METROPOLITAN SEWER DISTRICT of greater CINCINNATI

MSD Benchmarking Assessment

2013

Contents

Executive Summary

Metropolitan Sewer District of Greater Cincinnati (MSD) is among the top 5 Combined Sewer Overflow (CSO) dischargers in the country, discharging approximately 11.4-billion gallons of overflow during a typical year of rainfall. MSD is implementing an integrated, watershed based approach to reducing CSO volume that improves the water quality in the streams and rivers in its service area. MSD is under a federal consent order, requiring it to manage significant Wet Weather Improvement Program. To comply with these obligations, major capital investments are required to be in compliance with the consent decree at the same time that , MSD must continue to manage the day to day operations in the most effective and efficient way. The large capital budget required by MSD to make these improvements is estimated to exceed $3.0 billion, increasing stakeholder's interest in MSD performance management to insure this large investment is wisely administered.

Federally driven mandates create a unique set of circumstances for the utility – balancing wet weather improvements against the need to maintain existing structures and facilities; expansion of systems and processes to meet new and higher levels of output and expectations; managing sewer revenue in light of potential rate payer fatigue. While there are many specialized self-assessment and benchmarking tools within the industry, there is no assessment tool that integrates and addresses the unique challenges of CSO communities. With the agreement and support of the Five Cities utilities, MSD took the lead in developing a new comprehensive self-assessment utility benchmarking tool that could be piloted at MSD and then refined to be utilized by Five Cities and other utilities as desired. This approach allowed for a speedy path to address MSD's immediate needs while also addressing the greater needs of other potential partners.

MSD commissioned CH2M HILL to develop a self-assessment benchmarking tool to include elements that are necessary to meet and address consent decree requirements; watershed based practices, regulatory practices, financial/affordability constraints, and sustainability. It included both metric and practice measurement. The consultant team developed the assessment tool in early 2013, with MSD subsequently piloting the tool.

The goal for this project is to develop a framework and a benchmarking assessment tool that could be recognized, used, and adopted as an industry standard for consent decree utilities. The aim of the tool is three-fold:

- To help utilities deal more strategically and cost effectively with regulators to manage consent orders
- Assist in assessing the status of performance and utility management practices, as well as areas for improvement
- To provide context for stakeholders to measure the utility against a set of peers

The basic process for the tool development included review of industry knowledge to compile a comprehensive framework and tool that assesses organizational practices qualitatively through measures and quantitatively through metrics. Building on industry knowledge, the tool is cohesive and relevant to existing standards; however gaps were filled with new practices and measures that addressed consent decree issues not yet dealt with by the industry. The framework and tool were reviewed by MSD staff, and comments were incorporated. MSD piloted the benchmarking tool in June and July of 2013, identifying areas of organizational strength and areas for improvement. This assessment results will serve as a baseline for performance that can be monitored, measured and improved over time for MSD. The pilot exercise also led to suggested improvements and finalization of the benchmarking tool.

Throughout the course of the assessment tool development, steps were taken to set the stage with other utilities and various industry organizations to engage in future benchmarking and procure industry wide acceptance.

Benchmarking Self-Assessment Overview

Purpose:

- Measure compliance
- Negotiate consent decree
- Allow more capabilities for utilities to manage consent decree with outcomes, projects, and BMPs

Objectives:

- Create capability to deal more strategically and cost effectively with the Regulators to represent Cincinnati's interests
- Develop a concept model with supporting practices and tools that are consistent with goals of consent decree communities
- Help consent decree utilities to prioritize the right investments
- Help consent decree utilities define the pace of improvements (affordability)

The approach to developing this tool can be summarized in the following steps:

