

The City of
Niagara Falls
Canada



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**The recommendation(s)
contained in this report were
adopted by City Council**

December 6, 2004

His Worship Mayor Ted Salci
and Members of the Municipal Council
City of Niagara Falls, Ontario

Members:

Re: MW-2004-176 - 2004 Infrastructure Management Report

RECOMMENDATION:

That this report be received for the information of Council.

BACKGROUND:

The Director of Municipal Works requested that the Infrastructure Section prepare a report on the state of the City's Infrastructure prior to Council's deliberations with respect to the Municipal Capital Works budget. This request is consistent with Council's 2004 - 2006 priorities as identified in their strategic planning session in January of 2004.

In general this report deals with the three major networks, wastewater collection system, water distribution system and the municipal road network. This report identifies **near or immediate needs** in these systems and does **not provide** for financing for sustainability which was the subject of a previous report.

The results presented here were generated via all of the information currently available for the said networks. The information used has been collected over a ten-year period and fed into various sophisticated database and mapping systems to present the results shown here. This analysis differs from all previous studies in that all three networks are assessed at the same time in order to build a program that allows for reconstruction of all infrastructure on a street at the same time versus independent repairs or replacements which are less cost effective.

Please see below a description of the methods used in evaluating each system along with a description of the respective results and the costs associated with replacing said infrastructure. It is important to note that the results presented are infrastructure items in need of immediate replacement

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or rehabilitation.

Water Distribution System

The City owned potable water distribution system consists of approximately 5,000 pipe sections with a total length of 490 kilometers. Staff restricted the analysis to those pipes which appeared to exhibit characteristics outside of commonly accepted engineering principles. The measurements or metrics used to evaluate the water distribution system are as follows. Please note that the metrics are listed in order of increasing priority with respect to public safety and corporate risk management.

Fire Flow

The ability for a watermain to supply adequate fire flow to the Hydrants connected to it for the purposes of firefighting. Corrosion in watermains over time results in substantial restrictions in the ability of the watermain to convey flow. For the purposes of this analysis a fire flow 65 liters per second at 20 pounds per square inch has been used. Insurance underwriters typically determine the required fire fighting flow at any given location based on the building use and square footage. The number used here is an average.

C factor

Aging watermain distribution pipes often exhibit a reduction in their ability to convey flow due to internal corrosion, material of construction and age. The higher the c factor attributed to a watermain, the better its capability to carry flows. In this analysis a c factor of 40 was used in the determination of what pipe sections required replacement. Watermains with a C factor equal to or below 40 often exhibit impaired water quality, are prone to breakage and cannot deliver sufficient flow in times of high demand. By comparison a new PVC watermain would have a C factor of 130.

Age

The typically accepted life span for older pipe types is in the range of 70 to 100 years. The Regional Municipality of Niagara assumed a life span for both water and sewer pipe of 70 years in their last Master Servicing Study. For the purpose of this analysis, a pipe life of 100 years was used.

Water System Required Works

The above metrics were applied to the City of Niagara Falls water system and results were produced highlighting portions of the system that did not meet the requirements as defined by staff. Detailed listings of the pipes requiring replacement along with replacement costing were documented and a map was created using the Municipal Works GIS system that allows for display of defective pipes across the network. An attached map shows the watermains in need of repair, highlighted in blue, across the urban service area. The total replacement cost for these watermains in today's dollars is approximately \$12.5 million.

Wastewater Collection System

The measurements or metrics used to evaluate the wastewater collection system are as follows. Please note that the metrics are listed in order of increasing priority with respect to public safety and corporate risk management.

Sewer T.V. Inspection Data

Normally the analysis of tv sewer inspection data would largely dictate a capital replacement program. Due to five years of funding shortages in this area a lack of information exists to make informed decisions for replacement. Council however authorized funding in the 2004 budget to inspect the entire system over the next five years. The results of these inspections will be incorporated into this analysis when they become available.

Age

The typically accepted life span for older pipe types is in the range of 70 to 100 years. The Regional Municipality of Niagara assumed a life span for both water and sewer pipe of 70 years in their last Master Servicing Study. For the purpose of this analysis, a pipe life of 100 years was used.

Sanitary versus Combined Sewer

At present, approximately 27% of the City owned wastewater collection system is combined. It is economically advantageous to consider separation of these combined sewers during capital projects involving road and watermain replacement. In most cases these separation works provide a better level of basement flooding control, decrease storm water flows to the Stanley Avenue Treatment Plant and reduce combined sewer overflow to natural waterways.

