Municipality of West Elgin

CityWide Software Implementation & Asset Management Program Development

Project Implementation Plan

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Contact List

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Project Deliverables

This document contains a high-level project plan for the Client for delivering an implementation of CityWide Asset Manager and CPA. The proposed schedule, requirements and scope presented in this document are to be refined and updated as client requirements, business and operational goals, and constraints are gathered throughout the project. PSD will deliver the following items as part of the implementation of the CityWide Software Suite for the Municipality of West Elgin. The work will include the following project(s):

PHASE 1 (2020)

1. CityWide Asset Manager with GIS Viewer and Asset Collector

Asset Manager (AM) is the core module in CityWide's Enterprise Asset Management (EAM) System. It serves as one central asset database for all asset classes, providing users with a single corporate-wide source for asset information. More than just an asset register, AM powers accurate and efficient financial reporting, along with sophisticated asset management functions, including lifecycle planning, risk management, levels of service, and decision optimization. This module is fully integrated with all CityWide modules, allowing real-time data updates to flow between applications. AM allows for advanced analysis and easy reporting, in which users can create asset profiles for similar asset types, then easily generate detailed lifecycle strategies, risk matrices, and condition reports within the application. Users can also run accurate and automated TCA reports from one system. Some of the core functions of AM are listed below:

Asset Register
- ☑ Complete asset register that supports all asset classes and hierarchies
- ☑ Condition Assessments, Lifecycle Management, Risk Modelling, Decision Trees, Levels of Service, Accounting

Reporting
- ☑ Full suite of standard reports
- ☑ Rich graphing engine for presentations
- ☑ Create and save ad-hoc reports and share across the organization

Mapping
- ☑ Seamless integration with GIS to visualize assets, condition, and risk
- ☑ Easily communicate your strategies

Lifecycle Modelling
- ☑ Create profiles for each asset class to determine optimal lifecycle strategies
- ☑ Financial Planning for Sustainability
- ☑ Capital Plans, Operating Plans, Growth

Risk Management
- ☑ Industry leading risk modelling built through a dynamic user-controlled interface
- ☑ Unlimited risk classes, metrics, and weightings

Decision Support
- ☑ Based on your asset profiles project optimal funding requirements
- ☑ Project Levels of Service including condition and risk
- ☑ Project Planning

Attributes
- ☑ Unlimited development of asset attributes Develop multiple scenarios for real-time comparison
- ☑ All attributes can be used as part of your risk analysis and optimization

CityWide GIS Viewer

CityWide's GIS Viewer module allows users to visualize and directly access all the asset information stored within their asset register via a versatile mapping solution, enhancing infrastructure planning capabilities and enabling superior communication around asset management. It is designed to function as a standalone GIS system – fully integrating with CityWide's EAM modules – or together with existing client GIS solutions.

GIS Integration

The integration services will be based out of PSD's head office in London, Ontario. The integration is performed remotely, completed by leveraging screen-sharing technology. PSD will also organize discussions with the Municipality to gather the information required. If an integration to GIS is preferred, CityWide offers

a lite version of the GIS module. It serves as a repository for spatial data that is served up to an associated web-based "viewer", with potential to draw from and serve third party systems. Key design principles include an intuitive interface with high visual impact, to produce demonstrable maps while maintaining the required internal functionality that an organization needs. The viewer is designed to work together with existing client systems. The viewer integrates with the other modules and allows for viewing of asset location through the Asset Manager database. The viewer will integrate with the other modules and allows for viewing of asset location through the Asset Manager database, mapping work orders/service requests and project prioritization through filterable reporting and viewing.

Automatic Integration: CityWide has an OGC compliant GIS Viewer that can connect to existing WMS/WFS services from any compliant service. By identifying a common ID between the assets in GIS and our system, our solution can pass standard HTTP GET arguments to load our viewer with them. Our application can be modified to take such arguments (i.e. a link generated from a feature in the GIS system) to load our system directly to the related asset.

Manual Integration: The GIS files are imported automatically and show up as a point in the GIS system. Then assets are manually added to be part of the inventory listing, which would then be linked to the corresponding GIS file. Integration relies on identifying a "unique ID" or "Primary Key" that facilitates a one-to-one mapping between the two systems that are being integrated. A scheduled task will run, facilitating the integration process. This generally involves one system exporting data for the other so that it can be compared. The export is typically in the CSV format and can either contain changes since the last sync procedure, or a more complete dataset to allow an iterative comparison of field values between the two systems. Alternatively, one system may access the other's data via direct connection to a database, or via an API. Generally, APIs are preferable to use, when available. If an API is robust enough, it may be possible to facilitate virtually instantaneous updates between the two systems, if desired, thus eliminating the need for a scheduled task.

