Aggregate Recycling by Ontario Municipalities

A Research Report on the Leaders and Laggards

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EXECUTIVE SUMMARY

Every year in Ontario, millions of tonnes of reusable asphalt and concrete aggregate is generated from road building and other construction projects. These valuable resources are recyclable and can be used by municipalities in their roads and infrastructure projects. Unfortunately, municipal policies and specifications often prohibit or severely limit the reuse of recycled aggregates in their construction projects, and large volumes of recyclable aggregate end up in our landfills.

There are numerous environmental benefits from recycling aggregate materials. These include removing tens of thousands of trucks loaded with millions of tonnes of aggregates off the road and reducing green house gas emissions, reducing wear and damage to public roads, preservation of new aggregate supplies and avoiding impacts from extracting them, reuse of petroleum products in recycled asphalt and keeping massive quantities of aggregate material out of municipal landfills.

Greater use of recycled aggregate materials in municipal roads and infrastructure construction and maintenance represents the opportunity for Ontario municipalities to demonstrate their environmental commitment.

Unfortunately, Ontario's largest municipalities have a long way to go before they can fully realize the benefits of increased use of recycled aggregate materials. Research on a sample of Ontario municipalities finds:

- Many large municipalities prohibit or severely limit the use of recycled aggregate materials for new roads and infrastructure, and for municipal subdivisions;
- Most large municipalities either do not allow or only allow partial use of recycled aggregate materials in the base and subbase for pavement, engineered fill and trench backfill materials, unpaved shoulders, and fill under concrete slab;
- The type of projects where municipalities are most likely to allow full use of recycled aggregate materials are construction access roads and bicycle paths;
- Most municipalities have not made changes to their policies regarding the use of recycled aggregate materials in the past two years, and only half anticipate making changes over the next two years;
- There is a wide range in the policies and practices of large Ontario municipalities with respect to the use of recycled aggregate materials, where some have policies and practices in place which encourage greater use than others; and
- In a ranking of municipalities based on the extent to which their current policies and practices encourage the use of recycled aggregate materials, the Cities of Toronto, Cambridge and Markham emerge at the top of the list - and Peel Region, the City of Oshawa, and City of Mississauga appear at the bottom.

The research suggests there is room for growth and improvement, by encouraging Ontario municipalities to examine their policies and find ways to realize the benefits of greater use of recycled materials.

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INTRODUCTION

1. Background

Conducted in July and August 2018, this independent study examined current policies and practices regarding the use of recycled aggregate in Ontario municipalities. The research was commissioned by the Toronto and Area Road Builders Association (TARBA) and supported by the Ontario Sewer and Watermain Construction Association (OSWCA), the Greater Toronto Sewer and Watermain Contractors Association (GTSWCA), the Heavy Construction Association of Toronto (HCAT) and the Residential and Civil Construction Alliance of Ontario (RCCAO). These industry associations advocate for the increased use of recycled aggregate materials in infrastructure projects in Ontario, with their primary interests being:

- **To promote more environmentally friendly practices.** The environmental benefits of recycled asphalt and concrete aggregates are numerous and significant: reduced green house gas emissions from tens of thousands of trucks each year hauling virgin aggregates from remote sources 50km, 100km and even further away from the place they are needed; reduced wear on and damage to public roads and bridges; preservation of virgin aggregate supplies and reducing the need for new pits and quarries; reduction in the amount of new asphalt cement (petroleum product) needed to make new hot mix asphalt; and, reduction in amount of recyclable material going to landfill.

- **To support municipalities in achieving efficiencies.** There are potential cost savings to municipalities from using recycled aggregates, although there are costs associated with trucking, managing and processing recycled aggregates to specification. Actual cost savings are dependent on a number of factors including how far virgin aggregates would have to be hauled, volumes of recycled aggregates to be supplied and hauling and crushing requirements to process the materials to specification. Diverting recyclable material from landfill delivers cost savings of about $100 in tipping fees per truckload. Currently producers do not charge contractors for dumping recyclable materials in their yards but as stockpiles grow and space becomes limited, the trend is to charge a fee for accepting recyclable materials, also increasing the cost of new construction.

2. Objectives

This research project has two primary objectives:

1. To understand current policies and practices regarding the use of recycled aggregates in a sample of urban municipalities in Ontario; and

2. To develop a ranked comparison of these municipalities, based on the data collected.

3. Methodology

The research project examines current policy and practices regarding the use of recycled aggregates in a sample of Ontario municipalities. The sample was identified by TARBA, and included six regional municipalities and 19 single or lower tier municipalities:

Regional Municipalities:

- Durham Region
- Halton Region
- Niagara Region
- Peel Region
- Waterloo Region
- York Region

Single or Lower Tier Municipalities:

- City of Barrie
- City of Brampton
- City of Brantford
- City of Burlington
- City of Cambridge
- City of Guelph
- City of Hamilton
- City of Kingston
- City of Kitchener
- City of London
- City of Markham
- City of Mississauga
- City of Oshawa
- City of Ottawa
- City of Toronto
- City of Vaughan
- City of Waterloo
- City of Windsor
- Town of Oakville

Collectively, these 25 municipalities serve more than 10 million Ontarians (more than 76% of Ontario's population) and spend more than $1.2 billion per year on roads.[1]

The data was collected through an online survey. In July 2018, the municipal staff member responsible for roads (Director or equivalent) in each municipality was contacted by email to complete a survey on their current policy and practices (see survey questions in the Appendices). Follow up communications occurred in early August as required. By the end of August 2018, 20 of the 25 municipalities had completed the survey.

