



*CORPORATION OF THE CITY
OF PEMBROKE*

ASSET MANAGEMENT PLAN

January 2014

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1.0 Asset Management Plan

The City of Pembroke has fully implemented its obligations for Capital Asset Accounting under PSAB 3150 so why is there a need to develop an asset management plan?

In order to understand asset management plans it is important to first define asset management. While there are many ways to define asset management, for the purposes of the City of Pembroke Asset Management Plan, it is beneficial to define the essential components of the overall plan.

1. Asset Value

All municipal infrastructure assets have a monetary value. For PSAB 3150, the cost of original construction was determined or estimated using best management practices. Under PSAB 3150, typically using a straight line depreciation model, those assets are being depreciated and reported upon. While this is useful for accounting purposes, as typically those assets must be replaced or rehabilitated in the future, it is of some importance to know the current replacement value and future capital and operating obligations associated with the asset.

2. Life Cycle Management

All assets have a limited life expectancy and to some extent it is possible to estimate or model the rate of deterioration. Every asset is different and its rate of deterioration depends upon a number of factors. Under PSAB 3150, typically an asset's expected life is estimated and it is depreciated in a straight line fashion over its life. Under an asset management plan, the life of certain asset classes are modeled more precisely, including allowances for use and levels of service, and the asset management plan attempts to predict the most cost effective capital and maintenance interventions to maximize the life of the asset.

3. Sustainability

A common definition of sustainable development is "...meeting the needs of the present generation without compromising the ability of future generations to meet their own needs...". In terms of asset management while it is certainly a goal to maximize the lifecycle of all assets, investment, both operating and capital, must be sustainable for the current and future generations. While it may not always be possible to meet all current financial commitments, the asset management plan should be able to predict current and future financial obligations so that decision makers can make informed decisions about investment strategies and levels of taxation. If a certain asset is deemed to be too expensive to operate, maintain and rehabilitate, decision makers may choose to abandon the asset or establish specific funding models (user fees) to help maximize the lifecycle of that asset.

4. Technical and Financial Planning

While a financial plan (PSAB 3150 for example) can estimate the depreciation on an asset and suggest the most appropriate time for a capital intervention and a technical plan can suggest the

most efficient method of rehabilitating an asset, often the two plans are not complementary. Furthermore, in many instances the lifecycle of several assets are tied together and a financial investment into one asset impacts the life of another asset. A goal of asset management is to integrate technical and financial planning for the optimization of asset life cycles.

5. Risk Management

Decision making must be based on the effective management of risk. Without reading the asset management plan, a decision maker can likely infer that the City cannot afford to rehabilitate every asset it owns to maximize its lifecycle. Decisions to commit or defer investments into assets must acknowledge all risk factors including technical, financial, environmental, health and safety, life cycle and political risks. While the deferral of an investment may lead to continued degradation of asset, “failure” of the asset should be avoided.

6. Performance Management

While in the context of a public government performance management has many meanings, with respect to an asset management plan, performance management implies monitoring of performance (financial and technical) and updating of the plan on an on-going basis.

While an asset management plan can cover any and all asset classes, for the purposes of the City of Pembroke Asset Management Plan, the asset classes considered are underground infrastructure (water, sanitary and storm), roads (including granulars and sidewalks) and bridges. In 2014, facility specific asset management plans will be developed for water and wastewater treatment plants, sanitary liftstations, recreational facilities and other City buildings. Furthermore, the fleet replacement program is in place and the lifecycle management of fleet is self-funded through the Equipment Reserve.

2.0 Asset Value

In order to plan where you want to go, you need to determine where you have been and where you currently are. With respect to asset management, in order to plan for the future, decision makers need to know the current status of assets. With respect to an inventory of assets, the City of Pembroke is quite fortunate in that this data has been collected as part of the PSAB 3150 exercise. While many assumptions have been made as part of the PSAB 3150 exercise, for the asset classes under consideration, the following information is available:

Table 1. Asset Valuation

Asset Type	Acquisition Cost	Inflated Cost (at 2% per year)	Replacement
Water	\$14.4 Million	\$25.0 Million	\$55.0 Million
Sanitary	\$5.6 Million	\$10.1 Million	\$34.6 Million
Storm	\$9.7 Million	\$12.9 Million	\$25.7 Million

Roads	\$53.5 Million	\$79.5 Million	\$157.1 Million
Bridges	\$7.7 Million	\$14.1 Million	\$40.0 Million
TOTALS	\$90.9 Million	\$141.6 Million	\$312.4 Million

*** Replacement Cost is based on recent unit prices (per meter costs for example) of replacement of infrastructure in 2013 based on known existing inventories.