When comparing data, if conflicts are found between the two data sets, a set of rules will be followed to facilitate the updating of field values between the two datasets. Similarly, the addition/removal and other functions occur at this point. Upon completion, an "integration report" is produced to detail any outstanding conflicts or errors that occurred during the sync. The report also contains more granular details such as which specific fields/assets were impacted.

Asset Collector (CityWide Asset Manager Add-on)

Asset Collector is the newest feature of the CityWide Mobile app, which enables users to add new assets and assessed condition data to their asset database using their iOS or Android device. Capturing data in the field saves users valuable time and effort, eliminating the need to update inventories back in the office, and ensures greater data accuracy. With Asset Collector, field staff have access to more information about their assets, which improves efficiency and performance in asset management.

Core Features of Asset Collector

- ☑ Field staff can add assets directly from the CityWide Mobile map and upload visuals in real time
- ☑ Users can access rich asset data in the field, including thumbnails, condition assessment records, asset attributes and GIS information
- ☑ With an easy to use slider, field staff can quickly and accurately capture the condition of the asset in the field according to the specifications of that asset type
- ☑ CityWide Mobile functions without internet access, so field staff can still collect data using Asset Collector and then easily sync with CityWide when the internet is available
  - o Asset Collector integrates seamlessly with the whole suite of CityWide modules: Once a new asset has been created, users can issue work orders tagged to the new asset using CityWide Maintenance Manager (MM)

- o Staff in the office and in the field will be able to access one complete and up-to-date record of assets using CityWide Asset Manager (AM)
- o CityWide GIS enables users in the field to download and view assets directly through a MAP VIEW

2. CityWide Capital Planning and Analysis

The Capital Planning and Analysis (CPA) module is a financial modeling application for asset management and lifecycle costing. CPA enables public sector organizations to capture data from their asset inventory, analyse and consolidate it, then develop unlimited scenarios in real-time, generating a series of options and long-term recommendations. This application uses the information from CityWide Asset Manager, along with revenue, reserve, and debt financial information. Variables such as Taxes, Revenue, Reserves and Debt are utilized to allow analysis of future funding requirements, sources of funds and long-term implications for the organization, thereby allowing for:

- ☑ Reserve Planning & Management
- ☑ Manage revenue sources and one-time funding
- ☑ Debt Management
- ☑ Allocation of funding to projects

CityWide CPA therefore builds and prioritizes the full lifecycle plan for maintaining and replacing any category of asset and supports the development of strategic financial plans and multi-year operating & capital plans, including growth projects.

The CPA module integrates with the Asset Manager database, importing lifecycle renewal and replacement data for all assets. It is used to derive short, medium and long-term financial plans by tracking expenditures (lifecycle renewals and capital projects) and revenues (taxes, reserves, debt). Modelling of financial scenarios allows the Municipality to prioritize projects based on risk, condition, lifecycle strategies, and location and optimize decision making by analyzing all assets and services to build coordinated projects.

3. Asset Management Policy Review and Update

For the stability of a good asset management program, it is important to establish an asset management policy that clearly states program objectives, roles, and responsibilities, and is vetted through senior management and endorsed by council. The policy becomes a guideline for employees to follow in making decisions. It provides a framework for the delegation of decision making, eliminates misunderstandings, reduces uncertainties and enable goals and objectives to be met.

The Asset Management Policy aligns the asset management strategy and objectives to the organizations strategic plan. The Policy clearly establishes asset management roles and responsibilities as endorsed by Council. The Municipality of West Elgin has already developed an Asset Management Policy to meet the first requirement of Ontario Regulation 588/17, therefore PSD will perform a review of their current Policy and make sure that it aligns with the Municipality's current asset management strategy and objectives.

4. Asset Management Maturity Assessment

It is important to gauge the current state of practice related to asset management at the Municipality of West Elgin. This assessment will allow for a thorough gap analysis to determine where the Municipality should focus its efforts to build up a strong asset management program. To facilitate this step, PSD has developed 2 methodologies: Asset Management Self-Assessment Tool (AMSAT), and a series of stakeholder interviews.

