

MANAGEMENT REPORT TO METROLINX

Report Title:	Cost of Road Congestion in the Greater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft RTP				
Report Number:	ISP 08-015	Date to Board:	Nov 28, 2008	Date to Committee:	N/A
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Report Referred From:	N/A				
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Item Class:	IN CAMERA	<input type="checkbox"/>	DECISION	<input checked="" type="checkbox"/>	INFORMATION <input checked="" type="checkbox"/>

1.0 RECOMMENDATION:

RESOLVED:

THAT the report ISP 08-015 “Cost of Road Congestion in the Greater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft RTP” be received for information.

THAT the Board direct staff to release this report for public review.

2.0 PURPOSE & EXECUTIVE SUMMARY:

The purpose of this report is to present the findings of the Cost of Road Congestion in the Greater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft RTP (the “Cost of Congestion Report”).

3.0 BACKGROUND:

Metrolinx retained the services of the consulting firm HDR, to study the economic costs of congestion in the Greater Toronto and Hamilton Area (GTHA), and to conduct an impact and cost benefit analysis of the Draft RTP. HDR recently completed similar cost of congestion work for both the Canadian Urban Transit Association (CUTA) and the American Public Transit Association (APTA). David Lewis, HDR's Chief Economist has also presented a paper for the Brooking Institute on America's traffic congestion problem.

Please note that the terms of HDR's assignment were to review the Draft RTP, therefore the analysis is based on the plan that was received at the Board on September 26, 2008.

4.0 DISCUSSION:

Overview

The quality of life in the GTHA, the competitiveness of the region's commercial and industrial base, and the ability to attract and sustain business investment, job creation and tourism, all hinge on the provision of safe, fast, reliable and convenient roads, bridges and public transit. To be sure, economic growth brings with it some congestion during busy times.

Up to a point, crowds and queues signal mobility, prosperity and economic health. Indeed, it would not be economically sensible to expand transportation infrastructure to operate with zero congestion at all times of the day and the year – the economic benefits would not justify the economic costs. But beyond a certain level of congestion, its attendant costs – costs that arise in the form of delay, diminished productivity, wasted energy, environmental degradation, a diminished standard of living – begin to threaten the region's viability as a decent place to live, visit and conduct business.

In 2006 alone, the economic burden of congestion amounted to \$3.3 billion for commuters and \$2.7 billion in lost opportunities for economic expansion – for a total \$6.0 billion cost of congestion per year in the GTHA. These economic, social and environmental costs will more than double over the next quarter century if the congestion from which they arise remains unattended.

Metrolinx has developed a Draft RTP in response to the challenges posed by mounting congestion. Comprising a 25-year program of investments in roadways, bridges and public transit, the Draft RTP estimates capital costs of about \$50 billion (in constant 2006 dollars) plus operating and maintenance costs. When converted to their present-day equivalent value (to allow for the time-value of resources), these costs total fully \$31.2 billion. However, valued at \$46.7 billion, the Plan's economic, safety, community, social, and environmental benefits are greater still – \$15.5 billion greater, fully justifying the investment with an average annual rate of return of almost 20 percent.

The construction program under the Plan would generate just under 430,000 jobs in Ontario over the multi-year course of its completion – or an average annual estimate of 17,000 Ontario based jobs. The Ontario-based production of goods and services in support of the Plan would represent fully \$18 billion. Unless the construction program is executed during a period when Ontario labour and productive capacity are already fully employed, these macroeconomic effects represent net new economic activity and growth for the Province. Coming now, at a point of decline in macroeconomic activity in Ontario, and to the extent that projects can be started up quickly, the Plan offers the Province a win-win proposition – an economically worthwhile investment for the long-term and the prospect of significant near-term redress in the region's and Province's diminished economic fortunes.

