Asset Management Newsletter

FOURTEENTH EDITION – SUMMER 2015 ISSUE

Opinion Piece: Local Infrastructure - the Foundation for our Communities

Gord Hume, Past City of London Councillor, Author

I was honoured to be the opening keynote speaker at the Canadian Network of Asset Managers (CNAM) conference in Vancouver in May. The room was sold-out, and there was a lot of enthusiasm and interest in the sessions throughout the well-run conference.

In helping to set the tone for the conference, I focused on the importance of **asset management for municipalities today.** As I said in my opening,

> *"Our towns and cities today aspire to be successful, prosperous and deliver a great quality of life to local residents. Local infrastructure is the foundation of the health, well-being and economic prosperity of communities across Canada. When cities and towns talk about economic development and building wonderful neighbourhoods, it all begins with basic infrastructure."*

I believe the generally-accepted definition of Canada's municipal infrastructure deficit (which focuses primarily on the horizontal infrastructure of our towns and cities) is too shallow and limiting. I think we need to broaden the definition very significantly to include things like technology (including a modern, secure electricity and telecommunications grid), the creative needs of communities (such as libraries and a community's green and natural assets), the growing demands of the health-care and post-secondary education sectors, and the desperate need to push the provincial and federal governments to invest in their assets that directly impact municipal prosperity - things like border security, harbours, the Trans-Canada highway and many others.

In my speech, I also focused on what I see as an emerging role for assets managers across Canada—and that is to also consider design elements in the planning of municipal assets.

To quote another excerpt from my Vancouver speech,

> *"Increasingly, I think that you, as the leading asset managers in Canada, will have a greater role to play as cities design and re-build their infrastructure. From public transit to social housing, from how we use our streets and sidewalks, it is not just a numbers game on a spreadsheet. This is why it is urgent for you to understand the importance and the changing role of urban design, and the public realm, and how people use it."*

There is a global hunt for talent right now. Cities are fighting to attract entrepreneurs, smart young graduates, families starting out and people in the 'CRINK' economy - Creative, Innovative, and Knowledge-based economies. These are the jobs of today, and most certainly of tomorrow.

Graduates and job-creators are looking for fun, smart and engaged cities and towns in which to live, work, play and raise their families. Cities that create that kind of environment, that have a vibrant downtown, an active social scene and housing that is affordable are more

likely to attract this emerging talent base. As I noted in my presentation,

> *"There are direct connections between how we design and build our cities and their ability to attract talent, entrepreneurs, investors and job-creators. There is a critical link between local economic prosperity, your public places and spaces, and how you maintain and protect your civic infrastructure. Something that has been ignored by most elected people is how crucial you are to your city's prosperity agenda. This is something you should be impressing upon elected officials and senior management."*

Canada's asset managers must understand the changing dynamics of our society in Canada, as well as the shifting base globally. This will help their community to plan better for future capital asset investments. For example, the fastest-growing segment of the housing market is single-person households. Housing, particularly in metro and urban areas, is getting smaller—a 291 sq ft micro-suite in downtown San Francisco recently sold for a breath-taking $415,000. What will that shift mean to downtown public transportation plans? Will your sewers and sidewalks have sufficient capacity? The electricity grid? Accessing fresh, local food?

At the same time, there is a massive global shift of people from rural to urban settings, particularly in China, India, Southeast Asia and Africa. This will create a gigantic demand for new infrastructure investments that some are estimating at $50 trillion.

If North American cities and nations fall behind in our infrastructure, we risk our international competitiveness. However, the problem is how to pay for these investments.

In Canada we have a federal government with no urban agenda. Provincial governments are cash-strapped. The property tax system is broken and can't be fixed.

We need to **re-think our whole system of financing municipalities**. I have argued in my books and speeches for many years that we need to change the system. Municipalities need access to—and be held accountable for—a piece of the consumption taxes: Income, Sales, Gas, etc.

We need more **innovative ideas for funding capital** spending—tax-free Municipal bonds for example, and getting large Canadian pension funds to invest in municipal infrastructure.

We need to **attract Canadian philanthropists** to also consider city-building needs in their donation strategies. The US is way ahead of us in this field.

We need to make the other orders of government **understand that prosperous, strong towns and cities are the foundation for a flourishing national economy** that can compete internationally. We might even need to - *gulp* - raise taxes a bit to pay for these much-needed investments. The alternative is to dump this growing problem on the laps of the next generation, which quite frankly is a timid and lousy thing to do.

We need a **stronger commitment to innovation and creativity** in our emerging businesses and industries. And our municipalities need to cut the red tape and roll out the red carpet for investments and entrepreneurs.

Asset managers are growing in importance to successful municipalities. Your actions and leadership will be crucial to developing Canada's towns and cities, and to impacting our community's economic success in the future.

The future is very much in your hands.

Gord Hume's latest book is "Places and Spaces. (www.gordhume.com)

Articles in this Edition:

Asset Management and the Town of High River's Flood Recovery

Town of High River:
Douglas Holmes, Deputy CAO, Renewal Operations,
and Kevin Tetzlaff, Communications Advisor

The Flood

When the Highwood River spilled its banks into the Town of High River in June of 2013, it did so at a flow rate more than double the size of any flood the town had experienced in the last 100 years.

Over 13,000 people and 5,000 homes were evacuated, almost the entire population of the town. Residents were billeted for several days with friends, relatives or residents of more than 10 other communities around the province.

Almost every area of High River was impacted by the flood, with over 70 per cent of homes being affected by water. Town infrastructure and assets were heavily damaged. A total of 79 of 83 Town properties were moderately to severely damaged by water. Roads, laneways, parks, playgrounds and green spaces were affected in every part of town.

This disaster prompted the first ever State of Provincial Emergency by the Government of Alberta, and the Town remained in a State of Local Emergency for months afterwards.

The response to the event was massive, involving Town staff, resources and personnel from municipalities across the province, as well as the Government of Alberta, Canadian Forces, RCMP, Non-Governmental Organizations, businesses, contractors and thousands of volunteers. Individuals and organizations across the country also assisted with material, equipment and monetary donations.

Asset Management and Recovery

Immediately following the 2013 flood, assessments were conducted for surface and underground infrastructure including roads, sidewalks, pathways, sewer lines and water mains, all of which were damaged by the flood. In 2014 the Town began undertaking a multi-year major infrastructure repair and replacement program and conducted a complete evaluation of parks and green space remediation requirements.

