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WATER AND WASTEWATER OPTIMIZE WORKS PROGRAM PHASE 1 UPDATE AND FINAL REPORT

The Transportation and Works Committee recommends:

- 1. The presentation by D. Korolnek, Director, Water and Wastewater, be received; and**
- 2. The recommendation contained in the following report, April 21, 2004, from the Commissioner of Transportation and Works be adopted:**

1. RECOMMENDATION

It is recommended that:

1. Transportation and Works Committee and Regional Council receive this report for information.

2. EXECUTIVE SUMMARY

The Water and Wastewater Branch initiated an overall service improvement program consisting of several strategic projects. One of these projects was the Water and Wastewater Best Practices review. This project, derived from the three principle concepts of organization, practices, and technology, is referred to as OPTimize Works.

The OPTimize Works program plays a key role in the Water and Wastewater Branch's response to the challenges and opportunities being faced such as unprecedented growth, an aging workforce, and the introduction of more stringent water quality regulations. This report outlines the OPTimize Works conclusions which are designed to achieve optimal performance from existing and future operational assets, the Branch's skilled staff, and the technology solutions being deployed. The conclusions outline the resource requirements necessary to deliver the best possible service value to area ratepayers. OPTimize Works provides the branch with a program for responding to the requirements of Bill 175 "The Sustainable Water and Sewage Systems Act".

The report is structured to highlight the program conclusions in terms of the main components: Organization, Practices, and Technology.

The *Organization* conclusions include: the introduction of a new Branch business unit – Strategic Asset Management; consolidation of the operations and maintenance functions into a single business unit – Water and Wastewater Operations; merging the Water and Wastewater Planning group into the Water Resource Planning business unit; and refocusing the direction of the Operations Support business unit. The program further recommends the creation of seven geographically based operations "hub" each staffed

with operators responsible for all water and wastewater operations and asset maintenance. The organization conclusions include a resource increase of twelve to a staff complement of 108 permanent full time employees implemented over 2005 and 2006.

Practices conclusions include finalizing the work practices needed to accommodate the revised organizational structure. Practices conclusions cover the physical water and wastewater processes, work management practices, materials handling and management practices, asset management, performance management, and practices related to the various internal and external support services. Implementation of the practices will begin in 2004 using a pilot “hub” to confirm their effectiveness. The implementation will carry on through 2005 with the practices rolled out to the remaining hubs.

Technology is a key component to the OPTimize Works program. *Technology* conclusions include: development of integration architecture, network enhancements, Supervisory Control And Data Acquisition (SCADA) related improvements in conjunction with the ongoing SCADA Master Plan, creation of data warehouse, implementing a comprehensive Geographic Information System (GIS) for asset management, and developing performance measurement related technologies to enable the use of collected data for making decisions.

The OPTimize Works program will require an investment of approximately \$3.1M over the next five years (2004 to 2008) and will be subject to Council approval through the annual Budget and Business Plan process. The associated benefits will be approximately \$5.5M with a payback period of 4.65 years from the initiation of the project in 2003. Costs result from the redesigned business units, training, and technology implementation. Savings are achieved through the implementation of more compact geographic operational areas, cross-trained and multi-skilled employees, and effective deployment and use of technology solutions. Once fully implemented, the Region is expected to realize a net savings of approximately \$1.5M annually.

Implementation of the OPTimize Works program conclusions will be carried out over the next ten years in phases with staff obtaining Council approval through the annual Budget and Business Plan process. Staff will issue a Request for Proposal for consulting services for the implementation following a planning workshop designed to confirm the implementation scope. Staff will report back to Committee and Council upon completion of the procurement process.

3. PURPOSE

This report provides Transportation and Works Committee and Regional Council with the final conclusions of the Water and Wastewater Branch Best Practices Phase 1 project (OPTimize Works program). OPTimize Works Phase 1 included the planning and design of the best practices program for the Branch and covered work process redesign, development of a Branch information systems master plan, selection and implementation

of a work management system, development of an implementation plan, and overall project management.

4. BACKGROUND

The Water and Wastewater Branch faces continuing challenges in the delivery of core business services to York Region's nine area municipalities. In an environment of increasing legislation, tremendous population growth and the need to ensure public accountability, the Water and Wastewater Branch is an industry leader in looking at operational effectiveness and sustainability.

The five main challenges affecting day to day operations and maintenance of York Region's water and wastewater systems are:

- Regulatory Compliance – regulatory and legislative changes continue to strain staff due to significantly increased reporting requirements and liability.
- Hiring and Retention Issues – throughout the industry, municipalities have difficulty hiring and retaining experienced qualified water and wastewater operators.
- Growth Pressure – York Region is the fastest growing region in Canada with new infrastructure being added to the water and wastewater operations base annually.
- Asset Management – accurate asset valuation is needed for strategically planning future assets and making decisions on asset upgrades, replacement and renewal; additionally, understanding the extent of water and wastewater assets enables the development of full cost accounting strategies for the branch, as required under Bill 175, "The Sustainable Water and Sewage Systems Act".
- Performance Measurement – municipal managers are being asked to demonstrate through performance measures and management their accountability to the ratepayers.

To address these challenges the branch embarked on an overall service improvement program consisting of several strategic projects including the Operations and Maintenance Service Assessment (OMSA) completed in 2002. Results from OMSA encouraged the Water and Wastewater Branch to conduct a redesign of all branch business units. This best practices project based on the principle concepts of organization, practices, and technology, is referred to as OPTimize Works. These two initiatives are described in the following sections.

4.1 Operations & Maintenance Service Assessment

The Water and Wastewater Branch retained EMA Canada Inc. to carry out an initial Operations and Maintenance Service Assessment (OMSA). The OMSA initiative involved the assessment of the operations, maintenance and administrative elements of York's water and wastewater services. The work program included a gap analysis, identification and quantification of benefits related to reducing performance gaps, and a cost-benefit analysis of moving to "best in class" or Best Practices operations.

Representatives from the various branch business units participated in interviews and in-field “ride along” trips to the facilities. The consultant gathered information and validated activities as they occurred during the day to day operations.

Eight paradigms of change form the foundation and common focus for the best practices initiative. They were introduced to staff during OMSA and are now recognized as key components to becoming more efficient and effective in service delivery.