The municipalities that did not respond to the survey are: City of Brantford, City of Guelph, City of Oshawa, City of Vaughan, and Town of Oakville. One municipality, Waterloo Region, provided partial data. TARBA was able to obtain data on the City of Oshawa, which has been included in this report.

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[1] Source: 2016 Financial Information Returns of the 25 Municipalities, Schedule 40, Total Roads Expenses Paved and Unpaved (L0611.CO1.11 + L0612.CO1.11).

RANKINGS

FINDINGS

4. Municipal Rankings

Although Ontario has provincial standards with respect to the use of recycled aggregate materials in infrastructure projects, municipalities have discretion in the implementation of these standards - and in their local policies. As a result, practices can vary widely by municipality.

The survey data shows that some Ontario municipalities use and encourage more recycled aggregate materials than do others. The following page presents a ranking [2] of the municipalities which participated in the survey, relative to one another.

The 'Leaders' are identified by the green bars and are moving well toward the goal of maximum use of recycled aggregates, although all have considerable room for increased use.

The 'Laggards' identified by the red bars are municipalities that place greater emphasis on restricting the use of recycled aggregates than allowing its use in their projects.

The middle group are identified by yellow bars, reflecting municipalities that are showing some signs of commitment to recycling concrete and asphalt aggregates but which are not maximizing the opportunity to recycle enough to be included in the 'Leaders' category.

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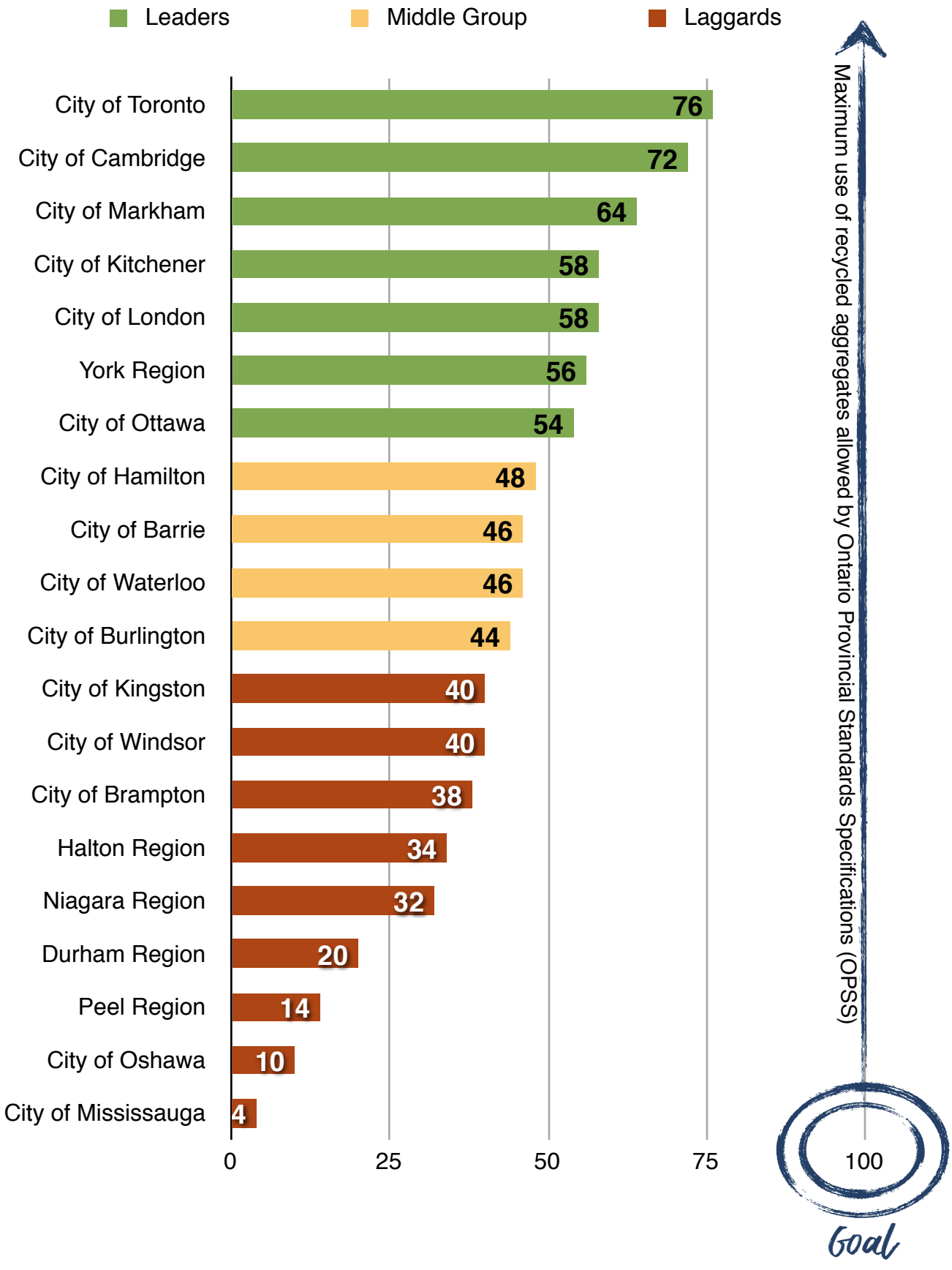
[2] A weighted ranking system was used to develop the scores. A description of the approach and weight given for each score (as established by TARBA) is presented in the Appendices, on page 43.

