waterloo, R. M. of	5.8	5.6	5.8	7.3	7.7	8.2	7.8	8.0	9.5
Wellington Co.	6.0	6.4	6.9	7.5	8.4	8.9	8.9	9.1	9.1
York, R. M. of	2.0	2.6	2.2	2.7	3.0	2.4	2.4	2.0	1.9
TOTAL	114.3	125.0	125.2	131.5	146.0	144.9	141.8	143.2	149.8

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.
As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.

Table 4

**LICENCE PRODUCTION IN 2004
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality	County/Region	2004 Production	Production				
			2003	2002	2001	2000	1999
1 City of Ottawa ⁽¹⁾	City of Ottawa	9.9	10.0	10.7	10.1	10.6	8.1
2 City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.8	6.7	6.4	6.4	7.1	6.0
3 City of Hamilton ⁽³⁾	City of Hamilton	6.3	5.9	5.4	6.0	6.3	4.6
4 City of Burlington/ Town of Halton Hills	Halton	5.8	5.5	6.3	7.0	6.5	6.1
5 Town of Milton	Halton	5.6	5.2	5.9	8.8	9.0	7.7
6 Township of Uxbridge	Durham	5.5	4.9	4.7	5.0	4.1	3.4
7 Municipality of Clarington	Durham	5.3	5.6	4.7	4.7	4.3	3.8
8 City of Mississauga/ Town of Caledon	Peel	5.3	4.5	4.3	5.2	5.2	4.5
9 Puslinch Township	Wellington County	5.2	5.1	5.3	5.5	4.1	3.9
10 Township of North Dumfries	Waterloo	4.4	3.9	3.3	3.7	3.5	3.2
Total		60.1	57.3	57.0	62.4	60.7	51.3

Note: Municipalities are ranked in order of their licenced production for 2004

Production statistics for 1999 - 2001 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	170	146	24	154	16	0	0
Aylmer	310	233	77	292	12	6	0
Bancroft	42	18	24	23	14	5	0
Guelph (Cambridge)	455	375	80	417	35	3	0
Kemptville	502	273	229	360	120	22	0
Midhurst	465	346	119	419	42	4	0
Pembroke	112	56	56	98	8	6	0
Peterborough (Tweed)	492	271	221	394	83	15	0
Sault Ste. Marie	65	31	34	59	1	5	0
Sudbury	139	98	41	113	6	20	0
TOTAL	2,752	1,847	905	2,329	337	86	0

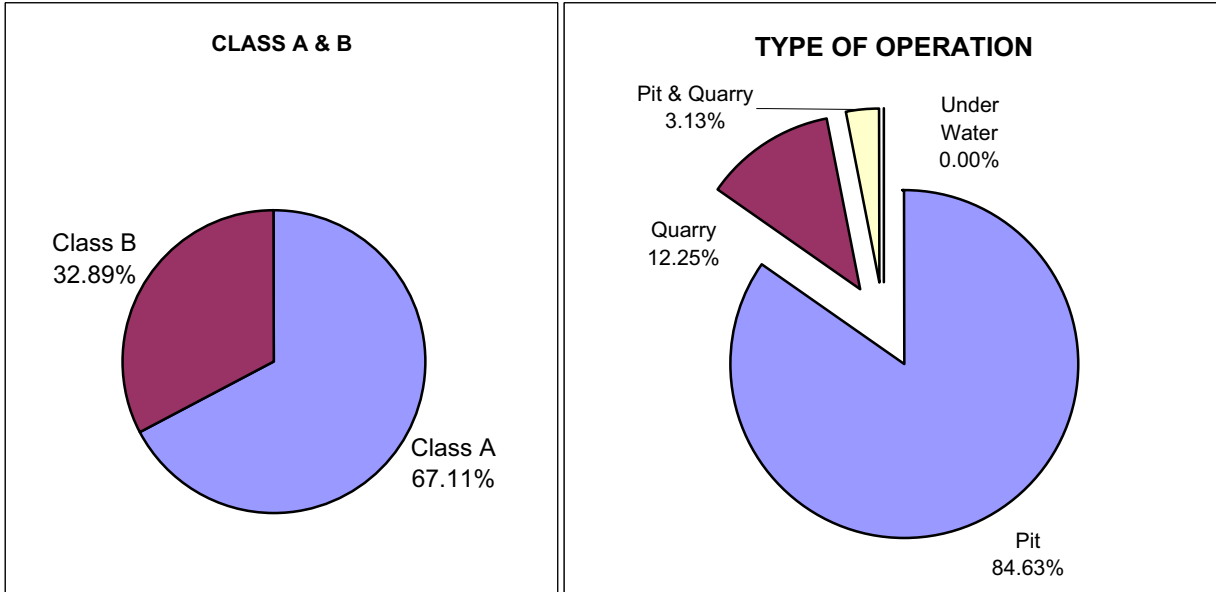


Table 6

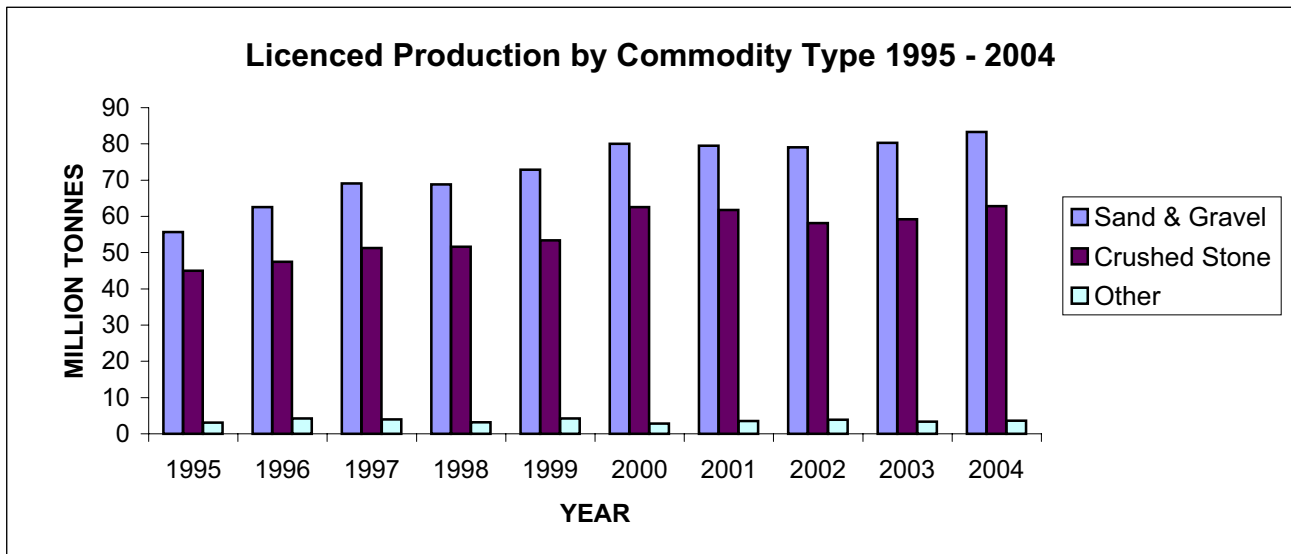
**2004 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	31,181,650.68	16,246,212.81	13,051,818.74	1,403,565.12	480,054.01
Aylmer	14,870,785.62	10,872,588.61	3,991,696.35	6,255.33	245.33
Bancroft	2,725,360.90	103,059.82	2,575,038.00	819.20	46,443.88
Guelph (Cambridge)	37,779,486.39	24,705,385.80	12,882,122.86	170,844.82	21,132.91
Kemptville	19,152,884.04	5,682,542.72	12,338,306.55	105,519.00	1,026,515.77
Midhurst	20,249,589.89	13,026,632.00	6,935,728.08	53,888.24	233,341.57
Pembroke	1,870,708.49	1,213,689.70	655,055.79	0.00	1,963.00
Peterborough	18,345,379.61	8,238,169.35	10,019,567.36	56,211.53	31,431.37
Sault Ste. Marie	808,629.18	787,885.90	17,367.72	0.00	3,375.56
Sudbury	2,776,280.51	2,401,867.17	359,800.08	14,141.76	471.50
TOTAL	149,760,755.31	83,278,033.88	62,826,501.53	1,811,245.00	1,844,974.90

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1995	103.80	55.70	45.01	3.09
1996	114.27	62.52	47.48	4.27
1997	124.29	69.05	51.23	4.01
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.75	83.28	62.83	3.65

Table 7

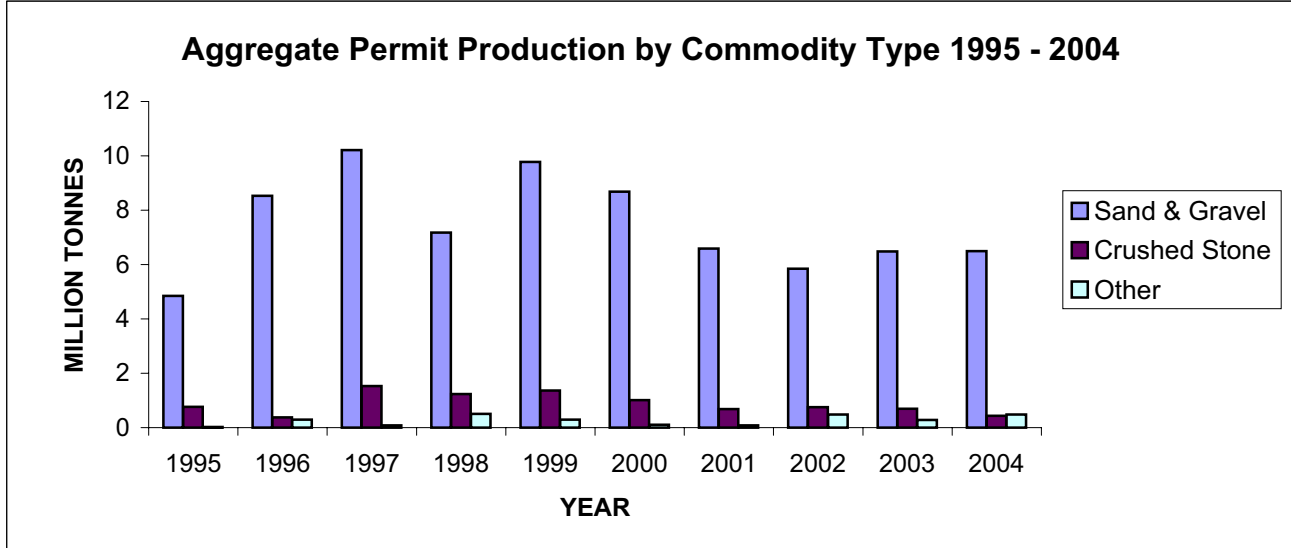
**2004 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	542,193.79	542,193.79	-	-	-
Cochrane	307,836.09	273,453.53	34,252.00	130.56	-
Hearst	260,545.70	167,472.70	92,828.00	245.00	-
Kirkland Lake	186,735.64	186,735.64	-	-	-
North Bay	389,469.21	368,501.00	20,217.14	-	751.07
Sault Ste. Marie	258,999.69	258,989.69	-	-	10.00
Sudbury	529,006.79	510,909.17	15,577.22	20.40	2,500.00
Timmins	863,284.34	783,924.71	-	-	79,359.63
Wawa	872,625.41	617,913.96	146,922.45	107,754.00	35.00
Sub-Total	4,210,696.66	3,710,094.19	309,796.81	108,149.96	82,655.70
NORTHWEST					
Dryden	884,870.52	664,279.52	-	-	220,591.00
Fort Frances	337,459.12	334,566.12	1,656.00	-	1,237.00
Kenora	154,179.39	137,535.19	-	-	16,644.20
Nipigon	728,495.77	663,222.43	62,167.00	550.00	2,556.34
Red Lake	257,060.60	256,663.00	-	-	397.60
Sioux Lookout	253,701.42	237,807.80	14,404.00	-	1,489.62
Thunder Bay	288,564.82	288,551.32	-	-	13.50
Sub-Total	2,904,331.64	2,582,625.38	78,227.00	550.00	242,929.26
SOUTHCENTRAL					
Algonquin Park	61,612.80	61,612.80	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	898.12	898.12	-	-	-
Bancroft	94,111.29	44,954.00	8,330.33	-	40,826.96
Guelph (Cambridge)	-	-	-	-	-
Kemptville	342.72	342.72	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	84,201.54	51,411.04	32,701.00	-	89.50
Pembroke	38,501.76	38,501.76	-	-	-
Peterborough (Tweed)	2,245.00	-	2,245.00	-	-
Sub-Total	281,913.23	197,720.44	43,276.33	0.00	40,916.46
TOTAL	7,396,941.53	6,490,440.01	431,300.14	108,699.96	366,501.42

Note: Amounts shown are in metric tonnes

Table 8

**2004 LICENCED AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1995	5.63	4.85	0.76	0.02
1996	9.21	8.53	0.38	0.30
1997	11.82	10.21	1.53	0.08
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48

Table 9

**2004 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	898	898	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	113,705	62,213	10,575	0	40,916
East (6)	39,684	39,684	0	0	0
Northeast (7)	3,211,161	2,932,579	195,575	396	82,611
Northwest (8)	4,031,493	3,455,065	225,149	108,304	242,974
TOTAL	7,396,942	6,490,440	431,300	108,700	366,501

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

**2004 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,865,313	14,031,101	4,788,955	41,939	3,317
Peninsula (2)	15,098,704	2,979,763	12,084,864	34,077	0
West Central (3)	38,935,845	31,593,742	6,935,728	154,972	251,403
GTA (4)	31,181,651	16,246,213	13,051,819	1,403,565	480,054
East Central (5)	17,049,359	7,865,008	9,110,266	24,794	49,291
East (6)	25,044,974	7,372,454	16,477,702	137,756	1,057,063
Northeast (7)	2,776,281	2,401,867	359,800	14,142	472
Northwest (8)	808,629	787,886	17,368	0	3,376
TOTAL	149,760,755	83,278,034	62,826,502	1,811,245	1,844,975

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2004
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	170	9,245.19	3,707.87	91.25	182.11	3,617.01
Aylmer	310	8,408.01	3,018.63	99.63	166.82	2,951.45
Bancroft	42	2,019.40	308.52	16.82	0.89	324.45
Guelph (Cambridge)	455	16,272.68	4,494.54	268.56	151.70	4,611.40
Kemptville	502	14,194.92	3,936.72	120.83	82.28	3,975.27
Midhurst	465	13,881.64	3,420.82	134.47	139.34	3,415.96
Pembroke	112	3,428.27	484.65	39.63	13.48	510.80
Peterborough (Tweed)	492	13,271.18	3,387.48	79.43	29.70	3,437.21
Sault Ste. Marie	65	2,708.21	331.08	18.46	3.57	345.98
Sudbury	139	10,085.29	816.90	17.25	15.20	818.95
TOTAL	2,752	93,514.79	23,907.22	886.33	785.08	24,008.48

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

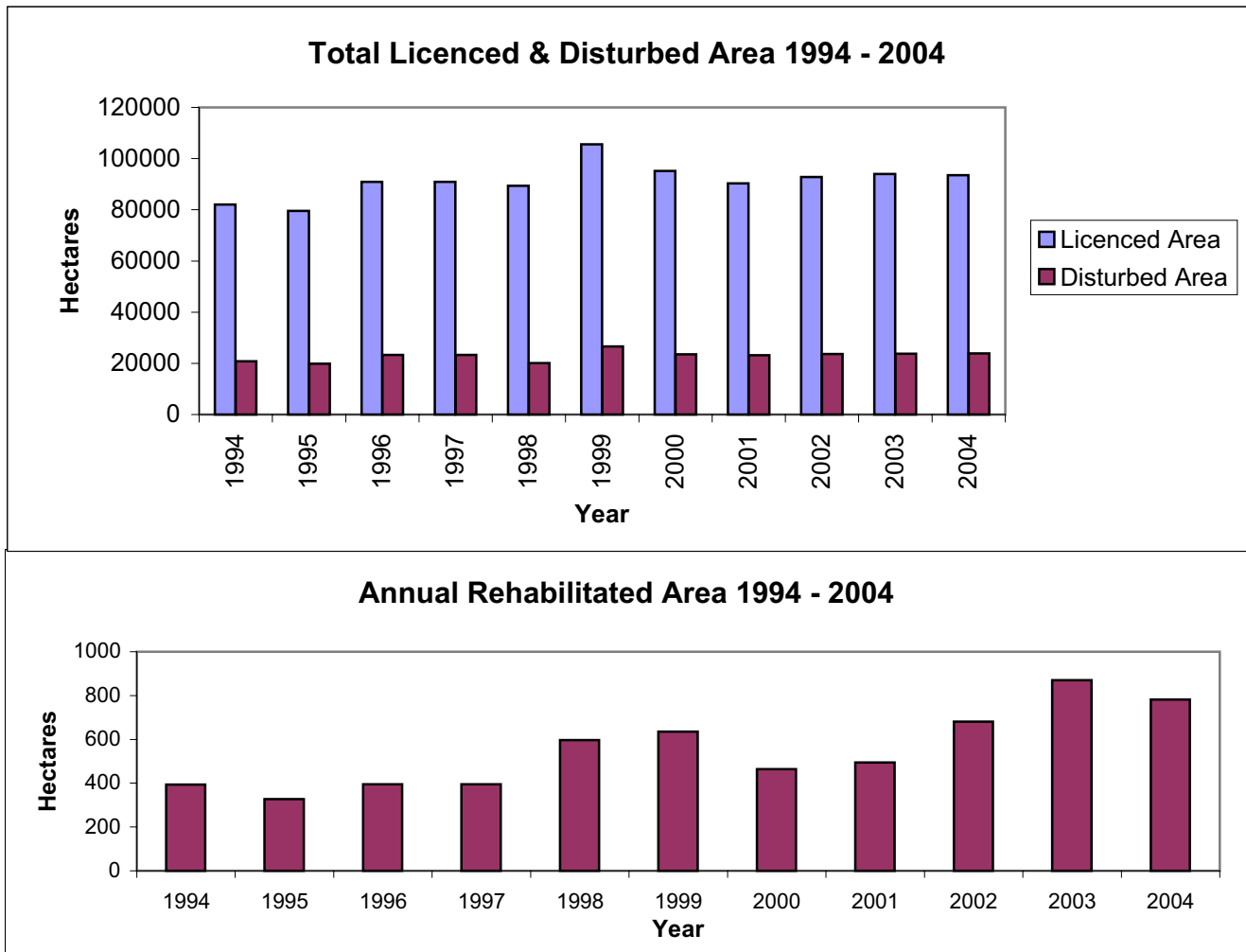


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,083.07	193	191	2	0	0
Cochrane	2,665.12	122	110	7	5	0
Hearst	3,444.34	168	145	19	4	0
Kirkland Lake	1,846.39	163	155	6	2	0
North Bay	2,351.79	200	177	18	5	0
Sault Ste. Marie	886.10	110	106	2	2	0
Sudbury	4,144.52	181	153	18	10	0
Timmins	1,961.85	165	155	7	3	0
Wawa	2,501.07	269	257	4	8	0
Sub-Total	20,884.25	1,571	1,449	83	39	0
NORTHWEST						
Dryden	2,159.04	244	231	7	6	0
Fort Frances	2,524.35	297	283	6	8	0
Kenora	2,844.62	208	173	24	11	0
Nipigon	3,478.54	323	305	15	3	0
Red Lake	1,246.46	120	119	1	0	0
Sioux Lookout	1,295.43	87	85	2	0	0
Thunder Bay	2,659.65	201	187	10	4	0
Sub-Total	16,208.09	1,480	1,383	65	32	0
SOUTHCENTRAL						
Algonquin Park	25.06	32	32	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	882.41	78	67	11		0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	7.00	2	1	0		1
Midhurst	1.00	1	0	0	0	1
Parry Sound	796.81	102	75	13	4	10
Pembroke	119.17	43	43	0	0	0
Peterborough (Tweed)	31.40	2		1	1	0
Sub-Total	2,483.45	263	218	25	5	15
TOTAL	39,575.79	3,314	3,050	173	76	15

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

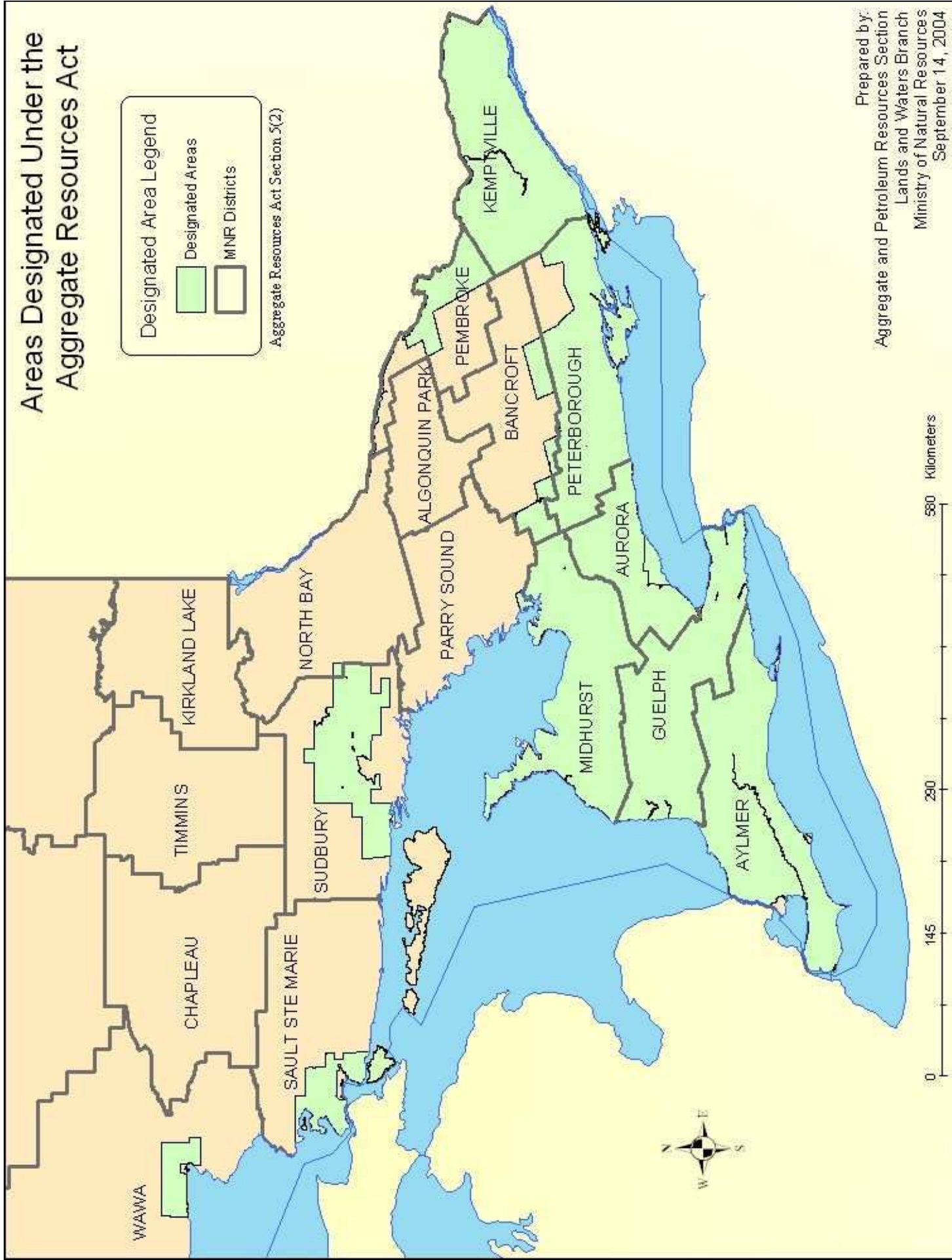
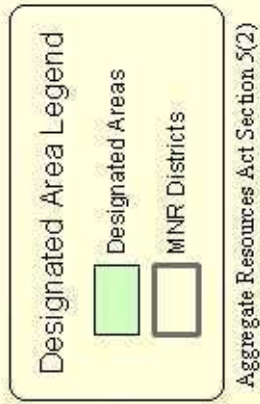
Please refer to the Revised Regulations of Ontario for accuracy.

CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



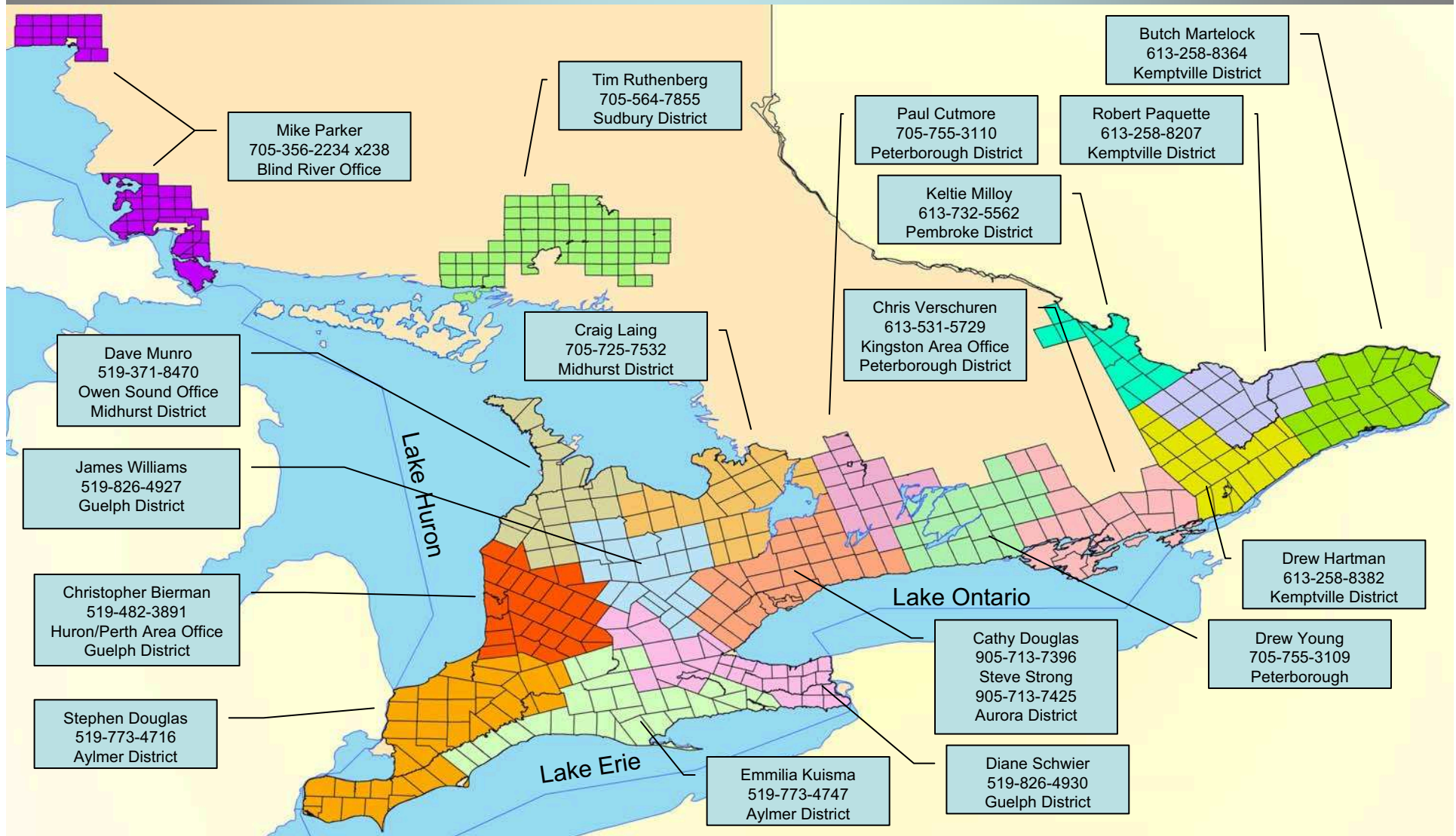
Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	TIMISKAMING	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Areas Designated Under the Aggregate Resources Act



Prepared by:
Aggregate and Petroleum Resources Section
Lands and Waters Branch
Ministry of Natural Resources
September 14, 2004

Aggregate Officers of Ontario





- MINERAL
- AGGREGATES
- IN ONTARIO

Statistical Update

2 0 0 5

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2005

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern ‘built environment’. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2005, this basic non-renewable resource was supplied from 2,741 licensed aggregate sites on private land in designated parts of the Province and 3,390 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario’s Mineral Aggregate Resources

At the Provincial level, the management of Ontario’s aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the “Act”), gave the Minister the power to create the Aggregate Resources Trust (the “Trust”) and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2005 totaled approximately 174 million tonnes, a small increase from the previous year. Production from licensed operations was down 1.2 million tonnes compared to 2004, a decrease of 0.8%. Wayside permit production increased substantially from 2004 (1.1 million in 2005 from 0.1 million in 2004). Production from aggregate permits on Crown Land increased 6.8% from 2004 (7.9 million in 2005 from 7.4 million tonnes in 2004).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1993 - 2005
(rounded to nearest million tonnes)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Licences	105	113	109	114	124	124	131	145	145	141	143	150	149
Wayside Permits*	2	2	2	2	1	2	1	1	0	0	0	0	1
Aggregate Permits	12	10	9	9	8	9	11	10	7	7	7	7	8
Category 14 (Forest Industry)	-	-	-	-	-	-	2	3	3	4	3	4	4
Private Land Non-Designated (estimated)	12	11	10	11	11	11	12	12	12	12	12	12	12
ONTARIO TOTAL	131	136	130	136	144	146	157	171	167	164	165	173	174

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002 and .3 million tonnes for 2003, .1 million tonnes for 2004

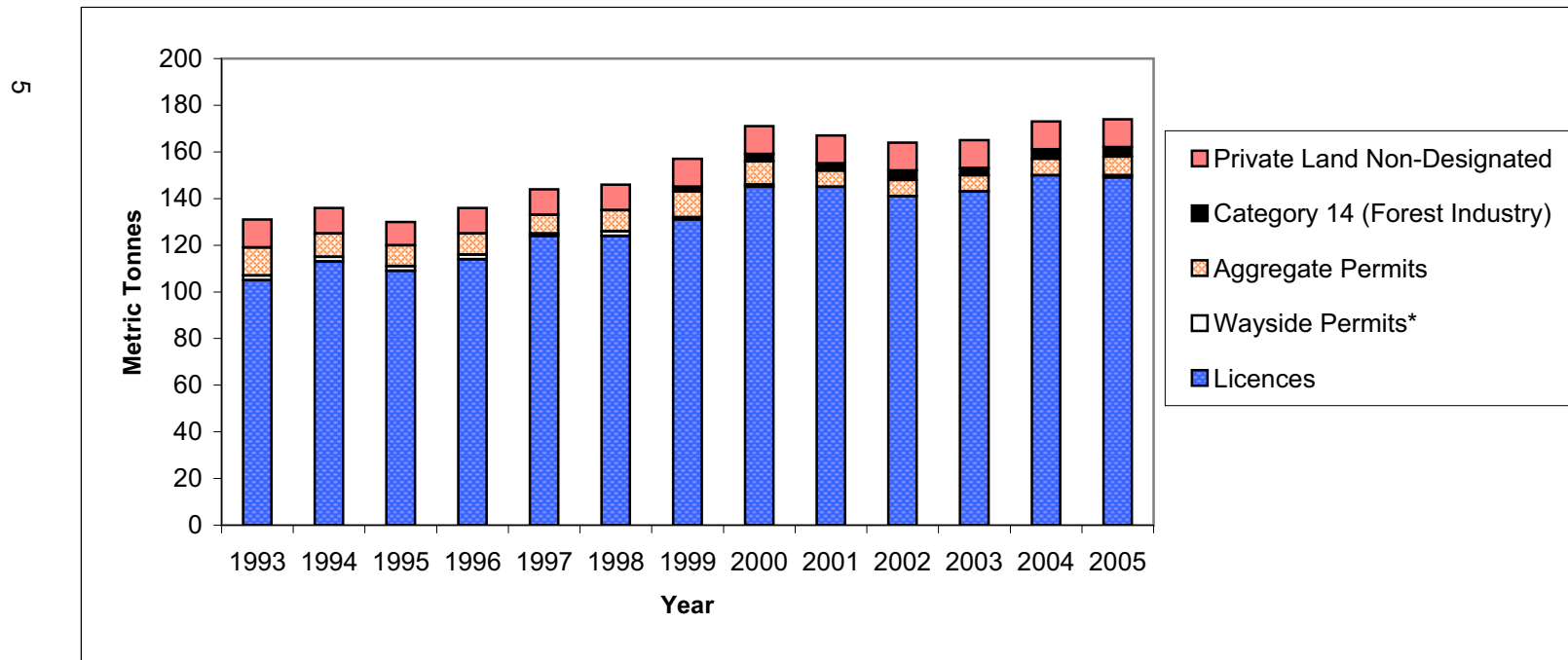


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Algoma District			
Algoma District, Unorganized	49,356.80		49,356.80
Hilton Tp	34,366.94		34,366.94
Jocelyn Tp	14,062.42		14,062.42
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	75,985.60		75,985.60
Laird Tp/St. Joseph Tp	19,007.90		19,007.90
Macdonald, Meredith & Aberdeen Add'l Tp	291,436.30	720,000.00	1,011,436.30
Sault Ste. Marie, City of/Prince Tp	729,097.90		729,097.90
Sub-Total	1,213,313.86	720,000.00	1,933,313.86
Brant			
Brant, County of/Brantford, City of	1,775,976.69		1,775,976.69
Sub-Total	1,775,976.69	0.00	1,775,976.69
Bruce			
Arran-Elderslie, Municipality of	221,372.87		221,372.87
Brockton, Municipality of	59,636.24		59,636.24
Huron-Kinloss Tp	282,633.43		282,633.43
Kincardine, Municipality of	54,296.30		54,296.30
Northern Bruce Peninsula, Municipality of	249,398.54		249,398.54
Saugeen Shores, Town of	254,426.42		254,426.42
South Bruce, Municipality of	380,039.11		380,039.11
South Bruce Peninsula, Town of	282,306.27		282,306.27
Sub-Total	1,784,109.18	0.00	1,784,109.18
Chatham-Kent			
Chatham-Kent, Municipality of	389,202.80		389,202.80
Sub-Total	389,202.80	0.00	389,202.80
Dufferin			
Amaranth Tp/East Luther Grand Valley Tp	118,937.04		118,937.04
East Garafraxa Tp	1,347,388.22		1,347,388.22
Melancthon Tp	730,779.94		730,779.94
Mono Tp	459,172.11		459,172.11
Mulmur Tp	274,535.06		274,535.06
Sub-Total	2,930,812.37	0.00	2,930,812.37
Durham			
Brock Tp	1,786,715.97		1,786,715.97
Clarington, Municipality of	5,756,421.60		5,756,421.60
Oshawa, City of/Scugog Tp/Whitby, Town of	296,371.14		296,371.14
Uxbridge Tp	5,326,624.57		5,326,624.57
Sub-Total	13,166,133.28	0.00	13,166,133.28
Elgin			
Bayham/West Elgin, Municipality of	234,040.87	28,760.00	262,800.87
Central Elgin, Municipality of	565,886.60		565,886.60
Sub-Total	799,927.47	28,760.00	828,687.47

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,206,668.35		1,206,668.35
Kingsville, Town of	465,564.23		465,564.23
Sub-Total	1,672,232.58	0.00	1,672,232.58
Frontenac			
Frontenac Islands Tp	45,059.76		45,059.76
Kingston, City of	1,919,371.43		1,919,371.43
South Frontenac Tp	418,132.46		418,132.46
Sub-Total	2,382,563.65	0.00	2,382,563.65
Greater Sudbury			
Greater Sudbury, City of	2,767,392.93		2,767,392.93
Sub-Total	2,767,392.93	0.00	2,767,392.93
Grey			
Chatsworth Tp	495,524.63		495,524.63
Georgian Bluffs, Tp	635,005.33		635,005.33
Grey Highlands, Municipality of	477,919.02		477,919.02
Meaford, Municipality of	814,219.23		814,219.23
Southgate Tp	248,761.31		248,761.31
The Blue Mountains, Town of	480,651.07		480,651.07
West Grey, Municipality of	360,593.77	140,000.00	500,593.77
Sub-Total	3,512,674.36	140,000.00	3,652,674.36
Haldimand			
Haldimand, County of	1,972,490.99		1,972,490.99
Sub-Total	1,972,490.99	0.00	1,972,490.99
Halton			
Burlington, City of/Halton Hills, Town of	5,872,702.83		5,872,702.83
Milton, Town of	4,996,602.18		4,996,602.18
Sub-Total	10,869,305.01	0.00	10,869,305.01
Hamilton			
Hamilton, City of	5,592,564.41		5,592,564.41
Sub-Total	5,592,564.41	0.00	5,592,564.41
Hastings			
Belleville, City of	504,311.65		504,311.65
Centre Hastings, Municipality of	136,700.65		136,700.65
Madoc Tp	531,848.08		531,848.08
Marmora & Lake, Municipality of	15,573.00		15,573.00
Quinte West, City of	609,235.33		609,235.33
Stirling-Rawdon, Tp	20,895.48		20,895.48
Tyendinaga Tp	204,713.92		204,713.92
Tweed, Municipality of	84,562.20		84,562.20
Sub-Total	2,107,840.31	0.00	2,107,840.31

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	781,851.34		781,851.34
Bluewater, Municipality of	14,246.00		14,246.00
Central Huron, Municipality of	576,382.71		576,382.71
Howick Tp	227,410.57		227,410.57
Huron East, Municipality of	799,106.43		799,106.43
Morris-Turnberry, Municipality of	180,218.58		180,218.58
North Huron Tp	20,327.66		20,327.66
South Huron, Municipality of	31,234.00		31,234.00
Sub-Total	2,630,777.29	0.00	2,630,777.29
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,779,771.82		6,779,771.82
Sub-Total	6,779,771.82	0.00	6,779,771.82
<i>Lambton</i>			
Enniskillen/Warwick Tp	321,191.76		321,191.76
Lambton Shores, Municipality of	266,733.93		266,733.93
Plympton-Wyoming, Town of	121,766.66		121,766.66
Sub-Total	709,692.35	0.00	709,692.35
<i>Lanark</i>			
Beckwith Tp	72,374.78		72,374.78
Drummond-North Elmsley Tp	179,337.47		179,337.47
Lanark Highlands Tp	1,631,553.36		1,631,553.36
Mississippi Mills, Town of	183,672.81		183,672.81
Montague Tp	209,770.89		209,770.89
Tay Valley Tp	17,441.68		17,441.68
Sub-Total	2,294,150.99	0.00	2,294,150.99
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	150,472.32		150,472.32
Augusta Tp	145,908.50		145,908.50
Edwardsburgh-Cardinal Tp	87,189.42		87,189.42
Elizabethtown-Kitley Tp	566,933.72		566,933.72
Leeds and the Thousand Islands Tp	614,219.66	231,884.00	846,103.66
Merrickville-Wolford, Village of	36,885.58		36,885.58
North Grenville Tp	400,332.11		400,332.11
Rideau Lakes Tp	83,366.91		83,366.91
Sub-Total	2,085,308.22	231,884.00	2,317,192.22
<i>Lennox & Addington</i>			
Greater Napanee, Town of	265,239.56		265,239.56
Loyalist Tp	1,553,378.75		1,553,378.75
Stone Mills Tp	68,019.04		68,019.04
Sub-Total	1,886,637.35	0.00	1,886,637.35

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Middlesex			
Adelaide Metcalfe Tp	19,878.00		19,878.00
London, City of	1,967,731.76		1,967,731.76
Lucan Biddulph Tp	33,230.35		33,230.35
Middlesex Centre Tp	888,993.50		888,993.50
North Middlesex, Municipality of	72,080.76		72,080.76
Strathroy-Caradoc Tp	29,434.00		29,434.00
Thames Centre, Municipality of	3,200,456.79		3,200,456.79
Sub-Total	6,211,805.16	0.00	6,211,805.16
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,840,148.36		1,840,148.36
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,273,192.00		1,273,192.00
Niagara Falls, City of	1,356,595.50		1,356,595.50
Sub-Total	4,469,935.86	0.00	4,469,935.86
Norfolk			
Norfolk, County of	433,465.85		433,465.85
Sub-Total	433,465.85	0.00	433,465.85
Northumberland			
Alnwick-Haldimand Tp	246,643.75		246,643.75
Brighton, Municipality of	413,579.92		413,579.92
Cramahe Tp	2,155,676.04		2,155,676.04
Hamilton Tp	364,040.16		364,040.16
Port Hope, Municipality of	48,143.24		48,143.24
Trent Hills, Municipality of	256,218.98		256,218.98
Sub-Total	3,484,302.09	0.00	3,484,302.09
Ottawa			
Ottawa, City of	10,646,466.80		10,646,466.80
Sub-Total	10,646,466.80	0.00	10,646,466.80
Oxford			
Blandford-Blenheim Tp	241,779.82		241,779.82
East Zorra-Tavistock Tp/Woodstock, City of	35,143.18		35,143.18
Norwich Tp	26,580.53		26,580.53
South-West Oxford Tp	723,670.44		723,670.44
Zorra Tp	3,896,375.44		3,896,375.44
Sub-Total	4,923,549.41	0.00	4,923,549.41
Peel			
Caledon, Town of	5,079,022.92		5,079,022.92
Sub-Total	5,079,022.92	0.00	5,079,022.92
Perth			
North Perth, Town of/St. Marys, Separated Town of	123,319.92		123,319.92
Perth East Tp	328,574.98		328,574.98
Perth South Tp	1,396,388.75		1,396,388.75
West Perth Tp	147,351.42		147,351.42
Sub-Total	1,995,635.07	0.00	1,995,635.07

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp	317,426.00		317,426.00
Cavan-Millbrook-North Monaghan Tp	238,797.87		238,797.87
Douro-Dummer Tp	792,083.39		792,083.39
Galway-Cavendish-Harvey Tp	420,416.99		420,416.99
Havelock-Belmont-Methuen Tp	9,468.00		9,468.00
Otonabee-South Monaghan Tp	177,010.52		177,010.52
Smith-Ennismore-Lakefield Tp	761,413.43		761,413.43
Sub-Total	2,716,616.20	0.00	2,716,616.20
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	256,322.33		256,322.33
Champlain Tp	582,745.60		582,745.60
Clarence-Rockland, City of	244,945.96		244,945.96
East Hawkesbury Tp	45,038.20		45,038.20
Russell Tp	161,086.02		161,086.02
The Nation, Municipality of	395,786.21		395,786.21
Sub-Total	1,685,924.32	0.00	1,685,924.32
<i>Prince Edward Co</i>			
Prince Edward, County of	2,371,860.25		2,371,860.25
Sub-Total	2,371,860.25	0.00	2,371,860.25
<i>Renfrew</i>			
Admaston-Bromley Tp/Greater Madawaska Tp/ Renfrew, Town of	138,929.62		138,929.62
Horton Tp	356,727.37		356,727.37
Laurentian Valley Tp	276,424.01		276,424.01
McNab-Braeside Tp	195,344.88		195,344.88
Petawawa, Town of	150,413.13		150,413.13
Whitewater Region Tp	154,334.94		154,334.94
Sub-Total	1,272,173.95	0.00	1,272,173.95
<i>Simcoe</i>			
Adjala-Tosorontio Tp	396,615.44		396,615.44
Barrie, City of/Bradford West Gwillimbury, Town of/ Collingwood, Town of/Orillia, City of	14,821.00		14,821.00
Clearview Tp	1,968,644.60		1,968,644.60
Essa Tp	63,825.36		63,825.36
Innisfil, Town of	225,727.03		225,727.03
Midland, Town of/Penetanguishine, Town of	286,970.44		286,970.44
New Tecumseth, Town of	18,442.30		18,442.30
Oro-Medonte Tp	2,835,247.25		2,835,247.25
Ramara Tp	3,009,487.93		3,009,487.93
Severn Tp	2,102,167.90		2,102,167.90
Springwater Tp	1,285,383.07		1,285,383.07
Tay Tp	127,013.61		127,013.61
Tiny Tp	256,412.74		256,412.74
Sub-Total	12,590,758.67	0.00	12,590,758.67

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	735,931.40		735,931.40
North Glengarry Tp	166,749.62		166,749.62
North Stormont Tp	889,435.99		889,435.99
South Dundas Tp	211,644.52		211,644.52
South Glengarry Tp	284,530.47		284,530.47
South Stormont Tp	729,295.21		729,295.21
Sub-Total	3,017,587.21	0.00	3,017,587.21
<i>Sudbury District</i>			
Baldwin Tp	57,930.00		57,930.00
French River, Municipality of/Nairn & Hyman Tp	9,481.39		9,481.39
Markstay-Warren, Municipality of	72,218.84		72,218.84
Sables Spanish Rivers Tp/Espanola, Town of	136,311.47		136,311.47
Sudbury District, Unorganized	513,552.78		513,552.78
Sub-Total	789,494.48	0.00	789,494.48
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	889,143.29		889,143.29
North Dumfries Tp	4,130,209.97		4,130,209.97
Wellesley Tp	1,566,521.40		1,566,521.40
Wilmot Tp	958,672.29		958,672.29
Woolwich Tp	661,556.23		661,556.23
Sub-Total	8,206,103.18	0.00	8,206,103.18
<i>Wellington</i>			
Centre Wellington Tp	923,500.64		923,500.64
Erin, Town of	1,761,441.81		1,761,441.81
Guelph-Eramosa Tp	266,990.74		266,990.74
Mapleton Tp	71,518.40		71,518.40
Minto, Town of	291,634.94		291,634.94
Puslinch Tp	4,852,952.18		4,852,952.18
Wellington North Tp	174,237.73		174,237.73
Sub-Total	8,342,276.44	0.00	8,342,276.44
<i>York</i>			
East Gwillimbury, Town of	173,067.12		173,067.12
Georgina, Town of	43,656.90		43,656.90
King Tp/Vaughan, City of/Whitchurch-Stouffville, Town of	815,791.99		815,791.99
Sub-Total	1,032,516.01	0.00	1,032,516.01
GRAND TOTAL	148,592,371.78	1,120,644.00	149,713,015.78

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Algoma, District of	0.6	0.6	0.6	0.8	0.8	0.6	0.8	0.6	0.8	1.9
Brant Co.	1.7	2.1	1.5	1.5	2.1	2.0	1.8	2.1	2.0	1.8
Bruce Co.	1.2	1.3	1.6	1.5	1.7	1.6	1.7	1.7	1.9	1.8
Chatham-Kent, R. M. of	0.4	0.5	0.4	0.5	0.5	0.3	0.5	0.4	0.3	0.4
Dufferin Co.	1.5	1.5	1.8	2.1	2.6	2.4	2.3	3.0	2.7	2.9
Durham, R. M. of	7.6	8.7	7.8	9.2	10.2	11.4	11.0	11.8	12.6	13.2
Elgin Co.	0.5	0.7	0.4	0.6	0.7	0.6	0.5	0.6	0.7	0.8
Essex Co.	2.2	2.7	2.0	1.9	2.0	2.2	1.9	1.9	1.9	1.7
Frontenac Co.	1.6	1.5	1.2	1.3	1.4	1.3	1.6	2.0	2.2	2.4
Greater Sudbury, City of	2.7	2.5	2.3	2.9	2.3	1.8	2.3	1.7	2.2	2.8
Grey Co.	2.0	2.1	2.1	2.8	2.5	2.6	2.6	3.1	3.2	3.7
Haldimand Co.	----	----	----	----	----	1.5	1.9	1.8	1.6	2.0
Haldimand-Norfolk, R. M. of	1.7	2.1	1.8	2.0	2.0	----	----	----	----	----
Halton, R. M. of	12.3	14.4	13.4	13.8	15.5	15.8	12.1	10.7	11.4	10.9
Hamilton, City of	4.0	5.2	4.7	4.6	6.3	6.0	5.5	6.0	6.3	5.6
Hastings Co.	1.6	2.0	1.9	2.2	2.0	2.0	2.1	2.4	2.3	2.1
Huron Co.	2.8	2.4	2.6	2.8	2.7	3.0	2.7	2.8	2.5	2.6
Kawartha Lakes, City of	----	----	----	----	----	6.4	6.4	6.7	6.8	6.8
Lambton Co.	0.4	0.5	0.6	0.6	0.5	0.5	0.7	0.4	0.5	0.7
Lanark Co.	1.2	1.2	1.3	1.5	1.6	1.7	2.0	2.4	2.3	2.3
Leeds & Grenville Co.'s	2.0	2.1	4.2	2.2	3.0	2.3	2.0	1.9	2.2	2.3
Lennox & Addington Co.	1.8	1.7	1.9	1.7	1.8	1.8	1.7	1.9	1.8	1.9
Middlesex Co.	4.5	5.3	6.1	5.6	6.4	6.0	5.4	5.6	6.2	6.2
Niagara, R. M. of	4.7	4.9	4.6	4.3	4.6	4.6	4.9	4.6	4.7	4.5
Norfolk Co.	----	----	----	----	----	0.4	0.4	0.4	0.5	0.4
Northumberland Co.	3.0	3.2	3.2	3.6	3.2	3.1	3.0	3.4	3.3	3.5
Ottawa, City of	6.1	6.7	7.1	8.1	10.7	10.1	10.7	10.0	9.9	10.6
Oxford Co.	4.6	5.3	4.9	5.1	5.4	4.9	4.8	4.9	4.8	5.0
Peel, R. M. of	3.8	4.3	4.2	4.5	5.2	5.2	4.3	4.5	5.3	5.1
Perth Co.	1.9	1.7	1.7	1.6	2.1	2.0	2.1	2.0	2.0	2.0
Peterborough Co.	1.8	1.8	1.8	1.8	2.2	2.4	3.2	2.5	2.5	2.7
Prescott & Russell Co.'s	1.2	1.4	1.1	1.2	1.4	1.4	1.3	1.4	1.4	1.7
Prince Edward Co.	1.8	2.1	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.4
Renfrew Co.	1.5	1.2	1.3	1.5	1.5	1.2	1.8	1.6	1.7	1.3
Simcoe Co.	7.4	7.6	9.0	9.0	9.3	10.6	11.4	11.8	12.7	12.6
Stormont, Dundas & Glengarry Co.'s	2.1	2.4	2.4	2.8	3.0	2.7	2.6	2.7	3.5	3.0
Sudbury, District of	0.3	0.2	0.2	0.4	0.5	1.0	0.6	0.6	0.6	0.8
Victoria Co.	6.0	6.5	6.6	6.0	7.1	----	----	----	----	----
Waterloo, R. M. of	5.8	5.6	5.8	7.3	7.7	8.2	7.8	8.0	9.5	8.2
Wellington Co.	6.0	6.4	6.9	7.5	8.4	8.9	8.9	9.1	9.1	8.3
York, R. M. of	2.0	2.6	2.2	2.7	3.0	2.4	2.4	2.0	1.9	1.0
TOTAL	114.3	125.0	125.2	131.5	146.0	144.9	141.8	143.2	149.8	149.7

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.
As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.
Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2005
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2005 Production	Production				
				2004	2003	2002	2001	2000
1	City of Ottawa ⁽¹⁾	City of Ottawa	10.6	9.9	10.0	10.7	10.1	10.6
2	City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.8	6.8	6.7	6.4	6.4	7.1
3	Municipality of Clarington	Durham	5.8	5.3	5.6	4.7	4.7	4.3
4	City of Hamilton ⁽³⁾	City of Hamilton	5.6	6.3	5.9	5.4	6.0	6.3
5	Township of Uxbridge	Durham	5.3	5.5	4.9	4.7	5.0	4.1
6	Town of Caledon	Peel	5.1	5.3	4.5	4.3	4.9	4.9
7	Town of Milton	Halton	5.0	5.6	5.2	5.9	8.8	9.0
8	Puslinch Township	Wellington County	5.0	5.2	5.1	5.3	5.5	4.1
9	Township of North Dumfries	Waterloo	4.1	4.4	3.9	3.3	3.7	3.5
10	Township of Zorra	Oxford	3.9	3.6	3.5	3.4	3.5	3.8
Total			57.2	57.9	55.3	54.1	58.6	57.7

Note: Municipalities are ranked in order of their licenced production for 2005

Production statistics for 2000 - 2001 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	166	142	24	150	16	0	0
Aylmer	311	238	73	294	11	6	0
Bancroft	42	18	24	23	14	5	0
Guelph (Cambridge)	451	373	78	414	34	3	0
Kemptville	496	272	224	354	119	23	0
Midhurst	463	347	116	415	44	4	0
Pembroke	112	56	56	97	9	6	0
Peterborough (Tweed)	496	273	223	396	85	15	0
Sault Ste. Marie	65	32	33	58	1	6	0
Sudbury	139	99	40	112	6	21	0
TOTAL	2,741	1,850	891	2,313	339	89	0

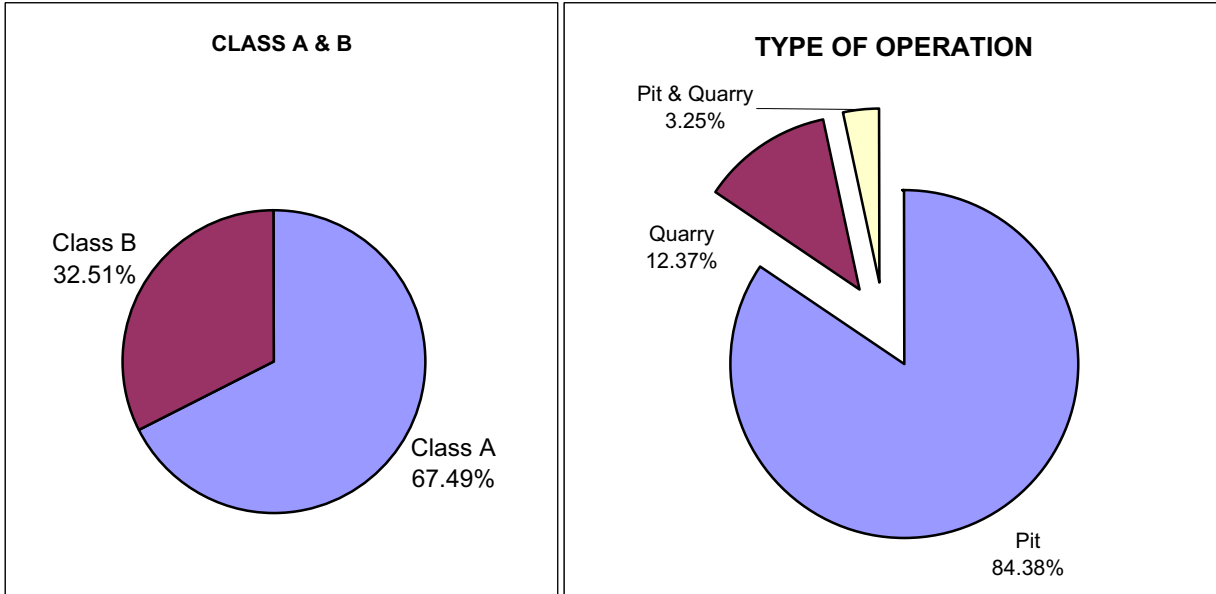


Table 6

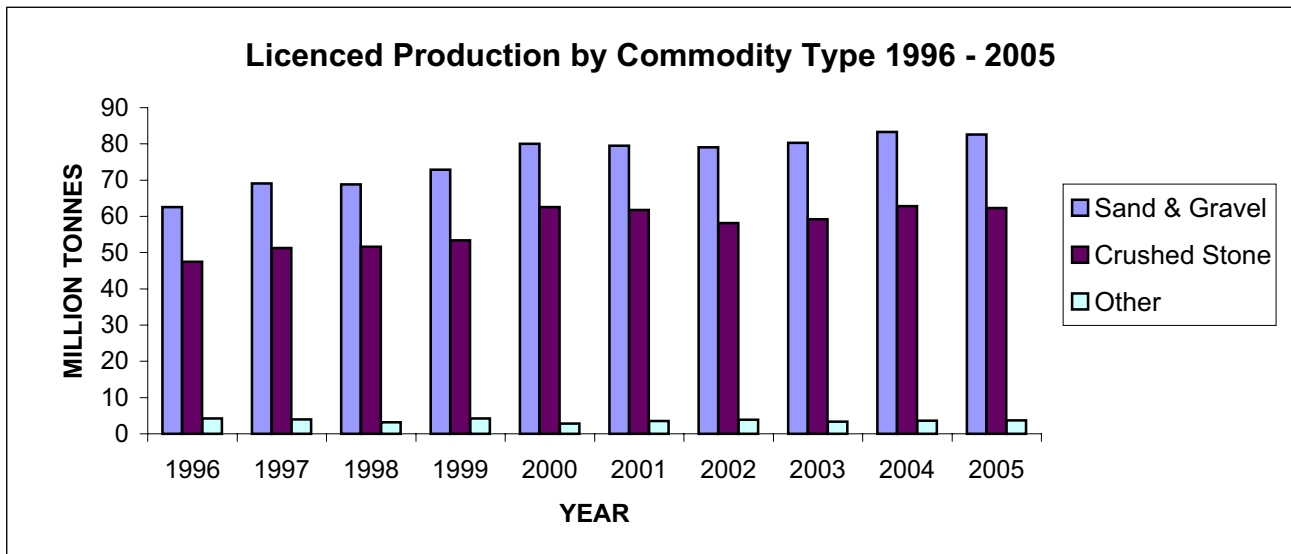
**2005 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	30,146,977.22	15,477,748.65	12,911,778.00	906,966.98	850,483.59
Aylmer	15,139,875.62	11,298,915.23	3,831,441.77	9,490.86	27.76
Bancroft	2,852,943.64	122,000.54	2,676,486.52	165.00	54,291.58
Guelph (Cambridge)	35,041,322.93	22,345,027.66	12,391,613.76	147,977.44	156,704.07
Kemptville	19,516,888.54	5,812,741.13	12,511,321.32	123,851.03	1,068,975.06
Midhurst	20,762,791.58	13,043,904.06	7,395,727.77	97,392.25	225,767.50
Pembroke	1,484,722.95	1,235,341.08	247,173.87	0.00	2,208.00
Peterborough	18,876,648.03	8,968,605.66	9,865,998.55	29,064.04	12,979.78
Sault Ste. Marie	1,213,313.86	1,132,792.85	75,377.03	0.00	5,143.98
Sudbury	3,556,887.41	3,178,877.90	359,534.75	18,235.40	239.36
TOTAL	148,592,371.78	82,615,954.76	62,266,453.34	1,333,143.00	2,376,820.68

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1996	114.27	62.52	47.48	4.27
1997	124.29	69.05	51.23	4.01
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70

Table 7

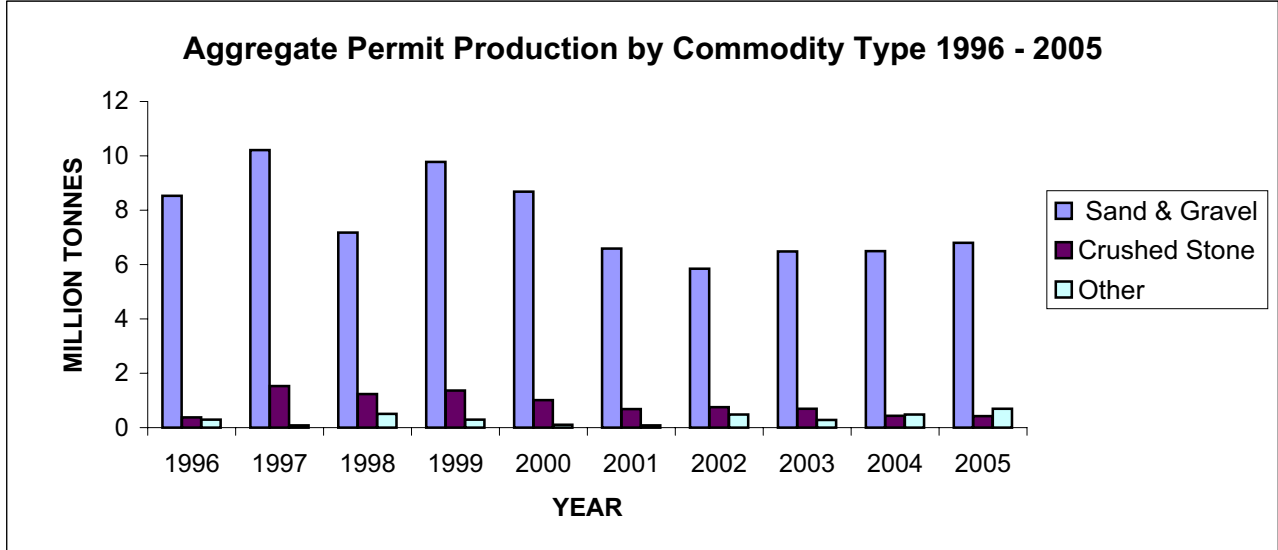
**2005 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	191,942.31	191,942.31	-	-	-
Cochrane	443,815.25	404,494.25	39,321.00	-	-
Hearst	536,100.62	462,540.62	73,195.00	-	365.00
Kirkland Lake	290,766.48	288,074.50	-	2,691.98	-
North Bay	350,657.63	332,709.82	17,333.84	-	613.97
Sault Ste. Marie	189,677.37	189,662.87	-	-	14.50
Sudbury	610,798.08	422,906.25	161,099.82	23,911.00	2,881.01
Timmins	1,130,502.08	1,044,843.58	-	-	85,658.50
Wawa	621,370.50	375,646.50	-	245,724.00	-
Sub-Total	4,365,630.32	3,712,820.70	290,949.66	272,326.98	89,532.98
NORTHWEST					
Dryden	591,885.98	344,375.86	-	-	247,510.12
Fort Frances	293,805.18	293,697.02	-	8.16	100.00
Kenora	169,898.90	153,081.48	-	-	16,817.42
Nipigon	660,365.86	621,213.58	36,340.04	-	2,812.24
Red Lake	572,574.47	571,336.94	419.53	-	818.00
Sioux Lookout	370,475.08	369,327.24	-	-	1,147.84
Thunder Bay	434,622.94	434,505.94	-	-	117.00
Sub-Total	3,093,628.41	2,787,538.06	36,759.57	8.16	269,322.62
SOUTHCENTRAL					
Algonquin Park	80,858.00	80,858.00	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	200.00	200.00	-	-	-
Bancroft	209,931.87	149,594.03	3,050.00	669.12	56,618.72
Guelph (Cambridge)	-	-	-	-	-
Kemptville	420.00	420.00	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	133,168.64	41,303.24	91,628.60	-	236.80
Pembroke	29,296.14	29,296.14	-	-	-
Peterborough (Tweed)	-	-	-	-	-
Sub-Total	453,874.65	301,671.41	94,678.60	669.12	56,855.52
TOTAL	7,913,133.38	6,802,030.17	422,387.83	273,004.26	415,711.12

Note: Amounts shown are in metric tonnes

Table 8

**2005 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1996	9.21	8.53	0.38	0.30
1997	11.82	10.21	1.53	0.08
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69

Table 9

**2005 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	200	200			0
Peninsula (2)	0	0			0
West Central (3)	0	0			0
GTA (4)	0	0	0	0	0
East Central (5)	158,694	62,119	39,050	669	56,856
East (6)	30,474	30,474	0		0
Northeast (7)	3,828,441	3,365,624	346,937	26,603	89,276
Northwest (8)	3,895,324	3,343,612	36,401	245,732	269,579
TOTAL	7,913,133	6,802,030	422,388	273,004	415,711

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

**2005 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	19,332,822	14,569,762	4,626,936	136,097	28
Peninsula (2)	14,244,434	2,633,121	11,596,120	15,193	0
West Central (3)	37,366,734	29,484,964	7,395,728	103,571	382,472
GTA (4)	30,146,977	15,477,749	12,911,778	906,967	850,484
East Central (5)	17,460,391	8,620,036	8,755,311	28,224	56,821
East (6)	25,270,812	7,518,653	16,545,670	124,856	1,081,634
Northeast (7)	3,556,887	3,178,878	359,535	18,235	239
Northwest (8)	1,213,314	1,132,793	75,377	0	5,144
TOTAL	148,592,372	82,615,955	62,266,453	1,333,143	2,376,821

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Amounts shown are in metric tonnes

*CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2005
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	166	9,160.00	3,480.05	76.00	219.74	3,336.31
Aylmer	311	8,384.22	2,933.81	119.29	117.89	2,935.21
Bancroft	42	2,019.40	324.45	10.56	3.65	331.36
Guelph (Cambridge)	451	16,193.25	4,600.53	194.74	135.40	4,659.88
Kemptville	496	14,104.64	4,036.68	164.41	89.24	4,111.86
Midhurst	463	14,021.55	3,365.11	170.56	108.38	3,427.29
Pembroke	112	3,143.93	509.80	22.19	6.23	525.76
Peterborough (Tweed)	496	13,251.57	3,401.99	106.31	90.54	3,417.76
Sault Ste. Marie	65	2,739.82	349.83	13.66	3.30	360.18
Sudbury	139	10,220.20	817.63	25.28	10.05	832.86
TOTAL	2,741	93,238.58	23,819.88	903.00	784.41	23,938.47

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

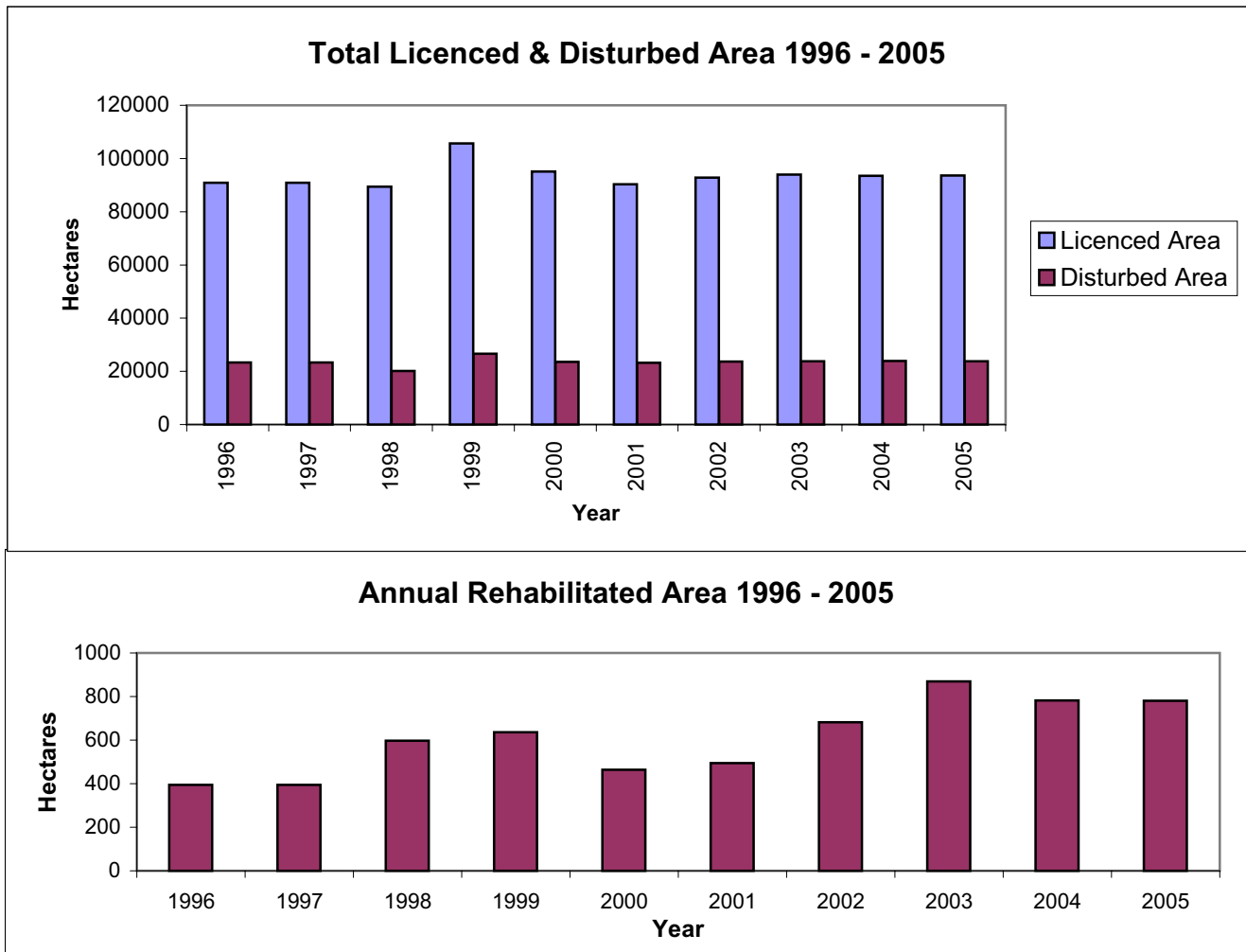


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,165.05	196	196	0	0	0
Cochrane	2,832.96	129	114	9	6	0
Hearst	3,622.60	175	153	18	4	0
Kirkland Lake	1,866.62	163	155	6	2	0
North Bay	2,284.34	193	171	17	5	0
Sault Ste. Marie	921.39	111	106	2	3	0
Sudbury	4,456.02	184	154	19	11	0
Timmins	1,977.62	167	157	7	3	0
Wawa	2,574.65	270	264	4	2	0
Sub-Total	21,701.25	1,588	1,470	82	36	0
NORTHWEST						
Dryden	2,202.21	242	229	7	6	0
Fort Frances	2,494.88	294	281	5	8	0
Kenora	2,874.38	211	175	24	12	0
Nipigon	3,760.64	340	316	16	8	0
Red Lake	1,293.52	126	124	2	0	0
Sioux Lookout	1,327.31	96	94	2	0	0
Thunder Bay	3,068.52	225	209	11	5	0
Sub-Total	17,021.46	1,534	1,428	67	39	0
SOUTHCENTRAL						
Algonquin Park	33.64	41	41	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	927.26	79	67	12	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	2.00	1	1	0	0	0
Midhurst	1.00	1	0	0	0	1
Parry Sound	778.27	98	72	12	4	10
Pembroke	130.38	43	43	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,524.55	268	224	25	5	14
TOTAL	41,247.26	3,390	3,122	174	80	14

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.
9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.
10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.
11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.
12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.
13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

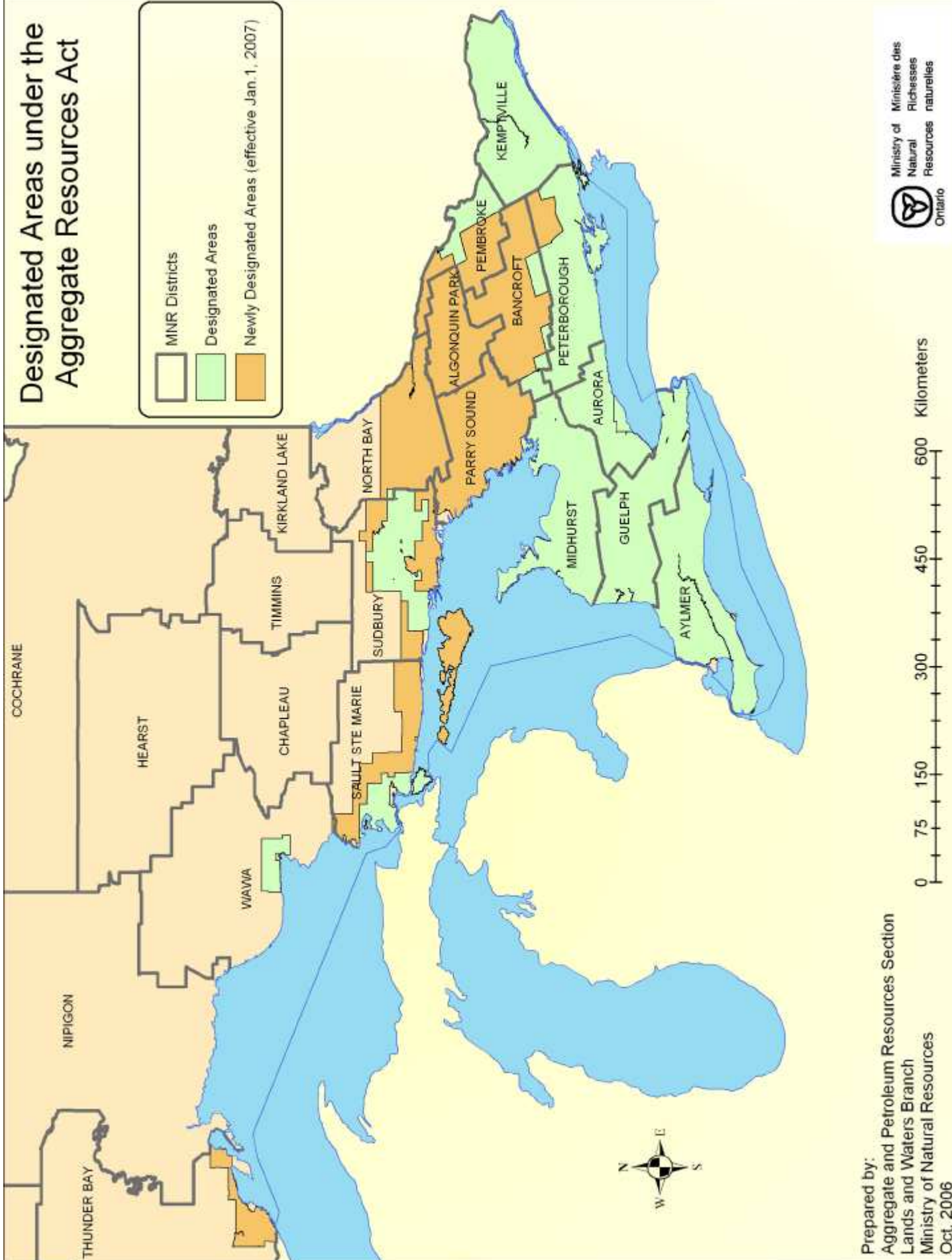
CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	TIMISKAMING	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

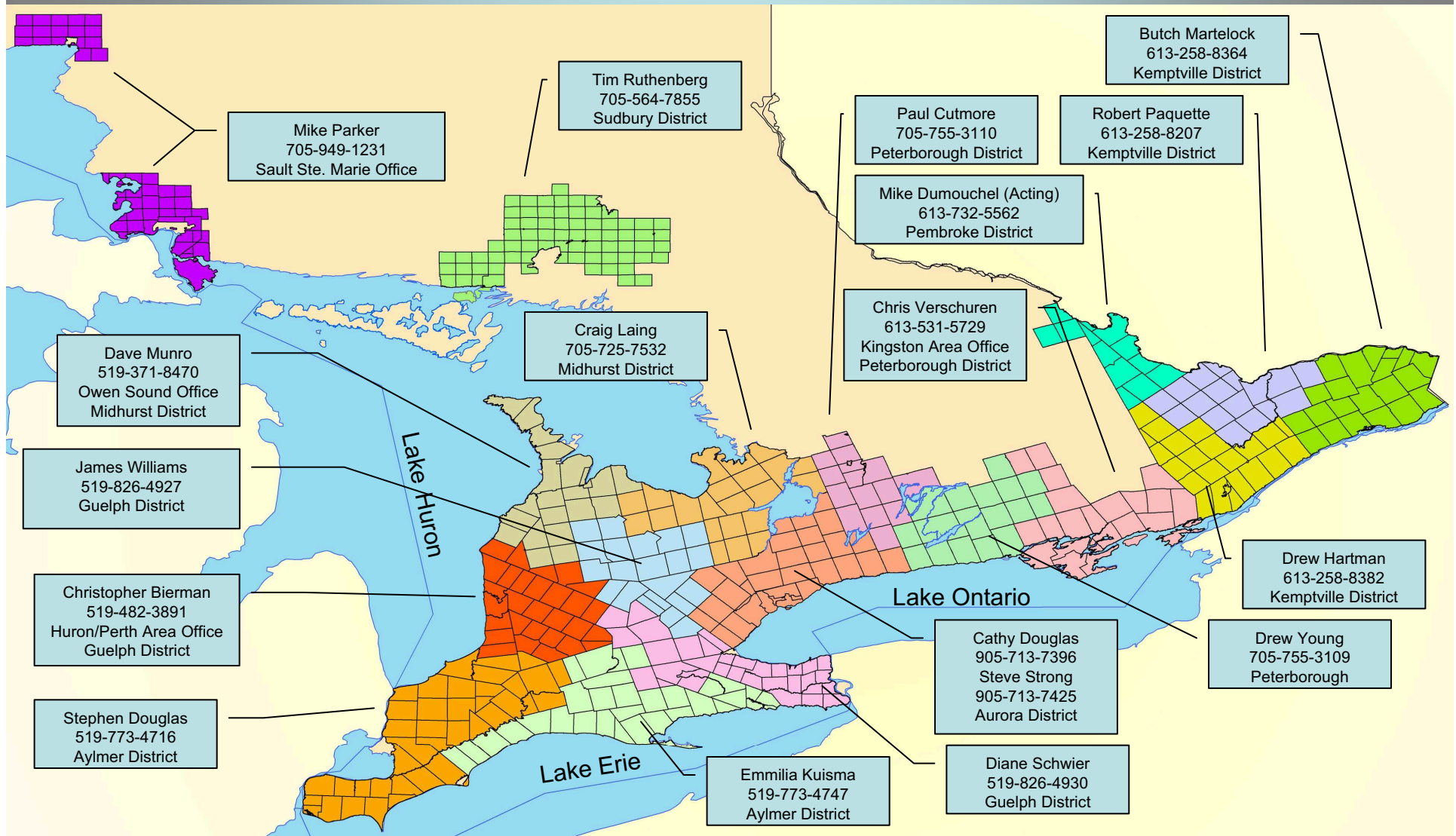
Designated Areas under the Aggregate Resources Act

MNR Districts
 Designated Areas
 Newly Designated Areas (effective Jan. 1, 2007)



Prepared by:
 Aggregate and Petroleum Resources Section
 Lands and Waters Branch
 Ministry of Natural Resources
 Oct, 2006

Aggregate Officers of Ontario





- **MINERAL**
- **AGGREGATES**
- **IN ONTARIO**

Statistical Update

2 0 0 6

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2006

Prepared by

The Ontario Aggregate Resources Corporation

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- B. Historical Designation of Private Land under the Pits and Quarries Control Act and the Aggregate Resources Act
- C. CPCA Geographic Areas
- D. Map of Areas Designated under the Aggregate Resources Act
- E. Map of Aggregate Licence Officers of Ontario

Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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or Fax (905) 319-7423

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Database Administrator at the above address or fax number or contact him directly via
email, jcdorlas@toarc.com

MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern ‘built environment’. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 270,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2006, this basic non-renewable resource was supplied from 2,795 licensed aggregate sites on private land in designated parts of the Province and 3,473 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario’s Mineral Aggregate Resources

At the Provincial level, the management of Ontario’s aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the “Act”), gave the Minister the power to create the Aggregate Resources Trust (the “Trust”) and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Production of mineral aggregates in 2006 totaled approximately 179 million tonnes, up 2.9% from the previous year. Production from licensed operations was up 3 million tonnes compared to 2005, an increase of 2%. Wayside permit production decreased by 72.7% on relatively small volume from 2005 (1.1 million in 2005 compared to .3 million in 2006). Production from aggregate permits on Crown Land increased 32.9% from 2005 (10.5 million in 2006 from 7.9 million tonnes in 2005).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1994 - 2006
(rounded to nearest million tonnes)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Licences	113	109	114	124	124	131	145	145	141	143	150	149	152
Wayside Permits*	2	2	2	1	2	1	1	0	0	0	0	1	0
Aggregate Permits	10	9	9	8	9	11	10	7	7	7	7	8	11
Category 14 (Forest Industry)	-	-	-	-	-	2	3	3	4	3	4	4	4
Private Land Non-Designated (estimated)	11	10	11	11	11	12	12	12	12	12	12	12	12
ONTARIO TOTAL	136	130	136	144	146	157	171	167	164	165	173	174	179

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004 and .3 million tonnes for 2006

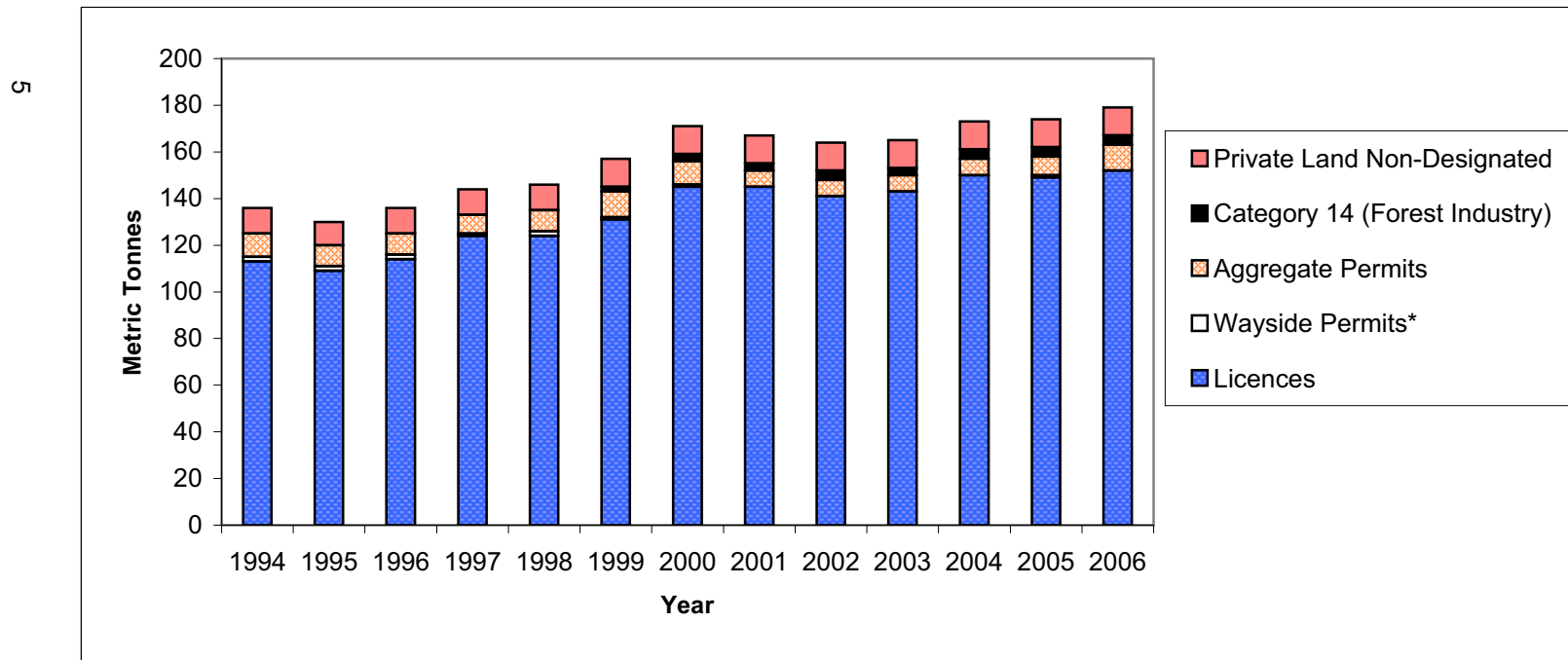


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	55,234.72		55,234.72
Hilton Tp	42,134.80		42,134.80
Jocelyn Tp	26,679.62		26,679.62
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	27,723.90		27,723.90
Laird Tp/St. Joseph Tp	49,544.30		49,544.30
Macdonald, Meredith & Aberdeen Add'l Tp	192,795.40		192,795.40
Sault Ste. Marie, City of/Prince Tp	794,925.73		794,925.73
Sub-Total	1,189,038.47	0.00	1,189,038.47
<i>Brant</i>			
Brant, County of/Brantford, City of	2,267,675.33		2,267,675.33
Sub-Total	2,267,675.33	0.00	2,267,675.33
<i>Bruce</i>			
Arran-Elderslie, Municipality of	151,277.92		151,277.92
Brockton, Municipality of	155,705.96		155,705.96
Huron-Kinloss Tp	599,567.23		599,567.23
Kincardine, Municipality of	61,816.32		61,816.32
Northern Bruce Peninsula, Municipality of	203,467.98		203,467.98
Saugeen Shores, Town of	326,736.04		326,736.04
South Bruce, Municipality of	408,541.14		408,541.14
South Bruce Peninsula, Town of	351,936.15		351,936.15
Sub-Total	2,259,048.74	0.00	2,259,048.74
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	334,064.36		334,064.36
Sub-Total	334,064.36	0.00	334,064.36
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	172,553.78		172,553.78
East Garafraxa Tp	1,283,322.92		1,283,322.92
Melancthon Tp	754,967.89		754,967.89
Mono Tp	501,474.96		501,474.96
Mulmur Tp	344,508.94		344,508.94
Sub-Total	3,056,828.49	0.00	3,056,828.49
<i>Durham</i>			
Brock Tp	1,596,422.07		1,596,422.07
Clarington, Municipality of	5,030,295.37		5,030,295.37
Oshawa, City of/Scugog Tp/Whitby, Town of	246,668.18		246,668.18
Uxbridge Tp	5,365,631.80		5,365,631.80
Sub-Total	12,239,017.42	0.00	12,239,017.42
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	278,277.73		278,277.73
Central Elgin, Municipality of	430,102.17		430,102.17
Sub-Total	708,379.90	0.00	708,379.90