Table 1
Eight Paradigms of Change

From		To
Operations & Maintenance	—————>	Total Productive Operations
Reactive Work	—————>	Program Driven Work
Attended Facilities	—————>	Less Attended Facilities
Work Separated by Craft	—————>	Work Force Flexibility
Technology as Risky	—————>	Technology as Strategy
Organization as Structure	—————>	Organization as Strategy
Customer as Nuisance	—————>	Customer as Advocate
Assets as Costs	—————>	Assets as Investments

Total Productive Operations (TPO) enables effective achievement of common goals. With TPO distinctions between and among various jobs and tasks are minimized. Teams are organized to maximize productivity and maintain a full workload throughout the day.

Program Driven Work (PDW) moves from reactive to proactive maintenance and activities. PDW focuses on problem prevention and helps get the right people, skills, plans, tools and equipment to the right job at the right time.

Less Attended Operations allows businesses to reallocate staff to critical business functions while using technology to automate and simplify time-consuming tasks.

Workforce Flexibility (WFF) maximizes productivity through cross-training and multi-skilling staff. WFF enhances staff career development resulting in improved employee morale and job satisfaction.

Using a *Technology as Strategy* perspective recognizes that the best water and wastewater services operators use technology to provide enterprise-wide information and minimize costs. They collect information so staff can use and share it and together they can modify the way they work.

Adopting an *Organization as Strategy* viewpoint yields a flexible organization that creates empowerment. Removing organization barriers and becoming more team-oriented strengthens the organization and increases accountability.

The *Customer as Advocate* philosophy yields spontaneous and positive public support for public utilities by providing support for infrastructure expansion and innovation, and confirming customer confidence. This philosophy relates to initiatives such ISO where customer feedback is used as an opportunity for continual improvement.

Thinking of *Assets as Investments* encourages municipalities to rethink the way that they invest, maintain, recycle, replace, finance, and plan capital expenditures. This perspective embodies a proactive repair and replacement program to extend the life of key assets in the system. Municipalities can move to investing in assets with the lowest life cycle ownership costs that meet service level objectives to maximize long term financial savings and maintenance costs.

The Operations and Maintenance Service Assessment (OMSA) was completed in July 2002. EMA rated the Water and Wastewater Branch services against the eight best practices paradigms of change to compile a baseline assessment. By comparing the Branch's results against best practices, an overall comparative opportunity gap of 10% to 17% was identified between the baseline and the optimal position. The opportunity gap is defined as the opportunity to improve on operations and maintenance practices related to the eight paradigms. Similar sized municipalities rated 23% on average meaning that the Water and Wastewater Branch is better positioned for optimization and cost savings through implementing best practices.

4.2 OPTimize Works Phase 1

The Water and Wastewater Branch retained EMA Canada for planning and implementation services for Best Practices in Water and Wastewater organization, practices and technology.

The first phase of the project (Phase 1) consisted of the following elements:

- Project Management and Integration.
- Work Process Redesign.
- Development of an Information Systems Master Plan (ISMP).
- Selection and Implementation of a Computerized Work Management System (CWMS).
- Development of an Implementation Plan for Phase 2.

Under the *Project Management and Integration* track, the deliverables included: establishing the project guiding principles and a communications plan; coordinating OPTimize Works activities with other ongoing strategic business improvement projects (i.e. SCADA Master Plan, Asset Inventory); managing project resources and the project schedule; and coordinating the development of the phase 2 implementation plan.

Work Process Redesign deliverables included: conducting the review and redesign workshops with staff from all levels of the branch and other branches and departments as

needed; documenting the current (As-Is) versus the proposed (To-Be) business processes including identifying resource levels and enhanced technology needs to support the future practices; updating the business case for moving forward with implementation of the conclusions; and developing and presenting the final redesign report to the Strategy Team.

The primary deliverables of the *Information System Master Plan* track (data model, technology blueprint, system development methodology, system implementation plan, and recommended information technology support structure) were achieved through the following activities: evaluating the effectiveness of the current and planned technology solutions used to support the branch; defining the scope and requirements of proposed technologies and the supporting resources needed to maintain and update them; and developing the systems' functional requirements for the provision of technology solutions in response to the redesigned business processes.

The *Computerized Work Management System (CWMS)* track was comprised of two major activities – the selection and implementation of a CWMS. The deliverables of this track were: developing the functional requirements document for the CWMS; selection of the CWMS (including the completion of the Request for Qualifications, Request for Proposal, scoring criteria, demonstration requirements and scripts, final selection, and contract negotiations); conducting the conference room pilot (including development of the configuration criteria and structures, configuration of the system relative to the redesigned business processes and the selected pilot area, testing, developing training materials, loading production data, 'go-live' for the pilot area, post 'go-live' review and evaluation, and developing interfaces with other systems).

The development of the detailed *Implementation Plan* included the following deliverables: developing the work breakdown structure for the Phase 2 activities; coordinating the conclusions from Phase 1 into the appropriate tracks for Phase 2; updating the business case for implementation; developing the master schedule and preliminary project timeline; and determining the resources needed to proceed with implementation.

The conclusions and outcomes of OPTimize Works Phase 1 are outlined in Section 5 of this report.

5. ANALYSIS AND OPTIONS

An important aspect of OPTimize Works was the involvement of staff throughout the branch. A workshop approach was applied to achieve buy-in through staff involvement while allowing staff to manage their required day-to-day duties. Workshop teams reviewed work practices, recommended modifications, and redesigned practices when necessary. To address issues outside the Water and Wastewater Branch's mandate and responsibility, appropriate staff from other regional departments and branches

participated in the workshops. The workshop approach allowed the project team to gather and compile information from a broader staff perspective. The teams developed an organization that supports the recommended direction for the branch. The project focused on achieving optimal performance from current and future assets, from the skilled staff currently employed, and from the technology solutions being deployed.

During the workshops, the teams considered several specific strategies while working to meet the project objectives including:

- *Examining all processes that contribute value* to ensure staff time is spent on activities critical to water and wastewater service delivery.
- *Reviewing practices that support water and wastewater quality* and that are impacted by the new regulatory requirements (i.e. Safe Drinking Water Act, 2002; Sustainable Water and Sewage Systems Act, 2002).
- *Retaining corporate knowledge* to capture the valuable water and wastewater knowledge of individuals in the organization and to ensure this information and knowledge is retained and shared.
- *Identifying future leaders* to ensure that practical long-term succession planning is implemented as a result of the overall improvement program.
- *Leveraging and integrating other Regional initiatives* already in place or underway (such as ISO 14001 and ISO 9001 programs, SCADA Master Plan, Asset Inventory, GIS program, T&W CARES complaint management system, Water Resources Management database).
- *Measuring and managing performance* to reflect and capture progress toward the branch's vision, mission, and service delivery expectations.
- *Managing and sharing integrated information* to ensure information from all areas of the branch is managed, made available, and shared by all staff for informed decision-making, precise compliance reporting, and accurate customer billing.

