



**WESTERN CANADA ROADBUILDERS &
HEAVY CONSTRUCTION ASSOCIATION (WCR & HCA)**

1236 Ellice Avenue, Winnipeg, Manitoba R3G 0E7
Telephone (204) 947-1379 • Fax (204) 943-2279

**NATIONAL INFRASTRUCTURE POLICY (NIP)
A SUSTAINED COMMITMENT
JANUARY 1998**

TABLE OF CONTENTS

A. Introduction

B. Infrastructure Investment - Deficit and Opportunity

Federation of Canadian Municipalities (FCM) Report
Council of Ministers Responsible for Transportation and Highway Safety
Soberman Report
Mirza Article
Observations

C. Government Action

1. The Provinces, Territories and Federal Government
2. The Role for Sustained Federal Leadership

D. Stakeholder View

E. Principles for Infrastructure Renewal

1. Sustained Duration
2. Operate within existing fiscal framework
3. Flexible
4. Three pronged policy program approach
national infrastructure program
national highways system
strategic infrastructure investments
5. Order of magnitude
6. Application of new and innovative technologies

F. National Benefits

1. Nation Building
2. Economic Benefits
3. Opportunities Through technology

G. Conclusion

Attachments

- A Western Canada Roadbuilders and Heavy Construction Association (WCR&HCA) mandate and membership.

- B Summary details of the National Highway System.
- C *"Canada's Deteriorating Infrastructure"* by Dr. Saeed Mirza, P.Eng., FCSCE - Professor of Civil Engineering & Applied Mechanics, McGill University, published in the September 1997 edition of the Canadian Civil Engineer.
- D *"Proposed Guidelines for a New National Infrastructure Program"* adopted by Premiers and Territorial Leaders at the 1996 Annual Premiers' Conference.
- E *"Towards a Better Financial Relationship Between the Federal Government and the Provinces and Territories"* - Western Finance Ministers 1997 Report.
- F *"All Provinces and Territory Consensus Proposal"* presented to federal Finance Minister Paul Martin in December 1997 by Manitoba Finance Minister Eric Stefanson.
- G Manitoba Bureau of Statistics Preliminary Analysis of the CIWP.
- H *"National Infrastructure Policy - Briefing Note"* prepared by the Western Canada Roadbuilders and Heavy Construction Association (WCR&HCA).
- I *"Advanced materials and Smart Technology - Preparing for 21st Century Opportunities"* by Lloyd McGinnis, P.Eng., ISIS Canada Chief Executive Officer and Jennifer Redston, ISIS Canada Public Affairs Officer, published in the Manitoba Heavy Construction Association, HeavyNews Annual '98 Magazine.

A: INTRODUCTION

Historically, the federal and provincial governments have undertaken many initiatives relating to infrastructure investments. Such undertakings however, require ongoing structure, commitment and sustainability.

The purpose of this brief therefore, is to outline the benefits of a sound, sustained and fair National Infrastructure Policy (NIP), targeting three program areas: a *National Infrastructure Program (NIP)* to address rehabilitation of municipal infrastructure; a *National Highways Program (NHP)* to tackle national highway system requirements; and *Strategic Infrastructure Investments (SII)* to create new areas of economic activity and enhanced quality of life, as components of both NIP and NHP.

B: INFRASTRUCTURE INVESTMENT - DEFICIT & OPPORTUNITY

When addressing infrastructure investment, two (2) elements are deserving of attention, namely:

1. Infrastructure Deficit; and
2. New and Strategic Opportunities

1. Infrastructure Deficit

Like any capital asset, infrastructure has a finite life cycle. The extent to which its useful life can be maximized depends upon the level of investment made during its life.

Some of Canada's traditional core infrastructure -- including roads and bridges, sewer and water systems - - are quickly coming to the end of their useful life cycle and require rehabilitation or replacement.

“Infrastructure deficit” is defined as the *gap between the investment required to maintain or upgrade existing infrastructure to acceptable standard and the amount actually invested*. Sustained improvements are required to ensure the infrastructure deficit does not accelerate at alarming rates.