AMSAT, implemented in a survey format, relies on a series of questions across specific categories which are based on established international standards and processes and are seen as the requirements of a successful asset management program. The assessment will cover asset management methods, tools, and

practices within the Municipality of West Elgin in accordance with the established AMSAT method. Municipal staff from various departments, including Finance, and each infrastructure group, like engineering, facilities, parks, will be expected to complete this survey.

In addition to the AMSAT, additional information will be gathered through a series of in-depth meetings with key stakeholders for each asset group, including Finance, who are either directly involved or support the delivery of an asset class. The specific asset classes that will be assessed through this process will be determined by PSD and the Municipality of West Elgin at the onset of the project. The results of the AMSAT and stakeholder interviews will be compiled and reported back to the Municipality. These results will then allow PSD to compare the current state of practice within the Municipality of West Elgin with the international standards and processes which set the benchmark for a successful asset management program. The main assessment categories as part of the AMSAT are:

- ☑ **Organizational Cognizance** – Relates to the degree to which AM is both understood and prioritized by both senior management and council
- ☑ **Organizational Capacity** – High organizational capacity to undertake asset management includes adequate human resources, staff knowledge, and a cross-functional team working together
- ☑ **Infrastructure data/information** – Assesses the completeness and accuracy of all asset inventory and condition data sets
- ☑ **Asset Management Strategies** – Should establish a set of planned management activities to prioritize and optimize infrastructure programs and manage risk
- ☑ **Financial Strategies** – Assesses the completeness and sustainability of current financial strategies related to asset management
- ☑ **Level of Service** – Assesses the robustness of level of service frameworks which dictate the quality thresholds at which municipal services should be delivered to the community

The Municipality of West Elgin will be rated on its proficiency level for each category described above. The overall results and proficiency level ratings will be reported back through a formal State of Maturity Report.

5. Condition Protocols and Data Capture Tools

Municipalities need to have a clear understanding regarding the performance and condition of their assets, as all management decisions regarding future expenditures and field activities should be based on this knowledge. An incomplete understanding of an asset may lead to ill-timed failure or premature replacement. This stage involves an assessment of existing condition assessment protocols in order to develop and deliver industry standard condition assessment templates. The Municipality is also given time to use the templates to gather condition data to be incorporated into the remainder of the project. Some benefits of holistic condition assessment programs within the overall asset management process are listed below:

- ☑ Understanding of overall network condition leads to better management practices
- ☑ Prevents future failures and provides liability protection
- ☑ Establishes proactive repair schedules and preventive maintenance and rehabilitation programs
- ☑ Extends asset service life, therefore improving level of service
- ☑ Enables accurate asset reporting which, in turn, enables better decision making

Through the asset management program development process, available condition assessment protocols by asset type will be reviewed, including the cycle or continued timeline for capture of the field condition data.

PHASE 2 (2021)

1. CityWide Maintenance Manager

CityWide Maintenance Manager is a complete Computerized Maintenance Management System (CMMS) that will allow the Municipality to centralize its business functions, reduce the duplication of data, and facilitate how it manages information. The module is a web based, service request, work order, and preventative maintenance application designed to enable all departments to prioritize, schedule and track projects. The module is equipped to manage and record labour, material and equipment time and costs while the Municipality maintains its assets. Additionally, the solution enables the tracking of progress and status of all work, creation of custom processes, and scheduling of resources. The Maintenance Manager module would be used to generate, schedule and track progress and cost of work orders and service requests. Work orders can be initiated either internally or externally or can be automatically generated through user-defined preventative maintenance schedules. Users would use this module for maintenance management, fleet management and facility management.

Core Functions of Maintenance Manager

- ☑ **Service Requests:** Track front-line requests from residents related to and not related to assets.
- ☑ **Work Orders:** Take service requests and turning them into actionable work orders, tying them to assets, assign schedule and action that work to be take care of.
- ☑ **Preventative Maintenance**: Scheduling routine or regular maintenance tasks and activities.
- ☑ **Mobile App:** Allows field workers to update complete work orders and service request via tablet or mobile phone with online and offline functionality.
- ☑ **Resource costing:** Allows users to track consumable parts and materials, equipment, employee labour hours, contractor and other costs that may be incurred.
- ☑ **Reporting:** Allows the organization to leverage valuable data housed within the system. To analyze trends, resource usage, and help make informed decisions about maintenance decisions and asset management practices.

