F I N A L

Asset Management Best Practice Roadmap

Prepared for

Douglas County Public Works

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Executive Summary

Introduction

Douglas County Public Works (DCPW) has identified comprehensive asset management (CAM) as its approach to continual improvement through the implementation of leading practices.

The goal of CAM is to meet service levels and reduce risk at the lowest lifecycle cost, resulting in an efficient, effective organization functioning at its optimum. CAM does not solely focus on tactical initiatives such as asset register development, condition assessments, and/or maintenance approaches. CAM addresses strategic elements such as an asset management (AM) policy and strategy development, defining levels of service (LOS). Additionally, CAM incorporates the development of tactical approaches such as business case evaluations (BCEs) and risk frameworks incorporating triple bottom line considerations.

A CAM approach is broad in that it considers four elements: Strategy, Process, People and Technology, when working together significantly contribute towards meeting DCPW's goal to justify, manage and use resources as efficiently and effectively as possible. DCPW has been working to implement CAM, and efforts to date, including the following:

- Getting buy in and commitments from the Douglas County (County) Manager and Board of Commissioners for a multiyear CAM program
- Fund a 5-year budget to implement CAM program elements

Through the ongoing implementation of CAM, DCPW will be better able to quantify the required renewal and investment programs and better understand the linkage between investment and the customer outcomes it delivers. This strategy will allow DCPW to understand and demonstrate the value that it is providing to customers.

DCPW retained CH2M HILL Engineers, Inc. (CH2M) to assess the current state of the AM program and make recommendations to prioritize initiatives for further implementation as well as additional initiatives that should be considered. The objectives of the assessment were to work with DCPW staff to understand the current situation with respect to the AM program and develop this long-term *Asset Management Best Practice Roadmap* (Roadmap) to improve DCPW management and performance. This Roadmap will identify the improvement initiatives that will form the basis of a plan for the ongoing implementation of the AM program for the DCPW over the next 5 years.

Approach to Asset Management

For the purposes of this assessment, CAM is defined to include four fundamental building blocks:

1. *Strategy* – Set the vision, mission, and Roadmap for DCPW
2. *Process* – Minimize total cost of ownership, increase reliability, and meet performance standards in a safe and environmentally conscious manner
3. *People* – Make good choices in organizational design, people resources, and knowledge retention
4. *Technology* – Invest in and continually enhance data and technology systems that support the strategy, process effectiveness, and development of the capabilities of people

These building blocks must be in balance to consistently meet service levels, reduce risk, and minimize overall cost of asset ownership.

Implementation Methodology

This assessment project follows a three-step methodology:

- Step 1 – Kickoff, data gathering, and review
- Step 2 – Staff interviews, comprehensive asset management review and assessment (CAMRA) workshop, and data/gap analysis
- Step 3 – Roadmap development

In Step 1, the CH2M team reviewed various DCPW documents over a range of topics that apply to AM from DCPW. A kickoff meeting was held and two AM Primer presentations were made on August 22, 2016.

To undertake Step 2, CH2M conducted interviews with staff representing the breadth and depth of DCPW and other supporting County departments that included information technologies (IT), Community Development (County Engineer and Stormwater), and Finance. The goal of the interviews was to determine the strengths and opportunities for improvement with respect to DCPW's AM program. In addition, an assessment workshop with DCPW staff was conducted using CH2M's proprietary AM assessment tool, CAMRA.

CAMRA supports a structured, quantitative evaluation of an organization's AM practices, aligned with international standards (ISO 55000), and focused on the four elements identified above: Strategy, Process, People, and Technology. During the workshop held on August 25, 2016, 36 categories (organized by Strategy, Process, People, and Technology) were presented to DCPW staff from across the organization. For each category, DCPW self-assessed their present state of practices and their desired future state in 3 to 5 years. Scores were based on the AM maturity scale, which ranges from 1 to 5, from innocence to excellence, respectively.

Taken together, the document review, interviews, and CAMRA workshop were used to analyze DCPW's overall strengths and opportunities for improvement. This analysis was then used in Step 3 to develop the Roadmap.

Summary of Current Conditions

Based on the review of numerous DCPW documents pertaining to AM, subsequent information provided by DCPW, the staff interviews, and the CAMRA workshop, there are a variety of areas where there are strengths and opportunities for improvement within DCPW. A summary of global strengths and opportunities is provided in Table ES-1.

Table ES-1. DCPW Global Strengths and Opportunities
Asset Management Best Practice Roadmap

Assess Management Component	Strengths	Opportunities
Strategy	Highly responsive customer service Attention to regulatory environment (e.g., water regulatory changes)	No performance measures at the corporate or division level are tracked and used for performance assessment and improvement.
People	Capable, committed staff Leadership is committed to AM Leadership understands their weaknesses	DCPW has only 45 staff for a very large service territory, with many diverse assets; DCPW has no backup capacity, and key staff are used in a suboptimal way. Leadership is concerned about salaries and wages from the standpoint of being able to compete to attract and retain qualified staff.

Table ES-1. DCPW Global Strengths and Opportunities
Asset Management Best Practice Roadmap

Assess Management Component	Strengths	Opportunities
Process	Collects lots of data that could be usable (but isn't) Well supported by the County's Finance Department	Written SOPs are sparse in all divisions, and work is not performed in a consistent fashion. The County's financial management system (NewWorld) does not currently support activity based costing, which DCPW needs to understand the full cost of doing all of its work.
Technology	Strong GIS capability within DCPW and IT Mobile devices provided by the County New leadership in IT seems willing to help	There is very little technology across DCPW. This prevents the entire organization from mining and analyzing valuable data. The lack of enterprise applications is time consuming for staff and prevents DCPW from being able to plan and schedule work, analyze asset performance, understand which assets create the greatest risk, and respond to customer needs in an efficient manager. There is a strong negative perception of IT throughout DCPW.

Notes:
GIS = geographical information system
SOP = standard operating procedure

Improvement Initiatives and Immediate Actions

Based on the opportunities for improvement identified from the document review, staff interviews, and CAMRA workshop, a list of improvement initiatives was developed. CH2M's proposed improvement initiatives are shown in Table ES-2. Together, these improvement initiatives are the Roadmap.

Table ES-2. Recommended Improvement Initiatives
Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
AM Program Office	Includes the development and staffing of an AM Program Office with a full time manager and three technical and analytical staff	1. Hire staff 2. Develop program charter 3. Develop program work plan 4. Develop performance metrics for the AM program 5. Establish AM Steering Committee 6. Execute this Roadmap TOTAL DURATION: 1 YEAR	Formal responsibility and accountability for AM Reduced asset failures and life cycle costs Greater confidence in maintenance strategies and CIP investment decisions		DCPW staff ($280k in 2017 and $350k per year starting in 2018)
High-priority IT Initiatives	Includes a DCPW-specific IT Master Plan, computerized maintenance management system (CMMS),	1. Evaluate current systems and functional requirements 2. Conduct an assessment of existing gaps in IT system integration; evaluate technology	Ability to plan for long term IT needs to ensure that DCPW needs are met Ability to plan and adequately document	Technology and software assessment ($75k one-time cost) Implementation plan and pilot	Annual software licensing and IT costs ($60k per year)

Table ES-2. Recommended Improvement Initiatives
Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
	and supervisory control and data acquisition (SCADA) integration between locations	needs and priorities, develop approach/methodology for successful system selection and implementation including use of existing systems 3. Identify and select systems that will meet DCPW's needs 4. Implemented selected systems TOTAL DURATION: 5 YEARS	maintenance efforts and costs Ability to identify assets that should be rehabbed or replaced Ability to determine causes of asset failures Ability to control processes at different locations remotely	for CMMS ($150k one-time cost) Expand CMMS across DCPW ($300k total cost spread over 3 years)	
Asset Registry and Mapping Needs	Includes mapping all appropriate assets, their hierarchy, and major types of failures (e.g., breaks and leaks)	1. Identify data requirements for Water, Wastewater, Roads, and Stormwater 2. Identify data sources 3. Develop data gathering plan for missing data 4. Collect missing data 5. Create maps TOTAL DURATION: 2 YEARS	Understanding the location of assets to address any issues that arise Understanding the types of failures that occur and where they occur to prevent recurrence and improve response times Ability to provide decision makers with more timely and accurate information regarding asset failures, maintenance requirements and costs	Scope Items 1–3 ($20k one-time cost)	
Standard Operating Procedures for Operations and Maintenance (O&M)	Includes the development and documentation of SOPs for O&M	1. Obtain templates from other organizations and industries to support SOP development 2. Establish a multiyear work plan for creating SOPS 3. Execute work plan with staff involvement (with assign staff to develop SOPs) TOTAL DURATION: 3 YEARS	Consistent use of work processes Reduced asset failure risk Improved training material Knowledge retention	Scope Items 1–3 ($40k one-time cost)	DCPW internal staff (50% of time; $30k per year)
O&M Prioritization Criteria	Includes a rigorous prioritization approach for scheduling O&M work	1. Identify appropriate O&M prioritization criteria for each function performed by DCPW (Water, Wastewater, Stormwater, Fleets, Roads, and Buildings)	Increased confidence that there is an appropriate balance between scheduled work and demand (emergency work)	Scope Items 1 and 2 ($20k one-time cost)	DCPW staffing ($10k one-time cost)

Table ES-2. Recommended Improvement Initiatives

Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
		2. Train staff on the use of new prioritization criteria 3. Implement new criteria in new enterprise systems if available, or in existing systems until new systems are available TOTAL DURATION: 2 YEARS			
Performance Measures	Includes the development and monitoring of detailed performance measures to communicate to managers and work units	1. Identify appropriate key performance indicators (KPIs) for DCPW's core functions, using examples from other organizations 2. Develop tools to collect and report KPIs at least monthly 3. Identify data sources for KPIs and staff to maintain reporting tool TOTAL DURATION: 4 YEARS	Increased staff accountability for their actions Early identification and resolution of issues Ability to access performance improvement	Scope Items 1–3 ($25k one-time cost)	DCPW internal support (25% of one person staff time; $15k per year)
Condition Assessments and Asset Risk Scoring	Includes the assessment of condition of assets and the risk scoring of assets	1. Identify appropriate tool for creating and maintaining asset risk scores 2. Conduct pilot project to risk score a subset of assets (e.g., wastewater pump station assets) 3. Teach and train DCPW staff to perform condition assessments and risk score assets 4. Expand pilot to other asset classes TOTAL DURATION: 3 YEARS	Understanding of most risky and critical assets and their condition Ability to address asset needs before failures occur Ability to weigh costs of O&M, rehab, and/or replacement	Scope Items 1–3 ($30k one-time cost)	Four DCPW field staff to participate in Scope Items 1–4 (50% time for 6 months; $120k)
Plan Review Efficiencies	Includes outsourcing initial review of developer plans to a consulting firm	1. Identify and select a firm or firms to perform initial plan reviews TOTAL DURATION: 1 YEAR	Reduced work load burden on DCPW; frees up time for more important duties		25% of a DCPW senior staff time equivalent ($25k per year)
GRAND TOTAL	N/A	N/A	N/A	Approximately $785k	Approximately $3,030k

Notes:

CIP = capital improvements program

HR = Human Resources

N/A = not applicable

The review also identified steps that could be quickly accomplished in the short term to further implement the AM program and provide immediate benefits. These include process improvements in the following areas:

- Creation of an AM program charter – leading AM programs have charters that describe the purpose and objectives for the program, the boundaries of the program, the roles and responsibilities of program staff, and a work plan (usually 3 to 5 years).
- Out-sourcing the initial review of developer plan reviews to a consulting firm – three managers stated that they spend several hours each week reviewing developer plans. This is an inefficient use of their time that could be better spent in the field, project management, analyzing data for CIP planning, and other tasks.
- Develop Excel-based reports to make data analysis easier – DCPW collects a large amount of data that is inaccessible for analysis. The data are mostly stored in paper files, Access databases, and Excel files, which makes data analysis difficult. CH2M has identified several data sources kept by DCPW that could potentially be mined to identify "problem assets" and potential efficiencies.
- Obtain tablet computers, internet connectivity, and access to required systems/data to enable remote access to business applications for Water O&M staff, reducing the need to travel back to the office and drive time.
- Implement some of the ArcGIS solution templates (e.g., Leak Detection) to centralize information; DCPW is currently set up from a technology standpoint (GIS servers and mobile devices) to implement the templates. These can be implemented at little cost but provide value in the short term.

Roadmap

A Roadmap has been developed that considers overall phasing of the identified improvement initiatives to close the gaps identified for Strategy, Technology, People, and Process.

Although the first phase of this project has focused on understanding of DCPW's current capabilities and competencies, subsequent phases will focus on the improvement initiatives required to move DCPW towards a fully implemented AM program.

In the short-term, improvement initiatives focus on high-priority IT systems for asset mapping and work management because of the obvious needs in this area. In an effort to help DCPW prioritize its work, CH2M has not recommended initiatives in all process areas. Those areas where improvement initiatives are recommended are shown in Table ES-2.

To facilitate the successful delivery of these improvement initiatives, one of the first tasks will be to agree on the appropriate governance structure and processes that will manage and guide the implementation of the improvement initiatives. This is a key task for moving forward. In addition, it is necessary that DCPW adequately funds these recommendations if it is to realize the full benefits of AM.

The overview Roadmap detailing the improvement initiatives is shown on Figure ES-1.

Initiative	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
AM Program Office	→	→	→	→	→
High-priority IT Initiatives	→	→	→	→	→
Asset Registry and Mapping Needs	→	→	→		
Standard Operating Procedures for O&M		→	→	→	
O&M Prioritization Criteria		→	→		
Performance Measures	→	→	→	→	→
Condition Assessments and Asset Risk Scoring		→			
Plan Review Efficiencies	→	→			

Figure ES-1. Overview of Roadmap Initiatives

Summary and Recommendations

Based on the assessment, DCPW is similar to several other public works departments across North America, where the focus has often been on the operational elements of AM.

CH2M often finds that the more strategic elements such as better definition of LOS are less well progressed because there is often an underlying assumption that the assets are operated to provide a LOS that meets the needs of the community. However, as the asset base continues to deteriorate and municipal organizations are asked to provide a more robust case for funding requests, there is a need to obtain a better understanding of the linkages between investment and customer outcomes, either with regard to maintaining or improving service.

CH2M has identified eight key improvement initiatives that are focused on achieving successful implementation of the AM program and realizing its associated benefits. Success will be measured by DCPW's ability to have more informed discussions with customers and to adequately communicate future investment needs in a way that is meaningful to all stakeholders.

CH2M recommends that these improvement initiatives start as soon as possible to produce measurable benefits and that the improvement initiatives be addressed in the sequence set out in this Roadmap.

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Acronyms and Abbreviations

AM	asset management
BCE	business case evaluations
CAM	comprehensive asset management
CAMRA	comprehensive asset management review and assessment
CH2M	CH2M HILL Engineers, Inc.
CIP	capital improvement program
CMMS	computerized maintenance management system
County	Douglas County
DCPW	Douglas County Public Works
FOG	fats, oils, and grease
GIS	geographical information system
HR	Human Resources
IT	information technologies
LOS	levels of service
MGD	million gallons per day
O&M	operation and management
Roadmap	Asset Management Best Practice Roadmap
SOP	standard operating procedure
WWTP	wastewater treatment plant

SECTION 1

Assessment of Current Conditions

1.1 Introduction

Douglas County Public Works (DCPW) provides water and wastewater treatment, distribution, collection, and disposal operation and management (O&M), stormwater management O&M (flood control and water quality), roads management, fleet management, facilities management, engineering, and customer service. As with most other public works organizations, DCPW faces challenges including funding, growth, capital and operating budgets, potential loss of knowledge through retirements, deteriorating infrastructure, and staffing challenges. In response to these pressures, DCPW has been implementing an asset management (AM) program to better meet service levels and reduce risks at the lowest lifecycle cost.

DCPW retained CH2M HILL Engineers, Inc. (CH2M) to assess the current state of the AM program and to make recommendations for prioritizing improvement initiatives for further implementation and additional improvement initiatives that should be considered. The objectives of the assessment were to work with DCPW staff to understand the current situation with respect to DCPW's AM program and develop this long-term *Asset Management Best Practice Roadmap* (Roadmap) to improve DCPW management and performance. This Roadmap will identify the improvement initiatives that will form the basis of a plan for the ongoing implementation of an AM program for the DCPW over the next 5 years.

1.2 Approach to Asset Management

For the purposes of this assessment, comprehensive asset management (CAM) is defined to include four fundamental building blocks:

1. *Strategy*: Set the vision, mission, and Roadmap for the DCPW
2. *Process*: Minimize total cost of ownership, increase reliability, and meet performance standards in a safe and environmentally conscious manner
3. *People*: Make good choices in organizational design, people resources, and knowledge retention
4. *Technology*: Invest in and continually enhance data and technology systems that support the strategy, process effectiveness, and development of the capabilities of people

These must be in balance to consistently meet service levels and minimize overall cost of asset ownership.

Recent trends validate that many municipal organizations need this balance and culture change in implementing a comprehensive and sustainable approach to AM. Proper balance of these four elements is also essential for optimal business performance. When these elements are in balance, DCPW will consistently achieve improved performance with the investment in its assets, minimize life cycle costs, manage risks, and ensure continuity of levels of service (LOS) in the face of changing business drivers.

1.3 Implementation Methodology

A robust six-step phased implementation process should be considered to implement DCPW's AM program, as shown in Figure 1-1. This assessment has guided DCPW through the implementation of Steps 1 and 2, forming Phase 1. Phase 1 has positioned DCPW for implementation of subsequent phases as next steps to achieving the full implementation of the AM program.