Municipal Rankings



FINDINGS

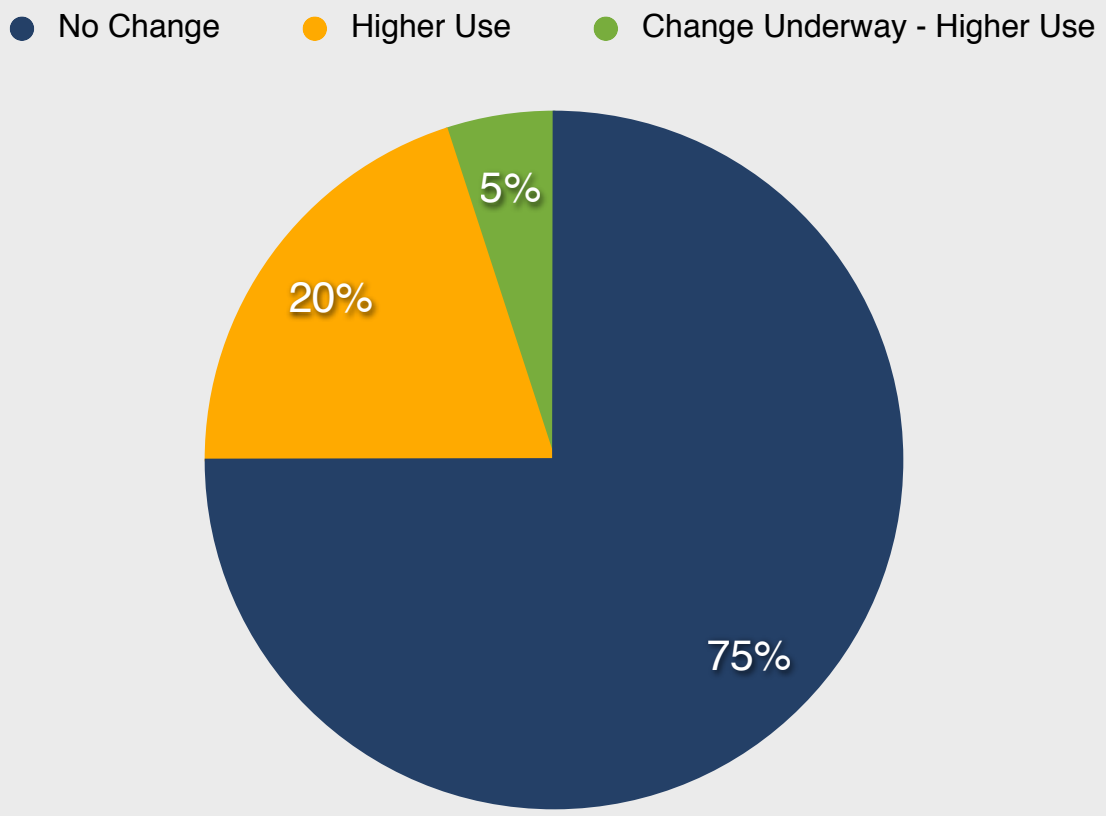
FINDINGS

5. Current Policy Environment

Most municipalities surveyed have an established policy, standards or otherwise regarding the use of recycled aggregate materials. Only one municipality, the City of Kitchener, indicated that they do not have a municipal policy in place ("We follow the Ontario Provincial Standard Specifications. Kitchener does not have its own standards. This will not change anytime soon.").