Benefits

- ☑ **Easy to Use; Configurable Architecture**: System architecture for Maintenance Manager is easy to configure - no coding required, meaning that skilled IT resources are not needed to change and add to the configuration. Once users start using the system, they can organically expand and add to their use of the software.
- ☑ **Workflow Process Control** is built into the core of system functionality – help manage flow of communications, data quality, ensuring that processes are being completed at by the right person at the right time in the right way to the right assets.
- ☑ **GIS Centric, Asset Centric:** *All components* of the program allow users to access location information of an asset and visualize it on maps and find key asset information in the Asset Manager repository.

Other Features

- ☑ **Core Customer Contacts & Properties Listing:** users can store history on service requests and work orders.
- ☑ **Inventory Management:** users are able to manage resource levels.
- ☑ **Child-Parent Work Orders:** link work orders for any dependant and subsequent activities that result from a particular work order.
- ☑ **E-Mail Notifications:** as part of workflow process control, users can highlight and be notified about key activities and statuses of work orders.
- ☑ **Role-based Permissions:** users can control settings within organizations.

Work orders can be attached directly to the assets housed within the Asset Manager Module, which the Municipality is looking into implementing. This includes mobile tools that will allow staff to capture photos, asset data and inspection information even when offline in remote areas. Recurring inspections are auto generated, and user to-do lists are viewable by individual users and their supervisors. Inspections and asset information can be collected and uploaded using mobile tools such as smartphones and tablets.

Available for the Maintenance Manager module is also a mobile application, designed for staff to access the work order system information in the field. Users can consult work order information, update calendars, complete priority work, review and complete pending tasks. The mobile application remains functional when there is no available internet connection; information is synchronized once an internet connection is available. Maintenance Manager was designed as a work order and workflow application to enable public works departments to prioritize, schedule and track projects.

Work orders can be attached directly to assets in the Asset Manager database. The system can generate automatic e-mail notifications that send work orders to assigned workers, crews or external vendors. The assigned party can update the progress and completion of the work order in the system, in the field through the mobile application, or from any desktop computer that has an internet browser. Workers can include notes, pictures and condition assessments within the work order. The Municipality also has the option to attach preventative maintenance checklists to the work order for the assigned party to complete and create additional work orders/service requests, as necessary. Additionally, Maintenance Manager allows for easy disposals, partial disposals, or additions to work orders independently without disrupting any work order history. The scope of this project includes and excludes the following items.

In Scope:
Client Business Units to be Implemented

Business Unit	Implementation Phase
Public Works	Phase 1 (PSD Resources)
Water & Wastewater	Phase 1 (PSD Resources)
Parks and Recreation	Phase 2 (* Internal Client Resources)
Fleet	Phase 2 (*Internal Client Resources)
Facilities	Phase 2 (*Internal Client Resources)
By-Law	Phase 2 (*Internal Client Resources)

Asset Classes to be Imported

AM Asset Classes	In Scope	Exists in AM Inventory	Asset Registry Build / Breakdown Required *
Road	Yes	Yes	(*Internal Client Resources)
Bridges	Yes	Yes	(*Internal Client Resources)
Water	Yes	Yes	(*Internal Client Resources)
Wastewater	Yes	Yes	(*Internal Client Resources)
Facilities	Yes	Yes	(*Internal Client Resources)
Parks	Yes	Yes	(*Internal Client Resources)
Equipment	Yes	Yes	(*Internal Client Resources)
Vehicles	Yes	Yes	(*Internal Client Resources)

*Professional services required to assist the client with re-building or disaggregating their asset registry is subject to additional PSD professional services fees.

CityWide Maintenance Manager Functions to be Implemented

Maintenance Manager Functions	In Scope?	Implementation Phase
Activity Based Work Orders	Yes	Phase 1
Asset Based Work Orders	Yes	Phase 1 & 2*
Asset Based Work Orders via Mapped Assets	Yes	Phase 1
Workflow Process Control • Email notifications • User defined attributes • User defined processes	Yes	Phase 1
Asset Based Routine Inspections	Yes	Phase 1
Service Requests	Yes	Phase 1
Customers & Properties	Yes	Phase 1
Preventative Maintenance Scheduling	No	Phase 2*
Resource Costing – Labour	No	Phase 2*
Resource Costing – Equipment	No	Phase 2*
Resource Costing – Parts & Materials	Yes	Phase 1 & 2*
Mobile App – Work Orders, Service Requests, Inspections	Yes	Phase 1 & 2
Mobile App – Patrol (Trails/Paths)	Yes	Phase 1 & 2
Mobile App – Data Collection (Condition & Attributes)	Yes	Phase 1 & 2

*"Phase 2" is for future consideration and can be implemented by the Client at any time without utilizing PSD staff for implementation support.