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,159,448.00		1,159,448.00
Kingsville, Town of	428,780.87		428,780.87
Sub-Total	1,588,228.87	0.00	1,588,228.87
Frontenac			
Frontenac Islands Tp	34,598.17		34,598.17
Kingston, City of	1,614,334.85		1,614,334.85
South Frontenac Tp	460,090.01		460,090.01
Sub-Total	2,109,023.03	0.00	2,109,023.03
Greater Sudbury			
Greater Sudbury, City of	2,885,127.56		2,885,127.56
Sub-Total	2,885,127.56	0.00	2,885,127.56
Grey			
Chatsworth Tp	419,848.40		419,848.40
Georgian Bluffs, Tp	717,486.77		717,486.77
Grey Highlands, Municipality of	513,305.14		513,305.14
Meaford, Municipality of	580,955.34		580,955.34
Southgate Tp	307,068.96		307,068.96
The Blue Mountains, Town of	450,832.96		450,832.96
West Grey, Municipality of	387,558.20	17,000.00	404,558.20
Sub-Total	3,377,055.77	17,000.00	3,394,055.77
Haldimand			
Haldimand, County of	1,819,319.80		1,819,319.80
Sub-Total	1,819,319.80	0.00	1,819,319.80
Halton			
Burlington, City of/Halton Hills, Town of	4,988,826.00		4,988,826.00
Milton, Town of	4,600,570.33		4,600,570.33
Sub-Total	9,589,396.33	0.00	9,589,396.33
Hamilton			
Hamilton, City of	6,214,378.32		6,214,378.32
Sub-Total	6,214,378.32	0.00	6,214,378.32
Hastings			
Belleville, City of	698,647.29		698,647.29
Centre Hastings, Municipality of	148,139.54		148,139.54
Madoc Tp	595,463.76		595,463.76
Marmora & Lake, Municipality of	26,037.60		26,037.60
Quinte West, City of	419,458.45		419,458.45
Stirling-Rawdon, Tp	3,636.00		3,636.00
Tyendinaga Tp	94,657.40		94,657.40
Tweed, Municipality of	279,119.37		279,119.37
Sub-Total	2,265,159.41	0.00	2,265,159.41

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	787,221.82		787,221.82
Bluewater, Municipality of	16,285.00		16,285.00
Central Huron, Municipality of	636,634.42		636,634.42
Howick Tp	247,384.32		247,384.32
Huron East, Municipality of	681,363.40		681,363.40
Morris-Turnberry, Municipality of	177,085.86		177,085.86
North Huron Tp	92,528.54		92,528.54
South Huron, Municipality of	64,412.60		64,412.60
Sub-Total	2,702,915.96	0.00	2,702,915.96
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	6,464,797.24		6,464,797.24
Sub-Total	6,464,797.24	0.00	6,464,797.24
<i>Lambton</i>			
Enniskillen/Warwick Tp	356,872.98		356,872.98
Lambton Shores, Municipality of	283,425.74		283,425.74
Plympton-Wyoming, Town of	18,788.44		18,788.44
Sub-Total	659,087.16	0.00	659,087.16
<i>Lanark</i>			
Beckwith Tp	34,298.92		34,298.92
Drummond-North Elmsley Tp	120,541.25		120,541.25
Lanark Highlands Tp	1,695,135.86		1,695,135.86
Mississippi Mills, Town of	156,673.44		156,673.44
Montague Tp	282,823.82		282,823.82
Tay Valley Tp	16,823.29		16,823.29
Sub-Total	2,306,296.58	0.00	2,306,296.58
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	228,350.17		228,350.17
Augusta Tp	138,067.26		138,067.26
Edwardsburgh-Cardinal Tp	74,612.45		74,612.45
Elizabethtown-Kitley Tp	564,185.93		564,185.93
Leeds and the Thousand Islands Tp	582,382.74		582,382.74
Merrickville-Wolford, Village of	55,331.82		55,331.82
North Grenville Tp	490,603.90		490,603.90
Rideau Lakes Tp	121,202.05		121,202.05
Sub-Total	2,254,736.32	0.00	2,254,736.32
<i>Lennox & Addington</i>			
Greater Napanee, Town of	192,971.15		192,971.15
Loyalist Tp	1,676,173.97		1,676,173.97
Stone Mills Tp	60,706.96		60,706.96
Sub-Total	1,929,852.08	0.00	1,929,852.08

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Middlesex</i>			
Adelaide Metcalfe Tp	28,576.92		19,878.00
London, City of	1,754,690.52		1,967,731.76
Lucan Biddulph Tp	19,042.28		19,042.28
Middlesex Centre Tp	927,307.85		927,307.85
North Middlesex, Municipality of	88,292.77		88,292.77
Strathroy-Caradoc Tp	39,905.80		39,905.80
Thames Centre, Municipality of	2,706,596.22		2,706,596.22
Sub-Total	5,564,412.36	0.00	5,564,412.36
<i>Niagara</i>			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,913,594.98		1,913,594.98
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,609,400.66		1,609,400.66
Niagara Falls, City of/Thorold, City of	1,367,995.50	198,050.00	1,566,045.50
Sub-Total	4,890,991.14	198,050.00	5,089,041.14
<i>Norfolk</i>			
Norfolk, County of	527,755.58		527,755.58
Sub-Total	527,755.58	0.00	527,755.58
<i>Northumberland</i>			
Alnwick-Haldimand Tp	347,302.19		347,302.19
Brighton, Municipality of	351,580.62		351,580.62
Cramahe Tp	2,091,536.50		2,091,536.50
Hamilton Tp	267,459.74		267,459.74
Port Hope, Municipality of	55,890.46		55,890.46
Trent Hills, Municipality of	273,157.74		273,157.74
Sub-Total	3,386,927.25	0.00	3,386,927.25
<i>Ottawa</i>			
Ottawa, City of	11,062,539.06		11,062,539.06
Sub-Total	11,062,539.06	0.00	11,062,539.06
<i>Oxford</i>			
Blandford-Blenheim Tp	305,491.62		305,491.62
East Zorra-Tavistock Tp/Woodstock, City of	471,966.35		471,966.35
Norwich Tp	10,707.08		10,707.08
South-West Oxford Tp	765,272.35		765,272.35
Zorra Tp	3,890,776.61		3,890,776.61
Sub-Total	5,444,214.01	0.00	5,444,214.01
<i>Peel</i>			
Caledon, Town of	5,316,215.81		5,316,215.81
Sub-Total	5,316,215.81	0.00	5,316,215.81
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	154,609.72		154,609.72
Perth East Tp	446,719.79		446,719.79
Perth South Tp	1,634,234.22		1,634,234.22
West Perth Tp	152,321.61		152,321.61
Sub-Total	2,387,885.34	0.00	2,387,885.34

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Peterborough</i>			
Asphodel-Norwood Tp	365,733.00		365,733.00
Cavan-Millbrook-North Monaghan Tp	118,406.95		118,406.95
Douro-Dummer Tp	799,240.19		799,240.19
Galway-Cavendish-Harvey Tp	404,381.73		404,381.73
Havelock-Belmont-Methuen Tp/Asphodel-Norwood Tp	24,070.01		24,070.01
Otonabee-South Monaghan Tp	267,110.20		267,110.20
Smith-Ennismore-Lakefield Tp	626,404.94		626,404.94
Sub-Total	2,605,347.02	0.00	2,605,347.02
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	242,406.31		242,406.31
Champlain Tp	542,690.00		542,690.00
Clarence-Rockland, City of	201,189.91		201,189.91
East Hawkesbury Tp	43,859.86		43,859.86
Russell Tp	159,097.55		159,097.55
The Nation, Municipality of	289,449.55		289,449.55
Sub-Total	1,478,693.18	0.00	1,478,693.18
<i>Prince Edward Co</i>			
Prince Edward, County of	2,240,737.90		2,240,737.90
Sub-Total	2,240,737.90	0.00	2,240,737.90
<i>Renfrew</i>			
Admaston-Bromley Tp/Greater Madawaska Tp/ Renfrew, Town of	401,921.48		401,921.48
Horton Tp	423,605.96		423,605.96
Laurentian Valley Tp	407,068.47		407,068.47
McNab-Braeside Tp	265,750.26		265,750.26
Petawawa, Town of	192,441.87		192,441.87
Whitewater Region Tp	211,261.92		211,261.92
Sub-Total	1,902,049.96	0.00	1,902,049.96
<i>Simcoe</i>			
Adjala-Tosorontio Tp	349,184.92		349,184.92
Bradford West Gwillimbury, Town of/Collingwood, Town of	100,774.96		100,774.96
Clearview Tp	1,974,885.96		1,974,885.96
Essa Tp	77,160.99		77,160.99
Innisfil, Town of	80,574.30		80,574.30
Midland, Town of/Penetanguishine, Town of	331,638.91		331,638.91
New Tecumseth, Town of	12,403.27		12,403.27
Oro-Medonte Tp	2,824,647.29		2,824,647.29
Ramara Tp	2,761,601.07		2,761,601.07
Severn Tp	2,400,786.26		2,400,786.26
Springwater Tp	2,034,486.89		2,034,486.89
Tay Tp	150,506.43		150,506.43
Tiny Tp	262,246.83		262,246.83
Sub-Total	13,360,898.08	0.00	13,360,898.08

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	622,170.81		622,170.81
North Glengarry Tp	136,768.99		136,768.99
North Stormont Tp	975,333.59		975,333.59
South Dundas Tp	220,004.50		220,004.50
South Glengarry Tp	433,742.59		433,742.59
South Stormont Tp	987,253.39		987,253.39
Sub-Total	3,375,273.87	0.00	3,375,273.87
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	50,085.00		50,085.00
French River, Municipality of/Nairn & Hyman Tp	33,108.86		33,108.86
Markstay-Warren, Municipality of	79,129.41		79,129.41
Sables Spanish Rivers Tp/Espanola, Town of	44,130.96		44,130.96
Sudbury District, Unorganized	606,219.52		606,219.52
Sub-Total	812,673.75	0.00	812,673.75
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	875,262.34	58,465.00	933,727.34
North Dumfries Tp	4,959,590.93		4,959,590.93
Wellesley Tp	1,442,211.44		1,442,211.44
Wilmot Tp	1,369,846.26		1,369,846.26
Woolwich Tp	600,640.61		600,640.61
Sub-Total	9,247,551.58	58,465.00	9,306,016.58
<i>Wellington</i>			
Centre Wellington Tp	1,002,427.56		1,002,427.56
Erin, Town of	1,688,938.59		1,688,938.59
Guelph-Eramosa Tp	816,932.45		816,932.45
Mapleton Tp	64,851.60		64,851.60
Minto, Town of	414,907.78		414,907.78
Puslinch Tp	4,695,042.57		4,695,042.57
Wellington North Tp	141,603.35		141,603.35
Sub-Total	8,824,703.90	0.00	8,824,703.90
<i>York</i>			
East Gwillimbury, Town of	138,990.86		138,990.86
Georgina, Town of	39,435.80		39,435.80
Whitchurch-Stouffville, Town of	781,067.34		781,067.34
Sub-Total	959,494.00	0.00	959,494.00
GRAND TOTAL	151,607,790.93	273,515.00	151,881,305.93

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Algoma, District of	0.6	0.6	0.8	0.8	0.6	0.8	0.6	0.8	1.9	1.2
Brant Co.	2.1	1.5	1.5	2.1	2.0	1.8	2.1	2.0	1.8	2.3
Bruce Co.	1.3	1.6	1.5	1.7	1.6	1.7	1.7	1.9	1.8	2.3
Chatham-Kent, R. M. of	0.5	0.4	0.5	0.5	0.3	0.5	0.4	0.3	0.4	0.3
Dufferin Co.	1.5	1.8	2.1	2.6	2.4	2.3	3.0	2.7	2.9	3.1
Durham, R. M. of	8.7	7.8	9.2	10.2	11.4	11.0	11.8	12.6	13.2	12.2
Elgin Co.	0.7	0.4	0.6	0.7	0.6	0.5	0.6	0.7	0.8	0.7
Essex Co.	2.7	2.0	1.9	2.0	2.2	1.9	1.9	1.9	1.7	1.6
Frontenac Co.	1.5	1.2	1.3	1.4	1.3	1.6	2.0	2.2	2.4	2.1
Greater Sudbury, City of	2.5	2.3	2.9	2.3	1.8	2.3	1.7	2.2	2.8	2.9
Grey Co.	2.1	2.1	2.8	2.5	2.6	2.6	3.1	3.2	3.7	3.4
Haldimand Co.	----	----	----	----	1.5	1.9	1.8	1.6	2.0	1.8
Haldimand-Norfolk, R. M. of	2.1	1.8	2.0	2.0	----	----	----	----	----	----
Halton, R. M. of	14.4	13.4	13.8	15.5	15.8	12.1	10.7	11.4	10.9	9.6
Hamilton, City of	5.2	4.7	4.6	6.3	6.0	5.5	6.0	6.3	5.6	6.2
Hastings Co.	2.0	1.9	2.2	2.0	2.0	2.1	2.4	2.3	2.1	2.3
Huron Co.	2.4	2.6	2.8	2.7	3.0	2.7	2.8	2.5	2.6	2.7
Kawartha Lakes, City of	----	----	----	----	6.4	6.4	6.7	6.8	6.8	6.5
Lambton Co.	0.5	0.6	0.6	0.5	0.5	0.7	0.4	0.5	0.7	0.7
Lanark Co.	1.2	1.3	1.5	1.6	1.7	2.0	2.4	2.3	2.3	2.3
Leeds & Grenville Co.'s	2.1	4.2	2.2	3.0	2.3	2.0	1.9	2.2	2.3	2.3
Lennox & Addington Co.	1.7	1.9	1.7	1.8	1.8	1.7	1.9	1.8	1.9	1.9
Middlesex Co.	5.3	6.1	5.6	6.4	6.0	5.4	5.6	6.2	6.2	5.6
Niagara, R. M. of	4.9	4.6	4.3	4.6	4.6	4.9	4.6	4.7	4.5	5.1
Norfolk Co.	----	----	----	----	0.4	0.4	0.4	0.5	0.4	0.5
Northumberland Co.	3.2	3.2	3.6	3.2	3.1	3.0	3.4	3.3	3.5	3.4
Ottawa, City of	6.7	7.1	8.1	10.7	10.1	10.7	10.0	9.9	10.6	11.1
Oxford Co.	5.3	4.9	5.1	5.4	4.9	4.8	4.9	4.8	5.0	5.4
Peel, R. M. of	4.3	4.2	4.5	5.2	5.2	4.3	4.5	5.3	5.1	5.3
Perth Co.	1.7	1.7	1.6	2.1	2.0	2.1	2.0	2.0	2.0	2.4
Peterborough Co.	1.8	1.8	1.8	2.2	2.4	3.2	2.5	2.5	2.7	2.6
Prescott & Russell Co.'s	1.4	1.1	1.2	1.4	1.4	1.3	1.4	1.4	1.7	1.5
Prince Edward Co.	2.1	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.4	2.2
Renfrew Co.	1.2	1.3	1.5	1.5	1.2	1.8	1.6	1.7	1.3	1.9
Simcoe Co.	7.6	9.0	9.0	9.3	10.6	11.4	11.8	12.7	12.6	13.4
Stormont, Dundas & Glengarry Co.'s	2.4	2.4	2.8	3.0	2.7	2.6	2.7	3.5	3.0	3.4
Sudbury, District of	0.2	0.2	0.4	0.5	1.0	0.6	0.6	0.6	0.8	0.8
Victoria Co.	6.5	6.6	6.0	7.1	----	----	----	----	----	----
Waterloo, R. M. of	5.6	5.8	7.3	7.7	8.2	7.8	8.0	9.5	8.2	9.3
Wellington Co.	6.4	6.9	7.5	8.4	8.9	8.9	9.1	9.1	8.3	8.8
York, R. M. of	2.6	2.2	2.7	3.0	2.4	2.4	2.0	1.9	1.0	1.0
TOTAL	125.0	125.2	131.5	146.0	144.9	141.8	143.2	149.8	149.7	151.9

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.
As of January 1, 2001 Haldimand-Norfolk has been split into two different counties;
Haldimand County and Norfolk County.
Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2006
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2006 Production	Production				
				2005	2004	2003	2002	2001
1	City of Ottawa ⁽¹⁾	City of Ottawa	11.1	10.6	9.9	10.0	10.7	10.1
2	City of Kawartha Lakes ⁽²⁾	City of Kawartha Lakes	6.5	6.8	6.8	6.7	6.4	6.4
3	City of Hamilton ⁽³⁾	City of Hamilton	6.2	5.6	6.3	5.9	5.4	6.0
4	Township of Uxbridge	Durham	5.4	5.3	5.5	4.9	4.7	5.0
5	Town of Caledon	Peel	5.3	5.1	5.3	4.5	4.3	4.9
6	Municipality of Clarington	Durham	5.0	5.8	5.3	5.6	4.7	4.7
7	Township of North Dumfries	Waterloo	5.0	4.1	4.4	3.9	3.3	3.7
8	Puslinch Township	Wellington County	4.7	5.0	5.2	5.1	5.3	5.5
9	Town of Milton	Halton	4.6	5.0	5.6	5.2	5.9	8.8
10	Township of Zorra	Oxford	3.9	3.9	3.6	3.5	3.4	3.5
Total			57.7	57.2	57.9	55.3	54.1	58.6

Note: Municipalities are ranked in order of their licenced production for 2006

Production statistics for 2001 include tonnage of the pre-amalgamated cites and townships of :

⁽¹⁾ Cities of Ottawa, Gloucester and Neapean, Townships of Cumberland, Goulborn, Osgoode, Rideau and West Carleton

⁽²⁾ Townships of Bexley, Laxton, Digby & Longford, Bobcaygeon, Carden/Dalton, Eldon, Emily, Fenelon, Manvers, Mariposa, Somerville

⁽³⁾ Cities of Hamilton and Stoney Creek, Towns of Ancaster, Dundas and Glanbrook

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	168	145	23	152	16	0	0
Aylmer	311	241	70	294	10	7	0
Bancroft	45	20	25	23	17	5	0
Guelph (Cambridge)	457	379	78	419	35	3	0
Kemptville	502	278	224	356	123	23	0
Midhurst	470	350	120	420	46	4	0
Pembroke	115	57	58	99	9	7	0
Peterborough (Tweed)	513	284	229	410	87	16	0
Sault Ste. Marie	66	32	34	59	1	6	0
Sudbury	148	108	40	120	6	22	0
TOTAL	2,795	1,894	901	2,352	350	93	0

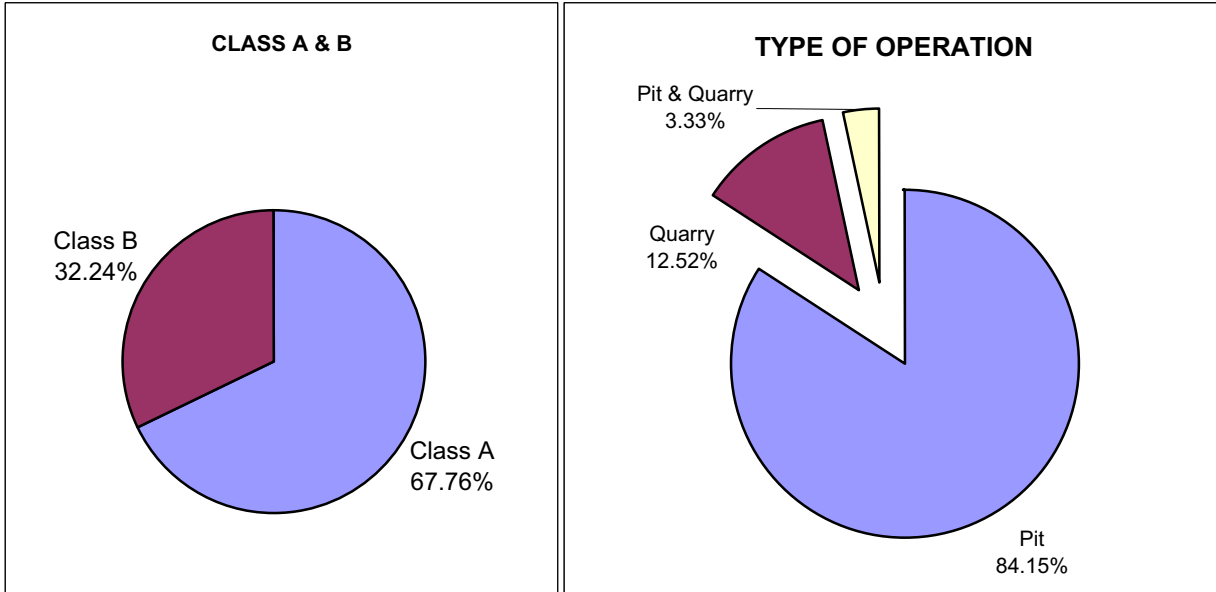


Table 6

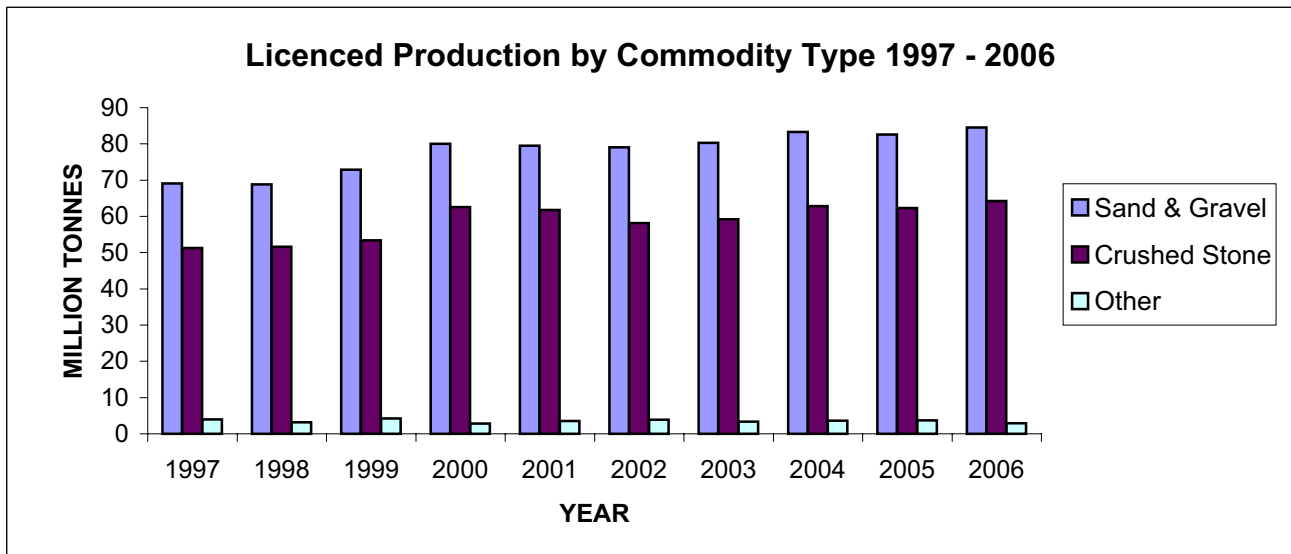
**2006 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	28,104,123.56	15,197,726.75	11,883,562.29	850,487.47	172,347.05
Aylmer	14,826,142.24	10,641,520.79	4,176,065.71	8,542.94	12.80
Bancroft	2,607,309.06	164,132.73	2,391,343.95	0.00	51,832.38
Guelph (Cambridge)	38,415,523.47	24,533,305.39	13,645,810.97	234,407.11	2,000.00
Kemptville	20,175,959.01	5,392,440.40	13,519,089.24	158,175.35	1,106,254.02
Midhurst	21,993,728.98	14,277,349.49	7,449,968.59	8,315.54	258,095.36
Pembroke	2,203,629.96	1,594,400.88	607,279.14	0.00	1,949.94
Peterborough	18,394,534.87	8,388,031.52	9,976,707.20	4,142.52	25,653.63
Sault Ste. Marie	1,189,038.47	1,154,440.52	31,957.40	0.00	2,640.55
Sudbury	3,697,801.31	3,141,843.71	554,916.68	127.00	913.92
TOTAL	151,607,790.93	84,485,192.18	64,236,701.17	1,264,197.93	1,621,699.65

Note: Totals may not equal due to rounding

Other Stone includes building stone, industrial stone, dimensional stone

Reported in metric tonnes



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1997	124.29	69.05	51.23	4.01
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88

Table 7

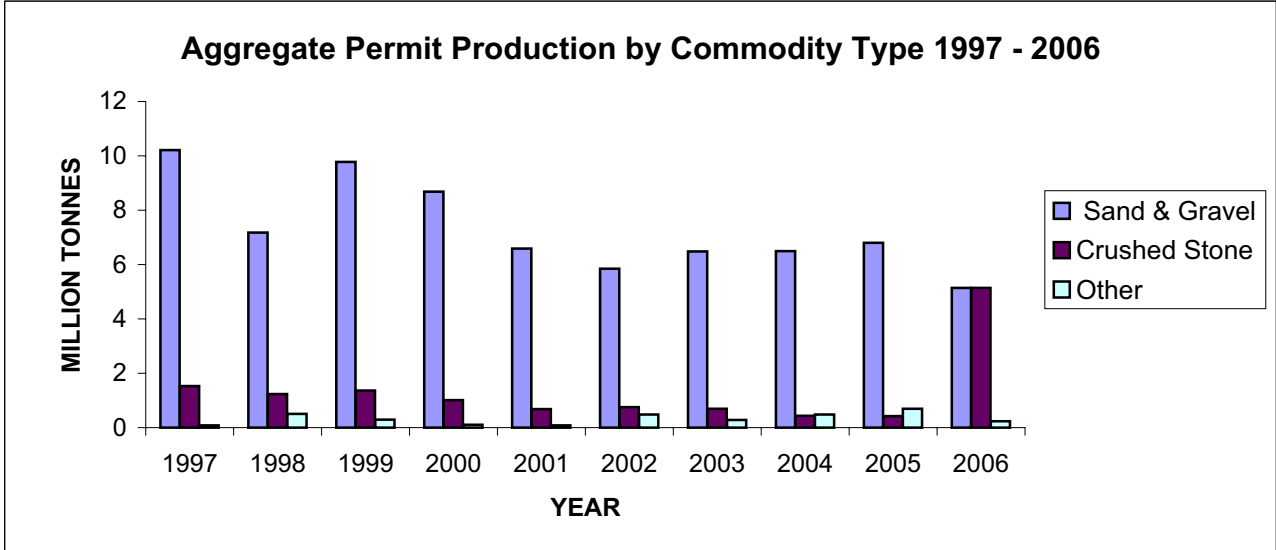
**2006 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	312,440.95	312,440.95	-	-	-
Cochrane	4,295,616.40	335,415.40	3,960,201.00	-	-
Hearst	336,734.20	275,134.20	59,400.00	-	2,200.00
Kirkland Lake	223,152.78	208,048.43	15,104.35	-	-
North Bay	384,777.21	366,715.52	17,253.34	-	808.35
Sault Ste. Marie	399,411.48	399,411.48	-	-	-
Sudbury	651,391.74	245,782.84	402,934.78	57.12	2,617.00
Timmins	509,626.44	278,024.07	106,647.44	77,835.80	47,119.13
Wawa	405,831.28	380,793.28	11,038.00	14,000.00	-
Sub-Total	7,518,982.48	2,801,766.17	4,572,578.91	91,892.92	52,744.48
NORTHWEST					
Dryden	450,920.55	202,868.55	246,881.00	-	1,171.00
Fort Frances	380,537.63	379,738.63	-	-	799.00
Kenora	112,365.65	99,882.58	40.00	-	12,443.07
Nipigon	597,072.07	462,206.63	130,350.88	-	4,514.56
Red Lake	300,171.07	298,133.73	2,037.34	-	-
Sioux Lookout	200,465.93	197,164.93	1,227.00	-	2,074.00
Thunder Bay	500,722.28	500,714.46	-	-	7.82
Sub-Total	2,542,255.18	2,140,709.51	380,536.22	-	21,009.45
SOUTHCENTRAL					
Algonquin Park	60,455.70	60,455.70	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	4,952.51	4,952.51	-	-	-
Bancroft	126,427.89	45,790.14	10,350.14	-	70,287.61
Guelph (Cambridge)	-	-	-	-	-
Kemptville	489.60	489.60	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	202,148.86	26,766.36	174,030.10	-	1,352.40
Pembroke	54,069.45	54,069.45	-	-	-
Peterborough (Tweed)	6,530.44	-	6,530.44	-	-
Sub-Total	455,074.45	192,523.76	190,910.68	0.00	71,640.01
TOTAL	10,516,312.11	5,134,999.44	5,144,025.81	91,892.92	145,393.94

Note: Amounts shown are in metric tonnes

Table 8

**2006 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1997	11.82	10.21	1.53	0.08
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24

Table 9

**2006 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	4,953	4,953	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	299,186	66,666	160,881	0	71,640
East (6)	55,598	55,598	0	0	0
Northeast (7)	6,790,326	2,068,118	4,591,571	77,893	52,744
Northwest (8)	3,366,249	2,939,665	391,574	14,000	21,009
TOTAL	10,516,312	5,134,999	5,144,026	91,893	145,394

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

**2006 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CPCA* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	19,389,188	14,496,317	4,766,658	126,200	13
Peninsula (2)	15,720,120	3,048,251	12,562,477	109,392	0
West Central (3)	40,126,087	31,907,608	7,942,710	15,674	260,095
GTA (4)	28,104,124	15,197,727	11,883,562	850,487	172,347
East Central (5)	16,962,969	8,130,156	8,768,117	1,719	62,976
East (6)	26,418,464	7,408,849	17,726,302	160,599	1,122,714
Northeast (7)	3,697,801	3,141,844	554,917	127	914
Northwest (8)	1,189,038	1,154,441	31,957	0	2,641
TOTAL	151,607,791	84,485,192	64,236,701	1,264,198	1,621,700

Note: Totals may not equal due to rounding
 Other Stone includes building stone, industrial stone, dimensional stone
 Amounts shown are in metric tonnes
 *CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2006
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	168	9,187.43	3,378.22	57.92	120.50	3,315.64
Aylmer	311	8,394.93	2,941.90	129.55	136.20	2,935.24
Bancroft	45	2,167.19	354.85	12.06	2.05	364.86
Guelph (Cambridge)	457	16,410.80	4,690.97	140.46	100.57	4,730.87
Kemptville	502	14,398.87	4,158.27	128.21	53.59	4,232.89
Midhurst	470	14,313.56	3,468.36	145.86	75.56	3,538.66
Pembroke	115	3,196.04	526.79	25.87	7.66	545.01
Peterborough (Tweed)	513	13,983.89	3,571.49	106.79	41.75	3,636.53
Sault Ste. Marie	66	2,835.42	363.68	13.50	14.52	362.66
Sudbury	148	11,651.32	900.33	50.95	28.81	922.47
TOTAL	2,795	96,539.45	24,354.87	811.18	581.20	24,584.84

Note: Areas shown are in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

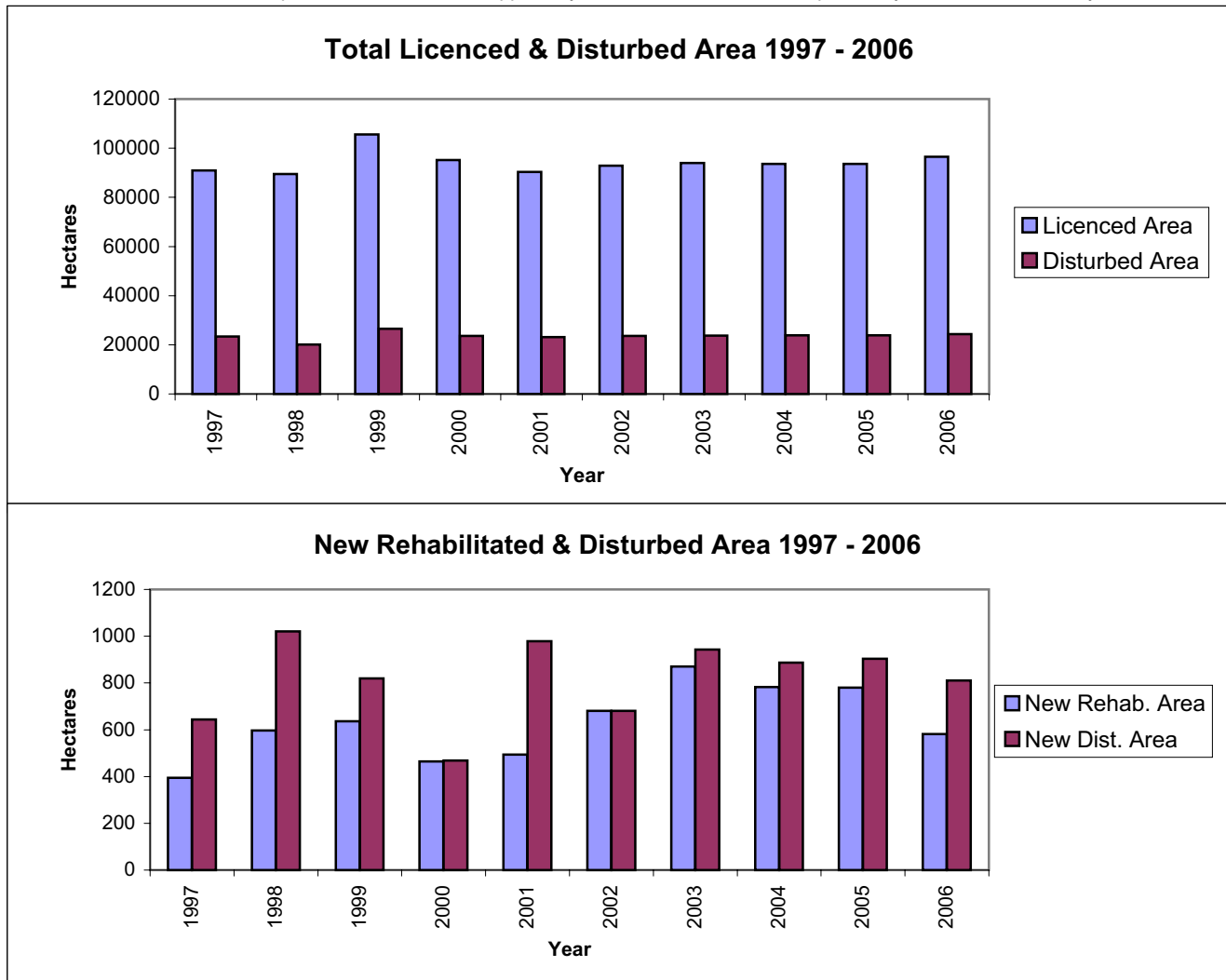


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,207.98	213	213	0	0	0
Cochrane	2,847.16	129	114	9	6	0
Hearst	3,807.06	181	159	18	4	0
Kirkland Lake	1,844.62	158	150	6	2	0
North Bay	2,321.10	195	172	18	5	0
Sault Ste. Marie	956.03	111	106	2	3	0
Sudbury	4,920.79	191	156	23	12	0
Timmins	2,027.99	172	161	8	3	0
Wawa	2,605.95	273	267	4	2	0
Sub-Total	22,538.68	1,623	1,498	88	37	0
NORTHWEST						
Dryden	2,221.58	249	236	7	6	0
Fort Frances	2,543.09	299	285	5	9	0
Kenora	2,914.16	218	178	28	12	0
Nipigon	3,792.05	341	316	17	8	0
Red Lake	1,421.81	126	124	2	0	0
Sioux Lookout	1,387.29	106	103	3	0	0
Thunder Bay	3,155.75	241	222	14	5	0
Sub-Total	17,435.73	1,580	1,464	76	40	0
SOUTHCENTRAL						
Algonquin Park	33.64	41	41	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	972.16	78	65	13	0	0
Guelph (Cambridge)	620.50	2	0	0	0	2
Kemptville	2.00	1	1	0	0	0
Midhurst	0.00	0	0	0	0	0
Parry Sound	797.93	101	74	13	4	10
Pembroke	130.33	44	44	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,588.06	270	225	27	5	13
TOTAL	42,562.47	3,473	3,187	191	82	13

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

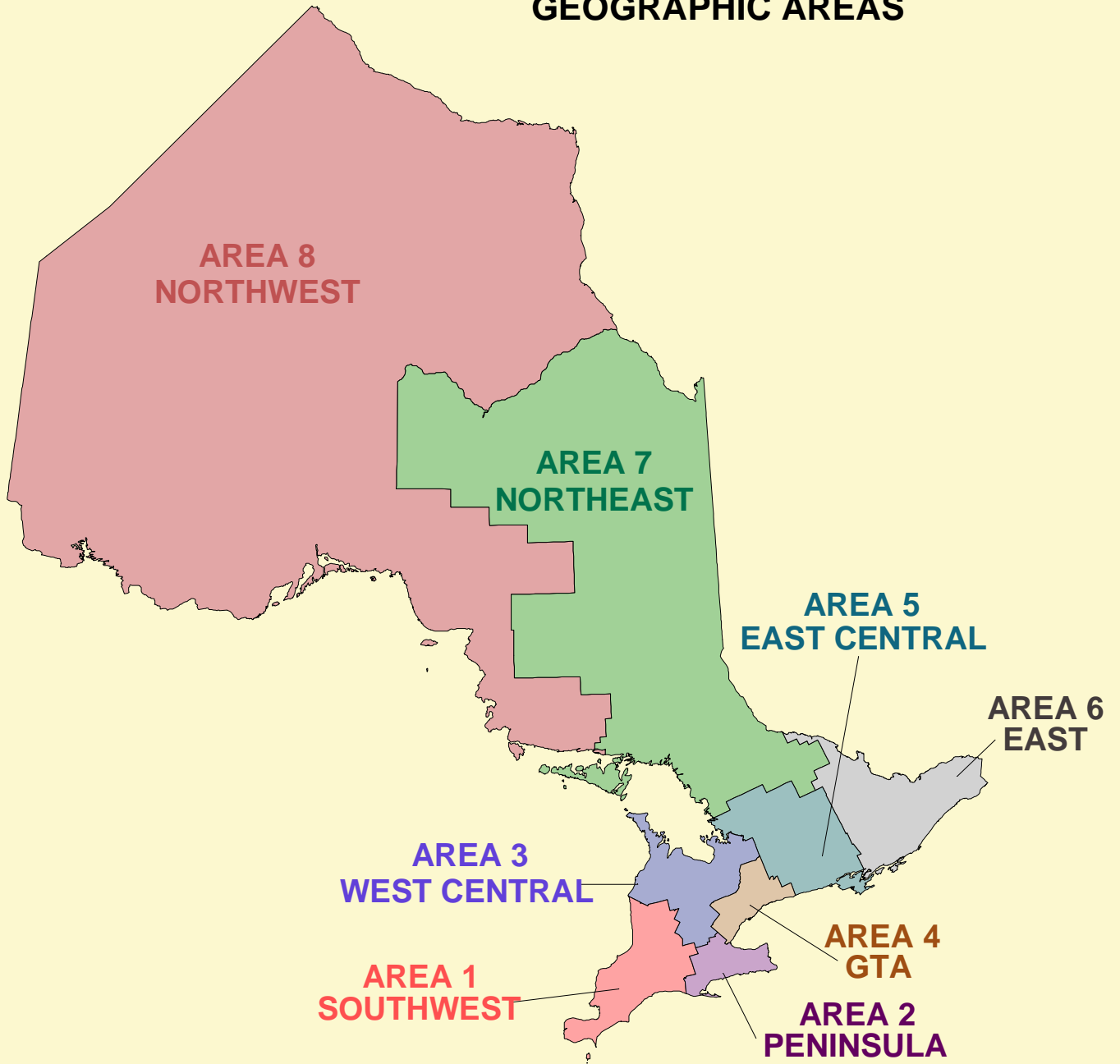
Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Orlig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.
9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.
10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.
11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.
12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.
13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

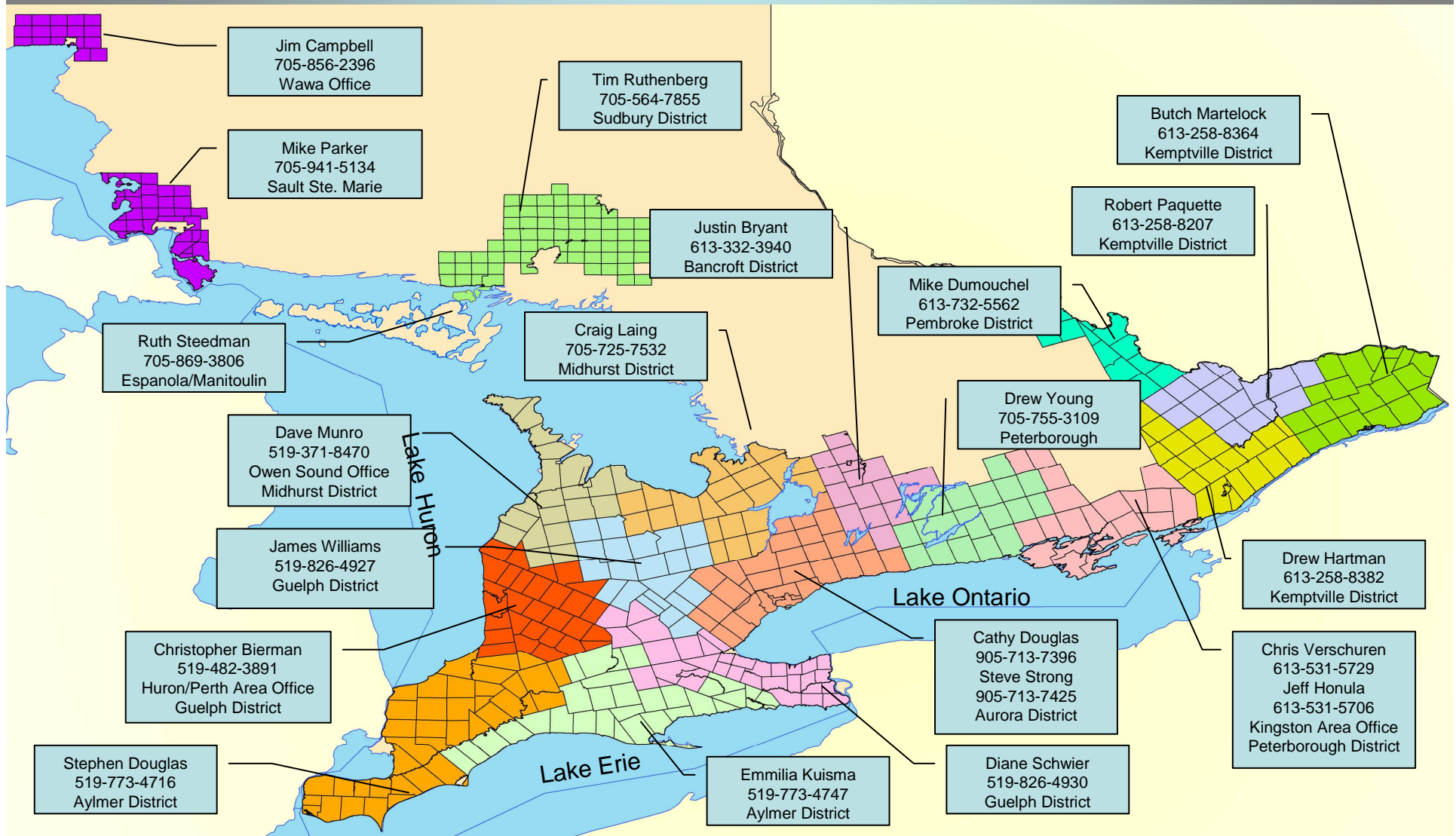
CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		



Aggregate Officers of Ontario





- **MINERAL**
- **AGGREGATES**
- **IN ONTARIO**

Statistical Update

2 0 0 7

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2007

Prepared by

The Ontario Aggregate Resources Corporation

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- C. CAC (formerly CPCA) Geographic Areas
- D. Map of Areas Designated under the Aggregate Resources Act
- E. Map of Aggregate Licence Officers of Ontario

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 292,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2007, this basic non-renewable resource was supplied from 3,764 licensed aggregate sites on private land in designated parts of the Province and 3,361 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Overall production of mineral aggregates in 2007 totaled approximately 173 million tonnes, down 6 million tonnes or 3.4% from the previous year. Production from licenced operations was up 6.0 million tonnes or 3.9% compared to 2006. However, disguised in licenced production tonnage is the fact that the production reporting base was expanded in 2007 by the designation of new areas under the Aggregate Resources Act. The newly designated areas accounted for 12.9 million tonnes of production in 2007 not included under the 'Licensed' category of previous reports. If we compare the formerly licenced area production (2007 vs. 2006) we discover that production for licences is down 6.9 million tonnes or 4.5%.

The total production for the Province contains an estimate of 2.0 million tonnes for production on private land in non designated areas (compared to 12 million tonnes in past years). Wayside permit production increased by 233% on relatively small volumes from 2006 (.3 million in 2006 compared to 1 million in 2007). Production from aggregate permits on Crown Land decreased 28.6% from 2006 (7.5 million in 2007 from 10.5 million tonnes in 2006).

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1995 - 2007
(rounded to nearest million tonnes)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Licences	109	114	124	124	131	145	145	141	143	150	149	152	158
Wayside Permits*	2	2	1	2	1	1	0	0	0	0	1	0	1
Aggregate Permits	9	9	8	9	11	10	7	7	7	7	8	11	8
Category 14 (Forest Industry)	-	-	-	-	2	3	3	4	3	4	4	4	4
Private Land Non-Designated (estimated)	10	11	11	11	12	12	12	12	12	12	12	12	2
ONTARIO TOTAL	130	136	144	146	157	171	167	164	165	173	174	179	173

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004 and .3 million tonnes for 2006

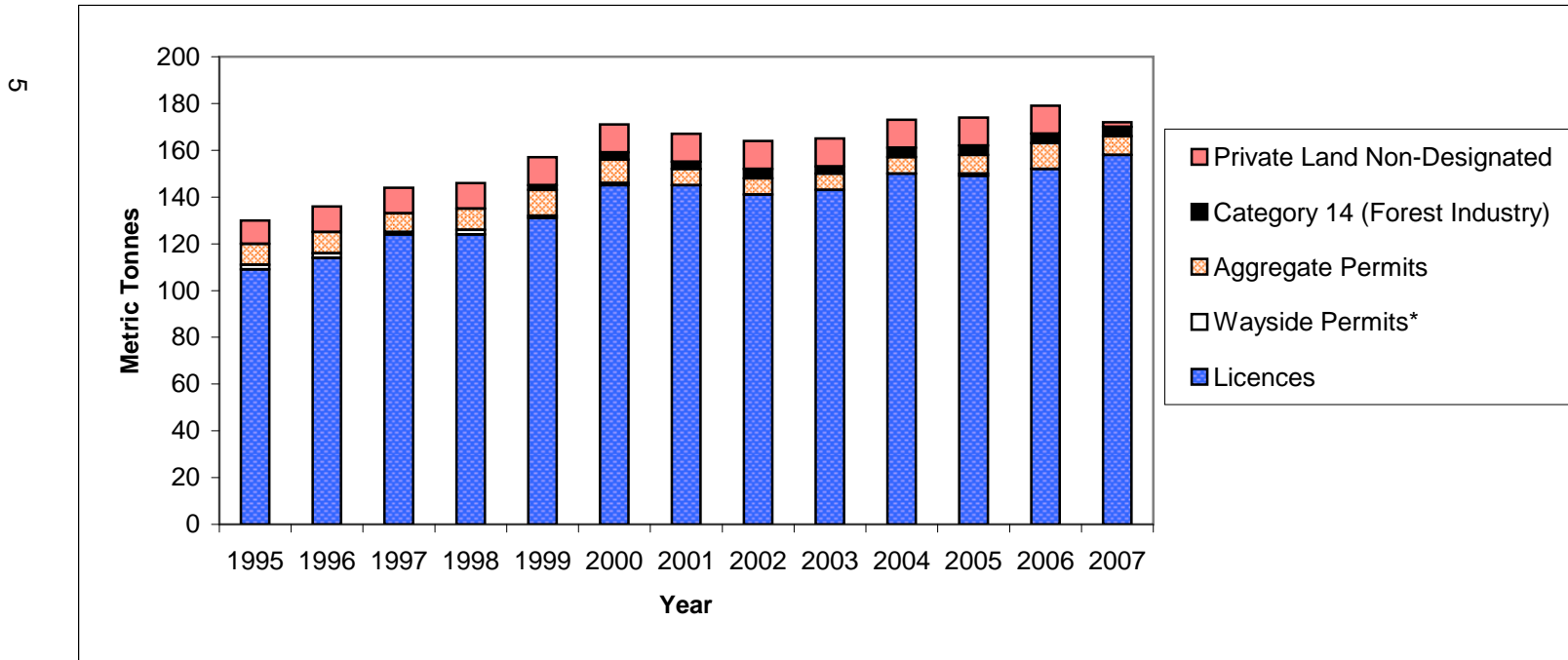


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	58,490.76		58,490.76
Blind River, Town of/Spanish, Town of/The North Shore, Tp	64,847.07		64,847.07
Bruce Mines, Town of/Huron Shores, Municipality of/ Plummer Additional Tp	1,952,704.66		1,952,704.66
Hilton Tp	12,925.20		12,925.20
Jocelyn Tp	14,785.60		14,785.60
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	20,717.50		20,717.50
Laird Tp/St. Joseph Tp	12,033.80		12,033.80
Macdonald, Meredith & Aberdeen Add'l Tp	19,160.00		19,160.00
Sault Ste. Marie, City of/Prince Tp	644,908.77		644,908.77
Sub-Total	2,800,573.36	0.00	2,800,573.36
<i>Brant</i>			
Brant, County of/Brantford, City of	2,262,164.64		2,262,164.64
Sub-Total	2,262,164.64	0.00	2,262,164.64
<i>Bruce</i>			
Arran-Elderslie, Municipality of	239,278.98		239,278.98
Brockton, Municipality of	254,699.72		254,699.72
Huron-Kinloss Tp	438,289.22		438,289.22
Kincardine, Municipality of	123,435.57		123,435.57
Northern Bruce Peninsula, Municipality of	262,532.14		262,532.14
Saugeen Shores, Town of	324,189.31		324,189.31
South Bruce, Municipality of	467,035.30		467,035.30
South Bruce Peninsula, Town of	284,386.52		284,386.52
Sub-Total	2,393,846.76	0.00	2,393,846.76
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	292,402.94		292,402.94
Sub-Total	292,402.94	0.00	292,402.94
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	134,760.75		134,760.75
East Garafraxa Tp	982,589.77		982,589.77
Melancthon Tp	1,217,214.70		1,217,214.70
Mono Tp	354,573.98		354,573.98
Mulmur Tp	284,542.96		284,542.96
Sub-Total	2,973,682.16	0.00	2,973,682.16
<i>Durham</i>			
Brock Tp	1,673,467.86		1,673,467.86
Clarington, Municipality of	5,204,754.97		5,204,754.97
Oshawa, City of/Scugog Tp/Whitby, Town of	224,517.76		224,517.76
Uxbridge Tp	4,588,316.94		4,588,316.94
Sub-Total	11,691,057.53	0.00	11,691,057.53
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	277,061.02		277,061.02
Central Elgin, Municipality of	340,907.01		340,907.01
Sub-Total	617,968.03	0.00	617,968.03

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,172,041.73		1,172,041.73
Kingsville, Town of	235,559.33	250,000.00	485,559.33
Sub-Total	1,407,601.06	250,000.00	1,657,601.06
Frontenac			
Central Frontenac Tp	185,314.20		185,314.20
Frontenac Islands Tp	23,395.30		23,395.30
Kingston, City of	1,354,753.42		1,354,753.42
North Frontenac Tp	151,365.62		151,365.62
South Frontenac Tp	373,539.26		373,539.26
Sub-Total	2,088,367.80	0.00	2,088,367.80
Greater Sudbury			
Greater Sudbury, City of	2,669,580.86	530,485.00	3,200,065.86
Sub-Total	2,669,580.86	530,485.00	3,200,065.86
Grey			
Chatsworth Tp	444,405.52		444,405.52
Georgian Bluffs, Tp	809,363.34		809,363.34
Grey Highlands, Municipality of	475,562.93		475,562.93
Meaford, Municipality of	486,959.33		486,959.33
Southgate Tp	262,658.93		262,658.93
The Blue Mountains, Town of	369,138.84		369,138.84
West Grey, Municipality of	354,277.99		354,277.99
Sub-Total	3,202,366.88	0.00	3,202,366.88
Haldimand			
Haldimand, County of	1,419,711.11		1,419,711.11
Sub-Total	1,419,711.11	0.00	1,419,711.11
Haliburton			
Algonquin Highlands, Tp	37,470.61		37,470.61
Dysart et al, Tp	289,899.04		289,899.04
Highlands East, Tp	36,353.28		36,353.28
Minden Hills, TP	130,264.41		130,264.41
Sub-Total	493,987.34	0.00	493,987.34
Halton			
Burlington, City of	2,284,733.10		2,284,733.10
Halton Hills, Town of	2,612,378.20		2,612,378.20
Milton, Town of	4,587,488.57		4,587,488.57
Sub-Total	9,484,599.87	0.00	9,484,599.87
Hamilton			
Hamilton, City of	5,585,705.27		5,585,705.27
Sub-Total	5,585,705.27	0.00	5,585,705.27

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
Hastings				
Bancroft, Town of		33,328.95		33,328.95
Belleville, City of		736,989.33		736,989.33
Carlo/Mayo Tp		17,602.20		17,602.20
Centre Hastings, Municipality of		143,865.72		143,865.72
Faraday Tp		16,622.44		16,622.44
Hasting Highlands		93,261.60		93,261.60
Limerick Tp		20,516.96		20,516.96
Madoc Tp		689,470.96		689,470.96
Marmora & Lake, Municipality of		14,731.20		14,731.20
Quinte West, City of		418,085.29		418,085.29
Stirling-Rawdon, Tp		11,079.82		11,079.82
Tweed, Municipality of		95,901.85		95,901.85
Tyendinaga Tp		241,543.10		241,543.10
Wollaston		39,350.16		39,350.16
Sub-Total		2,572,349.58	0.00	2,572,349.58
Huron				
Ashfield-Colborne-Wawanosh Tp		909,351.08		909,351.08
Bluewater, Municipality of		44,483.23		44,483.23
Central Huron, Municipality of		636,800.76		636,800.76
Howick Tp		211,306.13		211,306.13
Huron East, Municipality of		764,439.57		764,439.57
Morris-Turnberry, Municipality of		191,212.19		191,212.19
North Huron Tp		47,533.89		47,533.89
South Huron, Municipality of		62,717.64		62,717.64
Sub-Total		2,867,844.49	0.00	2,867,844.49
Kawartha Lakes				
Kawartha Lakes, City of		5,913,324.01		5,913,324.01
Sub-Total		5,913,324.01	0.00	5,913,324.01
Lambton				
Enniskillen/Warwick Tp		275,181.22		275,181.22
Lambton Shores, Municipality of		158,373.04		158,373.04
Plympton-Wyoming, Town of		46,431.68		46,431.68
Sub-Total		479,985.94	0.00	479,985.94
Lanark				
Beckwith Tp		320,884.66		320,884.66
Drummond-North Elmsley Tp		183,850.01		183,850.01
Lanark Highlands Tp		1,400,028.99		1,400,028.99
Mississippi Mills, Town of		168,083.84		168,083.84
Montague Tp		220,167.42		220,167.42
Tay Valley Tp		13,426.00		13,426.00
Sub-Total		2,306,440.92	0.00	2,306,440.92

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp	202,293.37		202,293.37
Augusta Tp	180,412.00		180,412.00
Edwardsburgh-Cardinal Tp	70,266.45		70,266.45
Elizabethtown-Kitley Tp	465,130.99		465,130.99
Leeds and the Thousand Islands Tp	474,756.25		474,756.25
Merrickville-Wolford, Village of	30,741.52		30,741.52
North Grenville Tp	462,857.04		462,857.04
Rideau Lakes Tp	133,239.82		133,239.82
Sub-Total	2,019,697.44	0.00	2,019,697.44
<i>Lennox & Addington</i>			
Addington Highlands Tp	24,571.52		24,571.52
Greater Napanee, Town of	167,981.07		167,981.07
Loyalist Tp	1,689,774.76		1,689,774.76
Stone Mills Tp	133,759.92		133,759.92
Sub-Total	2,016,087.27	0.00	2,016,087.27
<i>Manitoulin District</i>			
Assignack, Tp	3,673.32		3,673.32
Barrie Island, TP/Burpee & Mills, Tp/Cockburn Island, Tp	5,876.54		5,876.54
Billings, Tp/Unorganized - Manitoulin D	3,510,531.68		3,510,531.68
Central Manitoulin Tp	13,350.82		13,350.82
Gordon, Tp	19,785.58		19,785.58
Northeastern Manitoulin & The Islands	66,027.57		66,027.57
Tehkummah, Tp	14,890.99		14,890.99
Sub-Total	3,634,136.50	0.00	3,634,136.50
<i>Middlesex</i>			
Adelaide Metcalfe Tp	28,596.00		19,878.00
London, City of	1,360,435.44		1,967,731.76
Lucan Biddulph Tp	20,832.08		20,832.08
Middlesex Centre Tp	728,669.01		728,669.01
North Middlesex, Municipality of	161,372.90		161,372.90
Strathroy-Caradoc Tp	31,307.00		31,307.00
Thames Centre, Municipality of	2,831,900.22		2,831,900.22
Sub-Total	5,163,112.65	0.00	5,163,112.65
<i>Muskoka</i>			
Bracebridge	718,690.01		718,690.01
Georgian Bay	8,833.50		8,833.50
Gravenhurst	107,873.86		107,873.86
Huntsville	791,780.94		791,780.94
Lake of Bays, Tp	152,639.59		152,639.59
Muskoka Lakes, Tp	319,932.05		319,932.05
Sub-Total	2,099,749.95	0.00	2,099,749.95
<i>Niagara</i>			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,429,111.65		1,429,111.65
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,405,433.49		1,405,433.49
Niagara Falls, City of	1,193,242.06		1,193,242.06
Sub-Total	4,027,787.20	0.00	4,027,787.20

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp	124,327.86		124,327.86
Calvin Tp	37,065.24		37,065.24
Chisholm Tp	70,172.90		70,172.90
Mattawan Tp/South Algonquin Tp	28,298.84		28,298.84
North Bay, City of	608,014.22		608,014.22
Papineau-Cameron Tp	56,457.46		56,457.46
Unorganized - Nipissing D	7,295.40		7,295.40
West Nipissing, Municipality of	404,616.35		404,616.35
Sub-Total	1,336,248.27	0.00	1,336,248.27
<i>Norfolk</i>			
Norfolk, County of	548,736.34		548,736.34
Sub-Total	548,736.34	0.00	548,736.34
<i>Northumberland</i>			
Alnwick-Haldimand Tp	273,956.69		273,956.69
Brighton, Municipality of	400,179.38		400,179.38
Cramahe Tp	2,145,561.41		2,145,561.41
Hamilton Tp	354,135.92		354,135.92
Port Hope, Municipality of	45,900.50		45,900.50
Trent Hills, Municipality of	214,195.85		214,195.85
Sub-Total	3,433,929.75	0.00	3,433,929.75
<i>Ottawa</i>			
Ottawa, City of	11,048,203.05	370,000.00	11,418,203.05
Sub-Total	11,048,203.05	370,000.00	11,418,203.05
<i>Oxford</i>			
Blandford-Blenheim Tp	367,410.89		367,410.89
East Zorra-Tavistock Tp/Norwich Tp/Woodstock, City of	733,457.09		733,457.09
South-West Oxford Tp	1,914,874.71		1,914,874.71
Zorra Tp	4,091,344.25		4,091,344.25
Sub-Total	7,107,086.94	0.00	7,107,086.94
<i>Parry Sound District</i>			
ArmourTp	254,467.30		254,467.30
Callander, Municipality of	19,018.64		19,018.64
Carling Tp/The Archipelago Tp	19,526.27		19,526.27
Joly Tp	13,140.94		13,140.94
Kearney, Town of	4,849.88		4,849.88
Machar Tp	241,048.22		241,048.22
Magnetawan, Municipality of	78,317.52		78,317.52
McDougall Tp	41,986.16		41,986.16
McKeller Tp	7,922.88		7,922.88
McMurrich-Monteith Tp	14,359.53		14,359.53
Nipissing Tp	21,071.89		21,071.89
Perry Tp	38,768.50		38,768.50
Powassan, Municipality of	61,475.02		61,475.02
Ryerson Tp	12,846.56		12,846.56
Seguin Tp	503,871.73		503,871.73
Strong Tp	33,183.30		33,183.30
Unorganized - Parry Sound	114,138.74		114,138.74
Whitestone The Municipality of	35,271.20		35,271.20
Sub-Total	1,515,264.28	0.00	1,515,264.28

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Peel</i>			
Caledon, Town of	4,745,923.35		4,745,923.35
Sub-Total	4,745,923.35	0.00	4,745,923.35
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	112,511.07		112,511.07
Perth East Tp	425,720.04		425,720.04
Perth South Tp	1,469,827.50		1,469,827.50
West Perth Tp	104,169.75		104,169.75
Sub-Total	2,112,228.36	0.00	2,112,228.36
<i>Peterborough</i>			
Asphodel-Norwood Tp	257,230.68		257,230.68
Cavan-Millbrook-North Monaghan Tp	64,599.03		64,599.03
Douro-Dummer Tp	660,491.83		660,491.83
Galway-Cavendish-Harvey Tp	476,894.22		476,894.22
North Kawartha Tp	13,285.00		13,285.00
Havelock-Belmont-Methuen Tp	397,926.35		397,926.35
Otonabee-South Monaghan Tp	279,316.32		279,316.32
Smith-Ennismore-Lakefield Tp	758,274.25		758,274.25
Sub-Total	2,908,017.68	0.00	2,908,017.68
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	312,610.80		312,610.80
Champlain Tp	590,298.00		590,298.00
Clarence-Rockland, City of	201,149.52		201,149.52
East Hawkesbury Tp	26,896.88		26,896.88
Russell Tp	66,877.85		66,877.85
The Nation, Municipality of	196,389.28		196,389.28
Sub-Total	1,394,222.33	0.00	1,394,222.33
<i>Prince Edward Co</i>			
Prince Edward, County of	2,364,490.95		2,364,490.95
Sub-Total	2,364,490.95	0.00	2,364,490.95
<i>Renfrew</i>			
Admaston-Bromley Tp	128,315.64		128,315.64
Bonnechere Valley Tp	74,938.11		74,938.11
Brudenell, Lyndoc and Raglan Tp	47,255.91		47,255.91
Deep River Tp/Head, Clara & Maria Tp	58,290.00		58,290.00
Greater Madawaska Tp	69,117.20		69,117.20
Horton Tp	380,237.28		380,237.28
Killaloe, Hagarty and Richards Tp	26,096.74		26,096.74
Laurentian Hills	57,079.38		57,079.38
Laurentian Valley Tp	425,842.50		425,842.50
Madawaska Valley	165,241.35		165,241.35
McNab-Braeside Tp	347,217.89		347,217.89
North Algona-Wilberforce Tp	28,602.60		28,602.60
Petawawa, Town of	283,063.41		283,063.41
Whitewater Region Tp	171,009.23		171,009.23
Sub-Total	2,262,307.24	0.00	2,262,307.24

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	293,182.87		293,182.87
Bradford West Gwillimbury, Town of/Collingwood, Town of	188,302.00		188,302.00
Clearview Tp	1,629,942.06		1,629,942.06
Essa Tp	58,672.30		58,672.30
Innisfil, Town of	34,587.78		34,587.78
Midland, Town of/Penetanguishine, Town of	248,602.83		248,602.83
New Tecumseth, Town of	25,679.23		25,679.23
Oro-Medonte Tp	2,851,996.95		2,851,996.95
Ramara Tp	2,613,492.28		2,613,492.28
Severn Tp	2,549,570.33		2,549,570.33
Springwater Tp	1,087,746.79		1,087,746.79
Tay Tp	109,119.41		109,119.41
Tiny Tp	309,302.81		309,302.81
Sub-Total	12,000,197.64	0.00	12,000,197.64
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	606,510.02		606,510.02
North Glengarry Tp	74,977.62		74,977.62
North Stormont Tp	818,236.46		818,236.46
South Dundas Tp	345,291.62		345,291.62
South Glengarry Tp	269,746.89		269,746.89
South Stormont Tp	719,977.06		719,977.06
Sub-Total	2,834,739.67	0.00	2,834,739.67
<i>Sudbury District</i>			
Baldwin Tp/ St. Charles, Municipality of	122,936.99		122,936.99
French River, Municipality of/Killarny, Municipality of	446,940.21		446,940.21
Markstay-Warren, Municipality of	71,579.78		71,579.78
Sables Spanish Rivers Tp/Espanola, Town of	50,934.61		50,934.61
Sudbury District, Unorganized	508,733.78		508,733.78
Sub-Total	1,201,125.37	0.00	1,201,125.37
<i>Thunder Bay District</i>			
Conmee, Tp/Gillies, Tp/Neebing, Municipality of	93,218.08		93,218.08
Oliver Paipoonge, Municipality of/Shuniah, Tp/	243,831.80		
Thunder Bay, City of	6,129.75		6,129.75
Sub-Total	343,179.63	0.00	343,179.63
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	805,990.86		805,990.86
North Dumfries Tp	4,233,060.42		4,233,060.42
Wellesley Tp	1,238,978.84		1,238,978.84
Wilmot Tp	1,151,755.38		1,151,755.38
Woolwich Tp	804,955.48		804,955.48
Sub-Total	8,234,740.98	0.00	8,234,740.98

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
Wellington				
Centre Wellington Tp		981,825.62		981,825.62
Erin, Town of		2,165,486.67		2,165,486.67
Guelph-Eramosa Tp		796,916.63		796,916.63
Mapleton Tp		90,825.80		90,825.80
Minto, Town of		395,827.72	45,000.00	440,827.72
Puslinch Tp		4,168,488.25		4,168,488.25
Wellington North Tp		361,154.26		361,154.26
Sub-Total		8,960,524.95	45,000.00	9,005,524.95
York				
East Gwillimbury, Town of		48,407.80		48,407.80
Georgina, Town of		61,326.93		61,326.93
Whitchurch-Stouffville, Town of		618,395.89		618,395.89
Sub-Total		728,130.62	0.00	728,130.62
GRAND TOTAL		157,563,428.96	1,195,485.00	158,758,913.96

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Algoma, District of	0.6	0.8	0.8	0.6	0.8	0.6	0.8	1.9	1.2	2.8
Brant Co.	1.5	1.5	2.1	2.0	1.8	2.1	2.0	1.8	2.3	2.3
Bruce Co.	1.6	1.5	1.7	1.6	1.7	1.7	1.9	1.8	2.3	2.4
Chatham-Kent, R. M. of	0.4	0.5	0.5	0.3	0.5	0.4	0.3	0.4	0.3	0.3
Dufferin Co.	1.8	2.1	2.6	2.4	2.3	3.0	2.7	2.9	3.1	3.0
Durham, R. M. of	7.8	9.2	10.2	11.4	11.0	11.8	12.6	13.2	12.2	11.7
Elgin Co.	0.4	0.6	0.7	0.6	0.5	0.6	0.7	0.8	0.7	0.6
Essex Co.	2.0	1.9	2.0	2.2	1.9	1.9	1.9	1.7	1.6	1.7
Frontenac Co.	1.2	1.3	1.4	1.3	1.6	2.0	2.2	2.4	2.1	2.1
Greater Sudbury, City of	2.3	2.9	2.3	1.8	2.3	1.7	2.2	2.8	2.9	2.7
Grey Co.	2.1	2.8	2.5	2.6	2.6	3.1	3.2	3.7	3.4	3.2
Haldimand Co.	----	----	----	1.5	1.9	1.8	1.6	2.0	1.8	1.4
Haldimand-Norfolk, R. M. of	1.8	2.0	2.0	----	----	----	----	----	----	----
Haliburton Co.	----	----	----	----	----	----	----	----	----	0.5
Halton, R. M. of	13.4	13.8	15.5	15.8	12.1	10.7	11.4	10.9	9.6	9.5
Hamilton, City of	4.7	4.6	6.3	6.0	5.5	6.0	6.3	5.6	6.2	5.6
Hastings Co.	1.9	2.2	2.0	2.0	2.1	2.4	2.3	2.1	2.3	2.6
Huron Co.	2.6	2.8	2.7	3.0	2.7	2.8	2.5	2.6	2.7	2.9
Kawartha Lakes, City of	----	----	----	6.4	6.4	6.7	6.8	6.8	6.5	5.9
Lambton Co.	0.6	0.6	0.5	0.5	0.7	0.4	0.5	0.7	0.7	0.5
Lanark Co.	1.3	1.5	1.6	1.7	2.0	2.4	2.3	2.3	2.3	2.3
Leeds & Grenville Co.'s	4.2	2.2	3.0	2.3	2.0	1.9	2.2	2.3	2.3	2.0
Lennox & Addington Co.	1.9	1.7	1.8	1.8	1.7	1.9	1.8	1.9	1.9	2.0
Manitoulin, District of	----	----	----	----	----	----	----	----	----	3.6
Middlesex Co.	6.1	5.6	6.4	6.0	5.4	5.6	6.2	6.2	5.6	5.2
Muskoka	----	----	----	----	----	----	----	----	----	2.1
Niagara, R. M. of	4.6	4.3	4.6	4.6	4.9	4.6	4.7	4.5	5.1	4.0
Nipissing, District of	----	----	----	----	----	----	----	----	----	1.3
Norfolk Co.	----	----	----	0.4	0.4	0.4	0.5	0.4	0.5	0.5
Northumberland Co.	3.2	3.6	3.2	3.1	3.0	3.4	3.3	3.5	3.4	3.4
Ottawa, City of	7.1	8.1	10.7	10.1	10.7	10.0	9.9	10.6	11.1	11.4
Oxford Co.	4.9	5.1	5.4	4.9	4.8	4.9	4.8	5.0	5.4	7.1
Parry Sound, District of	----	----	----	----	----	----	----	----	----	1.5
Peel, R. M. of	4.2	4.5	5.2	5.2	4.3	4.5	5.3	5.1	5.3	4.7
Perth Co.	1.7	1.6	2.1	2.0	2.1	2.0	2.0	2.0	2.4	2.1
Peterborough Co.	1.8	1.8	2.2	2.4	3.2	2.5	2.5	2.7	2.6	2.9
Prescott & Russell Co.'s	1.1	1.2	1.4	1.4	1.3	1.4	1.4	1.7	1.5	1.4
Prince Edward Co.	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.4	2.2	2.4
Renfrew Co.	1.3	1.5	1.5	1.2	1.8	1.6	1.7	1.3	1.9	2.3
Simcoe Co.	9.0	9.0	9.3	10.6	11.4	11.8	12.7	12.6	13.4	12.0
Stormont, Dundas & Glengarry Co.'s	2.4	2.8	3.0	2.7	2.6	2.7	3.5	3.0	3.4	2.8
Sudbury, District of	0.2	0.4	0.5	1.0	0.6	0.6	0.6	0.8	0.8	1.7
Thunder Bay, District of	----	----	----	----	----	----	----	----	----	0.3
Victoria Co.	6.6	6.0	7.1	----	----	----	----	----	----	----
Waterloo, R. M. of	5.8	7.3	7.7	8.2	7.8	8.0	9.5	8.2	9.3	8.2
Wellington Co.	6.9	7.5	8.4	8.9	8.9	9.1	9.1	8.3	8.8	9.0
York, R. M. of	2.2	2.7	3.0	2.4	2.4	2.0	1.9	1.0	1.0	0.7
TOTAL	125.2	131.5	146.0	144.9	141.8	143.2	149.8	149.7	151.9	158.8

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.

As of January 1, 2001 Haldimand-Norfolk has been split into two different counties; Haldimand County and Norfolk County.

Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2007
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

	Municipality	County/Region	2007 Production	Production				
				2006	2005	2004	2003	2002
1	City of Ottawa	City of Ottawa	11.0	11.1	10.6	9.9	10.0	10.7
2	City of Kawartha Lakes	City of Kawartha Lakes	5.9	6.5	6.8	6.8	6.7	6.4
3	City of Hamilton	City of Hamilton	5.6	6.2	5.6	6.3	5.9	5.4
4	Municipality of Clarington	Durham	5.2	5.0	5.8	5.3	5.6	4.7
5	Town of Caledon	Peel	4.7	5.3	5.1	5.3	4.5	4.3
6	Township of Uxbridge	Durham	4.6	5.4	5.3	5.5	4.9	4.7
7	Town of Milton	Halton	4.4	4.6	5	5.6	5.2	5.9
8	Township of North Dumfries	Waterloo	4.2	5.0	4.1	4.4	3.9	3.3
9	Puslinch Township	Wellington County	4.2	4.7	5.0	5.2	5.1	5.3
10	Township of Zorra	Oxford	4.1	3.9	3.9	3.6	3.5	3.4
Total			53.9	57.7	57.2	57.9	55.3	54.1

Notes:

1. Municipalities are ranked in order of their licenced production for 2007
2. Pre 2007 historical data for Table 4 has been corrected effective February 24, 2011.
This PDF version of Table 4 should be relied upon over previously printed versions.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	160	138	22	142	18	0	0
Aylmer	307	239	68	290	11	6	0
Bancroft	266	98	168	193	30	43	0
Guelph (Cambridge)	449	373	76	411	35	3	0
Kemptville	490	278	212	346	121	23	0
Midhurst	463	348	115	410	48	5	0
North Bay	154	60	94	125	5	24	0
Parry Sound	307	119	188	198	11	98	0
Pembroke	239	73	166	221	12	6	0
Peterborough (Tweed)	534	289	245	432	84	18	0
Sault Ste. Marie	95	52	43	78	5	12	0
Sudbury	242	125	117	175	18	49	0
Thunder Bay	58	23	35	49	2	7	0
TOTAL	3,764	2,215	1,549	3,070	400	294	0

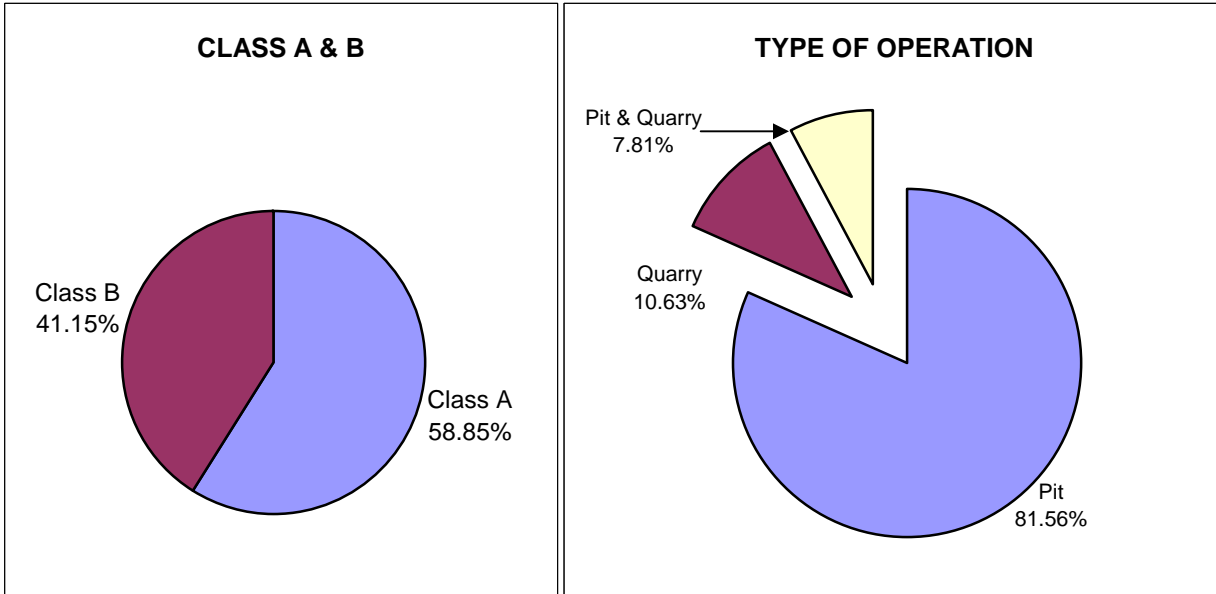
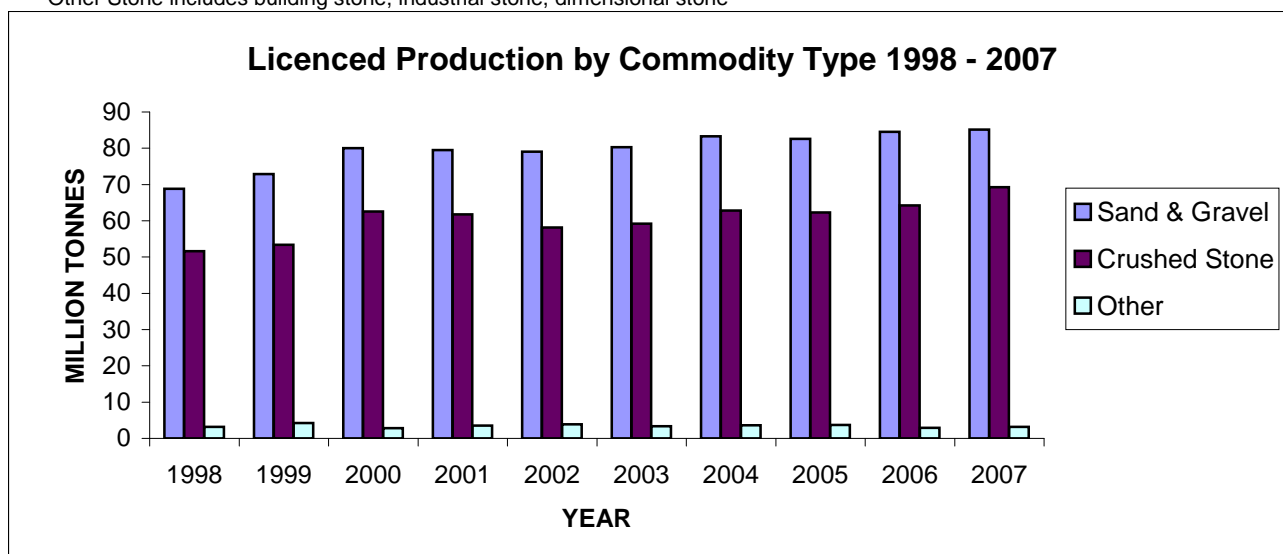


Table 6

**2007 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	26,640,180.49	14,132,551.52	11,316,157.71	1,067,798.06	123,673.20
Aylmer	15,616,893.90	11,567,655.94	4,041,074.26	8,115.74	47.96
Bancroft	4,021,821.43	861,746.45	3,066,080.50	431.20	93,563.28
Guelph (Cambridge)	35,523,400.00	23,584,750.98	11,822,820.49	112,828.53	3,000.00
Kemptville	19,378,420.41	4,333,107.75	13,658,590.78	189,376.01	1,197,345.87
Midhurst	20,517,400.44	12,906,225.86	7,337,808.49	83,183.31	190,182.78
North Bay	1,467,008.58	1,031,141.22	435,830.36	0.00	37.00
Parry Sound	3,494,518.95	1,941,332.51	1,522,693.27	3,450.36	27,042.81
Pembroke	2,487,190.24	2,095,581.76	390,319.48	0.00	1,289.00
Peterborough	17,774,038.80	7,878,669.13	9,867,901.24	9,292.63	18,175.80
Sault Ste. Marie	2,778,358.10	1,521,791.28	1,255,753.11	0.00	813.71
Sudbury	7,521,017.99	2,980,112.61	4,512,764.31	22,503.75	5,637.32
Thunder Bay	343,179.63	334,477.96	8,629.86	0.00	71.81
TOTAL	157,563,428.96	85,169,144.97	69,236,423.86	1,496,979.59	1,660,880.54

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1998	123.68	68.84	51.64	3.20
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15

Table 7

**2007 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

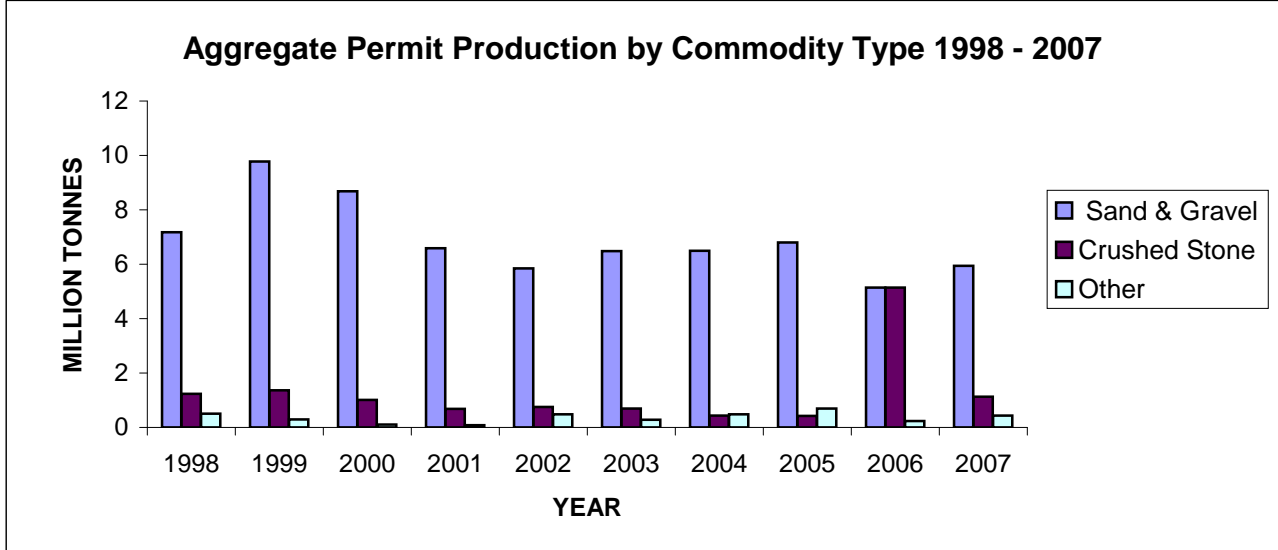
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	129,110.40	128,040.40	1,070.00	-	-
Cochrane	230,248.00	218,755.00	11,493.00	-	-
Hearst	380,055.33	252,531.52	126,245.01	-	1,278.80
Kirkland Lake	176,311.96	134,888.73	41,423.23	-	-
North Bay	261,796.88	240,837.76	19,934.40	-	1,024.72
Sault Ste. Marie	706,657.72	687,584.72	-	19,073.00	-
Sudbury	573,309.57	265,937.25	304,190.32	-	3,182.00
Timmins	1,069,469.35	741,900.37	-	286,844.00	40,724.98
Wawa	402,522.48	382,488.78	20,033.70	-	-
Sub-Total	3,929,481.69	3,052,964.53	524,389.66	305,917.00	46,210.50
NORTHWEST					
Dryden	454,797.75	266,717.75	186,687.00	-	1,393.00
Fort Frances	307,515.84	306,595.34	-	-	920.50
Kenora	144,043.36	128,784.57	4,399.00	-	10,859.79
Nipigon	786,653.06	560,766.56	225,713.14	-	173.36
Red Lake	488,886.31	488,123.31	672.00	-	91.00
Sioux Lookout	137,305.08	136,272.28	-	-	1,032.80
Thunder Bay	719,421.72	688,417.00	30,998.00	-	6.72
Sub-Total	3,038,623.12	2,575,676.81	448,469.14	-	14,477.17
SOUTHCENTRAL					
Algonquin Park	30,378.00	30,378.00	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	3,520.29	3,520.29	-	-	-
Bancroft	143,338.58	39,782.73	27,471.94	-	76,083.91
Guelph (Cambridge)	34,475.00	34,475.00	-	-	-
Kemptville	820.08	820.08	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	274,754.50	151,306.78	122,134.72	-	1,313.00
Pembroke	55,461.52	55,461.52	-	-	-
Peterborough (Tweed)	5,746.07	-	5,746.07	-	-
Sub-Total	548,494.04	315,744.40	155,352.73	0.00	77,396.91
TOTAL	7,516,598.85	5,944,385.74	1,128,211.53	305,917.00	138,084.58

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2007 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1998	8.92	7.18	1.23	0.51
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44

Table 9

**2007 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	3,520	3,520	0	0	0
Peninsula (2)	34,475	34,475	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	152,249	41,634	33,218	0	77,397
East (6)	58,025	58,025	0	0	0
Northeast (7)	2,975,521	1,987,830	654,637	286,844	46,211
Northwest (8)	4,292,809	3,818,902	440,357	19,073	14,477
TOTAL	7,516,599	5,944,386	1,128,212	305,917	138,085

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2007 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	20,048,230	15,353,365	4,614,946	79,871	48
Peninsula (2)	13,844,105	3,054,210	10,749,293	40,601	0
West Central (3)	37,765,359	29,651,057	7,837,464	83,656	193,183
GTA (4)	26,649,711	14,142,082	11,316,158	1,067,798	123,673
East Central (5)	19,785,849	9,052,946	10,602,800	6,314	123,789
East (6)	25,970,066	7,160,811	17,406,954	195,472	1,206,828
Northeast (7)	10,356,355	4,898,403	5,422,210	23,268	12,474
Northwest (8)	3,143,753	1,856,269	1,286,598	0	886
TOTAL	157,563,429	85,169,145	69,236,424	1,496,980	1,660,881

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2007
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	160	8,721.63	3,126.07	79.55	134.42	3,071.20
Aylmer	307	8,393.91	2,922.15	132.98	105.66	2,949.48
Bancroft	266	8,994.68	918.16	66.43	4.86	979.73
Guelph (Cambridge)	449	16,143.42	4,758.34	291.33	147.40	4,902.26
Kemptville	490	14,137.83	4,060.79	148.74	82.17	4,127.36
Midhurst	463	14,279.79	3,486.86	129.71	81.25	3,535.32
North Bay	154	6,940.30	581.73	16.57	2.60	595.70
Parry Sound	307	9,737.63	1,617.35	52.90	0.00	1,670.25
Pembroke	239	5,919.36	680.73	29.94	13.30	697.36
Peterborough (Tweed)	534	15,104.99	3,593.27	88.77	57.80	3,624.24
Sault Ste. Marie	95	4,126.20	622.21	26.00	5.25	642.95
Sudbury	242	16,630.11	1,305.27	66.68	50.52	1,321.43
Thunder Bay	58	3,508.94	104.86	7.68	1.65	110.89
TOTAL	3,764	132,638.79	27,777.78	1,137.29	686.89	28,228.18

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

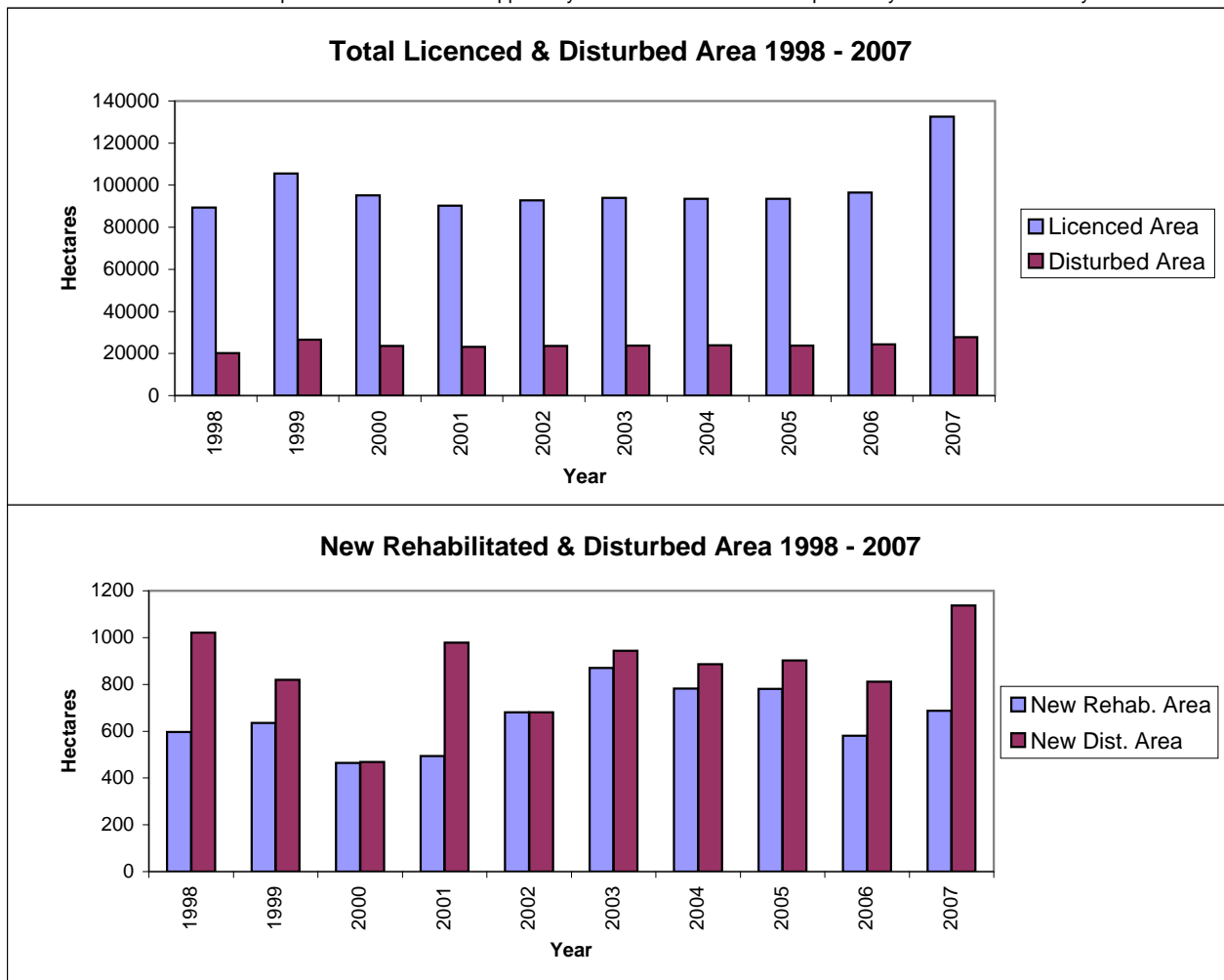


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,179.08	197	196	1	0	0
Cochrane	2,830.77	126	111	9	6	0
Hearst	3,730.76	181	159	18	4	0
Kirkland Lake	1,844.62	158	150	6	2	0
North Bay	2,368.44	193	169	19	5	0
Sault Ste. Marie	954.43	112	107	2	3	0
Sudbury	4,855.48	187	156	20	11	0
Timmins	2,023.16	171	159	9	3	0
Wawa	2,629.66	272	266	4	2	0
Sub-Total	22,416.40	1,597	1,473	88	36	0
NORTHWEST						
Dryden	2,307.19	239	224	8	7	0
Fort Frances	2,520.49	293	277	5	11	0
Kenora	2,931.99	209	170	25	14	0
Nipigon	3,750.88	322	293	17	12	0
Red Lake	1,433.86	124	121	3	0	0
Sioux Lookout	1,546.31	96	94	2	0	0
Thunder Bay	3,278.79	231	208	17	6	0
Sub-Total	17,769.51	1,514	1,387	77	50	0
SOUTHCENTRAL						
Algonquin Park	31.94	39	39	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	965.85	72	59	13	0	0
Guelph (Cambridge)	623.53	3	1	0	0	2
Kemptville	2.00	1	1	0	0	0
Midhurst	0.00	0	0	0	0	0
Parry Sound	831.48	91	70	14	6	1
Pembroke	127.44	41	41	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,613.74	250	211	28	7	4
TOTAL	42,799.65	3,361	3,071	193	93	4

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

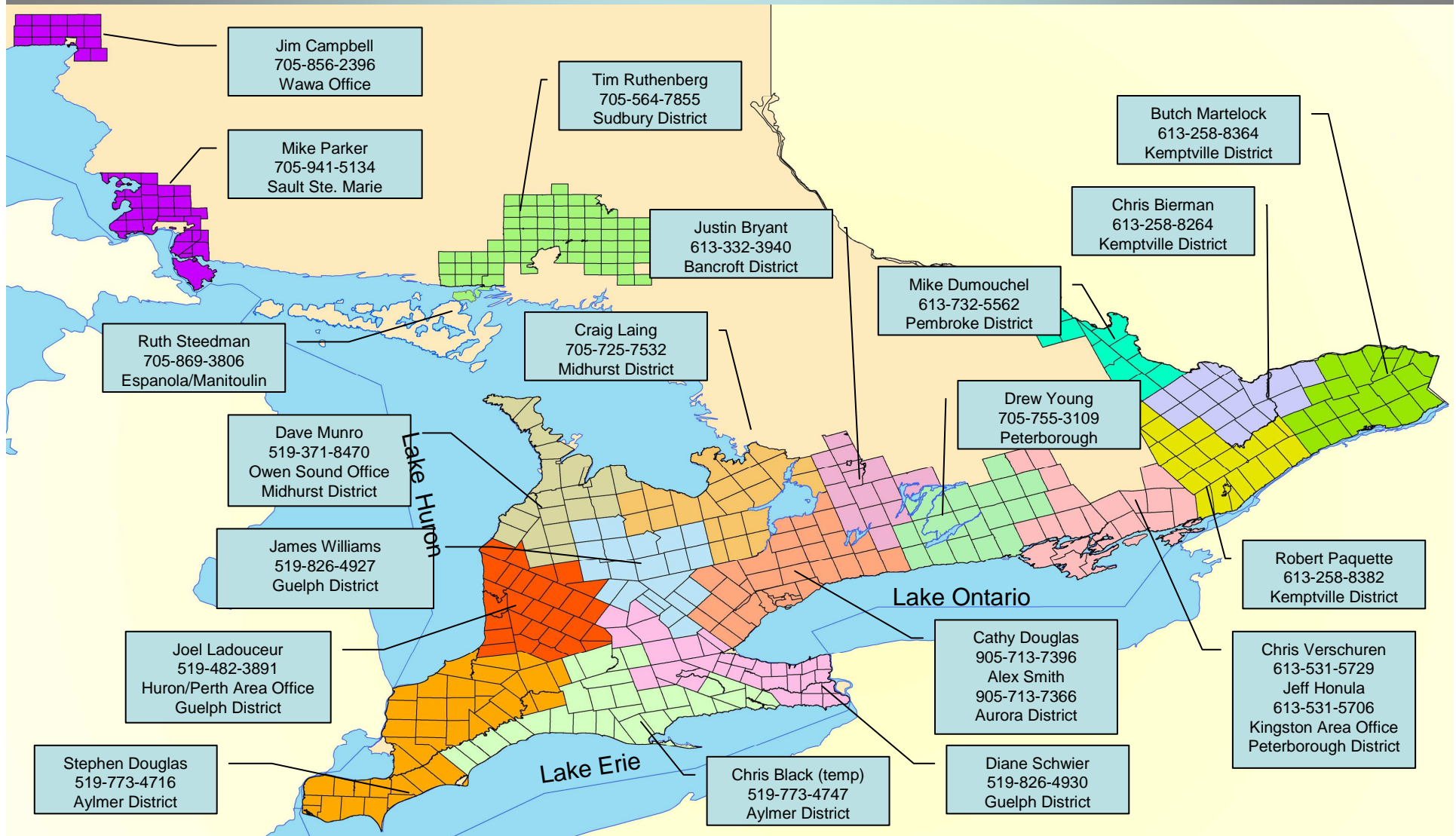
CANADIAN PORTLAND CEMENT ASSOCIATION GEOGRAPHIC AREAS



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		



Aggregate Officers of Ontario





● MINERAL ● AGGREGATES ● IN ONTARIO

Statistical Update

2 0 0 8

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2008

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 292,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2008, this basic non-renewable resource was supplied from 3,762 licensed aggregate sites on private land in designated parts of the Province and 3,199 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the *Aggregate Resources Act* and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staffs responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Aggregate and Petroleum Resources Section, Lands and Waters Branch, Natural Resource Management Division. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Overall production of mineral aggregates in 2008 totaled approximately 167 million tonnes, down 6 million tonnes or 3.5% from the previous year. Production from licenced operations was down 4.0 million tonnes or 2.5% compared to 2007. Wayside permit production decreased by 90% from 2007 on relatively small volumes (1 million in 2007 compared to .1 million in 2008). Production from aggregate permits on Crown Land decreased 13.3% from 2007 (6.5 million in 2008 from 7.5 million tonnes in 2007).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1996 - 2008
(rounded to nearest million tonnes)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Licences	114	124	124	131	145	145	141	143	150	149	152	158	154
Wayside Permits*	2	1	2	1	1	0	0	0	0	1	0	1	0
Aggregate Permits	9	8	9	11	10	7	7	7	7	8	11	8	7
Category 14 (Forest Industry)	-	-	-	2	3	3	4	3	4	4	4	4	4
Private Land Non-Designated (estimated)	11	11	11	12	12	12	12	12	12	12	12	2	2
ONTARIO TOTAL	136	144	146	157	171	167	164	165	173	174	179	173	167

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006 and .1 million for 2008

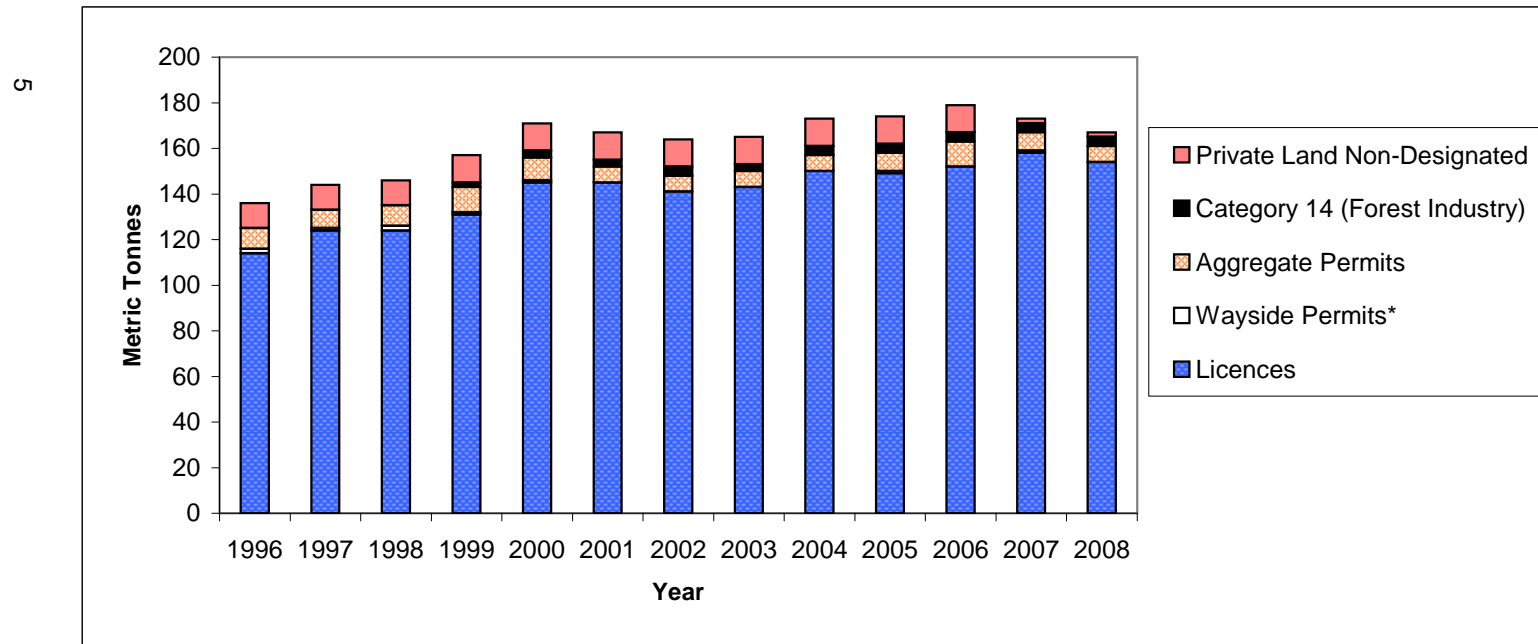


Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Algoma District			
Algoma District, Unorganized	46,692.51		46,692.51
Blind River, Town of/Spanish, Town of/The North Shore, Tp/ Elliot Lake, City of	119,060.77		119,060.77
Bruce Mines, Town of/Huron Shores, Municipality of/ Plummer Additional Tp	1,704,943.24		1,704,943.24
Hilton Tp	40,756.04		40,756.04
Jocelyn Tp	88,107.48		88,107.48
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	53,715.65		53,715.65
Laird Tp/St. Joseph Tp	8,819.38		8,819.38
Macdonald, Meredith & Aberdeen Add'l Tp	450.00		450.00
Sault Ste. Marie, City of/Prince Tp	852,576.34		852,576.34
Sub-Total	2,915,121.41	0.00	2,915,121.41
Brant			
Brant, County of/Brantford, City of	2,161,757.67		2,161,757.67
Sub-Total	2,161,757.67	0.00	2,161,757.67
Bruce			
Arran-Elderslie, Municipality of	180,983.31	21,100.00	202,083.31
Brockton, Municipality of	130,216.51		130,216.51
Huron-Kinloss Tp	371,513.74		371,513.74
Kincardine, Municipality of	122,020.79		122,020.79
Northern Bruce Peninsula, Municipality of	219,456.24		219,456.24
Saugeen Shores, Town of	258,230.70		258,230.70
South Bruce, Municipality of	389,797.82		389,797.82
South Bruce Peninsula, Town of	340,564.55		340,564.55
Sub-Total	2,012,783.66	21,100.00	2,033,883.66
Chatham-Kent			
Chatham-Kent, Municipality of	207,561.21		207,561.21
Sub-Total	207,561.21	0.00	207,561.21
Dufferin			
Amaranth Tp/East Luther Grand Valley Tp	193,734.00		193,734.00
East Garafraxa Tp	1,207,395.82		1,207,395.82
Melancthon Tp	963,522.90		963,522.90
Mono Tp	445,295.00		445,295.00
Mulmur Tp	243,868.27		243,868.27
Sub-Total	3,053,815.99	0.00	3,053,815.99
Durham			
Brock Tp	1,584,775.51		1,584,775.51
Clarington, Municipality of	4,550,342.80		4,550,342.80
Oshawa, City of/Scugog Tp/Whitby, Town of	129,115.44		129,115.44
Uxbridge Tp	3,728,275.41		3,728,275.41
Sub-Total	9,992,509.16	0.00	9,992,509.16
Elgin			
Bayham/West Elgin, Municipality of/Malahide Tp	309,934.73		309,934.73
Central Elgin, Municipality of	291,319.66		291,319.66
Sub-Total	601,254.39	0.00	601,254.39

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**
(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,257,512.00		1,257,512.00
Kingsville, Town of	356,024.00		356,024.00
Sub-Total	1,613,536.00	0.00	1,613,536.00
Frontenac			
Central Frontenac Tp	292,511.70		292,511.70
Frontenac Islands Tp	729,048.22		729,048.22
Kingston, City of	1,351,771.86		1,351,771.86
North Frontenac Tp	140,954.50		140,954.50
South Frontenac Tp	351,295.92		351,295.92
Sub-Total	2,865,582.20	0.00	2,865,582.20
Greater Sudbury			
Greater Sudbury, City of	3,176,459.96		3,176,459.96
Sub-Total	3,176,459.96	0.00	3,176,459.96
Grey			
Chatsworth Tp	484,558.63		484,558.63
Georgian Bluffs, Tp	649,056.24		649,056.24
Grey Highlands, Municipality of	266,251.35		266,251.35
Meaford, Municipality of	524,184.99		524,184.99
Southgate Tp	377,902.85		377,902.85
The Blue Mountains, Town of	368,766.80		368,766.80
West Grey, Municipality of	638,948.42	55,000.00	693,948.42
Sub-Total	3,309,669.28	55,000.00	3,364,669.28
Haldimand			
Haldimand, County of	1,310,270.30		1,310,270.30
Sub-Total	1,310,270.30	0.00	1,310,270.30
Haliburton			
Algonquin Highlands, Tp	54,409.21		54,409.21
Dysart et al, Tp	299,642.07		299,642.07
Highlands East, Tp	30,799.68		30,799.68
Minden Hills, TP	181,629.28		181,629.28
Sub-Total	566,480.24	0.00	566,480.24
Halton			
Burlington, City of/Halton Hills, Town of	4,057,825.16		4,057,825.16
Milton, Town of	4,487,238.58		4,487,238.58
Sub-Total	8,545,063.74	0.00	8,545,063.74
Hamilton			
Hamilton, City of	5,666,848.07		5,666,848.07
Sub-Total	5,666,848.07	0.00	5,666,848.07

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Hastings</i>			
Bancroft, Town of	46,817.24		46,817.24
Belleville, City of	729,362.04		729,362.04
Carlo/Mayo Tp	47,737.67		47,737.67
Centre Hastings, Municipality of	174,385.37		174,385.37
Faraday Tp	35,619.80		35,619.80
Hasting Highlands	156,523.86		156,523.86
Limerick Tp	19,615.28		19,615.28
Madoc Tp	771,285.41		771,285.41
Marmora & Lake, Municipality of/Stirling-Rawdon, Tp	19,732.75		19,732.75
Quinte West, City of	708,175.15		708,175.15
Tweed, Municipality of	126,289.99		126,289.99
Tyendinaga Tp	176,768.37		176,768.37
Wollaston	37,287.60		37,287.60
Sub-Total	3,049,600.53	0.00	3,049,600.53
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	845,717.38		845,717.38
Bluewater, Municipality of	6,344.46		6,344.46
Central Huron, Municipality of	607,229.80		607,229.80
Howick Tp	285,843.97		285,843.97
Huron East, Municipality of	706,418.33		706,418.33
Morris-Turnberry, Municipality of	207,949.99		207,949.99
North Huron Tp	69,135.60		69,135.60
South Huron, Municipality of	148,026.37		148,026.37
Sub-Total	2,876,665.90	0.00	2,876,665.90
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	5,475,255.06		5,475,255.06
Sub-Total	5,475,255.06	0.00	5,475,255.06
<i>Lambton</i>			
Enniskillen/Warwick Tp	276,570.94		276,570.94
Lambton Shores, Municipality of	42,015.47		42,015.47
Plympton-Wyoming, Town of	290,664.34		290,664.34
Sub-Total	609,250.75	0.00	609,250.75
<i>Lanark</i>			
Beckwith Tp	257,327.49		257,327.49
Drummond-North Elmsley Tp	126,468.19		126,468.19
Lanark Highlands Tp	1,159,366.19		1,159,366.19
Mississippi Mills, Town of	172,776.38		172,776.38
Montague Tp	209,451.61		209,451.61
Tay Valley Tp	21,160.80		21,160.80
Sub-Total	1,946,550.66	0.00	1,946,550.66

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Leeds & Grenville			
Athens Tp/Front of Yonge Tp	229,214.57		229,214.57
Augusta Tp	195,813.06		195,813.06
Edwardsburgh-Cardinal Tp	119,130.53		119,130.53
Elizabethtown-Kitley Tp	457,788.88		457,788.88
Leeds and the Thousand Islands Tp	488,883.58		488,883.58
Merrickville-Wolford, Village of	53,158.24		53,158.24
North Grenville Tp	584,027.31		584,027.31
Rideau Lakes Tp	156,156.14		156,156.14
Sub-Total	2,284,172.31	0.00	2,284,172.31
Lennox & Addington			
Addington Highlands Tp	20,162.92		20,162.92
Greater Napanee, Town of	199,357.73		199,357.73
Loyalist Tp	1,634,813.98		1,634,813.98
Stone Mills Tp	130,622.74		130,622.74
Sub-Total	1,984,957.37	0.00	1,984,957.37
Manitoulin District			
Assignack, Tp	9,814.68		9,814.68
Barrie Island, TP/Burpee & Mills, Tp/Cockburn Island, Tp	7,694.84		7,694.84
Billings, Tp	10,023.00		10,023.00
Central Manitoulin Tp	56,403.62		56,403.62
Gordon, Tp	18,786.12		18,786.12
Northeastern Manitoulin & The Islands	94,217.32		94,217.32
Tehkummah, Tp	19,250.48		19,250.48
Unorganized - Manitoulin D	3,691,291.51		3,691,291.51
Sub-Total	3,907,481.57	0.00	3,907,481.57
Middlesex			
Adelaide Metcalfe Tp	17,645.00		17,645.00
London, City of	1,511,642.32		1,511,642.32
Lucan Biddulph Tp	7,283.74		7,283.74
Middlesex Centre Tp	545,135.01		545,135.01
North Middlesex, Municipality of	93,653.14		93,653.14
Strathroy-Caradoc Tp	38,171.00		38,171.00
Thames Centre, Municipality of	2,617,526.82		2,617,526.82
Sub-Total	4,831,057.03	0.00	4,831,057.03
Muskoka			
Bracebridge	652,544.83		652,544.83
Georgian Bay	5,414.00		5,414.00
Gravenhurst	106,557.95		106,557.95
Huntsville	913,598.62		913,598.62
Lake of Bays, Tp	139,565.07		139,565.07
Muskoka Lakes, Tp	308,845.10		308,845.10
Sub-Total	2,126,525.57	0.00	2,126,525.57
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,604,917.21		1,604,917.21
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,289,543.69		1,289,543.69
Niagara Falls, City of	1,062,280.34		1,062,280.34
Sub-Total	3,956,741.24	0.00	3,956,741.24

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp	39,556.63		39,556.63
Calvin Tp	36,818.58		36,818.58
Chisholm Tp	70,187.72		70,187.72
Mattawan Tp/South Algonquin Tp	18,740.76		18,740.76
North Bay, City of	626,797.85		626,797.85
Papineau-Cameron Tp	46,835.90		46,835.90
Unorganized - Nipissing D	2,343.00		2,343.00
West Nipissing, Municipality of	365,502.69		365,502.69
Sub-Total	1,206,783.13	0.00	1,206,783.13
<i>Norfolk</i>			
Norfolk, County of	501,333.10		501,333.10
Sub-Total	501,333.10	0.00	501,333.10
<i>Northumberland</i>			
Alnwick-Haldimand Tp	188,232.05		188,232.05
Brighton, Municipality of	220,739.50		220,739.50
Cramahe Tp	2,056,806.05		2,056,806.05
Hamilton Tp	319,976.98		319,976.98
Port Hope, Municipality of	45,542.87		45,542.87
Trent Hills, Municipality of	206,296.39		206,296.39
Sub-Total	3,037,593.84	0.00	3,037,593.84
<i>Ottawa</i>			
Ottawa, City of	11,234,566.15		11,234,566.15
Sub-Total	11,234,566.15	0.00	11,234,566.15
<i>Oxford</i>			
Blandford-Blenheim Tp	525,645.19		525,645.19
East Zorra-Tavistock Tp/Norwich Tp	224,908.25		224,908.25
South-West Oxford Tp	1,517,948.54		1,517,948.54
Zorra Tp	3,561,230.00		3,561,230.00
Sub-Total	5,829,731.98	0.00	5,829,731.98
<i>Parry Sound District</i>			
ArmourTp	169,462.00		169,462.00
Callander, Municipality of	7,948.75		7,948.75
Carling Tp/The Archipelago Tp	16,752.16		16,752.16
Joly Tp	17,778.34		17,778.34
Kearney, Town of	19,661.08		19,661.08
Macher Tp	95,475.65		95,475.65
Magnetawan, Municipality of	152,072.63		152,072.63
McDougall Tp	148,352.20		148,352.20
McKeller Tp	80,456.66		80,456.66
McMurrich-Monteith Tp	23,803.05		23,803.05
Nipissing Tp	22,310.32		22,310.32
Perry Tp	48,002.56		48,002.56
Powassan, Municipality of	79,237.60		79,237.60
Ryerson Tp	22,210.98		22,210.98
Seguin Tp	640,767.10		640,767.10
Strong Tp	8,562.76		8,562.76
Unorganized - Parry Sound	198,292.38		198,292.38
Whitestone The Municipality of	27,479.72		27,479.72
Sub-Total	1,778,625.94	0.00	1,778,625.94

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Peel			
Caledon, Town of	3,757,366.65		3,757,366.65
Sub-Total	3,757,366.65	0.00	3,757,366.65
Perth			
North Perth, Town of/St. Marys, Separated Town of	87,500.74		87,500.74
Perth East Tp	398,800.33		398,800.33
Perth South Tp	1,229,409.60		1,229,409.60
West Perth Tp	140,116.21		140,116.21
Sub-Total	1,855,826.88	0.00	1,855,826.88
Peterborough			
Asphodel-Norwood Tp	407,347.26		407,347.26
Cavan-Millbrook-North Monaghan Tp	34,500.00		34,500.00
Douro-Dummer Tp	667,700.96		667,700.96
Galway-Cavendish-Harvey Tp	689,696.55		689,696.55
North Kawartha Tp	636,087.68		636,087.68
Havelock-Belmont-Methuen Tp	16,689.77		16,689.77
Otonabee-South Monaghan Tp	137,874.60		137,874.60
Smith-Ennismore-Lakefield Tp	653,425.66		653,425.66
Sub-Total	3,243,322.48	0.00	3,243,322.48
Prescott & Russell			
Alfred & Plantagenet Tp	369,656.45		369,656.45
Champlain Tp	671,708.01		671,708.01
Clarence-Rockland, City of	265,182.81		265,182.81
East Hawkesbury Tp	55,013.84		55,013.84
Russell Tp	93,985.78		93,985.78
The Nation, Municipality of	222,165.22		222,165.22
Sub-Total	1,677,712.11	0.00	1,677,712.11
Prince Edward Co			
Prince Edward, County of	2,381,089.95		2,381,089.95
Sub-Total	2,381,089.95	0.00	2,381,089.95
Renfrew			
Admaston-Bromley Tp	184,339.98		184,339.98
Bonnechere Valley Tp	116,990.32		116,990.32
Brudenell, Lyndoc and Raglan Tp	34,300.04		34,300.04
Deep River Tp/Head, Clara & Maria Tp	8,024.00		8,024.00
Greater Madawaska Tp	53,101.96		53,101.96
Horton Tp	251,348.19		251,348.19
Killaloe, Hagarty and Richards Tp	29,482.00		29,482.00
Laurentian Hills	72,477.09		72,477.09
Laurentian Valley Tp	415,560.66		415,560.66
Madawaska Valley	75,749.05		75,749.05
McNab-Braeside Tp	335,444.25		335,444.25
North Algona-Wilberforce Tp	41,454.57		41,454.57
Petawawa, Town of	316,269.26		316,269.26
Whitewater Region Tp	170,859.31		170,859.31
Sub-Total	2,105,400.68	0.00	2,105,400.68

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	445,190.23		445,190.23
Bradford West Gwillimbury, Town of/Collingwood, Town of	88,400.00		88,400.00
Clearview Tp	1,600,913.84		1,600,913.84
Essa Tp	42,699.57		42,699.57
Innisfil, Town of	71,026.20		71,026.20
Midland, Town of/Penetanguishine, Town of	318,670.95		318,670.95
New Tecumseth, Town of	11,958.00		11,958.00
Oro-Medonte Tp	2,762,908.66		2,762,908.66
Ramara Tp	2,443,959.38		2,443,959.38
Severn Tp	2,576,000.81		2,576,000.81
Springwater Tp	1,418,809.89		1,418,809.89
Tay Tp	140,919.80		140,919.80
Tiny Tp	220,669.94		220,669.94
Sub-Total	12,142,127.27	0.00	12,142,127.27
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	698,348.45		698,348.45
North Glengarry Tp	70,788.90		70,788.90
North Stormont Tp	1,078,127.52		1,078,127.52
South Dundas Tp	368,319.72		368,319.72
South Glengarry Tp	339,511.73		339,511.73
South Stormont Tp	675,949.72		675,949.72
Sub-Total	3,231,046.04	0.00	3,231,046.04
<i>Sudbury District</i>			
Baldwin Tp	96,502.78		96,502.78
French River, Municipality of	56,057.57		56,057.57
Killarny, Municipality of/Nairn & Hyman Tp	310,438.00		310,438.00
Markstay-Warren, Municipality of	70,683.54		70,683.54
Sables Spanish Rivers Tp/Espanola, Town of	95,010.86		95,010.86
Sudbury District, Unorganized	464,915.55		464,915.55
Sub-Total	1,093,608.30	0.00	1,093,608.30
<i>Thunder Bay District</i>			
Conmee, Tp	142,645.83		142,645.83
Neebing, Municipality of	76,981.00		76,981.00
Oliver Paipoonge, Municipality of	269,087.40		269,087.40
Shuniah, Tp	194,273.17		194,273.17
Thunder Bay, City of	1,297.44		1,297.44
Sub-Total	684,284.84	0.00	684,284.84
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	824,235.97		824,235.97
North Dumfries Tp	3,738,192.27		3,738,192.27
Wellesley Tp	1,359,105.14		1,359,105.14
Wilmot Tp	1,241,285.59		1,241,285.59
Woolwich Tp	766,034.15		766,034.15
Sub-Total	7,928,853.12	0.00	7,928,853.12

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
Wellington			
Centre Wellington Tp	1,026,212.12		1,026,212.12
Erin, Town of	1,633,677.15		1,633,677.15
Guelph-Eramosa Tp	792,936.36		792,936.36
Mapleton Tp	52,010.40		52,010.40
Minto, Town of	369,412.57		369,412.57
Puslinch Tp	3,864,269.04		3,864,269.04
Wellington North Tp	274,339.05		274,339.05
Sub-Total	8,012,856.69	0.00	8,012,856.69
York			
East Gwillimbury, Town of	144,873.31		144,873.31
Georgina, Town of	33,100.70		33,100.70
Whitchurch-Stouffville, Town of	876,932.30		876,932.30
Sub-Total	1,054,906.31	0.00	1,054,906.31
GRAND TOTAL	153,804,006.73	76,100.00	153,880,106.73

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Algoma, District of	0.8	0.8	0.6	0.8	0.6	0.8	1.9	1.2	2.8	2.9
Brant Co.	1.5	2.1	2.0	1.8	2.1	2.0	1.8	2.3	2.3	2.2
Bruce Co.	1.5	1.7	1.6	1.7	1.7	1.9	1.8	2.3	2.4	2.0
Chatham-Kent, R. M. of	0.5	0.5	0.3	0.5	0.4	0.3	0.4	0.3	0.3	0.2
Dufferin Co.	2.1	2.6	2.4	2.3	3.0	2.7	2.9	3.1	3.0	3.1
Durham, R. M. of	9.2	10.2	11.4	11.0	11.8	12.6	13.2	12.2	11.7	10.0
Elgin Co.	0.6	0.7	0.6	0.5	0.6	0.7	0.8	0.7	0.6	0.6
Essex Co.	1.9	2.0	2.2	1.9	1.9	1.9	1.7	1.6	1.7	1.6
Frontenac Co.	1.3	1.4	1.3	1.6	2.0	2.2	2.4	2.1	2.1	2.9
Greater Sudbury, City of	2.9	2.3	1.8	2.3	1.7	2.2	2.8	2.9	2.7	3.2
Grey Co.	2.8	2.5	2.6	2.6	3.1	3.2	3.7	3.4	3.2	3.3
Haldimand Co.	----	----	1.5	1.9	1.8	1.6	2.0	1.8	1.4	1.3
Haldimand-Norfolk, R. M. of	2.0	2.0	----	----	----	----	----	----	----	----
Haliburton Co.	----	----	----	----	----	----	----	----	0.5	0.6
Halton, R. M. of	13.8	15.5	15.8	12.1	10.7	11.4	10.9	9.6	9.5	8.5
Hamilton, City of	4.6	6.3	6.0	5.5	6.0	6.3	5.6	6.2	5.6	5.7
Hastings Co.	2.2	2.0	2.0	2.1	2.4	2.3	2.1	2.3	2.6	3.0
Huron Co.	2.8	2.7	3.0	2.7	2.8	2.5	2.6	2.7	2.9	2.9
Kawartha Lakes, City of	----	----	6.4	6.4	6.7	6.8	6.8	6.5	5.9	5.5
Lambton Co.	0.6	0.5	0.5	0.7	0.4	0.5	0.7	0.7	0.5	0.6
Lanark Co.	1.5	1.6	1.7	2.0	2.4	2.3	2.3	2.3	2.3	1.9
Leeds & Grenville Co.'s	2.2	3.0	2.3	2.0	1.9	2.2	2.3	2.3	2.0	2.3
Lennox & Addington Co.	1.7	1.8	1.8	1.7	1.9	1.8	1.9	1.9	2.0	2.0
Manitoulin, District of	----	----	----	----	----	----	----	----	3.6	3.9
Middlesex Co.	5.6	6.4	6.0	5.4	5.6	6.2	6.2	5.6	5.2	4.8
Muskoka	----	----	----	----	----	----	----	----	2.1	2.1
Niagara, R. M. of	4.3	4.6	4.6	4.9	4.6	4.7	4.5	5.1	4.0	4.0
Nipissing, District of	----	----	----	----	----	----	----	----	1.3	1.2
Norfolk Co.	----	----	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5
Northumberland Co.	3.6	3.2	3.1	3.0	3.4	3.3	3.5	3.4	3.4	3.0
Ottawa, City of	8.1	10.7	10.1	10.7	10.0	9.9	10.6	11.1	11.4	11.2
Oxford Co.	5.1	5.4	4.9	4.8	4.9	4.8	5.0	5.4	7.1	5.8
Parry Sound, District of	----	----	----	----	----	----	----	----	1.5	1.8
Peel, R. M. of	4.5	5.2	5.2	4.3	4.5	5.3	5.1	5.3	4.7	3.8
Perth Co.	1.6	2.1	2.0	2.1	2.0	2.0	2.0	2.4	2.1	1.9
Peterborough Co.	1.8	2.2	2.4	3.2	2.5	2.5	2.7	2.6	2.9	3.2
Prescott & Russell Co.'s	1.2	1.4	1.4	1.3	1.4	1.4	1.7	1.5	1.4	1.7
Prince Edward Co.	2.0	2.1	2.0	2.1	2.2	2.2	2.4	2.2	2.4	2.4
Renfrew Co.	1.5	1.5	1.2	1.8	1.6	1.7	1.3	1.9	2.3	2.1
Simcoe Co.	9.0	9.3	10.6	11.4	11.8	12.7	12.6	13.4	12.0	12.1
Stormont, Dundas & Glengarry Co.'s	2.8	3.0	2.7	2.6	2.7	3.5	3.0	3.4	2.8	3.2
Sudbury, District of	0.4	0.5	1.0	0.6	0.6	0.6	0.8	0.8	1.7	1.1
Thunder Bay, District of	----	----	----	----	----	----	----	----	0.3	0.7
Victoria Co.	6.0	7.1	----	----	----	----	----	----	----	----
Waterloo, R. M. of	7.3	7.7	8.2	7.8	8.0	9.5	8.2	9.3	8.2	7.9
Wellington Co.	7.5	8.4	8.9	8.9	9.1	9.1	8.3	8.8	9.0	8.0
York, R. M. of	2.7	3.0	2.4	2.4	2.0	1.9	1.0	1.0	0.7	1.1
TOTAL	131.5	146.0	144.9	141.8	143.2	149.8	149.8	151.9	158.8	153.8

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.

As of January 1, 2001 Haldimand-Norfolk has been split into two different counties; Haldimand County and Norfolk County.

Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2008
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2008 Production	Production(2)				
			2007	2006	2005	2004	2003
1 City of Ottawa	City of Ottawa	11.2	11.0	11.1	10.6	9.9	10.0
2 City of Hamilton	City of Hamilton	5.7	5.6	6.2	5.6	6.3	5.9
3 City of Kawartha Lakes	City of Kawartha Lakes	5.5	5.9	6.5	6.8	6.8	6.7
4 Municipality of Clarington	Durham	4.6	5.2	5.0	5.8	5.3	5.6
5 Town of Milton	Halton	4.5	4.4	4.6	5.0	5.6	5.2
6 Puslinch Township	Wellington County	3.9	4.2	4.7	5.0	5.2	5.1
7 Town of Caledon	Peel	3.8	4.7	5.3	5.1	5.3	4.5
8 Township of North Dumfries	Waterloo	3.7	4.2	5.0	4.1	4.4	3.9
9 Township of Uxbridge	Durham	3.7	4.6	5.4	5.3	5.5	4.9
10 Unorganized - Manitoulin D(3)	Manitoulin	3.7	3.5	-	-	-	-
Total		50.3	53.3	53.8	53.3	54.3	51.8

Notes:

1. Municipalities are ranked in order of their licenced production for 2008.
2. Historical data are for current year's Top Ten Producing Municipalities.
3. Unorganized - Manitoulin D only designated effective Jan. 1, 2007.
4. Pre 2008 historical data for Table 4 has been corrected effective February 24, 2011.
This PDF version of Table 4 should be relied upon over previously printed versions.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	150	128	22	134	16	0	0
Aylmer	311	243	68	295	10	6	0
Bancroft	268	99	169	193	32	43	0
Guelph (Cambridge)	445	374	71	407	35	3	0
Kemptville	485	280	205	340	122	23	0
Midhurst	464	348	116	410	49	5	0
North Bay	155	60	95	126	5	24	0
Parry Sound	308	120	188	199	11	98	0
Pembroke	244	75	169	223	11	10	0
Peterborough (Tweed)	536	290	246	435	84	17	0
Sault Ste. Marie	95	53	42	78	5	12	0
Sudbury	241	126	115	173	19	49	0
Thunder Bay	60	24	36	50	3	7	0
TOTAL	3,762	2,220	1,542	3,063	402	297	0

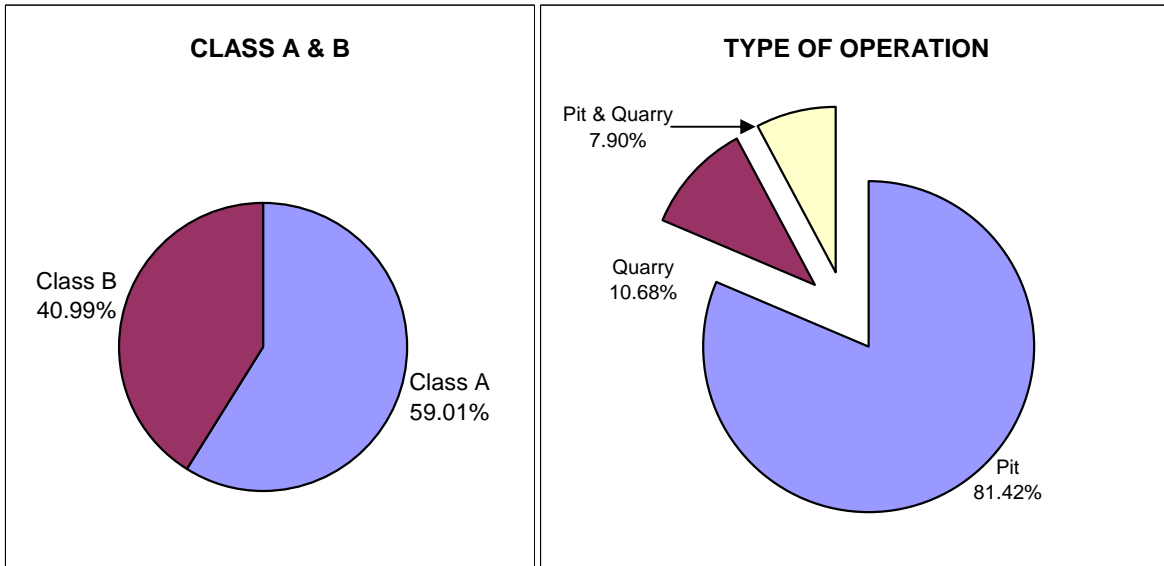
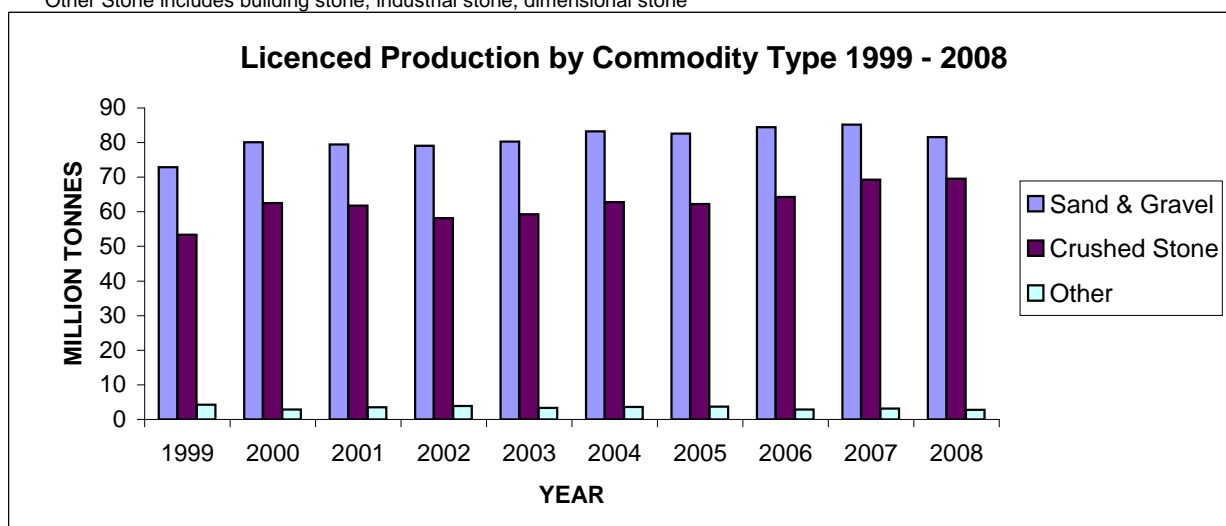


Table 6

**2008 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	23,344,345.86	12,554,715.20	9,819,731.01	877,282.50	92,617.15
Aylmer	14,193,724.46	10,583,755.98	3,603,738.12	6,230.36	0.00
Bancroft	4,207,301.77	960,432.83	3,117,705.61	272.34	128,890.99
Guelph (Cambridge)	33,805,213.87	22,106,190.65	11,603,880.18	95,143.04	0.00
Kemptville	20,139,179.27	4,234,949.46	14,810,874.03	120,167.45	973,188.33
Midhurst	20,483,002.20	13,019,272.25	7,165,249.69	46,969.15	251,511.11
North Bay	1,391,939.40	862,263.80	523,256.48	0.00	6,419.12
Parry Sound	3,727,505.75	1,813,078.39	1,828,929.97	63,525.09	21,972.30
Pembroke	2,340,268.68	1,912,312.97	424,428.71	0.00	3,527.00
Peterborough	18,398,855.08	7,562,739.73	10,794,952.02	19,624.87	21,538.46
Sault Ste. Marie	2,862,484.96	1,705,856.29	1,155,997.82	0.00	630.85
Sudbury	8,225,900.59	3,550,347.39	4,666,433.96	1,420.97	7,698.27
Thunder Bay	684,284.84	681,918.84	2,336.00	0.00	30.00
TOTAL	153,804,006.73	81,547,833.78	69,517,513.60	1,230,635.77	1,508,023.58

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1999	130.53	72.87	53.40	4.26
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73

Table 7

**2008 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

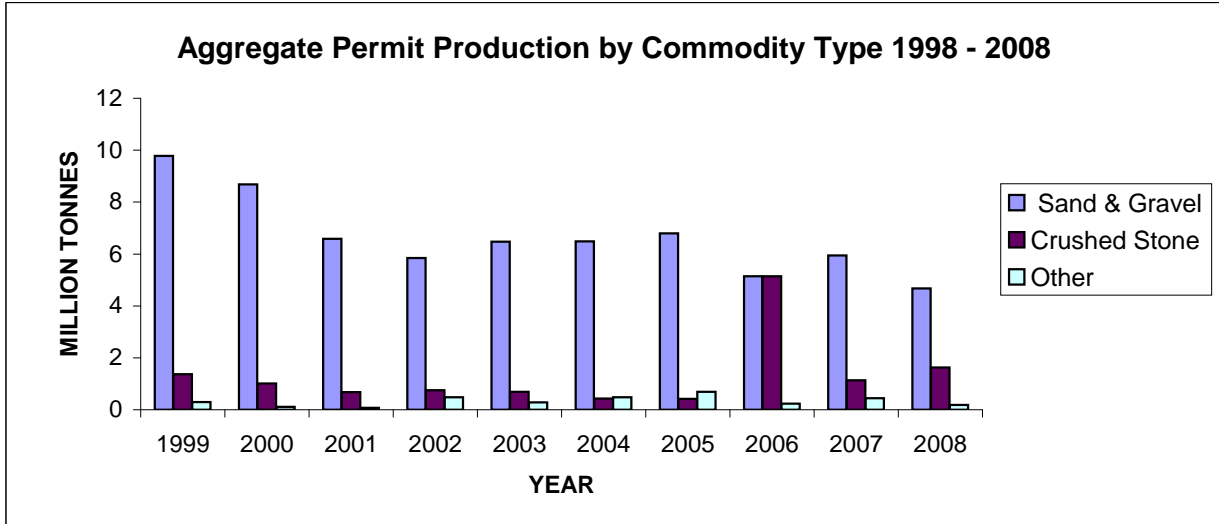
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	132,731.80	132,731.80	-	-	-
Cochrane	97,624.21	87,060.21	10,564.00	-	-
Hearst	255,762.64	227,281.64	28,126.00	355.00	-
Kirkland Lake	274,857.59	237,771.84	37,085.75	-	-
North Bay	385,817.69	364,967.27	19,733.73	-	1,116.69
Sault Ste. Marie	328,681.40	328,681.40	-	-	-
Sudbury	907,986.77	335,282.76	564,381.77	209.44	8,112.80
Timmins	417,684.89	368,593.87	1,333.42	24,296.11	23,461.49
Wawa	225,879.14	198,050.04	2,446.30	25,382.80	-
Sub-Total	3,027,026.13	2,280,420.83	663,670.97	50,243.35	32,690.98
NORTHWEST					
Dryden	614,347.38	365,465.38	248,327.00	-	555.00
Fort Frances	277,356.10	268,548.10	-	7,886.00	922.00
Kenora	393,142.53	351,418.94	27,029.00	-	14,694.59
Nipigon	338,235.95	310,648.19	25,046.76	-	2,541.00
Red Lake	134,694.26	134,677.94	-	-	16.32
Sioux Lookout	209,779.56	209,005.80	-	-	773.76
Thunder Bay	439,177.86	410,061.86	29,109.00	-	7.00
Sub-Total	2,406,733.64	2,049,826.21	329,511.76	7,886.00	19,509.67
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	2,422.98	2,422.98	-	-	-
Bancroft	204,149.16	96,226.20	40,971.89	-	66,951.07
Guelph (Cambridge)	-	-	-	-	-
Kemptville	1,346.40	1,346.40	-	-	-
Midhurst	145,652.00	145,652.00	-	-	-
Parry Sound	593,819.58	27,273.23	564,909.55	-	1,636.80
Pembroke	72,077.05	72,077.05	-	-	-
Peterborough (Tweed)	34,460.09	-	34,460.09	-	-
Sub-Total	1,053,927.26	344,997.86	640,341.53	0.00	68,587.87
TOTAL	6,487,687.03	4,675,244.90	1,633,524.26	58,129.35	120,788.52

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2008 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
1999	11.44	9.78	1.37	0.29
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18

Table 9

**2008 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	2,423	2,423	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	145,652	145,652	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	196,373	52,354	75,432	0	68,588
East (6)	74,328	74,328	0	0	0
Northeast (7)	3,106,985	1,813,943	1,238,917	24,861	29,264
Northwest (8)	2,961,925	2,586,545	319,175	33,269	22,936
TOTAL	6,487,687	4,675,245	1,633,524	58,129	120,789

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2008 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,424,884	14,287,800	4,130,255	6,829	0
Peninsula (2)	13,596,950	2,936,147	10,578,018	82,786	0
West Central (3)	36,460,106	28,485,272	7,664,595	58,728	251,511
GTA (4)	23,349,846	12,560,215	9,819,731	877,283	92,617
East Central (5)	19,879,868	8,736,123	10,979,369	3,027	161,349
East (6)	27,329,988	6,931,613	19,274,358	139,792	984,225
Northeast (7)	11,162,959	5,222,889	5,860,218	62,191	17,661
Northwest (8)	3,599,406	2,387,775	1,210,970	0	661
TOTAL	153,804,007	81,547,834	69,517,514	1,230,636	1,508,024

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2008
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	150	8,420.63	3,029.17	64.91	93.24	3,000.84
Aylmer	311	8,429.11	2,922.52	68.85	109.56	2,881.81
Bancroft	268	9,070.88	1,003.96	72.93	7.02	1,069.87
Guelph (Cambridge)	445	15,981.50	4,624.13	148.75	129.67	4,643.20
Kemptville	485	14,083.02	4,112.09	148.72	114.67	4,146.15
Midhurst	464	14,474.99	3,543.38	120.94	97.53	3,566.80
North Bay	155	6,981.72	862.60	22.88	7.21	878.27
Parry Sound	308	9,804.63	1,853.66	41.60	16.25	1,879.01
Pembroke	244	5,966.91	714.32	35.81	6.50	743.63
Peterborough (Tweed)	536	15,147.56	3,624.66	100.28	42.02	3,682.92
Sault Ste. Marie	95	4,037.21	654.12	21.30	3.08	672.34
Sudbury	241	16,765.05	1,406.86	88.67	20.93	1,474.60
Thunder Bay	60	3,571.09	141.71	13.38	12.20	142.89
TOTAL	3,762	132,734.30	28,493.19	949.02	659.88	28,782.33

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

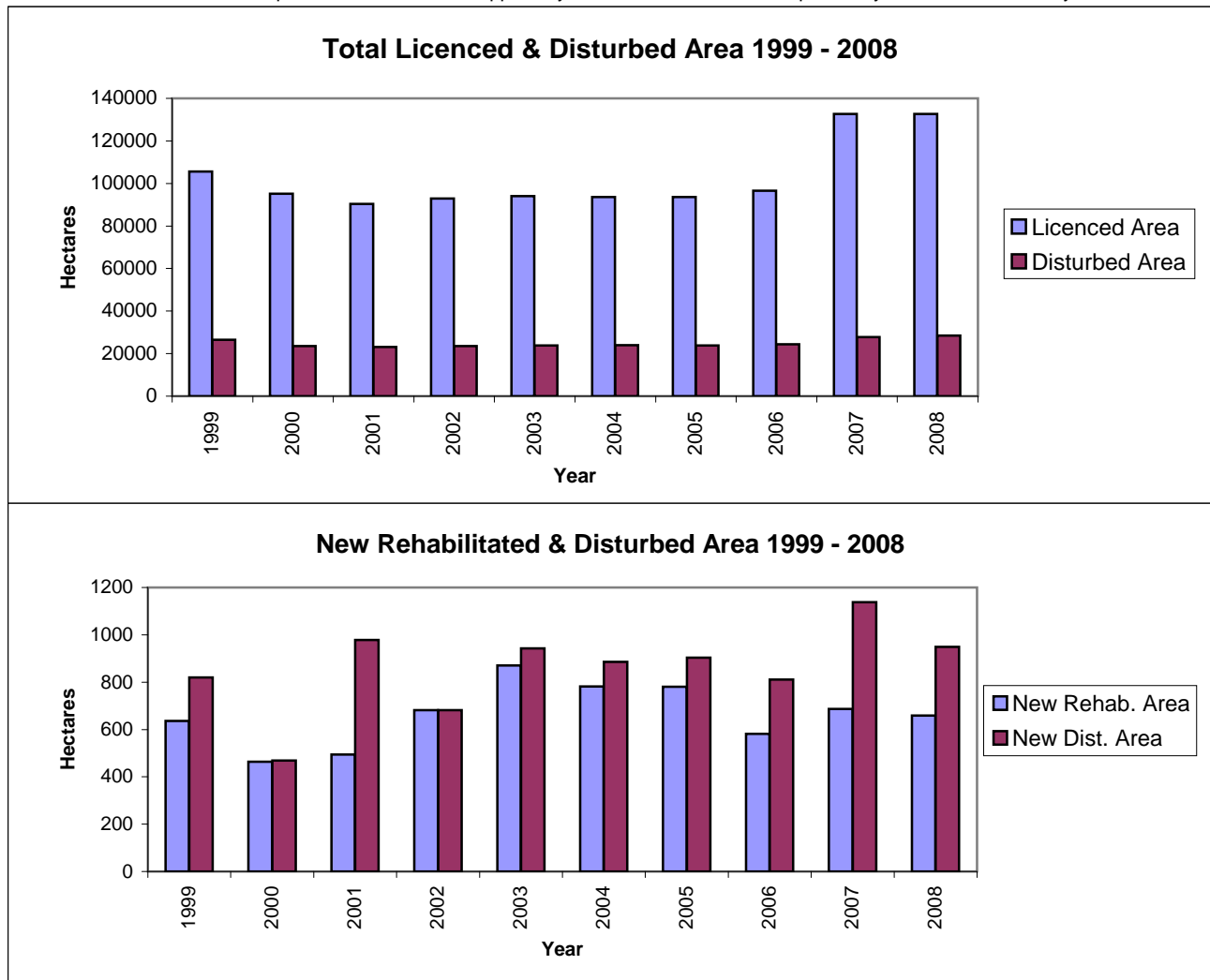


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,177.48	196	195	1	0	0
Cochrane	2,653.78	126	111	9	6	0
Hearst	3,740.49	182	160	18	4	0
Kirkland Lake	1,888.22	159	151	6	2	0
North Bay	2,471.29	195	169	20	6	0
Sault Ste. Marie	947.74	110	106	2	2	0
Sudbury	4,646.90	179	148	20	11	0
Timmins	2,115.68	174	162	9	3	0
Wawa	2,636.89	268	262	4	2	0
Sub-Total	22,278.47	1,589	1,464	89	36	0
NORTHWEST						
Dryden	2,318.31	227	211	8	8	0
Fort Frances	2,323.15	239	222	5	12	0
Kenora	2,973.29	210	169	27	14	0
Nipigon	3,755.38	317	288	17	12	0
Red Lake	1,436.10	123	120	3	0	0
Sioux Lookout	1,541.45	89	86	2	1	0
Thunder Bay	3,241.58	199	174	18	7	0
Sub-Total	17,589.26	1,404	1,270	80	54	0
SOUTHCENTRAL						
Algonquin Park	0.00	0	0	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	962.31	72	59	13	0	0
Guelph (Cambridge)	0.00	1	0	0	0	1
Kemptville	2.00	1	1	0	0	0
Midhurst	10.50	1	1	0	0	0
Parry Sound	832.93	89	69	14	6	0
Pembroke	128.98	39	39	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	1,968.22	206	169	28	7	2
TOTAL	41,835.95	3,199	2,903	197	97	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water. There are three types of aggregate permits, they are commercial, public authority and personal.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT
(by Geographic Twp)**

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		



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Compiled by MHBC Planning with the cooperation and assistance of the Ministry of Natural Resources Aggregate Resources Program staff & TOARC (January 2010)

Aggregate Officers of Ontario

AGGREGATE RESOURCES ACT DESIGNATED AREAS





● MINERAL ● AGGREGATES ● IN ONTARIO

Statistical Update

2 0 0 9

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2009

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 292,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2009, this basic non-renewable resource was supplied from 3,762 licensed aggregate sites on private land in designated parts of the Province and 3,038 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Regional Operations Division, Integration Branch, Program Coordination Section. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Overall production of mineral aggregates in 2009 totaled approximately 153 million tonnes, down 14 million tonnes or 8.4% from the previous year. Production from licenced operations was down 15 million tonnes or 9.7% compared to 2008. Wayside permit production increased 100% from 2008 on relatively small volumes (.1 million in 2008 compared to .2 million in 2009). Production from aggregate permits on Crown Land increased 15.4% from 2008 (7.5 million in 2009 from 6.5 million tonnes in 2008).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

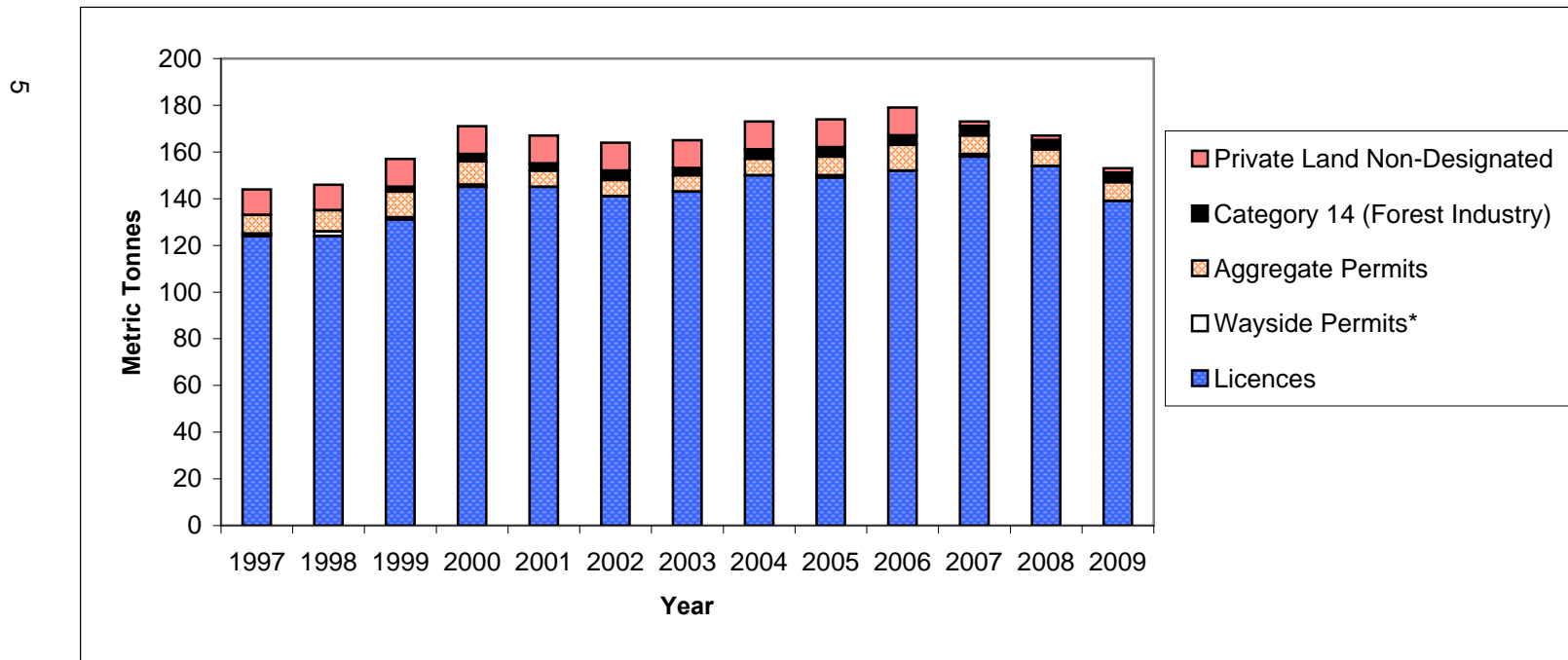
Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1997 - 2009
(rounded to nearest million tonnes)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Licences	124	124	131	145	145	141	143	150	149	152	158	154	139
Wayside Permits*	1	2	1	1	0	0	0	0	1	0	1	0	0
Aggregate Permits	8	9	11	10	7	7	7	7	8	11	8	7	8
Category 14 (Forest Industry)	-	-	2	3	3	4	3	4	4	4	4	4	4
Private Land Non-Designated (estimated)	11	11	12	12	12	12	12	12	12	12	2	2	2
ONTARIO TOTAL	144	146	157	171	167	164	165	173	174	179	173	167	153

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006, .1 million tonnes for 2008, and .2 million tonnes for 2009



Production Statistics Report
Table 2 Lower Tier Grouping Guidelines

The guiding principal is to not disclose the confidential information of a single client's tonnage.

1. There must be a least 3 clients with a minimum of 2 reporting tonnage, each with licenses, in any municipal (lower) tier that appears in the stats report.
2. If the above guideline can't be met then the grouping of lower tiers is required based on the following rules:
 - a. Upper tiers with multiple lower tier groups of 2 or less must be combined for the 3 client minimum lower tier grouping provided there are at least 2 clients reporting tonnage.
 - b. The preferred criteria for determining groups will be based on geographical proximity.
 - c. A single lower tier reporting ZERO tonnage is not reported if it is not required for the above minimum 3 client grouping.
 - d. If geographic proximity can't be resolved then historical (grouping of past stats reports) will determine grouping.

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	63,288.62		63,288.62
Blind River, Town of/Spanish, Town of/The North Shore, Tp/ Elliot Lake, City of	72,081.08		72,081.08
Bruce Mines, Town of/Huron Shores, Municipality of/ Plummer Additional Tp	1,584,799.90		1,584,799.90
Hilton Tp	66,596.42		66,596.42
Jocelyn Tp	87,770.92		87,770.92
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	33,903.14		33,903.14
Macdonald, Meredith & Aberdeen Add'l Tp/St. Joseph Tp	16,804.85		16,804.85
Sault Ste. Marie, City of/Prince Tp	679,443.57		679,443.57
Sub-Total	2,604,688.50	0.00	2,604,688.50
<i>Brant</i>			
Brant, County of/Brantford, City of	1,448,515.70		1,448,515.70
Sub-Total	1,448,515.70	0.00	1,448,515.70
<i>Bruce</i>			
Arran-Elderslie, Municipality of	115,590.30		115,590.30
Brockton, Municipality of	118,057.26		118,057.26
Huron-Kinloss Tp	339,631.25		339,631.25
Kincardine, Municipality of	28,082.70		28,082.70
Northern Bruce Peninsula, Municipality of	146,069.63		146,069.63
Saugeen Shores, Town of	275,589.26		275,589.26
South Bruce, Municipality of	432,813.82		432,813.82
South Bruce Peninsula, Town of	270,583.15		270,583.15
Sub-Total	1,726,417.37	0.00	1,726,417.37
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	317,792.33		317,792.33
Sub-Total	317,792.33	0.00	317,792.33
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	111,209.00		111,209.00
East Garafraxa Tp	1,066,348.46		1,066,348.46
Melancthon Tp	762,343.69		762,343.69
Mono Tp	500,412.94		500,412.94
Mulmur Tp	236,921.87		236,921.87
Sub-Total	2,677,235.96	0.00	2,677,235.96
<i>Durham</i>			
Brock Tp	1,099,537.77		1,099,537.77
Clarington, Municipality of	4,054,451.50		4,054,451.50
Oshawa, City of/Scugog Tp/Whitby, Town of	84,184.94		84,184.94
Uxbridge Tp	3,013,444.86		3,013,444.86
Sub-Total	8,251,619.07	0.00	8,251,619.07
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	318,347.74		318,347.74
Central Elgin, Municipality of	244,579.61		244,579.61
Sub-Total	562,927.35	0.00	562,927.35

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,390,816.77		1,390,816.77
Kingsville, Town of	330,898.50		330,898.50
Sub-Total	1,721,715.27	0.00	1,721,715.27
Frontenac			
Central Frontenac Tp	204,859.55		204,859.55
Frontenac Islands Tp	398,327.46		398,327.46
Kingston, City of	1,477,063.83		1,477,063.83
North Frontenac Tp	162,105.65		162,105.65
South Frontenac Tp	366,480.59		366,480.59
Sub-Total	2,608,837.08	0.00	2,608,837.08
Greater Sudbury			
Greater Sudbury, City of	2,066,917.81		2,066,917.81
Sub-Total	2,066,917.81	0.00	2,066,917.81
Grey			
Chatsworth Tp	469,513.03		469,513.03
Georgian Bluffs, Tp	394,207.98		394,207.98
Grey Highlands, Municipality of	333,346.12		333,346.12
Meaford, Municipality of	432,638.76		432,638.76
Southgate Tp	421,512.81	141,178.53	562,691.34
The Blue Mountains, Town of	265,847.75		265,847.75
West Grey, Municipality of	395,857.07		395,857.07
Sub-Total	2,712,923.52	141,178.53	2,854,102.05
Haldimand			
Haldimand, County of	1,132,047.93		1,132,047.93
Sub-Total	1,132,047.93	0.00	1,132,047.93
Haliburton			
Algonquin Highlands, Tp	44,225.38		44,225.38
Dysart et al, Tp	252,205.95		252,205.95
Highlands East, Tp	26,095.52		26,095.52
Minden Hills, TP	163,776.25		163,776.25
Sub-Total	486,303.10	0.00	486,303.10
Halton			
Burlington, City of/Halton Hills, Town of	3,171,775.53		3,171,775.53
Milton, Town of	3,703,201.73		3,703,201.73
Sub-Total	6,874,977.26	0.00	6,874,977.26
Hamilton			
Hamilton, City of	4,874,604.45		4,874,604.45
Sub-Total	4,874,604.45	0.00	4,874,604.45

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Hastings</i>			
Bancroft, Town of	15,361.60		15,361.60
Belleville, City of	798,897.48		798,897.48
Carlo/Mayo Tp	20,167.72		20,167.72
Centre Hastings, Municipality of	155,690.52		155,690.52
Faraday Tp	42,241.92		42,241.92
Hasting Highlands	83,820.72		83,820.72
Limerick Tp	31,594.75		31,594.75
Madoc Tp	817,749.47		817,749.47
Marmora & Lake, Municipality of	28,985.00		28,985.00
Quinte West, City of	1,009,179.18		1,009,179.18
Tweed, Municipality of	134,271.94		134,271.94
Tyendinaga Tp	220,095.55		220,095.55
Wollaston	25,416.95		25,416.95
Sub-Total	3,383,472.80	0.00	3,383,472.80
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	817,195.50		817,195.50
Bluewater, Municipality of	14,003.41		14,003.41
Central Huron, Municipality of	716,376.30		716,376.30
Howick Tp	221,852.03		221,852.03
Huron East, Municipality of	893,399.74		893,399.74
Morris-Turnberry, Municipality of	177,694.85		177,694.85
North Huron Tp	32,884.90		32,884.90
South Huron, Municipality of	123,399.62		123,399.62
Sub-Total	2,996,806.35	0.00	2,996,806.35
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	4,518,775.73		4,518,775.73
Sub-Total	4,518,775.73	0.00	4,518,775.73
<i>Lambton</i>			
Warwick Tp/Plympton-Wyoming, Town of	255,243.64		255,243.64
Lambton Shores, Municipality of	222,789.58		222,789.58
Sub-Total	478,033.22	0.00	478,033.22
<i>Lanark</i>			
Beckwith Tp	728,942.01		728,942.01
Drummond-North Elmsley Tp	83,995.50		83,995.50
Lanark Highlands Tp	885,241.59		885,241.59
Mississippi Mills, Town of	497,436.69		497,436.69
Montague Tp	270,214.17		270,214.17
Tay Valley Tp	20,121.10		20,121.10
Sub-Total	2,485,951.06	0.00	2,485,951.06

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
<i>Leeds & Grenville</i>				
Athens Tp/Front of Yonge Tp		269,812.07		269,812.07
Augusta Tp		110,041.40		110,041.40
Edwardsburgh-Cardinal Tp		104,861.45		104,861.45
Elizabethtown-Kitley Tp		403,275.63		403,275.63
Leeds and the Thousand Islands Tp		494,291.10		494,291.10
Merrickville-Wolford, Village of		33,472.11		33,472.11
North Grenville Tp		486,402.94		486,402.94
Rideau Lakes Tp		217,712.95		217,712.95
Sub-Total		2,119,869.65	0.00	2,119,869.65
<i>Lennox & Addington</i>				
Addington Highlands Tp		21,559.62		21,559.62
Greater Napanee, Town of		300,235.72		300,235.72
Loyalist Tp		1,428,671.34		1,428,671.34
Stone Mills Tp		217,765.55		217,765.55
Sub-Total		1,968,232.23	0.00	1,968,232.23
<i>Manitoulin District</i>				
Assignack, Tp		3,302.48		3,302.48
Gordon/Barrie Island/Burpee & Mills, Tp/Cockburn Island, Tp		40,318.04		40,318.04
Billings, Tp		13,438.00		13,438.00
Central Manitoulin Tp		52,046.05		52,046.05
Northeastern Manitoulin & The Islands		92,398.28		92,398.28
Tehkummah, Tp		25,418.76		25,418.76
Unorganized - Manitoulin D		2,675,147.11		2,675,147.11
Sub-Total		2,902,068.72	0.00	2,902,068.72
<i>Middlesex</i>				
Adelaide Metcalfe Tp		47,389.00		47,389.00
London, City of		1,038,054.15		1,038,054.15
Lucan Biddulph Tp		10,682.01		10,682.01
Middlesex Centre Tp		828,680.29		828,680.29
North Middlesex, Municipality of		147,115.08		147,115.08
Strathroy-Caradoc Tp		27,615.00		27,615.00
Thames Centre, Municipality of		2,213,982.93		2,213,982.93
Sub-Total		4,313,518.46	0.00	4,313,518.46
<i>Muskoka</i>				
Bracebridge		861,931.03		861,931.03
Georgian Bay		5,847.00		5,847.00
Gravenhurst		109,507.94		109,507.94
Huntsville		994,389.55		994,389.55
Lake of Bays, Tp		168,102.03		168,102.03
Muskoka Lakes, Tp		185,070.16		185,070.16
Sub-Total		2,324,847.71	0.00	2,324,847.71
<i>Niagara</i>				
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp		1,663,445.39		1,663,445.39
Lincoln, Town of/Niagara-on-the-Lake, Town of		1,170,732.10		1,170,732.10
Niagara Falls, City of		1,093,396.63		1,093,396.63
Sub-Total		3,927,574.12	0.00	3,927,574.12

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
<i>Nipissing District</i>				
Bonfield Tp		25,858.84		25,858.84
Calvin Tp		24,380.18		24,380.18
Chisholm Tp		73,742.70		73,742.70
Mattawan Tp/South Algonquin Tp		27,464.23		27,464.23
North Bay, City of		526,371.65		526,371.65
Papineau-Cameron Tp		68,756.83		68,756.83
Unorganized - Nipissing D		5,705.00		5,705.00
West Nipissing, Municipality of		461,640.50		461,640.50
Sub-Total		1,213,919.93	0.00	1,213,919.93
<i>Norfolk</i>				
Norfolk, County of		428,877.53		428,877.53
Sub-Total		428,877.53	0.00	428,877.53
<i>Northumberland</i>				
Alnwick-Haldimand Tp		181,120.05		181,120.05
Brighton, Municipality of		234,713.60		234,713.60
Cramahe Tp		1,823,007.72		1,823,007.72
Hamilton Tp		291,605.90		291,605.90
Port Hope, Municipality of		22,812.57		22,812.57
Trent Hills, Municipality of		249,895.81		249,895.81
Sub-Total		2,803,155.65	0.00	2,803,155.65
<i>Ottawa</i>				
Ottawa, City of		11,025,953.94		11,025,953.94
Sub-Total		11,025,953.94	0.00	11,025,953.94
<i>Oxford</i>				
Blandford-Blenheim Tp		514,510.50		514,510.50
East Zorra-Tavistock Tp/Norwich Tp		130,740.64		130,740.64
South-West Oxford Tp		1,420,864.09		1,420,864.09
Zorra Tp		2,845,098.02		2,845,098.02
Sub-Total		4,911,213.25	0.00	4,911,213.25
<i>Parry Sound District</i>				
ArmourTp		732,600.67		732,600.67
Callander, Municipality of		20,198.90		20,198.90
Carling Tp/The Archipelago Tp		22,701.16		22,701.16
Joly Tp		31,017.48		31,017.48
Kearney, Town of		31,411.94		31,411.94
Macher Tp		77,741.57		77,741.57
Magnetawan, Municipality of		220,081.06		220,081.06
McDougall Tp		36,326.69		36,326.69
McKeller Tp		8,304.04		8,304.04
McMurrich-Monteith Tp		26,687.94		26,687.94
Nipissing Tp		25,312.60		25,312.60
Perry Tp		72,584.75		72,584.75
Powassan, Municipality of		59,764.97		59,764.97
Ryerson Tp		39,888.22		39,888.22
Seguin Tp		441,722.62		441,722.62
Strong Tp		29,413.92		29,413.92
Unorganized - Parry Sound		477,838.21		477,838.21
Whitestone The Municipality of		21,477.04		21,477.04
Sub-Total		2,375,073.78	0.00	2,375,073.78

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peel</i>			
Caledon, Town of	3,560,597.39		3,560,597.39
Sub-Total	3,560,597.39	0.00	3,560,597.39
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	336,019.11		336,019.11
Perth East Tp	385,065.15		385,065.15
Perth South Tp	1,087,694.28		1,087,694.28
West Perth Tp	58,838.33		58,838.33
Sub-Total	1,867,616.87	0.00	1,867,616.87
<i>Peterborough</i>			
Asphodel-Norwood Tp	808,311.60		808,311.60
Cavan-Millbrook-North Monaghan Tp	27,604.01		27,604.01
Douro-Dummer Tp	436,479.99		436,479.99
Galway-Cavendish-Harvey Tp	423,357.91		423,357.91
North Kawartha Tp	706,843.76		706,843.76
Havelock-Belmont-Methuen Tp	23,311.57		23,311.57
Otonabee-South Monaghan Tp	204,765.81		204,765.81
Smith-Ennismore-Lakefield Tp	542,302.66		542,302.66
Sub-Total	3,172,977.31	0.00	3,172,977.31
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	361,512.64		361,512.64
Champlain Tp	648,712.00		648,712.00
Clarence-Rockland, City of	241,623.04		241,623.04
East Hawkesbury Tp	14,518.12		14,518.12
Russell Tp	125,819.12		125,819.12
The Nation, Municipality of	306,589.93		306,589.93
Sub-Total	1,698,774.85	0.00	1,698,774.85
<i>Prince Edward Co</i>			
Prince Edward, County of	1,615,995.00		1,615,995.00
Sub-Total	1,615,995.00	0.00	1,615,995.00
<i>Renfrew</i>			
Admaston-Bromley Tp/Renfrew, Town of	112,475.46		112,475.46
Bonnechere Valley Tp	155,909.77		155,909.77
Brudenell, Lyndoc and Raglan Tp	66,421.41		66,421.41
Deep River Tp/Head, Clara & Maria Tp	6,296.00		6,296.00
Greater Madawaska Tp	48,287.12		48,287.12
Horton Tp	341,281.21		341,281.21
Killaloe, Hagarty and Richards Tp	47,585.04		47,585.04
Laurentian Hills	89,429.90		89,429.90
Laurentian Valley Tp	391,436.77		391,436.77
Madawaska Valley	88,299.84		88,299.84
McNab-Braeside Tp	487,024.03		487,024.03
North Algona-Wilberforce Tp	55,661.03		55,661.03
Petawawa, Town of	191,529.28		191,529.28
Whitewater Region Tp	205,737.07		205,737.07
Sub-Total	2,287,373.93	0.00	2,287,373.93

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	559,806.64		559,806.64
Bradford West Gwillimbury, Town of/Midland, Town of/ Penetanguishine, Town of	337,062.82		337,062.82
Clearview Tp	1,132,136.18		1,132,136.18
Essa Tp	48,477.23		48,477.23
Innisfil, Town of	48,509.00		48,509.00
New Tecumseth, Town of	92,152.00		92,152.00
Oro-Medonte Tp	2,180,602.03		2,180,602.03
Ramara Tp	1,926,109.68		1,926,109.68
Severn Tp	2,571,324.55		2,571,324.55
Springwater Tp	1,116,382.34		1,116,382.34
Tay Tp	138,571.68		138,571.68
Tiny Tp	309,796.13		309,796.13
Sub-Total	10,460,930.28	0.00	10,460,930.28
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	753,311.04		753,311.04
North Glengarry Tp	48,019.31		48,019.31
North Stormont Tp	1,008,267.55		1,008,267.55
South Dundas Tp	186,410.25		186,410.25
South Glengarry Tp	447,375.70		447,375.70
South Stormont Tp	978,243.59		978,243.59
Sub-Total	3,421,627.44	0.00	3,421,627.44
<i>Sudbury District</i>			
Baldwin Tp	106,394.55		106,394.55
French River, Municipality of	134,225.57		134,225.57
Killarny, Municipality of/Nairn & Hyman Tp	78,546.70		78,546.70
Markstay-Warren, Municipality of	70,858.71		70,858.71
Sables Spanish Rivers Tp/Espanola, Town of	68,342.50		68,342.50
Sudbury District, Unorganized	345,603.83		345,603.83
Sub-Total	803,971.86	0.00	803,971.86
<i>Thunder Bay District</i>			
Conmee, Tp	398,704.87		398,704.87
Neebing, Municipality of	15,412.83		15,412.83
Oliver Paipoonge, Municipality of	284,617.13	61,833.96	346,451.09
Shuniah, Tp	270,845.03		270,845.03
Thunder Bay, City of	2,939.64		2,939.64
Sub-Total	972,519.50	61,833.96	1,034,353.46
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	393,135.13		393,135.13
North Dumfries Tp	3,387,150.78		3,387,150.78
Wellesley Tp	1,434,621.76		1,434,621.76
Wilmot Tp	1,315,064.18		1,315,064.18
Woolwich Tp	599,258.48		599,258.48
Sub-Total	7,129,230.33	0.00	7,129,230.33

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Wellington			
Centre Wellington Tp	1,032,069.75		1,032,069.75
Erin, Town of	889,555.04		889,555.04
Guelph-Eramosa Tp	615,329.08		615,329.08
Mapleton Tp	64,309.00		64,309.00
Minto, Town of	345,981.78		345,981.78
Puslinch Tp	3,424,807.93		3,424,807.93
Wellington North Tp	254,621.68		254,621.68
Sub-Total	6,626,674.26	0.00	6,626,674.26
York			
East Gwillimbury, Town of	181,588.02		181,588.02
Georgina, Town of	20,569.15		20,569.15
Whitchurch-Stouffville, Town of	772,851.55		772,851.55
Sub-Total	975,008.72	0.00	975,008.72
GRAND TOTAL	138,838,164.56	203,012.49	139,041,177.05

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Algoma, District of	0.8	0.6	0.8	0.6	0.8	1.9	1.2	2.8	2.9	2.6
Brant Co.	2.1	2.0	1.8	2.1	2.0	1.8	2.3	2.3	2.2	1.4
Bruce Co.	1.7	1.6	1.7	1.7	1.9	1.8	2.3	2.4	2.0	1.7
Chatham-Kent, R. M. of	0.5	0.3	0.5	0.4	0.3	0.4	0.3	0.3	0.2	0.3
Dufferin Co.	2.6	2.4	2.3	3.0	2.7	2.9	3.1	3.0	3.1	2.7
Durham, R. M. of	10.2	11.4	11.0	11.8	12.6	13.2	12.2	11.7	10.0	8.3
Elgin Co.	0.7	0.6	0.5	0.6	0.7	0.8	0.7	0.6	0.6	0.6
Essex Co.	2.0	2.2	1.9	1.9	1.9	1.7	1.6	1.7	1.6	1.7
Frontenac Co.	1.4	1.3	1.6	2.0	2.2	2.4	2.1	2.1	2.9	2.6
Greater Sudbury, City of	2.3	1.8	2.3	1.7	2.2	2.8	2.9	2.7	3.2	2.1
Grey Co.	2.5	2.6	2.6	3.1	3.2	3.7	3.4	3.2	3.3	2.9
Haldimand Co.	----	1.5	1.9	1.8	1.6	2.0	1.8	1.4	1.3	1.1
Haldimand-Norfolk, R. M. of	2.0	----	----	----	----	----	----	----	----	----
Haliburton Co.	----	----	----	----	----	----	----	0.5	0.6	0.5
Halton, R. M. of	15.5	15.8	12.1	10.7	11.4	10.9	9.6	9.5	8.5	6.9
Hamilton, City of	6.3	6.0	5.5	6.0	6.3	5.6	6.2	5.6	5.7	4.9
Hastings Co.	2.0	2.0	2.1	2.4	2.3	2.1	2.3	2.6	3.0	3.4
Huron Co.	2.7	3.0	2.7	2.8	2.5	2.6	2.7	2.9	2.9	3.0
Kawartha Lakes, City of	----	6.4	6.4	6.7	6.8	6.8	6.5	5.9	5.5	4.5
Lambton Co.	0.5	0.5	0.7	0.4	0.5	0.7	0.7	0.5	0.6	0.5
Lanark Co.	1.6	1.7	2.0	2.4	2.3	2.3	2.3	2.3	1.9	2.5
Leeds & Grenville Co.'s	3.0	2.3	2.0	1.9	2.2	2.3	2.3	2.0	2.3	2.1
Lennox & Addington Co.	1.8	1.8	1.7	1.9	1.8	1.9	1.9	2.0	2.0	2.0
Manitoulin, District of	----	----	----	----	----	----	----	3.6	3.9	2.9
Middlesex Co.	6.4	6.0	5.4	5.6	6.2	6.2	5.6	5.2	4.8	4.3
Muskoka	----	----	----	----	----	----	----	2.1	2.1	2.3
Niagara, R. M. of	4.6	4.6	4.9	4.6	4.7	4.5	5.1	4.0	4.0	3.9
Nipissing, District of	----	----	----	----	----	----	----	1.3	1.2	1.2
Norfolk Co.	----	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4
Northumberland Co.	3.2	3.1	3.0	3.4	3.3	3.5	3.4	3.4	3.0	2.8
Ottawa, City of	10.7	10.1	10.7	10.0	9.9	10.6	11.1	11.4	11.2	11.0
Oxford Co.	5.4	4.9	4.8	4.9	4.8	5.0	5.4	7.1	5.8	4.9
Parry Sound, District of	----	----	----	----	----	----	----	1.5	1.8	2.4
Peel, R. M. of	5.2	5.2	4.3	4.5	5.3	5.1	5.3	4.7	3.8	3.6
Perth Co.	2.1	2.0	2.1	2.0	2.0	2.0	2.4	2.1	1.9	1.9
Peterborough Co.	2.2	2.4	3.2	2.5	2.5	2.7	2.6	2.9	3.2	3.2
Prescott & Russell Co.'s	1.4	1.4	1.3	1.4	1.4	1.7	1.5	1.4	1.7	1.7
Prince Edward Co.	2.1	2.0	2.1	2.2	2.2	2.4	2.2	2.4	2.4	1.6
Renfrew Co.	1.5	1.2	1.8	1.6	1.7	1.3	1.9	2.3	2.1	2.3
Simcoe Co.	9.3	10.6	11.4	11.8	12.7	12.6	13.4	12.0	12.1	10.5
Stormont, Dundas & Glengarry Co.'s	3.0	2.7	2.6	2.7	3.5	3.0	3.4	2.8	3.2	3.4
Sudbury, District of	0.5	1.0	0.6	0.6	0.6	0.8	0.8	1.7	1.1	0.8
Thunder Bay, District of	----	----	----	----	----	----	----	0.3	0.7	1.0
Victoria Co.	7.1	----	----	----	----	----	----	----	----	----
Waterloo, R. M. of	7.7	8.2	7.8	8.0	9.5	8.2	9.3	8.2	7.9	7.1
Wellington Co.	8.4	8.9	8.9	9.1	9.1	8.3	8.8	9.0	8.0	6.6
York, R. M. of	3.0	2.4	2.4	2.0	1.9	1.0	1.0	0.7	1.1	1.0
TOTAL	146.0	144.9	141.8	143.2	149.8	149.8	151.9	158.8	153.8	139.0

Note: As of January 1, 2001 Victoria County is now known as The City of Kawartha Lakes.