Congestion in the GTHA: the Cost of Doing Nothing

The impact of traffic congestion is evident to all. Currently, more than two million automobile trips are made during the peak travel period each morning in the GTHA, with the number to approach three million by 2031. Traffic congestion is already a serious problem and is trending to become a great deal worse unless we act decisively. Traffic congestion in the GTHA increases the costs of the region's transportation activities, negatively impacts the region's economy, and impairs the quality of life by costing travelers' time and money, degrading the environment and causing accidents.

The principal economic and social costs of congestion are as follows:

1. The costs of reduced economic output and accompanying job loss;
2. The costs of travel delays for auto and transit users and the unreliability of trip times;
3. The increased vehicle operating costs associated with higher traffic volumes; and
4. The additional environmental costs of vehicle emissions and the higher frequency of accidents.

As shown in Summary Table 1, existing traffic conditions result in a significant economic, social and environmental cost to the GTHA region; in 2006 the annual cost to commuters was \$3.3 billion and the annual cost to the economy was \$2.7 billion. This cost can be expected to increase significantly, with population growth bringing about an increase in daily traffic demand and thus exacerbating the level of congestion – indeed, the cost of congestion experienced by GTHA inhabitants is forecast to increase considerably by 2031, resulting in an increase from \$3.3 billion per year to \$7.8 billion. Similarly, the cost to the economy would experience a similar increase, with a reduction in GDP due to excess congestion rising from \$2.7 billion in 2006 to \$7.2 billion in 2031.

These values are in line with those of other large metropolitan regions; previous studies conducted by HDR report the 2006 cost of congestion in the New York City region to be \$7 billion for commuters and \$4 billion for the regional economy. The cost of congestion in Chicago was an estimated \$7.3B billion in 2006.

Summary Table 1: Summary of Components of Congestion Cost in 2006, GTHA Average

COST COMPONENT	ANNUAL EXCESS COST OF CONGESTION (\$MILLIONS)
Time cost - auto users	\$2,245
Time cost - transit riders	\$337
Vehicle operating costs	\$479
Accidents	\$256
Vehicle emissions	\$29
COST OF CONGESTION	\$3,347
REDUCTION IN REGIONAL GDP	\$2,733

Costs of the Metrolinx Draft RTP

The Draft RTP requires a considerable level of investment. Over the 25-year horizon of the Draft RTP (from 2006-2031), capital expenditures account for almost \$50 billion, while operating and maintenance costs account for an additional \$12 billion, amounting to a total life-cycle cost of nearly \$60 billion (in constant 2006 dollars). It should be noted that at the time of the analysis, maintenance and storage facilities and refurbishment costs were not included. Also, the operations and maintenance cost estimate did not include Program and Policy Operating Costs.

Discounting these costs over the study period at an annual rate of 5 percent, the result is a present value of \$31.2 billion. In order for the Draft RTP to be an economically worthwhile undertaking, the present value of its expected benefits must thus exceed \$31.2 billion.

Benefits of the Metrolinx Draft RTP

Benefits of the Draft RTP arise, among others, from time savings to auto and transit users, savings in vehicle operating costs, reduced emissions and accident frequency, enhanced mobility for low-income travelers and related cross-sector benefits, commercial and economic development, and increased economic output.

As shown in Summary Table 2, the estimated benefits likely to arise under the Draft RTP over the 25-year study period are approximately \$46.7 billion for the GTHA, of which congestion management benefits account for \$28 billion, mobility benefits for \$3.6 billion, community development for \$5.1 billion and increased economic output for \$10 billion.

Summary Table 2: Benefits of the Draft RTP by Source (2010-2031)

BENEFITS CATEGORY	GTHA
Congestion Management	\$27,959
Mobility Benefits	\$3,604
Community Development	\$5,060
Economic Output	\$10,051
ALL BENEFITS	\$46,674

Note: values are in millions of dollars (\$2006), in present value terms

Over the 25-year study period, the present value of the benefits of the Draft RTP ranges from \$4,201 per person in the city of Hamilton to \$7,843 per person in the Durham region (with the GTHA average being \$6,359 per person) – full breakdown provided in Appendix A.

