REHABILITATING MUNICIPAL INFRASTRUCTURES IN ONTARIO:

Challenges and prospects of funding

This study aims to determine whether or not Ontario municipalities have a completed asset management plan to assess the rate of deterioration of existing municipal infrastructure items and how municipalities plan to pay for the building, re-building, and rehabilitation of each item, given the finite funding available through government channels.
Rehabilitating municipal infrastructures in Ontario: Challenges and prospects of funding

Barbara Lynn Asselin (1210118)

University Canada West

April 12, 2014

Professor: Dr. Abera B. Demeke

Word count: 4,156
Rehabilitating municipal infrastructures in Ontario: Challenges and prospects of funding

Executive Summary

Abstract

This study aims to determine whether or not Ontario municipalities have a completed asset management plan to assess the rate of deterioration of existing municipal infrastructure items and how municipalities plan to pay for the building, re-building, and rehabilitation of each item, given the finite funding available through government channels. This report describes the current issues facing Ontario municipalities and poses questions and hypothesizes that Ontario municipalities with comprehensive asset management plans have forecasted annual financial shortfalls that cannot be financially maintained by the municipality without utilizing options such as increasing taxes and increasing debt load. The survey employed by this report guides Ontario municipalities through a series of 16 questions that ultimately support the proposed hypothesis. The individual asset management plan review further supports the proposed hypothesis by outlining in detail how one municipality identified its infrastructure, the cost to maintain such infrastructure, and the annual financial shortfall that will occur as a result of maintaining its infrastructure to safe levels. Finally, this report provides a list of funding options available to each municipality to alleviate some of the anticipated annual financial shortfall.

KEYWORDS: Ontario municipality, asset management plan, municipal infrastructure projects, municipal financial shortfall
Acknowledgements

I would like to take this opportunity to thank the following people for their unending support during the pursuit of my MBA:

- My family, Jacqueline Asselin, Allan Sykes, and Julie Sykes, for their never-ending support through the entire process
- My daughters, Casey and Jamie, for being my loudest cheerleaders over the past two years and for accepting that I often had to be at my computer doing homework, instead of having fun with them, and
- My husband, Mike, for filling in where I couldn’t at home, for his never-ending support during the past two years, and finally, for his expert feedback during my entire thesis project, a project that I couldn’t have completed without his knowledge, expertise, and support.

Thank you. I love you all.
REHABILITATING ONTARIO MUNICIPAL INFRASTRUCTURES

Table of Contents

Executive Summary ........................................................................................................... 1
Abstract .............................................................................................................................. 1
Acknowledgements .......................................................................................................... 2
Table of Contents ............................................................................................................. 3
Chapter One: Introduction ............................................................................................... 7
  Background ...................................................................................................................... 7
  Research Objectives ...................................................................................................... 10
Chapter Two: Literature Review ..................................................................................... 11
  Literature Map ............................................................................................................... 11
  Introduction .................................................................................................................. 12
  Municipal Infrastructure ............................................................................................... 12
    Maturity ....................................................................................................................... 13
    Deterioration ............................................................................................................... 13
  Asset Management Plans ............................................................................................. 15
  Infrastructure Funding Gap ........................................................................................... 17
Funding Options ............................................................................................................... 17
  Tax Increases ............................................................................................................... 17
  Development Charges ................................................................................................. 17
  Federal Funding ........................................................................................................... 18
  Provincial Funding ....................................................................................................... 18
  Reducing Transportation Specific Taxes ..................................................................... 18
  Municipal Borrowing .................................................................................................... 19
  User Fees ..................................................................................................................... 19
  Citizen Engagement ..................................................................................................... 19
  Public-Private Partnerships ......................................................................................... 19
  Worldwide Concerns .................................................................................................... 20
Conclusion ...................................................................................................................... 20
Chapter Three: Methodology ......................................................................................... 21
  Research Methodology and Procedures ...................................................................... 21
  Sampling ....................................................................................................................... 21
Chapter Four: Results of General Municipal Survey

Recipients

Responses

Identification of Municipality

Municipal Population

Asset Management Plan

Cost of Asset Management Plan

Cost Recovery

Financial Forecast

Annual Reserve

Anticipated Financial Shortfall

Estimated Size of Anticipated Financial Shortfall

Anticipated Financial Shortfall Funding Options

Existing Debt Charges

Availability of Asset Management Plan

Further Discussion

Chapter Five: Results of Specific Asset Management Plan Review

Town of Renfrew

Total Assets

Total Cost to Repair all Assets

Minimum Financial Shortfall

Funding Strategy for Ongoing Financial Shortfall

What This Means for the Rest of Ontario

Analysis and Discussion

Chapter Six: One Specific Infrastructure Project

Town of Renfrew Critical Project
Chapter One: Introduction

Background

Municipal infrastructure consists of many aspects of our towns and cities, such as:

- Public transit
- Roads and bridges
- Digital technology
- Schools and universities
- Hospitals, community centres, and other municipal buildings, and
- Water and wastewater plants and operating systems (Government of Ontario, n.d.).

Living in a municipality, residents are provided with various services associated with these infrastructure categories. When a tap is turned on, the resulting stream of water is provided by the municipality’s water treatment plant through various pipes and systems. When a resident flushes a toilet, the waste is treated through the municipality’s wastewater treatment plant.

Ontario municipalities provide service to residents and other individuals visiting and travelling through their municipalities for over 15,000 bridges and culverts and over 140,000 kilometers of roads. Ontario’s water and wastewater treatment plants service over 10 million individuals in Ontario (Ministry of Infrastructure, n.d.).

Most of Ontario’s public infrastructure is decades old and deteriorating quickly. Rebuilding many of these assets will be required to sustain the quality of service Ontarians are accustomed to. To add to the burden, it is estimated that 80% of Canadians live in urban areas and rely on existing public infrastructure. Older municipalities are approaching a crisis situation where deterioration is imminent and safety is an issue. Two recent catastrophes show how deteriorating infrastructure cannot be ignored. In 2000, Walkerton, Ontario experienced an e coli water contamination that resulted in the deaths of seven individuals. In 2006, the collapse of a Quebec overpass resulted in the deaths of five individuals (Haider, Crowley, & DiFrancesco, 2013).

Tragic incidents such as the Walkerton and Quebec incidents caused the government to become involved in the implementation of infrastructure projects, so that new safety policies could be maintained. For example, the Walkerton tragedy gave rise to the Walkerton
Commission of Inquiry, the results of which led to 93 recommendations from Mr. Justice Dennis O’Connor (O’Connor, 2002). Those recommendations included the expenditure of $280 million on water safety and the implementation of the Ontario Safe Drinking Water Act (CBC News, 2010). The Safe Drinking Water Act lists very specific “requirements for the sampling and testing of drinking water and the installation and operation of treatment equipment” and many municipalities spent millions of dollars upgrading their water treatment plants to meet these new specifications (CELA, 2011). While the upgrades were positive and necessary, control of the order of the implemented projects went from the municipality to the provincial government.

Canadian municipalities are maturing, resulting in aging infrastructure. At the same time, rate payers expect a level of service that is safe, despite recently increased levels of regulation, yet those same rate payers are intolerant of heavy tax increases that may be required depending on the extent of infrastructure repairs that exist (Sidawi, 2008).

Municipal property taxes do not automatically increase over time, as does the economy. While infrastructure is driven by economic and population growth, property taxes generally increase only marginally. Further, property taxes are generally for pay-per-use services, such as water usage, where the amount used is easily calculated. Using property taxes to fund roads is less accountable in that many externals will use the road during its lifetime (Slack, 2005).

The 2013 Ontario government budget allowed for a $100 million infrastructure fund for small, rural, and northern Ontario municipalities to complete infrastructure projects. In order to apply for funding under this program, municipalities must have completed a detailed, long-term asset management plan. This plan will help municipalities to create a long term plan for minimizing the costs of and maximizing the use of its infrastructure. A smart plan will use fewer funds to make incremental improvements (Building Together: Municipal Infrastructure Strategy, n.d.).
With nearly 450 municipalities in Ontario, will the provincial government’s annual allotment of infrastructure funds be enough to complete all of the required repairs for every municipality, without the occurrence of another Walkerton tragedy? If there are not enough funds for the necessary and planned improvements under the municipality’s asset management plan, will a municipal tax increase be required to pay for it? Will the municipality’s elected officials levy a tax increase sufficient to pay for all required infrastructure repairs, knowing that disgruntled taxpayers may not re-elect them on that basis? Will the elected officials choose to delay the infrastructure repairs, hoping that a new solution will make itself known? Are there other avenues to follow for funding that do not involve increasing municipal taxes?