The review and redesign process addressed the three fundamental components of the Branch's business: Organization, Practices and Technology. The conclusions are presented in the following sections including the implementation activities that represent the Phase 2 program.

The conclusions of OPTimize Works Phase 1 provide the vision for the Branch over the next ten years. Implementation will be phased based on the immediate term (one to two years), the intermediate term (three to five years), and the long term (more than five years). The immediate term implementation is anticipated to commence this year and carry through to the end of 2005. Some conclusions such as those identified in the ISMP will require several years to complete with appropriate staging of activities.

5.1 Organization

Organization activities included reviewing the current Branch organizational hierarchy, reporting relationships, skills and training needs, and works locations. The outcomes recommend reorganizing the Branch into four business units to support optimal service

delivery. *Figure 1* illustrates the proposed business units and the management and administration team. In recognition of the program's importance and its impact on the branch, staffing of OPTimize Works is recommended on a secondment basis. Currently, one permanent full time resource and one temporary resource are allocated to this project. The same level of effort is anticipated for the duration of the implementation.

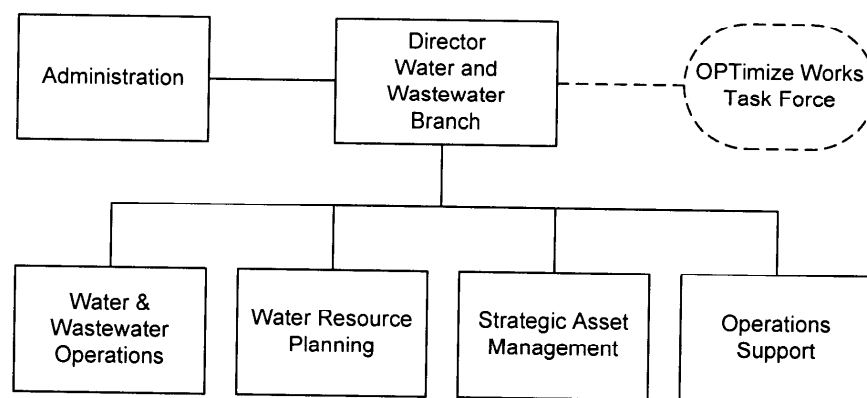


Figure 1: Proposed Water and Wastewater Business Units

The 2004 Budget shows a Branch staff complement of 96 permanent full time (PFT) employees. To support the best practices conclusions, an organization structure with 108 permanent full time employees is anticipated. The Water and Wastewater Branch currently has a number of temporary full time (TFT) employees that are crucial to service delivery. While the proposed organization design shows an overall increase in the PFT positions, there is an opportunity to convert some TFT positions into permanent roles and maintain the current level of service delivery. The resource implications will be considered during the 2005 Budget preparation cycle with potential for phasing in the resource needs over two years. Table 2 illustrates the shift from the existing (2004) to the proposed organization structure.

Table 2
Recommended Organizational Changes

Work Unit	2004 Organization	Best Practices Organization
Management Team	4	5
Water & Wastewater Operations	46	63 ¹
Water Resource Planning	13	13
Strategic Asset Management	29 ²	17 ³
Operations Support		6 ⁴
Administration	4	4
Total	96	108

1. Includes mechanics (5), electrical/SCADA technicians (5), control panel operators (4), reduction of 2 supervisors, and 2 PFTs moving from YDSS inspections to the asset management team.

2. Note that the current Operations Support team includes the functions within the current "Operations Support" work unit.

3. The Strategic Asset Management team includes the introduction of a technology assets team (4), and additional PCS/SCADA technologists (total of 3 PFTs).
4. The *new* Operations Support team includes three program managers (business improvement, training, and quality/compliance) plus one ISO technologist.

The addition of a new business unit enables greater delegation and coordination of work at the strategic level. The staff increase will allow the Branch to move forward with industry best practices such as the strategic use of technology, planned maintenance rather than reactive maintenance, comprehensive asset management, and enhanced automation and control of plant processes. With these changes, the Branch will be positioned to effectively respond to the legislative changes, the increasingly strict compliance environment, and to anticipate and mitigate or prevent issues rather than react to them once they have occurred. Major organizational changes from the current structure are described below under the headings of the four new business units.

5.1.1 Water and Wastewater Operations

The current Branch structure has the operations and maintenance functions in two separate business units: Operations and Operations Support. Under the proposed organization, Water and Wastewater Operations includes the consolidation of operations and maintenance functions into one business unit. Operations teams are proposed to be organized into geographic “hubs” for improved response and reduced travel time to the hub facilities. This proposal will have the hub teams manage all water and wastewater operations as well as routine linear and plant asset maintenance. This business unit will contain a mix of centralized and decentralized maintenance to support the operations teams. Hubs will have decentralized maintenance staff when a full workload for a specialized maintenance trade has been identified.

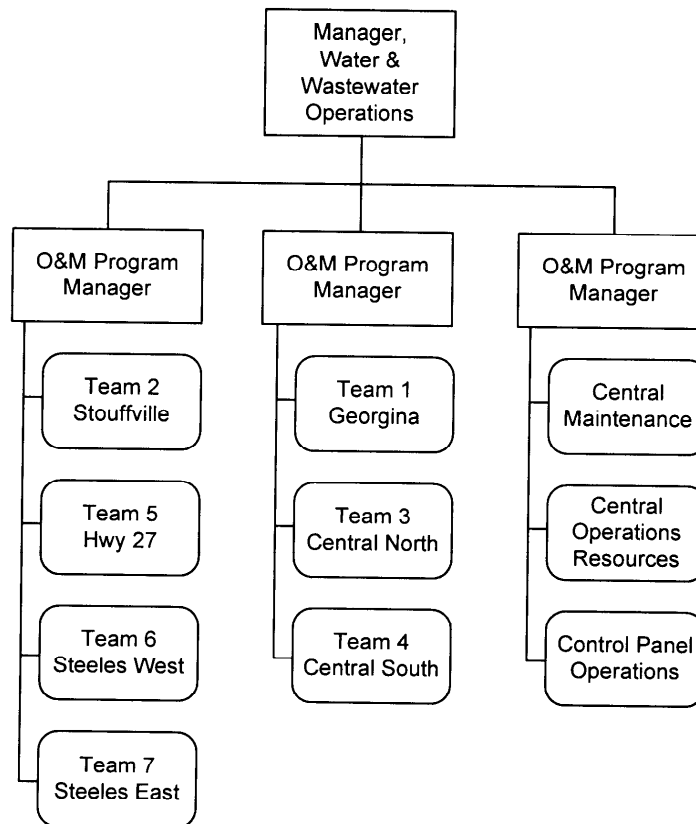


Figure 2: Proposed Water & Wastewater Operations Business Unit

A key element of the proposed organization is the proposal for a skills-based compensation system. With skill-based compensation, workers are able to acquire training and skills in a broader range of areas. Management benefits from this broader skill set and employees benefit from enhanced career development and morale.

