CANADIAN INFRASTRUCTURE REPORT CARD

Informing the Future

CANADIAN INFRASTRUCTURE REPORT CARD

ACKNOWLEDGEMENTS

For more information on this Report Card, or the project, please contact **info@canadainfrastructure.ca**

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This project results from the shared conviction that assessing the health of municipal infrastructure is necessary if Canada is to ensure that the services, quality of life and economic growth provided by this infrastructure can be sustained over the long term.

The Canadian Infrastructure Report Card (CIRC) provides an assessment of the health of municipal infrastructure as reported by cities and communities across Canada. It is not a prescriptive document, it does not provide recommendations for action, nor does it forecast future capital requirements resulting from municipal growth.

Informing the Future: The Canadian Infrastructure Report Card builds and improves on the first CIRC, published in 2012. The 2016 CIRC report survey assessed the state of municipal roads and bridges, public transit, buildings, sport and recreation facilities, stormwater, wastewater and potable water infrastructure. A total of 120 survey responses were received from municipalities across Canada.

Of the 120 municipalities that responded to the survey, 52 also participated in the 2012 exercise (see Appendix A for a comparison of the 2012 and 2016 survey samples). Further, the 2016 CIRC survey results included a higher percentage of questions answered and provided more detail on inventory, condition and replacement value. There was therefore a marked improvement in the availability of data and source of condition information. Due to these important distinguishing factors, the 2012 and 2016 CIRC report should be viewed as separate snapshots in time.

This report is presented in two parts: Part 1 provides a national picture based on extrapolated survey results, while Part 2 presents the actual (not extrapolated) survey results by asset class. Extrapolated results in Part 1 are based on a reasonably representative sample of Canada's geographic population distribution. Because a high percentage of large municipalities responded to the survey, the extrapolation of the results in Part 1 took into account the size of responding municipalities in order to better estimate the state of municipal infrastructure nationally.

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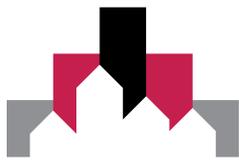
METHODOLOGY

The information used in this study was collected using a voluntary survey, distributed to the nearly 2,000 members of the Federation of Canadian Municipalities (FCM)[1], which represent nearly 90% of the Canadian population. Information on transit infrastructure was collected through a separate survey with the help of the Canadian Urban Transit Association (CUTA).[2] The self-reported results provide qualitative and quantitative information on municipal infrastructure and its management.

Municipal governments own nearly 60% of Canada's core public infrastructure (see Figure 1). The 2016 CIRC survey collected information on the following municipally-owned public infrastructure assets: water systems, roads and bridges, buildings, sport and recreation facilities and public transit. The survey did not collect data on other municipally-owned infrastructure classes, including: solid waste management, municipal fleet and equipment (other than transit), affordable housing, energy systems, and information and communication technologies. As such, the total value of municipal infrastructure is not inclusive of all infrastructure assets.
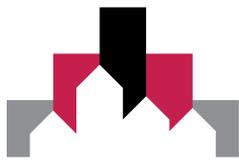
Figure 1: Net Stock of Core Public Infrastructure by Level of Government, 2013

Notes: Net stock calculated using a depreciation model. 2013 data based on forecast.

Source: *Updating Infrastructure in Canada: An Examination of Needs and Investments.*
Report of the Standing Committee on Transport, Infrastructure and Communities, June 2015.

FEDERAL:
1.8%

PROVINCIAL/
TERRITORIAL
41.4%
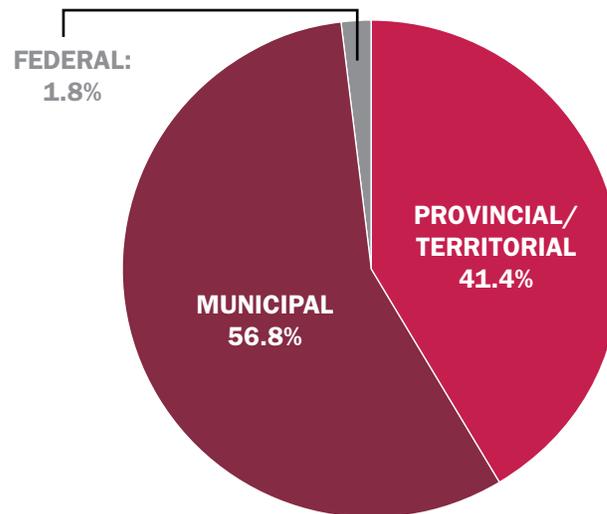
MUNICIPAL
56.8%

The survey developed for this report contained nearly 100 detailed questions on the inventory, condition and management of municipally-owned or leased infrastructure. A total of 120 municipalities responded to the survey, including 10 regional municipalities and 110 single or lower-tier municipalities. These 120 municipalities represent a population sample of nearly 20 million Canadians, equivalent to 56% of Canada's total population. Survey results were extrapolated to the full Canadian population[3] to achieve the national picture presented in Part 1 of this report, with the exception of the transit data which was only extrapolated to the serviced transit population of Canada[4] (see Appendices D and E for the full list of municipalities and transit authorities that provided survey data). More detailed sector reports for each asset class are available in Part 2.

It is important to take a number of factors into account when reading both the extrapolated results contained in Part 1 and the direct survey results displayed in Part 2 of the this report. First, the survey was entirely voluntary and did not target a particular sample of municipalities. Due to the high number of questions and the level of detail sought, it is reasonable to deduce that the participating municipalities have more mature infrastructure-management systems than the norm, and as a result, may be more proactive in managing and maintaining their infrastructure.
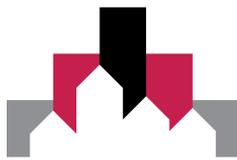
METHODOLOGY

Whereas the maturity of asset management systems varies in communities of all sizes, small towns and rural municipalities faced more of a barrier to participation in this study, as staffing and budgetary limitations reduce capacity for internal asset management.

It is therefore not surprising that large municipalities were overrepresented in the survey sample.[5] Large municipalities often have more capacity to answer very detailed survey questions on asset inventory, value and condition. To account for the disproportionate representation of large municipalities, two separate extrapolations were undertaken; one for large municipalities and one combining medium-sized and small municipalities (see Glossary of Terms for definitions).[6] These two extrapolations were then added together to provide a national picture. This approach produced a more accurate extrapolation as the inventory, condition and value of municipal infrastructure per household differs by size of municipality.

For the purposes of reporting average condition ratings, the most representative measure was used. For assets such as roads and pipes, survey questions assessed the physical condition by length of the asset. For other categories such as facilities and buildings, physical condition was assessed according to the replacement value of the asset. Using length of asset where applicable provided a more consistent and reliable means of comparing assets across municipalities. For buildings and facilities, it was determined that assessing physical condition by replacement value was the most representative indicator.

The calculation of the overall condition rating assigned to an asset category used weighted averages, based on the following system:

Condition rating	Weight assigned
Very poor	0.2
Poor	0.4
Fair	0.6
Good	0.8
Very good	1.0

The methodology followed was not designed to produce exact numbers, but rather to provide a picture of the health of our national municipal infrastructure foundation and its value across the country.

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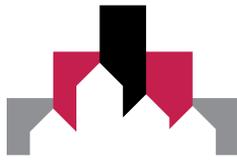
INTRODUCTION

Municipal infrastructure gets people and goods moving, provides safe drinking water, handles our waste, creates spaces for sport and recreation, and helps protect our homes against flooding and other natural disasters. It is the foundation that the daily life of Canadians is built upon. The strength of this foundation enables our communities and local businesses to grow, and ensures Canadians have a high quality of life.

The Canadian Infrastructure Report Card (CIRC) assesses the condition of Canada's municipally-owned infrastructure to help decision-makers identify cracks in this important foundation, and inform solutions to address them.

Building infrastructure, building Canada

Development of Canada's public infrastructure has closely tracked that of the country, beginning in the early 1800s with the first roads, canals and railways. Projects like the Lachine, Welland and Rideau Canals and transcontinental railway lines are a testament to the strong public infrastructure Canada's three orders of governments began to build in the 19th century.

By the early 20th century, Canadian public works reflected the country's new industrial reality. Electrification, safe drinking water, waste management, and public transit supported growing cities and communities. Further investment in our national transportation system supported manufacturing, exports and industrial growth.

Canada's infrastructure 'Golden Age' followed the Second World War, and continued through the 1950s and 60s, with investments in municipal infrastructure supporting both urban and rural development.

In the 1970s and 80s, however, government spending on public infrastructure declined in the face of competing priorities and the end of the post-war economic boom.

The deferral of needed investment led to a decline in the physical condition of local infrastructure and an increase in the cost of renewing aging assets.
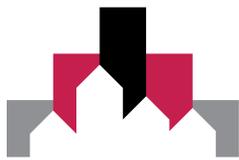
INTRODUCTION

Figure 2: General Government Gross Fixed Capital Formation as a Percentage of GDP[7]
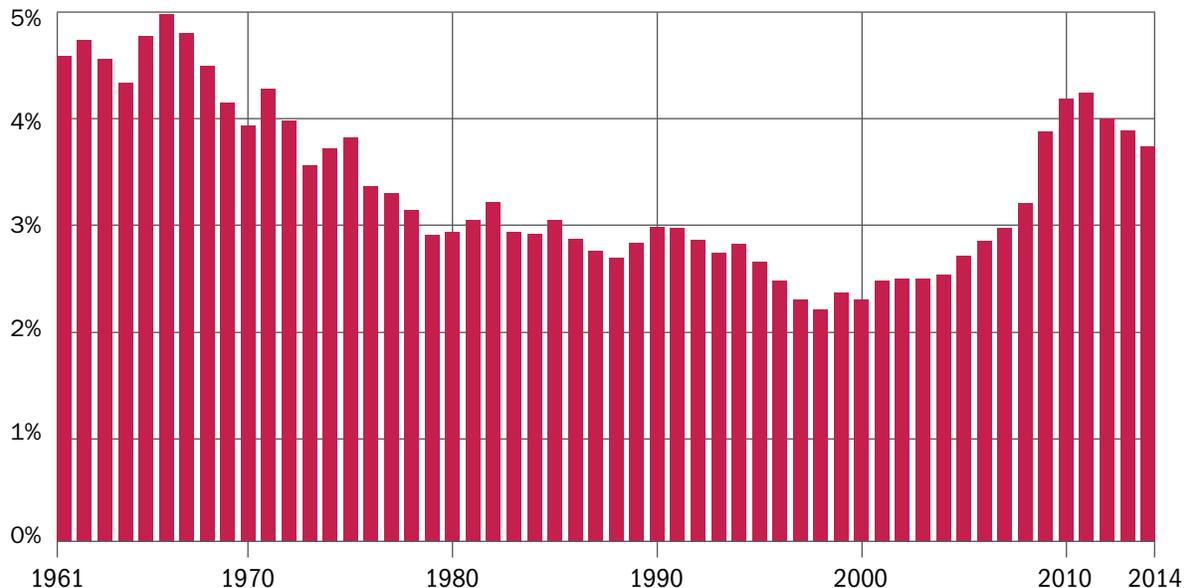
Since the early 2000s, federal, provincial and territorial governments have worked more closely with municipalities to address the country's aging infrastructure, in recognition of local ownership, needs and financial pressures.

The federal New Deal for Cities in 2004 created the federal Gas Tax Fund, with the objective of providing predictable funding for municipal infrastructure projects. Subsequent investments under the Building Canada Fund launched in 2007 expanded the federal role in infrastructure, as did the indexation of the permanent Gas Tax Fund and a new 10-year New Building Canada Fund, both launched in 2014.

As owners of the majority of Canada's public infrastructure, municipal governments are essential partners in building Canada, identifying and implementing projects that respond to local needs. This includes both responding to new needs caused by population and economic growth as well as the renewal and reinvestment of the existing stock of municipally-owned infrastructure. All local governments, regardless of size, face multiple pressures and demands for infrastructure including population growth, climate change and environmental legislation that create new needs and make upgrades to older systems necessary.

Despite a renewed commitment to infrastructure by the three levels of government in recent years, the impact of unpredictable investment patterns is still felt by municipalities today.

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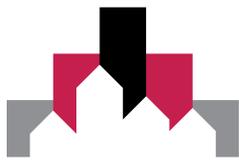
KEY MESSAGES

Municipalities own the core infrastructure assets that are critical to the quality of life of Canadians and the competitiveness of our country. Almost 60% of Canada's core public infrastructure is owned and maintained by municipal governments. According to survey results, the total value of core municipal infrastructure assets is estimated at $1.1 trillion dollars, or about $80,000 per household.[8] Municipal infrastructure gets people and goods moving, provides safe drinking water, handles our waste, creates spaces for sport and recreation, and helps protect our homes against flooding and other natural disasters. The delivery of these essential public services is reliant on a strong foundation of municipal infrastructure. This foundation enables our communities and local businesses to grow, and ensures Canadians can lead safe and healthy lives.

One-third of our municipal infrastructure is in fair, poor or very poor condition, increasing the risk of service disruption. The survey asked municipalities to qualitatively assess their infrastructure according to a five-point rating scale ranging from Very Good to Very Poor (see Glossary of Terms for more detail). Nearly 35% of assets are in need of attention. Assets in fair, poor and very poor conditions represent a call for action. Survey results demonstrate that roads, municipal buildings, sport and recreation facilities and public transit are the asset classes most in need of attention. Figure 3 provides a summary of the physical condition ratings for the sectors included in this report.

Figure 3: Summary of Average Physical Condition Rating
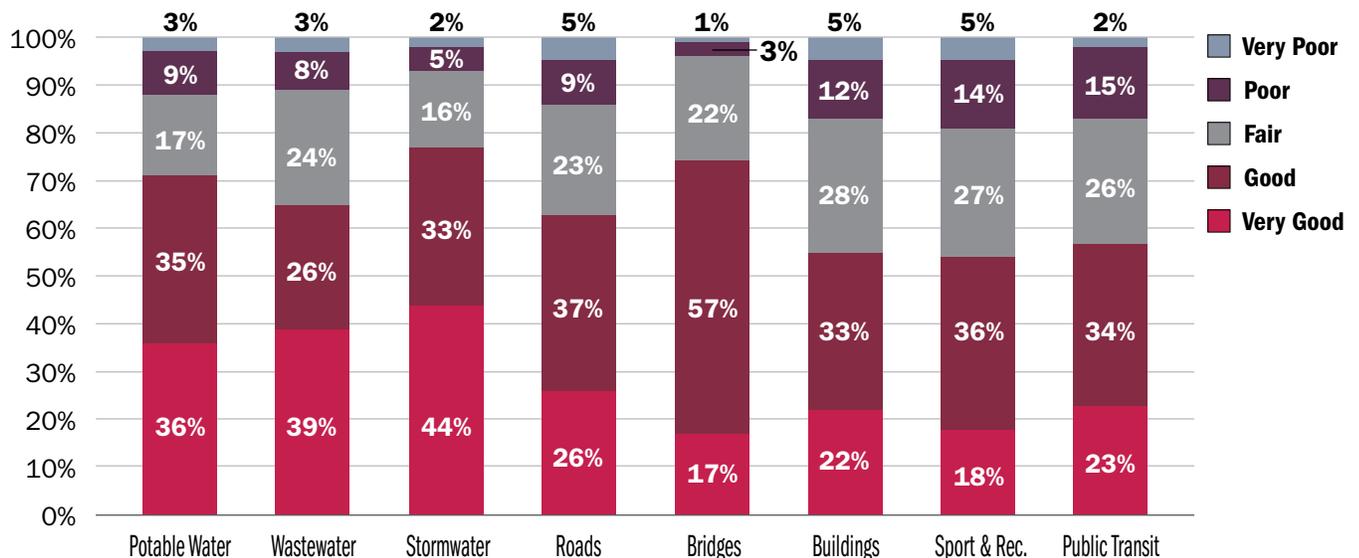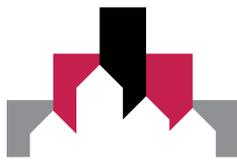
KEY MESSAGES

Increasing reinvestment rates will stop the deterioration of municipal infrastructure. The 2016 CIRC found that rates of reinvestment are lower than targets recommended by asset management practitioners. The rate can vary based on factors such as the age of the infrastructure, the level of service and risk tolerance. The values provided are based on the experience of municipal asset management practitioners and are intended to be informative in nature. Roads and sidewalks, storm water, and sport and recreation infrastructure presented the largest gaps in terms of current and target rates of reinvestment, with water systems-related facilities not far behind. Figures 4 and 5 demonstrate the gap between current and target reinvestment levels. Continuing down this path will result in a gradual decline of physical condition levels that will impact municipal services.[9] When contrasted with target reinvestment rates[10] it becomes clear that current levels of reinvestment in municipal infrastructure are inadequate.

Figure 4: Target Reinvestment Rates vs Current Reinvestment Rate

Infrastructure	Lower Target Reinvestment Rate	Upper Target Reinvestment Rate	Current Reinvestment Rate
Potable Water (linear)	1.0%	1.5%	0.9%
Potable Water (non-linear)	1.7%	2.5%	1.1%
Wastewater (linear)	1.0%	1.3%	0.7%
Wastewater (non-linear)	1.7%	2.5%	1.4%
Stormwater (linear)	1.0%	1.3%	0.3%
Stormwater (non-linear)	1.7%	2.0%	1.3%
Roads and Sidewalks	2.0%	3.0%	1.1%
Bridges	1.0%	1.5%	0.8%
Buildings	1.7%	2.5%	1.7%
Sport and Recreation	1.7%	2.5%	1.3%
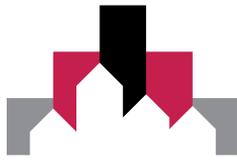
KEY MESSAGES

Figure 5: Summary of the physical condition of the infrastructure studied, by replacement value, extrapolated to the entire country

Infrastructure	Extrapolated Replacement Value of All Assets	Assets in Very Poor and Poor Condition	Assets in Fair Physical Condition	Anticipated Condition Based on Reported Reinvestment Levels (Improving, Stable, Declining)
		Replacement Value	Replacement Value	
Potable Water	$207 billion	$25 billion (12%)	$35 billion (17%)	Declining
Wastewater	$234 billion	$26 billion (11%)	$56 billion (24%)	Declining
Stormwater	$134 billion	$10 billion (7%)	$21 billion (16%)	Declining
Roads	$330 billion	$48 billion (15%)	$75 billion (23%)	Declining
Bridges	$50 billion	$2 billion (4%)	$11 billion (22%)	Declining
Buildings	$70 billion	$12 billion (17%)	$20 billion (28%)	Declining
Sport and Recreation Facilities	$51 billion	$9 billion (18%)	$14 billion (27%)	Declining
Transit	$57 billion	$9 billion (16%)	$15 billion (27%)	Unavailable
Total	**$1.1 trillion**	**$141 billion (12%)**	**$247 billion (22%)**	
Replacement Value per Household	**$80,000**	**$10,000**	**$18,000**	
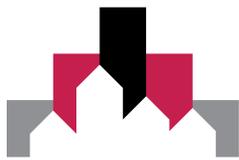
Increasing reinvestment rates will save money in the long-term. Without an increase in current reinvestment rates, the condition of Canada's core municipal infrastructure will gradually decline, costing more money and risking service disruption. For example, Figure 6[11] demonstrates that when roads, as is typical for many assets,[12] are allowed to deteriorate below a Fair condition rating, the rate of deterioration and reinvestment costs both increase substantially. Investing in preventive maintenance and regular repair will prolong the asset service life, avoiding premature and costly reconstruction and service disruption.

Figure 6: Example of asset deterioration curve (Roads)

RATING:

100%	EXCELLENT
	GOOD
	FAIR
	POOR
20%	VERY POOR
	FAILED

40% Drop in Quality

75% of Life

40% Drop in Quality

12% of Life

Spending $1 on preservation here…

…eliminates or delays spending $6 to $10 on rehabillitation or reconstruction here.

0   5   10   15   20   AGE
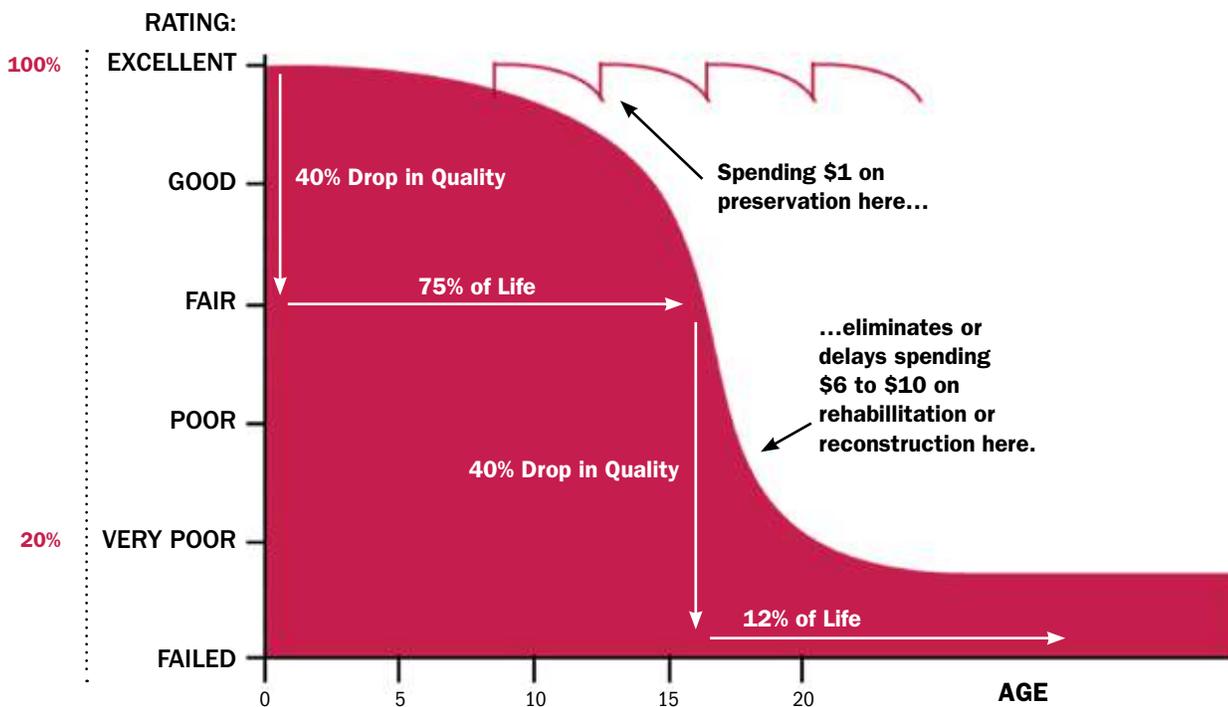
Building for today's communities and tomorrow's Canada requires long-term planning. Survey results demonstrate that, if our current rates of reinvestment do not change, the condition of Canada's existing municipal infrastructure will decline. A long-term plan is needed to ensure Canadians can continue to rely upon essential public services without disruption. This would also allow municipalities to plan for projected population growth, keep up with technological innovation, and deal with the increasing impact of extreme weather events.
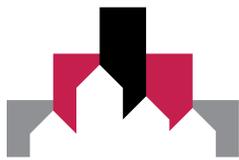
ASSET MANAGEMENT

The 2016 CIRC survey included a section on asset management for the first time. These questions shed light on the state of Canadian municipal asset management practices.[13]

Survey results point to varied asset management practices according to community size. For instance, 62% of large municipalities, 56% of medium-sized municipalities and 35% of small municipalities reported having a formal asset management plan in place. **All communities, particularly smaller municipalities, would benefit from increased asset management capacity.**

Further, nearly 40% of responding municipalities reported publishing a state of infrastructure report (SOIR).[14] Once again, results varied according to the size of the municipality. Only 10% of small municipalities reported publishing an SOIR, whereas levels reached 56% for medium-sized municipalities and 63% for large municipalities.

Many municipalities reported having undertaken risk assessments, applied new inspection technology to assess the condition of infrastructure, and carried out periodic inspections. Survey results also pointed to a high degree of variability in the condition of the infrastructure assessed, suggesting that having an objective understanding of the physical condition is an area that requires continued attention.

In addition to physical condition, survey questions focused on gaining a better understanding of the ways municipalities are managing their assets. For example, approximately 40% of responding municipalities reported that they use computer-based information and maintenance-management systems to manage their road and transit assets; almost 25% for potable water and wastewater; 20% for stormwater; 22% for sport and recreation facilities and 30% for municipal buildings. Should these figures improve over time, better and more consistent condition reporting can be expected.

Finally, approximately 19% of responding municipalities stated that they use formal mechanisms (i.e. municipal policies or documented practices) to factor climate change adaptation strategies into decision-making. Adaptation strategies were formally factored-in for the following assets: Stormwater (16%); Roads and Bridges (15%); Wastewater (16%); Buildings (14%); Potable Water (14%); Sport and Recreation Facilities (13%); Public Transit (6%). Whether a municipality formally factored in climate change varied somewhat according to size of municipality: 10% for small municipalities, and 27% for both large and medium municipalities.

More detailed information on these areas of asset management is included in the summary of results by category in Part 1, as well as in the detailed reports found in Part 2 of this report.

CANADIAN INFRASTRUCTURE REPORT CARD

PART 1:
THE NATIONAL PICTURE
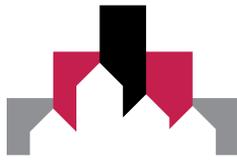
PART 1: THE NATIONAL PICTURE

SUMMARY OF RESULTS BY INFRASTRUCTURE CATEGORY

POTABLE WATER

POTABLE WATER

The potable water infrastructure assets that were included in the survey capture the linear portion of drinking water systems (i.e. distribution and transmission pipes) as well as non-linear assets (i.e. water treatment plants, water pumping stations and water reservoirs).

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 106 responses received for the potable water section of the survey, which corresponds to a sample of 19 million Canadians.

Key Performance Indicator	Results
Extrapolated replacement value of assets in poor or very poor condition	$25 billion
Extrapolated replacement value of assets in fair condition	$35 billion
Extrapolated replacement value of assets in good or very good condition	$147 billion
Total extrapolated replacement value of all potable water assets	$207 billion
Average physical condition of potable water assets	78.3 (Good)[15]
Average age of linear assets	37 years
Reinvestment rate of linear potable water assets	0.9%
Reinvestment rate of non-linear potable water assets	1.1%
Replacement value per Canadian household	$14,507

CANADIAN INFRASTRUCTURE REPORT CARD

PART 1: THE NATIONAL PICTURE

POTABLE WATER

Potable water: Physical Condition Ratings by Replacement Value

VERY POOR
3%
$7 billion

POOR
9%
$18 billion

FAIR
17%
$35 billion

VERY GOOD
36%
$75 billion

GOOD
35%
$72 billion

Potable Water: Average Physical Condition Ratings

	Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
	78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

☐ <50%: Very Poor   ☐ 50-59.9%: Poor   ☐ 60-69.9%: Fair   ☐ 70-79.9%: Good   ☐ 80-100%: Very Good

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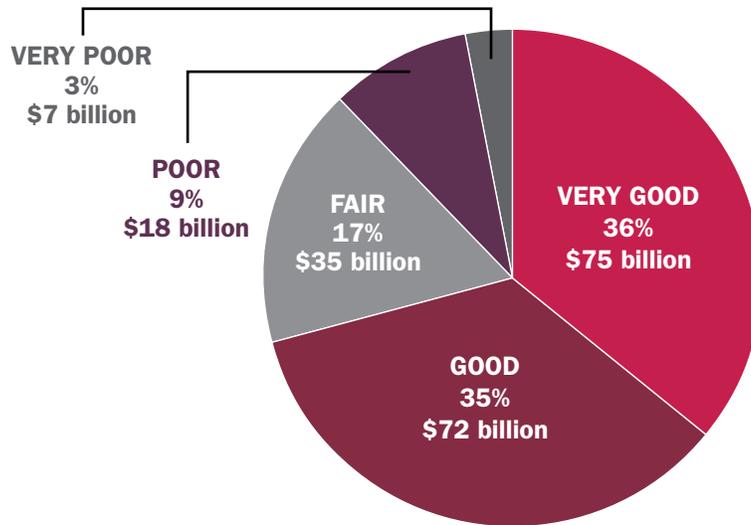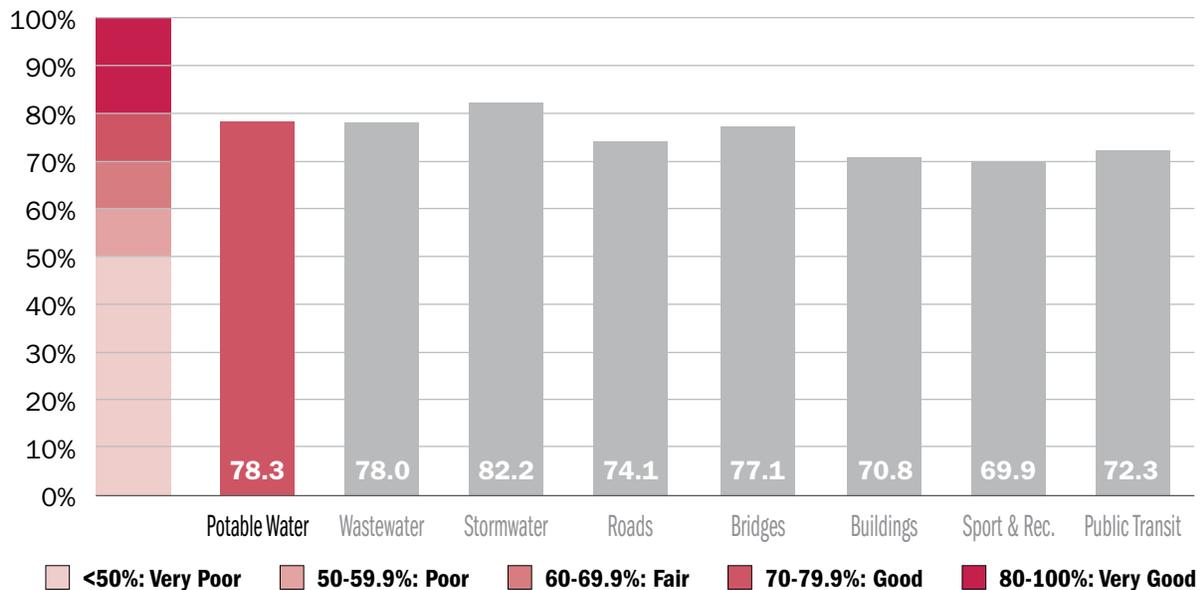
PART 1: THE NATIONAL PICTURE

POTABLE WATER

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS WILL RESULT IN A **DECLINE** IN THE CONDITION OF **POTABLE WATER** ASSETS OVER TIME.

Based on the responses received, the average annual reinvestment rate of linear (pipes) potable water assets is 0.9%. For non-linear assets, such as treatment plants, pumping stations and reservoirs, the average annual reinvestment rate is 1.1%. For potable water pipes, asset management practitioners typically target a reinvestment rate between 1% to 1.5%. For non-linear assets, the target reinvestment rate varies for each facility type, but is typically between 1.7% and 2.5%.

AVERAGE ANNUAL REINVESTMENT RATE		
	TARGET	CURRENT
linear assets	1.0% to 1.5%	0.9%
non-linear assets	1.7% to 2.5%	1.1%

PART 1: THE NATIONAL PICTURE

POTABLE WATER

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Source of Physical Condition Information: For linear assets, proxy information (age, pipe material, etc.) was indicated as the source of condition information for approximately half the responses and for non-linear assets, opinion of municipal representative was the most common source of condition information.

Condition Assessment Cycle: For 22% of responding municipalities, the condition assessment cycle of linear assets is greater than 10 years and almost half indicated they had no data. The condition assessment cycle for non-linear assets was less than five years for nearly 40% of municipalities, over five years for 40% and almost 20% had no data.

Use of Technology: Almost 90% of municipalities reported using some type of technology to assess their underground water mains.

Assessing vulnerabilities

Risk Assessment: Nearly 60% of municipalities have undertaken a risk/criticality assessment of their potable water assets.

Climate Change. Fourteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for potable water.

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), a high percentage (75%) of those plans include potable water assets.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), approximately 75% of those reports include potable water assets.

Asset Management Systems: The majority of respondents reported having a potable water asset management system.

WASTEWATER

WASTEWATER

The wastewater infrastructure assets that were included in the survey relate to the linear wastewater collection system (i.e. small local collection pipes, large local collection pipes, trunk collection pipes and forcemains) as well as non-linear assets (i.e. treatment plants, pumping stations and storage tanks).

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 102 responses received for the wastewater section of the survey, which corresponds to a sample of 19.8 million Canadians.

Key Performance Indicator	Results
Extrapolated replacement value of assets in poor or very poor condition	$26 billion
Extrapolated replacement value of assets in fair condition	$56 billion
Extrapolated replacement value of assets in good or very good condition	$152 billion
Extrapolated replacement value of all wastewater assets	$234 billion
Average physical condition of wastewater assets	78.0 (Good)[16]
Average age of linear assets	38 years
Reinvestment rate of linear wastewater assets	0.7%
Reinvestment rate of non-linear wastewater assets	1.4%
Replacement value per Canadian household	$16,380

CANADIAN INFRASTRUCTURE REPORT CARD

WASTEWATER

Wastewater: Physical Condition Ratings by Replacement Value

VERY POOR
3%
$6 billion

POOR
8%
$20 billion

FAIR
24%
$56 billion

VERY GOOD
39%
$91 billion

GOOD
26%
$60 billion

Wastewater: Average Physical Condition Ratings

	Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
	78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

☐ <50%: Very Poor   ☐ 50-59.9%: Poor   ☐ 60-69.9%: Fair   ☐ 70-79.9%: Good   ☐ 80-100%: Very Good

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PART 1: THE NATIONAL PICTURE

WASTEWATER

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF WASTEWATER ASSETS OVER TIME.

Based on the responses received, the average annual reinvestment rate of linear wastewater assets (pipes) is 0.7%. For non-linear assets, such as treatment plants and pumping stations, the average annual reinvestment rate is 1.4%. For wastewater pipes, asset management practitioners typically target a reinvestment rate in the range of 1% to 1.3%. For non-linear assets, the target reinvestment rate varies for each facility type, but is typically around 1.7% to 2.5%.

AVERAGE ANNUAL REINVESTMENT RATE		
	TARGET	CURRENT
linear assets	1.0% to 1.3%	0.7%
non-linear assets	1.7% to 2.5%	1.4%

WASTEWATER

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Source of Physical Condition Information: For linear assets, proxy information (age, pipe material) was the most common source of condition information indicated by 27-43% of respondents. Opinion of municipal representative was the most common response for non-linear assets, with 32-39% of responses.

Condition assessment cycle: Forty-six per cent responding municipalities assess their linear assets every ten years; 22% had no data. The condition assessment cycle for non-linear assets was at least every ten years for 59% of municipalities and 15% had no data.

Use of Technology: Almost all (97%) of municipalities reported that they use technology to assess their underground wastewater sewers with the largest percentage using Closed Circuit TV (59%).

Assessing vulnerabilities

Risk Assessment: Fifty-eight per cent of municipalities have undertaken a risk/criticality assessment of their wastewater assets.

Climate Change: Sixteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for wastewater.

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), nearly 80% of those plans include wastewater.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), 80% of those include wastewater assets.

Asset Management Systems: Ninety-five per cent of respondents that own and/ or operate wastewater systems reported using asset management systems whether computer only (24%), paper only (13%) or both (58%). The remaining five per cent did not have an asset management system.
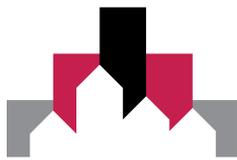
PART 1: THE NATIONAL PICTURE

STORMWATER

The stormwater infrastructure assets that were included in the survey relate to the linear stormwater collection system (i.e. small local collection pipes, large local collection pipes and trunk collection pipes) as well as non-linear assets (i.e. stormwater drainage pump stations, stormwater management facilities and culverts).

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 111 responses received for the stormwater section of the survey, which corresponds to a sample of about 20 million Canadians.

