CITY OF GRAND FORKS

ASSET MANAGEMENT INVESTMENT PLAN

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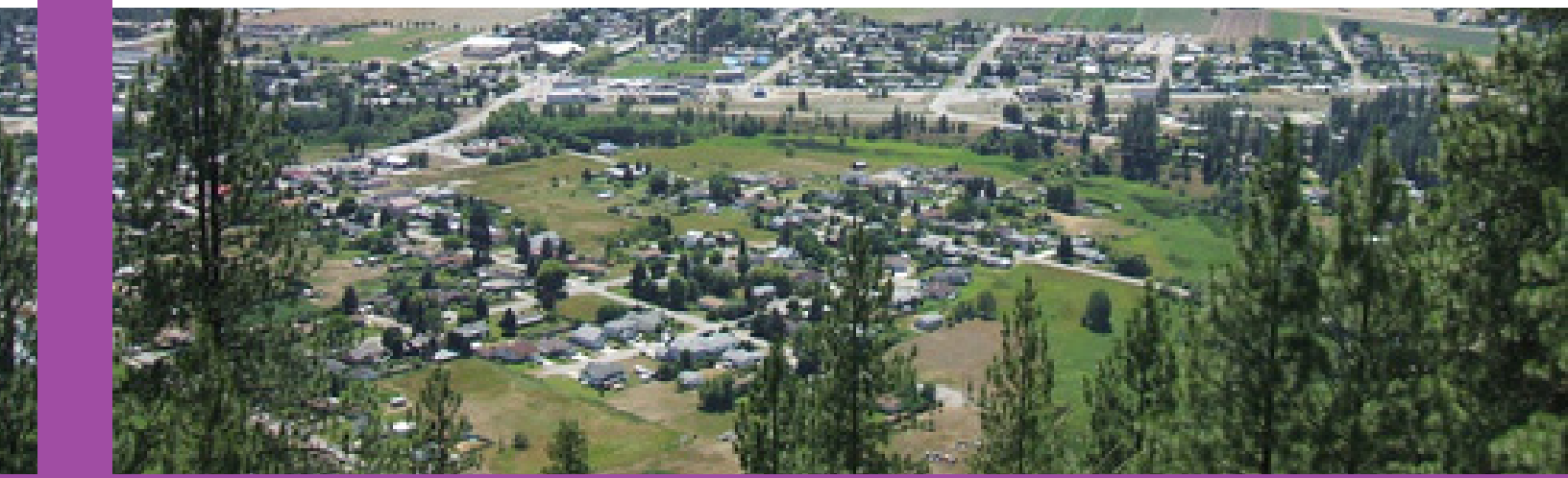

March, 2011

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EXECUTIVE SUMMARY

The City of Grand Forks is responsible for providing and maintaining a wide variety of infrastructure. This infrastructure is vital to the well-being of the residents and businesses in the community; however, a significant proportion has reached, or will be reaching, the end of service life very soon. The City would like to maintain a sustainable foundation of infrastructure that is affordable, provide service levels consistent with resident's expectations, and attract to new residents and businesses. Maintaining existing levels of service will require major investments in the near future.

An Asset Management Investment Plan (AMIP) has been created as a first step in the City's Asset Management Program. The AMIP model presents a sustainable investment scenario for the City's linear and non-linear infrastructure assets over a 20 year period. It is functional (can be used immediately as an early win); and transitional (built through a collaborative effort between functional areas), provides invaluable infrastructure information to guide future master and strategic plans, and enables the integration of functional areas into a team approach to decision-making. The AMIP will also help achieve the Grand Forks Sustainability Plan's guiding principle of ensuring long-term sustainable municipal infrastructure.

The AMIP estimates the **full replacement value** of the City's linear and non-linear infrastructure assets to be approximately $127 million (2010). This infrastructure has a **remaining (deteriorated) value** of approximately $53 million (2010), meaning that the average expected remaining life of these assets is 42%. The remaining life represents an overall condition level of Fair, however it is important to note that this does not accurately reflect the condition of specific asset components. For example, significantly lower remaining service lives can be seen with the sanitary sewer mains, stormwater mains, and roadway system.

There is a total **infrastructure deficit (backlog)** of approximately $32 million (2010). The City's three major asset components (roadway, water and sanitary) together have a deficit of almost $27 million. **To put this number in perspective, the $27 million deficit is equal to the full replacement value of the water system.**

An **average annual investment (renewal budget)** of $3.85 million is required to address infrastructure deficits and maintain a sustainable level of investment moving forward.

The development of this initial AMIP for the City is the rallying point for creating a robust infrastructure investment decision-making framework. An AssetSmart workshop with Mayor and Council, as well as a draft public outreach program, will be undertaken as part of this current project. Additional steps are recommended for the City's consideration in the ongoing evolution of their Asset Management Program.

1.0 BACKGROUND

The City of Grand Forks is a community of approximately 4,000 residents that are experiencing significant change. Current demographic trends indicate that within the next few years, a significant proportion of the population in Grand Forks will be over the age of 65. Looking ahead twenty years, assuming a mid-range growth rate of 1%, the population is expected to grow to 5,000 residents. With current economic challenges facing the community, the economic viability of Grand Forks is a very high concern. As with many other communities, you may find yourself asking the following questions:

- What is a sustainable community?
- How do we create a sustainable community?
- How can we ensure residents have the services they need and prefer?
- What levels of service are affordable?
- How can we find enough money to do all of this?

A significant part of the answer lies in how communities manage infrastructure. This report helps to address some of these questions in the context of asset management, specifically through the City's first Asset Management Investment Plan (AMIP). A good AMIP has the following benefits:

- Makes the best use of Council's time;
- Ensures Council, management and staff expectations are aligned;
- Aligns community expectations with affordable service levels and reasonable risk;
- Ensures value for money through least life cycle cost management and asset supply;
- Integrates decision-making and budgeting (performance-based budgeting);
- Provides a sustainable asset base to expand upon;
- Supports a stable organization driven by business principles rather than individual preference;
- Builds a healthy and focused workplace with top performers and low staff turnover; and,
- Quantifies investment priorities and benefits for the public

The outcomes of the City's AMIP are summarized in the following sections, along with an overview of what others are doing to manage community infrastructure. Staff have been engaged throughout the process to ensure a strategic direction that is forward-looking, while remaining well-grounded in information that is credible and defensible for decision-making.

1.1 Infrastructure and Community

The City would like to maintain a sustainable foundation of infrastructure that is affordable, provide service levels consistent with resident's expectations, and attract new residents and businesses. Key considerations in planning for a sustainable future include:

- Composition and diversity of the City's future economic base
- Attraction and retention of young working families to the community

- Availability of health services for an aging population
- Emphasis on local food production and consumption
- Emphasis on sustainability and self-sufficiency

Recognizing the ever-changing world with respect to the global economy and climate change, the City would like to be poised and prepared for the future. The City has developed guiding principles for the Grand Forks Sustainability Plan. This includes the principle of **ensuring long-term sustainable municipal infrastructure.**

Sustainable infrastructure is linked to creating and maintaining a vibrant community. Infrastructure attracts people to live together in the same space – living together creates community – healthy communities require social programs – healthy communities attract business – healthy infrastructure promotes population and business retention and growth.

This cycle is illustrated in **Figure 1.**

When it comes to the infrastructure necessary to promote and provide a community its social and economic affluence, the choices are simple and the consequences of neglect or under funding are dire; a community funds the repair and replacement of its infrastructure to an adequate service and risk level, or the infrastructure continues to age until it expires (failure). This is the same infrastructure that attracts and retains residents and businesses.