1. Various industry benchmarking tools and leading practices databases were identified through the literature review process.
2. The identified benchmarking tools and leading practice databases were evaluated for framework and content.
3. Specific benchmarking tools and leading practices were selected for use in developing the benchmarking tool.
4. Based on the literature review, a draft benchmarking tool framework was developed.
5. The draft benchmarking tool framework was reviewed by MSD and updated to reflect review comments.
6. Once the framework was finalized, specific practices, definitions, measures, metrics, and a scoring system were identified using the literature review as a foundation.
7. The draft practices, definitions, measures, metrics, and scoring system were reviewed by MSD and updated to reflect review comments.
8. The draft benchmarking tool was compiled and formatted and presented to MSD in a pilot training workshop.
9. MSD conducted a pilot self-assessment using the draft benchmarking tool through teams to collect data.
10. Data from the self-assessment was compiled into the draft benchmarking tool to provide results to MSD on their organizational strengths and areas for improvement, as well as specific improvement recommendations.
11. Benchmarking tool feedback from the self-assessment was incorporated into a final benchmarking tool.
12. Industry associations, future funding partners, and other utilities were engaged in order to facilitate the future use of the benchmarking tool and to garner future utility participation with the goal of having the benchmarking tool recognized, accepted, validated, enhanced and supported by the wastewater industry, including regulators.

The Guiding Principles for Development

- Build off the existing industry literature and best practice where possible
- Develop an assessment that can be recognized, used, and adopted as an industry and regulatory tool
- Housed and managed by an industry organization (EPA, non-profit that works on behalf of multiple utility or orgs, or research association)
- Audit/validation?
- Pilot the tool with MSD with the intention of offering to other utilities in next phase
- Do nothing that is inconsistent with the long term goal of finding an organization that houses the maintenance of the tool

Tool Development

Literature Review

In order to develop a benchmarking tool that is robust and built upon industry knowledge, a list of well accepted benchmarking tools and best practice databases that span across the field of utility management were identified. This list is presented below:

Benchmarking Tools and Best Practices Databases

Literature/Tool	Publishing Organization	Focus
Aquamark	WSAA and IWA	Asset management tool
Financial Survey	NACWA	Financial data and comparisons
Stormwater Menu of BMPs	USEPA	Stormwater best management practices online resource
Core Attributes of Effectively Managed Wastewater Collection Systems	APWA, NAWC, NACWA, WEF, AWWA, AMWA	Utility management guidance document
QualServe Benchmarking	AWWA, WEF	Performance metrics
SAM Gap Analysis tool	WERF	Asset management practices
Simple- Sustainable Infrastructure Management Program Learning Environment	WEFR	Sustainability guidance
Triple Bottom Line Reporting for Water Utility	AWWA	Asset management and financial evaluation
Effective Utility Management	NACWA, WEF, AWWA, AMWA, APWA, NAWC	Attributes of effectively managed utilities
Wastewater Sustainability Reporting Indicators	WEF	Utility metrics guidance
Planning for Sustainability	EPA	Sustainability guidance document
Best Practices in Public Budgeting	GROA	Financial online resource
2011 NACWA Financial Survey	NACWA	Financial guidance document
Enhancement of QualServe Tools to Improve Utility Operations	AWWA and WRF	Utility management guidance document
SAM-GAP	WERF	Asset management online tool
Sustainable Infrastructure Management Program Learning Environment (SIMPLE)	WERF and WaterRF	Asset management online resource
Triple Bottom Line	AWWA	
Water EUM	AMWA, APWA, AWWA, WEF, EPA, NACWA, NAWC	Effective Utility Management online resource
Wastewater Sustainability Reporting Indicators	WERF	Guidelines and indicators for sustainability
WateriD *Benchmarking Water Services*. (2011)	Virginia Tech, WERF, EPA, NSF AWWA, IWA	Water Infrastructure database Benchmarking methodology manual

Framework

Based on the literature review and evaluation of the various components, frameworks, organizational approaches, etc., a draft framework was compiled that comprehensively addressed a utility organization. The framework was organized by category, subcategory, practice, measures and metrics. To assess performance, measures are measured qualitatively. Metrics are measured quantitatively through a mathematical formula. Specific categories, subcategories, and practices were identified, evaluated, reviewed, and finalized based on discussion with MSD. Once the framework was finalized, measures from the various literature review sources were mapped to a specific category, subcategory, and practice. Metrics were mapped directly to categories

This self-assessment tool was piloted by MSD to conduct their self-assessment. Data collection for metrics was conducted for 2012 actuals. Some additional metrics were identified to start baselining in 2013 for future assessments. A similar approach was used to develop the scoring mechanism for these measures and metrics. Metrics are measured quantitatively, and therefore mathematical formulas were developed for each metric using literature review sources. In addition, there were two qualitative components (data quality, effectiveness) to each metric measured on qualitative scoring system.