Knowing the answers to these questions will assist all stakeholders:

- Taxpayers will know what specific tax increases are expected and why they are necessary
- Municipalities will know the exact state of each infrastructure item and the cost to build or re-build or repair
- Provincial government officials will know the exact deficiencies in funding anticipated by municipalities in fulfilling the annual goals of the mandatory asset management plan, and
- The general public will be secure in knowing that municipal infrastructure across the province is safe and that it is unlikely for disasters to occur as a result of deterioration.
Research Objectives

The research objectives are as follows:

- To determine if a municipality is capable of funding the necessary projects identified under its required asset management plan
- To estimate the anticipated required government funding and resulting deficit, if any, in realizing the municipality’s annual goals under its required asset management plan, and
- To recommend options for future funding of projects under a municipality’s required asset management plan.

It is anticipated that the funding requirements for realization of the projects contained in the asset management plans for the majority of municipalities in Ontario will greatly exceed the available funds generated through the municipality’s standard tax roll and that the proposed funding offered by the provincial and federal governments will not bridge the gap between the costs and the available funds.
Chapter Two: Literature Review

Literature Map

Ontario Infrastructure

- Identify
  - (Government of Canada, 2009)
  - (Government of Ontario, 2012)
  - (Sidawi, 2008)
- Maturity
  - (Roy, 2007)
  - (Hein, 2008)
- Deterioration
  - (Mirza, 2006)
  - (MOI, n.d.)
  - (Hein, 2008)
- Asset Management Plan
  - (Burn, et al, 2010)
  - (Halfawy, et al, 2006)
- Funding Gap
  - (RCCAC, 2006)
  - (Government of Ontario, 2008)
  - Tax increases
    - (Slack, 2005)
  - Development charges
    - (Tomalty, et al, 2003)
    - (Slack, 2005)
  - Federal funding
    - (Bojorquez, et al, 2009)
  - Provincial funding
    - (Palacios, et al, 2010)
  - Transportation taxes
    - (Clemens, et al, 2004)
  - Municipal borrowing
    - (Slack, 2005)
  - User fees
    - (Slack, 2005)
  - Citizen engagement
    - (Sidawi, 2008)
  - Public-private partnerships
    - (Slack, 2005)
  - Worldwide concerns
    - (de Palma, et al, 2012)

Figure 2.1 Literature Map
Introduction

The following literature review starts with the municipal infrastructure process and how it is identified, how it is aging and deteriorating, and how it can be assessed on a consistent basis with asset management plans. The potential and estimated gap between the identified projects under asset management plans and existing available funds is then addressed, together with potential existing funding options. The literature review shows that, since the asset management plan requirement is new to the provincial requirements for infrastructure projects, no data is currently available to show actual predicted deficits in required infrastructure projects and funding options.

Municipal Infrastructure

Identification

Public Safety Canada’s recent publication details its plan for cohesive action between federal, provincial, and territorial bodies for maintenance of “ten critical infrastructure sectors”. Its purpose is to build partnerships that will mitigate risk associated with identified critical infrastructure items (Government of Canada, 2009).

The Ontario Ministry of Infrastructure is continuously working towards modernizing public infrastructure, encouraging economic growth, and creating jobs. Its results-based plan briefing book for 2011-12 shows that its initiatives have, since 2003, built over 400 schools, provided $1.5 billion towards 49 colleges and universities, contributed to 18 new hospital projects, given $10.8 billion to public transit projects, and allocated over $12 billion to municipal infrastructure projects. $493 million has been re-allocated to 2011-12 fiscal year so that specific
projects can be completed including colleges, universities, roads, recreation, non-profit projects, and water/wastewater projects (Government of Ontario, 2012).

Maturity

Over the past 60 years, many Ontario municipalities have grown significantly and, due to that growth, have implemented and built significant infrastructure projects such as roads, bridges, water treatment plants, sewage treatment plans, and municipal buildings. The average lifespan of many infrastructure projects is 100 years, leading to the realization that these municipalities are entering their “mature” years (Sidawi, 2008).

Canadian government had spent a lot of money on infrastructure during the post war boom and in the 60s and 70s. In the 1990s, less government funds were given to infrastructure projects due to budget cuts. Also, during this time, many items built during the boom of the previous decades required maintenance, while the infrastructure funding burden was shifting from federal government, to provincial government, to municipal government (Roy, 2007).

Government spending on infrastructure in Ontario peaked in the 1960s at 4.1% annual growth. From 2001-2005, that growth has been 2.8%. Since the 1980s, provincial and federal ownership of infrastructure items has declined significantly (Roy, 2007).

Deterioration

With a shift to higher populations in rural areas of Ontario, municipalities are finding that they are now responsible for the maintenance of the majority of Ontario roads, rather than provincial or federal governments. This increase of responsibility, together with limited funds from municipal taxes, results in the need to preserve our infrastructure for as long as possible. A series of steps can be implemented through a strategic asset management plan to maintain
Ontario’s roads rather than having to re-build them. It is less costly to improve a road than it is to re-build it (Hein, 2008).

The deteriorating infrastructure in Canada is rapidly increasing to a point where it will be difficult to maintain. Urgent research in civil engineering technologies is necessary to provide options that will allow for maintenance that is economical and interdisciplinary (Mirza, 2006).

Figure 2.2 Forecasted Infrastructure Maintenance Deficit (Mirza, 2006)
Asset Management Plans

The Ministry of Infrastructure views asset management plans as the foundation to determining the proper course of action with respect to setting priorities within Ontario’s various infrastructure projects. They will “allow needs to be prioritized over wants” and will help to “minimize future repair and rehabilitation costs and maintain municipal assets”. Beginning in 2012 the Ministry is requiring each municipality to submit an asset management plan as a prerequisite to an application for government funding initiatives (Ministry of Infrastructure, n.d.).

Asset management plans can assist in determining the remaining life span of a particular asset and how its cost to maintain can be optimized by charting the cost per risk impact against the replacement interval to find the lowest point of intersect. In the diagram below, the circled regions are the optimum points of cost versus time frame for maintenance (Burn, Marlow, & Tran, 2010).
Figure 2.3 Cost per risk impact (Burn, Marlow, & Tran, 2010)

Asset management plans are implemented by municipalities using software programs that are geared to single use functionality and asset life-cycle data is specific to each municipality and typically not shared between municipalities. The cost of implementing an accurate asset management plan is great; however, this cost can be reduced if asset life-cycle data could be shared between municipalities. Given the number of municipalities that could benefit from such a system, municipalities are encouraged to share as much data as possible so that asset management systems across the board will be more consistent. Such an information sharing system has not yet been developed (Halfawy, Vanier, & Froese, 2006).
Infrastructure Funding Gap

The Residential and Civil Construction Alliance of Ontario conducted a study in 2006 to estimate the cost to maintain Ontario’s infrastructure. It estimated a total of $19 billion to rehabilitate existing public infrastructure with an additional $7 billion per year for expansion of roads, electricity, hospitals, and public transportation. These estimates did not take into account sewer, water, schools, or social housing (RCCAC, 2006).

In 2008, the Provincial-Municipal Fiscal and Service Delivery Review estimated that a total of $22.4 billion would be required to bring all Ontario municipal infrastructures into an acceptable state of repair. An additional $3.7 billion per year would be required to continue to maintain that level of repair (Government of Ontario, 2008).

It is clear that the anticipated gap between infrastructure requirements and available funding will be great, but to date there have been no studies to show precise funding gaps.

Funding Options

Tax Increases

Tax increases are paid by the current tax base, but many infrastructure items benefit the tax base for years to come. Therefore, tax increases are only suitable for infrastructure items with a short life span (Slack, 2005).

Development Charges

Ontario municipalities traditionally collect development charges to assist with paying for the infrastructure that accompanies a new development. However, many municipalities set their development charges according to an income model instead of in relation to the planning goals of the municipality. Therefore, development charges becomes an election matter, instead of an
issue that is purely taking into account the infrastructure requirements based on future development under the Planning Act (Tomalty & Skaburskis, 2003).

Development charges are appropriate to cover the costs of infrastructure directly related to new development, such as new roads, ditches, storm water management ponds, etc. It is not appropriate, however, for upgrading existing infrastructure, where special assessments or local improvement levies would be a better choice (Slack, 2005).

**Federal Funding**

The federal government released its Economic Action Plan wherein nearly $12 billion in infrastructure funding was allocated between 2009 and 2010. Due to this stimulus package, federal grants and tax sharing transfers from the federal government to municipalities has increased since 2005 (Bojorquez, Champagne, & Vaillancourt, 2009).