Like the fiscal deficit which passes the costs of today’s government programs to future generations, an infrastructure deficit passes on the costs of today’s use and consumption of infrastructure to future generations, limiting their ability to meet future infrastructure needs. Failure to address the infrastructure deficit is to contravene the fundamental principles of sustainable development.

Unlike the fiscal deficit, the infrastructure deficit cannot be precisely quantified. As a result, there is no definitive nor authoritative calculation of Canada's infrastructure deficit. Nonetheless, a number of reports have attempted to document the needed investments in Canada's infrastructure. These reports independently conclude that there is a substantial national infrastructure deficit which requires government intervention and leadership.

Federation of Canadian of Municipalities (FCM) Reports

The most exhaustive reports on traditional municipal infrastructure were undertaken in 1985 and again in 1996 by the Federation of Canadian Municipalities (FCM).

The 1996 update by the FCM estimated \$44 billion as being required to bring Canada's infrastructure up to an acceptable level. Pertinent observations from the 1996 Report on the State of Municipal Infrastructure in Canada include:

- Expenditures on infrastructure total over \$11 billion per year. Expenditures are primarily in new construction. Repairs comprise 20 per cent of the spending.
- Regional roads have a life expectancy of 20 years (40 with renewal), bridges 60 to 80 years, water systems 60 years and sewers 60 to 80 years; however, deterioration of infrastructure facilities is escalating due to deferred maintenance. The cost to upgrade the infrastructure facilities was estimated at \$12 billion in 1985. In 1992 the cost estimate was \$20 billion.
- Water and wastewater systems are deteriorating. It is estimated that the total annual revenues for all municipalities for water services provided is around \$3 billion. Up to \$60 to \$100 billion may be required over the next 10 to 15 years to repair, extend and improve the existing systems.

Council of Ministers Responsible for Transportation and Highway Safety

From 1987 to 1992 the Council of Ministers Responsible for Transportation and Highway Safety conducted the National Highway Policy Study. The study proposed that 25,000 kilometres of nationally and internationally significant highways throughout Canada be designated as the National Highway System, and recommended minimum design and engineering standards for the system. To upgrade the National System the study recommended a federal/provincial, cost-shared National Highway Program.

The Phase II Report of the National Highway Policy Study estimated a \$13 to \$18 billion infrastructure deficit associated with the National Highway System as of 1988. (Attachment “B”)

Currently, the Council of Deputy Ministers of Transportation is updating the 1992 Study to identify current conditions, estimated costs for rehabilitation/upgrading of deficient sections and update the benefits of investing in a National Highway Program. The results are expected by mid-1998.

Soberman Report

As part of a national evaluation exercise of the current Canada Infrastructure Works Program, the federal government commissioned Richard M. Soberman, P. Eng., Bahen-Tanenbaum Chair in Civil Engineering at the University of Toronto to prepare “*Taking Stock: A Review of the Canada Infrastructure Works Program*”. The report was published in August 1996.

Soberman examines the impact of deferred maintenance as a contributing factor to infrastructure needs in Canada. “*Deferred maintenance*” results in the eventual costs of the repair being higher than if regular maintenance had been undertaken at appropriate points in the infrastructure life cycle. In addition, when maintenance is deferred, the life of the infrastructure is decreased and complete reconstruction may be necessary at an earlier date.

While Soberman may not agree with the extent of the FCM infrastructure deficit estimates, he does concede that the current deficit, partly due to deferred maintenance, significantly exceeds the \$6 billion provided under the Canada Infrastructure Works Program.

Mirza Article

An article entitled “*Canada’s Deteriorating Infrastructure*” by M. Saeed Mirza, P. Eng, Professor of Civil Engineering & Applied Mechanics at McGill University, and published in the September 1997 edition of the Canadian Civil Engineer (Attachment “C”) is instructive. Mirza estimates the total infrastructure rehabilitation needs in Canada to be \$100 billion. Mirza claims that this amount could increase to \$200 to \$300 billion over the next five to ten years if appropriate repair and upgrading programs are not implemented in the near future.

2. New or Strategic Opportunities

In addition to the infrastructure deficit there are also significant economic opportunities requiring new and major infrastructure investments. Timely upgrades or strategic investments can capitalize on these opportunities, thereby generating new wealth, economic growth, and increased productivity. Examples of strategic opportunities include major upgrades to ports, strategic transportation systems supporting the export sector, telecommunications, the information highway, and so on.