Like many smaller municipalities, the Town of High River was working towards implementing an organization wide asset management program, but we did not have one completely in place at the time of the flood.

Had a plan been in place, the Town would have been starting with a comprehensive list of all of its assets with a statement on their pre-flood condition. Such a list would have assisted in at least two ways.

- First, many Town staff and contractors spent time compiling lists of Town assets so that needed repairs could be identified and prioritized. While the Town did not have to start from scratch, a comprehensive listing of all assets did not exist and would have been hugely beneficial.
- Second, some funding that the Town has and will access in relation to disaster response and recovery is targeted at the repair or replacement of existing Town infrastructure, (e.g. the Disaster Recovery Program administered by the Province and funded by both the Provincial and Federal Governments). In order to determine the extent of damage attributable to the flood, current information on the pre-flood condition of the assets is extremely helpful. Again, a maintained asset list with current information on the condition of the assets would have been an advantage.

Certainly, very current information did exist for numerous parts of the Town's capital assets, (e.g., several blocks of the downtown sewer had been videoed in the fall of 2012). However, for a disaster like the flooding of 2013, the advantages of more comprehensive and current information on the Town's capital would be significant.

Due to the widespread impact of the flood, almost every area of town requires some level of reconstruction work.

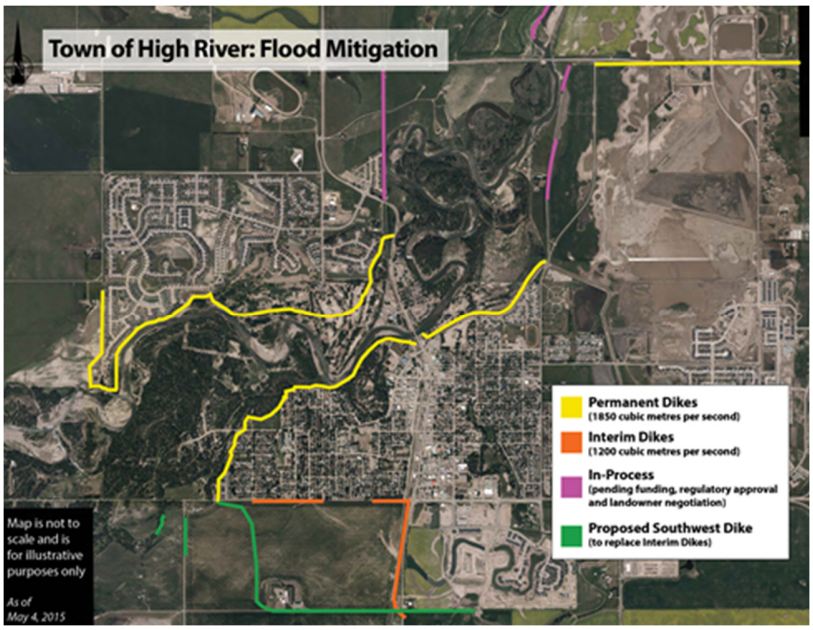
George Lane Memorial Park, located in the heart of High River's downtown, has been beautifully restored since the flood.

The Town of High River has seized this opportunity with the financial assistance of both the federal and provincial governments to rebuild the community better than ever, using innovative methods and implementing best practices throughout the organization.

One of the Town's new dikes along the Highwood River. Many of the dikes have been paved with walking and bike paths to connect the community.

One such area that the Town is working to improve is managing its approximately $500 million in assets.

This has become even more important throughout recovery, as millions of dollars are being invested in flood mitigation, underground utilities, streetscape improvements and remediation of parks and green spaces. For example, over $100 million has been invested to date in dikes and other flood mitigation measures to protect the town from future flooding.



Map of the Town's dike improvement program

Being able to cost-effectively and sustainably plan for the long-term maintenance needs of this new infrastructure will be key to the Town's continued success in the future, both for continued flood protection and to ensure financial sustainability.

Moving Forward

An organization-wide asset management plan would have assisted in High River's, or any municipality's post-disaster activities. As there are many different disasters that municipalities need to prepare for including floods, fires, hurricanes, tornadoes and others, having a viable asset management program would be hugely advantageous in optimizing response and recovery efforts.

In March of 2015, Town of High River council adopted a long-term financial plan to help guide decisions and ensure sound financial management of municipal programs, services and infrastructure. A key component of the plan is to strive to have a fully operational asset management system in place by 2018.

Integral to the success of this plan is having strong support from council and senior administration. This support has been shown through the allocation of budget dollars to move forward with implementation.

Recognizing that funding of infrastructure repairs is vital to the success of the program, council has made the proactive move to create a two per cent tax levy specifically for infrastructure replacement. All funds collected go directly into long-term savings that will only be used to undertake the repair and replacement of existing infrastructure.

An asset management working group has been formed that consists of employees from all aspects of the organization. They have begun the process of identifying the key issues and software required to implement an asset management plan, as well as how to instill larger asset management principles within the organization.

The Town continues down the path to implementing an organization wide asset management plan and will continue to work towards that goal in the coming years. One of the first milestones will be reached in the summer of 2015 when a town-wide road condition assessment will be performed and this data integrated into its GIS and other systems.

With Thanks to the following High River staff :

Tom Maier, *Chief Financial Officer*,
Gary Henry, *Utilities, Fleet & Facilities Supervisor*,
Joan Botkin, *Communications Manager*,
Claire Halpin, *Content Advisor – Website/Social Media*,
Andre Ulloa, *GIS Technician*,
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Climate Change and our Infrastructure: A Core Issue

By Guy Felio, Ph.D, P.Eng, FCSCE
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Introduction to Vulnerability and Adaptation of Infrastructure to Extreme Weather and Climate Changes

Note: This is a summary of the full article available at ***www.assetmanagementbc.ca***

It is fundamentally clear that climate change represents a profound risk to the performance of engineered systems and to public safety in Canada and around the world. As such, engineers, asset managers and decision-makers must address climate change adaptation as part of their primary mandate – the protection of the public interest, which includes life, health, property, economic interest and the environment.

Extreme weather and climate change result in significant modifications of statistical weather patterns and consequently can have impacts on design data. Physical infrastructure systems designed using this inadequate data (i.e., data that is less relevant because actual conditions have changed) are vulnerable to failure, compromising public and economic safety.