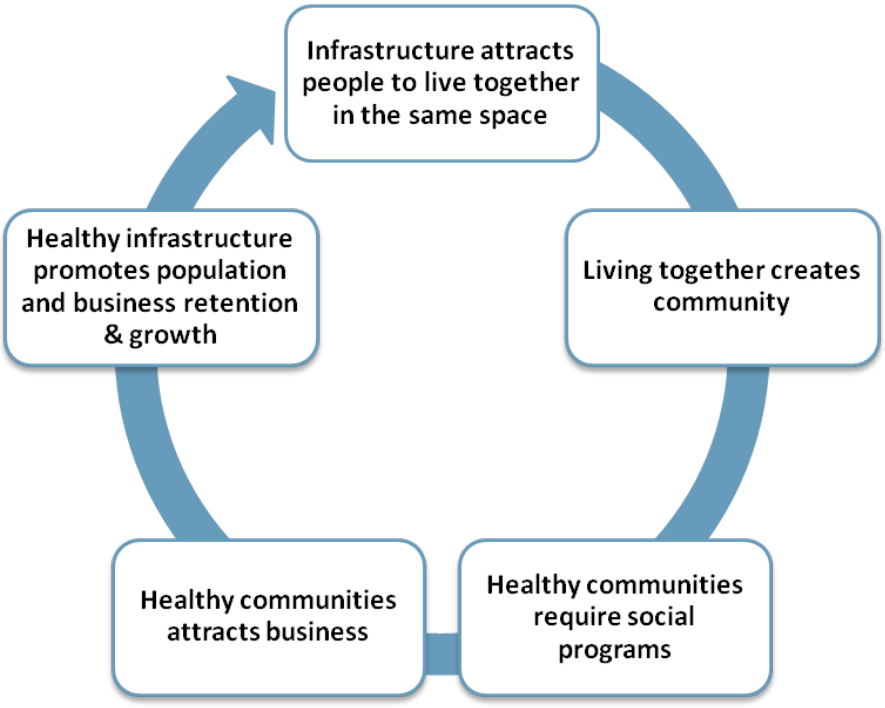


Figure 1

1.2 Roles and Responsibilities

The City of Grand Forks is responsible for providing and maintaining a wide variety of infrastructure. This infrastructure is vital to the well-being of the residents and businesses in the community. With ongoing use and the passage of time, existing infrastructure is deteriorating. Much of the City's infrastructure will be reaching the end of service life over the next few decades and will require a significant investment to maintain existing levels of service.

Reinvestment in the infrastructure, which includes replacement and restoration, is required to ensure that the City's asset base is preserved and that future generations are able to enjoy the same quality of service. Similar to sustainability, asset management is about planning for the needs of today without compromising the needs of future generations.

The success of the City's Asset Management Program is based on a supportive and functional team of senior decision-makers. To maintain a vibrant and healthy community, the following elements are important:

- Community look and feel
- Accommodations
- Safety and health
- Affordability
- Amenities
- Proximity to family and friends

This will in turn attract new business and help support the diversity of the City's economic base.

1.3 Asset Management Trends

Managing the supply and repair of public or private infrastructure is not new – it has been around for centuries. What is new, or relatively recent, is the growing competition for the diminishing funds available to provide the public with the cost effective, balanced and affordable levels of service that they expect and require of their preferred community. Close scrutiny appears to show that governance or decision-making became fractured and dislocated **(Figure 2**).

Over the past 20 years, asset management practitioners have successfully focused on the technical components

of asset management: inventories, GIS mapping, condition assessments and tangible capital asset accounting. These technical components are very good analytically yet miss the integration and transitional building blocks necessary for communities to make progress in an affordably sustainable manner. **The missing integration and transitional pieces are the blueprint or framework for the successful implementation of an asset management business practice.** A community needs to change or modify itself to adopt and institutionalize asset management business techniques consistently throughout its organizational structure. It is very challenging for asset management to take hold in a community when only a few functional units participate, while other functional units remain unchanged, or if the change does not enable consistent trade-off analysis across all tangible capital assets. The unchanged functional units or inconsistencies prevent overall integrated decision-making, a performance-based budgeting process, and the pursuit of incremental revenue generation strategies and practices.

Change does not have to be radical; it can be a matter of closing governance gaps (direction-setting and decision-making gaps) through cross-functional teams and

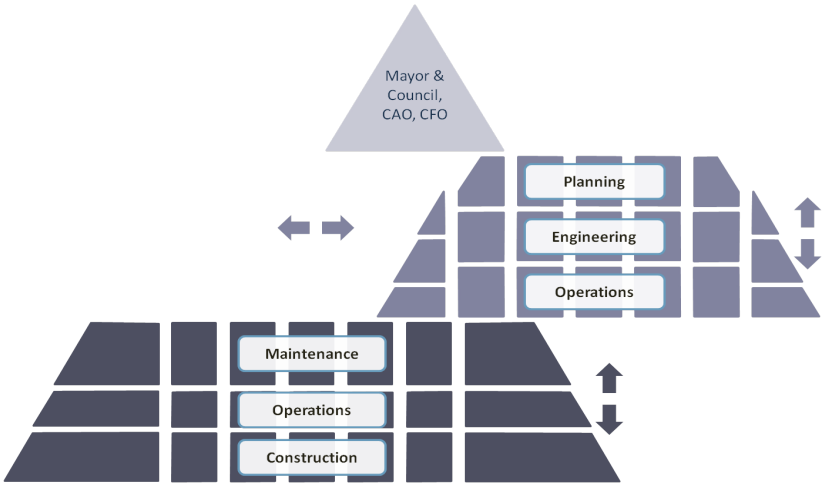


Figure 2

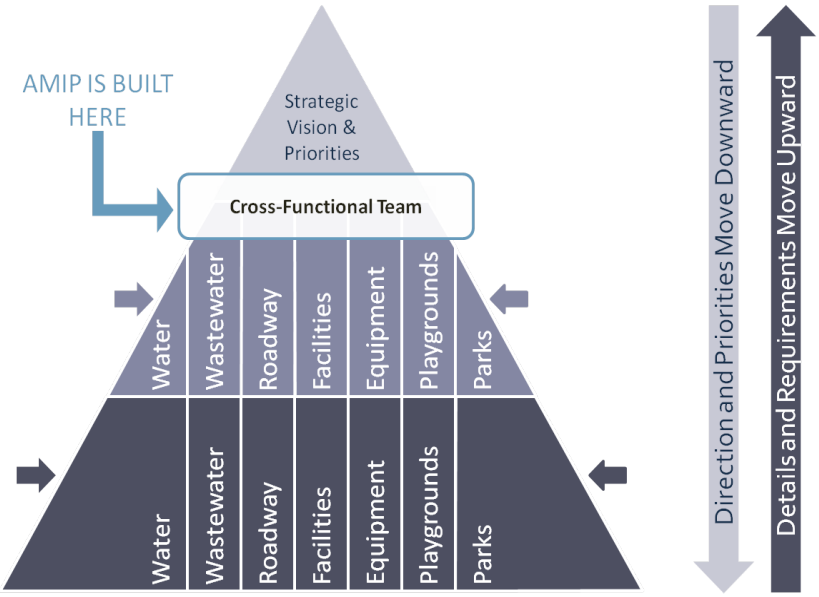


Figure 3

long term multi-asset planning and programming (**Figure 3**); and this is the essence of modern asset management. Change is most successful if introduced through a rallying issue or product, with early wins. For the City of Grand Forks, this rallying point is the AMIP. The AMIP is functional (can be used immediately as an early win); and transitional (common to all functional areas), provides a target format for future master plans and implementation, and enables the integration of functional areas into a team approach to decision-making.

The importance of using the AMIP as a starting point is underscored by its prominence at the beginning of each annual cycle in setting the context and direction for managing the community's infrastructure. The 'directional' positioning of the AMIP up-front in integrated asset management governance also shapes the fullness of the governance framework, as well as the downstream processes and procedures. It should therefore follow that a weak, incomplete or partial AMIP will result in a weak framework with processes and procedures that are subject to broad interpretation. Without the AMIP there is little control over what comes out of the overall integrated asset management governance each year. This creates an environment of uncertainty which adversely affects line staff, and prevents Councils from achieving long-term value.

1.4 What Others Are Doing

In 2009, the BC Government undertook an assignment to gain an understanding of how municipalities were using modern asset management business principles and techniques to manage their infrastructure. Their intent was to determine what next steps were necessary in helping municipalities move forward in implementing and adopting these business principles. The findings of this assignment showed an interest in asset management business practices, but an inability to adopt them and reap the benefits. This finding was supported by 2007 Federation of Canadian Municipalities report, Danger Ahead: The Coming Collapse of Canada's Municipal Infrastructure.

While providing value for money services to constituents has always been a goal of municipalities, a new awareness of growing deficits has created a renewed urgency around identifying and adopting additional asset management business skills. A number of communities are undertaking recent asset management activities to address the long term operations of key infrastructure. This includes, but is not limited to:

- Lake Country
- Cranbrook
- New Westminster
- Castlegar
- Peachland
- UBC Endowment Lands

1.5 Layout of Report

This document is organized in the following sections:

1. Background – discusses the origin of the project and methodology
2. Overview of Asset Management Investment Plan – explains the purpose and methodology of the project
3. Asset Management Investment Plan Model – presents a sustainable scenario for the City's infrastructure assets

4-9. Linear Asset Component Summaries – summarizes the water, sanitary sewer, stormwater, electrical and roadway infrastructure systems

10. Conclusions and Recommendations - provides suggested next steps in the City's Asset Management Program.

2.0 OVERVIEW OF ASSET MANAGEMENT INVESTMENT PLAN

The City has undertaken the development of an Asset Management Investment Plan for use in the next budgeting cycle. The AMIP will be a high-level 20 year forecast of the expenditures required for all infrastructure necessary to maintain adequate and sustainable levels of service, condition and risk. For this iteration of the AMIP, age and condition were defined in consultation with the Grand Forks team.