Key Performance Indicator	Results
Extrapolated replacement value of assets in poor or very poor condition	$10 billion
Extrapolated replacement value of assets in fair condition	$21 billion
Extrapolated replacement value of assets in good or very good condition	$103 billion
Extrapolated replacement value of all stormwater assets	$134 billion
Average physical condition of stormwater assets	82.2 (Very Good)[15]
Average age of linear assets	32 years
Reinvestment rate of linear stormwater assets	0.3%
Reinvestment rate of non-linear stormwater assets	1.3%
Replacement value per Canadian household	$9,357

STORMWATER

Stormwater: Physical Condition Ratings by Replacement Value

VERY POOR
2%
$3 billion

POOR
5%
$7 billion

FAIR
16%
$21 billion

VERY GOOD
44%
$59 billion

GOOD
33%
$44 billion

Stormwater: Average Physical Condition Ratings

Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

☐ <50%: Very Poor ☐ 50-59.9%: Poor ☐ 60-69.9%: Fair ☐ 70-79.9%: Good ☐ 80-100%: Very Good
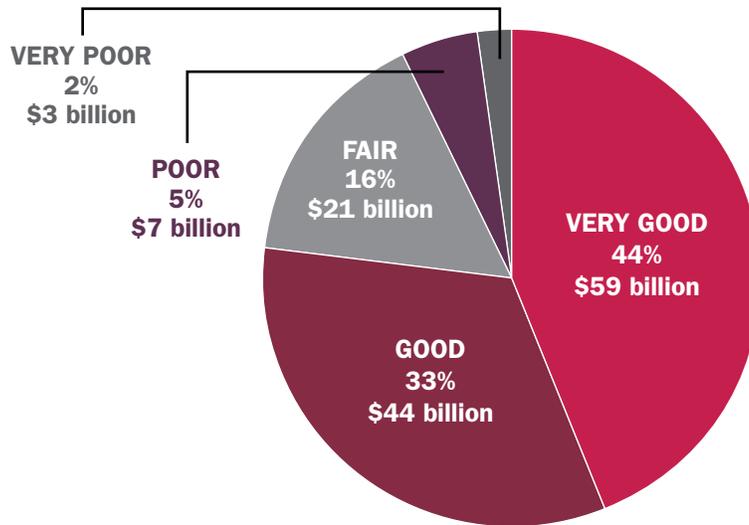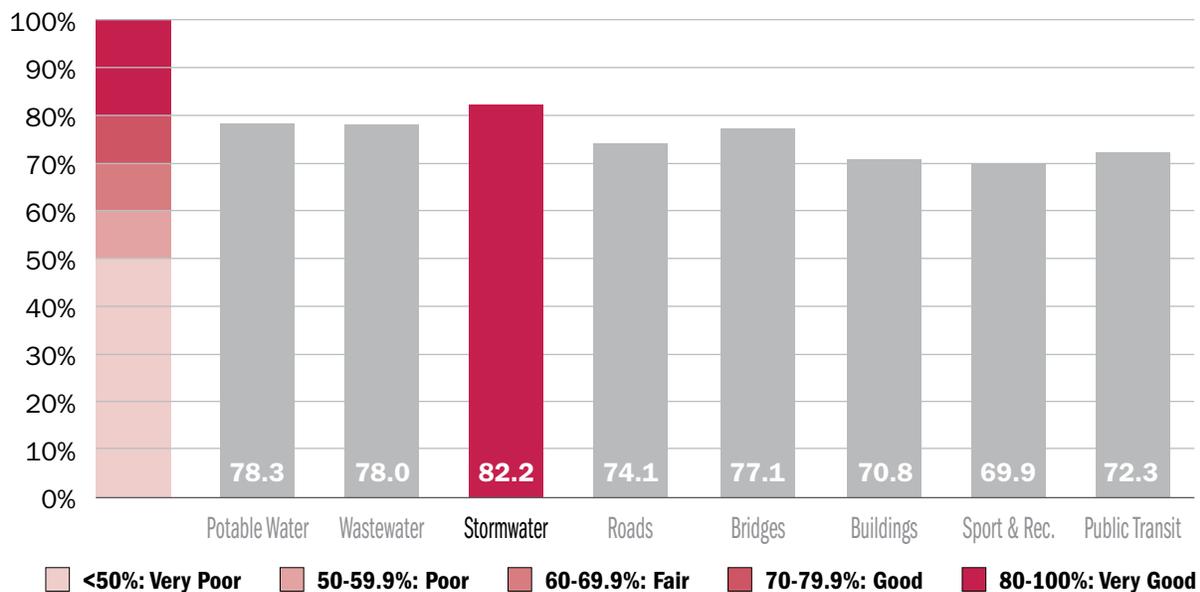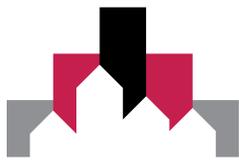
STORMWATER

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF STORMWATER ASSETS OVER TIME.

Based on the responses received, the average annual reinvestment rate of linear (pipes) stormwater assets is 0.3%. For non-linear assets such as stormwater ponds and pumping stations the average annual reinvestment rate is 1.3%. For stormwater pipes, asset management practitioners typically target a reinvestment rate of 1% to 1.3%. For non-linear assets, the target reinvestment rate varies for each facility type, but is typically around 1.7% to 2.0%.

AVERAGE ANNUAL REINVESTMENT RATE		
	TARGET	CURRENT
linear assets	**1.0% to 1.3%**	**0.3%**
non-linear assets	**1.7% to 2.0%**	**1.3%**

PART 1: THE NATIONAL PICTURE

STORMWATER

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Source of Physical Condition Information: For linear assets, proxy information was the most common response with almost 40% of responses. For non-linear assets, responses were mixed.

Condition assessment cycle: The condition assessment cycle for linear stormwater assets was most often five to ten years (34%) and over ten years (34%); 24% had no data. For non-linear stormwater assets, it had been more than five years for 40% of municipalities and 30% of municipalities had no data.

Use of Technology: Almost 90% of municipalities reported that they use technology to assess their stormwater assets with the largest percentage using Closed Circuit TV (66%).

Assessing vulnerabilities

Risk Assessment: Just over half of the responding municipalities have undertaken a risk/criticality assessment of their stormwater assets.

Climate Change: Sixteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for storm water.

Flood Damage: Forty-eight responding municipalities representing a total population of 8.7 million reported 671 occurrences that resulted in flood damages since 2009. Based on data provided by half of the responding municipalities, the numbers of private properties impacted was in excess of 66,000 and the cost of damage estimated in the order of $500 million. (not extrapolated to the rest of Canada)

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), nearly 80% of those asset management plans include stormwater assets.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), 67% of those reports include stormwater assets.

Asset Management Systems: More than eighty per cent of responding municipalities that own and/or operate stormwater systems reported using asset management systems, whether computer-based (20%), paper-based (15%) or both (47%). Eighteen per cent of municipalities did not have an asset management system.
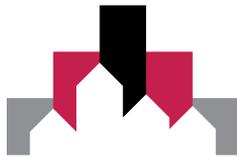
PART 1: THE NATIONAL PICTURE

**ROADS &
BRIDGES**

ROADS AND BRIDGES

The road networks section of the survey included two-lane equivalent kilometres of highways, arterial roads, collector roads, local roads and lanes and alleys. Questions on sidewalks and bridges (including bridges, culverts three metres and greater and footbridges) were also included in the survey.

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 115 responses received to the roads and bridges survey section of the survey, which corresponds to a sample of 19.8 million Canadians.

Key Performance Indicator	Roads & Sidewalks	Bridges
Extrapolated replacement value of assets in poor or very poor condition	$48 billion	$2 billion
Extrapolated replacement value of assets in fair condition	$75 billion	$11 billion
Extrapolated replacement value of assets in good or very good condition	$207 billion	$37 billion
Extrapolated replacement value of all assets	$330 billion	$50 billion
Average physical condition of assets	73.7 (Good)[18]	77.1 (Good)[19]
Average age	Not assessed for age	
Reinvestment rate of assets	1.1%	0.8%
Replacement value per Canadian household	$23,105	$3,553

PART 1: THE NATIONAL PICTURE

ROADS & BRIDGES

Roads and Bridges: Physical Condition Ratings by Replacement Value (Roads)

POOR
9%
$31.1 billion

VERY POOR
5%
$17.1 billion

VERY GOOD
26%
$85.1 billion

FAIR
23%
$75.3 billion

GOOD
37%
$121.3 billion
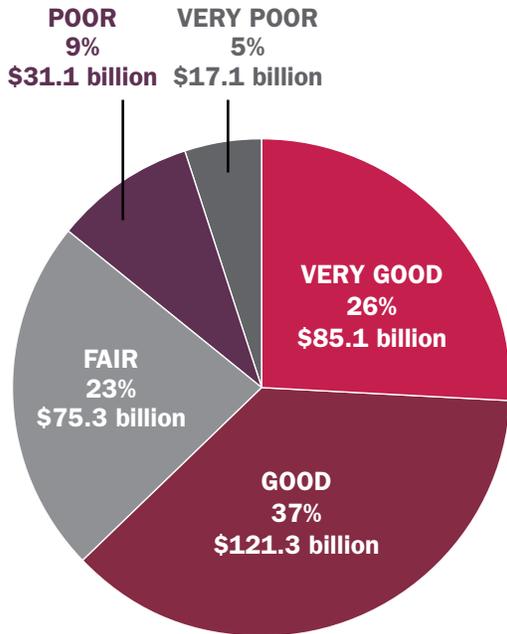
Roads and Bridges: Physical Condition Ratings by Replacement Value (Bridges)

POOR
3%
$1.8 billion

VERY POOR
1%
$0.4 billion

VERY GOOD
17%
$8.5 billion

FAIR
22%
$10.9 billion

GOOD
57%
$28.4 billion
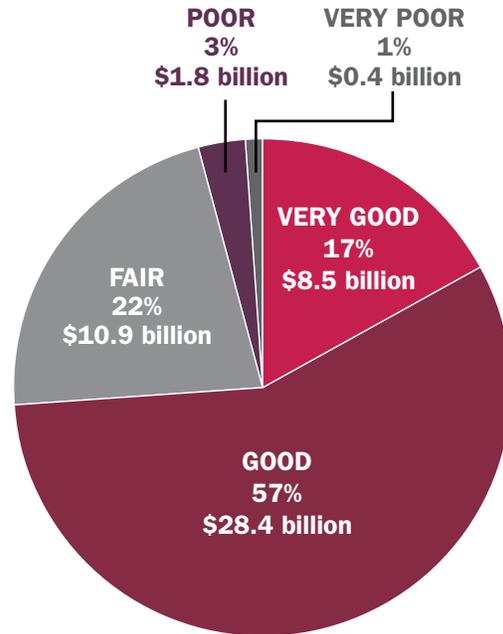
Roads and Bridges: Average Physical Condition Ratings

Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

☐ <50%: Very Poor   ☐ 50-59.9%: Poor   ☐ 60-69.9%: Fair   ☐ 70-79.9%: Good   ☐ 80-100%: Very Good
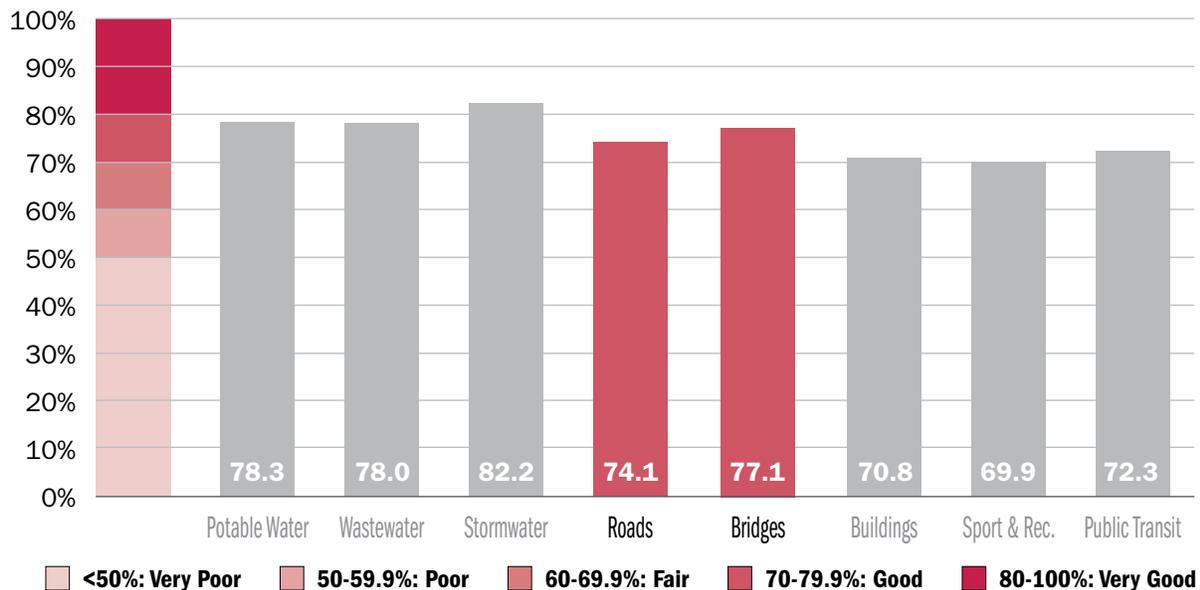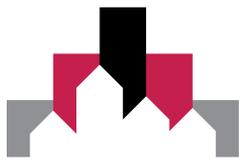
PART 1: THE NATIONAL PICTURE

ROADS & BRIDGES

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF ROADS OVER TIME.

Based on the responses received, the average annual reinvestment rate of roads is 1.1%. Asset management practitioners typically target a reinvestment rate for roads between 2.0% and 3.0%.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
2.0% to 3.0%	1.1%

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF BRIDGES OVER TIME.

Based on the responses received, the average annual reinvestment rate of bridges is 0.8%. Asset management practitioners typically target a reinvestment rate for bridges in the range of 1.0% to 1.7%.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
1.0% to 1.7%	0.8%
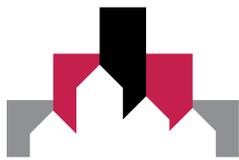
ROADS & BRIDGES

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Source of Physical Condition Information: About 50-60% of respondents cited complete data as their source for most road condition information. Sidewalk, roads and alleys less often used complete data. For bridge assets, complete data was also the most common response, ranging from 50-72%.

Condition assessment cycle: The condition assessment cycle for road assets took place at least every five years for 71% of municipalities. Fifty-six per cent of bridge assets were assessed at least every three years.

Assessing vulnerabilities

Climate Change: Fifteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for roads and bridges.

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), 95% of those plans include roads and bridge assets.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), 87% of those include roads and bridges.

Asset Management Systems: Ninety-five per cent of responding municipalities that own and/or operate road networks reported using asset management systems. Eighty-nine per cent have asset management systems in place for their bridge networks.

PART 1: THE NATIONAL PICTURE

BUILDINGS

BUILDINGS

The municipally-owned buildings that were captured by the CIRC survey include: administrative buildings, childcare/daycare centres, community centres and cultural facilities, fire stations, health care facilities, libraries, long-term care centres, paramedic stations, police stations and shelters.

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 101 responses received for the buildings section of the survey, which corresponds to a sample of 18.6 million Canadians.

Key Performance Indicator	Results
Extrapolated replacement value of assets in poor or very poor condition	$12 billion
Extrapolated replacement value of assets in fair condition	$20 billion
Extrapolated replacement value of assets in good or very good condition	$38 billion
Extrapolated replacement value of all building assets	$70 billion
Average physical condition of building assets	70.8 (Good)[20]
Average age	37 years
Reinvestment rate of building assets	1.7%
Replacement value per Canadian household	$4,913

PART 1: THE NATIONAL PICTURE

BUILDINGS

Buildings: Physical Condition Ratings by Replacement Value

VERY POOR
5%
$4 billion

POOR
12%
$8 billion

FAIR
28%
$20 billion

VERY GOOD
22%
$15 billion

GOOD
33%
$23 billion
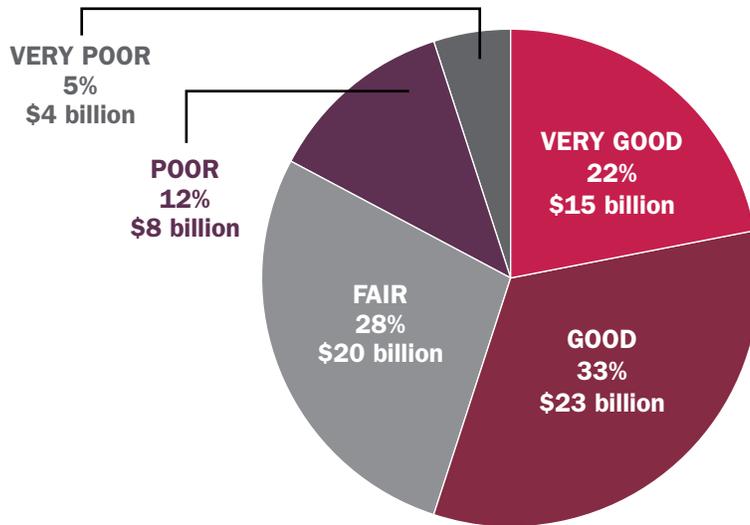
Buildings: Average Physical Condition Ratings

	Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
	78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

◻ <50%: Very Poor   ◻ 50-59.9%: Poor   ◻ 60-69.9%: Fair   ◻ 70-79.9%: Good   ◼ 80-100%: Very Good
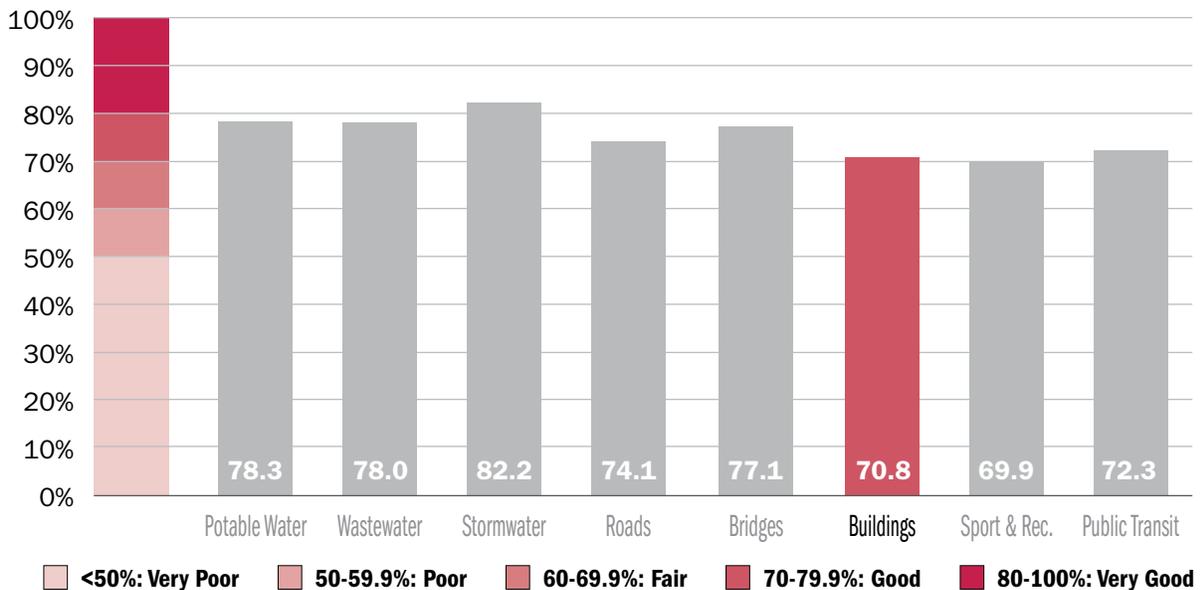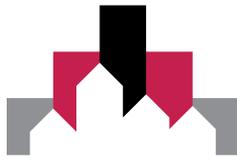
PART 1: THE NATIONAL PICTURE

BUILDINGS

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS COULD RESULT IN A **DECLINE** IN THE CONDITION OF **MUNICIPAL BUILDINGS** OVER TIME.

Based on the responses received, the average annual reinvestment rate of building assets is 1.7%. The target reinvestment rate varies depending on the type of building, but asset management practitioners typically target a reinvestment rate between 1.7% and 2.5%.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
1.7% to 2.5%	**1.7%**
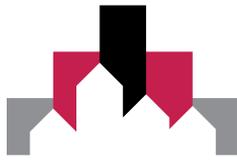
PART 1: THE NATIONAL PICTURE

BUILDINGS

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Condition assessment cycle: The vast majority of respondents (90%) reported having a condition assessment cycle in place for their buildings. Seventy-two per cent assess their buildings at least every 10 years. Ten per cent had no data.

Assessing vulnerabilities

Climate Change: Fourteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for municipal buildings.

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), 73% of plans include building assets.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), 61% of reports include building assets.

Asset Management Systems: Ninety per cent of responding municipalities reported using asset management systems for municipal buildings, whether computer-based (30%), paper-based (16%) or both (45%).
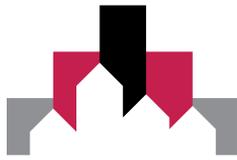
SPORT & RECREATION FACILITIES

SPORT AND RECREATION FACILITIES

The municipally-owned sport and recreation facilities that were captured by the CIRC survey include: community recreation centres/multiplexes, curling rinks, ice arenas, pools, senior centres, skateparks, ski hills, sports fields, stadiums, tennis courts, and youth centres.

WHERE ARE WE NOW?

The information included in this summary is based on an extrapolation of the 88 responses received for the sport and recreation facilities section of the survey, which corresponds to 16.3 million Canadians.

Key Performance Indicator	Results
Extrapolated replacement value of assets in poor or very poor condition	$9 billion
Extrapolated replacement value of assets in fair condition	$14 billion
Extrapolated replacement value of assets in good or very good condition	$28 billion
Extrapolated replacement value of all sport and recreation facilities	$51 billion
Average physical condition of sport and recreation facilities	69.9 (Fair)[21]
Average age	30 years
Reinvestment rate of sport and recreation facilities	1.3%
Replacement value per Canadian household	$3,583

SPORT & RECREATION FACILITIES

Sport and Recreation Facilities: Physical Condition Ratings by Replacement Value

VERY POOR
5%
$2 billion

POOR
14%
$7 billion

VERY GOOD
18%
$9 billion

FAIR
27%
$14 billion

GOOD
36%
$18 billion
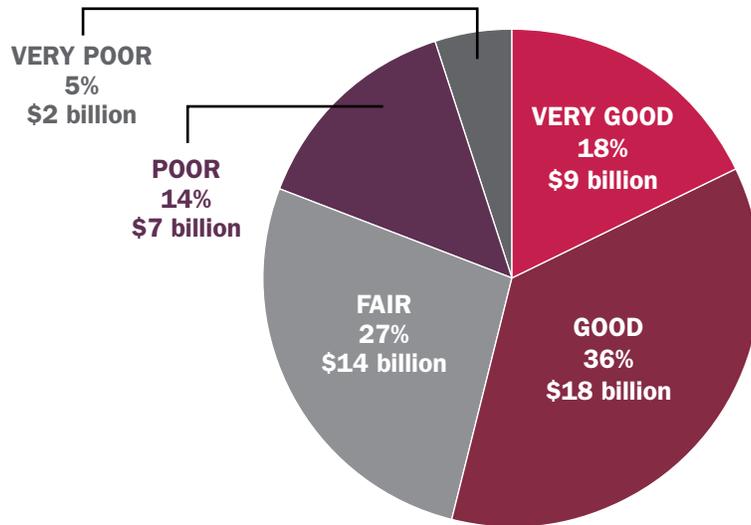
Sport and Recreation Facilities: Average Physical Condition Ratings
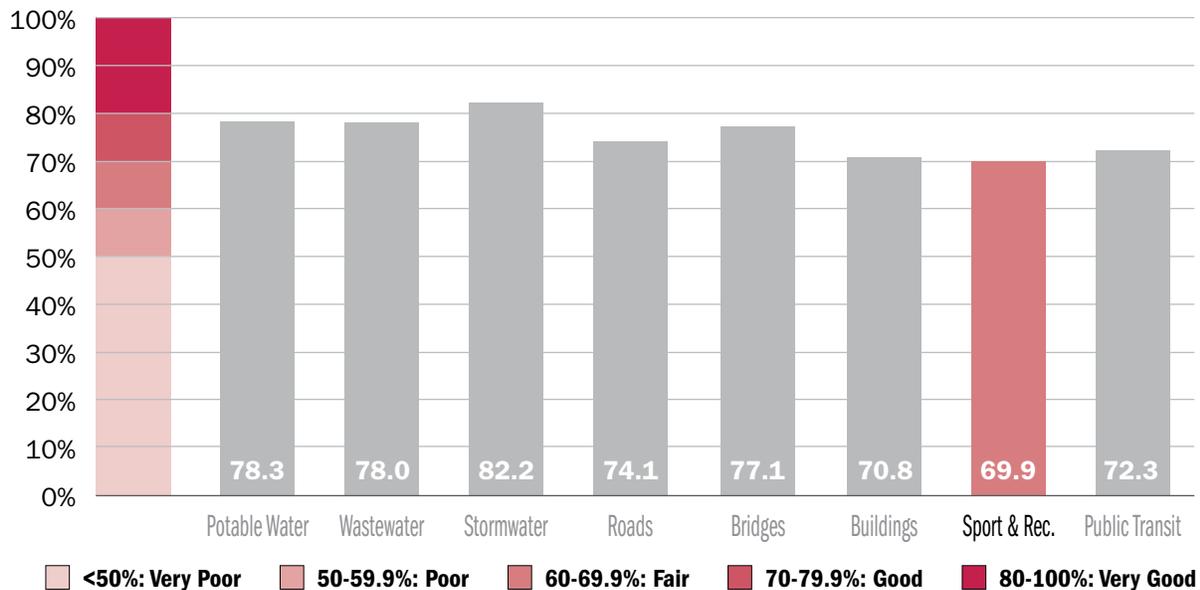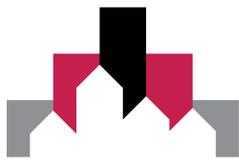
	Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
	78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

☐ <50%: Very Poor   ☐ 50-59.9%: Poor   ☐ 60-69.9%: Fair   ☐ 70-79.9%: Good   ☐ 80-100%: Very Good

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PART 1: THE NATIONAL PICTURE

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF SPORT AND RECREATION FACILITIES OVER TIME.

Based on the responses received, the average annual reinvestment rate of sport and recreation facilities is 1.3%. The target reinvestment rate for sport and recreation assets varies for each facility type, but asset management practitioners typically target a range between 1.7% and 2.5%.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
1.7% and 2.5%	**1.3%**

SPORT & RECREATION FACILITIES

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Condition assessment cycle: The majority of respondents (83%) reported having a condition assessment cycle in place for their sport and recreation facilities. Close to 70% assess their sport and recreation facilities at least every 10 years and 18% had no data on their sport and recreation facilities condition assessment cycles.

Assessing vulnerabilities

Climate Change: Thirteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for municipal sport and recreation facilities.

Asset management systems and reporting

Asset Management Plans: For municipalities that reported having asset management plans (49%), just over half (53%) of those plans include sport and recreation facilities.

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), 44% of those reports include sport and recreation facilities.

Asset Management Systems: Eighty-nine per cent of municipalities reported having a sport and recreation facilities asset management system whether computer-based (22%), paper-based (26%) or both (41%).
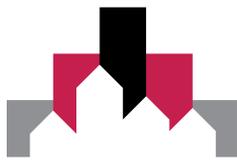
PUBLIC TRANSIT

PUBLIC TRANSIT

The CIRC surveyed the following municipally-owned transit assets: buses, streetcars, ferries, heavy railcars, commuter railcars, light railcars, mobile technology, security systems, rail signal systems, terminals, transit shelters, tunnels, exclusive rights-of-way, tracks, parking facilities and service facilities. The range of transit assets is quite diverse, and more detail was gathered for this asset category to provide a better picture of the state of public transit assets.

WHERE ARE WE NOW?

The information included in this summary is based on responses received from 37 transit authorities representing a total serviced population of 17.2 million people or 67% of the national total. This population represents 88% of all transit trips taken in 2013. Data from the 37 respondents was extrapolated to the 2013-2014 Canadian transit service population of 25.6 million.

Key Performance Indicator	Results				
	Vehicles		Technology	Fixed Assets	All Assets
	Buses	Railcars & Ferries			
Extrapolated replacement value of transit assets in poor or very poor condition	$291 million	$49 million	$148 million	$8.8 billion	$9 billion
Extrapolated replacement value of assets in fair condition	$1.6 billion	$2.3 billion	$57 million	$9.9 billion	$15 billion
Extrapolated replacement value of assets in good or very good condition	$14 billion	$3.5 billion	$1 billion	$15.6 billion	$33 billion
Replacement value of all assets	$16 billion[22]	$5.9 billion[23]	$1.3 billion	$34.3 billion	$57 billion
Average physical condition of all assets	85.6 (Very Good)[24]	74.1 (Good)[25]	80.8 (Very Good)[26]	66.8 (Fair)[27]	72.3 (Good)[28]
Average age of assets	7	18.7	5.4	13	12
Replacement value per Canadian household[29] served by transit	$1,561	$572	$125	$3,350	$5,600

PART 1: THE NATIONAL PICTURE

PUBLIC TRANSIT

Public Transit: Physical Condition Ratings by Replacement Value

VERY POOR
2%
$1.1 billion

POOR
15%
$8.3 billion

VERY GOOD
23%
$13.1 billion

FAIR
27%
$15.1 billion

GOOD
34%
$19.4 billion
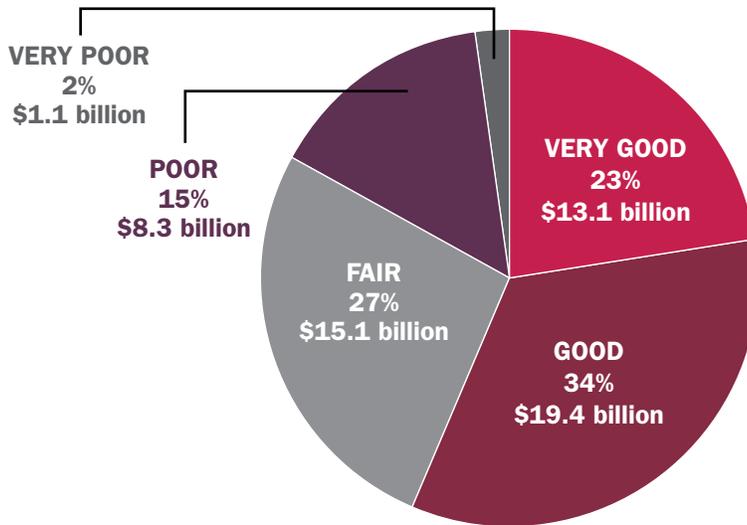
Public Transit: Average Physical Condition Ratings

	Potable Water	Wastewater	Stormwater	Roads	Bridges	Buildings	Sport & Rec.	Public Transit
	78.3	78.0	82.2	74.1	77.1	70.8	69.9	72.3

Chart y-axis: 0% to 100%

Legend:
- <50%: Very Poor
- 50-59.9%: Poor
- 60-69.9%: Fair
- 70-79.9%: Good
- 80-100%: Very Good

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PUBLIC TRANSIT

WHERE ARE WE GOING? THE OUTLOOK FOR THE FUTURE

The transit survey asked respondents to provide data on replacement value of assets and the annual renewal budget, which is how the report derives reinvestment rates. However, very few were able to provide both. For this reason, this report does not assess reinvestment rates for transit assets.

HOW ARE ASSETS BEING MANAGED?

The CIRC survey sought to determine how condition information is obtained, how often it is updated, the extent to which risk is considered and how many develop asset management plans and/or use asset management systems.

Condition information

Source of Physical Condition Information: For vehicles, all of the above was the most common response with 53% of responses. For technology and fixed assets, proxy information was the most common response with 41% and 39% of responses, respectively.

Condition assessment cycle[30] for physical condition: The majority of transit authorities that responded inspect their assets for physical condition at least every three years (86% for vehicles, 83% of technology and 61% for fixed assets).

Assessing vulnerabilities

Risk Assessment: Fifty-four per cent of transit authorities have undertaken a risk/criticality assessment of their transit assets (58% for vehicles, 48% for technology and 53% for fixed assets).

Climate Change: Six per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for transit.

Asset management systems and reporting

Asset Management Plans: The majority of transit agencies (76%) report having an asset management plan that includes vehicles (92%), technology (50%), and fixed assets (73%).

State of Infrastructure Report (SOIR): For municipalities that reported having SOIRs (38%), approximately 26% of those reports include public transit.

Asset Management Systems: Seventy-one per cent of responding transit authorities reported using asset management systems for transit assets, whether computer-based (39%), paper-based (9%) or both (23%).

PART 2:
SURVEY RESULTS BY SECTOR

PART 2: SURVEY RESULTS BY SECTOR

INTRODUCTION

This section of *Informing The Future* provides direct results for each of the asset classes included in the survey. While Part 1 provides extrapolated results to the whole of Canada, this section presents results reported by municipalities and transit operators that responded to the survey. Each sector report contains data for most of the following areas:

- Overall rating
- Performance indicators
- Source of physical condition information
- Risk assessment cycle
- Technology
- Replacement value

- Physical condition
- Network summary
- Age
- Condition assessment cycle
- Demand/capacity condition
- Reinvestment rate

Note that due to limited sample size, demand/capacity condition data was not extrapolated to the rest of Canada in Part 1.
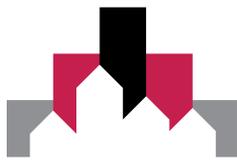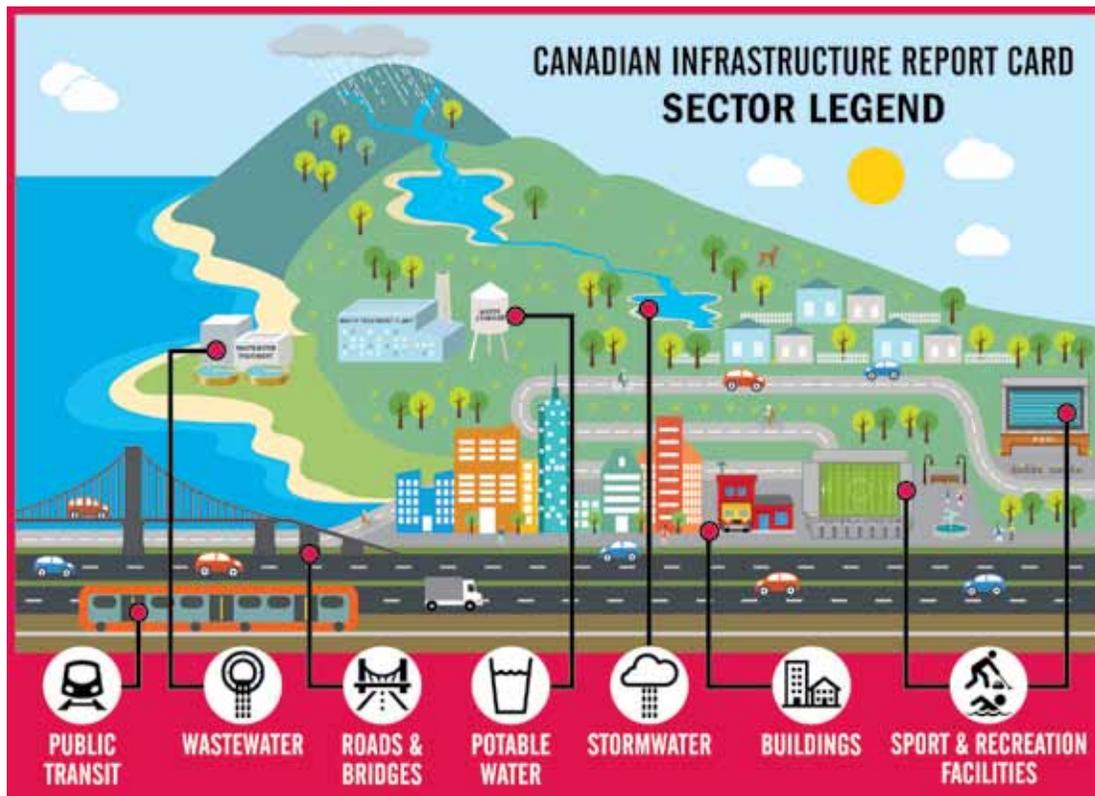
MUNICIPAL INFRASTRUCTURE SECTOR DEFINITIONS

Public Transit: Buses, streetcars, ferries, heavy railcars, commuter railcars, light railcars, mobile technology, security systems, rail signal systems, terminals, transit shelters, tunnels, exclusive rights-of-way, tracks, parking facilities and service facilities.