While significant detailed financial information is available, according to the most recent Financial Information Returns (FIR) for Pembroke, for the asset classes under consideration, the following information is available

Table 2. Asset Net Book Value

Asset Class	2010 Value	2011 Value	2012 Value
Water	\$8.7 Million	\$8.9 Million	\$9.2 Million
Sanitary	\$3.7 Million	\$4.1 Million	\$4.4 Million
Storm	\$5.1 Million	\$6.0 Million	\$7.3 Million
Roads	\$22.7 Million	\$23.4 Million	\$23.8 Million
Bridges	\$3.7 Million	\$4.6 Million	\$4.4 Million
TOTALS	\$43.9 Million	\$47.0 Million	\$49.1 Million

This data would indicate that accounting for straight line depreciation of the asset classes under consideration, the net book value of those assets has increased year-over-year since 2010. In other words, Council has been investing into these assets and enhancing their lifecycle at a rate faster than their straight line depreciation. This is a positive indicator.

With respect to the inflated cost of the assets under consideration, this figure is useful in that Best Management Practices suggest that on an annual basis, 3% to 4% of the current cost of assets should be invested to maintain and enhance asset lifecycles. As such for the asset classes listed, annual investment should be in the order of 3% to 4% of \$141.6 Million or \$4.2 Million to \$5.7 Million. Referring to the most recent FIRs, for the asset classes under consideration, the following information is available:

Table 3. Asset Investment

Asset Class	2010 Investment	2011 Investment	2012 Investment
Water	\$0.5 Million	\$0.5 Million	\$0.6 Million
Sanitary	\$0.7 Million	\$0.5 Million	\$0.4 Million

Storm	\$0.7 Million	\$1.0 Million	\$1.5 Million
Road	\$3.6 Million	\$2.4 Million	\$1.9 Million
Bridges	\$0.2 Million	\$1.1 Million	\$0.1 Million
TOTALS	\$5.7 Million	\$5.5 Million	\$4.5 Million

Again, this data would indicate that between 2010 and 2012, sufficient investment into infrastructure renewal occurred. Again, this is a positive indicator.

Between 2010 and 2012, while sufficient investment into infrastructure renewal occurred, one would expect that the net book value of the assets would remain relatively stable; however, that was not the case. This would imply that many assets had already reached the end of their useful life and thus their renewal resulted into a significant increase in net book value. In other words, the net book value of the assets under consideration is below what it should typically be, which is indicative of historic past under-funding of infrastructure renewal. This is evident anecdotally and visually across the City. Unfortunately this is a negative indicator.

In Table 1, there is a wide disparity between the inflated cost of assets and the projected replacement cost of all assets. Again, this is indicative of historic past under-funding of infrastructure renewal. If infrastructure were to have been renewed in a timely fashion, simply by the nature of the calculations used, the “inflated cost” would approach the replacement cost. Unfortunately this is also a negative indicator.

The disparity between Replacement Cost and Inflated Cost is also analogous to an “infrastructure deficit” or a gap in levels of service. The older an asset is and the longer it has not been renewed, the greater the disparity between the inflated cost and the replacement cost. As an asset is replaced, not only does the Net Book Value increase, but the gap between the inflated cost and the replacement cost closes. If one were to consider the ratio of the inflated cost to the replacement cost, being $141.6/312.4 = 0.453$, this could be considered as a “desired” level of service. The ratio between the net book value and the inflated costs, being $49.1/141.6 = 0.347$ could be considered as an “existing” level of service. As such, the existing level of service is below the desired level of service which is a negative indicator. However, as infrastructure renewal occurs both the inflated cost and the net book value increase which changes the ratios presented above. As such, these ratios are for illustrative purposes only and are meant to illustrate that infrastructure renewal has historically been under-funded. As infrastructure renewal occurs, the gaps between the ratios will tend converge.