As of January 1, 2001 Haldimand-Norfolk has been split into two different counties; Haldimand County and Norfolk County.

Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2009
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2009 Production	Production(2)				
			2008	2007	2006	2005	2004
1 City of Ottawa	City of Ottawa	11.0	11.2	11.0	11.1	10.6	9.9
2 City of Hamilton	City of Hamilton	4.9	5.7	5.6	6.2	5.6	6.3
3 City of Kawartha Lakes	City of Kawartha Lakes	4.5	5.5	5.9	6.5	6.8	6.8
4 Municipality of Clarington	Durham	4.1	4.6	5.2	5.0	5.8	5.3
5 Town of Milton	Halton	3.7	4.5	4.4	4.6	5.0	5.6
6 Town of Caledon	Peel	3.6	3.8	4.7	5.3	5.1	5.3
7 Puslinch Township	Wellington County	3.4	3.9	4.2	4.7	5.0	5.2
8 Township of North Dumfries	Waterloo	3.4	3.7	4.2	5.0	4.1	4.4
9 Township of Uxbridge	Durham	3.0	3.7	4.6	5.4	5.3	5.5
10 Township of Zorra	Oxford	2.8	3.6	4.1	3.9	3.9	3.6
Total		44.4	50.2	53.9	57.7	57.2	57.9

Notes:

1. Municipalities are ranked in order of their licenced production for 2009.
2. Historical data are for current year's Top Ten Producing Municipalities.
3. Pre 2009 historical data for Table 4 has been corrected effective February 24, 2011.
This PDF version of Table 4 should be relied upon over previously printed versions.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	147	126	21	131	16	0	0
Aylmer	309	243	66	293	10	6	0
Bancroft	270	99	171	194	33	43	0
Guelph (Cambridge)	452	385	67	414	35	3	0
Kemptville	479	279	200	335	121	23	0
Midhurst	471	356	115	415	51	5	0
North Bay	153	61	92	123	6	24	0
Parry Sound	306	120	186	197	11	98	0
Pembroke	240	75	165	219	11	10	0
Peterborough (Tweed)	536	289	247	433	86	17	0
Sault Ste. Marie	96	53	43	79	5	12	0
Sudbury	241	126	115	173	19	49	0
Thunder Bay	60	24	36	50	3	7	0
Wawa	2	2	0	1	0	1	0
TOTAL	3,762	2,238	1,524	3,057	407	298	0

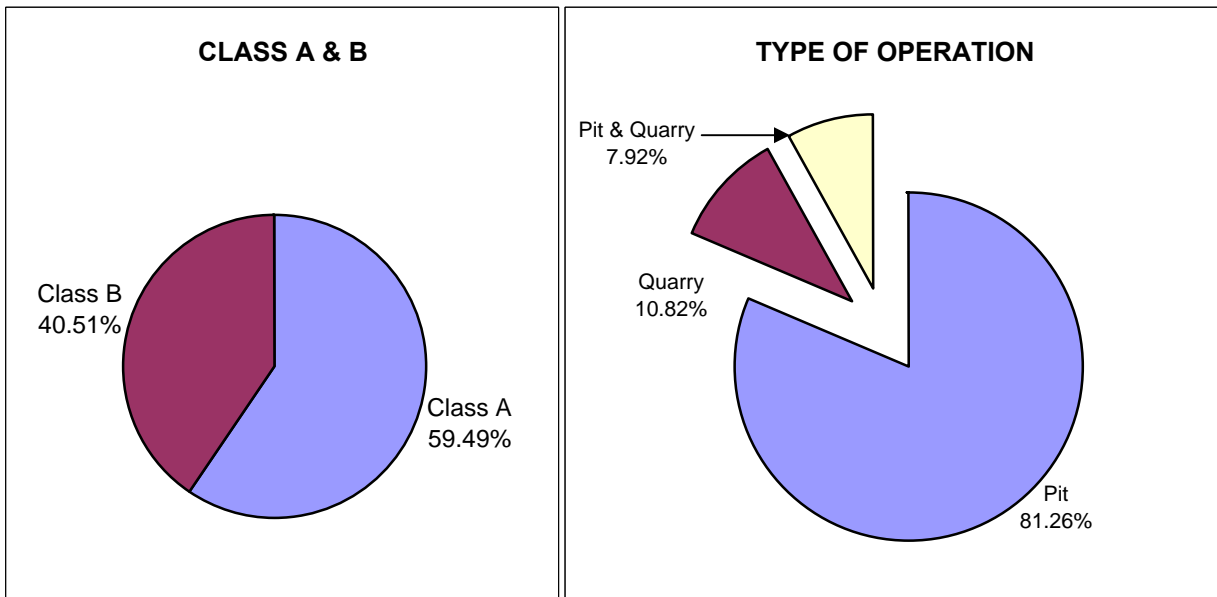
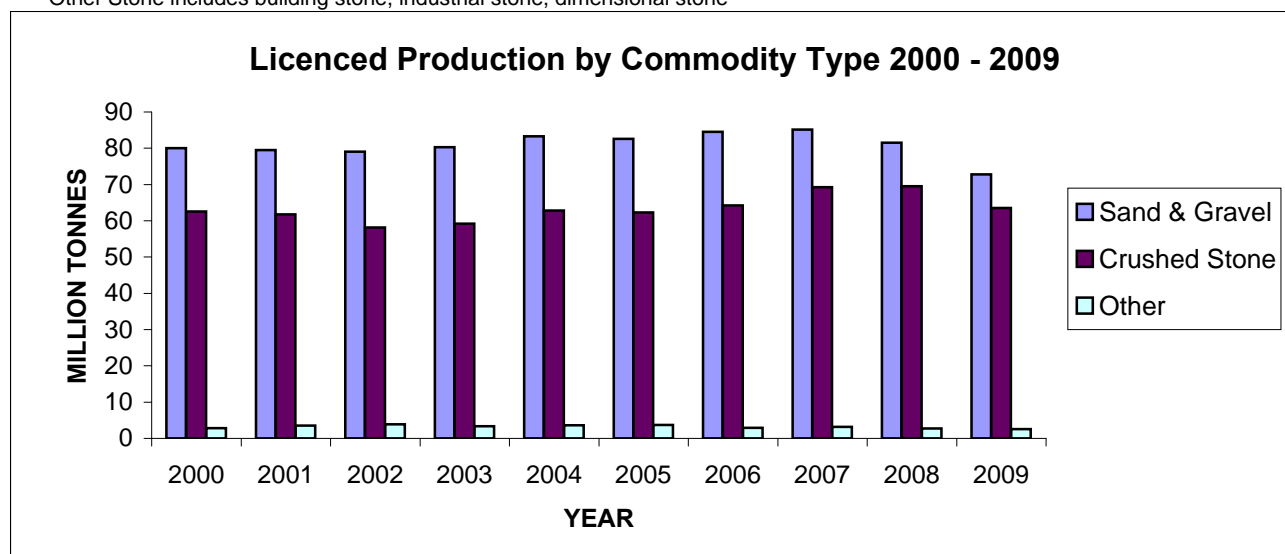


Table 6

**2009 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	19,653,952.44	10,626,131.02	8,333,664.18	546,083.87	148,073.37
Aylmer	12,734,077.41	9,643,540.05	3,057,245.09	33,047.47	244.80
Bancroft	3,438,167.13	780,236.56	2,548,609.06	1,272.70	108,048.81
Guelph (Cambridge)	30,034,593.01	19,164,712.01	10,787,853.84	82,027.16	0.00
Kemptville	20,580,628.94	3,947,707.60	15,399,106.33	10,455.50	1,223,359.51
Midhurst	17,545,984.12	11,322,528.52	5,963,147.61	41,405.34	218,902.65
North Bay	1,474,804.92	886,466.14	579,361.51	0.00	8,977.27
Parry Sound	4,456,510.28	2,505,683.72	1,924,082.39	864.18	25,879.99
Pembroke	2,458,921.93	1,885,273.07	566,606.03	0.00	7,042.83
Peterborough	17,114,398.99	7,309,566.50	9,777,183.55	6,319.80	21,329.14
Sault Ste. Marie	2,593,070.02	1,515,296.41	1,075,891.56	0.00	1,882.05
Sudbury	5,780,535.87	2,342,298.49	3,379,956.97	46,990.17	11,290.24
Thunder Bay	972,519.50	859,758.52	112,414.28	336.70	10.00
TOTAL	138,838,164.56	72,789,198.61	63,505,122.40	768,802.89	1,775,040.66

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2000	145.49	80.07	62.57	2.85
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73
2009	138.84	72.79	63.51	2.54

Table 7

**2009 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

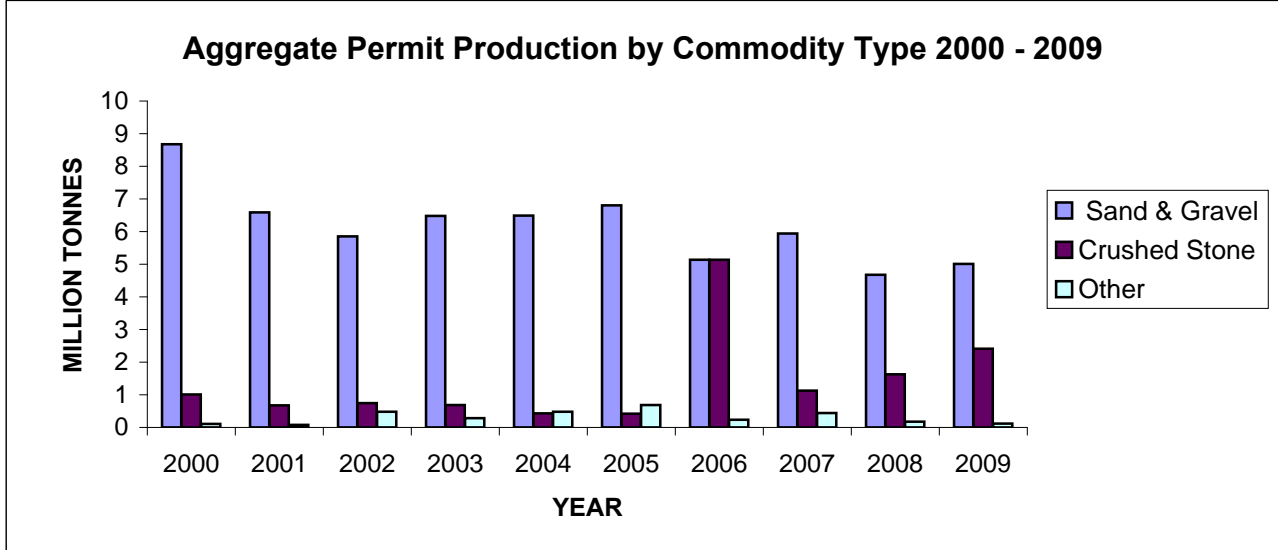
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	204,500.54	204,500.54	-	-	-
Cochrane	94,184.97	86,172.77	7,849.00	163.20	-
Hearst	381,866.83	261,990.35	114,650.00	5,226.48	-
Kirkland Lake	247,934.26	210,001.07	37,933.19	-	-
North Bay	276,499.09	248,353.09	25,053.85	-	3,092.15
Sault Ste. Marie	264,411.72	264,411.72	-	-	-
Sudbury	1,039,732.05	301,863.95	730,029.01	-	7,839.09
Timmins	486,614.50	486,614.50	-	-	-
Wawa	185,574.19	178,489.71	7,084.48	-	-
Sub-Total	3,181,318.15	2,242,397.70	922,599.53	5,389.68	10,931.24
NORTHWEST					
Dryden	674,456.72	385,530.72	287,770.00	-	1,156.00
Fort Frances	419,840.91	352,086.35	65,933.80	160.48	1,660.28
Kenora	142,126.45	112,916.41	16,540.00	-	12,670.04
Nipigon	478,164.22	351,560.29	126,021.96	-	581.97
Red Lake	72,613.37	70,798.88	1,814.49	-	-
Sioux Lookout	210,192.44	209,355.32	100.00	-	737.12
Thunder Bay	238,905.22	210,185.12	28,680.00	-	40.10
Sub-Total	2,236,299.33	1,692,433.09	526,860.25	160.48	16,845.51
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	3,860.99	3,860.99	-	-	-
Bancroft	281,468.22	70,683.39	121,768.68	6,780.36	82,235.79
Guelph (Cambridge)	-	-	-	-	-
Kemptville	1,669.28	1,669.28	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	1,473,547.87	817,878.30	654,615.57	-	1,054.00
Pembroke	183,315.71	183,315.71	-	-	-
Peterborough (Tweed)	184,944.25	-	184,944.25	-	-
Sub-Total	2,128,806.32	1,077,407.67	961,328.50	6780.36	83,289.79
TOTAL	7,546,423.80	5,012,238.46	2,410,788.28	12,330.52	111,066.54

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2009 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2000	9.80	8.68	1.01	0.11
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18
2009	7.54	5.01	2.41	0.12

Table 9

**2009 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	3,861	3,861	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	454,354	57,521	306,763	6,780	83,290
East (6)	185,154	185,154	0	0	0
Northeast (7)	4,186,855	2,599,622	1,574,425	5,390	7,419
Northwest (8)	2,716,200	2,166,081	529,601	160	20,358
TOTAL	7,546,424	5,012,238	2,410,788	12,330	111,067

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2009 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	17,169,623	13,292,761	3,816,527	60,090	245
Peninsula (2)	11,811,620	2,160,914	9,613,580	37,126	0
West Central (3)	31,333,412	24,677,106	6,378,140	59,263	218,903
GTA (4)	19,662,202	10,634,131	8,333,664	546,084	148,323
East Central (5)	18,305,527	8,267,712	9,895,386	4,890	137,539
East (6)	27,616,620	6,597,631	19,763,407	13,197	1,242,385
Northeast (7)	9,361,952	4,781,735	4,506,648	47,815	25,753
Northwest (8)	3,577,208	2,377,209	1,197,770	337	1,892
TOTAL	138,838,165	72,789,199	63,505,122	768,803	1,775,041

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2009
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	147	8,333.08	3,051.51	48.04	98.53	3,001.02
Aylmer	309	8,514.17	2,905.83	113.68	107.85	2,911.66
Bancroft	270	9,362.74	1,050.27	29.50	8.12	1,071.66
Guelph (Cambridge)	452	16,292.26	4,671.57	135.46	50.54	4,756.48
Kemptville	479	14,180.87	4,076.17	152.80	46.37	4,182.61
Midhurst	471	15,047.81	3,522.55	134.86	61.31	3,596.10
North Bay	153	7,205.27	921.82	25.39	17.58	929.63
Parry Sound	306	9,774.14	1,873.39	48.28	36.76	1,884.91
Pembroke	240	5,986.06	779.45	39.32	38.02	780.75
Peterborough (Tweed)	536	15,147.93	3,684.94	109.67	31.64	3,762.97
Sault Ste. Marie	96	4,050.61	620.60	40.54	1.03	660.11
Sudbury	241	17,054.59	1,442.36	41.72	17.56	1,466.52
Thunder Bay	60	3,669.38	219.99	5.77	1.25	224.51
Wawa	2	46.87	0.00	0.00	0.00	0.00
TOTAL	3,762	134,665.78	28,820.46	925.03	516.56	29,228.94

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

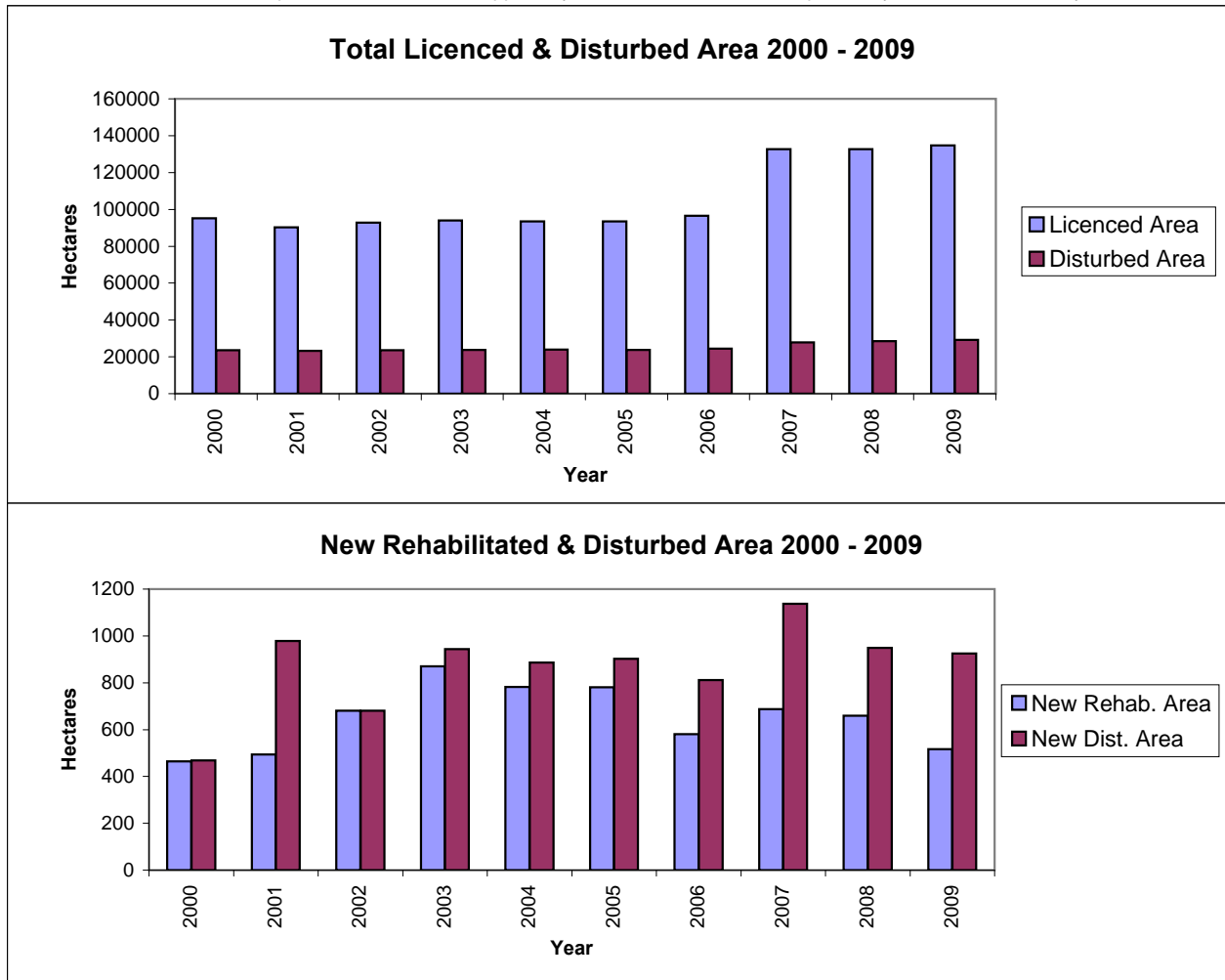


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,347.32	196	194	2	0	0
Cochrane	2,602.18	127	112	9	6	0
Hearst	3,756.77	183	160	19	4	0
Kirkland Lake	2,032.31	161	150	9	2	0
North Bay	2,583.01	195	167	22	6	0
Sault Ste. Marie	946.74	109	104	3	2	0
Sudbury	4,655.68	177	145	21	11	0
Timmins	2,109.18	172	160	9	3	0
Wawa	2,646.31	269	257	8	4	0
Sub-Total	22,679.50	1,589	1,449	102	38	0
NORTHWEST						
Dryden	2,274.42	214	197	9	8	0
Fort Frances	2,319.45	238	221	4	13	0
Kenora	2,991.44	207	163	26	18	0
Nipigon	3,241.23	251	220	16	15	0
Red Lake	1,206.25	84	80	3	1	0
Sioux Lookout	1,559.08	85	82	2	1	0
Thunder Bay	3,306.94	157	128	21	8	0
Sub-Total	16,898.81	1,236	1,091	81	64	0
SOUTHCENTRAL						
Algonquin Park	0.00	0	0	0	0	0
Aurora (GTA)	0.00	0	0	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	1,368.08	73	58	15	0	0
Guelph (Cambridge)	0.00	1	0	0	0	1
Kemptville	2.00	1	1	0	0	0
Parry Sound	942.36	91	67	18	6	0
Pembroke	205.58	44	44	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,549.52	213	170	34	7	2
TOTAL	42,127.83	3,038	2,710	217	109	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 25 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT**

(by Geographic Twp)

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown
Amherst Island
Bedford
Camden East
Dalton
Digby
Ernestown

Howe Island
Laxton
Longford
Loughborough
North Fredericksburgh
Portland
Richmond

Somerville
South Fredericksburgh
Town of Napanee
Villages of Bath and
Newburgh
Wolfe Island

SEPTEMBER 1, 1993

Admaston
Alice and Fraser
Bagot and Blithfield
Bromley
City of Pembroke
Horton

McNab
Pembroke
Petawawa
Ross
Stafford

Towns of Arnprior and
Renfrew
Villages of Beachburg,
Braeside, Cobden and
Petawawa
Westmeath

JANUARY 1, 1998

Anderson
Appleby
Archibald
Aweres
Awrey
Baldwin
Burwash
Cartier
Cascaden
Casimir
Chesley Additional
Cleland
Cosby
Curtin
Delamere
Dennis
Deroche
Duncan
Dunnet
Eden
Fenwick
Fisher
Foster
Foy

Gaudette
Gough
Hagar
Hallam
Harrow
Harty
Haviland
Hawley
Hendrie
Henry
Herrick
Hess
Hilton
Hodgins
Hoskin
Hyman
Jarvis
Jennings
Jocelyn
Johnson
Kars
Kehoe
Laird
Laura

Ley
Loughrin
Macdonald
May
McKinnon
Meredith and Aberdeen
Additional
Merritt
Mongowin
Nairn
Pennefather
Ratter
Secord
Servos
Shakespeare
Shields
St. Joseph
Street
Tarbutt and Tarbutt
Additional
Tilley
Tilton
Tupper
VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.
9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.
10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.
11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.
12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.
13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Designated Areas under the Aggregate Resources Act



Prepared by:
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Oct, 2006

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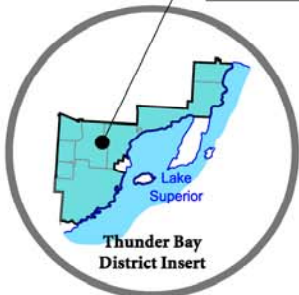


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Compiled by MHBC Planning with the cooperation and assistance of the Ministry of Natural Resources Aggregate Resources Program staff & TOARC (January 2011)

Aggregate Officers of Ontario

AGGREGATE RESOURCES ACT DESIGNATED AREAS





• MINERAL • AGGREGATES • IN ONTARIO

Statistical Update

2 0 1 0

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

MINERAL AGGREGATES IN ONTARIO

PRODUCTION STATISTICS

2010

Prepared by

The Ontario Aggregate Resources Corporation

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MINERAL AGGREGATES IN ONTARIO

Overview

Mineral aggregate is an indispensable commodity to the infrastructure of our modern 'built environment'. High quality aggregate is a key ingredient in the production of ready-mixed concrete, manufactured concrete products of all types (block, brick, precast, etc.), asphalt pavements and sub-surface fill which is so important in providing drainage and load bearing base for structures. Aggregates literally provide the basis for a \$37 billion construction industry that employs over 292,000 people in Ontario. The aggregate industry employs an estimated 7,000 people directly and some 34,000 people indirectly in services such as transportation and equipment. The aggregate industry also makes a significant contribution to the \$1.9 billion cement and concrete manufacturing industry, the \$1.3 billion glass and glass products industry, and a \$2.9 billion pharmaceutical and medicine manufacturing industry in Ontario.

In 2010, this basic non-renewable resource was supplied from 3,748 licensed aggregate sites on private land in designated parts of the Province and 2,964 permitted sites on Crown land. It is estimated that over 50% of all aggregate produced in the Province is sold to public authorities for the construction and maintenance of the public infrastructure such as roads, bridges, etc.

Management of Ontario's Mineral Aggregate Resources

At the Provincial level, the management of Ontario's aggregate resources is the responsibility of the Ministry of Natural Resources (MNR). In 1997, in an effort to better focus resources on the delivery of core programs, the MNR took steps to build a partnership with private industry to manage certain administrative functions. Accordingly, subsections 6.1 (1) and 6.1 (3) of the *Aggregate Resources Act*, R.S.O. 1990, Chap. A.8, as amended (the "Act"), gave the Minister the power to create the Aggregate Resources Trust (the "Trust") and appoint a trustee to look after its affairs. TOARC was incorporated in 1997 to act as trustee of the Aggregate Resources Trust, a trust created under the authority of the Aggregate Resources Act and pursuant to a trust indenture between the Corporation and the Minister of Natural Resources for the Province of Ontario.

The Trust Purposes include:

1. The rehabilitation of land for which a Licence or Permit has been revoked and for which final rehabilitation has not been completed;
2. The rehabilitation of abandoned pits and quarries, including surveys and studies respecting their location and condition;
3. Research on aggregate resources management, including rehabilitation;
4. Payments to the Crown in right of Ontario and to regional municipalities, counties and local municipalities in accordance with regulations made pursuant to the Act;
5. The management of the Abandoned Pits and Quarries Rehabilitation Fund;

6. Such other purposes as may be provided for by or pursuant to Paragraph 6.1(2) 5 of the Act.

In August of 1999, Addendum 1 to the Original Trust Indenture was signed to expand the Trust Purposes to include:

- (a) The education and training of persons engaged in or interested in the management of the aggregate resources of Ontario, the operation of pits or quarries, or the rehabilitation of land from which aggregate has been excavated;
- (b) The gathering, publishing and dissemination of information relating to the management of the aggregate resources of Ontario, the control and regulation of aggregate operations and the rehabilitation of land from which aggregate has been excavated.

TOARC is governed by a multi-stakeholder board of directors. The seven-member Board is composed of directors from the Ontario Stone, Sand & Gravel Association of Ontario (OSSGA), representatives from environmental groups, municipalities and non-OSSGA member aggregate producers. TOARC maintains its own office facilities and management staff. TOARC as the ARA trustee is responsible to the Minister of Natural Resources to fulfill the Trust purposes as outlined in Bill 52. The MNR maintains a presence on the Board with an ex officio representative.

Since its inception in 1997, TOARC has focused upon the efficient collection and disbursement of aggregate resource charges, the auditing of production reports, the rehabilitation of abandoned pits and quarries through the MAAP program, the creation of an inventory of sites where licences have been revoked, as well as their rehabilitation, and the general management of the Trust assets.

Role of the Ministry of Natural Resources

While the MNR has developed certain external partnerships for the delivery of portions of their Aggregate Resources Program, their mission remains:

- To protect the provincial interest in aggregate resources and develop, maintain and enforce appropriate technical standards.
- To provide leadership in the development of partnerships with key stakeholders for the effective management of aggregate resources to benefit the people of Ontario.

With the guidance of the mission statements, a number of program objectives have been created which drive MNR's daily business practices. These program objectives include:

- Promote exploration and ensure availability through the conservation and orderly development of aggregate resources.

- Ensure that aggregate resources are developed with a high standard of environmental protection and public safety.
- Upgrade and maintain current information databases essential for sound technical and scientific decisions.
- Ensure fair revenue from the production of Crown resources.
- Ensure industry compliance with technical standards.
- Train staff and external clients in skills and knowledge essential for the effective delivery of the Aggregate Resources Program.

The continued business approach for the Aggregate Resources Program is based on the following principles:

- The core business of the program is:
 - Standards and policy development
 - Technical approvals
 - Ensuring compliance with standards
- Private industry clients assume responsibility and accountability for:
 - Compliance reporting
 - Financial management
 - Operations

The delegation of authority policy approved in July of 1998 continues. The objective of this policy is to delegate Ministerial authority to the level that provides the best efficiencies and customer service. Standing committees with the industry continue to encourage ongoing communication and customer service.

Core program staff responsible for the standards and policy development, program design and program coordination, evaluation and monitoring are part of the Regional Operations Division, Integration Branch, Program Coordination Section. The districts that have either Aggregate Resources Officers or Aggregate Technicians deliver this program. The specialists and technicians, who are designated inspectors, are the core staff responsible for the acceptance of applications and are leads when dealing with compliance. These inspectors often have responsibility beyond the administrative boundaries of their districts. Also, at the district level, reporting to the Compliance Supervisor, Conservation Officers take an active role in enforcement actions under the Aggregate Resources Act.

In 1997, certain responsibilities with respect to the issuing and administration of permits and wayside permits were delegated to the Ontario Ministry of Transportation (MTO), specific to MTO contracts and needs.

Aggregate Production

Overall production of mineral aggregates in 2010 totaled approximately 166 million tonnes, up 13 million tonnes or 8.5% from the previous year. Production from licenced operations was up 13 million tonnes or 9.4% compared to 2009. Wayside permit production decreased 100% from 2009 on relatively small volumes (.2 million in 2009 compared to zero in 2010). Production from aggregate permits on Crown Land increased 6.7% from 2009 (8 million in 2010 from 7.5 million tonnes in 2009).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

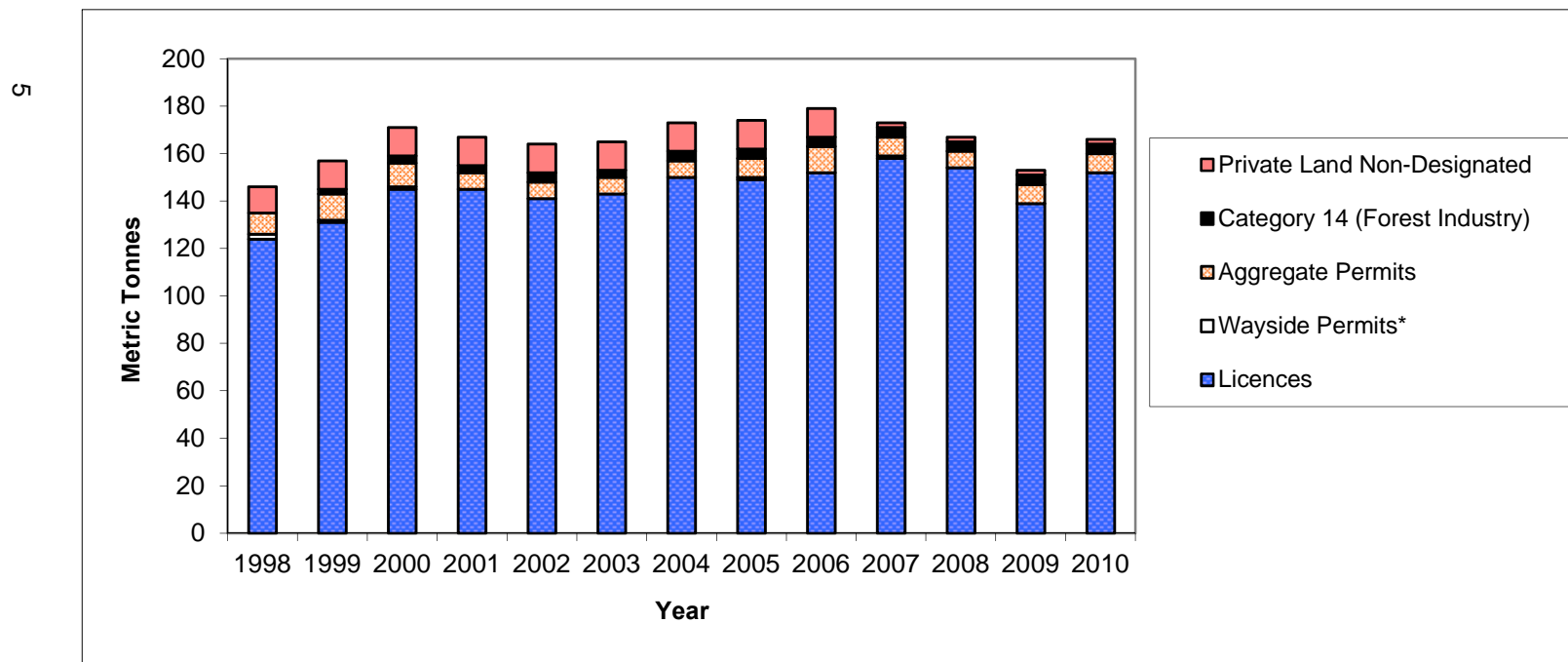
Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1998 - 2010
(rounded to nearest million tonnes)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Licences	124	131	145	145	141	143	150	149	152	158	154	139	152
Wayside Permits*	2	1	1	0	0	0	0	1	0	1	0	0	0
Aggregate Permits	9	11	10	7	7	7	7	8	11	8	7	8	8
Category 14 (Forest Industry)	-	2	3	3	4	3	4	4	4	4	4	4	4
Private Land Non-Designated (estimated)	11	12	12	12	12	12	12	12	12	2	2	2	2
ONTARIO TOTAL	146	157	171	167	164	165	173	174	179	173	167	153	166

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006, .1 million tonnes for 2008, .2 million tonnes for 2009 and zero tonnes for 2010.



Production Statistics Report
Table 2 Lower Tier Grouping Guidelines

The guiding principal is to not disclose the confidential information of a single client's tonnage.

1. There must be a least 3 clients with a minimum of 2 reporting tonnage, each with licenses, in any municipal (lower) tier that appears in the stats report.
2. If the above guideline can't be met then the grouping of lower tiers is required based on the following rules:
 - a. Upper tiers with multiple lower tier groups of 2 or less must be combined for the 3 client minimum lower tier grouping provided there are at least 2 clients reporting tonnage.
 - b. The preferred criteria for determining groups will be based on geographical proximity.
 - c. A single lower tier reporting ZERO tonnage is not reported if it is not required for the above minimum 3 client grouping.
 - d. If geographic proximity can't be resolved then historical (grouping of past stats reports) will determine grouping.

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	73,358.87		73,358.87
Blind River, Town of/Spanish, Town of/The North Shore, Tp/ Elliot Lake, City of	114,641.20		114,641.20
Bruce Mines, Town of/Huron Shores, Municipality of/ Plummer Additional Tp	1,665,754.04		1,665,754.04
Hilton Tp	39,613.76		39,613.76
Jocelyn Tp	85,147.36		85,147.36
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	43,907.63		43,907.63
Macdonald, Meredith & Aberdeen Add'l Tp/St. Joseph Tp	57,172.47		57,172.47
Sault Ste. Marie, City of/Prince Tp	848,137.95		848,137.95
Sub-Total	2,927,733.28	0.00	2,927,733.28
<i>Brant</i>			
Brant, County of/Brantford, City of	1,862,342.59		1,862,342.59
Sub-Total	1,862,342.59	0.00	1,862,342.59
<i>Bruce</i>			
Arran-Elderslie, Municipality of	159,394.83		159,394.83
Brockton, Municipality of	243,673.80		243,673.80
Huron-Kinloss Tp	420,752.97		420,752.97
Kincardine, Municipality of	100,862.80		100,862.80
Northern Bruce Peninsula, Municipality of	196,749.49		196,749.49
Saugeen Shores, Town of	364,528.49		364,528.49
South Bruce, Municipality of	384,516.06		384,516.06
South Bruce Peninsula, Town of	391,346.36		391,346.36
Sub-Total	2,261,824.80	0.00	2,261,824.80
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	280,017.15		280,017.15
Sub-Total	280,017.15	0.00	280,017.15
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	184,357.78		184,357.78
East Garafraxa Tp	1,162,904.28		1,162,904.28
Melancthon Tp	632,535.08		632,535.08
Mono Tp	412,065.99		412,065.99
Mulmur Tp	279,165.70		279,165.70
Sub-Total	2,671,028.83	0.00	2,671,028.83
<i>Durham</i>			
Brock Tp	1,276,395.04		1,276,395.04
Clarington, Municipality of	4,890,254.28		4,890,254.28
Oshawa, City of/Scugog Tp	70,845.76		70,845.76
Uxbridge Tp	3,350,567.78		3,350,567.78
Sub-Total	9,588,062.86	0.00	9,588,062.86
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	239,176.65		239,176.65
Central Elgin, Municipality of	264,744.80		264,744.80
Sub-Total	503,921.45	0.00	503,921.45

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	2,289,326.45		2,289,326.45
Kingsville, Town of	350,870.93		350,870.93
Sub-Total	2,640,197.38	0.00	2,640,197.38
Frontenac			
Central Frontenac Tp	91,935.04		91,935.04
Frontenac Islands Tp	46,140.37		46,140.37
Kingston, City of	1,603,354.32		1,603,354.32
North Frontenac Tp	147,242.14		147,242.14
South Frontenac Tp	488,538.32		488,538.32
Sub-Total	2,377,210.19	0.00	2,377,210.19
Greater Sudbury			
Greater Sudbury, City of	2,468,922.47		2,468,922.47
Sub-Total	2,468,922.47	0.00	2,468,922.47
Grey			
Chatsworth Tp	457,748.23		457,748.23
Georgian Bluffs, Tp	430,152.13		430,152.13
Grey Highlands, Municipality of	403,479.96		403,479.96
Meaford, Municipality of	624,670.59		624,670.59
Southgate Tp	546,554.55		546,554.55
The Blue Mountains, Town of	244,825.10		244,825.10
West Grey, Municipality of	816,914.39		816,914.39
Sub-Total	3,524,344.95	0.00	3,524,344.95
Haldimand			
Haldimand, County of	1,351,099.35		1,351,099.35
Sub-Total	1,351,099.35	0.00	1,351,099.35
Haliburton			
Algonquin Highlands, Tp	39,934.46		39,934.46
Dysart et al, Tp	304,539.42		304,539.42
Highlands East, Tp	50,972.08		50,972.08
Minden Hills, TP	152,882.31		152,882.31
Sub-Total	548,328.27	0.00	548,328.27
Halton			
Burlington, City of/Halton Hills, Town of	3,507,699.18		3,507,699.18
Milton, Town of	3,725,413.87		3,725,413.87
Sub-Total	7,233,113.05	0.00	7,233,113.05
Hamilton			
Hamilton, City of	5,312,663.40		5,312,663.40
Sub-Total	5,312,663.40	0.00	5,312,663.40

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Hastings</i>			
Bancroft, Town of	39,695.20		39,695.20
Belleville, City of	775,835.38		775,835.38
Carlo/Mayo Tp	19,787.76		19,787.76
Centre Hastings, Municipality of	137,892.50		137,892.50
Faraday Tp	42,426.36		42,426.36
Hasting Highlands	290,152.49		290,152.49
Limerick Tp	35,595.92		35,595.92
Madoc Tp	845,770.79		845,770.79
Marmora & Lake, Municipality of	12,827.48		12,827.48
Quinte West, City of	913,547.58		913,547.58
Tweed, Municipality of	82,719.46		82,719.46
Tyendinaga Tp	281,847.12		281,847.12
Wollaston	35,126.20		35,126.20
Sub-Total	3,513,224.24	0.00	3,513,224.24
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	783,013.35		783,013.35
Bluewater, Municipality of	12,152.00		12,152.00
Central Huron, Municipality of	472,451.45		472,451.45
Howick Tp	232,563.52		232,563.52
Huron East, Municipality of	646,196.39		646,196.39
Morris-Turnberry, Municipality of	139,793.15		139,793.15
North Huron Tp	65,464.10		65,464.10
South Huron, Municipality of	193,684.08		193,684.08
Sub-Total	2,545,318.04	0.00	2,545,318.04
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	4,577,148.45		4,577,148.45
Sub-Total	4,577,148.45	0.00	4,577,148.45
<i>Lambton</i>			
Warwick Tp/Plympton-Wyoming, Town of	320,204.85		320,204.85
Lambton Shores, Municipality of	158,585.52		158,585.52
Sub-Total	478,790.37	0.00	478,790.37
<i>Lanark</i>			
Beckwith Tp	599,599.75		599,599.75
Drummond-North Elmsley Tp	193,635.14		193,635.14
Lanark Highlands Tp	960,378.70		960,378.70
Mississippi Mills, Town of	974,819.03		974,819.03
Montague Tp	146,206.98		146,206.98
Tay Valley Tp	28,440.63		28,440.63
Sub-Total	2,903,080.23	0.00	2,903,080.23

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Leeds & Grenville			
Athens Tp/Front of Yonge Tp	276,635.68		276,635.68
Augusta Tp	129,275.59		129,275.59
Edwardsburgh-Cardinal Tp	117,046.50		117,046.50
Elizabethtown-Kitley Tp/Merrickville-Wolford, Village of	544,744.52		544,744.52
Leeds and the Thousand Islands Tp	601,627.62		601,627.62
North Grenville Tp	759,996.21		759,996.21
Rideau Lakes Tp	192,420.53		192,420.53
Sub-Total	2,621,746.65	0.00	2,621,746.65
Lennox & Addington			
Addington Highlands Tp	43,818.49		43,818.49
Greater Napanee, Town of	415,792.17		415,792.17
Loyalist Tp	1,644,311.60		1,644,311.60
Stone Mills Tp	246,601.34		246,601.34
Sub-Total	2,350,523.60	0.00	2,350,523.60
Manitoulin District			
Assignack, Tp	7,750.55		7,750.55
Gordon/Barrie Island/Burpee & Mills, Tp/Cockburn Island, Tp	64,529.24		64,529.24
Billings, Tp	11,681.00		11,681.00
Central Manitoulin Tp	52,349.93		52,349.93
Northeastern Manitoulin & The Islands	202,960.22		202,960.22
Tehkummah, Tp	24,822.32		24,822.32
Unorganized - Manitoulin D	3,222,622.01		3,222,622.01
Sub-Total	3,586,715.27	0.00	3,586,715.27
Middlesex			
Adelaide Metcalfe Tp	22,601.00		22,601.00
London, City of	1,189,312.65		1,189,312.65
Lucan Biddulph Tp	5,634.28		5,634.28
Middlesex Centre Tp	578,483.89		578,483.89
North Middlesex, Municipality of	104,938.44		104,938.44
Strathroy-Caradoc Tp	12,648.50		12,648.50
Thames Centre, Municipality of	2,914,887.38		2,914,887.38
Sub-Total	4,828,506.14	0.00	4,828,506.14
Muskoka			
Bracebridge	734,987.72		734,987.72
Georgian Bay	16,574.80		16,574.80
Gravenhurst	128,963.72		128,963.72
Huntsville	1,059,808.18		1,059,808.18
Lake of Bays, Tp	205,487.61		205,487.61
Muskoka Lakes, Tp	267,605.66		267,605.66
Sub-Total	2,413,427.69	0.00	2,413,427.69
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	2,208,969.42		2,208,969.42
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,346,910.21		1,346,910.21
Niagara Falls, City of	1,023,723.64		1,023,723.64
Sub-Total	4,579,603.27	0.00	4,579,603.27

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp	26,147.05		26,147.05
Calvin Tp	33,984.69		33,984.69
Chisholm Tp	39,973.07		39,973.07
Mattawan Tp/South Algonquin Tp	5,624.60		5,624.60
North Bay, City of	548,084.93		548,084.93
Papineau-Cameron Tp	112,597.28		112,597.28
Unorganized - Nipissing D	954.00		954.00
West Nipissing, Municipality of	322,569.94		322,569.94
Sub-Total	1,089,935.56	0.00	1,089,935.56
<i>Norfolk</i>			
Norfolk, County of	480,827.30		480,827.30
Sub-Total	480,827.30	0.00	480,827.30
<i>Northumberland</i>			
Alnwick-Haldimand Tp	313,470.29		313,470.29
Brighton, Municipality of	210,331.98		210,331.98
Cramahe Tp	2,085,158.89		2,085,158.89
Hamilton Tp	245,945.60		245,945.60
Port Hope, Municipality of	7,750.11		7,750.11
Trent Hills, Municipality of	285,149.62		285,149.62
Sub-Total	3,147,806.49	0.00	3,147,806.49
<i>Ottawa</i>			
Ottawa, City of	12,742,542.87		12,742,542.87
Sub-Total	12,742,542.87	0.00	12,742,542.87
<i>Oxford</i>			
Blandford-Blenheim Tp	393,308.46		393,308.46
East Zorra-Tavistock Tp/Norwich Tp	168,593.45		168,593.45
South-West Oxford Tp	1,248,003.05		1,248,003.05
Zorra Tp	3,343,512.95		3,343,512.95
Sub-Total	5,153,417.91	0.00	5,153,417.91
<i>Parry Sound District</i>			
Armour Tp	1,201,129.55		1,201,129.55
Callander, Municipality of	34,210.80		34,210.80
Carling Tp/The Archipelago Tp	34,652.12		34,652.12
Joly Tp	19,224.04		19,224.04
Kearney, Town of	24,075.84		24,075.84
Macher Tp	585,536.61		585,536.61
Magnetawan, Municipality of	152,466.06		152,466.06
McDougall Tp	47,045.76		47,045.76
McKeller Tp	9,342.66		9,342.66
McMurrich-Monteith Tp	11,041.61		11,041.61
Nipissing Tp	19,532.42		19,532.42
Perry Tp	80,236.91		80,236.91
Powassan, Municipality of	87,354.67		87,354.67
Ryerson Tp	184,536.55		184,536.55
Seguin Tp	652,365.70		652,365.70
Strong Tp	32,248.10		32,248.10
Unorganized - Parry Sound	277,309.60		277,309.60
Whitestone The Municipality of	22,469.50		22,469.50
Sub-Total	3,474,778.50	0.00	3,474,778.50

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Peel			
Caledon, Town of	3,887,442.70		3,887,442.70
Sub-Total	3,887,442.70	0.00	3,887,442.70
Perth			
North Perth, Town of/St. Marys, Separated Town of	38,750.35		38,750.35
Perth East Tp	549,890.71		549,890.71
Perth South Tp	1,932,591.26		1,932,591.26
West Perth Tp	207,554.00		207,554.00
Sub-Total	2,728,786.32	0.00	2,728,786.32
Peterborough			
Asphodel-Norwood Tp	500,542.00		500,542.00
Cavan-Millbrook-North Monaghan Tp	1,309.43		1,309.43
Douro-Dummer Tp	629,325.02		629,325.02
Galway-Cavendish-Harvey Tp	378,849.70		378,849.70
North Kawartha Tp	684,845.57		684,845.57
Havelock-Belmont-Methuen Tp	9,355.47		9,355.47
Otonabee-South Monaghan Tp	440,153.65		440,153.65
Smith-Ennismore-Lakefield Tp	636,230.33		636,230.33
Sub-Total	3,280,611.17	0.00	3,280,611.17
Prescott & Russell			
Alfred & Plantagenet Tp	388,149.12		388,149.12
Champlain Tp	610,532.00		610,532.00
Clarence-Rockland, City of	224,007.26		224,007.26
East Hawkesbury Tp	43,337.44		43,337.44
Russell Tp	47,254.09		47,254.09
The Nation, Municipality of	333,823.32		333,823.32
Sub-Total	1,647,103.23	0.00	1,647,103.23
Prince Edward Co			
Prince Edward, County of	1,693,747.90		1,693,747.90
Sub-Total	1,693,747.90	0.00	1,693,747.90
Renfrew			
Admaston-Bromley Tp/Renfrew, Town of	138,667.08		138,667.08
Bonnechere Valley Tp	207,286.94		207,286.94
Brudenell, Lyndoc and Raglan Tp	65,079.80		65,079.80
Deep River Tp/Head, Clara & Maria Tp	14,170.40		14,170.40
Greater Madawaska Tp	32,611.06		32,611.06
Horton Tp	450,050.27		450,050.27
Killaloe, Hagarty and Richards Tp	36,664.64		36,664.64
Laurentian Hills	112,690.85		112,690.85
Laurentian Valley Tp	459,571.25		459,571.25
Madawaska Valley	117,590.66		117,590.66
McNab-Braeside Tp	270,436.80		270,436.80
North Algona-Wilberforce Tp	29,109.40		29,109.40
Petawawa, Town of	237,516.79		237,516.79
Whitewater Region Tp	174,825.06		174,825.06
Sub-Total	2,346,271.00	0.00	2,346,271.00

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	346,416.66		346,416.66
Bradford West Gwillimbury, Town of/Midland, Town of/ Penetanguishine, Town of/Collingwood, Town of	280,514.97		280,514.97
Clearview Tp	1,026,526.01		1,026,526.01
Essa Tp	75,625.50		75,625.50
Innisfil, Town of	30,103.42		30,103.42
New Tecumseth, Town of	48,898.59		48,898.59
Oro-Medonte Tp	2,408,496.05		2,408,496.05
Ramara Tp	2,117,756.75		2,117,756.75
Severn Tp	2,558,545.15		2,558,545.15
Springwater Tp	1,045,835.96		1,045,835.96
Tay Tp	72,638.41		72,638.41
Tiny Tp	244,070.97		244,070.97
Sub-Total	10,255,428.44	0.00	10,255,428.44
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	869,313.10		869,313.10
North Glengarry Tp	72,347.75		72,347.75
North Stormont Tp	968,647.73		968,647.73
South Dundas Tp	216,444.15		216,444.15
South Glengarry Tp	313,861.97		313,861.97
South Stormont Tp	888,240.55		888,240.55
Sub-Total	3,328,855.25	0.00	3,328,855.25
<i>Sudbury District</i>			
Baldwin Tp	60,876.92		60,876.92
French River, Municipality of	128,495.87		128,495.87
Killarny, Municipality of/Nairn & Hyman Tp	138,834.58		138,834.58
Markstay-Warren, Municipality of	64,375.97		64,375.97
Sables Spanish Rivers Tp/Espanola, Town of	75,992.02		75,992.02
Sudbury District, Unorganized	367,663.46		367,663.46
Sub-Total	836,238.82	0.00	836,238.82
<i>Thunder Bay District</i>			
Conmee, Tp	298,936.38		298,936.38
Neebing, Municipality of	15,456.43		15,456.43
Oliver Paipoonge, Municipality of	143,124.61		143,124.61
Shuniah, Tp	312,045.23		312,045.23
Thunder Bay, City of	10,336.00		10,336.00
Sub-Total	779,898.65	0.00	779,898.65
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	289,467.88		289,467.88
North Dumfries Tp	3,831,420.67		3,831,420.67
Wellesley Tp	1,313,632.11		1,313,632.11
Wilmot Tp	1,438,998.56		1,438,998.56
Woolwich Tp	598,453.40		598,453.40
Sub-Total	7,471,972.62	0.00	7,471,972.62

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Wellington			
Centre Wellington Tp	970,025.52		970,025.52
Erin, Town of	818,998.11		818,998.11
Guelph-Eramosa Tp	856,966.21		856,966.21
Mapleton Tp	55,468.16		55,468.16
Minto, Town of	365,430.14		365,430.14
Puslinch Tp	3,606,023.73		3,606,023.73
Wellington North Tp	100,854.94		100,854.94
Sub-Total	6,773,766.81	0.00	6,773,766.81
York			
East Gwillimbury, Town of	254,993.70		254,993.70
Georgina, Town of	14,765.85		14,765.85
Whitchurch-Stouffville, Town of	418,991.21		418,991.21
Sub-Total	688,750.76	0.00	688,750.76
GRAND TOTAL	151,757,076.27	0.00	151,757,076.27

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Algoma, District of	0.6	0.8	0.6	0.8	1.9	1.2	2.8	2.9	2.6	2.9
Brant Co.	2.0	1.8	2.1	2.0	1.8	2.3	2.3	2.2	1.4	1.9
Bruce Co.	1.6	1.7	1.7	1.9	1.8	2.3	2.4	2.0	1.7	2.3
Chatham-Kent, R. M. of	0.3	0.5	0.4	0.3	0.4	0.3	0.3	0.2	0.3	0.3
Dufferin Co.	2.4	2.3	3.0	2.7	2.9	3.1	3.0	3.1	2.7	2.7
Durham, R. M. of	11.4	11.0	11.8	12.6	13.2	12.2	11.7	10.0	8.3	9.6
Elgin Co.	0.6	0.5	0.6	0.7	0.8	0.7	0.6	0.6	0.6	0.5
Essex Co.	2.2	1.9	1.9	1.9	1.7	1.6	1.7	1.6	1.7	2.6
Frontenac Co.	1.3	1.6	2.0	2.2	2.4	2.1	2.1	2.9	2.6	2.4
Greater Sudbury, City of	1.8	2.3	1.7	2.2	2.8	2.9	2.7	3.2	2.1	2.5
Grey Co.	2.6	2.6	3.1	3.2	3.7	3.4	3.2	3.3	2.9	3.5
Haldimand Co.	1.5	1.9	1.8	1.6	2.0	1.8	1.4	1.3	1.1	1.4
Haliburton Co.	-----	-----	-----	-----	-----	-----	0.5	0.6	0.5	0.5
Halton, R. M. of	15.8	12.1	10.7	11.4	10.9	9.6	9.5	8.5	6.9	7.2
Hamilton, City of	6.0	5.5	6.0	6.3	5.6	6.2	5.6	5.7	4.9	5.3
Hastings Co.	2.0	2.1	2.4	2.3	2.1	2.3	2.6	3.0	3.4	3.5
Huron Co.	3.0	2.7	2.8	2.5	2.6	2.7	2.9	2.9	3.0	2.5
Kawartha Lakes, City of	6.4	6.4	6.7	6.8	6.8	6.5	5.9	5.5	4.5	4.6
Lambton Co.	0.5	0.7	0.4	0.5	0.7	0.7	0.5	0.6	0.5	0.5
Lanark Co.	1.7	2.0	2.4	2.3	2.3	2.3	2.3	1.9	2.5	2.9
Leeds & Grenville Co.'s	2.3	2.0	1.9	2.2	2.3	2.3	2.0	2.3	2.1	2.6
Lennox & Addington Co.	1.8	1.7	1.9	1.8	1.9	1.9	2.0	2.0	2.0	2.4
Manitoulin, District of	-----	-----	-----	-----	-----	-----	3.6	3.9	2.9	3.6
Middlesex Co.	6.0	5.4	5.6	6.2	6.2	5.6	5.2	4.8	4.3	4.8
Muskoka	-----	-----	-----	-----	-----	-----	2.1	2.1	2.3	2.4
Niagara, R. M. of	4.6	4.9	4.6	4.7	4.5	5.1	4.0	4.0	3.9	4.6
Nipissing, District of	-----	-----	-----	-----	-----	-----	1.3	1.2	1.2	1.1
Norfolk Co.	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5
Northumberland Co.	3.1	3.0	3.4	3.3	3.5	3.4	3.4	3.0	2.8	3.1
Ottawa, City of	10.1	10.7	10.0	9.9	10.6	11.1	11.4	11.2	11.0	12.7
Oxford Co.	4.9	4.8	4.9	4.8	5.0	5.4	7.1	5.8	4.9	5.2
Parry Sound, District of	-----	-----	-----	-----	-----	-----	1.5	1.8	2.4	3.5
Peel, R. M. of	5.2	4.3	4.5	5.3	5.1	5.3	4.7	3.8	3.6	3.9
Perth Co.	2.0	2.1	2.0	2.0	2.0	2.4	2.1	1.9	1.9	2.7
Peterborough Co.	2.4	3.2	2.5	2.5	2.7	2.6	2.9	3.2	3.2	3.3
Prescott & Russell Co.'s	1.4	1.3	1.4	1.4	1.7	1.5	1.4	1.7	1.7	1.6
Prince Edward Co.	2.0	2.1	2.2	2.2	2.4	2.2	2.4	2.4	1.6	1.7
Renfrew Co.	1.2	1.8	1.6	1.7	1.3	1.9	2.3	2.1	2.3	2.3
Simcoe Co.	10.6	11.4	11.8	12.7	12.6	13.4	12.0	12.1	10.5	10.3
Stormont, Dundas & Glengarry Co.'s	2.7	2.6	2.7	3.5	3.0	3.4	2.8	3.2	3.4	3.3
Sudbury, District of	1.0	0.6	0.6	0.6	0.8	0.8	1.7	1.1	0.8	0.8
Thunder Bay, District of	-----	-----	-----	-----	-----	-----	0.3	0.7	1.0	0.8
Waterloo, R. M. of	8.2	7.8	8.0	9.5	8.2	9.3	8.2	7.9	7.1	7.5
Wellington Co.	8.9	8.9	9.1	9.1	8.3	8.8	9.0	8.0	6.6	6.8
York, R. M. of	2.4	2.4	2.0	1.9	1.0	1.0	0.7	1.1	1.0	0.7
TOTAL	144.9	141.8	143.2	149.8	149.7	152.0	158.8	153.8	139.0	151.8

Note: Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2010
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2010 Production	Production(2)				
			2009	2008	2007	2006	2005
1 City of Ottawa	City of Ottawa	12.7	11.0	11.2	11.0	11.1	10.6
2 City of Hamilton	City of Hamilton	5.3	4.9	5.7	5.6	6.2	5.6
3 Municipality of Clarington	Durham	4.9	4.1	4.6	5.2	5.0	5.8
4 City of Kawartha Lakes	City of Kawartha Lakes	4.6	4.5	5.5	5.9	6.5	6.8
5 Town of Caledon	Peel	3.9	3.6	3.8	4.7	5.3	5.1
6 Township of North Dumfries	Waterloo	3.8	3.4	3.7	4.2	5.0	4.1
7 Town of Milton	Halton	3.7	3.7	4.5	4.4	4.6	5.0
8 Puslinch Township	Wellington County	3.6	3.4	3.9	4.2	4.7	5.0
9 Township of Uxbridge	Durham	3.4	3.0	3.7	4.6	5.4	5.3
10 Township of Zorra	Oxford	3.3	2.8	3.6	4.1	3.9	3.9
Total		49.2	44.4	50.2	53.9	57.7	57.2

Notes:

1. Municipalities are ranked in order of their licenced production for 2010.
2. Historical data are for current year's Top Ten Producing Municipalities.
3. Pre 2009 historical data for Table 4 has been corrected effective February 24, 2011.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	143	124	19	127	16	0	0
Aylmer	302	237	65	288	8	6	0
Bancroft	270	99	171	194	33	43	0
Guelph (Cambridge)	454	387	67	416	35	3	0
Kemptville	478	282	196	335	120	23	0
Midhurst	474	357	117	415	54	5	0
North Bay	150	61	89	120	6	24	0
Parry Sound	304	119	185	196	11	97	0
Pembroke	237	75	162	215	12	10	0
Peterborough (Tweed)	537	295	242	433	87	17	0
Sault Ste. Marie	96	52	44	79	6	11	0
Sudbury	241	126	115	173	19	49	0
Thunder Bay	59	24	35	49	3	7	0
Wawa	2	2	0	1	0	1	0
TOTAL	3,747	2,240	1,507	3,041	410	296	0

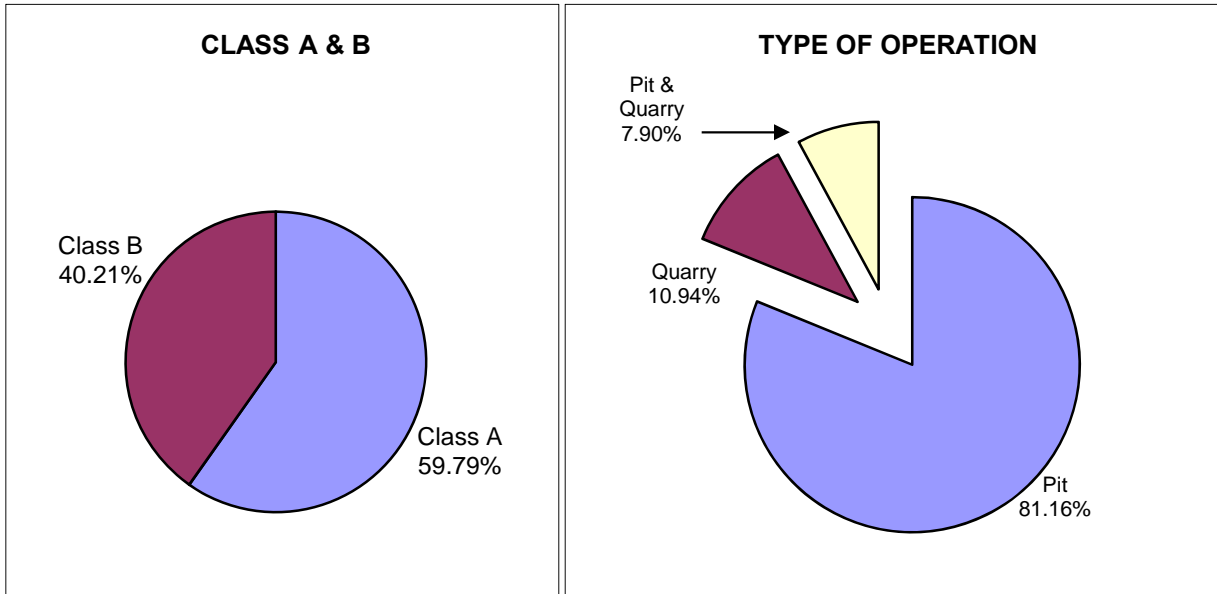
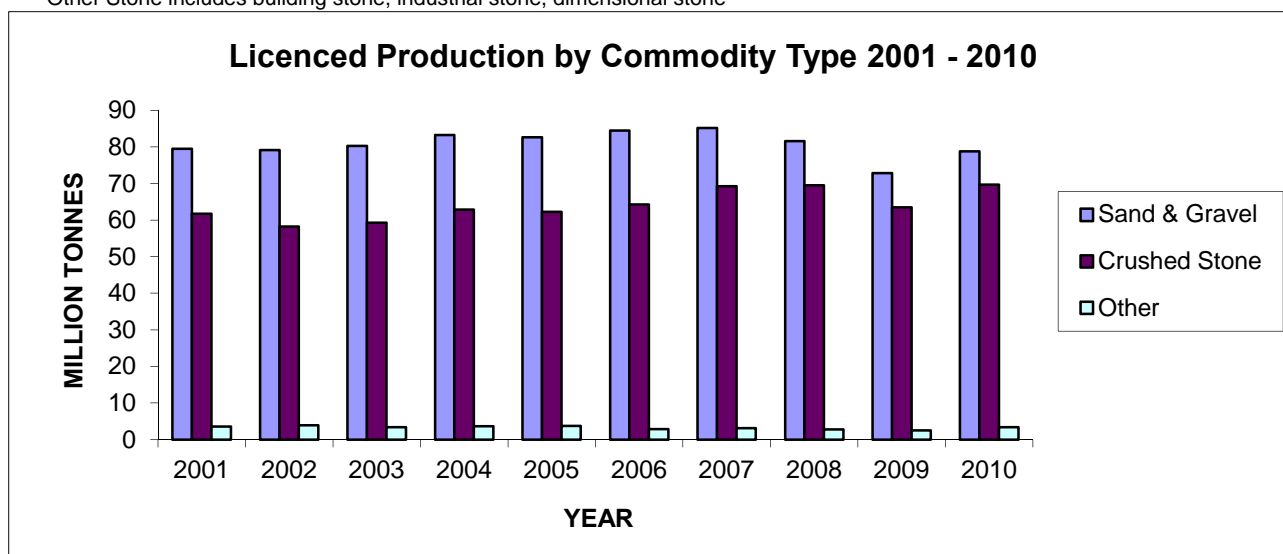


Table 6

**2010 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	21,395,169.37	12,022,346.89	8,509,177.32	767,904.79	95,740.37
Aylmer	14,365,677.70	10,516,800.29	3,806,510.21	21,099.51	21,267.69
Bancroft	3,823,611.80	973,668.47	2,730,928.24	1,578.48	117,436.61
Guelph (Cambridge)	32,707,609.81	20,196,502.25	12,344,042.00	150,077.86	16,987.70
Kemptville	23,243,328.23	4,808,756.02	16,949,554.74	20,704.60	1,464,312.87
Midhurst	18,630,569.61	11,932,984.09	6,408,052.60	44,403.81	245,129.11
North Bay	1,286,090.73	900,382.49	372,751.34	0.00	12,956.90
Parry Sound	5,730,018.31	3,403,559.56	2,191,718.33	20,576.97	114,163.45
Pembroke	2,346,271.00	2,004,916.97	321,057.85	10,498.80	9,797.38
Peterborough	17,635,570.96	7,150,842.95	10,418,107.31	44,118.54	22,502.16
Sault Ste. Marie	2,901,225.28	1,655,794.88	1,244,980.90	0.00	449.50
Sudbury	6,912,034.82	2,564,632.55	4,219,182.95	121,811.19	6,408.13
Thunder Bay	779,898.65	651,471.61	119,801.04	0.00	8,626.00
TOTAL	151,757,076.27	78,782,659.01	69,635,864.84	1,202,774.55	2,135,777.87

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2001	144.76	79.46	61.76	3.54
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73
2009	138.84	72.79	63.51	2.54
2010	151.76	78.78	69.64	3.34

Table 7

**2010 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

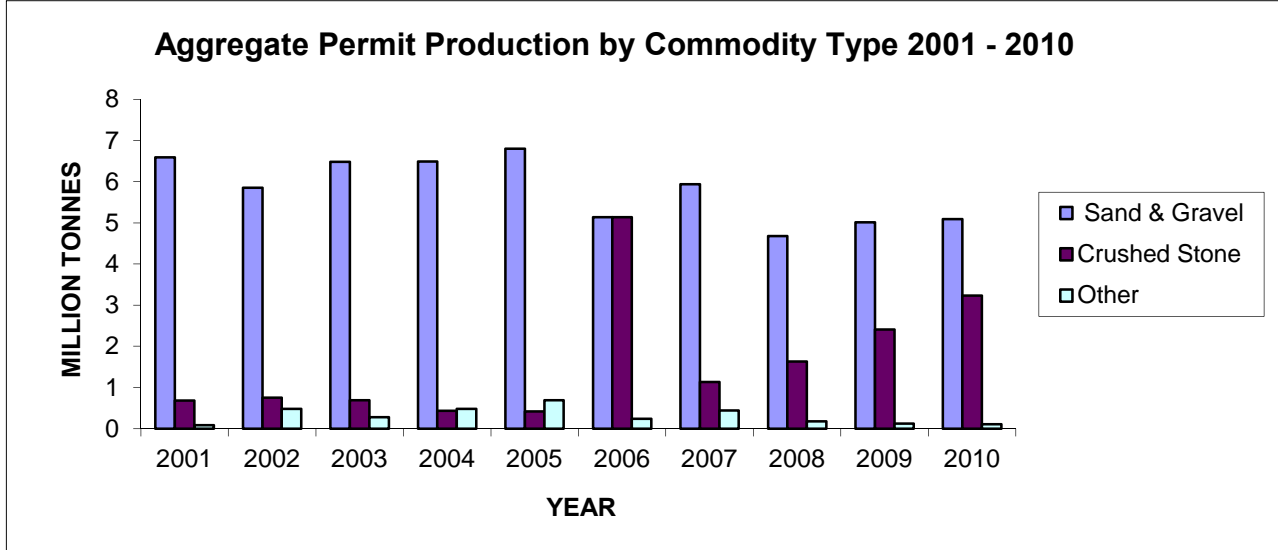
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	60,478.30	60,478.30	-	-	-
Cochrane	314,103.25	308,463.25	5,640.00	-	-
Hearst	1,049,834.64	645,874.64	402,490.00	1,470.00	-
Kirkland Lake	601,798.01	251,820.01	349,978.00	-	-
North Bay	542,093.49	442,528.79	96,914.95	-	2,649.75
Sault Ste. Marie	276,284.87	276,284.87	-	-	-
Sudbury	1,055,136.05	474,930.90	571,680.11	190.40	8,334.64
Timmins	258,937.88	258,937.88	-	-	-
Wawa	255,627.54	248,817.54	6,810.00	-	-
Sub-Total	4,414,294.03	2,968,136.18	1,433,513.06	1,660.40	10,984.39
NORTHWEST					
Dryden	663,568.15	275,607.15	386,904.00	-	1,057.00
Fort Frances	633,069.84	531,593.12	96,764.72	4,080.00	632.00
Kenora	178,641.63	105,360.80	56,619.96	2,720.00	13,940.87
Nipigon	510,817.42	319,282.78	190,899.84	-	634.80
Red Lake	212,409.53	107,589.13	104,800.00	-	20.40
Sioux Lookout	282,267.11	281,535.43	-	-	789.31
Thunder Bay	318,840.08	286,055.45	32,698.00	-	29.00
Sub-Total	2,799,613.76	1,907,023.86	868,686.52	6,800.00	17,103.38
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	698.84	698.84	-	-	-
Bancroft	314,895.06	24,987.60	221,159.74	1,274.00	67,473.72
Guelph (Cambridge)	-	-	-	-	-
Kemptville	1,153.28	1,153.28	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	648,160.12	88,200.90	558,239.22	-	1,720.00
Pembroke	102,378.49	102,378.49	-	-	-
Peterborough (Tweed)	153,549.52	-	153,549.52	-	-
Sub-Total	1,220,835.31	217,419.11	932,948.48	1274.00	69,193.72
TOTAL	8,434,743.10	5,092,579.15	3,235,148.06	9,734.40	97,281.49

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2010 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2001	7.35	6.59	0.68	0.08
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18
2009	7.54	5.01	2.41	0.12
2010	8.43	5.09	3.23	0.11

Table 9

**2010 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	699	699	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	0	0	0	0	0
East Central (5)	470,515	25,938	375,159	1,274	68,144
East (6)	104,838	104,838	0	0	0
Northeast (7)	4,480,942	2,483,182	1,986,775	1,660	9,325
Northwest (8)	3,377,750	2,477,923	873,214	6,800	19,813
TOTAL	8,434,743	5,092,579	3,235,148	12,330	97,281

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2010 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	19,158,955	14,263,951	4,825,768	30,981	38,255
Peninsula (2)	13,586,536	2,729,611	10,789,720	67,205	0
West Central (3)	32,958,366	25,652,725	6,943,117	117,395	245,129
GTA (4)	21,397,369	12,024,347	8,509,177	767,905	95,940
East Central (5)	19,174,294	8,268,163	10,664,554	37,071	204,506
East (6)	30,317,333	7,571,566	21,200,952	60,185	1,484,631
Northeast (7)	11,456,591	5,964,058	5,312,259	122,032	58,241
Northwest (8)	3,707,632	2,308,238	1,390,318	0	9,076
TOTAL	151,757,076	78,782,659	69,635,865	1,202,775	2,135,778

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2010
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	143	8,155.82	3,005.85	36.47	150.95	2,891.37
Aylmer	302	8,516.25	2,902.91	125.79	116.64	2,912.06
Bancroft	270	9,439.12	1,101.85	33.60	12.66	1,122.78
Guelph (Cambridge)	454	16,181.77	4,803.76	133.94	112.94	4,824.77
Kemptville	478	14,285.97	4,248.49	155.26	32.48	4,371.27
Midhurst	474	15,131.71	3,644.30	190.53	84.15	3,750.69
North Bay	150	7,122.90	957.69	61.90	112.31	907.28
Parry Sound	304	9,717.78	1,861.62	142.58	24.07	1,980.13
Pembroke	237	5,831.72	774.35	41.56	9.50	806.41
Peterborough (Tweed)	537	15,279.22	3,731.41	77.27	21.60	3,787.07
Sault Ste. Marie	96	4,058.45	672.00	27.30	1.15	698.15
Sudbury	241	16,990.46	1,522.73	72.38	41.43	1,553.68
Thunder Bay	59	3,619.28	235.31	4.79	2.61	237.49
Wawa	2	46.87	0.00	0.00	0.00	0.00
TOTAL	3,747	134,377.32	29,462.27	1,103.36	722.50	29,843.13

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

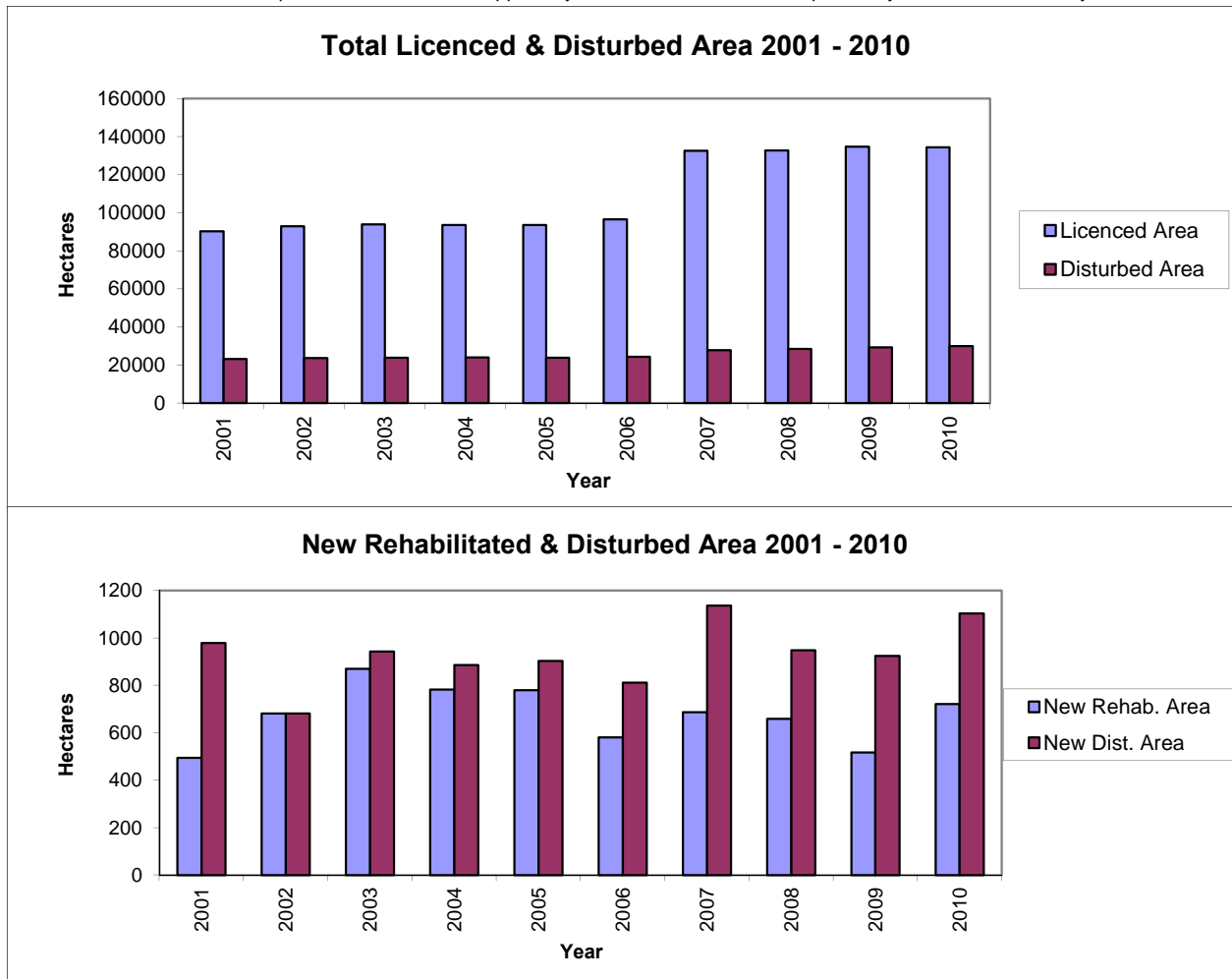


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,153.73	182	180	2	0	0
Cochrane	2,638.38	129	114	9	6	0
Hearst	3,809.13	187	162	21	4	0
Kirkland Lake	2,048.65	162	150	10	2	0
North Bay	2,637.35	198	170	22	6	0
Sault Ste. Marie	960.36	102	96	4	2	0
Sudbury	4,686.78	169	135	22	12	0
Timmins	2,081.26	162	150	9	3	0
Wawa	2,784.55	273	260	8	5	0
Sub-Total	22,800.19	1,564	1,417	107	40	0
NORTHWEST						
Dryden	2,259.81	191	174	9	8	0
Fort Frances	2,323.98	238	221	4	13	0
Kenora	3,045.91	202	157	27	18	0
Nipigon	3,350.82	252	220	16	16	0
Red Lake	1,206.25	84	80	3	1	0
Sioux Lookout	1,539.32	76	73	2	1	0
Thunder Bay	3,596.75	156	128	19	9	0
Sub-Total	17,322.84	1,199	1,053	80	66	0
SOUTHCENTRAL						
Aylmer	0.10	1	0	0	0	1
Bancroft	1,168.30	69	55	14	0	0
Guelph (Cambridge)	0.00	1	0	0	0	1
Kemptville	2.00	1	1	0	0	0
Midhurst	10.50	1	1	0	0	0
Parry Sound	937.46	90	65	18	7	0
Pembroke	126.44	36	36	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	2,276.20	201	158	33	8	2
TOTAL	42,399.23	2,964	2,628	220	114	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 50 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT**

(by Geographic Twp)

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown
Amherst Island
Bedford
Camden East
Dalton
Digby
Ernestown

Howe Island
Laxton
Longford
Loughborough
North Fredericksburgh
Portland
Richmond

Somerville
South Fredericksburgh
Town of Napanee
Villages of Bath and
Newburgh
Wolfe Island

SEPTEMBER 1, 1993

Admaston
Alice and Fraser
Bagot and Blithfield
Bromley
City of Pembroke
Horton

McNab
Pembroke
Petawawa
Ross
Stafford

Towns of Arnprior and
Renfrew
Villages of Beachburg,
Braeside, Cobden and
Petawawa
Westmeath

JANUARY 1, 1998

Anderson
Appleby
Archibald
Aweres
Awrey
Baldwin
Burwash
Cartier
Cascaden
Casimir
Chesley Additional
Cleland
Cosby
Curtin
Delamere
Dennis
Deroche
Duncan
Dunnet
Eden
Fenwick
Fisher
Foster
Foy

Gaudette
Gough
Hagar
Hallam
Harrow
Harty
Haviland
Hawley
Hendrie
Henry
Herrick
Hess
Hilton
Hodgins
Hoskin
Hyman
Jarvis
Jennings
Jocelyn
Johnson
Kars
Kehoe
Laird
Laura

Ley
Loughrin
Macdonald
May
McKinnon
Meredith and Aberdeen
Additional
Merritt
Mongowin
Nairn
Pennfather
Ratter
Secord
Servos
Shakespeare
Shields
St. Joseph
Street
Tarbutt and Tarbutt
Additional
Tilley
Tilton
Tupper
VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

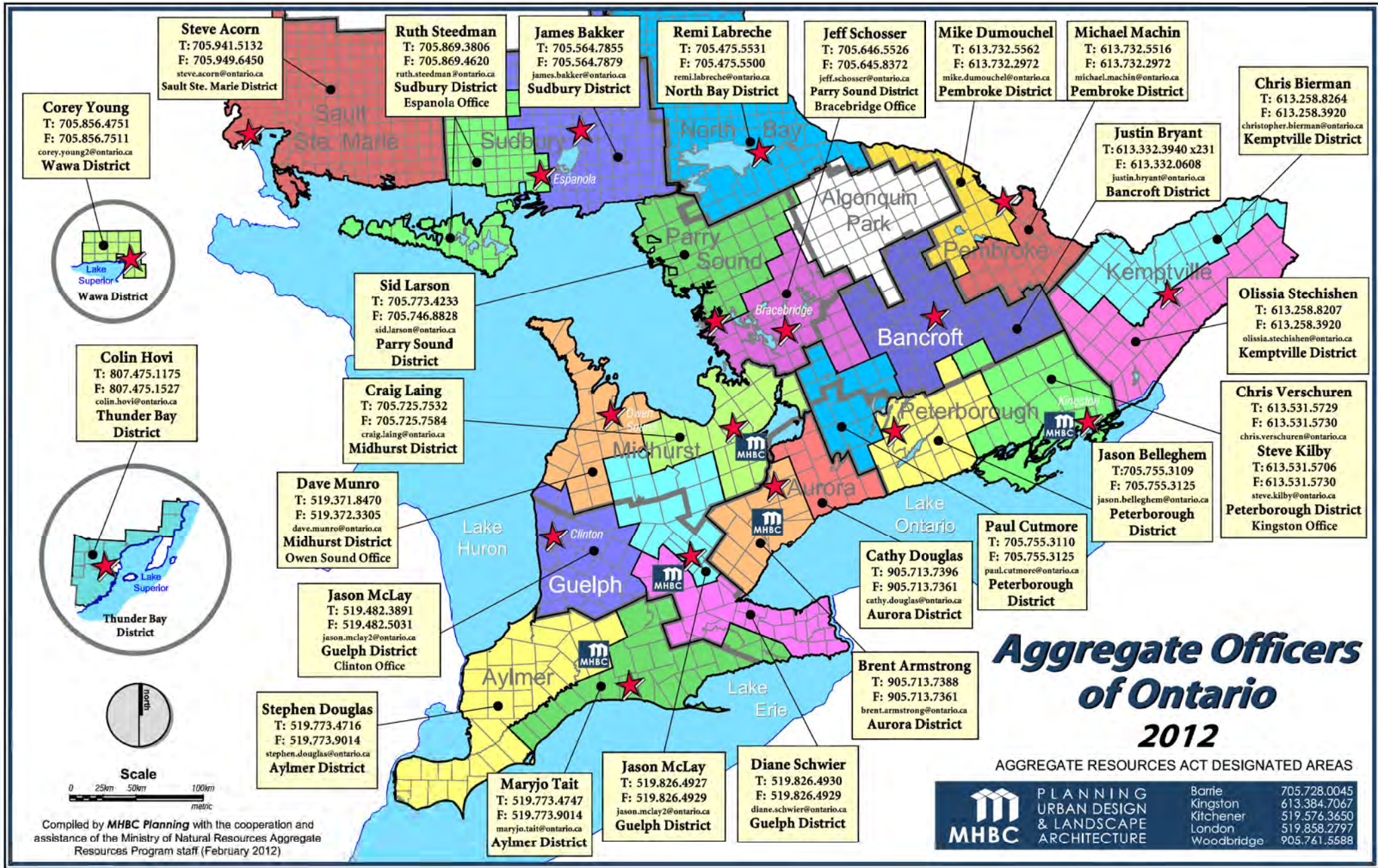
CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		





Aggregate Officers of Ontario 2012

AGGREGATE RESOURCES ACT DESIGNATED AREAS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

Barrie	705.728.0045
Kingston	613.384.7067
Kitchener	519.576.3650
London	519.858.2797
Woodbridge	905.761.5588

Compiled by **MHBC Planning** with the cooperation and assistance of the Ministry of Natural Resources Aggregate Resources Program staff (February 2012)



• MINERAL • AGGREGATES • IN ONTARIO

Statistical Update

2 0 1 1

Prepared by:



**THE ONTARIO AGGREGATE
RESOURCES CORPORATION**

AGGREGATE RESOURCES STATISTICS IN ONTARIO

PRODUCTION STATISTICS

2011

Prepared by

The Ontario Aggregate Resources Corporation

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Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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AGGREGATE RESOURCES STATISTICS IN ONTARIO

Overview

Aggregate resources are used in the everyday lives of all Ontario residents, and make up an integral part of our roads, sidewalks, sewers, subway tunnels and airports, as well as our homes, offices, hospitals, schools and shopping centres. On average, Ontarians use about 14 tonnes of aggregate per person per year.