Wastewater: Wastewater collection, treatment and discharge

Roads and Bridges: Highways, arterials, collectors, local roads and alleys, sidewalks, bridges, culverts and footbridges

Potable Water: Drinking water production, storage and distribution

Stormwater: Collection, stormwater management facilities

Buildings: Administrative buildings, childcare/daycare centres, community centres and cultural activities, fire stations, health care facilities, libraries, long-term care centres, paramedic stations, police stations and shelters.

Sport and Recreation Facilities: Community recreation centres/multiplexes, curling rinks, ice arenas, pools, senior centres, skateparks, ski hills, sports fields, stadiums, tennis courts, and youth centres.

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CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: POTABLE WATER
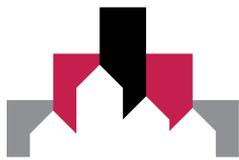
POTABLE WATER

Drinking water production, storage and distribution

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF POTABLE WATER ASSETS OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE		
	TARGET	CURRENT
linear assets	**1.0% to 1.5%**	**0.9%**
non-linear assets	**1.7 to 2.5%**	**1.1%**

A. INTRODUCTION AND OVERALL RATING

The potable water infrastructure assets that were surveyed relate to the linear portion of potable water systems: distribution pipes less than 416 millimetres and transmission pipes of 416 millimetres or greater, as well as non-linear assets: water treatment plants, water pumping stations and water reservoirs.

The physical condition of potable water assets has an overall rating of Good: Adequate for now. The potable water production, storage and distribution infrastructure in the system or network is in good, within acceptable condition.

POTABLE
WATER

B. PHYSICAL CONDITION

Respondents were asked to rank the physical condition of their assets (distribution pipes, transmission pipes, treatment plants, pumping stations, reservoirs) from very good condition to very poor condition. The average physical condition rating of these individual asset types ranges between good and very good. Across all responding municipalities, 35% of linear (pipes) assets were in fair, poor and very poor condition. When examined by size of municipality, linear assets in fair, poor and very poor condition comprise 24% of systems in small responding municipalities, 54% in medium-sized responding municipalities and 32% in large responding municipalities.

Non-linear (facilities, pumping stations, etc.) assets were generally in better condition, with 16% in fair, poor and very poor condition. When examined by size of municipality, non-linear assets in fair, poor and very poor condition comprise 23% of systems in small responding municipalities, 17% of systems in medium-sized responding municipalities and 16% in large responding municipalities.

Asset Type	Average Condition Rating
Distribution Pipes	**Good:** Adequate for now – within acceptable condition
Transmission Pipes	**Good:** Adequate for now – within acceptable condition
Treatment Plants	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Pumping Stations	**Good:** Adequate for now – within acceptable condition
Reservoirs	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated

PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

Potable water: Physical condition by length – linear assets

VERY POOR
4%
$2 billion

POOR
11%
$7 billion

FAIR
20%
$13 billion

VERY GOOD
37%
$24 billion

GOOD
28%
$18 billion
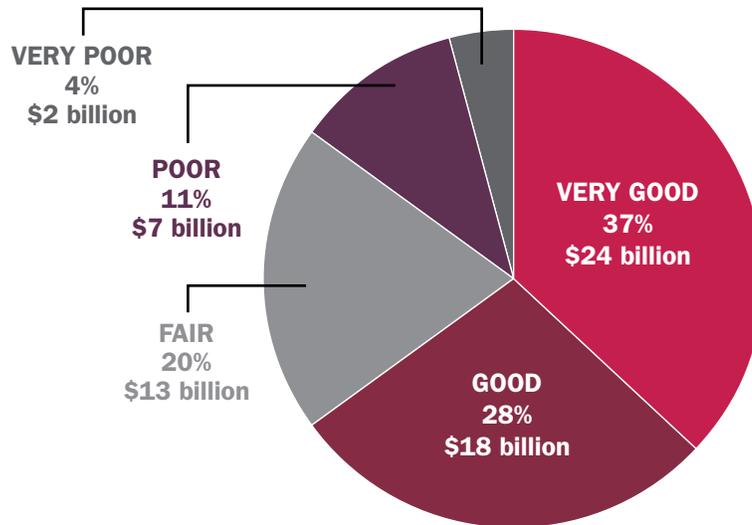
Potable water: Physical condition by replacement – non-linear assets

POOR
4%
$1 billion

FAIR
10%
$2 billion

VERY POOR
2%
$0.5 billion

VERY GOOD
36%
$8 billion

GOOD
48%
$10 billion
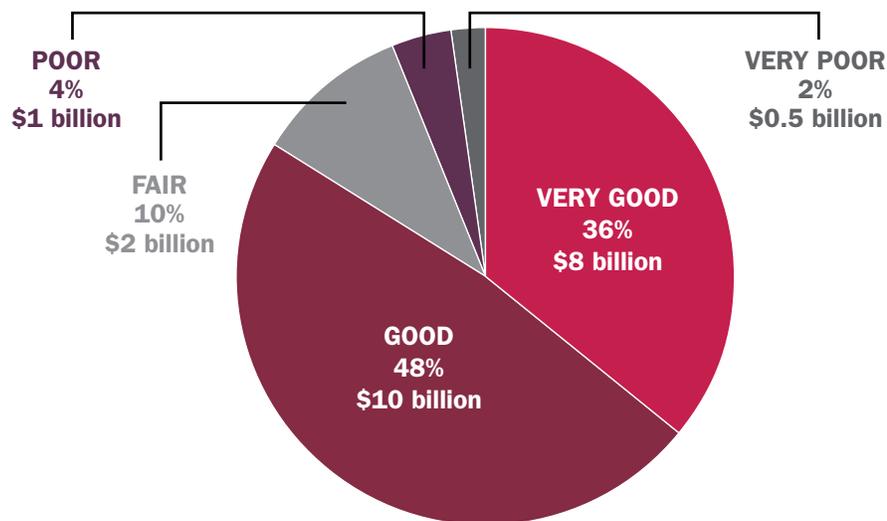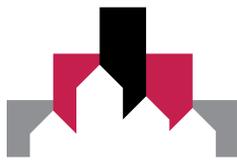
PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

C. PERFORMANCE INDICATORS

This figure examines the results on some key potable water indicators. While the Report Card provides extrapolated results to the whole of Canada, this section provides results as reported in the potable water survey.

Performance Indicator	Results
% of assets in poor or very poor condition	12.2%
Replacement value of assets in poor or very poor condition	$10.3 billion
% of assets in fair condition	16.8%
Replacement value of assets in fair condition	$14.2 billion
% of assets in good or very good condition	71%
Replacement value of assets in good or very good condition	$59.9 billion
Replacement value of all reported potable water assets	$84.4 billion
Replacement value per household of all potable water assets for municipalities that responded	$13,249
Average physical condition rating of potable water assets	78.3 (Good)
Average age of linear assets (pipes, sewers, forcemains)	37 years
Reinvestment rate[31] of linear potable water assets	0.9%
Reinvestment rate of non-linear (stations, tanks, facilities, reservoirs) potable water assets	1.1%

D. NETWORK SUMMARY

	Results
Number of municipalities that provided responses to this section	106
Population represented by responding municipalities	19 million (2013 population)
% of Canada's population (2013)	53.2%
Total population served	18.5 million (78 municipalities)
Total households served	5.8 million (81 municipalities)
Total businesses served	220,346 (70 municipalities)
Total kilometres of pipe	68,646 km (90 municipalities)
Total storage of reservoirs (megalitres)	12,745 ML (69 municipalities)
Population of Canada (2013)	35,710,000
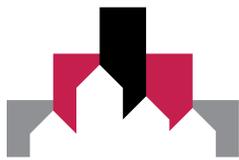
POTABLE WATER

The 106 municipalities that provided responses to the potable water questionnaire represent a population of 19 million. Not all 106 responded to every question of the potable water section of the survey. Seventy-eight[32] indicated that they serve 18.5 million Canadians (5.8 million households and 220,346 businesses). The municipalities reported that they own a total of 68,646 km of pipes, composed primarily of distribution pipes (62,380 km or 90.9%). The remaining 6,241 km (9.1%) are classified as transmission pipes.

Ninety-eight per cent of the reported inventory has been assessed for age. The top three age categories reported are:

- 20-39 years old (30%)
- < 20 years old (29%)
- 40-59 years old (25%)

Asset Management and Sources of Data

The majority of responding municipalities that own and/or operate potable water systems reported using asset management systems, whether computer-based (24%), paper-based (10%) or both (61%). Only six per cent of these municipalities did not have an asset management system. When examining the data by size of municipality, 12% of small municipalities, three per cent of large municipalities and no medium-sized municipalities reported not having an asset management system.

Nineteen per cent of the respondents did not have data on the condition assessment cycle of their non-linear assets (treatment plants, pumping stations and reservoirs). Forty per cent reported that they assess the condition of these assets less frequently than every five years.

Almost half the responding municipalities (48%) reported having no data on the condition assessment cycle of their linear assets (pipes). Twenty-two per cent of the respondents reported that they assess the condition of their linear assets less frequently than every ten years.

Eighty-eight per cent of responding municipalities reported that they use some type of technology to assess the condition of watermains, with the largest percentage using acoustic leak detection (47%).
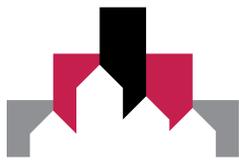
PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

The majority of respondents cited opinion of municipal representative with experience working with this asset as the source of information for the condition of non-linear (stations, tanks, facilities, reservoirs) assets and proxy information such as age of material, soil environment, estimated service life, etc., as the source of information for linear asset condition.

Nearly sixty per cent (59.6%) of responding municipalities undertake risk assessment for their potable water assets.

Fourteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for potable water. For municipalities that reported having asset management plans (49%), a high percentage (75%) of those plans include potable water assets. For municipalities that reported having a State of Infrastructure Report (38%), approximately 75% of those include potable water assets.

E. SOURCE OF PHYSICAL CONDITION INFORMATION

The survey asked respondents to rank the physical condition of their assets (distribution pipes, transmission pipes, treatment plants, pumping stations, reservoirs) from very good condition to very poor condition. The survey also asked respondents to provide the primary source of the physical condition information as: complete data based on detailed inspection and analysis; opinion of municipal representative, based on experience working with the asset; using proxy information such as age of material, soil environment, estimated service life, etc.; or all of the above.

For linear (pipes) assets, proxy information was the most common response (48% for distribution pipes and 51% for transmission pipes) and for non-linear (facilities, stations, reservoirs) assets, opinion of municipal representative was the most common response (43% for treatment plants, 38% for pumping stations and 35% for reservoirs).

For small responding municipalities the source of physical information of linear assets (pipes) is most often municipal representative (48% for distribution pipes and 40% for transmission pipes). Proxy information is the most common source of physical information for linear assets in large responding municipalities (74% for distribution and 61% for transmission pipes) and medium-sized responding municipalities (45% for distribution and 47% for transmission pipes). In the case of non-linear assets, the source in small and medium-sized responding municipalities is most often municipal representative (ranging from 36%-46% depending on asset type in small responding municipalities and 47%-56% in medium-sized responding municipalities). The source of information for non-linear assets in large responding municipalities is evenly distributed, ranging from 16%-36% depending on asset type.

POTABLE WATER

Potable water: Source of physical condition information

Legend:
- All
- Using proxy information
- Opinion of municipal representative
- Complete data based on detail inspection

Reservoirs
- 29.2%
- 13.8%
- 35.4%
- 21.5%

Pump Stations
- 28.1%
- 12.5%
- 37.5%
- 21.9%

Treatment Plants
- 26.4%
- 9.4%
- 43.4%
- 20.8%

Transmission Pipes (km)
- 23.1%
- 50.8%
- 18.5%
- 7.7%

Distribution Pipes (km)
- 21.2%
- 48.2%
- 28.2%
- 2.4%

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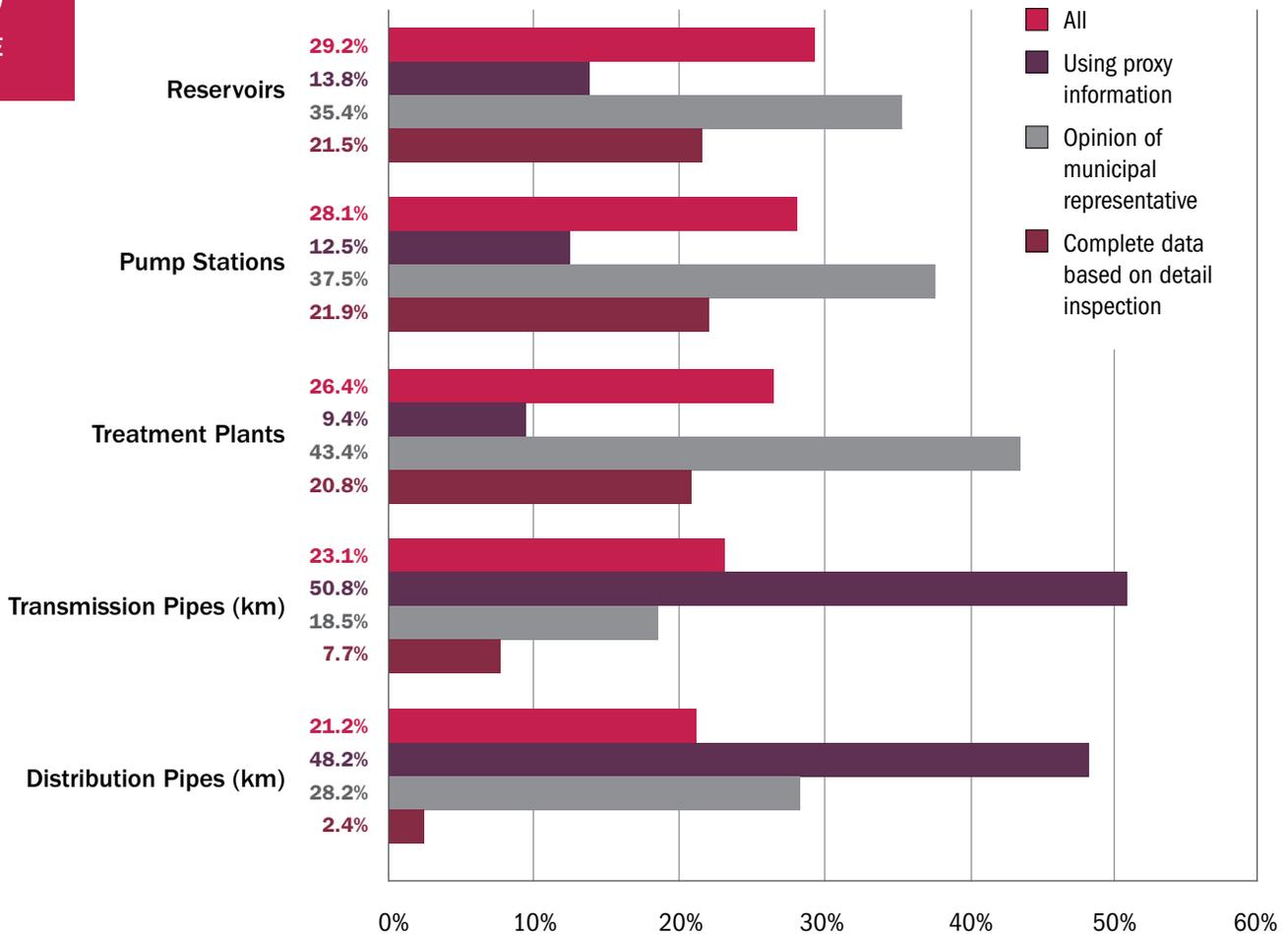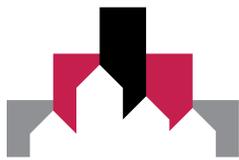
POTABLE WATER

F. AGE

Fifty-nine per cent of linear assets (pipes)[33] reported are less than 40 years old and nine per cent are over 80 years old. The proportions are generally the same when breaking out the responses by small, medium and large responding municipalities.

Potable water: Age breakdown of total linear assets

≥ 100 YEARS OLD 5%

80-99 YEARS OLD 4%

60-79 YEARS OLD 7%

40-59 YEARS OLD 25%

< 20 YEARS OLD 20%

20-39 YEARS OLD 30%
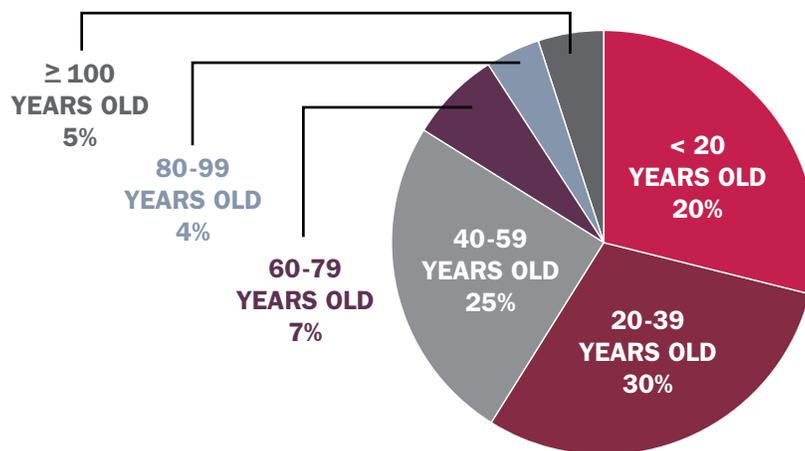
G. RISK ASSESSMENT CYCLE

Most responding municipalities have undertaken a risk/criticality assessment[35] of their potable water assets (55% for linear assets and 63% for non-linear assets). Small responding municipalities that responded have undertaken a risk assessment less often for both linear (41%) and non-linear (stations, tanks, facilities, reservoirs) (56%) assets. Medium-sized responding municipalities are more likely than small responding municipalities to have undertaken risk assessment; 53% in the case of linear assets (pipes) and 57% for non-linear assets. Large responding municipalities are most likely to have undertaken risk assessment with 68% for linear assets and 73% for non-linear assets.

Potable water: Risk Assessment Cycle (Yes vs. No)

Yes
No

Total linear
55.3%
44.7%

Total non-linear
62.8%
37.2%

0%   10%   20%   30%   40%   50%   60%   70%
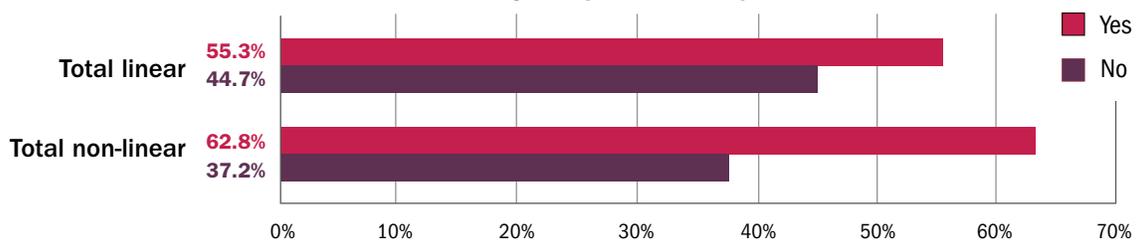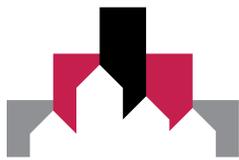
PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

H. CONDITION ASSESSMENT CYCLE

Forty-eight per cent of respondents had no data on the condition assessment cycle of their linear potable water assets. Twenty-two per cent of responding municipalities indicated it had been more than ten years since their last linear asset condition assessment. When examining how the data compared between small, medium and large responding municipalities, the results for linear assets (pipes) indicate that 57% of large responding municipalities, 46% of medium sized responding municipalities and 39% of small responding municipalities reported having no data available. The condition assessment cycle for non-linear potable water assets was less frequent than five years for 40% of responding municipalities.

Potable water: Average condition assessment of linear assets
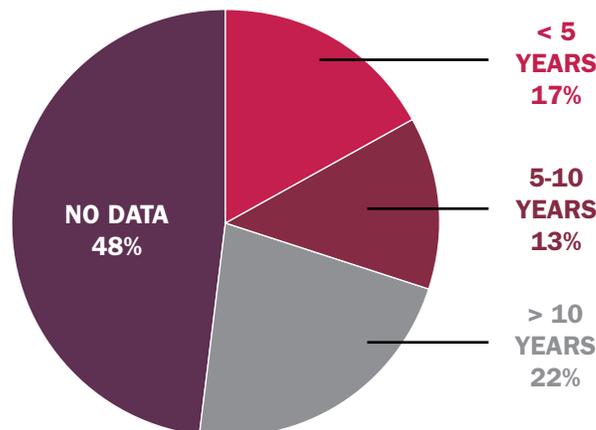
NO DATA
48%

< 5
YEARS
17%

5-10
YEARS
13%

> 10
YEARS
22%

Potable water: Average condition assessment of non-linear assets

NO DATA
9%

< 3
YEARS
16%

3-5
YEARS
25%

> 5
YEARS
40%

PART 2: SURVEY RESULTS BY SECTOR

POTABLE
WATER

I. TECHNOLOGY

Eighty-eight per cent of responding municipalities reported that they use technology to assess their underground watermains. Acoustic leak detection was the most common response (47%). Large municipalities that responded were more likely to use technology to assess watermain condition (96%), as were medium-sized responding municipalities (92%), whereas small responding municipalities were less likely (74%).

Potable water: Technology used to assess watermain condition

Category	Value
None	12.2%
Other Technologies	15.8%
Sonar	2.9%
Ground Penetrating Radar	2.2%
Electromagnetic Tests	9.4%
Acoustic Leak Detection	46.8%
Closed Circuit TV	10.8%

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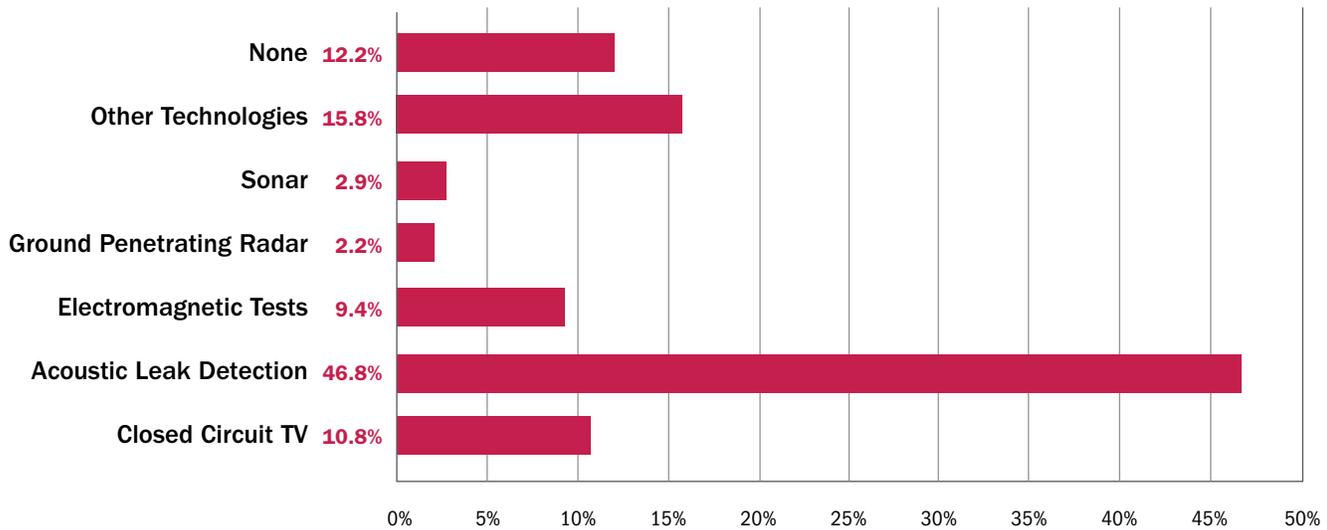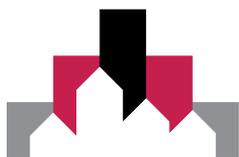
PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

J. REPLACEMENT VALUE

The total replacement value of the assets reported by the 86 municipalities that provided data was $84.4 billion. This corresponds to $13,249 per household represented by the municipalities that responded to the potable water survey

Close to 75% of the total replacement value of water assets was for linear assets (transmission and distribution pipes). The breakdown of asset replacement values for the various asset types is shown in the following table.

Asset	Replacement Value	No. of Respondents
Distribution Pipes	$45,503,172,704	68
Transmission Pipes	$16,104,288,760	47
Sub-Total	**$61,607,461,464**	**70**
Not broken down by asset type	$1,684,819,278	8
Total linear replacement value	**$63,292,280,742**	**78**
Treatment Plants	$12,740,597,911	45
Pumping Stations	$3,144,123,770	57
Reservoirs	$4,995,209,738	53
Sub-Total	**$20,879,931,419**	**61**
Not broken down by asset type	$271,770,873	5
Total non-linear replacement value	**$21,151,702,292**	**66**
Grand Total	**$84,443,983,034**	**86**
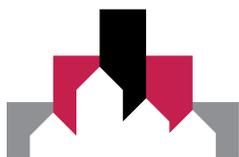
PART 2: SURVEY RESULTS BY SECTOR

POTABLE WATER

K. REINVESTMENT RATE

Reinvestment refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

The overall reinvestment rate for potable water assets is less than one per cent (0.97%). The reinvestment rates across all responding municipalities ranges from 0.6% to 1.6% depending on asset type. For small responding municipalities, the reinvestment rate was higher for all asset types except water treatment plants, which was lower. Medium-sized and large responding municipalities showed no significant differences from all responding municipalities, except in the case of medium-sized reservoirs that had a reinvestment rate of 11.4%, although the sample size was very small and not representative (two respondents).

Target reinvestment rates for potable water assets are 1% to 1.5% for linear assets (pipes) and for non-linear assets (treatment plants, pumping stations and reservoirs), reinvestment rates vary for each facility type, but are typically between 1.7% and 2.5%.

All Municipal Responses						
	Replacement Value ($)*	Annual Renewal Budget ($)	Reinvestment Rate	km or Units	Replacement Value Per Unit ($)	Number of Respondents
Distribution Pipes	31,578,666,919	334,226,591	1.1%	35,229	896,383	39
Transmission Pipes	12,073,021,972	69,485,371	0.6%	3,002	4,021,660	18
Treatment Plants	10,261,453,932	110,150,455	1.1%	208	49,333,913	45
Pumping Stations	2,161,304,776	35,276,450	1.6%	363	5,954,008	25
Reservoirs	3,841,296,737	33,858,984	0.9%	252	15,243,241	22

*Many responding municipalities were not able to provide information for both replacement value and annual renewal budget. Only those that provided data for both are included in the numbers above. There were between 18 and 45 respondents, depending on the type of asset.

CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: WASTEWATER
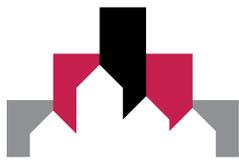
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

Wastewater collection, treatment and discharge

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF WASTEWATER ASSETS OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE		
	RECOMMENDED	CURRENT
linear assets	**1.0% to 1.3%**	**0.7%**
non-linear assets	**1.7% to 2.5%**	**1.4%**

A. INTRODUCTION AND OVERALL RATING

The wastewater infrastructure assets that were surveyed relate to the linear wastewater collection system: small local collection pipes less than 450 millimetres, large local collection pipes between 450 and 1,500 millimetres, trunk collection pipes of 1,500 millimetres or greater and forcemains, as well as non-linear assets: treatment plants, pumping stations and storage tanks.

The physical condition of wastewater linear assets (pipes, sewers, forcemains) has an overall rating of Very Good: Fit for the future; well-maintained, good condition, new or recently rehabilitated.

The physical condition of wastewater non-linear assets has an overall rating of Good: Adequate for now. The treatment plants, pumping stations and storage infrastructure in the system or network is in good, within acceptable condition.
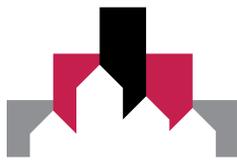
WASTEWATER

B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets (collection pipes, forcemains, treatment plants, pumping stations and storage tanks). The physical condition of these individual asset types range between fair and very good. Across all responding municipalities, 27% were in fair, poor and very poor condition. When examined by size of municipality, linear (pipes) assets in fair, poor and very poor condition comprise of 52% of systems in small responding municipalities, 30% in medium-sized responding municipalities and 26% in large responding municipalities.

Non-linear (facilities, stations, reservoirs) assets were generally in worse condition, with 54% in fair, poor and very poor condition. When examined by size of municipality, non-linear assets in fair, poor and very poor condition comprise 62% of systems in small responding municipalities, 34% in medium-sized responding municipalities and 54% in large responding municipalities.

Asset Type	Average Condition Rating
Small Local Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Large Local Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Trunk Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Forcemains	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Treatment Plants	**Good:** Adequate for now – within acceptable condition
Pumping Stations	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Storage Tanks	**Good:** Adequate for now – within acceptable condition

PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

Wastewater: Physical condition by replacement value of linear assests
(measured by length)

VERY POOR
3%
$3 billion

POOR
8%
$7 billion

FAIR
16%
$14 billion

VERY GOOD
47%
$41 billion

GOOD
26%
$23 billion

Wastewater: Physical condition by replacement value of non-linear assests

VERY POOR
1%
$0.5 billion

POOR
10%
$4 billion

FAIR
43%
$16 billion

VERY GOOD
19%
$7 billion

GOOD
27%
$10 billion

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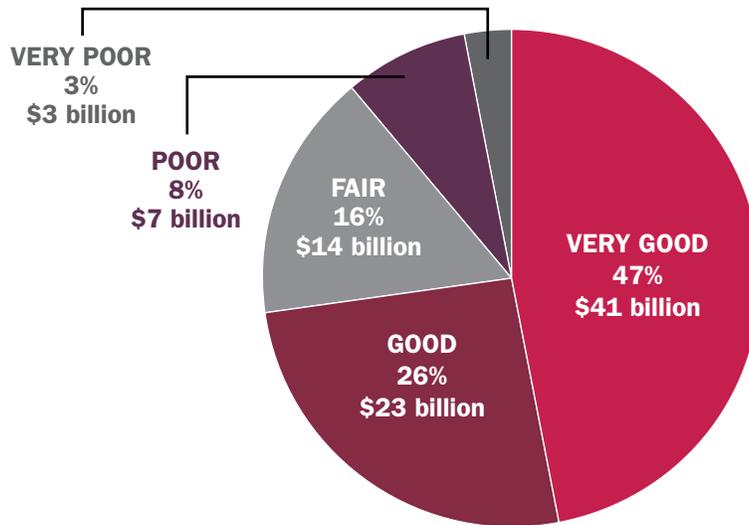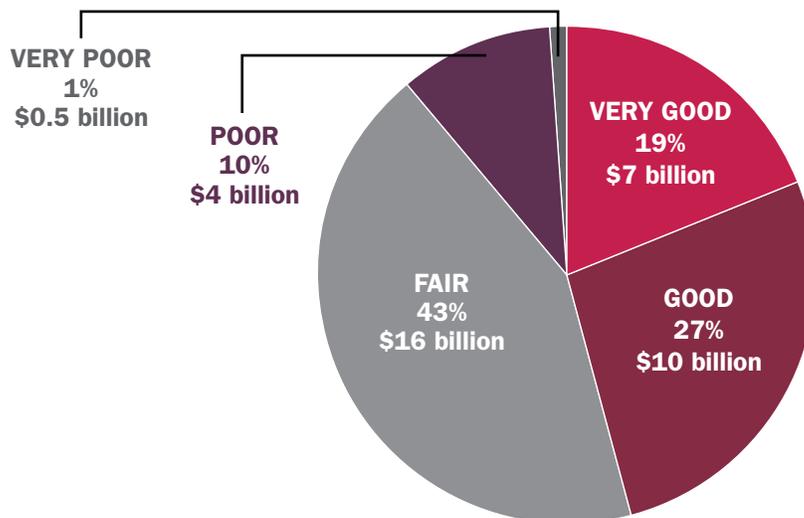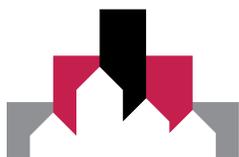
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

C. PERFORMANCE INDICATORS

This figure examines the results on some key wastewater indicators. While the Report Card provides extrapolated results to the whole of Canada, this section provides results that were reported in the wastewater survey.

Performance Indicator	Results
% of assets in poor or very poor condition	11%
Replacement value of assets in poor and very poor condition	$13.6 billion
% of assets in fair condition	23.8%
Replacement value of assets in fair condition	$29.6 billion
% of assets in good or very good condition	65.2%
Replacement value of assets in good or very good condition	$81 billion
Replacement value of all reported wastewater assets	$124.3 billion
Replacement value per household of municipalities that responded	$18,462
Average physical condition rating of wastewater assets	78.0 (Good)
Average age of linear assets (pipes, sewers, forcemains)	38 years
Reinvestment rate of linear wastewater assets	0.7%
Reinvestment rate of non-linear wastewater assets	1.4%

D. NETWORK SUMMARY

	Results
Number of municipalities that provided responses to the wastewater section of the survey	102
Total population (2013)	19.8 million
% of Canada's population (2013)	56%
Total km of pipes	66,771 km (93 municipalities)
Total storage capacity (tanks pipe storage, ponds or lagoons) in megalitres	846 megalitres (22 municipalities)
Population of Canada (2013)	35,710,000
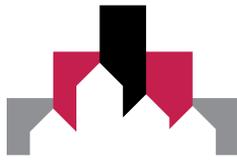
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

The 102 municipalities (total population of 19.8 million in 2013) that provided responses to the wastewater questionnaire reported a total of 66,771 km of pipes. The network reported is composed primarily (68%) of small local collection pipes (< 450 mm in diameter).

The pipes in the system are mostly concrete (36%) and plastic (33%), with the remaining pipes of vitrified clay, other, unknown and metal materials.

The responding municipalities jointly owned or operated 80 wastewater storage structures (tanks, pipe storage, ponds or lagoons) with a capacity of 846 megalitres.

Eighty-eight per cent of the pipe networks were assessed for age, with most of the network falling into three age ranges:

- 20-39 years old (29%)
- 40-59 years old (29%)
- < 20 years old (26.5%)

Asset Management and Sources of Data

Ninety-five per cent of respondents that own and/or operate wastewater systems reported using asset management systems whether computer only (24%), paper only (13%) and both (58%). The remaining five per cent did not have an asset management system.

An average of 15% of the respondents did not have data on their non-linear (stations, tanks, facilities, reservoirs) wastewater systems and 22% did not have data on their linear wastewater system. Fifty-nine per cent of responding municipalities inspect their non-linear wastewater assets at least every ten years and 46% assess their linear wastewater assets at least every ten years.

Ninety-seven per cent of responding municipalities reported that they use some type of technology to assess the condition of buried wastewater pipes, with the largest percentage using Closed Circuit TV (59%).
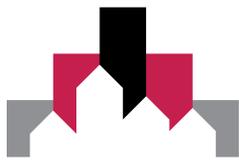
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

The majority of respondents cited proxy information such as age of material, soil environment, estimated service life , etc., as the source of information for linear asset condition. Opinion of municipal representative was the most common response for non-linear assets.

Fifty-eight per cent of responding municipalities undertake risk assessment.

Sixteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for wastewater. For municipalities that reported having asset management plans (49%), a high percentage (80%) of those plans include wastewater assets. For municipalities that reported having a State of Infrastructure Report (38%), approximately 80% of those include wastewater assets.

E. SOURCE OF PHYSICAL CONDITION INFORMATION

The survey asked respondents to rank the physical condition of their assets (collection pipes, treatment plants, pumping stations, and reservoirs) from very good condition to very poor condition. The survey also asked respondents to provide the primary source of the physical condition information as: complete data based on detailed inspection and analysis; opinion of municipal representative, based on experience working with the asset; using proxy information such as age of material, soil environment, estimated service life, etc.; or all of the above.