Infrastructure	Operations	Maintenance	Organization	People	Environment
Planning Policies and Procedures	Collections	Collections	Financial Management	Workforce	Regulatory Compliance
Design	Treatment	Treatment	Risk Management	Health and Safety	Water Quality
Construction	Stormwater/Watershed	Stormwater/Watershed	Strategic/Business Planning	Stakeholder Management	Land Management
			Legal	Communication	Environmental Management
			Quality		
			TBL Policy & Reporting		
			Enterprise Document Management		
			Security		
			IT		
			Procurement		

Infrastructure—All elements pertaining to asset knowledge and lifecycle, from planning through decommissioning, with the exception of operations and maintenance. Assets include all infrastructure, moving stock, fleet, equipment, IT and other supporting items.

Operations—All elements pertaining to the operation of the system, from pretreatment through disposal, as well as compliance. Includes all operational modes, such as standard and emergency conditions.

Maintenance—All elements pertaining to the maintenance of the system, from pretreatment through disposal.

Organization—All elements pertaining to the functions and processes of the utility.

People—All elements pertaining to people interacting with a utility including employees, customers, and stakeholders.

Environment—All elements pertaining to the natural environment and its interactions including living and non-living things occurring naturally including all vegetation, microorganisms, soil, rocks, air, water, climate, energy, etc.

Practice & Measure: Quantitative

The overall framework for the benchmarking tool is comprised of a hierarchy of categories, subcategories, and practices. Categories are further divided into subcategories, and subcategories are further divided into practices. Each practice has one or more measures, which qualitatively assess performance.

Example: Infrastructure

Subcategory	Practice	Measure	Documentation	Application	Effectiveness	Total Score	Usefulness	Comment
Planning	Planning takes into account future changes that need to be made to accommodate growth, regulatory and management (organizational values) changes, and technology while meeting levels of service, and measures the performance of the agency. Changes can include both asset and non asset solutions to provide the greatest flexibility such that the optimal solution can be selected to reduce costs and other penalties.							
Planning Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to planning. Political, management, financial, and administrative mechanisms arranged to reach planning goal, organizational values, and levels of service. Includes support documentation that describes Who, What, Where, When and Why to establish accountability in support of the Implementation of the planning policy.							
		The agency assigns accountabilities and responsibilities for planning policy and procedure documentation, implementation and continual improvement and links planning data and roles and responsibilities through a framework.	3	3	3	3	Not rated	Define end of planning

Practice & Measure Scoring Method

The scoring system for the measures is qualitative and composed of three components – Documentation, Application, and Effectiveness – which are scored from 1 to 5 based on the description for each. Documentation addresses how well the measure is documented. Application addresses how widely spread is the use of the measure. Effectiveness addresses how effective is the measure. For the purposes of the pilot only, Usefulness was assessed for each measure, as well as any comments. Usefulness was scored from 1 to 5, a score of 1 being a functional practice of a wastewater utility regardless of combined sewer overflow (CSO) or consent decree characteristics, a score of 3 being mid-range CSO or consent decree characteristics, and a score of 5 being high priority CSO or consent decree characteristics. The scores from all three components are averaged to provide an overall score. The higher the score, the better the performance as related to that measure.