This 20 year AMIP will provide Grand Forks with its first long term multi-asset investment plan. The intention is to support community decision-makers by presenting the information needed to better understand the level of expenditure required to maintain the City's infrastructure at a sustainable level. This understanding provides a sound basis for estimating and pursuing long term revenue generation strategies to offset these costs. Future iterations of the AMIP should include assessments of levels of service, performance and risk.

The AMIP identifies infrastructure deficit where it exists in each asset category (e.g. water system, sanitary system, etc.), and produces an improvement model that addresses deficit and regular annual repair. The AMIP developed is both functional and transition in nature; it is based on the best detail available. It can be used for budgeting purposes, and provides a basis for continual cross-functional teamwork and ongoing improvements. The AMIP was designed to fit into Grand Forks' infrastructure asset management governance (informed decision-making) process. The strategic direction links high level policies with detailed capital planning (eg. costs, timing, service levels and infrastructure supply).

James Baker, Mayor
District of Lake Country

"Staff have outlined our options in a very informative manner".

"We need to look at the future and we need to expand our tax base to make our budget and quality of life sustainable in Lake Country and what we heard is the right way of doing it".

"The municipality is also faced with replacing half of its quarter-billion dollars worth of roads, water, sewer and other infrastructure within the next 30 years".

Geoff Greenwell, Councillor
District of Lake Country

"Staff are recommending that a long term solution be sought to achieve the appropriate level of funding".

"We have a responsibility to create a long-term strategy".

2.1 Purpose of Asset Management Investment Plan

The purpose of the AMIP is to:

- Bring the City's senior team together to collaborate
- Present a realistic 20 year cost profile
- Identify annual spikes that need to be flattened (typically through reserve build up and draw down)
- Initiate programming of detailed model to ensure a sound basis for credible and defensible decision-making
- Ensure a dynamically linked summary model of the costs required for sustainable capital assets over the next 20 year period. This will provide an easy tool for updates that can keep senior team constantly informed
- AMIP is always current; it is a rolling plan that moves ahead year by year

2.2 Definitions

The following definitions provide detail regarding some of the key terms used in the City's Asset Management Investment Plan.

- **AMIP** – Asset Management Investment Plan. It is a model that presents a sustainable investment scenario for the City's linear and non-linear infrastructure assets over a 20 year period.
- **2010 replacement value** – cost of replacing the asset in 2010 dollars. For linear assets, this was calculated according to the length and 2010 unit rate. For non-linear assets, this was based on information from City staff (e.g. City Facilities Inventory, 2009 Capital Planning Report) and component rates provided by Urban Systems Ltd.
- **Infrastructure deficit (backlog)** – work backlog which results in decreased service levels, increasing the costs required to maintain the asset and the risk of asset failure. This is calculated as a total of the replacement value for each asset.
- **Sustainable average annual investment** – budget based on an annual average of the total replacement value for an asset over its expected service life
- **Length of mains** – a summary of the length of each component in GIS
- **Expected remaining life of asset** – a percentage of the remaining value of an asset compared to the total replacement value.
- **Expected service life of asset –** an estimate of the life expectancy of an asset. See the table in **Appendix A.**

2.3 Analysis Methodology

Sustainable capital reinvestment requires looking well beyond the 5 year period of the legislated timeframe of a typical municipal Capital Plan to appreciate the long range capital needs and upcoming financial shortcomings. While predominantly based upon infrastructure service lives, this initial phase of the AMIP also considers projects that have been identified by the City over a 20 year timeframe.

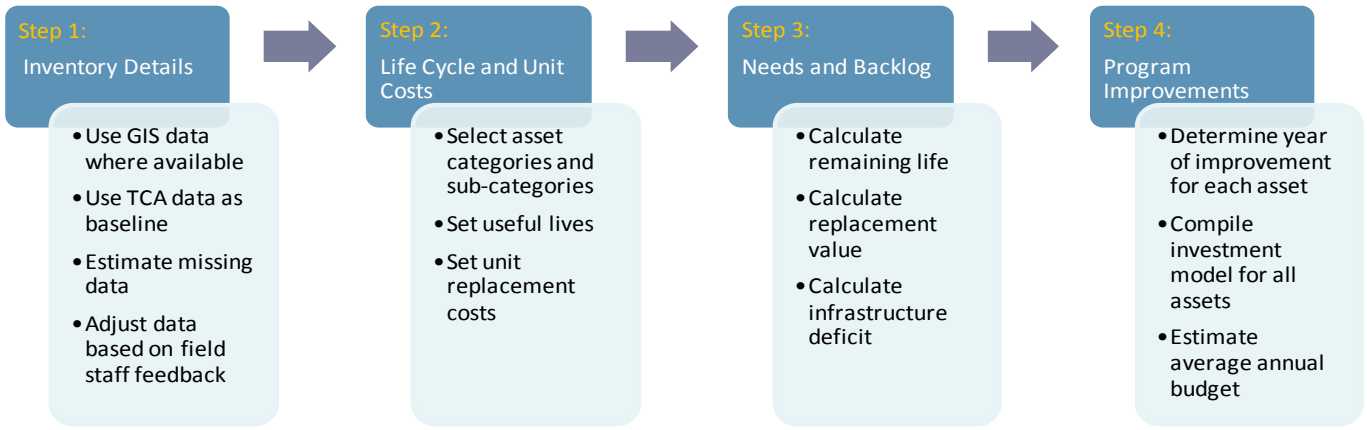


Figure 4

To develop the AMIP a typical infrastructure 4-Step analytical approach (**Figure 4**) was used, and where possible existing City data and information formed the basis for the AMIP. This ensured that the results and recommendations were based on the most accurate and up-to-date information available.

The data developed as part of the 4-Step analytical approach resembles **Figure 5**. The 'Center Piece' of the AMIP is the Level 1 – Investment Level. It is designed for Mayors and Councils and is a summary model of the costs required for sustainable tangible capital assets over the next 20 year period. The attributes of the Level 1 include:

- Based on very detailed information from Level 2 and 3 (Figure 6); this provides a sound basis for credible and defensible decision making. It also demonstrates that the Level 1 is well grounded, and helps achieve buy-in;
- Comprehensive tool that focuses financial and community infrastructure management discussions on all tangible capital assets;
- Encourages exploration around sustainable funding levels and funding reform; and
- Provides a basis for discussions on affordable levels of service, and the pace of community growth.

Level 1, Investment Level: *For strategic planning with mayors, councils, and senior managers*

Asset Category	100% Replacement Value	Loss in Value	Remaining Value	Percent Remaining Life	2011	2012	2013	2014	2015
Mains	$87,428,000	$54,449,000	$32,979,000	38%	$0	$976,000	$0	$1,277,000	$135,000
Water Supply and Pump Houses	$7,890,000	$7,746,000	$144,000	2%	$7,730,000	$0	$0	$0	$0
Reservoirs	$12,035,000	$3,542,188	$8,492,813	71%	$0	$0	$0	$0	$0
Dams	$400,000	$225,000	$175,000	44%	$0	$0	$0	$0	$0
Pressure Reducing Stations	$3,960,000	$3,717,333	$242,667	6%	$3,700,000	$0	$0	$0	$0
Sub-total Water	$111,713,000	$69,679,521	$42,033,479	38%	$11,432,500	$978,500	$2,500	$1,279,500	$137,500

Level 2, Program Level: *For tactical planning with senior managers and staff*

Asset Category	Diameter (mm)	100% Replacement Value	Loss in Value	Remaining Value	Percent Remaining Life	2011	2012	2013	2014	2015
Mains	> 600	$12,780,000	$8,865,000	$3,915,000	31%	$0	$0	$0	$0	$0
	350 - 600	$11,813,000	$8,266,000	$3,547,000	30%	$0	$943,000	$0	$1,181,000	$0
	300	$7,609,000	$3,569,000	$4,040,000	53%	$0	$0	$0	$63,000	$0
	250	$5,451,000	$3,446,000	$2,005,000	37%	$0	$33,000	$0	$0	$0
	200	$22,746,000	$12,755,000	$9,991,000	44%	$0	$0	$0	$33,000	$0
	150	$15,302,000	$9,644,000	$5,658,000	37%	$0	$0	$0	$0	$0
	<= 100	$11,727,000	$7,904,000	$3,823,000	33%	$0	$0	$0	$0	$135,000
	Subtotal Mains	$87,428,000	$54,449,000	$32,979,000	38%	$0	$976,000	$0	$1,277,000	$135,000