This proposal requires further discussion with both Human Resources Branch representatives and the Union. Pending the success of these discussions, staff may need to report back to Committee and Council for direction.

5.1.2 Water Resources Planning

The new Water Resource Planning business unit recommended in Phase 1 and implemented in 2003, brings the Water Resource Protection and Water and Wastewater Planning teams together into a single work unit. This business unit is responsible for branch services such as the groundwater management strategy, source protection, well monitoring, water quality sampling, compliance reporting, growth forecasting and modelling, system master plan development, and identification of growth-related infrastructure needs.

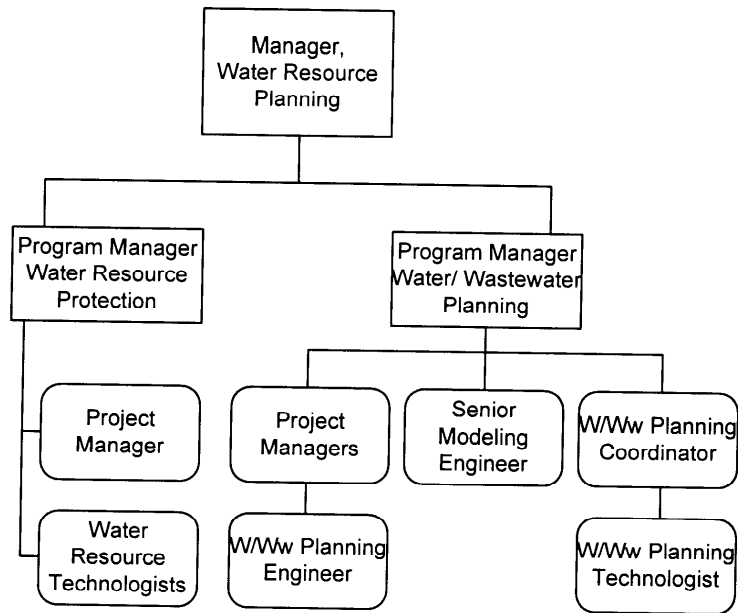


Figure 3: Proposed Water Resource Planning Business Unit

5.1.3 Strategic Asset Management

The formation of a comprehensive strategic asset management program relies on establishing a team focused on optimized lifecycle management of all physical and technology assets. This team will work cooperatively across business units and with other Branches and Departments to achieve results through all lifecycle phases.

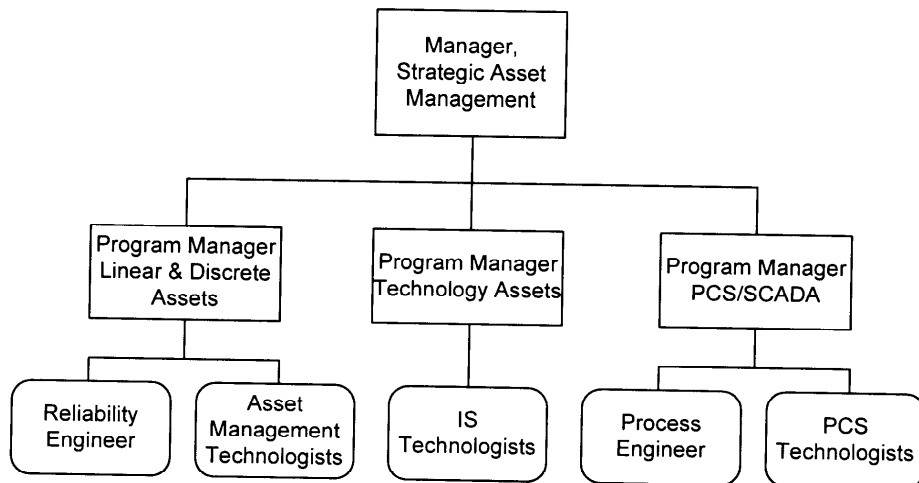


Figure 4: Proposed Strategic Asset Management Business Unit

5.1.4 Operations Support

The Operations Support team will provide supporting services to core business functions throughout the Branch in the areas of regulatory requirements, quality management, training development and coordination, and continual improvement.

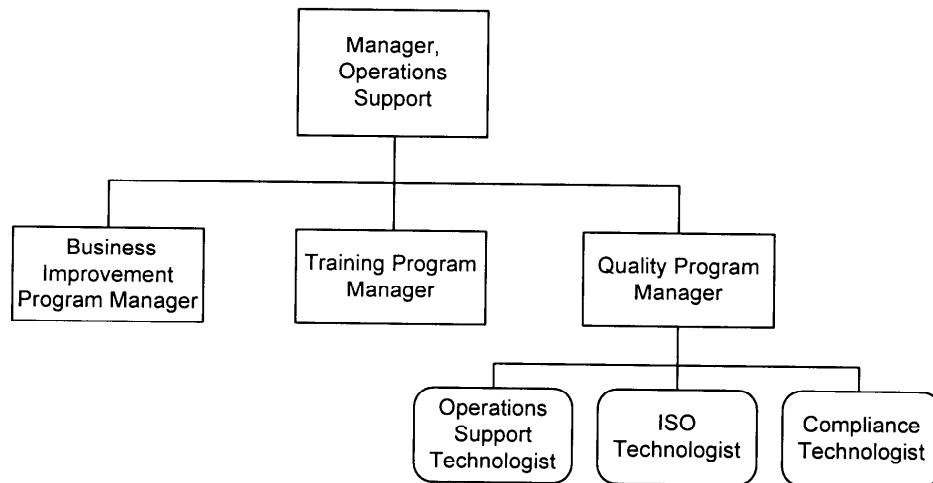


Figure 5: Proposed Operations Support Business Unit

5.2 Practices

The Practices activities included reviewing the current state of work practices and identifying which practices should be redesigned, added or eliminated. The redesign teams developed a large number of practices conclusions targeted at improving the efficiency, effectiveness, or quality of service delivery.