When asked "Has your municipality's policy on the use of recycled aggregates changed within the past two years?" the majority - three quarters - of the municipalities sampled indicated that their current policy has not changed. In municipalities where the policy has changed or is changing, the shift is towards higher use (rather than reduced use) of recycled aggregates. Four municipalities indicated that their policy has changed in the past two years to allow increased use, and one municipality - the City of Kingston - is currently developing a policy for increased use.

CHART 1 I Responses to Question, "Has your municipality's policy on the use of recycled aggregates changed within the past two years?"

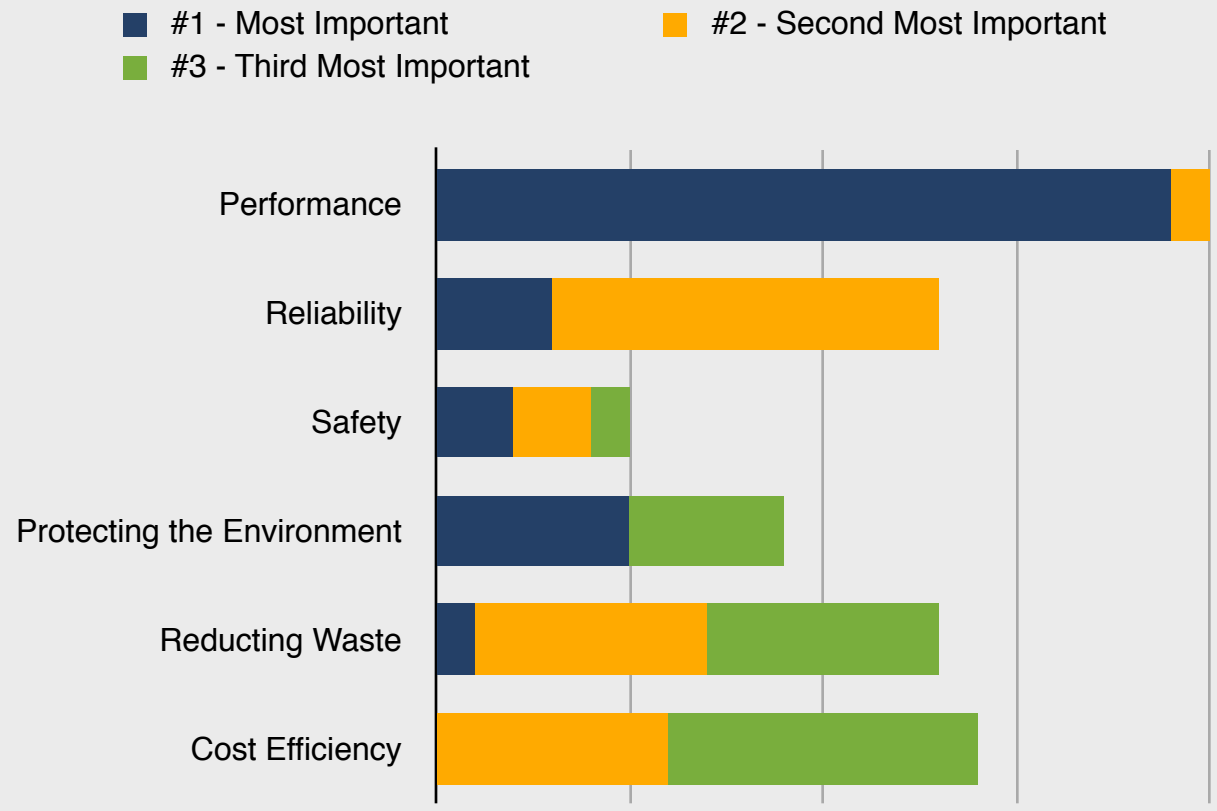


6. Policy Priorities

When asked to rank “What considerations do you think are most important when setting policy about the use of recycled aggregate?” the top response, by a large margin, was performance. Almost all municipalities selected performance as the most important consideration. The second most important consideration is reliability. Factors such as cost efficiency, reducing waste and protecting the environment emerged as less important considerations:

- Performance (weighted average, where 1.0 is most important, of 1.05)
- Reliability (weighted average of 1.77)
- Safety (weighted average of 1.80)
- Protecting the Environment (weighted average of 1.89)
- Reducing Waste (weighted average of 2.38)
- Cost Efficiency (weighted average of 2.57)

CHART 2 I Responses to Question, “What considerations do you think are most important when setting policy about the use of recycled aggregate?”