The aggregate industry plays a foundational role within the Ontario economy. The economic activity generated by the industry begins with the aggregate production itself but also feeds industries which receive and use the raw materials: including cement and concrete products, other aggregate-based products (asphalt, chemical, clay, glass, etc.) and construction.

In 2011, there were 3,729 licences for pits and quarries on private land in areas designated under the Aggregate Resources Act (refer to Appendix D – Map of Areas Designated), 2,868 aggregate permits on Crown land and 3 wayside permits.

Aggregate Production

Overall production of mineral aggregates in 2011 totaled approximately 159 million tonnes, down 7 million tonnes or 4.2% from the previous year. Production from licenced operations was down 8 million tonnes or 5.3% compared to 2010. Forestry Aggregate Pits (formerly Category 14) pit production has decreased 42.5% or 1.7 million tonnes compared to 2010 as a result of a change in the MNR estimate. Similar to 2010, there was no wayside permit production in 2011. Production from aggregate permits on Crown Land increased 37.5% from 2010 (11 million in 2011 from 8.0 million tonnes in 2010).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

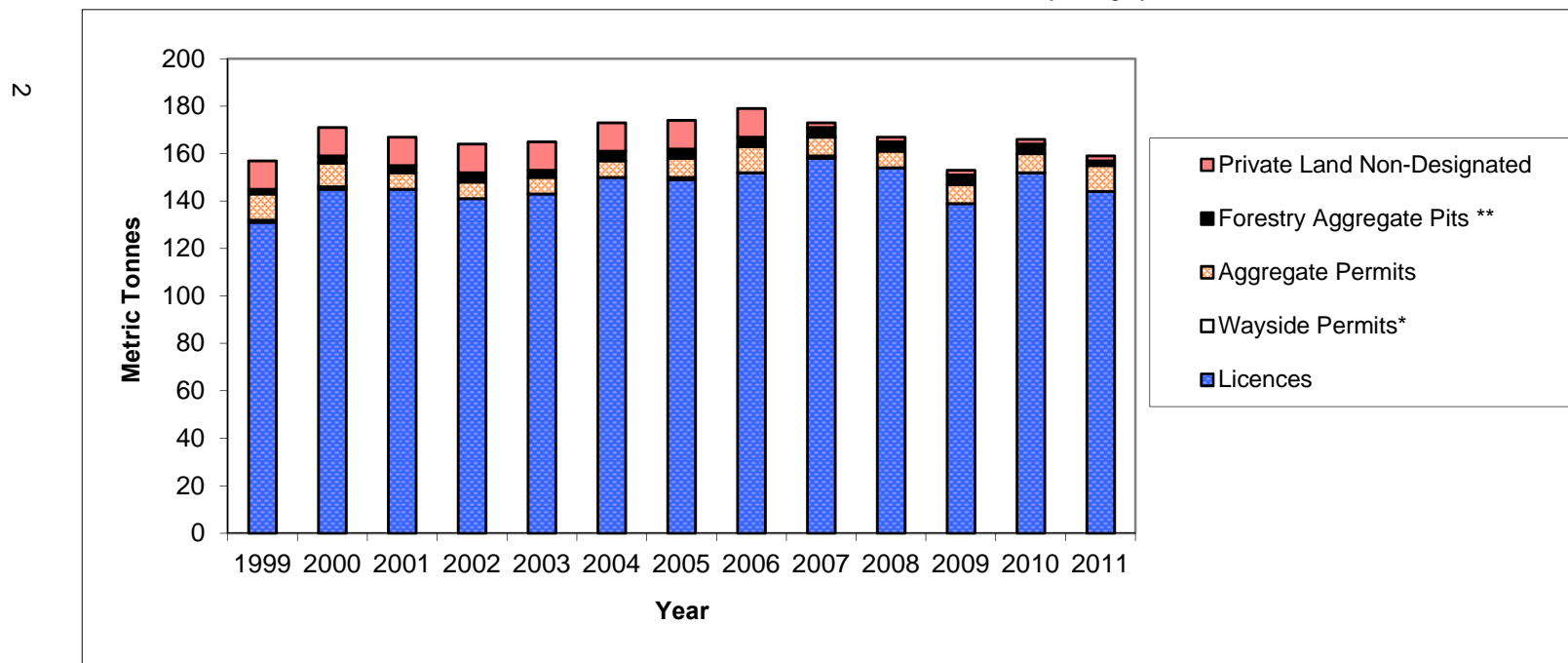
Table 1

AGGREGATE PRODUCTION IN ONTARIO - 1999 - 2011
(rounded to nearest million tonnes)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Licences	131	145	145	141	143	150	149	152	158	154	139	152	144
Wayside Permits*	1	1	0	0	0	0	1	0	1	0	0	0	0
Aggregate Permits	11	10	7	7	7	7	8	11	8	7	8	8	11
Forestry Aggregate Pits **	2	3	3	4	3	4	4	4	4	4	4	4	2
Private Land Non-Designated (estimated)	12	12	12	12	12	12	12	12	2	2	2	2	2
ONTARIO TOTAL	157	171	167	164	165	173	174	179	173	167	153	166	159

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .2 million tonnes for 2001, .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006, .1 million tonnes for 2008, .2 million tonnes for 2009, zero tonnes for 2010 and zero tonnes for 2011; ** Formerly Category 14



Production Statistics Report
Table 2 Lower Tier Grouping Guidelines

The guiding principal is to not disclose the confidential information of a single client's tonnage.

1. There must be a least 3 clients with a minimum of 2 reporting tonnage, each with licenses, in any municipal (lower) tier that appears in the stats report.
2. If the above guideline can't be met then the grouping of lower tiers is required based on the following rules:
 - a. Upper tiers with multiple lower tier groups of 2 or less must be combined for the 3 client minimum lower tier grouping provided there are at least 2 clients reporting tonnage.
 - b. The preferred criteria for determining groups will be based on geographical proximity.
 - c. A single lower tier reporting ZERO tonnage is not reported if it is not required for the above minimum 3 client grouping.
 - d. If geographic proximity can't be resolved then historical (grouping of past stats reports) will determine grouping.

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	67,675.89		67,675.89
Blind River, Town of/Spanish, Town of/The North Shore, Tp/ Elliot Lake, City of	65,595.70		65,595.70
Bruce Mines, Town of/Huron Shores, Municipality of/ Plummer Additional Tp	1,894,342.80		1,894,342.80
Hilton Tp	23,236.44		23,236.44
Jocelyn Tp	22,385.16		22,385.16
Laird Tp/St. Joseph Tp	30,544.88		30,544.88
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	34,411.94		34,411.94
Macdonald, Meredith & Aberdeen Add'l Tp	17,567.64		17,567.64
Sault Ste. Marie, City of/Prince Tp	715,954.43		715,954.43
Sub-Total	2,871,714.88	0.00	2,871,714.88
<i>Brant</i>			
Brant, County of/Brantford, City of	1,696,330.83		1,696,330.83
Sub-Total	1,696,330.83	0.00	1,696,330.83
<i>Bruce</i>			
Arran-Elderslie, Municipality of	106,650.22		106,650.22
Brockton, Municipality of	161,183.38		161,183.38
Huron-Kinloss Tp	346,430.41		346,430.41
Kincardine, Municipality of	33,740.40		33,740.40
Northern Bruce Peninsula, Municipality of	133,328.97		133,328.97
Saugeen Shores, Town of	187,309.73		187,309.73
South Bruce, Municipality of	361,899.57		361,899.57
South Bruce Peninsula, Town of	354,861.98		354,861.98
Sub-Total	1,685,404.66	0.00	1,685,404.66
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	350,899.04		350,899.04
Sub-Total	350,899.04	0.00	350,899.04
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	281,470.72		281,470.72
East Garafraxa Tp	1,013,524.76		1,013,524.76
Melancthon Tp	555,546.42		555,546.42
Mono Tp	317,373.11		317,373.11
Mulmur Tp	153,288.81		153,288.81
Sub-Total	2,321,203.82	0.00	2,321,203.82
<i>Durham</i>			
Brock Tp	1,208,349.47		1,208,349.47
Clarington, Municipality of	4,997,005.13		4,997,005.13
Oshawa, City of/Scugog Tp	62,125.35		62,125.35
Uxbridge Tp	3,914,858.13		3,914,858.13
Sub-Total	10,182,338.08	0.00	10,182,338.08
<i>Elgin</i>			
Bayham/West Elgin, Municipality of/Malahide Tp	189,389.92		189,389.92
Central Elgin, Municipality of	295,089.87		295,089.87
Sub-Total	484,479.79	0.00	484,479.79

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,586,278.14		1,586,278.14
Kingsville, Town of	403,096.33		403,096.33
Sub-Total	1,989,374.47	0.00	1,989,374.47
Frontenac			
Central Frontenac Tp	113,881.35		113,881.35
Frontenac Islands Tp	38,655.61		38,655.61
Kingston, City of	1,437,314.54		1,437,314.54
North Frontenac Tp	144,484.80		144,484.80
South Frontenac Tp	449,525.34		449,525.34
Sub-Total	2,183,861.64	0.00	2,183,861.64
Greater Sudbury			
Greater Sudbury, City of	3,131,366.81		3,131,366.81
Sub-Total	3,131,366.81	0.00	3,131,366.81
Grey			
Chatsworth Tp	444,606.93		444,606.93
Georgian Bluffs, Tp	394,480.04		394,480.04
Grey Highlands, Municipality of	505,746.65		505,746.65
Meaford, Municipality of	506,270.30		506,270.30
Southgate Tp	402,401.53		402,401.53
The Blue Mountains, Town of	190,974.54		190,974.54
West Grey, Municipality of	565,735.66		565,735.66
Sub-Total	3,010,215.65	0.00	3,010,215.65
Haldimand			
Haldimand, County of	1,175,267.73		1,175,267.73
Sub-Total	1,175,267.73	0.00	1,175,267.73
Haliburton			
Algonquin Highlands, Tp	36,449.25		36,449.25
Dysart et al, Tp	267,121.93		267,121.93
Highlands East, Tp	29,449.29		29,449.29
Minden Hills, TP	143,481.07		143,481.07
Sub-Total	476,501.54	0.00	476,501.54
Halton			
Burlington, City of/Halton Hills, Town of	3,821,870.41		3,821,870.41
Milton, Town of	4,903,825.09		4,903,825.09
Sub-Total	8,725,695.50	0.00	8,725,695.50
Hamilton			
Hamilton, City of	5,014,014.81		5,014,014.81
Sub-Total	5,014,014.81	0.00	5,014,014.81

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
Hastings				
Bancroft, Town of		28,321.45		28,321.45
Belleville, City of		967,786.63		967,786.63
Carlo/Mayo Tp		14,660.67		14,660.67
Centre Hastings, Municipality of		74,597.39		74,597.39
Faraday Tp		45,538.00		45,538.00
Hasting Highlands		120,451.09		120,451.09
Limerick Tp		18,304.24		18,304.24
Madoc Tp		877,636.98		877,636.98
Marmora & Lake, Municipality of		15,826.20		15,826.20
Quinte West, City of		607,061.46		607,061.46
Tweed, Municipality of		68,194.84		68,194.84
Tyendinaga Tp		261,789.11		261,789.11
Wollaston		33,729.28		33,729.28
Sub-Total		3,133,897.34	0.00	3,133,897.34
Huron				
Ashfield-Colborne-Wawanosh Tp		1,009,812.75		1,009,812.75
Bluewater, Municipality of		6,408.67		6,408.67
Central Huron, Municipality of		511,602.42		511,602.42
Howick Tp		141,227.76		141,227.76
Huron East, Municipality of		833,389.41		833,389.41
Morris-Turnberry, Municipality of		191,883.04		191,883.04
North Huron Tp		29,764.04		29,764.04
South Huron, Municipality of		121,023.44		121,023.44
Sub-Total		2,845,111.53	0.00	2,845,111.53
Kawartha Lakes				
Kawartha Lakes, City of		4,653,544.57		4,653,544.57
Sub-Total		4,653,544.57	0.00	4,653,544.57
Lambton				
Warwick Tp/Plympton-Wyoming, Town of		335,427.85		335,427.85
Lambton Shores, Municipality of		123,259.41		123,259.41
Sub-Total		458,687.26	0.00	458,687.26
Lanark				
Beckwith Tp		71,565.50		71,565.50
Drummond-North Elmsley Tp		139,181.94		139,181.94
Lanark Highlands Tp		904,098.51		904,098.51
Mississippi Mills, Town of		491,103.47		491,103.47
Montague Tp		133,576.97		133,576.97
Tay Valley Tp		19,872.90		19,872.90
Sub-Total		1,759,399.29	0.00	1,759,399.29

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Leeds & Grenville			
Athens Tp/Front of Yonge Tp	211,516.72		211,516.72
Augusta Tp	108,768.34		108,768.34
Edwardsburgh-Cardinal Tp	91,960.89		91,960.89
Elizabethtown-Kitley Tp/Merrickville-Wolford, Village of	434,795.17		434,795.17
Leeds and the Thousand Islands Tp	447,019.80		447,019.80
North Grenville Tp	459,523.55		459,523.55
Rideau Lakes Tp	197,211.31		197,211.31
Sub-Total	1,950,795.78	0.00	1,950,795.78
Lennox & Addington			
Addington Highlands Tp	20,007.52		20,007.52
Greater Napanee, Town of	449,164.21		449,164.21
Loyalist Tp	1,584,871.49		1,584,871.49
Stone Mills Tp	96,685.92		96,685.92
Sub-Total	2,150,729.14	0.00	2,150,729.14
Manitoulin District			
Assignack, Tp	2,996.90		2,996.90
Gordon/Barrie Island/Burpee & Mills, Tp/Cockburn Island, Tp	34,661.38		34,661.38
Billings, Tp	23,312.28		23,312.28
Central Manitoulin Tp	76,351.32		76,351.32
Northeastern Manitoulin & The Islands	122,603.36		122,603.36
Tehkummah, Tp	105,013.16		105,013.16
Unorganized - Manitoulin D	2,868,808.85		2,868,808.85
Sub-Total	3,233,747.25	0.00	3,233,747.25
Middlesex			
Adelaide Metcalfe Tp	30,653.97		30,653.97
London, City of	1,076,456.99		1,076,456.99
Lucan Biddulph Tp	5,201.59		5,201.59
Middlesex Centre Tp	524,798.65		524,798.65
North Middlesex, Municipality of	55,033.52		55,033.52
Strathroy-Caradoc Tp	5,808.00		5,808.00
Thames Centre, Municipality of	2,252,794.43		2,252,794.43
Sub-Total	3,950,747.15	0.00	3,950,747.15
Muskoka			
Bracebridge	637,287.39		637,287.39
Georgian Bay	5,028.56		5,028.56
Gravenhurst	138,248.68		138,248.68
Huntsville	929,612.87		929,612.87
Lake of Bays, Tp	179,475.04		179,475.04
Muskoka Lakes, Tp	244,093.75		244,093.75
Sub-Total	2,133,746.29	0.00	2,133,746.29
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,708,828.28		1,708,828.28
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,296,210.13		1,296,210.13
Niagara Falls, City of	901,412.56		901,412.56
Sub-Total	3,906,450.97	0.00	3,906,450.97

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp	31,008.09		31,008.09
Calvin Tp	41,103.96		41,103.96
Chisholm Tp	40,560.50		40,560.50
Mattawan Tp/South Algonquin Tp	5,331.50		5,331.50
North Bay, City of	583,270.96		583,270.96
Papineau-Cameron Tp	109,361.16		109,361.16
Unorganized - Nipissing D	2,782.00		2,782.00
West Nipissing, Municipality of	310,483.23		310,483.23
Sub-Total	1,123,901.40	0.00	1,123,901.40
<i>Norfolk</i>			
Norfolk, County of	517,480.56		517,480.56
Sub-Total	517,480.56	0.00	517,480.56
<i>Northumberland</i>			
Alnwick-Haldimand Tp	147,945.36		147,945.36
Brighton, Municipality of	183,627.84		183,627.84
Cramahe Tp	1,836,883.85		1,836,883.85
Hamilton Tp	237,227.28		237,227.28
Port Hope, Municipality of	27,352.13		27,352.13
Trent Hills, Municipality of	223,426.10		223,426.10
Sub-Total	2,656,462.56	0.00	2,656,462.56
<i>Ottawa</i>			
Ottawa, City of	10,930,168.32		10,930,168.32
Sub-Total	10,930,168.32	0.00	10,930,168.32
<i>Oxford</i>			
Blandford-Blenheim Tp	304,381.69		304,381.69
East Zorra-Tavistock Tp/Norwich Tp	132,197.36		132,197.36
South-West Oxford Tp	787,879.38		787,879.38
Zorra Tp	3,641,734.49		3,641,734.49
Sub-Total	4,866,192.92	0.00	4,866,192.92
<i>Parry Sound District</i>			
ArmourTp	483,922.16		483,922.16
Callander, Municipality of	34,412.95		34,412.95
Carling Tp/The Archipelago Tp	16,438.92		16,438.92
Joly Tp	22,063.32		22,063.32
Kearney, Town of	15,968.31		15,968.31
Macher Tp	195,575.18		195,575.18
Magnetawan, Municipality of	102,119.30		102,119.30
McDougall Tp	37,300.29		37,300.29
McKeller Tp	9,659.28		9,659.28
McMurrich-Monteith Tp	17,808.29		17,808.29
Nipissing Tp	15,529.79		15,529.79
Perry Tp	36,431.85		36,431.85
Powassan, Municipality of	68,544.06		68,544.06
Ryerson Tp	376,069.07		376,069.07
Seguin Tp	384,205.80		384,205.80
Strong Tp	8,653.16		8,653.16
Unorganized - Parry Sound	240,267.18		240,267.18
Whitestone The Municipality of	36,582.92		36,582.92
Sub-Total	2,101,551.83	0.00	2,101,551.83

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

(Reported in Metric Tonnes)

Municipality	Licences	Wayside Permits	Total
<i>Peel</i>			
Caledon, Town of	3,626,344.73		3,626,344.73
Sub-Total	3,626,344.73	0.00	3,626,344.73
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	77,216.46		77,216.46
Perth East Tp	467,211.27		467,211.27
Perth South Tp	1,502,673.28		1,502,673.28
West Perth Tp	127,809.53		127,809.53
Sub-Total	2,174,910.54	0.00	2,174,910.54
<i>Peterborough</i>			
Asphodel-Norwood Tp	307,536.00		307,536.00
Cavan-Millbrook-North Monaghan Tp/ Otonabee-South Monaghan Tp	781,849.50		781,849.50
Douro-Dummer Tp	702,442.59		702,442.59
Galway-Cavendish-Harvey Tp	396,866.42		396,866.42
North Kawartha Tp	5,900.43		5,900.43
Havelock-Belmont-Methuen Tp	564,250.72		564,250.72
Smith-Ennismore-Lakefield Tp	393,986.77		393,986.77
Sub-Total	3,152,832.43	0.00	3,152,832.43
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	343,998.72		343,998.72
Champlain Tp	673,067.00		673,067.00
Clarence-Rockland, City of	137,465.38		137,465.38
East Hawkesbury Tp	30,046.16		30,046.16
Russell Tp	74,153.91		74,153.91
The Nation, Municipality of	368,643.54		368,643.54
Sub-Total	1,627,374.71	0.00	1,627,374.71
<i>Prince Edward Co</i>			
Prince Edward, County of	1,646,938.40		1,646,938.40
Sub-Total	1,646,938.40	0.00	1,646,938.40
<i>Renfrew</i>			
Admaston-Bromley Tp/Renfrew, Town of	159,939.20		159,939.20
Bonnechere Valley Tp	135,982.93		135,982.93
Brudenell, Lyndoc and Raglan Tp	51,615.50		51,615.50
Deep River Tp/Head, Clara & Maria Tp	17,587.40		17,587.40
Greater Madawaska Tp	29,021.28		29,021.28
Horton Tp	341,785.40		341,785.40
Killaloe, Hagarty and Richards Tp	33,631.40		33,631.40
Laurentian Hills	38,278.01		38,278.01
Laurentian Valley Tp	636,207.96		636,207.96
Madawaska Valley	93,059.63		93,059.63
McNab-Braeside Tp	213,349.45		213,349.45
North Algona-Wilberforce Tp	31,742.50		31,742.50
Petawawa, Town of	265,295.39		265,295.39
Whitewater Region Tp	141,408.61		141,408.61
Sub-Total	2,188,904.66	0.00	2,188,904.66

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	258,309.61		258,309.61
Midland, Town of/Penetanguishine, Town of/ Collingwood, Town of	265,694.72		265,694.72
Clearview Tp	1,379,571.06		1,379,571.06
Essa Tp	104,308.49		104,308.49
Innisfil, Town of	42,101.96		42,101.96
New Tecumseth, Town of	45,205.00		45,205.00
Oro-Medonte Tp	2,340,670.99		2,340,670.99
Ramara Tp/Orillia, City of	2,106,796.83		2,106,796.83
Severn Tp	2,707,738.86		2,707,738.86
Springwater Tp	1,182,613.90		1,182,613.90
Tay Tp	74,449.18		74,449.18
Tiny Tp	198,616.70		198,616.70
Sub-Total	10,706,077.30	0.00	10,706,077.30
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	692,860.44		692,860.44
North Glengarry Tp	125,808.72		125,808.72
North Stormont Tp	1,012,958.05		1,012,958.05
South Dundas Tp	180,336.43		180,336.43
South Glengarry Tp	272,539.11		272,539.11
South Stormont Tp	1,769,763.80		1,769,763.80
Sub-Total	4,054,266.55	0.00	4,054,266.55
<i>Sudbury District</i>			
Baldwin Tp	74,949.07		74,949.07
French River, Municipality of	107,289.61		107,289.61
Killarny, Municipality of/Nairn & Hyman Tp	106,098.28		106,098.28
Markstay-Warren, Municipality of	49,410.59		49,410.59
Sables Spanish Rivers Tp/Espanola, Town of	116,588.40		116,588.40
Sudbury District, Unorganized	404,484.34		404,484.34
Sub-Total	858,820.29	0.00	858,820.29
<i>Thunder Bay District</i>			
Conmee, Tp	395,625.53		395,625.53
Neebing, Municipality of	22,424.96		22,424.96
Oliver Paipoonge, Municipality of	187,659.46		187,659.46
Shuniah, Tp	438,954.52		438,954.52
Thunder Bay, City of	3,577.00		3,577.00
Sub-Total	1,048,241.47	0.00	1,048,241.47
<i>Waterloo</i>			
Kitchener, City of	150,767.86		150,767.86
North Dumfries Tp	4,536,879.80		4,536,879.80
Wellesley Tp	1,324,149.19		1,324,149.19
Wilmot Tp	1,211,020.34		1,211,020.34
Woolwich Tp	571,513.33		571,513.33
Sub-Total	7,794,330.52	0.00	7,794,330.52

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	(Reported in Metric Tonnes)	Licences	Wayside Permits	Total
Wellington				
Centre Wellington Tp		1,035,124.95		1,035,124.95
Erin, Town of		977,249.61		977,249.61
Guelph-Eramosa Tp		923,607.09		923,607.09
Mapleton Tp		38,932.62		38,932.62
Minto, Town of		350,212.05		350,212.05
Puslinch Tp		3,132,538.22		3,132,538.22
Wellington North Tp		74,265.85		74,265.85
Sub-Total		6,531,930.39	0.00	6,531,930.39
York				
East Gwillimbury, Town of		81,463.85		81,463.85
Georgina, Town of		12,904.21		12,904.21
Whitchurch-Stouffville, Town of		555,507.83		555,507.83
Sub-Total		649,875.89	0.00	649,875.89
GRAND TOTAL		143,732,131.29	0.00	143,732,131.29

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Algoma, District of	0.8	0.6	0.8	1.9	1.2	2.8	2.9	2.6	2.9	2.9
Brant Co.	1.8	2.1	2.0	1.8	2.3	2.3	2.2	1.4	1.9	1.7
Bruce Co.	1.7	1.7	1.9	1.8	2.3	2.4	2.0	1.7	2.3	1.7
Chatham-Kent, R. M. of	0.5	0.4	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.4
Dufferin Co.	2.3	3.0	2.7	2.9	3.1	3.0	3.1	2.7	2.7	2.3
Durham, R. M. of	11.0	11.8	12.6	13.2	12.2	11.7	10.0	8.3	9.6	10.2
Elgin Co.	0.5	0.6	0.7	0.8	0.7	0.6	0.6	0.6	0.5	0.5
Essex Co.	1.9	1.9	1.9	1.7	1.6	1.7	1.6	1.7	2.6	2.0
Frontenac Co.	1.6	2.0	2.2	2.4	2.1	2.1	2.9	2.6	2.3	2.2
Greater Sudbury, City of	2.3	1.7	2.2	2.8	2.9	2.7	3.2	2.1	2.5	3.1
Grey Co.	2.6	3.1	3.2	3.7	3.4	3.2	3.3	2.9	3.5	3.0
Haldimand Co.	1.9	1.8	1.6	2.0	1.8	1.4	1.3	1.1	1.4	1.2
Haliburton Co.	----	----	----	----	----	0.5	0.6	0.5	0.5	0.5
Halton, R. M. of	12.1	10.7	11.4	10.9	9.6	9.5	8.5	6.9	7.2	8.7
Hamilton, City of	5.5	6.0	6.3	5.6	6.2	5.6	5.7	4.9	5.3	5.0
Hastings Co.	2.1	2.4	2.3	2.1	2.3	2.6	3.0	3.4	3.5	3.1
Huron Co.	2.7	2.8	2.5	2.6	2.7	2.9	2.9	3.0	2.5	2.8
Kawartha Lakes, City of	6.4	6.7	6.8	6.8	6.5	5.9	5.5	4.5	4.6	4.7
Lambton Co.	0.7	0.4	0.5	0.7	0.7	0.5	0.6	0.5	0.5	0.5
Lanark Co.	2.0	2.4	2.3	2.3	2.3	2.3	1.9	2.5	2.9	1.8
Leeds & Grenville Co.'s	2.0	1.9	2.2	2.3	2.3	2.0	2.3	2.1	2.6	2.0
Lennox & Addington Co.	1.7	1.9	1.8	1.9	1.9	2.0	2.0	2.0	2.4	2.2
Manitoulin, District of	----	----	----	----	----	3.6	3.9	2.9	3.6	3.2
Middlesex Co.	5.4	5.6	6.2	6.2	5.6	5.2	4.8	4.3	4.8	4.0
Muskoka	----	----	----	----	----	2.1	2.1	2.3	2.4	2.1
Niagara, R. M. of	4.9	4.6	4.7	4.5	5.1	4.0	4.0	3.9	4.6	3.9
Nipissing, District of	----	----	----	----	----	1.3	1.2	1.2	1.1	1.1
Norfolk Co.	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5
Northumberland Co.	3.0	3.4	3.3	3.5	3.4	3.4	3.0	2.8	3.1	2.7
Ottawa, City of	10.7	10.0	9.9	10.6	11.1	11.4	11.2	11.0	12.7	10.9
Oxford Co.	4.8	4.9	4.8	5.0	5.4	7.1	5.8	4.9	5.2	4.9
Parry Sound, District of	----	----	----	----	----	1.5	1.8	2.4	3.5	2.1
Peel, R. M. of	4.3	4.5	5.3	5.1	5.3	4.7	3.8	3.6	3.9	3.6
Perth Co.	2.1	2.0	2.0	2.0	2.4	2.1	1.9	1.9	2.7	2.2
Peterborough Co.	3.2	2.5	2.5	2.7	2.6	2.9	3.2	3.2	3.3	3.2
Prescott & Russell Co.'s	1.3	1.4	1.4	1.7	1.5	1.4	1.7	1.7	1.6	1.6
Prince Edward Co.	2.1	2.2	2.2	2.4	2.2	2.4	2.4	1.6	1.7	1.6
Renfrew Co.	1.8	1.6	1.7	1.3	1.9	2.3	2.1	2.3	2.3	2.2
Simcoe Co.	11.4	11.8	12.7	12.6	13.4	12.0	12.1	10.5	10.3	10.7
Stormont, Dundas & Glengarry Co.'s	2.6	2.7	3.5	3.0	3.4	2.8	3.2	3.4	3.3	4.1
Sudbury, District of	0.6	0.6	0.6	0.8	0.8	1.7	1.1	0.8	0.8	0.9
Thunder Bay, District of	----	----	----	----	----	0.3	0.7	1.0	0.8	1.0
Waterloo, R. M. of	7.8	8.0	9.5	8.2	9.3	8.2	7.9	7.1	7.5	7.8
Wellington Co.	8.9	9.1	9.1	8.3	8.8	9.0	8.0	6.6	6.8	6.5
York, R. M. of	2.4	2.0	1.9	1.0	1.0	0.7	1.1	1.0	0.7	0.6
TOTAL	141.8	143.2	149.8	149.7	152.0	158.8	153.8	139.0	151.7	143.7

Note: Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2011
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2011 Production	Production(2)				
			2010	2009	2008	2007	2006
1 City of Ottawa	City of Ottawa	10.9	12.7	11.0	11.2	11.0	11.1
2 City of Hamilton	City of Hamilton	5.0	5.3	4.9	5.7	5.6	6.2
3 Municipality of Clarington	Durham	5.0	4.9	4.1	4.6	5.2	5.0
4 Town of Milton	Halton	4.9	3.7	3.7	4.5	4.4	4.6
5 City of Kawartha Lakes	City of Kawartha Lakes	4.7	4.6	4.5	5.5	5.9	6.5
6 Township of North Dumfries	Waterloo	4.5	3.8	3.4	3.7	4.2	5.0
7 Township of Uxbridge	Durham	3.9	3.4	3.0	3.7	4.6	5.4
8 Township of Zorra	Oxford	3.6	3.3	2.8	3.6	4.1	3.9
9 Town of Caledon	Peel	3.6	3.9	3.6	3.8	4.7	5.3
10 Puslinch Township	Wellington County	3.1	3.6	3.4	3.9	4.2	4.7
Total		49.2	49.2	44.4	50.2	53.9	57.7

Notes:

1. Municipalities are ranked in order of their licenced production for 2011.
2. Historical data are for current year's Top Ten Producing Municipalities.
3. Pre 2009 historical data for Table 4 has been corrected effective February 24, 2011.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	141	123	18	125	16	0	0
Aylmer	302	237	65	288	8	6	0
Bancroft	270	99	171	194	33	43	0
Guelph (Cambridge)	454	387	67	416	35	3	0
Kemptville	480	285	195	336	121	23	0
Midhurst	479	362	117	420	54	5	0
North Bay	147	62	85	116	6	25	0
Parry Sound	303	119	184	196	10	97	0
Pembroke	226	73	153	205	11	10	0
Peterborough (Tweed)	533	295	238	427	89	17	0
Sault Ste. Marie	96	52	44	78	6	12	0
Sudbury	238	126	112	170	20	48	0
Thunder Bay	58	24	34	47	3	8	0
Wawa	2	2	0	1	0	1	0
TOTAL	3,729	2,246	1,483	3,019	412	298	0

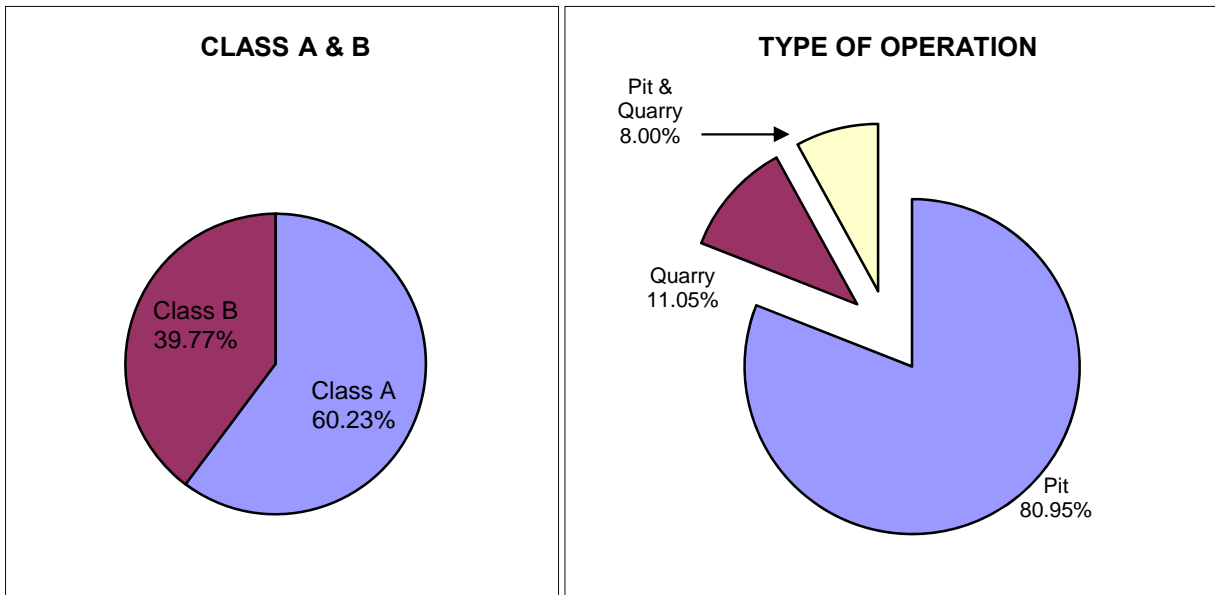
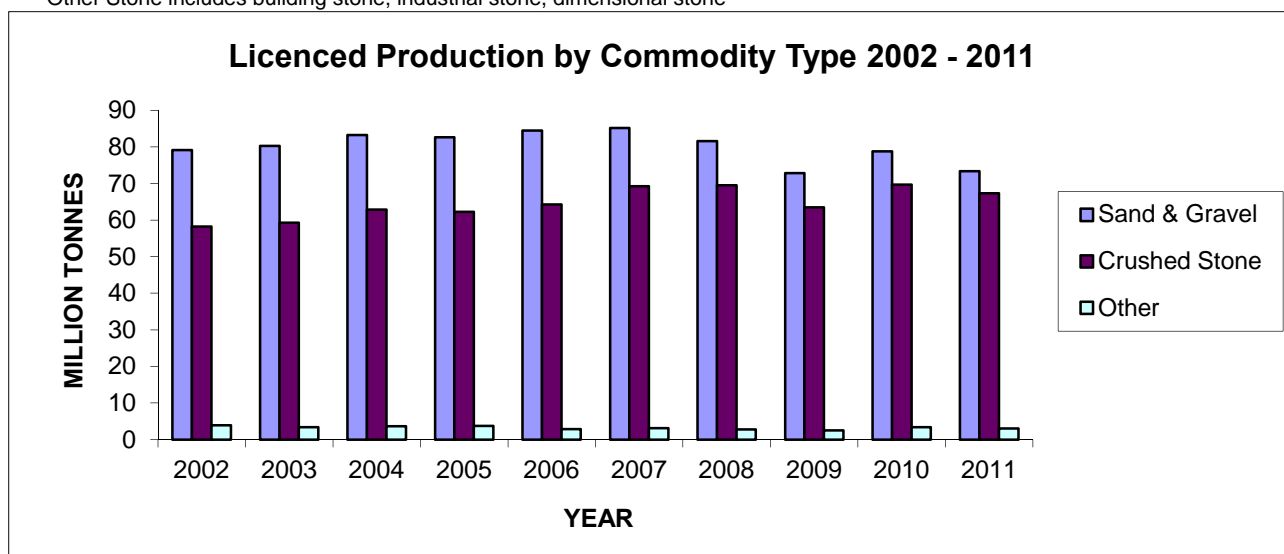


Table 6

**2011 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	23,181,254.20	11,766,365.44	10,744,511.82	564,317.11	106,059.83
Aylmer	12,617,861.19	9,085,736.65	3,515,248.37	5,711.17	11,165.00
Bancroft	3,373,573.92	747,298.02	2,507,878.32	0.00	118,397.58
Guelph (Cambridge)	31,296,234.70	19,990,687.53	11,232,728.49	69,336.64	3,482.04
Kemptville	20,322,004.65	4,163,887.74	14,702,054.50	28,438.40	1,427,624.01
Midhurst	17,565,014.05	10,616,481.29	6,664,278.13	43,052.28	241,202.35
North Bay	1,314,528.06	843,305.86	457,174.60	1,740.80	12,306.80
Parry Sound	4,104,188.32	2,359,406.71	1,723,088.37	2,361.06	19,332.18
Pembroke	2,188,904.66	1,826,720.76	357,248.10	0.00	4,935.80
Peterborough	16,628,790.84	6,457,134.84	9,913,219.57	220,588.52	37,847.91
Sault Ste. Marie	2,871,165.28	1,523,650.05	1,347,487.23	0.00	28.00
Sudbury	7,220,369.95	3,143,645.62	3,965,739.02	104,488.95	6,496.36
Thunder Bay	1,048,241.47	833,104.88	215,136.59	0.00	0.00
TOTAL	143,732,131.29	73,357,425.39	67,345,793.11	1,040,034.93	1,988,877.86

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2002	141.17	79.09	58.19	3.89
2003	142.91	80.30	59.25	3.36
2004	149.76	83.28	62.83	3.65
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73
2009	138.84	72.79	63.51	2.54
2010	151.76	78.78	69.64	3.34
2011	143.73	73.36	67.34	3.03

Table 7

**2011 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

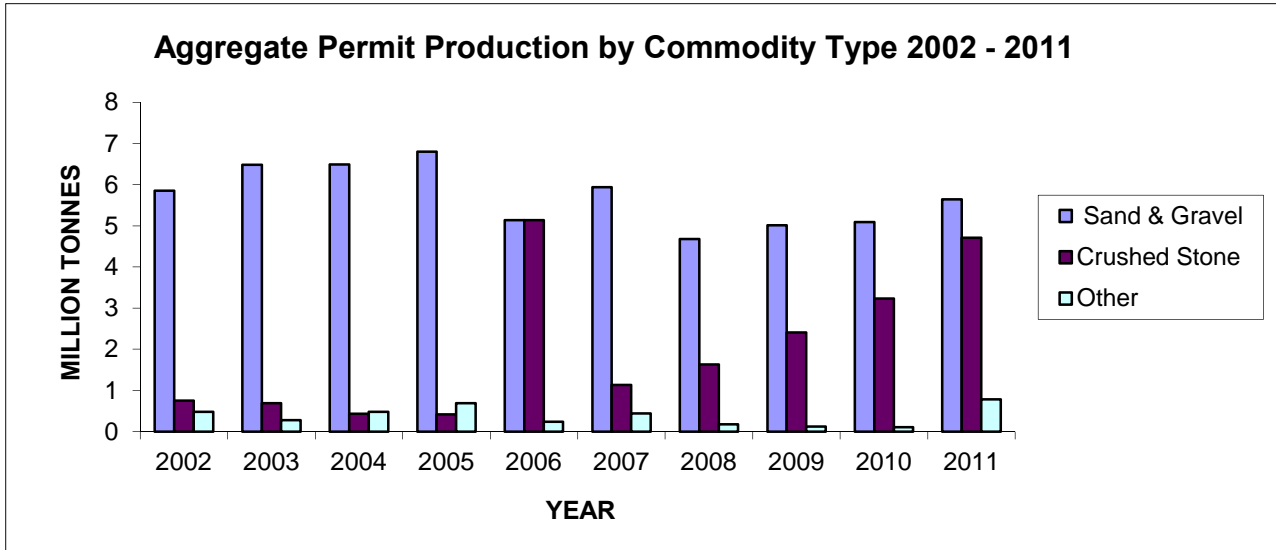
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	50,249.00	50,249.00	-	-	-
Cochrane	920,251.25	835,332.25	84,919.00	-	-
Hearst	637,997.33	558,514.19	79,483.14	-	-
Kirkland Lake	3,249,242.35	825,759.35	2,423,483.00	-	-
North Bay	344,583.02	231,990.18	110,967.32	-	1,625.52
Sault Ste. Marie	311,563.38	238,026.38	73,537.00	-	-
Sudbury	788,782.06	459,158.03	323,879.52	95.20	5,649.31
Timmins	248,469.74	248,469.74	-	-	-
Wawa	277,898.61	176,759.67	101,138.94	-	-
Sub-Total	6,829,036.74	3,624,258.79	3,197,407.92	95.20	7,274.83
NORTHWEST					
Dryden	605,268.72	191,520.72	412,657.00	-	1,091.00
Fort Frances	276,308.52	224,051.40	52,030.12	-	227.00
Kenora	175,243.43	69,532.86	92,220.00	-	13,490.57
Nipigon	333,942.29	167,649.37	165,198.92	-	-
Red Lake	296,697.63	296,697.63	-	-	-
Sioux Lookout	436,263.37	405,864.69	30,173.00	-	225.68
Thunder Bay	593,260.35	326,098.66	267,133.00	-	28.69
Sub-Total	2,716,984.31	1,681,415.33	1,019,412.04	-	15,062.94
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	-	-	-	-	-
Aylmer	3,041.42	3,041.42	-	-	-
Bancroft	335,203.68	32,127.92	218,809.78	-	84,265.98
Guelph (Cambridge)	-	-	-	-	-
Kemptville	1,240.32	1,240.32	-	-	-
Midhurst	674,620.00	-	-	674,620.00	-
Parry Sound	199,621.24	66,528.11	131,253.13	-	1,840.00
Pembroke	233,219.58	233,219.58	-	-	-
Peterborough (Tweed)	142,262.93	-	142,262.93	-	-
Sub-Total	1,589,209.17	336,157.35	492,325.84	674,620.00	86,105.98
TOTAL	11,135,230.22	5,641,831.47	4,709,145.80	674,715.20	108,443.75

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2011 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2002	7.08	5.85	0.75	0.48
2003	7.45	6.48	0.69	0.28
2004	7.40	6.49	0.43	0.48
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18
2009	7.54	5.01	2.41	0.12
2010	8.43	5.09	3.23	0.11
2011	11.13	5.64	4.71	0.78

Table 9

**2011 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	3,041	3,041	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	674,620	0	0	674,620	0
GTA (4)	0	0	0	0	0
East Central (5)	517,813	64,723	366,984	0	86,106
East (6)	234,913	234,913	0	0	0
Northeast (7)	6,390,718	3,235,273	3,148,074	95	7,275
Northwest (8)	3,314,126	2,103,881	1,194,088	0	16,157
TOTAL	11,135,230	5,641,831	4,709,146	674,715	109,538

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2011 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	17,120,403	12,730,382	4,331,665	43,718	14,637
Peninsula (2)	12,309,545	2,520,909	9,757,421	31,205	10
West Central (3)	32,049,162	24,441,615	7,323,168	43,177	241,202
GTA (4)	23,184,254	11,769,365	10,744,512	564,317	106,060
East Central (5)	17,853,923	7,433,406	10,074,138	182,674	163,705
East (6)	26,845,500	6,689,401	18,646,554	66,424	1,443,122
Northeast (7)	10,449,388	5,415,103	4,905,650	108,520	20,114
Northwest (8)	3,919,956	2,357,245	1,562,684	0	28
TOTAL	143,732,131	73,357,425	67,345,793	1,040,035	1,988,878

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

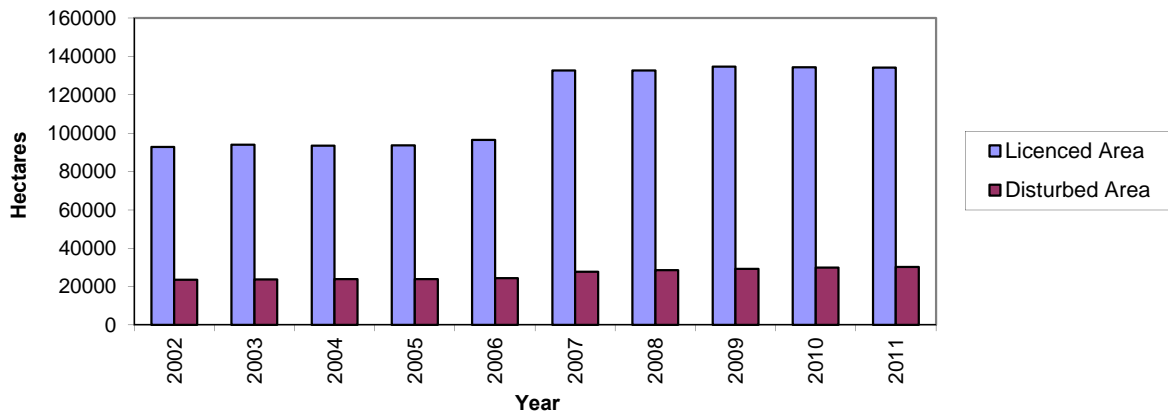
**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2011
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	141	8,128.37	3,047.95	42.25	65.51	3,024.69
Aylmer	302	8,589.46	2,959.67	110.07	104.78	2,964.96
Bancroft	270	9,327.46	1,150.78	57.18	12.16	1,195.80
Guelph (Cambridge)	454	16,213.95	4,887.22	173.11	137.33	4,923.00
Kemptville	480	14,441.98	4,416.50	140.79	44.37	4,512.92
Midhurst	479	15,521.76	3,777.59	116.74	66.72	3,827.60
North Bay	147	7,195.33	944.99	30.61	26.67	948.93
Parry Sound	303	9,567.56	1,974.64	92.95	31.80	2,035.79
Pembroke	226	5,562.55	771.40	21.03	23.32	769.11
Peterborough (Tweed)	533	15,220.55	3,785.63	84.89	54.62	3,815.91
Sault Ste. Marie	96	4,221.94	713.10	37.68	24.18	726.60
Sudbury	238	16,697.80	1,574.83	75.07	25.95	1,623.95
Thunder Bay	58	3,548.08	240.69	10.43	2.35	248.77
Wawa	2	46.87	0.00	0.00	0.00	0.00
TOTAL	3,729	134,283.66	30,244.97	992.81	619.75	30,618.02

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

Total Licenced & Disturbed Area 2002 - 2011



New Rehabilitated & Disturbed Area 2002 - 2011

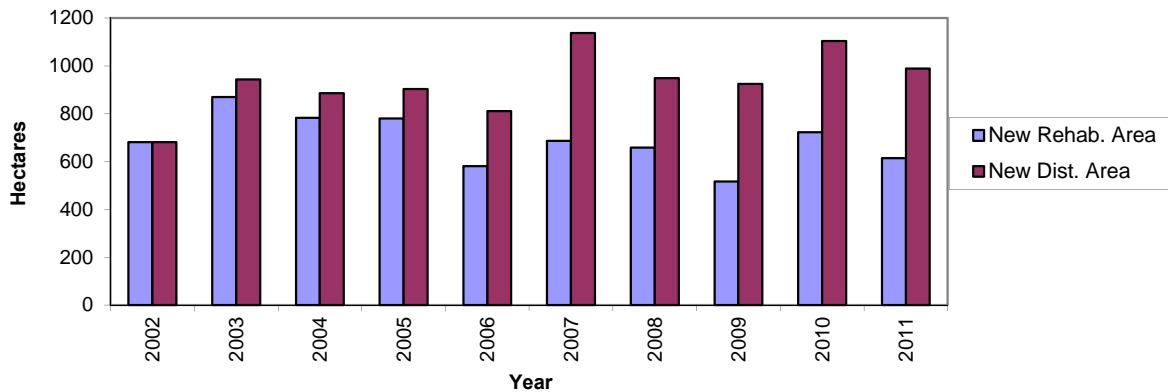


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,056.27	155	152	3	0	0
Cochrane	3,011.23	131	114	10	7	0
Hearst	3,819.11	188	163	23	2	0
Kirkland Lake	2,063.26	163	151	10	2	0
North Bay	2,648.53	193	165	22	7	0
Sault Ste. Marie	985.84	95	90	3	2	0
Sudbury	4,632.03	161	126	23	12	0
Timmins	2,072.15	156	144	9	3	0
Wawa	2,800.34	276	262	8	6	0
Sub-Total	23,088.76	1,518	1,367	111	41	0
NORTHWEST						
Dryden	2,314.61	185	167	9	9	0
Fort Frances	2,288.84	219	201	4	14	0
Kenora	2,986.56	193	151	23	19	0
Nipigon	3,340.76	240	205	17	18	0
Red Lake	1,207.87	84	80	3	1	0
Sioux Lookout	1,682.99	77	74	2	1	0
Thunder Bay	3,738.24	159	130	19	10	0
Sub-Total	17,559.87	1,157	1,008	77	72	0
SOUTHCENTRAL						
Aylmer	0.10	1	0	0	0	1
Bancroft	1,166.80	67	53	14	0	0
Guelph (Cambridge)	2.00	1	0	0	0	1
Kemptville	10.50	1	1	0	0	0
Midhurst	952.59	89	1	0	0	0
Parry Sound	120.41	31	64	18	7	0
Pembroke	31.40	2	31	0	0	0
Peterborough (Tweed)	0.00	1	0	1	1	0
Sub-Total	2,283.80	193	150	33	8	2
TOTAL	42,932.43	2,868	2,525	221	121	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 50 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT**

(by Geographic Twp)

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

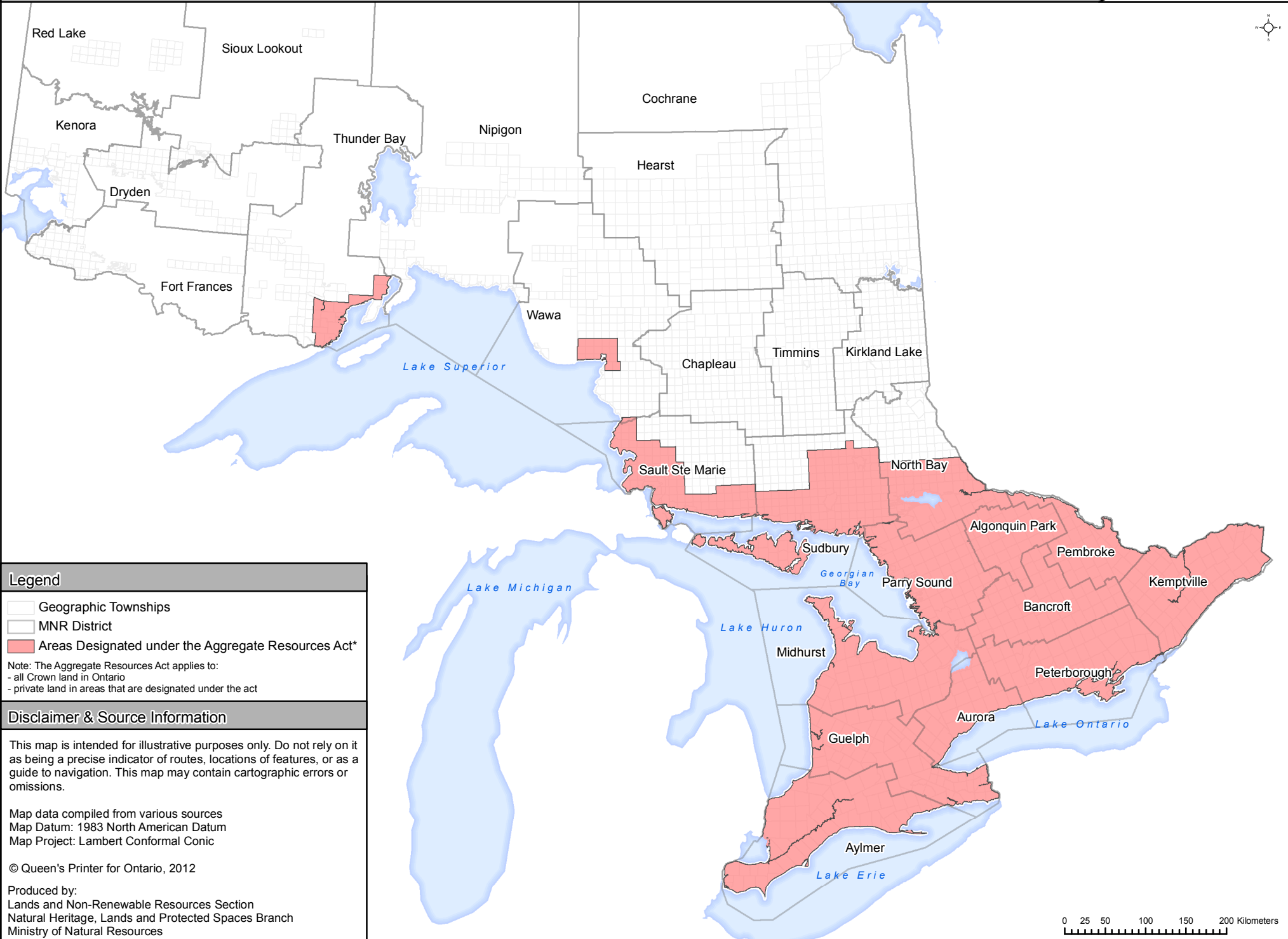
CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Areas Designated under the Aggregate Resources Act



Legend

- Geographic Townships
- MNR District
- Areas Designated under the Aggregate Resources Act*

Note: The Aggregate Resources Act applies to:
- all Crown land in Ontario
- private land in areas that are designated under the act

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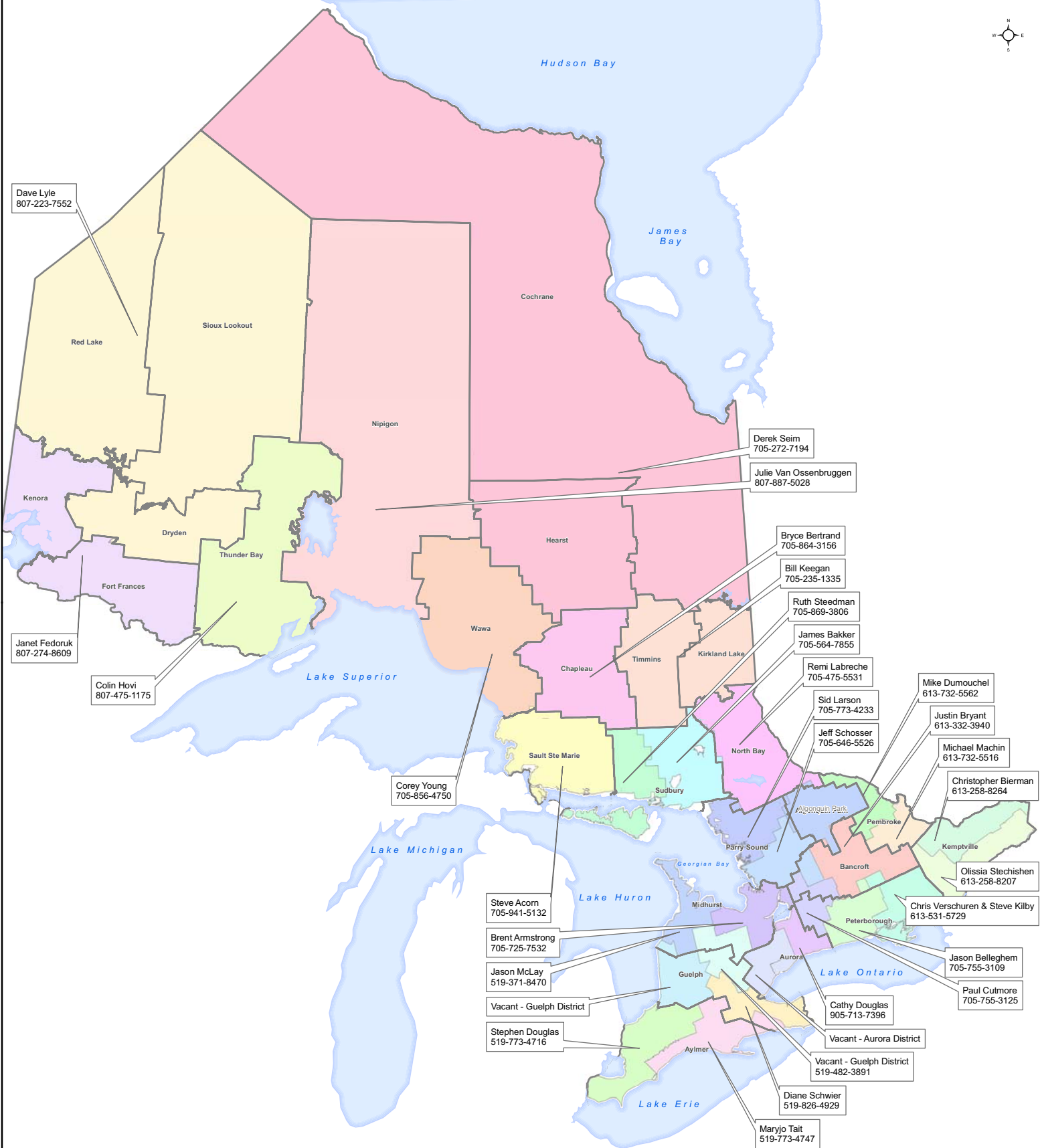
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Map Project: Lambert Conformal Conic

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Lands and Non-Renewable Resources Section
Natural Heritage, Lands and Protected Spaces Branch
Ministry of Natural Resources



Aggregate Inspector Jurisdiction



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 Ministry of Natural Resources
 July 2012

Map data compiled from a variety of sources
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AGGREGATE RESOURCES STATISTICS IN ONTARIO

PRODUCTION STATISTICS 2014

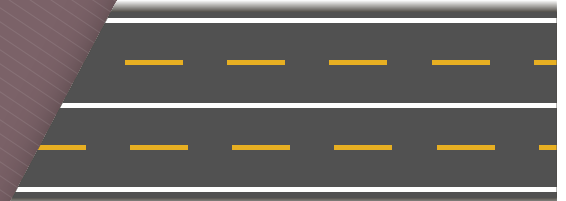
DID YOU KNOW?

1,760

TRUCKLOADS



1KM



1 km of 4-lane highway

3,760

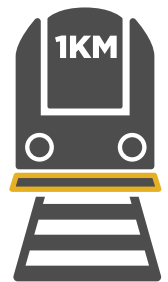
TRUCKLOADS



A 32,000m² hospital

4,560

TRUCKLOADS



1 km of subway line

14 TONNES



Every Ontarian uses
14 TONNES of stone,
sand and gravel each year.

AGGREGATE RESOURCES STATISTICS IN ONTARIO

PRODUCTION STATISTICS

2014

Prepared by

The Ontario Aggregate Resources Corporation

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- B. Historical Designation of Private Land under the Pits and Quarries Control Act and the Aggregate Resources Act
- C. CPCA (now CAC) Geographic Areas
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- E. Map of MNR Aggregate Officers of Ontario

Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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Database Administrator at the above address or fax number or contact him directly via
email, jcdorlas@toarc.com

AGGREGATE RESOURCES STATISTICS IN ONTARIO

Overview

Aggregate resources are used in the everyday lives of all Ontario residents, and make up an integral part of our roads, sidewalks, sewers, subway tunnels and airports, as well as our homes, offices, hospitals, schools and shopping centres. On average, Ontarians use about 14 tonnes of aggregate per person per year.

The aggregate industry plays a foundational role within the Ontario economy. The economic activity generated by the industry begins with the aggregate production itself but also feeds industries which receive and use the raw materials: including cement and concrete products, other aggregate-based products (asphalt, chemical, clay, glass, etc.) and construction.

In 2014, there were 3,689 licences for pits and quarries on private land in areas designated under the Aggregate Resources Act (refer to Appendix D – Map of Areas Designated), 2,649 aggregate permits on Crown land and 1 wayside permit.

Aggregate Production

Overall production of mineral aggregates in 2014 totaled approximately 153 million tonnes, up 10 million tonnes or 7% from the previous year. Production from licenced operations was up 10 million tonnes or 7.6% compared to 2013. Forestry Aggregate Pits (formerly Category 14) pit production has remained the same. Similar to 2013, there was no wayside permit production in 2014. Production from aggregate permits on Crown Land decreased 5.7% from 2013 (6.6 million in 2014 from 7 million tonnes in 2013).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

Table 1

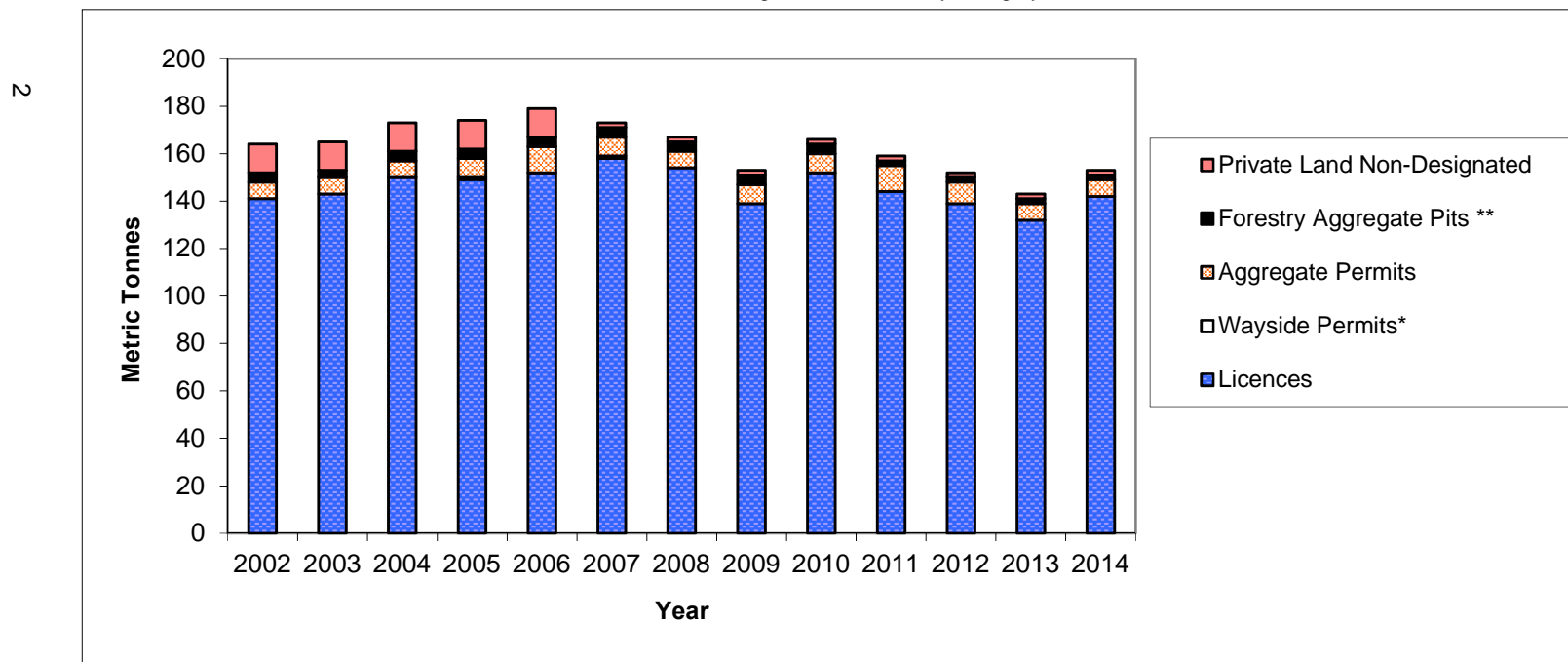
AGGREGATE PRODUCTION IN ONTARIO - 2002 - 2014
(rounded to nearest million tonnes)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Licences	141	143	150	149	152	158	154	139	152	144	139	132	142
Wayside Permits*	0	0	0	1	0	1	0	0	0	0	0	0	0
Aggregate Permits	7	7	7	8	11	8	7	8	8	11	9	7	7
Forestry Aggregate Pits **	4	3	4	4	4	4	4	4	4	2	2	2	2
Private Land Non-Designated (estimated)	12	12	12	12	12	2	2	2	2	2	2	2	2
ONTARIO TOTAL	164	165	173	174	179	173	167	153	166	159	152	143	153

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006

.1 million tonnes for 2008, .2 million tonnes for 2009, zero tonnes for 2010 through 2014; ** Formerly Category 14



Production Statistics Report
Table 2 Lower Tier Grouping Guidelines

The guiding principal is to not disclose the confidential information of a single client's tonnage.

1. There must be a least 3 clients with a minimum of 2 reporting tonnage, each with licenses, in any municipal (lower) tier that appears in the stats report.
2. If the above guideline can't be met then the grouping of lower tiers is required based on the following rules:
 - a. Upper tiers with multiple lower tier groups of 2 or less must be combined for the 3 client minimum lower tier grouping provided there are at least 2 clients reporting tonnage.
 - b. The preferred criteria for determining groups will be based on geographical proximity.
 - c. A single lower tier reporting ZERO tonnage is not reported if it is not required for the above minimum 3 client grouping.
 - d. If geographic proximity can't be resolved then historical (grouping of past stats reports) will determine grouping.

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	147,694.03		147,694.03
Blind River, Town of	51,539.53		51,539.53
Bruce Mines, Town of/Plummer Additional Tp	1,065,713.09		1,065,713.09
Elliot Lake, City of/Spanish, Town of/The North Shore, Tp	44,615.20		44,615.20
Hilton Tp	56,950.60		56,950.60
Huron Shores, Municipality of	531,489.65		531,489.65
Jocelyn Tp	18,430.44		18,430.44
Laird Tp/St. Joseph Tp	32,613.80		32,613.80
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	4,498.30		4,498.30
Macdonald, Meredith & Aberdeen Add'l Tp	8,242.20		8,242.20
Sault Ste. Marie, City of/Prince Tp	743,778.36		743,778.36
Sub-Total	2,705,565.20	0.00	2,705,565.20
<i>Brant</i>			
Brant, County of/Brantford, City of	1,644,690.48		1,644,690.48
Sub-Total	1,644,690.48	0.00	1,644,690.48
<i>Bruce</i>			
Arran-Elderslie, Municipality of	152,639.95		152,639.95
Brockton, Municipality of	75,837.06		75,837.06
Huron-Kinloss Tp	499,349.49		499,349.49
Kincardine, Municipality of	134,961.08		134,961.08
Northern Bruce Peninsula, Municipality of	111,587.38		111,587.38
Saugeen Shores, Town of	131,374.85		131,374.85
South Bruce, Municipality of	289,617.02		289,617.02
South Bruce Peninsula, Town of	357,052.63		357,052.63
Sub-Total	1,752,419.46	0.00	1,752,419.46
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	237,685.74		237,685.74
Sub-Total	237,685.74	0.00	237,685.74
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	231,938.65		231,938.65
East Garafraxa Tp	1,125,805.17		1,125,805.17
Melancthon Tp	770,635.26		770,635.26
Mono Tp	370,146.67		370,146.67
Mulmur Tp	181,433.74		181,433.74
Sub-Total	2,679,959.49	0.00	2,679,959.49
<i>Durham</i>			
Brock Tp	1,023,177.37		1,023,177.37
Clarington, Municipality of	5,451,771.84		5,451,771.84
Oshawa, City of/Scugog Tp	299,594.85		299,594.85
Uxbridge Tp	3,566,835.19		3,566,835.19
Sub-Total	10,341,379.25	0.00	10,341,379.25
<i>Elgin</i>			
Bayham/West Elgin, Municipality of	138,274.01		138,274.01
Central Elgin, Municipality of	213,997.18		213,997.18
Sub-Total	352,271.19	0.00	352,271.19

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,385,858.93		1,385,858.93
Kingsville, Town of	259,609.27		259,609.27
Sub-Total	1,645,468.20	0.00	1,645,468.20
Frontenac			
Central Frontenac Tp	221,686.58		221,686.58
Frontenac Islands Tp	32,343.02		32,343.02
Kingston, City of	1,106,800.12		1,106,800.12
North Frontenac Tp	141,208.04		141,208.04
South Frontenac Tp	491,977.46		491,977.46
Sub-Total	1,994,015.22	0.00	1,994,015.22
Greater Sudbury			
Greater Sudbury, City of	2,847,922.96		2,847,922.96
Sub-Total	2,847,922.96	0.00	2,847,922.96
Grey			
Chatsworth Tp	494,772.04		494,772.04
Georgian Bluffs, Tp	366,123.71		366,123.71
Grey Highlands, Municipality of	542,641.56		542,641.56
Meaford, Municipality of	479,049.55		479,049.55
Southgate Tp	274,685.36		274,685.36
The Blue Mountains, Town of	161,440.51		161,440.51
West Grey, Municipality of	901,660.22		901,660.22
Sub-Total	3,220,372.95	0.00	3,220,372.95
Haldimand			
Haldimand, County of	1,458,820.31		1,458,820.31
Sub-Total	1,458,820.31	0.00	1,458,820.31
Haliburton			
Algonquin Highlands, Tp	50,631.00		50,631.00
Dysart et al, Tp	253,464.47		253,464.47
Highlands East, Tp	44,752.34		44,752.34
Minden Hills, TP	113,934.69		113,934.69
Sub-Total	462,782.50	0.00	462,782.50
Halton			
Burlington, City of/Halton Hills, Town of	2,209,315.60		2,209,315.60
Milton, Town of	5,494,593.62		5,494,593.62
Sub-Total	7,703,909.22	0.00	7,703,909.22
Hamilton			
Hamilton, City of	5,200,065.53		5,200,065.53
Sub-Total	5,200,065.53	0.00	5,200,065.53

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Hastings			
Bancroft, Town of	35,094.14		35,094.14
Belleville, City of	837,878.60		837,878.60
Carlo/Mayo Tp	26,102.00		26,102.00
Centre Hastings, Municipality of	347,814.16		347,814.16
Faraday Tp	16,823.47		16,823.47
Hasting Highlands	219,492.99		219,492.99
Limerick Tp	21,105.08		21,105.08
Madoc Tp	557,312.16		557,312.16
Marmora & Lake, Municipality of	6,746.95		6,746.95
Quinte West, City of	653,292.03		653,292.03
Tweed, Municipality of	114,622.56		114,622.56
Tyendinaga Tp	223,530.77		223,530.77
Wollaston	38,099.45		38,099.45
Sub-Total	3,097,914.36	0.00	3,097,914.36
Huron			
Ashfield-Colborne-Wawanosh Tp	1,450,816.37		1,450,816.37
Bluewater, Municipality of	4,531.75		4,531.75
Central Huron, Municipality of	379,470.38		379,470.38
Howick Tp	327,150.81		327,150.81
Huron East, Municipality of	1,084,401.28		1,084,401.28
Morris-Turnberry, Municipality of	197,267.55		197,267.55
North Huron Tp	64,534.15		64,534.15
South Huron Tp	178,731.57		178,731.57
Sub-Total	3,686,903.86	0.00	3,686,903.86
Kawartha Lakes			
Kawartha Lakes, City of	5,487,833.34		5,487,833.34
Sub-Total	5,487,833.34	0.00	5,487,833.34
Lambton			
Lambton Shores, Municipality of	181,789.27		181,789.27
Warwick Tp/Plympton-Wyoming, Town of	495,762.43		495,762.43
Sub-Total	677,551.70	0.00	677,551.70
Lanark			
Beckwith Tp/Drummond-North Elmsley Tp	161,353.09		161,353.09
Lanark Highlands Tp	1,014,287.25		1,014,287.25
Mississippi Mills, Town of	275,182.16		275,182.16
Montague Tp	172,017.67		172,017.67
Tay Valley Tp	28,186.78		28,186.78
Sub-Total	1,651,026.95	0.00	1,651,026.95

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Leeds & Grenville</i>			
Athens Tp/Front of Yonge Tp/Leeds and Thousand Islands Tp	254,832.77		254,832.77
Augusta Tp	176,988.51		176,988.51
Edwardsburgh-Cardinal Tp	76,372.02		76,372.02
Elizabethtown-Kitley Tp/Merrickville-Wolford, Village of	344,665.00		344,665.00
Leeds and Thousand Islands Tp	597,257.88		597,257.88
North Grenville Tp	598,053.21		598,053.21
Rideau Lakes Tp	162,669.98		162,669.98
Sub-Total	2,210,839.37	0.00	2,210,839.37
<i>Lennox & Addington</i>			
Addington Highlands Tp	33,958.93		33,958.93
Greater Napanee, Town of	194,321.01		194,321.01
Loyalist Tp	1,709,406.86		1,709,406.86
Stone Mills Tp	48,620.90		48,620.90
Sub-Total	1,986,307.70	0.00	1,986,307.70
<i>Manitoulin District</i>			
Assignack, Tp	38,980.07		38,980.07
Billings, Tp	3,778.88		3,778.88
Central Manitoulin Tp	68,795.04		68,795.04
Gordon/Barrie Island/Burpee & Mills, Tp/Cockburn Island, Tp	45,923.06		45,923.06
Northeastern Manitoulin & The Islands	64,700.87		64,700.87
Tehkummah, Tp	16,484.56		16,484.56
Unorganized - Manitoulin D	2,579,149.83		2,579,149.83
Sub-Total	2,817,812.31	0.00	2,817,812.31
<i>Middlesex</i>			
Adelaide Metcalfe Tp/Strathroy-Caradoc Tp	63,504.86		63,504.86
London, City of	881,785.38		881,785.38
Lucan Biddulph Tp	9,753.41		9,753.41
Middlesex Centre Tp	236,094.32		236,094.32
North Middlesex, Municipality of	40,094.75		40,094.75
Thames Centre, Municipality of	2,320,992.10		2,320,992.10
Sub-Total	3,552,224.82	0.00	3,552,224.82
<i>Muskoka</i>			
Bracebridge	584,888.33		584,888.33
Georgian Bay	6,930.00		6,930.00
Gravenhurst	158,280.48		158,280.48
Huntsville	915,280.60		915,280.60
Lake of Bays, Tp	122,925.10		122,925.10
Muskoka Lakes, Tp	232,481.41		232,481.41
Sub-Total	2,020,785.92	0.00	2,020,785.92
<i>Niagara</i>			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	1,804,840.51		1,804,840.51
Lincoln, Town of/Niagara-on-the-Lake, Town of	1,485,026.40		1,485,026.40
Niagara Falls, City of	1,004,971.97		1,004,971.97
Sub-Total	4,294,838.88	0.00	4,294,838.88

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp	153,375.84		153,375.84
Calvin Tp/East Ferris, Municipality of	11,215.00		11,215.00
Chisholm Tp	45,927.50		45,927.50
Mattawan Tp/South Algonquin Tp/Unorganized - Nippissing D	11,032.04		11,032.04
North Bay, City of	497,018.39		497,018.39
Papineau-Cameron Tp	66,691.84		66,691.84
West Nipissing, Municipality of	324,566.85		324,566.85
Sub-Total	1,109,827.46	0.00	1,109,827.46
<i>Norfolk</i>			
Norfolk, County of	836,710.46		836,710.46
Sub-Total	836,710.46	0.00	836,710.46
<i>Northumberland</i>			
Alnwick-Haldimand Tp	242,801.29		242,801.29
Brighton, Municipality of	129,652.94		129,652.94
Cramahe Tp	1,807,113.72		1,807,113.72
Hamilton Tp	173,032.04		173,032.04
Port Hope, Municipality of	40,314.22		40,314.22
Trent Hills, Municipality of	185,191.14		185,191.14
Sub-Total	2,578,105.35	0.00	2,578,105.35
<i>Ottawa</i>			
Ottawa, City of	9,983,625.68		9,983,625.68
Sub-Total	9,983,625.68	0.00	9,983,625.68
<i>Oxford</i>			
Blandford-Blenheim Tp	547,652.93		547,652.93
East Zorra-Tavistock Tp/Norwich Tp	154,979.81		154,979.81
South-West Oxford Tp	664,897.71		664,897.71
Zorra Tp	4,953,385.60		4,953,385.60
Sub-Total	6,320,916.05	0.00	6,320,916.05
<i>Parry Sound District</i>			
Armour Tp/Burks Falls, Village of	287,998.17		287,998.17
Callander, Municipality of	87,851.00		87,851.00
Carling Tp/The Archipelago Tp	13,510.36		13,510.36
Joly Tp	35,764.21		35,764.21
Kearney, Town of	14,120.29		14,120.29
Macher Tp	32,576.54		32,576.54
Magnetawan, Municipality of	152,652.50		152,652.50
McDougall Tp/Parry Sound, Town of	32,037.03		32,037.03
McKeller Tp	9,620.82		9,620.82
McMurrich-Monteith Tp	22,936.84		22,936.84
Nipissing Tp	5,830.50		5,830.50
Perry Tp	53,186.06		53,186.06
Powassan, Municipality of	91,603.54		91,603.54
Ryerson Tp	27,714.99		27,714.99
Seguin Tp	361,155.78		361,155.78
Strong Tp	10,819.04		10,819.04
Unorganized - Parry Sound	106,956.02		106,956.02
Whitestone The Municipality of	21,319.81		21,319.81
Sub-Total	1,367,653.50	0.00	1,367,653.50

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Peel</i>			
Caledon, Town of	3,957,949.01		3,957,949.01
Sub-Total	3,957,949.01	0.00	3,957,949.01
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	51,131.23		51,131.23
Perth East Tp	675,903.64		675,903.64
Perth South Tp	1,477,582.82		1,477,582.82
West Perth Tp	344,038.38		344,038.38
Sub-Total	2,548,656.07	0.00	2,548,656.07
<i>Peterborough</i>			
Asphodel-Norwood Tp	82,304.00		82,304.00
Cavan-Millbrook-North Monaghan Tp	147,002.35		147,002.35
Douro-Dummer Tp	568,592.20		568,592.20
Galway-Cavendish-Harvey Tp	436,435.09		436,435.09
Havelock-Belmont-Methuen Tp	809,684.50		809,684.50
North Kawartha Tp	4,084.46		4,084.46
Otonabee South Monaghan Tp	329,503.65		329,503.65
Selwyn Tp	336,865.59		336,865.59
Sub-Total	2,714,471.84	0.00	2,714,471.84
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	267,433.85		267,433.85
Champlain Tp	721,922.00		721,922.00
Clarence-Rockland, City of	115,848.99		115,848.99
East Hawkesbury Tp	8,941.00		8,941.00
Russell Tp	125,912.45		125,912.45
The Nation, Municipality of	293,226.66		293,226.66
Sub-Total	1,533,284.95	0.00	1,533,284.95
<i>Prince Edward Co</i>			
Prince Edward, County of	1,542,005.04		1,542,005.04
Sub-Total	1,542,005.04	0.00	1,542,005.04
<i>Renfrew</i>			
Admaston-Bromley Tp/Renfrew, Town of	126,503.39		126,503.39
Bonnechere Valley Tp	167,788.03		167,788.03
Brudenell, Lyndoc and Raglan Tp	48,307.30		48,307.30
Deep River Tp/Head, Clara & Maria Tp	15,132.00		15,132.00
Greater Madawaska Tp	45,067.00		45,067.00
Horton Tp	265,436.69		265,436.69
Killaloe, Hagarty and Richards Tp	48,716.01		48,716.01
Laurentian Hills	32,679.91		32,679.91
Laurentian Valley Tp	290,304.40		290,304.40
Madawaska Valley	71,915.40		71,915.40
McNab-Braeside Tp	358,306.07		358,306.07
North Algona-Wilberforce Tp	34,347.76		34,347.76
Petawawa, Town of	228,430.88		228,430.88
Whitewater Region Tp	151,238.85		151,238.85
Sub-Total	1,884,173.69	0.00	1,884,173.69