Strategic opportunities are also created by the application of new technologies, for example “*smart bridges*”. Infrastructure renewal provides an opportunity to showcase or demonstrate the successful transfer of technology to the field and the resulting cost-savings and benefits. The commercialization of new applications produces significant economic development opportunities (*see also pg. 9, Opportunities Through Technology*).

Observations

Regardless of source, there is consensus that a shortfall exists in the maintenance or reinvestment of Canada’s infrastructure. Roads, highways, bridges, transportation systems, water supply and wastewater treatment facilities have definitive life spans and in Canada, they are nearing or have reached the functional end of those lives. In addition, significant economic opportunities will be missed if we neglect strategic investments in infrastructure.

Another indication of the extent of Canada’s infrastructure deficit and the extent of opportunities associated with new infrastructure, is the demand the current CIWP experienced. It is reported that requests for infrastructure funding across Canada exceeds available funds on a scale of four to one.

Clearly, the Canadian experience is that there is a serious need to continue to reinvest in Canada's infrastructure through a focused and sustained National Infrastructure Policy (NIP) if we are to avoid missing opportunities that positively impact on Canada's social and economic growth..

C. GOVERNMENT ACTION

1. The Provinces, Territories and the Federal Government

At the August 1993 Annual Premiers' Conference (APC), Provincial Premiers and Territorial Leaders agreed that developing a National Infrastructure Policy (NIP) was key to improving Canada's competitiveness, while providing vital jobs and supporting important long-term trade and economic development goals. Premiers agreed an infrastructure initiative should target sectors such as highways, rail systems, ports, airports, communications and energy.

Later at the December 1993 First Ministers Conference, the Prime Minister and Premiers agreed to a three year \$6 billion Canada Infrastructure Works Program (CIWP), involving local governments and other third party partners.

The goals of the Canada Infrastructure Works Program (CIWP) were:

- < To renew, enhance and create physical infrastructure that is instrumental in providing public services, notably in local communities; and
- < To accelerate economic growth through timely, effective job creation.

The federal government subsequently extended the program to five years by re-profiling the current level of program expenditures over an additional two years. Then in its 1997 Budget, the federal government offered a one-year top-up of \$475 million, resulting in \$1.275 billion with provincial and third party contributions. In short, the current CIWP is now a five (5) year, \$7.275 billion program of direct infrastructure investment by program contributors.

The position of the Premiers and Territorial Leaders has been consistent and clear: For over two years they have called upon the federal government to agree to a new, multi-year national infrastructure policy at least equal in value to the original program and with a focus on strategic infrastructure, including transportation, to enhance competitiveness and long-term employment growth and stability. Specifically at the 1996 Annual Premiers' Conference, all Premiers and Territorial Leaders endorsed "*Proposed Guidelines for a New National Infrastructure Program*" (Attachment "D") and unanimously reaffirmed these guidelines again in 1997.

Provincial Finance Ministers have likewise expressed unequivocal support for a renewed infrastructure commitment. The Western Finance Ministers 1997 report "*Towards a Better Financial Relationship between the Federal Government and the Provinces and Territories*" (Attachment "E"), to federal Finance Minister Martin urged that "an adequate, long-term federal financial commitment to Canada's infrastructure should be a high priority for consideration." Again as recently as December 1997 Manitoba's Finance Minister Eric Stefanson presented an "*All Province and Territory Consensus Proposal*" (Attachment "F") to Federal Finance Minister Paul Martin. The consensus called for a renewal of the program based on an October 1997 update of the Premiers' "*Proposed Guidelines*".

To date, there has been no federal response to the above efforts by the Premiers and Territorial Leaders, and Provincial Finance Ministers.

2. The Role for Sustained Federal Leadership

By virtue of Canada's vast geographical distances, regional economic disparities, pocketed concentrations of populated areas, political structure and so on, Canadians have traditionally relied upon the federal government to exercise national leadership in a number of diverse policy areas. This has allowed Canadians to have access both to services tied to national standards and balanced economic opportunities. Those include international trade, social policy, health care, deficit and debt reduction. Historically the national government led in both the construction of the national rail line and the Trans Canada Highway. Leadership to address a national infrastructure need was evidenced in the Canada Infrastructure Works Program (CIWP).

