



National Guide to Sustainable
Municipal Infrastructure
(InfraGuide)



DECISION MAKING AND INVESTMENT PLANNING BEST PRACTICE DMIP 7—MANAGING INFRASTRUCTURE ASSETS

SUMMARY

When Steve Wyton of the City of Calgary's Corporate Asset Management Department, Infrastructure Services and his team began developing the City's first corporate asset management program, they had a valuable tool at their disposal: the InfraGuide best practice, Managing Infrastructure Assets.

In 2004, the Corporate Asset Management Program was initiated under the direction of Infrastructure Services to cover the assets of the entire municipality. The City's key asset managing Departments (Protective Services, Community Services, Corporate Properties/Fleet, Utilities, and Transportation) were each running their own asset management initiatives. The Corporate Asset Management Program consolidated the asset management efforts of all departments into one comprehensive strategy, to optimize spending on the building, operation, maintenance, and replacement of infrastructure. The

Program provides medium range (10-year) plans to assist City business units as they balance the use of their assets for effective and sustainable service delivery.

Client Identification

Steve Wyton, *Manager,
Corporate Asset Management*

Michael Lyzaniwski
*Asset Management Program
Coordinator*

Brian McKibbin, *Senior
Asset Management Engineer*

Karen Wichuk, *Senior
Asset Management Engineer*

City of Calgary
*Corporate Asset Management
Infrastructure Services*

Population:
956,078 as of April 2005

Population trend: Growing

Local municipality: Urban

Main industries: largely centred on the petroleum industry, with agriculture, tourism, construction, and the high-tech industries contributing to the city's rapid economic growth.



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Canada

BACKGROUND

The City of Calgary in southern Alberta has 956,078¹ residents. Its population has increased steadily in the past 25 years. Over the past four years, the City has grown by about 17,000 people per year on average, or 10,000 new homes per year. Growth is largely attributed to Alberta’s booming economy, centred on the petroleum industry. Agriculture, tourism, and high-tech industries also contribute to Calgary’s rapid economic growth.

Much of the City’s infrastructure was constructed during the economic growth period between the 1960s and the mid-1980s. Population growth and economic activity, combined with aging infrastructure now challenge the capacity of infrastructure to meet the increased demand. In addition, more stringent environmental regulations and volatile construction costs put pressure on the already limited funds for infrastructure investment.

In the early 1990s, the first corporate Infrastructure Status Report laid the groundwork for incorporating life cycle costing into infrastructure management. Since then, the City updates the Infrastructure Status Report annually for Council to provide a reference against which to benchmark infrastructure needs. The Report identifies investment shortfalls and provides future direction for managing corporate assets.

Asset management promotes the efficient operation and replacement of infrastructure, thereby allowing a municipality to optimize its infrastructure resources (such as existing infrastructure and infrastructure funding), and realize economic, environmental, and social benefits. The City of Calgary first considered



developing its own asset management best practices at the corporate level in the mid-1990s when asset management was first applied in the water and wastewater departments and then incorporated into the roads department. Between 1997 and 2000, the City underwent a major restructuring of its departments, and asset management was deemed a priority at the corporate level.

CHALLENGE/ISSUE/NEED

According to the City’s latest Infrastructure Status Report,² Calgary manages over \$28 billion in infrastructure assets and will spend over \$10 Billion over the next 10 years on both infrastructure growth and maintenance. Much of this money relates to infrastructure that supports development on new—or green-field—sites. To help Council understand the advantages of infill development, the Corporate Asset Management has promoted a business case for development within the existing urban boundary. Benefits of doing so include maximized use of existing infrastructure and preventing the need to build, operate,

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1 As of April 2005. City of Calgary municipal census.
2. City of Calgary. Infrastructure Status Report, 2005.





Around the same time that asset management became a priority in the late 1990s, Alberta's economy surged, and the province had available capital for cities. Calgary especially experienced significant growth and wanted to optimize decisions on how the provincial funds it received would be spent.



and maintain costly new infrastructure and other community services. The Infrastructure Status Report also underscores the fact that the City has an infrastructure gap. Over the next 10 years (the time frame of the Asset Management Program), an additional investment of \$5.4 billion is needed to fund both the maintenance and growth of the City's infrastructure. Of this gap, \$2.7 billion relates to maintenance, and \$2.7 billion is for growth.

Around the same time that asset management became a priority in the new millennium, Alberta's economy surged, and the province made infrastructure investment a priority. Given this newly available funding, combined with a growing infrastructure maintenance burden and Calgary's record-setting growth, the City needed to optimize decisions on its infrastructure priorities. For example, the City wanted to know where and what this money

would be spent on and how to optimize spending on infrastructure assets.