7. Future Policy Environment

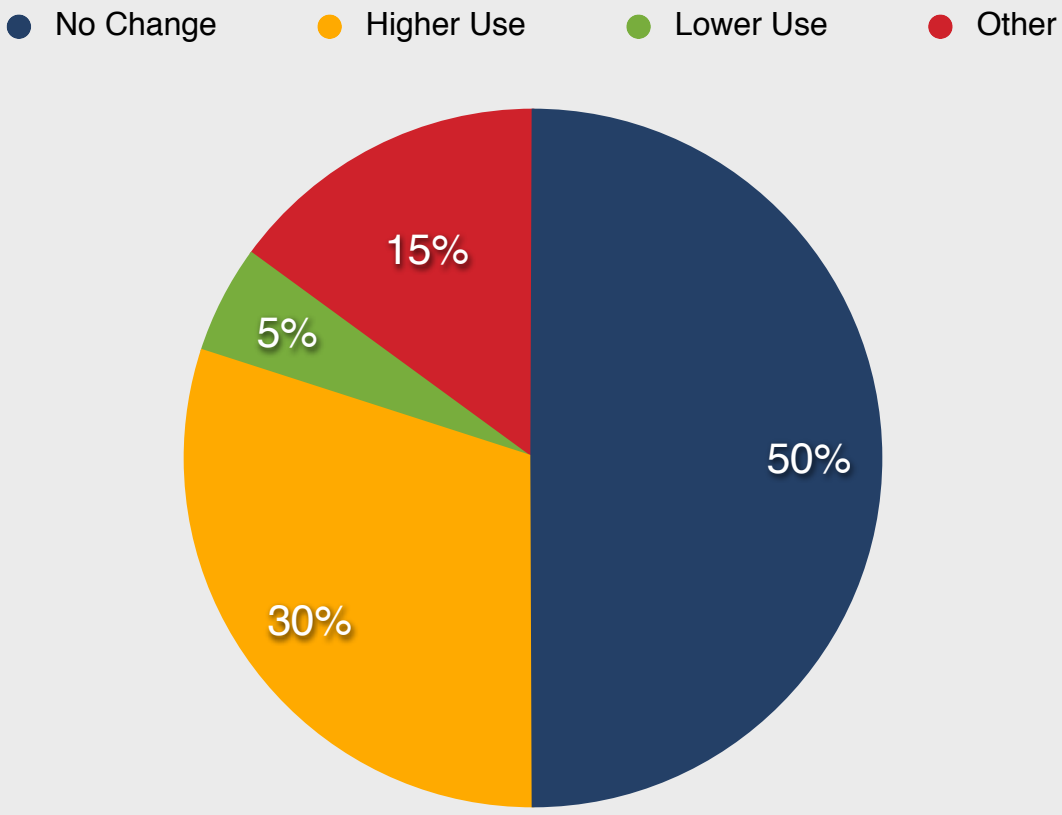
When asked “Do you envision your municipality’s policy on the use of recycled aggregates changing in the next two years?” the most common response was to indicate that no changes are expected. Half of the municipalities do not envision any changes in the near future.

In municipalities where a policy change is anticipated, six indicated that the shift will be towards higher use of recycled aggregates and one (City of Ottawa) indicated that the shift will be towards lower use.

Three municipalities indicated that they did not know whether their policy would change, and provided the following context:

- City of Windsor: “we are working with the local heavy construction industry to develop a plan for additional uses and increase percentage of use in various applications”
- City of Mississauga: use may increase “if greater control on products”
- Region of Durham: “we continue to explore the use of recycled materials for various projects under the right circumstances”

CHART 3 | Responses to Question, “Do you envision your municipality’s policy on the use of recycled aggregates to change in the next two years?”



8. Use of Recycled Aggregates for New Roads & Infrastructure

When asked about the use of recycled aggregates in their new roads and infrastructure projects, municipal policies varied. Most municipalities indicated allowing no or some use of recycled aggregates in base, subbase and pavement. Most municipalities allow partial use for trench backfill, engineered fill, stabalization, fill under concrete slab, and unpaved shoulders. The highest percentage of municipalities allowing full use occurs for lower value applications such as construction access roads and bicycle paths.

TABLE 1 | Responses to Question "Please indicate your municipality's standards for the use of recycled concrete and asphalt aggregates for new roads and infrastructure"

	Does Not Allow	Allow Partial Use	Allow Full Use	Requires Full Use
55mm aggregate for granular base and subbase for pavements	**50%**	40%	10%	0%
19mm aggregate for granular pavement use	**55%**	35%	10%	0%
Trench backfill material	26%	**42%**	32%	0%
Engineered fill	25%	**50%**	25%	0%
Stabilization of soft subgrades	35%	**40%**	25%	0%
Fill under concrete slab on grade	**37%**	**37%**	21%	5%
Unpaved pavement shoulders	25%	**40%**	30%	5%
Construction access roads, bicycle paths, etc.	5%	**45%**	**45%**	5%
Hot mix asphalt	35%	**60%**	5%	0%
Portland cement (ready mix) concrete	**80%**	20%	0%	0%

Note: not all municipalities were able to provide data for all questions. The data has also been rounded to the nearest whole number, so not all rows add to 100.