Engineering vulnerability and risk assessment form the bridge to ensure climate change is considered in engineering design, operations and maintenance of civil infrastructure. Identifying the components of the infrastructure within a system that are highly vulnerable to climate change impacts enables cost-effective engineering, operations and policy solutions to be developed.

The table below presents the "billion dollar years" of payouts by Canadian insurers. Of note is the increased frequency of those devastating years, and the fact that 2013 was the first time ever insurance companies paid in excess of two billion dollars for losses.

Billion-dollar payment years from Canadian insurance companies

Year	Main event(s) causing losses
1998	Due solely to the Eastern Canada ice storm
2005	Greatly due to the August 19 Greater Toronto Area (GTA) rainstorm
2009	Mainly due to back-to-back windstorms in Alberta
2010	Due greatly to large hailstorm in Alberta
2011	Mainly because of the Slave Lake wildfire
2012	Caused mainly by one large and two smaller hailstorms in Alberta
2013	Due to the Southern Alberta flood and GTA flood. First time ever for two billion-dollar events

(Source: McGillivray, G., ICLR 2014)

Establishing the exposure and sensitivity of infrastructure to threats, whether from natural causes such as extreme climate events or earthquakes, or from man-made sources is an integral part of sound asset management.

Engineering vulnerability is a function of:

1. Character, magnitude and rate of change in the climatic conditions to which infrastructure is predicted to be exposed
2. Sensitivities of infrastructure to the changes, in terms of positive or negative consequences of changes in applicable climatic conditions
3. Built-in capacity of infrastructure to absorb any net negative consequences from the predicted changes in climatic conditions

An engineering vulnerability assessment will therefore require assessing all three elements above.

Engineers Canada – PIEVC Infrastructure Engineering Vulnerability Assessment

Engineers Canada, with support from Natural Resources Canada (NRCan) created the Public Infrastructure Engineering Vulnerability Committee (PIEVC) which in 2008 produced a tool, the PIEVC Engineering Protocol ("the Protocol"). The purpose of this tool is to guide engineers working with other professionals in assessing the engineering vulnerability of infrastructure and develop adaptation solutions. As an engineering tool, the Protocol helps assess vulnerabilities in several related areas such as planning, operations and maintenance of the infrastructure.

Initially targeted to water resources infrastructure (potable water, wastewater and storm water), roads, bridges, and buildings, the PIEVC Protocol has since been applied to a wider spectrum of infrastructure, including dams, coastal structures, airports and electrical transmission grids and distribution networks. As of April 2015, the Protocol has been or is being used for more than 40 risk evaluations in Canada as shown in the figure below, and two have been completed outside Canada: Honduras and Costa Rica.

Locations and Type of Protocol Vulnerability Assessments Completed or in Progress as of February 2013

There are no known limitations to the type of infrastructure the Protocol can be applied to. It has been used in small (e.g., District of Shelburne, NS – population about 3,000) and large (Toronto, ON) municipalities across Canada. The complete list of applications can be found at www.PIEVC.ca

The Protocol is based on the same principles of risk assessment that are used in assessing other types of risk e.g. business, health, etc., and aligns with ISO 31000 Risk management. It provides a profile of high, medium and low risks to infrastructure from climate impacts at a screening level. It does not require comprehensive and complete data to complete an assessment. Gaps are addressed by professional judgment and experience of the inter-disciplinary team of professionals needed to define the nature and consequence of climate impacts that damage or destroy infrastructure or impede its service to the community it serves.

Experience has shown that screening level risk assessment of infrastructure climate risks produces cost-effective and timely evidence at an affordable cost to large and small communities. Recommendations to address the highest risks to improve climate resilience range from collecting more data or more targeted and quantitative engineering analysis to adjustments in operations and maintenance policies and procedures to design improvements that require additional cost information.

Incorporating Climate Resilience in the Design of Public Infrastructure in BC

Association of Professional Engineers and Geoscientists of BC (APEGBC) APEGBC, through its Climate Change Advisory Group, has published a position paper on climate change as it relates to the practice of professional engineering and geoscience (available at www.apeg.bc.ca/climatechange). APEGBC recognizes that the climate is changing and commits to raising awareness about the potential impacts as they relate to the practice of engineering and geoscience, and to providing information and assistance to members in managing implications for their own professional practice.

Recently, APEGBC has partnered with the BC Ministry of Transportation and Infrastructure (MoTI) on the creation of Professional Practice guidelines relating to climate change adaptation to provide engineers and geoscientists working on MoTI projects information on how to conduct risk assessments so their designs address a changing climate. The risk assessment component of this guideline will be based on the PIEVC protocol (but engineers will be free to use other models if they choose). Because this field of practice is evolving, in addition to establishing the standard of care that will be applied by APEGBC members, these guidelines seek to address:

- Climate science, as it applies to practice of professional engineering and professional geoscience
- The tools available to assess risk to MoTI infrastructure's due to climate change
- Resources available for professionals to help with incorporating climate change adaptation in designs
- Quality management in professional practice
- Adaptation design examples from practicing professionals
- Education and training requirements

The completed draft guideline document is expected to be completed by March 31st 2016. These guidelines will help develop a common level of expectation amongst a variety of stakeholders while establishing minimum

acceptable standards of practice for APEGBC members and licensees.

It is hoped that by conveying the information in a simple and consistent manner, the decision maker is provided with the information from which the design decisions have been made. As the tools and models used in design adaptation work are evolving, these guidelines will instruct the professional to inform the decision maker the versions of the tools and the climate models have been utilized in design adaptation.

Let's Talk About Asset Management and Climate Change

Q & A with Emanuel Machado, CAO, Town of Gibsons
by Jennifer Nichols,
Content Manager for the BC Climate Action Toolkit

The Town of Gibsons, in British Columbia, Canada, is pioneering a new approach to asset management to place nature, and the municipal services that it provides, at the core of the town's municipal infrastructure system with an Eco-Asset strategy.

The draft strategy was endorsed by Council in early February and it forms part of the Town's overall Asset management Plan. Download the strategy here: www.gibsons.ca/eco-assets

Leading the initiative is Emanuel Machado, CAO of the Town of Gibsons. The following is a short discussion between Jennifer Nichols, Content Manager of the BC Climate Action Toolkit (Toolkit) and Emanuel Machado (EM), on the Gibsons' approach.