Michael Lyzaniwski emphasized that an asset accuracy inventory is the foundation of the Asset Management Program. As is the case with many municipalities, challenges exist regarding the accuracy and availability of asset condition information within the City of Calgary.

Another key challenge in the development of the Asset Management Program was the need to evolve the existing capital budget process into new total asset management process. The new Corporate Asset Management team faced the challenge of creating an integrated process which spanned across the corporate "silos" in order to create their own asset management priorities and 10-year capital programs. Council assigned Corporate Asset Management the mandate to develop a framework so different assets, roads and sewers for example, can be compared as "apples to apples". The process change was most challenged by the fact that the budget process was operational while changes were occurring: analogous to changing the engine on an airplane in mid-flight.

The last major challenge the Corporate Asset Management team faced was change management: getting people in operations on board and demonstrating the benefits of a corporate asset management strategy. Newly developed processes threaten the way that municipal employees traditionally managed their business and assets. Furthermore, many of the new business processes were based on cutting edge practice, including the use of the Triple Bottom Line and risk based decisionmaking. These concepts were often foreign to asset managing staff.

ADOPTED SOLUTION

As noted above, an accurate inventory of the City’s assets is one of the keys to the development of the Asset Management Program. Corporate Asset Management produced the first Infrastructure Status Report for all of the City’s assets in 2004. These annual reports act as the main capital or financing planning tool for the corporation, detail the health of the City’s infrastructure and provide the City with a reference point to benchmark infrastructure needs.

In the last 18 months, the Corporate Asset Management Department worked substantially on the business case for asset management. A lot of this work was based on the Infrastructure Status Report, as it contains hard data that show where the City’s problems are. The Department is also working on obtaining missing data through an inventory of assets.

Steve and his team took the business case for asset management to their senior administration and the City’s Asset Management Network was established. This network consists of one representative from each department that had been carrying out asset management independently. The framework was presented to the City’s senior administration team, and the Corporate Asset Management Program was ratified.

To address the tension with operations staff, a grass-roots approach is being used: the Corporate Asset Management team works with operations personnel to show how asset management can optimize the use of operations resources, such as money, people, and time.



HOW INFRAGUIDE WAS USED IN THE SOLUTION

Steve and his team used the InfraGuide Managing Infrastructure Assets best practice as a valuable resource for the development of Calgary’s Asset Management Program. The best practice outlines requirements that are key to an asset management strategy:

- asset value;
- life cycle management;
- sustainability;
- integration of technical and financial plans;
- risk assessment;
- performance measurement; and
- high-level and detailed plans.

As Calgary’s Asset Management Program unfolds and the City develops its own best practices, the Corporate Asset Management Team will integrate the above requirements into the document.

The Managing Infrastructure Assets best practice also provides essential elements for the framework of an asset management plan. These elements are being incorporated into Calgary’s Asset Management Program and are already a cornerstone of the Infrastructure

BUSINESS UNITS MANAGING THE MAJORITY OF THE CITY’S INFRASTRUCTURE

- Calgary Police Service
- Civic Partners
- Corporate Properties and Buildings
- Emergency Medical Services
- Fire
- Fleet Services
- Information Technology
- Parks
- Recreation
- Roads
- Calgary Transit
- Waste Management
- Wastewater
- Waterworks



EACH BUSINESS UNIT WITH RESPONSIBILITY FOR CAPITAL ASSETS HAS BEEN ASKED TO PROVIDE THE FOLLOWING INFORMATION:

- A summary of their inventory of infrastructure
- A breakdown of this inventory by established category
- An estimate of the current replacement value of the infrastructure
- An assessment of the condition of the infrastructure based on physical condition, demand/capacity and functionality
- A general overview of the assets within their business unit
- A detailed overview of the key issues and major needs for individual infrastructure
- A summary of their total approved budget directly related to infrastructure maintenance and growth
- A summary of necessary infrastructure maintenance and growth needs based on current level of service and projected growth.

Status Report. The essential elements are phrased as seven basic, but vital questions.

- *What do you have and where is it?*
(Inventory)
- *What is it worth?*
(Costs/replacement rates)
- *What is its condition and expected remaining service life?*
(Condition and capability analysis)
- *What is the level of service expectation and what needs to be done?*
(Capital and operating plans)
- *When do you need to do it?*
(Capital and operating plans)
- *How much will it cost and what is the acceptable level of risk(s)?*
(Short- and long-term financial plan)
- *How do you ensure long-term affordability?*
(Short- and long-term financial plan)

Council found these elements very valuable as the questions helped identify the \$5.4 billion infrastructure funding gap in the 10-year time frame of the Asset Management Program.