9. Use of Recycled Aggregates for Municipal Subdivisions

When asked about allowing the use of recycled aggregates in municipal subdivisions, municipal policies varied again. Most municipalities indicated allowing no use of recycled aggregates in new ready mix concrete projects such as subdivision sidewalks and curbs. Most municipalities allow partial use for projects such as road base and subbase, trench backfill and engineered fill, and in new hot mix asphalt. There were no cases where municipalities require full use in any of the types of projects identified. Generally municipal restrictions on the use of recycled aggregates are even greater for private subdivision redevelopment than for their own infrastructure projects.

TABLE 2 | Responses to Question "Please indicate your municipality's standards for the use of recycled concrete and asphalt aggregates for new roads and infrastructure"

	Does Not Allow	Allow Partial Use	Allow Full Use	Requires Full Use
Aggregates for road base and subbase	39%	**50%**	11%	0%
Aggregates for trench backfill and engineered fill	22%	**50%**	28%	0%
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	**74%**	21%	5%	0%
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	37%	**63%**	0%	0%

Note: not all municipalities were able to provide data for all questions. The data has also been rounded to the nearest whole number, so not all rows add to 100.

10. Conclusions

Ontario's largest municipalities have a long way to go before they can fully realize the benefits of increased use of recycled aggregate materials. Currently, policies and practices across Ontario municipalities vary. Based on the survey data provided by the municipalities, some municipalities emerge as "Leaders" and others as "Laggards" in this area. Even in the municipalities identified as "Leaders" there is room for continued growth.

There is much that municipalities can learn from one another in this respect, sharing best practices and working together to increase the use of recycled aggregate materials in order to realize more of the associated benefits for their communities.

Ontario municipalities may also benefit from looking to the Government of Ontario as an example of a public tendering agency that accepts and encourages aggregates recycling. About 20% of the aggregates used in Ministry of Transportation (MTO) projects - whether for granular base and fills or new hot mix asphalt - are recycled asphalt and concrete materials.

Millions of Ontarians rely on their municipalities to build and maintain critical infrastructure, such as roads. Citizens also expect their municipal governments to pursue opportunities to reduce their impact on the environment, decrease costs, and find efficiencies. Increasing the use of recycled aggregate materials in road infrastructure projects represents an opportunity to help municipalities achieve these objectives.

APPENDICES

CITY OF BARRIE

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Comments on Partial Use: Currently follow OPS1010 with provisions for some exceptions.

CITY OF BRAMPTON

In past two years, policy has ...	In next two years, expecting policy to ...
▲ Allowed higher use of recycled aggregate	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades			X	
Fill under concrete slab on grade				X
Unpaved pavement shoulders				X
Construction access roads, bicycle paths, etc.				X
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Comments on Partial Use: Partial use is not based on a percentage but is job specific. We don't allow using recycled aggregate on a roadway but we encourage it off the actual road i.e. sidewalks, park pathways, parking lots etc.

CITY OF BURLINGTON

In past two years, policy has ...	In next two years, expecting policy to ...
▲ Allowed higher use of recycled aggregate	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material		X		
Engineered fill	X			
Stabilization of soft subgrades	X			
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase				
Aggregates for trench backfill and engineered fill				
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: Other-Parking lots,pathways full recycle material (concrete with 30% RAP)
Road base: Crusher Run or Crusher Run with 30% RAP

CITY OF CAMBRIDGE

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements			X	
19mm aggregate for granular pavement use	X			
Trench backfill material			X	
Engineered fill			X	
Stabilization of soft subgrades			X	
Fill under concrete slab on grade			X	
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt			X	
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill			X	
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: 20% RAP for Binder Course Only

CITY OF HAMILTON

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use			X	
Trench backfill material			X	
Engineered fill	X			
Stabilization of soft subgrades	X			
Fill under concrete slab on grade			X	
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: Physical properties shall conform to OPSS.MUNI 1010.05.02, and Table 1. 100% Reclaimed Concrete Material (RCM) and up to 30% by mass Reclaimed Asphalt Pavement (RAP) shall be accepted in Granular 'A' base course materials. Asphalt: Aggregates used shall be in accordance with OPSS.MUNI 1003 Material Specification for Aggregates – Hot Mix Asphalt.

CITY OF KINGSTON

In past two years, policy has ...	In next two years, expecting policy to ...
▲ Currently in development to allow for increased use of recycled aggregate	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material			X	
Engineered fill			X	
Stabilization of soft subgrades			X	
Fill under concrete slab on grade		X		
Unpaved pavement shoulders	X			
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill			X	
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Comments on Partial Use: the use is project specific.

CITY OF KITCHENER

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material	X			
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete		X		

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)		X		
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: We follow OPSS for our allowed percentages.

CITY OF LONDON

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete		X		

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)		X		
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: As per OPSS.

CITY OF MARKHAM

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material			X	
Engineered fill			X	
Stabilization of soft subgrades			X	
Fill under concrete slab on grade			X	
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt		X		
Portland cement (ready mix) concrete		X		

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill			X	
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)			X	
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: As approved and recommended by a qualified geotechnical engineer.