Practices	Scoring	1	2	3	4	5
Documentation		None	Minimal, Partially defined 25%-50%	Moderate, Structured but not comprehensive defined, 50%-75%	Advanced, Substantially complete 75%-100%	Complete, Fully defined and understood 100%
Application		Spars, use is uncommon and isolated	Limited, use is applied in many relevant areas, 25%-50%	Moderate, use is intermittently applied in relevant areas, 50%-75%	Predominant, use is mostly applied in relevant areas, 75%-100%	Total, use is applied in all relevant areas, 100%
Effectiveness		Rarely, defined outcomes achieved in few relevant areas	Occasionally, defined outcomes achieved in many relevant areas, 25%-50%	Often, defined outcomes achieved intermittently relevant areas, 50%-75%	Usually, defined outcomes achieved in most relevant areas, 75%-100%	Always, defined outcomes achieved in all relevant areas, 100%

Metrics: Quantitative

Each category is also comprised of numerous metrics, which quantitatively assess performance. The Metrics are compiled from the same literature sources as the practices. They are mapped to the main practice categories and tailored down into a core set of metrics. MSD conducted an internal review and provided comments, suggestion, proposed new measures, and ultimately provided 2012 actual data and performance targets for each metric. There is a scoring system based on three components for measures, and mathematical formulas and the two part scoring system based on data quality & effectiveness.

Example: Infrastructure

Metric	Formula	2012 Actuals	2012 Target	Performance	Quality	Effectiveness
Cash Reserve (Days)	Undesignated Cash Reserve Dollars/(Annual O&M Budget/365)	$213.43	$180.00	●	5	5
Modeling: % of constructed system in Model	• Modeling: % of system updated calibration over the last 5 years • Modeling: % of constructed system that is modeled, regularly calibrated and validated • Modeling: % of sanitary system that is modeled, regularly calibrated and validated conveyance system in model • Modeling: % of combined system that is modeled, regularly calibrated and validated	85%	93%	●	4.25	4.25