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	128,274.13		128,274.13
Clearview Tp	710,917.93		710,917.93
Collingwood, Town of/Essa Tp/Innisfil, Town of	283,553.06		283,553.06
Midland, Town of/Penetanguishine, Town of/	159,887.93		159,887.93
New Tecumseth, Town of	47,175.00		47,175.00
Oro-Medonte Tp	2,252,186.55		2,252,186.55
Ramara Tp	3,022,839.09		3,022,839.09
Severn Tp	3,696,484.31		3,696,484.31
Springwater Tp	905,325.84		905,325.84
Tay Tp	102,732.79		102,732.79
Tiny Tp	109,591.95		109,591.95
Sub-Total	11,418,968.58	0.00	11,418,968.58
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	474,673.32		474,673.32
North Glengarry Tp	45,172.11		45,172.11
North Stormont Tp	1,001,962.39		1,001,962.39
South Dundas Tp	206,791.78		206,791.78
South Glengarry Tp	182,392.45		182,392.45
South Stormont Tp	870,611.22		870,611.22
Sub-Total	2,781,603.27	0.00	2,781,603.27
<i>Sudbury District</i>			
Baldwin Tp	90,931.78		90,931.78
French River, Municipality of	101,584.29		101,584.29
Killarny, Municipality of/Nairn & Hyman Tp	163,710.00		163,710.00
Markstay-Warren, Municipality of	111,045.13		111,045.13
Sables Spanish Rivers Tp/Espanola, Town of	79,536.12		79,536.12
Sudbury District, Unorganized	354,503.86		354,503.86
Sub-Total	901,311.18	0.00	901,311.18
<i>Thunder Bay District</i>			
Conmee, Tp	216,299.75		216,299.75
Neebing, Municipality of	35,956.80		35,956.80
Oliver Paipoonge, Municipality of	202,877.75		202,877.75
Shuniah, Tp	424,310.35		424,310.35
Thunder Bay, City of	853.00		853.00
Sub-Total	880,297.65	0.00	880,297.65
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	73,964.66		73,964.66
North Dumfries Tp	4,265,398.45		4,265,398.45
Wellesley Tp	1,122,579.64		1,122,579.64
Wilmot Tp	1,296,478.26		1,296,478.26
Woolwich Tp	176,608.32		176,608.32
Sub-Total	6,935,029.33	0.00	6,935,029.33

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Wellington			
Centre Wellington Tp	999,061.08		999,061.08
Erin, Town of	1,044,499.77		1,044,499.77
Guelph-Eramosa Tp	470,178.64		470,178.64
Mapleton Tp	20,701.00		20,701.00
Minto, Town of	216,209.94		216,209.94
Puslinch Tp	3,522,023.71		3,522,023.71
Wellington North Tp	136,777.94		136,777.94
Sub-Total	6,409,452.08	0.00	6,409,452.08
York			
East Gwillimbury, Town of	55,834.85		55,834.85
Georgina, Town of	11,487.10		11,487.10
Whitchurch-Stouffville, Town of	512,360.22		512,360.22
Sub-Total	579,682.17	0.00	579,682.17
GRAND TOTAL	142,015,090.27	0.00	142,015,090.27

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algoma, District of	1.9	1.2	2.8	2.9	2.6	2.9	2.9	2.6	2.4	2.7
Brant Co.	1.8	2.3	2.3	2.2	1.4	1.9	1.7	1.7	1.7	1.6
Bruce Co.	1.8	2.3	2.4	2.0	1.7	2.3	1.7	1.5	1.4	1.8
Chatham-Kent, R. M. of	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.2	0.3	0.2
Dufferin Co.	2.9	3.1	3.0	3.1	2.7	2.7	2.3	2.2	2.3	2.7
Durham, R. M. of	13.2	12.2	11.7	10.0	8.3	9.6	10.2	9.9	10.1	10.3
Elgin Co.	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4
Essex Co.	1.7	1.6	1.7	1.6	1.7	2.6	2.0	2.0	2.1	1.6
Frontenac Co.	2.4	2.1	2.1	2.9	2.6	2.3	2.2	1.9	2.0	2.0
Greater Sudbury, City of	2.8	2.9	2.7	3.2	2.1	2.5	3.1	2.7	2.6	2.8
Grey Co.	3.7	3.4	3.2	3.3	2.9	3.5	3.0	2.6	2.8	3.2
Haldimand Co.	2.0	1.8	1.4	1.3	1.1	1.4	1.2	1.3	1.2	1.5
Haliburton Co.	----	----	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.5
Halton, R. M. of	10.9	9.6	9.5	8.5	6.9	7.2	8.7	7.4	6.8	7.7
Hamilton, City of	5.6	6.2	5.6	5.7	4.9	5.3	5.0	5.0	4.9	5.2
Hastings Co.	2.1	2.3	2.6	3.0	3.4	3.5	3.1	2.7	2.5	3.1
Huron Co.	2.6	2.7	2.9	2.9	3.0	2.5	2.8	2.5	2.7	3.7
Kawartha Lakes, City of	6.8	6.5	5.9	5.5	4.5	4.6	4.7	5.1	4.3	5.5
Lambton Co.	0.7	0.7	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.7
Lanark Co.	2.3	2.3	2.3	1.9	2.5	2.9	1.8	1.5	1.8	1.7
Leeds & Grenville Co.'s	2.3	2.3	2.0	2.3	2.1	2.6	2.0	2.1	1.9	2.2
Lennox & Addington Co.	1.9	1.9	2.0	2.0	2.0	2.4	2.2	2.2	1.8	2.0
Manitoulin, District of	----	----	3.6	3.9	2.9	3.6	3.2	2.5	2.2	2.8
Middlesex Co.	6.2	5.6	5.2	4.8	4.3	4.8	4.0	3.8	3.6	3.6
Muskoka	----	----	2.1	2.1	2.3	2.4	2.1	1.9	2.1	2.0
Niagara, R. M. of	4.5	5.1	4.0	4.0	3.9	4.6	3.9	4.7	4.6	4.3
Nipissing, District of	----	----	1.3	1.2	1.2	1.1	1.1	1.2	1.0	1.1
Norfolk Co.	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.8	1.0	0.8
Northumberland Co.	3.5	3.4	3.4	3.0	2.8	3.1	2.7	3.1	2.6	2.6
Ottawa, City of	10.6	11.1	11.4	11.2	11.0	12.7	10.9	10.6	9.6	10.0
Oxford Co.	5.0	5.4	7.1	5.8	4.9	5.2	4.9	5.6	5.8	6.3
Parry Sound, District of	----	----	1.5	1.8	2.4	3.5	2.1	1.5	1.2	1.4
Peel, R. M. of	5.1	5.3	4.7	3.8	3.6	3.9	3.6	3.9	3.6	4.0
Perth Co.	2.0	2.4	2.1	1.9	1.9	2.7	2.2	2.1	1.8	2.5
Peterborough Co.	2.7	2.6	2.9	3.2	3.2	3.3	3.2	2.6	2.6	2.7
Prescott & Russell Co.'s	1.7	1.5	1.4	1.7	1.7	1.6	1.6	1.5	1.3	1.5
Prince Edward Co.	2.4	2.2	2.4	2.4	1.6	1.7	1.6	1.6	1.3	1.5
Renfrew Co.	1.3	1.9	2.3	2.1	2.3	2.3	2.2	2.2	1.9	1.9
Simcoe Co.	12.6	13.4	12.0	12.1	10.5	10.3	10.7	10.5	10.1	11.4
Stormont, Dundas & Glengarry Co.'s	3.0	3.4	2.8	3.2	3.4	3.3	4.1	3.5	3.2	2.8
Sudbury, District of	0.8	0.8	1.7	1.1	0.8	0.8	0.9	1.0	0.8	0.9
Thunder Bay, District of	----	----	0.3	0.7	1.0	0.8	1.0	1.1	0.8	0.9
Waterloo, R. M. of	8.2	9.3	8.2	7.9	7.1	7.5	7.8	7.3	6.9	6.9
Wellington Co.	8.3	8.8	9.0	8.0	6.6	6.8	6.5	7.0	6.5	6.4
York, R. M. of	1.0	1.0	0.7	1.1	1.0	0.7	0.6	0.9	0.7	0.6
TOTAL	149.7	151.9	158.9	153.8	139.0	151.7	143.7	139.3	132.0	142.0

Note: Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2014
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2014 Production	Production(2)				
			2013	2012	2011	2010	2009
1 City of Ottawa	City of Ottawa	10.0	9.6	10.6	10.9	12.7	11.0
2 Town of Milton	Halton	5.5	4.8	4.4	4.9	3.7	3.7
3 City of Kawartha Lakes	City of Kawartha Lakes	5.5	4.3	5.1	4.7	4.6	4.5
4 Municipality of Clarington	Durham	5.5	5.3	5.1	5.0	4.9	4.1
5 City of Hamilton	City of Hamilton	5.2	4.9	5.0	5.0	5.3	4.9
6 Township of Zorra	Oxford	5.0	4.1	4.1	3.6	3.3	2.8
7 Township of North Dumfries	Waterloo	4.3	4.1	4.4	4.5	3.8	3.4
8 Town of Caledon	Peel	4.0	3.7	3.9	3.6	3.9	3.6
9 Severn Township	Simcoe	3.7	3.0	3.1	2.7	2.6	2.6
10 Township of Uxbridge	Durham	3.6	3.6	3.6	3.9	3.4	3.0
Total		52.3	47.4	49.3	48.8	48.2	43.6

Notes:

1. Municipalities are ranked in order of their licenced production for 2014.
2. Historical data are for current year's Top Ten Producing Municipalities.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	135	118	17	119	16	0	0
Aylmer	300	236	64	285	9	6	0
Bancroft	265	99	166	191	33	41	0
Guelph (Cambridge)	461	397	64	422	36	3	0
Kemptville	464	287	177	320	121	23	0
Midhurst	482	370	112	417	60	5	0
North Bay	142	62	80	109	7	26	0
Parry Sound	296	119	177	191	10	95	0
Pembroke	220	75	145	198	12	10	0
Peterborough (Tweed)	533	298	235	426	90	17	0
Sault Ste. Marie	100	56	44	81	6	13	0
Sudbury	230	128	102	163	20	47	0
Thunder Bay	59	25	34	47	3	9	0
Wawa	2	2	0	1	0	1	0
TOTAL	3,689	2,272	1,417	2,970	423	296	0

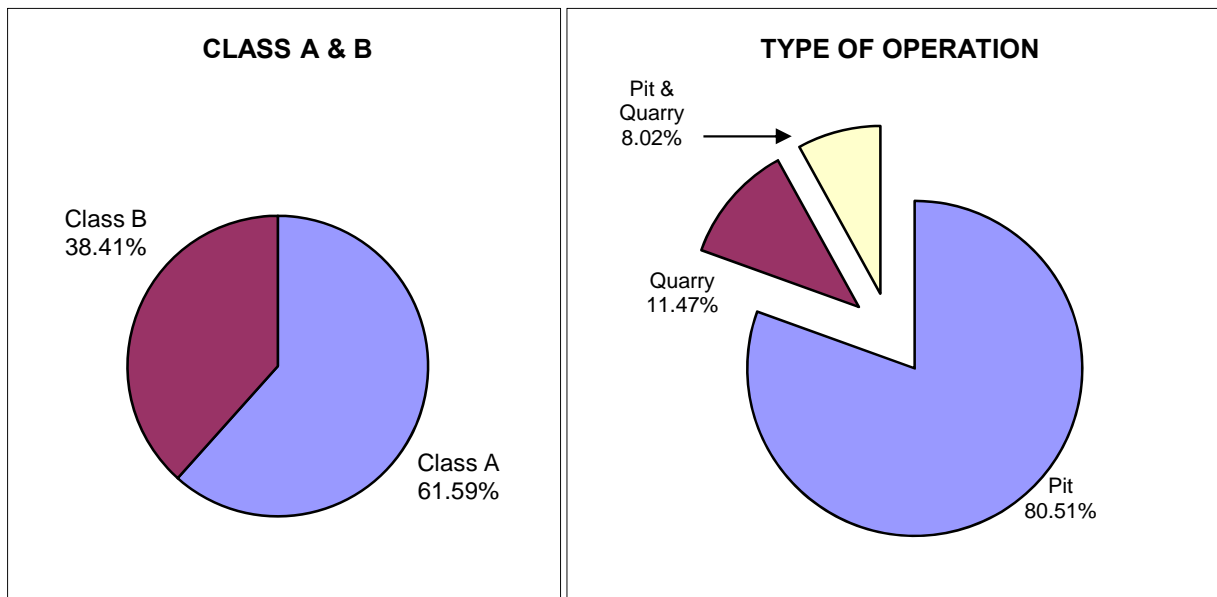
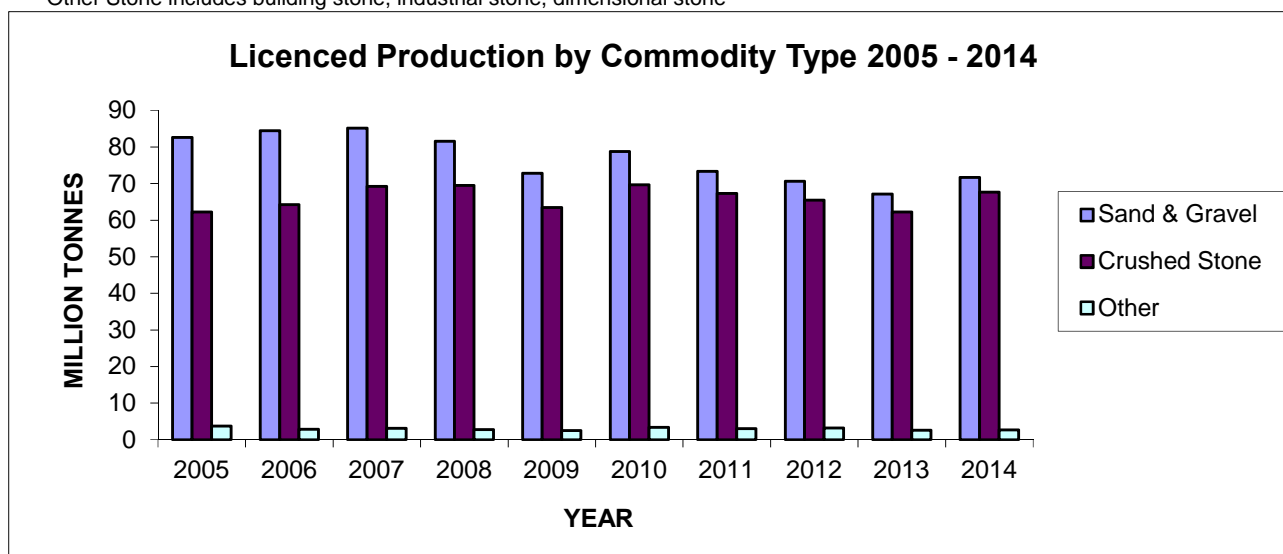


Table 6

**2014 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	22,581,569.65	11,630,623.45	10,420,878.69	528,295.79	1,771.72
Aylmer	13,622,828.16	9,430,628.47	4,178,965.63	355.00	12,879.06
Bancroft	4,414,717.13	755,171.39	3,553,492.40	15.00	106,038.34
Guelph (Cambridge)	32,439,642.86	20,452,152.18	11,875,057.11	107,998.45	4,435.12
Kemptville	18,146,962.99	3,685,931.51	12,952,014.77	12,871.63	1,496,145.08
Midhurst	18,810,534.16	10,434,503.83	8,159,403.90	25,126.23	191,500.20
North Bay	1,377,075.75	917,816.09	444,098.33	1,024.00	14,137.33
Parry Sound	3,138,684.57	1,425,091.54	1,684,538.15	8,503.00	20,551.88
Pembroke	1,897,590.92	1,427,372.82	467,288.82	0.00	2,929.28
Peterborough	15,443,596.81	6,470,631.55	8,889,037.72	64,626.39	19,301.15
Sault Ste. Marie	2,702,008.20	1,490,107.12	1,175,567.46	0.00	36,333.62
Sudbury	6,559,581.42	2,900,143.30	3,648,967.03	7,114.74	3,356.35
Thunder Bay	880,297.65	663,419.07	216,708.58	0.00	170.00
TOTAL	142,015,090.27	71,683,592.32	67,666,018.59	755,930.23	1,909,549.13

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2005	148.59	82.62	62.27	3.70
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73
2009	138.84	72.79	63.51	2.54
2010	151.76	78.78	69.64	3.34
2011	143.73	73.36	67.34	3.03
2012	139.30	70.60	65.50	3.20
2013	131.97	67.13	62.23	2.61
2014	142.02	71.68	67.67	2.67

Table 7

**2014 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

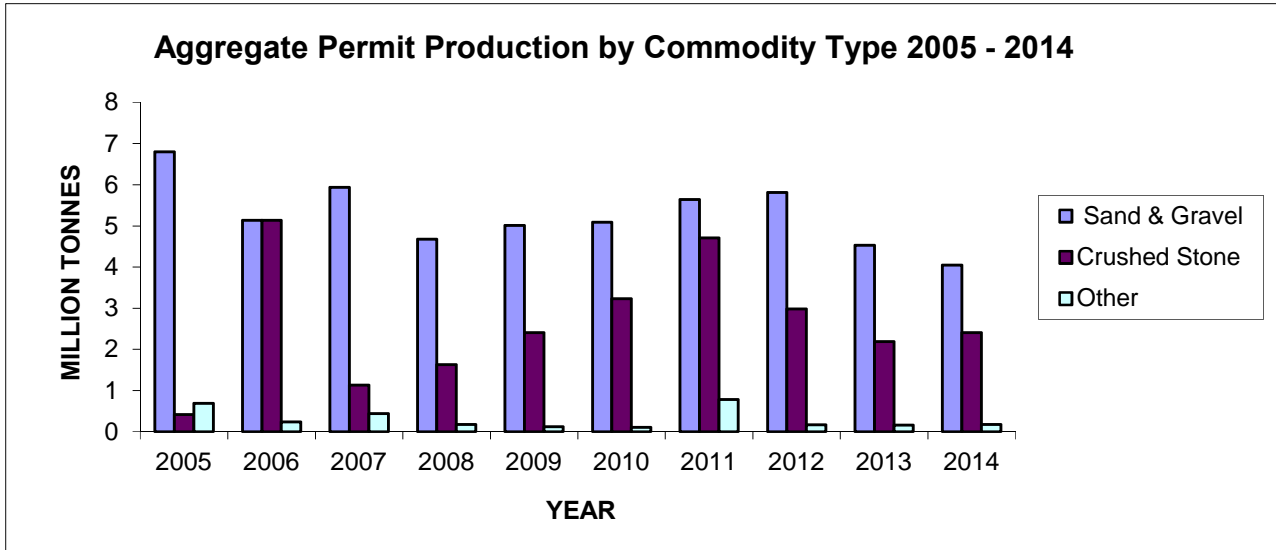
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	207,553.93	207,553.93	-	-	-
Cochrane	209,464.66	116,223.16	71,401.50	21,840.00	-
Hearst	385,349.28	224,876.67	160,472.61	-	-
Kirkland Lake	206,974.16	179,068.16	27,906.00	-	-
North Bay	234,380.48	192,811.71	41,473.00	-	95.77
Sault Ste. Marie	246,431.74	246,431.74	-	-	-
Sudbury	680,846.10	114,488.03	553,940.61	5,745.99	6,671.47
Timmins	219,456.81	219,456.81	-	-	-
Wawa	313,734.58	246,035.22	49,746.36	17,953.00	-
Sub-Total	2,704,191.74	1,746,945.43	904,940.08	45,538.99	6,767.24
NORTHWEST					
Dryden	681,552.16	366,896.16	313,842.00	-	814.00
Fort Frances	466,878.64	299,305.64	167,573.00	-	-
Kenora	241,767.70	125,541.58	98,683.55	-	17,542.57
Nipigon	722,027.46	518,753.11	202,310.35	-	964.00
Red Lake	201,068.73	200,748.73	320.00	-	-
Sioux Lookout	245,050.66	244,622.26	-	-	428.40
Thunder Bay	435,855.95	186,863.00	248,748.00	-	244.95
Sub-Total	2,994,201.30	1,942,730.48	1,031,476.90	-	19,993.92
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	250,980.00	250,980.00	-	-	-
Aylmer	8,543.00	8,543.00	-	-	-
Bancroft	458,526.22	19,714.50	332,492.30	320.00	105,999.42
Guelph (Cambridge)	-	-	-	-	-
Kemptville	924.02	924.02	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	56,180.43	26,789.80	28,625.63	-	765.00
Pembroke	57,116.46	57,116.46	-	-	-
Peterborough (Tweed)	116,395.03	-	116,395.03	-	-
Sub-Total	948,665.16	364,067.78	477,512.96	320.00	106,764.42
TOTAL	6,647,058.20	4,053,743.69	2,413,929.94	45,858.99	133,525.58

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2014 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2005	7.91	6.80	0.42	0.69
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18
2009	7.54	5.01	2.41	0.12
2010	8.43	5.09	3.23	0.11
2011	11.13	5.64	4.71	0.78
2012	8.96	5.81	2.98	0.17
2013	6.88	4.53	2.19	0.16
2014	6.64	4.05	2.41	0.18

Table 9

**2014 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	8,543	8,543	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	250,980	250,980	0	0	0
East Central (5)	580,726	24,755	448,887	320	106,764
East (6)	58,714	58,714	0	0	0
Northeast (7)	2,163,189	1,243,175	885,661	27,586	6,767
Northwest (8)	3,584,906	2,467,578	1,079,382	17,953	19,994
TOTAL	6,647,058	4,053,744	2,413,930	45,859	133,526

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2014 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	19,021,678	13,945,997	4,996,763	61,624	17,294
Peninsula (2)	13,435,126	2,560,386	10,832,604	42,115	20
West Central (3)	32,416,202	23,810,901	8,384,060	29,740	191,500
GTA (4)	22,582,920	11,631,623	10,420,879	528,296	2,122
East Central (5)	17,903,898	7,296,030	10,456,643	17,827	133,398
East (6)	24,024,877	5,808,636	16,648,737	59,686	1,507,818
Northeast (7)	9,044,527	4,475,581	4,531,411	16,642	20,894
Northwest (8)	3,585,863	2,154,436	1,394,923	0	36,504
TOTAL	142,015,090	71,683,592	67,666,019	755,930	1,909,549

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

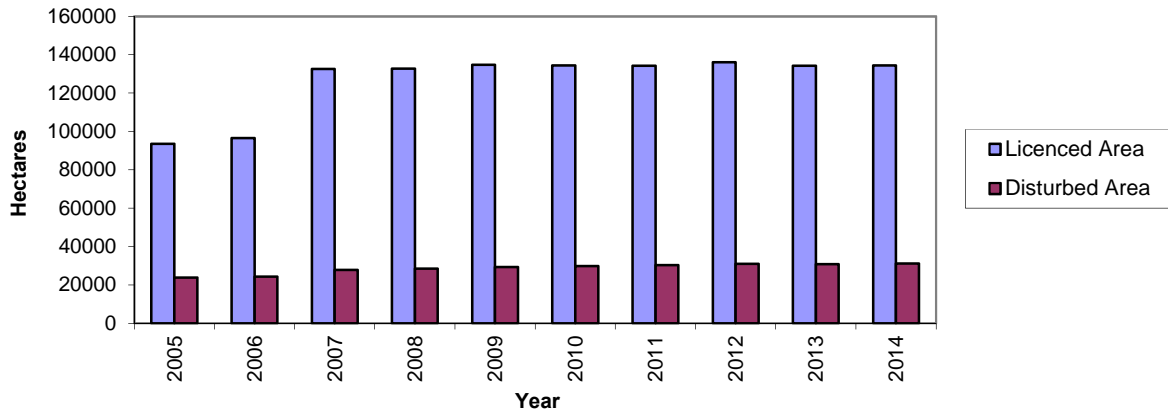
**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2014
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	135	8,024.59	2,965.77	83.06	309.65	2,739.18
Aylmer	300	8,401.48	2,877.06	138.74	105.74	2,910.06
Bancroft	265	9,425.11	1,224.68	40.83	5.27	1,260.24
Guelph (Cambridge)	461	16,879.49	5,011.47	223.61	193.17	5,041.91
Kemptville	464	14,341.47	4,627.70	96.22	50.34	4,673.58
Midhurst	482	15,836.24	3,926.26	146.26	68.65	4,003.88
North Bay	142	6,648.42	917.01	8.85	3.44	922.42
Parry Sound	296	9,566.87	2,102.96	26.93	36.82	2,093.07
Pembroke	220	5,653.57	829.05	23.95	1.29	851.72
Peterborough (Tweed)	533	15,501.73	3,919.62	102.90	61.81	3,960.70
Sault Ste. Marie	100	3,969.79	732.19	20.99	2.32	750.86
Sudbury	230	16,280.52	1,657.12	54.63	51.12	1,660.64
Thunder Bay	59	3,736.37	245.51	10.31	5.67	250.15
Wawa	2	46.87	0.00	0.00	0.00	0.00
TOTAL	3,689	134,312.52	31,036.40	977.28	895.29	31,118.40

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

Total Licenced & Disturbed Area 2005 - 2014



New Rehabilitated & Disturbed Area 2005 - 2014

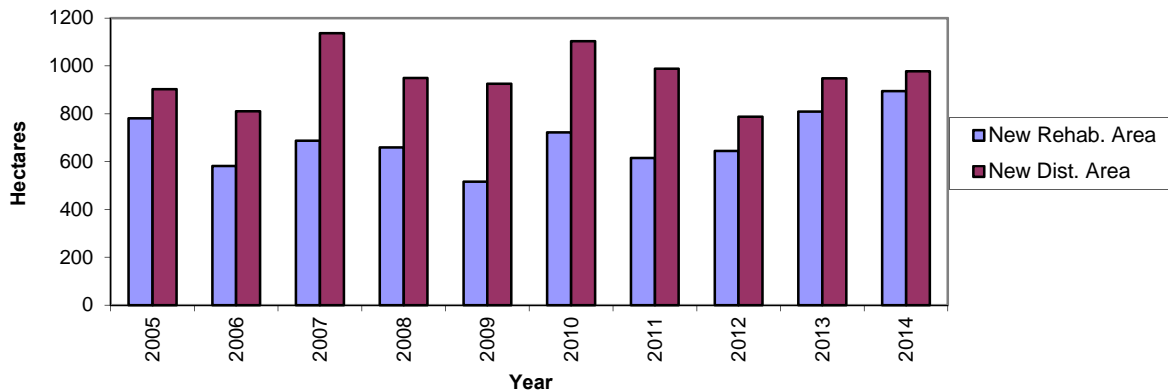


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,263.08	106	102	4	0	0
Cochrane	3,297.81	127	110	10	7	0
Hearst	3,880.35	190	163	25	2	0
Kirkland Lake	2,009.68	151	139	10	2	0
North Bay	3,091.37	201	163	29	9	0
Sault Ste. Marie	1,116.87	101	95	4	2	0
Sudbury	4,886.50	161	121	24	16	0
Timmins	2,127.06	140	125	9	6	0
Wawa	2,377.32	185	170	9	6	0
Sub-Total	24,050.04	1,362	1,188	124	50	0
NORTHWEST						
Dryden	2,390.09	179	159	9	11	0
Fort Frances	2,331.32	209	187	6	16	0
Kenora	3,005.44	172	129	23	19	0
Nipigon	3,506.55	221	184	17	19	0
Red Lake	1,197.90	69	64	3	2	0
Sioux Lookout	2,150.61	85	80	2	3	0
Thunder Bay	4,033.36	156	120	21	12	0
Sub-Total	18,615.27	1,091	923	81	82	0
SOUTHCENTRAL						
Aurora	4.90	1	1	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	1,276.80	68	53	15	0	0
Guelph (Cambridge)	620.00	1	0	0	0	1
Kemptville	2.00	1	1	0	0	0
Parry Sound	1,002.68	89	61	21	7	0
Pembroke	122.30	33	33	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	3,060.18	196	149	37	8	2
TOTAL	45,725.49	2,649	2,260	242	140	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 50 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT**

(by Geographic Twp)

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown	Howe Island	Somerville
Amherst Island	Laxton	South Fredericksburgh
Bedford	Longford	Town of Napanee
Camden East	Loughborough	Villages of Bath and
Dalton	North Fredericksburgh	Newburgh
Digby	Portland	Wolfe Island
Ernestown	Richmond	

SEPTEMBER 1, 1993

Admaston		Towns of Arnprior and
Alice and Fraser	McNab	Renfrew
Bagot and Blithfield	Pembroke	Villages of Beachburg,
Bromley	Petawawa	Braeside, Cobden and
City of Pembroke	Ross	Petawawa
Horton	Stafford	Westmeath

JANUARY 1, 1998

Anderson	Gaudette	Ley
Appleby	Gough	Loughrin
Archibald	Hagar	Macdonald
Aweres	Hallam	May
Awrey	Harrow	McKinnon
Baldwin	Harty	Meredith and Aberdeen
Burwash	Haviland	Additional
Cartier	Hawley	Merritt
Cascaden	Hendrie	Mongowin
Casimir	Henry	Nairn
Chesley Additional	Herrick	Pennefather
Cleland	Hess	Ratter
Cosby	Hilton	Secord
Curtin	Hodgins	Servos
Delamere	Hoskin	Shakespeare
Dennis	Hyman	Shields
Deroche	Jarvis	St. Joseph
Duncan	Jennings	Street
Dunnet	Jocelyn	Tarbutt and Tarbutt
Eden	Johnson	Additional
Fenwick	Kars	Tilley
Fisher	Kehoe	Tilton
Foster	Laird	Tupper
Foy	Laura	VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

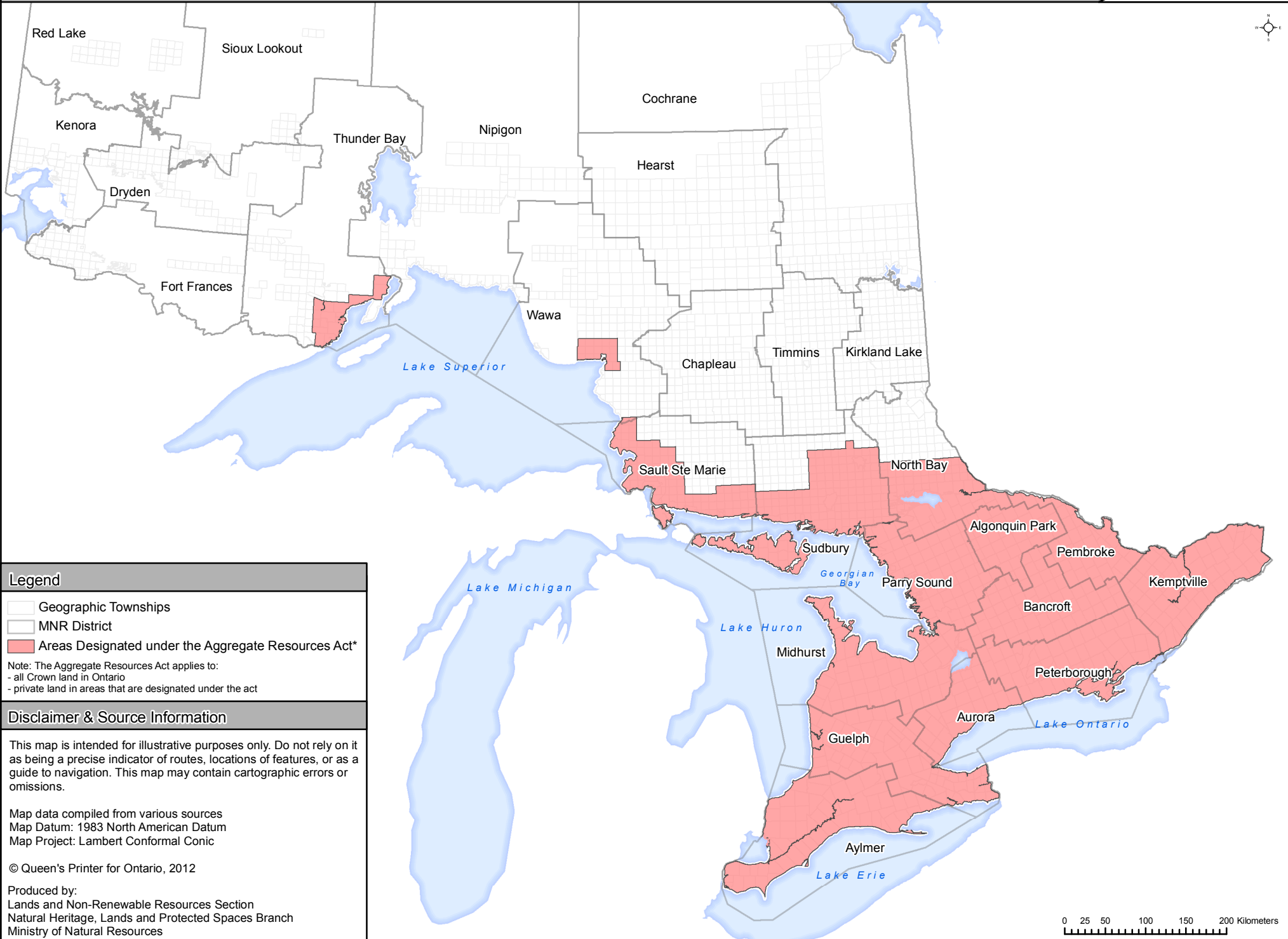
CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Areas Designated under the Aggregate Resources Act



Legend

- Geographic Townships
- MNR District
- Areas Designated under the Aggregate Resources Act*

Note: The Aggregate Resources Act applies to:
- all Crown land in Ontario
- private land in areas that are designated under the act

Disclaimer & Source Information

This map is intended for illustrative purposes only. Do not rely on it as being a precise indicator of routes, locations of features, or as a guide to navigation. This map may contain cartographic errors or omissions.

Map data compiled from various sources
Map Datum: 1983 North American Datum
Map Project: Lambert Conformal Conic

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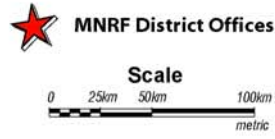
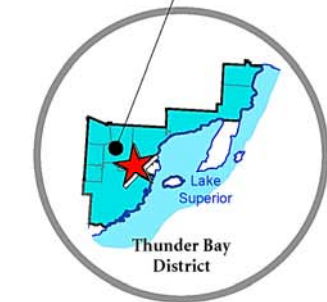
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Compiled by **MHBC Planning** with the cooperation and assistance of the Ministry of Natural Resources & Forestry, Aggregate Resources Program staff (Feb. 2016)

2016 Aggregate Officers of Ontario

AGGREGATE RESOURCES ACT DESIGNATED AREAS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

Kitchener	519.576.3650
Woodbridge	905.761.5588
London	519.858.2797
Kingston	613.384.7067
Barrie	705.728.0045
Burlington	416.518.8394



PRELIMINARY

AGGREGATE RESOURCES STATISTICS IN ONTARIO

PRODUCTION STATISTICS 2015

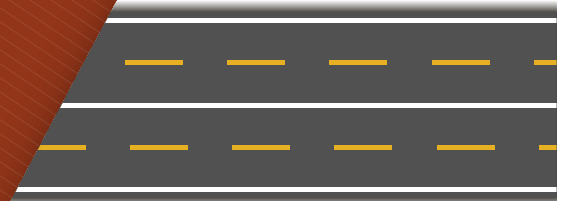
DID YOU KNOW?

1,760

TRUCKLOADS



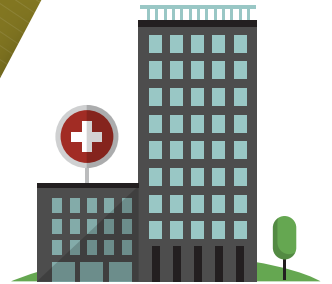
1KM



1 km of 4-lane highway

3,760

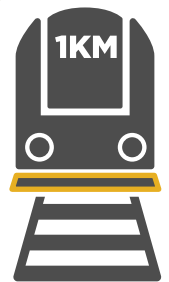
TRUCKLOADS



A 32,000m² hospital

4,560

TRUCKLOADS



1 km of subway line

14 TONNES



Every Ontarian uses
14 TONNES of stone,
sand and gravel each year.

AGGREGATE RESOURCES STATISTICS IN ONTARIO

PRODUCTION STATISTICS

2015

READER'S NOTE

The information in this document is based on production statistics reported to March 31, 2016. This document will be revised following December 31st, 2016 and will be considered final at that time. It is believed that aggregate production for 2015 is substantially reported in this document and gross numbers should remain unchanged in the final version. However, some numbers will change at the municipal level.

Prepared by

The Ontario Aggregate Resources Corporation

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- B. Historical Designation of Private Land under the Pits and Quarries Control Act and the Aggregate Resources Act
- C. CPCA (now CAC) Geographic Areas
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- E. Listing of MNRF Aggregate Officers of Ontario

Additional copies of this report may be obtained at a cost of \$5.00 each to cover preparation and postage from:

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Database Administrator at the above address or fax number or contact him directly via
email, jcdorlas@toarc.com

AGGREGATE RESOURCES STATISTICS IN ONTARIO

Overview

Aggregate resources are used in the everyday lives of all Ontario residents, and make up an integral part of our roads, sidewalks, sewers, subway tunnels and airports, as well as our homes, offices, hospitals, schools and shopping centres. On average, Ontarians use about 14 tonnes of aggregate per person per year.

The aggregate industry plays a foundational role within the Ontario economy. The economic activity generated by the industry begins with the aggregate production itself but also feeds industries which receive and use the raw materials: including cement and concrete products, other aggregate-based products (asphalt, chemical, clay, glass, etc.) and construction.

In 2015, there were 3,666 licences for pits and quarries on private land in areas designated under the Aggregate Resources Act (refer to Appendix D – Map of Areas Designated), 2,639 aggregate permits on Crown land and 1 wayside permit.

Aggregate Production

Overall production of mineral aggregates in 2015 totaled approximately 160 million tonnes, up 7 million tonnes or 4.6% from the previous year. Production from licenced operations was up 6 million tonnes or 4.2% compared to 2014. Forestry Aggregate Pits (formerly Category 14) pit production has remained the same. Wayside permit production increased on small volumes (.15 million in 2015 compared to zero in 2014). Production from aggregate permits on Crown Land increased 15.2% from 2014 (7.6 million in 2015 from 6.6 million tonnes in 2014).

Note: Totals and percentage changes are based on rounded numbers from Table 1.

Table 1

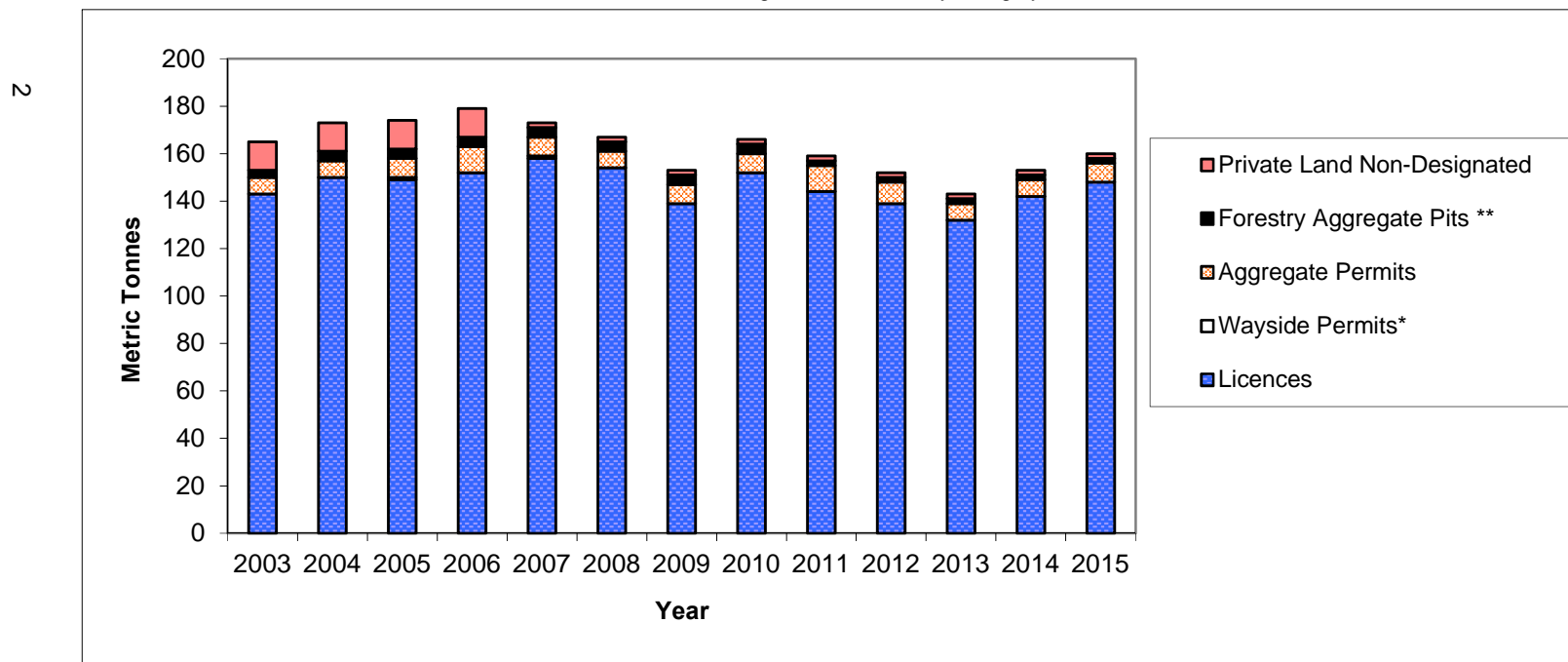
AGGREGATE PRODUCTION IN ONTARIO - 2003 - 2015
(rounded to nearest million tonnes)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Licences	143	150	149	152	158	154	139	152	144	139	132	142	148
Wayside Permits*	0	0	1	0	1	0	0	0	0	0	0	0	0
Aggregate Permits	7	7	8	11	8	7	8	8	11	9	7	7	8
Forestry Aggregate Pits **	3	4	4	4	4	4	4	4	2	2	2	2	2
Private Land Non-Designated (estimated)	12	12	12	12	2	2	2	2	2	2	2	2	2
ONTARIO TOTAL	165	173	174	179	173	167	153	166	159	152	143	153	160

*Wayside Permit production is reported as the 'total applied for' tonnage of all permits issued, adjusted where actual tonnages for completed contracts are known.

*Actual production for Wayside Permits was .3 million tonnes for 2002, .3 million tonnes for 2003, .1 million tonnes for 2004, .3 million tonnes for 2006

.1 million tonnes for 2008, .2 million tonnes for 2009, zero tonnes for 2010 through 2015; ** Formerly Category 14



Production Statistics Report
Table 2 Lower Tier Grouping Guidelines

The guiding principal is to not disclose the confidential information of a single client's tonnage.

1. There must be a least 3 clients with a minimum of 2 reporting tonnage, each with licenses, in any municipal (lower) tier that appears in the stats report.
2. If the above guideline can't be met then the grouping of lower tiers is required based on the following rules:
 - a. Upper tiers with multiple lower tier groups of 2 or less must be combined for the 3 client minimum lower tier grouping provided there are at least 2 clients reporting tonnage.
 - b. The preferred criteria for determining groups will be based on geographical proximity.
 - c. A single lower tier reporting ZERO tonnage is not reported if it is not required for the above minimum 3 client grouping.
 - d. If geographic proximity can't be resolved then historical (grouping of past stats reports) will determine grouping.

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Algoma District</i>			
Algoma District, Unorganized	74,904.86		74,904.86
Blind River, Town of	48,194.49		48,194.49
Bruce Mines, Town of/Plummer Additional Tp	1,327,906.06		1,327,906.06
Elliot Lake, City of/Spanish, Town of/The North Shore, Tp	57,397.18		57,397.18
Hilton Tp	48,382.00		48,382.00
Huron Shores, Municipality of	573,936.97		573,936.97
Jocelyn Tp	28,815.76		28,815.76
Johnson Tp/Tarbutt & Tarbutt Add'l Tp	30,359.35		30,359.35
Laird Tp/St. Joseph Tp	3,788.00		3,788.00
Macdonald, Meredith & Aberdeen Add'l Tp	19,232.50		19,232.50
Sault Ste. Marie, City of/Prince Tp	666,763.29		666,763.29
Sub-Total	2,879,680.46	0.00	2,879,680.46
<i>Brant</i>			
Brant, County of/Brantford, City of	1,860,616.22		1,860,616.22
Sub-Total	1,860,616.22	0.00	1,860,616.22
<i>Bruce</i>			
Arran-Elderslie, Municipality of	124,168.07		124,168.07
Brockton, Municipality of	265,646.28		265,646.28
Huron-Kinloss Tp	398,435.55		398,435.55
Kincardine, Municipality of	194,003.96		194,003.96
Northern Bruce Peninsula, Municipality of	140,650.72		140,650.72
Saugeen Shores, Town of	182,210.23		182,210.23
South Bruce Peninsula, Town of	299,818.15		299,818.15
South Bruce, Municipality of	383,266.55		383,266.55
Sub-Total	1,988,199.51	0.00	1,988,199.51
<i>Chatham-Kent</i>			
Chatham-Kent, Municipality of	199,642.97		199,642.97
Sub-Total	199,642.97	0.00	199,642.97
<i>Dufferin</i>			
Amaranth Tp/East Luther Grand Valley Tp	116,262.10		116,262.10
East Garafraxa Tp	894,252.85		894,252.85
Melancthon Tp	868,991.03		868,991.03
Mono Tp	293,809.70		293,809.70
Mulmur Tp	85,179.66		85,179.66
Sub-Total	2,258,495.34	0.00	2,258,495.34
<i>Durham</i>			
Brock Tp	1,016,416.73		1,016,416.73
Clarington, Municipality of	5,769,440.36		5,769,440.36
Oshawa, City of/Scugog Tp	141,259.91		141,259.91
Uxbridge Tp	3,023,334.69		3,023,334.69
Sub-Total	9,950,451.69	0.00	9,950,451.69
<i>Elgin</i>			
Bayham/West Elgin, Municipality of	156,327.56		156,327.56
Central Elgin, Municipality of	192,721.37		192,721.37
Sub-Total	349,048.93	0.00	349,048.93

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Essex			
Amherstburg, Town of/Leamington, Municipality of/Pelee Tp	1,473,308.35		1,473,308.35
Kingsville, Town of	407,912.34		407,912.34
Sub-Total	1,881,220.69	0.00	1,881,220.69
Frontenac			
Central Frontenac Tp	100,939.55		100,939.55
Frontenac Islands Tp	32,884.55		32,884.55
Kingston, City of	1,108,042.38		1,108,042.38
North Frontenac Tp	110,550.50		110,550.50
South Frontenac Tp	433,647.71		433,647.71
Sub-Total	1,786,064.69	0.00	1,786,064.69
Greater Sudbury			
Greater Sudbury, City of	3,131,301.29		3,131,301.29
Sub-Total	3,131,301.29	0.00	3,131,301.29
Grey			
Chatsworth Tp	466,019.88		466,019.88
Georgian Bluffs, Tp	479,263.65		479,263.65
Grey Highlands, Municipality of	1,167,664.13		1,167,664.13
Meaford, Municipality of	516,807.90		516,807.90
Southgate Tp	368,989.45		368,989.45
The Blue Mountains, Town of	213,609.30		213,609.30
West Grey, Municipality of	859,823.23		859,823.23
Sub-Total	4,072,177.54	0.00	4,072,177.54
Haldimand			
Haldimand, County of	829,390.50		829,390.50
Sub-Total	829,390.50	0.00	829,390.50
Haliburton			
Algonquin Highlands, Tp	75,882.40		75,882.40
Dysart et al, Tp	200,879.11		200,879.11
Highlands East, Tp	5,794.01		5,794.01
Minden Hills, TP	100,434.36		100,434.36
Sub-Total	382,989.88	0.00	382,989.88
Halton			
Burlington, City of/Halton Hills, Town of	2,382,083.75		2,382,083.75
Milton, Town of	4,854,043.22		4,854,043.22
Sub-Total	7,236,126.97	0.00	7,236,126.97
Hamilton			
Hamilton, City of	5,852,142.53		5,852,142.53
Sub-Total	5,852,142.53	0.00	5,852,142.53

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Hastings</i>			
Bancroft, Town of	23,287.82		23,287.82
Belleville, City of	708,257.29		708,257.29
Carlo/Mayo Tp	2,072.80		2,072.80
Centre Hastings, Municipality of	208,312.57		208,312.57
Faraday Tp	12,563.40		12,563.40
Hasting Highlands	255,781.30		255,781.30
Limerick Tp	26,226.68		26,226.68
Madoc Tp	585,632.12		585,632.12
Marmora & Lake, Municipality of	5,211.00		5,211.00
Quinte West, City of	641,832.11		641,832.11
Tweed, Municipality of	78,765.85		78,765.85
Tyendinaga Tp	255,709.39		255,709.39
Wollaston	22,721.09		22,721.09
Sub-Total	2,826,373.42	0.00	2,826,373.42
<i>Huron</i>			
Ashfield-Colborne-Wawanosh Tp	1,031,124.10		1,031,124.10
Bluewater, Municipality of	13,856.29		13,856.29
Central Huron, Municipality of	396,142.75		396,142.75
Howick Tp	490,089.10		490,089.10
Huron East, Municipality of	824,664.13		824,664.13
Morris-Turnberry, Municipality of	148,726.48		148,726.48
North Huron Tp	82,074.38		82,074.38
South Huron, Municipality of	108,416.54		108,416.54
Sub-Total	3,095,093.77	0.00	3,095,093.77
<i>Kawartha Lakes</i>			
Kawartha Lakes, City of	7,020,888.96		7,020,888.96
Sub-Total	7,020,888.96	0.00	7,020,888.96
<i>Lambton</i>			
Lambton Shores, Municipality of	229,409.79		229,409.79
Warwick Tp/Plympton-Wyoming, Town of	347,689.66		347,689.66
Sub-Total	577,099.45	0.00	577,099.45
<i>Lanark</i>			
Beckwith Tp/Drummond-North Elmsley Tp	159,086.34		159,086.34
Lanark Highlands Tp	1,140,611.19		1,140,611.19
Mississippi Mills, Town of	370,259.36		370,259.36
Montague Tp	172,607.83		172,607.83
Tay Valley Tp	33,634.92		33,634.92
Sub-Total	1,876,199.64	0.00	1,876,199.64

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
Leeds & Grenville			
Athens Tp/Front of Yonge Tp/Leeds and Thousand Islands Tp	242,457.72		242,457.72
Augusta Tp	60,492.21		60,492.21
Edwardsburgh-Cardinal Tp	73,340.53		73,340.53
Elizabethtown-Kitley Tp/Merrickville-Wolford, Village of	310,279.89		310,279.89
Leeds and Thousand Islands Tp	484,332.69		484,332.69
North Grenville Tp	621,510.64		621,510.64
Rideau Lakes Tp	115,496.54		115,496.54
Sub-Total	1,907,910.22	0.00	1,907,910.22
Lennox & Addington			
Addington Highlands Tp	13,925.56		13,925.56
Greater Napanee, Town of	255,797.51		255,797.51
Loyalist Tp	1,972,358.50		1,972,358.50
Stone Mills Tp	121,821.63		121,821.63
Sub-Total	2,363,903.20	0.00	2,363,903.20
Manitoulin District			
Assignack, Tp	16,470.72		16,470.72
Billings, Tp	8,258.16		8,258.16
Central Manitoulin Tp	40,686.67		40,686.67
Gordon/Barrie Island/Burpee & Mills, Tp/Cockburn Island, Tp	2,613,616.30		2,613,616.30
Northeastern Manitoulin & The Islands	45,848.94		45,848.94
Tehkummah, Tp	177,150.75		177,150.75
Unorganized - Manitoulin D	29,986.60		29,986.60
Sub-Total	2,932,018.14	0.00	2,932,018.14
Middlesex			
Adelaide Metcalfe Tp/Strathroy-Caradoc Tp	38,398.04		38,398.04
London, City of	1,043,783.11		1,043,783.11
Lucan Biddulph Tp	4,927.27		4,927.27
Middlesex Centre Tp	289,211.05		289,211.05
North Middlesex, Municipality of	46,185.26		46,185.26
Thames Centre, Municipality of	2,224,645.53		2,224,645.53
Sub-Total	3,647,150.26	0.00	3,647,150.26
Muskoka			
Bracebridge	684,461.01		684,461.01
Georgian Bay	9,650.06		9,650.06
Gravenhurst	161,295.71		161,295.71
Huntsville	1,043,171.95		1,043,171.95
Lake of Bays, Tp	122,648.75		122,648.75
Muskoka Lakes, Tp	260,761.03		260,761.03
Sub-Total	2,281,988.51	0.00	2,281,988.51
Niagara			
Fort Erie, Town of/Pelham, Town of/Port Colborne, City of/ Wainfleet Tp	2,057,621.99		2,057,621.99
Lincoln, Town of/Niagara-on-the-Lake, Town of	2,060,398.67		2,060,398.67
Niagara Falls, City of	876,013.75		876,013.75
Sub-Total	4,994,034.41	0.00	4,994,034.41

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences	Wayside Permits	Total
<i>Nipissing District</i>			
Bonfield Tp/Calvin Tp	138,072.44		138,072.44
Chisholm Tp	31,348.90		31,348.90
Mattawan Tp/South Algonquin Tp/Unorganized - Nipissing D	12,027.11		12,027.11
North Bay, City of	446,285.05		446,285.05
Papineau-Cameron Tp	6,073.93		6,073.93
West Nipissing, Municipality of	504,455.81		504,455.81
Sub-Total	1,138,263.24	0.00	1,138,263.24
<i>Norfolk</i>			
Norfolk, County of	614,010.27		614,010.27
Sub-Total	614,010.27	0.00	614,010.27
<i>Northumberland</i>			
Alnwick-Haldimand Tp	435,587.23		435,587.23
Brighton, Municipality of	145,939.26		145,939.26
Cramahe Tp	2,169,694.39		2,169,694.39
Hamilton Tp	153,463.65		153,463.65
Port Hope, Municipality of	32,935.71		32,935.71
Trent Hills, Municipality of	163,949.63		163,949.63
Sub-Total	3,101,569.87	0.00	3,101,569.87
<i>Ottawa</i>			
Ottawa, City of	9,727,606.89		9,727,606.89
Sub-Total	9,727,606.89	0.00	9,727,606.89
<i>Oxford</i>			
Blandford-Blenheim Tp	669,438.12		669,438.12
East Zorra-Tavistock Tp/Norwich Tp	164,182.15		164,182.15
South-West Oxford Tp	886,459.88		886,459.88
Zorra Tp	4,117,135.97		4,117,135.97
Sub-Total	5,837,216.12	0.00	5,837,216.12
<i>Parry Sound District</i>			
Armour Tp/Burks Falls, Village of	67,489.86		67,489.86
Callander, Municipality of	55,717.56		55,717.56
Carling Tp/The Archipelago Tp	12,410.11		12,410.11
Joly Tp	32,437.63		32,437.63
Kearney, Town of	23,915.08		23,915.08
Macher Tp	49,059.00		49,059.00
Magnetawan, Municipality of	126,066.42		126,066.42
McDougall Tp/Parry Sound, Town of	46,110.77		46,110.77
McKeller Tp	7,521.84		7,521.84
McMurrich-Monteith Tp	24,793.60		24,793.60
Nipissing Tp	22,194.64		22,194.64
Perry Tp	47,207.16		47,207.16
Powassan, Municipality of	111,300.15		111,300.15
Ryerson Tp	27,866.15		27,866.15
Seguin Tp	428,177.01		428,177.01
Strong Tp	8,077.06		8,077.06
Unorganized - Parry Sound	129,374.46		129,374.46
Whitestone The Municipality of	15,962.68		15,962.68
Sub-Total	1,235,681.18	0.00	1,235,681.18

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Peel</i>			
Caledon, Town of	3,457,525.67	150,000.00	3,607,525.67
Sub-Total	3,457,525.67	150,000.00	3,607,525.67
<i>Perth</i>			
North Perth, Town of/St. Marys, Separated Town of	87,223.69		87,223.69
Perth East Tp	607,761.92		607,761.92
Perth South Tp	1,500,331.96		1,500,331.96
West Perth Tp	355,209.12		355,209.12
Sub-Total	2,550,526.69	0.00	2,550,526.69
<i>Peterborough</i>			
Asphodel-Norwood Tp	263,774.00		263,774.00
Cavan-Millbrook-North Monaghan Tp	51,104.86		51,104.86
Douro-Dummer Tp	532,780.66		532,780.66
Galway-Cavendish-Harvey Tp	662,341.17		662,341.17
Havelock-Belmont-Methuen Tp	998,628.60		998,628.60
North Kawartha Tp	5,550.63		5,550.63
Otonabee South Monaghan Tp	309,736.52		309,736.52
Selwyn Tp	300,064.28		300,064.28
Sub-Total	3,123,980.72	0.00	3,123,980.72
<i>Prescott & Russell</i>			
Alfred & Plantagenet Tp	255,188.20		255,188.20
Champlain Tp	605,855.70		605,855.70
Clarence-Rockland, City of	145,367.04		145,367.04
East Hawkesbury Tp	16,300.47		16,300.47
Russell Tp	108,271.56		108,271.56
The Nation, Municipality of	383,473.24		383,473.24
Sub-Total	1,514,456.21	0.00	1,514,456.21
<i>Prince Edward Co</i>			
Prince Edward, County of	1,335,978.28		1,335,978.28
Sub-Total	1,335,978.28	0.00	1,335,978.28
<i>Renfrew</i>			
Admaston-Bromley Tp/Renfrew, Town of	149,824.25		149,824.25
Bonnechere Valley Tp	106,991.11		106,991.11
Brudenell, Lyndoc and Raglan Tp	42,554.41		42,554.41
Deep River Tp/Head, Clara & Maria Tp	13,127.71		13,127.71
Greater Madawaska Tp	7,157.00		7,157.00
Horton Tp	333,479.05		333,479.05
Killaloe, Hagarty and Richards Tp	77,526.80		77,526.80
Laurentian Hills	32,403.14		32,403.14
Laurentian Valley Tp	380,980.16		380,980.16
Madawaska Valley	39,143.61		39,143.61
McNab-Braeside Tp	387,321.20		387,321.20
North Algona-Wilberforce Tp	42,131.13		42,131.13
Petawawa, Town of	387,975.07		387,975.07
Whitewater Region Tp	113,960.58		113,960.58
Sub-Total	2,114,575.22	0.00	2,114,575.22

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
<i>Simcoe</i>			
Adjala-Tosorontio Tp	165,926.67		165,926.67
Clearview Tp	690,147.92		690,147.92
Collingwood, Town of/Essa Tp/Innisfil, Town of	137,107.47		137,107.47
Midland, Town of/Penetanguishine, Town of/	202,743.19		202,743.19
New Tecumseth, Town of	36,540.00		36,540.00
Oro-Medonte Tp	2,474,289.60		2,474,289.60
Ramara Tp	4,378,523.67		4,378,523.67
Severn Tp	3,993,841.77		3,993,841.77
Springwater Tp	1,061,116.05		1,061,116.05
Tay Tp	105,497.91		105,497.91
Tiny Tp	105,207.49		105,207.49
Sub-Total	13,350,941.74	0.00	13,350,941.74
<i>Stormont, Dundas & Glengarry</i>			
North Dundas Tp	466,898.75		466,898.75
North Glengarry Tp	37,834.65		37,834.65
North Stormont Tp	957,713.30		957,713.30
South Dundas Tp	115,026.20		115,026.20
South Glengarry Tp	166,580.21		166,580.21
South Stormont Tp	751,881.50		751,881.50
Sub-Total	2,495,934.61	0.00	2,495,934.61
<i>Sudbury District</i>			
Baldwin Tp	95,603.47		95,603.47
French River, Municipality of	106,721.54		106,721.54
Killarny, Municipality of/Nairn & Hyman Tp	232,909.13		232,909.13
Markstay-Warren, Municipality of	51,754.41		51,754.41
Sables Spanish Rivers Tp/Espanola, Town of	116,139.87		116,139.87
Sudbury District, Unorganized	332,121.98		332,121.98
Sub-Total	935,250.40	0.00	935,250.40
<i>Thunder Bay District</i>			
Conmee, Tp	211,518.87		211,518.87
Neebing, Municipality of	25,902.33		25,902.33
Oliver Paipoonge, Municipality of/Thunder Bay, City of	176,552.42		176,552.42
Shuniah, Tp	56,218.63		56,218.63
Sub-Total	470,192.25	0.00	470,192.25
<i>Waterloo</i>			
Cambridge, City of/Kitchener, City of	99,722.96		99,722.96
North Dumfries Tp	5,317,664.55		5,317,664.55
Wellesley Tp	1,249,277.63		1,249,277.63
Wilmot Tp	1,904,939.87		1,904,939.87
Woolwich Tp	153,608.52		153,608.52
Sub-Total	8,725,213.53	0.00	8,725,213.53

Table 2

**LICENCE AND WAYSIDE PERMIT PRODUCTION
BY LOWER TIER MUNICIPALITY**

Municipality	Licences (Reported in Metric Tonnes)	Wayside Permits	Total
Wellington			
Centre Wellington Tp	871,725.89		871,725.89
Erin, Town of	1,325,608.95		1,325,608.95
Guelph-Eramosa Tp	442,566.96		442,566.96
Mapleton Tp	85,251.48		85,251.48
Minto, Town of	336,836.00		336,836.00
Puslinch Tp	3,917,048.85		3,917,048.85
Wellington North Tp	115,686.82		115,686.82
Sub-Total	7,094,724.95	0.00	7,094,724.95
York			
East Gwillimbury, Town of	85,290.12		85,290.12
Georgina, Town of	9,936.60		9,936.60
Whitchurch-Stouffville, Town of	963,029.60		963,029.60
Sub-Total	1,058,256.32	0.00	1,058,256.32
GRAND TOTAL	148,062,113.35	0.00	148,062,113.35

Table 3

**LICENCE AND WAYSIDE PRODUCTION
BY UPPER TIER MUNICIPALITY
(Million Tonnes)**

Municipality	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Algoma, District of	1.2	2.8	2.9	2.6	2.9	2.9	2.6	2.4	2.7	2.9
Brant Co.	2.3	2.3	2.2	1.4	1.9	1.7	1.7	1.7	1.6	1.9
Bruce Co.	2.3	2.4	2.0	1.7	2.3	1.7	1.5	1.4	1.8	2.0
Chatham-Kent, R. M. of	0.3	0.3	0.2	0.3	0.3	0.4	0.2	0.3	0.2	0.2
Dufferin Co.	3.1	3.0	3.1	2.7	2.7	2.3	2.2	2.3	2.7	2.3
Durham, R. M. of	12.2	11.7	10.0	8.3	9.6	10.2	9.9	10.1	10.3	10.0
Elgin Co.	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
Essex Co.	1.6	1.7	1.6	1.7	2.6	2.0	2.0	2.1	1.6	1.9
Frontenac Co.	2.1	2.1	2.9	2.6	2.3	2.2	1.9	2.0	2.0	1.8
Greater Sudbury, City of	2.9	2.7	3.2	2.1	2.5	3.1	2.7	2.6	2.8	3.1
Grey Co.	3.4	3.2	3.3	2.9	3.5	3.0	2.6	2.8	3.2	4.1
Haldimand Co.	1.8	1.4	1.3	1.1	1.4	1.2	1.3	1.2	1.5	0.8
Haliburton Co.	----	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.4
Halton, R. M. of	9.6	9.5	8.5	6.9	7.2	8.7	7.4	6.8	7.7	7.2
Hamilton, City of	6.2	5.6	5.7	4.9	5.3	5.0	5.0	4.9	5.2	5.9
Hastings Co.	2.3	2.6	3.0	3.4	3.5	3.1	2.7	2.5	3.1	2.8
Huron Co.	2.7	2.9	2.9	3.0	2.5	2.8	2.5	2.7	3.7	3.1
Kawartha Lakes, City of	6.5	5.9	5.5	4.5	4.6	4.7	5.1	4.3	5.5	7.0
Lambton Co.	0.7	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.7	0.6
Lanark Co.	2.3	2.3	1.9	2.5	2.9	1.8	1.5	1.8	1.7	1.9
Leeds & Grenville Co.'s	2.3	2.0	2.3	2.1	2.6	2.0	2.1	1.9	2.2	1.9
Lennox & Addington Co.	1.9	2.0	2.0	2.0	2.4	2.2	2.2	1.8	2.0	2.4
Manitoulin, District of	----	3.6	3.9	2.9	3.6	3.2	2.5	2.2	2.8	2.9
Middlesex Co.	5.6	5.2	4.8	4.3	4.8	4.0	3.8	3.6	3.6	3.6
Muskoka	----	2.1	2.1	2.3	2.4	2.1	1.9	2.1	2.0	2.3
Niagara, R. M. of	5.1	4.0	4.0	3.9	4.6	3.9	4.7	4.6	4.3	5.0
Nipissing, District of	----	1.3	1.2	1.2	1.1	1.1	1.2	1.0	1.1	1.1
Norfolk Co.	0.5	0.5	0.5	0.4	0.5	0.5	0.8	1.0	0.8	0.6
Northumberland Co.	3.4	3.4	3.0	2.8	3.1	2.7	3.1	2.6	2.6	3.1
Ottawa, City of	11.1	11.4	11.2	11.0	12.7	10.9	10.6	9.6	10.0	9.7
Oxford Co.	5.4	7.1	5.8	4.9	5.2	4.9	5.6	5.8	6.3	5.8
Parry Sound, District of	----	1.5	1.8	2.4	3.5	2.1	1.5	1.2	1.4	1.2
Peel, R. M. of	5.3	4.7	3.8	3.6	3.9	3.6	3.9	3.6	4.0	3.5
Perth Co.	2.4	2.1	1.9	1.9	2.7	2.2	2.1	1.8	2.5	2.6
Peterborough Co.	2.6	2.9	3.2	3.2	3.3	3.2	2.6	2.6	2.7	3.1
Prescott & Russell Co.'s	1.5	1.4	1.7	1.7	1.6	1.6	1.5	1.3	1.5	1.5
Prince Edward Co.	2.2	2.4	2.4	1.6	1.7	1.6	1.6	1.3	1.5	1.3
Renfrew Co.	1.9	2.3	2.1	2.3	2.3	2.2	2.2	1.9	1.9	2.1
Simcoe Co.	13.4	12.0	12.1	10.5	10.3	10.7	10.5	10.1	11.4	13.4
Stormont, Dundas & Glengarry Co.'s	3.4	2.8	3.2	3.4	3.3	4.1	3.5	3.2	2.8	2.5
Sudbury, District of	0.8	1.7	1.1	0.8	0.8	0.9	1.0	0.8	0.9	0.9
Thunder Bay, District of	----	0.3	0.7	1.0	0.8	1.0	1.1	0.8	0.9	0.5
Waterloo, R. M. of	9.3	8.2	7.9	7.1	7.5	7.8	7.3	6.9	6.9	8.7
Wellington Co.	8.8	9.0	8.0	6.6	6.8	6.5	7.0	6.5	6.4	7.1
York, R. M. of	1.0	0.7	1.1	1.0	0.7	0.6	0.9	0.7	0.6	1.1
TOTAL	151.9	158.9	153.8	139.0	151.7	143.7	139.3	132.0	142.0	148.1

Note: Totals may not equal due to rounding.

Table 4

**LICENCE PRODUCTION IN 2015
THE TOP TEN PRODUCING MUNICIPALITIES
(Rounded to nearest million tonnes)**

Municipality(1)	County/Region	2015 Production	Production(2)				
			2014	2013	2012	2011	2010
1	City of Ottawa	9.7	10.0	9.6	10.6	10.9	12.7
2	City of Kawartha Lakes	7.0	5.5	4.3	5.1	4.7	4.6
3	City of Hamilton	5.9	5.2	4.9	5.0	5.0	5.3
4	Municipality of Clarington	5.8	5.5	5.3	5.1	5.0	4.9
5	Township of North Dumfries	5.3	4.2	4.1	4.4	4.5	3.8
6	Town of Milton	4.9	5.5	4.8	4.4	4.9	3.7
7	Ramara Township	4.4	3.0	2.4	2.1	2.2	2.2
8	Township of Zorra	4.1	4.9	4.1	4.1	3.6	3.3
9	Severn Township	4.0	3.7	3.0	3.1	2.7	2.6
10	Township of Puslinch	3.9	3.5	3.5	3.8	3.1	3.6
Total		55.0	51.0	46.0	47.7	46.6	46.7

Notes:

1. Municipalities are ranked in order of their licenced production for 2015.
2. Historical data are for current year's Top Ten Producing Municipalities.

Table 5

**NUMBER AND TYPE OF AGGREGATE LICENCES
(Reported by MNR District)**

District	No. of Licences	Category		Type of Operation			
		Class A	Class B	Pit	Quarry	Pit & Quarry	Underwater
Aurora (GTA)	133	117	16	117	16	0	0
Aylmer	298	233	65	284	8	6	0
Bancroft	263	99	164	188	34	41	0
Guelph (Cambridge)	460	397	63	421	36	3	0
Kemptville	460	289	171	315	122	23	0
Midhurst	482	372	110	417	60	5	0
North Bay	140	60	80	107	7	26	0
Parry Sound	293	117	176	188	10	95	0
Pembroke	221	76	145	199	12	10	0
Peterborough (Tweed)	527	296	231	422	88	17	0
Sault Ste. Marie	99	56	43	80	6	13	0
Sudbury	227	128	99	161	20	46	0
Thunder Bay	61	25	36	47	5	9	0
Wawa	2	2	0	1	0	1	0
TOTAL	3,666	2,267	1,399	2,947	424	295	0

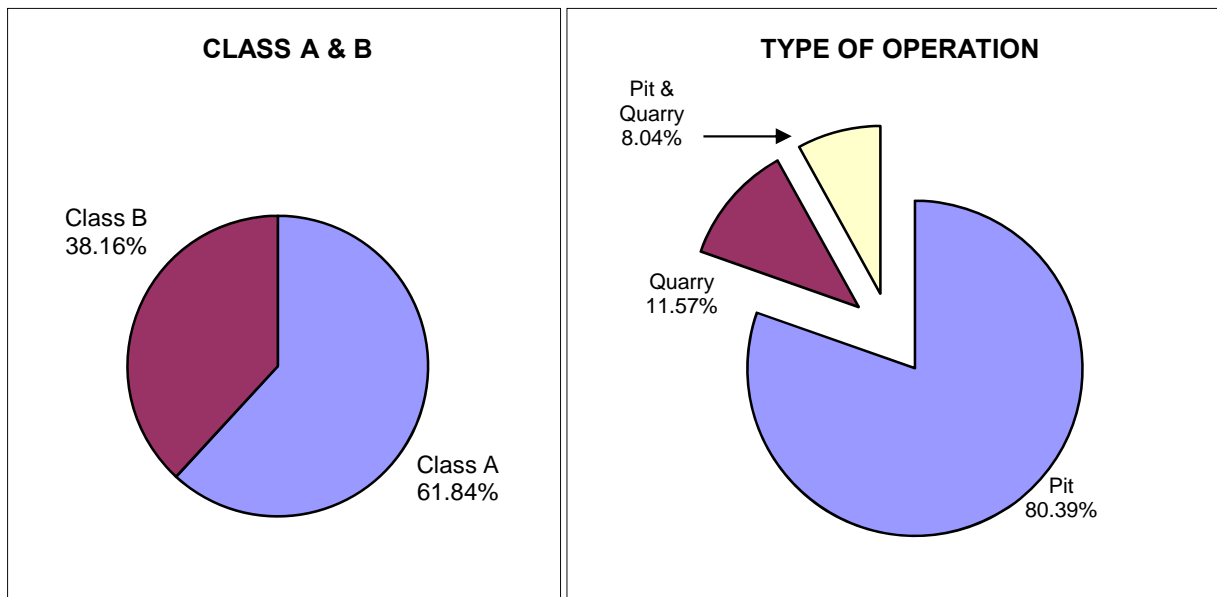
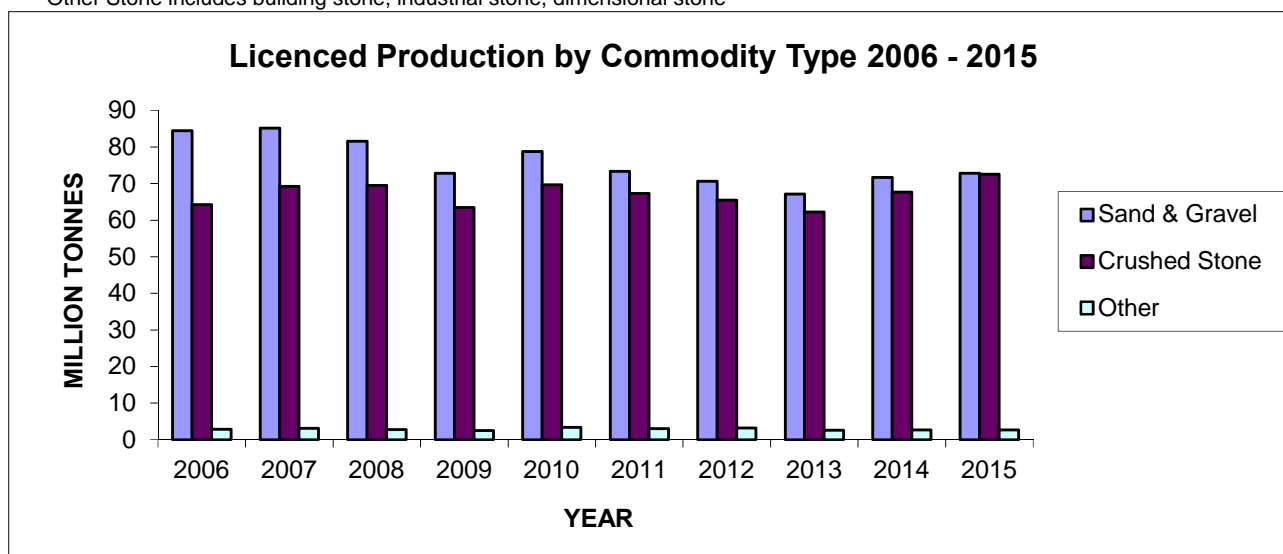


Table 6

**2015 LICENCED AGGREGATE PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

District	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Aurora (GTA)	21,701,660.65	10,754,945.55	10,283,249.00	621,389.51	42,076.59
Aylmer	13,105,388.69	9,448,958.71	3,608,210.39	27,707.53	20,512.06
Bancroft	5,636,200.88	562,372.55	4,960,127.02	16.00	113,685.31
Guelph (Cambridge)	35,143,089.54	22,547,332.50	12,465,621.50	123,610.81	6,524.73
Kemptville	17,512,697.73	3,605,341.23	12,595,709.09	15,763.00	1,295,884.41
Midhurst	21,528,467.19	10,935,270.55	10,377,610.43	8,621.63	206,964.58
North Bay	1,426,739.18	931,930.52	477,415.94	0.00	17,392.72
Parry Sound	3,244,931.47	1,256,320.17	1,963,379.51	432.50	24,799.29
Pembroke	2,123,985.06	1,581,622.12	538,640.14	308.29	3,414.51
Peterborough	16,298,376.42	6,432,637.05	9,744,014.23	98,869.15	22,855.99
Sault Ste. Marie	2,872,369.42	1,397,821.28	1,469,079.64	4,349.50	1,119.00
Sudbury	6,998,014.87	2,968,733.19	4,003,575.41	20,485.82	5,220.45
Thunder Bay	470,192.25	404,139.85	65,870.40	0.00	182.00
TOTAL	148,062,113.35	72,827,425.27	72,552,502.70	921,553.74	1,760,631.64

Note: Totals may not equal due to rounding - Reported in metric tonnes
Other Stone includes building stone, industrial stone, dimensional stone



**Yearly Production for Aggregate Licences
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2006	151.61	84.49	64.24	2.88
2007	157.56	85.17	69.24	3.15
2008	153.80	81.55	69.52	2.73
2009	138.84	72.79	63.51	2.54
2010	151.76	78.78	69.64	3.34
2011	143.73	73.36	67.34	3.03
2012	139.30	70.60	65.50	3.20
2013	131.97	67.13	62.23	2.61
2014	142.02	71.68	67.67	2.67
2015	148.06	72.83	72.55	2.68

Table 7

**2015 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by MNR District)**

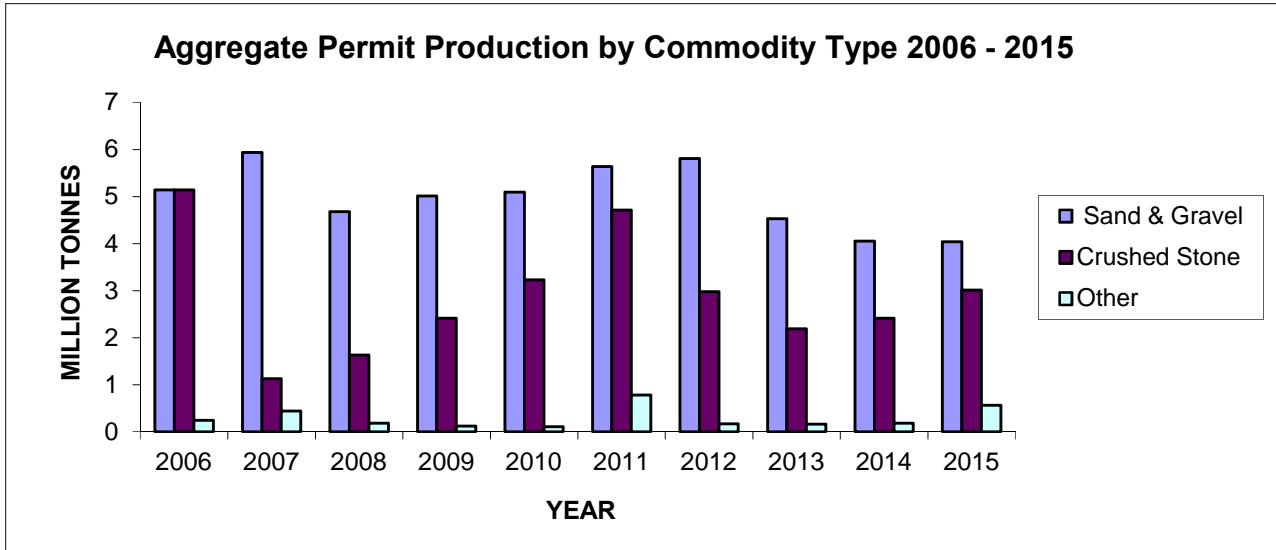
Region/District	Total Production	Sand & Gravel	Crushed Stone	Clay/Shale	Other Stone
NORTHEAST					
Chapleau	235,932.36	235,932.36	-	-	-
Cochrane	400,368.38	122,175.07	278,193.31	-	-
Hearst	407,913.63	207,036.28	197,134.35	1,769.00	1,974.00
Kirkland Lake	144,758.70	144,758.70	-	-	-
North Bay	444,194.02	378,518.05	65,650.97	-	25.00
Sault Ste. Marie	353,133.12	262,936.12	90,197.00	-	-
Sudbury	739,313.67	210,951.19	497,600.25	85.14	30,677.09
Timmins	226,049.77	226,049.77	-	-	-
Wawa	315,135.46	173,767.64	64,704.82	76,663.00	-
Sub-Total	3,266,799.11	1,962,125.18	1,193,480.70	78,517.14	32,676.09
NORTHWEST					
Dryden	576,378.00	278,534.00	296,552.00	-	1,292.00
Fort Frances	1,174,931.15	498,758.77	674,016.38	-	2,156.00
Kenora	302,391.45	200,408.28	88,241.22	-	13,741.95
Nipigon	514,446.03	308,658.04	204,774.79	-	1,013.20
Red Lake	150,197.15	149,624.93	572.22	-	-
Sioux Lookout	333,190.08	333,101.68	-	-	88.40
Thunder Bay	285,125.91	141,694.46	143,352.00	-	79.45
Sub-Total	3,336,659.77	1,910,780.16	1,407,508.61	-	18,371.00
SOUTHCENTRAL					
Algonquin Park	-	-	-	-	-
Aurora (GTA)	328,892.00	-	-	328,892.00	-
Aylmer	7,696.85	7,696.85	-	-	-
Bancroft	423,175.90	35,972.80	283,532.59	960.00	102,710.51
Guelph (Cambridge)	-	-	-	-	-
Kemptville	1,447.72	1,447.72	-	-	-
Midhurst	-	-	-	-	-
Parry Sound	69,432.07	34,627.66	33,824.41	-	980.00
Pembroke	82,418.60	82,418.60	-	-	-
Peterborough (Tweed)	92,161.82	-	92,161.82	-	-
Sub-Total	1,005,224.96	162,163.63	409,518.82	329852.00	103,690.51
TOTAL	7,608,683.84	4,035,068.97	3,010,508.13	408,369.14	154,737.60

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

Table 8

**2015 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported By Year)**



**Yearly Production for Aggregate Permits
(in Million Tonnes)**

	Total	Sand & Gravel	Crushed Stone	Other
2006	10.52	5.14	5.14	0.24
2007	7.51	5.94	1.13	0.44
2008	6.49	4.68	1.63	0.18
2009	7.54	5.01	2.41	0.12
2010	8.43	5.09	3.23	0.11
2011	11.13	5.64	4.71	0.78
2012	8.96	5.81	2.98	0.17
2013	6.88	4.53	2.19	0.16
2014	6.64	4.05	2.41	0.18
2015	7.61	4.04	3.01	0.56

Table 9

**2015 AGGREGATE PERMIT PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	7,697	7,697	0	0	0
Peninsula (2)	0	0	0	0	0
West Central (3)	0	0	0	0	0
GTA (4)	328,892	0	0	328,892	0
East Central (5)	527,527	48,800	374,076	960	103,691
East (6)	85,850	84,232	1,618	0	0
Northeast (7)	2,620,409	1,494,929	1,090,950	1,854	32,676
Northwest (8)	4,038,310	2,399,412	1,543,864	76,663	18,371
TOTAL	7,608,684	4,035,069	3,010,508	408,369	154,738

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

**2015 AGGREGATE LICENCE PRODUCTION
BY COMMODITY TYPE
(Reported by CAC* Geographic Areas)**

Area	Total	Sand & Gravel	Crushed Stone	Clay/ Shale	Other Stone
Southwest (1)	18,136,999	13,577,026	4,420,885	112,052	27,037
Peninsula (2)	14,150,194	2,675,527	11,435,596	39,071	0
West Central (3)	37,489,753	26,679,008	10,594,962	8,817	206,965
GTA (4)	21,702,361	10,755,546	10,283,249	621,390	42,177
East Central (5)	20,073,770	7,227,983	12,634,227	59,538	152,022
East (6)	23,786,651	5,761,143	16,662,331	55,851	1,307,326
Northeast (7)	9,372,514	4,348,101	4,980,122	20,486	23,805
Northwest (8)	3,349,873	1,803,091	1,541,131	4,350	1,301
TOTAL	148,062,113	72,827,425	72,552,503	921,554	1,760,632

Note: Totals may not equal due to rounding - Reported in metric tonnes

Other Stone includes building stone, industrial stone, dimensional stone

*CAC - Cement Association of Canada formerly CPCA - Canadian Portland Cement Association

Table 10

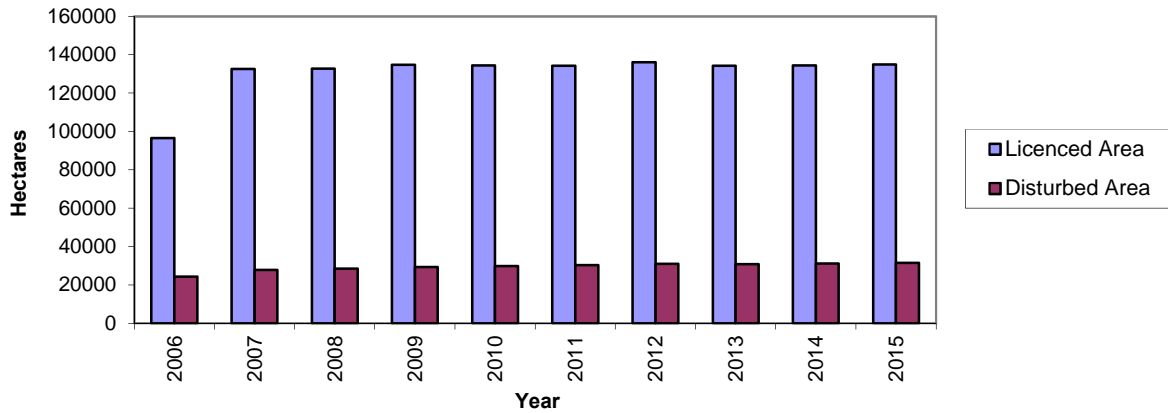
**REHABILITATION OF
LICENCED AGGREGATE SITES IN 2015
(Reported by MNR District)**

District	Total No. of Licences	Total Licenced Area	Original Disturbed Area	New Disturbed Area	New Rehab. Area	Total Disturbed Area
Aurora (GTA)	133	7,941.63	2,724.10	67.17	176.14	2,615.13
Aylmer	298	8,816.43	3,120.58	104.55	237.87	2,987.26
Bancroft	263	9,277.34	1,234.47	51.04	8.56	1,276.95
Guelph (Cambridge)	460	16,786.06	5,185.64	241.76	135.08	5,292.32
Kemptville	460	14,300.63	4,545.23	68.22	32.17	4,581.28
Midhurst	482	15,900.74	4,044.07	210.80	71.88	4,182.99
North Bay	140	6,549.10	907.40	41.63	165.12	783.91
Parry Sound	293	9,362.30	2,062.28	51.45	26.93	2,086.80
Pembroke	221	5,600.25	861.02	18.28	13.15	866.14
Peterborough (Tweed)	527	15,611.32	3,973.90	130.27	72.06	4,032.11
Sault Ste. Marie	99	3,967.42	745.72	26.78	4.37	768.14
Sudbury	227	16,898.41	1,853.83	51.23	49.79	1,855.27
Thunder Bay	61	3,769.07	250.65	22.53	30.12	243.06
Wawa	2	46.87	0.00	0.00	0.00	0.00
TOTAL	3,666	134,827.57	31,508.89	1,085.72	1,023.25	31,571.36

Note: Areas reported in hectares

These statistics are compiled from information supplied by licencees and are not independently checked for accuracy.