Level 3, Project Level: *For on-going operations, design and construction*

Asset Category	Diameter (mm)	Material	GIS	Length	Installed	Life	100% Replacement Value	Loss in Value	Remaining Value	Percent Remaining Life	2011	2012	2013	2014	2015
Mains	300	DI	WP-1295	1.509393	1967	50	$1,132	$1,036	$96	9%	$0	$0	$0	$1,132	$0
	300	DI	WP-1297	7.775934	1967	50	$5,832	$5,336	$496	9%	$0	$0	$0	$5,832	$0
	300	DI	WP-1345	213.19579	1967	50	$159,897	$146,289	$13,608	9%	$0	$0	$0	$159,897	$0
	300	DI	WP-3609	21.873558	1965	50	$16,405	$15,707	$698	4%	$0	$16,405	$0	$0	$0
	300	DI	WP-3613	21.977496	1965	50	$16,483	$15,782	$701	4%	$0	$16,483	$0	$0	$0
	300	DI	WP-3614	6.9852663	1965	50	$5,239	$5,016	$223	4%	$0	$5,239	$0	$0	$0

Figure 5

2.3.1 Asset Categories

The focus of the AMIP was to include all of the City's linear assets, in addition to major non-linear assets (**Figure 6**). Including all relevant asset categories helped illustrate the importance and benefit in presenting an infrastructure investment plan that included all capital cost pressure within the City. Future AMIP iterations could fine-tune the non-linear asset needs information; and should consider the merit of including major or critical non-capital funding pressures.

Asset Categories	
Linear	Water System
	Sanitary Sewer System
	Stormwater System
	Electrical System
	Roadway
Non-Linear	Building & Facilities
	Fleet

Figure 6

2.3.2 Base Information

The AMIP used the most recent digital infrastructure information for Grand Forks, which was reviewed and consolidated for the purposes of this project. Further preparation of a base dataset will be completed in the coming months to ensure the City has one dataset with the most accurate infrastructure information. This information is primarily based on the data used in the Utilities Capital Planning Report, 2009, which City staff identified as the most complete and up-to-date digital information available. It has been supplemented with information from City staff and from the Tangible Capital Assets (TCA) inventory. As the AMIP evolves over the years through future iterations, data enhancements will allow further refinement to the inventory.

In order to provide an appropriate level of accuracy for the analysis of linear asset categories, each category was divided into sub-categories. Sub-categories were based upon similar infrastructure components and limited to major sub-categories that are significant for investment planning and trade-off analysis. Minor asset sub-categories are typically shown in levels 2 and 3, but are rolled-up into the "other" sub-category in level 1. The asset sub-categories used are shown below (Figure 7).

Figure 7

Water System
Mains
Wells/Pumps/Treatment
Reservoirs
Other

Roadway System
Roads
Sidewalks
Paved Pathways
Streetlights

Fleet
Trucks - Heavy
Trucks - Light
Equipment

Sanitary Sewer System
Gravity Mains
Forcemains
Treatment Plant
Pump Stations
Other

Electrical System
Electrical Distribution Lines
Donaldson Feeder
Power Poles
Transformers
Ruckles Substation

Stormwater System
Mains
Catchbasins
Dry Wells / Soak Aways

Buildings & Facilities
Civic Buildings
Park Facilities
Public Works

2.3.3 Estimating the Replacement Value

The replacement value refers to the cost required to re-build or re-acquire the City's assets in 2010 dollars (excluding property). This information was built up using the linear asset sub-category, and the non-linear asset categories. Asset service life estimates and unit replacement costs were compiled, reviewed and approved changes were made where appropriate based upon discussions with City staff. Knowing the magnitude of current replacement costs of all assets creates or re-affirms the importance of maintaining these assets in a healthy state of repair. **Figure 9** presents the calculated replacement value, loss in value and remaining value of the City's linear and non-linear infrastructure assets.

Replacement costs were based upon original standards and have not been increased to accommodate for changes to standards and regulations since their original installation. Standards and regulations do change over time and typically result in incremental costs, and these changes should be determined at the master planning level.

In order to ensure that the City's infrastructure investments are protected this investment is protected over time it will be critical that a proactive rehabilitation and replacement of assets be undertaken. This will require that fiscal resources be allocated towards maintaining existing levels of service, discussed in more detail in subsequent report Sections.

2.3.4 Predicting Improvement/ Replacement Timing

For this AMIP iteration, asset service lives were used to determine the improvement/replacement timing. Ideally condition assessments coded to actual infrastructure elements should be used to adjust asset life predictions. It is recognized that the City has some condition data for assets (for example the Road Rehabilitation Study), however, this information includes only a portion of the City's assets and is not necessarily up-to-date. With future iterations of the AMIP, the City can collect condition data that can be used to correct to remaining service life of each asset sub-category as time passes. Predicted service lives are average estimates only and are affected by items such as material quality, construction quality, soils, usage and weather. As such, condition information can help to refine these estimates.

2.4 Data Relevance

An additional benefit of using the AMIP as the rallying point for modern assert management techniques is that it identifies the basic data required. When an organization starts its asset management business practice development at a lower level there is a primary focus on data. As a result, future iterations of the asset management program become bogged down in detail or cannot afford the data streams perceived to be needed. Using the AMIP as the starting point allows an effective assessment of what data is needed for investment planning, and what data is required for ongoing operations.

As a next step in building the asset management business framework the City may want to consider developing a cost effective annual data collection program. A sound data base can lead to better (lower) cost estimates and expenditures.

3.0 ASSET MANAGEMENT INVESTMENT PLAN MODEL

The AMIP model presents a sustainable investment scenario for the City's linear and non-linear infrastructure assets over a 20 year period. This AMIP scenario assumes that an adequate annual operations and maintenance (O&M) budget is in place to optimize asset service lives. Reduced or inadequate O&M budget levels would reduce the service lives and increase the unit replacement costs used. A breakdown of the replacement value for each component is shown in **Figure 8.**

"The AMIP model presents a sustainable investment scenario for the City's linear and non-linear infrastructure assets over a 20 year period".