Note: that the ‘per capita’ calculations are based on the average population of the region over the period from 2006 to the forecasted population level in 2031

Net Benefits and Return on Investment of the Metrolinx Draft RTP

As shown in Summary Table 3, the estimated benefits of the Draft RTP significantly exceed the expected costs of its implementation. The mean net present value (NPV) is \$15.5B (with a 90 percent confidence interval of \$12.6 billion to \$21.2 billion). This is equivalent to a 19 percent internal rate of return (IRR).

Summary Table 3: Cost Benefit Analysis of the 25-Year Draft RTP

INDICATOR – VALUE FOR MONEY	MEAN
Total Costs (Present Value)	\$31,156
Total Benefits (Present Value)	\$46,674
Net Present Value (at 5%)	\$15,519
Internal Rate of Return	19.0%

Note: values are in millions of dollars (\$2006), in present value

Macroeconomic Effects of the Draft RTP Construction Program

The economic impacts of the Draft RTP construction program are estimated as direct, indirect, and induced impacts of the investment expenditures. All impacts are estimated in terms of business revenue, jobs, employment income, GDP, and tax revenues within the province of Ontario. More specifically, output is defined as the sum of gross business revenue across all affected business establishments. Employment is the number of jobs (both full-time and part-time). Employment income is the value of wages and salaries, supplementary labour income, and propriety income. GDP, or the Gross Regional Product, is the sum of a value added at every stage of production of final goods and services.

As economic impact in an area of interest is driven by the amount of expenditures made in that area, it is necessary to estimate the amount of Draft RTP expenditures that would take place in Ontario to Ontario manufacturers and service suppliers. The estimated Draft RTP expenditures to be made within Ontario amount to nearly \$34 billion, or 71 percent of the estimated total capital expenditure of about \$50 billion.

The total output impact of the Draft RTP investment projects amount to over \$69.6 billion, including \$33.9 billion of the original expenditures that would take place in Ontario, \$209 billion in indirect or spin-off effects, and \$14.7 billion of induced impacts. The plan will create an estimated 429,528 jobs, including 153,795 direct jobs, 116,126 indirect jobs, and 159,607 induced jobs. These jobs would generate an employment income effect of over \$20.9 billion, including \$9.4 billion of direct employment income, \$5.9 billion of indirect income and \$5.6 billion induced income. The Draft RTP projects will result in an increase in Ontario's GDP of over \$31 billion. This estimate includes over \$12.4 billion of direct GDP, \$9.3 billion of indirect GDP, and \$9.4 billion of induced GDP.

The total tax revenue impact of the Draft RTP is estimated to exceed \$14.8B. This includes \$1.9 billion in local and municipal tax revenues, \$6.8 billion of provincial tax revenues, and \$6 billion of federal tax revenues. These tax revenues include all sources of taxation, in particular personal income taxes, corporate income taxes, property taxes, and consumption taxes. Summary Table 4 gives the present value of the economic impacts over the investment period of the Draft RTP.

Summary Table 4: Economic Impact Analysis Evaluation Metrics of the 25-Year Draft RTP

ECONOMIC IMPACT	PRESENT VALUE
Output	\$39,266
Employment Income	\$11,825
GDP	\$17,630

Note: values are in millions of dollars (\$2006), in present value terms

All results discussed above represent the cumulative impact over the period when expenditures for the Draft RTP would be made. The annual impact of the Draft RTP would be equal to the proportion of expenditures made in a particular year. For example, if all expenditures were equally distributed over a period of 25 years, the annual impact of the Draft RTP in each year (during this 25-year period) could be calculated by dividing all impacts by a factor of 25.

5.0 FINANCIAL MATTERS:

N/A

6.0 HUMAN RESOURCES MATTERS:

N/A

7.0 ENVIRONMENTAL MATTERS:

N/A

8.0 COMMUNICATION MATTERS:

N/A

9.0 LEGAL MATTERS:

N/A

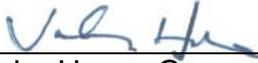
10.0 CONCLUSION:

Congestion in the Greater Toronto and Hamilton Area (GTHA) is significant and increasing. In 2006 alone, it cost the region's economy \$2.7 billion. Motorists and transit riders endured \$3.3 billion in travel delays, unreliable travel times, increased vehicle operating costs, and higher costs associated with vehicle emissions and accidents.