Total Licenced & Disturbed Area 2006 - 2015



New Rehabilitated & Disturbed Area 2006 - 2015

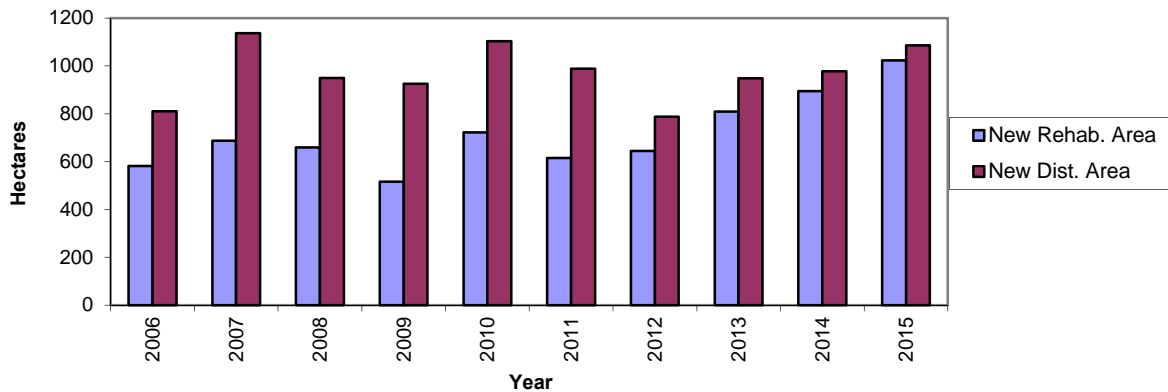


Table 11

**NUMBER AND TYPE OF AGGREGATE PERMITS
(Reported by MNR District)**

Region/District	Total Hectarage	Total No. of Permits	Pit	Quarry	Pit & Quarry	Underwater
NORTHEAST						
Chapleau	1,294.31	107	103	4	0	0
Cochrane	3,432.32	127	110	10	7	0
Hearst	3,697.72	190	163	25	2	0
Kirkland Lake	2,000.08	150	138	10	2	0
North Bay	3,300.36	198	159	30	9	0
Sault Ste. Marie	1,094.99	91	85	4	2	0
Sudbury	4,885.75	160	120	24	16	0
Timmins	2,152.76	142	127	9	6	0
Wawa	2,434.18	185	169	9	7	0
Sub-Total	24,292.47	1,350	1,174	125	51	0
NORTHWEST						
Dryden	2,403.63	173	168	9	11	0
Fort Frances	2,393.66	210	187	7	16	0
Kenora	3,045.81	175	133	25	19	0
Nipigon	3,556.40	224	186	17	19	0
Red Lake	1,195.05	67	65	3	2	0
Sioux Lookout	2,143.91	84	77	2	3	0
Thunder Bay	4,079.88	160	117	23	12	0
Sub-Total	18,818.34	1,093	933	86	82	0
SOUTHCENTRAL						
Aurora	4.90	1	1	0	0	0
Aylmer	0.10	1	0	0	0	1
Bancroft	1,383.80	69	53	16	0	0
Guelph (Cambridge)	620.00	1	0	0	0	1
Kemptville	2.00	1	1	0	0	0
Parry Sound	969.98	87	61	19	7	0
Pembroke	135.00	34	34	0	0	0
Peterborough (Tweed)	31.40	2	0	1	1	0
Sub-Total	3,147.18	196	150	36	8	2
TOTAL	46,257.99	2,639	2,257	247	141	2

APPENDIX A

GLOSSARY OF TERMS

For actual definitions, please refer to the Aggregate Resources Act.

Active Licence

A licence that has been issued, being transferred, or under suspension at the end of the calendar year.

Aggregate

Includes sand, gravel, limestone, dolostone, crushed stone, rock other than metallic ores, and other prescribed material.

Aggregate Permit

A permit for a pit or quarry issued under the Aggregate Resources Act allowing for the excavation of aggregate that is the property of the Crown, on land where the surface rights are the property of the Crown, or from land under water.

ALPS

The Aggregate Licence and Permit System (ALPS) is an automated data base that facilitates the management of mineral aggregate production and related information, for individual licences, aggregate permits and wayside permits across the province.

Building Dimension

A slab or block of rock, flagstone if foliated and dimension stone if massive, generally rectangular, and cut to specified measurements for ornamental surfacing in buildings or other construction applications.

Clay/Shale

Clay is a fine-grained, natural, earthy material composed primarily of hydrous aluminum silicates. It is plastic when moist and hardens when dried. Shale is fine-grained sedimentary laminated rock predominantly composed of clay grade and other fine minerals.

Class A Licence

A licence under the Aggregate Resources Act to allow excavation of more than 20,000 tonnes of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Class B Licence

A licence under the Aggregate Resources Act to allow excavation of 20,000 tonnes or less of aggregate annually from a pit or quarry within parts of Ontario that have been designated under the Aggregate Resources Act.

Crown Land

Ownership of land which is vested in the Crown or owned by the Province of Ontario.

Crushed Stone

Rock or stone mechanically crushed to specified sizes and grading.

Designated Area

An area of the Province identified by regulation under the Aggregate Resources Act where a person requires a licence for the excavation of aggregate from private land.

Disturbed Area

An area within a site that has been, or is being excavated to operate a pit or quarry, and has not been rehabilitated.

Gravel

Small stones and pebbles or a mixture of sand and small stones. More specifically, fragments of rock worn by the action of air and water, larger and coarser than sand. MTO specifications define gravel as unconsolidated granular material greater than 4.75mm.

Housing Starts

The number of housing units started where construction has advanced to 100 per cent of footings. In case of multiple dwellings, a "start" implies the commencement of individual structures.

Inactive Licence

A licence that has been revoked or surrendered prior to the end of the calendar year.

Licence

A licence for a pit or quarry issued under the Aggregate Resources Act allowing for the extraction of aggregate in designated areas.

Licensed Area

A specific area for which a licence has been issued for the extraction of mineral aggregates under the Aggregate Resources Act.

Pit

Land or land under water from which unconsolidated aggregate is being or has been excavated, and has not been rehabilitated.

Private Land

Land owned by an individual or corporation, as opposed to land which is owned by the Crown.

Progressive Rehabilitation

As per the requirements of the Aggregate Resources Act, sequential rehabilitation completed within reasonable time over disturbed land from which aggregate has been extracted. The rehabilitation is carried out according to the Act, the regulations, the site plan, and the conditions of the licence or permit during the period that aggregate is being extracted.

Pits & Quarries Control Act

An Act to manage and regulate mineral aggregate extraction in Ontario. The Act had been automatically repealed and replaced by the Aggregate Resources Act as of January 1, 1990.

Quarry

Land or land under water from which consolidated rock is or has been excavated and the site has not been rehabilitated.

Rehabilitation

To treat the land from which aggregate has been excavated to a pre-excitation condition or use, or to a condition compatible with adjacent land.

Royalty

A payment made to the Crown in recognition of the extraction of aggregates owned by the Crown. Under the Aggregate Resources Act, the royalty is set at a minimum of 50 cents per tonne. The Minister may set a higher rate or may allow exemption.

Sand

Any hard granular rock material finer than gravel and coarser than dust. MTO specifications define sand as granular material ranging in size from .075mm to 4.75 mm.

Wayside Permit

A permit issued to a public authority or a person who has a contract with a public authority for a temporary road project or an urgent project for which no alternative source of aggregate is available under licence or permit. A wayside permit expires 18 months from the date of issue or upon completion of the project, whichever comes first.

APPENDIX B

**HISTORICAL DESIGNATION OF PRIVATE LAND UNDER THE
PITS AND QUARRIES CONTROL ACT AND
THE AGGREGATE RESOURCES ACT**

(by Geographic Twp)

Designations under the Pits and Quarries Control Act (1971-1989)

DECEMBER 19, 1971

Adjala	Euphrasia	Nottawasaga
Albemarle	Flamborough East	Osprey
Albion	Flamborough West	Pelham
Amabel	Grantham	Reach
Ancaster	Grimsby North	Saltfleet
Artemesia	Holland	Stamford
Barton	Keppel	St. Edmunds
Beverly	Lindsay	St. Vincent
Caledon	London	Sydenham
Chinguacousy	Louth	Thorold
Clinton	Melancthon	Toronto Gore
Collingwood	Mono	Trafalgar
Derby	Mulmur	Westminster
Eastnor	Nassagaweya	West Nissouri
Erin	Nelson	Whitby
Esquesing	Niagara	Whitchurch

MARCH 3, 1972

Brock	Lobo	Pickering
East Whitby	Markham	Toronto
Gloucester	Nepean	Vaughan
Hallowell	Osgoode	

MAY 9, 1972

Brantford	Pittsburgh	South Dumfries
Guelph	Puslinch	Waterloo
Kingston	North Dumfries	

AUGUST 15, 1973

Anderdon	Dereham	Humberstone
Bertie	Dunn	Huntley
Blenheim	Eramosa	King
Brighton	Fitzroy	Malden
Clarke	Gosfield South	Manvers
Colchester North	Gosfield North	March
Colchester South	Haldimand	Mersea
Cramahe	Hamilton	Murray
Crowland	Harwich	Nichol
Darlington	Hope	North Cayuga

North Gower
North Oxford
Oneida
Orillia
Oro
Pilkington
Raleigh
Romney

Sidney
Sunnidale
Thurlow
Tilbury East
Tyendinaga
Uxbridge
Vespra
Walpole

Wellesley
West Oxford
Willoughby
Wilmot
Woodhouse
Woolwich
Yarmouth

FEBRUARY 15, 1974

Delaware
North Dorchester

MAY 17, 1974

Pelee

MAY 1, 1975

Alnwick
Amaranth
Arran
Arthur
Asphodel
Balfour
Bayham
Belmont
Bexley
Biddulph
Binbrook
Blandford
Blanshard
Blezard
Bowell
Broder
Burford
Caistor
Camden
Capreol
Cartwright
Cavan
Charlotteville
Chatham
Creighton
Cumberland
Denison
Dieppe
Dill
Douro
Dover
Dowling
Drury

Dryden
Dummer
East York
East Garafraxa
East Nissouri
East Luther
East Gwillimbury
East Oxford
East Zorra
Eldon
Emily
Ennismore
Essa
Etobicoke
Fairbank
Falconbridge
Fenelon
Flos
Gainsborough
Garson
Georgina
Glanford
Glenelg
Goulburn
Graham
Hanmer
Harvey
Houghton
Howard
Hutton
Innisfil
Levack
Lorne

Louise
Lumsden
MacLennan
Maidstone
Malahide
Mara
Mariposa
Marlborough
Maryborough
Matchedash
McKim
Medonte
Middleton
Minto
Morgan
Moulton
Neelon
Norman
North Monaghan
North Walsingham
North Norwich
North Gwillimbury
North York
Oakland
Onondaga
Ops
Orford
Otonabee
Peel
Percy
Proton
Rainham
Rama

Rawden
Rayside
Rochester
Sandwich, East
Sandwich, West
Scarborough
Scott
Scugog
Seneca
Seymour
Sherbrooke
Smith
Snider
South Walsingham

South Cayuga
South Dorchester
South Grimsby
South Norwich
South Monaghan
Sullivan
Tay
Tecumseh
Thorah
Tilbury, North
Tilbury, West
Tiny
Torbolton
Tosorontio

Townsend
Trill
Tuscarora
Verulam
Wainfleet
Waters
West Luther
West Garafraxa
West Gwillimbury
West Zorra
Windham
Wisner
York
Zone

APRIL 6, 1976

Great LaCloche Island
Little LaCloche Island

AUGUST 27, 1976

Avenge
Bosanquet
Carden

Korah
Parke
Prince

Rankin
St. Mary's
Tarentorus

JANUARY 1, 1981

Adelaide
Aldborough
All of the County of Perth
All of the County of Huron
All of the County of Lanark
Ameliasburgh
Athol
Bentinck
Brant
Brooke
Bruce
Carrick
City of Belleville
Culross
Dawn
Dunwich
E. Williams
Egremont
Elderslie
Elzevir and Grimsthorpe

Enniskillen
Euphemia
Exfrid
Greenock
Hillier
Hungerford
Huntingdon
Huron
Kincardine
Kinloss
Madoc
Marmora and Lake
McGillivray
Moore
Mosa
Normanby
North Marysburgh
Plympton
Sarnia
Saugeen

Separated Town of Trenton
Sombra
Sophiasburgh
South Marysburgh
Southwold
Town of Deseronto
Tudor
United Counties of Prescott
and Russell
United Counties of Stormont,
Dundas & Glengarry
United Counties of Leeds and
Grenville
Villages of Deloro, Frankford,
Madoc, Marmora, Stirling
and Tweed
W. Williams
Walford
Warwich
Wyoming

JULY 1, 1984

Storrington

Designations under the Aggregate Resources Act (Jan. 1, 1990)

APRIL 1, 1992

Adolphustown
Amherst Island
Bedford
Camden East
Dalton
Digby
Ernestown

Howe Island
Laxton
Longford
Loughborough
North Fredericksburgh
Portland
Richmond

Somerville
South Fredericksburgh
Town of Napanee
Villages of Bath and
Newburgh
Wolfe Island

SEPTEMBER 1, 1993

Admaston
Alice and Fraser
Bagot and Blithfield
Bromley
City of Pembroke
Horton

McNab
Pembroke
Petawawa
Ross
Stafford

Towns of Arnprior and
Renfrew
Villages of Beachburg,
Braeside, Cobden and
Petawawa
Westmeath

JANUARY 1, 1998

Anderson
Appleby
Archibald
Aweres
Awrey
Baldwin
Burwash
Cartier
Cascaden
Casimir
Chesley Additional
Cleland
Cosby
Curtin
Delamere
Dennis
Deroche
Duncan
Dunnet
Eden
Fenwick
Fisher
Foster
Foy

Gaudette
Gough
Hagar
Hallam
Harrow
Harty
Haviland
Hawley
Hendrie
Henry
Herrick
Hess
Hilton
Hodgins
Hoskin
Hyman
Jarvis
Jennings
Jocelyn
Johnson
Kars
Kehoe
Laird
Laura

Ley
Loughrin
Macdonald
May
McKinnon
Meredith and Aberdeen
Additional
Merritt
Mongowin
Nairn
Pennfather
Ratter
Secord
Servos
Shakespeare
Shields
St. Joseph
Street
Tarbutt and Tarbutt
Additional
Tilley
Tilton
Tupper
VanKoughnet

DECEMBER 4, 1999

Village of Hilton Beach

JULY 22, 2004

Andre
Bostwick
Franchere
Groseilliers
Legarde

Levesque
Macaskill
Menzies
Michipicoten
Musquash

Rabazo
St. Germain
Warpula

Newly Designated Private Lands (Effective January 1, 2007)

1. Those parts of the County of Frontenac consisting of the townships of Central Frontenac and North Frontenac.
2. Those parts of the County of Renfrew consisting of,
 - a) the Township of Bonnechere Valley, the Township of Brudenell, Lyndoch and Raglan, the Township of Head, Clara and Maria, the Township of Killaloe, Hagarty and Richards, the Township of Madawaska Valley and the Township of North Algona Wilberforce;
 - b) the Township of Greater Madawaska, except the townships of Bagot and Blythfield; and
 - c) the towns of Deep River and Laurentian Hills.
3. Those parts of the County of Lennox and Addington consisting of,
 - a) the Township of Addington Highlands; and
 - b) the Township of Stone Mills, except the Township of Camden East.
4. Those parts of the County of Hastings consisting of,
 - a) the Town of Bancroft;
 - b) the townships of Carlow/Mayo, Faraday, Limerick and Wollaston;
 - c) the Municipality of Hastings Highlands; and
 - d) the Township of Tudor and Cashel, except the Township of Tudor.
5. Those parts of the County of Peterborough consisting of,
 - a) the Township of Galway-Cavendish-Harvey, except the Township of Harvey;
 - b) the Township of Havelock-Belmont-Methuen, except the Township of Belmont and the Town of Havelock; and
 - c) the Township of North Kawartha.
6. All of the County of Haliburton.
7. Those parts of the Territorial District of Nipissing consisting of,
 - a) the Town of Mattawa;
 - b) the City of North Bay;
 - c) the Municipality of West Nipissing;
 - d) the townships of Bonfield, Calvin, Chisholm, East Ferris, Mattawan, Papineau- Cameron and South Algonquin; and
 - e) the geographical townships of Airy, Anglin, Antoine, Ballantyne, Barron, Biggar, Bishop, Blyth, Boulter, Bower, Boyd, Bronson, Butler, Butt, Canisbay, Charlton, Clancy, Clarkson, Commanda, Deacon, Devine, Dickson, Eddy, Edgar, Finlayson, Fitzgerald, French, Freswick, Garrow, Gladman, Guthrie, Hammell, Hunter, Jocko, Lauder, Lyman, Lister, Lockhart, Master, McCraney, McLaughlin, McLaren, Merrick, Mulock, Niven, Notman, Olig, Osborne, Osler, Paxton, Peck, Pentland, Phelps, Poitras, Preston, Sproule, Stewart, Stratton, Thistle, White and Wilkes

8. All parts of the Territorial District of Parry Sound consisting of,
 - a) the townships of Armour, Carling, Joly, Machar, McKellar, McMurrich/Monteith, Nipissing, Perry, Ryerson, Seguin, Strong and The Archipelago;
 - b) the municipalities of Powassan, Magnetawan, McDougall, Callander and Whitestone;
 - c) the towns of Kearney and Parry Sound;
 - d) the villages of Burk's Falls, South River and Sundridge; and
 - e) the geographical townships of Bethune, Blair, Brown, East Mills, Gurd, Hardy, Harrison, Henvey, Laurier, Lount, McConkey, Mowat, Patterson, Pringle, Proudfoot, Shawanaga, Wallbridge and Wilson.

9. All parts of the Territorial District of Muskoka consisting of,
 - a) the towns of Bracebridge, Gravenhurst and Huntsville;
 - b) the townships of Georgian Bay, Lake of Bays and Muskoka Lakes; and
 - c) the District Municipality of Muskoka.

10. Those parts of the Territorial District of Sudbury consisting of,
 - a) the Municipality of French River, except the geographical townships of Cosby, Delamere and Hoskin;
 - b) the Township of Sables – Spanish River, except the geographical townships of Gough, Hallam, Harrow, May, McKinnon and Shakespeare;
 - c) the Town of Killarney;
 - d) the Municipality of Killarney;
 - e) those parts of the City of Greater Sudbury consisting of the geographical townships of Aylmer, Fraleck, Hutton, MacKelcan, Parkin, Rathburn and Scadding; and
 - f) the geographical townships of Bevin, Caen, Carlyle, Cox, Davis, Dunlop, Halifax, Humboldt, Janes, Kelly, Leinster, McCarthy, Munster, Porter, Roosevelt, Shibananing, Truman, Tyrone and Waldie.

11. All parts of the Territorial District of Manitoulin, except Great LaCloche Island and Little LaCloche Island.

12. Those parts of the Territorial District of Algoma consisting of,
 - a) the towns of Blind River, Bruce Mines and Thessalon;
 - b) the City of Elliot Lake;
 - c) the townships of The North Shore, Plummer Additional and Shedden;
 - d) the Municipality of Huron Shores; and
 - e) the geographical townships of Aberdeen, Boon, Bridgland, Brule, Cadeau, Curtis, Dablon, Daumont, Deagle, Gaiashk, Galbraith, Gerow, Gillmor, Grenoble, Hughes, Hurlburt, Hynes, Kane, Kincaid, Lamming, Laverendrye, Marne, McMahan, Montgomery, Morin, Nicolet, Norberg, Palmer, Parkinson, Patton, Peever, Plummer, Rix, Rose, Ryan, Slater, Smilsky, Wells, Whitman and Wishart.

13. Those parts of the Territorial District of Thunder Bay consisting of,
 - a) the City of Thunder Bay;
 - b) the Municipality of Neebing; and
 - c) the townships of Conmee, Dorion, Gillies, O'Conner, Oliver Paipoonge and Shuniah.

Please refer to the Revised Regulations of Ontario for accuracy.

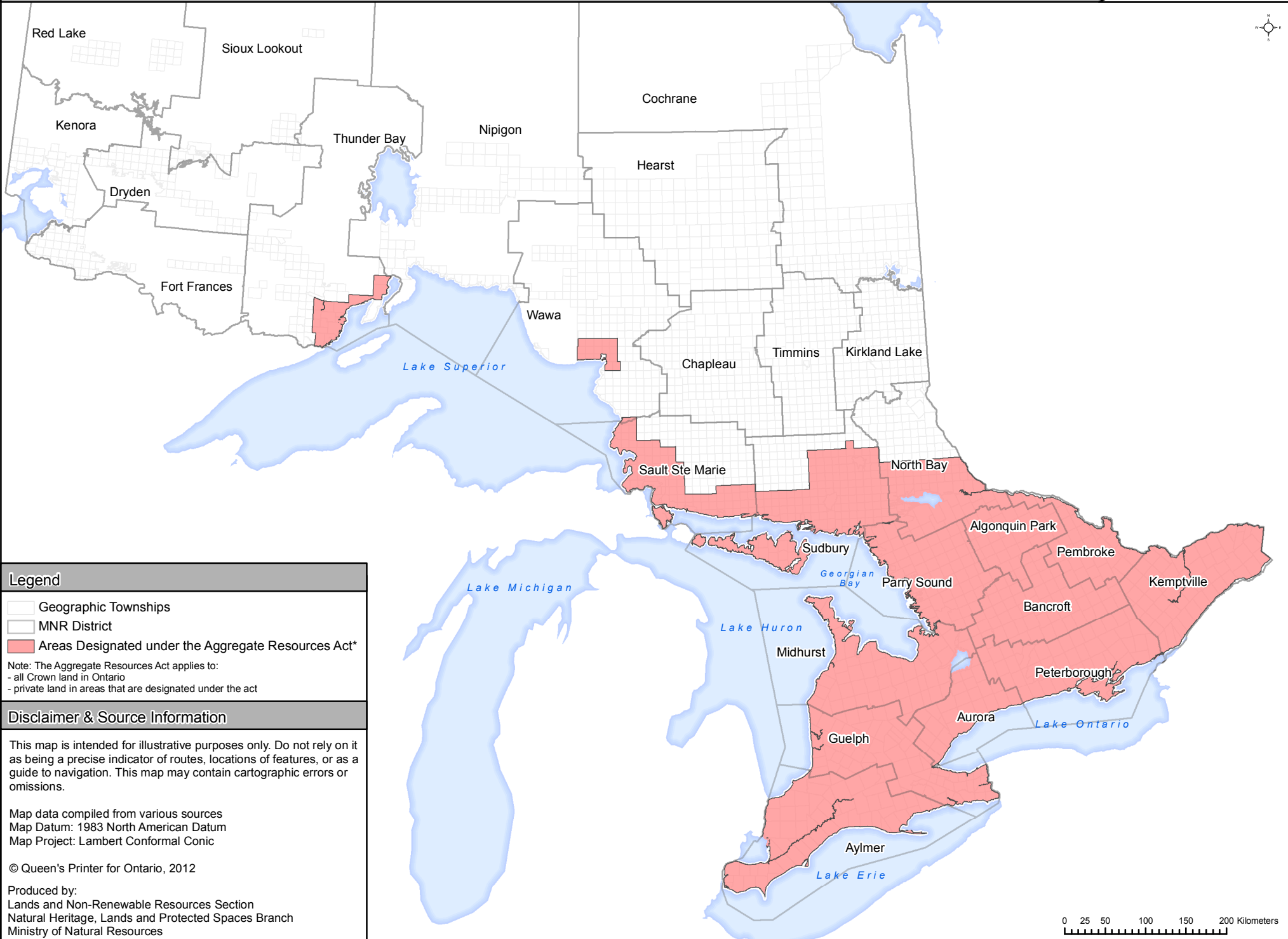
CANADIAN PORTLAND CEMENT ASSOCIATION* GEOGRAPHIC AREAS

* Now CAC - Cement Association of Canada



Area 1 Southwest	Area 2 Peninsula	Area 3 West Central	Area 4 GTA	Area 5 East Central	Area 6 East	Area 7 Northeast	Area 8 Northwest
Essex	Niagara	Bruce	Metro Toronto	Kawartha Lakes	Prescott & Russell	Nipissing	Algoma
Chatham-Kent	Brant	Grey	Peel	Peterborough	Leeds & Grenville	Parry Sound	Thunder Bay
Lambton	Haldimand	Simcoe	York	Haliburton	Stormont, Dundas, & Glengarry	Timiskaming	Kenora
Elgin	Norfolk	Dufferin	Durham	Northumberland	Frontenac	Cochrane	Rainy River
Middlesex	Hamilton	Wellington	Halton	Hastings	Greater Ottawa	Sudbury District	
Huron		Waterloo		Prince Edward	Lanark	Greater Sudbury	
Perth				Muskoka	Renfrew	Manitoulin	
Oxford					Lennox & Addington		

Areas Designated under the Aggregate Resources Act



Legend

- Geographic Townships
- MNR District
- Areas Designated under the Aggregate Resources Act*

Note: The Aggregate Resources Act applies to:
- all Crown land in Ontario
- private land in areas that are designated under the act

Disclaimer & Source Information

This map is intended for illustrative purposes only. Do not rely on it as being a precise indicator of routes, locations of features, or as a guide to navigation. This map may contain cartographic errors or omissions.

Map data compiled from various sources
Map Datum: 1983 North American Datum
Map Project: Lambert Conformal Conic

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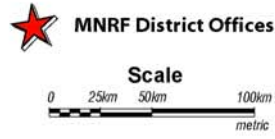
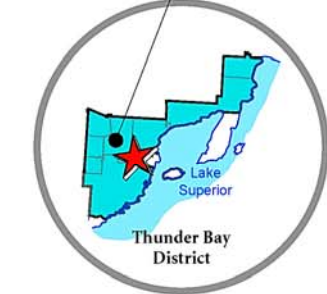
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Compiled by **MHBC Planning** with the cooperation and assistance of the Ministry of Natural Resources & Forestry, Aggregate Resources Program staff (Feb. 2016)

2016 Aggregate Officers of Ontario

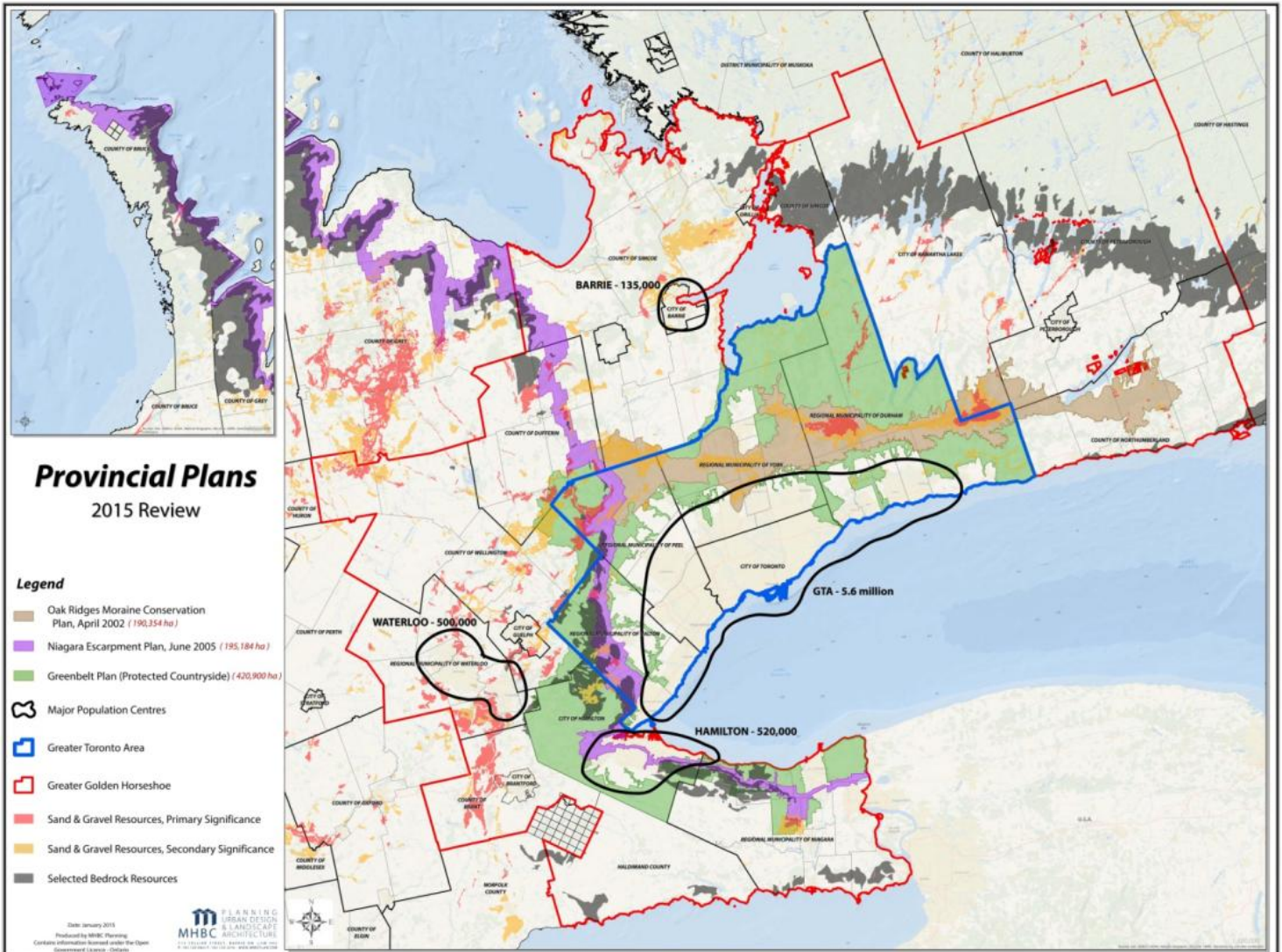
AGGREGATE RESOURCES ACT DESIGNATED AREAS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

Kitchener	519.576.3650
Woodbridge	905.761.5588
London	519.858.2797
Kingston	613.384.7067
Barrie	705.728.0045
Burlington	416.518.8394

The Future of Ontario's Close to Market Aggregate Supply: The 2015 Provincial Plan Review

Aggregate Industry Discussion Paper



April 30, 2015

Recommendations

Overview

1. The public and provincial interest in close to market aggregate supply can only be achieved if Provincial Plans contain reasonable policies to make aggregate available.
2. There would be significant economic, environmental and social implications of shifting away from the close to market policy in favour of importation from long distance sources to the Greater Toronto Area (GTA) and Greater Golden Horseshoe (GGH) markets.
3. The need for revisions to the Provincial Plans should be based on implementation experiences with operations approved since each of the Plans came into effect.
4. While it is recognized that the geographic, social and economic conditions of one municipality may vary from another, there should be consistency in each Provincial Plan Area in ensuring that significant aggregate resources are made available based on reasonable and objective policies.

Recommendations for all Provincial Plans

5. Fundamentally, the Provincial Plan Review should not consider any new prohibitions on consideration of aggregate extraction. The Provincial Plan Areas are the close to market aggregate resource for the GGH and are among the highest quality resources available.
6. Changes to land use designations and expansion of Provincial Plan boundaries can have major impacts on the availability of close to market resources. Decisions to expand or increase areas and designations must consider impacts on resource availability.
7. In order to avoid confusion and unnecessary complexity, the Provincial Policy Statement (PPS) should be used as the standard for those features and areas that are not unique to the Provincial Plans. As an example, the policies related to the protection and use of natural heritage, agriculture, water and aggregate resources should be consistent with the PPS.

8. The Provincial Plans should protect existing aggregate operations and their ability to expand in accordance with the PPS.
9. The designations of the Provincial Plans that contemplate extraction should continue to have an objective to provide for new licenced supply while minimizing environmental and social impacts.
10. The Greenbelt Plan is the newest of the Provincial Plans and creates an appropriate balance between environmental, agricultural, water and aggregate resources. The Greenbelt Plan includes detailed requirements that ensure sites are rehabilitated to contribute to the long-term goals of the Greenbelt. The strong fundamentals which recognize the Provincial interest in aggregate resources must be maintained and upheld.
11. In environmental areas, a higher standard for rehabilitation could be required to restore natural features and enhance biodiversity.
12. The Provincial Plans should recognize the regulated process under the Endangered Species Act and revise the applicable policies consistent with the recent changes to the PPS.
13. Municipal official plans should defer to the aggregate resource policies of the Provincial Plans to protect the provincial interest in aggregate resources, and to avoid conflicting policies and costly hearings to defend the policies of the Provincial Plans.
14. The Provincial Plans should contain policies to promote recycling of aggregate resources.
15. The extraction in significant woodlands policy should be reviewed to determine whether it is reasonable to limit extraction to young plantations and early successional habitat (Oak Ridges Moraine Conservation Plan and Greenbelt Plan).

Recommendations for the Niagara Escarpment Plan (NEP)

16. Any proposal to significantly alter the balance that has been achieved in the NEP would have to be justified based on implementation experience that definitively demonstrated that the current policies were not working and there would be substantial environmental harm incurred by continuing to accommodate aggregate extraction within the Escarpment Rural Area.

17. The policy framework of the NEP is the oldest of the three Provincial Plans and therefore most in need of fine-tuning and updating to be more consistent with current terminology and practice, and applicable legislation.
18. If mapping or designation criteria changes are contemplated to the land use designations in the NEP, the impact on aggregate availability must be considered and assessed in recognition of the significance of the resource, close to market supply and relatively limited existing Escarpment Rural Areas.
19. Eliminate regulatory duplication and inefficiency by adding new policy acknowledging the Aggregate Resources Act (ARA) regulatory function. A development permit would still be required but, once issued, day to day regulation would be under the sole jurisdiction of the Ministry of Natural Resources & Forestry (MNRF) under the ARA.
20. The policies should take into consideration mitigation measures that minimize visual impacts for aggregate operations and recognize that the final rehabilitation, although a different landform, can contribute to the open landscape character of the NEP.
21. Timelines for processing aggregate applications should be prescribed consistent with the Planning Act.

Recommendations for the Oak Ridges Moraine Conservation Plan (ORMCP)

22. In accordance with the ORMCP Implementation provisions, the 10-year review should include an examination of the policies prohibiting extraction in Natural Core Areas. The policies restricting extraction to above the water table in Natural Linkage Areas should also be reviewed. Areas within the Natural Core Areas and Natural Linkage Areas do not contain environmental features, and rehabilitation could enhance the lands.
23. The overall goals and objectives of the ORMCP must be considered when applying the 1.25 km natural corridor width policy. The location of Natural Core Areas and the actual use of the surrounding lands should be taken into account when assessing the 1.25 km corridor.

Recommendations for the Greenbelt Plan

24. If the Province contemplates an expansion of the Greenbelt, the presence of significant aggregate resources beyond and adjacent to the existing Greenbelt Area must be considered.

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Introduction

The Aggregate Industry Discussion Paper for the 2015 Provincial Plan Review was prepared on behalf of the following aggregate producers:

- Aecon
- Brock Aggregates Inc.
- Fowler Construction Ltd.
- Harold Sutherland Construction Ltd.
- Holcim (Canada) Inc. (Dufferin Aggregates)
- James Dick Construction Ltd.
- Lafarge Canada Inc.
- Miller Group
- Nelson Aggregate Co.
- R.W. Tomlinson Ltd.
- Walker Aggregates Inc.

These producers have operations throughout Ontario including within the Provincial Plan Areas and have a significant interest in the Plan Review:

- In total, the producers have over 325 licences in Ontario from Windsor to Ottawa to Sault Ste. Marie. The producers have over 15 licences in the Niagara Escarpment Plan Area, 40 licences in the Oak Ridges Moraine Conservation Plan Area and 25 licences in the Greenbelt Plan Area.
- Collectively, the producers have licenced, operated and/or rehabilitated hundreds of pits and quarries within the Provincial Plan Areas.
- These producers contribute to the economy within Provincial Plan Areas through direct and indirect employment, assessment and community contributions.

The Aggregate Industry Discussion Paper was endorsed by the Ontario Stone, Sand & Gravel Association.

Methodology and Approach

This discussion paper was prepared by MHBC Planning. The conclusions and findings are based on MHBC's direct experience with over 20 pit and quarry applications in the Provincial Plan Areas and in consultation with other aggregate applicants and practitioners.

The statistics presented in this paper are based on published Government sources and data provided by the Ministry of Natural Resources & Forestry (e.g. TOARC production statistics, Provincial studies, etc.).

The review of the Provincial Plans should be based on facts and implementation experience. The review should build on established and effective principles and reflect broad public interest objectives.

Aggregate Resources and Provincial Plans

Overview

Aggregate resources are literally the foundation of Ontario's economy and society. Aggregate resources include gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite, rock or other prescribed material under the Aggregate Resources Act (ARA). Aggregate resources are commonly referred to as sand, gravel or crushed stone. These non-renewable resources are found in certain fixed locations in Ontario.

Aggregate resources are used to build Ontario's infrastructure including highways, roads, transit lines, hospitals, airports and other residential, institutional and industrial buildings. **Figure 1** from the Ministry of Natural Resources and Forestry's (MNRF) website identifies how much aggregate is needed to build critical elements of Ontario's infrastructure (by number of 25-tonne truckloads).

Aggregate resources are also used in manufacturing processes for iron, steel, aluminum and plastic, and are considered critical ingredients in several manufactured products such as glass, paint and pharmaceuticals.

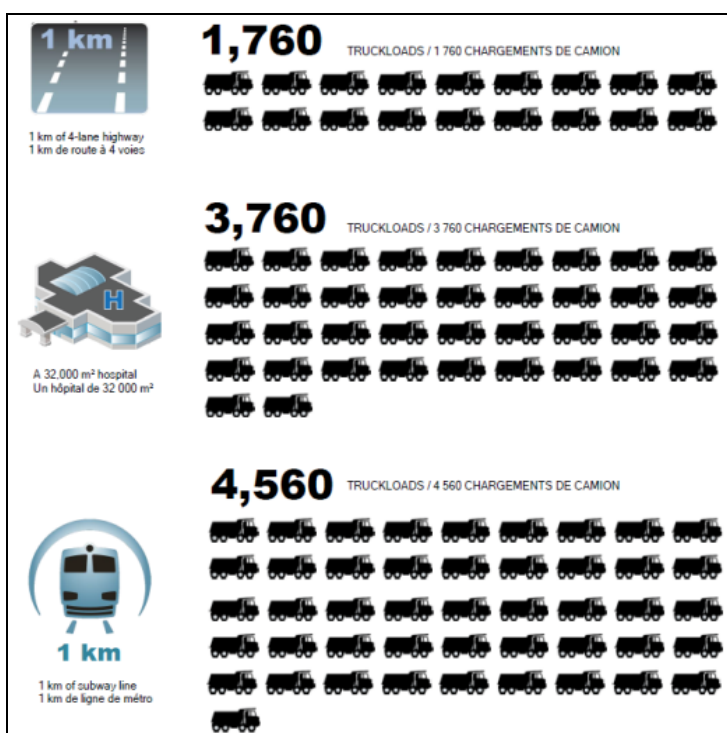


Figure 1 Average amount of aggregate used in infrastructure projects (each truck symbol identifies 100, 25-tonne trucks) (Source: MNRF)

The aggregate industry is important to the economic health of Ontario. Local aggregate products support Ontario's \$37 billion construction industry allowing for the employment of 292,000 Ontarians. Ontario aggregate producers employ more than 7,000 people directly and more than 34,000 indirectly. The aggregate industry contributes an estimated \$1.6 billion of Gross Domestic Product (GDP) to the provincial economy¹.

¹ Ontario Stone, Sand & Gravel Association

Aggregate Production and Consumption in Ontario

In 2013, Ontario production of aggregate resources totaled approximately 143 million tonnes² which was the lowest total since 1996 (136 million tonnes). Over the last 15 years, **aggregate production in Ontario has averaged 164 million tonnes per year.**

Aggregate production is directly tied to Ontario's economy (**Figure 2**). When economic conditions in Ontario are generally favourable (as evidenced by change in Gross Domestic Product (GDP)), aggregate production is relatively high. The opposite is true when conditions are not as favourable economically as has been the case in the last few years.

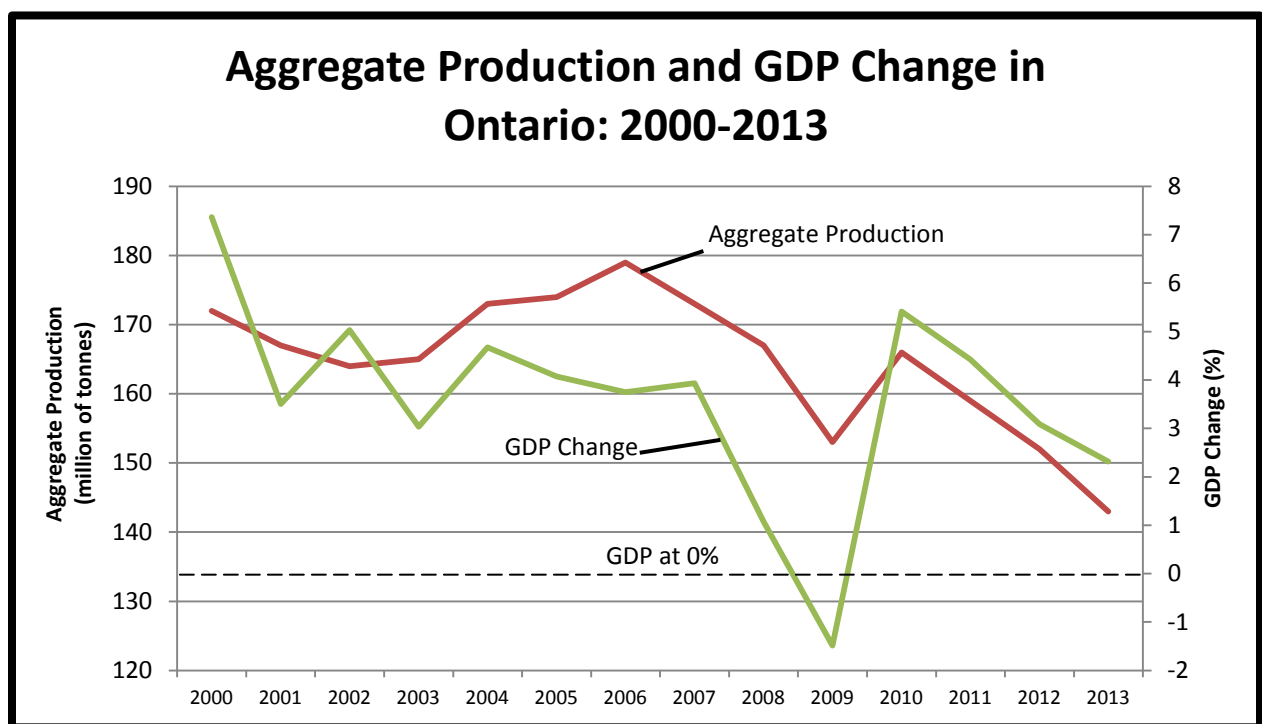


Figure 2 Aggregate Production and Change in Gross Domestic Product (GDP) in Ontario: 2000-2013

Based on research completed through the MNRF's State of the Aggregate Resource in Ontario Study (SAROS), **Ontarians use about 14 tonnes of aggregate per person per year³.**

² Aggregate production is calculated based on the amount of resources extracted and shipped from licences, permits, forestry pits and private lands not designated under the ARA. The vast majority of the total production comes from licences (92%) while the remaining approval types are generally smaller-scale and short in tenure.

³ Paper 1 – Aggregate Consumption and Demand, State of the Aggregate Resource in Ontario Study, 2010 (MNRF). Based on aggregate production over the last 15 years, per capita consumption is approximately 13 tonnes per year (total decreased to 11 tonnes in 2013).

SAROS concluded that the **Greater Toronto Area⁴ (GTA) consumes approximately one-third of the aggregate in Ontario each year (approximately 60 million tonnes) while the Greater Golden Horseshoe⁵ (GGH) consumes more than half of Ontario's total (approximately 90 to 100 million tonnes).**

The Growth Plan projects that the GTA will increase in population by 3 million from 2011 to 2041 and by 4.5 million in the GGH. **The GGH will require over 2 billion tonnes of aggregate over the next 25 years** to build and maintain infrastructure within Canada's largest urban area⁶.

A readily available supply of close to market aggregate will be required taking into account this planned growth, the Province's goal of tackling the infrastructure deficit and aggregate consumption levels in the GGH.

In comparison to GTA aggregate consumption, the GTA produced approximately 21.2 million tonnes of aggregate in 2013. This is the total amount of aggregate extracted and shipped from operations within the GTA. For every three tonnes of aggregate consumed in the GTA, only one of those tonnes is produced within the GTA. The majority of resources consumed in the GTA are imported from adjacent areas in the GGH.

Since 2001, the average annual decrease in aggregate production in the GTA is approximately 1.1 million tonnes. A portion of this decrease may be due to reduced demand from the slowing economy but it is also directly impacted by the decreasing amount of licenced supply within the GTA. While the use of recycled aggregate products has been increasing⁷, recycled materials alone cannot replace the substantial reduction in licenced GTA aggregate supply.

Resources within existing licences in the GTA are being rapidly depleted and are not being replaced by resources in new licences. For example, for every three tonnes of aggregate produced in the GTA, approximately one tonne is replaced through new licences in the GTA (**Figure 3**) (similar to the GTA production-consumption ratio). In addition, over 80% of the Class A licences in the GTA predate the Aggregate Resources Act (1990) (**Figure 4**).

⁴ GTA refers to the City of Toronto, and Regions of Durham, York, Peel and Halton.

⁵ GGH refers to the GTA and the Region of Niagara, City of Hamilton, Haldimand County, County of Brant, City of Brantford, Region of Waterloo, County of Wellington, City of Guelph, County of Dufferin, County of Simcoe, City of Barrie, City of Orillia, City of Kawartha Lakes, County of Peterborough, City of Peterborough and County of Northumberland.

⁶ The City of Toronto is the 4th largest city in North America by population.

⁷ Estimated that approximately 13 million tonnes of recycled aggregate are consumed annually (Aggregate Recycling of Ontario).

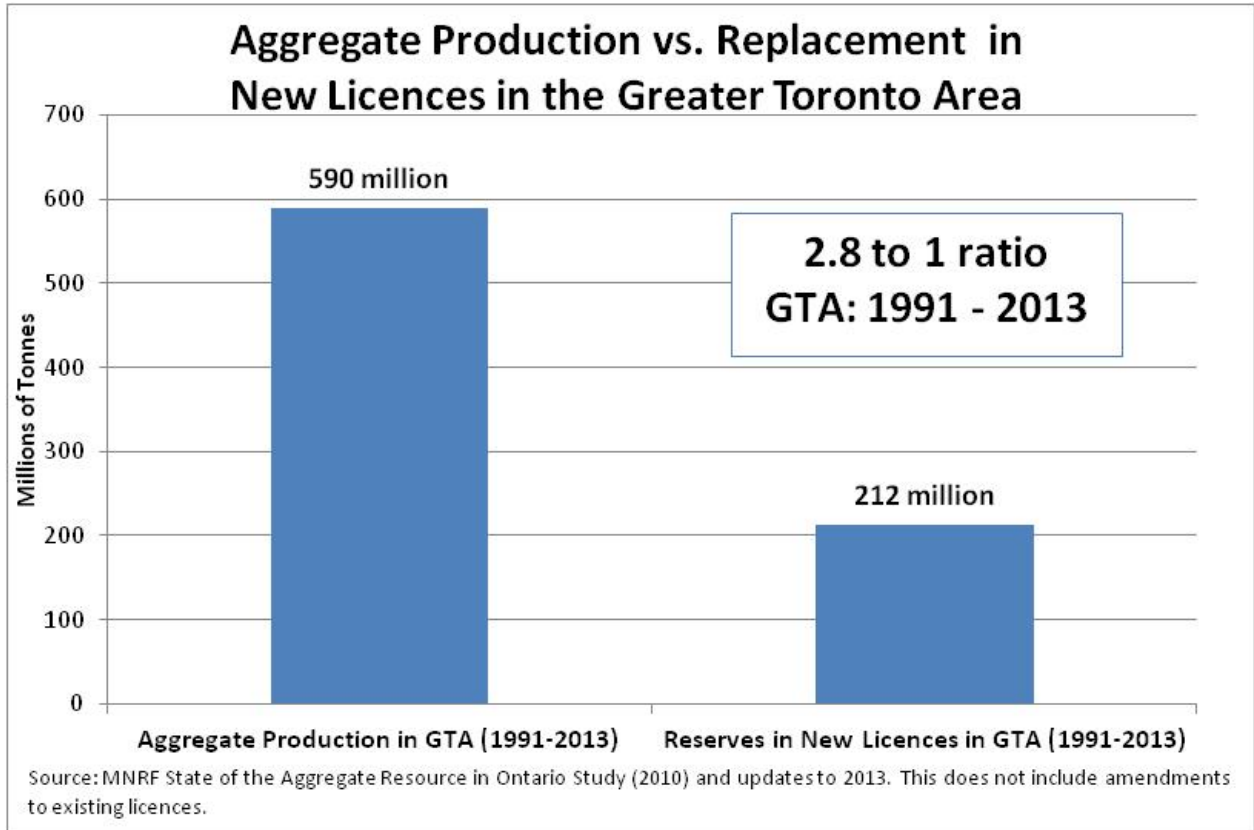


Figure 3 GTA Aggregate Production vs. Replacement in New Licences (1991 to 2013)

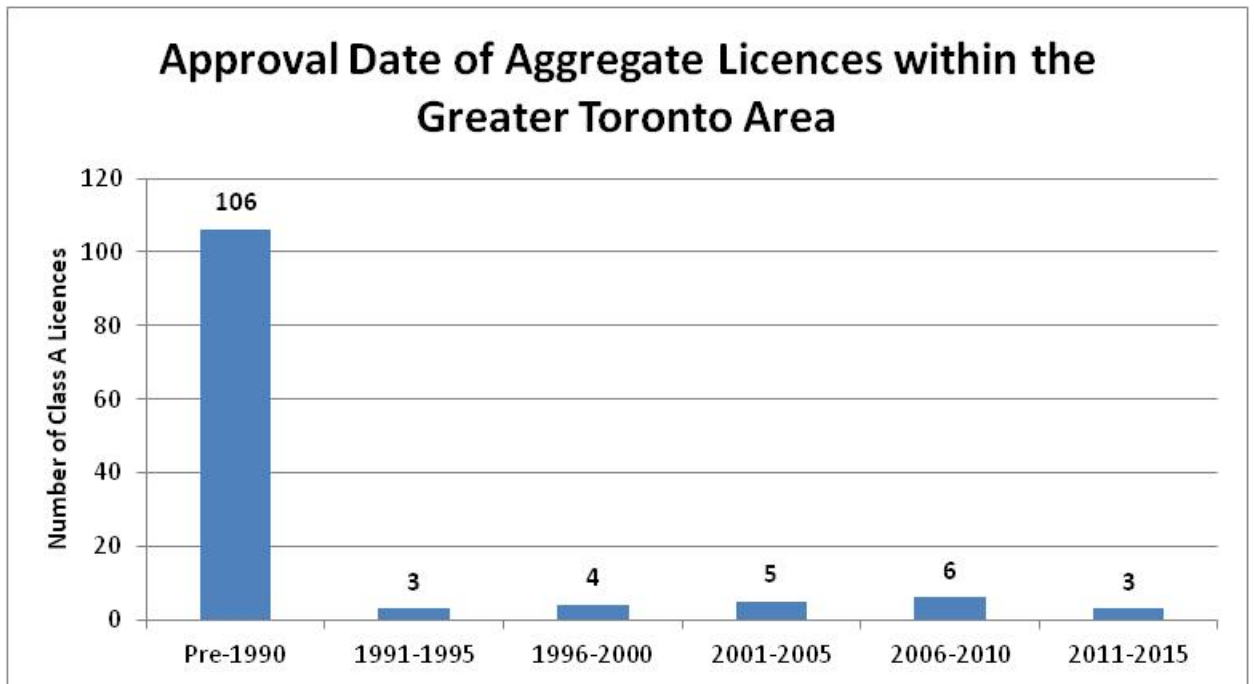


Figure 4 Approval Date of Aggregate Licences within the GTA (Class A Licences)

SAROS examined opportunities to maximize resource use within existing licences⁸. This exercise was undertaken based on the knowledge that licenced supply was diminishing relative to new supply. The paper concluded that maximizing reserves on existing licenced sites is a responsible method for resource management to the extent that the surrounding natural environment and social receptors are not increasingly affected.

Examples of maximizing resource use within existing licences include reducing regulatory setbacks, extracting road allowances where feasible, extracting to greater depths and maximizing importation for rehabilitation to reduce resource sterilization.

Provincial Interest in Aggregate Availability

The conservation and management of the mineral resource base is a matter of provincial interest in accordance with the Planning Act (Section 2). The 2014 Provincial Policy Statement (PPS) states that the wise use and management of mineral resources over the long term is a key provincial interest. These tested principles have been recognized in provincial planning for over 40 years.

The importance of these non-renewable resources to our economy and their critical role in the maintenance and construction of infrastructure is well known⁹.

There is a provincial interest in maintaining a readily available supply of close to market aggregate in order to minimize environmental and social impacts, and transportation costs.

Aggregate resources are required in economically active and growing regions. The GTA and GGH are among the fastest growing regions in North America. Provincial policies provide for the continued growth and development within these urban areas.

Aggregate resources are considered high bulk, lower per unit value resources which places constraints on the distance over which they are transported. Extracting resources close to where they are utilized avoids unnecessarily transferring impacts to other jurisdictions.

The decades-long provincial interest in aggregate outlines the importance of the resource to our economy. Ontario is currently affected by substantial debt (\$284 billion as of March 2015). This debt is impacting the maintenance and renewal of infrastructure. This is not an issue that is specific to the GTA but is currently affecting all parts of Ontario.

⁸ Paper 5 – Aggregate Reserves in Existing Operations, SAROS, 2010 (MNRF)

⁹ Standing Committee Report on Aggregate Resources Act Review, October 2013

A readily available supply of close to market aggregate can ensure these resources are economically competitive while minimizing social and environmental impacts in accordance with the PPS. This supply will also contribute to the government's plan to build an integrated transportation network across the Province (Moving Ontario Forward). The plan will make nearly \$31.5 billion available over the next 10 years for investments in priority infrastructure projects across Ontario such as public transit, roads, bridges and highways.¹⁰

Importing aggregate resources further from market will result in higher aggregate prices. There is only so much money allocated in the budget which could result in fewer infrastructure projects being completed if close to market aggregate is not utilized.

Location of Aggregate Resources

Aggregate resources are fixed in location and must be extracted where they naturally occur. They cannot be extracted in any location. Several geological variables affect the location of these resources including resource quantity and quality, depth of overburden (topsoil and subsoil) and other factors. Aggregate resources by their very nature, are found in river valleys, outwash plains, escarpments, limestone plains, eskers, kames and moraines. Many of these landforms are less developed for agriculture and therefore contain wetlands, woodlands and water features.

Planning for aggregate cannot assume there will be resources available after everything else is planned for or protected. Rather, an integrated, positive and proactive effort is required to plan for future aggregate availability. SAROS found that **93% of selected bedrock resources (high quality crushed stone) had overlapping constraints such as environmental, agricultural and/or social constraints.**

Without an integrated and balanced approach, it is unlikely that an aggregate deposit could be made available since there is a high probability of on-site and adjacent natural features, agriculture, water resources and social factors to consider

¹⁰ Two dedicated funds would be established – one for the Greater Toronto and Hamilton Area with about \$16 billion available for investment in transit and one for the rest of Ontario with about \$15 billion available for critical infrastructure projects (2015 Budget).

Implications of Extracting Resources Further from Market

There would be **significant economic, environmental and social implications of shifting away from the close to market policy in favour of importation from long distance sources to the GTA market** even when considering alternative modes of transportation (e.g. rail, marine, etc.). Similar to locally sourced food, using close to market aggregate resources significantly reduces environmental and economic impacts.

The environmental and social implications of extracting resources further from market are well documented¹¹. Previous studies assessing alternative modes of transportation have noted that there is no identifiable environmental benefit of extracting aggregate from a pit and quarry located further from market. Localized and site specific impacts are well regulated and controlled. These impacts are similar independent of site location.

While some believe that moving extraction further from market would address local land use conflicts and reduce social concerns, a host of new incremental impacts and issues emerge when delivering far from market aggregate to a job site. **Figure 5** provides a summary of the impacts as a result of transporting aggregate further from market supply areas (page 13).

When assessing alternatives to the existing close to market policy, it is necessary to look at the entire material flow path from aggregate operation to job site. With close to market, the truck loaded at the pit or quarry can deliver the product directly to the job site. With the alternatives, additional stages of transportation are required to deliver material to the job site. In addition, close to market docks, rail terminals or redistribution terminals are necessary to stockpile aggregate and reload it onto short-haul delivery trucks.

This, in turn, presents a number of social, environmental and economic impacts that will accrue as a result of using alternative transportation modes. Whether aggregate is shipped by truck or rail to a redistribution terminal, this may create its own social impact concerns and local land use conflicts. Unlike close to market, which disperses traffic to a greater extent, alternative options tend to impose significant traffic volumes on fewer routes.

The size and capacity of the redistribution terminals are limited due to the capacity of the road network that must accommodate high volumes of truck traffic. Availability of large parcels of land

¹¹ State of the Aggregate Resource in Ontario Study, MNRF (2010); Between Rock and a Hard Place, Canadian Urban Institute (2009); Greenbelt Plan, MMAH (2005).

for these permanent, heavy industrial uses is another limitation. As a result, multiple facilities are required within and near urban areas.

In addition, many related industrial uses that are traditionally located in close to market pits and quarries will also have to be accommodated at redistribution terminals or nearby facilities. These include aggregate recycling and the temporary storage of recycling materials, deposition of clean fill materials, asphalt and concrete plants, as well as parking and staging areas for haulage trucks. These are all heavy industrial uses that require large areas and generate heavy truck traffic.

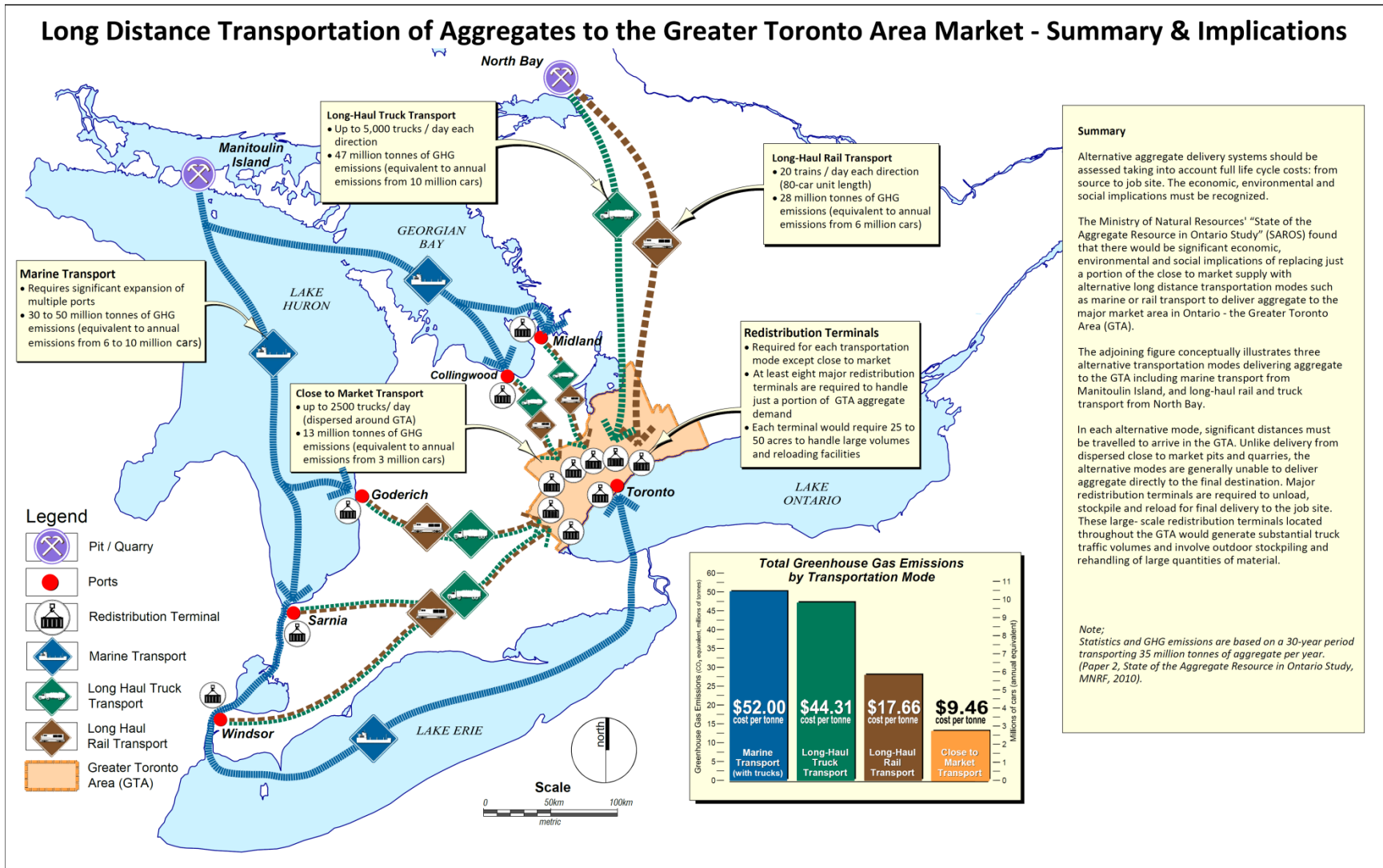


Figure 5 Long Distance Transportation of Aggregates to the GTA Market – Summary & Implications

Regulation of Aggregate Resources

Over 25 provincial and federal acts apply to the management of aggregate resources. It is a well regulated industry that is subject to stringent environmental and operational regulations.

The Aggregate Resources Act (ARA) and its implementing policies are continually updated to stay current with societal expectations. The ARA Review is currently ongoing and recommendations have been prepared. The government has committed to improving the ARA as outlined in the Premier's 2014 Mandate Letter to the Minister of Natural Resources¹².

The need for revisions to the Provincial Plans should be based on implementation experiences with operations approved since each of the Plans came into effect.

Provincial Plans

The Province has eight Provincial Plans currently in effect:

- Parkway Belt West Plan (1978)
- Niagara Escarpment Plan (1985, 1994, 2005)
- Oak Ridges Moraine Conservation Plan (2002)
- Greenbelt Plan (2005)
- Growth Plan for the Greater Golden Horseshoe (2006)
- Central Pickering Development Plan (2006)
- Lake Simcoe Protection Plan (2009)
- Growth Plan for Northern Ontario (2011)

All of these Provincial Plans except for the Growth Plan for Northern Ontario are located within some portion of the GTA and the GGH. **The Niagara Escarpment Plan (NEP), Oak Ridges Moraine Conservation Plan (ORMCP) and Greenbelt Plan apply to over 8,000 km² of land** in southern Ontario, primarily surrounding the largest urban area in Canada. By comparison, the size of the GTA is approximately 7,125 km² (**Figure 6**).

¹² "Engaging with stakeholders, Aboriginal communities and other concerned ministers to address the recommendations of the Standing Committee on General Government's Report on the Review of the Aggregate Resources Act. You will also bring forward recommended regulatory and legislative changes to improve the Aggregate Resources Act" (Premier's Mandate Letter to Minister of Natural Resources, p. 3).

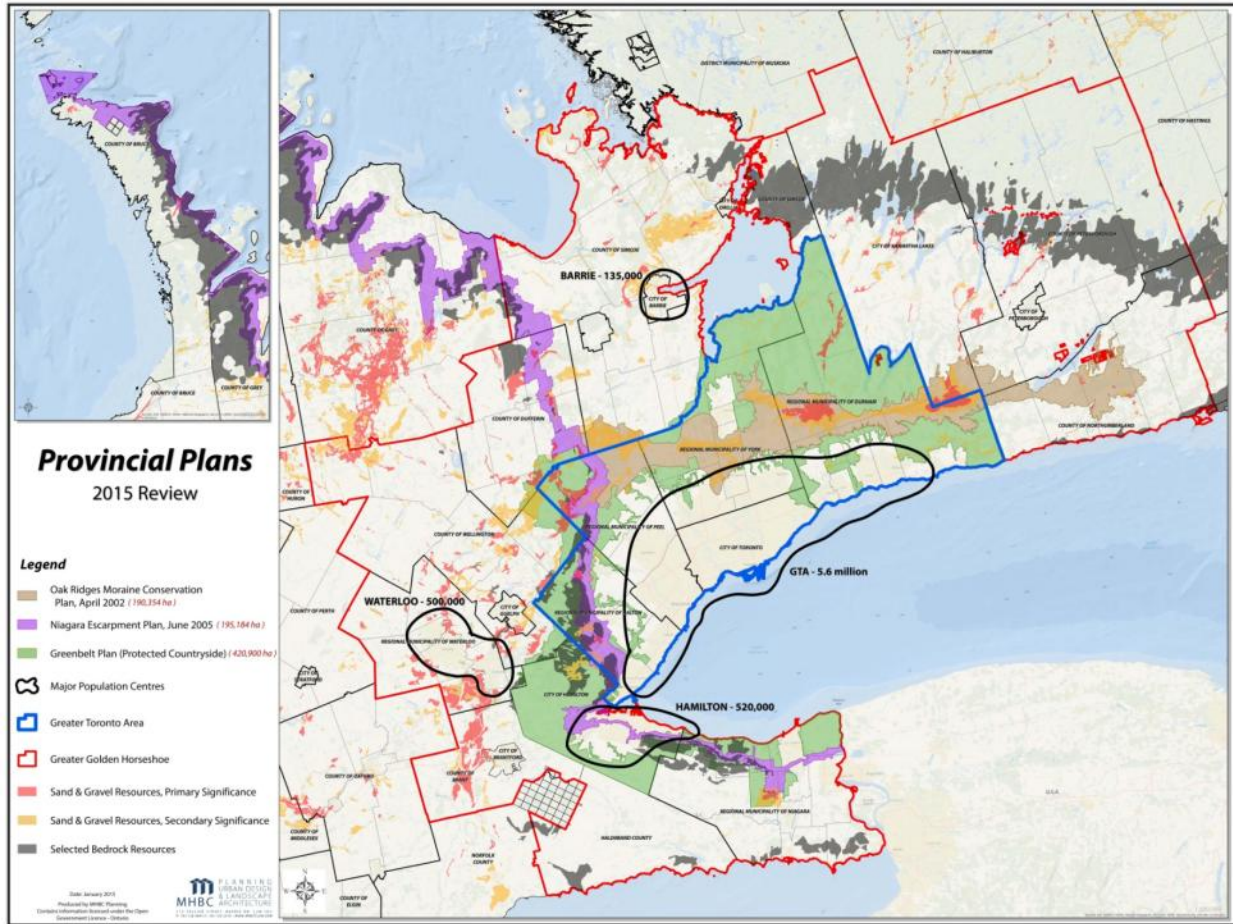


Figure 6 Provincial Plan Areas

The authority to develop and implement Provincial Plans comes from specific legislation enacted for each of the Provincial Plans. Conceptually, the planning system in Ontario within Provincial Plan Areas generally contains the hierarchy outlined in **Figure 7** (from left to right):

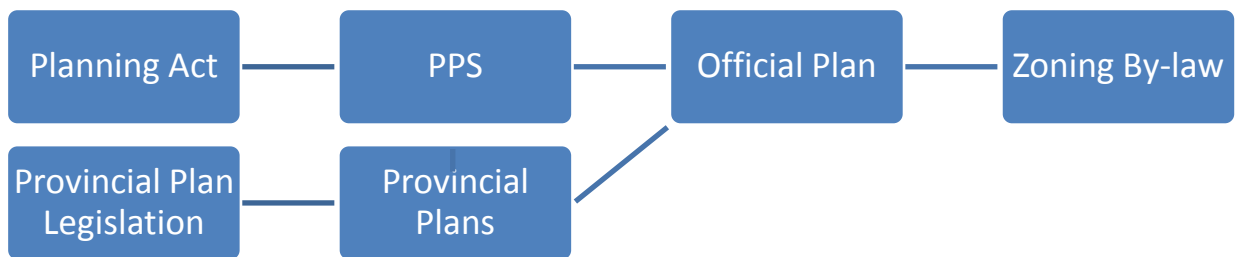


Figure 7 Conceptual Planning System in Ontario

All planning decisions in Ontario shall conform with the Provincial Plans that are in effect on that date, or shall not conflict with them, as the case may be. Provincial Plans shall be read in conjunction with the PPS and take precedence over its policies to the extent of any conflict, except where legislation establishing Provincial Plans provides otherwise.

The conflict provisions in each of the Provincial Plans and the PPS create a complex policy environment notably within the GGH.

The ORMCP and the Greenbelt Plan prohibit municipal official plans from adopting more restrictive aggregate resource policies than the policies contained in each of those Plans. This policy is not contained in the NEP or PPS.

Aggregate Production in Provincial Plan Areas

The NEP, ORMCP and Greenbelt Plan contain very high quality sources of close to market aggregate required by the GGH including sand and gravel, and bedrock resources.

In 2013, **aggregate production from the three Provincial Plans was approximately 28.4 million tonnes** or approximately 20% of Ontario's total aggregate production (despite covering only 0.7% of Ontario's land area). A large portion of the GGH's total aggregate production originates from the Provincial Plans and almost all of the GTA's production comes from the Provincial Plan Areas¹³. In addition, **eight of the top 10 aggregate producing municipalities are located within at least one of these Provincial Plans**¹⁴.

SAROS concluded that the GGH consumes more than half of Ontario's total aggregate production (approximately 90 to 100 million tonnes per year). In 2013, **the Provincial Plan Areas supplied approximately 35% of the GGH's total aggregate needs.**

While the Provincial Plan Areas contribute a significant amount of production, **only 1.5% of these Plan Areas are licenced for aggregate extraction.** Of the 1.5% that is licenced for extraction, only 37% of this area is disturbed while the remaining area is rehabilitated or not yet extracted (**0.6% of the Provincial Plan Areas are subject to active aggregate extraction**).

Since 1990, over 3,000 ha (100+ licences) have been surrendered and returned to other uses within the Plan Areas. The after uses of these sites include natural heritage areas, publicly accessible greenspace, agricultural land and other land uses.

¹³ In 2013, the GGH produced approximately 68.8 million tonnes and the GTA produced approximately 21.2 million tonnes of aggregate.

¹⁴ The City of Ottawa and Township of Zorra are the only two municipalities not located within one of the Provincial Plan Areas.

Since approval of the Provincial Plans, only 0.1% of the Plan Areas has been licenced for aggregate operations (22 licences in total).

The public and provincial interest in close to market supply can only be achieved if Provincial Plans contain reasonable policies to make aggregate available.

Quality of Aggregate Resources in Provincial Plan Areas

The NEP, ORMCP and Greenbelt Plan contain very high quality sources of close to market aggregate required by the GGH including sand and gravel, and bedrock resources. The Growth Plan for the GGH requires higher density development and infrastructure needs that can only be produced from high quality aggregate resources such as those found within the Plan Areas.

The NEP Area contains what is considered to be Ontario's highest quality limestone resources (Amabel Formation). It is suitable for the production of a wide range of construction projects including crushed stone, concrete aggregate and building stone.

The ORMCP contains significant sand and gravel resources that are considered to be essential to provincial, regional and municipal public infrastructure, construction and maintenance programs.

The Greenbelt Plan due to its overall size contains both significant sand and gravel as well as bedrock resources (e.g. Amabel Formation, Sunderland Esker, Caledon Outwash, Fonthill Kame, etc.).

The resources within these Plan Areas are the closest to market resources for Ontario's major growth area. In terms of aggregate quality, **the resources within the Provincial Plan Areas are among the highest quality resources available within the GGH** (both bedrock, and sand & gravel). This is recognized in Provincial Aggregate Resources Inventory Papers:

- *"The brow and upper surface of the Niagara Escarpment is formed by the tough, erosion-resistant unsubdivided Amabel Formation...that is well suited for the production of road-building and construction aggregate. It has also been used in high performance concrete and extracted for building and landscape stone elsewhere in the province. The unsubdivided Amabel Formation is considered to be an aggregate resource of provincial significance for these products"* (Aggregate Resources Inventory for the County of Simcoe, ARIP 188, 2013).

- *"Since the Amabel Formation produces excellent crushed stone, and this area is located within a provincial region of high demand, this area should be considered for resource protection"* (Aggregate Resources Inventory of the Region of Halton, ARIP 164, 1996).
- *"The Oak Ridges moraine represents the largest and most important aggregate resource area in the region"* (Aggregate Resources Inventory of the Region of Durham, ARIP 185, 2010).
- *"The best quality and most extensive sand and gravel deposits are in the southern part of the county, particularly in the Oak Ridges Moraine"* (Aggregate Resources Inventory of Victoria County, ARIP 168, 2000).
- *"Sand and gravel was deposited in this channel and formed the Caledon Outwash deposit (Cowan 1976). This deposit contains large resources of sand and gravel and is a major aggregate source in central Ontario"* (Aggregate Resources Inventory of the Region of Peel, ARIP 165, 2009).
- *"Mineral aggregates provide essential building materials for growth. According to the Ministry of Natural Resources (MNR) aggregate mapping and its 1992 State of the Resource Report, there are significant aggregate resource deposits in the Golden Horseshoe region that directly supply the housing and manufacturing industries"* (Greenbelt Task Force Discussion Paper, 2004).

SAROS concluded the use of higher quality crushed stone in road construction is increasing, particularly in urban settings where high volumes and heavy loads are encountered¹⁵. This trend is expected to continue for both ongoing maintenance and new construction. The increase in higher-density development will also necessitate large volumes of high quality aggregate. The close to market resources from these Provincial Plans will be able to accommodate these needs for high quality aggregate.

High quality aggregate resources are needed to build higher density developments and the infrastructure required by the Growth Plan.

Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the GGH is the Government's vision for building stronger, prosperous communities by better managing growth in this region. The Growth Plan recognizes that decades of neglect and lack of sufficient investment have resulted in the current infrastructure deficit and

¹⁵ Paper 1 – Aggregate Consumption and Demand, State of the Aggregate Resource in Ontario Study, 2010 (MNRF).

that tens of billions of dollars beyond current levels of investment will be required to bring it back into balance.

The guiding principles of the Growth Plan are the following:

- Build compact, vibrant and complete communities.
- Plan and manage growth to support a strong and competitive economy.
- Protect, conserve, enhance and wisely use the valuable natural resources of land, air and water for current and future generations.
- Optimize the use of existing and new infrastructure to support growth in a compact, efficient form.
- Provide for different approaches to managing growth that recognize the diversity of communities in the GGH.
- Promote collaboration among all sectors – government, private and non-profit – and residents to achieve the vision.

The Growth Plan states that a balanced approach to the wise use and management of all resources, including natural heritage, agriculture and mineral aggregates, will be implemented. The ongoing availability of these resources is essential for sustainability of all communities.

Ensuring a readily available supply of close to market aggregate resources is consistent with the objectives and guiding principles of the Growth Plan. This can only be achieved if a balanced approach to resource management is utilized by securing new licenced supply while minimizing environmental and social impacts.

Balancing Other Resources

1. Agriculture

Provincial policy regarding agricultural and aggregate uses has a long history as evidenced through the evolution of provincial policies and guidelines from the 1978 Food Land Guidelines to the 2014 PPS.

Over the past 30 years policy has consistently acknowledged that both agricultural and aggregate resources are important to the Province. The conflict between resources is often resolved by extracting the aggregate and rehabilitating the site back to agricultural land which has been consistently recognized in provincial policy.

However, where agricultural rehabilitation is not possible, compromises are required and over the years the policy has evolved to deal with this situation. Since 1995, provincial policy has allowed below water table extraction on prime agricultural land to be considered without the requirement for complete agricultural rehabilitation subject to meeting specific tests. This policy approach is retained in the 2014 PPS.

During the Standing Committee hearings on the ARA Review, concerns were expressed regarding the loss of prime agricultural lands as a result of aggregate extraction. The data revealed that **of the approximately 4.9 million ha of prime agricultural land in southern Ontario, only 35,000 ha contain an aggregate licence (0.7% of prime agricultural land)**. This would not reflect the amount of prime agricultural land lost as a large portion of these licences would be rehabilitated back to prime agricultural land in accordance with provincial policy.

Between 2010 and 2014, the Ontario Stone, Sand & Gravel Association (OSSGA) assessed over 700 former pits and quarries across southern Ontario¹⁶. Post-rehabilitation, agriculture was found to be the second highest land use just after natural land uses (vegetated terrestrial or aquatic ecosystems). Former aggregate operations are being rehabilitated to agricultural land uses.

2. Water

One of the purposes of the ARA is to minimize adverse impact on the environment in respect of aggregate operations. When considering whether a licence should be issued or refused, the Minister of Natural Resources & Forestry shall have regard to any possible effects on ground and surface water resources. The PPS and Provincial Plans also contain policies protecting water resources and ensuring that impacts on ground and surface water resources are minimized to acceptable levels.

While impacts to water resources are required to be minimized during the operation of pits and quarries, the after-use of these operations can contribute to creating resilient communities in the face of a changing climate. Rehabilitated pits and quarries provide opportunities for water storage and diverse wetland habitats which can address water quantity issues and minimize flooding in flood-prone areas, respectively. These are examples of the interim nature of extraction and accommodating subsequent land uses based on local needs.

¹⁶ Study of Aggregate Site Rehabilitation in Ontario, OSSGA, 2014

Summary

The NEP, ORMCP and Greenbelt Plan contain very high quality sources of close to market aggregate required by the GGH. All three of the Provincial Plan Areas are located within and adjacent to Ontario's economic and population centre. The Growth Plan for the GGH requires higher density development and infrastructure needs that can only be produced from high quality aggregate resources such as those found within the Plan Areas.

The GGH has a major infrastructure deficit. The Province is investing more than \$130 billion in public infrastructure over the next 10 years including \$31.5 billion in dedicated funds available for public transit, transportation and other priority infrastructure projects under Moving Ontario Forward¹⁷. In the GGH, over 2 billion tonnes of aggregate will be needed over the next 25 years to build and maintain required infrastructure.

The public and provincial interest in close to market supply can only be achieved if Provincial Plans contain reasonable policies to make aggregate available and not include arbitrary restrictions or prohibitions. A readily available supply of close to market aggregate can ensure these resources are economically competitive while minimizing social and environmental impacts in accordance with the PPS.

¹⁷ 2015 Ontario Budget.

Plan Review Requirements

The Provincial Plans contain specific review provisions for considering revisions and amendments. Recent changes to Provincial Plan legislation now require that the Greenbelt Plan be reviewed in conjunction with the reviews of the NEP and ORMCP.

The Greenbelt Plan is to be reviewed every 10 years after the date the Plan comes into force to determine whether it should be revised. According to the Greenbelt Plan, *"the purpose of the review is to assess the effectiveness of the policies contained in the Plan (using information gathered through the monitoring program, and conducted through a public process), and make amendments, if appropriate, to update or include new information or improve the effectiveness and relevance of the policies"* (Section 5.6). The review is to ensure the Plan does not remain static and does not become irrelevant over time.

The review of the ORMCP must determine whether any revisions should be made to the Plan. The review cannot consider removing land from the Natural Core Areas or the Natural Linkage Areas. According to the ORMCP, the review shall consider the following:

- the need to change or refine the boundaries of the Countryside Areas and Settlement Areas;
- the continued effectiveness and relevance of the Plan's vision, purpose, objectives and policies;
- the effectiveness of the Plan's policies in meeting the Plan's vision, purpose and objectives;
- new, updated, or corrected information;
- new science, technologies, or practices that shall improve the Plan's effectiveness;
- any other matter that the Ontario government deems appropriate.

The ORMCP also states that the review may include an examination of the Plan's policies on extraction in Natural Core Areas *"recognizing that mineral aggregates are a non-renewable resource that are particularly desirable this close to markets"* (Implementation, p. 11). In particular, the review may consider changing the policies to consider whether new aggregate operations may be permitted in Natural Core Areas where the ecological integrity of those Areas can be maintained or improved.

The NEPDA requires that the Minister consult with affected ministries, the Niagara Escarpment Commission, interested public bodies, applicable municipalities and advisory committees, and

ensure that the public is given an opportunity to participate in the review. After completion of the review, the Minister may propose amendments to the NEP. Amendments to the NEP resulting from a review shall be consistent with and promote the objectives of the NEP.

For each Provincial Plan, the Minister(s) has the discretion to decide whether the Plan should be amended based on this Plan Review.

Niagara Escarpment Plan

Overview

The Niagara Escarpment includes a variety of topographic features and land uses extending 725 km from Queenston in Niagara Region to Tobermory in Bruce County.

The Niagara Escarpment Planning and Development Act (NEPDA) was enacted in 1973 in response to studies assessing the impacts of development on the escarpment. The Act provided for the establishment of the Niagara Escarpment Commission (NEC) and the preparation of a Niagara Escarpment Plan (NEP).

After extensive consultation efforts, months of hearings and recommendation reports, Cabinet approved the NEP in 1985. The Plan provides for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment. The NEP serves as a framework of objectives and policies to strike a balance between development, preservation and the enjoyment of this important resource.

The objectives of the Plan are:

1. To protect unique ecologic and historic areas;
2. To maintain and enhance the quality and character of natural streams and water supplies;
3. To provide adequate opportunities for outdoor recreation;
4. To maintain and enhance the open landscape character of the Niagara Escarpment in so far as possible, by such means as compatible farming or forestry and by preserving the natural scenery;
5. To ensure that all new development is compatible with the purpose of the Plan;
6. To provide for adequate public access to the Niagara Escarpment; and
7. To support municipalities within the Niagara Escarpment Plan Area in their exercise of the planning functions conferred upon them by the Planning Act.