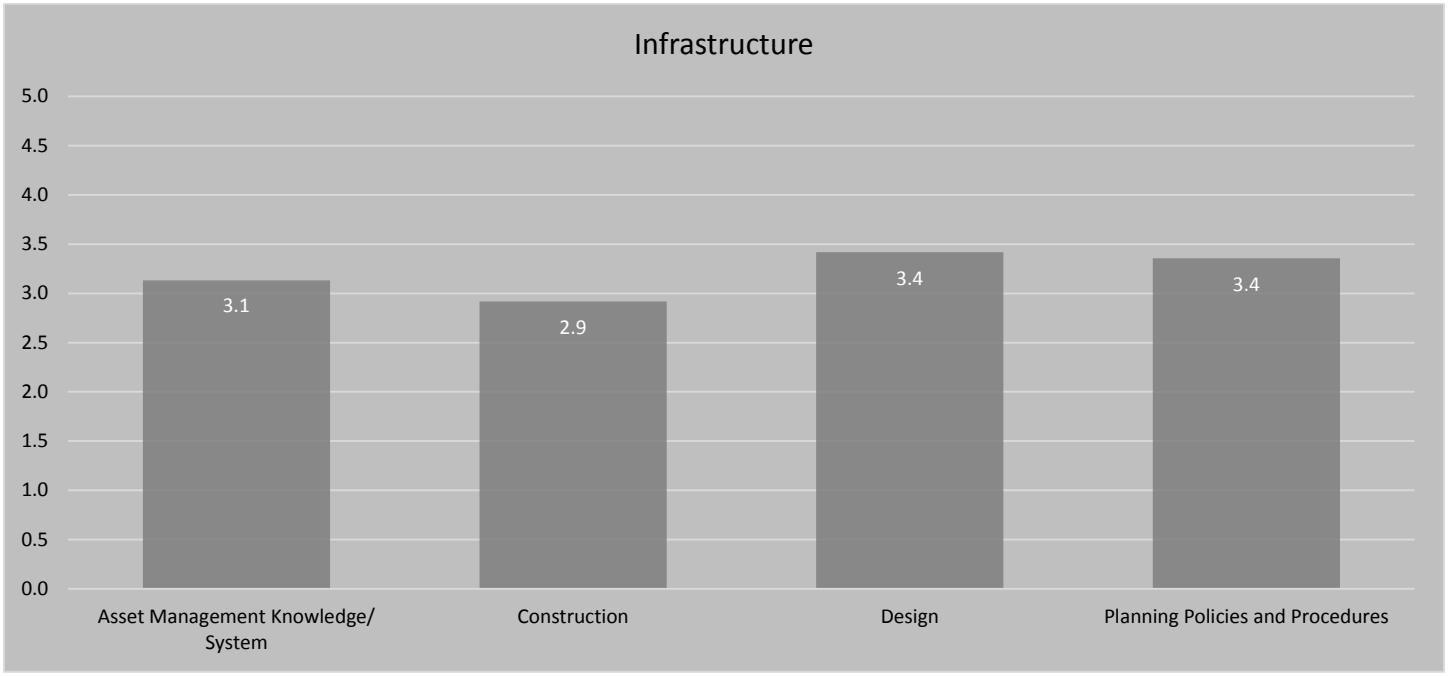
Metric Scoring Method

The scoring system for metrics is composed of two parts. The first is quantitative and is the actual calculation of the metric based on the mathematical formula, as shown in Table 6, and a target value for the metric. The target is the value that the utility is seeking to achieve. The second part is qualitative and comprised of Data Quality and Effectiveness, which are scored from 1 to 5. For the purposes of the pilot only, Usefulness was assessed for each metric, as well as any comments. An owner was assigned for the data collection required for completing the metrics portion of the benchmarking self-assessment.