Figure 8

	2010					Investment Year (2010 Dollars)																				
Asset Category	**100% Replacement Value**	**Loss in Value**	**Remaining Value**	**Expected Remaining Life**	**Infrastructure Deficit (Backlog)**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**20 Year Total**	**Average Annual Investment**
Water System																										
Mains	$23,525,000	$11,176,000	$12,349,000	52%	$641,000	$0	$18,000	$0	$0	$0	$0	$0	$0	$0	$291,000	$0	$0	$0	$0	$0	$0	$0	$68,000	$1,308,000	$904,000	$3,230,000	$361,000
Wells/Pumps/Treatment	$1,529,000	$1,330,000	$199,000	13%	$790,000	$500,000	$500,000	$453,000	$0	$0	$0	$0	$0	$0	$0	$110,000	$0	$186,000	$0	$0	$0	$0	$0	$0	$0	$2,539,000	$57,000
Reservoirs	$2,071,000	$424,000	$1,647,000	80%	$200,000	$2,250,000	$2,250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,700,000	$261,000
Other	$75,000	$75,000	$0	0%	$316,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,116,000	$105,000
Sub-total Water	$27,200,000	$13,005,000	$14,195,000	52%	$1,947,000	$2,950,000	$2,968,000	$653,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$291,000	$110,000	$0	$186,000	$0	$0	$0	$0	$68,000	$1,308,000	$904,000	$12,585,000	$784,000
Sanitary Sewer System																										
Gravity Mains	$10,535,000	$8,756,000	$1,779,000	17%	$0	$0	$0	$0	$0	$0	$0	$9,109,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9,109,000	$0
Forcemains	$325,000	$166,000	$159,000	49%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Treatment Plant	$11,016,000	$5,914,000	$5,102,000	46%	$0	$0	$0	$0	$0	$420,000	$0	$0	$750,000	$0	$0	$9,728,000	$0	$0	$0	$392,000	$547,000	$0	$0	$0	$0	$11,837,000	$490,000
Pump Stations	$4,043,000	$707,000	$3,336,000	83%	$3,443,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$200,000	$0	$200,000	$0	$200,000	$0	$0	$0	$0	$4,043,000	$162,000
Other	$75,000	$75,000	$0	0%	$1,300,000	$800,000	$850,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,350,000	$218,000
Sub-total Sanitary Sewer	$25,994,000	$15,618,000	$10,376,000	40%	$4,743,000	$800,000	$850,000	$200,000	$200,000	$620,000	$200,000	$9,309,000	$950,000	$200,000	$0	$9,728,000	$200,000	$0	$200,000	$392,000	$747,000	$0	$0	$0	$0	$29,339,000	$870,000
Stormwater System																										
Mains	$3,141,000	$3,036,000	$105,000	3%	$2,575,000	$0	$0	$20,000	$319,000	$0	$0	$0	$228,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,142,000	$105,000
Catchbasins	$860,000	$138,000	$722,000	84%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$11,000
Dry Wells/Soak Aways	$1,200,000	$425,000	$775,000	65%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,000
Sub-total Stormwater	$5,201,000	$3,599,000	$1,602,000	31%	$2,575,000	$0	$0	$20,000	$319,000	$0	$0	$0	$228,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,142,000	$131,000
Electrical																										
Electrical Distribution Lines	$2,500,000	$1,250,000	$1,250,000	50%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000
Donaldson Feeder	$200,000	$48,000	$152,000	76%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$200,000	$0	$200,000	$8,000
Power Poles	$2,500,000	$1,900,000	$600,000	24%	$1,000,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,500,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,500,000	$100,000
Transformers	$2,500,000	$1,250,000	$1,250,000	50%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000
Ruckles Substation	$2,000,000	$80,000	$1,920,000	96%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000
Sub-total Electrical	$9,700,000	$4,528,000	$5,172,000	53%	$1,000,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,500,000	$0	$0	$0	$0	$0	$0	$0	$0	$200,000	$0	$2,700,000	$228,000
Roadway System																										
Roads	$29,001,000	$26,432,000	$2,569,000	9%	$19,913,000	$2,993,000	$0	$0	$0	$0	$0	$0	$2,614,000	$0	$0	$0	$0	$0	$0	$3,879,000	$0	$0	$0	$0	$0	$29,399,000	$1,114,000
Sidewalks	$3,732,000	$1,335,000	$2,397,000	64%	$35,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$75,000
Paved Pathways	$0	$0	$0	0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Streetlights	$1,800,000	$1,029,000	$771,000	43%	$0	$0	$0	$0	$0	$0	$1,200,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,200,000	$51,000
Sub-total Roadway	$34,533,000	$28,796,000	$5,737,000	17%	$19,948,000	$2,993,000	$0	$0	$0	$0	$1,200,000	$0	$2,614,000	$0	$0	$0	$0	$0	$0	$3,879,000	$0	$0	$0	$0	$0	$30,634,000	$1,240,000
Fleet																										
Trucks - Heavy	$3,492,000	$2,070,000	$1,422,000	41%	$1,245,000	$0	$127,000	$0	$41,000	$130,000	$260,000	$504,000	$117,000	$150,000	$230,000	$50,000	$0	$0	$0	$240,000	$0	$0	$135,000	$0	$68,000	$2,052,000	$202,000
Trucks - Light	$612,000	$324,000	$288,000	47%	$228,000	$65,000	$0	$0	$0	$71,000	$0	$0	$135,000	$0	$113,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$384,000	$50,000
Equipment	$278,000	$129,000	$149,000	54%	$75,000	$0	$40,000	$0	$8,000	$5,000	$115,000	$0	$0	$0	$0	$2,000	$10,000	$0	$0	$0	$0	$0	$18,000	$0	$0	$198,000	$24,000
Sub-total Fleet	$4,382,000	$2,523,000	$1,859,000	42%	$1,548,000	$65,000	$167,000	$0	$49,000	$206,000	$375,000	$504,000	$252,000	$150,000	$343,000	$52,000	$10,000	$0	$0	$240,000	$0	$0	$153,000	$0	$68,000	$2,634,000	$276,000
Buildings & Facilities																										
Civic Buildings	$12,807,000	$2,393,000	$10,414,000	81%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$142,000
Park Facilities	$3,679,000	$2,206,000	$1,473,000	40%	$647,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,600,000	$0	$0	$0	$2,600,000	$92,000
Public Works	$3,567,000	$1,454,000	$2,113,000	59%	$46,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$59,000
Sub-total Buildings & Facilities	$20,053,000	$6,053,000	$14,000,000	70%	$693,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,600,000	$0	$0	$0	$2,600,000	$293,000
Program Support Costs																										
Asset Management Support	N/A	N/A	N/A	N/A	N/A	$20,000	$20,000	$20,000	$20,000	$20,000	$0	$0	$0	$0	$20,000	$0	$0	$0	$0	$20,000	$0	$0	$0	$0	$20,000	$160,000	
Infrastructure Inspections	N/A	N/A	N/A	N/A	N/A	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$500,000	
Sub-total Program Support						$45,000	$45,000	$45,000	$45,000	$45,000	$25,000	$25,000	$25,000	$25,000	$45,000	$25,000	$25,000	$25,000	$25,000	$45,000	$25,000	$25,000	$25,000	$25,000	$45,000	$660,000	$30,000
Total Infrastructure	$127,063,000	7412200000%	$52,941,000		$32,454,000	$6,853,000	$4,030,000	$918,000	$813,000	$1,071,000	$2,000,000	$10,038,000	$4,269,000	$575,000	$2,179,000	$9,915,000	$235,000	$211,000	$225,000	$4,556,000	$772,000	$2,625,000	$246,000	$1,533,000	$1,017,000	$84,294,000	$3,852,000

3.1 Summary of Asset Value

The estimated full replacement value of the City's linear and non-linear infrastructure assets is approximately $127 million (2010). The Roadway System is the most expensive asset category. This summary includes renewal, replacement and planned capital works only; it does not touch on growth/expansion, safety, regulatory, and economic development. These items can be incorporated into future iterations of the AMIP.

This infrastructure has a remaining (deteriorated) value of approximately $53 million (2010) which is 42% of the replacement value (remaining life). The remaining life represents an overall condition level of Fair, however it is important to note that this does not accurately reflect the condition of specific asset components. The City's three major asset components (by value), the roadway system (17%), the water system (52%) and sanitary system (40%) together have 35% remaining value. Replacement value and condition levels are discussed further in the following sub-sections that deal with the individual asset categories.

A low percentage of remaining life shows that there are significant infrastructure deficits (repair backlog). Symptoms of this may also be found in the number and focus of resident complaints, claims and breaks. The City's linear and non-linear assets have a total infrastructure deficit (backlog) of approximately $32 million (2010). The City's three major asset components (roadway, water and sanitary) together have a deficit of almost $27 million. To put this number in perspective, the $27 million deficit is equal to the full replacement value of the water system.

Individual asset category deficits and other information regarding the AMIP model are discussed in the following sub-sections.

Figure 9

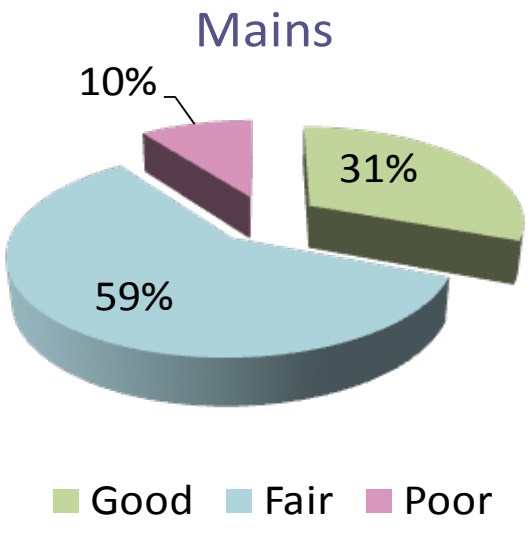
2010 Replacement Value

Linear	Water System	$27,200,000
	Sanitary Sewer System	$25,994,000
	Stormwater System	$5,201,000
	Electrical System	$9,700,000
	Roadway	$34,533,000
Non-Linear	Building & Facilities	$20,053,000
	Fleet	$4,382,000
	Total	$127,063,000

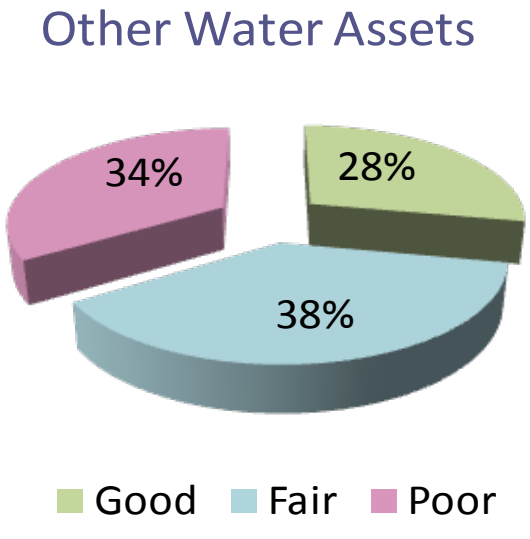
4.0 WATER SYSTEM SUMMARY

The water system has a total value of over $27 million, including 53 km of mains, wells/pumps/treatment, reservoirs, and other infrastructure (e.g. miscellaneous projects and minor upgrades). The remaining value of the water system approximately $14 million, with an expected remaining life of 52%. The current deficit is almost $2 million.