For linear assets overall, proxy information was the most common response (30% for small local collection pipes, 31% for trunk collection pipes and 43% for forcemains) except for large local collection pipes where all was the most common response. When looking at small responding municipalities, the source for physical information is most often opinion of municipal representative (40%). Medium-sized responding municipalities showed a mix of all sources and large responding municipalities showed opinion as the least common information source (9%). For large responding municipalities, the source for linear assets is most commonly proxy information (35%).

For non-linear assets, opinion of municipal representative was the most common response for treatment plants (32%) and pumping stations (39%). For storage tanks, opinion of municipal representative and complete data based on detailed inspection were cited equally as often (33%). The results were similar when looking small and medium-sized responding municipalities and large responding municipalities used mostly complete data to assess physical condition.

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WASTEWATER

Wastewater: Source of physical condition information

Legend:
- All
- Using proxy information
- Opinion of municipal representative
- Complete data based on detail inspection

Storage Tanks
- 20.0%
- 13.3%
- 33.3%
- 33.3%

Pumping Stations
- 25.0%
- 16.3%
- 38.8%
- 20.0%

Treatment Plants
- 22.7%
- 15.9%
- 31.8%
- 29.6%

Forcemains
- 22.9%
- 42.9%
- 28.6%
- 5.7%

Trunk Collection Pipes
- 28.9%
- 31.1%
- 13.3%
- 26.7%

Large Local Collection Pipes
- 31.1%
- 27.0%
- 18.9%
- 23.0%

Small Local Collection Pipes
- 27.4%
- 29.8%
- 21.4%
- 21.4%

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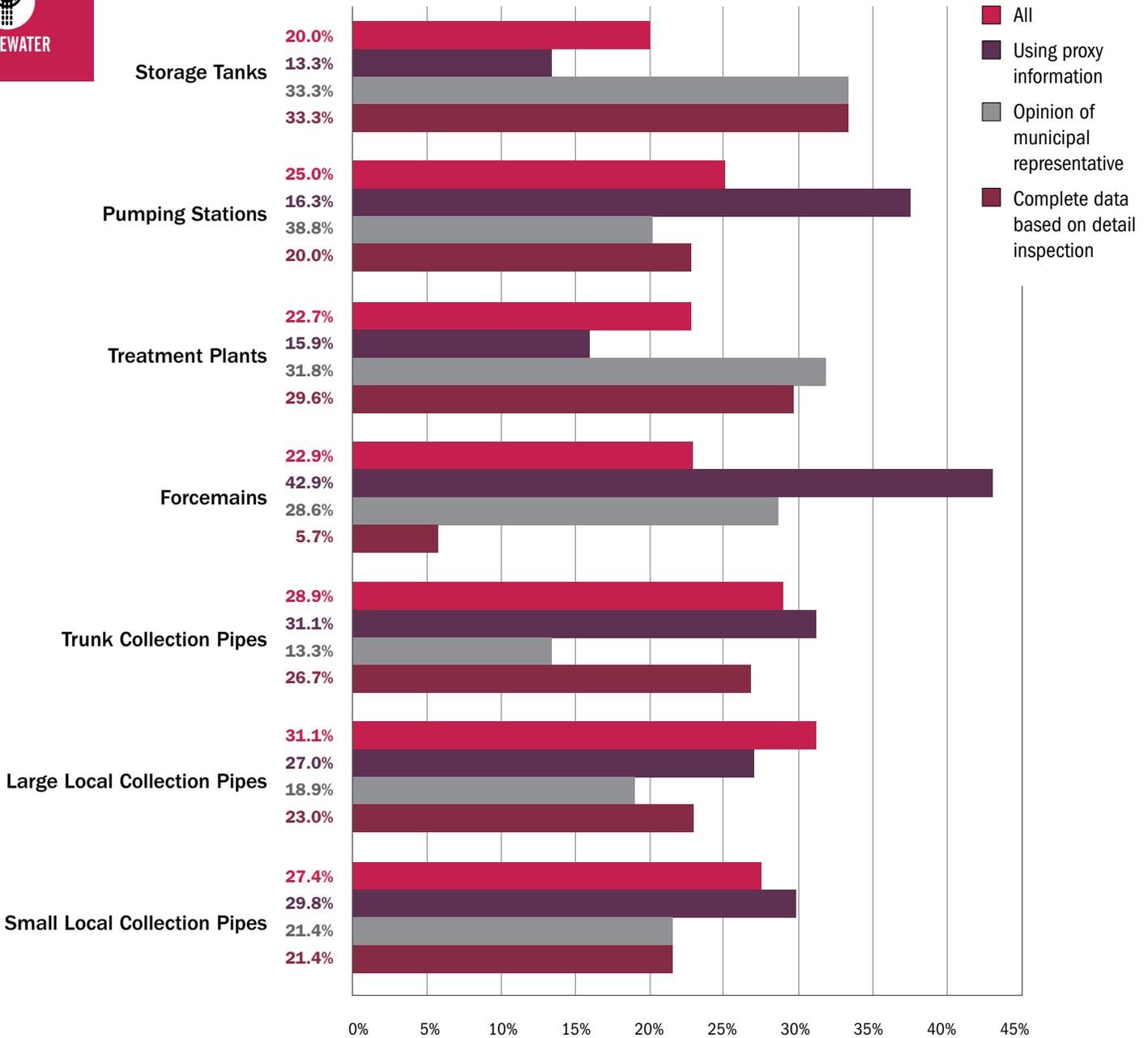
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

F. AGE

Pipes that are under 60 years old are evenly distributed into the following three age ranges: <20 years (27%), 20-39 years (29%) and 40-59 years (29%). When looking at small responding municipalities only, thirty-seven per cent of the linear inventory are between the ages 20 to 39. In medium-sized responding municipalities, thirty-four per cent of the linear inventory is between 20 to 39 years old and large responding municipalities have the highest percentage of the older linear infrastructure with eight per cent between 60 to 79 years old, five per cent between 80 to 99 years old and four per cent over 100 years old.

Wastewater: Age breakdown of total linear assets

≥ 100 YEARS OLD 4%

80-99 YEARS OLD 4%

60-79 YEARS OLD 7%

40-59 YEARS OLD 29%

< 20 YEARS OLD 27%

20-39 YEARS OLD 29%
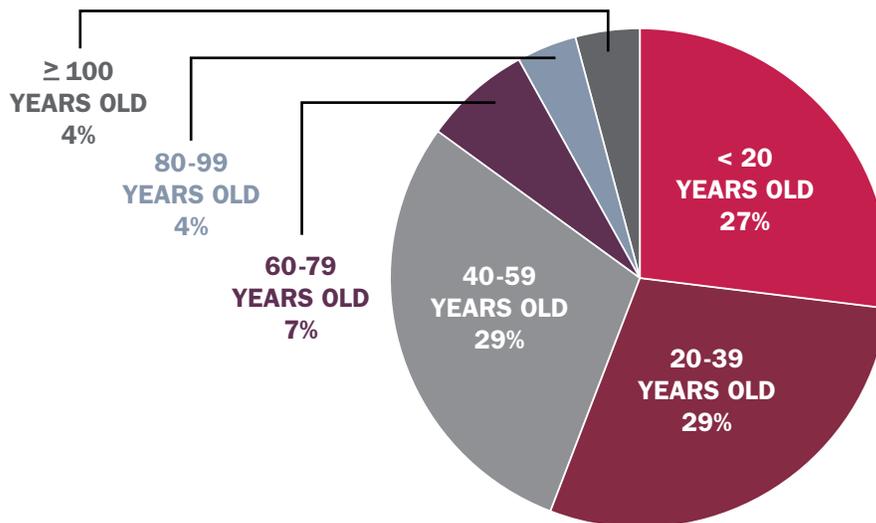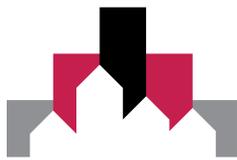
WASTEWATER

G. RISK ASSESSMENT CYCLE

Over half of the responding municipalities have undertaken a risk/criticality assessment[35] of their wastewater assets (59% for non-linear and 57% for linear assets). Small municipalities that responded undertake risk assessment less frequent than average for both linear (42%) and non-linear (stations, tanks, facilities, reservoirs) (56%). Medium-sized municipalities are more likely to undertake risk assessment on linear asset (62%) than small responding municipalities but less likely for non-linear assets (41%). Large responding municipalities are most likely to undertake risk assessment for both linear (66%) and non-linear assets (68%).

Wastewater: Risk Assessment Cycle (Yes vs. No)

Total linear: 57.9% Yes, 43.0% No
Total non-linear: 58.6% Yes, 41.4% No
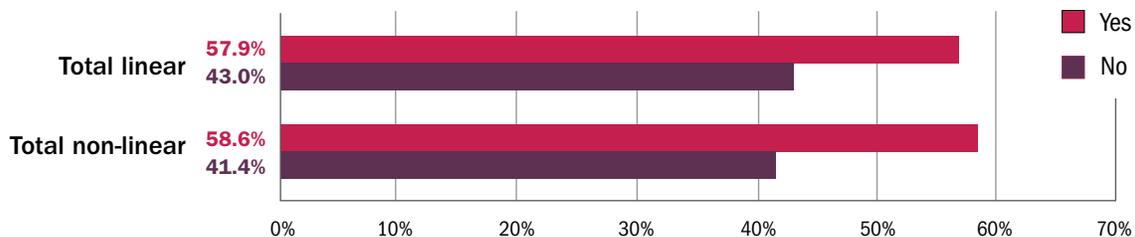
### H. CONDITION ASSESSMENT CYCLE

The condition assessment cycle for linear (pipes) wastewater assets was every five to ten years for one-third of responding municipalities. For non-linear (facilities, stations) wastewater assets, the most common response was also five to ten years, with 31% of responses. Thirty-two per cent of responding municipalities indicated it had been more than 10 years since their last linear asset inspection.

When examining how the data compared across small, medium and large responding municipalities, the results for linear assets (pipes, sewers, forcemains) showed that 35% of small responding municipalities had no data, 39% of medium-sized responding municipalities indicated that their condition assessment cycle is more than 10 years. Thirty-nine per cent of large responding municipalities inspect their linear assets every five to ten years and 38% has a condition assessment cycle of longer than every 10 years. The results for non-linear assets indicated that small responding municipalities inspect their non-linear assets most frequently, or less than five years, (30% of responses). Both large (36%) and medium-sized (47%) responding municipalities indicated every five to ten years.

See the Appendix A for a more detailed breakdown by size of municipality.

WASTEWATER

Wastewater: Average condition assessment of linear assets

NO DATA
22%

< 5
YEARS
13%

5-10
YEARS
33%

> 10
YEARS
32%

Wastewater: Average condition assessment of non-linear assets

VARIES
15%

NO DATA
15%

> 10
YEARS
11%

< 5
YEARS
28%

5-10
YEARS
31%
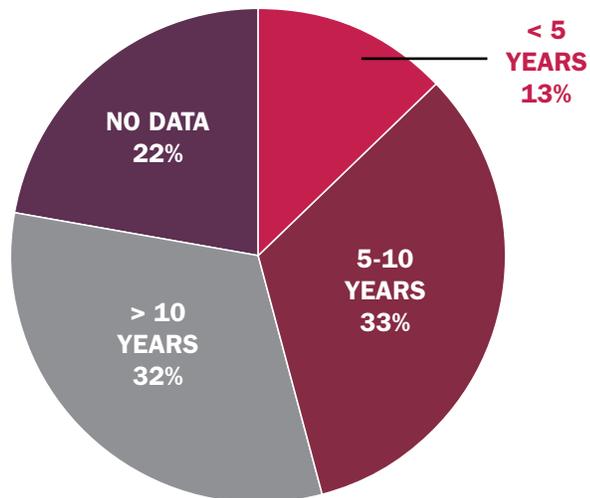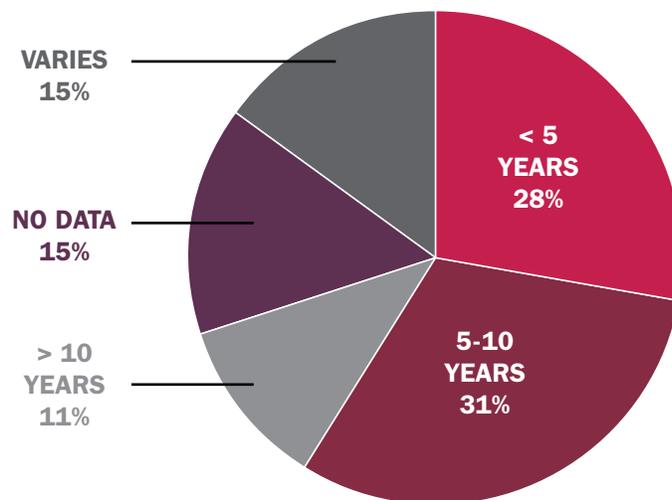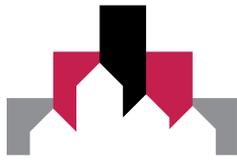
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

I. DEMAND/CAPACITY CONDITION

The survey asked respondents to rank the demand/capacity condition of their assets (collection pipes, treatment plants, pump stations and storage tanks) from very good condition to very poor condition. Just over ten per cent (11.6%) of pipes were assessed for demand/capacity condition. Sixty-three per cent were in good demand/capacity condition. Across all municipalities that responded, 75% of linear assets (pipes, sewers, forcemains) were reported to be in good and very good condition.

When examined by size of municipality, the distribution of results varied significantly. In small responding municipalities, 65% of linear assets were in very good condition. In medium-sized responding municipalities, 74% of linear assets were in good (54%) and very good condition (20%). In large responding municipalities, 67% of linear assets were in good condition.

The demand/capacity condition rating of non-linear (stations, tanks, facilities, reservoirs) assets in very good and good condition is 78% when looking at all responding municipalities. When examined by size of municipality, 38% of small responding municipalities were in good (17%) and very good condition (21%). In medium-sized responding municipalities, 58% of non-linear assets were in good condition and 42% were in fair condition. In large responding municipalities, 78% of assets were in good (45%) and very good condition (33%).

PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

Wastewater: Demand/capacity condition of linear assets (measured by length)
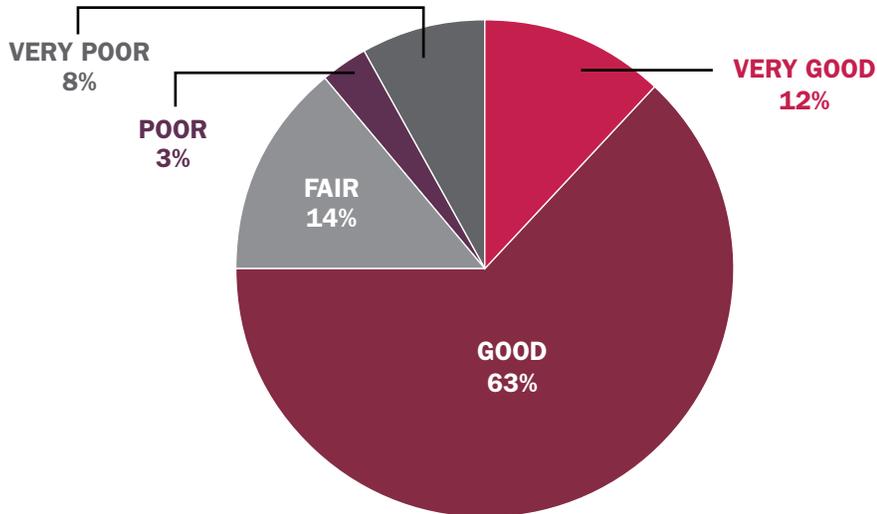
VERY POOR
8%

POOR
3%

FAIR
14%

VERY GOOD
12%

GOOD
63%

Wastewater: Demand/capacity condition of non-linear assets
(measured by replacement value)

VERY POOR
0%

POOR
1%

FAIR
21%

VERY GOOD
33%

GOOD
45%

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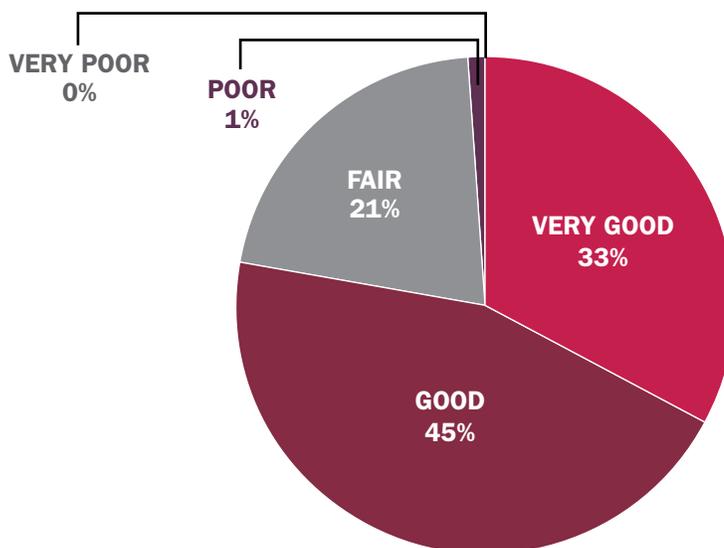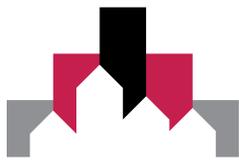
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

J. TECHNOLOGY

Ninety-seven per cent of responding municipalities reported that they use technology to assess their underground wastewater sewers. One hundred per cent of large responding municipalities use technology for this purpose as do 96% of medium-sized responding municipalities and 90% of small responding municipalities.

Wastewater: **Technology used to assess underground linear assets**

Technology	Percentage
None	3.5%
Other Technologies	16.1%
Sonar	7.7%
Ground Penetrating Radar	2.8%
Electromagnetic Tests	4.9%
Acoustic Leak Detection	6.3%
Closed Circuit TV	58.7%
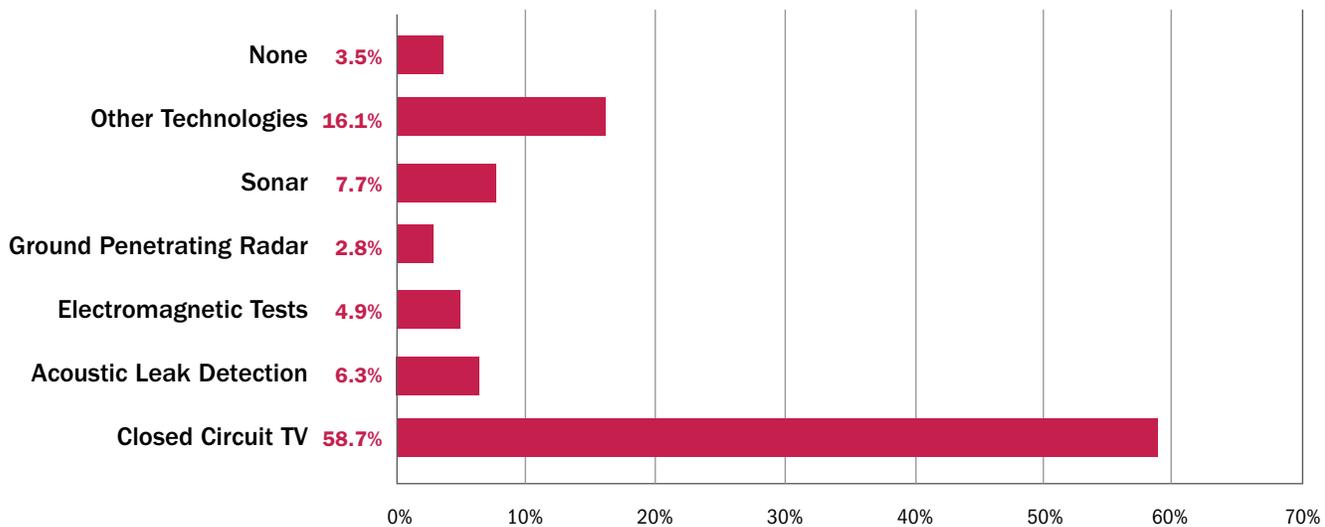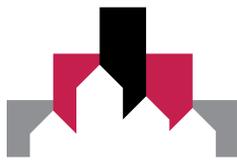
WASTEWATER

K. REPLACEMENT VALUE

The total replacement value of the assets reported by the 81 responding municipalities that provided data in this asset category was $ 124.3 billion (including forcemains); this corresponds to $18,462 per household served by the system. Seventy per cent of the total replacement value of wastewater assets was for sewer pipes (local pipes, trunk sewers and forcemains).

Asset	Replacement Value	No. of Respondents
Small Local Collection Pipes	$45,661,056,686	62
Large Local Collection Pipes	$14,575,952,425	48
Trunk Collection Pipes	$5,477,775,080	22
Forcemains	$3,141,323,096	52
Sub-total	**$68,856,107,287**	**66**
Not broken down by asset type	$18,218,279,699	16
Total linear replacement value	**$87,074,386,986**	**78**
Treatment Plants	$31,476,691,322	49
Pumping Stations	$4,895,235,308	61
Storage Tanks	$358,351,181	11
Subtotal	**$36,730,277,811**	**67**
Not broken down by asset type	$533,458,915	10
Total non-linear replacement value	**$37,263,736,726**	**76**
Total replacement value of wastewater systems	**$124,338,123,712**	**81**
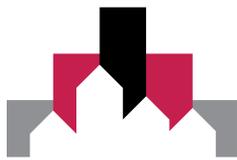
PART 2: SURVEY RESULTS BY SECTOR

WASTEWATER

L. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

The reinvestment rate for all responding municipalities range from 0.6% to 2.9%, depending on asset type. Small responding municipalities have a lower reinvestment rates for non-linear wastewater assets and medium-sized responding municipalities show a much higher rate for pumping stations in particular (5.8%).[36]

Target reinvestment rates for wastewater assets are between 1.0% and 1.3% for linear assets (pipes) and for non-linear assets (treatment plants, pumping stations and reservoirs), reinvestment rates vary for each facility type, but are typically around 1.7% to 2.5%.

All Municipal Responses						
	Replacement Value ($)*	Annual Renewal Budget ($)	Reinvestment Rate	km or Units	Replacement Value Per Unit ($)	Number of Respondents
Small Local Collection Pipes	21,717,247,490	128,454,297	0.6%	21,774	997,394	30
Large Local Collection Pipes	5,719,382,321	49,429,053	0.9%	2,849	2,007,505	17
Trunk Collection Pipes	1,636,566,431	12,627,964	0.8%	243	6,734,841	8
Forcemains	750,630,973	8,723,235	1.2%	582	1,289,744	11
Treatment Plants	15,319,222,371	198,631,485	1.3%	184	83,256,643	23
Pumping Stations	1,838,941,042	48,403,692	2.6%	1,578	1,165,362	31
Storage Tanks	49,310,478	1,442,633	2.9%	59	835,771	2

*Many responding municipalities were not able to provide information for both replacement value and annual renewal budget. Those that did provide data for both are included in the numbers above. There were between two and 31 respondents, depending on the type of asset.

CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: STORMWATER
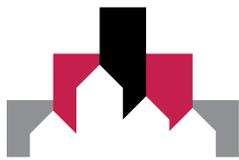
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

Collection, stormwater management facilities

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF STORMWATER ASSETS OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE		
	RECOMMENDED	CURRENT
linear assets	**1.0% to 1.3%**	**0.3%**
non-linear assets	**1.7% to 2.0%**	**1.3%**

A. INTRODUCTION AND OVERALL RATING

The stormwater infrastructure assets that were surveyed relate to the linear stormwater collection system: small local collection pipes less than 450 millimetres, large local collection pipes between 450 and 1,500 millimetres and trunk collection pipes of 1,500 millimetres or greater, as well as non-linear assets: stormwater drainage pump stations, stormwater management facilities and culverts with diameter smaller than three metres.

The physical condition of linear stormwater assets has an overall rating of Very Good: Fit for the future; well-maintained, good condition, new or recently rehabilitated.

The physical condition of non-linear stormwater assets has an overall rating of Good: Adequate for now; within acceptable condition.
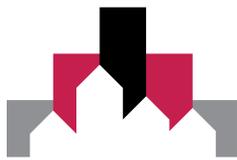
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets (collection pipes, drainage pump stations, management facilities and culverts) from very good condition to very poor condition. The physical condition of individual asset types within the stormwater system ranges between good and very good. Across all municipalities that responded, 24% were in fair, poor and very poor condition. When examined by size of municipality, linear assets (pipes) in fair, poor and very poor condition comprised 21% of systems in small responding municipalities, 30% in medium-sized responding municipalities and 26% in large responding municipalities.

Twenty-seven per cent of non-linear assets were in fair, poor and very poor condition. When examined by size of municipality, non-linear assets in fair, poor and very poor condition comprise 74% of systems in small responding municipalities, 16% in medium-sized responding municipalities and 26% in large responding municipalities.

Asset Type	Average Condition Rating
Small Local Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Large Local Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Trunk Collection Pipes	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Drainage Pump Stations	**Good:** Adequate for now – within acceptable condition
Management Facilities	**Good:** Adequate for now – within acceptable condition
Culverts (less than 3 m)	**Good:** Adequate for now – within acceptable condition

PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

Stormwater: Physical condition by replacement value of linear assests (measured by length)

VERY POOR
2%
$1 billion

POOR
5%
$3 billion

FAIR
17%
$9 billion

VERY GOOD
46%
$25 billion

GOOD
30%
$16 billion

Stormwater: Physical condition by replacement value of non-linear assests

VERY POOR
4%
$0.3 billion

POOR
9%
$0.7 billion

FAIR
14%
$1 billion

VERY GOOD
27%
$2 billion

GOOD
46%
$4 billion

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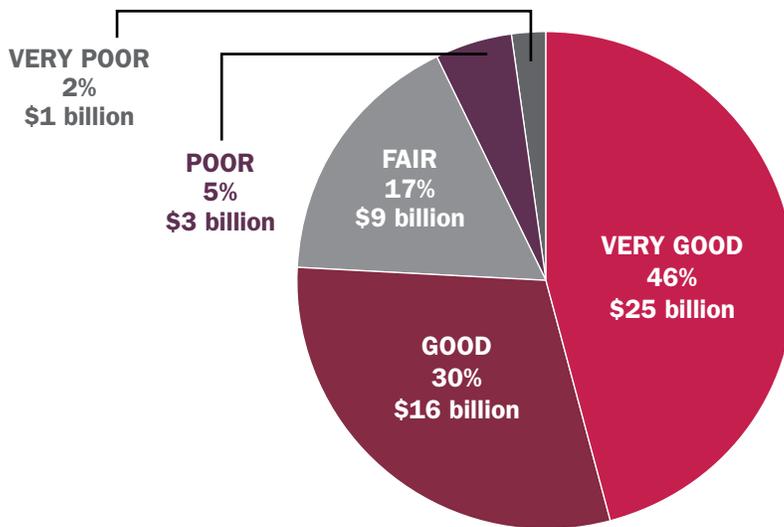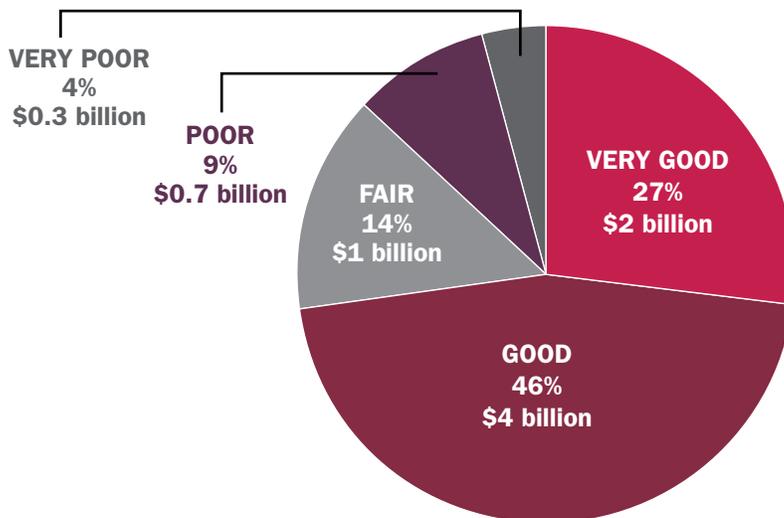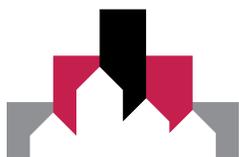
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

C. PERFORMANCE INDICATORS

This figure examines the results on some key stormwater indicators from 2016. While the Report Card provides extrapolated results to the whole of Canada, this section provides results as reported in the stormwater survey.

Performance Indicator	Results
% of assets in very poor or poor condition	8.2%
Replacement value of assets in poor or very poor condition	$4.9 billion
% of assets in fair condition	16.9%
Replacement value of assets in fair condition	$10.1 billion
% of assets in good or very good condition	74.9%
Replacement value of assets in good or very good condition	$46.4 billion
Replacement value of all reported stormwater assets	$61.9 billion
Replacement value per household of municipalities that responded	$9,157
Average physical condition rating of stormwater assets	82.2 (Very Good)
Average age of linear assets (pipes, sewers, forcemains)	32 years
Reinvestment rate of linear stormwater assets	0.3%
Reinvestment rate of non-linear stormwater assets	1.3%

D. NETWORK SUMMARY

	Results
Number of municipalities that provided responses to the stormwater section of the survey	111
Total population (2013)	19.9 million
% of Canada's population (2013)	55.7%
Total km of pipe	46,990 km (90 municipalities)[37]
Population of Canada (2013)	35,710,000
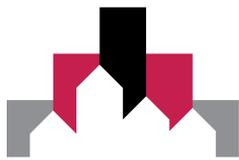
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

The 111 municipalities that provided responses to the stormwater questionnaire represent a population of 19.9 million in 2013. Not all 111 responded to every question of the stormwater section of the survey. Ninety responding municipalities reported that they own a total of 49,990 km of pipes, comprised of small local collection pipes (49.1%), large local collection pipes (45.5%) and trunk collection pipes (5.3%).

Of the reported inventory, 94.4% has been assessed for age. The top three age categories reported are:

- 20-39 years old (35%)
- < 20 years old (30%)
- 40-59 years old (28%)

Asset Management and Sources of Data

The majority of responding municipalities (82%) that own and/or operate stormwater systems reported using asset management systems, whether computer-based (20.4%), paper-based (15%) or both (46.6%). Eighteen per cent of responding municipalities did not have an asset management system.

Eighty-nine per cent of responding municipalities reported that they use some type of technology to assess the condition of buried stormwater pipes, with the largest percentage using Closed Circuit TV (66%).

The majority of respondents cited proxy information such as age of material, soil environment, estimated service life, etc., as the source of information for linear asset condition. Responses were mixed for non-linear assets.

Nearly fifty-four per cent (53.6%) of responding municipalities undertake risk assessment.

Sixteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for storm water. For municipalities that reported having asset management plans (49%), a high percentage (80%) of those plans include stormwater assets. For municipalities that reported having a State of Infrastructure Report (38%), approximately 67% of those include stormwater assets.
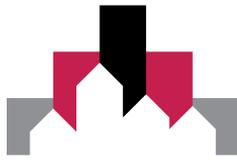
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

Particular to the stormwater section were questions about flood events. Forty-eight responding muncipalities representing a total population of 8.7 million reported 671 occurrences that resulted in flood damages since 2009. Based on data provided by half of the responding municipalities, the numbers of private properties impacted was in excess of 66,000 and the cost of damage estimated in the order of $500 million.

E. SOURCE OF PHYSICAL CONDITION INFORMATION

The survey asked respondents to rank the physical condition of their assets (collection pipes, drainage pump stations, management facilities and culverts smaller than three metres) from very good condition to very poor condition. The survey asked respondents to also provide the primary source of the physical condition information as: complete data based on detailed inspection and analysis; opinion of municipal representative, based on experience working with the asset; using proxy information such as age of material, soil environment, estimated service life, etc.; or all of the above.

For linear assets (pipes), proxy information was the most common response (36% for small local collection pipes, 34% for large local collection pipes and 38% for trunk collection pipes) and for non-linear assets, the most common response was opinion of municipal representative for culverts (42%); all sources for pumping stations (39%) and facilities had 33% each for all sources and opinion of municipal representative.

Municipal responses by size show that for small responding municipalities, opinion or all sources is the most common response for all asset types, proxy was highest for linear assets in medium-sized responding municipalities (with no pattern for non-linear assets) and large responding municipalities had proxy or all sources as the highest response for all assets except culverts, which had the highest response from opinion.
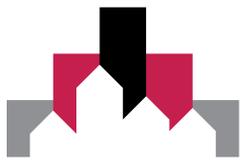
STORMWATER

Stormwater: Source of physical condition information

Legend:
- All
- Using proxy information
- Opinion of municipal representative
- Complete data based on detail inspection

Culverts (smaller than 3 m)
- 16.7%
- 27.1%
- 41.7%
- 14.6%

Facilities
- 32.7%
- 20.4%
- 32.7%
- 14.3%

Pumps Stations
- 39.3%
- 10.7%
- 28.6%
- 21.4%

Trunk Collection Pipes
- 32.8%
- 37.9%
- 17.2%
- 12.1%

Large Local Collection Pipes
- 31.1%
- 33.8%
- 20.3%
- 14.9%

Small Local Collection Pipes
- 29.9%
- 36.4%
- 22.1%
- 11.7%
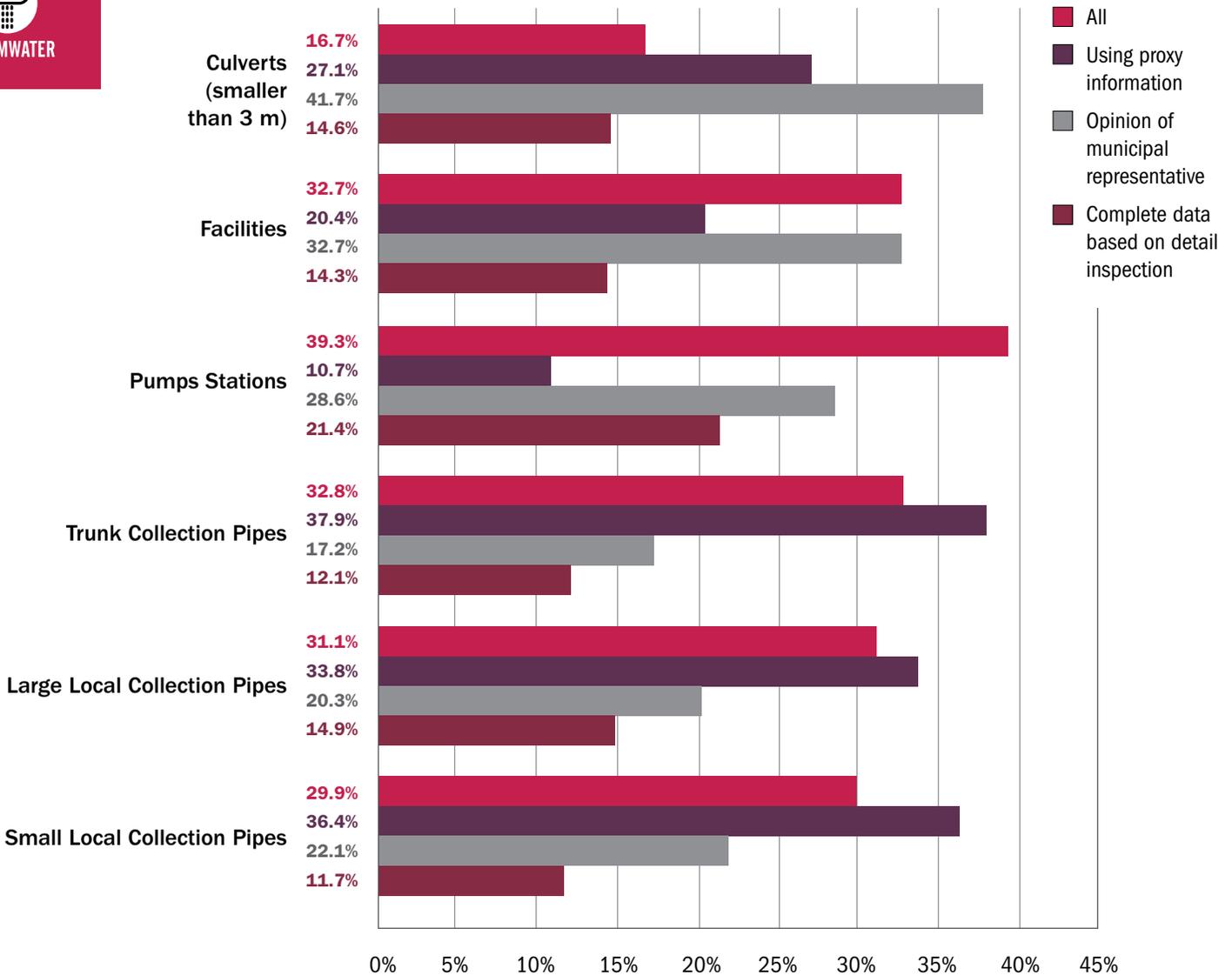
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

F. AGE

Sixty-five per cent of linear stormwater assets reported are less than 40 years old and two per cent are over 80 years old. In small responding municipalities, none of the linear assets (pipes) were over 80 years old and 57% were under 20 years old. The results for medium and large responding municipalities are similar to those shown here for all responding municipalities.