**Provincial Funding**

Following the 2009/2010 federal stimulus funding, the government proposed to slow the pace of its capital projects in an effort to reduce the proposed deficit on a go-forward basis, however, specifically earmarked $32 billion for additional infrastructure stimulus investments, even though the province’s debt would grow by 38.6% in 2011 and by 40.8% in 2012 (Palacios & Lammam, 2010).

**Reducing Transportation Specific Taxes**

Municipalities are responsible for payment of the majority of expenses from transportation, including infrastructure development and maintenance; however, they receive the least amount of transportation-specific funds from taxes and other revenue sources. One possible option of giving municipal governments more money to work with is for the federal government
to reduce their transportation specific taxes, so that that money can be accessed by municipal
governments, who need it for infrastructure (Clemens, Godin, & Veldhuis, 2004).

**Municipal Borrowing**

Municipal borrowing may be an acceptable option for the upgrading of existing
infrastructure that would not necessarily be part of new development and may be required due to
provincial or federal legislation (Slack, 2005).

**User Fees**

User fees are an acceptable way to pay for infrastructure such as water plants, sewage
plants and toll bridges since the user fee is directly related to the amount of use of each
beneficiary (Slack, 2005).

**Citizen Engagement**

Ratepayers must be informed as to the regulations that must be upheld, as well as the
financial requirements, so that they can be prepared for the financial ramifications that go with it.
They are typically very resistant to tax increases, so discussions will need to be held to
realistically seek resolution to the financial issues that accompany such large expenditures
(Sidawi, 2008).

**Public-Private Partnerships**

Public-private partnerships may be a viable option for municipalities where large capital
projects are necessary and it is not possible to receive enough government funding due to cut
backs in funding options. It can also relieve the necessity for municipalities to provide up front
capital costs (Slack, 2005).
Worldwide Concerns

There is worldwide concern over future funding of transportation infrastructure. Currently, there is “insufficient capacity and poor condition of transportation infrastructure” around the world. Existing solutions include property tax levies, fuel taxes, user pay options such as highway toll booths and airport improvement fees, and public-private partnerships. There is the potential that these will not adequately support the growing requirement for building and maintaining these infrastructure items. Publicly funded projects are a potential solution, however, are risky with respect to political vulnerability (de Palma, Lindsey, & Proost, 2012).

Conclusion

The literature review shows that there is much written about the deteriorating state of Ontario’s municipal infrastructure. There is also a great deal of speculation on the potential gap between infrastructure projects identified under required municipal asset management plans and potential and existing funding options. There is a gap in the literature that does not provide actual projected deficits in fulfilling the required asset management plans. Since the requirement of an asset management plan is a new requirement, this study is timely in that it will be the first study to document projected infrastructure deficits within Ontario municipalities.
Chapter Three: Methodology

Research Methodology and Procedures

This mixed methods study begins with questions that determine whether or not a municipality has or is creating an asset management plan, and has a realistic plan to fund the items under the asset management plan.

- Do Ontario municipalities generate sufficient funds to accommodate the annual infrastructure projects that are necessary under their asset management plan?
- What options are there for municipalities who foresee a deficit in the funds required to complete all necessary annual infrastructure projects identified under their asset management plans?

Sampling

In its first phase, a quantitative survey is sent to each small and large municipality through email, to facilitate ease of completion. It is the hope of this study that a minimum of 5% of Ontario municipalities will participate in the quantitative survey. A 5% return rate would equal approximately 22 municipalities. The survey assesses the state of each municipality’s asset management plan, determines if there is an expected shortfall, and assesses anticipated shortfall funding options.

Using the information obtained through the municipal surveys, specific asset management plans are identified and reviewed to assess specific shortfalls anticipated for rural versus urban centers.

Instrumentation

Firstly, a qualitative survey is sent to every municipality within the Province of Ontario.
A cross-sectional representation of data is obtained in the following manner:

1. First, a survey is distributed to each of the municipalities in Ontario in the form of a self-administered, online questionnaire

2. Second, a structured record review to collect participant survey information is conducted.

The survey that is sent to the municipalities is an original online survey that is emailed to each municipality’s main email address as posted on its website on a Monday. Responses are requested within a four-week time frame. The email includes the Participant Consent Form and the Non-Disclosure Agreement, as well as:

- A cover letter introducing the study, which is detailed in Appendix A, and
- A link to the online survey to be completed for each municipality that will ask:
  - What is the name of your municipality?
  - What is the estimated population of your municipality?
  - Does your municipality have an asset management plan?
  - If you answered yes to the previous question, what was the estimated cost to prepare your asset management plan?
  - Were any of the costs to complete the asset management plan recovered through government funding?
  - Approximately how much of the cost was recovered through government funding?
  - Does your asset management plan contain a financial forecast?
  - Is there an annual reserve amount set aside for future infrastructure projects?
o Does your asset management plan’s financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?

o How great would you consider the shortfall to be?

o What options does your municipality plan to use to cover this forecasted shortfall?

o Is the municipality currently carrying debt charges for previously completed infrastructure projects?

o Is your asset management plan available to the public through your website?

o If you answered yes to the previous question, could you please provide a link to the online version of your asset management plan?

o Would you be prepared to discuss your municipality’s asset management plan and infrastructure projects in further detail?

o Please provide the name and phone number and email address of the individual who completed this survey. This email address is where we will send the survey results to those municipalities that participated in this survey. Thank you.

The survey is shown in Appendix B.

Four weeks after the initial interaction, a follow up letter is emailed to all participants thanking them for their participation. The follow up email contains the Participant Consent Form and the Non-Disclosure Agreement, so that any participants who have not already returned the completed forms can do so. The follow up letter is detailed in Appendix C.
If a minimum of 5% of surveyed municipalities have not responded, the survey will attempt to be completed via telephone survey. Phone calls will be made to unresponsive municipalities until a minimum of 5% of municipalities have been surveyed.

After evaluating the data collected, the study will measure the anticipated deficit and the following hypothesis will be tested:

**Municipalities who prepare the mandatory asset management plan have identified annual infrastructure projects that far exceed the existing annual monetary resources available to them.**

Through the survey responses, municipalities will advise:

1. If they have an asset management plan
2. If annual infrastructure projects are identified under the asset management plan
3. If they anticipate a shortfall in funding the identified projects under the asset management plan
4. How they intend to fund the anticipated shortfall.

Using this information, the hypothesis will be either supported or unsupported.

Finally, the study concludes with recommendations as to funding alternatives for the anticipated annual infrastructure repair deficit created by the mandatory asset management plan.

**Ethics**

Since the subjects of the study are corporate entities, however, the surveys are answered by individual representatives from each municipality; an informed consent form is included with the introductory letter.
Reporting

The initial email sent to municipal representatives indicates that the survey results will be forwarded to them, once the data is compiled and analyzed. The results will be sent via email to the email address provided in the survey response. The email is detailed in Appendix D. The resulting report is shown in Appendix E.
Chapter Four: Results of General Municipal Survey

Recipients

The recipients of the survey are each of the 444 municipalities in the Province of Ontario. The email addresses were obtained from the Association of Municipal Clerks and Treasurers of Ontario (www.amcto.com).

Responses

Over a four-week period, 53 of the 444 Ontario municipalities responded to the survey by completing it in full. A further 16 municipalities responded to the survey by completing only a portion of it. The 16 partially completed entries were removed from the pool of data before it was analyzed, so that only completed responses were analyzed.

The 53 complete responses received represent an 11.9% sample of Ontario municipalities. This is a far greater response than the required 5%, as outlined in the methodology section of this paper. Accordingly, no phone calls were required in order to obtain verbal survey responses to reach a 5% response rate.

Identification of Municipality

Question one required each participant to indicate the name of their municipality. Since the results of this survey are confidential, the responses to this question will not be detailed in this paper. A total of 53 responses were obtained to this question.

Municipal Population

Question two required the participants to indicate the estimated population of each municipality. The figure below shows the count for each of the multiple choice answers for this question.
Figure 4.1 Municipal population question count

Figure 4.1 shows that the survey elicited responses from each of the population categories given in the survey. The lowest populated municipalities provided the highest number of survey responses, while the highest populated municipalities provided the least number of survey responses. Figure 4.2 depicts the information from question two in a pie chart.

Figure 4.2 Municipal population question pie chart
Each of the population categories in the survey are represented by the participants. This provides a good cross-section of responses across all population thresholds and the results of the survey will be far more realistic than if one or more population categories had not participated in the survey.