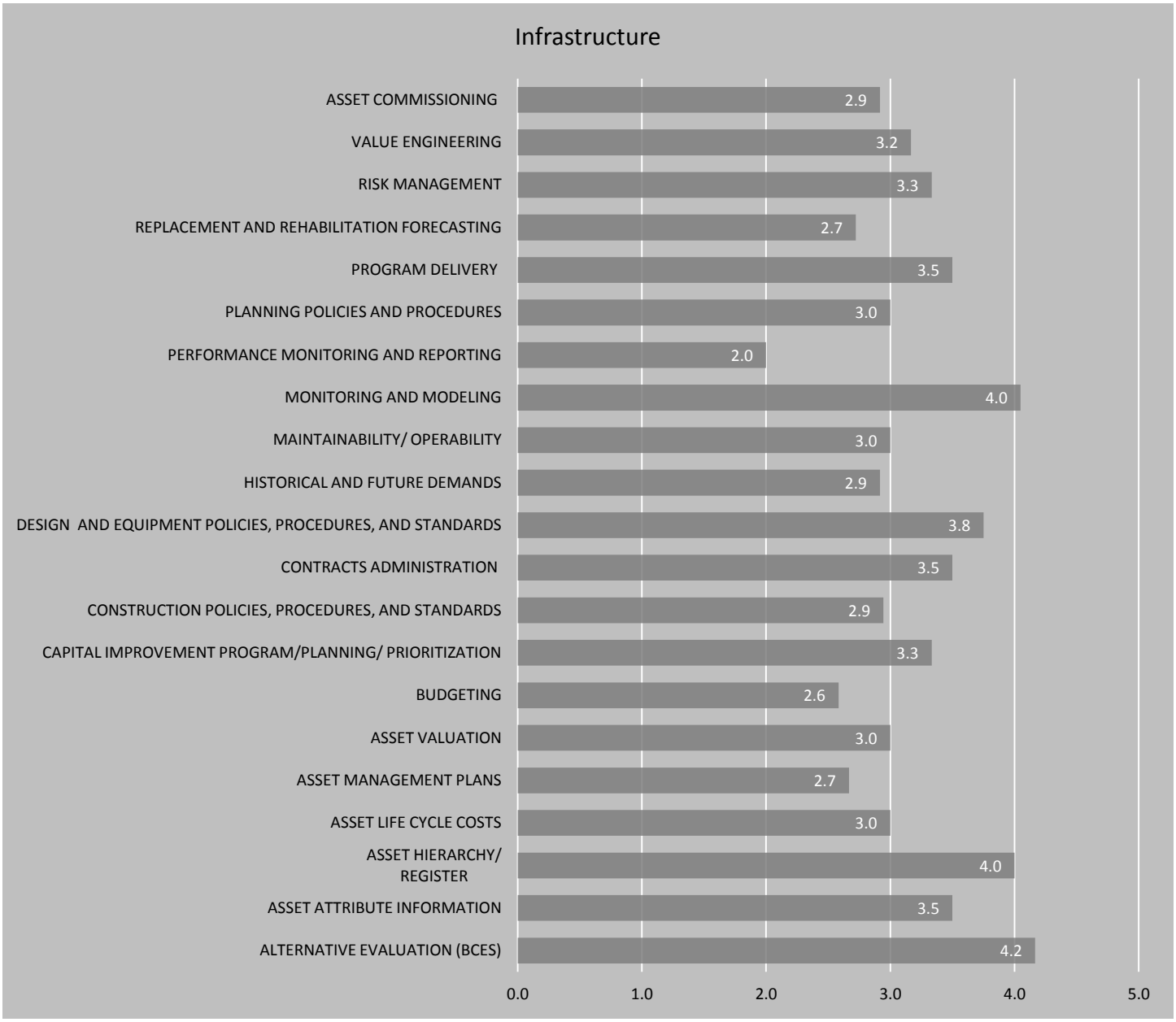
Self-Assessment Results: Infrastructure

Subcategory	Definition
Infrastructure	
Planning	Planning takes into account future changes that need to be made to accommodate growth, regulatory and management changes, and technology while meeting levels of service, and measures the performance of the agency. Changes can include both asset and non asset solutions to provide the greatest flexibility such that the optimal solution can be selected to reduce costs and other penalties.
Design	The design process includes: design project management, TBL (triple bottom line) life cycle cost analysis, value management/engineering, input by maintenance/operations, engineering certification of designs, consideration of performance history of previous designs, and appropriate documentation. The design process is carried out by "best value" design services.
Construction	Construction is a process that consists of the building or assembling of infrastructure. Involved with the execution is the successful scheduling, budgeting, construction site safety, availability of building materials, logistics, inconvenience to the public caused by construction delays and bidding, etc.
Decommissioning	The process of removing infrastructure from service for demolition or repurpose.
Asset Management Knowledge/System	The asset management system comprises the agency asset management policy, asset management objectives, asset management strategy, asset management plans, and the activities, processes and organizational structures necessary for their development, implementation and continual improvement.