Stormwater: **Age breakdown of total linear assets**

80-99 YEARS OLD 1%

60-79 YEARS OLD 5%

40-59 YEARS OLD 28%

≥ 100 YEARS OLD 1%

< 20 YEARS OLD 30%

20-39 YEARS OLD 35%
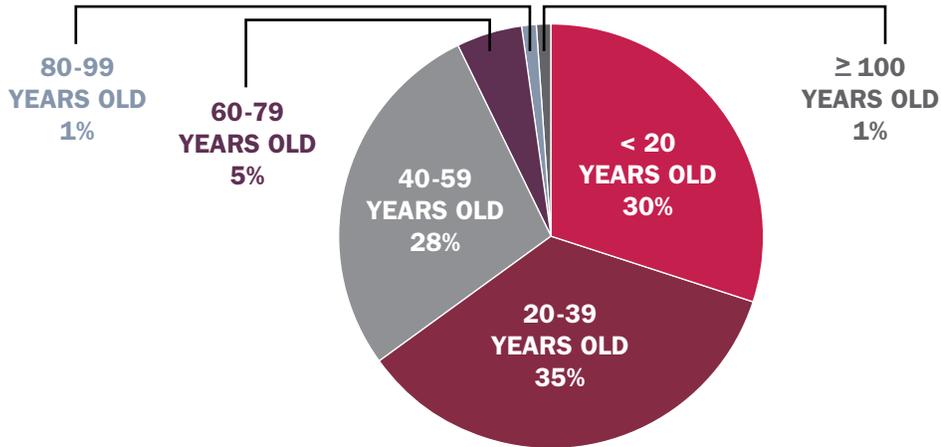
G. RISK ASSESSMENT CYCLE

Just over half of the responding municipalities have undertaken a risk/criticality assessment[38] of their stormwater assets (54% for linear and 50% for non-linear assets). Small responding municipalities that responded have undertaken a risk assessment less frequently for both linear (32%) and non-linear (41%) assets. Large responding municipalities are more likely to have undertaken risk assessment for their stormwater assets than average, with 64% for linear and 58% for non-linear (stormwater drainage pump stations, stormwater management facilities and culverts) assets.

Stormwater: **Risk Assessment Cycle (Yes vs. No)**

Total linear
53.6%
46.4%

Total non-linear
50.3%
49.7%

Yes
No

0%   10%   20%   30%   40%   50%   60%

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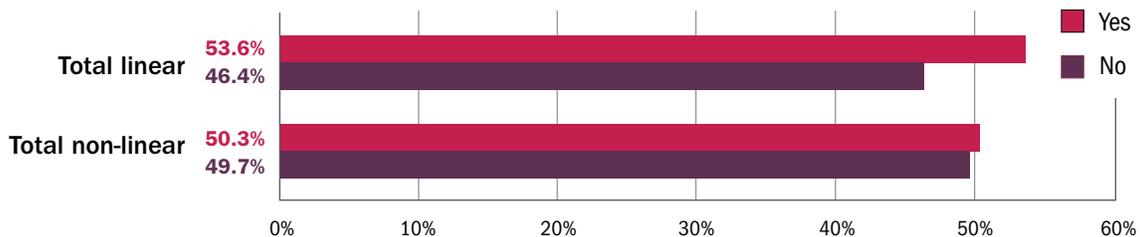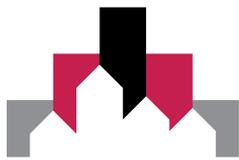
STORMWATER

H. CONDITION ASSESSMENT CYCLE

The condition assessment cycle for linear stormwater assets was most often five to ten years (34%) and over ten years (34%). For non-linear stormwater assets, it had been more than five years for 39% of responding municipalities. When examining how the data compared between small, medium and large responding municipalities, the results are very similar for non-linear assets and for linear assets in large responding municipalities. For linear assets in small responding municipalities, there was a higher rate of no data (38%) and in medium-sized responding municipalities, more than 10 years was the most common response (53%).

Stormwater: Average condition assessment of linear assets
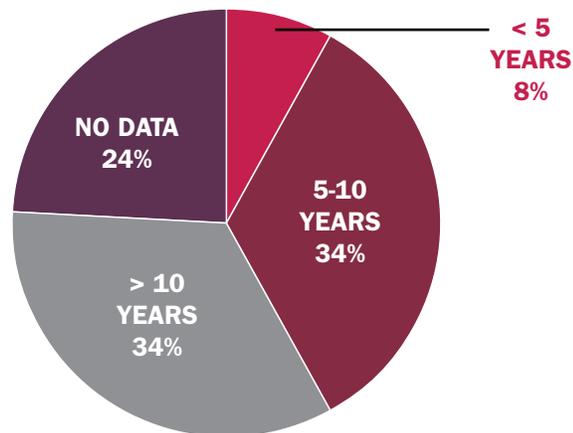
< 5
YEARS
8%

NO DATA
24%

5-10
YEARS
34%

> 10
YEARS
34%

Stormwater: Average condition assessment of non-linear assets

NO DATA
33%

< 3
YEARS
28%

3-5
YEARS
30%

> 5
YEARS:
9%
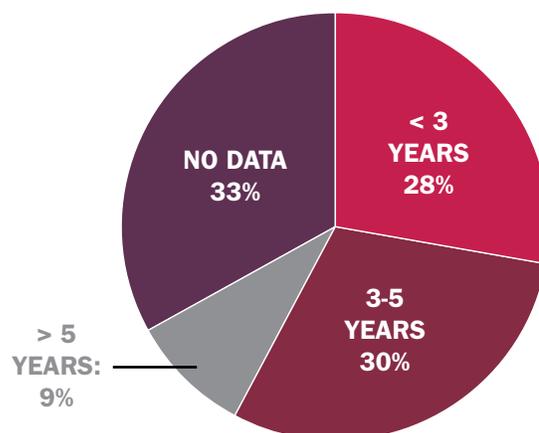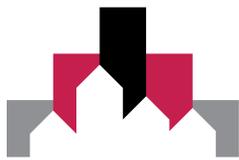
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

I. DEMAND/CAPACITY CONDITION

The survey asked respondents to rank the demand/capacity condition of their assets (collection pipes, drainage pump stations, management facilities and culverts) from very good condition to very poor condition. Only 4.9% of pipes were assessed for capacity condition. Thirty-three per cent were in fair capacity condition. Across all municipalities that responded, 35% of linear assets (pipes) were in good and very good condition.

When examined by size of municipality, the distribution of results varied significantly. In small responding municipalities, 53% of linear assets were in poor condition. In medium-sized responding municipalities, the majority (51%) of linear assets were in fair condition and 37% were in good and very good condition. In large responding municipalities, good and fair ratings each represented 40% of linear assets (pipes).

The capacity condition rating of non-linear assets in very good and good condition is 84% when looking at all responding municipalities. When examined by size of municipality, 95% of small responding municipalities were in good (69%) and very good condition (26%). In medium-sized responding municipalities, 53% of non-linear assets were in good and very good condition and 43% were in fair condition. In large responding municipalities, 86% of assets were in good (45%) and very good condition (41%).

PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

Stormwater: Demand/capacity condition of linear assests
(measured by length)
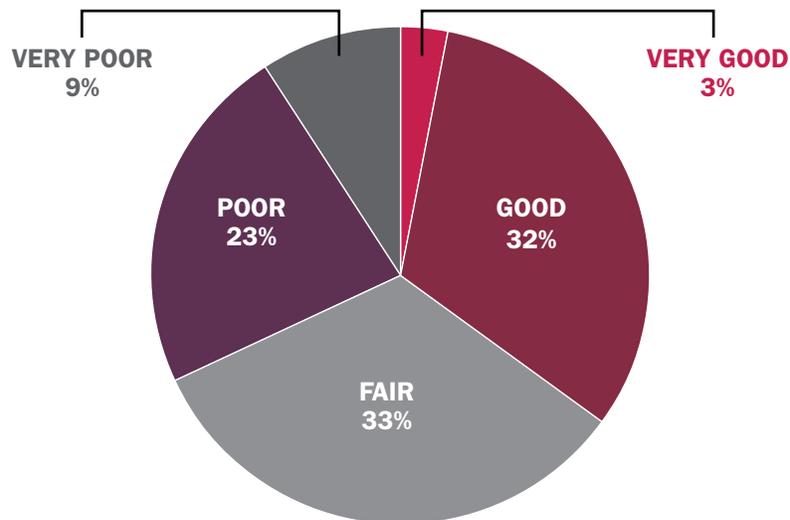
VERY POOR
9%

VERY GOOD
3%

POOR
23%

GOOD
32%

FAIR
33%

Stormwater: Demand/capacity condition of non-linear assests
(measured by replacement value)

POOR
3%

VERY POOR
1%

FAIR
12%

VERY GOOD
40%

GOOD
44%
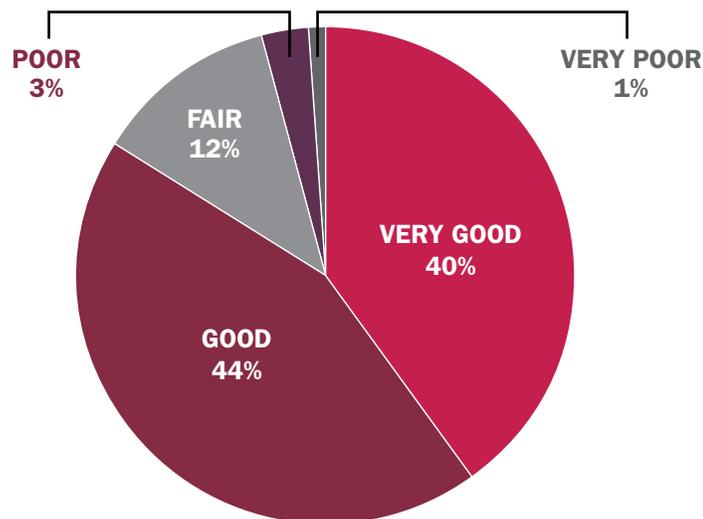
STORMWATER

J. TECHNOLOGY

Eighty-nine per cent of responding municipalities reported that they use technology to assess their underground stormwater pipes. Large and medium-sized responding municipalities were more likely to use technology (98% and 96% respectively), small responding municipalities were much less likely (68%).

Stormwater: Technology used to assess underground stormwater systems

Technology	Percentage
None	11.5%
Other Technologies	15.0%
Sonar	3.5%
Ground Penetrating Radar	0.9%
Electromagnetic Tests	0.9%
Acoustic Leak Detection	1.8%
Closed Circuit TV	66.4%
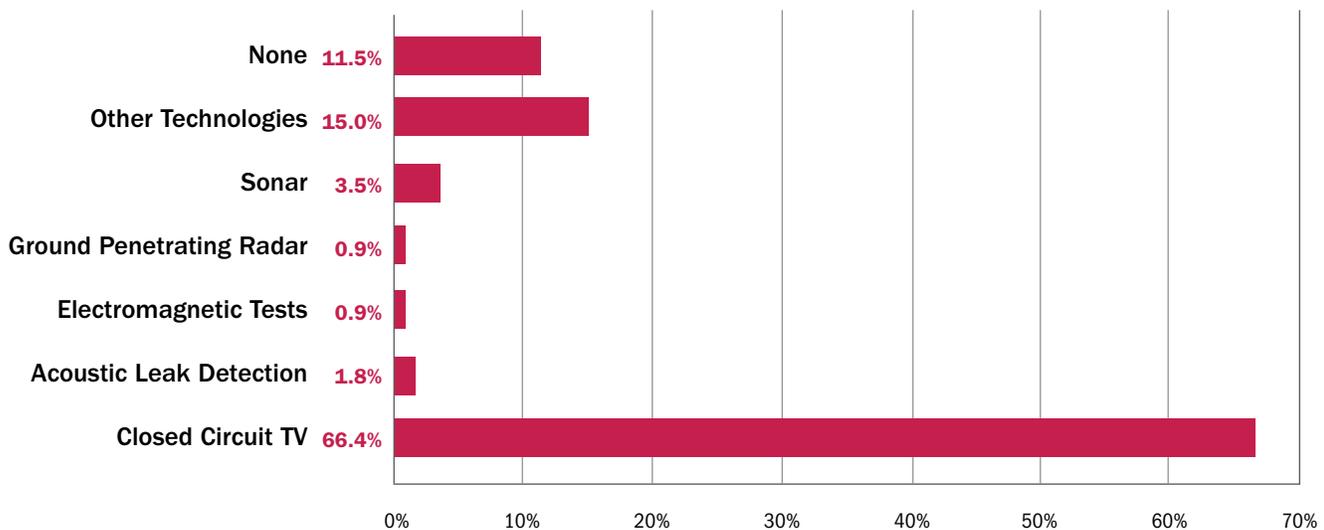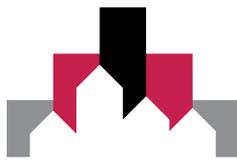
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

K. REPLACEMENT VALUE

The total replacement value of the assets reported by the 84 responding municipalities that provided data for stormwater assets was $61.9 billion. This corresponds to $9,157 per household served by the system.

Close to 91% of the total replacement value of the stormwater system was for pipes (collection pipes). The breakdown of asset replacement values for the system's various components is presented in the table below.

Asset	Replacement Value	No. of Respondents
Small local collection pipes	$15,754,119,082	53
Large local collection pipes	$14,194,330,530	48
Trunk collection pipes	$6,649,975,935	36
Sub-total	**$36,598,425,547**	**56**
Not broken down by asset type	$17,632,970,082	23
Total linear replacement value	**$54,231,395,629**	**75**
Pumping Stations	$549,887,690	26
Facilities	$2,509,768,904	34
Culverts (smaller than 3 m)	$698,917,103	33
Sub-total	**$3,758,573,697**	**60**
Not broken down by asset type	$3,918,235,516	17
Total non-linear replacement value	**$7,676,809,213**	**67**
Total replacement value of Stormwater systems	**$61,908,204,842**	**84**
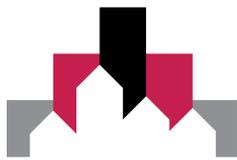
PART 2: SURVEY RESULTS BY SECTOR

STORMWATER

L. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

The reinvestment rate for all responding municipalities reporting stormwater infrastructure range from 0.2% to 1.9% depending on asset type. For small responding municipalities, the proportion was higher except for management facilities, which was slightly lower. There was no data for provided for pumping stations. Medium-sized responding municipalities showed a higher reinvestment rate for pumping stations and small collection pipes. There was no data for management facilities and culverts. Large responding municipalities showed no change for all assets (slightly lower for pumping stations.

Target reinvestment rates for stormwater assets are 1.0% and 1.3% for linear assets (pipes) and for non-linear assets (stormwater ponds and pumping stations), reinvestment rates vary for each facility type, but are typically around 1.7% to 2.0%.

All Municipal Responses						
	Replacement Value ($)*	Annual Renewal Budget ($)	Reinvestment Rate	km or Units	Replacement Value Per Unit	Number of Respondents
Pumping Stations	219,984,746	4,078,607	1.9%	104	2,115,238	8
Management Facilities	1,187,047,632	16,668,000	1.4%	1,808	656,553	14
Culvert (smaller than 3 m)	630,225,894	5,734,712	0.9%	25,139	25,070	16
Small Local Collection Pipes	10,211,160,784	31,476,990	0.3%	8,346	1,223,480	19
Large Local Collection Pipes	8,802,704,765	26,762,340	0.3%	5,893	1,493,756	16
Trunk Collection Pipes	1,110,411,090	2,426,120	0.2%	508	2,185,849	9

*Many responding municipalities were not able to provide information for both replacement value and annual renewal budgets. Those that did provide data for both are included in the numbers above. There were between eight and 19 respondents, depending on the type of asset.

CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: ROADS AND BRIDGES
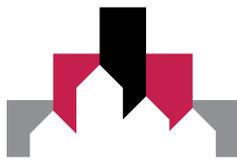
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

Highways,
arterials, collectors,
local roads and alleys,
sidewalks and bridges

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF ROADS OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE

TARGET	CURRENT
2.0% to 3.0%	1.1%

CURRENT REINVESTMENT LEVELS WILL RESULT IN A DECLINE IN THE CONDITION OF BRIDGES OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE

TARGET	CURRENT
1.0% to 1.7%	0.8%

A. INTRODUCTION AND OVERALL RATING

The road networks surveyed refer to two-lane equivalent kilometres of highways, arterial roads, collector roads, local roads and lanes and alleys. The asset categories of sidewalks and bridges (including bridges, culverts three metres and greater, and footbridges) were also surveyed.

The physical condition of the road and bridge networks has an overall rating of Good: Adequate for now; acceptable condition, within acceptable condition
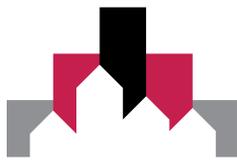
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets from very good condition to very poor condition. The physical condition of the majority of these individual asset types is good condition with the exception of collector roads (fair) and lanes and alleys (poor). Across all municipalities that responded, 39% of roads and 28% of sidewalks were in fair, poor and very poor condition. When examined by size of municipality roads and sidewalks in fair, poor and very poor condition comprise 42% of road networks and 45% of sidewalks in small responding municipalities, 43% of roads and 44% of sidewalks in medium-sized responding municipalities and 39% of roads and 28% of sidewalks in large responding municipalities.

When bridge assets were assessed by the replacement value in each rating, 26% of bridges were in fair, poor and very poor condition. When examined by size of municipality, bridge assets in fair, poor and very poor condition comprise 45% of systems in small responding municipalities, 32% in medium-sized responding municipalities and 26% in large responding municipalities.

Asset Type	Average Condition Rating
Highways	**Good:** Adequate for now – within acceptable condition
Arterial	**Good:** Adequate for now – within acceptable condition
Collector	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Local	**Good:** Adequate for now – within acceptable condition
Lanes & Alleys	**Poor:** At risk of affecting service
Sidewalks	**Good:** Adequate for now – within acceptable condition
Bridges	**Good:** Adequate for now – within acceptable condition
Culverts (3 m and greater)	**Good:** Adequate for now – within acceptable condition
Footbridges	**Good:** Adequate for now – within acceptable condition
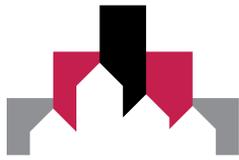
PART 2: SURVEY RESULTS BY SECTOR

**ROADS &
BRIDGES**

Roads and Bridges: Physical condition by
replacement value of roads (measured by length)

POOR
10%
$10 billion

VERY POOR
6%
$6 billion

VERY GOOD
24%
$24 billion

FAIR
23%
$24 billion

GOOD
37%
$39 billion
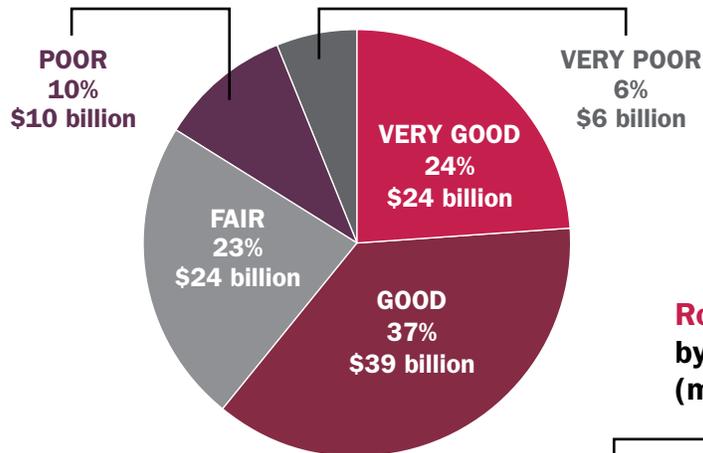
Roads and Bridges: Physical condition
by replacement value of sidewalks
(measured by length)
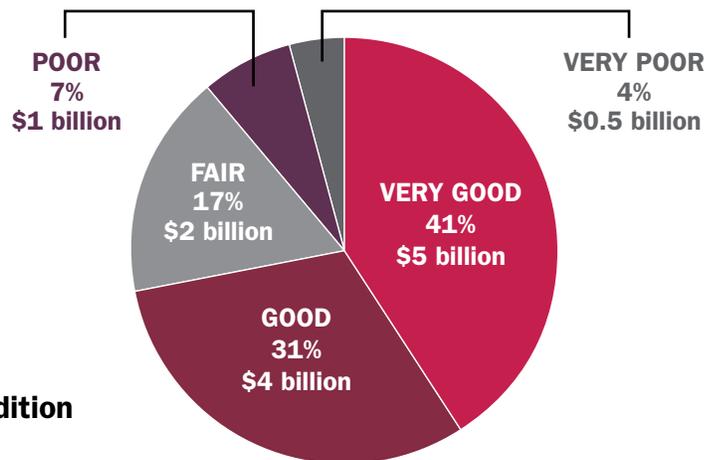
POOR
7%
$1 billion

VERY POOR
4%
$0.5 billion

FAIR
17%
$2 billion

VERY GOOD
41%
$5 billion

GOOD
31%
$4 billion

Roads and Bridges: Physical condition
by replacement value of bridges

POOR
3%
$0.7 billion

VERY POOR
1%
$0.2 billion

FAIR
22%
$4.5 billion

VERY GOOD
17%
$4 billion

GOOD
57%
$12 billion

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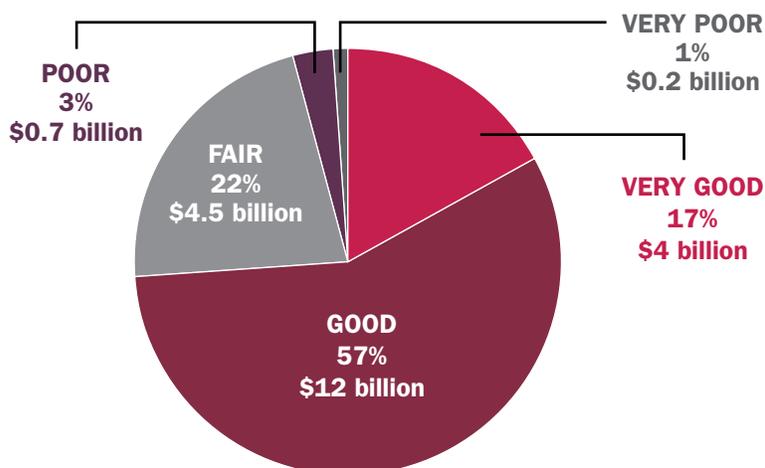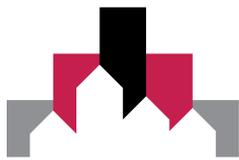
PART 2: SURVEY RESULTS BY SECTOR

**ROADS &
BRIDGES**

C. PERFORMANCE INDICATORS

This figure examines the results on some key road and bridge indicators from 2016. While the Report Card provides extrapolated results to the whole of Canada, this section provides results that were reported in the roads and bridges survey.

Performance Indicator	Results	
	Roads (Including Sidewalks)	Bridges
% of assets in poor or very poor condition	14.6%	4.3%
Replacement value of assets in poor or very poor condition	$17 billion	$0.9 billion
% of assets in fair condition	22.8%	21.9%
Replacement value of assets in fair condition	$26.6 billion	$4.5 billion
% of assets in good or very good condition	62.6%	73.8%
Replacement value of assets in good or very good condition	$73 billion	$15.4 billion
Replacement value of all reported assets	$116.7 billion	$20.8 billion
Replacement value per household of responding municipalities	$17,205	$3,172
Average physical condition rating of road and bridge assets	73.7[39] (Good)	77.1 (Good)
Reinvestment rate of road and bridge assets	1.1%	0.8%

D. NETWORK SUMMARY

	Results
Number of municipalities that provided responses to the roads and bridges section of the survey	115
Total population (2013)	19.8 million
% of Canada's population (2013)	55%
Total km of roads	107,038 km (110 municipalities)
Total km of sidewalks	57,629 (81 municipalities)
Total number of bridges	13,599
Population of Canada (2013)	35,710,000

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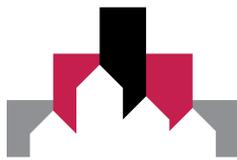
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

The 115 municipalities that provided responses to the roads questionnaire reported a total of 107,038 km (two-lane equivalents) of roads, 57,629 km of sidewalks and 13,599 bridges, serving a population of 19.8 million people. The bridge network is comprised of bridges (39%), culverts (46.3%) and footbridges (14.7%) The road network includes 76% urban roads and 24% rural roads, broken down as follows:

	Rural (2-lane km)	Urban (2-lane km)
Highway/Expressways	NA	1,597
Arterial	5,216	17,490
Collector	8,539	11,934
Local	10,382	40,154
Lanes and Alleys	NA	6,462
Not broken down by type	5,264	
Sub-total	**24,138**	**77,636**
Total (all roads)	**107,038**	

Asset Management and Sources of Data

Ninety-five per cent of responding municipalities that own and/or operate road networks reported using asset management systems, whether computer-based (40%), paper-based (8%) or both (47%).

The vast majority of respondents (90%) reported having a condition assessment cycle in place for their road network. Seventy-one per cent assess their roads at least every five years. When examining each road asset type, 27% of respondents did not have data for lanes and alleys, and 15% did not have data for sidewalks.

Eighty-nine per cent of respondents indicated using computer-based tools, paper-based tools or a combination of the two to manage their bridge networks. The remaining 11% did not have an asset management system in place. Most (56%) assessed bridge assets at least every three years.

Fifteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for roads and bridges. For municipalities that reported having asset management plans (49%), a high percentage (95%) of those plans include roads and bridges. For municipalities that reported having a State of Infrastructure Report (38%), approximately 87% of those include roads and bridges.
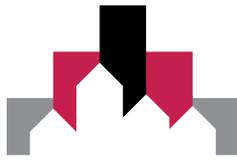
**ROADS &
BRIDGES**

E. SOURCE OF PHYSICAL CONDITION INFORMATION

The survey asked respondents to rank the physical condition of their assets from very good condition to very poor condition. The survey also asked for the primary source of the physical condition information as: complete data based on detailed inspection and analysis; opinion of municipal representative, based on experience working with the asset; using proxy information such as age of material, soil environment, estimated service life, etc.; or all of the above.

The source of the condition data was similar for most road asset types with the exception of sidewalks and lanes and alleys. Approximately 50% to 60% of respondents cited complete data based on detailed inspection and analysis as their source. The percentage drops to 40% for lanes and alleys and 32% for sidewalks, where opinion of municipal representative was the highest response.

For bridge assets, the most commonly cited source of condition data is complete data based on detailed inspection and analysis. Bridges have the most complete data (72%), followed by culverts (59%) and footbridges (51%).

When examining responses by municipal size, small responding municipalities report opinion of municipal representatives most often for all asset types except bridges (complete data) and culverts (all). Medium-sized and large responding municipalities reported complete data as the most common response for all asset types.

ROADS & BRIDGES

Roads and Bridges: Source of physical condition information

Legend:
- All
- Using proxy information
- Opinion of municipal representative
- Complete data based on detail inspection

Footbridges
- 24.6%
- 3.3%
- 21.3%
- 50.8%

Culverts (3 m and greater)
- 22.1%
- 5.9%
- 13.2%
- 58.8%

Bridges
- 22.2%
- 2.5%
- 3.7%
- 71.6%

Sidewalks
- 20.5%
- 7.5%
- 39.7%
- 32.1%

Lanes & Alleys (km)
- 15.0%
- 10.0%
- 35.0%
- 40.0%

Local (km)
- 19.4%
- 6.1%
- 22.4%
- 52.0%

Collectors (km)
- 20.7%
- 5.7%
- 16.1%
- 57.5%

Arterials (km)
- 15.7%
- 7.2%
- 14.5%
- 62.7%

Highways (km)
- 33.3%
- 0.0%
- 13.3%
- 53.3%

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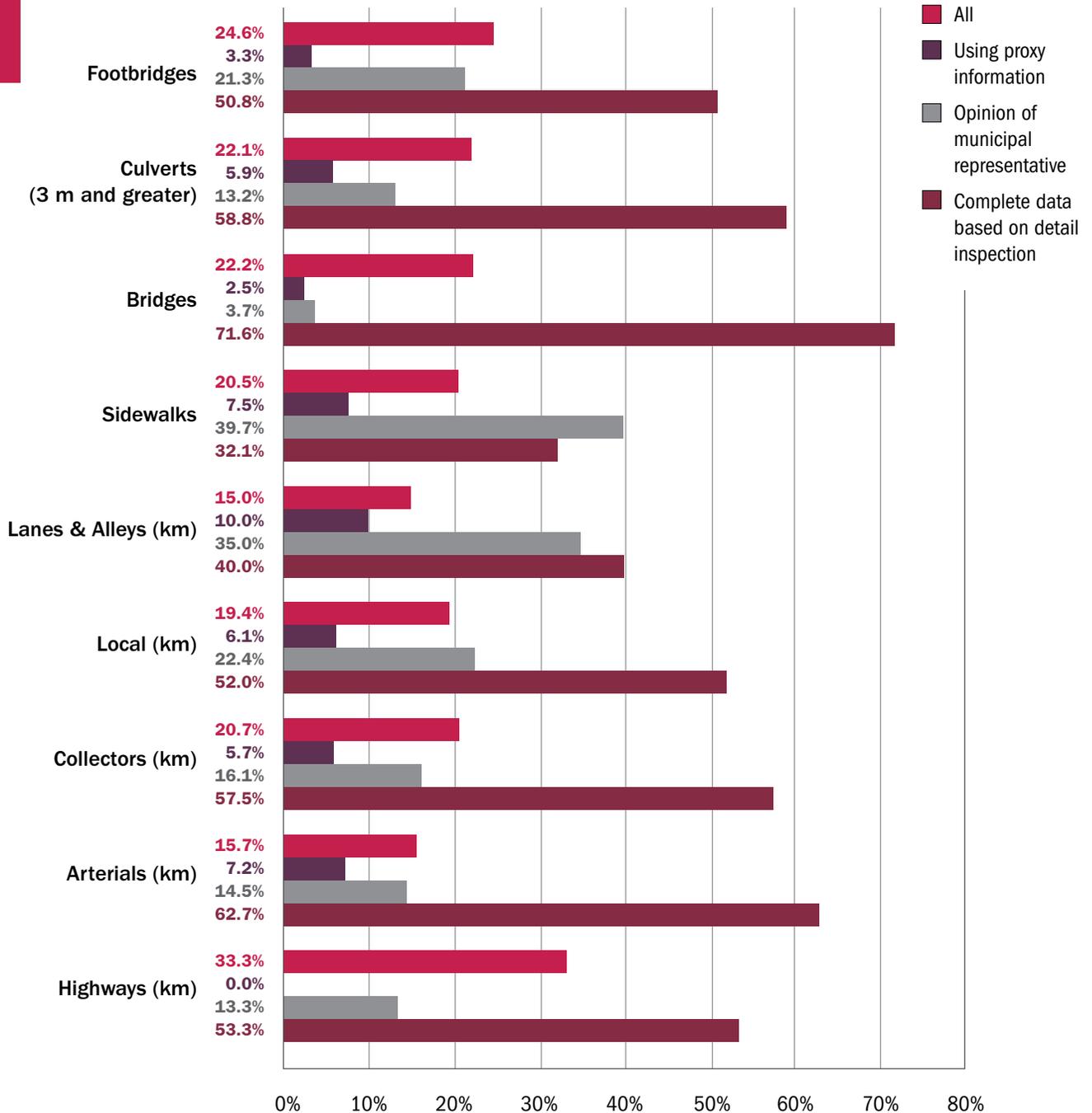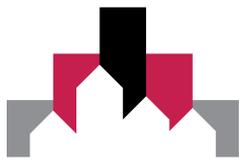
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

F. CONDITION ASSESSMENT CYCLE

The condition assessment cycle for road assets took place at least every five years for 71% of responding municipalities. When examining how the data compared between small, medium and large responding municipalities, the results for road assets indicate that 49% of small responding municipalities, 69% of medium-sized responding municipalities and 90% of large responding municipalities reported inspecting their roads at least every five years.

Most bridge assets (56%) were assessed at least every three years. This number dropped to 26% for small responding municipalities and increased to 73% for large responding municipalities. Sixty per cent of medium-sized responding municipalities assessed their bridge assets at least every three years.

Roads and Bridges: Average condition assessment of road assets

NO DATA
10%

> 5
YEARS
19%

< 3
YEARS
27%

3-5
YEARS
44%
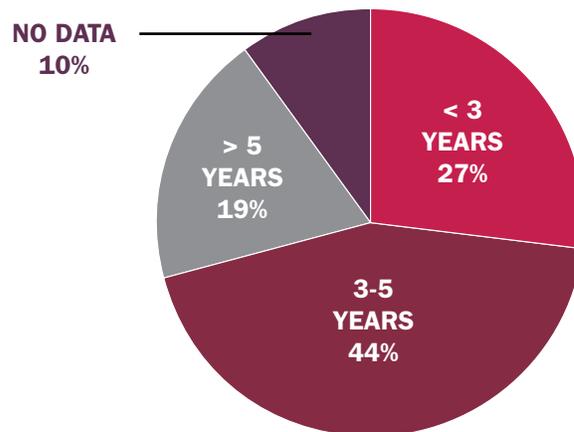
Roads and Bridges: Average condition assessment of bridge assets

NO DATA
11%

> 5
YEARS
10%

3-5
YEARS
23%

< 3
YEARS
56%
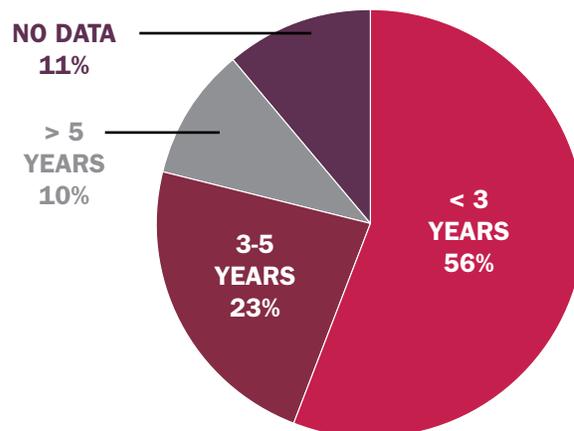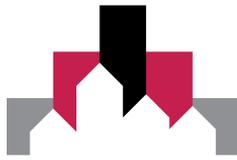
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

G. REPLACEMENT VALUE

The total replacement value of existing roads and sidewalks is $116.7 billion or $17,205 per household served. This value was reported by 77 responding municipalities, representing a 93,342 km network of (two-lane equivalent) roads and 44,858 km of sidewalks. Local roads account for 37% of this value, while arterial roads and collector roads make up another 46%. Sidewalks alone account for 10% of this value. An additional seven per cent of roads were not broken down by type.

The total replacement value of the bridge network including bridges, culverts and footbridges is $19.5 billion. An additional $1.3 billion of bridge assets were not broken down by type, resulting in a total replacement value of $20.8 billion.