Length 53 km **Value $27.20M** **Deficit $1.95M**



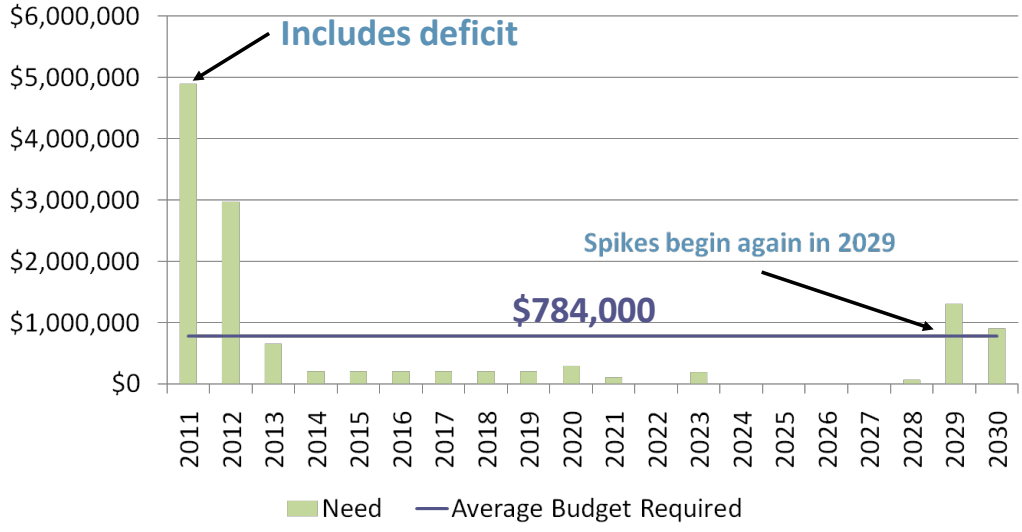
- 10% of water mains have passed 2/3 of their service life



- 34% of other water assets have passed 2/3 of their service life

The water system renewal schedule for the next 20 years shows a pending peak in water main replacements (**Figure 10**).

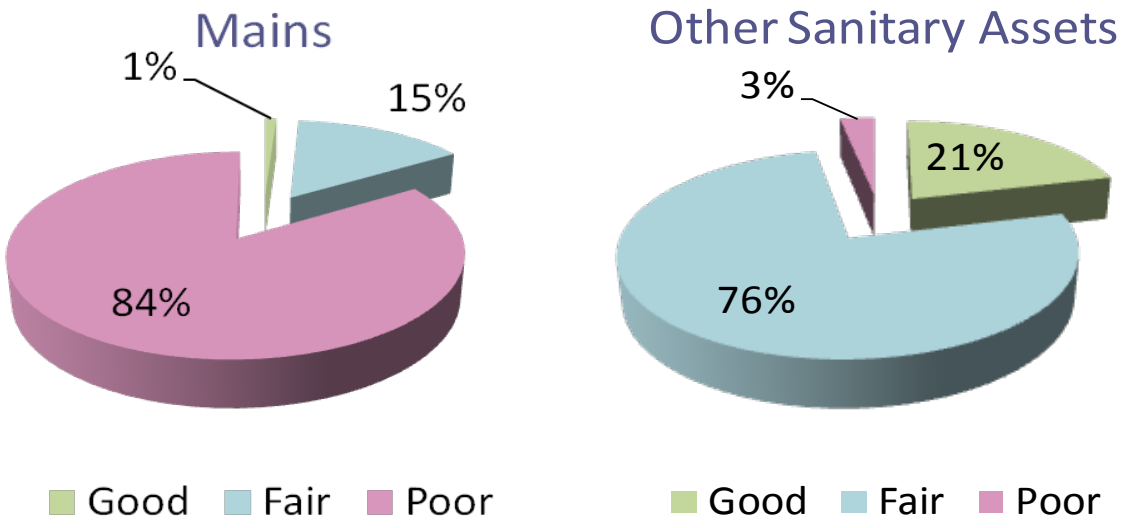
Figure 10



5.0 SANITARY SYSTEM SUMMARY

The sanitary system has a total value of almost $26 million, including 35 km of gravity and forcemains, treatment plant facilities, pump stations, and other infrastructure (e.g. flow meters, and miscellaneous projects and minor upgrades). The remaining value of the sanitary system approximately $10 million, with an expected remaining life of 40%. The current deficit is almost $5 million.

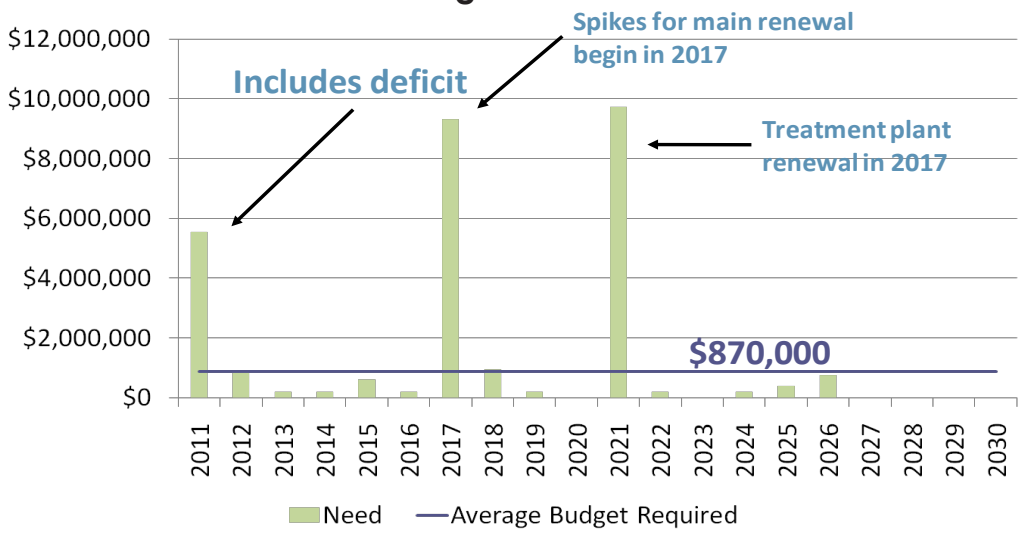
Length 35 km	Value $25.99M	Deficit $4.74M



- 84% of sanitary mains have passed 2/3 of their service life
- 3% of other sanitary assets have passed 2/3 of their service life

The sanitary system renewal schedule for the next 20 years shows a major spike in gravity main rehabilitation in 2017, and for the treatment plant in 2021 (**Figure 11**).

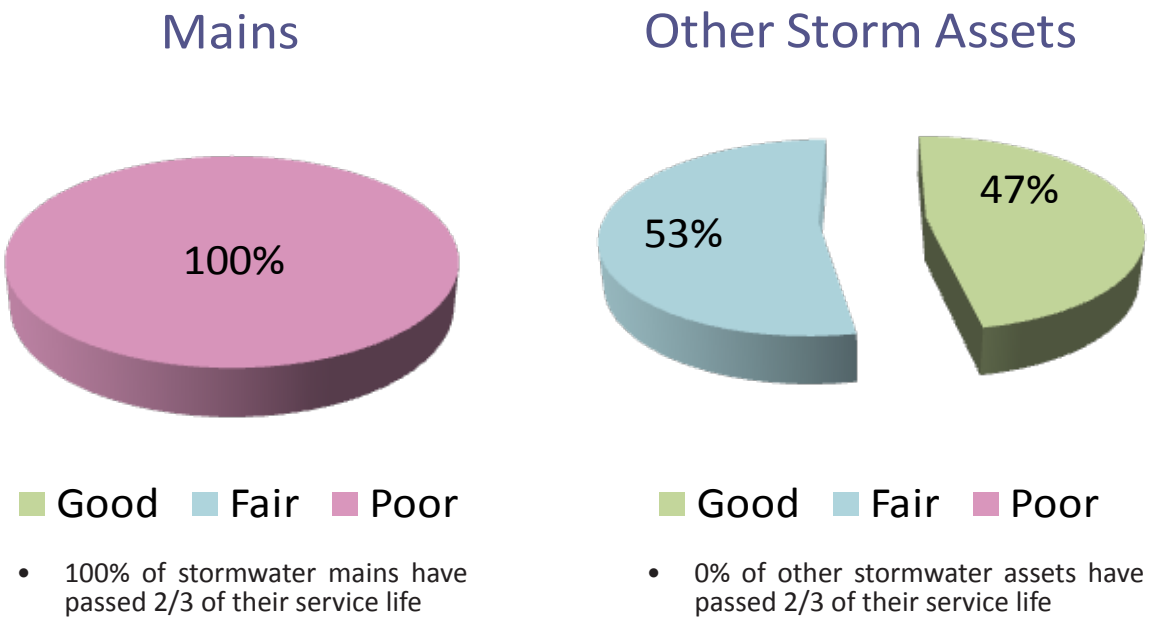
Figure 11



6.0 STORMWATER SYSTEM SUMMARY

The stormwater system has a total value of over $5 million, including 8 km of mains, catchbasins, and dry wells/soak aways. The remaining value of the stormwater system is approximately $1.6 million, with an expected remaining life of 31%. The current deficit is approximately $2.6 million.