The Glossary and References sections were also valuable in providing further information and complementary resources on asset management. Steve and Michael were also pleased to see that the References section of the best practice included many of the same resource documents they had already consulted. This confirmed that the most relevant



resources on asset management are being incorporated into Calgary's Asset Management Program.

VALUE AND BENEFITS TO THE CLIENT

The InfraGuide best practice is helping shape the City of Calgary's Asset Management Program. It provided valuable information to the asset management team.

Economic benefits apply to a diversity of stakeholders including the municipality, residents, and business and industry. The City will save money through the better management of municipal infrastructure, such as water and road systems. Asset management promotes the co-ordination of infrastructure upgrade and repair activities, thus allowing the municipality to make informed, and cost-effective decisions. Sustainable infrastructure also promotes economic development by creating a place where people want to live and do business.

The environmental benefits of asset management are advantageous to all stakeholders, while helping Calgary reduce its ecological footprint. As mentioned above, asset management maximizes the efficiency of infrastructure. Brian McKibbin noted, for example, that demand on the City's water resources is being managed to reduce water consumption, decrease the stress put on natural waterways by reducing the total volume of water withdrawn from rivers, as well as the total volume of water that must be treated, distributed, and then treated again as wastewater. Stakeholders will benefit from energy savings, as less water needs to be transported and treated by the water treatment plant. In addition, water efficiency reduces the amount of chemicals that need to be used for the treatment of drinking water. As mentioned above, the Asset Management Department champions infill



development to Council as a way to avoid the construction of more costly roads, and use existing infrastructure assets. As the population continues to grow, single occupancy vehicle travel will become less feasible due to congestion from the increased number of cars. Public transit use can be encouraged through infill development (on existing transit routes), and building in proximity to the C-Train, Calgary’s light rail transit. This will decrease congestion, thereby reducing air pollution and greenhouse gas emissions.

Social benefits of asset management include decreased inconveniences to residents and business caused by the interruption to services. The InfraGuide concept of the “culture of sustainability,” an enhanced

social and environmental consciousness that can have widespread and long-term benefits for a municipality, is also a vision shared by the City’s triple bottom line policy. This policy, which is the foundation of the Asset Management Program, ensures that social, environmental, and economic factors are considered in all decision-making processes.

CONCLUSION

Developing asset management strategies for infrastructure is a new challenge increasingly facing Canadian municipalities. All municipalities can look to the City of Calgary’s InfraGuide-supported strategy for developing an asset management program.

LESSONS LEARNED

A solid asset inventory and engaging all municipal departments are key factors to the success of an asset management strategy. Supported by InfraGuide’s best practice publications and InfraGuide’s national network of infrastructure professionals, local practitioners have the tools at their disposal to ensure sustainable municipal infrastructure is delivered. Measures, such as the creation of

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TESTIMONIALS

“Municipal infrastructure is the foundation for a healthy and vibrant city. This includes Calgary’s roads, parks, transit, water and wastewater systems. Despite proactive past investment programs, the City of Calgary is facing a critical challenge that is common to municipalities around the world: a \$5.4 Billion funding shortfall required to meet Calgary’s infrastructure needs.

“The City of Calgary has risen to the challenge by develop a proactive strategy to effectively manage its asset inventory. Our Asset Management Strategy, based largely on Infraguide’s guiding principles, is the foundation for infrastructure best practices that will allow us to provide effective municipal service while balancing smart growth with a sustainable quality of life. Calgary’s active participation in national efforts like Infraguide is critical for the successful implementation of an effective asset management program.”

Steve Wyton, Manager, Corporate Asset Management



an asset management network will be integral for creating a vision and corporate framework for asset management.

NEXT STEPS



Looking forward into 2007 and beyond, the team will continue to deliver highly innovative asset management process improvements and best practices.

The efforts of the Corporate Asset Management team have largely been focussed in designing and implementing an intricate capital planning process within the new multiyear capital budget process.

Specifically, it is working on developing new process, tools, and systems to enhance the Asset Management Program, including lifecycle costing and capital budget risk-based decision making with the intent to optimize Council's capital budget decisions. Looking forward into 2007 and beyond, the team will continue to deliver highly innovative asset management process improvements and best practices.

Beyond 2006, the City of Calgary will look to developing the following best practices:

1. Evolution of the existing Infrastructure Status Report to compliment the new multiyear capital budget process as a corporate infrastructure dashboard. Currently, the ISR provides Council insight into the condition of their existing assets and a glimpse into the growth needs of infrastructure. The "new" ISR would include an IT supported process that will extract raw data from the various asset management systems being developed in the corporation. This data will be

used to complete a third party business "audit" of how our capital investments are impacting our infrastructure gap (similar to a set of financial annual reporting program using balance sheets, income statements, etc.). This document will set Calgary's 10 year infrastructure strategic plan and targets.