The replacement values of different types of roads for two-lane equivalents are shown below, rounded to the nearest $1,000:

	Average (2-lane km)	Median (2-lane km)
Highways	$2,100,000	$2,125,000
Arterial	$1,350,000	$1,172,000
Collector	$1,154,000	$1,055,000
Local	$803,000	$676,000
Lanes & alleys	$509,000	$415,000
Sidewalks	$179,000	$162,000
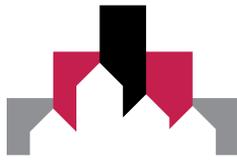
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

ROADS		
Asset	**Replacement Value**	**No. of Respondents**
Highways	$3,074,825,236	11
Arterial	$31,183,365,925	54
Collector	$18,613,545,998	54
Local	$40,263,819,415	66
Lanes & Alleys	$3,408,019,991	36
Sub-total	**$96,543,576,565**	**74**
Sidewalks	$11,318,063,594	61
Roads not broken down by asset type	$8,830,485,281	12
Total	**$116,692,125,440**	**77**

BRIDGES		
Asset	**Replacement Value**	**No. of Respondents**
Bridges	$16,752,947,612	55
Culverts (3 m and greater)	$2,064,760,896	38
Footbridges	$682,651,031	33
Sub-total	**$19,500,359,539**	**63**
Not broken down by asset type	$1,293,918,230	14
Total	**$20,794,277,769**	**76**
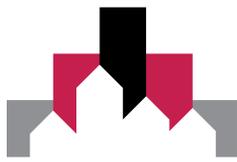
PART 2: SURVEY RESULTS BY SECTOR

ROADS & BRIDGES

H. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

The reinvestment rate for all responding municipalities range from 0.7% to 4.1% depending on asset type. When examining the results by size of municipality, they were generally the same with a few exceptions. In small responding municipalities, the reinvestment rates for arterial roads and culverts were much higher (5.3% and 3.1% respectively). Target reinvestment rates for road assets are 2.0% to 3.0% and for bridges they are typically in the range of 1.0% to 1.7%

All Municipal Responses			
	Replacement Value ($)*** | **Annual Renewal Budget ($)	**Reinvestment Rate**	**Number of Respondents**
Highways	2,514,863,062	104,013,133	4.10%	6
Arterials	24,275,575,282	302,703,161	1.20%	33
Collectors	12,856,012,292	134,178,926	1.00%	30
Local Roads	28,465,277,676	211,373,457	0.70%	39
Lanes	2,312,752,623	9,936,018	0.40%	16
Sidewalks	9,631,899,437	84,275,416	0.90%	35
Bridges	20,309,799,879	164,682,093	0.80%	33
Culverts (3 m and greater)	1,548,041,561	12,791,858	0.80%	18
Footbridges	389,158,245	9,535,620	2.50%	16

* Many responding municipalities were not able to provide information for both replacement value and annual renewal budget. Those that did provide data for both are included in the numbers above. There were between six and 39 respondents, depending on the type of asset.

CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: BUILDINGS
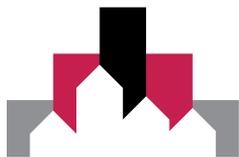
BUILDINGS

Administrative buildings, childcare/daycare centres, community centres and cultural activities, fire stations, health care facilities, libraries, long-term care centres, paramedic stations, police stations and shelters.

CURRENT REINVESTMENT LEVELS COULD RESULT IN A **DECLINE** IN THE CONDITION OF **MUNICIPAL BUILDINGS** OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
1.7% to 2.5%	**1.7%**

A. INTRODUCTION AND OVERALL RATING

The municipally-owned buildings that were included in the CIRC survey include: administrative buildings, childcare/daycare centres, community centres and cultural facilities, fire stations, health care facilities, libraries, long-term care centres, paramedic stations, police stations and shelters.

The physical condition of buildings has an overall rating of Good: adequate for now; within acceptable condition.

CANADIAN
INFRASTRUCTURE
REPORT CARD
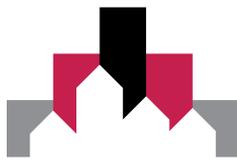
PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets from very good condition to very poor condition. Most of the individual asset types were in either good or fair physical condition with the exception of long-term care centres which were in very good condition. Across all municipalities that responded, 45% of building assets by replacement value were in fair, poor and very poor condition. When examined by size of municipality, buildings in fair, poor and very poor condition comprise 41% of systems in small responding municipalities, 43% in medium-sized responding municipalities and 46% in large responding municipalities.

Asset Type	Average Condition Rating
Administrative buildings, service centres, work yards	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies
Childcare/daycare centres	**Good:** Adequate for now – within acceptable condition
Community centres & cultural facilities	**Good:** Adequate for now – within acceptable condition
Fire stations	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies
Health care facilities	**Good:** Adequate for now – within acceptable condition
Libraries	**Good:** Adequate for now – within acceptable condition
Long-term care centres	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated
Paramedic stations	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies
Police stations	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies
Shelters	**Good:** Adequate for now – within acceptable condition

PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

The overall condition rating of building assets in small and medium-sized responding municipalities was Fair: requires attention – Signs of deterioration, some elements exhibit deficiencies. In large responding municipalities, the overall condition rating was Good: Adequate for now within acceptable condition.

Individual Building Type Ratings				
Building Asset Type	**Rating for All Responding Municipalities**	**Rating for Small Responding Municipalities (<30,000 pop.)**	**Rating for Medium Responding Municipalities (30-100,000 pop.)**	**Rating for Large Responding Municipalities (>100,000 pop.)**
1. Administrative buildings, service centres, work yards	Fair	Fair	Good	Fair
2. Childcare/daycare centres	Good	Good	Poor	Good
3. Community centres and cultural facilities	Good	Fair	Fair	Good
4. Fire Station	Fair	Fair	Fair	Fair
5. Health care facilities	Good	Very Good	N/A	Good
6. Libraries	Good	Very Good	Good	Good
7. Long-term care centres	Very Good	N/A	Very Poor	Very Good
8. Paramedic Stations	Fair	Good	Good	Fair
9. Police Stations	Fair	Fair	Very Good	Fair
10. Shelters	Good	N/A	Fair	Good
Overall	**Fair**	**Fair**	**Good**	**Fair**

CANADIAN INFRASTRUCTURE REPORT CARD

PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

Buildings: Physical condition by replacement value

VERY POOR
5%
$2 billion

POOR
12%
$4 billion

FAIR
28%
$9 billion

VERY GOOD
22%
$7 billion

GOOD
33%
$10 billion
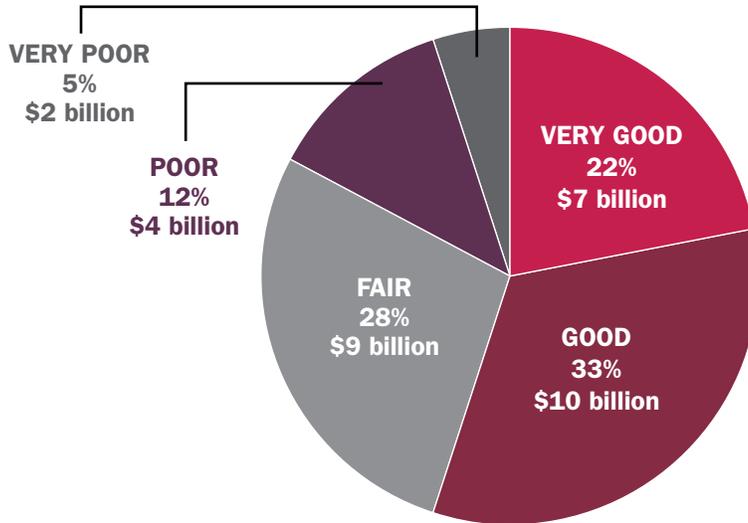
Buildings: Physical condition of building types by replacement value

	Administrative Buildings, Service Centres, Work Yards	Childcare/ Daycare Centres	Community Centres & Cultural Facilities	Fire Stations	Health Care Facilities	Libraries	Long-term Care Centres	Paramedic Stations	Police Stations	Shelters
Very Poor	6%	7%	2%	6%	8%	16%	1% / 2%	19%	15%	5%
Poor	13%	5%	11%	14%			11%	8%	8%	32%
Fair	30%	28%	33%	29%	47%	26%	38%	13%	19%	
Good	30%	43%	35%	31%	8%	39%		35%	34%	29%
Very Good	20%	18%	19%	20%	37%	18%	47%	24%	25%	34%

Legend: ■ Very Good ■ Good ■ Fair ■ Poor ■ Very Poor

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PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

C. PERFORMANCE INDICATORS

This figure reports some key building asset indicators. While the Report Card provides extrapolated results to the whole of Canada, this section provides results as reported in the buildings survey.

Performance Indicator	Results
% of assets in poor or very poor condition	17.3%
Replacement value of assets in poor and very poor condition	$5.1 billion
% of assets in fair condition	28.2%
Replacement value of assets in fair condition	$8.3 billion
% of assets in good or very good condition	54.5%
Replacement value of assets in good or very good condition	$16.7 billion
Replacement value of all reported building assets	$30.6 billion
Replacement value per household of municipalities that responded	$4,116
Average physical condition rating of buildings	70.8 (Good)
Average age of buildings	37 years
Reinvestment rate of buildings	1.7%

D. NETWORK SUMMARY

	Results
Number of municipalities that provided responses to the buildings section of the survey	101
Population of municipalities that responded (2013)	18.6 million
% of Canada's population	52%
Total number of buildings assessed	5,786
Population of Canada (2013)	35,710,000
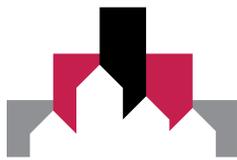
PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

The 101 municipalities that provided responses to the buildings survey reported a total of 5,786 buildings serving a population of 18.6 million people. The building inventory comprised:

- Administrative buildings, service centres, work yards (47%)
- Community centres and cultural facilities (22%)
- Fire stations (13%)
- Libraries (7%)
- Police stations (4%)
- Childcare / daycare centres (3%)
- Paramedic stations (2%)
- Long-term care centres (1%)
- Shelters (1%)
- Health care facilities (0. 4%)

Asset Management

Ninety per cent of responding municipalities reported using asset management systems for municipal buildings, whether computer-based (31%), paper-based (16%) or both (44%). When examining the data by size of municipality, 83% of small responding municipalities reported using asset management systems (15% computers, 31% paper and 37% both), 93% of medium-sized responding municipalities reported using asset management systems (18% computers, 7% paper and 68% both) and 95% of large responding municipalities reported using asset management systems (49% computers, 8% paper and 38% both).

The vast majority of respondents (90%) reported having a condition assessment cycle in place for their buildings. Seventy-two per cent (72%) assess their buildings at least every 10 years.

Fourteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for municipal buildings. For municipalities that reported having asset management plans (49%), a high percentage (73%) of those plans include municipal buildings. For municipalities that reported having a State of Infrastructure Report (38%), approximately 61% of those include municipal buildings.

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BUILDINGS

E. AGE

Thirty per cent of municipal building assets were 31-49 years old. Twenty-three per cent were more than fifty years old. When looking at small responding municipalities only, 53% of buildings were between the ages 31 to 49 and only three per cent of buildings were older than 50 years. In medium-sized and large responding municipalities, the results are similar to the aggregated pie chart below.

Health care facilities, shelters and community centres and cultural facilities are the three oldest building types with 48%, 44% and 37% of the respective inventory being older than 50 years. When examining the data by size of municipality, the results varied significantly. In small responding municipalities, 80% of health care facilities, 57% of shelters and 35% of community centres and cultural facilities were less than 20 years old. In medium-sized responding municipalities, 50% of health care facilities were less than 20 years old, 33% of shelters were between the ages 31 and 49 and 30% of community centres and cultural facilities were over 50 years old. In large responding municipalities, 69% of health care facilities, 59% of shelters and 41% of community centres and cultural facilities were more than 50 years old.

Paramedic stations, police stations and long-term care facilities were the three newest building categories with 51%, 50% and 45% of the respective inventory under 20 years old. When examining by municipal size, the results were similar but the representations were different. In small responding municipalities, 86% of police stations and 83% of paramedic stations were under 20 years old and 100% of long-term care facilities were between the ages of 21 to 49. In medium-sized responding municipalities, 77% of police stations 84% of paramedic stations and 33% of long-term care facilities were under 20 years old. In large responding municipalities, 41-49%of police stations, paramedic stations and long-term care facilities were under 20 years old.

CANADIAN
INFRASTRUCTURE
REPORT CARD

BUILDINGS

Buildings: Age breakdown of building assets

AGE N/A
6%

1-10
YEARS
13%

11-20
YEARS
13%

21-30
YEARS
15%

31-49
YEARS
30%

50+
YEARS
23%
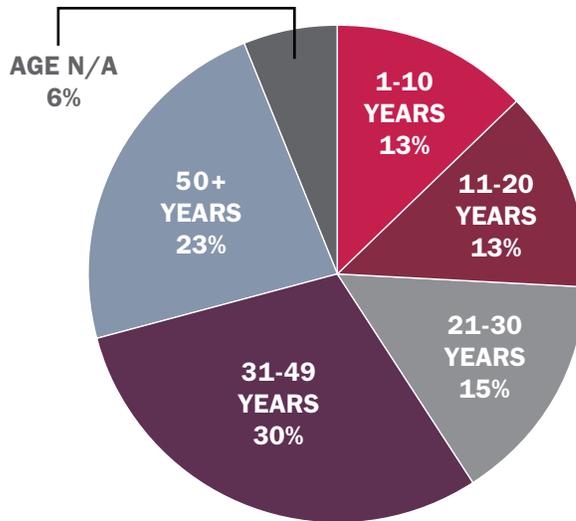
Buildings: Age breakdown by building type

Building type	1-10 years	11-20 years	21-30 years	31-49 years	50+ years	Age N/A
Administrative Buildings, Service Centres, Work Yards	13%	14%	16%	32%	18%	7%
Childcare/Daycare Centres	15%	13%	13%	28%	25%	5%
Community Centres & Cultural Facilities	8%	9%	12%	24%	37%	9%
Fire Stations	15%	12%	16%	35%	20%	2%
Health Care Facilities	9%	17%	9%	17%	48%	
Libraries	14%	9%	17%	38%	21%	1%
Long-term Care Centres	25%	20%	18%	16%	20%	
Paramedic Stations	38%	13%	18%	18%	6%	7%
Police Stations	21%	29%	16%	16%	10%	8%
Shelters	11%	16%	12%	12%	44%	6%

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PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

F. CONDITION ASSESSMENT CYCLE

The condition assessment cycle for building assets was at least every five years for 28% of responding municipalities and 72% inspected their assets at least every 10 years. When examining how the data compared across small, medium and large responding municipalities, the results did not differ widely: 31% of small responding municipalities, 29% of medium-sized responding municipalities and 25% of large responding municipalities reported inspecting their buildings at least every five years.

Childcare/daycare centres (95%), health care facilities (89%) and long-term care centres (86%) reported that they undergo condition assessments at least every 10 years.

The types of building assets that have no data regarding condition assessment cycles are highest in shelters (20%), fire stations (14%) and administrative buildings (13%).

Buildings: Average condition assessment of buildings
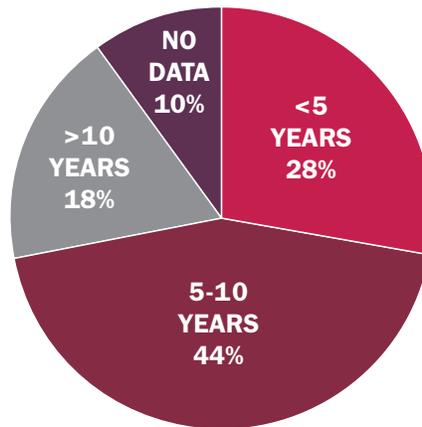
Buildings: Average condition assessment of building type
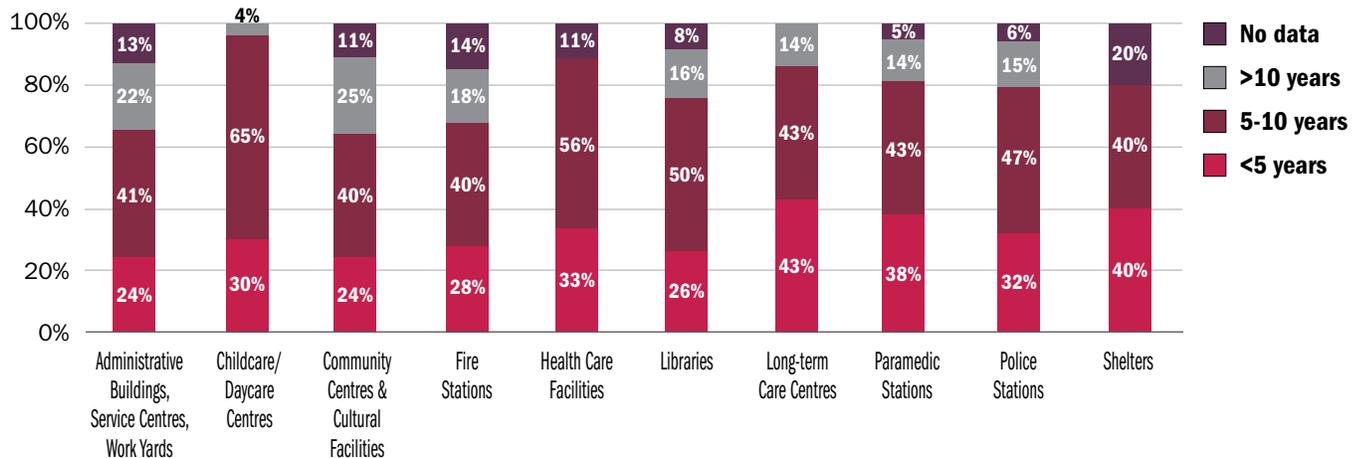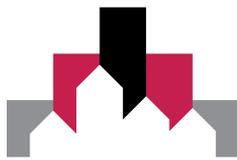
PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

G. REPLACEMENT VALUE

The total replacement value of the assets reported by the 86 responding municipalities that provided replacement value data in the building asset category was $30.6 billion. This corresponds to $4,116 per household served by these assets. Administrative buildings and Community centres and cultural facilities accounted for 44% and 21% of this value, respectively.

Building Types	Replacement Value	No. of Respondents
Administrative buildings, service centres, work yards	$13,438,127,637	83
Childcare/daycare centres	$246,799,451	21
Community centres & cultural facilities	$6,577,574,900	65
Fire stations	$2,388,525,427	71
Health care facilities	$81,797,624	9
Libraries	$2,920,474,033	52
Longterm-care centres	$1,747,809,370	12
Paramedic stations	$245,871,625	15
Police stations	$2,822,268,129	46
Shelters	$165,282,488	10
Total	**$30,634,530,684**	**86**
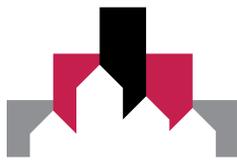
PART 2: SURVEY RESULTS BY SECTOR

BUILDINGS

H. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value. The reinvestment rate of building assets across all responding municipalities range from 1.2% (for fire stations and shelters) to 5.1% (for childcare/daycare centres facilities) depending on asset type. When examining the results by size of municipality, results are significantly different. In small responding municipalities, reinvestment rates are lowest for libraries and health care facilities (0.4%), highest for administrative buildings (2.9%) and there was no data for shelters and long-term care facilities. In medium-sized responding municipalities, reinvestment rate was lowest for shelters (0.3%) and highest for paramedic stations (10.1%) and there was no data for childcare/daycare centres. In line with the overall results, reinvestment rates in large responding municipalities were lowest for shelters and fire stations (1.2%) and highest for childcare/daycare centres (5.1%).

Target reinvestment rates for building assets vary by type of facility but are generally between 1.7% to 2.5%.

All Municipal Responses				
Asset	Replacement Value ($)*	Annual Renewal Budget ($)	Reinvestment Rate	Number of Respondents
Administrative buildings, service centres, work yards	7,740,475,490	145,155,809	1.9%	46
Childcare/daycare centres	200,032,561	10,180,731	5.1%	10
Community centres & cultural facilities	4,578,149,667	63,210,219	1.4%	31
Fire stations	1,480,783,307	17,038,349	1.2%	33
Health care facilities	60,735,770	1,292,180	2.1%	5
Libraries	2,093,941,942	29,025,407	1.4%	27
Long-term care centres	1,591,089,415	28,661,331	1.8%	9
Paramedic stations	201,777,037	4,940,380	2.4%	7
Police stations	2,187,484,632	45,956,794	2.1%	23
Shelters	138,640,221	1,705,796	1.2%	5

*Many responding municipalities were not able to provide information for both replacement value and annual renewal budget. Those that did provide data for both are included in the numbers above.
There were between five and 46 respondents, depending on the type of asset.

CANADIAN INFRASTRUCTURE REPORT CARD

SECTOR REPORT: SPORT AND RECREATION FACILITIES
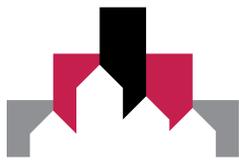
SPORT & RECREATION FACILITIES

Community recreation centres/multiplexes, curling rinks, ice arenas, pools, senior centres, skateparks, ski hills, sports fields, stadiums, tennis courts, and youth centres.

CURRENT REINVESTMENT LEVELS WILL RESULT IN A **DECLINE** IN THE CONDITION OF **SPORT AND RECREATION FACILITIES** OVER TIME.

AVERAGE ANNUAL REINVESTMENT RATE	
TARGET	CURRENT
1.7% to 2.5%	**1.3%**

A. INTRODUCTION AND OVERALL RATING

The municipally-owned sport and recreation facilities that were included in the CIRC survey are: community recreation centres/multiplexes, curling rinks, ice arenas, pools, senior centres, skateparks, ski hills, sports fields, stadiums, tennis courts, and youth centres.

The physical condition of sport and recreation facilities is Fair: Requires attention; showing signs of deterioration, with some elements exhibiting deficiencies. The physical condition of sport and recreation facilities were assessed the lowest of all of the asset categories included in the 2016 CIRC survey.
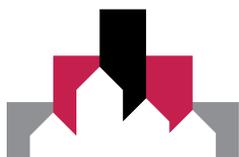
PART 2: SURVEY RESULTS BY SECTOR

**SPORT & RECREATION
FACILITIES**

B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets from very good condition to very poor condition. Ice arenas, curling rinks, stadiums, tennis courts and senior centres were assessed in fair condition. Pools, skateparks, sports fields, ski hills and community recreation centres/multiplexes were in good condition and youth centres in poor condition. Across all responding municipalities, 54% of sport and recreation facility assets were assessed in very good and good condition and 19% in very poor and poor condition. 27% of sport and recreation facilities are in fair condition. Combined, 46% of sport and recreation facilities are in poor, very poor and fair condition, requiring attention. This is consistent with previous sport and recreation sector studies which have shown a high level of deferred maintenance in facilities.

The results were similar when examined by size of municipality: 60% in very good and good and 21% in very poor and poor for small responding municipalities; 57% in very good and good and 24% in very poor and poor for medium-sized responding municipalities; and 54% in very good and good and 18% in very poor and poor for large responding municipalities. The analysis segmented and compared the condition of the indoor and outdoor facility types and as two groups of facilities and no significant differences were identified.

Asset Type	Average Condition Rating
Community Recreation Centres/Multiplexes	**Good:** Adequate for now – within acceptable condition
Curling Rinks (indoor)	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Ice Arenas	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Pools	**Good:** Adequate for now – within acceptable condition
Senior Centres	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Skateparks	**Good:** Adequate for now – within acceptable condition
Ski Hills	**Good:** Adequate for now – within acceptable condition
Sports Fields	**Good:** Adequate for now – within acceptable condition
Stadiums	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Tennis Courts	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.
Youth Centres	**Poor:** At risk of affecting service
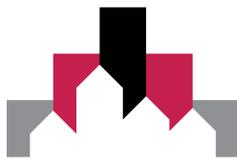
PART 2: SURVEY RESULTS BY SECTOR

SPORT & RECREATION FACILITIES

The overall rating was the same in medium-sized responding municipalities but improves to good: adequate for now for small and large responding municipalities. The ratings of individual facility types varied but were mostly rated as good or fair.

Individual Facility Type Ratings				
Asset Type (number of responses)	**All Responding municipalities (59 responses)[40]**	**Small Responding municipalities (23 responses)**	**Medium Responding municipalities (10 responses)**	**Large Responding municipalities (26 responses)**
Community Recreation Centres/Multiplexes (43)	Good	Good	Good	Good
Curling Rinks (indoor) (14)	Fair	Fair	Very Poor	Good
Ice Arenas (48)	Fair	Fair	Fair	Fair
Pools (42)	Good	Fair	Fair	Good
Senior Centres (21)	Fair	Good	Fair	Fair
Skateparks (33)	Very Good	Very Good	Good	Good
Ski Hills (3)	Good	N/A	N/A	Good
Sports Fields (37)	Good	Good	Fair	Good
Stadiums (17)	Fair	N/A	Good	Fair
Tennis Courts (36)	Fair	Good	Good	Fair
Youth Centres (7)	Poor	Fair	Poor	Fair
Overall	**Fair**	**Good**	**Fair**	**Good**

PART 2: SURVEY RESULTS BY SECTOR

SPORT & RECREATION FACILITIES

Sport and Recreation Facilities: Physical condition by replacement value of assets

VERY POOR 5% $1 billion

POOR 14% $2 billion

VERY GOOD 18% $3 billion

FAIR 27% $5 billion

GOOD 36% $6 billion
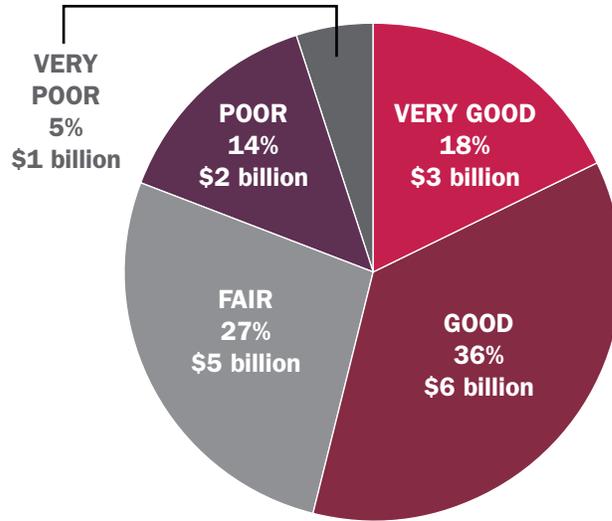
Sport and Recreation Facilities: Physical condition by replacement value of facility type

Legend: Very Good — Good — Fair — Poor — Very Poor

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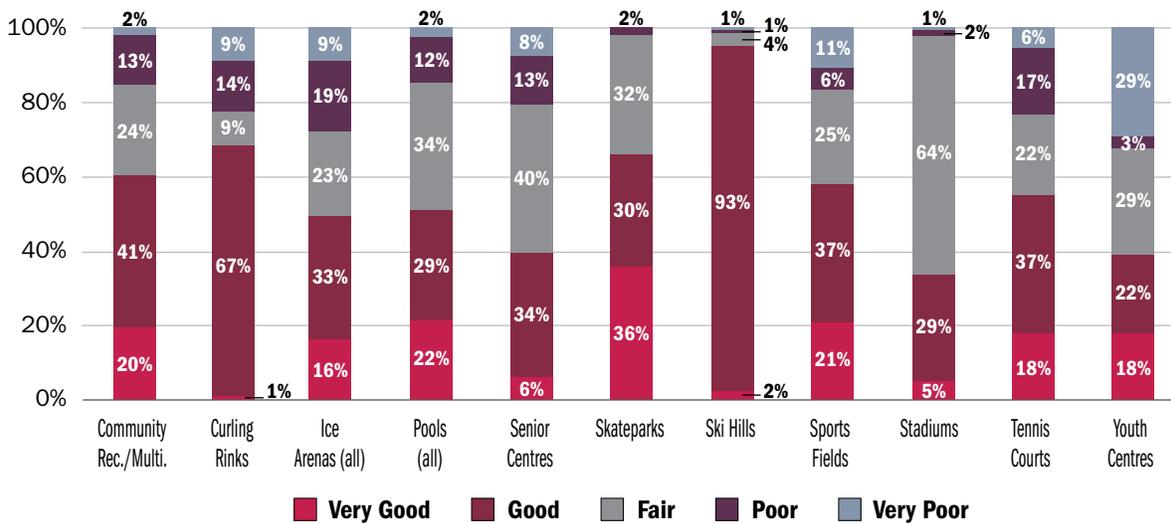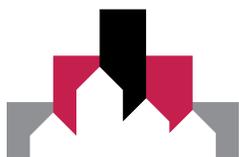
SPORT & RECREATION FACILITIES

C. PERFORMANCE INDICATORS

This figure lists the results on the key sport and recreation facility indicators. While the Report Card provides extrapolated results, this section provides results as reported in the sport and recreation facilities survey.

Performance Indicator	Results
% of sport and recreation facilities in poor or very poor condition	18.4%
Replacement value of assets in poor or very poor condition	$3.0 billion
% of sport and recreation facilities in fair condition	27%
Replacement value of assets in fair condition	$4.5 billion
% of sport and recreation facilities in good or very good condition	54.6%
Replacement value of assets in good or very good condition	$9.1 billion
Replacement value of all reported sport and recreation facilities	$16.6 billion
Replacement value per household of responding municipalities that responded	$2,829
Average physical condition rating of sport and recreation facilities	69.9 (Fair)
Average age	30 years
Reinvestment rate[41] of sport and recreation facilities	1.3%

D. NETWORK SUMMARY

	Results
Number of responding municipalities that provided responses to the sport and recreation section of the survey	88
Total population represented (2013)	16,300,000
% of Canada's population (2013)	46%
Total number of sport and recreation facilities included in survey	11,159
Population of Canada (2013)	35,700,000
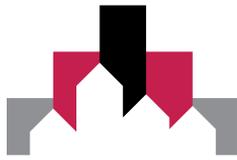
PART 2: SURVEY RESULTS BY SECTOR

SPORT & RECREATION FACILITIES

The 88 responding municipalities (representing a total population of 16.3 million in 2013) that provided responses to the sport and recreation survey reported a total of 11,159 facilities. The inventory is comprised of:

- Sports fields (42%)
- Tennis courts (17%)
- Pools (16%)
- Community recreation centres/multiplexes (8%)
- Ice arenas (8%)
- Skateparks (1%)
- Ski hills (1%)
- Senior centres (1%)
- Stadiums (0.5%)
- Youth centres (0.2%)
- Curling rinks (0.2%)
- Five per cent of the inventory was not broken down by facility type.

Asset Management

Eighty-nine per cent of responding municipalities reported using asset management systems, whether computer-based (22%), paper-based (26%) or both (41%). When examining how the data compared between small, medium and large responding municipalities, 82% of small responding municipalities reported using asset management systems (4% computers, 34% paper and 44% both). In medium-sized responding municipalities, 93% of respondents reported using asset management systems (17% computers, 33% paper and 44% both). In large responding municipalities, 91% of respondents reported using asset management systems (38% computers, 17% paper and 37% both).

The majority of respondents (83%) reported having a condition assessment cycle in place for their facilities. Sixty-nine per cent assess their sport and recreation facilities at least every ten years.

Thirteen per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for sport and recreation facilities. For municipalities that reported having asset management plans (49%), just over half (53%) of those plans include sport and recreation facilities. For municipalities that reported having a State of Infrastructure Report (38%), approximately 44% of those include sport and recreation facilities.
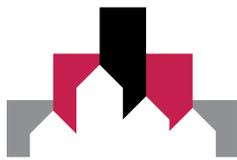
PART 2: SURVEY RESULTS BY SECTOR

E. AGE

The survey asked respondents to report the number of individual sport and recreation facility asset types by age ranges. Of the 11,159 units reported, 30% were categorized as age unknown. In small responding municipalities the age unknown category only represented one per cent of the inventory and only two per cent in medium-sized responding municipalities. In large responding municipalities, one-third (33%) of the inventory was classified as age unknown. Further analysis shows that 47% of sports fields and 30% of wading pools and tennis courts were not assessed for age. These assets alone represent 64% of the total inventory in large responding municipalities.

Twenty-nine per cent of the inventory was more than 31 years old. When examined by municipal size, there were significant differences that indicate older facilities in larger responding municipalities. In small responding municipalities, 22% of the inventory was over 31 years old. This increases to 28% in medium-sized responding municipalities and 30% in large responding municipalities even though 33% of the inventory in large responding municipalities was not assessed.

When looking at all responding municipalities, 27% of the total inventory was less than 20 years old. In small responding municipalities 64% were less than 20 years old, 52% in medium-sized responding municipalities and 23% in large responding municipalities.

Skateparks are by far the newest asset type with 77% of the inventory less than 20 years old (47% between one and ten years and 30% between 11-20 years). When examining the data between municipal sizes, results were similar with 100% of skateparks under 20 years old in small responding municipalities, 78% in medium-sized responding municipalities and 73% in large responding municipalities. The second newest asset type was stadiums with 40% of the inventory less than 20 years old.

PART 2: SURVEY RESULTS BY SECTOR

SPORT & RECREATION
FACILITIES

Sport and Recreation Facilities: Age breakdown of assets

- 1-10 YEARS: 14%
- 11-20 YEARS: 13%
- 21-30 YEARS: 14%
- 31-49 YEARS: 19%
- 50+ YEARS: 10%
- AGE N/A: 30%
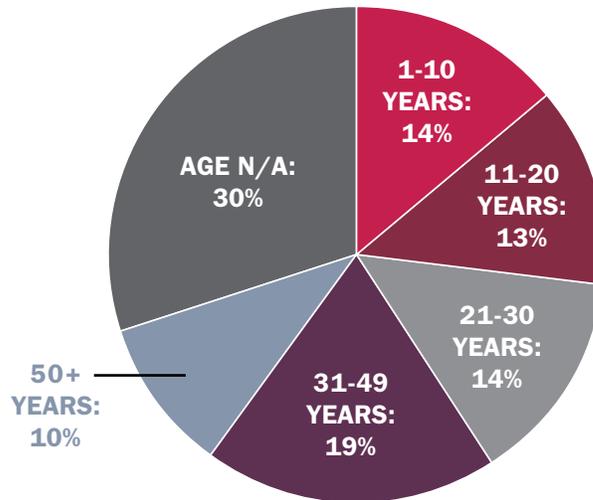
Sport and Recreation Facilities: Age breakdown by facility type

	1-10 years	11-20 years	21-30 years	31-49 years	50+ years	Age N/A
Community Rec./Multi.	12%	12%	13%	29%	26%	7%
Curling Rinks	20%	16%	16%	16%	32%	
Ice Arenas (all)	18%	9%	17%	35%	19%	2%
Pools (all)	19%	15%	9%	21%	17%	19%
Senior Centres	5%	2%	23%	37%	25%	9%
Skateparks	47%	30%	5%	1%	1%	16%
Ski Hills	2%	18%	25%	31%	22%	3%
Sports Fields	11%	12%	16%	13%	6%	43%
Stadiums	22%	18%	6%	27%	20%	8%
Tennis Courts	15%	16%	13%	25%	5%	26%
Youth Centres	13%	25%	13%	21%	17%	13%
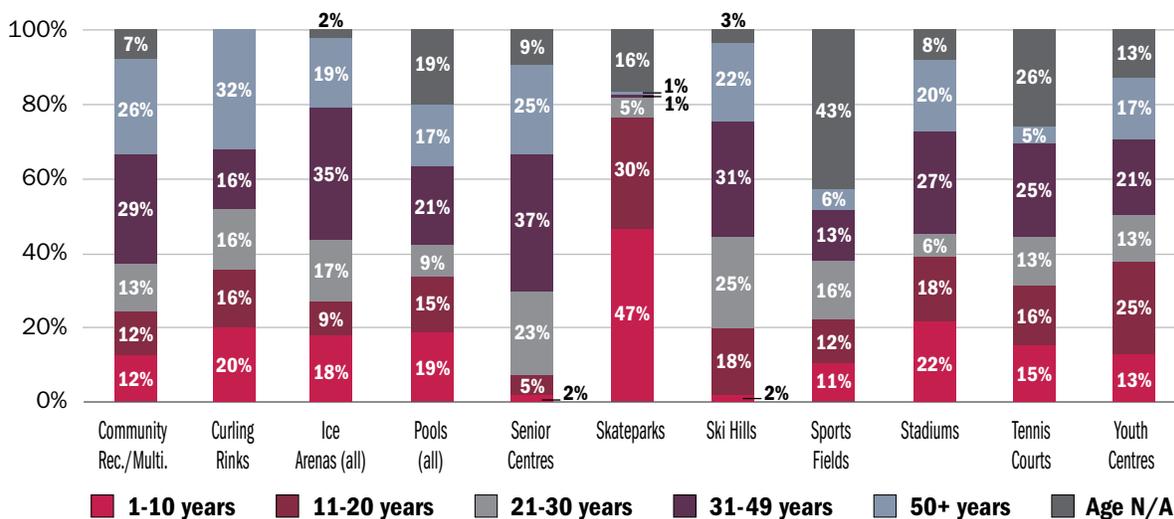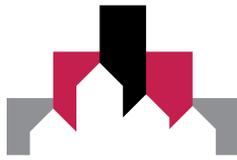
PART 2: SURVEY RESULTS BY SECTOR

**SPORT & RECREATION
FACILITIES**

F. CONDITION ASSESSMENT CYCLE

The condition assessment cycle for sport and recreation facilities is ten years or less for 69% of responding municipalities. When examining how the data compared between small, medium and large responding municipalities, the results are as follows: 54% of small responding municipalities, 77% of medium-sized responding municipalities and 75% of large responding municipalities reported inspecting their facilities at least every ten years.