Although the above modules are included and available with a standard software purchase, only items identified as part of the scope are included in the implementation and training budget for this project. The implementation project presumes that data will be provided to PSD by the Client on PSD standard Excel data collection templates. One initial load for testing purposes and one final re-load if necessary is included. Additional implementation assistance can be purchased at the applicable PSD Professional Services daily rate.

Value Added Services:

The value-added services included and not included as part of this implementation project are outlined below. Additional services can be purchased at the applicable PSD Professional Services daily rate.

Value Added Services	In Scope?
End User Training	Yes
Pre-implementation Needs Analysis	No
Custom Reporting Services	No
Customized Address Search	Yes
Customer Service Web Integration (iFrame)	Yes
Process Mapping and Improvement	No
Legacy Data Analysis & Upload	No
Asset Data analysis/disaggregation	No
3rd Party Integration	No
Digitize Assets from Map/Ortho Photos (Park assets, Storm assets, Facilities)	No

Out of Scope:

The following items have been discussed as future offerings/consideration, but are not included as part of this initial implementation project

Out of scope Items	
1	Future need for a System Integrations has been discussed. Requirements, scope discussion and associated costs will be a separate project for consideration
2	Client Asset registry may not be fully ready for asset-based tracking of work orders. Professional services required to assist the client with re-building or disaggregating their asset registry will be a separate project for consideration or handled internally by the client.

PHASE 3 (2022)

1. CityWide Decision Support (DS)

CityWide Decision Support allows organizations to create and define various level of service scenarios from different asset intervention strategies, taking into consideration risk, performance, and lifecycle event information. CityWide DS allows for the generation of unlimited scenarios, comparing up to four simultaneous scenarios on actual available budget dollars. Because of the use of risk, performance and lifecycle information, users will be able to forecast for budgets using accurate asset information and data driven decision making, leading to long-erm savings on your overall asset maintenance program.

Core Features of CityWide Decision Support

☑ CityWide DS uses a genetic algorithm to automatically test and compare all possible scenarios for asset event strategies, providing users with the most optimal outcome

☑ Customized weightings (i.e. 40% risk-60% performance) are used to prioritize the most impactful measurements for your organization

☑ Toggle between different graphs/outputs to communicate scenarios most clearly for your audience

☑ Use the maps feature to plot assets based on performance and/or risk, enabling you to see from a bird's eye view grouped assets and their performance and the changes that occur over different time periods

CityWide Decision Support Benefits

☑ Ensure that budget forecasts are based on concrete and accurate asset data

☑ Gain a comprehensive understanding of asset profiles and the impacts of various asset intervention scenarios

☑ Conduct ad hoc scenario comparisons (i.e. conduct a scenario on all rural road profiles given a $1 million per year budget versus $1 million per year plus inflation)

☑ Perform a quick analysis of various scenarios on all asset categories

☑ Ensure that decision-making is based on possible scenarios given budget parameters. DS will identify if a chosen scenario won't work based on the data provided

☑ Quickly and accurately produce dynamic graphs and tables to assist with communicating decision points to council, senior management, and the public

☑ Agile and user-friendly interface

☑ Continued system enhancement offered to all DS users

2. Risk Analysis and Management

PSD will develop a risk system, which will rank overall risk based on parameters that consider economic, social, environmental impacts, as well as all other available data regarding the condition of assets, known operational issues, etc.

Risk and criticality models and analysis are a key element of good asset management practices and programs. They are now recognized nationally and internationally as best practice. Through their use, an asset manager can determine which infrastructure is critical to the organization and can also rank and rate the level of business risk associated with all the infrastructure stock. This can be achieved at the organizational level, the asset category level, the individual asset level, and the asset component level. This becomes extremely useful when limited internal resources are being used to try and address a significant number of field needs or priorities.

As part of the development of this rating system, important questions will be asked and quantified. For instance, how much risk is currently associated with the delivery of infrastructure services for the

Municipality? And, what is being done to reduce or mitigate risks? The proposed risk model will quantify the first question and therefore initiate analysis and management processes to address the second question.