**Asset Management Plan**

Question three asked the participants if they currently have an asset management plan for their municipality. Figures 4.3 and 4.4 show the individual count of the responses and the responses depicted in a pie chart, respectively.
The figures above show that 98.1% of responding municipalities have an asset management plan. The plan is either completed in full or in the process of being completed.

Since the Ministry of Infrastructure requires each municipality to submit an asset management plan as a prerequisite to an application for government funding initiatives and the deadline was December 31, 2013, these responses were anticipated (Ministry of Infrastructure, n.d.).

By putting the process into place to obtain an asset management plan, each municipality will:

- Benefit from the knowledge of the state of their existing infrastructure
- Be able to anticipate the costs associated with the repair and maintenance of their deteriorating infrastructure, and
- Be in a good position to apply for government funding for infrastructure development and rehabilitation, as new initiatives are announced by the Ministry of Infrastructure.

Only one municipality does not have an asset management and is not in the process of having one completed. Conversely, this municipality, which represents 1.9% of respondents, will not be in a position to benefit from new government infrastructure funding initiatives as they become available and will need to rely on other forms of funding for its future infrastructure projects.

**Cost of Asset Management Plan**

For those participants with an asset management plan, question four asks for the approximate price to complete the asset management plan. The answers for this question can be
seen in Figures 4.5 and 4.6, which show the individual count for each response as well as the pie chart, respectively.

![Figure 4.5 Cost of asset management plan count](image)

![Figure 4.6 Cost of asset management plan pie chart](image)

The figures above show that there are a wide range of costs associated with the completed and partially completed asset management plans addressed in question three. More than 14% of
the asset management plans cost more than $100,000. However, more than half of the respondents spent less than $25,000 on the completion of their asset management plan.

The wide variety of costs associated with the asset management plans can indicate that:

- Perhaps smaller municipalities spend less on their asset management plans as they have less infrastructure and the plan takes less time to complete,
- Perhaps larger municipalities require a more extensive asset management plan as they have more infrastructure to be accounted for, thus resulting in a more costly asset management plan, or
- Asset management plans that cost more are more detailed and accurate and have a greater degree of complexity than plans that cost less. The more detailed asset management plans would be more precise in their depiction of the financial implications of maintaining the current infrastructure of the municipality.

The Ministry of Infrastructure provides very specific details on the preparation of a proper asset management plan in preparation for application for government funding initiatives (Ministry of Infrastructure, n.d.).

**Cost Recovery**

For those respondents with an asset management plan, question five asks if any of the costs to complete the asset management plan were recovered through government funding. Figures 4.7 and 4.8 show the count and the pie chart associated with the responses to question five.
The figures above show that more than 25% of respondents did not recover any costs associated with the creation of their asset management plan through government funding, while over 70% of respondents did recover some of the costs associated with their asset management plans through government funding.
If government funding is available for the creation of asset management plans and the creation of the asset management plan is a prerequisite for infrastructure project funding, the results of this survey question are puzzling (Ministry of Infrastructure, n.d.).

Potential reasons for this inconsistency include, but are not limited to:

- Those municipalities that did not receive reimbursement do not know about the reimbursement option
- The reimbursement option is only available to those municipalities with completed asset management plans, and some of the respondents are still in the process of completing their asset management plans
- The reimbursement is only given to municipalities with completed asset management plans as at a certain date, and those municipalities that did not receive reimbursement did not meet the qualifications, or
- The municipality must prepare an application for reimbursement and some municipalities have not yet prepared their applications for reimbursement.

Question six asked the respondents approximately how much of the cost to prepare their asset management plan was recovered. Figures 4.9 and 4.10 show the count and the chart associated with the answers to question six.
Figures 4.9 and 4.10 show that over one-third of respondents had 100% of the cost of their asset management plan recovered through government funding.

Nearly 28% of respondents responded that this question was “not applicable” or they recovered none of the cost of the creation of the asset management plan. Possible reasons for
this selection are either the asset management plan was not started, is not yet completed, or the municipality is unaware of the reimbursement program.

Of the approximately 72% of respondents who have recovered some of all of the cost of creating their asset management plan, the most likely reason for a municipality to not have recovered all of the cost is that the government reimbursement program has a limit to the amount that can be recovered. Since nearly 14% of respondents recovered less than half of the costs associated with creating their asset management plan, this indicates that the upper limit on the reimbursement amount is based on a municipality with a population of a certain number or less. This conclusion is supported by the responses to questions two (with respect to population) and four (with respect to the cost of the asset management plan). The wide variety of populations and the wide variety of costs of asset management plans indicate that larger municipalities require more funds to generate their asset management plans, potentially as they are more comprehensive and complex.

Financial Forecast

Question seven asked respondents if their asset management plan contains a financial forecast. Figures 4.11 and 4.12 show the count and chart for the responses to this question.

![Figure 4.11 Financial forecast count](image-url)
The figures above show that more than 92% of respondents have a financial forecast within their asset management plan, while slightly less than 8% of respondents do not.

The fact that a large majority of asset management plans contain a financial forecast indicates that each municipality has made an effort to be realistic in the amount of money that will be required to maintain each of their infrastructure items. When the hypothesis of this paper is tested against the results of the survey, the result should be accurate, given that the majority of respondents included a financial forecast in their asset management plan.

**Annual Reserve**

Question eight asks respondents to indicate if there is an annual reserve amount that is set aside in their municipality to pay for future infrastructure projects. Figures 4.13 and 4.14 show the count and chart responses to this question.
Over 77% of participating municipalities have an annual reserve amount set aside for future infrastructure projects, while slightly more than 20% do not.

Since a large majority of respondents show annual reserve funds being set aside for completion of infrastructure projects, it is clear that respondents acknowledge that planning ahead is necessary in order to complete all necessary projects. It is assumed that the 2% of municipalities that responded “not applicable” to this question do not have an asset management plan. Without an asset management plan, these municipalities are unaware of the state of their
infrastructure and they are unable to apply for funding to assist with the rehabilitation of any infrastructure projects.

More than 20% of respondents do not have a financial forecast as part of their asset management plan. It is likely that these municipalities have more of an asset identification plan as opposed to an asset management plan. A true asset management plan provides identification of assets as well as a plan for the maintenance of those assets that are identified under the plan.

The Ministry is requiring each municipality to submit an asset management plan as a prerequisite to an application for government funding initiatives and one of the requirements for a complete asset management plan is that the municipality must include a financial forecast (Ministry of Infrastructure, n.d.).

**Anticipated Financial Shortfall**

Question nine followed up on the responses to question seven regarding financial forecast, and asked if the respondent’s asset management plan indicated a shortfall in 2014 or any upcoming year with respect to completing identified projects under the plan. The responses in both count and chart format are shown in Figures 4.15 and 4.16. At this point in the survey, we can see that the survey responses are starting to indicate responses that support the hypothesis of this report. The figures below show that 98% of respondents show a shortfall in the financial forecast for this year or an upcoming year, whereas just 2% of respondents did not.
1. Does your asset management plan’s financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>50</td>
<td>98.0%</td>
</tr>
<tr>
<td>no</td>
<td>1</td>
<td>2.0%</td>
</tr>
<tr>
<td>not applicable</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Statistics
Total Responses: 51

Figure 4.15 Financial forecast shortfall count

9. Does your asset management plan’s financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?

Figure 4.16 Financial forecast shortfall chart
Nearly every municipality with a financial forecast as part of their asset management plan indicates that they anticipate a financial shortfall in the current or an upcoming year. Note that this shortfall is despite the fact that these municipalities have already stated that they have certain reserve funds set aside for the maintenance and creation of infrastructure projects.

**Estimated Size of Anticipated Financial Shortfall**

Following up on the financial shortfall indicated in question nine, question 10 takes the question a step further and asks about the anticipated size of the financial shortfall. The results of this question are evident in Figures 4.17 and 4.18. The majority of respondents (74.5%) indicate that the expected shortfall is estimated to be considerable.

![Figure 4.17 Size of financial shortfall count](image)
To further analyze the responses to this question, we can see that 2% of respondents note this question as being “not applicable”. This respondent would likely be a municipality without either an asset management plan, or a financial forecast as part of their asset management plan. Nearly 4% of respondents indicate their shortfall to be minimal and nearly 20% of respondents indicate their financial shortfall to be moderate. Potential reasons for a municipality to indicate that their shortfall is minimal or moderate are:

- The municipality’s infrastructure is fairly recent or new and will not require rehabilitation either this year or shortly thereafter
- The municipality is in good financial position with respect to reserve funds and can withstand the current rate of deterioration of its existing infrastructure, or
These municipalities are part of the four respondents who indicated in question seven that their asset management plan does not have a financial forecast.