Infrastructure: Subcategory Scores



Infrastructure: Breakdown by Practice Areas



Infrastructure Metrics

● Exceeds Target ● Within Target Range ● Under Target

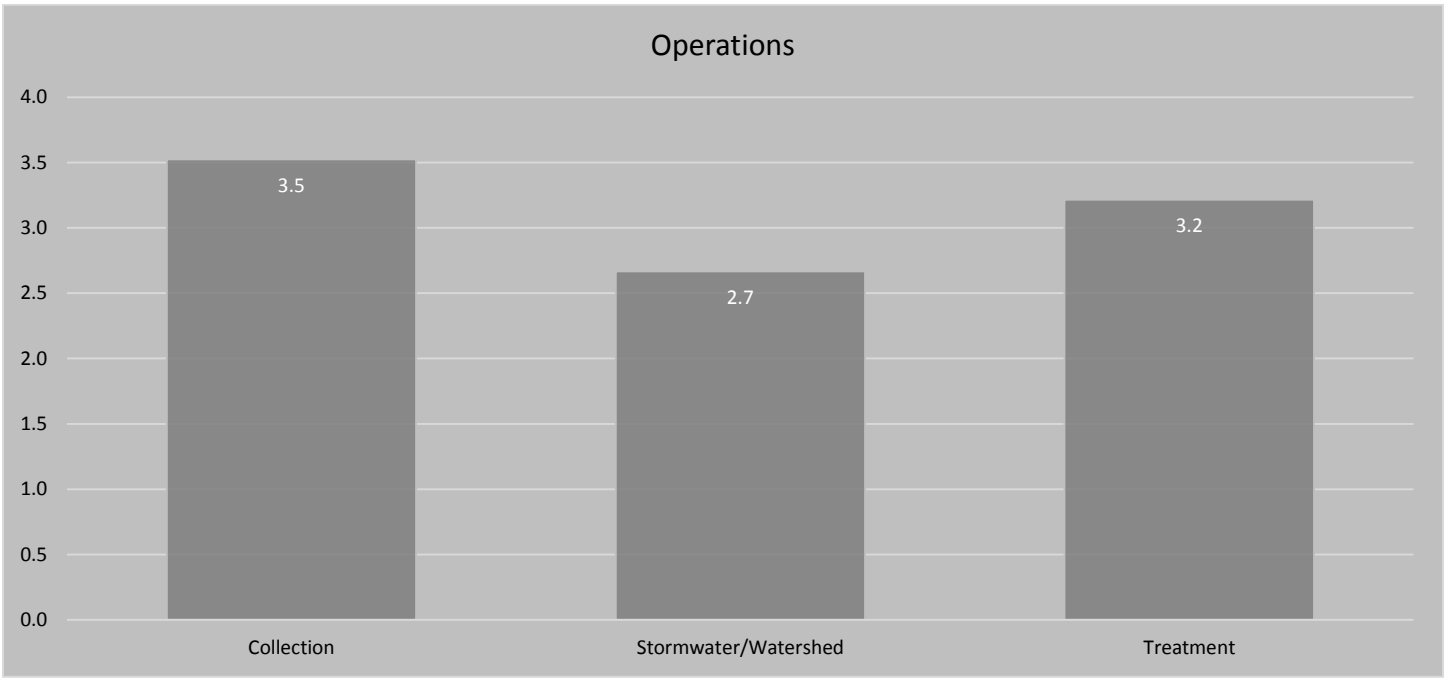
		Metric	Formula	2012 Actuals	2012 Target	Performance	Quality	Effectiveness
INFRASTRUCTURE	Reported	Cash Reserve (Days)	Undesignated Cash Reserve Dollars/(Annual O&M Budget/365)	213.43	180.00	●	5	5
		Modeling: % of constructed system in model	• Modeling: % of system updated calibration over the last 5 years • Modeling: % of constructed system that is modeled, regularly calibrated and validated • Modeling: % of sanitary system that is modeled, regularly calibrated and validated conveyance system in model • Modeling: % of combined system that is modeled, regularly calibrated and validated	85%	93%	●	4	4
		Sanitary Sewer overflows (occurrences per 1000 miles)	Number of reported sanitary sewer overflows per 1,000 miles of pipe per year	112	Per Consent Decree	N/A	5	2
		Renewal Rate (%)	Linear feet of sewer main rehab'd or replaced/total in ft of sewer main	0.47%	1.0%	●	5	2
		Sewer system effectiveness	% of reported sewer backups NOT attributable to utility	93%	90%	●	5	5
	Target Under Consideration	Failure Rate (sewer can no longer convey any flow) of collection system	100 (Total number of collection system failures during the year)/Total miles of collection system piping	0.04%	Target under consideration			

INFRASTRUCTURE	
Average Quality Score:	4.85
Average Effectiveness Score:	3.65
Target Percentage:	
Percentage Meet or Exceeds Target	50%
Under Target:	50%