CITY OF MISSISSAUGA

In past two years, policy has ...	In next two years, expecting policy to ...
▲ Allowed higher use of recycled aggregate	▶ "May be if greater control on products"

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material	X			
Engineered fill	X			
Stabilization of soft subgrades	X			
Fill under concrete slab on grade	X			
Unpaved pavement shoulders	X			
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill	X			
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

CITY OF OSHAWA

In past two years, policy has ...	In next two years, expecting policy to ...
No Data	No Data

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material	X			
Engineered fill	X			
Stabilization of soft subgrades	X			
Fill under concrete slab on grade	X			
Unpaved pavement shoulders	X			
Construction access roads, bicycle paths, etc.	X			
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill	X			
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)		X		
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Note: data provided by TARBA, and obtained from the City's standard construction specifications. No data was provided from the City of Oshawa.

CITY OF OTTAWA

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▼ Reduce use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades	X			
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: we allow partial use and it depends on traffic level and the layers (if base, sub-base for granular and binder or surface course for asphalt).

CITY OF TORONTO

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements			X	
19mm aggregate for granular pavement use		X		
Trench backfill material			X	
Engineered fill	X			
Stabilization of soft subgrades	X			
Fill under concrete slab on grade			X	
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase			X	
Aggregates for trench backfill and engineered fill			X	
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: specific percentage for base course asphalt only and not allow any for the surface course asphalt.

CITY OF WATERLOO

In past two years, policy has ...	In next two years, expecting policy to ...
▲ Allowed higher use of recycled aggregate	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use		X		
Trench backfill material	X			
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade		X		
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete		X		

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase		X		
Aggregates for trench backfill and engineered fill	X			
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)		X		
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

CITY OF WINDSOR

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material		X		
Engineered fill			X	
Stabilization of soft subgrades		X		
Fill under concrete slab on grade	X			
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: For trench backfill, recycle material is allowed if the trench is greater than 1.6m. We stipulate a 0.6m cap of virgin aggregate on a minimum of 1m of recycled fill. Let than 1.6m must be virgin aggregate. For asphalt, all mixes (base and surface) can have a maximum of 15% Rap.

DURHAM REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use	X			
Trench backfill material	X			
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade	X			
Unpaved pavement shoulders	X			
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill	X			
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Comments on Partial Use: We use TS1010 from Toronto as our specification. We do not allow material specified OPSS 1010 to be used and of sufficient quality except for a temporary road.

HALTON REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade	X			
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: Project specific. Some local municipalities do not allow any recycled aggregates in road (sub)base and trench backfill.

NIAGARA REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▲ Allow higher use of recycled aggregate

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material			X	
Engineered fill			X	
Stabilization of soft subgrades			X	
Fill under concrete slab on grade	X			
Unpaved pavement shoulders	X			
Construction access roads, bicycle paths, etc.			X	
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase	X			
Aggregates for trench backfill and engineered fill			X	
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)	X			

Comments on Partial Use: N/A

PEEL REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements	X			
19mm aggregate for granular pavement use	X			
Trench backfill material				
Engineered fill		X		
Stabilization of soft subgrades	X			
Fill under concrete slab on grade				
Unpaved pavement shoulders		X		
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt	X			
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase				
Aggregates for trench backfill and engineered fill				
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)				
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)				

Comments on Partial Use: Engineered Fill - 50% and depends on circumstances. Shoulders - Allow millings from same source and must meet gradation requirements. Multi-Use Paths - Allow 50% RCM as granular base. Must meet gradation requirements. No deleterious materials can be used for the above noted.

WATERLOO REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements				
19mm aggregate for granular pavement use				
Trench backfill material				
Engineered fill				
Stabilization of soft subgrades				
Fill under concrete slab on grade				
Unpaved pavement shoulders				
Construction access roads, bicycle paths, etc.				
Hot mix asphalt				
Portland cement (ready mix) concrete				

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase				
Aggregates for trench backfill and engineered fill				
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)				
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)				

Comments: We allow the use of recycled aggregates in conformance with OPS MUNI specifications, so I didn't complete the detailed par. At the Regional Municipal level, we do not look after subdivisions so I would have to defer to our lower tier municipalities for that information

YORK REGION

In past two years, policy has ...	In next two years, expecting policy to ...
▶ Stayed the same	▶ Stay the same

NEW ROADS & INFRASTRUCTURE	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
55mm aggregate for granular base and subbase for pavements		X		
19mm aggregate for granular pavement use			X	
Trench backfill material		X		
Engineered fill		X		
Stabilization of soft subgrades		X		
Fill under concrete slab on grade	X			
Unpaved pavement shoulders			X	
Construction access roads, bicycle paths, etc.		X		
Hot mix asphalt		X		
Portland cement (ready mix) concrete	X			

MUNICIPAL SUBDIVISIONS	Does Not Allow	Allow Partial Use	Allow Full Use	Require Full Use
Aggregates for road base and subbase			X	
Aggregates for trench backfill and engineered fill		X		
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)	X			
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)		X		

Comments on Partial Use: We typically follow the allowance as indicated in OPSS.