More than 94% of all responding municipalities consider their anticipated shortfall to be either considerable or moderate. Since the responding municipalities are representative of all of the various population divisions of Ontario municipalities, the cumulative shortfall could be significant.

**Anticipated Financial Shortfall Funding Options**

Question 11 follows up on the size of the financial shortfall to ask respondents to indicate all of the potential means of covering the anticipated financial shortfall they intend to utilize. The responses to this question are detailed in figures 4.19 and 4.20 below.

![Figure 4.19 Financial shortfall options count](image-url)
The responses to this question indicate that many municipalities are looking at many of
the options presented to fulfill their financial requirements as forecasted in their asset
management plans. This is clearly a complex matter and no single option will work for a
municipality. Note that 2% of respondents indicate that these funding options are “not
applicable”. This is the likely response of a municipality without an asset management plan or
without much infrastructure.

Noting the wide variety of funding options that municipalities are looking at, it is starting
to become clear that government funding, through either federal or provincial channels, will not
be enough to meet the financial requirements forecasted by the required asset management plans.
This could potentially lead to a financial shortfall that gets larger each year. Each year that the
shortfall prevents an infrastructure project from being completed or rehabilitated represents a
potential safety hazard.
Existing Debt Charges

To get a sense of how each municipality is dealing with the cost of previously completed infrastructure projects, question 12 asks if the municipality is carrying any debt charges associated with previously completed infrastructure projects. The responses to question 12 are detailed in figures 4.21 and 4.22.

**Figure 4.21 Debt charges count**

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>38</td>
<td>76.0%</td>
</tr>
<tr>
<td>no</td>
<td>10</td>
<td>20.0%</td>
</tr>
<tr>
<td>not applicable</td>
<td>2</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

**Figure 4.22 Debt charges chart**
We can note that 76% of respondents are currently making debt repayments for previously completed infrastructure projects. Couple that with the 75.5% of respondents that indicated that they will use financing as an option for dealing with their anticipated financial shortfall and we can see that the majority of municipalities are facing even more debt to keep their constituents safe.

**Availability of Asset Management Plan**

Question 13 asks the participant if the municipality’s asset management plan is available through the municipality’s website. The responses to question 13 are shown in figures 4.23 and 4.24.

![Figure 4.23 Asset management plan availability count](image-url)

**Figure 4.23 Asset management plan availability count**
The responses to question 13 indicate that more than 31% of responding municipalities have their asset management plans available online through their websites, more than 60% of responding municipalities have not made their plans available online, and nearly 8% of responding municipalities do not have a completed asset management plan.

Question 14 asked respondents with online asset management plans to provide a link to the online plan. The links are not provided in this report.

The links provided were followed up on through the process of completing this report to get an overview of the types, varieties, and complexities of asset management plans that have been prepared by the respondents.
Further Discussion

Question 15 asked if respondents would be willing to discuss their municipality’s asset management plan and infrastructure projects in further detail. The responses to question 15 are detailed in figures 4.25 and 4.26. These figures show that 46% of respondents are not willing to discuss their plans and projects further, whereas 54% would be willing to discuss their plans and projects further.

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>27</td>
<td>54.0%</td>
</tr>
<tr>
<td>no</td>
<td>23</td>
<td>46.0%</td>
</tr>
</tbody>
</table>

Figure 4.25 Further discussion count
Finally, question 16 asked respondents to provide the name, phone number, and email address of the individual who completed the survey, so that the survey responses could be sent to those individuals once analysed. Due to the confidential nature of the survey, the responses to question 16 are not included in this report.

**Analysis and Discussion**

Now that the data has been collected and evaluated, the following hypothesis can be tested:
Municipalities who prepare the mandatory asset management plan have identified annual infrastructure projects that far exceed the existing annual monetary resources available to them.

The survey given to Ontario municipalities contained 16 questions that lead respondents from the existence of an asset management plan, through a financially forecasted shortfall and the anticipated size of that shortfall, to the potential funding options that could assist with each municipality’s anticipated shortfall.

While the first eight questions set the stage for the scenario that would address the hypothesis, question nine is really the beginning of the survey’s ability to either prove or disprove the hypothesis. Question nine shows us that 98% of responding municipalities expect to experience a financial shortfall either this year or in an upcoming year.

Although question nine begins to justify the hypothesis, ultimately it is question 10, with respect to the size of the anticipated financial shortfall, which carries the most weight in either supporting or refuting the hypothesis of this paper.

Over 74% of responding municipalities indicate their anticipated financial shortfall is expected to be considerable, while another nearly 20% report that their shortfall is expected to be moderate. The responses to this question support the hypothesis of this paper that municipalities with asset management plans foresee future infrastructure expenses that they alone cannot cover.

Question 11 continues to support this paper’s hypothesis as it asks participants to select the funding avenues they plan to pursue in meeting their financial obligations as set out under their asset management plans.
While 65.3% of respondents will be able to utilize reserve funds previously set aside, 77.6% will rely on provincial funding, 71.4% will rely on federal funding, and 83.7% will rely on tax increases, at least 75% of all responding municipalities anticipate that their future infrastructure financial liabilities will lead to additional financing and accruing additional debt.

If the 11.9% of responding municipalities is an accurate representation of the approximately 450 existing municipalities in Ontario, then we can expect the following:

- Approximately 441, or 98% of all Ontario municipalities will likely see a financial shortfall with respect to the rehabilitation of their existing infrastructure.

Of those 441 municipalities:

- Approximately 88 Ontario municipalities will likely experience a moderate financial shortfall in this or the coming years
- Approximately 335 Ontario municipalities will likely experience a considerable financial shortfall in this or the coming years
- Approximately 423 Ontario municipalities will likely experience a moderate to considerable financial shortfall in this or the coming years
- Approximately 298 municipalities may be required to dip into their reserve funds to fund infrastructure projects
- Approximately 349 municipalities may apply for provincial funding for their upcoming infrastructure projects
- Approximately 321 municipalities may apply for federal funding for their upcoming infrastructure projects
• Approximately 340 municipalities may apply for additional financing for their upcoming infrastructure projects, whereas 342 municipalities are already repaying existing debts associated with prior infrastructure projects

• Approximately 64 municipalities may be looking for public-private partnerships to assist in the rehabilitation of their existing infrastructure

• Approximately 377 municipalities will likely increase municipal taxes in order to pay for the funding of upcoming infrastructure projects

• Approximately 156 municipalities will likely issue development charges to their constituents in order to pay for the funding of upcoming infrastructure projects, and

• Approximately 37 municipalities will likely levy special assessments to their taxpayers in order to pay for the funding of upcoming infrastructure projects.

It is the assertion of this paper that the following hypothesis has been proven to be correct:

Municipalities who prepare the mandatory asset management plan have identified annual infrastructure projects that far exceed the existing annual monetary resources available to them.
Town of Renfrew

The Town of Renfrew’s (Renfrew) Asset Management Plan (AMP) was reviewed in its entirety from the link provided in question 14 of the municipal survey (Dillon Consulting Limited, 2014).

Total Assets

Renfrew’s AMP takes into account all linear assets and calculates the total to maintain these assets at a level of service that is deemed to be acceptable to the public. The value of the assets is estimated to total nearly $210,000,000 and is comprised of the linear assets noted in Figure 5.1 (Dillon Consulting Limited, 2014).

<table>
<thead>
<tr>
<th>Infrastructure Network</th>
<th>Quantity</th>
<th>Replacement Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanitary Sewer</td>
<td>59 km</td>
<td>$66,176,460</td>
</tr>
<tr>
<td>Storm Sewer</td>
<td>20 km</td>
<td>$24,552,500</td>
</tr>
<tr>
<td>Water</td>
<td>75 km</td>
<td>$64,953,170</td>
</tr>
<tr>
<td>Roads</td>
<td>65 km</td>
<td>$48,998,517</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>46 km</td>
<td>$4,915,800</td>
</tr>
<tr>
<td><strong>Total Asset Value</strong></td>
<td></td>
<td><strong>$209,596,447</strong></td>
</tr>
</tbody>
</table>

*Figure 5.1 Total asset values of linear assets of the Town of Renfrew*

Total Cost to Repair all Assets

The AMP then describes the current state of the existing linear infrastructure assets and acknowledges that there are many repairs that have not been completed due to lack of funding. The AMP analysis software provided with the AMP was used to determine the total amount
necessary to complete all required repairs on each linear asset. No financial parameters were entered, although an unlimited budget is not a realistic scenario for any municipality. The software was run without a financial parameter to see the full extent of the repairs required to meet the level of service that the Town is required to provide to its constituents. The results are shown in Figure 5.2 (Dillon Consulting Limited, 2014).