5.2.1 Physical Water and Wastewater Practices

The Physical Process Redesign Teams reviewed the Branch's current water and wastewater operational processes. Where opportunities for improved efficiency and cost effectiveness without compromising quality were identified, the processes were redesigned. To assist with this effort, the team developed a business model of water and wastewater processes. Specific recommendations for change were made for each component of the model.

The Water and Wastewater Business Model (*Figure 6*) illustrates the eight components of the water and wastewater cycle. Value is added throughout the process of providing either water or wastewater services to the customer by a number of supporting services. These primary support services are illustrated in the centre of the figure.

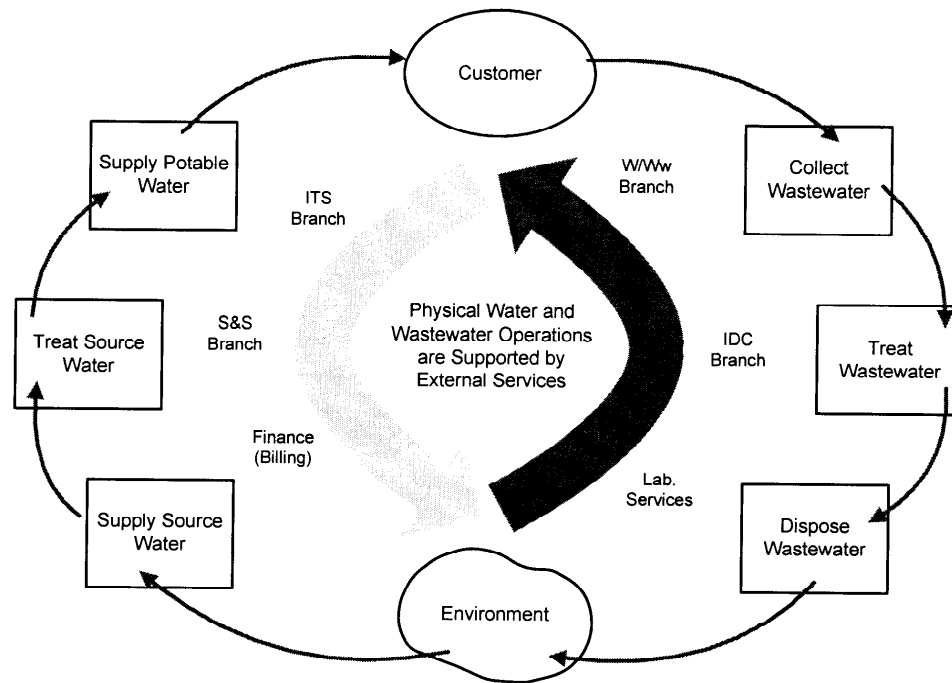


Figure 6: Water & Wastewater Business Model

The redesign teams reviewed a number of areas for improvement related to physical plant processes. Many conclusions were tied to other project elements such as technology improvements (Supervisory Control And Data Acquisition (SCADA) enhancements, Computerized Work Management System (CWMS) implementation), asset management practices to support day-to-day operations, and improved resource planning. Specific water and wastewater process conclusions included:

- Formalize the Water Resource Planning business unit programs including defining and clarifying the roles and responsibilities of unit staff and the responsibilities for policy development.
- Establish system monitoring and control of water quality at boundary meters and valves (point of entry monitoring).
- Formalize project definition process to ensure the needs of all branch business units are adequately identified.
- Use appropriate modeling tools, water supply contract thresholds, alternate water source information, and sewer capacity limits to enhance the long-range water and wastewater master planning process.
- Implement additional SCADA monitoring and control to confirm the effectiveness of treatment processes.
- Confirm contractual obligations with external service providers regarding water quality and data reporting requirements.

5.2.2 Work Management

Work management practices focused on the day-to-day activities carried out by operations and maintenance staff including general rounds, routine facility maintenance, programmed and emergency maintenance. The key work management conclusion is the creation of geographic hubs. The proposed hubs will be self-sustaining business units responsible for the complete operation of water and wastewater systems throughout the asset lifecycle. Under this proposal, staff will be trained to operate both water and wastewater facilities and be compensated for skills acquired. As described under Section 5.1 Organization, centralized maintenance will remain with decentralized maintenance at the hubs on an as-needed basis.

Work practices conclusions for the hubs include:

- Improved planning and scheduling to maximize time spent at each facility.
- Operators visit facilities to accomplish as much work as possible including regular operations, routine CLAIR work (Cleaning, Lubricating, Adjusting, Inspecting, and minor Repair), sampling, and monitoring chemical supplies.
- Operations staff will monitor regulatory compliance and identify amendments or modifications needed for Certificates of Approval.
- Hub staff will carry out utility locates and stakeouts for the infrastructure in their hub area.
- Chemical vendors will deliver chemicals directly to facilities, where feasible.

Work practices conclusions for the centralized services include:

- Central maintenance includes staff with specialized skills such as electricians, mechanics, instrumentation and SCADA technicians.
- Operations Resource team is comprised of skilled staff from any job classification (i.e. operator, electrician, mechanic, instrument technician); this resource team is created to cover work in exceptional circumstances including facility commissioning, seasonal peaks, training for individuals and area teams, assisting with major overhauls, carrying out emergency response, creating standard operating procedures, working on major projects, etc.

The proposed work practices rely on the implementation of a CWMS and enhanced SCADA automation. The introduction of a CWMS will improve work flow (routing of work requests, work orders, sharing information between individuals and teams), enhance planning and scheduling of work (resources, equipment, and tools), and move the branch towards program driven work (away from reactive work and crisis management to preventive, predictive and condition-based work activities).

SCADA system enhancements are required to support the work practices redesign including greater access to the SCADA system for on-call operators, consolidating chart recorders and additional data collection through SCADA to reduce frequency of facility visits for collection data manually and to improve support functions such as billing.