2. Creation of a long range (50–100 year) lifecycle budgets to identify the Corporation's long term infrastructure lifecycle costs, targets and trends and possibly provide support for long range financial and service delivery plans.
3. The design and implementation of a Total Asset Mgmt Plans (and supportive processes) within each Department. This process is analogous to the Business Planning/Operating Budget process undertaken by the Corporation in 2005 but centers around infrastructure management and capital budgeting. The Asset Management Planning process will be used to support and eventually drive the capital budget process, similar to the Corporate Business Planning process driving the Operating Budget.
4. Corporate Asset Management staff will work with the City's IT staff regarding the development of a corporate IT strategy that supports a corporate asset management decision-making and includes business drivers such as Total Asset Management, Capital Budget Process and Infrastructure Status Reporting and auditing.

These complementary initiatives will be based on Calgary's triple bottom line strategy, the growth strategy, and enterprise risk management to manage the City's assets is being ensured to manage and improve infrastructure effectively.



CASE STUDY TEMPLATE

InfraGuide is always interested in knowing how municipalities have used these best practices in their effort to build sustainable futures for their communities. If you have an interesting case study that you would like to share with us, please use the following template and email it to us at [<infraguide@nrc-cnrc.gc.ca>](mailto:infraguide@nrc-cnrc.gc.ca).

DESCRIPTION

Provide a brief description of the organization or municipality and describe the scope of the project (in a few sentences).

THE CHALLENGE

Discuss the challenge faced by the municipality. What problem(s) you had to overcome (one paragraph).

THE SOLUTION

What InfraGuide Best Practices were used to overcome the challenge(s) and describe how

the best practice(s) helped you overcome these challenge(s)? If possible, describe what quantitative and qualitative measures were used to assess the project. Against what benchmark was the success of the project measured? (This section can include tables and figures.)



THE VALUE

What are the benefits of the value-added and tangible results that were derived from using InfraGuide best practice(s)?

TESTIMONIAL

Provide brief testimonials that support the use of InfraGuide best practices.

ABOUT INFRAGUIDE

A Network of Excellence

InfraGuide is a national network of experts and a growing collection of best practice publications for core infrastructure—offering the best in Canadian experience and knowledge of core infrastructure. With our founders—the **Federation of Canadian Municipalities**, the **National Research Council** and **Infrastructure Canada**, and our founding member the **Canadian Public Works Association**—we help municipalities make informed, smart decisions that sustain our quality of life. By gathering and synthesizing the best Canadian experience and knowledge, InfraGuide helps municipalities get the maximum return on every dollar they spend on infrastructure—while being mindful of the social and environmental implications of their decisions.

Volunteer technical committees and working groups—with the assistance of consultants and other stakeholders—are responsible for the research and publication of the best practices. This is a system of shared knowledge, shared responsibility and shared benefits. We urge you to become a part of the InfraGuide Network of Excellence.

PLEASE JOIN US

Contact **InfraGuide** toll-free at 1-866-330-3350 or visit our Web site at [<www.infraguide.ca>](http://www.infraguide.ca) for more information. We look forward to working with you.

INFRAGUIDE PROJECT INFORMATION

InfraGuide Contacts:

1-866-330-3350
 Fax (613) 993-2180
 E-mail: infraguide@nrc-cnrc.gc.ca
[<www.infraguide.ca>](http://www.infraguide.ca)

City of Calgary
[<www.calgary.ca>](http://www.calgary.ca)

Our products:

- Best Practice Publications
- Case Studies
- Knowledge Products
- e-Learning
- Network of Consultants



InfraGuide Best Practices

Potable Water

Michael Tobalt
 Tel. (613) 993-5722
Michael.Tobalt@nrc-cnrc.gc.ca

Environmental Protocols

Justin Brulé
 Tel. (613) 949-0192
Justin.Brulé@nrc-cnrc.gc.ca

Decision Making and Investment Planning

Harold Murphy
 Tel. (613) 993-3816
Harold.Murphy@nrc-cnrc.gc.ca

Storm and Wastewater

Bilgin Buberoglu
 Tel. (613) 991-6841
Bilgin.Buberoglu@nrc-cnrc.gc.ca

Municipal Roads

Sylvain Boudreau
 Tel. (613) 990-6641
Sylvain.Boudreau@nrc-cnrc.gc.ca

Transit

Sylvain Boudreau
 Tel. (613) 990-6641
Sylvain.Boudreau@nrc-cnrc.gc.ca