The information presented above can be summarized as follows:

- From 2010 to 2012, Council has been investing into the asset classes under consideration at an appropriate level
- From 2010 to 2012, the Net Book Value of the asset classes under consideration has increased

- Prior to 2010 (historic) there has been under-funding of asset renewal which has lead to a “infrastructure deficit”

3.0 Lifecycle Management

Intuitively, it is generally accepted that a road like Pembroke Street West has a much different lifecycle as compared to a street like Howe Street. From a macro-accounting perspective, it is likely sufficient to account for these assets and to depreciate them in the same way. But the lifecycle of these assets is very different.

To start with, these two roads are built upon two different differing native soils. In the west end of Pembroke, many areas are underlain by sand whereas in the east end, clay persists. Each of these native soils behaves in a different way which influences the lifecycle of the asset. These two roads have a different structure. Pembroke Street West likely has 300 to 450 mm Granular B, with 150 mm Granular A and 3 lifts of asphalt, whereas Howe Street likely has 150 mm Granular A and 1 lift of asphalt. That being said, these two roads carry different types of traffic, with Pembroke Street West being a main arterial and Howe Street being a minor residential street

While somewhat related, the maintenance practices on these two roads are also drastically different. Often maintenance practices can influence the lifecycle of an asset.

In an urban environment like Pembroke, streets are underlain with buried infrastructure. Unfortunately, buried infrastructure often has a drastically different lifecycle than roads, curbs and sidewalks. For example, water, sanitary and storm pipes typically have estimated useful lives in the range of 40 to 80 years, whereas a road surface typically has a life in the order of 18 to 20 years. The challenge becomes integrating asset replacement strategies to maximize asset lifecycles and minimize disruptions. To this end, various asset rehabilitation strategies are available for each asset class, each with differing orders of magnitude of cost and each resulting in differing lifecycle benefits.

To maximize the life of an asset, there are preventative interventions that can be done. A road surface is an excellent example. After a road and the associated underground infrastructure is fully reconstructed, over its life there are interventions that can extend its life cycle. An excellent example would be as follows:

Year	Action
0	Full Reconstruction
3	Crack sealing
10	Crack sealing
18	Shave and pave replacement of top lift of asphalt

35	Road Reconstruction including new Gran A and structure rehab
40	Crack sealing
55	Shave and pave and infrastructure relining and structure rehab
60	Crack sealing
75	Road Reconstruction
80	Crack sealing
95	Shave and pave
Etc...	

So while from a financial perspective, a road may be amortized over 25 years and the pipes amortized over 75 years, there are maintenance and capital interventions over the life of an asset that may result in extensions of the lifecycle.

Conversely, there are factors beyond our reasonable control that adversely impact on an assets lifecycle. An excellent example is the watermain on Elizabeth Street. While there definitely are issues with its original construction (not deep enough), the native sub-soils are frost susceptible which has resulted in numerous breaks in a relatively short period of time, thus compromising the integrity of the pipe. Watermain break frequency is one factor in determining relative priority for watermain replacement.

4.0 Sustainability

Under the heading of Asset Value (above), it was determined that an annual capital investment of between \$4.2 Million and \$5.7 Million is recommended to maintain the stock of infrastructure that the City of Pembroke owns, operates and maintains. Historically this capital investment did not occur and thus an "infrastructure deficit" has built up. In addition, because of the lack of capital or maintenance interventions, many assets have deteriorated to such a point that replacement is the only viable alternative for the renewal of that piece of infrastructure.

Sustainability is about making informed decisions within the financial capacity of today's generations that does not impact on future generations ability to make those same informed decisions within the financial realities of the future.

So while an investment of between \$4.2 and \$5.7 Million is required on an annual basis, it is sometimes not possible to achieve this level of funding. Accordingly, decisions that maximize the lifecycle of assets must be made. Where a capital intervention cannot be made, sometimes an operational change may be required. Where an asset is consistently under-funded, perhaps user-fess are appropriate to generate additional revenue.