Given Canada's infrastructure deficit and the concurrent national economic opportunities represented through rehabilitative and strategic investments, it is only logical that the federal government continue to lead in the renewal of Canada's infrastructure. All of the provinces and territories, as well as national organizations including the Federation of Canadian Municipalities (FCM), and the Coalition to Renew Canada's Infrastructure (CRCI), have expressed unanimous support for a new program. What is missing is a commitment to a national policy by the federal government. Federal leadership ensure that all parts of Canada have the opportunity to participate in infrastructure renewal and enjoy the economic benefits that accrue from such a program.

Section F of this brief outlines the national benefits of a sustained National Infrastructure Policy, including nation building, economic benefits and opportunities through technology. In addition however, all levels of government benefit directly from investments in infrastructure renewal.

In a preliminary analysis of economic and tax revenue impacts and job creation of the current CIWP, the Manitoba Bureau of Statistics (Attachment “G”) estimates that for every \$1.00 the three levels of government combined spend, \$0.44 of tax revenue will ultimately be recovered by governments. Of this figure, the federal government benefits the most, receiving \$0.22, the provinces \$0.17 and local government \$0.05. While it appears on the surface that local governments benefit the least, the CIWP improved local infrastructure at one-third of the cost normally borne by municipalities.

The Soberman evaluation of the CIWP also concluded that the net cost of infrastructure renewal to governments is less than the actual cost: “. . . increased income tax and GST revenues, as well as reductions in social assistance payments, at least over the near term, greatly reduce the net cost of the Program for the federal government and, to a lesser extent, the provincial governments as well.”

D. STAKEHOLDER VIEW

A number of national, regional and provincial stakeholder organizations representing a substantial cross-section of Canadians have consistently urged the Federal Government to assume its national leadership role in this area.

Recently, the Western Canada Roadbuilders & Heavy Construction Association (WCR & HCA) developed and circulated to First Ministers a “*National Infrastructure Policy - Briefing Note*” (Attachment “H”). The *WCR&HCA Brief* and its recommendations are consistent with the Premiers’ “*Proposed Guidelines*”. The WCR&HCA’s main recommendation is as follows:

“To address Canada’s growing infrastructure deficit the federal government must adopt as a matter of good governance, a National Infrastructure Policy. Its objective should be to address municipal infrastructure, the national highways system and strategic infrastructure investments, from within existing revenues in a sustainable manner which levers matching contributions from other levels of government and/or the private sector.”

The *WCR&HCA Brief* also received expressed support from a number of national organizations including but not limited to: The Road and Infrastructure Program of Canada (TRIP/Canada), the Coalition to Renew Canada’s Infrastructure (CRCI), the Canadian Construction Association (CCA) and the Western Canada Roadbuilders and Heavy Construction Association (WCR&HCA). The *WCR&HCA Brief* is currently being considered by the Federation of Canadian Municipalities.

In short, it could be said that the principles for a new National Infrastructure Policy as embodied in the “*Premiers’ Guidelines*” and the “*WCR&HCA Brief*” represent a broadly supported public view in Canada.

It is now up to the Federal Government to respond to these repeated and consistent calls for renewal in partnership with provincial and municipal governments, and the Canadian public.

E. PRINCIPLES FOR INFRASTRUCTURE RENEWAL

The *Premiers’ Guidelines* and *WCR&HCA’s Brief* each proposed to the Federal Government a new national infrastructure program based on a number of elements or principles. These include:

Less well-known are the significant number of projects of strategic economic importance, involving the private sector, co-ops, non-profit organizations, educational, health care, and cultural institutions, etc..., as the proponent.

Governments should also examine non-traditional forms of funding infrastructure investment through *PublicPrivate Partnerships (PPP)*. Considerable work has been done in this field by the *Canadian Construction Association*, *Canadian Council on Public Private Partnerships* and the *Standing Committee on Transportation* Report of February 1997. PPPs are well advanced in some jurisdictions in Canada and many throughout the United States. We should take serious note of their successes and failures and learn from them.