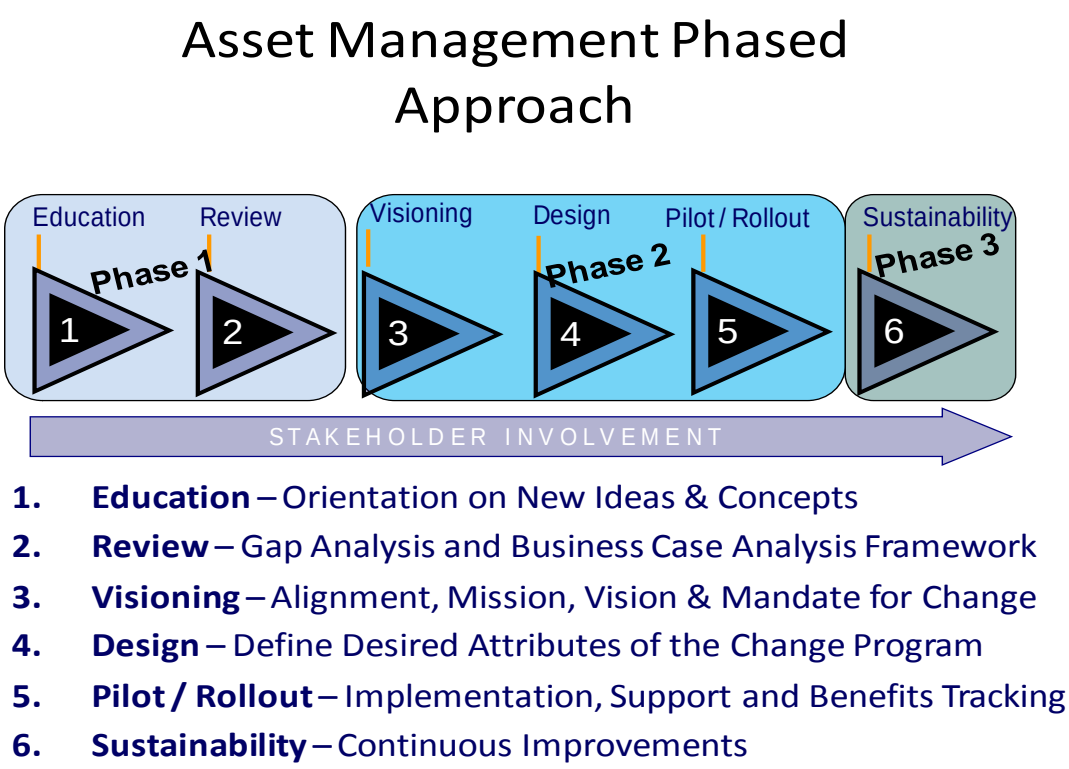

Figure 1-1. Phased AM Approach

1.3.1 Step 1: Education

It is important that everyone directly or indirectly involved in the DCPW AM program understands the various leading practices that are available as potential approaches to modify current business processes. The AM process, implementation approach, and methodology comprise valuable information for people who are participating in the process or are expected to make or realize change as a result of the implementation process. Implementation of the AM program may require a shift in strategies, thinking, or behaviors. As such, alignment to a common vision and mission are considered essential for success. An overview of AM leading practice was provided during the AM Primer presentations, the introduction to the Comprehensive Asset Management Review and Assessment (CAMRA) workshop, and throughout the workshop, where leading practices concepts are embedded in the CAMRA tool.

1.3.2 Step 2: Review

A high-level review of DCPW current AM practices and operations was conducted. The review served three purposes:

1. Raise awareness for the AM program and supported the engagement of staff
2. Gain an understanding of the current situation with respect to how the DCPW operates (set a baseline)
3. Identify existing leading practices currently in place at DCPW that should be leveraged moving forward with the AM program

The assessment of current conditions comprises three components: document review, staff interviews, and the CAMRA workshop. The document review component was completed prior to the onsite work. CH2M requested numerous documents that provided a thorough understanding of how DCPW operates.

The staff interviews and the CAMRA workshop were conducted onsite. Information from the document review, staff interviews, and CAMRA workshop was used by CH2M to facilitate the self-assessment and population of the CAMRA tool by DCPW staff. The review focused on the four building blocks discussed in Section 1.2: Strategy, Process, People, and Technology. Results of the review are critical for initiating future steps.

The review also identified some quick wins that could be implemented in the short term to further implement the AM program and provide immediate benefits. These include process improvements in the following areas:

- Creation of an AM program charter – leading AM programs have charters, which describe what the purpose and objectives are for the program, what the boundaries are of the program, the roles and responsibilities of program staff, and a work plan (usually 3 to 5 years).
- Out-sourcing the initial reviews of developer plans to a consulting firm – three managers stated that they spend several hours each week reviewing developer plans. This is an inefficient use of their time, which could be better spent in the field, project management, analyzing data for capital improvement program (CIP) planning, and other tasks.
- Develop Excel based reports to make data analysis easier – DCPW collects a large amount of data that is inaccessible for analysis. These data are mostly stored in paper files, Access databases, and Excel files, which makes data analysis difficult or nearly impossible. CH2M has identified several data sources kept by DCPW that could potentially be mined to identify “problem assets” and potential efficiencies.
- Budget for and obtain tablet computers, internet connectivity, and access to required systems/data to enable remote access to business applications for Water operations and maintenance (O&M) staff, reducing the need to travel back to the office and drive time.
- Implement some of the ArcGIS solution templates (e.g., Leak Detection) to centralize information; DCPW is currently set up from a technology standpoint (geographical information system [GIS] servers and mobile devices) to implement the templates. These can be implemented at little cost but provide value in the short term.

1.4 Document Review

Based on the review of DCPW documents pertaining to AM as well as subsequent information, it is clear that DCPW is overall performing their functions in an efficient and effective manner with limited resources. The following types of documents were reviewed:

- Strategic and master plans
- Communication resources
- Departmental performance reports
- Program inventories
- Customer survey results
- Short and long term business plans, development protocols, and policies and procedures
- Major information technologies (IT) applications, use, and integration
- Financial policies, statements, and rate studies
- O&M and CIP budgets
- Procurement policies
- Fleet inventory and availability

- Human resource policies
- Staff profile by work unit/division and employee turnover
- Description of major training programs
- Organizational charts
- Succession and knowledge management plans and strategies
- Skills and competency plans and strategies
- Description of emergency management program and response plans and safety plans and data
- Unit cost information and productivity data
- Recent history of leaks, main breaks, sewer main breaks, etc.
- Standard operating procedure (SOP) for operations, maintenance, equipment, and materials and known gaps
- CIP project development, prioritization, and delivery processes
- Asset renewal and replacement decision making processes and policies
- Quality assurance, quality control, audit, and continuous improvement policies and procedures

Some general observations from the document review include the following:

- DCPW has a 5-year plan for funding AM.
- There is a robust CIP request form for justification and funding.
- There were recent changes to the organizational structure to improve efficiency.

1.5 Summary from Staff Interviews

Interviews with staff were held on August 22 through 24, 2016. A list of staff interview participants is provided in Appendix A. The staff interviews conducted with DCPW determined additional areas where there are leading practices occurring within the organization as well as areas that are lagging.

1.5.1 Strengths

The interviews highlighted the following strengths are summarized in the following sections.

1.5.1.1 Strategy

- Extensive water quality program in place with good regulatory compliance for a variety of programs.
- Pretreatment/fats, oils, and grease (FOG) program in place for commercial businesses.
- New staff facilities as part of the North Valley Plant expansion.
- Good support from the Finance Department, and staff are involved in the annual budgeting process Douglas County (County) use of Priority Based budgeting.
- Implementation of some sustainable technologies and smart energy solutions.
- Strong customer service ethic embedded in the culture.
- Wastewater assets are new and in good condition.
- Understanding and support for AM from DCPW leadership.

1.5.1.2 Process

- Document labor hours and work done in various log books and reports.
- Some written SOPs exist, checklists for work tasks are used by staff, and work is prioritized based on health and safety issues and impacts on the public.
- Good internal communication within DCPW; leadership meets on a weekly basis internally and externally within the County.
- 20-year rehabilitation program in place for wastewater assets.
- Staff knowledge of flooding problem areas.
- A DCPW staff person who functions as a liaison to IT.
- Technology Review Board and Technology Steering Committee meet regularly.
- Staff regularly use existing IT systems.
- Board of Commissioners is receptive to the presentation of data to support decision making.

1.5.1.3 People

- Teams within DCPW work well together, and they have quality staff.
- Staff have a diverse set of skills.
- Stormwater Program Manager position is in place.
- The County IT Director is looking for input from DCPW into the County IT Strategy and Master Plan.
- There is a trainee program in place and support for continuing education. Efforts have been made to start some cross training within Finance. There is an incentive package in place for operators to seek higher levels of certification.
- A Supervisory Control and Data Acquisition (SCADA) technician position was recently approved.

1.5.1.4 Technology

- Water quality data are recorded in AllMax for monthly reporting.
- Square Rigger is used for fleet maintenance management.
- DCPW has an AllData subscription for labor and parts estimates.
- Weekly job reports are filled out by facility for tracking labor, and Roads fills out daily worksheets.
- Facilities' assets are tracked in New World.
- Most culvert locations are in GIS, and the locations are recorded for most regulatory signs.
- Micropaver has condition scores for roads.
- Support for GIS has been good; the GIS system meets DCPW's needs and can integrate with a computerized maintenance management system (CMMS) application.
- DCPW SCADA Master Plan was recently completed.
- County IT is developing a County IT Strategy and Master Plan.
- New World has all capital assets (more than $5K) with cost and depreciation schedules in the system.

- Electronic time sheets will be implemented in the near future.
- Fleets uses an "app" (i.e., Dip Sticking sheet) to track mileage and remind staff of maintenance needs. Fuel cards are used at fueling stations, and mileage is recorded as part of the process.

1.5.2 Opportunities

The areas where DCPW has the greatest opportunity for improvement are discussed in the following sections.

1.5.2.1 Strategy

- For the Cave Rock and Skyland water system, 534 connections require $25M in improvements, and residents are suing the County. This is an example of the challenges with taking over systems from developers or private parties.
- County processes do not require a business licenses to state the nature of the business. This creates complications for the FOG and pretreatment programs in the wastewater system.
- Community Development and Public Works have different perspectives regarding development activities and County assets. Community Development is interested in facilitating development and increased revenue while Public Works is focused on the infrastructure associated with development and financial impacts on County assets.
- There are unsanitary working conditions for wastewater staff at the North Valley Plant.
- Fleets does not have enough tools, vehicles, or space to do their work. Staff spend a lot of time handling the customer service aspects of the work rather than on the fleet itself.
- There are failing infrastructure and systems in all divisions of DCPW.
- Roads does not have the equipment necessary to maintain roads, signs, and signals. Budgets and resources are constrained. Additional road systems are taken on without a commensurate increase in O&M funding.
- DCPW divisions are under budgeted and understaffed.
- The stormwater program does not currently have any funding, however Community Development has contracted with an engineering firm to evaluate a stormwater management program and a stormwater utility fee.
- Contingencies are not built into capital expenditure budgets. Budgeting is based upon what was needed in the previous year.
- A clearer link is needed between the Strategic Plan and daily work.
- The Board of Commissioners is sensitive to increased funding associated with the County IT Department.
- It will be a challenge to staff and sustain an AM program. There is no longer a formal project management office.

1.5.2.2 Process

- There is no formal water planned maintenance program in place, all work is reactionary. The system is challenging to operate, and much time is spent driving from site to site. The superintendent would like to spend more time out in the field with staff.
- Help is needed with Material Safety Data Sheets.
- Facilities' work requests are ad hoc, and there are no formal, documented SOPs.

- The scheduling of work for Roads is ad hoc, and a formal service request process is needed.
- Stormwater facilities at the lake need to be registered with the Nevada Department of Environmental Protection. A plan for inspection and cleaning of each facility needs to be assigned as part of the registration process.
- There is no data management standard in place for files on the network.
- Improvements are needed to the CIP process.
- The County processes create additional burdens on staff time.
- The Board of Commissioners is more receptive to the opinions of DCPW staff when those opinions are accompanied by data on the issues that inform decision making.

1.5.2.3 People

- Salary and benefits are not competitive, and staff are resistant to losing their overtime hours. Merit increases and operator incentives are inadequate. Salary compensation studies do not factor in appropriate benchmarks.
- Wastewater training opportunities are limited, especially for Occupational Safety and Health Administration requirements. Only minimum certifications are required. Training is needed on newer Fleet equipment. Cross training is needed in Finance.
- Additional staff are needed in most divisions. The resource pool for hiring is limited. Electrical and heating, ventilation, and air conditioning (HVAC) skills are needed. Turnover is high. It takes an average of 3 months to fill a position.
- More AM knowledge is needed.

1.5.2.4 Technology

- SCADA does not have any remote control ability, only data collection.
- Daily work reports do not capture material or equipment costs by asset type. Square Rigger does not capture itemized part costs.
- Tracking for stormwater is done in Excel instead of GIS.
- The sign inventory is incomplete.
- The County does not have good street centerline GIS data, but it is under development.
- New World does not currently allow for activity based budgeting and charging. Time reporting is not activity-based.
- Many reports and logs are manual. Many calculations are done by hand.
- The fueling system data are not accessible.
- There is no IT system to support the County's permitting process.
- There is no data warehouse, but the County will be implementing a data warehouse in spring 2017.
- Many IT applications are obsolete. Databases cannot export to Excel. Many functions are not working.
- There are not enough computers in many divisions.
- Historically, IT support has been poor, but new leadership in the Technology Services Department is committed to improving collaboration and service. A DCPW specific IT Master Plan is needed, or section added to the County's IT Master Plan.

1.6 Summary of Global and Division Specific Strengths and Opportunities

Table 1-1 summarizes global strengths and opportunities, based on the results of the assessment of current conditions. Division specific strengths and opportunities are shown in Table 1-2.

Table 1-1. DCPW Global Strengths and Opportunities
Asset Management Best Practice Roadmap

Assess Management Component	Strengths	Opportunities
Strategy	Highly responsive customer service Attention to regulatory environment (e.g., water regulatory changes)	There are no performance measures at the corporate or division level that are tracked and used for performance assessment and improvement.
People	Capable, committed staff Leadership is committed to AM Leadership understands weaknesses	DCPW has only 45 staff members for a very large service territory and many diverse assets. DCPW has no backup capacity, and key staff members are used in a suboptimal way.
Process	Collects lots of data that could be usable but isn't	Written SOPs are sparse in all divisions, and work is not performed in a consistent manner.
Technology	Strong GIS capability within DCPW and IT Mobile devices provided by the County New leadership in IT seems willing to help	There is very little technology across DCPW. This prevents the entire organization from mining and analyzing valuable data. The lack of enterprise applications is time consuming for staff and prevents DCPW from being able to plan and schedule work, analyze asset performance, understand which assets create the greatest risk, and respond to customer needs in an efficient manager. There is a strong negative perception of IT throughout DCPW.

Table 1-2. DCPW Division Specific Strengths and Opportunities
Asset Management Best Practice Roadmap

Division	Strengths	Opportunities
Wastewater	• Staff members get along well, and communication is good; well qualified staff • Assets are new and in good condition • FOG/pretreatment program is in place • SOPs are in place for some plant operations; daily reports and log sheets are used • There are few regulatory problems; AllMax is used for monthly water quality reports • A 20-year rehabilitation program is in place • North Valley Plant expansion provides for some new facilities	• County processes create issues with the FOG and pretreatment programs • County does not recognize the impacts from development • Salary and benefits are not competitive; staff members do not want to give up overtime hours • Additional staff is needed; one wastewater operator for the North Valley Plant • Discontinued the condition assessment/cleaning program • Operator training opportunities are limited; only minimum certifications are required • Daily work reports do not track material or equipment costs by asset type

Table 1-2. DCPW Division Specific Strengths and Opportunities
Asset Management Best Practice Roadmap

Division	Strengths	Opportunities
	• A SCADA Master Plan was recently developed • AM is a way to save time and money; management has a lot of AM knowledge • SCADA technician job approved • Able to implement a 4-day, 10-hour schedule • Implemented an incentive program for operator certification • Good support from Finance	• Working conditions are unsanitary at the North Valley Plant • Additional computers are needed • More AM knowledge is needed for O&M staff • Superintendent would like to spend more time in the field with staff • Need an additional construction crew to improve response time and reduce costs • Certification incentives are inadequate • SOPs are needed • Difficulties with IT support • Need better systems in place • Need better data
Water	• Operators log what work they complete and when • Fairly extensive water quality program in place with weekly sampling • Daily and weekly preventative maintenance logs • AM is a way to save time and money; management has a lot of AM knowledge • Staff members get along well, and communication is good; well qualified staff • Able to implement a 4-day, 10-hour schedule • Implemented an incentive program for operator certification • Good support from Finance	• No preventative maintenance program in place, all reactionary • Challenge to operate the system • Cave Rock and Skyland system: 534 connections need $25M in improvements; residents are suing the County • Lots of time is spent driving from site to site • Issues with taking over systems from developers or private parties • SCADA system does not have remote control, only data collection • No condition assessment data • Very small parts inventory • Superintendent would like to spend more time in the field with staff • Need an additional construction crew to improve response time and reduce costs • Certification incentives are inadequate • SOPs are needed • Difficulties with IT support • Need two additional staff • Need better systems in place • Need better data
Stormwater	• A stormwater program manager position is in place and filled • Have facility locations in GIS • Staff know weak points in the system • Have most culverts in GIS	• Initiate facility inspections • Need to have the stormwater facilities at the lake registered with the Nevada Department of Environmental Protection • Tracking information in GIS instead of Excel • Create a funding mechanism • Assigning inspection and cleaning responsibilities • Develop a County IT system to support permitting • Need better data

Table 1-2. DCPW Division Specific Strengths and Opportunities
Asset Management Best Practice Roadmap

Division	Strengths	Opportunities
Roads	• Have locations for regulatory signs • Daily work sheets are filled out • Micropaver is used for condition scores for roads • Competent staff committed to providing County residence with quality service • Big focus on customer service • Internal communications are good • Successfully used a pavement management system to justify expenses supported by data	• Additional equipment is required to maintain roads, signs, and signals • Daily work is not prioritized based on a systematic approach • Incomplete sign inventory • Need a service request process for County staff • Budgeting and resources are a challenge • Good street centerline GIS data are needed • Staff are unhappy with merit increases; some have left for more competitive compensation • Training budgets are limited • Issues with taking on new road systems without increases to O&M budgets • O&M cost data are managed with an unsupported database • External communications are challenging • Need a clearer linkage between the DCPW Strategic Plan and daily work • Need additional staff • Infrastructure is failing • Need better asset data
Fleet	• Staff services a wide range of vehicle types • Square Rigger is used for maintenance management (tracks labor and parts costs) • Have own fluids and some parts • AllData provides labor and parts estimates • Use fuel cards and track mileage • Use an “app” (Dip Sticking sheet) to track mileage and remind staff of maintenance needs • Customer service focus • Staff routinely uses Square Rigger • Great staff • Internal communications are good	• Additional computers are needed • Additional tools, equipment, and space is needed • Training is needed on newer equipment • Itemized parts’ costs are not adequately tracked in Square Rigger • Much time is spent on customer service • Additional staff are needed; resource pool for hiring is limited • Fuel data are not integrated with Square Rigger • Square Rigger is old • Staff are unhappy with merit increases; some have left for more competitive compensation • Training budgets are limited • Need a clearer linkage between the Strategic Plan and daily work • Issues with budget adequacy • Need a better life cycle costing tool
Facilities	• Staff handles a variety of regulatory programs • Work is prioritized based on health and safety issues and impacts on the public • Good support from Finance • Some buildings are implementing sustainable technologies	• Failing infrastructure and systems (building HVAC) • Historically poor IT support • Additional staff are needed; electrical and HVAC skills are needed • Service requests are ad hoc, and some are entered into an IT system (Help Star); a service request process is not in place. A new service desk is being implemented where facilities will have their own portal.