![Figure 5.2 Total current financial requirements to maintain all linear assets](image)

**Minimum Financial Shortfall**

Next, the AMP uses its software analysis to determine the annual shortfall in maintaining the linear assets to the minimum acceptable level of service for its constituents. The results are shown in Figure 5.3 (Dillon Consulting Limited, 2014).
Figure 5.3 Forecasted annual funding shortfall for Town of Renfrew

**Funding Strategy for Ongoing Financial Shortfall**

The funding for this annually anticipated shortfall is proposed to come from the following sources:

- Taxation increases, even though Renfrew taxpayers are currently paying the highest rate of residential taxes for municipalities of their size in the immediate area
- Water and wastewater user fees, which are expected to increase by 71.3% over the next 10 years
- Introduction of an Infrastructure Levy of 0.25%, which will increase every year by 0.25% for the foreseeable future, and
- Acquisition of new debt every year for the foreseeable future, even though Renfrew currently is shouldering a current debt load of over $13 million and annual debt repayments of over $1.1 million (Dillon Consulting Limited, 2014).
What This Means for the Rest of Ontario

The Town of Renfrew’s Asset Management Plan indicates an annual financial shortfall of $725,000 to maintain the minimum acceptable levels of maintenance for its linear assets. This does not include critical road and building projects or new infrastructure. Although the Asset Management Plan provides a strategy for funding the anticipated deficit, the strategy includes increasing its already substantial debt load and increasing its residential tax rate, which is already the highest in the area as well as increasing its water and wastewater rates by an unprecedented 71.3% over the next ten years (Dillon Consulting Limited, 2014).

If each of Ontario’s municipalities experienced the same level of shortfall, it would result in an annual provincial shortfall of $337.5 million, which would only include maintenance of existing linear infrastructure and would not include new infrastructure projects, or critical projects as they may be required.

Analysis and Discussion

Now that the specific asset management plan has been reviewed, the hypothesis can again be tested on an individual basis, instead of a province-wide basis.

The individual asset management plan of the Town of Renfrew shows that the Town has accurately identified annual infrastructure projects for all of its linear infrastructure assets. To maintain the minimum acceptable levels of maintenance necessary for public safety of its constituents, the plan shows an annual forecasted financial shortfall of $725,000. This amount is solely for maintenance of existing infrastructure and not for the construction of new infrastructure. That would be additional costs for the municipality.

Further, the individual review shows that in order to meet the forecasted deficit, the municipality will have to:
- Increase already-high taxes
- Take on additional debt annually, and
- Nearly double water and wastewater user fees.

It is the assertion of this paper that the following hypothesis has been proven to be correct:

**Municipalities who prepare the mandatory asset management plan have identified annual infrastructure projects that far exceed the existing annual monetary resources available to them.**
Chapter Six: One Specific Infrastructure Project

Town of Renfrew Critical Project

The Town of Renfrew’s Asset Management Plan details the state of its linear infrastructure as shown in Chapter Five above. The AMP further identified a critical link between a municipal road, a provincial highway, and the Trans-Canada Highway that was cause for concern with respect to public safety due to functional deficiencies. This section of road was deemed to be Renfrew’s top critical road project. The estimated cost to complete this project to responsible safety standards is approximately $2,400,000. Renfrew decided to apply for provincial funding for this critical project under the Municipal Infrastructure Investment Initiative program (Dillon Consulting Limited, 2014).

Government Funding Initiatives

The Ontario Ministry of Infrastructure has implemented the Municipal Infrastructure Investment Initiative has allocated $100 million for small, rural, and northern Ontario municipalities and their critically identified projects. A requirement of this initiative is that the applicant municipality must have a completed comprehensive asset management plan (Ministry of Infrastructure, 2014).

The Ministry of Infrastructure has previously granted twenty successful municipalities with fund for their critical project applications (Ministry of Infrastructure, 2014)

Since the Town of Renfrew had previously completed its asset management plan prior to the application deadline, it met the requirements of the new initiative.

Funding Awarded

On March 11, 2014, the Ministry of Rural Affairs announced in a press conference that it is investing more than $5 million in four new Ontario critical infrastructure projects and creating
new jobs for Ontarians. The four new projects include the Town of Renfrew’s project to rehabilitate a section of Highway 132 to accommodate increased traffic flow (Ministry of Rural Affairs, 2014).

This project, and the 23 others that were successful in their proposals represent one funding avenue that can be followed by Ontario municipalities, provided the project meets the initiative guidelines, however, there are 426 other municipalities that may have submitted proposals that were not successful. Those municipalities will need to find other avenues of funding for their infrastructure financial shortfalls.
Chapter Seven: Funding Options Available to Ontario Municipalities

**Reserve Funds**

Municipalities are empowered by the provincial government to levy reserve funds as they are deemed necessary to balance their municipal budget (Province of Ontario, n.d.).

The Town of Renfrew’s asset management plan relies on increasing reserve funds and using existing reserve funds to cover their project financial deficit on an annual basis, a technique that can be used by other municipalities to alleviate the necessity to accrue more debt (Dillon Consulting Limited, 2014).

The survey that was given to Ontario municipalities shows that 65.3% of the responding municipalities plan to utilize reserve funds for funding their anticipated financial shortfall.

**Provincial Funding**

The Ontario provincial government has earmarked $32 billion for infrastructure stimulus projects (Palacios & Lammam, 2010).

The Ministry of Infrastructure has further dedicated $100 million to critical small, rural and northern infrastructure projects (Ministry of Infrastructure, 2014).

The Town of Renfrew specific asset management plan review shows that critical infrastructure projects can be successful in achieving provincial funding (Ministry of Rural Affairs, 2014).

The survey that was given to Ontario municipalities shows that 77.6% of the responding municipalities plan to utilize provincial funding for funding their anticipated financial shortfall.

**Federal Funding**

The federal government released its Economic Action Plan wherein nearly $12 billion in infrastructure funding was allocated between 2009 and 2010. Due to this stimulus package,
federal grants and tax sharing transfers from the federal government to municipalities has increased since 2005 (Bojorquez, Champagne, & Vaillancourt, 2009).

Further, the Canadian government’s Infrastructure Canada program plans to spend $14 billion over the next 10 years (Government of Canada, n.d.).

These federal funding initiatives may also provide relief for municipalities facing a funding deficit.

The survey that was given to Ontario municipalities shows that 71.4% of the responding municipalities plan to utilize federal funding for funding their anticipated financial shortfall.

**Financing**

Municipal borrowing may be an acceptable option for the upgrading of existing infrastructure as long as it fits into the municipality’s fiscal plan (Slack, 2005).

As seen in our specific asset management plan review, the Town of Renfrew plans to increase its financing to an amount that it deems acceptable to cover its growing infrastructure costs (Dillon Consulting Limited, 2014).

The survey that was given to Ontario municipalities shows that 75.5% of the responding municipalities plan to utilize financing for funding their anticipated financial shortfall.

**Private-Public Partnerships**

Public-private partnerships may be a viable option for municipalities where large capital projects are necessary and government funding proposals are not accepted or successful. It can also relieve the necessity for municipalities to provide up front capital costs (Slack, 2005).
The survey that was given to Ontario municipalities shows that 14.3% of the responding municipalities plan to utilize private-public partnerships for funding their anticipated financial shortfall.

**Tax Increases**

Tax increases are paid by the current tax base, but many infrastructure items benefit the tax base for years to come. Tax increases are one of the best options for infrastructure items with a short life span (Slack, 2005).

The specific asset management plan review of the Town of Renfrew shows that Renfrew plans to increase its taxes, even though they are already considered high, in an effort to offset the forecasted financial shortfall (Dillon Consulting Limited, 2014).

The survey that was given to Ontario municipalities shows that 83.7% of the responding municipalities plan to utilize tax increases for funding their anticipated financial shortfall.

**User Fees**

User fees are an acceptable way to pay for infrastructure such as water plants, sewage plants and toll bridges since the user fee is directly related to the amount of use of each beneficiary (Slack, 2005).

The review of the Town of Renfrew’s asset management plan shows that it has a 10-year plan to increase its water and wastewater user fees by over 70% (Dillon Consulting Limited, 2014).
Development Charges and Special Assessments

Development charges are usually levied to cover the costs of infrastructure directly related to new development, such as new roads, ditches, storm water management ponds, and other infrastructure items (Slack, 2005).

The Town of Renfrew has included development charges in its asset management plan as part of its financial forecast to cover the anticipated shortfall of $750,000 annually (Dillon Consulting Limited, 2014).