Toolkit: *What are some of the practices associated with the Town's draft Eco-Asset Strategy?*

EM: Our strategy relies on best practices for asset management, as recommended by Asset Management BC, NAMS and others; on long term financial planning, including life-cycle costing and identifying new methods to valuate those services, as well as on ecological management by updating our practices, reducing the impact of hard infrastructure on the natural environment and understanding the services we receive from natural systems like filtration and storage of drinking water, etc.

Ultimately, we are integrating ecosystems services provided by nature that provide a municipal function into a well-established asset management practice.

Toolkit: *How does the Eco-Asset management strategy incorporate climate action mitigation or adaptation?*

EM: The strategy does both mitigation and adaptation. On the mitigation front, we make the case, business and otherwise, of the importance of identifying, accounting for, assessing, maintaining and monitoring natural assets in the same manner we approach engineered assets. As these assets have no upfront or replacement costs, cost a fraction to maintain, are carbon neutral, or even carbon positive in some cases, we need to do our 5best to maintain them in perpetuity. The woodlands and the foreshore (eelgrass) in particular have well established carbon sinking abilities, in the case of the forested areas and blue carbon (which despite still being in its infancy), offers a lot of opportunity for off-set projects.

On the adaptation front, Gibsons has recently completed a condition assessment of its shoreline and developed an action plan to rebuild at-risk areas, taking into account expected sea level rise over the next 100 years. The works will use a Green Shores based approach that will also allow for the protection of key infrastructure (sewer line along the shore) and improve the sea walk as a linear park. In a separate project at White Tower Park, we are assessing the role trees and wetlands (ponds) play in the storm water management system. The Town is highly dependent on these natural systems and it's important we understand their role, the value of the service they provide and our risk/exposure if those assets failed to perform adequately.

Toolkit: *Could the Eco-Asset management approach be adopted by other municipalities*?

EM: Yes. While the number and type of natural assets is unique to each municipality, an asset management plan that contains only engineered assets is incomplete, in my view, as these assets do not operate in a vacuum and are in fact integrated into nature. Being dependent on those natural services, as most, if not all, communities are, requires an understanding of those services and the level of dependency communities have on them. Not doing so exposes local governments to substantial risks and liabilities if those services failed.

Toolkit: *What is your advice for other municipalities determining whether a similar strategy is right for them? Can you offer advice and lessons from Gibsons' experiences?*

EM: The Town of Gibsons continues to develop its practices around natural assets and hopes to create a Toolkit to be available to other local governments, in partnership with academia, other levels of government and the private sector. In the meantime, any community keen on heading in this direction could start by identifying ecosystems services in their own community. Take for example storm water system. Are there creeks, wetlands, etc. that play role in storing, treating and conveying that water as it makes its way through the community? The very fact of recognizing the services provided by natural assets in the community leads to more informed and holistic decision-making.

Join the discussion about Asset Management and Climate Action on the Toolkit LinkedIn Group here: https://www.linkedin.com/groups?mostRecent=&gid=6783176&trk=my_groups-tile-flipgrp

The Toolkit LinkedIn group is a tool for knowledge sharing and collaboration. The group is an extension of the Toolkit website (www.toolkit.bc.ca). The site provides the latest news, best practices; practical advice, information, and strategic guidance to help BC local governments successfully reduce greenhouse gas emissions and, at the same time, strengthen their communities.

BC CLIMATE ACTION TOOLKIT

The Climate Action Toolkit is provided by a three-way partnership between the Green Communities Committee (with representatives from the Province and the Union of British Columbia Municipalities) and the Fraser Basin Council.

Front-end thinking for Integrated Asset Management - BC's Community Infrastructure Planning Decision Support Tool

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BC Ministry Of Community, Sport And Cultural Development

The Asset Management / Infrastructure Development Challenge

Aging infrastructure is a challenge that is at the forefront of local government concern.

In 2010 **Asset Management BC** assessed the state of asset management in the province and identified a need to enhance the long-term financial and infrastructure planning process, and to integrate local government departments and functional areas.

As Frank Blues, Asset Manager for the Prince George indicated at the recent CNAM conference in Vancouver, there are many things missing from current asset management and infrastructure development practice that are contributing to the infrastructure deficit and threatening the sustainability of communities. Asset management activities currently occur after the infrastructure has been designed, installed, and has been operating for some time. Some key issues are;

- Development standards are not being looked at in conjunction with development form.
- The evaluation of development, infrastructure maintenance, and service costs (RCMP, Fire, Recreation, etc.) over the long term as they relate to different development options is not common practice.
- Asset management is not being looked at from an integrated long term perspective that engages planners, engineers, operator and accountants.

It is important to ensure that the land use planning today effectively considers the long-term financial implications of land use decisions in an integrated way. This perspective can be seen as **"front-end thinking"**.

Integrating Front-End Thinking for Asset Management

The Provincial Ministry of Community, Sport and Cultural Development (MCSCD), has developed the **Community Infrastructure Planning Decision Support Tool** to help Local Governments integrate front-end thinking into asset management and infrastructure development decision making.

Front-end thinking helps to identify whether the development is contributing to or helping address the infrastructure deficit. It requires an improved understanding of costs and issues related to infrastructure renewal and replacement over the long-term. It requires taking an interdisciplinary approach to invite integrated thinking.

Front-end thinking encourages the use of tools to inform community planning discussions thereby improving the understanding of the consequences of development decisions.

"Each time a planning committee or council makes a land use decision without knowing if revenues will support infrastructure life cycle costs, it is gambling on its fiscal health" - InfraGuide

BC's Community Infrastructure Planning Decision Support Tool

MCSCD's Community Infrastructure Planning Decision Support Tool (the Tool) is designed to enable communities to compare the lifecycle infrastructure costs of different development scenarios. The Tool has the potential to play a valuable part in:

- Assisting local governments, to effectively and efficiently evaluate the long-term financial impacts of their land-use decisions and to compare alternative development scenarios over a 100 year period.
- Facilitating a collaborative discussion and decision-making process among land-use planners, engineers, and financial officers.
- Providing fast and simple planning cost and revenue estimates, as opposed to complex, detailed budgetary cost analyses.