Table 1-2. DCPW Division Specific Strengths and Opportunities
Asset Management Best Practice Roadmap

Division	Strengths	Opportunities
	• Weekly job reports are filled out tracking labor by facility • New World tracks assets over $5,000 • Have some smart energy solutions in place • Great staff • Big focus on customer service • Internal communications are good	• No documented SOPs • Weekly job reports are manual and entered by hand into Excel • Staff members are unhappy with merit increases; some have left for more competitive compensation • Training budgets are limited • Need a clearer linkage between the Strategic Plan and daily work • Issues with budget adequacy • Need better condition data
Engineering	• Board of Commissioners is receptive to the presentation of data • Good support from Finance • Use training to keep their licenses	• The Board of Commissioners is more receptive to the opinions of DCPW staff when those opinions are accompanied by data on the issues that inform decision making. • County processes are a burden on staff time • Need two more staff members for modeling and projects • Salaries are not competitive, and the resource pool is limited • IT has been a challenge • Budgeting process is based on the previous year's needs • No activity based time reporting; time sheets are manual and require calculations by hand • No formal data management standards in place • Need to implement data driven decision making • Would like a robust risk assessment methodology and better life cycle costing • Need to eliminate standalone IT systems
IT/GIS	• GIS system is good, and there is good support for it • DCPW has a staff member functioning as a liaison to County IT • Developing a County IT Strategy and Master Plan; seeking DCPW input • Routine meetings with the Technology Review Board and the Technology Steering Committee	• County IT support has historically been poor • The Board of Commissioners is sensitive to increased funding associated with the County IT Department • There is no data warehouse
Customer Service	• Run monthly and ad hoc reports for Roads	• Daily work reports require hand calculations • Existing databases cannot export to Excel; databases are obsolete
Finance	• NewWorld has all capital assets with cost and depreciation schedules • Implementing electronic time sheets • Use Priority Based budgeting • Starting to cross train staff	• NewWorld does not allow for activity based budgeting and charging • Time sheets are manual • Need to improve the CIP process • Need contingencies built into capital expenditure budgets; need to improve predicting budgets • Additional cross training is needed

Table 1-2. DCPW Division Specific Strengths and Opportunities
Asset Management Best Practice Roadmap

Division	Strengths	Opportunities
Human Resources (HR)	• Have a trainee program and support for continuing education through tuition reimbursement	• Challenges with recruitment; resource pool is limited and takes 12 weeks to fill a position • High turnover and low salaries • Salary compensation studies do not include the appropriate benchmarks • Occupational Safety and Health Administration training support is needed
Director's Office	• Very supportive of AM; management has good AM knowledge • Weekly meetings with staff and County management • Coordinates with staff on budgets • Highly involved in the development of rate studies • Good support from Finance • Good GIS support	• O&M staff need more AM knowledge; staffing and sustaining the AM program will be a big challenge • No longer have a formal project management office • Need more certified operators • Salaries and benefits are not competitive; high turnover rate • Need a DCPW specific IT Master Plan • Issues with justifying rate increases or additional budgets or staff • Need a review of the organizational structure • Need improved data and systems

1.7 Conclusions from the CAMRA Workshop

The CAMRA tool developed by CH2M provided a quantitative evaluation of DCPW's AM practices for the Strategy, Process, People, and Technology building blocks over 36 categories as presented in Table 1-3. The categories are assessed based on the AM maturity scale (1 through 5, ranging from innocence to excellence, respectively).

Table 1-3. CAMRA Categories by Building Block
Asset Management Best Practice Roadmap

Strategy
Asset and Customer Levels of Service
Asset Management Leadership and Governance
Asset Management Policy and Strategy
Continuous Improvement Culture (sustainability)
Future Trends (impact of growth)
Legal, Regulatory and Statutory Requirements
Overall Strategic Planning
Performance Measurement and Reporting
Risk Framework – Strategic Level and Asset Level
The Management System for Asset Management
Commercial Focus (O&M and CIP)
Financial – Budgeting and Reporting

Table 1-3. CAMRA Categories by Building Block
Asset Management Best Practice Roadmap

Process
Asset Knowledge (analysis of data)
Asset Management Plans
Asset Management Quality Assurance
Business Continuity and Emergency Preparedness and Response
Business Process Mapping and Procedures
Capital Projects – Planning, Design and Construction
Communication and Information Sharing
Document, Data and Information Control
Materials Management
Operations Management/Optimized Asset Interventions
Capital Investment Plans – Development and Implementation
People
Knowledge Retention and Succession Planning
Learning and Development
People Skills and Competencies Master Planning
Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change
Technology
Asset Information
Asset Registry
Business Applications
Maintenance Management
Technology Assets Planning
Technology Systems Integration

The maturity scale is shown on Figure 1-2. An example of one of the CAMRA Themes is Question Number 2 – Asset & Customer Levels of Service, shown on Figure 1-3. The scoring for criteria (maturity scale) for each category is shown in detail in Appendix B.

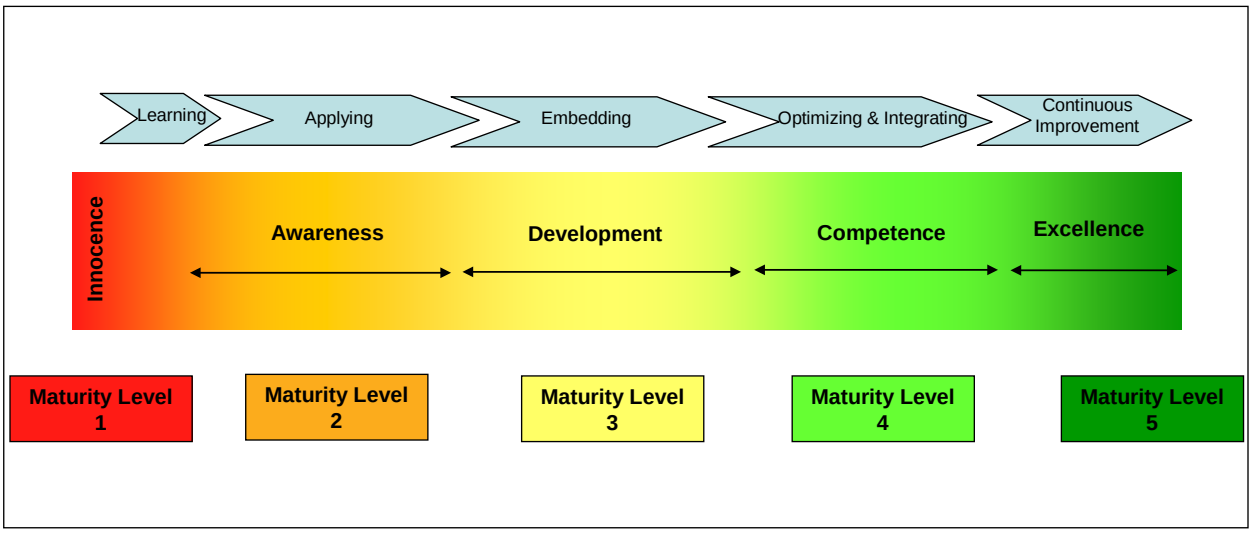

Figure 1-2. AM Maturity Scale

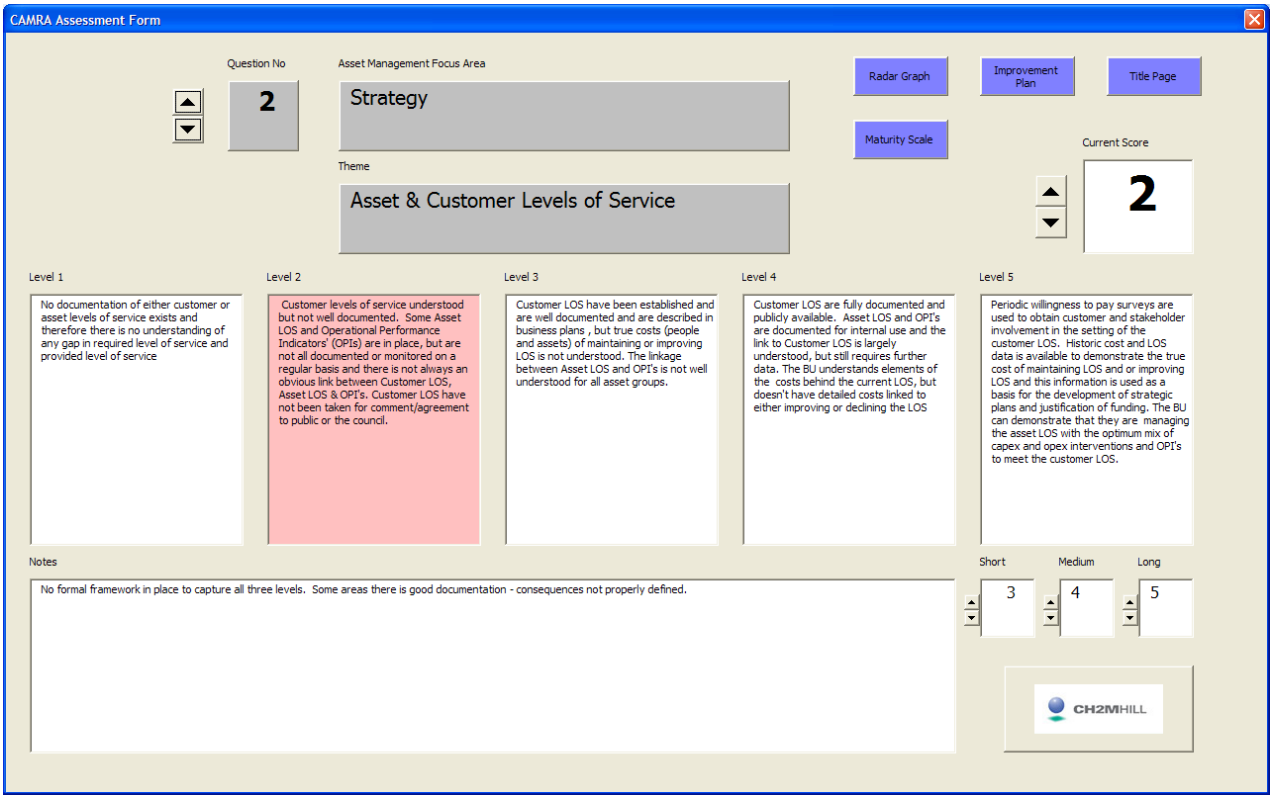

Figure 1-3. Example CAMRA Category

During the CAMRA workshop, the categories, organized by Strategy, Process, People, and Technology, were presented to DCPW staff from across the organization. A list of CAMRA workshop participants is provided in Appendix C. Prior to each section of categories, a short presentation was given to introduce the topics and provide examples of leading practices. The presentations are provided in Appendix D. For each category, DCPW self-assessed the present state of their AM practices and their desired future state in 3 to 5 years. Self-assessment scores were based on the AM maturity scale. Results from the self-assessment are provided in Appendix E.

Overall, DCPW demonstrated a culture of dedication to customer service and doing more with less. With respect to AM practices, DCPW demonstrated a maturity level around 2 (awareness). Table 1-4 shows the detailed scores for the 36 categories in the focus areas of Strategy, Process, People, and Technology for DCPW.

Table 1-4. CAMRA Scoring by Category

Asset Management Best Practice Roadmap

Category	Focus Area	Category	Current
1	Strategy	Overall Strategic Planning	2
2	Strategy	Performance Measurement and Reporting	2
3	Strategy	Asset and Customer Levels of Service	2.5
4	Strategy	People Skills and Competencies Master Planning	2
5	Strategy	Technology Assets Planning	1.5
6	Strategy	Business Process Mapping and Procedures	2

Table 1-4. CAMRA Scoring by Category

Asset Management Best Practice Roadmap

Category	Focus Area	Category	Current
7	Strategy	Future Trends (implications of growth)	3
8	Strategy	Asset Management Policy and Strategy	2
9	Strategy	Asset Management Plans	2
10	Strategy	Legal, Regulatory and Statutory Requirements	3
11	Strategy	Business Continuity and Emergency Preparedness and Response	3
12	Technology	Asset Registry	2
13	Technology	Asset Information	1
14	Technology	Asset Knowledge (analysis of data)	1
15	Technology	Document, Data and Information Control	1
16	Technology	Business Applications	2
17	Technology	Technology Systems Integration	1
18	Technology	Capital Improvement Plans (CIP) – Development and Implementation	2.5
19	Technology	Risk Framework – Strategic Level and Asset Level	2
20	People	Asset Management Leadership and Governance	2.5
21	People	Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change	3
22	People	Learning and Development	3
23	People	Communication and Information Sharing	3
24	People	Continuous Improvement Culture	2.5
25	People	Knowledge Retention and Succession Planning	2
26	People	Optimization of O&M Delivery	2
27	Process	Optimization of Project Delivery (CIP)	2.5
28	Process	Capital Projects – Planning, Design, and Construction	3
29	Process	Operations Management	2
30	Process	Maintenance Management	2.5
31	Process	Materials Management	2
32	Process	Financial – Budgeting and Rate Setting	3
33	Process	Financial Reporting	2.5
34	Process	Optimized Asset Interventions	1
35	Process	The Management System for Asset Management	2
36	Process	Asset Management Quality Assurance	1

Figure 1-4 provides a snapshot of the current AM capabilities.

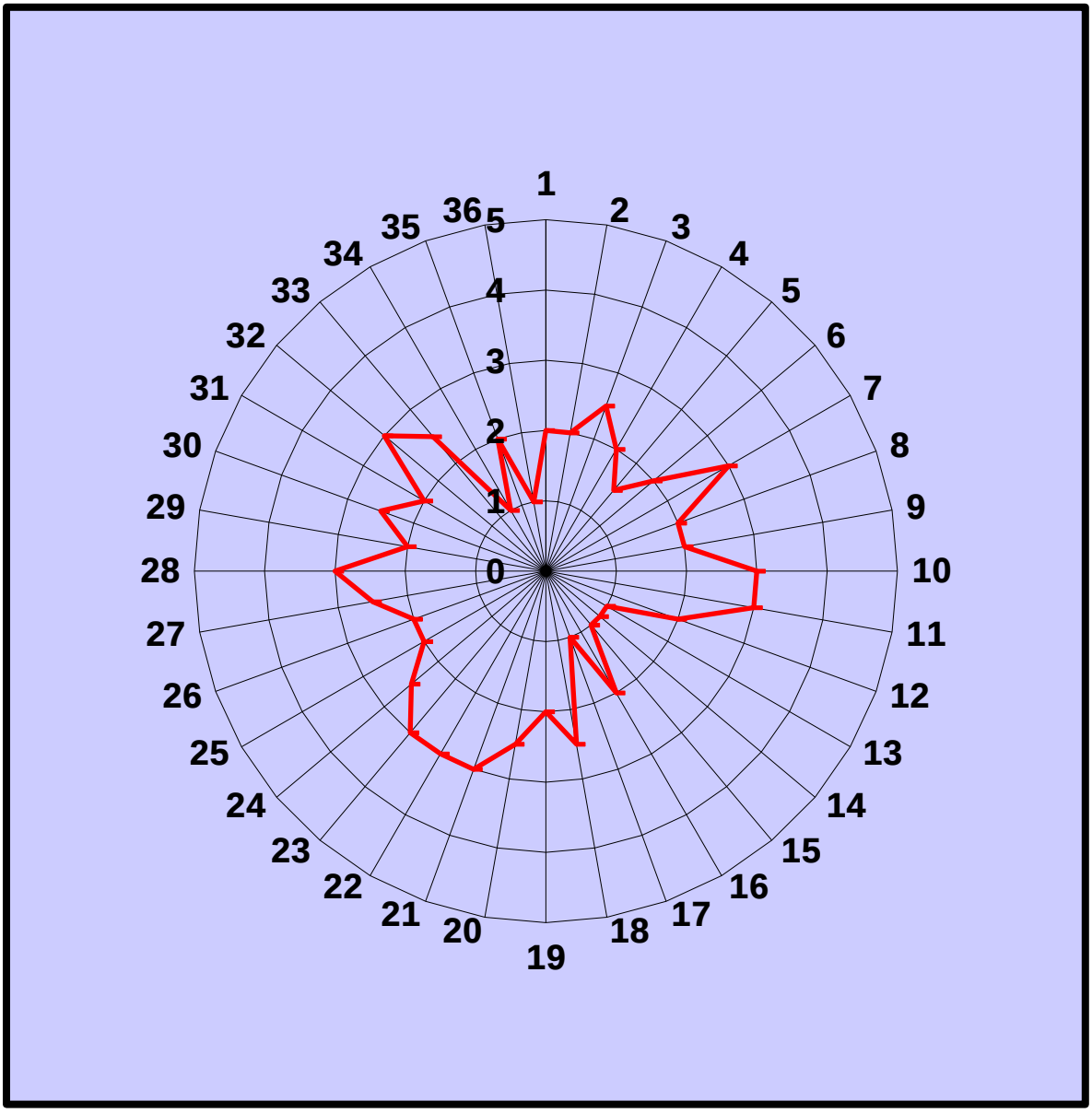

Figure 1-4. Overall CAMRA Results

There are several opportunities to enhance management of DCPW assets and more efficiently meet desired LOS. The following sections summarizes observations, strengths, and opportunities in the four AM focus areas.