Flexibility was important to accommodate projects funded solely by federal and provincial governments in the case of most highways, for example. Flexibility in the CIWP was also a major factor in accommodating local project selection and delivery throughout the different regions of Canada -- a basic tenet of the Canada Infrastructure Works Agreement.

4. Three Pronged Policy Program Approach

The *National Infrastructure Policy* should target three broad and distinct areas of program areas:

a) ***National Infrastructure Program (NIP)*** with annual cost-shared investments of \$1.8 billion, to address rehabilitation of municipal infrastructure. This would target the FCM's estimated \$44 billion municipal infrastructure deficit, as well as emerging economic opportunities.

b) ***National Highways Program (NHP)*** with annual cost-shared investments of \$1.6 billion to address the estimated \$13 to 18 billion in investments required over the next ten years to bring Canada's national highway system up to agreed upon national standards, and thereby achieve substantial net benefits relating to: enhanced internal and international trade and tourism; increased economic growth and productivity; and improved safety and road user benefits.

c) ***Strategic Infrastructure Investments (SII)*** which serve to generate new areas of economic activity and therefore new wealth. This would be funded within the national infrastructure and national highways system program allocations.

5. Significant Order of Magnitude

National Infrastructure Program (NIP) - An annual federal investment of \$600 million matched by the provincial and municipal governments and/or the private and non-profit sector, for an annual investment of \$1.8 billion, is an appropriate amount with which to continue rebuilding both municipal and innovative infrastructure. This sum is also consistent with the first phase (\$6 billion) CIWP level of funding.

National Highways Program (NHP) - Historically, the federal government has contributed an average of approximately \$300 million annually for road and bridge investment. It currently receives roughly \$4 billion in road use fuel excise taxes. The excise tax on road use gasoline was increased by 1.5 cents per litre in the 1995 federal budget as a federal deficit reduction measure, increasing federal revenue by \$500 million annually.

Now that the federal deficit reduction targets have been exceeded, and ongoing surpluses have been projected, it is appropriate that the revenue from this highway use related tax be returned through investment in the national highway infrastructure. This amount, together with the historical federal spending, would comprise an annual federal commitment of \$800 million.

Matched by the provinces and Territories, a total annual highway national and strategic investment program of \$1.6 billion would be achieved from within existing fiscal frameworks.

Strategic Infrastructure Investments (SII) - This component focuses on investments which serve to generate new areas of economic activity and therefore new wealth. This would be funded from the national infrastructure and national highways system program allocations.

6. Application of New and Innovative Technologies

The application of new Canadian technologies, that realize cost savings and positive life cycle benefits to infrastructure, and that enable more efficient use of infrastructure, should be encouraged. This allows Canadians to showcase such applications to the rest of the world, address national problems, create new export opportunities and lower user costs. *This approach is both practical and strategic in nature.*

Use of innovative technologies is one of the criteria of the current program and should continue to be a significant and strengthened feature in subsequent programs. For example, the Quebec program actually reserved a portion of program funding to projects that applied new technologies.

F. NATIONAL BENEFITS

The benefits to the nation of a national infrastructure policy are many. While not all inclusive, they include the following:

1. Nation Building

- X There can be no doubting the value to national unity and nation building of a common national objective to rebuild Canada with an improved and more efficient transportation and municipal infrastructure capable of visibly enhancing and expanding upon the standard of living Canadians enjoy and seek to have preserved;
- X As the Trans-Canada Highway is the “*ribbon that binds us*”, so too can a national infrastructure program be the “*foundation that unites us*”.
- X The Western Finance Ministers' Report of May 1997 cites the Infrastructure Works program as a noteworthy example of successful federal-provincial/territorial partnership.

2. Economic Benefits

- X The Manitoba Bureau of Statistics analysis (mentioned previously) estimated that every \$1 of direct expenditure under the current CIWP generated \$1.30 in Gross Domestic Product (GDP), based on direct expenditures of \$7.7 billion generating \$10 billion in growth in Canada's GDP. MBS also calculated that program commitments throughout Canada as of November 1997, created 181,000 person years of employment, including 61,000 direct and 120,000 spin-off jobs.
- X Countries with whom Canada competes are making sizeable investments and reinvestment in their respective national infrastructure. It is of sad note to be reminded in the 1988 National Highways Policy Study for Canada, that of the OECD countries, Canada's national investment in highways is the lowest.