The percentage of sport and recreation facilities that undergo condition assessment at least every ten years is greatest in pools (79%), curling rinks (75%) and community recreation centres/multiplexes (74%).

Eighteen per cent of respondents reported having no data on the condition assessment cycle of sport and recreation facilities (30% for ski hills, 24% for sports fields and 23% for both tennis courts and stadiums). Only three per cent of medium-sized responding municipalities had no data.

Sport and Recreation Facilities: Average condition assessment of assets
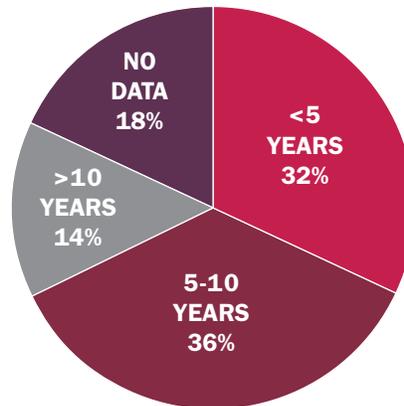
Sport and Recreation Facilities: Average condition assessment by facility type
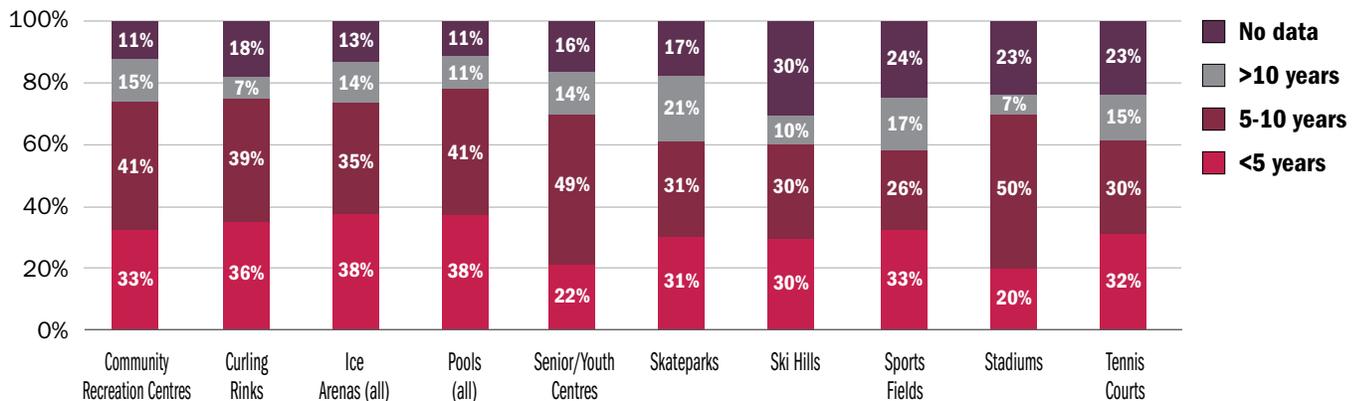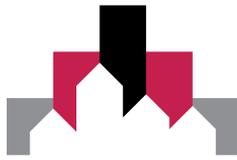
PART 2: SURVEY RESULTS BY SECTOR

G. REPLACEMENT VALUE

The total replacement value of the assets reported by the 66 responding municipalities that provided data in this asset category was $16.6 billion; corresponding to $2,829 per household served by the system. Community recreation centres/multiplexes, pools and ice arenas accounted for 87% of the total replacement value.

Facility Types	Replacement Value	No. of Respondents
Community Rec/Multiplex	$6,262,060,914	50
Curling Rinks (indoor)	$145,064,727	15
Ice Arenas	$4,645,869,541	57
Pools	$3,565,828,333	53
Senior Centres	$167,976,220	25
Skateparks	$48,464,339	41
Ski Hills	$61,771,426	6
Sports Fields	$821,461,843	47
Stadiums	$661,800,819	20
Tennis Courts	$171,872,848	43
Youth Centres	$21,087,749	8
Total	**$16,573,258,759**	**66**
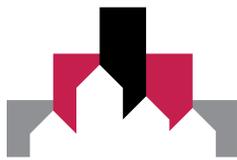
PART 2: SURVEY RESULTS BY SECTOR

SPORT & RECREATION FACILITIES

H. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

The reinvestment rate for all responding municipalities ranges from 0.5% for stadiums to 2.7% for pools. Results differ when examined by size of municipality. In small responding municipalities, reinvestment rates are highest for sports fields (2.8%) and there was no data for senior centres, curling rinks, youth centres and ski hills. In medium-sized responding municipalities, reinvestment rates are lowest for skateparks (0.1%) and highest for pools (2.7%), with no data for ski hills. Similar to small responding municipalities, in large responding municipalities, reinvestment rates are lowest for stadiums (0.5%) and highest for pools (2.7%).

Target reinvestment rates for sport and recreation facilities vary depending on the type of facility, but are generally between 1.7% and 2.5%.

All Municipal Responses						
Asset	**Replacement Value ($)***	**Annual Renewal Budget ($)**	**Reinvestment Rate**	**Units**	**Replacement Value Per Unit ($)**	**Number of Respondents**
Ice Arenas	1,859,806,512	23,709,597	1.3%	444	4,188,753	30
Pools	858,953,569	22,811,674	2.7%	401	2,142,029	29
Skateparks	16,835,133	110,850	0.7%	52	323,753	15
Indoor Curling Rinks	23,717,623	226,785	1.0%	8	2,964,703	7
Stadiums	207,918,734	1,041,564	0.5%	14	14,851,338	9
Tennis Courts	131,941,674	1,925,951	1.5%	1306	101,027	20
Sports Fields	539,804,924	4,472,927	0.8%	1483	363,995	21
Ski Hills	16,609,876	239,000	1.4%	62	267,901	3
Community Rec/Multiplex	3,564,589,537	41,102,509	1.2%	397	8,978,815	28
Senior Centres	62,219,300	869,691	1.4%	24	2,592,471	9
Youth Centres	14,182,066	179,792	1.3%	12	1,181,839	5
Total	**7,296,578,948**	**96,690,340**	**1.3%**	**4,203**	**37,956,624**	**176**

*Many responding municipalities were not able to provide information for both replacement value and annual renewal budget. Those that did provide data for both are included in the table above. There were between three and 30 respondents, depending on the type of asset.

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SECTOR REPORT: PUBLIC TRANSIT
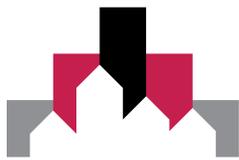
PART 2: SURVEY RESULTS BY SECTOR

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Buses, streetcars, ferries, heavy railcars, commuter railcars, light railcars, mobile technology, security systems, rail signal systems, terminals, transit shelters, tunnels, exclusive rights-of-way, tracks, parking facilities and service facilities.

The transit survey asked respondents to provide data on replacement value of assets and the annual renewal budget, which is how the report derives reinvestment rates. However, very few were able to provide both. For this reason, this report does not assess reinvestment rates for transit assets.

A. INTRODUCTION AND OVERALL RATING

The CIRC surveyed the following municipally-owned transit assets: buses, streetcars, ferries, heavy railcars, commuter railcars, light railcars, mobile technology, security systems, rail signal systems, terminals, transit shelters, tunnels, exclusive rights-of-way, tracks, parking facilities and service facilities. The range of transit assets is quite diverse, and more detail was gathered for this asset category to provide a better picture of the state of public transit assets.

The overall rating of physical condition of transit assets is Good: adequate for now: in acceptable condition.
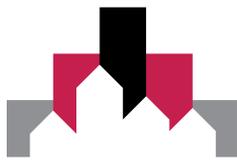
PART 2: SURVEY RESULTS BY SECTOR

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B. PHYSICAL CONDITION

The survey asked respondents to rank the physical condition of their assets from very good condition to very poor condition. The physical condition of all assessed vehicles and technology was in very good or good condition (with the exception of 100% of trolley buses that were rated in fair condition). There was insufficient data on double decker buses, streetcars, ferries and commuter railcars to accurately determine a rating for these assets.

Asset Type	Average Condition Rating
Vehicles (buses)	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated.
Vehicles (railcars + ferries)	**Good:** Adequate for now – within acceptable condition.
Technology	**Very Good:** Fit for the future – well-maintained, good condition, new or recently rehabilitated.
Fixed Assets	**Fair:** Requires attention – signs of deterioration, some elements exhibit deficiencies.

The condition rating of transit assets in large and medium-sized transit authorities was good: adequate for now. In small transit authorities, the condition rating was fair: requires attention.[42]

Individual Building Type Ratings				
Transit Asset Type	Rating for All Transit Authorities	Rating for Small Transit Authorities (<50,000 pop.)	Rating for Medium Transit Authorities (50,000-400,000 pop.)	Rating for Large Transit Authorities (>400,000 pop.)
1. Vehicles (buses)	Very Good	Poor	Good	Very Good
2. Vehicles (railcars + ferries)	Good	N/A	N/A	Good
3. Technology	Very Good	Good	Very Good	Very Good
4. Fixed Assets	Fair	Fair	Fair	Fair

PUBLIC TRANSIT

Public Transit: Physical condition by replacement value of buses

VERY POOR
0%

POOR
1%
$0.1 billion

FAIR
10%
$0.6 billion

GOOD
43%
$2 billion

VERY GOOD
46%
$3 billion

Public Transit: Physical condition by replacement value of railcars and ferries

VERY POOR
1%
$58 million

POOR
0%

FAIR
39%
$2 billion

GOOD
49%
$3 billion

VERY GOOD
11%
$0.7 billion
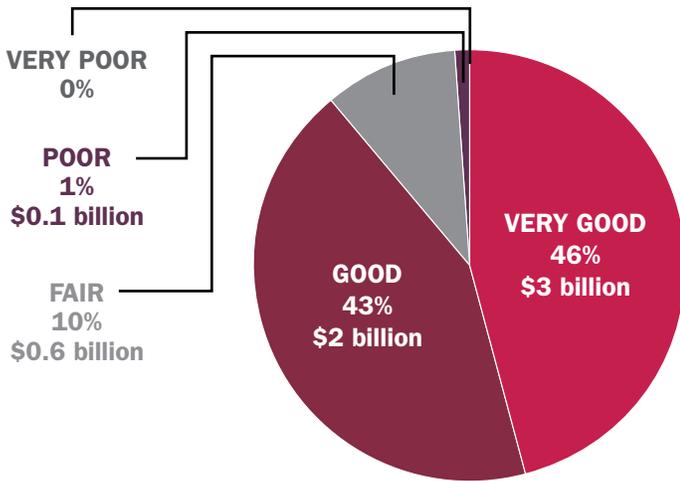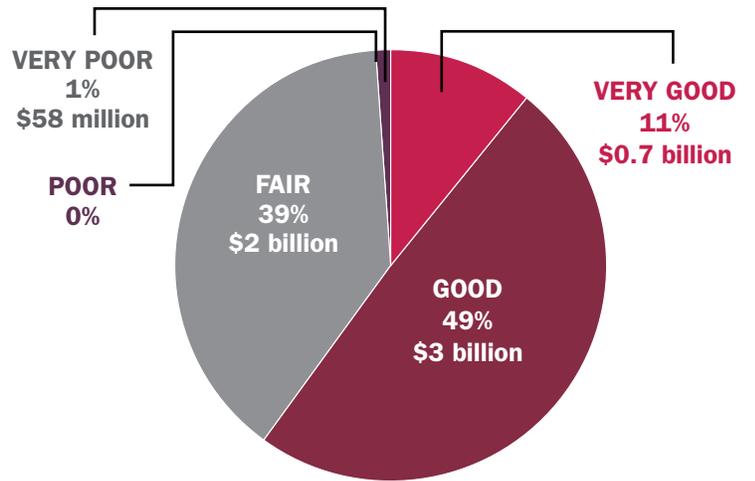
Public Transit: Physical condition by replacement value of technology
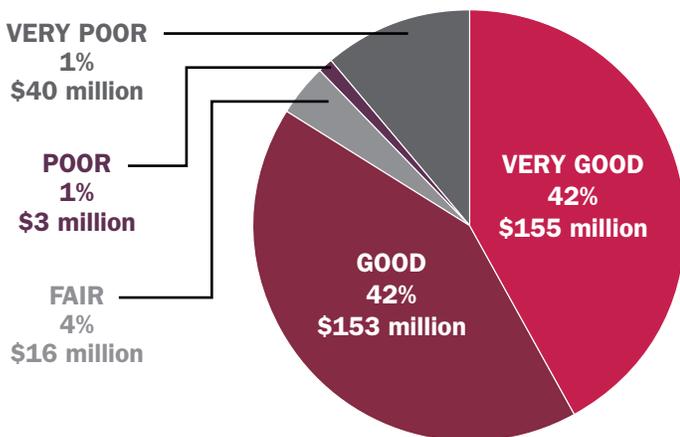
VERY POOR
1%
$40 million

POOR
1%
$3 million

FAIR
4%
$16 million

GOOD
42%
$153 million

VERY GOOD
42%
$155 million

Public Transit: Physical condition by replacement value of fixed assets

VERY POOR
2%
$0.5 billion

POOR
23%
$4 billion

FAIR
29%
$5 billion

GOOD
29%
$5 billion

VERY GOOD
17%
$3 billion

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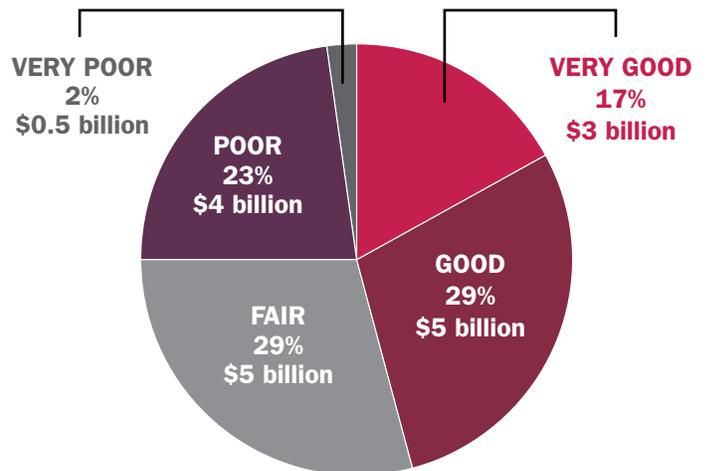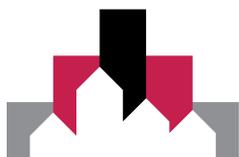
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

C. PERFORMANCE INDICATORS

This figure reports some key transit asset indicators. While the Report Card provides extrapolated results, this section provides results that were reported in the public transit survey.

Performance Indicator	Vehicles		Technology	Fixed Assets
	Buses	Railcars/Ferries		
% of assets in poor and very poor condition	2%	0.9%	11.6%	25.7%
Replacement value of assets in poor and very poor condition	$102 million	$52 million	$43.7 million	$4.8 billion
% of assets in fair condition	10.1%	38.5%	4.4 %	28.8 %
Replacement value of assets in fair condition	$567 million	$2.2 billion	$16.3 million	$5.4 billion
% of assets in good or very good condition	87.9%	60.6%	84%	45.5%
Replacement value of assets in good or very good condition	$4.9 billion	$3.5 billion	$309 million	$8.5 billion
Replacement value of all reported assets	$5.6 billion	$5.8 billion	$368 million	$18.6 billion
Replacement value per household (of population serviced by any mode of transit reported)	$4,418[43]			
Average physical condition rating of transit assets	Very Good (85.6)	Good (74.1)	Very Good (80.8)	Fair (66.8)
Average age of assets	7	18.7	5.4	13

D. NETWORK SUMMARY

The following table summarizes some of the data represented by the respondents to the transit survey.

	Results
Number of transit authorities	37
Serviced population of transit authorities (2013)	17.2 million
% of Canada's population serviced by transit (2013)	67%
Total ridership of transit authorities (2013)	1.84 billion
% of Canada's transit ridership (2013)	88%
Total number of vehicles	15,666
Estimated % of Canada's total transit vehicles	82%
Total number of technology assets	9,898
Total number of fixed assets (non-linear)	142,380
Total number of fixed assets (linear)	4,206

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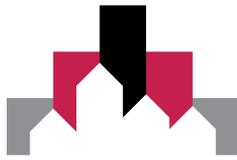
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

The vehicle inventory comprised:

- Buses (79%)
- Heavy railcars (10%)
- Commuter railcars (6%)
- Light railcars (3%)
- Streetcars (2%)
- Locomotives (1%)
- Ferries (<1%)

The technology inventory comprised:

- Mobile technology such as automation equipment, AVL, GPS (57%)
- Security Systems (42.6%)
- Rail Signal Systems (<1%)

The fixed-asset inventory comprised (non-linear):

- Car stalls (84%)
- Transit shelters (11%)
- Bicycle racks (4%)
- Stations/Terminals (<1%)
- Service facilities (<1%)
- Parking facilities (<1%)
- Passenger drop off facilities ('Kiss and Ride') (<1%)

The fixed-asset inventory comprised (linear):

- Tracks (77%)
- Exclusive rights-of-way (17%)
- Tunnels (7%)

Asset Management

Six per cent of respondents indicated that climate change adaptation strategies factor formally through municipal policies or documented practices into decision-making for public transit. The majority of transit agencies (76%) report having an asset management plan that includes vehicles (92%), technology (50%) and fixed assets (73%). For municipalities that report having a State of the Infrastructure Report (38%), approximately (26%) include public transit.

Seventy-one per cent of responding authorities reported using asset management systems for transit assets, whether computer-based (39%), paper-based (9%) or both (23%). When examining the data by size of serviced population, 87% of the smaller providers reported using asset management systems (10% computer, 38% paper and 38% both), 87% of medium-sized providers reported using asset management systems (38% computers, 2% paper and 38% both) and 66% of larger authorities reported using asset management systems (45% computer, 5% paper and 16% both).
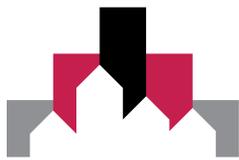
PUBLIC TRANSIT

E. SOURCE OF PHYSICAL CONDITION INFORMATION

Respondents were asked to rate the physical condition of their assets (vehicles, technology, and fixed assets) from very good condition to very poor condition. They were also asked to provide the primary source of the physical condition information as: complete data based on detailed inspection and analysis; opinion of certified mechanical engineers; using proxy information such as age of the asset or estimated serviced life, etc.; or all of the above.

For vehicles, all of the above was the most common response (53%) followed by complete data based on detailed inspection and analysis (29%). For technology, proxy information was the most common response (41%) followed by completed data based on detail inspection and analysis (34%). For fixed assets, proxy information was the most common response (39%) followed by all of the above (36%).

Public Transit: Source of physical condition information

Legend:
- Complete data based on detail inspection
- Based on certified mechanical engineer
- Using proxy information
- All of the above

Buses: 24%, 0%, 22%, 53%
Railcars and Ferries: 38%, 0%, 0%, 63%
Technology: 34%, 0%, 41%, 24%
Fixed Assets: 23%, 1%, 39%, 36%
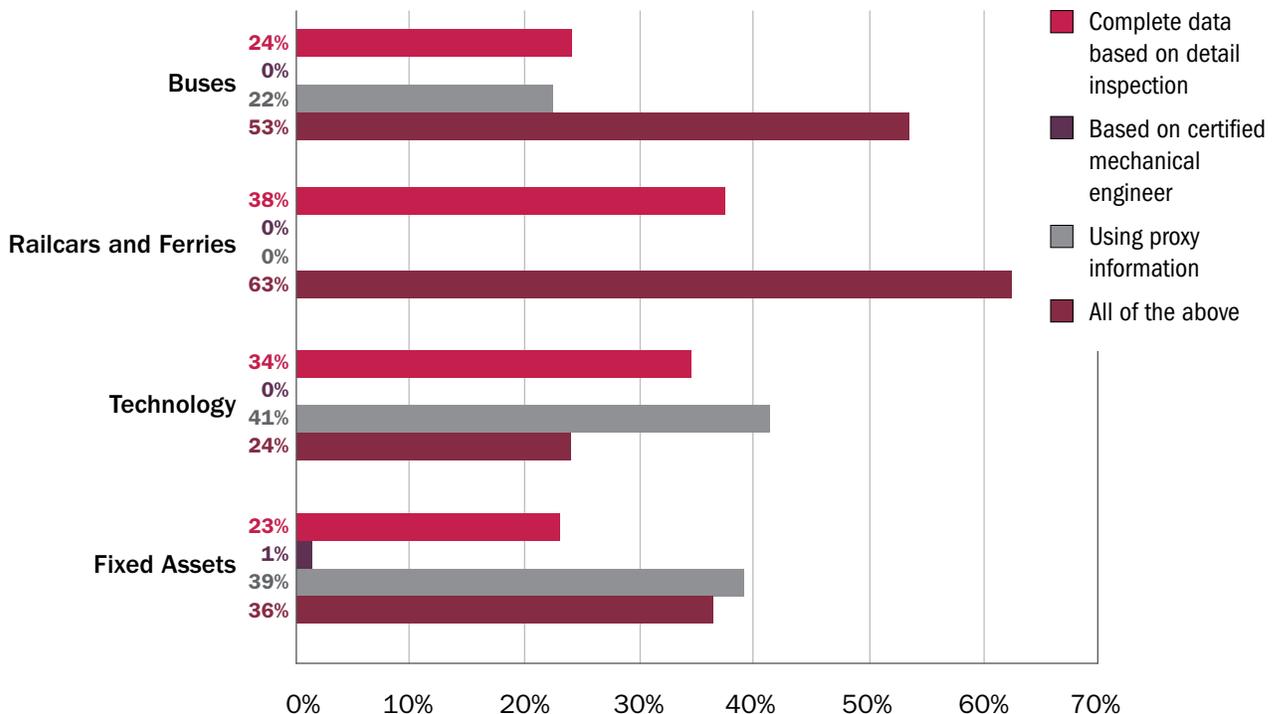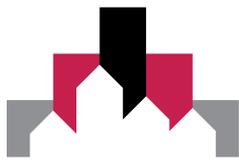
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

F. AGE

The average ages of buses, railcars and ferries, technology and fixed assets were 7, 18.7, 5.4 and 13 years respectively. When examining fixed assets by linear (rail) and non-linear, the average age was 22.7 years for linear assets (tracks, exclusive rights-of-way and tunnels) and 12.9 years for non-linear assets.

For technology, 52% was less than five years old and 46% was between ages six and ten. The results did not differ substantially by size of transit authority.

The ages of fixed assets were varied.

Public Transit: Age breakdown of buses[44]

> 25 YEARS 0%
21-25 YEARS 0%
0-5 YEARS 41%
6-10 YEARS 40%
11-15 YEARS 14%
16-20 YEARS 5%
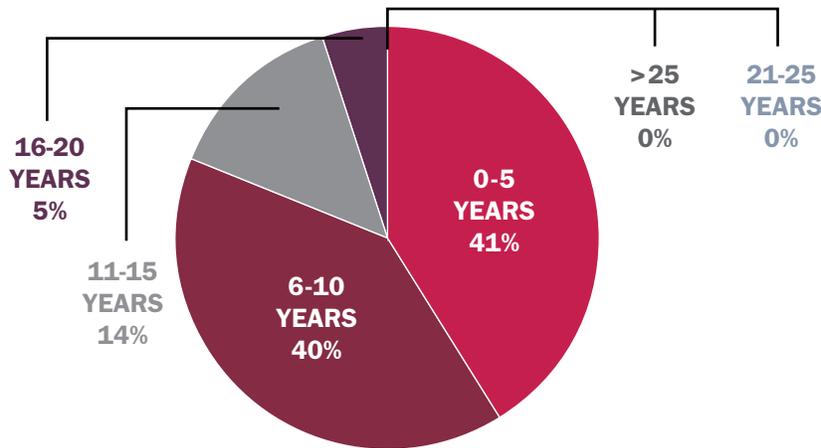
Public Transit: Age breakdown of railcars and ferries[45]

> 25 YEARS 42%
0-5 YEARS 25%
6-10 YEARS 4%
11-15 YEARS 12%
16-20 YEARS 6%
21-25 YEARS 11%
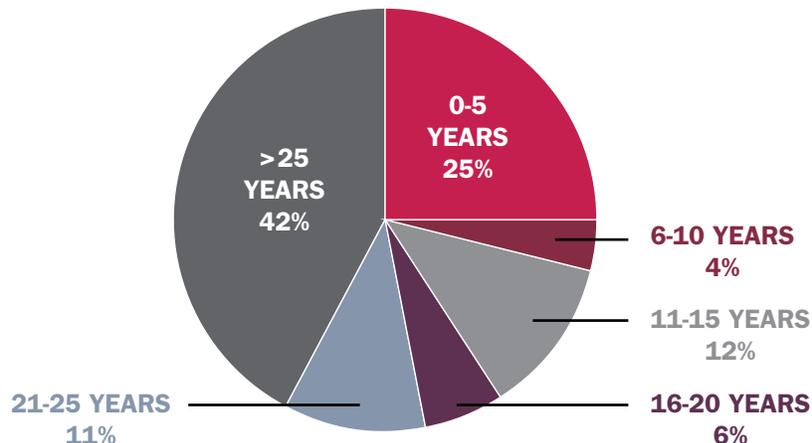
PUBLIC TRANSIT

Public Transit: Age breakdown of technology[46]

16-20 YEARS 0%

11-15 YEARS 1%

> 25 YEARS 1%

21-25 YEARS 0%

6-10 YEARS 46%

0-5 YEARS 52%
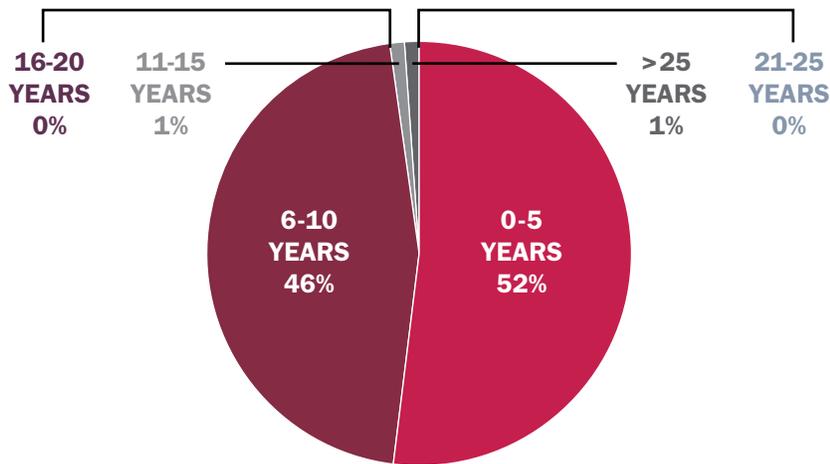
Public Transit: Age breakdown of linear fixed assets[47]

0-5 YEARS 5%

6-10 YEARS 13%

11-15 YEARS 10%

16-20 YEARS 10%

21-25 YEARS 4%

> 25 YEARS 58%
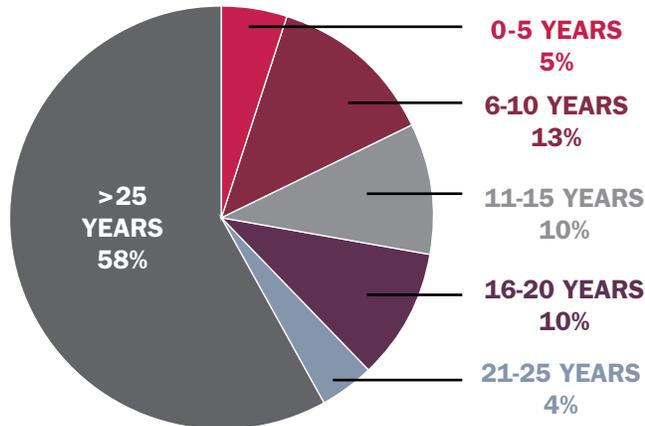
Public Transit: Age breakdown of non-linear fixed assets[48]

> 25 YEARS 3%

0-5 YEARS 19%

6-10 YEARS 22%

11-15 YEARS 21%

16-20 YEARS 19%

21-25 YEARS 16%
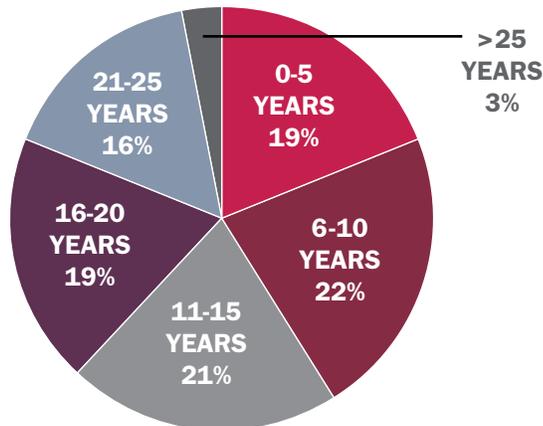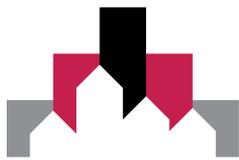
PUBLIC TRANSIT

G. RISK ASSESSMENT CYCLE

More than half of transit authorities have undertaken a risk/criticality assessment[49] of their transit assets (51% for vehicles, 56% for technology and 53% for fixed assets). Smaller transit authorities are less likely to undertake risk assessment (29% for vehicles, 33% for technology and 44% for fixed assets). Medium-sized transit authorities are most likely to undertake risk assessment (55% for vehicles, 88% for technology and 60% for fixed assets). About half of large transit authorities undertook risk assessments of their assets: 58% for vehicles, 48% for technology and 53% for fixed assets.

Public Transit: Risk Assessment Cycle (Yes vs. No)

Buses: Yes 45%, No 55%
Railcars and Ferries: Yes 90%, No 10%
Technology: Yes 56%, No 44%
Fixed Assets: Yes 53%, No 47%
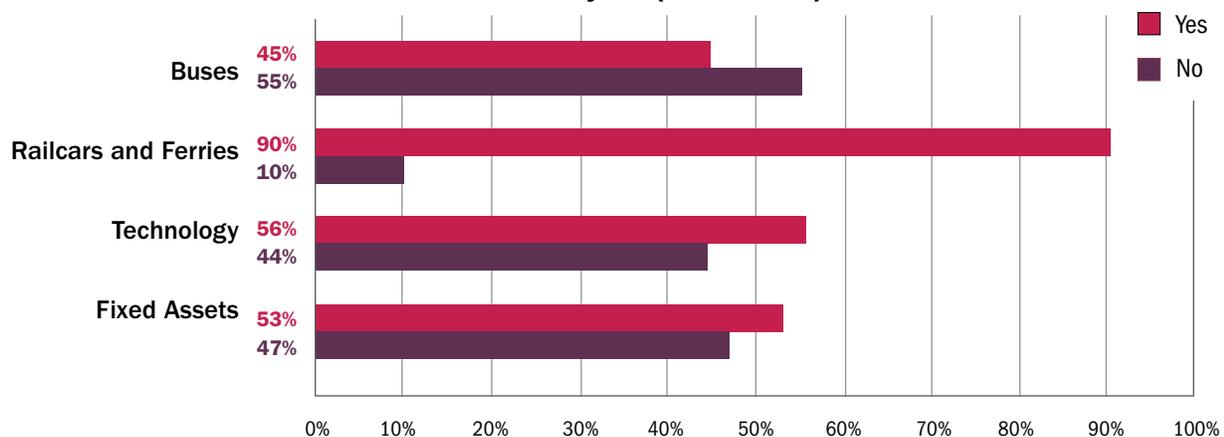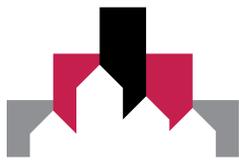
PUBLIC TRANSIT

H. CONDITION ASSESSMENT CYCLE

The most common condition assessment cycle for physical condition of transit assets was regularly (multiple times in a year) and less than three years for most transit assets (86% for vehicles, 83% for technology and 61% for fixed assets). For small providers, these numbers were 33% for vehicles and technology and 36% for fixed assets. For medium-sized providers, these numbers were 89% for vehicles, 66% for technology, 94% for fixed assets. For large providers, these numbers were 100% for vehicles, 87% for technology and 55% for fixed assets.

It is important to note that the condition assessment cycle results for vehicles do not necessarily include required vehicle condition assessments that operators and maintenance staff are required to undertake daily, such as circle checks, or regular maintenance schedules.

Public Transit: Average condition assessment of assets

Legend:
- No data
- >10 years
- 6-10 years
- 3-5 years
- <3 years
- Regularly (multiple times in a year)

Vehicles: 74%, 12%, 8%, 3%, 1%, 3%
Technology: 60%, 23%, 3%, 13%
Fixed Assets: 41%, 20%, 14%, 11%, 5%, 9%
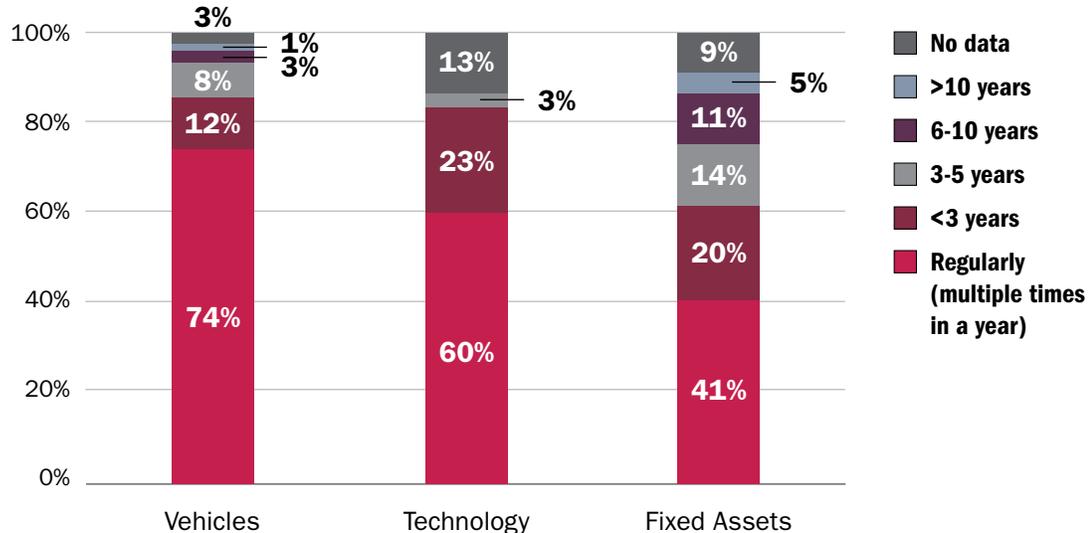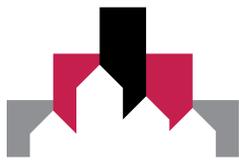
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

I. DEMAND/CAPACITY CONDITION

Respondents were asked to rank the demand/capacity condition[50] of their assets (vehicles, technology, fixed assets) from very good condition to very poor condition. Fifty-eight per cent of the replacement value was assessed for capacity condition. Eighty-seven per cent of vehicles were in very good and good condition, 66% of technology was in very good and good condition and 77% of fixed assets were in very good and good condition.