The survey that was given to Ontario municipalities shows that 34.7% of the responding municipalities plan to utilize development charges and a further 8.2% of the responding municipalities plan to utilize special assessments for funding their anticipated financial shortfall.
Chapter Eight: Conclusion

In conclusion, this paper outlines the problem that Ontario municipalities have infrastructure projects that have been identified through asset management plans and that the existing tax base and government funding options are not sufficient to maintain the existing infrastructure to industry and government-imposed standards and regulations. A research question and hypotheses are determined and a literature review is outlined.

The tested hypothesis is as follows:

**Municipalities who prepare the mandatory asset management plan have identified annual infrastructure projects that far exceed the existing annual monetary resources available to them.**

Following the literature review, the methodology of the proposed study is given, together with drafts of each document in the methodological process including the survey and various correspondences.

The survey is completed and 11.9% of Ontario municipalities responded, which is higher than the anticipated 5% response rate. The results of the survey are assessed and analyzed with respect to the proposed hypothesis. The survey results show that 98% of responding municipalities show a project financial shortfall in this or an upcoming year and that over 74% of responding municipalities consider their anticipated shortfall to be considerable.

It is determined that the proposed hypothesis is supported by the survey results.

A specific asset management plan is further analyzed to determine if an examination of an individual municipality will further support the paper’s hypothesis. The comprehensive review shows that the individual asset management plan projects an annual financial shortfall of approximately $725,000 and that it will be necessary for the municipality to take on substantial
new debt, increase already-high taxes, and nearly double water and wastewater user fees to fund the anticipated shortfall. Therefore, the hypothesis is supported on an individual basis as well as on a province-wide basis.

Finally, funding options are given to provide municipalities with a projected funding shortfall that additional debt and higher taxes are not the only options.
References


http://ehis.ebscohost.com/eds/pdfviewer/pdfviewer?sid=7871ce5d-8c26-42a4-b134-34f350ab341a%40sessionmgr10&vid=1&hid=6


http://www.attorneygeneral.jus.gov.on.ca/english/about/pubs/walkerton/part2/Chapter_1.pdf


http://ehis.ebscohost.com/ehost/detail?sid=1af009d7-6166-4009-94ac-4f9588736425%40sessionmgr114&vid=1&hid=116&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=a9h&AN=72667431
Attention: Public Works Department

Re: Rehabilitating Ontario Municipal Infrastructures

I am a student performing an MBA thesis through the University Canada West in Vancouver, Canada. I am currently researching whether or not Ontario municipalities have a completed asset management plan to assess the rate of deterioration of existing municipal infrastructure items and how municipalities plan to pay for the building, re-building, and rehabilitation of each item, given the finite funding available through government channels.

I would appreciate your participation in my research project by completing a short survey online regarding municipal infrastructure projects and funding alternatives. There are 16 multiple choice questions. I anticipate that it will take 5-10 minutes to complete.

I can confirm that all municipalities that participate in this survey will be emailed the survey results, once completed.

The survey should be completed by someone within the public works or admin departments, with knowledge of your municipality’s infrastructure projects and asset management plan.

The survey can be accessed here:


I can confirm that all information received will be kept confidential until it is destroyed.

I am enclosing a Participant Consent Form and a Non-Disclosure Agreement Form. I would appreciate it if you could review each document and, if you agree, sign each document and forward to 613-623-8339 via fax, or to barbasselin@yahoo.ca via email. I will need the consent of each participant in order to complete my thesis.

Thank you for your anticipated cooperation in this important research project.

Barb Asselin, MBA student
University Canada West
Rehabilitating Ontario Municipal Infrastructures

University Canada West (UCW) offers its MBA students thesis course and requires that they perform a research project. Student Barb Asselin has compiled the following questionnaire to determine whether or not Ontario municipalities have a completed asset management plan to assess the rate of deterioration of existing municipal infrastructure items and how municipalities plan to pay for the building, re-building, and rehabilitation of each item, given the finite funding available through government channels. As an Ontario municipality, Barb would appreciate a few minutes of your time to complete this survey regarding your municipality’s infrastructure projects and asset management plan.

Be assured that your responses will remain confidential and will not be used outside of the scope of this MBA thesis course and will not be released to anyone outside this University course.

We thank you in advance for your contribution to the thesis efforts of this UCW MBA student.

Please indicate the best answer that describes the situation in your municipality.

1. What is the name of your municipality?
2. What is the estimated population of your municipality?
   a. Less than 5,000
   b. Between 5,000 and 10,000
   c. Between 10,000 and 50,000
   d. Between 50,000 and 100,000
   e. Between 100,000 and 500,000
   f. More than 500,000
3. Does your municipality have an asset management plan?
   a. Yes
   b. No
   c. Partially completed
4. If you answered yes to the previous question, what was the estimated cost to prepare your asset management plan?
   a. Less than $25,000
   b. Between $25,000 and $50,000
   c. Between $50,000 and $100,000
   d. Between $100,000 and $300,000
   e. More than $300,000
f. Not applicable
5. Were any of the costs to complete the asset management plan recovered through government funding?
   a. Yes
   b. No
   c. Not applicable
6. Approximately how much of the cost was recovered through government funding?
   a. All of the cost
   b. More than half of the cost
   c. Less than half of the cost
   d. None of the cost
   e. Not applicable
7. Does your asset management plan contain a financial forecast?
   a. Yes
   b. No
   c. Not applicable
8. Is there an annual reserve amount set aside for future infrastructure projects?
   a. Yes
   b. No
   c. Not applicable
9. Does your asset management plan’s financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?
   a. Yes
   b. No
   c. Not applicable
10. How great would you consider the shortfall to be?
    a. Considerate
    b. Moderate
    c. Minimal
    d. Not applicable
11. What options does your municipality plan to use to cover this forecasted shortfall?
    a. Reserve funds previously set aside
    b. Provincial funding
    c. Federal funding
    d. Financing
    e. Private-public partnerships
    f. Tax increase
    g. Development charges
    h. Special assessment
    i. Not applicable
12. Is the municipality currently carrying debt charges for previously completed infrastructure projects?
    a. Yes
    b. No
    c. Not applicable
13. Is your asset management plan available to the public through your website?
a. Yes
b. No
c. We don’t have an asset management plan

14. If you answered yes to the previous question, could you please provide a link to the online version of your asset management plan?

15. Would you be prepared to discuss your municipality’s asset management plan and infrastructure projects in further detail?
   a. Yes
   b. No

16. Please provide the name and phone number and email address of the individual who completed this survey. This email address is where we will send the survey results to those municipalities that participated in this survey. Thank you.

The survey is now complete. Thank you again for your support of UCW’s MBA students.
Re: Rehabilitating Ontario Municipal Infrastructures

Further to my previous email, I want to personally thank you for your participation in my MBA thesis research project. I am starting to compile and analyze the results now. Once I have completed analyzing the results and after I have submitted my completed thesis report to University Canada West, I will email the results to your municipality so that you can see them first hand.

Thank you again for your cooperation in my research project.

If you haven’t completed the Participant Consent Form and a Non-Disclosure Agreement Form, I would appreciate it if you could take a few minutes to review each document and, if you agree, sign each document and forward to 613-623-8339 via fax, or to barbasselin@yahoo.ca via email. I will need the consent of each participant in order to complete my thesis.

Thank you for your anticipated cooperation in this important research project.

Barb Asselin, MBA student
University Canada West
Encl.
Attention: Public Works Department

Re: Rehabilitating Ontario Municipal Infrastructures

Further to my previous email, I want to personally thank you again for your participation in my MBA thesis research project and for confirming your agreement to the Participant Consent Form and the Non-Disclosure Agreement.

I am pleased to advise that I have received 53 completed responses to my survey, which represents 11.9% of Ontario’s 444 municipalities.

I am enclosing a report detailing the responses I received, for your information.

Thank you again for your contribution to my research project.