5.2.3 Materials Management

The Materials Management redesign team focused on redesigning work practices followed by operations and maintenance staff related to day to day purchasing and materials management. The redesign exercise uncovered a need to provide additional training to staff on the purchasing by-law. A number of materials management practices will be addressed through the introduction of the CWMS such as creating a Bill of Materials for individual or groups of assets, establishing work flow and authorization routines for purchase requisitions, and managing inventory (location, numbers, reserves, reorder thresholds, etc.). Other materials management conclusions include:

- Establish a formal central warehouse and satellite storerooms in each hub to enable the Branch to take control of parts and materials and to ensure that parts needed to execute work are generally on hand when they are needed.
- Increase the use of standing contracts for large volume or large dollar items.
- Ensure all teams follow standardized materials management processes consistent with the Regional Purchasing By-law.
- Leverage features of the Regional Purchasing By-law to manage annual and ongoing service needs (i.e. use of bid registries for common services, annual supplies and services contracts, and look for opportunities to work with other departments and branches for similar supplies and services to gain improved pricing).

5.2.4 Asset Management

The Asset Management team focused on redesigning work practices related to long term management of the Branch's discrete, linear, and technology assets. Conclusions for the new Strategic Asset Management business unit took a lifecycle approach to asset management. This involves looking at assets from the first stage in the cycle where the need is identified, through planning, design, procurement, construction and commissioning, operations, maintenance and performance monitoring, modifications or upgrades, and finally decommissioning.

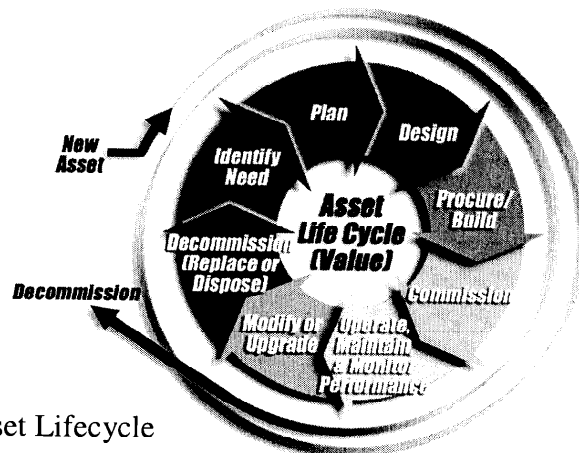


Figure 7: Asset Lifecycle

In order to develop the proposed practices for this new business unit, the team adopted some principles to guide the redesign effort. These included: considering the full cost of ownership when creating new assets or modifying existing assets; coordinating efforts by all groups involved in managing the asset lifecycle (i.e. Water and Wastewater Planning, Infrastructure Design and Construction, Water and Wastewater Operations and Maintenance); clearly identifying accountability for asset management (hubs, facilities in each hub); and applying best in class asset management concepts to the York experience (input from everyone is valuable, minimize cost of ownership, design with the end user in mind, asset preservation versus economic replacement, meet regulatory requirements, manage performance, use integrated solutions).

The asset management team compiled the following conclusions:

- Implement the Asset Management conclusions related to Organization and Technology such as: implement the Strategic Asset Management business unit; outline the specific roles and responsibilities for the linear/discrete, technology, and PCS/SCADA asset teams; and implement an integrated technology solution for asset management.
- Develop strategic asset management documents to guide the asset management team as they develop this new practice within the branch including: high level strategic plan with vision and mission statements; charter for the asset management team identifying their scope and authorizing them to execute the strategic plan; handbook documenting the branch's approach to asset management; communication plan outlining roles and responsibilities of relevant parties (Water and Wastewater Branch and other branches).
- Establish an asset management core team to oversee the permanent implementation of the asset management plan (the core team should include senior managers capable of committing resources to asset management tasks).
- Foster operations and maintenance staff participation in asset creation by coordinating and facilitating the execution of the 10 step capital project process, updating and sharing this process with Infrastructure Design and Construction (IDC), and extending the process to include the technology assets.
- Manage the integrated technology solution as a valuable asset by following the System Development Life Cycle approach and coordinating with other Regional departments and branches to execute, and periodically update the Information Systems Master Plan (ISMP).
- Develop and manage design guidelines including reviewing the existing design guidelines and identifying any gaps (for example, record drawings to be submitted in a format compatible with the Region's GIS package).
- Design and implement records management practices to ensure critical asset records are accurate and are accessible when needed.
- Complete a comprehensive asset assessment and condition rating system to provide a baseline for the current condition of all branch assets including: the development of asset condition rating standards specific to each asset class; creation of a common condition rating standard to compare across asset classes; development of condition

assessment practices to ensure that condition data is updated within a reasonable timeframe.

5.2.5 Performance Management

The Performance Management redesign team developed a framework for performance management within the Water Wastewater Branch together with the initial measures to be tracked using the framework. The framework is based on an integrated, two-tier approach to performance measurement and management. The top tier involves the identification of measures that will be used at a management level to make decisions regarding the operation and direction of the business. A “Balanced Scorecard” formulation was used to structure these measures in the categories of Financial, Customer, Learning and Growth, and Internal Business Process.

The lower tier measures need to support day to day operational decision making and management. These measures should be focused on the particular activities and responsibilities of operational staff and should be specific to each work group, team, or individual (i.e. maintenance measures could relate to work order backlog, yet operations measures could report on volume of wastewater treated by hub area).

All measures in either tier should provide information on one or more of the three primary measurement areas of: efficiency (ratio of inputs to outputs), effectiveness (outcome or results), or quality (meets standards or compliance). Coverage of all three areas is desirable but not essential at each level.

The performance management team assembled the following conclusions:

- Adopt, populate and implement the performance measures framework and monitor these measures to ensure they support decision making at all levels.
- Align performance measures developed with reporting programs already in place such as the Municipal Performance Management Program (MPMP), and the Chief Administrative Officer’s key performance indicators (KPIs) to avoid duplication of reporting.
- Leverage the existing performance measures reporting system in use by the Business Support Services Branch to implement and begin using measures where data is already available.
- Coordinate the performance management framework with the CWMS configuration to ensure that the CWMS provides the data required for performance reporting.

5.2.6 Internal and External Support Services

Many support services are provided both internally within the branch and externally by other branches or departments. In some cases, staff recommended that services currently being provided internally be reassigned to more appropriate groups or even to be discontinued entirely. Conclusions related to internal support services include:

- Implement a self-serve hauled waste operation with a swipe card system capable of providing access and payment information.
- Provide billing information directly to Durham Region for the hauled waste program and have Durham staff manage collections of outstanding bills and invoices.
- Shift the Spills Response responsibility to the Roads Operations Branch.
- Implement enhanced SCADA data collection and transfer billing reconciliation to the Regional Finance Department.
- Provide response for well complaints only during working hours.