- X The safe and speedy movement of goods east and west, and north and south along an efficient national highways system, is of paramount importance to Canada's manufacturing, agricultural, food processing and related export industries which collectively sustain in excess of three million Canadian jobs. Adequate highway infrastructure is essential to gain the productivity advantages of modern supply chain management principles such as "just in time" inventory control.
- X A recent Study under Transport Canada's Special Infrastructure Project showed a positive relationship exists between public highway capital investment and private sector output and productivity. Macroeconomic analysis suggested that a shortfall in the stock of public highway capital in Canada exists, and that increased highway investment would result in a gain in economic output of over \$3 for every \$1 invested.
- X Our ability as a nation to take full advantage of the economic and tourism opportunities presented through FTA and NAFTA requires no less a national commitment to our strategic transportation system, than those made by each of the United States and Mexico, the countries with whom we are partnered in the aforementioned agreements.
- X Canada's ability to expand as a nation exporting goods, services and technologies will be strengthened by a national strategy that reinforces core infrastructure and strategic transportation systems as vital to national and international economic competitiveness.
- X Improve transportation safety, thereby saving injury and lives, property damage and more than \$10 billion in annual economic and health care costs.

3. Opportunities Through Technology

- X A national infrastructure program can serve to showcase federal and provincial government investment in research initiatives, such as the Network of Centres of Excellence (NCE) program.
- X *Intelligent Sensing for Innovative Structures (ISIS Canada)* is one such NCE program. Over 200 world-renowned researchers conducting their research in Canada from coast to coast, are applying new technologies to combat age-old infrastructure-related problems. Their approach includes developing innovative materials to combat the rapid deterioration of concrete structures reinforced with corroding steel, and using intelligent optic sensors built into fibres to gather and communicate information between structures and remote computers anywhere in the world.

Applying ISIS Canada developed technology to infrastructure addresses practical owner concerns including: longer life cycle, reduced maintenance costs, superior strength, enhanced durability, resistance to corrosion, increased job site productivity, cost efficiencies, substantial savings over conventional build or repair technologies, design options, early warning system for catastrophic failure and elimination of costly (financial and human risk) site visits.

Examples of the beneficial application of this technology include the following pilot projects sponsored by ISIS Canada:

“Waterloo Creek Bridge, British Columbia - a steel-free concrete bridge deck that incorporates an integrated fibre optic structural sensing system for remote monitoring.

Crowchild Bridge, Alberta - the world's first continuous span steel-free bridge deck. Upon completion, the bridge will be stronger, more resistant to corrosion, and less expensive to maintain than if it had been constructed using traditional materials and methods. On a tendered basis, it proved to be the least costly option.

Clearwater Creek Bridge, Alberta - a rehabilitation project testing the quality of bridge girders reinforced with carbon fibre reinforced polymer sheets.

Leading Edge Ground Anchor System - The ground anchor is the key to a successful post tensioning system. Conventional structures rely on a network of steel post-tensioning rods that are prone to rapid corrosion. With this new ground anchorage system, as the post-tensioning system deteriorates, individual tendons can be replaced with carbon FRP tendons.

Taylor Bridge, Headingley, Manitoba - the world's longest span bridge reinforced with fibre reinforced polymer (FRP) and capable of remote monitoring using fibre optic sensors. The bridge incorporates carbon FRP for pre-stressing and shear reinforcement of four girders as well as in a portion of the deck slab which is placed along side a portion of the deck slab with conventional steel reinforcements. Glass FRP was used to reinforce a portion of the barrier wall. This bridge continues to be followed closely by the international engineering community.

Maryland Street Bridge, Manitoba - deteriorating columns and girders will be reinforced with carbon fibre sheeting at an estimated 40 to 50 % savings over traditional repair methods.

North End Water Pollution Control Centre, Manitoba - concrete roof panels have been reinforced with carbon fibre straps to accommodate heavier loads than the originally designed load capacity and to extend their service life at a fraction of the traditional replacement costs.