Wastewater Collection System Required Works

The above metrics were applied to the City of Niagara Falls wastewater collection system and results were produced highlighting portions of the system that did not meet the requirements as defined by staff. The attached map shows the wastewater sewer, highlighted in red, over 100 years of age and carrying combined flows across the urban service area. The total replacement cost for these sewers in today's dollars is approximately \$18.0 million. This cost represents wastewater pipe replacement and does not include the cost associated with the installation of storm sewers. The cost for the installation of storm sewers associated with these works would constitute a 40% additional cost, \$7.2 million, to the number shown above.

Road Network

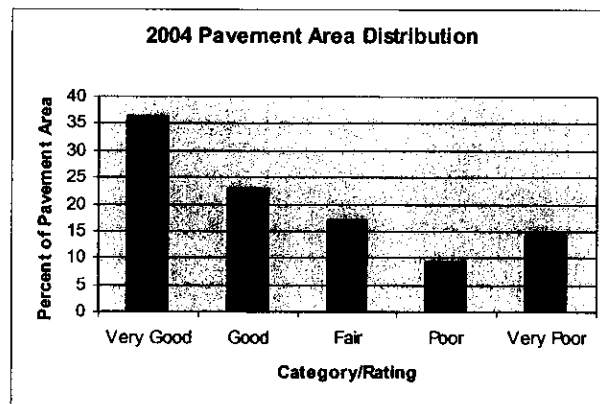
In 2002 and 2004 City Staff in conjunction with consultants inspected the urban road network for the purpose of creating a pavement inventory and management system. A separate and detailed report concerning the road network will be presented to Council early in 2005. The only metric used in the determination of needs for the City of Niagara Falls road system is the Pavement Condition Index

generated from detailed inspection reports. Other factors such as type of road, traffic volume and primary use have not been included in the analysis as of yet but will be incorporated into the final recommended capital works plan.

Pavement Condition Index

In determining the condition of any given road section factors such as surface defects, ride comfort and structural integrity are assessed by City Staff. The results are then weighed by a pavement management computer system to determine the pavement condition index or P.C. I. A PCI value is expressed as a number from zero to 100 with 100 being a new piece of pavement. A PCI value of less than 60 indicates a road surface that is no longer suitable for rehabilitation and has deteriorated to the point where it is better left to deteriorate to the point of absolute failure and then reconstructed. A proactive road rehabilitation plan can prevent roads from deteriorating to this stage and is more cost effective in the long run. The key to an effective road management plan is to address pavement defects prior to the road falling below the 60 PCI value. This is illustrated in the attached newspaper article. A distribution of the relative road conditions of the Niagara Falls networks is shown below.

<u>Category</u>	<u>Rating</u>	<u>Area</u>	<u>Percent</u>
Very Good	80-100	1500631	36
Good	65 to 80	937504	23
Fair	55 to 65	702901	17
Poor	45 to 55	388069	9
Very Poor	<45	587290	14
		Total	4116395



Road System Required Works

Approximately 153 km of city-owned roadway with a PCI of less than 60 requires reconstruction at a cost approaching \$ 28 million of which approximately 64 km or 42% is in the rural area. Rural roads in need of replacement are shown on the second attached map. These sections are shown in the attached plan highlighted in thick black lines. Mr. David Hein of Eres Consulting Engineers will present a more detailed report and presentation complete with more accurate costing to Council early in 2005.

Summary

The results and dollar values presented in this report are for high-level discussion purposes only and do not constitute street level engineering design costing analysis. The total cost of the required improvements presented here is in the range of 50 to \$60 million. The use of advanced replacement techniques along with economies of scale by virtue of larger replacement contracts would likely lower the cost substantially.

In an attempt to address some of the issues presented here, the 2003 Municipal Works Capital Budget reflected an increase of 15% in water, sewer and roads budgets. The 2004 budget reflected an increase of 15% in the area of sewer and water only.

City Engineering Staff are currently investigating national benchmarking initiatives with respect to their current asset and infrastructure management efforts in hopes of comparing the City of Niagara Falls capital budget funding levels and mechanisms with other municipalities in Canada participating in the program. The approximate cost of this initiative is \$ 20,000 and will be the subject of a future council report.

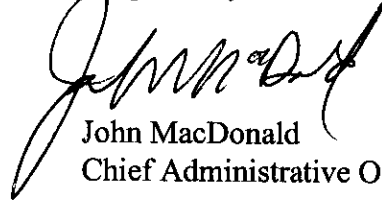
Council's concurrence with the above recommendation is requested.