The Metrolinx Draft Regional Transportation Plan seeks to address the congestion problem through investment in public transportation services and infrastructure, roadway improvements, and traffic demand management and related initiatives. While necessitating a large-scale commitment of capital funding, the Draft RTP would yield net benefits of an estimated \$15 billion, a rate of return of just under 20 percent. The construction program would yield almost 430,000 jobs.

Respectfully submitted,

Approved for Submission to the Board



John Howe, General Manager,
Investment Strategy & Projects



W. Michael Fern, CEO

Appendices:

Appendix A: Table - Estimated Benefits per Capita of the Draft Regional Transportation Plan, by Source and by Sub-Region (2010-2031)

Appendix B: "Costs of Road Congestion in the Greater Toronto and Hamilton Area: Impact and Cost Benefit Analysis of the Metrolinx Draft Regional Transportation Plan"

Staff & Others Consulted:

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Notifications:

Special Instructions:

Appendix A

Estimated Benefits per Capita of the Draft Regional Transportation Plan, by Source and by Sub-Region (2010-2031)

Note: values are in dollars (\$2006), in present value terms, and divided by the average population between 2006 and 2031 in each region

CATEGORY	GTHA	CITY OF HAMILTON	HALTON REGION	PEEL REGION	CITY OF TORONTO	YORK REGION	DURHAM REGION
BENEFITS							
CONGESTION MANAGEMENT							
Time Savings - Auto Users	\$2,950	\$2,139	\$3,870	\$3,279	\$1,546	\$4,697	\$4,637
Savings in Vehicle Operating Costs	\$656	\$495	\$529	\$706	\$553	\$932	\$729
Emission Savings	\$112	\$165	\$184	\$140	\$1	\$214	\$212
Accident Cost Savings	\$91	\$100	\$92	\$94	\$59	\$124	\$146
<i>Total Congestion Management</i>	<i>\$3,809</i>	<i>\$2,898</i>	<i>\$4,674</i>	<i>\$4,219</i>	<i>\$2,158</i>	<i>\$5,967</i>	<i>\$5,725</i>
MOBILITY							
Time Savings - Transit Users	\$443	\$5	\$97	\$428	\$756	\$461	-\$97
Value to Low-Income Travelers	\$42	\$47	\$65	\$39	\$26	\$58	\$56
Cross Sector Benefits	\$7	\$4	\$7	\$6	\$8	\$5	\$8
<i>Total Mobility Benefits</i>	<i>\$491</i>	<i>\$56</i>	<i>\$169</i>	<i>\$473</i>	<i>\$790</i>	<i>\$523</i>	<i>-\$33</i>
COMMUNITY DEVELOPMENT							
Commercial Development	\$257	\$90	\$52	\$160	\$531	\$56	\$39
Residential Development	\$432	\$115	\$87	\$154	\$936	\$154	\$54
<i>Total Community Development</i>	<i>\$689</i>	<i>\$205</i>	<i>\$138</i>	<i>\$314</i>	<i>\$1,467</i>	<i>\$210</i>	<i>\$94</i>
ECONOMIC OUTPUT							
<i>Economic Output</i>	<i>\$1,369</i>	<i>\$458</i>	<i>\$1,948</i>	<i>\$1,354</i>	<i>\$4,702</i>	<i>\$1,204</i>	<i>\$5,152</i>
ALL BENEFITS	\$6,359	\$4,201	\$6,662	\$6,523	\$5,190	\$8,844	\$7,843

Note: sub-regional distributions are based on the distribution of trip *origins*, and thus do not correspond to the residents of each region. Also note that the benefits are calculated over the period of 2010-2031. The assumption is that the benefits of the Draft RTP will start to be experienced in 2010, and will be ramped-up as the projects are finalized throughout the course of the Draft RTP.