The external support service redesign team focused its efforts on developing draft Service Level Agreements (SLAs) with the Branch's external support service providers. The redesign team worked with representatives of some support services to gain an understanding of the services provided and any current service level targets. Draft SLAs were developed with Infrastructure Development and Construction (IDC), Business Support Services (BSS), Geomatics, Health Services, Human Resources (HR), and Information Technology and Systems (ITS).

In any customer/provider relationship, the parties may have a different expectation and perspective of the relationship without being aware of it. This situation can lead to dissatisfaction for both parties. The development of SLAs helps to align expectations and to define service levels to be provided.

The specific objectives of SLAs are: to specify the product or service to be provided; to define roles and responsibilities for the service provider and for the customer; to match customer expectations with provider capability (level of service); to identify performance measures; and to determine compensation.

Conclusions related to external support services include:

- Complete and adopt the high priority SLAs that will be critical to the successful implementation of the OPTimize Works program including ITS (Technology activities), HR (Organization activities), IDC (Practices activities related to Asset Management).
- Monitor performance of service providers against the agreed upon services and service level targets and provide feedback to providers when appropriate.

5.3 Technology

The introduction of key technology solutions is essential to the success of the OPTimize Works program. Many of the practices and organization related conclusions rely on these technology solutions. As described previously, there is a systems approach to the conclusions with interdependencies to the three elements: Organization, Practices, and Technology.

5.3.1 Information Systems Master Plan (ISMP)

The redesign phase included the development of an Information Systems Master Plan (ISMP) to provide a comprehensive, high-level strategy and implementation plan for

technologies needed to support the Water and Wastewater Branch. The ISMP will become the primary planning document for the Technology Asset Team in the Strategic Asset Management business unit. The plan was developed collaboratively with corporate ITS and will be used to facilitate ongoing cooperation and communication between the branch and ITS.

The ISMP defined the overall “blueprint” for information, systems and technologies needed to support the efficient and effective management and delivery of water and wastewater services, and developed a capital investment plan to design, acquire/build, and implement the necessary information, systems, and technologies. A vital technology solution identified at the outset of and included in the Phase 1 project was the selection and implementation of the CWMS.

The ISMP identified a number of priority technology projects needed to support the Branch’s future direction. Some of these projects include:

- Development of an integration architecture methodology, specifications, and standards toolkit to achieve a technology environment that uses a standards-based architecture for application integration.
- Coordinate network architecture requirements and enhancements to respond to both SCADA and water and wastewater business applications network needs (increased bandwidth, network availability, network maintenance and sustainability).
- Procurement and configuration of a SCADA Historian to formalize data capture and storage.
- Creation of an Operational Data Store (data warehouse) that will assist with integrating SCADA, CWMS, performance management software, etc.
- Development of a set of technologies used for gathering, storing, analyzing, and providing access to data to assist the Water and Wastewater Branch make business decisions (linked to performance measures and management reporting).
- Implement a comprehensive Geographic Information System (GIS) for the management of linear and discrete assets.

The ISMP outlines a significant program for technology solutions. The planning and programming of these projects will be reviewed as part of the implementation activities (Phase 2 of OPTimize Works).

5.3.2 Computerized Work Management System (CWMS)

In recognition of the importance of a technology solution to assist the day-to-day operations of the branch, the phase 1 project included a track for the selection and implementation of a Computerized Work Management System (CWMS). The CWMS track was broken into two stages – the selection stage and the implementation stage – due to the work involved to complete the activities.

The selection stage involved a lengthy procurement process including: detailed requirements definition, issuing and evaluating Request for Qualifications, issuing and

evaluating a Request for Proposal to the short listed group of vendors, hosting and evaluating vendor product demonstrations for the top three vendors, site visits to water and wastewater facilities using the top two products, selecting the preferred product, and negotiating with the vendor. Staff has selected the product MAXIMO from MRO Software Inc. as the preferred product. A report for the May 5, 2004 agenda of the Transportation and Works Committee entitled *Water and Wastewater OPTimize Works Program Contract Award for Computerized Work Management System (CWMS)* requests authorization to award to this vendor.

The implementation phase will commence following the award and contract execution with the software vendor. The CWMS implementation stage includes the installation of the licensed software and the provision of select services to be carried out by MRO. These services are:

- Familiarization Workshop
- Project Management and Administration
- Product Training
- Fit/Gap Workshop
- Establish the Prototype Build and Test Environment
- Prototype System Development and Testing
- Production System Implementation and Start-up
- Post “Go-Live” Support

The work to be covered by these services is described in report to Transportation and Works Committee on the May 5, 2004 agenda entitled *Water and Wastewater OPTimize Works Program Contract Award for Computerized Work Management System (CWMS)*. The success of the CWMS implementation relies on dedicating key staff to this project on a full time basis. Temporary full time resources will be allocated to the project for the CWMS implementation. As the OPTimize Works conclusions are implemented including the proposed organizational changes, the technology asset team positions will be filled on a permanent basis. The core implementation team includes the CWMS Team Leader, the CWMS system administrator, and a temporary full time resource from Corporate IT. These resources are all within our complement and approved budget. Similar to the format used during the workshops for the OPTimize Works redesign, subject matter experts will participate as needed to configure certain modules.

Implementation activities for the initial software roll-out are expected to take approximately a year and half to complete. The software configuration and conference room pilot will occur during the first eight months. Given the anticipated duration of the project, the need for an ongoing user training facility, and the future integration needs for the CWMS, a project room was created; it will become a corporate asset at the end of the CWMS project.

5.3.3 SCADA Systems Master Plan

A significant number of conclusions relating to enhanced SCADA usage were made during the redesign workshops. The consulting team reviewed the SCADA Systems Master Plan (SSMP) to ensure that the conclusions for both projects were aligned. Specific conclusions include:

- Coordinate SSMP activities with the implementation activities of OPTimize Works.
- Implement the SSMP staffing recommendations (the identified roles are incorporated into the proposed Strategic Asset Management business unit – PCS/SCADA assets program).
- Complete network enhancements necessary to support the proposed direction of the SSMP (this is identified as a key integration point for the branch to optimize network needs for both the SCADA system and other water and wastewater business applications).
- Develop SCADA standards for ease of maintenance and upgrade of SCADA assets.
- Align data structure used for identifying assets and associated SCADA elements (i.e. the asset tag identifies the part – light bulb; the SCADA tag identifies the point where the part is located – socket).