- ☑ A good risk model will assist with the prioritization of available resources and it will:
- ☑ Ensure vital services are available
- ☑ Prioritize and streamline inspection and condition assessment programs
- ☑ Prioritize and optimize operations and maintenance programs
- ☑ Prioritize and optimize capital budget processes and program delivery
- ☑ Ensure that available money and resources are applied to the right asset at the right time
- ☑ And will establish attainable levels of service.

Approach and Parameters:

As stated above, infrastructure needs will typically exceed available resources and therefore project prioritization parameters will be developed to ensure the right projects come forward into the short and long-range budgets for the Municipality. An important method of project prioritization is to rank each project, or each piece of infrastructure, based on how much risk it represents to the organization. As a best practice within the infrastructure industry risk has been defined by the following equation:

RISK = PROBABILITY OF FAILURE (POF) x CONSEQUENCE OF FAILURE (COF)

The Probability of Failure (POF)

The probability of failure (POF) relates to the current state of each asset, whether they are new or old, or in excellent, good, fair or poor condition, as this is a good indicator regarding their future risk of failure. Additional parameters can also contribute to the future POF of an asset such as the average daily traffic count on specific roads within the road network. The following is a general list of parameters that are often used for POF:

- ☑ Condition data
- ☑ % of asset life consumed
- ☑ Known operational issues
- ☑ Other parameters contributing to asset deterioration (e.g. traffic counts, soil types)

The Consequence of Failure (COF)

The consequence of failure relates to the magnitude, or overall effect, that an asset's failure will cause. For instance, a small diameter water main break in a subdivision may cause a few customers to have no water service for a few hours, whereby a large trunk water main break outside a hospital could have disastrous effects and would be a front-page news item. The COF parameters should address the economic, social and environmental impacts of asset failure in order to fully quantify the overall risk to the organization. The summary of these impacts are as follows:

- ☑ Economic – the impact of the asset's failure on financial resources
- ☑ Social – the impact of the asset's failure to the general population & society
- ☑ Environmental – the impact of the asset's failure on the environment.

The following is a general list of parameters that are often used for COF:

☑ **Economic (cost of rehabilitation or replacement)**

     ✓ Asset type (e.g. road or pipe material)
     ✓ Asset size (e.g. number of road lanes or pipe diameter)
     ✓ Overall replacement cost

☑ **Social (number of people or critical services affected)**

     ✓ Land Use (e.g. industrial, commercial, residential)
     ✓ Bus / truck / emergency route
     ✓ Asset carrying capacity (e.g. traffic counts, pipe diameter)

☑ **Environmental (impact to the environment)**

     ✓ Proximity to water bodies
     ✓ Proximity to environmentally sensitive areas
     ✓ Asset carrying capacity (e.g. traffic counts, pipe diameter)

Risk Ranking

Evidently, the accuracy of a risk ranking for an asset will be reliant on the accurate assessment of the probability of failure and the consequence of failure. The reliability of both will depend on the level of assessment and data and the data or expert knowledge applied to support the analysis. A risk value is derived once a consequence of failure and probability of failure value is computed. PSD will use a risk matrix to group the assets in their respective risk groups.

Consequences \ Probability	1	2	3	4	5
5	Minor	Moderate	Major	Severe	Severe
4	Insignificant	Minor	Moderate	Major	Severe
3	Insignificant	Minor	Minor	Moderate	Major
2	Insignificant	Insignificant	Minor	Minor	Moderate
1	Insignificant	Insignificant	Insignificant	Insignificant	Minor

The collected data from assets will be loaded into the CityWide system, to make use of the probability of failure and consequence of failure parameters to create Risk Ratings for each asset category. Below is an example of the risk rating of an asset and all the information on its POF x COF.

The overall risk shown through the Risk Rating speaks to the priority of the asset over others. The Citywide risk rating is obtained from the probability x consequence of failure. The probability of failure will be heavily weighted from the overall condition rating (condition inspection information), whereas consequence of failure may bring in various factors to show the impact of failure. These factors could be cost, the type of material, traffic count, road class, etc. All factors together will form the overall health result.