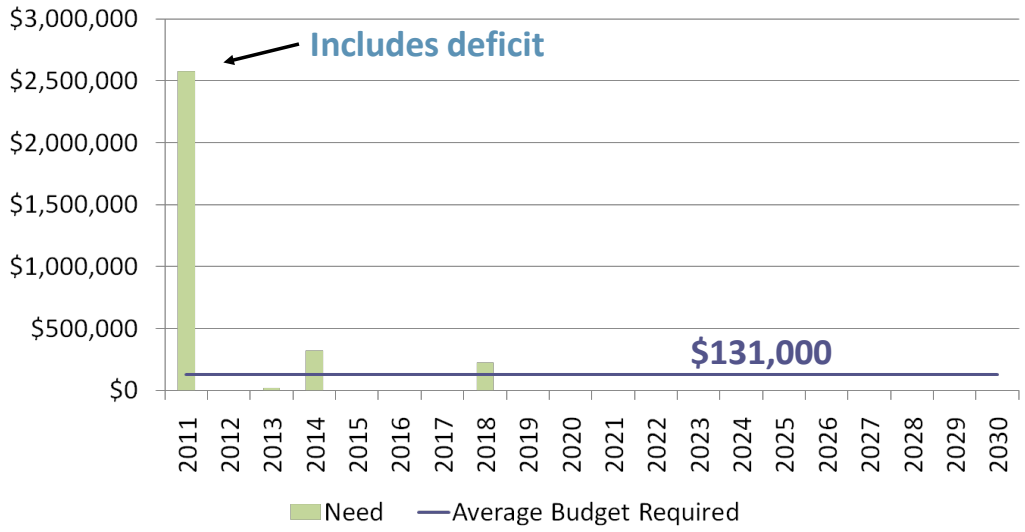
Length 8 km	Value $5.20M	Deficit $2.58M



- 100% of stormwater mains have passed 2/3 of their service life
- 0% of other stormwater assets have passed 2/3 of their service life

The stormwater system renewal schedule for the next 20 years shows an immediate spike rehabilitation due to the age of stormwater mains (**Figure 12**).

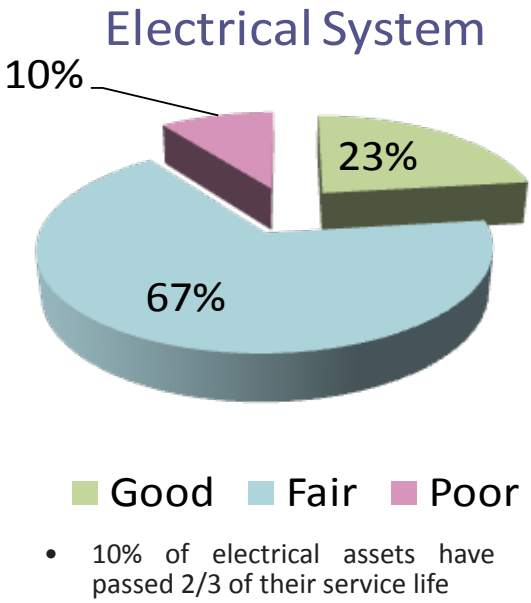
Figure 12



7.0 ELECTRICAL SYSTEM SUMMARY

The electrical system has a total value of almost $10 million, including 50 km of electrical distribution lines, the Donaldson Feeder, power poles, transformers, and the Ruckles Substation. The remaining value of the electrical system is over $5 million, with an expected remaining life of 53%. The current deficit is approximately $1 million.

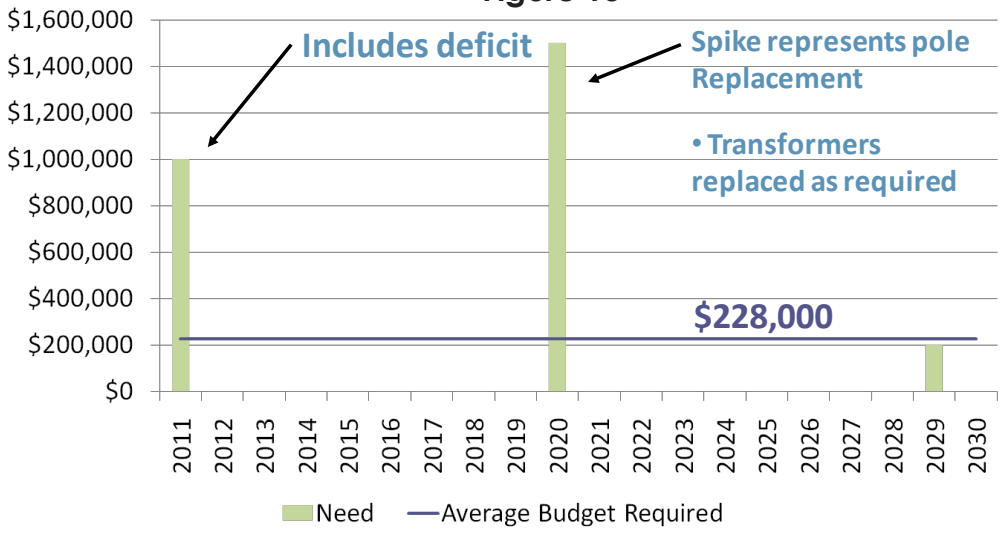
Length 50 km	Value $9.70M	Deficit $1.00M



- 10% of electrical assets have passed 2/3 of their service life

The electrical system renewal schedule for the next 20 years shows spikes for power pole rehabilitation, however it is recognized that the City has an ongoing program for updates (**Figure 13**).

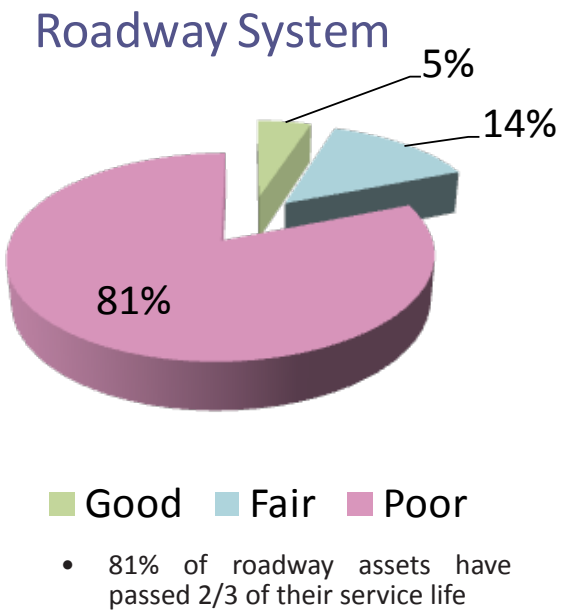
Figure 13



8.0 ROADWAY SYSTEM SUMMARY

The roadway system has a total value of over $35 million, including 59 km of roads, sidewalks, paved pathways, and streetlights. The remaining value of the roadway system is approximately $5.7 million, with an expected remaining life of 17%. The current deficit is almost $20 million.