The development of the Tool has been a collaborative process involving local governments, other agencies including the Union of British Columbia Municipalities, Asset Management BC, Fraser Basin Council, the Government Finance Officers Association, and Opus and Stantec Consulting firms.

Piloting the Tool

In the fall of 2014 six communities across BC piloted the Infrastructure Costing Tool. These six communities (City of Fernie, District of Kitimat, District of North Vancouver, District of Central Saanich, City of Prince George and City of Nanaimo) were mentored through the use of the Tool over a four month period. Each used it in ways that complimented work that they were doing. This included comparing the long-term infrastructure costs of a subdivision with single family housing vs mixed density, establishing a baseline for long-term infrastructure costs of a currently built out area, and comparing low density greenfield development with medium density infill development.

As Tiina Watt, City of Prince George, has experienced, the Tool has helped break down silos. It has facilitated collaborative decision making and this has encouraged conversation and relationship building between land use planners, engineers and financial officers. Those involved have begun to understand the value other perspectives provide and the skills and knowledge others can bring.

The visual results have helped staff more effectively understand the cost difference of different development scenarios to better inform how land use decisions are being made on the ground.

The Tool provides an opportunity to translate the values of "smart planning", traditionally explained as soft costs and benefits, in a quantifiable manner. Prince George is continuing work to identify how the tool will integrate within their development decision making framework.

Inside the Tool

The Tool allows a user to estimate the major costs of community development, and to compare alternative development scenarios. It uses a simple, nine-step Microsoft Excel-based platform and is available for free download on the MCSCD website.

The Tool requires the user to identify the characteristics of each development scenario (e.g. the types and number of residential units, types and length of roads, etc.) and it multiplies these characteristics with the capital and operational unit costs (e.g. the cost to service one household, to build and maintain one metre of road, etc.).

Once the user provides the key inputs, the Tool automatically calculates, compares, and graphs, results for the various scenarios in the following major categories:

- Infrastructure Capital Costs
- Infrastructure Operational Costs
- Infrastructure Lifecycle Cost, based on a 100 year time horizon
- Private User Costs, including driving costs and home heating costs
- External Costs, including: air pollution, climate change, motor vehicle collisions

The Tool can provide estimated costs for the local government, the developer, and private users. This helps in providing a clear analysis of alternatives to inform critical planning decisions that will have long-term consequences for infrastructure spending.

Conclusion

The case for more complete, compact development patterns will likely continue to strengthen as communities address their fiscal and infrastructure deficit challenges, and implement an integrated asset management approach. With this trend, comes the need for tools to help bring together the information needed to encourage more integrated decision making that considers the financial, social and environmental implications of development.

The Community Infrastructure Planning Decision Support Tool is such a tool and part of a continuum of tools, projects and processes supporting local governments to address growth and development in a holistic way and create a foundation for informed decision making to support long-term sustainable development and asset management.

COMMUNITY INFRASTRUCTURE PLANNING DECISION SUPPORT TOOL

BRITISH COLUMBIA

The Infrastructure Costing Tool and related information can be found on the Ministry of Community, Sport and Cultural Development's website:
http://www.cscd.gov.bc.ca/lgd/greencommunities/sustainable_development.htm

Also look out for the "Community Infrastructure Planning Decision Support Tool" group on LinkedIn - coming soon.

Burnaby Adopts MMCD Asset Data Exchange Standards

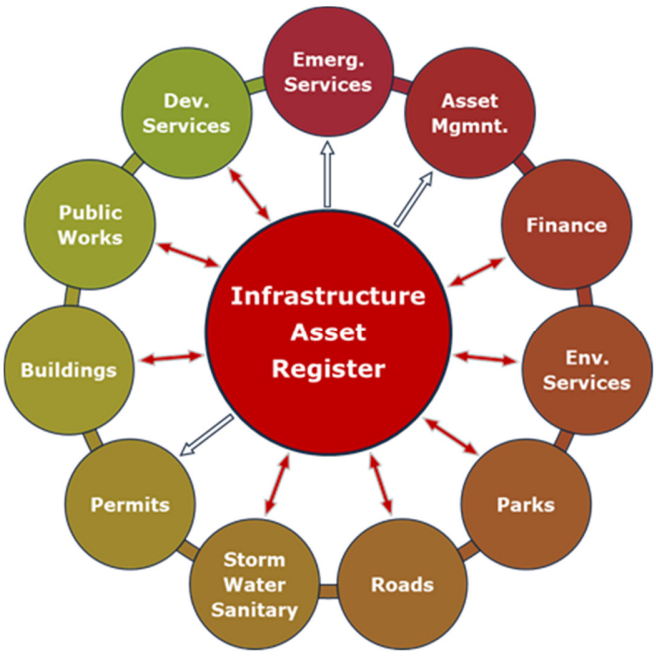
Jonathan Helmus, P. Eng. Burnaby
Assistant Director Engineering-Infrastructure & Development
Andrew Walther, P. Eng., APW Engineering

Over the last several years Local Governments in British Columbia have been making significant efforts to institute practices required for sustainable infrastructure data management. These efforts have not only been necessary for TCA reporting and compliance to the PSAB 3150 accounting standards, but also to better serve both internal and external consumers of infrastructure data.

Equally important to the ongoing management and distribution of infrastructure data is the collection of data as infrastructure changes on a daily basis, through both capital programs and maintenance activity. The City of Burnaby's new Infrastructure Asset Data Exchange Standard is based on the MMCD (Master Municipal Construction Documents Association) Municipal CAD Standard, and provides consultants with tools to assign required attributes to infrastructure data. Approximately 80% of Burnaby's capital program is executed to replace aging infrastructure that is at the end of its useful life. The intent of the Asset Data Exchange Standard is to automate the delivery of attribute rich data that accurately reflects changes to existing infrastructure and newly created infrastructure assets.

Infrastructure Data Consumers

Many Departments at the City of Burnaby have a vested interest in working with infrastructure data. Finance require access to infrastructure data for Tangible Capital Assets (TCA) compliance and accounting practices. Emergency Services require good information relating to the location and configuration of fire hydrants and roads. Transportation and public utility departments require data to assess community needs, plan and carry out activities relating to the annual capital plan, and to ensure the required level of service for public assets is being met. Similarly, Public works and operations departments are using infrastructure data on a daily basis for ongoing proactive and reactive maintenance and operations activity.