Planning decisions within the NEP Area must conform to the Plan. Where there is a conflict between any provision of the NEP and any provision of an Official Plan, Zoning By-law or the PPS, then the provision of the NEP prevails. This authority is established through the NEPDA.

The NEP Area is approximately 195,184 ha in size. Eight upper/single-tier municipalities and 22 lower-tier municipalities are located within the NEP Area. There are seven land use designations within the Plan Area (**Figure 8**):

- Escarpment Protection Area (69,397 ha – 36%)
- Escarpment Natural Area (58,289 ha – 30%)
- Escarpment Rural Area (53,719 ha – 28%)
- Escarpment Recreation Area (7,280 ha – 4%)
- Urban Area (3,972 ha – 2%)
- Minor Urban Centre (Overlay) (2,877 ha – 1%)
- Mineral Resource Extraction Area (2,520 ha – 1%)

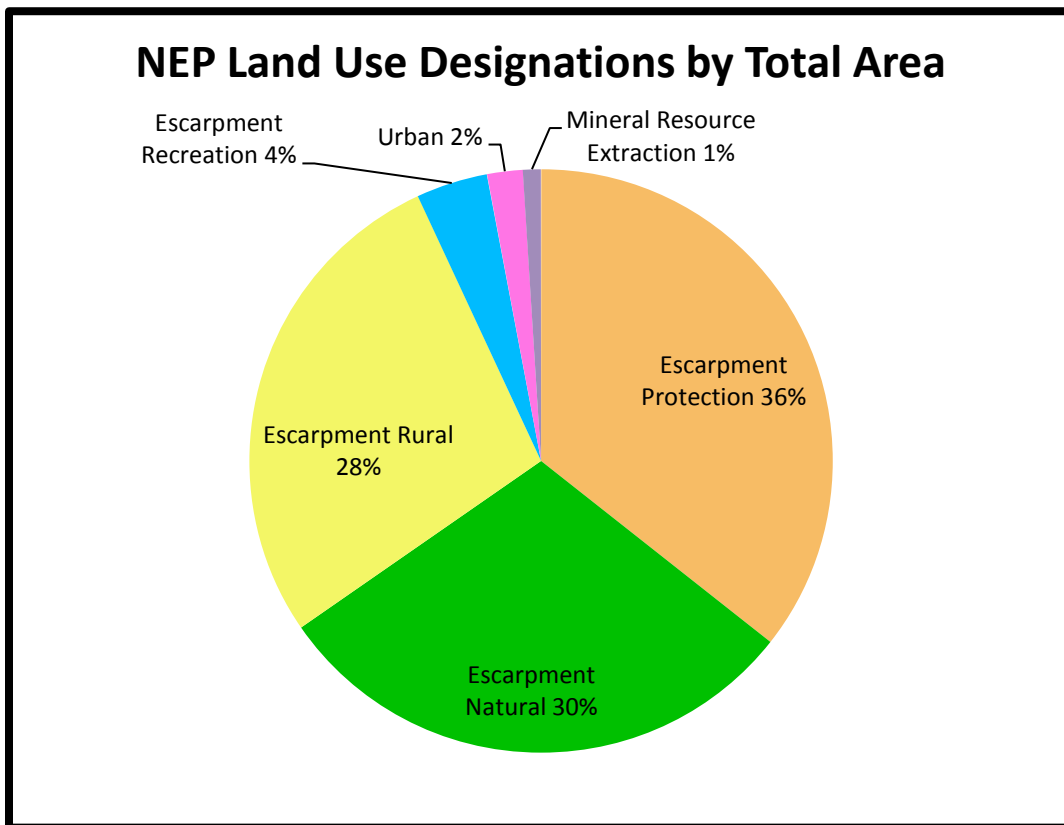


Figure 8 NEP Land Use Designations by Total Area (may not add up to 100% due to rounding)

The Escarpment Protection Area and Escarpment Natural Area correspond with the escarpment and represent environmental designations where the most significant natural features are located. Limited uses are permitted in these designations.

The Escarpment Rural Area is the remnant area that provides a buffer to the more ecologically sensitive areas of the escarpment. Objective #5 of the Escarpment Rural Area is *"to provide for the designation of new Mineral Resource Extraction Areas which can be accommodated by an amendment to the Niagara Escarpment Plan"*. Permitted use #21 in the Escarpment Rural Area is *"new licensed pits or quarries producing more than 20,000 tonnes (22,000 tons) annually subject to Part 1.9 (requiring an amendment to the Niagara Escarpment Plan), and Part 2.11"*. These policies have been included in the NEP since Cabinet approval of the Plan in 1985 and have been subject to subsequent Plan reviews.

The inclusion of an objective in the Escarpment Rural Area designation is an expression of the importance of providing for new Mineral Resource Extraction Areas within the NEP area, where appropriate¹⁸.

New aggregate extraction is only permitted in the NEP by amendment to the Escarpment Rural Area designation¹⁹. Aggregate extraction is not permitted in the Escarpment Protection Area and Escarpment Natural Area designations. These two designations are approximately 127,686 ha in size which represents 66% of the NEP.

Aggregate Resources and Licences within the NEP

Approximately 39,106 ha of the Escarpment Natural Area and Escarpment Protection Area designations contain significant aggregate resources²⁰. This represents a substantial area with known resources that is not available for extraction because consideration of extraction is not permitted in these designations. In total, **approximately 63% of the significant aggregate resources located in the NEP Area are not available for extraction**²¹.

By comparison, approximately 24,349 ha of the Escarpment Rural Area contain significant aggregate resources²². This represents approximately 12.5% of the total NEP Area. The majority of this area is located within the northern portion of the NEP in Grey and Bruce Counties (15,133 ha or 62% of the Escarpment Rural Area resources). Bruce and Grey are the only upper-tier municipalities in the NEP that are not located within the GGH.

¹⁸ Walker Duntroon Quarry Decision (OCH Case No. 08-094, June 18, 2012, p. 10)

¹⁹ Class B licences producing less than 20,000 tonnes annually are permitted in the Escarpment Rural Area.

²⁰ Significant refers to ARIP primary and secondary sand & gravel resources, and selected bedrock resource areas.

²¹ Also considers the resources located within Escarpment Recreation Area and Urban Area designations.

²² This represents the total area of significant aggregate resources and does not account for environmental, social or planning constraints that may further impact resource availability.

The Mineral Resource Extraction Area designation includes licenced pits and quarries. **Approximately 1% of the NEP Area is designated Mineral Resource Extraction Area.** The Mineral Resource Extraction Area is the smallest of the seven NEP land use designations in terms of land area. For context, the Escarpment Recreation Area designation is almost three times as large.

In 1995, there were approximately 45 Class A licences located within the NEP Area²³. This number has decreased to 38 as of 2014.

Since the approval of the NEP in 1985, 12 applications for new or expansion aggregate operations have been approved in the NEP Area²⁴ (five pits and seven quarries). Approval was upheld for several of these applications after being petitioned to Cabinet. Twelve licences amounts to one approval every two-and-a-half years. The total licenced area of these approved operations is 552 ha which represents 0.3% of the NEP Area. There is currently one active application in the NEP Area (Dufferin Acton Quarry Extension).

During this same time, the amount of former aggregate operations that have been rehabilitated and redesignated from Mineral Resource Extraction Areas to other designations has been significant. **Since 1985, almost 1,000 ha of land from 24 former pits and quarries have been redesignated to other designations.** The majority of the sites are now designated Escarpment Natural Area or Escarpment Protection Area (e.g. Milton Limestone Quarry, Lafarge Mono Mills Pit, Dufferin Milton Quarry, etc.).

OSSGA has been researching aggregate rehabilitation across Ontario including within the NEP Area (Study of Aggregate Site Rehabilitation in Ontario, 2010-2013). OSSGA found that almost half of the studied former extraction sites within the NEP Area were rehabilitated to natural uses (48%) followed by open space (13%) and water uses/features (12%). Forty-six percent (46%) of the sites are now located within the Escarpment Protection Area.

In 2012, the NEC released a "Self Study Report" as part of the 10-year review of the escarpment's Biosphere Reserve designation. Under the section "*Describe the main conservation programs that have been conducted in the biosphere reserve during the past ten years as well as current on-going ones*", the report highlighted the Lafarge Mono Mills Pit, the J.C. Duff Pit and the Dufferin Milton Quarry as redesignating land to the "core area" (Escarpment Natural Area). The report noted that

²³ Mineral Resources Planning Study, Niagara Escarpment Plan Area and Surrounding Areas, 1995

²⁴ Total accounts for applications that were subject to the Niagara Escarpment Plan, and not grandfathered or exempted applications.

"licensed aggregate operations within the NEBR [Niagara Escarpment Biosphere Reserve] have a limited life span" (p. 28).

The benefits of rehabilitated pits and quarries have been identified in several recent Plan Amendment reports. The NEC has recognized that extracted lands can be returned to uses and natural states that are compatible with the escarpment environment. The NEC has applied high value scenic ratings to former aggregate operations.

Since 1985, the amount of land redesignated from former aggregate operations has doubled the amount of newly licenced land within the NEP. This is a clear demonstration that aggregate extraction is an interim use that can accommodate subsequent uses. Planning for aggregate availability must recognize this important component by including rehabilitation opportunities as a factor in the consideration of new licence applications.

Along with the significant amount of land redesignated as a result of rehabilitated pits and quarries, the Escarpment Natural Area and Escarpment Protection Area have increased in size as a result of additions to the NEP Area:

Comparison of NEP Land Use Designations	1991*	2014
Total NEP Area	183,000 ha	195,184 ha (+7%)
Escarpment Natural Area	48,367 ha	58,289 ha (+21%)
Escarpment Protection Area	67,463 ha	69,397 ha (+3%)
Escarpment Rural Area	53,701 ha	53,719 ha (0%)
Mineral Resource Extraction Area	3,100 ha	2,520 ha (-19%)

*Land areas based on Aggregate Producers' Association of Ontario (APAO) Submission to NEC, May 1991

The amount of land designated for extraction in the NEP Area has decreased 580 ha since 1991 (annual average decrease of 40 ha per year). At the same time, the amount of land designated Escarpment Natural and Protection has increased 11,856 ha. The majority of these lands were added to the NEP Area in the last 20 years. If these added lands contained significant aggregate resources, they can no longer be considered for extraction.

Niagara Escarpment and Close to Market Supply

The Niagara Escarpment is an important source of both bedrock, and sand and gravel resources. The escarpment contains high-quality aggregate resources including dolostone and shale

resources. Resources such as those extracted from the Amabel Formation (located from Hamilton to the Bruce Peninsula) are capable of producing strong and durable construction materials including concrete stone, asphalt stone, granulars, drainage stone, screenings and landscape stone.

It is estimated that **approximately 9.7 million tonnes of aggregate were produced from the NEP Area in 2013**. This equates to approximately 7% of Ontario's total aggregate production. For context, the NEP would be the highest producing municipality in Ontario in 2013²⁵.

The majority of the 9.7 million tonnes is produced within the GTA and almost all of the production comes from the GGH (**Figure 9**).

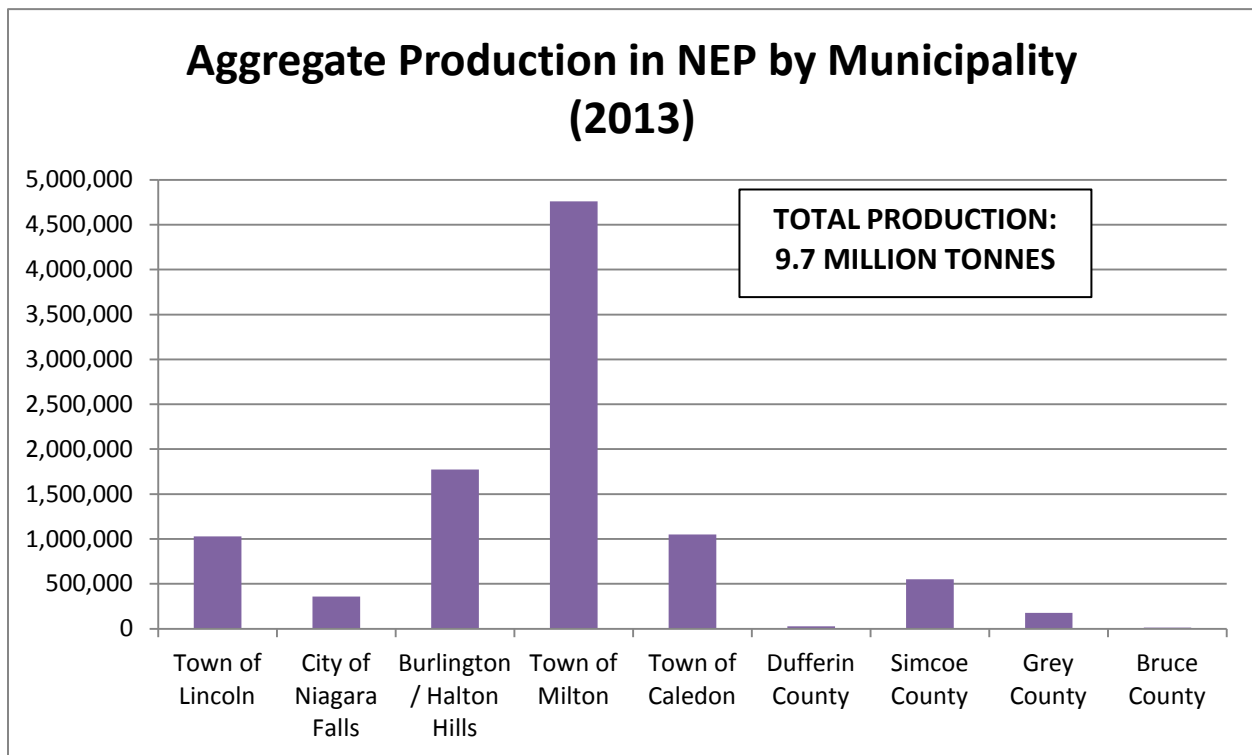


Figure 9 Aggregate Production in NEP by Municipality (2013)

In 2013, approximately 12% of the GGH's total aggregate consumption was supplied from the NEP.

²⁵ By municipality, the City of Ottawa produced the most aggregate resources in Ontario in 2013 with 9.6 million tonnes. The City of Ottawa is over 80,000 ha larger in size than the NEP Area.

Implementation Experience

The NEP has a longer history compared to the other Provincial Plans including more thorough and comprehensive policy reviews. There has been more study, public hearings, public consultation, involvement of Provincial ministries and implementation experience. As a result, it is a well established principle that the NEP objective of allowing consideration of aggregate extraction in the Escarpment Rural Area is in accordance with the purpose and objectives of the NEPDA.

The approved NEP policies represent a balanced approach to the management of aggregate resources. Continued availability of aggregate resources from the NEP Area has been an important component throughout the evolution and review of the Plan. The approved policies evolved out of extensive periods of consultation, debate, hearings, studies, and Cabinet deliberations which have allowed for all sides of the issues to be examined several times over a 45-year period.

The balance that has been secured protects the Escarpment Natural Area and Escarpment Protection Area (71% of the Plan Area is protected from extraction²⁶). The objectives of the Escarpment Rural Area allow for consideration of extraction subject to strict environmental criteria and considerations contained in the NEP as well as municipal official plans, the PPS and Aggregate Resources Act. Only a small portion of the NEP Area has potential to supply aggregate resources (12.5%)²⁷.

The principles of the NEP and its policies, including consideration of controlled extraction, are consistent with the UNESCO Biosphere Reserve designation. Biosphere Reserves typically include transition areas where sustainable development, resource management and human activity are encouraged. In the NEP, the transition areas are the Escarpment Rural Areas and designations that permit resource use and recreation.

The original Plan for the Niagara Escarpment was developed over a 15-year period (1969-1985). The determination of an outer boundary for the Plan Area and the internal designations were developed in stages over this period. It is important to appreciate that the escarpment feature, significant related landforms and important environmental features are contained and protected within the Escarpment Natural Area and Escarpment Protection Area. The Escarpment Rural Area

²⁶ Includes the Escarpment Natural Area, Escarpment Protection Area, Escarpment Recreation Area and Urban Area.

²⁷ This total does not account for environmental, social or planning constraints that may further impact resource availability.

is within the somewhat arbitrary and politically-based outer boundary of the Plan that is not designated Escarpment Protection Area or Escarpment Natural Area. There are no inherent physical characteristics of the Escarpment Rural Area that differentiate it from many rural areas outside the Plan. This history is easily forgotten and it should not be assumed that inclusion of land inside the NEP Area necessarily implies significant environmental value.

An examination of whether the characteristics of the Escarpment Rural Area warrant a greater degree of protection was further examined in the 1995 "Mineral Resource Planning Study of the Niagara Escarpment Plan Area and Surrounding Areas" (Bird and Hale). The study was prepared following the first Plan review. It concluded that the Escarpment Rural Area contains some constraints that preclude aggregate extraction but other areas have no constraints precluding aggregate extraction. Site-specific investigations, as required by current policy and other legislation, should determine site suitability and acceptability of a proposal.

The fundamental NEP principle of allowing consideration of extraction inside the Escarpment Rural Area was comprehensively re-examined through the first Plan review (1990-1995). The NEC proposed to remove this principle from the Plan and prohibit future aggregate extraction. These proposals were opposed by provincial ministries led by the MNR. The hearing on the proposed changes involved extensive evidence consuming at least three months of hearing time. The Hearing Officers resoundingly rejected the NEC's proposed prohibition and found the NEC approach to aggregate extraction was "fundamentally misguided" (p. 227)²⁸. There was no evidence provided to suggest that pits and quarries approved under the Plan were having unanticipated or unacceptable environmental effects. The Hearing Officers cautioned the policy makers from relying too heavily on NEC evidence which was often found to be less than objective.

Despite the Hearing Officers' findings, the NEC continued to promote the prohibition on new extraction but this was also rejected by Cabinet when the updated Plan was approved.

The principle of aggregate extraction in the Escarpment Rural Area has been central to a 25-year debate regarding the requirement that applicants for Plan Amendments justify need for their proposals taking into account availability of aggregate resources outside the NEP Area. The NEC's requirement to justify need for aggregate applications has been characterized as a "de facto prohibition"²⁹. Suffice to say, this requirement would override the objectives of the Escarpment Rural Area which allow for consideration of new aggregate extraction through the amendment

²⁸ Niagara Escarpment Plan Review Hearing, Report of the Hearing Officers, 1993.

²⁹ Armbro Joint Board Decision CH-02-05, 1996

process. The NEC's approach was tested in the 1990-1995 Plan Review and rejected. It has also been rejected through several decisions on site-specific applications thereby confirming the appropriateness of the policies that provide for consideration of aggregate availability from within the Plan Area.

Making resources available from a close to market location within the NEP has been determined to be sound and prudent public policy. Notwithstanding, there remains philosophical and special interest pressure to prohibit extraction from the entire Plan Area. **Any proposal to reverse or significantly alter the balance that has been achieved would have to be justified on implementation experience that definitively demonstrated that the current policies were not working and there would be substantial environmental harm incurred by continuing with the current policy regime.**

In fact, implementation experience demonstrates that the current policies are functioning as intended. In the Harold Sutherland Keppel Quarry application (which the NEC supported), the NEC explicitly recognized that the NEP provides the opportunity for consideration of aggregate extraction and that the test for aggregate applications is not that there be no impacts³⁰:

"Many of the comments received opposing the application comment that a quarry should not be located in the NEP area or they mention the natural heritage features of the site or the area characteristics which the objector believes should preclude the development of a quarry in this location. With regard to the location of the quarry in the NEP area and within the Biosphere Reserve – the policies of the NEP do not preclude a quarry "if it can be accommodated" by an Amendment.

...

All aggregate operations have impacts. It is not possible to establish a quarry without a degree of change and disturbance. However, the NEP provides the opportunity for the consideration of aggregate extraction in the Escarpment Rural Area. The test under the NEP is not that there be no impact but whether or not after all factors are assessed, the extraction proposed is likely to negatively affect the Escarpment environment" (p. 17-18).

Current Issues

Consistency with Provincial Legislation and Current Practices

The policies in the NEP are the oldest of the three Provincial Plans and therefore most in need of fine-tuning and updating to be more consistent with current terminology and

³⁰ NEP Amendment PG 167 07, Addendum Staff Report, August 18, 2011

practice, and applicable legislation. The approach to managing, defining and delineating environmental features has evolved. While some aspects of the NEP are unique to the escarpment landscape and purpose and objectives of the NEPDA, many others are more generic and deal with what are now known to be common elements of natural heritage planning.

Many of the discrepancies between terminology and approaches in the NEP relative to the PPS and more contemporary Provincial Plans are a result of historical legacy and not justifiable differences based on need for different approaches.

For example, the PPS, recent Provincial Plans and current Provincial legislation provide consistent definitions, delineation and strong protection for features such as significant wetlands, significant woodlands, species at risk habitat, prime agricultural areas and wellhead protection areas. There is no rationale for treating these features differently in the NEP Area.

The NEP should protect existing aggregate operations and their ability to expand in accordance with the PPS. Existing Class A operations are established and designated uses in the NEP.

Treatment of Species at Risk Habitat

Section 2.8.1 of the NEP states that *"new development will not be permitted in identified habitat of endangered (regulated) plant or animal species"*. However, the Endangered Species Act (ESA), which is administered by the MNRF, permits development within species at risk habitat subject to specific conditions and approvals. The NEC is not the approval authority under the ESA and is not responsible for delineating species at risk habitat yet development is prohibited in the NEP. There is no rationale for applying different development policies to species at risk habitat within the NEP. Regardless if habitat is located within or outside the NEP, it is protected and managed in accordance with the ESA.

The NEC is attempting to expand their role in regulating species at risk habitat by proposing a Plan Amendment to prohibit development in endangered and threatened species habitat³¹. The purpose of the proposed amendment according to the NEC is to align with the ESA. However, the proposed policy revisions reflect a different story.

The NEP should recognize the regulated process under the ESA and revise the applicable policies consistent with the recent changes to the PPS (Section 2.1.7).

³¹ NEC-initiated Niagara Escarpment Plan Amendment PC 201 13 (Proposed)

Municipal Official Plan Implementation

Municipal official plans also address lands within the NEP Area. This can create a complex policy structure that leads to unpredictable results and timely delays. In situations with two-tier municipalities, there can be up to three land use designations applicable to a single property³². While official plans must conform to the NEP, there can be unique interpretations from each policy document as evidenced through specific applications.

This issue was highlighted in the Joint Board's decision to approve the Walker Duntroon Quarry³³:

*"The Joint Board notes in this case that there is a plethora of planning policy regimes in place (the County and Township Official Plans, the NEP, the PPS, The Green Belt Plan) purporting some planning policy jurisdiction over the NEP Area. While, this maybe bureaucratically satisfying it does nothing to assist in a clear understanding of the importance of the NEP. Perhaps the goals and objectives of the NEP would be better served if in the local planning policy documents they merely referenced and deferred to the policy directions of the NEP. The attempts to mimic the NEP in local planning documents are confusing and provide little added planning value to the general public. **The resultant conflicting planning policy interpretations as demonstrated at this Hearing can provide little comfort or planning certainty to anyone.***

*The Joint Board during the course of this Hearing heard conflicting opinion evidence from six well qualified professional planners regarding the interpretations to be applied to the various provincial and local planning documents having some policy jurisdiction over the subject proposal. The differences in the local planning documents due to subtle word variations and interpretations proffered by the planning experts are in many ways counterproductive to good planning. One must wonder how individuals could ever find their way correctly through this planning policy morass when six well qualified professional planners with many years of experience found so many areas of disagreement with respect to the meaning of these local planning policy documents. When well qualified professional planners testify that some of the applicable planning policies are befuddling and not clear, there is room for improvement. **Good planning policy should be clear and concise so that citizen, approval authorities, and planning professionals can clearly understand their purpose and meaning. The minor contradictions found in the multiple planning policy documents in no small part have contributed to this very lengthy Hearing***

³² Examples in the GGH include the City of Burlington, Town of Milton, Town of Halton Hills and Township of Clearview.

³³ OCH Case No. 08-094, June 18, 2012

and offer little guidance to the overriding planning policies found in the NEP and the PPS”
(p. 18-19).

In order to avoid such confusion and unnecessary complexity, **the PPS should be used as the standard for those features and areas that are not unique to the escarpment landscape.** As an example, **the policies related to the protection and use of natural heritage, agriculture, water and aggregate resources should be consistent with the PPS within the Escarpment Rural Area designation.**

Policies, Designation Criteria and Mapping of the Escarpment Rural Area

The policies of the Escarpment Rural Area should continue to have an objective to provide for new licenced supply while minimizing environmental and social impacts. The Escarpment Rural Area policies could be improved by providing for a higher standard of rehabilitation to provide long-term public benefits. Through the Biosphere Reserve reporting, the NEC has recognized the benefits of former aggregate operations contributing to the escarpment landscape. This should be carried forward in the Escarpment Rural Area policies.

Since aggregate extraction is prohibited in the Escarpment Natural Area and Escarpment Protection Area, redesignation of the Escarpment Rural Area to these designations will negatively impact aggregate availability on the escarpment. The new designation criteria proposed by the NEC through the NEP Review Discussion Papers would result in a significant reduction of the Escarpment Rural Area and increases to the Escarpment Natural Area and Escarpment Protection Area. These two designations should reflect the unique features and landscapes of the escarpment and not “standard” features such as municipal natural heritage systems, linkages or corridors.

If mapping or designation criteria changes are contemplated to the land use designations in the NEP, the impact on aggregate availability must be considered and assessed in recognition of the significance of the resource, close to market supply and relatively limited existing Escarpment Rural Areas. To maintain a balanced approach, significant expansions of the Escarpment Natural Area or Escarpment Protection Area should be accompanied by policy changes to allow for consideration of new aggregate extraction subject to protection of the actual escarpment feature and other natural features and agricultural areas in accordance with the PPS.

Application Processing Times

From an administrative perspective, the processing time for aggregate applications is unreasonable. Since the 1990s, the average processing time for new or expansion aggregate applications in the NEP is approximately 7.5 years³⁴. This likely exceeds the average processing time for aggregate applications in Ontario and other Provincial Plan Areas. Efficiencies and streamlining should be recognized in the application process. **The timelines for processing applications should be prescribed consistent with the Planning Act.**

Regulating Aggregate Operations

There is unnecessary overlap and duplication in the current system of regulating aggregate operations in the NEP. Section 24 of the NEPDA requires a development permit for all development within the development control area. The NEC has discretion over the permit conditions. The difficulty is permits are usually issued requiring compliance with the ARA site plans. This directly duplicates the requirements of the ARA so that two provincial agencies are doing the same thing. The ARA is specifically designed to regulate aggregate operations. The NEC development permit control system is not. The MNRF has expertise and detailed policies and procedures to specifically deal with pits and quarries while the NEC does not.

This circumstance creates confusion and delays where revisions to permits, licences or site plans are required. Two approval authorities and duplicative processes are required where one would suffice. Enforcement is less effective where lead responsibilities are unclear. This is an unwise use of government resources (the NEC has acknowledged that matters related to extraction of a pit or quarry is more directly regulated by the MNRF and MOE³⁵).

Rationalizing the regulatory function would be a small but important step towards implementing recommendations of the 2012 Commission on the Reform of Ontario's Public Services (Drummond Report). The Commission's report recommended that the agencies involved in land use planning and resource management should be rationalized and consolidated. In particular, it was recommended that a single agency could be created to deliver natural resource management activities in central southern Ontario including the NEC.

³⁴ From commencement of ARA application to licence issuance (includes approved and refused applications).

³⁵ Harold Sutherland Keppel Quarry, Plan Amendment 167

Eliminating this inefficiency would be accomplished by new NEP policy acknowledging the ARA regulatory function and administrative changes to the standard conditions that are included on NEC development permits for aggregate operations. A development permit would still be required but, once issued, day to day regulation would be under the sole jurisdiction of the MNRF under the ARA.

Visual Impacts

The NEP contains specific policies with respect to visual impacts and maintaining the open landscape character of the escarpment. The NEP objective of providing for aggregate extraction in the Escarpment Rural Area should be incorporated by NEC in the review and decision-making of visual impact studies for aggregate applications. It should be noted that former aggregate extraction sites have been identified as some of the highest quality areas in terms of visual attractiveness.

The policies should take into consideration mitigation measures that minimize visual impacts for aggregate operations (e.g. berms, screenings, etc.) and recognize that the final rehabilitation although a different landform can contribute to the open landscape character of the NEP.

Oak Ridges Moraine Conservation Plan

Overview

The Oak Ridges Moraine is a geological landform in south central Ontario stretching from the Niagara Escarpment in Caledon in the west to Northumberland County in the east (Rice Lake). The moraine is located north of the built-up area of the GTA (65% of the moraine is located in the GTA and the entire moraine is located within the GGH) (**Figure 10**).

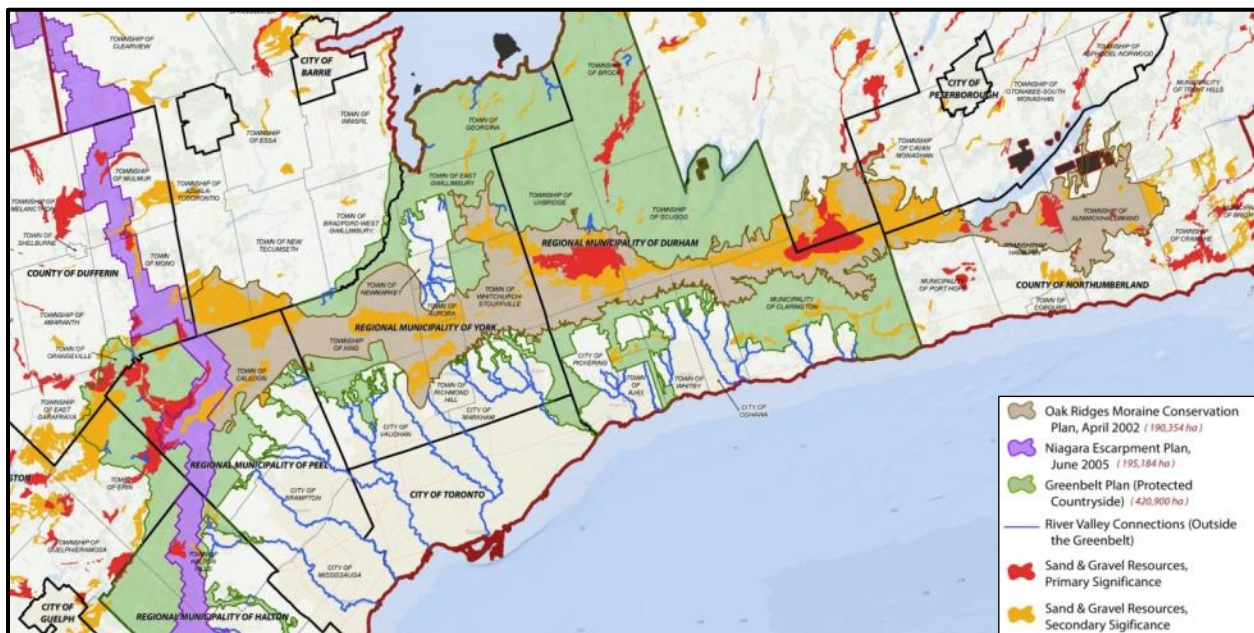


Figure 10 The Oak Ridges Moraine.

The Oak Ridges Moraine is a major source of sand & gravel resources for the GTA. The resources of the moraine are considered to be essential to provincial, regional and municipal public infrastructure, construction and maintenance programs. According to the Oak Ridges Moraine Conservation Plan (ORMCP), the moraine has a unique concentration of environmental, geological and hydrological features including “sand and gravel resources close to market” (Introduction, p. 2).

Planning on the Oak Ridges Moraine

The 1990s was an intensive period of activity for planning on the Oak Ridges Moraine. In 1991, the government formed a technical committee to create a long-term development strategy for the moraine. The strategy would provide the basis for a regional approach to planning. As part of the

strategy, a background study was prepared on the state of aggregate resources on the moraine³⁶. The study provided the following conclusions which are still relevant today:

- Aggregate extraction has co-existed with other land uses on the Oak Ridges Moraine for over 100 years while supplying essential aggregate products for the GTA and local growth (economic development) (2-20).
- The current Ontario legislative and regulatory framework provides for comprehensive assessment and mitigation of environmental impacts related to aggregate extraction (4-30).
- Any planning initiatives for the Oak Ridges Moraine must recognize the provincial significance of the sand and gravel resource in the moraine and their importance to the Greater Toronto Area and adjacent market areas (6-1).

The overall planning strategy was completed in 1994.

In the late 1990s, several residential development proposals on the moraine brought significant attention to its management and protection. In response to these pressures, the government introduced the Oak Ridges Moraine Protection Act which came into effect in May 2001 and established a six-month moratorium for development on the moraine in order for the government to conduct consultation on how to protect the moraine.

Following the passage of this Act, the government established an Advisory Panel to provide recommendations on a plan for the future of the moraine. In consultation with public and stakeholder consultation, the Advisory Panel and government provided final recommendations which formed the basis of the ORMCP.

The Oak Ridges Moraine Conservation Act was approved in December 2001 which established the authority for the Minister of Municipal Affairs and Housing to prepare an ORMCP for all or part of the moraine.

The ORMCP was finalized in April 2002 and was deemed to have come into force on November 16, 2001. The purpose of the Plan is to provide land use and resource management planning direction to provincial ministers, ministries, agencies, municipalities, municipal planning authorities, landowners and other stakeholders on how to protect the moraine's ecological and hydrological features and functions.

³⁶ Oak Ridges Moraine Planning Background Study 10 (Aggregate Resources Study), 1994

Prior to the ORMCP, planning for the moraine recognized the correlation between the geological landform and the close to market aggregate resource.

One of the drivers for the development of a Provincial Plan on the moraine was protection of its hydrogeological function (described as southern Ontario's rain barrel). It is well established that there is no negative impact on the hydrologic or hydrogeological functions of the moraine as a result of aggregate extraction. The science has not changed and recent Source Water Protection planning has confirmed that extraction is not a threat to water supplies.

Unlike the NEP, the ORMCP does not have a specific agency to implement and manage its policies. The ORMCP is implemented through municipal official plans. Planning decisions are required to conform with the ORMCP and municipalities were required to bring their official plans into conformity with the Plan within three years of it coming into effect.

In conjunction with the ORMCP, the Province developed a series of technical papers to assist in the implementation of the policies and application of some of the technical requirements. The papers represent the Province's approach to implementing the ORMCP policies (**Figure 11**).

The Province noted that the technical papers were prepared based on the best science and information available at the time of preparation and may be amended from time to time to incorporate new information and improved approaches as they become available.

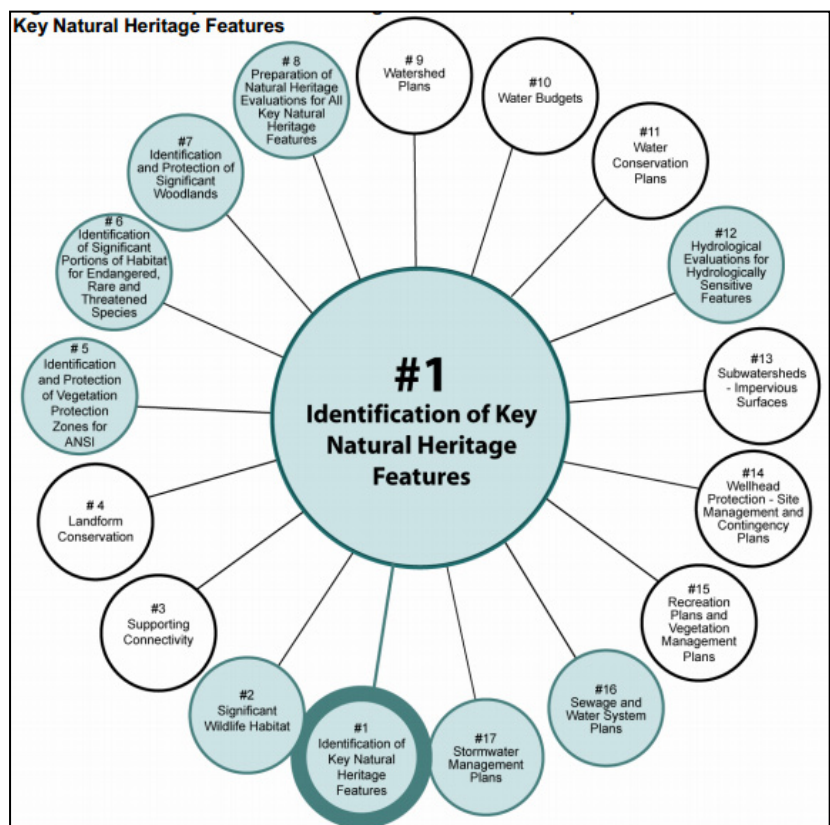


Figure 11 Topics for ORMCP Technical Paper Series

Land Use Designations and Policies

The legislation and ORMCP recognize the importance of sand & gravel resources on the moraine. Municipalities cannot adopt policies that are more restrictive than the policies of the ORMCP with respect to aggregate resources (Section 33 of ORMCP).

The Oak Ridges Moraine Conservation Act states that the objectives of the Plan are:

- a) protecting the ecological and hydrological integrity of the Oak Ridges Moraine Area;
- b) ensuring that only land and resource uses that maintain, improve or restore the ecological and hydrological functions of the Oak Ridges Moraine Area are permitted;
- c) maintaining, improving or restoring all the elements that contribute to the ecological and hydrological functions of the Oak Ridges Moraine Area, including the quality and quantity of its water and its other resources;
- d) ensuring that the Oak Ridges Moraine Area is maintained as a continuous natural landform and environment for the benefit of present and future generations;
- e) providing for land and resource uses and development that are compatible with the other objectives of the Plan;
- f) providing for continued development within existing urban settlement areas and recognizing existing rural settlements;
- g) providing for a continuous recreational trail through the Oak Ridges Moraine Area that is accessible to all including persons with disabilities; and
- h) providing for other public recreational access to the Oak Ridges Moraine Area; and,
- i) any other prescribed objectives.

Objectives b) and e) provide for resource uses that maintain, improve or restore the ecological and hydrological functions of the moraine and resource uses that are compatible with the other objectives of the Plan. Retaining balanced policies for aggregate resource management is required to meet the objectives of the Plan and legislation.

The ORMCP Area is approximately 190,354 ha in size. The moraine crosses 32 municipalities in three regions (Peel, York and Durham), four counties (Dufferin, Simcoe, Peterborough and Northumberland), and the City of Kawartha Lakes.

There are four land use designations within the Plan Area (**Figure 12**):

- Natural Core Area (71,877 ha – 38%)
- Natural Linkage Area (46,038 ha – 24%)
- Countryside Area (56,212 ha – 30%)
- Settlement Area (15,840 ha – 8%)

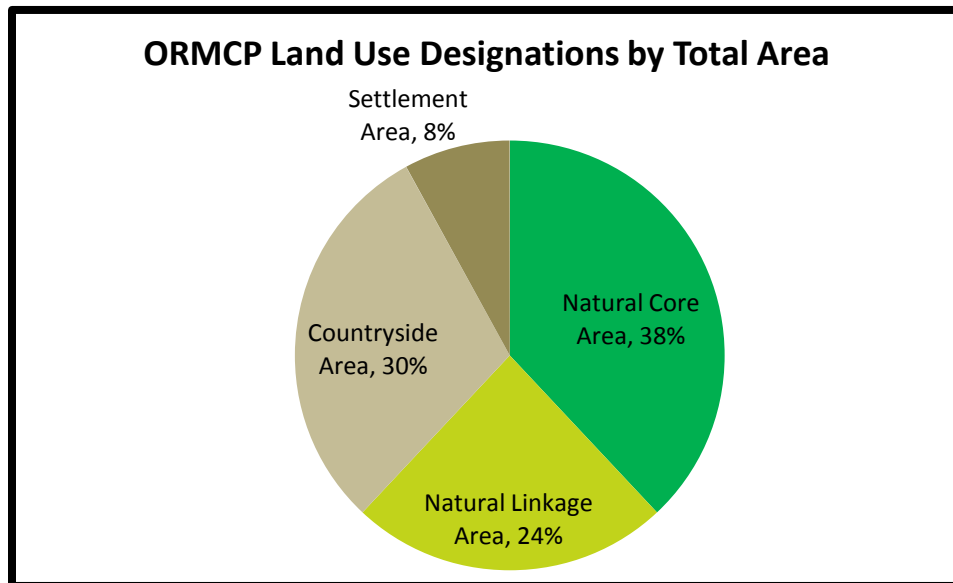


Figure 12 ORMCP Land Use Designations by Total Area

Natural Core Areas protect those lands with the greatest concentrations of key natural heritage features which are critical to maintaining the integrity of the moraine as a whole. Permitted uses are limited. New aggregate operations are not permitted.

Natural Linkage Areas protect critical natural and open space linkages between the Core Areas and along rivers and streams. Only those operations extracting above the water table are permitted in the Linkage Area.

Countryside Areas provide an agricultural and rural transition and buffer between the Core and Linkage Areas and the urbanized Settlement Areas. Most agricultural and rural uses are permitted in this designation including aggregate extraction (above or below water).

New aggregate extraction is only permitted in the ORMCP in the Natural Linkage Areas and Countryside Areas. **Aggregate extraction is prohibited in approximately 46% of the Plan Area and below water extraction is prohibited in approximately 70% of the Plan Area.**

Aggregate Resources and Licences within the ORMCP

Over 50% of the total significant sand & gravel resources are not available for extraction in the ORMCP³⁷. The Natural Core Area contains the most significant sand & gravel resources by land area compared to the other designations in the ORMCP. The Countryside Area designation, which permits above or below extraction, contains approximately 14,795 ha or 24% of significant sand & gravel resources.

Not including lands that are currently licenced for a Class A pit within significant resource areas, there are approximately 25,470 ha of resources available for extraction in the ORMCP³⁸ (41% of the total significant resources in the ORMCP). This represents the total area of significant aggregate resources and does not account for environmental, social or planning constraints that may further impact resource availability.

Approximately 16% of the ORMCP Area contains significant sand & gravel resources where extraction may be permitted (Countryside Area and Natural Linkage Area).

The majority of primary sand & gravel resources are located within the Township of Uxbridge, City of Kawartha Lakes and Municipality of Clarington (approximately 78% of the 13,430 ha of primary sand & gravel resources in the ORMCP). A significant portion of these areas are currently licenced for extraction or have been rehabilitated with the licence surrendered.

These resources of primary significance are some of the closest to market sand & gravel resources available to the GTA market. To underline the importance of these areas, four of the top 10 aggregate producing municipalities in 2013 are located within the ORMCP (Clarington, Kawartha Lakes, Uxbridge and Caledon). Almost all of the resources extracted from Uxbridge originate from the ORMCP while the majority of sand & gravel resources extracted from Kawartha Lakes and Clarington originate from the OMRCP. A limited amount of resources are extracted from the ORMCP in Caledon.

There are currently 107 licences in the ORMCP Area with a total licenced area of 5,040 ha (approximately 2.6% of the ORMCP Area). A significant portion of these licences were "grandfathered" under the former Pits and Quarries Control Act in the early 1970s.

³⁷ Significant refers to ARIP primary and secondary resources.

³⁸ May include minor double-counting if licences are located within Natural Core Area designation.

If licenced aggregate operations were a designation in the ORMCP, it would be the smallest in terms of land area. The majority of the licenced pit area is a result of existing pits that were included in the ORMCP Area when the Plan came into effect in 2002 (97% of total licenced area).

Since the approval of the ORMCP in 2002, seven applications for new or expansion pits have been approved in the ORMCP (four of the seven applications were appealed to the OMB)³⁹. The total licenced area of these approved operations is approximately 174 ha which represents less than 0.1% of the ORMCP Area. The total reserves from the seven operations are approximately 35 million tonnes. In other words, **an average of less than 3 million tonnes has been licenced in the ORMCP each year since 2002.**

There are currently five active pit applications within the ORMCP Area. The total licenced area of the proposed pits is 149 ha (0.1% of the ORMCP Area) with estimated reserves of more than 25 million tonnes. This is a substantial amount of sand & gravel resources that would be available in a close to market location.

Since 1990, 38 licences have been surrendered under the Aggregate Resources Act in the ORMCP Area (1,174 ha). **Rehabilitation and the surrender of aggregate licences are exceeding the issuance of new licences in the ORMCP.**

Based on OSSGA's recent rehabilitation research, more than half of the studied sites within the ORMCP Area were rehabilitated to natural uses (52%) followed by open space (14%) and recreational uses (9%). Thirty-eight percent (38%) of the sites are now located within the Natural Linkage Area or Natural Core Area.

Oak Ridges Moraine and Close to Market Supply

The Oak Ridges Moraine is an important source of sand and gravel resources. It is estimated that **approximately 8.1 million tonnes of aggregate were produced from the ORMCP Area in 2013.** This equates to approximately 6% of Ontario's total aggregate production. For context, the ORMCP would be the second highest producing municipality in Ontario in 2013 behind only the City of Ottawa (9.6 million tonnes)⁴⁰.

³⁹ Total accounts for applications that were subject to the Oak Ridges Moraine Conservation Plan, and not grandfathered or exempted applications.

⁴⁰ The City of Ottawa is almost 90,000 ha larger in size than the ORMCP Area.

The majority of the 8.1 million tonnes is produced within the GTA. More than 95% of the ORMCP's production comes from the GTA and the City of Kawartha Lakes (Manvers Township) (**Figure 13**).

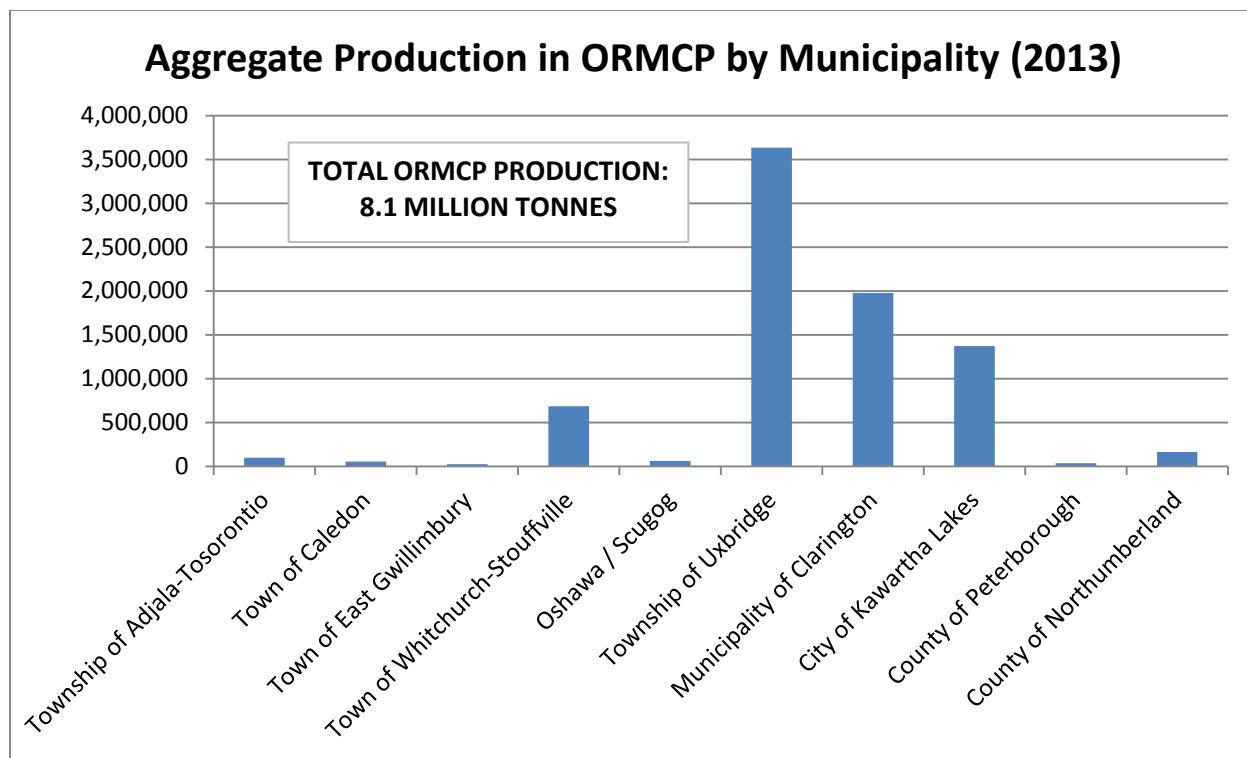


Figure 13 Aggregate Production in ORMCP by Municipality (2013)

In 2013, approximately 10% of the GGH's total aggregate consumption was supplied from the ORMCP.

Aggregate production in the ORMCP is exceeding replacement through new licenced supply. Based on the ORMCP producing approximately 6% of Ontario's aggregate production and reserves from the seven new licences issued since 2002, the ratio of ORMCP production to replacement is approximately 3.4 to 1.

Current Issues

A key issue in the development of the ORMCP in the 1990s and early 2000s was the appropriateness of restrictions on aggregate availability. Specifically, prohibiting new aggregate extraction in Natural Core Areas and limiting extraction to above the water table in Natural Linkage Areas.

Prohibiting New Extraction within Natural Core Areas

While the Natural Core Areas are described in the ORMCP as concentrations of significant features and functions which are critical to maintaining the integrity of the moraine, the designation includes both significant features as well as less significant wooded and wetland areas and, of more concern, open agricultural landscapes, pastured lands and early successional vegetation.

Figure 14 identifies an area within the Township of Uxbridge that is designated Natural Core Area. While these lands are located adjacent to a conservation area, the large open fields and agricultural lands do not contain key natural heritage features. The open area contains primary and secondary sand & gravel resources that are not available for extraction due to the Natural Core Area designation.



Figure 14 Natural Core Area designation within the Township of Uxbridge

A specific example of unnecessarily prohibiting access to significant aggregate resources involves an application in the Township of Uxbridge by Vicdom Sand & Gravel. **Figure 15** identifies the Natural Core Area that extends onto the pit expansion property. This area is not considered a high quality natural feature however due to the designation, extraction is prohibited. Even though a relatively small area of Natural Core Area is located on the property, the extent and location of the designation leads to the sterilization of a significant amount of sand & gravel resources on a property that is primarily designated Countryside Area.

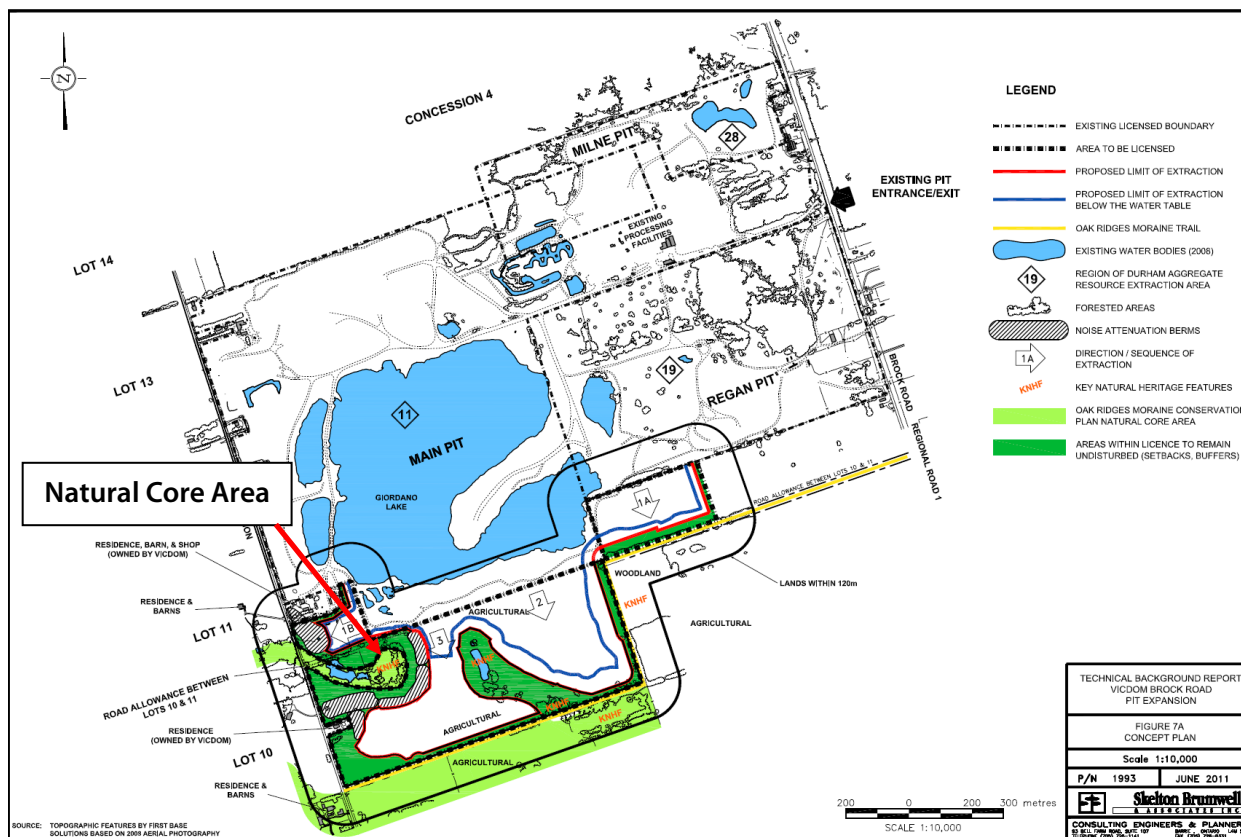


Figure 15 Natural Core Area designation on Vicdom pit expansion property (Source: Skelton Brumwell & Associates).

This is an example of why **liberally delineating a prohibitive land use designation can have major impacts on close to market resource availability.**

Prohibiting new extraction in the Natural Core Area was one of the more contentious issues when the ORMCP was proposed. Recognizing the environmental consequences of limiting significant close to market aggregate supply, the implementation provisions of the ORMCP specify that the 10-year review may include an examination of the policies on prohibiting extraction in Natural Core Area.

The ORMCP review should include an examination of the policies on extraction in Natural Core Areas.

Limiting Extraction to Above Water in Natural Linkage Areas

The other significant concern was limiting extraction to above the water table only in Natural Linkage Areas. No hydrogeological basis has been established for this restriction. The net effects

of below water table extraction on the water balance are normally minor and localized⁴¹. There should not be arbitrary restrictions on the amount of aggregate that can be removed from sites that could be licenced in the Natural Linkage Area.

These restrictions represent a significant reduction in the amount of aggregate that can be considered for extraction and result in materials being extracted further from market sources which has well established economic, social and environmental consequences.

Natural Corridor Width

For aggregate applications, the ORMCP requires that an excluded area be at least 1.25 km wide in the Natural Linkage Area in order to maintain connectivity. Through the development of the ORMCP and technical papers, OSSGA consistently raised issues with the interpretation of this policy as further prohibiting extraction on the moraine. This policy has been interpreted to require a continuous 1.25 km corridor in the Natural Linkage Area which will sterilize locations where extraction may meet all of the other objectives of the Plan. In addition, sites which are located adjacent to the Natural Core Area and do not have 1.25 km of Natural Linkage Area may be precluded regardless of the fact that a natural corridor would exist within the Natural Core Area. The implementation of this policy has been an issue.

The overall goals and objectives of the ORMCP must be considered when applying the 1.25 km natural corridor width policy. The policy should not be interpreted to be a "continuous corridor". The location of Natural Core Areas and the actual use of the surrounding lands should be taken into account when assessing the 1.25 km corridor. In addition, the policies could clarify that opportunities through phasing and progressive rehabilitation are considerations in maintaining connectivity on the moraine.

⁴¹ APAO Integrated Resource Management for the Oak Ridges Moraine, September 2001

Greenbelt Plan

Overview

In December 2003, the Province introduced the Greenbelt Protection Act (Bill 27) which sought to create a Greenbelt Study Area in the Golden Horseshoe. The Province identified an immediate need to study an area in the Golden Horseshoe in order to protect environmentally sensitive land and farmland, and contain urban sprawl. The Act would establish a moratorium that would temporarily prevent new urban uses outside existing urban boundaries on rural and agricultural lands within key portions of the study area.

In May 2004, the Greenbelt Task Force released a discussion paper which outlined a number of proposed approaches for a "Golden Horseshoe Greenbelt". The vision for the Greenbelt was that it would be a permanent and sustainable legacy for current and future generations.

The discussion paper stated that to ensure the long-term protection of the features and functions of a natural system, compatible uses such as aggregate extraction can coexist with environmental protection, provided it does not hinder the integrity of the system. The paper recognized that the study area contained significant aggregate resources, both bedrock and sand & gravel, and that more than 75% of aggregate resources used in the greenbelt area come from the Oak Ridges Moraine and Niagara Escarpment areas.

The paper provided the following summary with respect to the regulatory environment for aggregate resources:

"Over the past decade, the regulatory environment for aggregate extraction has become increasingly sophisticated, resulting in fewer new licenses for quarries. Most existing quarries were established in the 1950s, and are reaching the end of their deposits.

Mineral aggregate resources are non-renewable resources. Their proximity to market is one of the most significant factors in their overall cost. Since more than 90 per cent of mineral aggregate is moved by truck, transportation is one of the main factors in the cost of the resource not only in direct cost to the consumer, but also in its impacts on air quality. Shipping mineral aggregates long distances increases energy consumption and greenhouse gas emissions into the atmosphere. Proper planning for near-market extraction can reduce negative environmental impacts" (p. 21).

The Greenbelt Protection Act came into effect in June 2004. Following the enactment, the Greenbelt Task Force provided advice and recommendations to the Minister of Municipal Affairs and Housing on creating a Golden Horseshoe Greenbelt. The Task Force recognized that defining the greenbelt would be a complex task and that good science and sound economics would be vital to maintaining the integrity of the greenbelt.

The Task Force recommended that areas that have been identified as high potential aggregate sites should be included in the greenbelt and that the Province should clarify what are appropriate provincial and municipal policies related to new aggregate applications. It was recommended that extraction be subject to more rigorous rehabilitation requirements. It was recognized that aggregate resources provide essential building materials for the housing that population growth requires and the availability of these resources close to market is important.

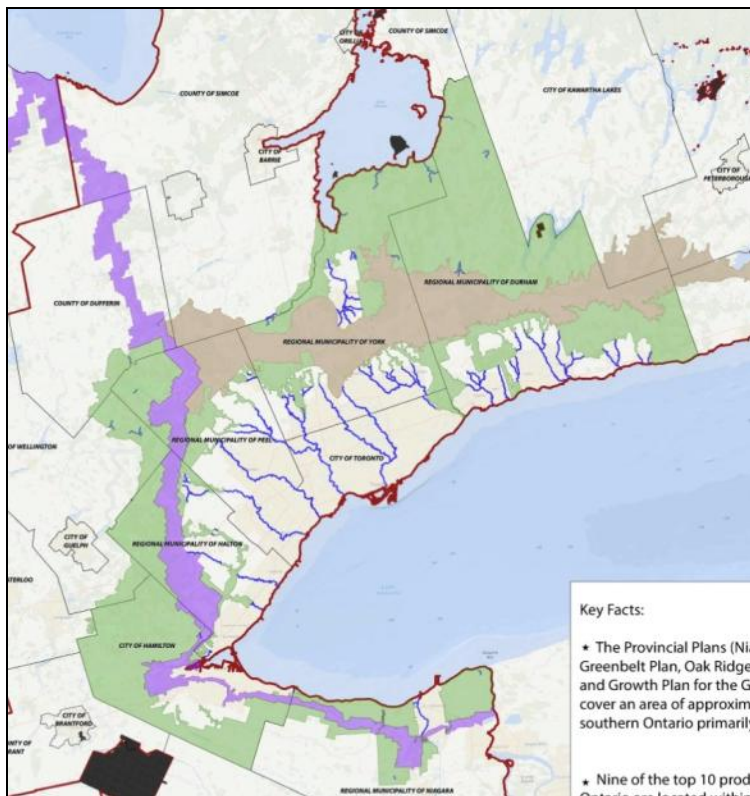


Figure 16 The Greenbelt Plan Area (identified in green shade)

and Region of Waterloo. Eleven upper/single-tier municipalities and close to 40 lower-tier municipalities are located within the Greenbelt Plan.

In February 2005, the Greenbelt Plan was established under the Greenbelt Act, to take effect as of December 2004. The Greenbelt covers over 800,000 ha of land in southern Ontario including the NEP and ORMCP Areas⁴². The Greenbelt Plan surrounds urban areas in the GTA and Hamilton. Not including the NEP or ORMCP, the Greenbelt Plan is approximately 420,000 ha in size (**Figure 16**).

The Greenbelt Plan is primarily located within the GTA, City of Hamilton and Region of Niagara however portions of the Plan extend into the County of Simcoe, County of Dufferin, County of Wellington

⁴² The Greenbelt Plan is intended to enhance the spatial extent of agriculturally and environmentally protected lands currently covered by the NEP and ORMCP while at the same time improving linkages between these areas and the surrounding major lake systems and watersheds. Most of the policies in the Greenbelt Plan do not apply to the NEP and ORMCP Areas.

As part of managing growth in the GGH, the Greenbelt identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape.

The Greenbelt Plan includes lands within, and is intended to build upon the ecological protections provided by the NEP and the ORMCP. While providing permanent agricultural and environmental protection, the Greenbelt also contains important natural resources and supports a wide range of recreational and tourism uses, areas and opportunities along with a rural and agricultural economy.

The vision for the Greenbelt is a broad band of permanently protected land which:

- Protects against the loss and fragmentation of the agricultural land base and supports agriculture as the predominant land use;
- Gives permanent protection to the natural heritage and water resource systems that sustain ecological and human health and that form the environmental framework around which major urbanization in south-central Ontario will be organized; and
- Provides for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation and resource uses.

The Protected Countryside designation applies to the entire Greenbelt Plan. The Protected Countryside includes an Agricultural System, Natural System and Settlement Areas. Lands in the Protected Countryside are within one of the following policy areas: Specialty Crop Areas, Prime Agricultural Areas, Rural Areas, Towns/Villages, Hamlets or Shoreline Areas.

The Natural Heritage System in the Greenbelt Plan is intended to identify areas with the highest concentration of the most sensitive and/or significant natural features and functions. **The Natural Heritage System applies to more than half of the Greenbelt Plan Area (215,800 ha). The Natural Heritage System is larger than each of the NEP and ORMCP Areas.**

All decisions on planning applications shall conform to the policies of the Greenbelt Plan. In addition, the Greenbelt Act requires that municipalities amend their official plan to conform to the Greenbelt Plan (most municipalities have completed conformity exercises for their official

plan). Municipal official plans cannot contain provisions that are more restrictive than the aggregate policies in the Greenbelt Plan⁴³.

Aggregate resources are identified as non-renewable resources in the Greenbelt Plan. Among the goals of the Greenbelt Plan are the recognition of the benefits of protecting non-renewable natural resources, and provision for the availability and sustainable use of those resources critical to the region's social, environmental, economic and growth needs.

Aggregate extraction is permitted in the Protected Countryside and the Natural Heritage System. The Greenbelt Plan recognizes that aggregate resources provide significant building materials for communities and infrastructure, and the availability of aggregate close to market is important for both economic and environmental reasons.

The Greenbelt Plan recognizes that aggregate resources and aggregate operations need to be treated differently from other forms of development. This is primarily due to the following factors:

- The management of aggregate resources is a matter of Provincial interest.
- It is in the public interest to protect close to market resources.
- Aggregate resources are fixed in location and cannot be extracted anywhere.
- Aggregate extraction is an interim use where subsequent uses can be accommodated through rehabilitation.

Specific exception provisions apply to aggregate extraction within key features. Extraction is permitted within these features subject to specific criteria and certain limitations.

The Greenbelt Plan includes specific rehabilitation policies including establishing maximum disturbed area for both proposed and existing operations and rehabilitation targets for sites in the Natural Heritage System in terms of establishing forest cover no less than what existed prior to extraction (except for operations that extract below the water table).

Extraction is permitted within prime agricultural areas including specialty crop areas subject to specific criteria. The exception is that new operations are not permitted between Lake Ontario and the NEP in the Niagara Peninsula Tender Fruit and Grape Lands.

⁴³ "With the exception of the lot creation policies of section 4.6, official plans and zoning by-laws shall not, however, contain provisions that are more restrictive than the policies of sections 3.1 and 4.3.2 as they apply to agricultural uses and mineral aggregate resources respectively" (Section 5.3, Greenbelt Plan).

The Greenbelt Plan recognizes the importance of aggregate resources by ensuring that they remain available and permitting extraction throughout the Plan Area subject to rigorous requirements that contribute to the goals and objectives of the Greenbelt.

The Natural Heritage System *"includes areas of the Protected Countryside with the highest concentration of the most sensitive and/or significant natural features and functions"*. The Natural Heritage System also contains areas that have the potential to be restored (e.g. agricultural and open fields). According to the Ministry of Municipal Affairs and Housing, the Natural Heritage System consists of the following:

- Core Areas (could be up to 50% non-natural features).
- Linkages that form connections between the cores (may not be natural features).
- Lands that have been restored or have the potential to be restored to a natural state.

The Greenbelt Plan allows aggregate extraction in the Natural Heritage System subject to specific criteria including maintaining connectivity, habitat replacement, maintaining or restoring key features, and rehabilitation requirements. The policies help ensure that there are only positive, long-term outcomes for the natural environment.

There are opportunities through rehabilitation to enhance the Natural Heritage System, and create linkages and natural features where they may not have previously existed. This was recognized by the Task Force during the development of the Greenbelt Plan as well as the existing policies which contemplate extraction within this system. These policies should be maintained and explicitly recognized in the review of the Greenbelt Plan.

The Greenbelt Plan recognizes the importance of the availability of close to market resources for both economic and environmental reasons, and for providing significant building materials for communities and infrastructure. Protecting and making provision for aggregate resources are among the goals of the Plan. **These strong fundamentals which recognize the Provincial interest in aggregate resources must be maintained and upheld.**

In general, the Greenbelt policies take a balanced approach to protecting environmental and agricultural resources while providing for non-renewable resources. The Greenbelt is a working countryside consisting of farms, agri-food uses, resource-based uses, infrastructure, pits and quarries and is not intended to be only a public park or open space.

Aggregate Resources and Licences within the Greenbelt Plan

There are approximately 54,427 ha of significant aggregate resources located within the Greenbelt Plan⁴⁴. The majority of these are selected bedrock resources from the Amabel, Guelph and Lockport Formations while the remaining are primary and secondary sand & gravel resources. Approximately 13% of the Greenbelt Plan contains significant aggregate resources.

These significant resource areas are located close to market and must be protected for the expansion and continued use of aggregate operations (along with the remaining significant resource areas in the Greenbelt).

There are currently 69 licences located within the Greenbelt Plan (56 pits and 13 quarries⁴⁵). **The total licenced area of these sites is approximately 4,290 ha or 1% of the Plan Area.**

Since approval of the Greenbelt Plan in 2005, three applications only for expansions to existing aggregate operations have been approved in the Greenbelt⁴⁶ (two pits and one quarry). This represents one new licence every three years.

The total licenced area of these approved operations is 149 ha which represents less than 0.1% of the total Greenbelt Plan Area. The total reserves from these three expansions are approximately 27.5 million tonnes. In other words, an average of 2.75 million tonnes has been licenced in the Greenbelt each year since 2005.

There are currently ten active aggregate applications within the Greenbelt Plan (seven pits and three quarries; two new and eight expansions)⁴⁷. The total licenced area of the proposed applications is 526 ha (0.1% of the Greenbelt Plan Area) with estimated reserves of more than 120 million tonnes. This is a substantial amount of sand & gravel, and bedrock resources that would be available in a close to market location.

Since 1990, 50 licences (1,402 ha) have been surrendered under the Aggregate Resources Act in the Greenbelt Plan Area.

⁴⁴ Significant refers to ARIP primary and secondary sand & gravel, and selected bedrock resources.

⁴⁵ Includes portions of the Dufferin Acton Quarry and Walker Vineland Quarries which are primarily located within the NEP Area.

⁴⁶ Total accounts for applications that were subject to the Greenbelt Plan, and not grandfathered or exempted applications.

⁴⁷ Includes the Dufferin Acton Quarry Extension which is also located within the NEP Area.

Based on OSSGA's recent rehabilitation research, almost half of the studied sites within the Greenbelt were rehabilitated to natural uses (47%) followed by open space (11%) and agricultural uses (11%). Seventy-nine percent (79%) of the sites are now located within the Natural Heritage System.

Greenbelt and Close to Market Supply

It is estimated that **approximately 10.5 million tonnes of aggregate were produced from the Greenbelt in 2013 (Figure 17)**. This equates to approximately 7% of Ontario's total aggregate production. For context, the Greenbelt would be the highest producing municipality in Ontario which is largely due to its size but also the presence of significant bedrock and sand & gravel resources.

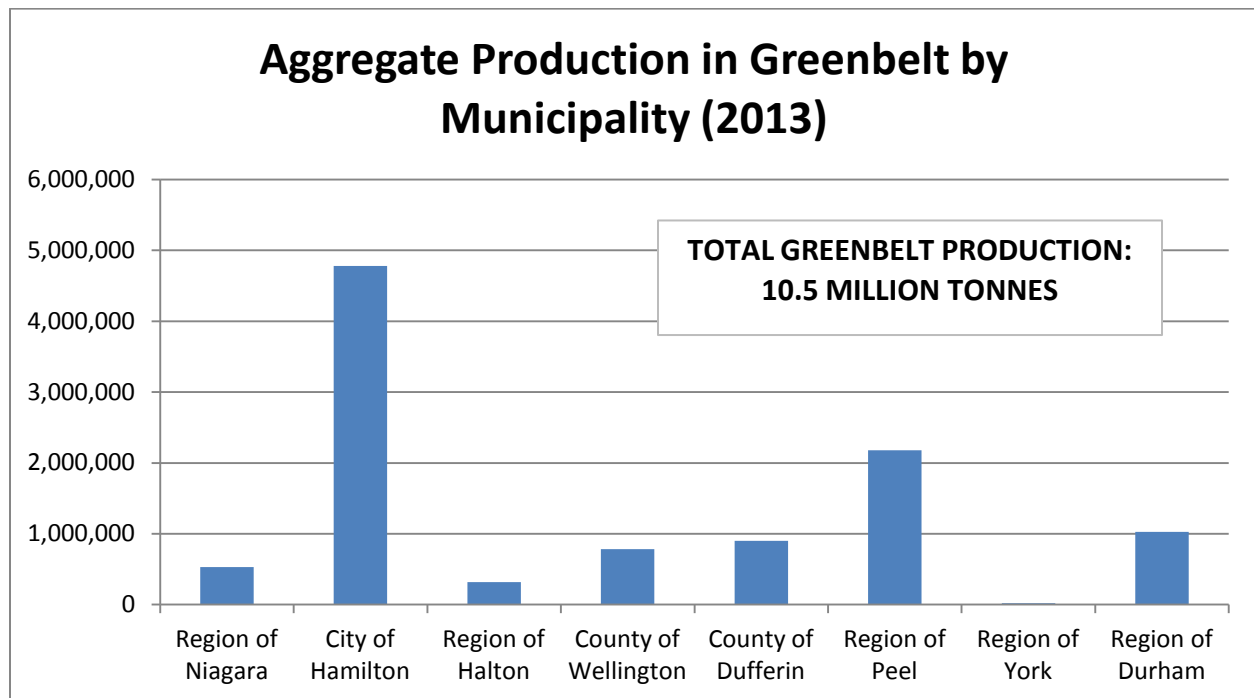


Figure 17 Aggregate Production in Greenbelt by Municipality (2013)

All of the 10.5 million tonnes are extracted within the GGH. **In 2013, approximately 13% of the GGH's total aggregate consumption was supplied from the Greenbelt.**

Of the Greenbelt's 10.5 million tonnes, the share between sand & gravel, and bedrock resources is relatively even. The sand & gravel resources are primarily extracted north and east of Halton within Wellington, Dufferin, Peel and Durham. A regionally significant amount of sand & gravel is

extracted from the Fonthill Kame where such resources are limited in Niagara. All of the bedrock resources are extracted above the Niagara Escarpment within Hamilton, Halton and Niagara.

Current Issues

Extraction within Significant Woodlands and Species at Risk Habitat

Aggregate extraction is permitted within significant woodlands if they contain young plantations or early successional habitat. The PPS permits extraction within significant woodlands if it is demonstrated that there are no negative impacts on the feature or its ecological functions. The Greenbelt policies with respect to rehabilitation and reforestation recognize the positive attributes of aggregate operations as interim uses. **The Greenbelt significant woodland limitation should be reviewed to determine whether it is reasonable to limit extraction to young plantations and early successional habitat.**

Similar to the significant woodlands policy, aggregate extraction is not permitted within the significant habitat of endangered and threatened species. Recent changes to the PPS provide an exception in recognition of provincial and federal requirements (e.g. authorizations under the Endangered Species Act). This policy should be recognized in the Greenbelt Plan.

Municipal Official Plan Implementation

Implementation of the Greenbelt Plan can vary by municipality. **While it is recognized that the geographic, social and economic conditions of one municipality in the Greenbelt may vary from another, there should be consistency in ensuring that significant aggregate resources are made available consistent with the applicable policies.**

If changes or revisions occur to the Greenbelt Plan and subsequent municipal conformity exercises are required, interested parties should continue to have the ability to appeal the resulting official plan process in accordance with the provisions of the Planning Act. Such appeal rights are an important part of the planning process in Ontario. This is especially true considering the complexity and interrelationship between the PPS, Provincial Plans and local objectives. Municipalities cannot be more restrictive than the Greenbelt Plan policies for aggregate resources.

Potential Greenbelt Expansion

In 2008, the Province released criteria to be used when considering requests from municipalities to expand the Greenbelt. It is our understanding that during this review, expanding the Greenbelt may be a significant topic of discussion⁴⁸.

If the Province contemplates an expansion of the Greenbelt (presumably “outside” of the Greenbelt within the GGH), the presence of significant aggregate resources beyond and adjacent to the existing Greenbelt Area must be considered. The explicit recognition that aggregate resources are a matter of provincial interest and that their availability close to market is important for economic and environmental reasons must continue.

⁴⁸ Premier Wynne's Mandate Letter to Minister of Municipal Affairs & Housing (September 25, 2014)

Summary

Making aggregate resources available within the Provincial Plan Areas is required to meet the high quality aggregate demands of the GGH, replace diminishing supplies and reduce environmental and economic impacts of importing aggregate further from market.

Aggregate resources are literally the foundation of Ontario's economy and society. Aggregate resources are used to build and maintain Ontario's infrastructure.

The GGH has a major infrastructure deficit. The Province is investing more than \$130 billion in public infrastructure over the next 10 years including \$31.5 billion in dedicated funds available for public transit, transportation and other priority infrastructure projects under Moving Ontario Forward. In the GGH, over 2 billion tonnes of aggregate will be needed over the next 25 years to build and maintain required infrastructure (approximately 90-100 million tonnes per year).

The aggregate resources of the Provincial Plan Areas are the closest to market resources for most of Ontario's major urban areas. The Niagara Escarpment Plan, Oak Ridges Moraine Conservation Plan and Greenbelt Plan contain very high quality deposits of limestone and sand and gravel, critical to the construction of high quality infrastructure in the GGH:

- **In 2013, the Provincial Plan Areas supplied approximately 35% of GGH's total aggregate needs.**
- **Eight of the top 10 aggregate producing municipalities are located within at least one of these three Provincial Plans.**
- **Aggregate production from the Provincial Plans accounts for approximately 20% of Ontario's total production.**

While the Provincial Plan Areas contribute a significant amount of production, **only 1.5% of these Plan Areas are licenced for aggregate extraction.** Of the 1.5% that is licenced for extraction, only 37% of this area is disturbed while the remaining area is rehabilitated or has not been extracted (**0.6% of the Provincial Plan Areas are subject to active aggregate extraction**).

There is a provincial interest in maintaining a readily available supply of close to market aggregate in order to minimize environmental and social impacts, and transportation costs.

The Plan Reviews should be based on implementation experience with operations approved since each of the Plans came into effect.

Fundamentally, the Provincial Plan Review should not consider any new prohibitions on consideration of aggregate extraction. Policies providing for the management of aggregate resources have been deemed necessary to meet the objectives of legislation including upholding matters of provincial interest. The Provincial Plans already include strong protection for significant environmental features. Locations where aggregate extraction may be considered are limited by policy and the existing tests for new extraction are onerous so that only environmentally acceptable sites with opportunities for contributions to ecological integrity are approved.

Niagara Escarpment Plan

The Niagara Escarpment Plan (NEP) has a longer history compared to the other Provincial Plans including more thorough and comprehensive policy reviews. There has been more study, public hearings, public consultation, involvement of Provincial ministries and implementation experience. As a result, it is a well established principle that the NEP objective of allowing consideration of aggregate extraction in the Escarpment Rural Area is in accordance with the purpose and objectives of the Niagara Escarpment Planning and Development Act (NEPDA).

The balance that has been secured protects the Escarpment Natural Area and Escarpment Protection Area as aggregate extraction is not a permitted use and the policies do not provide for its consideration (71% of the Plan Area is protected from extraction). In addition, the actual escarpment feature is protected from development and site alteration.

The objectives of the Escarpment Rural Area allow for consideration of extraction subject to strict environmental criteria and considerations contained in the NEP as well as municipal official plans, the Provincial Policy Statement (PPS) and Aggregate Resources Act. Only a small portion of the NEP Area has potential to supply aggregate resources (12.5%).

Making resources available from a close to market location within the NEP has been determined to be sound and prudent public policy. Notwithstanding, there remains philosophical and special interest pressure to prohibit extraction from the entire Plan Area. Any proposal to significantly alter the balance that has been achieved would have to be justified based on implementation experience that definitively demonstrated that the current policies were not working and there

would be substantial environmental harm incurred by continuing to accommodate aggregate extraction within the Escarpment Rural Area.

In fact, implementation experience demonstrates that the current policies are functioning as intended. Since the NEP came into effect in 1985, the amount of land redesignated from former aggregate operations has doubled the amount of newly licenced land within the NEP. This is a clear demonstration that aggregate extraction is an interim use that can accommodate subsequent uses that are compatible with the escarpment environment. Planning for aggregate availability must recognize this important component by including rehabilitation opportunities as a factor in the consideration of new licence applications.

The policies in the NEP are the oldest of the three Provincial Plans and therefore most in need of fine-tuning and updating to be more consistent with current terminology and practice, and applicable legislation. While some aspects of the NEP are unique to the escarpment landscape, and purpose and objectives of the NEPDA, many others are more generic and deal with common elements of natural heritage planning.

For example, the PPS, recent Provincial Plans and current Provincial legislation provide consistent definitions, delineation and strong protection for features such as significant wetlands, significant woodlands, species at risk habitat, prime agricultural areas and wellhead protection areas. There is no rationale for treating these features differently in the NEP Area.

The PPS should be used as the standard for those features and areas that are not unique to the escarpment landscape. The policies related to the protection and use of natural heritage, agriculture, water and aggregate resources should be consistent with the PPS within the Escarpment Rural Area designation.

The policies within the Escarpment Rural Area should continue to have an objective to provide for new licenced supply while minimizing environmental and social impacts. Due to the unique attributes of the escarpment, the Escarpment Rural Area policies could be improved by providing for a higher standard of rehabilitation to provide long-term public benefits.

Oak Ridges Moraine Conservation Plan

Prior to the Oak Ridges Moraine Conservation Plan (ORMCP), planning for the Oak Ridges Moraine recognized the correlation between the geological landform and the close to market aggregate resource.

One of the main drivers for the development of a Provincial Plan on the moraine was protection of its hydrogeological function (described as southern Ontario's rain barrel). It is well established that there is no negative impact on the hydrologic or hydrogeological functions of the moraine as a result of aggregate extraction. The science has not changed and recent Source Water Protection planning has confirmed that extraction is not a threat to water supplies.

The ORMCP review should include an examination of the policies on extraction in Natural Core Areas. Prohibiting new extraction in the Natural Core Area was one of the more contentious issues when the ORMCP was proposed recognizing that the Natural Core Area does not necessarily contain significant natural features, and rehabilitation could enhance the function of the core area.

The ORMCP limits extraction to above the water table in Natural Linkage Areas. No hydrogeological basis has been established for this restriction. The net effects of below water table extraction on the water balance are normally minor and localized. There should not be arbitrary restrictions on the amount of aggregate that can be removed from sites that could be licenced in the Natural Linkage Area.

These restrictions represent a significant reduction in the amount of aggregate that can be considered for extraction. The direct implication is the need to transport materials from further from market sources which has well established economic, social and environmental consequences.

Greenbelt Plan

Aggregate resources are identified as non-renewable resources in the Greenbelt Plan. Among the goals of the Greenbelt Plan are the recognition of the benefits of protecting non-renewable natural resources, and provision for the availability and sustainable use of those resources critical to the region's social, environmental, economic and growth needs.

Aggregate extraction is permitted in the Protected Countryside and the Natural Heritage System. The Greenbelt Plan recognizes that aggregate resources provide significant building materials for communities and infrastructure, and the availability of aggregate close to market is important for both economic and environmental reasons.

The Greenbelt Plan recognizes that aggregate resources and aggregate operations need to be treated differently from other forms of development. Aggregate extraction is permitted in the

Natural Heritage System subject to specific criteria including maintaining connectivity, habitat replacement, maintaining or restoring key features, and rehabilitation requirements. The policies help ensure that there are only positive, long-term outcomes for the natural environment. There are opportunities through rehabilitation to enhance the Greenbelt Natural Heritage System, and create linkages and natural features where they may not have previously existed.

In general, the Greenbelt policies take a balanced approach to protecting environmental and agricultural resources while providing for non-renewable resources. The Greenbelt is a working countryside consisting of farms, agri-food uses, resource-based uses, infrastructure, pits and quarries and is not intended to be only a public park or open space. The strong fundamentals which recognize the Provincial interest in aggregate resources must be maintained and upheld in the Greenbelt Plan.







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Current Position: Executive Vice President
James Dick Construction Limited

Education: High School Diploma- Humberview School Bolton- Ontario Scholar
B.Sc, University of Guelph

Industry Experience: 35 Years Experience at James Dick Construction from 1981 to the present. Have first-hand knowledge of the following tasks:
Truck Driver, Rock Truck Driver, Loader Operator, Plant Operator, Quality Control Technician, Lead Hand Plant Construction, Quality Control Manager, Land and Resource Manager, Supervise all Government Permit Applications including all Pit and Quarries Control Act/ Aggregate Resources Act License applications 1988 to present, Supervise Human Resources, Signing Authority for James Dick Health and Safety Program, Assist Mr. Dick as a member of the Senior Management in operating the business day to day.

In charge of formulating and implementing the Corporate Mission Statement:

“Our Mission is to be the most energy efficient producer of construction materials in all our market areas. We will make our customers successful with a distinct advantage in price, quality and service. We will protect the environment by operating benign pits and quarries with excellent progressive rehabilitation. We will be a safe, fun and respectful place to work that our employees can be proud of. We will manage our business efficiently and proactively to maintain long term profitability. We will be a leader in the supply of essential primary materials to build a strong Ontario.”

Ontario Stone Sand and Gravel Association Experience:

Chairman of the Board 2006

Board Member 1996-2014

Chaired the following OSSGA Committees: Transportation, Health and Safety, Operations, Rehabilitation, Specifications, Provincial Plans Review Task Force, Governance.

Member of Environment Committee and Specifications Committee in the 1980's and 1990's.

The Ontario Aggregate Resource Corporation

Chairman of the Board 2007

Board member 2007-2013