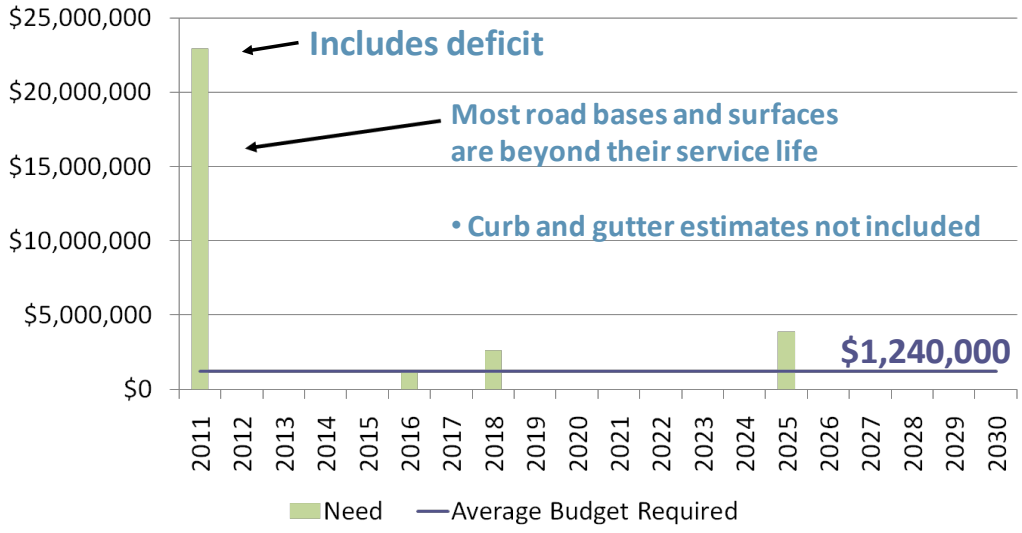
Length 59 km	Value $35.53M	Deficit $19.95M



- 81% of roadway assets have passed 2/3 of their service life

The roadway system renewal schedule for the next 20 years shows a significant backlog in road infrastructure upgrades due to the age of road bases (**Figure 14**).

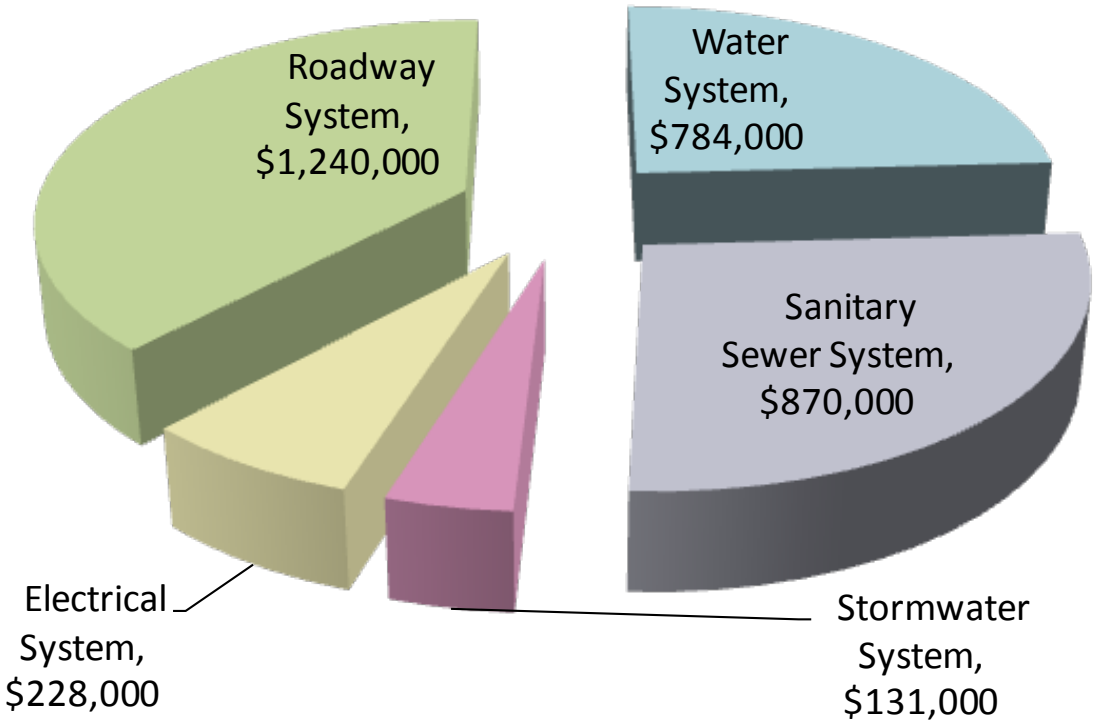
Figure 14



9.0 SUMMARY OF ALL ASSETS

An average annual investment (renewal budget) of $3.85 million (see **Figure 15** below) is required to address infrastructure deficits and maintain a sustainable level of investment moving forward. This budget includes the linear and non-linear asset categories identified in the AMIP which focus on renewal, replacement and planned capital works only. An initial budget for program support costs (i.e. asset management support and infrastructure inspections) is also included in this estimate; however, it does not touch on growth/expansion, safety, regulatory, and economic development.

Figure 15



10.0 CONCLUSIONS AND RECOMMENDATIONS

The development of this initial AMIP for the City is the first step towards a robust infrastructure investment decision-making framework. This version of the AMIP is both functional and transitional. The transitional capability encourages the City's leadership team to continue to implement changes and enhancements over the ensuing years at a pace suitable to the City.

Starting to implement asset management business practices at the AMIP level was an ideal kick-off point for the City's asset management business framework. The following next steps will be undertaken to complete the current project.

Next Assignments Steps
AssetSmart Gap Analysis workshop with Mayor and Council
Draft a public outreach program

Based upon our asset management experience, we recommend that the City maintain its current asset management momentum and continue its transition by pursuing the opportunities of improvement recommended below.

Recommended Next Steps for Grand Forks
Undertake long term revenue generation review (AMFP)
Determine affordable levels of service, performance and risk
Refine and implement a public outreach program
Continue transition to asset management culture
Expand AMIP: growth, safety, regulatory and economic needs
Close data gaps, inspections, data rules, integrate TCA; and acquire data management system
Pursue economies of scale for lower costs

APPENDIX A

ESTIMATE OF THE LIFE EXPENTANCY OF AN ASSET




Infrastructure Life Expectancies

Water Pipe Material	Life Expectancy
AC	60
CI	60
DI	60
DT	60
GALV	60
SP	60
STEEL	60
PVC	80

Water Components	Life Expectancy
Wells / Pumps / Treatment	25
Reservoirs	80
Flow Meters	30
Apputenances	15

Sanitary Pipe Material	Life Expectancy
AC	60
CONC	60
VCT	60
STEEL	60
PVC	80

Sanitary Components	Life Expectancy
Treatment Plant	25
Pump Stations	25
Chlorination Building	80
Generator Building	70
Flow Meters	30

Infrastructure Life Expectancies

Storm Pipe Material	Life Expectancy
CMP	30

Storm Components	Life Expectancy
Dry Wells / Soak Aways	80
Catchbasins	80

Road Material	Life Expectancy
Road (paved) Surface	25
Road (unpaved) Surface	80
Road (paved) Base	40
Road (unpaved) Base	80
Sidewalks, Curb and Gutter	50
Streetlights	35

Electrical Component	Life Expectancy
Electrical Lines	50
Transformers	50
Donaldson Feeder	25
Power Poles	25
Ruckles Substation	100

Building & Facilities	Life Expectancy
Civic	90
Parks	40
Public Works	60

Fleet life expectancies were used in accordance with data provided by City staff.

City of Grand Forks

2010 Unit Costs

Water Distribution System Costs		Diameter (>=)													
Description	Units	25	50	75	100	150	200	250	300	350	400	450	500	550	600
Mains*	$/m	$300	$325	$350	$380	$420	$470	$530	$560	$750	$800	$850	$900	$950	$1,000

**includes valves, fittings, hydrants, services, and a 30% engineering contingency*

Sanitary Sewer Gravity Collection System Costs		Diameter (>=)								
Description	Units	100	150	200	250	300	350	375	450	525
Mains*	$/m	$200	$250	$300	$350	$400	$450	$500	$550	$650
pump stations	each	$200,000								

**includes manholes, service connections, and a 30% engineering contingency*

Sanitary Sewer Forcemain Collection System Costs		Diameter (>=)			
Description	Units	100	150	200	300
Mains*	$/m	$250	$300	$350	$400

**includes a 30% engineering contingency*

Storm Sewer Gravity Collection System Costs		Diameter (>=)																	
Description	Units	100	150	200	250	300	350	375	400	450	500	525	600	650	675	750	800	1050	1200
Mains*	$/m	$200	$250	$300	$350	$400	$450	$500	$550	$600	**650**	675	$700	$750	$800	$850	$900	$1,100	$1,250
pits	each	$10,000																	
catchbasins	each	$5,000																	

**includes manholes, CB and Leads, and a 30% engineering contingency*

Roadway Construction Costs		
Description	Units	Rates
Paved Road - Surface	**/m2**	$20
Paved Road - Base	/m2	$55
Unpaved Road	/m2	$40
Sidewalks (concrete)	/lm	$165
Pathways	/lm	$165
Curb and Gutter	/lm	$150
Streetlights - Decorative	ea.	$5,000
Streetlights - Cobra Heads with Pole	ea.	$2,500

Note: Assumption that all roads are 2 lanes, at 3m wide per lane

Electrical System		
Description	Units	Rates
lines and poles	**/l.m.**	$50
transformers	/l.m.	$5,000
substations	/l.m.	$250,000
poles	ea	$2,000