ISIS Faroex Filament Winding Research Centre, Gimli, Manitoba - manufactures transmission poles using filament wound glass and carbon fibre reinforced plastic. The conventional use of wood is on its way to being permanently replaced with this more environmentally friendly alternative.

Chatham Bridge, Ontario - the world's second steel free concrete deck slab. With no reinforcing steel to corrode, the concrete is immune to the damaging effects of chlorides. For engineers this revolutionizes the way bridges are designed because it means that a relatively thin layer of concrete slab can span a long distance without reinforcement which translates into "maintenance free". This Canadian design has won five national and international awards.

Webster Street Parkade, Quebec - an award winning rehabilitation project incorporating advanced composite materials to strengthen beams and columns, and an integrated fibre optic sensing system to monitor the structure's behavior.

Universite du Sherbrooke, Quebec - deteriorating concrete and steel columns were protected and strengthened using a high strength fibre reinforced plastic wrap.

St. Etienne de Bolton Overpass, Quebec - Circular columns were deteriorating due to steel reinforcements in an advanced state of corrosion. While some columns were repaired with advanced composite materials, others were repaired using conventional materials for comparison. Fibre optic sensors were then installed to measure the structure's response to severe temperature variations, corrosion and loading.

Champlain Bridge, Quebec - glass fibre composites were used to rehabilitate one pier of this ageing Montreal bridge.

Confederation Bridge, Prince Edward Island - the fixed link between New Brunswick and Prince Edward Island has been outfitted with a fibre optic monitoring system in a girder and drop in panel located in the centre of a 250 metre span.

Salmon River Bridge, Nova Scotia - the world's first steel free bridge deck demonstrating the merits of its innovative design and materials. This bridge was awarded the Lieutenant Governor of Nova Scotia award for Excellence in Engineering as well as an Association of Consulting Engineers of Canada Award for Excellence.” (Attachment “I”)

- X Canadian-developed technologies such as those pioneered ISIS Canada can position Canada to seize a sizeable share of the world-wide, \$2 trillion infrastructure deficit, (*per Mirza, see Attachment “C”*) and take full advantage of the economic opportunities associated with this burgeoning industry.
- X Rigorous support for the use and commercial application of Canadian technologies can enhance Canada's ability to export both knowledge and experience, as well as products, goods and services, which will thereby strengthen our abilities as an export nation.
- X Finally, use and application of new technologies to address world-wide infrastructure opportunities, will measurably enhance Canada's international reputation as a problem solver.

G. CONCLUSION

For the past four years Canada’s infrastructure has benefitted from cost-shared investments between senior levels of government. What is required now is an ongoing sense of national purpose.

The Premiers' *Proposed Guidelines* and *WCR&HCA Brief* reflect a consensus of national, political and public will. They are a reflection of the public desire to meet the challenges and opportunities implicit in a renewal of Canada's infrastructure.

The *Proposed Guidelines* and *WCR&HCA's Brief* appropriately therefore present the launching pad from which to renew cooperative federalism, and build upon the “Team Canada” approach to seizing new economic opportunities. The magnitude of the problem serves also to demonstrate the size of the opportunity which can economically position and advantage the nation, both domestically and abroad.

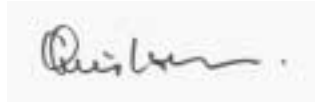
It is also clear that the national infrastructure deficit can no longer be ignored. A commitment to a sustained National Infrastructure Policy is no less important to the nation's future, than are the issues related to health, education and debt/deficit management.

Failure by Canada to address this issue will result in an unsustainable infrastructure, unable to support our competitiveness, unable to sustain our quality of life and unable to allow Canadian enterprise to fully take advantage of existing or new market opportunities. This would leave as a legacy to future generations a national infrastructure deficit the size of which will be financially unmanageable.

A commitment to a national infrastructure policy renews the national spirit, helping to ensure that the next century belongs to Canada.

The final conclusion should, therefore be apparent. The Federal government joined by the Provinces and Territories must as a matter of governance and leadership, formally agree to address a national challenge through a focused and sustained, National Infrastructure Policy.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Chris Lorenc", is centered on a light gray rectangular background.

Chris Lorenc, B.A., LL.B.
President WCR&HCA

January, 1998

cw\c:\nip98\nipnhp.98