When examined by size of transit authority, the distribution of results varied. In small transit authorities, almost 100% of the replacement value was assessed for demand/capacity condition, 39% of vehicles, 80% of technology and 36% of fixed assets were in good condition; 0% of assets were in very good condition. In medium-sized transit authorities, 81% of vehicles were in very good and good condition, 100% of technology was in very good and good condition and only 27% of fixed assets were in very good and good condition. Large transit authorities had similar results to the overall results.
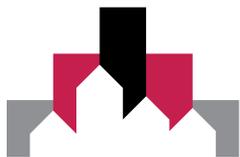
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

Public Transit: Demand/capacity condition of vehicles
(measured by replacement value)

POOR
2%

VERY
POOR
3%

FAIR
8%

GOOD
21%

VERY
GOOD
66%
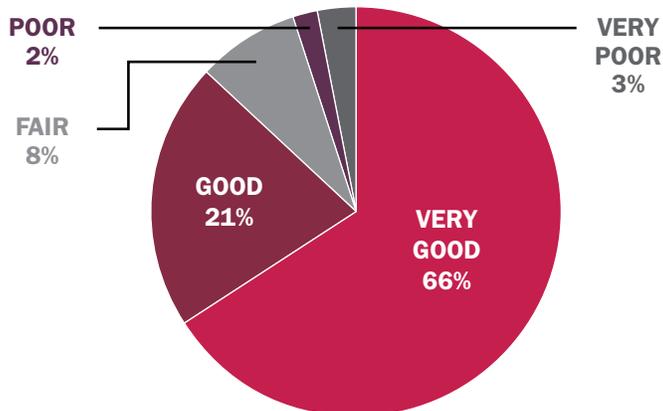
Public Transit: Demand/capacity condition of technology
(measured by replacement value)

VERY
POOR
8%

VERY
GOOD
13%

POOR
17%

FAIR
9%

GOOD
53%
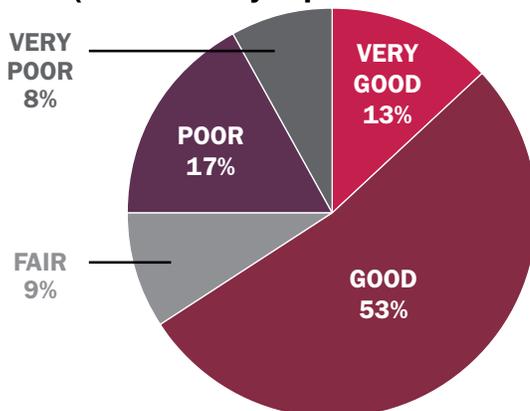
Public Transit: Demand/capacity condition of fixed assets
(measured by replacement value)

VERY POOR
11%

POOR
1%

FAIR
11%

GOOD
4%

VERY
GOOD
73%

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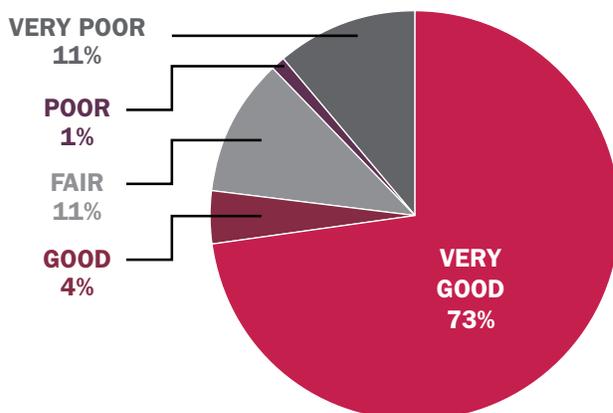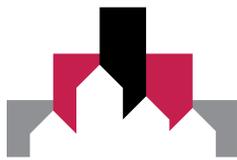
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

J. REPLACEMENT VALUE

The total replacement value of the assets reported by the 37 operators that provided replacement value data was $30.4 billion. Large transit authorities represent 99% of this value.

Vehicles	Replacement value
Buses (not broken down by type)	$598,200,000
Small bus	$106,989,104
Standard bus	$4,383,250,294
Double-decker bus	–
Trolley bus	$4,000,000
Articulated bus	$506,045,987
Total buses	**$5,598,485,385**
Streetcars	$1,074,230,000
Ferries	–
Heavy railcars	$4,130,640,900
Commuter railcars	–
Light railcars	$573,192,946
Locomotives	$1,750,777
Total	**$11,378,300,008**
Technology	
Mobile technology such as automation equipment, AVL, GPS	$37,016,990
Security system such as CCTV	$118,870,657
Rail signal systems	$211,993,417
Total	**$367,881,064**
Fixed Assets	
Stations/terminals	$6,121,745,882
Transit shelters	$169,873,904
Tunnels	$8,465,736,097
Exclusive rights-of-way	$273,968,488
Tracks	$435,088,830
Parking facilities	$80,849,524
Car stalls	$8,000,000
Bicycle racks	$119,676
Passenger drop off facilities ('Kiss and Ride')	–
Service facilities (such as administrative, maintenance, and support)	$3,072,003,125
Total	**$18,627,385,526**
GRAND TOTAL	**$30,373,566,598**
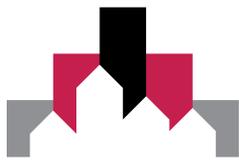
PART 2: SURVEY RESULTS BY SECTOR

PUBLIC TRANSIT

K. REINVESTMENT RATE

Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value. The transit survey asked respondents to provide data on replacement value of assets and the annual renewal budget, which is how the report derives reinvestment rates. However, very few were able to provide both. For this reason, this report does not assess reinvestment rates for transit assets.

L. PEAK PERIODS

In 2013, 81.2% of the total active transit vehicle inventory was in operation during weekday peak periods. This ranges from 67% of (ferries) to 79% (heavy railcars) depending on vehicle type. During mid-day, week-day periods, the minimum operation rate for vehicles ranges from 20% (commuter rails) to 67% (ferries).

The occupancy rate during peak hours is 87.4% for buses, 100% for heavy railcars, 89.6% for light railcars, 74.1% for parking facilities, 90.4% for car stalls, and 48% for bicycle racks. In small responding municipalities, the occupancy rate for buses during peak hours was about 40% and at nearly 90% in medium-sized responding municipalities.

Public Transit: Percentage of vehicles operated (peak period vs. mid day period)

Peak Period

Mid-day Period (Minimum)

	Peak	Mid-day
Buses (all types)	81%	45%
Streetcars	78%	58%
Ferries	67%	67%
Heavy Railcars	79%	47%
Commutor Railcars	73%	20%
Light Railcars	77%	48%
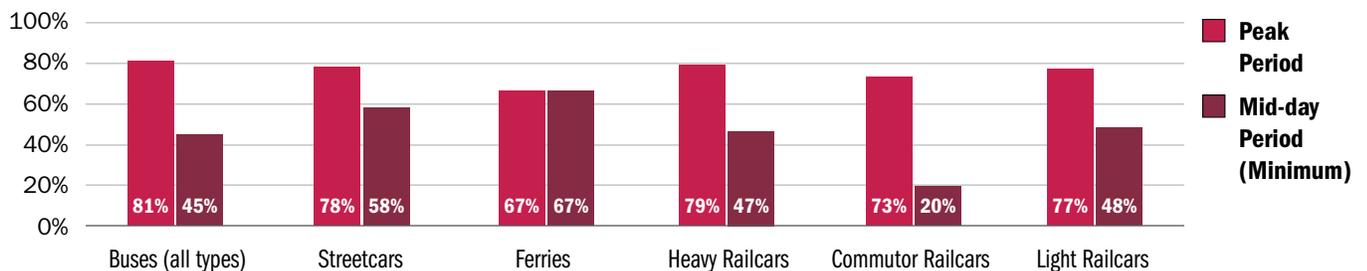
Public Transit: Occupancy during weekday peak periods

Buses (all types)	86.4%
Heavy Railcars	100%
Light Railcars	89.6%
Parking Facilities	74%
Car Stalls	90%
Bicycle Racks	48%

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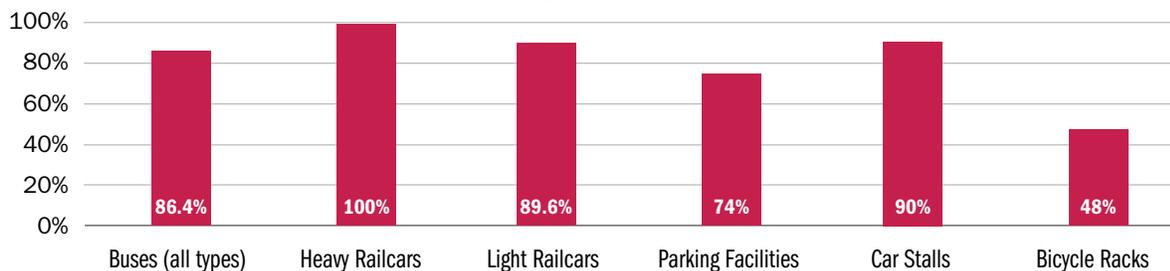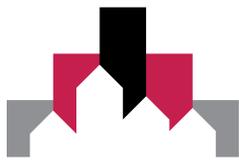
GLOSSARY OF TERMS

Annual Renewal Budget: Annual budget for the rehabilitation, reconstruction or replacement of infrastructure.

Asset Management: The coordinated activities of an organization to realize value from its assets in the achievement of its organizational objectives. From a practical perspective, asset management is based on a set of four key fundamentals:

- **Value:** Assets exist to provide value to the organization and its stakeholders.
- **Alignment:** Asset management aligns the organizational objectives with technical and financial decisions, plans, and activities.
- **Leadership:** Leadership and workplace culture are crucial to realize value.
- **Assurance:** Asset management gives assurance that assets will fulfill their required purpose.

Asset Management Plans (AMP): Defines how a group of assets is to be managed over a period of time. The AMP describes the characteristics and condition of infrastructure assets, the levels of service expected from them, planned actions to ensure the assets are providing the expected level of service, and financing strategies to implement the planned actions. AMPs can include a State of Infrastructure Report.

Condition Assessment Cycle (CAC): CAC refers to how often a municipality undertakes a formal process to determine the current state of the municipality's infrastructure, usually based on a rating system such as good, fair and poor. Condition assessments determine need and timing of preventative or remedial action to maintain the desired level of service, manage risk and assess the asset's remaining useful life. There are currently no formal industry-recognized target condition assessment cycles for municipal infrastructure, although in some cases government mandates how often these are to take place. For example, in Ontario, condition assessments for bridges are to be conducted every two years. In other cases the frequency will be determined based on condition or other indicators such as maintenance cost or depreciated replacement cost.

(**Source:** Condition Assessment and Asset Performance Guidelines. The Institute of Public Works Engineering Australasia (IPWEA) and NAMS. 2012.)

Core public infrastructure includes roads, bridges, transit, water, wastewater, stormwater, buildings and sport and recreation facilities.
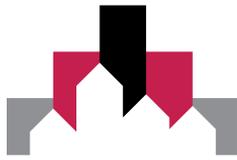
GLOSSARY OF TERMS

Linear Assets: Includes all water distribution and transmission systems, stormwater, sewer and sanitary collection pipes, trunk sewers and forcemains.

Non-linear Assets: Includes water systems-related facilities such as treatment plants, pumping stations/lift stations and storage tanks/reservoirs.

Reinvestment Rate and Target Reinvestment Rate: Reinvestment rate refers to the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value. There are currently no formal industry-recognized target reinvestment rates. The rate varies across responding municipalities based on factors such as the average age of the infrastructure, the level of maintenance expenditures, risk tolerance and available infrastructure funding. Municipal asset management practitioners in Canada are working to develop tools that municipalities can use to better establish target reinvestment rates for each asset type. The values provided in this report are based on the experience of municipal asset management practitioners and are therefore informative in nature.

Replacement Value: The approximate cost at the present time required to replace an asset, including demolition costs.

State of Infrastructure Report (SOIR):

As part of a municipality's asset management plan, an SOIR should:

- Document the inventory and replacement value of the assets owned by the municipality.
- Summarize the physical condition of each asset type.
- When ready, will also document the state of the services that are provided through the infrastructure systems.

Small Municipalities: Municipalities with populations under 30,000.

Medium Municipalities: Municipalities with populations between 30,000 and 99,999.

Large Municipalities: Municipalities with populations equal to or greater than 100,000.

GLOSSARY OF TERMS

Upper-tier municipalities: Formed by two or more lower-tier municipalities. Upper-tier municipalities often provide more regional services such as: arterial roads; transit; policing; sewer and water systems; waste disposal; region-wide land use planning and development; health and social services. Upper-tier municipalities can also be referred to as regions, regional districts, regional municipalities, districts, counties, metros, regional county municipalities (municipalités régionales de comté), metropolitan communities or CMs ("communautés métropolitaines") and regional government (administration régionale).

Lower-tier municipalities: Municipalities are referred to as "lower-tier" when there is another level of municipal government such as a county or region involved in providing services to residents. A lower-tier municipality may also be called a city, town, township, village, municipality, rural municipality, village, ville, community or resort municipality.

Single-tier municipalities: Single-tier municipalities are municipalities that do not form part of an upper-tier municipality and have responsibilities for all local services to their residents. These can also include former regional municipalities that have been amalgamated. May also be called city, town, township, municipality, rural municipality, village, ville, community or resort municipality.

*(**Source:** http://www.mah.gov.on.ca)*
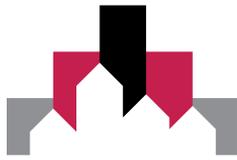
GLOSSARY OF TERMS

RATING SCALE FOR ASSET CONDITION

Very Good – fit for the future (weighted average 80% to 100%):
Well maintained, good condition, new or recently rehabilitated.

Good – adequate for now (weighted average 70% to 79.9%):
Acceptable, generally approaching mid-stage of expected service life.

Fair – requires attention (weighted average 60% to 69.9%):
Signs of deterioration, some elements exhibit deficiencies.

**Poor – increasing potential of affecting service
(weighted average 50% to 59.9%):** Approaching end of service life, condition
below standard, large portion of system exhibits significant deterioration.

Very Poor – unfit for sustained service (weighted average below 50%):
Near or beyond expected service life, widespread signs of advanced deterioration,
some assets may be unusable.

RATING SCALE FOR DEMAND/CAPACITY CONDITION

Very Good: Demand corresponds well to the design capacity and no operational
problems experienced.

Good: Demand is within design capacity and occasional operational problems
experienced.

Fair: Demand is approaching design capacity and/or significant operational
problems occur regularly.

Poor: Demand at design capacity and/or significant operational problems
are evident

Very Poor: Demand exceeds design capacity and/or operational problems are
serious and ongoing.

CANADIAN
INFRASTRUCTURE
REPORT CARD

APPENDIX A:
COMPARISON OF
2012 AND 2016 CIRC SURVEY
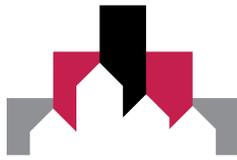
Appendix A: Comparison of 2012 and 2016 CIRC survey

	2012 CIRC Municipal Responses		2016 CIRC Municipal Responses		Municipalities that Responded to 2012 & 2016 surveys
	Number of Municipalities	Population Represented	Number of Municipalities	Population Represented	Number of Municipalities
Small municipalities (1,000 to 29,999 population)	62	423,475	52	414,755	11
Medium municipalities (30,000 to 99,999 population)	24	1,540,053	25	1,702,477	13
Large municipalities (more than 100,000 population)	37	15,651,662	43	17,814,708	28
Total	**123**	**17,615,190**	**120**	**19,931,940**	**52**

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APPENDIX B:
REPORT CARD ADVISORY BOARD
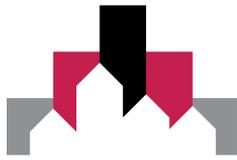
APPENDIX B

Appendix B: Report Card Advisory Board

A **Report Card Advisory Board (RCAB)** was formed and chaired by the Canadian Network of Asset Managers. RCAB members were responsible for linkages between the Report Card project and their respective associations. They provided feedback on the process, analysis, and results. Their respective networks allowed them to access the wide spectrum of expertise needed in the study. RCAB members participated in the development of overall assessment statements for the Report Card and recommended approval of the report to the Project Steering Committee.

The RCAB is made up of the following organizations, and their representatives for the 2016 CIRC is:

- Association of Consulting Engineering Companies (ACEC) – John Gamble
- Canadian Association of Municipal Administrators (CAMA) – Janice Baker
- Canadian Automobile Association (CAA) – Ian Jack
- Canadian Construction Association* (CCA) – Chris McNally and Bill Ferreira
- Canadian Council of Public-Private Partnerships (CCPPP) – Mark Romoff
- Canadian Institute of Planners (CIP) – Michael Gordon
- Canadian Network of Asset Managers (CNAM) – Bradley Leeman and Alain Gonthier (Chair, RCAB)
- Canadian Parks and Recreation Association (CPRA) – Darryl Condon
- Canadian Public Works Association* (CPWA) – Kealy Dedman and Steve Wyton
- Canadian Society for Civil Engineering* (CSCE) – Reg Andres and Nick Larson
- Canadian Urban Transit Association (CUTA) – Michael Roschlau and Wendy Reuter
- Canadian Water and Wastewater Association (CWWA) – Robert Haller
- Engineers Canada – Diane Freeman and Alana Lavoie
- Federal-Provincial/Territorial Sport Committee Working Group on Sport and Recreation Infrastructure – Grant Sinclair
- Federation of Canadian Municipalities* (FCM) – Adam Thompson and Andrée Chenard
- Transportation Association of Canada (TAC)[o] – Sarah Wells

*Association is member of the Project Steering Committee

[o] **Observer:** Association has interest in the infrastructure under study
but participates as an observer with no voting rights

CANADIAN INFRASTRUCTURE REPORT CARD

APPENDIX C:
LIST OF MUNICIPALITIES AND ADMINISTRATIVE JURISDICTIONS THAT PROVIDED DATA

APPENDIX C

Appendix C: List of Municipalities and Administrative Jurisdictions that Provided Data[51]

The following 120 municipalities provided data usable in the analysis for the asset classes under consideration. All provinces are represented in the Report Card database and three municipalities in Yukon provided data.

YUKON
Municipalities
3
Population
28,000

NORTHWEST TERRITORIES
Municipalities
0
Population
0

NUNAVUT
Municipalities
0
Population
0

Number of Municipalities that Completed the Survey

Total Lower or Single-Tier Municipalities: 110

Total Upper-Tier Municipalities: 10

BRITISH COLUMBIA
Municipalities
24
Population
2,945,000

QUEBEC
Municipalities
8
Population
2,820,000

NEWFOUNDLAND AND LABRADOR
Municipalities
2
Population
114,000

PRINCE EDWARD ISLAND
Municipalities
2
Population
3,000

ALBERTA
Municipalities
18
Population
2,465,000

SASKATCHEWAN
Municipalities
10
Population
209,000

MANITOBA
Municipalities
5
Population
695,000

ONTARIO
Municipalities
36
Population
9,436,000

NEW BRUNSWICK
Municipalities
5
Population
107,000

NOVA SCOTIA
Municipalities
7
Population
474,000

Per cent of Jurisdiction's Population Represented By Responding Municipalities

☐ 0%   ☐ 0.1 - 25%   ☐ 25.1 - 50%   ■ 50.1 - 75%   ■ 75.1 - 100%

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APPENDIX C

Alberta

City of Calgary*

City of Edmonton*

City of Leduc

City of Lethbridge*

City of Red Deer*

City of St. Albert*

County of Northern Lights

Mountain View County

Northern Sunrise County

Red Deer County

Regional Municipality of Wood Buffalo*

Strathcona County

Town of Banff

Town of Didsbury*

Town of Okotoks*

Town of Olds

Town of Penhold

Village of Marwayne

British Columbia

City of Burnaby*

City of Campbell River

City of Kelowna

City of Nanaimo

City of New Westminster*

City of Port Coquitlam

City of Port Moody

City of Prince George*

City of Prince Rupert

City of Richmond

City of Surrey*

City of Vancouver*

City of Vernon

Comox Valley Regional District*

District of Elkford

District of North Cowichan

District of North Vancouver*

District of Saanich*

District of Ucluelet

Metro Vancouver

Regional District of East Kootenay*

Resort Municipality of Whistler

Township of Langley

Village of Port Clements

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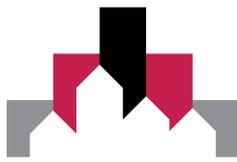
APPENDIX C

Manitoba

City of Thompson

City of Winnipeg*

Rural Municipality of Dufferin*

Town of Lynn Lake

Village of St-Pierre-Jolys

New Brunswick

City of Bathurst*

City of Moncton*

Town of Dalhousie

Town of Hampton

Town of Quispamsis

Newfoundland and Labrador

City of St. John's

Town of Portugal Cove - St.Philip's

Nova Scotia

Halifax Regional Municipality

Municipal District of East Hants*

Municipality of West Hants

Town of Amherst

Town of Bridgewater

Town of Truro

Town of Yarmouth

Ontario

City of Barrie

City of Brantford

City of Burlington*

City of Cambridge

City of Guelph*

City of Hamilton*

City of Kenora

City of Kingston

City of Kitchener*

City of London*

City of Markham

City of Mississauga*

City of Orillia

City of Oshawa*

City of Ottawa*

City of Thunder Bay

City of Toronto*

City of Vaughan

City of Waterloo*

City of Welland*

City of Windsor*

Northumberland County*

Peterborough County

Regional Municipality of Durham

Regional Municipality of Halton*

Regional Municipality of Peel*

Regional Municipality of Waterloo

Regional Municipality of York*

Town of Halton Hills*

Town of Innisfil

Town of Newmarket

Town of Oakville*

Town of Whitby

Township of Ignace

Township of Puslinch

Township of Russell

APPENDIX C

Prince Edward Island

Community of Miltonvale Park

Town of Montague*

Quebec

Municipalité de Sainte-Catherine-de-Hatley

Ville de Bromont

Ville de Drummondville

Ville de Gatineau

Ville de Montreal*

Ville de Quebec

Ville de Saguenay*

Ville de Sherbrooke*

Saskatchewan

City of Regina*

Resort Village of Chitek Lake

Rural Municipality of Grandview No. 349*

Rural Municipality of Moose Range No. 486*

Town of Kindersley*

Town of LeRoy

Town of Lumsden*

Town of Wynyard*

Village of Paynton

Village of Rama

Yukon

City of Dawson

City of Whitehorse

Village of Mayo

Note: Municipalities indicated with * also participated in the *2012 Canadian Infrastructure Report Card*

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APPENDIX D:
MUNICIPAL AND TRANSIT AUTHORITIES THAT PROVIDED PUBLIC TRANSIT DATA

Appendix D: Municipal and Transit Authorities that Provided Public Transit Data

The following municipal and transit authorities provided the data related to transit used in this Report Card.

Alberta
Bow Valley
City of Calgary
City of Edmonton
City of Lethbridge
City of St. Albert

British Columbia
City of Kelowna
City of Vancouver

Manitoba
City of Winnipeg

New Brunswick
City of Fredericton

Prince Edward Island
City of Charlottetown

Quebec
Agence métropolitaine de transport (AMT)
Ville de Laval
Ville de Longueuil
Ville de Montreal
Ville de Québec
Ville de Sherbrooke

Ontario
City of Brampton
City of Burlington
City of Cornwall
City of Hamilton
City of Mississauga
City of Orillia
City of Ottawa
City of Peterborough
City of St. Catharines
City of Stratford
City of Toronto
City of Woodstock
Metrolinx
Town of Bancroft
Town of Midland
Town of Milton
Town of Orangeville
Town of Wasaga Beach
Township of Marmora and Lake
Region of Durham
Region of Waterloo

APPENDIX E:
ILLUSTRATION OF INFRASTRUCTURE SYSTEM/NETWORK DEGRADATION OVER ITS SERVICE LIFE
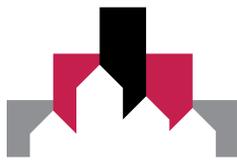
APPENDIX E

Appendix E: Illustration of Infrastructure System/Network Degradation Over its Service Life

The figure below illustrates infrastructure system/network degradation over its service life, assuming current practices are maintained and that every component in the "very poor" condition category is reconstructed.

As the figure shows, under current practices (investment, operations, maintenance), the majority of the infrastructure, even if in good to very good condition today, will require increasingly larger investments as it ages.

	TODAY	IN 20 YEARS	IN 40 YEARS	IN 60 YEARS
VERY GOOD	15%	5%	10%	30%
GOOD	40%	15%	5%	10%
FAIR	30%	40%	15%	5%
POOR	10%	30%	40%	15%
VERY POOR	5%	10%	30%	40%
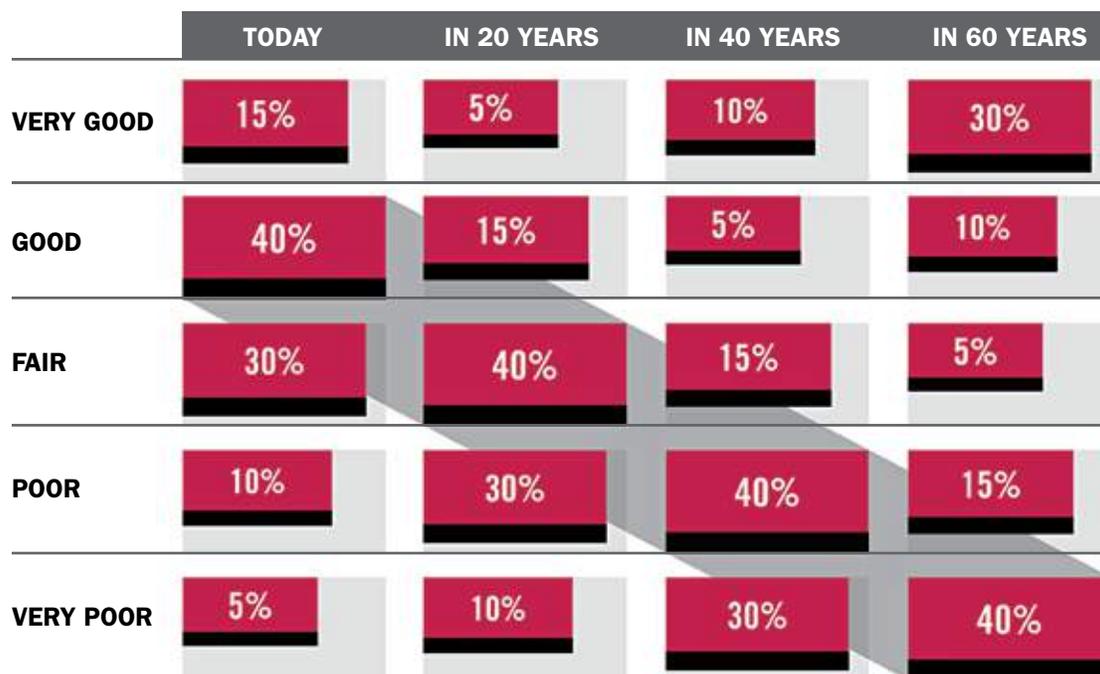
Source: Zuker, Richard, *Closing the Municipal Infrastructure Gap in Canada*.

Federation of Canadian Municipalities. (Ottawa, 2004).

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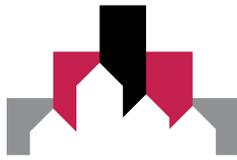
ENDNOTES

ENDNOTES

1   FCM's membership was just under 2000 municipalities during the survey period which took place from November 2014 to January 2015.

2   Most of the transit data was collected through a survey distributed to 130 transit operators across the country. The information was supplemented with data that the Canadian Urban Transit Association gathers annually from its members. A total of 37 transit authorities responded to the transit survey, representing a serviced population of just over 17 million (or about 67% of Canada's population serviced by transit) and representing 88% of all transit trips taken in 2013. The list of municipalities/transit authorities that provided data related to transit is contained in Appendix F. Where data in this report is extrapolated for transit, the serviced population is used and the extrapolation factors in different sizes of transit authorities.

3   The full Canadian population used to extrapolate the survey results is 35.7 million. This figure is a Statistics Canada population projection using a medium growth scenario. (See Statistics Canada, Population Projections for Canada, Provinces and Territories, Table 3.1, Components of population growth, medium-growth - historical trends (1981 to 2008) scenario (M1) — Canada, 2009/2010 to 2060/2061

4   Responses received from 37 transit authorities represented a total serviced population of 17.2 million people or 67% of the national total. This population represents 88% of all transit trips taken in 2013. Data from the 37 respondents was extrapolated to the 2013-2014 Canadian transit service population of 25.6 million.

5   Based on 2011 Census data, large municipalities represent 53% of Canada's population (see Statistics Canada, Population and dwelling counts, for Canada and census subdivisions (municipalities), 2011 and 2006 censuses. For the purposes of this report, the remaining 47% is classified under small and medium-sized municipalities. Large municipalities therefore have a 2014 total population of 18.9 million and small and medium-sized municipalities have a population of 16.8 million. The 2014 population is estimated at 35.7 million (see endnote 3). The data collected from the survey represents 94% of the total population of large municipalities in Canada but only represents 13% of the total population of both small and medium-sized municipalities combined, resulting in datasets that are more representative of large municipalities.

6   The 30,000 population limit for small municipalities is quite high for rural and remote communities. This report classifies municipalities as small, medium and large, consistent with Statistics Canada groupings, with one exception. Statistics Canada classifies small municipalities as having populations between 1,000 and 29,999, but this report includes all municipalities with a population under 30,000 as small.
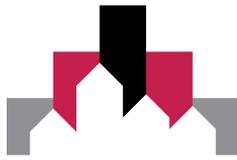
ENDNOTES

7   The ratio in the chart is General Government Gross Fixed Capital Formation as a percentage of Gross Domestic Product (GDP), which is total government investment in plant, buildings, machinery, equipment, roads, facilities, pipes, and other physical assets. This investment includes new construction and the replacement of assets, but can exclude certain maintenance expenditures. Due to Statistics Canada's transition to a new international protocol for reporting the National Income and Expenditure Accounts, the dataset draws on three sources. Data for 1961-1980 were drawn from Statistics Canada Catalogue No. 13-213S. Data for 1981-2010 were drawn from the Statistics Canada CANSIM Table 384-0002. Data for 2011 and forward were drawn from Statistics Canada CANSIM Table 380-0064. Data analysis by Casey Vander Ploeg.

8   For households in large municipalities (over 100,000 population), this cost is $73,000 and increases to almost $85,000 for households in small and medium-sized municipalities. This discrepancy is due to the fact that large urban centres have higher population density, which means that assets are extended over shorter distances and the costs are shared by more people.

9   The 2016 CIRC survey collected data on the current value, the estimated replacement value and projected annual renewal budget (for rehabilitation, reconstruction or replacement) for most asset categories. Average reinvestment rates were then derived from the data. The transit survey asked respondents to provide data on replacement value of assets and the annual renewal budget, which is how the report derives reinvestment rates. However, very few were able to provide both. For this reason, the report does not assess reinvestment rates for transit assets.

10 There are currently no formal industry-recognized target reinvestment rates. The rate varies across responding municipalities based on factors such as the average age of the infrastructure, the level of maintenance expenditures, risk tolerance and available infrastructure funding. Municipal asset management practitioners in Canada are working to develop tools that municipalities can use to better establish target reinvestment rates for each asset type (rehabilitation, reconstruction or replacement of infrastructure). The values provided in this report are based on the experience of municipal asset management practitioners providing advice to the CIRC PSC and are therefore intended to be informative in nature.

11 Larry Galehouse, James S. Moulthrop, and R. Gary Hicks, "Pavement Preservation Compendium II: Principles of Pavement Preservation - Definitions, Benefits, Issues, and Barriers," TR News, September-October 2003, pp. 4-15, Transportation Research Board (TRB), National Research Council, Washington, D.C.

12 Though only the deterioration curve for roads is included in this report, Appendix E provides a more detailed illustration of infrastructure system/network deterioration over its service life.

13 An important caveat when reading this section is that the survey sample was generated on a voluntary basis, likely resulting in a self-selection bias for communities with existing asset management practices.

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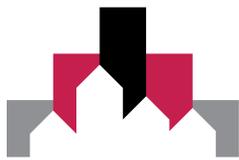
14 A SOIR is a tool that documents the inventory and replacement value of the assets owned by the municipality, summarizes the physical condition of each asset type, and ideally documents the state of the services that are provided through the infrastructure systems. The most common infrastructure types included in reported SOIRs are roads and bridges, potable water, stormwater and wastewater.

15 This rating was derived from the physical condition data provided by municipalities that own 94% of the reported linear inventory and 97% of the report replacement value of the non-linear potable water assets.

16 This rating was derived from the physical condition data provided by municipalities that own 84% of the reported linear (pipes) inventory and 88% of the non-linear (facilities) wastewater replacement value.

17 This rating was derived from the physical condition data provided by municipalities that own 86% of the reported linear (pipes) inventory and 27% of the reported non-linear (facilities and structures) stormwater replacement value.

18 This rating was derived from the physical condition data provided by municipalities that own 95% and 68% of the reported road and sidewalk inventory.

19 This rating was derived from the physical condition data provided by municipalities that own 93% of the reported replacement value of bridges.

20 This rating was derived from the physical condition data provided by municipalities that own 96% of the reported replacement value of buildings.

21 This rating was derived from the physical condition data provided by municipalities that own 90% of the reported replacement value of sport and recreation facilities.

22 Does not include replacement value of double decker buses.

23 Does not include replacement value of ferries and commuter railcars.

24 This rating was derived from the physical condition data provided by transit operators that own 67% of the reported replacement value of buses.

25 This rating was derived from the physical condition data provided by transit operators that own 43% of the reported replacement value of railcars and ferries.

26 This rating was derived from the physical condition data provided by transit operators that own 49% of the reported replacement value of transit technology.

27 This rating was derived from the physical condition data provided by transit operators that own 63% of the reported replacement value of fixed assets.

28 This rating was derived from the physical condition data provided by transit operators that own 61% of the reported replacement value of all transit assets.

29 Statistics Canada's average Canadian household of 2.5 persons.

30 The condition assessment cycle results for vehicles do not necessarily include required vehicle inspections that operators and maintenance staff are required to undertake daily, such as circle checks, or regular maintenance schedules.
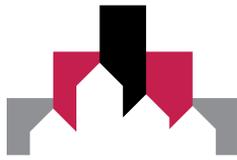
31 Reinvestment rate is the annual renewal budget (for rehabilitation, reconstruction or replacement of infrastructure) as a percentage of the asset's replacement value.

32 Twenty-eight municipalities did not respond to that particular question of the survey.

33 Only linear assets were assessed for age.

34 The survey did not assess the quality or thoroughness of the risk/criticality assessment.

35 The survey did not assess the quality or thoroughness of the risk/criticality assessment.

36 It is important to note that the sample sizes for assets broken down by municipal size are quite small.

37 Ninety municipalities responded to this question of the survey. One hundred and eleven municipalities provided responses to the stormwater section.

38 The survey did not assess the quality or thoroughness of the risk/criticality assessment.

39 When excluding sidewalks, it is 74.4%.

40 While 88 municipalities responded to the sport and recreation facilities survey, 59 responded to this question.

41 Reinvestment rate is the annual expenditure for asset replacement, asset rehabilitation or major asset maintenance, expressed as a percentage of the total replacement value of the infrastructure system.

42 For transit infrastructure, the population served ranges are small (<50,000 population), medium (50,000 – 400,000 population), and large (>400,000 population).

43 Per household cost of 98% of population serviced by transit.

44 Represents 92% of the reported bus inventory. Eight per cent of the inventory was not reported for age.

45 Represents 100% of the reported railcar and ferry inventory.

46 Represents 72% of the reported technologies. Twenty-eight per cent of the inventory did not report age.

47 Represents 55% of the reported linear fixed asset inventory. Forty-five per cent of the inventory did not report age.

48 Represents 29% of the reported n0n-linear fixed asset inventory. Seventy-one per cent of the inventory was not reported for age.

49 The survey did not assess the quality or thoroughness of the risk/criticality assessment.

50 Demand/capacity condition refers to the capacity of transit systems to meet demand.

51 Alberta Capital Region Wastewater Commission and Halifax Water also provided data.

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THANK YOU TO ALL WHO PARTICIPATED

On behalf of the Canadian Infrastructure Report Card (CIRC) team, we would like to thank all municipalities who completed this important survey. Your knowledge and expertise will help inform investment needs and asset management practices across Canada.

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