Suppliers and Users of Infrastructure Data

It was not until the introduction of the PSAB 3150 accounting standard that many Local Governments began to seriously contemplate changes to practices relating to infrastructure data management. As evidenced in the diagram above, infrastructure data is of

importance to many Local Government functions. The awareness of this is increasing and the age old methods of referring back to hardcopy drawings in a vault and associated spreadsheets, are slowly being replaced with processes and technologies centralized on both spatial and tabular digital data.

Asset Data Exchange Standard

Over the past few years the City of Burnaby has required engineering consultants to provide Asset Identification Drawings as part of the infrastructure design submission. These drawing duplicated the engineering drawings and were graphical portrayals of new infrastructure assets, intended to both align with construction payments, and support financial audit reviews. The drawings were complemented with spreadsheets to show required attributes for tracked assets. The spreadsheet information was loaded into a financial asset register, whereas the spatial information was recreated in a GIS asset register.

The City of Burnaby MMCD Asset Data Exchange Standard facilitates an automated process for infrastructure data recording and submission that is more efficient and less prone to error. This new standard replaces the old "label and table" method for data recording and entry, and allows consultants to enter the data directly in the drawing when the data is initially created.

There are four categories of data that are required for each infrastructure project:

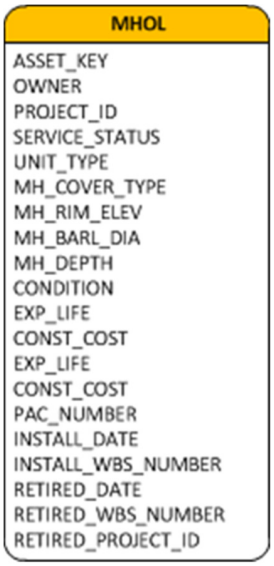
- **Existing Recorded Assets** – data for existing infrastructure sourced from City of Burnaby GIS, delivered in AutoCAD drawings compatible with MMCD Municipal CAD Standard, and using AutoCAD Map 3D object data tables for attribution, including the asset Service Status, which is reflective of the lifecycle state
- **Existing Surveyed Assets** – topographic survey data created by the consultant required for the detailed design and submitted to the City of Burnaby to validate and update asset locations and details in GIS
- **Proposed Design Assets** – design data reflective of assets to be constructed required for entry into City of Burnaby Finance systems
- **Construction Recorded Assets** – construction asset data created by consultants reflective of as constructed conditions

Data submitted to the City after design and construction is then processed using Safe FME software which can then feed data to City of Burnaby engineering and finance data systems. The four data categories are maintained in separate drawings to facilitate data creation/management and optimize post submission data processing.

All of the drawings are created using the MMCD Municipal CAD Standard. AutoCAD layers are prefixed with R-* for existing recorded assets, V-* for existing surveyed assets and C-* for proposed design assets. The constructed recorded assets drawing is created by duplicating the proposed design assets drawing and updating the data to reflect as constructed conditions.

AutoCAD Map 3D Object Data Tables

AutoCAD Map 3D object data tables are used for asset data attribution and have been created to be non-discipline specific, meaning that the Manhole (MHOL) object data table, for example, can apply to both sanitary and storm manholes. Safe FME software reads the layer placement to determine the type of manhole. This generic approach to object data table development means fewer object data tables to maintain and improves ease of use by consultants. The object data tables are populated with both physical properties and lifecycle management attributes.



AutoCAD Civil 3D

The use of AutoCAD Civil 3D is encouraged but not required on City of Burnaby infrastructure design projects. The key AutoCAD Civil 3D functionality to be leveraged is the use of pipe networks to model sanitary, storm and water systems. The benefit to consultants using AutoCAD Civil 3D not only lies with increased design efficiency but also in that physical properties such as elevations, grades and pipe diameters can be extracted directly from the design objects. This means that consultants using AutoCAD Civil 3D are not required to enter data representing physical properties in the AutoCAD Map 3D object data tables.

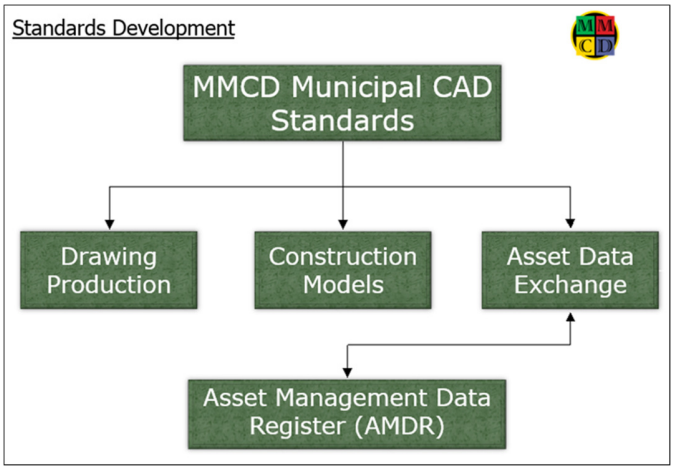
MMCD Infrastructure Procurement and Lifecycle Management Standards

Before discussing the City of Burnaby Asset Data Exchange Standard, it will be helpful to understand the entire suite of MMCD infrastructure data standards. The BC Master Municipal Construction Documents Association delivered the first BC Provincial CAD standard for infrastructure procurement with the release of the MMCD Municipal CAD Standard. This infrastructure procurement standard introduced consistency for both the AutoCAD and AutoCAD Civil infrastructure survey, planning and detailed design applications.

- **AutoCAD** standardized components include layers, blocks (symbols), text/dimension/multileader styles, page setup configurations with title blocks and color style tables for plotting.
- **AutoCAD Civil 3D** standardized components include survey codes, point group definitions, object styles, label styles and drawing/feature/command settings.

Since its first release in 2009, the MMCD Municipal CAD Standard has gone through 4 major updates and is used by many BC Local Governments and engineering consulting firms.

MMCD infrastructure procurement and lifecycle standardized components also address drawing production, construction, constructed asset data collection and lifecycle management. The suite of standards for infrastructure procurement and lifecycle management address individual project phases, and are shown in the following illustration.



MMCD Infrastructure Data Standards

The Drawing Production, Construction Modeling and Asset Data Exchange Standards are all subsets of the MMCD Municipal CAD Standard, and are described in the following sections. The Asset Management Data Register Standard is also discussed.