Save

Summary
- Details
- Attributes (7)
- Notes (0)
- Attached Files (0)
- Insurance/Warranty

Valuation

Amortization
- Adjustment Summary
- Additions (0)
- Full Disposals (0)
- Partial Disposals (0)
- Writedowns (0)
- Transfers (0)
- Overrides (0)

Profile
- Replacement Cost
- Condition (1)
- Risk
- Strategy
- Decision Tree

Works
- Work Orders (0)
- PM Events (0)
- Usage (0)

Manage
- Asset Log

Probability of Failure   [Automatic ▾]

Field	Value	Risk Level	Weight (%)	Score	Weighted Total
Condition	4.05	1 - Rare	70%	0.70	0.70
Service Life Remaining (Years)	40 Years 6 Months	1 - Rare	30%	0.30	0.30

Probability of Failure Total: | 1 - Rare |

Consequence of Failure   [Automatic ▾]

Economic - Weight: 100%

Field	Value	Risk Level	Weight (%)	Score	Weighted Total
COF - Health and Safety	Severe - Potential for death or multiple death with probably permanent disabilities.	5 - Severe	24%	1.20	1.20
COF - Environmental	Severe - Major long-term (+5 years) or permanent widespread damage to the environment.	5 - Severe	19%	0.95	0.95
COF - Financial	Medium - Cost of Reactive response and replacement is over 110% to 125% of proactive replacement or Increase in cost to providing service is over %10	3 - Moderate	19%	0.57	0.57
COF - Legal & Regulatory	Medium - Possible prosecution by public groups or Agencies.	3 - Moderate	19%	0.57	0.57
COF - Reputation & Image	High - Criminal charges against Senior staff or a Public official. Calls for public inquiry and/or change of a Senior official.	4 - Major	9.5%	0.38	0.38
COF - Service Interruption	Severe - City-wide service disruption: Over 5,000 people affected service interruption over 30 days	5 - Severe	9.5%	0.48	0.48
				Economic Total:	4.15

Consequence of Failure Total: | 4.15 - Major |

Risk Rating (Probability * Consequence)
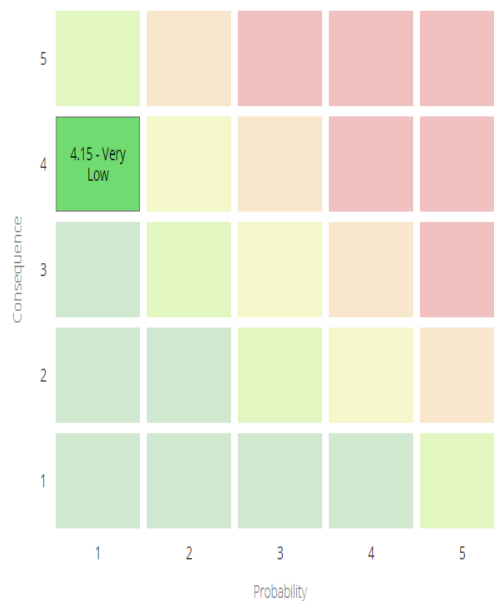
The map below represents an example of the results of a Risk Model we developed for a water distribution network.
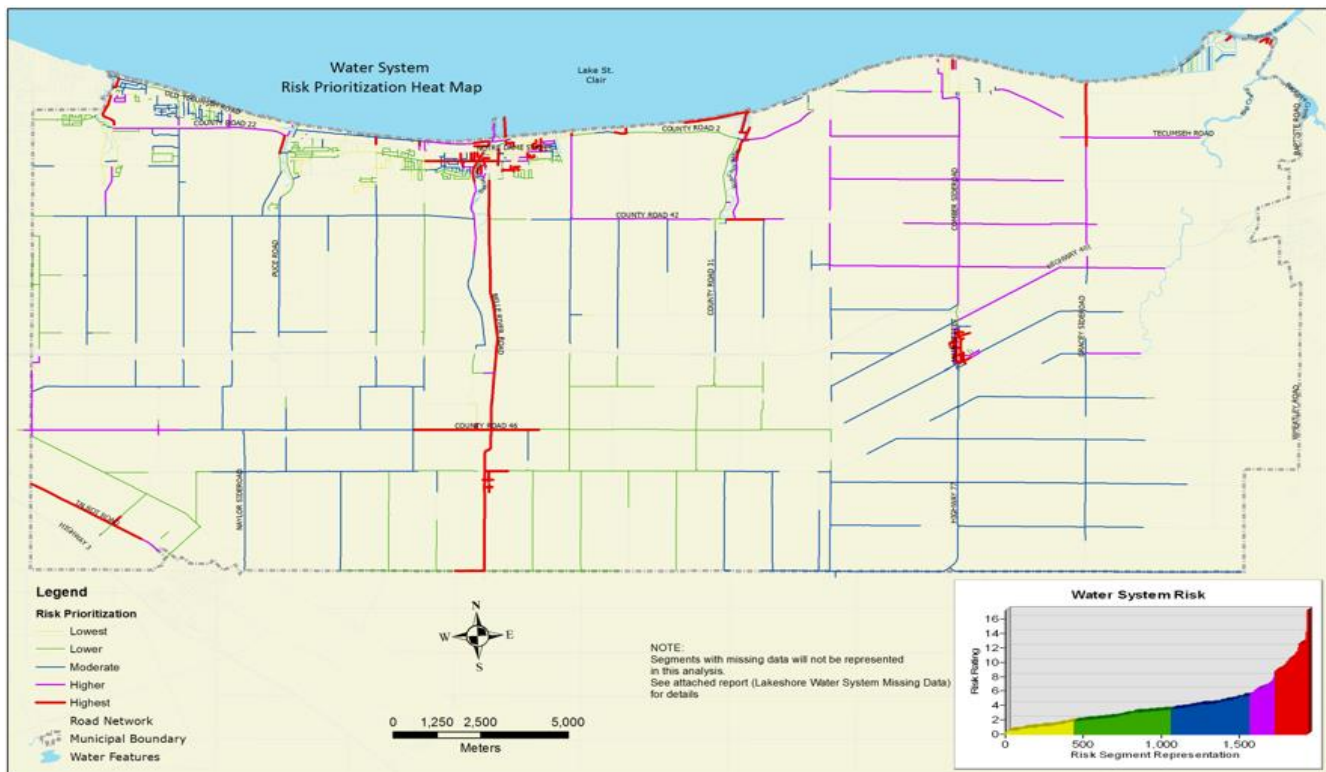
3. Levels of Service Framework Development