The challenge facing decision makers is to have the necessary information available and to understand the effect of their decisions and priorities. The challenge for staff is to provide the information in a

succinct manner that helps decision makers understand all available options and the consequences of deferring interventions.

Based on anticipated Council approval in 2014, a multi-year program of “shave and pave” projects is planned to be implemented. This program will hopefully result in enhanced lifecycles for several major roads in Pembroke.

In 2014, staff will also collate and coordinate the information from the PSAB 3150 data and use known Condition Ratings to determine which assets require interventions in the next 5 to 10 years. From this information, a Multi-Year Capital Construction Forecast will be brought forward. Of course, annual budgets are subject to Council approval, but the Forecast will present a reasonable plan for investment. The funding gap between the Multi-Year Capital Construction Forecast (annual budget approval) and the asset management plan represents the annual infrastructure deficit. The challenge for decision makers is to take steps that gradually reduces and eliminates this funding gap.

5.0 Technical and Financial Planning

From a financial planning perspective, the PSAB 3150 provides information on the financial status of assets, wherein assets that have been depreciated using straight line depreciation have reached the end of their useful life. In the first instance, this is very valuable information as it is a very good suggestion of which assets require rehabilitation in the short term.

Over time and from time to time, for the asset classes under consideration, the Operations Department gathers data that relates to condition assessment or capital needs. Furthermore, based on intuitive need, a Multi-Year Capital Construction Forecast has been developed. The challenge remains to integrate the PSAB 3150 data with existing and planned technical reports to determine the asset management plan (Capital Needs) and Multi Year Capital Construction Forecast (the budget plan).

6.0 Risk Management

A significant factor in the decision making process is risk management. It should come as no surprise that, simply based on the PSAB 3150 data, the list of assets requiring renewal is beyond the financial capacity of the City. That is not to say, that all those assets that PSAB 3150 indicates have reached the end of their useful life. Indeed many of the PSAB 3150 EUL assets do have remaining life. The first challenge is to successfully sort the PSAB 3150 data so that assets with truly less than 10 years EUL are listed appropriately.

Even after the PSAB 3150 data is validated, the capital needs will likely exceed the available funding and difficult decisions will have to be made as to prioritizing the capital needs into the Multi Year Capital

Construction Forecast. Managing risk is key in this process. From a very simplistic point of view, when determining the relative priority between Pembroke Street West and Howe Street, it would seem an easy decision to prioritize Pembroke Street West. But there are other factors to consider:

- The consequence of deferring an investment – a deferral should not lead to a higher potential of a “failure”
- The opportunity to integrate infrastructure renewal
- Cost

As staff initially prioritizes asset renewal, a risk management approach will be used. As new Council is elected in October 2014, decision makers may wish to reconsider priorities.

7.0 Performance Management

For several years, the City has adopted a Multi-Year Capital Construction Forecast which is a plan for capital renewal. While the Forecast has been based upon intuitive needs, the result of the Asset Management exercise and the capital renewal requirements will be used to validate and reprioritize the Multi-Year Forecast. As Council will be adopting its 2014 Budget in January/February 2014, an opportunity to reprioritize will exist.

The Asset Management exercise will not change based upon Council direction. Presumably an asset that is deemed to require renewal will continue to require renewal even if decision makers do not allocate funds for renewal. Herein lies an important distinction between asset management principles and budget forecasting. While an asset management plan will certainly serve to inform decision makers as to suggested relative priorities, it is the role of Council to approve and allocate budgets on an on-going basis.

On an annual basis, the data in the asset management plan will be validated and the capital forecast updated and approved during budget deliberations.

8.0 Current Status

While a number of essential components of an asset management plan have been discussed defined and placed in context with respect to a Pembroke Asset Management Plan, nothing has been documented.

The first necessary step in producing a meaningful asset management plan is to successfully document and validate the PSAB 3150 data for the asset classes under consideration. The attached Tables 1 through 6 are the necessary validation of that data.