In recognition of the criticality of coordinating the recommendations of the SSMP and the overall best practices conclusions, the implementation of the SSMP will become part of the OPTimize Works Phase 2 implementation.

5.4 Implementation Plan

The core project team conducted a planning workshop to develop the Phase 2 implementation program. This workshop covered the following elements:

- Phase 2 program charter to identify the mandate and objectives of the program.
- High-level work breakdown structure (WBS) to identify the major activities and compile them into work categories.
- Project organization chart to identify the project organization structure, the project teams, and the individual project roles.
- Project schedule to determine the relative sequence of the WBS activities and the estimated project duration.

These activities are complete at a high-level sufficient to provide direction for moving forward. However, staff recognizes the need to break each work category into a more discrete work breakdown structure to capture all tasks and dependencies. This detailed planning will be done with the specific Phase 2 implementation teams to improve understanding and buy-in, thereby resulting in a clear plan and greater opportunity for a successful implementation.

Implementation will require internal resources (Water and Wastewater Branch staff and staff from other regional departments and branches) on an as-needed basis with dedicated staff seconded full time to key positions. External resources will also be required such as

consulting teams and vendor resources related to technology implementation such as CWMS and SCADA. Funding for these resources are included in the Water and Wastewater Branch budget.

The Region will be issuing a Request for Proposal for consulting services to assist with the Phase 2 implementation. This RFP will be issued following the detailed planning workshop and confirmation of the implementation scope. Staff will report back to Committee and Council following the completion of the procurement process for the implementation services.

6. FINANCIAL IMPLICATIONS

The costs associated with program implementation are categorized as follows:

- Project costs to implement the program including: dedicated staff in key project roles; consulting services; and, CWMS and SCADA vendor resources.
- Organization costs such as: staffing adjustments to meet growth; staffing adjustments to support and sustain best practices; training.
- Technology cost including hardware and work management systems software.

The staff related costs are associated with the internal resources necessary to implement, support, and sustain the program. The major sources of savings are derived from staff related costs (reduction in overtime due to improved automation and technology access, geographic based work units for decreased driving time and increased time at facilities, cross-trained and multi-skilled employees for greater work force flexibility, shifting of frontline and supervisory PFTs in the Water and Wastewater business unit to fill needs in other work units, absorbing some of the temporary full time positions into the permanent pool of resources). The implementation of these conclusions will require an initial increase in staff however, over the longer term, the requirements for growth in the staff complement will reduce.

Costs are derived from the redesigned business units and the associated positions needed to support the redesign and enabling technologies (Strategic Asset Management, shifts in focus for Operations Support, merging of Water and Wastewater Planning with Water Resources Protection); training; implementation of ISMP projects (CWMS, network and integration architecture, SCADA Master Plan, GIS).

The program's simple payback period is approximately five years from the Phase 1 project start in 2003 with a continued cost savings thereafter associated with the residual benefits of maintaining a best practices work environment. The benefits will primarily be derived from reductions in the growth of labour needs over the long term, improvements through program driven work, and increased use of technology. The cash flow projections for the first five years of this program are summarized in Table 3.

Table 3
OPTimize Works Program Implementation (\$1,000)

Item	2003	2004	2005	2006	2007	2008
Benefits						
Technology and Practices ¹	0	375	950	1,300	1,350	1,550
Costs						
Technology related		646	1,032	237	130	130
Consulting	543 ²	553	390	15	0	0
Total Costs	543	1,199	1,422	252	130	130
Cumulative Cash Flow	-543	-1,367	-1,839	-791	429	1,849

1. Practices benefits include moving from reactive work practices to preventative and planned work practices and ensuring that the right resources and equipment are available for the job (Program Driven Work).

2. Consulting costs for OPTimize Works Phase 1.

Phase 2 implementation activities are programmed for 2004 and 2005. Once fully implemented, the net savings associated with work force savings, technology utilization, and program driven work are estimated to be \$1.5M per year. Council approved \$600K for OPTimize Works in 2003 for the planning and design phase of the project. Funding for 2004 includes \$1.2M for the OPTimize Works program directly. Additional funding is allocated through the operations budget for water and wastewater special projects (allocation of \$366K) to cover hardware and software costs associated with the CWMS. The total approved funding commitment for 2004 is approximately \$1.56M.

Organization related costs are balanced with the program savings. Productivity improvements, reduction in casual salaries, and the implementation of the proposed organization will result in shifting roles and responsibilities and the associated costs and savings. Estimated benefits of \$1.8M are offset against estimated costs of \$2.0M for the initial implementation to the end of 2005 amounting to a net cost of \$200K. By 2008, the cost-benefit shifts with benefits estimated at \$5.1M and cost estimated at \$4.9M (net savings of \$200K).

7. LOCAL MUNICIPAL IMPACT

The OPTimize Works program is a key element to the branch's overall efficiency improvement program aimed at York's water and wastewater services and products. York Region residents will benefit indirectly through improved operational efficiency and customer relationships. The nine local municipalities – the direct users of the services and products provided by the Water and Wastewater Branch – will similarly benefit from these efficiency and customer relations improvements.

8. CONCLUSION

The branch's vision is "to be a proactive team of empowered, flexible, well trained staff that inspires public confidence and protects the environment." Water and Wastewater Branch staff fulfills their mission of providing clean/safe drinking water and returning best quality effluent to the environment through the following activities: responding to customer needs; being fiscally responsible for service delivery; planning for future needs including asset replacement; incorporating new and innovative technologies, practices, and approaches; and providing a culture of safety, leadership, continual improvement, and innovation.

OPTimize Works fully supports the branch vision and mission. Staff is able to focus on the appropriate services needed to enable the supply, treatment, and distribution of clean water and the collection, treatment and disposal of wastewater. The OPTimize Works conclusions support the mission statements of planning for future needs and assets, being accountable for the costs of delivering services, leveraging technologies to optimize efficiency, being innovative in our approach to service delivery, and providing an environment focussed on safety, compliance, continual improvement and building future leaders.

Implementation of the OPTimize Works program will span the next ten years with immediate, intermediate, and longer term phasing for the conclusions. Staff will be issuing a Request for Proposal for consulting services to assist with the Phase 2 implementation following a detailed planning workshop designed to confirm the scope of the implementation activities. Staff will report back to Committee and Council upon completion of the procurement process for the implementation services.

The Senior Management Group has reviewed this report.