1.7.1 Strategy

1.7.1.1 Observations and Conclusions

- In general, the DCPW leadership team rated the organization relatively low on most Strategy building block categories (less than 3). This is common for public works agencies and utilities that are going through this self-assessment process for the first time.
- DCPW rated three categories 3 (Future Trends [implications of growth]; Legal, Regulatory, and Statutory Requirements; and Business Continuity and Emergency Preparedness and Response); CH2M believes these are strength areas.

- All other categories scored less than 3; of these, the following are noteworthy:
  - Overall Strategic Planning
  - Performance Measurement and Reporting
  - Asset and Customer Levels of Service

  These are foundational CAM building blocks, and DCPW has chosen performance measurement and reporting to be one of its top eight improvement initiatives.
- Among the Strategy building block categories, DCPW rated Technology Assets Planning as 1.5; technology gaps provide the greatest challenge. Data are stored in paper files and in standalone databases and is virtually unusable for analysis, planning, and estimating the costs of individual work activities without significant effort. DCPW has chosen High-priority IT Initiatives to be one of its top improvement initiative.

1.7.2 Process

1.7.2.1 Observations and Conclusions

- DCPW rated most Process building block categories below 3; however, two were rated 3: (1) Capital – Planning, Design and (2) Construction and Financial – Budgeting and Rate Setting.
- Five of DCPW's eight improvement initiatives will address gaps in this building block (e.g., select the right IT solution will address an asset performance problems), including Operations Management, Maintenance Management, and Optimized Asset Interventions.

1.7.3 People

1.7.3.1 Observations and Conclusions

- Although DCPW rated several categories in the People building block below 3; three categories were rated 3 (Clarity of Roles and Responsibilities, Learning and Development, and Communications and Information Sharing).
- One category, Optimization of O&M Delivery, was rated 2, which is primarily a result of inadequate technology, lack of SOPs, lack of risk scoring and condition assessment program, and failing infrastructure in a number of water systems in the service territory.

1.7.4 Technology

1.7.4.1 Observations and Conclusions

- The DCPW leadership team rated all Technology building block categories less than 3; four categories were rated 1. DCPW's High-priority IT Improvement Initiative addresses these gaps.

SECTION 3

Improvement Initiatives

2.1 Overview of Improvement Initiatives

There are opportunities to become more effective and efficient in the way the assets are managed with regard to more strategic approaches to the operation of DCPW. The improvement initiatives are expected to contribute significantly in delivering value from AM practices.

Table 2-1 presents the current and desired future CAMRA scores by category and the current CAMRA scores that resulted from the workshop with DCPW staff members on August 25, 2016.

Table 2-1. AM Development Plan Scores by Category

Asset Management Best Practice Roadmap

Category	Focus Area	Category	Current	3–5 Years
1	Strategy	Overall Strategic Planning	2	3
2	Strategy	Performance Measurement and Reporting	2	4
3	Strategy	Asset and Customer Levels of Service	2.5	3
4	Strategy	People Skills and Competencies Master Planning	2	3
5	Strategy	Technology Assets Planning	1.5	4
6	Strategy	Business Process Mapping and Procedures	2	3
7	Strategy	Future Trends (Implications of Growth)	3	3
8	Strategy	Asset Management Policy and Strategy	2	4
9	Strategy	Asset Management Plans	2	4
10	Strategy	Legal, Regulatory and Statutory Requirements	3	3
11	Strategy	Business Continuity and Emergency Preparedness and Response	3	4
12	Technology	Asset Registry	2	4
13	Technology	Asset Information	1	3
14	Technology	Asset Knowledge (Analysis of Data)	1	3
15	Technology	Document, Data and Information Control	1	3
16	Technology	Business Applications	2	4
17	Technology	Technology Systems Integration	1	4
18	Technology	Capital Improvement Plans (CIP) – Development and Implementation	2.5	3
19	Technology	Risk Framework – Strategic Level and Asset Level	2	3
20	People	Asset Management Leadership and Governance	2.5	3
21	People	Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change	3	3
22	People	Learning and Development	3	4

Table 2-1. AM Development Plan Scores by Category

Asset Management Best Practice Roadmap

Category	Focus Area	Category	Current	3–5 Years
23	People	Communication and Information Sharing	3	4
24	People	Continuous Improvement Culture	2.5	3
25	People	Knowledge Retention and Succession Planning	2	3
26	People	Optimization of O&M Delivery	2	3
27	Process	Optimization of Project Delivery (CIP)	2.5	3
28	Process	Capital Projects – Planning, Design, and Construction	3	3
29	Process	Operations Management	2	3
30	Process	Maintenance Management	2.5	3
31	Process	Materials Management	2	4
32	Process	Financial – Budgeting and Rate Setting	3	3
33	Process	Financial Reporting	2.5	3
34	Process	Optimized Asset Interventions	1	3
35	Process	The Management System for Asset Management	2	4
36	Process	Asset Management Quality Assurance	1	3

2.2 Detailed Description of Proposed Initiatives with Priorities

2.2.1 Improvement Initiatives Summary

Nineteen improvement initiatives were originally identified and ranked. Some were combined and others deferred, as determined by DCPW stakeholders. Eight improvement initiatives have been developed to help DCPW achieve their goal of fully implementing their AM program. These improvement initiatives were developed based on the feedback obtained through the document review, staff interviews, and CAMRA workshop. A phased approach to implementation is recommended. The listing of recommended improvement initiatives is shown in Table 2-2. The full list of improvement initiatives is included in Appendix F.

Table 2-2. Recommended Improvement Initiatives

Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
AM Program Office	Includes the development and staffing of an AM Program Office with a full time manager and three technical and analytical staff	1. Hire staff 2. Develop program charter 3. Develop program work plan 4. Develop performance metrics for the AM program 5. Establish AM Steering Committee 6. Execute this Roadmap TOTAL DURATION: 1 YEAR	Formal responsibility and accountability for AM Reduced asset failures and life cycle costs Greater confidence in maintenance strategies and CIP investment decisions		DCPW staff ($280k in 2017 and $350k per year starting in 2018)
High-priority IT Initiatives	Includes a DCPW specific IT Master Plan, CMMS, and SCADA integration between locations	1. Evaluate current systems and functional requirements 2. Conduct an assessment of existing gaps in IT system integration; evaluate technology needs and priorities, develop approach/methodology for successful system selection and implementation including use of existing systems 3. Identify and select systems that will meet DCPW's needs 4. Implemented selected systems TOTAL DURATION: 5 YEARS	Ability to plan for long term IT needs to ensure that DCPW needs are met Ability to plan and adequately document maintenance efforts and costs Ability to identify assets that should be rehabbed or replaced Ability to determine causes of asset failures Ability to control processes at different locations remotely	Technology and software assessment ($75k one-time cost) Implementation plan and pilot for CMMS ($150k one-time cost) Expand CMMS across DCPW ($300k total cost spread over 3 years)	Annual software licensing and IT costs ($60k per year)
Asset Registry and Mapping Needs	Includes mapping all appropriate assets, their hierarchy, and major types of failures (e.g., breaks and leaks)	1. Identify data requirements for Water, Wastewater, Roads, and Stormwater 2. Identify data sources 3. Develop data gathering plan for missing data 4. Collect missing data 5. Create maps TOTAL DURATION: 2 YEARS	Understanding the location of assets to address any issues that arise Understanding the types of failures that occur and where they occur to prevent recurrence and improve response times Ability to provide decision makers with more timely and accurate information regarding asset	Scope Items 1–3 ($20k one-time cost)	

Table 2-2. Recommended Improvement Initiatives
Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
			failures, maintenance requirements and costs		
Standard Operating Procedures for O&M	Includes the development and documentation of SOPs for O&M	1. Obtain templates from other organizations and/industries to support SOP development 2. Establish a multiyear work plan for creating SOPS 3. Execute work plan with staff involvement (with assigned staff to develop SOPs) TOTAL DURATION: 3 YEARS	Consistent use of work processes Reduced asset failure risk Improved training material Knowledge retention	Scope Items 1–3 ($40k one-time cost)	DCPW internal staff (half time; $30k per year)
O&M Prioritization Criteria	Includes a rigorous prioritization approach for scheduling O&M work	1. Identify appropriate O&M prioritization criteria for each function performed by DCPW (Water, Wastewater, Stormwater, Fleets, Roads, and Buildings) 2. Train staff on the use of new prioritization criteria 3. Implement new criteria in new enterprise systems if available, or in existing systems until new systems are available TOTAL DURATION: 2 YEARS	Increased confidence that there is an appropriate balance between scheduled work and demand (emergency work)	Scope Items 1 and 2 ($20k one-time cost)	DCPW staffing ($10k)
Performance Measures	Includes the development and monitoring of detailed performance measures to communicate to managers and work units	1. Identify appropriate key performance indicators (KPIs) for DCPW's core functions, using examples from other organizations 2. Develop tools to collect and report KPIs at least monthly 3. Identify data sources for KPIs and staff to maintain reporting tool TOTAL DURATION: 4 YEARS	Increased staff accountability for their actions Early identification and resolution of issues Ability to access performance improvement	Scope Items 1–3 ($25k one-time cost)	DCPW internal support (25% of time; $15k per year)

Table 2-2. Recommended Improvement Initiatives

Asset Management Best Practice Roadmap

Initiative Title	Description	Scope Items and Timing (in order)	Benefits	Consultant Cost	Internal Cost
Condition Assets/Asset Risk Scoring	Includes the assessment of condition of assets and the risk scoring of assets	1. Identify appropriate tool for creating and maintaining asset risk scores 2. Conduct pilot project to risk score a subset of assets (e.g., wastewater pump station assets) 3. Teach and train DCPW staff to perform condition assessments and risk score assets 4. Expand pilot to other asset classes TOTAL DURATION: 3 YEARS	Understanding of most risky and critical assets and their condition Ability to address asset needs before failures occur Ability to weigh costs of O&M, rehab, and/or replacement	Scope Items 1–3 ($30k one-time cost)	Four DCPW field staff to participate in Scope Items 1–4 (50% time for 6 months; $120k one-time cost)
Plan Review Efficiencies	Includes outsourcing initial review of developer plans to a consulting firm	1. Identify and select a firm or firms to perform initial plan reviews TOTAL DURATION: 1 YEAR	Reduced work load burden on DCPW; frees up time for more important duties		25% of a DCPW senior staff time equivalent ($25k per year)
GRAND TOTAL	N/A	N/A	N/A	Approximately $785k	Approximately $3,030k

Note:

N/A = not applicable

2.2.2 Detailed Improvement Initiatives

Tables 2-3 to 2-10 provide detailed descriptions for each improvement initiative including the objective; background; business drivers; preliminary scope; implementation priority and timeline; estimate of resources required; benefits/estimated savings; and ease of implementation, constraints, or barriers.

Table 2-3. Improvement Initiative 1
Asset Management Best Practice Roadmap

Improvement Initiative 1 – AM Program Office

A. Objective

Create an AM Program Office with a full time manager and three supporting staff. This office should report to the Director.

B. Background for Improvement Initiative

DCPW has made a multiyear commitment to AM. To implement this Roadmap and sustain the AM program long term requires dedicated resources with specialized skills (engineering, financial analysis, and GIS/IT capabilities).

C. Business Drivers for Improvement Initiative

- Increase operational efficiency
- Increase confidence in CIP project selection
- Reduce risk of major system failures
- Improve levels of service
- Optimize the use of O&M resources

D. Preliminary Scope

1. Hire staff
2. Develop program charter
3. Develop program work plan
4. Develop performance metrics for the AM program
5. Establish AM Steering Committee
6. Execute this Roadmap

E. Implementation Priority and Timeline

Priority – High

Timeline – 2017–2021

F. Estimate of Resources Required

2017– three DCPW staff ($280k in 2017 internal cost)

2018-2021 – Adding a fourth DCPW staff ($350 per year internal cost)

G. Benefits/Estimated Savings

- Optimized use of budget by prioritizing spending based on risk
- Improved O&M efficiency
- Increased asset reliability by promoting proactive maintenance
- Consistent and transparent prioritization methodology for work, resource, and budget allocation
- Prevention of major, costly failures
- More effective and productive decision making, transparent and consistent decisions
- Reduced overall asset, operational and management, and corporate risk
- Efficiencies in identifying the risks and consequences of asset failures
- Increased ability to focus resources on highest risk assets
- Greater confidence in the outputs of asset risk assessment tools
- Reduced cost of ownership
- Reduced infrastructure condition deficit
- Clear link between decision making and LOS
- Identification of level of risk tolerance
- Eliminated or deferred CIP
- Eliminated maintenance tasks

H. Ease of Implementation, Constraints or Barriers

- The AM Program Office should reside in Public Works and report to the Director. Easy to implement if there is decision maker support to hire these staff.

Table 2-4. Improvement Initiative 2

Asset Management Best Practice Roadmap

Improvement Initiative 2 – High-priority IT Initiatives

A. Objective

Ensure that DCPW IT systems are effectively planned, integrated, and streamlined to meet business needs. Review existing business processes and needs; identify, select, and implement suitable enabling core technologies to support business requirements. Introduce new technologies to enhance AM and decision making. Using an integrated architecture, prioritize and implement interfaces on an ongoing basis. Phase and sequence system improvements, including a financial plan, for implementation.

B. Background for Improvement Initiative

Integration of IT systems is critical to the efficient operations, capital planning, and other aspects of managing a public works agency with regional responsibilities. DCPW does not currently have an integrated architecture of enterprise systems (e.g., CMMS and GIS) that effectively serve the organization.

C. Business Drivers for Improvement Initiative

- Improved customer service
- Operational efficiency (e.g., reduced paperwork)
- Operational and capital planning, based on useful data and improved systems

D. Preliminary Scope

1. Evaluate current systems, functional and non-functional requirements
2. Conduct an assessment of existing gaps in IT system integration; evaluate technology needs and priorities, develop approach/methodology for successful system selection and implementation including use of existing systems
3. Identify and select systems that will meet DCPW's needs
4. Implemented selected systems

E. Implementation Priority and Timeline

Priority – High

Timeline – 2017–2021

F. Estimate of Resources Required

2017 – Assist DCPW in selecting a CMMS ($75k one-time consultant cost)

2018 – Assist DCPW implement, configure and pilot test CMMS ($150k one-time consultant cost)

2019–2021 –Assist DCPW expand CMMS throughout Public Works ($100k per year consultant cost for a total of $300k consultant cost)

2018–2021 - $60k per year in software/IT cost

G. Benefits/Estimated Savings

- Reduced costs of data retrieval
- More comprehensive data for operational and CIP planning
- Improved coordination between divisions
- Improved staff productivity
- Better leverage existing systems, data warehousing, and improvements to application requirements

H. Ease of Implementation, Constraints or Barriers

- Careful sequencing and organization for this work will be required, because of the many applications, varied system support and application staff, and system integration complexities. The AM Program Office will oversee this improvement initiative.

Table 2-5. Improvement Initiative 3

Asset Management Best Practice Roadmap

Improvement Initiative 3 –Asset Registry and Mapping Needs

A. Objective

Need to map all appropriate assets and major types of asset failures (e.g., leaks and breaks).

B. Background for Improvement Initiative

Public works agencies need GIS capabilities to quickly identify the location of assets and analyze asset performance over time, using geographic data that captures asset attributes (e.g., asset type, installation date, material, and failure history).

C. Business Drivers for Improvement Initiative

DCPW has a solid but underdeveloped GIS for Water, Wastewater, Roads, and Stormwater. Asset failures and types are not all available in GIS.

Staff need better data and better maps to assess asset failure risks, failure consequences, and improve operational and CIP planning.

D. Preliminary Scope

1. Identify data requirements for Water, Wastewater, Roads, Fleet, Facilities, and Stormwater
2. Identify data sources
3. Develop data gathering plan for missing data
4. Collect missing data
5. Create maps

E. Implementation Priority and Timeline

Priority – High

Timeline – 2017–2019

F. Estimate of Resources Required

2017 –Requirements analysis and training ($20k one-time consultant cost)

2018-2021 – One additional engineering technician ($70k per year cost)

G. Benefits/Estimated Savings

- Comprehensive inventory of DCPW asset hierarchy, assets, and respective locations
- Increased operational efficiency (time required to locate assets)
- Increased ability to identify failed assets and causes of failure
- Increased ability to identify the correct solution to an asset failure

H. Ease of Implementation, Constraints or Barriers

- Moderately difficult - data availability; ability to hire one additional engineering technician. Adapt and use ArcGIS Solution Templates where possible.