Prepared by:



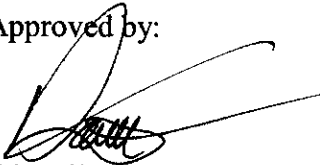
David Watt
Manager of Infrastructure & Environment

Respectfully submitted:



John MacDonald
Chief Administrative Officer

Approved by:



Ed Dujlovic, P.Eng.
Director of Municipal Works

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Nov. 23, 2004. 07:02 AM

Fix in for Toronto's worst street

Bathurst downtown is slated for major repairs in spring. But no relief is in sight for Steeles, deemed No. 2 in poll.

KEVIN MCGRAN
TRANSPORTATION REPORTER

Bathurst St. and Steeles Ave. are the two worst streets in the city of Toronto, according to the results of a web and phone survey released yesterday.

While motorists along the obstacle course known as Bathurst can at least rest easy knowing their thoroughfare is due for a \$5 million facelift beginning next spring, there's no end in sight for cars doing the bump and grind along Steeles, where \$100 million worth of needed work is being neglected.

In the unscientific poll, more than 11,000 people called or logged on to worstroads.ca outlining their gripes about roads in Ontario. Bathurst placed third overall, Steeles fifth. No final vote totals were released.

Steeles was named the worst road overall in Ontario last year, in the



When Pickering tackles street repairs, it does it big. Well, at least that's the case on the troublesome, highly pitted railway overpass on Rosebank Rd., which workers are in the process of replacing.

GTA COLUMNISTS

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Transportation reporter Kevin McGran wants to hear what you think on this subject and any transportation related issues. You can send him your thoughts via our [Talk to us about transportation page](#).

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inaugural poll. No work was done then and no work is planned now, because officials in Toronto and York Region can't agree on who pays for what to fix the border road.

"We need action now to prevent a bigger mess in a few years," said Rob Bradford of the Ontario Road Builders' Association, which allied itself with the Canadian Automobile Association and the Canadian Taxpayers Federation, among others, in the shame campaign targeting government indifference.

Bradford said governments delude themselves in thinking they save money by delaying maintenance. "The cost of basic preventative maintenance during the first 10 years of a road's life is between \$500 and \$1,000 per lane-kilometre. If this work is delayed, the cost jumps to \$80,000 by year 12 and as much as \$250,000 by year 15 as the problems become more serious."

John Niedra, director of transportation infrastructure management for Toronto, said the city will work on Bathurst between Bloor and Front Sts. next spring, pending approval of a \$250 million roads budget.

"The bulk of the concerns on Bathurst are with the streetcar allowance," Niedra said. "One of the problems we have is the track beds (in concrete) don't last as long as the adjacent (asphalt) roads."

The city has done away with the wooden ties that last only 20 or 25 years, and Niedra hopes new trackbed technology will give Bathurst a longer life this time around.

But continuing problems with Steeles — gridlock among both cars and bureaucrats — are sure to make motorists overheat. The city estimates that almost \$100 million worth of work will be needed over 15 years to repave rough spots and widen bottlenecks.

"We get two to three complaints a week on Steeles," Niedra said. "We just have to get out there and put the Band-Aids on and keep moving. We're just going to stick on maintenance and emergency repairs and keeping it safe. Once we get an agreement, we've got a plan to move forward. Our list is ready."

The problem on who pays the bills is legal. York Region officially begins a few metres north of Steeles. Nonetheless, it's deemed a "border" road, subject to cost-sharing agreements.

York's problem is whether it's legally entitled to spend tax money or development levies on projects outside its borders. Kees Schipper, York's commissioner of roads, hopes to have the issue settled by mid-2005.

"It has certainly been something we're trying to address," he said. "I don't think it's black and white. We're working together with the city of

Toronto ... (to learn) what is fair for York Region taxpayers to rehab a City of Toronto road. It's not all that easy. There are still some significant principles that have to be resolved."

Tasha Kheiriddin, of the Canadian Taxpayers Federation, said Ottawa collects \$2 billion in taxes from Ontario motorists, almost none of which goes toward roads. Queen's Park collects \$3 billion and spends about one-third of that on roads.

Meanwhile, southern Ontario drivers spend an average of almost \$2,000 over the life of their vehicles fixing damage caused by poor road conditions — the highest in Canada, she said.

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2004 Infrastructure Management Report

**NOTE: Rural roads viewed on the following page