Desired levels of service are high-level indicators, comprising many factors, as listed below that establish defined quality thresholds at which municipal services should be supplied to the community. They support the organization's strategic goals and are based on customer expectations, statutory requirements, standards, and the financial capacity of the municipality to deliver those levels of service. They typically involve a review of Strategic and Corporate Goals; Legislative Requirements; Expected Asset Performance; Community Expectations, and, Availability of Finances. Levels of service are used:

- ☑ To inform customers of the proposed type and level of service to be offered
- ☑ To identify the costs and benefits of the services offered
- ☑ To assess suitability, affordability, and equity of the services offered
- ☑ As a measure of the effectiveness of the AMP
- ☑ As a focus for the AM strategies developed to deliver the required level of service

A level of service framework will be developed for each asset class through a review of the key factors involved in the delivery of that service, and the interactions between those factors. In addition, key performance metrics will be developed for them to be tracked over an annual cycle to gain a better understanding of the current level of service supplied. For each asset class, the following Levels of Service Frameworks will be developed:

- ☑ Detailed models – Roads, Bridges, Water (Linear), Wastewater (Linear), Storm (Linear), Parks, Facilities
- ☑ High-level models – Fleet, Equipment

PROJECT BUDGET

Professional Services				
Service		**Phase 1 2020**	**Phase 2 2021**	**Phase 3 2022**
CityWide Asset Manager with GIS Viewer & Asset Collector	License	$12,500.00	x	x
	Implementation	$19,200.00		
	Annuity	$6,900.00		
CityWide Capital Planning and Analysis	License	$8,500.00	x	x
	Implementation	$15,000.00		
	Annuity	$2,900.00		
Asset Management Policy Review and Update		N/C	$	x
Best Practice Asset Management Workshop		$3,000.00		
Asset Management Maturity Assessment		$17,000.00	$	x
Conditions Assessment Protocols - CW Asset Manager		$15,000.00		
Asset Management Plan Services (Training and Services to support building the AMP into CWAM, CPA) (7 days)		$10,000.00		
CityWide Maintenance Manager	License	x	$19,500.00	x
	Implementation		$32,000.00	
	Annuity		$11,500.00	
CityWide Decision Support	License	x	x	$
	Implementation			$
	Annuity			$
Risk Management and Analysis		x	12,800.00	$12,800.00
Levels of Service Framework Development		x	x	$29,500.00
TOTAL		**$110,000**	**$75,800.00**	**$42,300.00**