Table 2-6. Improvement Initiative 4

Asset Management Best Practice Roadmap

Improvement Initiative 4 – Standard Operating Procedures for O&M

A. Objective

Develop and document SOPs for O&M work processes to ensure consistency of how work is performed, to capture legacy knowledge, and to train new staff.

B. Background for Improvement Initiative

DCPW currently conducts most of their processes informally, and documentation is inconsistent. There is a recognized need for the development and documentation of SOPs to support staff in completing their work tasks.

C. Business Drivers for Improvement Initiative

- Value for money/resource efficiency
- Aging infrastructure
- Knowledge loss
- Transparency
- Business performance improvement requirements
- Regulatory compliance
- Asset failure risk
- Increase maintenance efficiency
- Optimize operations

D. Preliminary Scope

1. Obtain templates from other organizations and/industries to support SOP development
2. Establish a multiyear work plan for creating SOPS
3. Execute work plan with staff involvement (with assign staff to develop SOPs)

E. Implementation Priority and Timeline

Priority – Medium

Timeline – 2018–2021

F. Estimate of Resources Required

2018-2021 - DCPW staff (half time; $30k per year internal cost)

2018- Train and support DCPW staff ($40k one-time consultant cost)

G. Benefits/Estimated Savings

- Improved consistency of work with DCPW requirements
- Increased knowledge retention
- Reduced risk of asset failures
- Improved business performance
- Improved regulatory compliance
- Increased efficiency and effectiveness in O&M

H. Ease of Implementation, Constraints or Barriers

- Moderate – requires an ongoing commitment of existing administrative resources and the AM Program Office.

Table 2-7. Improvement Initiative 5

Asset Management Best Practice Roadmap

Improvement Initiative 5 – O&M Prioritization Criteria

A. Objective

Develop consistent processes and tools for the identification, development, prioritization, and implementation of O&M across all asset types and service areas based on repair and replacement (R&R), expansion, regulatory, technology, and customer service needs and requirements. Implement process and perform prioritization.

B. Background for Improvement Initiative

DCPW lacks written SOPs for many working activities.

C. Business Drivers for Improvement Initiative

- Value for money/resource efficiency
- Aging infrastructure
- Regulatory requirements
- Transparency
- Reduce the risk and consequence of asset failure
- Customer service

D. Preliminary Scope

1. Identify appropriate O&M prioritization criteria for each function performed by DCPW (Water, Wastewater, Stormwater, Fleets, Roads, and Buildings) using examples from other organizations
2. Train staff on the use of new prioritization criteria
3. Implement new criteria in new enterprise systems if available or in existing systems until new systems are available

E. Implementation Priority and Timeline

Priority – Medium

Timeline – 2018 - 2019

F. Estimate of Resources Required

2019 — Training and support ($20k one-time consultant cost), staff training time ($10k one-time internal cost)

G. Benefits/Estimated Savings

- Improved decision making
- A reduction of the annual O&M budget due to improved prioritization
- Completion of needed O&M tasks on schedule
- Improved customer service

H. Ease of Implementation, Constraints or Barriers

- Difficult – requires an ongoing commitment of resources.

Table 2-8. Improvement Initiative 6

Asset Management Best Practice Roadmap

Improvement Initiative 6 – Performance Measures

A. Objective

To provide a framework, process, targets, and accountabilities for a greater performance focus in DCPW. Continued development and implementation of a performance and accountability system that captures key metrics and targets; links to LOS and the Strategic Plan, risk management plan and mitigations; incorporates operational/organizational measures; is tied to the budget and regular reporting; and establishes accountabilities throughout all work groups. An overall integrated performance and accountability process will be established. Develop the functional and technical requirements and workflow for a quality management and audit system that ensures all work performed around the asset life cycle is of high quality and meets desired standards.

B. Background for Improvement Initiative

DCPW operates with an informal performance and accountability process. However, application of a more formal set of performance and accountability processes and cascading accountabilities, with clear targets and measurement of results is needed to effectively measure progress in implementing DCPW's Strategic Plan and action plans, as well as to better report on organizational performance and accountability. This also represents a commitment to a continual improvement process, is connected to customer and environmental LOS, and is integral to a culture of high performance and employee engagement.

C. Business Drivers for Improvement Initiative

- Levels of customer and environmental service
- Value for money/resource efficiency
- Aging infrastructure
- Knowledge loss
- Transparency
- Business performance improvement requirements

D. Preliminary Scope

1. Identify appropriate KPIs for DCPW core functions using examples from other organizations
2. Develop tools to collect and report KPIs at least monthly
3. Identify data sources for KPIs and staff to maintain reporting tool

E. Implementation Priority and Timeline

Priority – Medium

Timeline – 2018–2021

F. Estimate of Resources Required

2017 – Consultant support with Scope Items 1–3 ($25k one-time consultant cost), DCPW internal support ($15k one-time internal cost)

2018–2021 – DCPW staff time (25% of time; $15k per year internal cost)

G. Benefits/Estimated Savings

- Clear targets and accountability
- Internal and external reporting
- Greater focus on biggest issues; prompt issue resolution
- Improved public and staff engagement
- Ability to manage cost, risk, and LOS trade-offs

H. Ease of Implementation, Constraints or Barriers

- DCPW internal support and administrative staff resourcing for this improvement initiative may be difficult based on ongoing work and competing improvement initiatives.

Table 2-9. Improvement Initiative 7

Asset Management Best Practice Roadmap

Improvement Initiative 7 – Condition Assessments/Asset Risk Scoring

A. Objective

Teach and train DCPW staff to conduct condition assessments of systems assets and to implement a methodology and tool(s) to risk score assets based on risk and consequence of failure.

B. Background for Improvement Initiative

Like most public works agencies in the United States, the DCPW risk management strategy is built primarily on assuring that it is adequately insured, that risks of asset failures are minimized, that future infrastructure needs are met, and that employees work safely. Some utilities in the United States (and many in Australia, the United Kingdom, and other countries) have developed and implemented more holistic and refined risk management plans. DCPW has begun to consider risk management as a major AM principle. There are opportunities for improvement in maintenance practices, including more effective use of the CMMS and the completion of full condition assessments.

C. Business Drivers for Improvement Initiative

- Regulatory compliance
- Aging infrastructure
- Affordability constraints
- Capital expenditure reduction
- Asset failure risk
- Long term asset planning
- Levels of service
- Transparency
- External risks (e.g., potential for an economic downturn, financial affordability, and reputation)
- Risks associated with natural disasters
- Increase maintenance efficiency
- Optimize investments
- Develop a more robust CIP

D. Preliminary Scope

1. Identify appropriate tool for creating and maintaining asset risk scores
2. Conduct pilot project to risk score a subset of assets (e.g., wastewater pump station assets)
3. Teach and train DCPW staff to perform condition assessments and risk score assets
4. Expand pilot to other asset classes

E. Implementation Priority and Timeline

Priority – Medium

Timeline – 2018–2021

F. Estimate of Resources Required

2018 – Training and support ($30k one-time consultant cost) and four DCPW field staff to participate in Scope Items 1–4 (50% time for 6 months; $120k one-time internal cost)

No ongoing O&M support required if an AM Program Office is adequately staffed

G. Benefits/Estimated Savings

- Optimized use of budget by prioritizing spending based on risk
- Improved O&M efficiency
- Increased asset reliability by promoting proactive maintenance
- Consistent and transparent prioritization methodology for work, resource, and budget allocation
- Prevention of major, costly failures

Table 2-9. Improvement Initiative 7
Asset Management Best Practice Roadmap

Improvement Initiative 7 – Condition Assessments/Asset Risk Scoring	
	• More effective and productive decision making, transparent and consistent decisions • Reduced overall asset, operational and management, and corporate risk • Efficiencies in identifying the risks and consequences of asset failures • Increased ability to focus resources on highest risk assets • Greater confidence in the outputs of asset risk assessment tools • Reduced cost of ownership • Reduced infrastructure condition deficit • Clear link between decision making and LOS • Identification of level of risk tolerance • Eliminated or deferred CIP • Eliminated maintenance tasks

H. Ease of Implementation, Constraints or Barriers

- Requires asset register and accurate asset data that may not initially be available.
- Inclusion of different levels of staff across the organization.
- Risk assessment methodology and strategies will need to be developed in conjunction with key members of the management, engineering, and O&M staff.
- Resourcing for this improvement initiative may be difficult based on ongoing work and competing improvement initiatives.
- Defining requirements will take careful thought and coordination.
- Defining risks, assessing the risks and consequence of each, and developing mitigation strategies will be time consuming.

Table 2-10. Improvement Initiative 8

Asset Management Best Practice Roadmap

Improvement Initiative 8 – Plan Review Efficiencies

A. Objective

Increase efficiency of the process to review developers' plans.

B. Background for Improvement Initiative

Currently 3 or more DCPW managers review developer plans for several hours a week. These individuals have other pressing duties, and initial plan review is not an effective use of their time. This initiative will outsource initial plan reviews to a consulting firm, and leave final approval to DCPW.

C. Business Drivers for Improvement Initiative

- Efficiency
- Take advantage of the specialized skills that consulting firms offer

D. Preliminary Scope

1. Identify and select a firm or firms to perform initial plan reviews

E. Implementation Priority and Timeline

Priority – High

Timeline – 2017–2018

F. Estimate of Resources Required

2017-2021 - 25% of a DCPW senior staff time equivalent ($25K per year internal cost)

G. Benefits/Estimated Savings

- More accurate and timely plan reviews
- Savings of 4 to 6 hours of DCPW manager time per plan (conservative estimate)

H. Ease of Implementation, Constraints or Barriers

- Easy to implement, requires modification and adoption of fee schedule.

2.3 Strategic Roadmap

A draft implementation Roadmap has been developed that considers overall phasing of improvement initiatives identified for Strategy, Process, People, and Technology building blocks for DCPW.

The first phase of this DCPW AM assessment focuses on gaining an understanding of DCPW's current capabilities and competencies. Subsequent phases focus on the improvement initiatives required to move DCPW towards more mature AM practices.

In the short term, initiating an AM Program Office will focus on developing a more strategic approach to the management of assets. The governance structure, development of AM champions, and communication efforts also provide a shared understanding of DCPW's approach to the management of assets. The implementation of High-priority IT and Asset Registry and Mapping improvement initiatives will enable DCPW to immediately start addressing the lack of accessible, reliable, and authoritative information on its assets.

To facilitate the successful delivery of these improvement initiatives, one of the first tasks will be to agree on the appropriate governance structure and processes that will manage and guide the implementation of the improvement initiatives. This is key for moving forward.

An overview Roadmap detailing the initiatives is provided on Figure 2-1. The initiative priorities and dependencies are listed in Table 2-11.

Initiative	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
AM Program Office	→	→	→	→	→
High-priority IT Initiatives	→	→	→	→	→
Asset Registry and Mapping Needs		→	→		
Standard Operating Procedures for O&M		→	→	→	
O&M Prioritization Criteria		→	→		
Performance Measures		→	→	→	→
Condition Assessments and Asset Risk Scoring		→			
Plan Review Efficiencies		→			

Figure 2-1. Overview of Roadmap Initiatives

Table 2-11. Improvement Initiative dependencies and priorities
Asset Management Best Practice Roadmap

Initiative #	Description	Dependencies	Priority
1	AM Program Office	None. The AM Program Office is necessary to support the implementation of all other initiatives.	High
2	High Priority IT Initiatives	Partially dependent on #1. This initiative is critical to accumulating data that will support efficiency improvements, CIP planning and performance reporting.	High
3	Asset Registry and Mapping Needs	None	High
4	Standard Operating Procedures for O&M	None	Medium
5	O&M Prioritization Criteria	Partially Dependent on #1	Medium
6	Performance Measures	Partially Dependent on #1	Medium
7	Condition Assessments and Asset Risk Scoring	Partially Dependent on #1	Medium
8	Plan Review Efficiencies	None	High

2.4 Implementation Approach/Methodology

The Roadmap will continue to guide overall implementation of leading practices within DCPW. Success will be ensured by attention to the following implementation concepts:

1. **Project Management** – creation of a team to manage implementation of improvement initiatives where the focus is on resources, scope, schedule, and budget.
2. **Leading Change** – ensuring new concepts and practices are fully understood and embraced by DCPW.
3. **Communications** – ensuring that the appropriate messages and communications methods are used to inform all stakeholders on a timely basis regarding DCPW AM.
4. **Team-based Approach** – maximize benefits, integration into existing operations, and effectiveness, while minimizing disruption to ongoing operations.
5. **Performance Tracking** – documenting and responding to KPIs will support benefits realized from the improvement initiatives as well as the overall improvement of organizational capabilities and capacity.
6. **Knowledge Transfer** – between and to DCPW staff to ensure sustainability of concepts and practices.
7. **Quality Control and Quality Assurance** – implementing a good quality assurance process to create good deliverables and eliminate the risk of substandard work and loss of buy-in from staff.
8. **Managing Disruption to Ongoing Operations** – managing improvement initiatives so they are not disruptive to the organization especially if the goal of using in-house resources and knowledge transfer are to be achieved. This must be carefully managed in terms of planning and logistics. At times, it may be necessary to adjust the schedule to accommodate ongoing business.

2.5 Program Costs

Table 2-12 shows the improvement initiatives budget by year for 2017–2021; the budget includes capital and internal costs.

Table 2-12. Asset Management Roadmap Budget
Asset Management Best Practice Roadmap

Initiative		FY 2017 ($)	FY 2018 ($)	FY 2019 ($)	FY 2020 ($)	FY 2021 ($)	TOTAL ($)
AM Program Office	Consultants	-	-	-	-	-	-
	Staff – New						
	Program Mgr.	110,000	110,000	110,000	110,000	110,000	550,000
	Engineering Tech	70,000	70,000	70,000	70,000	70,000	350,000
	Engineering Tech	-	70,000	70,000	70,000	70,000	280,000
	Analyst	100,000	100,000	100,000	100,000	100,000	500,000
	Initiative Total	**280,000**	**350,000**	**350,000**	**350,000**	**350,000**	**1,680,000**
High Priority IT Initiatives	Consultants	75,000	150,000	100,000	100,000	100,000	525,000
	Staff – Internal						-
	Software/IT		60,000	60,000	60,000	60,000	240,000
	Initiative Total	**75,000**	**210,000**	**160,000**	**160,000**	**160,000**	**765,000**
Immediate Mapping Needs[a]	Consultants	20,000	-	-	-	-	20,000
	Staff – Internal						-
	Initiative Total	**20,000**	**-**	**-**	**-**	**-**	**20,000**
Standard Operating Procedures for O&M	Consultants		40,000	-	-	-	40,000
	Staff – Internal		30,000	30,000	30,000	30,000	120,000
	Initiative Total	**-**	**70,000**	**30,000**	**30,000**	**30,000**	**160,000**
O&M Prioritization Criteria	Consultants	-	-	20,000	-	-	20,000
	Staff – Internal	-	-	10,000	-	-	10,000
	Initiative Total	**-**	**-**	**30,000**	**-**	**-**	**30,000**
Performance Measures	Consultants	25,000	-	-	-	-	25,000
	Staff – Internal	15,000	15,000	15,000	15,000	15,000	75,000
	Initiative Total	**40,000**	**15,000**	**15,000**	**15,000**	**15,000**	**100,000**
Condition Assessments and Asset Risk Scoring[b]	Consultants	-	30,000	-	-	-	30,000
	Staff – Internal	-	120,000	-	-	-	120,000
	Initiative Total	**-**	**150,000**	**-**	**-**	**-**	**150,000**
Plan Review Efficiencies	Consultants	25,000	25,000	25,000	25,000	25,000	125,000
	Staff – Internal						-
	Initiative Total	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**	**125,000**
Total Program Cost	Consultants	145,000	245,000	145,000	125,000	125,000	785,000
	Staff – Internal	15,000	165,000	55,000	45,000	45,000	325,000
	Staff – New	280,000	350,000	350,000	350,000	350,000	1,680,000
	Software/IT	-	60,000	60,000	60,000	60,000	240,000
	Initiative Total	**440,000**	**820,000**	**610,000**	**580,000**	**580,000**	**3,030,000**

[a] Immediate mapping need initiative requires an Engineering technician.

[b] Condition Assessments and Asset Risk Scoring requires existing operator staff time to complete.

Summary and Recommendations

Based on the results of this assessment, DCPW is similar to many other public works departments across North America, where the focus has often been on the operational elements of AM. Strategic elements, such as better definition of LOS, are less well progressed because there is often an underlying assumption that staff are operating the assets to provide a LOS that meets the needs of the community. However, as the asset base continues to deteriorate and municipal organizations are being asked to provide a more robust case for funding requests, there is a need to obtain a better understanding of the linkages between investment and customer outcomes, either with regard to maintaining or improving service.

CH2M identified eight improvement initiatives focused on achieving successful implementation of the AM program and realizing its associated benefits. Success is measured by DCPW's improved ability to have more informed discussions with customers and adequately communicate future investment needs in a way that is meaningful to all stakeholders.

CH2M recommends that these improvement initiatives (1) be implemented as soon as possible and (2) that the improvement initiatives be addressed in the sequence set out in this Roadmap.