For tables 1 through 6, the following legend applies:

- **Green Highlighting** indicates that the asset was recently rehabilitated and thus the PSAB 3150 data needs to be updated or verified – these assets do not require interventions in the short term
- **Orange Highlighting** indicates that the asset is included in the Multi Year Capital Construction Forecast
- **Yellow Highlighting** indicates that the asset has been inspected, does not require significant capital investment and is subject of on-going maintenance
- **Red Highlighting** indicates that the condition of the asset is well understood, but for other reasons, any necessary capital investment has been deferred
- **No Highlighting** indicates that the asset is known to be deficient, but that capital funding has not been identified. This can be inferred to represent an “Infrastructure Deficit”

Table 1 contains bridge data. As is plainly obvious, bridge assets are well understood. Significant recent investments and planned future investments will ensure that bridges continue to be sustainable assets in the City of Pembroke.

Tables 2 and 3 contain road data; both surface (asphalt) and base (granulars). The data lead to several observations as follows:

- In the recent past, several projects have already been completed and thus the PSAB 3150 data needs to be verified and updated to reflect the reality of the asset lifecycle.
- Many of the road sections have been identified in the Multi-Year Capital Construction Forecast, thus confirming the intuitive needs as identified by staff.
- Several road sections show only a need for surface rehabilitation. These road sections, where appropriate, should be a focus of “maintenance” interventions to extend their useful life. An example includes the 2014 program for “shave and pave”, where the surface is removed and replaced without impacting on the base of the road.
- Several road sections show a need for both surface and base rehabilitation. These road sections should be the subject of detailed inspections to confirm capital needs. The inspections should also include infrastructure (water, sanitary and storm).
- While inspections will confirm and further refine the colour coding of the assets, the magnitude of the none-highlighting is indicative of the “Infrastructure Deficit” that currently exists.

Table 4 contains storm infrastructure data. This data also leads to several observations as follows:

- The volume of data is much smaller as compared to roads data. This confirms two observations

- Across the City, several road sections do not have storm infrastructure (i.e. open ditches), which likely has negatively impacted on the road lifecycle. It is a well understood fact that urban ditch cross sections negatively impact on road lifecycles.
- The age of the existing storm infrastructure is such that it does not require rehabilitation.
- Where a storm section is identified as requiring intervention, this should be cross referenced and checked against the roads needs.

Tables 5 and 6 contain water and sanitary data. The data for water and sanitary has been captured in a fundamentally different format. The PSAB 3150 data for water and sanitary is based on the stock of infrastructure of a certain vintage and not be discrete location. That being said, the data does provide the basis to make the following observations:

- Roughly 40% of the sanitary infrastructure and 20% of the water infrastructure is showing as being at the end of its useful life using the “Acquisition Cost” as a measure.

9.0 Next Steps

From the analysis, the following observations can be made:

- From 2010 to 2012, the level of investment into the asset classes under consideration was sufficient and resulted in an increase in the Net Book Value of those asset classes.
- From an Asset Management perspective, the Multi-Year Capital Construction Forecast includes that road and infrastructure sections generally requiring rehabilitation. It can be inferred that there is a general understanding of asset condition, capital needs and relative priorities and as such advanced “planning tools” are likely not required.
- There is a significant “Infrastructure Deficit”. While it is difficult to assign a dollar value, the scope of planned investment (Multi-Year Capital Construction Forecast) does not meet the needs. Accordingly, decision makers should be thinking about establishing larger investment targets for infrastructure renewal for the asset classes under consideration.
- While the “Infrastructure Deficit” appears to be growing into the future, since 2006, the City of Pembroke has made significant investment into infrastructure renewal. Such fluctuations in capital spending make it difficult for decision makers to establish long term targets and plans for infrastructure renewal, which further underscores all Ontario Municipalities calls for long term, stable, predictable infrastructure funding arrangements with senior levels of Government.

For the 2014 Year, the following should form part of a work plan:

- **Data capture** – The data in the asset management plan is contained and derived from several sources, each on a “spreadsheet”. Tools should be researched to manage and integrate this data across the Corporation.
- **Asset condition** – While the roads data would suggest a large “Infrastructure Deficit”, it is suggested that inspections on these road sections be focused to confirm actual condition. So while from an accounting perspective a road section may have reached the end of its useful life, either through past practices or future maintenance, the service life of those assets may be extended. These inspections will result in a narrowing of the gap and a better understanding of the true “infrastructure deficit”.