Barb Asselin, MBA student
University Canada West
Encl
## REHABILITATING MUNICIPAL INFRASTRUCTURES IN ONTARIO:
### CHALLENGES AND PROSPECTS OF FUNDING

### Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario Municipal Survey</td>
<td>xviii</td>
</tr>
<tr>
<td>Question 1: Municipal Identification</td>
<td>xviii</td>
</tr>
<tr>
<td>Question 2: Municipal Population</td>
<td>xviii</td>
</tr>
<tr>
<td>Question 3: Asset Management Plan</td>
<td>xix</td>
</tr>
<tr>
<td>Question 4: Asset Management Plan Cost</td>
<td>xx</td>
</tr>
<tr>
<td>Question 5: Asset Management Plan Cost Recovery</td>
<td>xxi</td>
</tr>
<tr>
<td>Question 6: Cost Recovery Details</td>
<td>xxii</td>
</tr>
<tr>
<td>Question 7: Financial Forecast</td>
<td>xxiii</td>
</tr>
<tr>
<td>Question 8: Annual Reserve for Asset Management Plan Projects</td>
<td>xxiv</td>
</tr>
<tr>
<td>Question 9: Financial Forecast Shortfall</td>
<td>xxv</td>
</tr>
<tr>
<td>Question 10: Financial Forecast Shortfall Detail</td>
<td>xxvi</td>
</tr>
<tr>
<td>Question 11: Financial Forecast Shortfall Options</td>
<td>xxvii</td>
</tr>
<tr>
<td>Question 12: Infrastructure Debt Charges</td>
<td>xxviii</td>
</tr>
<tr>
<td>Question 13: Asset Management Plan Availability</td>
<td>xxix</td>
</tr>
<tr>
<td>Question 14: Asset Management Plan Link</td>
<td>xxix</td>
</tr>
<tr>
<td>Question 15: Asset Management Plan Further Discussion</td>
<td>xxx</td>
</tr>
<tr>
<td>Question 16: Further Discussion Details</td>
<td>xxx</td>
</tr>
<tr>
<td>Conclusion</td>
<td>xxx</td>
</tr>
</tbody>
</table>
Ontario Municipal Survey

The following survey questions were sent to all Ontario municipalities. A total of 53 municipalities completed the survey, which represents 11.9% of all Ontario municipalities. Following are the results of the survey:

**Question 1: Municipal Identification**

The results of this survey are confidential. As such, the answers for Question 1 are not provided.

**Question 2: Municipal Population**

2. What is the estimated population of your municipality?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 5,000</td>
<td>17</td>
<td>32.1%</td>
</tr>
<tr>
<td>between 5,000 and 10,000</td>
<td>10</td>
<td>18.9%</td>
</tr>
<tr>
<td>between 10,000 and 50,000</td>
<td>12</td>
<td>22.6%</td>
</tr>
<tr>
<td>between 50,000 and 100,000</td>
<td>8</td>
<td>15.1%</td>
</tr>
<tr>
<td>between 100,000 and 500,000</td>
<td>3</td>
<td>5.7%</td>
</tr>
<tr>
<td>more than 500,000</td>
<td>3</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
</tr>
</tbody>
</table>
Question 3: Asset Management Plan

3. Does your municipality have an asset management plan?

- yes 67.9%
- partially completed 30.2%
- no 1.9%

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>36</td>
<td>67.9%</td>
</tr>
<tr>
<td>no</td>
<td>1</td>
<td>1.9%</td>
</tr>
<tr>
<td>partially completed</td>
<td>16</td>
<td>30.2%</td>
</tr>
</tbody>
</table>

Statistics:
- Total Responses: 53
4. If you answered yes to the previous question, what was the estimated cost to prepare your asset management plan?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than $25,000</td>
<td>25</td>
<td>51.0%</td>
</tr>
<tr>
<td>between $25,000 and $50,000</td>
<td>11</td>
<td>22.5%</td>
</tr>
<tr>
<td>between $50,000 and $100,000</td>
<td>5</td>
<td>10.2%</td>
</tr>
<tr>
<td>between $100,000 and $300,000</td>
<td>3</td>
<td>6.1%</td>
</tr>
<tr>
<td>more than $300,000</td>
<td>4</td>
<td>8.2%</td>
</tr>
<tr>
<td>not applicable</td>
<td>1</td>
<td>2.0%</td>
</tr>
</tbody>
</table>
5. Were any of the costs to complete the asset management plan recovered through government funding?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>36</td>
<td>70.6%</td>
</tr>
<tr>
<td>no</td>
<td>13</td>
<td>25.5%</td>
</tr>
<tr>
<td>not applicable</td>
<td>2</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

Statistics

- Total Responses: 51
Question 6: Cost Recovery Details

6. Approximately how much of the cost was recovered through government funding?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>all of the cost</td>
<td>18</td>
<td>35.3%</td>
</tr>
<tr>
<td>more than half of the cost</td>
<td>12</td>
<td>23.5%</td>
</tr>
<tr>
<td>less than half of the cost</td>
<td>7</td>
<td>13.7%</td>
</tr>
<tr>
<td>none of the cost</td>
<td>7</td>
<td>13.7%</td>
</tr>
<tr>
<td>not applicable</td>
<td>7</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

Statistics:
- Total Responses: 51
Question 7: Financial Forecast

7. Does your asset management plan contain a financial forecast?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>47</td>
<td>92.2%</td>
</tr>
<tr>
<td>no</td>
<td>4</td>
<td>7.8%</td>
</tr>
<tr>
<td>not applicable</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Statistics:
- Total Responses: 51
8. Is there an annual reserve amount set aside for future infrastructure projects?

### Table

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>38</td>
<td>77.6%</td>
</tr>
<tr>
<td>no</td>
<td>10</td>
<td>20.4%</td>
</tr>
<tr>
<td>not applicable</td>
<td>1</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

### Statistics

- Total Responses: 49
Question 9: Financial Forecast Shortfall

9. Does your asset management plan's financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?

- yes 98%
- no 2%

9. Does your asset management plan's financial forecast indicate a shortfall in order to complete the identified projects this year or in any upcoming year?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>50</td>
<td>98.0%</td>
</tr>
<tr>
<td>no</td>
<td>1</td>
<td>2.0%</td>
</tr>
<tr>
<td>not applicable</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Statistics
Total Responses 51
Question 10: Financial Forecast Shortfall Detail

10. Would you consider the shortfall to be:

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>considerable</td>
<td>38</td>
<td>74.5%</td>
</tr>
<tr>
<td>moderate</td>
<td>10</td>
<td>19.6%</td>
</tr>
<tr>
<td>minimal</td>
<td>2</td>
<td>3.9%</td>
</tr>
<tr>
<td>not applicable</td>
<td>1</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Statistics:
Total Responses | 51
### Question 11: Financial Forecast Shortfall Options

11. What options does your municipality plan to use to cover this forecasted shortfall? (Please choose as many as are applicable.)

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>reserve funds previously set aside</td>
<td>32</td>
<td>65.3%</td>
</tr>
<tr>
<td>provincial funding</td>
<td>38</td>
<td>77.6%</td>
</tr>
<tr>
<td>federal funding</td>
<td>35</td>
<td>71.4%</td>
</tr>
<tr>
<td>financing</td>
<td>37</td>
<td>75.5%</td>
</tr>
<tr>
<td>private-public partnership(s)</td>
<td>7</td>
<td>14.3%</td>
</tr>
<tr>
<td>tax increase</td>
<td>41</td>
<td>83.7%</td>
</tr>
<tr>
<td>development charges</td>
<td>17</td>
<td>34.7%</td>
</tr>
<tr>
<td>special assessment</td>
<td>4</td>
<td>8.2%</td>
</tr>
<tr>
<td>not applicable</td>
<td>1</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

**Statistics**

Total Responses: 49
Question 12: Infrastructure Debt Charges

12. Is the municipality currently carrying debt charges for previously completed infrastructure projects?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>38</td>
<td>76.0%</td>
</tr>
<tr>
<td>no</td>
<td>10</td>
<td>20.0%</td>
</tr>
<tr>
<td>not applicable</td>
<td>2</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

Statistics:
- Total Responses: 50
Question 13: Asset Management Plan Availability

13. Is your asset management plan available to the public through your website?

- yes 31.4%
- no 60.3%
- we don’t have an asset management plan 7.8%

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>16</td>
<td>31.4%</td>
</tr>
<tr>
<td>no</td>
<td>31</td>
<td>60.3%</td>
</tr>
<tr>
<td>we don’t have an asset management plan</td>
<td>4</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Statistics
Total Responses 51

Question 14: Asset Management Plan Link

The results of this survey are confidential. As such, the answers for Question 14 are not provided.
Question 15: Asset Management Plan Further Discussion

15. Would you be prepared to discuss your municipality’s asset management plan and infrastructure projects in further detail?

<table>
<thead>
<tr>
<th>Value</th>
<th>Count</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>27</td>
<td>54.0%</td>
</tr>
<tr>
<td>no</td>
<td>23</td>
<td>46.0%</td>
</tr>
</tbody>
</table>

Question 16: Further Discussion Details

The results of this survey are confidential. As such, the answers for Question 16 are not provided.

Conclusion

I hope you found the results of this survey interesting. I enjoyed the process of completing this thesis as the culminating assignment to my MBA degree and thank you once again for your participation.

Barb Asselin