Appendix A
List of Staff Interview Participants

APPENDIX A

List of Staff Interview Participants

- RUSCHMEYER, CARL
- BRIDGES, NANCY
- SCHMIDT, NIKKI
- LEEPER, VERONICA
- MCCOY, MONA
- BAER, COLLEEN
- OAKDEN, CHRIS
- RADTKE, GLEN
- NADLER, NICHOLAS
- FORSYTH, DAVID A
- HERNANDEZ, MARIO
- HUFF, KEVIN A
- NAVARRETE, MANUEL
- PORCARI, BRIAN
- DAVIES, MICHAEL V
- MANZANO, VICTOR
- WEFERLING, DUANE
- KINSER, AUSTON
- LOUNSBURY, MATTHEW
- MACALUSO, DOMINICK
- MELANDOW, GREG
- REED, JR, BRETT E
- RIPPE, STEPHEN
- TAFLIN, THOMAS
- DE TURK, TIMOTHY
- MORAN, MARK
- FLYNT, TODD
- CAMP, ALLEN
- ERB, JON
- ROMAN, RONALD J
- CHARLES, NICHOLAS
- MCGEE, SHERRI
- RICHARDSON, MATTHEW
- SCHMIDT, ERIC
- NILSSEN, ERIK
- WALKER, COURTNEY
- LANG, WENDY
- KIDD, KATHY JO
- CHIEFFO, CAROLINE
- MACDONNELL, HEATHER

Appendix B
CAMRA Maturity Descriptors

Comprehensive Asset Management Review and Assessment Maturity Descriptors

	Theme	Score Descriptors				
		1	2	3	4	5
1	**Overall Strategic Planning**	The Dept. does not have short or long term business plans. Staff have had no involvement or input into the development of Strategic Plans, Council Priorities, Administrative Leadership, etc.	The Dept. is in the process of developing short and long term business plans, but the Dept. Management Team only provides limited input to the production of Strategic Plans and there is no process in pace to enable input from staff other than the Management Team. Front line staff cannot relate their activities to the key priorities detailed in the Strategic Plan.	The Dept. has short and long term business plans in place and these are used by the Dept. Management Team to provide input to the production of Strategic Plans. There is some involvement from staff other than the managers in the development of these plans. Limited sections of the Dept. can see how they contribute towards the strategic direction.	Short and long term Business Plans are in place and these are used by the Dept. Management Team to provide input to the production of Strategic Plans. The Business Plans are in the process of being implemented, and progress is tracked regularly. There has been opportunity for staff representation from all levels in the Dept. to be involved in the process and the resultant plans, once agreed, are made available to all levels of the Dept. There is a clear 'line of sight' between the Strategic Plan and the Dept. activities.	The Business Planning Process is part of business as usual. Dept. staff are able to contribute to the process and influence the Dept.'s short and long term business plans. The strategic plans have been communicated to all staff and everyone understands how they contribute to both the Dept.'s plans and Strategic Plans. Dept. plans are clearly influencing the Strategic Plans. Reporting against Dept. and Strategic Plans is communicated on a regular basis to all levels of staff.
2	**Performance Measurement and Reporting**	The Dept. does not have a comprehensive suite of performance measures in place and for any measures currently in place (goals, objectives and KPI's); these are not linked to the Strategic Goals and Objectives – Council Priorities, or longer term strategies.	The Dept. is in the process of developing a comprehensive suite of goals, objectives and KPIs that are derived from and are consistent with the Strategic Goals and Objectives.	The Dept. has in place goals, objectives and KPI's are generally derived from, and are generally consistent, with the Strategic Goals and Objectives, but there remain gaps.	The Dept.'s goals, objectives and KPI's are derived from, and are consistent with the Strategic Goals and Objectives. These are cascaded down from Council, to the City, to the Dept. Business Plan and form part of team and, where appropriate, personal objectives. Clear targets are set for KPIs and there is monthly reporting (or as appropriate), with results communicated to all levels.	The Dept. regularly reviews its goals, objectives and KPI's to ensure alignment with the Strategic Goals and Objectives and where necessary aims to proactively influence City and other statutory requirements with a view to resetting targets.

	Theme	Score Descriptors				
		1	2	3	4	5
3	**Asset and Customer Levels of Service**	No documentation of either Customer or Asset levels of service exists, and therefore there is little or no consistent understanding of any gap in required level of service and provided level of service.	Customer levels of service are understood but not well documented. Some Asset levels of service and Operational Performance Indicators' (OPIs) are in place, but are not all documented or monitored on a regular basis and there is not always an obvious link between Customer levels of service, Asset levels of service and OPI's. Customer levels of service have not been presented to the public or the Council for comment/agreement.	Customer levels of service have been established, are well documented, and are described in business plans, but true costs (people and assets) of maintaining or improving levels of service is not understood. The linkage between Asset levels of service and OPI's is not well understood for all asset groups.	Customer levels of service are fully documented and publicly available. Asset levels of service and OPI's are documented for internal use and the link to Customer levels of service is largely understood, but still requires further data. The Dept. understands elements of the costs behind the current levels of service, but doesn't have detailed costs linked to either improving or declining the levels of service.	Periodic willingness to pay surveys are used to obtain customer and stakeholder involvement in the setting of the Customer levels of service. Historic cost and levels of service data are available to demonstrate the true cost of maintaining levels of service and or improving levels of service and this information is used as a basis for the development of Strategic Plans and justification of funding. The Dept. can demonstrate that they are managing the Asset levels of service with the optimum mix of Capex and Opex interventions and OPI's to meet the Customer levels of service.
4	**People Skills and Competencies Master Planning**	The Dept. has not considered the need for a people skills and competencies master planning aimed at setting out the short, medium and long term skills competencies requirements.	The Dept. has identified relevant skills and competencies for some key positions and has associated plans but this is generally ad-hoc and focuses on short term requirements.	The Dept. is in the process of creating a skills and competencies master plan covering the short, medium and long term requirements for its staff (taking into account new technologies and changing skill sets) although there may be limited staff involvement.	Dept. Management are clear on long term structures, roles, responsibilities, competencies and staffing numbers and a documented skills and competencies master plan is readily available. Strategy development has involved Dept. staff and has been communicated out to all staff. Recruitment and retention strategies have been developed with HR and are regularly reviewed.	Dept. Management actively incorporate the skills and competencies master plan into business planning activities and regularly review the plan in line with changing needs. Dept. staff and other Depts. are engaged when relevant to determine potential impacts and appropriate actions. The City is able to actively plan for new and/or changes to staff training requirements.
5	**Technology Assets Planning**	No documented IT Master Plan in place (either for all Enterprise solutions or asset management). There is a disjointed	An IT Master Plan for is under development, but is not widely publicized and does not have input from end users.	A documented IT Master Plan is in place, but has not been communicated widely and is only available to a limited number of staff.	A documented IT Master Plan is in place. The plan has involved a wide range of staff in its development and has been communicated to all relevant end	A well-documented and understood IT Master Plan is in place. This is consistently updated annually, or as required and ensures the most

	Theme	Score Descriptors				
		1	2	3	4	5
		and/or reactive approach to hardware and software needs.			users. Processes are in place for implementation and review of the plan, both on a periodic basis and based on feedback from end users.	appropriate mix of technology assets, with appropriate interfaces, and is in place to enable optimized practices. End users are actively engaged in managing technology assets and feedback enables the system to be optimized.
6	**Business Process Mapping and Procedures**	The Dept. does not have a planned approach to business process mapping and the production of Standard Operating Procedures (SOP). There is no documented plan in place for the completion or review and updating of processes and procedures.	The need to create a plan for the development/production of business process mapping, and SOPs are understood and agreed to, but there has been limited progress in this area.	A plan is being developed for carrying out business process mapping and for producing SOPs for all key activities and responsibilities for carrying out the work have been identified. The plan has not yet involved all relevant staff and has not been widely communicated.	A clear plan is in place which sets out the justification, detail and timeline for business process mapping and SOPs. The plan has involved a wide range of staff and the resultant plan has been communicated to the relevant staff. Clear roles and responsibilities have been agreed for implementing the plan. Where process maps have been completed, the relevant end users are given appropriate training and support and compliance with the process is monitored and reviewed.	A long term plan is in place identifying the need for revised or new business process mapping and SOPs and is under regular review. Staff are aware of the need to optimize business processes and procedures and highlight where in-efficiencies or organizational change are leading to processes and procedures requiring review, thereby enabling business process mapping to be driven both top down and bottom up. The asset management business process master plan is fully integrated into an overall business process master plan covering all business activities.
7	**Future Trends**	No understanding of how future demographic trends and growth will affect the asset base and associated service levels.	Some understanding of the effects of growth and future demographic trends but this is not fully documented and may exist only for certain asset groups.	Growth related assessments are carried out and documented by the Dept. showing 20yr+ projections (or to a time frame specific to the asset base) for demand and the impact on assets. Options and costs exist for closing the gap. No or only limited cross referencing has been carried out to the growth projections of other Depts.	Long term assessments have been carried out and costed. Other relevant Depts. or stakeholders are engaged in the assessment process and final assessments are reviewed to ensure consistency with those of other Depts. and alignment with City projections. Sensitivity analysis has been included for key asset groups including pessimistic and	Detailed modeling has been undertaken to assess the impact of projected demand increases and population movement, and an accurate assessment of the impact at asset levels can be made. The Dept. actively engages other Depts. and stakeholders to foster an integrated and shared approach to growth. This information is

	Theme	Score Descriptors				
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					optimistic scenarios. Long term growth plans shared with appropriate staff.	then used as the foundation for the common development of the Dept.'s plans.
8	**Asset Management Policy and Strategy**	The Dept has not considered the need for an Asset Management Policy and Strategy.	The Asset Management Policy and Strategy exist in draft form or are under development but do not align with the Strategic Plan and have not been signed off by Senior Management.	The Asset Management Policy and Strategy are documented and signed off Senior Management. However, the documents are not readily accessible or widely known and elements may be out of date or inconsistent with other Dept. policies. There may have only been limited involvement of the staff in the development of the documents.	The Asset Management Policy and Strategy have been developed with input from a range of staff and have received Senior Management sign off. The documents have been communicated to staff at all levels of the Dept. with management endorsement. The documents have been reviewed for consistency with other Dept. policies, and processes are in place for review and changes.	The approved Asset Management Policy and Strategy is regularly reviewed and updated to ensure continued alignment with the Dept. and City goals, objectives and practices. The documents are shared with stakeholders and other Depts. and actions taken to ensure an integrated approach where relevant.
9	**Asset Management Plans**	The Dept. has not considered the need for AMP.	The Dept has sufficient information to start to create the AMP, and plans are place for drafting the AMP. Or the AMP is in the process of being developed.	The Dept. has designated the responsibility for creation and management of the AMP, and it is well underway, but not complete. The clear linkages between the AMP and other strategies and documents are understood but have not been embedded in the AMP.	The AMP is in place and forms the basis for all asset improvements and interventions. Progress is reviewed annually, and targets are reviewed periodically. Key projects are progressing as detailed in the AMP. The AMP details how it supports delivery of City objectives and the interfaces with relevant City documents and strategies.	The AMP is widely understood and bought into by the Dept. The AMP is integrated with those of other Depts. to ensure an integrated approach to asset improvements. These are also reviewed to ensure continuous improvement.
10	**Legal, Regulatory and Statutory Requirements**	The Dept. has not considered the need to identify its current legal, regulatory and statutory requirements.	The Dept. identifies its current legal, regulatory and statutory requirements but this is done in an ad hoc manner in the absence of a procedure, and the information is not always communicated in a timely manner or to the right people.	The Dept. has procedures and assigned accountabilities for the identification of its current legal, regulatory and statutory requirements, but information is not kept up to date. An ad hoc approach exists for the identification of future legislation which may impact the asset base.	The Dept. has procedures and assigned accountabilities for the identification of its current and future legal, regulatory and statutory requirements, and the information is kept up to date and communicated to relevant Depts. and acted upon. Asset upgrades take into account future/potential legislation where appropriate.	The Dept. is proactive in considering and possibly influencing/challenging future laws and changing regulatory requirements, and their consequential impacts on its operations, based on a robust understanding of costs and other implementation factors. These form the basis for strategic planning and are communicated to relevant

	Theme	Score Descriptors				
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						Depts. and where appropriate incorporated into existing projects and asset changes.
11	**Business Continuity and Emergency Preparedness and Response**	The Dept. has not considered the need to identify key risks and plan for emergencies – either asset related or related to the failure of business critical processes.	The Dept is aware of the need to identify key risks and plan for emergencies and has some limited capabilities which have been developed in an ad hoc manner. There is no coordinated approach to risk identification or the planning of associated emergency response capabilities.	Dept. Management have identified key threats and have allocated appropriate roles and responsibilities for emergency preparedness and response. Plans are being developed to respond to these key emergencies although some aspects of the response may be disjointed across different Depts. or staff. Key elements of the plan are untested, and there may be low confidence that the plans can be carried out without significant ad hoc management.	A structured approach has been taken to identify key risks and appropriate Dept. staff and stakeholders have been involved. Emergency preparedness and response plans, including trigger levels for action, have been developed for key risks and consistently communicated to the appropriate staff. Exercises and tests have been carried out or are planned to test key aspects of the plans. Processes are in place to ensure that the outcomes of exercises and tests are fed back into the plans.	A comprehensive exercise and testing program is in place to test the integrated application of the plans. Formal processes are in place for the collation of feedback and for updating the plans as a result. Actual incidents and near misses are monitored within the Dept. and wider industry sector for lessons learned. Emergency preparedness and response planners are fully engaged in asset management decision making when relevant.
12	**Asset Registry**	No documented asset registry(s) and therefore it is not clear what assets are owned by the Dept.	The Dept. has some asset records although these may not be formally structured, located in different sources, and with significant gaps in coverage or accuracy. Records are created and maintained in an ad hoc manner.	The Dept. has developed formal asset registers although these may be in different formats for different asset classes and accessible by a limited number of staff. The asset registers are substantially complete but plans are in place to further improve data coverage and accuracy. There is a defined hierarchical registry structure in place.	The Dept. has one global asset register or several asset registers which are operated under a common framework, guidelines and management overview. The format of the asset register(s) has been re- viewed to ensure it meets asset management needs. The asset register(s) is fully populated, and processes are in place to update the asset data when the assets are modified. Access to the asset register(s) is freely available and accessible to all appropriate asset management staff.	One asset registry is in place for all assets and/or the Dept. asset register(s) are fully integrated into an asset register system or process. The updating of asset register data are monitored and actions are consistently taken to ensure that data accuracy and coverage is kept to a high standard.
13	**Asset Information**	Limited data, some of which is of unknown quality. No documented condition assessments in	Subjective condition ratings are recorded for 50 % of critical assets. Data collection is	Objective ratings (based on a Dept. standard) are in place for all critical assets. Subjective ratings used for remainder of	Objective ratings (based on an industry standard) are in place for all critical assets, condition assessment techniques by asset	Cost, performance, and failure data are captured at the appropriate level for asset management decision making,

	Theme	Score Descriptors				
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		place, costs not attributed to assets, no failure data.	generally ad hoc. Limited cost, performance and failure data has been captured.	assets. Some cost data are captured at a high level for asset groupings or geographical area. A basic process for performance and failure data capture is in place, but not fully populated. Improved data collection processes are being developed. Data are collected and managed down to the maintenance managed item for larger value assets only.	class are identified, and detailed assessments are being done where required. Robust cost (O&M), performance and failure data capture processes are in place for the critical/higher cost assets, at the appropriate level to allow cross Dept. comparisons and enable correct targeting of Capex or Opex interventions. Data are collected and managed down to the maintenance managed item for all assets.	and recorded data can fully support life cycle cost analysis. Robust failure modes and root cause data are captured consistently from the field at the appropriate level for asset management decision making. Data collection processes are regularly reviewed with regard to asset management planning requirements.
14	**Asset Knowledge (Analysis of Data)**	There is none or very limited analysis of collected asset data. Any analysis that is done is typically ad hoc, uncontrolled and not subject to any quality control procedures.	Some attempts have been made to conduct a formal analysis of existing asset data for the purposes of asset management decision making although these are typically incomplete or disjointed. Key asset knowledge requirements are understood and the Dept. is assessing how best to implement these.	The Dept. understands and has documented its key asset knowledge requirements and has determined how these should be addressed with their existing and/or developing asset registry and asset information systems and processes. The Dept. has allocated roles and responsibilities to collate the relevant asset information, analyze it and disseminate the results to the appropriate Dept. staff. Implementation of key analyses is underway.	Robust analysis processes are in place for all aspects of key asset information required for current asset management decision making. The Dept. can demonstrate and communicate cost, performance and failure profiles and trends for critical assets. In addition to actual failure data, processes are in place for predicting expected failure modes for all assets. Asset information is readily available to relevant Dept. staff and the sources of such information are adequately controlled to ensure the validity of information.	Plans are in place to improve existing data analysis capabilities to meet future asset management decision making requirements and to support optimized asset management. Analysis procedures and associated asset information is regularly reviewed for accuracy and benchmarked against external sources where appropriate.
15	**Document, Data and Information Control**	Data are not maintained and cannot be relied on. No program or processes in place for reviewing or updating data. No formal approach to document control in place.	Processes for data maintenance are being developed. Data maintenance is ongoing in certain areas of the Dept. Document control is practiced at the local level, but only limited	Data for critical assets is maintained and kept relevant. Process for asset data maintenance has been developed, but is only being applied to certain asset groups, or certain parts of the Dept. Document control at the Dept.	There is a program in place across all asset groups for periodic updating of data. The timetable is based on a fixed period. A process is in place for the maintenance of data. Specific confidence/accuracy grades assigned to asset data types. Action plans for data	Assets are reviewed and data updated on a periodic basis, with the time interval based on a robust statistical analysis. Action plans for continuous data improvements are well established and are being tracked. The Dept. has a process