Drawing Production

The MMCD Drawing Production Standard brings consistency to the typical infrastructure engineering design drawing set by providing guidelines for required drawings and standards for presentation of infrastructure data. The Drawing Production Standard is intended to:

- optimize the legibility of design and construction data
- present data based on modern day staking and construction techniques and
- align the presentation of the data based on what AutoCAD Civil 3D can best produce

The development of the Drawing Production Standard is currently underway in a collaborative effort with the City of Burnaby.

Construction

AutoCAD Civil 3D is classified as a BIM (Building Information Modeling) tool where designers create models of proposed infrastructure works, and from these models extract data required for construction such as staking data, quantities and contract sheets. The intent of the MMCD Construction Standard is to outline the level of detail for design models required for construction.

The Construction standard has yet to be developed.

Asset Data Exchange

The MMCD Asset Data Exchange Standard is the topic of this article and provides guidelines for the submission of *constructed asset records* in spatial (graphical) with attributes, as required for lifecycle management and financial accounting purposes.

This standard is applied to existing infrastructure data in order to capture the new lifecycle state (removed, abandoned etc.) of the asset and data reflected of newly constructed infrastructure assets.

The Asset Data Exchange Standard was developed as a collaborative effort with the City of Burnaby and will be "neutralized" to a MMCD infrastructure procurement standard later this year.

Asset Management Data Register (AMDR)

The Asset Management Data Register (AMDR) Standard is used by Local Governments and offers standards for infrastructure data storage. The AMDR standard was developed in response to the introduction of the PSAB 3150 accounting standard and represents a data schema that offering guidelines for infrastructure features, naming conventions, physical properties and lifecycle management attributes.

Asset Management and GIS technology vendors have incorporated the MMCD AMDR schema into their software, thereby offering a localized flavor to their respective technologies. In addition to the schema, the AMDR also delivered a Microsoft (MS) Access database utility – the Infrastructure Data Manager – for use by the many smaller Local Governments and First Nation Communities lacking access to sophisticated GIS and Asset Management Systems.

Next Steps

The City of Burnaby is in the final stages of development of the Asset Data Exchange Standard, and is currently working on a Drawing Production Standard required for engineering drawing presentation consistency. Once completed these two projects will be "neutralized" to an MMCD flavor for use by other Local Governments in the BC. The biggest challenge for Local Governments is building an awareness to the importance of the data and subsequent enforcement of submissions.

We are lucky in BC in that the vast majority of consultants are creating their designs using AutoCAD and AutoCAD Civil 3D. Add MMCD's suite of infrastructure procurement and lifecycle management standards to the mix and there is enormous opportunity to implement processes that are wholly dependent on the use of standards. The benefits to the stakeholders speak for themselves.

For more information on the project, please contact Herman Louie (herman.louie@burnaby.ca) at the City of Burnaby.

CAO's Organization an Important Partner in Asset Management (LGMA)

The Local Government Management Association (LGMA) has been a partner and active supporter to increase knowledge and expertise across BC local governments on asset management principles, processes and approaches for the past several years, serving first on the Local Government Asset Management Working Group and later the Asset Management BC committee.

The LGMA also collaborated in the preparation of a Guide for Developing a Municipal Asset Management Policy in 2009, and has promoted long-term financial planning, sustainable service delivery and asset management policies with the GFOA-BC (Government Finance Officers' Association) of BC and other Asset Management BC partners.

Asset Management BC is a stakeholder advisory group, co-chaired by Andy Wardell, Director of Financial Services, District of North Vancouver, and David Allen, CAO, City of Courtney. Together they have been outstanding advocates and leaders in the local government arena, helping their colleagues across BC to understand the key policies and decision-points necessary to address the growing infrastructure deficit and the significant challenges faced by many councils for financing asset renewal.

The LGMA is raising awareness and providing information to help its members understand more about what's being done in the field of asset management and the experiences of BC local governments in addressing infrastructure renewal and financial and service sustainability. This is the best way for the LGMA to contribute to the work of Asset Management BC. In September 2013, the District of North Vancouver presented their learning and experience to more than 80 CAOs at the LGMA Breakfast at UBCM. Their key messages still resonate:

- Municipal infrastructure provides the foundations on which our economy rests, and municipal infrastructure is one of the most asset intensive of all businesses.
- The sustainability of services is the primary objective, and the one that is most critical for sound council stewardship but also the hardest to develop when councils tend to focus more on short term versus long term planning.
- Asset management is one tool in the toolkit to support sustainability of services and can enable financial and operational integration, improved decision-making and increase the

confidence of both the public and council in resource allocation.

- The challenge for local governments is to develop sound change management strategies, develop champions throughout their organizations, reinforce interdisciplinary teamwork and strive for collective learning that emphasizes "measuring to learn".

The LGMA's quarterly magazine Exchange edition in Fall 2014, also highlighted asset management practices, including a strong call to action to local governments, to address their infrastructure challenges and (building on a 2012 article), to raise awareness of asset management. The articles profiled best practices and the work under way in two smaller BC communities, and encouraged all local governments to evaluate and report publicly on the their state of infrastructure, implement sustainable infrastructure asset management practices, and make a start to secure funds through a long-term financial plan.

A proud supporter of Asset Management BC and its stakeholder network, the LGMA encourages its members to review and use the newly released Framework - *Asset Management for Sustainable Service Delivery: a BC Framework* and to check out the *Canadian Infrastructure Report Card and Asset Management Primer*. They are tremendous resources to help carry the work of infrastructure renewal forward.

Tips and Tactics: How to Communicate Infrastructure Asset Management

Compiled by Bernadette O'Connor,
from an article by Anna Robak, Renee Murphy & Shawn Landers
of Opus International Consultants (Canada) Ltd

Wanted: Asset Managers who can tell a good story!

If you have ever had to convince decision makers of the need to invest in asset management, chances are you were challenged to demonstrate "proof" of the need or the benefit.

Albert Einstein once said that "if you can't explain it simply, you don't understand it well enough".

While this may be true, there are notable challenges to effectively communicate asset management to decision makers. Although the science of asset management is well established and has been documented in numerous frameworks, asset managers continue to struggle to tell their story to both decision makers and to the public.

The potential for asset management to improve the investment of public money is enormous, and unlocking this lies in the way we communicate asset management.