SURVEY QUESTIONS

A) Background Information:

1. What is your name? [open]

2. What is your title? [open]

3. What municipality do you work for? [open]

B) Current Practices:

4. Please indicate your municipality's standards for the use of recycled concrete and asphalt aggregates for new roads and infrastructure. [select]

	Does Not Allow	Allow Partial Use	Allow Full Use	Requires Full Use
55mm aggregate for granular base and subbase for pavements				
19mm aggregate for granular pavement use				
Trench backfill material				
Engineered fill				
Stabilization of soft subgrades				
Fill under concrete slab on grade				
Unpaved pavement shoulders				
Construction access roads, bicycle paths, etc.				
Hot mix asphalt				
Portland cement (ready mix) concrete				

5. Please indicate your municipality's standards for the use of recycled concrete and asphalt aggregates for municipal subdivisions. [select]

	Does Not Allow	Allow Partial Use	Allow Full Use	Requires Full Use
Aggregates for road base and subbase				
Aggregates for trench backfill and engineered fill				
Recycled aggregates in new ready mix concrete (sidewalks, curbs, etc.)				
Recycled aggregates in new hot mix asphalt (temporary and permanent subdivision roads)				

6. If you indicated "allow partial use" for any of the questions above, does your municipality require a specific percentage or have other requirements? [open]

C) Current Policies:

7. Has your municipality's policy on the use of recycled aggregates changed within the past two years? [select]
- No, our policy has stayed the same
- Yes, our policy has changed to allow for a higher use of recycled aggregates
- Yes, our policy has changed to reduce the use of recycled aggregates
- Other (please specify)

8. Do you envision your municipality's policy on the use of recycled aggregates to change in the next two years? [select]
- No, I do not forsee any changes in the next two years
- Yes, I believe we will shift towards higher use of recycled aggregates
- Yes, I believe we will shift towards reduced use of recycled aggregates
- Other (please specify)

9. What considerations do you think are most important when setting policy about the use of recycled aggregates? Please choose the top three. [select]

	#1 - Most Important	#2 - Second Most Important	#3 - Third Most Important
Safety			
Reliability			
Performance			
Cost efficiency			
Reducing waste			
Protecting the environment			
Other [specify]			

10. Is there anything else you would like to share with us regarding the use of recycled aggregates in your municipality? [open]

RANKING METHODOLOGY

All municipal data was supplied by the municipalities except where no response was received. Data for Oshawa was developed from the city's standard construction specifications.

The survey questions related to a municipality's policies and specifications addressing acceptance of recycled aggregates for various common applications. Municipalities could choose 'Allow Full Use' which means they allow as much recycled aggregate in their work as permitted by Ontario Provincial Standard Specifications (OPSS).[2] Full marks are given for such responses. If they choose 'Partial Use Only', generally the municipality allows some degree of recycled aggregates but not as much as they could according to OPSS 1010. Partial marks were given for such responses. Where 'Does Not Allow' is the response for a given application, no marks are given for that question.

Following is a list of the survey questions and the weightings attached to each recycled aggregate application for purposes of developing a ranking score.

For Use In:	Allows Full Use	Partial Use	Does Not Allow
Roads and infrastructure			
55mm aggregate, granular base	4	2.5	0
19 mm granular pavements	2	1.5	0
Trench Backfill	2	1	0
Engineered Fill	1	0.5	0
Stabilization of soft subgrade	2	1.5	0
Fill under concrete slab on grade	2	1	0
Unpaved shoulders	1	0.5	0
Access roads, bike paths, etc.	1	0.5	0
Use in new hot mix asphalt	2	1	0
Use in new ready-mix concrete	1	0.5	0
Subdivisions			
Aggregates for road base and subbase	3	2	0
Trench backfill and engineered fill	2	1.5	0
New hot mix for temporary & final roads	2	1.5	0
Total	25		

[2] The OPSS are provincial specifications for construction and materials used for public infrastructure projects. OPSS are owned and maintained by the Ministry of Transportation (MTO) in partnership with the Municipal Engineers Association (MEA) and there is a version of the provincial documents that have been adapted for municipal use to address differences between building provincial highways and municipal roads.

ABOUT THE RESEARCHER

KATE GRAHAM researches, writes, consults, speaks and teaches about local government in Canada. Kate has a decade of experience working in local government, most recently as the Director, Community & Economic Innovation at the City of London. Kate was named as one of London's Top 20 Under 40 for her work in this role. Kate currently teaches Political Science at Western University and King's University College, and is completing a PhD in Political Science at the University of Western Ontario. Kate can be reached at katemariegraham@gmail.com.

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