	Theme	Score Descriptors				
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			processes exist to cover this area.	level is in the process of being implemented, but is not fully functional.	improvement are in place and being implemented. Fully document- ted process in place for document control. All staff have been trained in the approach and are working to current document versions only.	in place for the identification of archival asset management system documents, data and information retained for legal and/or knowledge preservation purposes.
16	**Business Applications**	Few or limited technology solutions are available for use by staff where there would be apparent gains from doing so.	Staff are aware of potential technology based efficiencies and are evaluating systems and/or experimenting. However, they are operating in separate groups and dealing with various vendors on a silo basis.	Staff have identified necessary systems and they are working with IT to implement and integrate them, but business processes and enablers are incomplete resulting in inefficient use of the applications.	All key business applications, where relevant and proven to be cost effective (e.g., CWMS, AMS, FIS, GIS, and SCADA), are in place to sup- port and optimize the business operations. Associated processes for the use of the systems are documented and are in use, along with procedures for their review. Clear ownership and system ad- ministration of all systems has been identified. Business applications are configured for asset management purposes as well as for core transactional purposes.	The efficiency and effectiveness of existing applications is regularly reviewed and improvement actions implemented. IT and representative Dept. staff actively seek out, jointly pilot and evaluate new technology solutions that could enhance productivity and effectiveness.
17	**Technology Systems Integration**	Limited technology and no integration – extensive use of paper or manual systems.	Use of standalone spreadsheet tools and databases, and any proprietary systems in use are generally unsupported or obsolete.	Stand-alone Commercial Off The Shelf systems are in place to support business processes, but are not integrated.	Systems integration is in place for key systems. But there are still areas where the optimum value is not being extracted from the data in the systems, or where the same data are input into several different systems.	A full Integrated technology solution in place and is under regular review – the concept of “data entered once and used many times” is in place.
18	**Capital Improvement Plans (CIP) - Development and Implementation**	There is a reactive approach to developing input for the CIP – projects are not objectively ranked but are predominantly promoted based on subjective representation of short	Dept. staff provide input on an annual basis to the CIP based on subjective judgments of asset condition – projects are typically not objectively ranked. No understanding of cost allocation for	A risk based approach is carried out for key assets or asset types to identify and prioritize the significant base maintenance elements of the CIP, but the CIP is still partly based on a split between Depts. Planning horizon is up to 10 years. Cost	A consistent approach to the justification and prioritization of competing projects is applied to the complete CIP program, and funding requirements are adjusted to suit the asset management needs. Costs are allocated to the correct purpose categories. The	A well-documented and robust risk based approach is applied to the maintenance elements of the CIP program, using an appropriate range of quantitative risk models, depending on the asset type. Capital maintenance

	Theme	Score Descriptors				
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		term needs (e.g., 1- to 2-year planning horizon). No BCEs are carried out.	projects. BCEs are only carried out for major projects and only limited numbers of staff are trained in their use.	allocation to purpose categories has not been fully implemented. Only high value elements of the CIP are driven by a rigorous understanding of asset need including risk measurements and root cause analysis. BCE training is underway and started to be used on all projects greater than a prescribed value.	CIP is driven by a rigorous understanding of asset need including risk measurements and root cause analysis. The asset need is clearly identified.	requirements are justified as opposed to being prioritized based on a defined funding level. The overall CIP is optimized to ensure that the best blend of projects is promoted to meet service and cost constraints. Project scopes are continually assessed throughout the governance process and whole life costs are reviewed to assess continued viability. There is a clear understanding of project need, scope, cost and deliverability.
19	**Risk Framework – Strategic Level and Asset Level**	No documented approach to the identification and management of risks in place.	Dept. Management are aware of key strategic risks that face the Dept. although these are not documented. Some of the higher risk assets have been notionally identified and some rudimentary risk assessments may be in place. All staff are aware of the need to further develop their risk assessment methodology.	Dept. Management have systematically identified key strategic risks and associated mitigations to be implemented within the Dept. For assets, staff typically use simplistic risk models (typically simple Excel work sheet models) to conduct the system level approach for critical asset groups. Linkage of these asset risk models to detailed mitigations is not fully understood. No processes exist to ensure that risk is monitored, and the risk profile is kept up to date.	Dept. Management have a robust risk identification, prioritization, and escalation process in place. Mitigations are communicated to appropriate Dept. staff for action, and progress is monitored at regular strategic risk reviews. The asset base is covered by bottom up/asset specific risk assessments that are linked to levels of service and are sufficiently granular for asset management decision making. Standardized Excel worksheets, or proprietary software is in use across the Dept. Processes are in place for the management of asset risks and for the identification of any changes to the risk profile. A high-level strategic risk review is also in place (e.g., strategic, financial, and people risks), but only may be reviewed informally.	The Dept. continuously assesses/reviews both its strategic/business risks and its asset related risks and there is a well defined and documented integrated approach to risk management. All critical assets have been defined and integrated risk mitigation strategies documented. Risk profiles are regularly and consistently reported, monitored and updated. Outputs from risk assessments are clearly linked to skills and training requirements. A common risk framework is used throughout the City.

	Theme	Score Descriptors				
		1	2	3	4	5
20	**Asset Management Leadership and Governance**	A short term approach to managing the assets takes precedence to a longer term sustainable approach. Resources are not made available to progress an asset management approach. No assessment of organizational effectiveness has been carried out.	The need to move towards a more planned environment is understood but resource or time limitations are restricting progress. No formal governance procedures in place with regard to asset management. There is only a limited understanding of organizational effectives and this may be for only specific groups within the Dept.	The Dept. Management team are agreed on a move towards adopting asset management tools and techniques. Some staff job descriptions include asset management responsibilities, and staff are encouraged to adopt new ways of working. Governance procedures are under development to capture formal decision making with regard to asset management.	Dept. Management actively encourage and support a move towards asset management good or best practice. Funding and resources are made available for the adoption of new processes and systems. Staff are engaged and empowered to progress towards good/best practice. Governance procedures are in place and operational. Processes are in place for Senior Management review of the Dept. approach to asset management.	Dept. Management are actively engaging other Depts. or external companies for sharing and adoption of new tools and techniques and encourage a continuous improvement environment. The right mix of centralized and decentralized (Dept.) asset management roles are in place, including governance procedures and they work effectively towards sustainable asset management.
21	**Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change**	Effects of change are not managed. Any changes to roles are not fully communicated to staff and therefore are not known or understood. This results in them being not accepted and not performed. Team has little initiative and requires full direction. No teamwork.	Roles are generally known and their nature understood, but, because of communication or cultural issues, are often not fully accepted and not fully performed. Duplication of roles exists in different job descriptions. Teams occasionally initiate work but follow through relies upon Dept. Management to clarify asset management vision and provide endorsement.	An assessment of organizational effectiveness has been carried out. Roles are typically known, understood and accepted and plans are in place which actively address communication and cultural issues. Teams periodically initiate work and are generally empowered to follow these through within their respective silos. There is evidence of some/sporadic team based planning, problem solving, decision making, conflict resolution and communication. Management style still tends to be directive.	RACI (Responsible, Accountable, Consulted, Informed) analysis is complete, and the output agreed upon and operational leading to roles being fully understood and accepted. This applies to both employees and relevant third parties. Teams regularly initiate work and are empowered to follow these through to conclusion with only some direct supervision and management. There is evidence of consistent team planning, problem solving, decision making, conflict resolution, communication and overall organizational effectiveness.	A robust change management system is in place with strong communication processes. Roles are understood, accepted and performed by all team members. Teams are empowered to make decisions and are fully accountable for work (management style is more coaching and facilitation). Teams plan, problem solve, make decisions, resolve conflicts and communicate effectively. Team charter is a guiding document.
22	**Learning and Development**	Training and development is prescribed and courses, where available, are part of the standard – No skills analysis has been done to	Skills gap is developed based on individual AM Job Descriptions. Skills gap analysis is mostly	The Dept. has an understanding of the core competencies required for key asset management staff and is basing its skills gap analysis on this. The	All asset management staff's training needs assessment has been done, and training is under way for all staff. There is a high degree of confidence that all staff	Asset management skills development is a continuous process with regular supervision and subordinate development sessions that provide input to

	Theme	Score Descriptors				
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		ensure that those responsible for the design, construction, operation and maintenance of assets are appropriately qualified.	incomplete and no training plans yet in place.	majority of the skills gap analysis is complete and training plans for key staff have been implemented. Short term training needs have generally been identified, but no longer are term development plans in place.	have (or will have) the right skills to do the job. Competency based role profiles exist for all staff. Development plans, aimed at the medium to long term are also in place. An asset management skills and knowledge matrix is in place.	the training program, ensuring skills gaps are filled. Skills are periodically assessed against external benchmarks.
23	**Communication and Information Sharing**	The Dept. has not considered the need to communicate asset management information to employees and stakeholders. There is limited and/or insufficient information available. The majority of information sharing is verbal.	Communication of asset management information is sporadic, ad hoc and inconsistent – the general feeling is that relevant information exists but is not available for those that would like to use it.	The Dept. is in the process of identifying what asset management information is required and by whom. Some information is shared, but there is no formal communication structure, and communication still tends to be top down. No formal version control of information.	Procedures are in place to ensure pertinent asset management Information is regularly communicated to and from employees and relevant stakeholders. However, there is room for improvement, and some potential to leverage technology tools further. Information is version controlled.	All employees and relevant stakeholders are well informed, have easy access to information through regular briefings and the use of technology assets. There is open, honest and all around communication in support of asset management.
24	**Continuous Improvement Culture**	Staff are not encouraged to try new ideas. Ad hoc initiatives occur usually when there is a failure with catastrophic or political consequences, but generally there is a status quo mentality. Little or no external benchmarking takes place.	Dept. Management are convinced of the benefits and recognize the need to encourage a continuous improvement culture at all levels of the organization and are in the process of developing plans to move towards this goal. Some benchmarking carried out but is typically not used to develop action plans for improvement.	Continuous improvement is publicly endorsed and encouraged by Dept. Management. Continuous improvement principles are embedded in key asset management processes. Key staff are familiar with the continuous improvement process, and a few initiatives have been identified and are being worked on. Periodic benchmarking is carried out and the output is used to develop action plans.	The Dept. has in place robust continuous improvement processes at all levels from senior management down to frontline staff. Senior management reinforce the continuous improvement agenda at regular opportunities. Dept. Management encourage the identification of new knowledge and demonstrates a commitment to implementation when potential benefit to the organization has been established. A formal scheme is in place and new ideas, when proven, are rewarded. Benchmarking is used appropriately, and the results are used to improve asset standards and ways of working.	Staff are fully engaged, and this is evidenced by the number of new ideas for improvement that are continuously brought forward. Asset management processes act as a catalyst to develop and implement recommendations for the continuous improvement of asset performance, reliability and overall cost effectiveness, resulting in optimal service delivery. The Dept. initiates benchmarking activities to continuously identify improvements.

	Theme	Score Descriptors				
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25	**Knowledge Retention and Succession Planning**	Dept. Management has not considered the need for a formal, forward looking approach to knowledge management and takes a reactive approach.	Succession planning is carried out for a limited number of staff, however, no strategies are in place to manage knowledge. Knowledge management is only carried out at a local level and on an ad hoc basis.	Potential retirees are identified and Dept. staff work with HR to identify potential successors and/or fill vacancies as they arise. A knowledge management system is under development.	Knowledge management strategies are documented and are in use by Dept. Management in partnership with HR. Robust succession planning is in place for all senior staff and there are robust processes to ensure continuity of people resources for critical asset management tasks.	The Dept. maintains a long term view of resourcing vulnerabilities and adopts appropriate strategies to mitigate these. Junior staff are actively coached and mentored by senior staff to ensure knowledge transfer. Technology systems are utilized to effectively capture pertinent information and to ensure efficient communication to successors and other relevant staff.
26	**Commercial Focus (O&M)**	The Dept. has not considered the need for testing alternative means of delivering services.	The Dept. has carried out limited 'right sourcing' assessments for certain operations or asset groups, but these are either out of date, or only apply to limited areas of the business.	The Dept. has examined the various 'right sourcing' options that might be relevant to its business and has an understanding of the issues and any asset management implications. Assessments are underway to determine the costs and benefits of these options, and a strategy is being developed. There has been limited staff involvement in the process.	The Dept. has conducted a full cost and benefit analysis of relevant 'right sourcing' options and has decided upon an appropriate strategy. The strategy is documented and takes full account of the asset management implications. The strategy has had appropriate involvement from a wide range of staff and the final document has been communicated to all relevant staff, roles and responsibilities have been allocated, and the strategy is being actively implemented. There is a customer service culture that acts as if it is operating in a competitive environment and constantly strives to improve customer service and reduce costs to retain its market share.	The costs and benefits of the 'right sourcing' strategy are actively monitored, reviewed and analyzed to determine if the strategy is realizing the forecasted benefits for the forecasted costs. Deviations from the strategy are reported to senior management. A process for strategy review exists and is triggered where appropriate. The Dept. maintains an outward look towards its industry sector to benchmark its strategy and performance against peers.

		Score Descriptors				
	Theme	**1**	**2**	**3**	**4**	**5**
27	**Commercial Focus (Project Delivery)**	The Dept. has not considered the need for testing alternative means of project delivery.	The Dept. has some/limited experience in the selection of alternative delivery methodologies, but these have largely been advanced as a result of individual preferences and approaches. No corporate wide approach exists.	A City wide approach is either still under development or is in place, but is yet to be rolled out across all departments. Larger projects are generally assessed with regard to alternative delivery approaches, but the process for all projects still needs to be implemented.	The Dept. has experience of a wide range of delivery mechanisms and applies a robust process to either individual projects or programs of work, aimed at selecting the optimum delivery approach (e.g., DBB, DB, and PPP). The processes in place take into account the value/and or complexity of the proposed projects. The Dept. has arrangements with its supply chain partners that a) ensures that partners are aligned with and incentivized to its objectives, b) enable innovation in the supply chain to be quickly and reliably adopted, and c) allow audit etc. as part of contract oversight.	Project delivery approaches are focused on attaining the best whole life cost solution. The process for selection of the project is well established and can be shown to be delivering benefits. The process is subject to regular review and continuously builds upon current national and international best practice.
28	**Capital Projects – planning, design and construction**	There are no documented processes for planning, design and construction activities. There is scope for each project to be approached differently.	The Dept. recognizes the need for processes and is in the process of drafting these. Some processes exist but they are not fully documented.	Processes exist but are not fully aligned or integrated across the relevant life cycle stages. Some projects still being initiated that have bypassed the process.	Documented processes exist covering all life cycle stages from feasibility to commissioning ensuring that fit for purpose assets are delivered within specified standards. Asset management design standards exist to guide new asset creation. Governance is in place to check projects (time, cost, quality) at all stages. Processes cover contract admin, project mgt, value eng etc. Project projections are accurate and up-to-date, and changes are identified early so that there is an opportunity to intervene and adjust.	All processes are fully integrated and are reviewed periodically through a continuous improvement process. Processes ensure that optimum maintainability and operability are built into the assets (e.g., HAZOPS). Projects are reviewed upon completion, and lessons learned are consistently incorporated into subsequent projects. All key players make the right contributions around the asset life cycle.

	Theme	Score Descriptors				
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29	**Operations Management**	No documented standard operating procedures, processes or work instructions. Poor operations practices and/or significantly different operations practices with potential to result in low asset availability, performance and high operating costs or presenting a safety risk.	Operators are generally qualified for tasks and typically follow common historical operating practices which may not be documented. There may be little interaction with maintenance or engineering staff. Dept. Management understand the need for standard operating procedures and a plan is being developed to generate these.	Standard operating procedures, manuals and task schedules are being developed, and operators are being required to follow these when introduced. The plan includes providing additional training where necessary. There is some interaction with maintenance or engineering staff, and this is being actively encouraged to share good practice. Some automation is in place, and this is incorporated into the standard operating procedures and task schedules.	Good operating processes and task schedules have been developed and are being carried out by operators with the aim of optimizing performance, quality and cost. Operators are fully engaged in the planning processes and full use of automated systems (e.g., SCADA) is incorporated into the processes and schedules. Comprehensive standard operating procedures, work instructions and O&M manuals exist for all key assets.	Best in class operating processes are being carried out by operators, and there is evidence that these are maximizing performance and quality at the lowest whole life cost. Operators take an active role in managing asset health, are engaged in the wider asset management system, and are undertaking forward projections regarding future changes to the asset life cycle. Full use of automated systems where appropriate.
30	**Maintenance Management**	Maintenance is carried out purely on a reactive basis, with no understanding of asset criticality and the associated risk exposure. No consideration has been given to developing the overall process for optimizing maintenance practices.	Proactive work is below 50%. Maintenance work orders are derived, but there is no in depth reporting in place. An assessment for determining the right mix of reactive to proactive maintenance has not been completed, or has been done previously, but is now considered outdated.	Proactive work is below 50%, but reports are being designed to identify performance trends. A criticality assessment has been carried out, and a risk based approach is in the process of being implemented to set maintenance intervals for critical assets, but manufacturers' data are being used for many of the assets.	Proactive work is at 70% to 75%. Reports are generated to identify performance trends. Maintenance intervals are a mix of risk based and manufacturer recommendations. Maintenance intervals are adjusted to enable tasks to be grouped. There is a clear understanding and justification for which is the appropriate maintenance regime for each asset.	Proactive work is between 75% and 85%. Reports are generated to identify performance trends. Root cause analysis is performed to identify the biggest problems. CWMS is appropriately leveraged. Advanced maintenance practices being used for the highest criticality assets.
31	**Materials Management**	No documented materials management process is in place for in house stores. No or only a few tailored agreements for purchasing.	Work orders contain material lists. Availability of critical spares cannot be guaranteed. Tailored purchasing agreements in place for <50% of outsourced materials.	Inventory requirements are used in planning and scheduling of work. Inventory balances are 80% accurate. Risk based approach to stock and spares control is being developed. Contacts are in place for the majority of outsourced components although there is	90% plus stock is identified and put into CWMS. Inventory balances are 90% accurate. Stock keeper applies min/max reorder points, based on a risk based approach incorporating asset criticality. Up to date purchasing agreements in place.	Work order generated pick lists and procurement system ensures all materials are available for scheduled work. Inventory balances are 90% plus accurate. Replenishing is automated and based on completed work orders. Stores levels are optimized based on a risk/criticality based approach.