In other countries, who have long histories in asset management, it is now widely accepted that asset management is something that all fiscally and socially responsible organizations do. However they also struggled with telling a good asset management story and some asset managers still struggle even when the concept of asset management is widely accepted.

So what are the stumbling blocks?

AM Communication Barriers

- Some decision-makers think the organization is already doing AM – so why do more?
- Many staff and decision-makers are unclear about what AM is.
- Often the people in an organization and the politicians do not have a clear view of how interconnected everyone is and how each ones actions and decisions influence other outcomes and can have long term impacts not visible today
- Few organizations in the early phase of AM fully understand and value the process of putting time and effort into genuine coordination, planning, and reviewing outcomes – but this upfront investment will save so much more in the long run.
- Asset managers do a lot of analysis before an investment is made, but very little analysis after the fact that proves the investment had the costs and benefits they said it would.
- Capital projects tend to get more funding and more media attention than asset management. The outcome of a capital project is more visible that AM outcomes. The physical size of a capital investment makes a greater impact on public opinion. Politicians in particular aim for major impact and they have the power to prioritize a capital project over an operations or maintenance investment.
- As many infrastructure decisions are influenced by politicians who want to make an impact during their tenure, the relative shortness of election cycles means that politicians favor initiatives with immediate results over those with longer-term benefits. The outcomes from asset management initiatives, however, take longer to materialize.
- Politicians are also influenced by people in the community. It is human nature to want "results fast" and we cannot expect to overcome human nature but with visual and memory aids, we can

try to convince people to wait for something better or to choose a greater good.

- There is a growing demand from the public and government for greater transparency and this means that more of the stakeholders to whom we are communicating are not engineers, accountants or asset managers. They are often unfamiliar with what the AM data means and if they can't understand the data, and what we tell them, why should they "trust us"?
- Sometimes we can be constrained by a fear of being judged poorly. Often this is based on past history and real events. When this fear is strong it can override a desire to be transparent and this will adversely impact communications.

Many of the barriers of communicating asset management are about how visible and relevant we make it. However the bigger issues that underlie and impact this are: our lack of reaching out; lack of evidence; and perhaps fear that asset management does not bring the benefits we say it does.

Without evidence, it is difficult to convince anyone of anything. It is critical therefore that we measure before and after impacts and compare these to report benefit in a tangible and meaningful way. Record case studies and share case studies of real results, in Canada, in similar organizations, and within your own organization.

Bridging the language barrier is now more critical than ever as governments grapple with complex decisions around aging infrastructure and with the public increasingly becoming active participants in the dialogue.

The following are some tools and techniques available for successfully communicating asset management. Some are relatively easy to do and may seem obvious, but often it is the obvious or easy that are overlooked! Other techniques are more involved and require a well-planned strategy.

Communication Techniques

- **Start with What You All Can Agree On:** One of the most successful ways of communicating with people is to start with the context, and outcome or a truth that everyone can agree with. Then you can move into more detail.
- **Validation and Transparency:** There is something powerful about having work validated by an independent third party.
- **Provide Meaningful Context:** To have good dialogue with stakeholders, existing information must be presented first, and presented in a way that allows people to make intuitive assessments.
- **Influence Diagrams:** These are detailed graphical representations that map systems all the way from root cause to end impact.
- **Spatial Representation:** People are drawn to spatial representations. They are able to make cognitive connection to the subject matter and can retain the information longer.
- **Dashboards:** These are relatively simple communication tools that visually display key statistics and performance metrics.
- **Nudging:** Is applying soft tactics that can drive changes such as speed message signage to change driver behaviour and water metering to generate conservation of water.
- **Non-Technical Translators:** Because technical jargon constrains communication it can be useful to use a skilled communicator from another discipline such as a planner.
- **Video Story Telling:** Short video clips (analogies, interviews, animations and humour) can be very effective in communicating key messages.
- **AM Games and Simulation:** Explaining AM using games is a way to introduce concepts and get people aligned in their thinking.

Conclusions

The potential for asset management to improve the investment of public money is enormous, and the answer to achieving maximum improvement lies in the way we communicate asset management.

Successful communication requires thought, time and coordination – but this upfront investment will save us millions, and perhaps billions, in the long run.

Without evidence, it is difficult to convince anyone of anything. It is critical therefore that we measure before and after impacts and compare these to report benefit in a tangible and meaningful way.

The asset management world is complex, and it is not surprising that some decision makers and the public will not understand why we might make a particular decision. However there are many communication tools and techniques that have proven effective. Use ones that fit your audience and your message.

Upcoming Events

Asset Management BC
September 30, October 1&2, 2015
NAMS training course for Asset Management
Vancouver Island
www.assetmanagementbc.ca

BC Water &Waste Association
Sept. 15 – 18, 2015
Western Canada Water 2015 Annual Conference and Exhibition
Winnipeg MB
www.bcwwa.org

Public Works Association of BC
Sept. 20-23, 2015
Technical **Conference** and Trade Show Victoria Public Works
Penticton, BC
www.pwabc.ca

Union of British Columbia Municipalities
September 21 – 25, 2015
Annual Convention
Vancouver Conference Centre
Vancouver, BC
www.ubcm.ca

Planning Institute of BC
Nov. 18 - 19, 2015
– Urban Design – Economic Fundamentals
Simon Fraser University
Vancouver, BC
www.pibc.bc.ca

Centre for Advancement of Trenchless Technology
November 17 – 19, 2015
Conference and Trade Show
Executive Airport Plaza, Hotel & Conference Center, Richmond/Vancouver, BC
www.cattevents.ca

Federation of Canadian Municipalities
February 9-11, 2016
Sustainable Communities Conference and Trade Show
Ottawa, ON
www.fcm.ca

Canadian Network of Asset Managers
May 8-11, 2016
9th Annual Networking Conference and Workshops
Conference Centre / St. George Hotel
Halifax NS
www.cnam.ca

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Asset Management: Questions and Answers

Responses provided by Editorial Panel

Note to Readers: *You are invited to email questions or comments to Asset Management BC or to the editor – see final page - and you can note in your email whether you wish your comment or question to be published.*

Raising questions and making comment are strongly encouraged as this newsletter is provided for the greater good of all types of Local Governments managing infrastructure and for the advancement of Asset Management within the Province.