	Theme	Score Descriptors				
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				evidence that some are out of date and no longer appropriate.		Purchasing agreements are reviewed on a regular basis and are optimized across Depts.
32	**Financial Budgeting**	Opex budgeting is carried out on a top down/historical basis, with no clear definition of growth or efficiency components. Capex is allocated on a historic basis, but can be subject to 'top slicing'. No documented processes exist for the allocation of for Capex and Opex.	Processes exist for the creation of Capex and Opex budgets but are not always followed and finance can be allocated outside of the formal process. Sections of the Opex budget can be justified based on historical spending.	Certain elements of the Opex budget are zero based. Processes are in place for the allocation of Capex and Opex budgets.	New Opex and any efficiency savings are clearly identified. The Capex and Opex budgeting process is transparent. A process is in place for the allocation of new Opex (associated with Capital projects or increased levels of service). Capex is allocated against agreed project outputs.	Flexibility exists within budgets to choose Opex or Capex interventions, based on the best whole life cost. The whole Opex budget is zero based and is created with input from all levels of staff.
33	**Financial Reporting**	No processes in place to assist in the in preparation of reporting. Data source is not necessarily reliable or data cannot be confirmed to be current.	Processes are ad hoc and generally are not documented. Data for reporting is collected and maintained separately to that held in the asset register	Processes are being developed, updated and documented. Where possible, data are extracted from existing systems. Updating data are carried out periodically rather than being part of a sustainable process, and the accuracy of data cannot consistently be guaranteed.	Robust processes are in place for carrying out asset valuations, determining remaining assets lives, capturing in service dates and asset betterment data. Processes cover asset additions, improvements and decommissioned/out of service assets.	Updating asset financial information and processes for updating the asset register are carried out routinely as part of other asset management functions. Data are readily available. Depreciation approaches are used that are appropriate to the asset class. Processes are reviewed periodically to ensure that the most efficient approach to compliance is in use.
34	**Optimized Asset Interventions**	Whole life costing is not used to determine appropriate asset interventions. Replacement of life expired assets is predominantly Capex focused.	Some whole life costing related issues are considered but this is done in ad hoc manner and is not part of a defined process. Life cycle replacement periods are still largely based on condition of assets and/or	Whole life costing approaches are utilized for assessment of Capex interventions options on certain large/priority projects, but assessments of associated Opex costs are typically high level only and no link exists to the Opex budget. Some documented processes exist but may be inconsistent or not	Processes are in place for making optimized asset renewal and replacement decisions, including both Capex and Opex Interventions. Intervention selection is driven by robust whole life costing (optimum replacement option) approaches, with all asset life cycle costs included in the analysis. Life cycle costing	A consistent approach to whole life costing is adopted. Standardized use of discount factors (H, M and L %) are in place. Senior management has fully bought into selecting options based on the lowest whole life costing, even if this results in higher initial Capex. Opex is made available where

	Theme	Score Descriptors				
		1	2	3	4	5
			perceived risks to service delivery.	consistently applied. Discount rates may vary depending on user.	(optimum replacement period) is based on a sound knowledge of asset condition, performance and criticality. Decisions are based the best cost-benefit option at an acceptable level of residual risk. Decision-making processes promote system thinking and innovation and like-for-like replacement is not the only option.	an operational solution is shown to be the lowest whole life costing solution. Life cycle replacement periods defined through a consistent/robust approach.
35	**The Management System for Asset Management**	The Dept. has not considered the need to define the scope and limits of its asset management system.	Limited parts of the management system are in place but the scope and boundaries are undefined and/or unclear. No process exists for the maintenance and review of the system, and there is no clear ownership of the management system.	A general management system, including an asset management process flow has been defined, but this does not cover all activities, and aspects of the scope are still unclear. Processes are in place for the maintenance and review of parts of the management system.	The asset management system is in place, and scope and boundaries are well defined and understood. A specific asset management process flow has been defined that clearly sets out the scope, boundaries and internal interconnectivity. There is clear ownership of the management system and supporting processes are in place for its review and maintenance. Processes also exist that ensure the integrity and optimization of the management system (i.e., there are measures in place to gauge the effectiveness of the management system).	The management system is subject to periodic review and any linkages to other Depts. are monitored and reviewed to ensure that it is optimized. The management system is optimized to ensure that processes, systems, and people strategies are well aligned and integrated, both in terms of asset management and the wider business context.
36	**Asset Management Quality Assurance**	The Dept. has not considered the need for an asset management audit program.	The Dept. understands the need to link its audit program with its risk assessment and the results of previous audits and is in the process of developing an audit program.	The Dept. has established an audit program but it is not yet fully implemented and does not provide for the results of the audit to be fully communicated.	The Dept. can demonstrate that its audit program is based upon the results of previous audits, takes into account the results of risk assessments, and results are communicated to the appropriate staff. There is evidence that results are acted upon.	The Dept. is proactive in seeking input from relevant stakeholders in developing its audit program, and the audit process can be seen to be adding value.

Note:

BCE = business case evaluations

Appendix C
List of CAMRA Workshop Participants

APPENDIX C

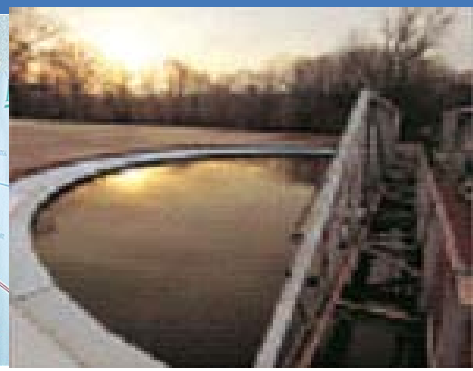
List of CAMRA Workshop Participants

- RUSCHMEYER, CARL
- OAKDEN, CHRIS
- DE TURK, TIMOTHY
- ERB, JON
- ROMAN, RONALD J
- CHARLES, NICHOLAS
- RICHARDSON, MATTHEW
- NILSSEN, ERIK

Appendix D
CAMRA Workshop Presentation

Asset Management Self Assessment Workshop



Douglas County Public Works
August 25, 2016

Ground Rules

- Turn cell off or put on vibrate
- Listen actively, respect others views
- Be patient – there is a lot cover and we won't be able to hear from everyone
- Raise your hand when you want to speak

Agenda

- Review of Objectives
- Conduct Self Assessment of AM Processes
  - Today focuses on where you are today
- Develop a desired state for the medium and long-term
  - We will do this tomorrow

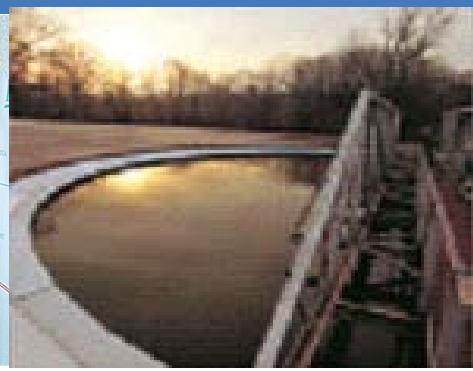
Objectives

- Today
  - Thoroughly assess DCPW's existing AM practices in four areas:
    - Strategy
    - People
    - Process
    - Technology
  - Listen to and consider ideas from other perspectives
  - Develop goals for where you want to be in the short, medium, and long term
  - Brainstorm strategies and initiatives to get you where you want to be

Seek consensus at all times!!

Strategy



Topic Areas - Strategy

- Asset and Customer Levels of Service
- Overall Strategic Planning
- Performance Measurement and Reporting
- People Skills and Competencies Master Planning
- Technology Assets Planning
- Business Process Mapping and Procedures
- Future Trends
- Asset Management Policy and Strategy

Topic Areas - Strategy

- Asset Management Plans
- Legal, Regulatory and Statutory Requirements
- Business Continuity and Emergency Preparedness and Response
- Risk Framework - Strategic Level and Asset Level

Investments in Strategy: What do they have to do with effective AM?

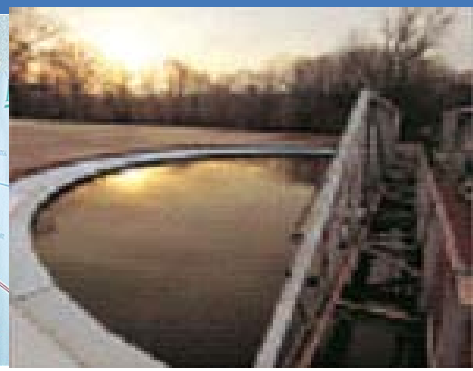
- Good strategy sets a clear direction for the organization, sets priorities and provides focus
- Well developed strategies assure that decision makers, customers and the organization are in agreement about priorities
- Well developed strategies provide a framework for managing in a changing environment and for responding to future risks
- Good strategies support, and are supported by, good asset management practices – you can't have one without the other

Questions to Consider- Strategy

- Does your Strategic Plan provide a clear, focused direction for the organization?
- Do you have customer levels of service measures defined for all your lines of business?
- Do have asset level of service measures for all your assets, especially critical assets?
- Do your performance measurement processes and reports adequately support continuous improvement?
- Is your budget adequately aligned with your asset management priorities?

Questions?

People



Topic Areas - People

- Asset Management Leadership and Governance
- Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change
- Learning and Development
- Communication and Information Sharing
- Continuous Improvement Culture
- Knowledge Retention and Succession Planning

Investments in People: What do they have to do with effective AM?

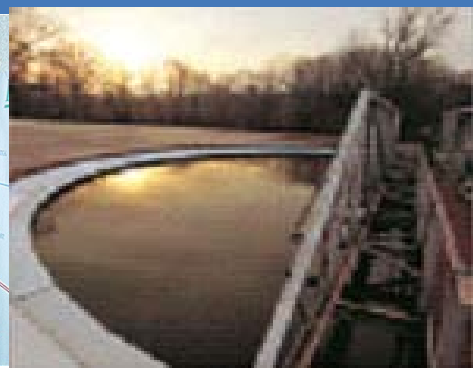
- Improved efficiency
- Successful knowledge capture
- Improved alignment, better engagement
- Improved communication
- Increased employee satisfaction and retention

Questions to Consider - People

- Is your asset management governance structure effective at setting and driving the organization's asset management program?
- To what extent do you have processes and procedures for effectively managing human resources?
  - Training
  - Performance management/performance reviews
  - Classification and compensation
- What succession plans are in place in your agency? What do you do to ensure the successor is up to speed?
- To what extent do you have processes and procedures for managing and implementing technological, operational, and other asset management related changes?
- Do you carry out regular staff surveys? To what extent do you involve line staff in process improvements?
- Are your human resource functions adequately resourced?

Questions?

Process



Topic Areas - Process

- Optimization of O&M Delivery
- Optimization of Project Delivery (CIP)
- Capital Projects - Planning, Design, and Construction
- Capital Improvement Plans (CIP) -Development and Implementation
- Operations Management
- Maintenance Management
- Materials Management

Topic Areas - Process

- Financial - Budgeting and Rate Setting
- Financial Reporting
- Optimized Asset Interventions
- The Management System for Asset Management
- Asset Management Quality Assurance

Investments in Process: What do they have to do with effective AM?

- Optimized asset lifecycles at least cost
- Optimized timing of investments
- Biggest bang for the dollar
- Reduced risk
- Consistency and repeatability
- Immediate access to the right data
- Improved communications

Questions to Consider - Process

- To what extent to do you have processes for optimizing O&M activities and investments?
- To what extent do you have processes and procedures to ensure the documentation of the strategies, plans, budgets, schedules and responsibilities for asset acquisition, operations, performance, maintenance, etc.?
- To what extent do you have processes for ensuring that investments are optimally timed?
- To what extent do you have processes for ensuring that you have selected the optimal project alternative?

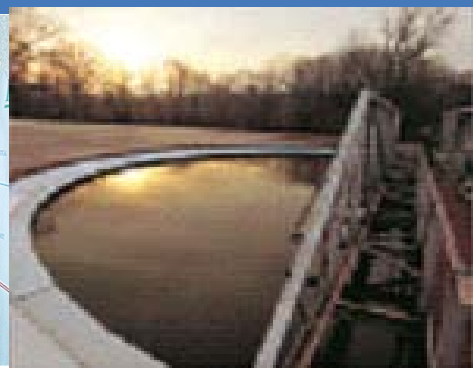
Questions to Consider - Process

- To what extent do you have standard procedures for capturing project data and information to be used in the capital program prioritization process, including capital cost, net present value, quantified risk value or score, benefit cost ratio, or assessment of contribution to corporate objectives or strategic value?

- To what extent do you have processes and procedures to audit process execution and assess compliance with processes and procedures and identify opportunities for improvement?

Questions?

Technology



Topic Areas - Technology

- Asset Registry
- Asset Information
- Asset Knowledge (Analysis of Data)
- Document, Data and Information Control
- Business Applications
- Technology Systems Integration

Investments in Technology: What do they have to do with effective AM?

- Effective asset management practices are data driven
- A complete asset registry is foundational to being able to monitor asset performance, identify and correct asset deficiencies, and plan and schedule work
- Highly integrated technology systems including GIS, FIS, CIS and LIMS support effective asset planning and management, financial management, customer service and regulatory needs

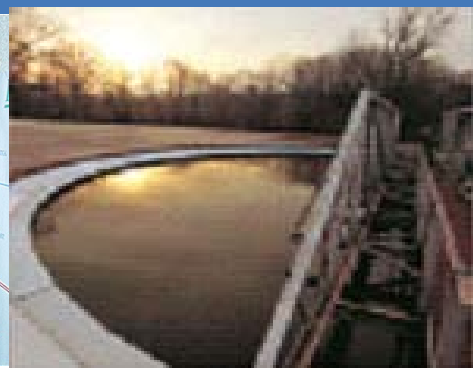
Questions to Consider - Technology

- Do you have a multi-year technology strategy (strategic plan) that reflects your organizations most critical priorities?
- Do you have a rigorous requirements process for determining application needs?
- Do you have a complete asset register that meets your asset management program needs?
- Do you collect the right data – and not too much but not too little?
- Do your existing business and operational systems meet your needs?
- Are your existing business and operational systems effectively integrated?
- Do you have a complete risk and consequence of failure profile for all of your assets, especially critical assets?

Questions?

Desired Future State



Agenda

- Focus for the next 6 months
- Focus during months 6-12
- Focus during months 12-18
- Next steps

Objectives

- Discuss the “ahas” from this morning
- Develop goals for where you want to be in the short, medium, and long term for each CAMRA category
- Brainstorm strategies and initiatives to get you where you want to be

Seek consensus at all times!!

Appendix E
CAMRA Workshop Results

Question #	Focus Area	Theme	Current	3-5 Years
1	Strategy	Overall Strategic Planning	2	3
2	Strategy	Performance Measurement and Reporting	2	4
3	Strategy	Asset and Customer Levels of Service	2.5	3
4	Strategy	People Skills and Competencies Master Planning	2	3
5	Strategy	Technology Assets Planning	1.5	4
6	Strategy	Business Process Mapping and Procedures	2	3
7	Strategy	Future Trends (Implications of Growth)	3	3
8	Strategy	Asset Management Policy and Strategy	2	4
9	Strategy	Asset Management Plans	2	4
10	Strategy	Legal, Regulatory and Statutory Requirements	3	3
11	Strategy	Business Continuity and Emergency Preparedness and Response	3	4
12	Technology	Asset Registry	2	4
13	Technology	Asset Information	1	3
14	Technology	Asset Knowledge (Analysis of Data)	1	3
15	Technology	Document, Data and Information Control	1	3
16	Technology	Business Applications	2	4
17	Technology	Technology Systems Integration	1	4
18	Technology	Capital Improvement Plans (CIP) -Development and Implementation	2.5	3
19	Technology	Risk Framework - Strategic Level and Asset Level	2	3
20	People	Asset Management Leadership and Governance	2.5	3
21	People	Roles and Responsibility Clarity, Empowerment and Teamwork, and Leading Change	3	3
22	People	Learning and Development	3	4
23	People	Communication and Information Sharing	3	4
24	People	Continuous Improvement Culture	2.5	3
25	People	Knowledge Retention and Succession Planning	2	3
26	People	Optimization of O&M Delivery	2	3
27	Process	Optimization of Project Delivery (CIP)	2.5	3
28	Process	Capital Projects - Planning, Design, and Construction	3	3
29	Process	Operations Management	2	3
30	Process	Maintenance Management	2.5	3
31	Process	Materials Management	2	4
32	Process	Financial - Budgeting and Rate Setting	3	3
33	Process	Financial Reporting	2.5	3
34	Process	Optimized Asset Interventions	1	3
35	Process	The Management System for Asset Management	2	4
36	Process	Asset Management Quality Assurance	1	3

Appendix F
Douglas County Public Works Improvement Initiatives

APPENDIX F

Douglas County Public Works Improvement Initiatives

Original Initiative	Final Initiative
Asset Management Program Office	Asset Management Program Office
IT Master Plan	High-priority IT Initiative
CMMS Implementation	
SCADA Integration	
Asset Mapping	Asset Registry and Mapping Needs
Failure Mapping	
Standard Operation Procedures	Standard Operation Procedures
O&M Prioritization	O&M Prioritization
Performance Metrics	Performance Metrics
Condition Assessment	Condition Assessment and Asset Risk Scoring
Asset Risk Scoring	
Plan Reviews	Plan Reviews
Stormwater Staffing	
Electronic Time Sheets	
Paperwork Automation	
Central Intake	
Organizational Structure	
Succession Planning	

Notes:
CMMS = computerized maintenance management system
IT = information technologies
O&M = operations and maintenance
SCADA = supervisory control and data acquisition