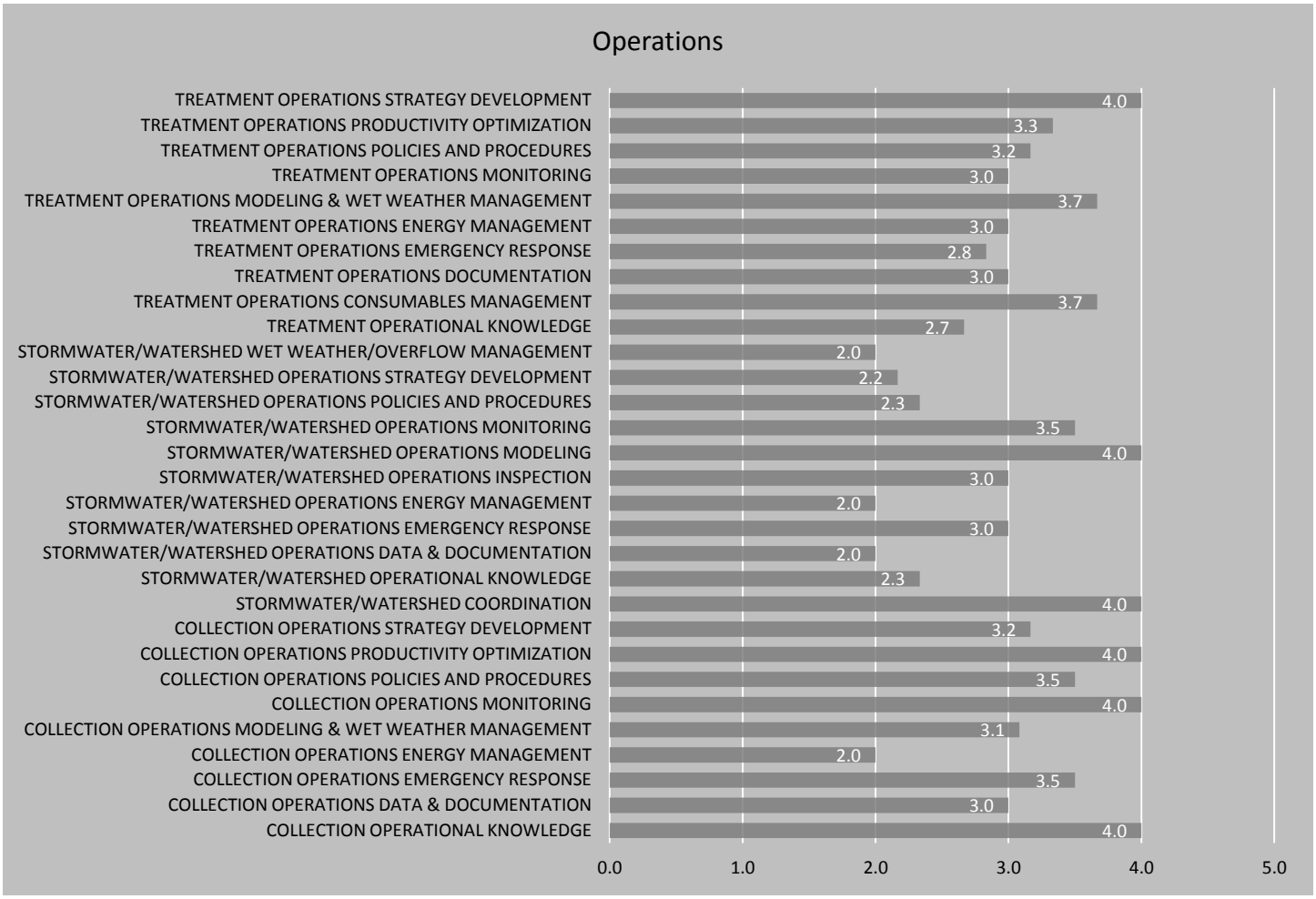
Self-Assessment Results: Operations

Subcategory	Definition
Operations	
Collection	The system that handles the collection of wastewater from residential, commercial, and industrial properties and conveyance to a wastewater treatment plant.
Treatment	Treatment is the process of removing contaminants from wastewater and household sewage, both runoff (effluents), domestic, commercial and institutional. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce an environmentally safe treated effluent and biosolids suitable for disposal or reuse.
Stormwater/Watershed	Stormwater is water that originates during precipitation events or with snowmelt which does not soak into the ground and becomes surface runoff that enters the Stormwater system. Watershed is the extent of an area of land where surface water from rain and melting snow or ice converges to a single point, usually the exit of the basin, where the waters join another water body, such as a river, lake, reservoir, estuary, wetland, sea, or ocean, and includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into the channels.

Operations: Subcategory Scores



Operations: Breakdown by Practice Areas



Operations Metrics

● Exceeds Target ● Within Target Range ● Under Target

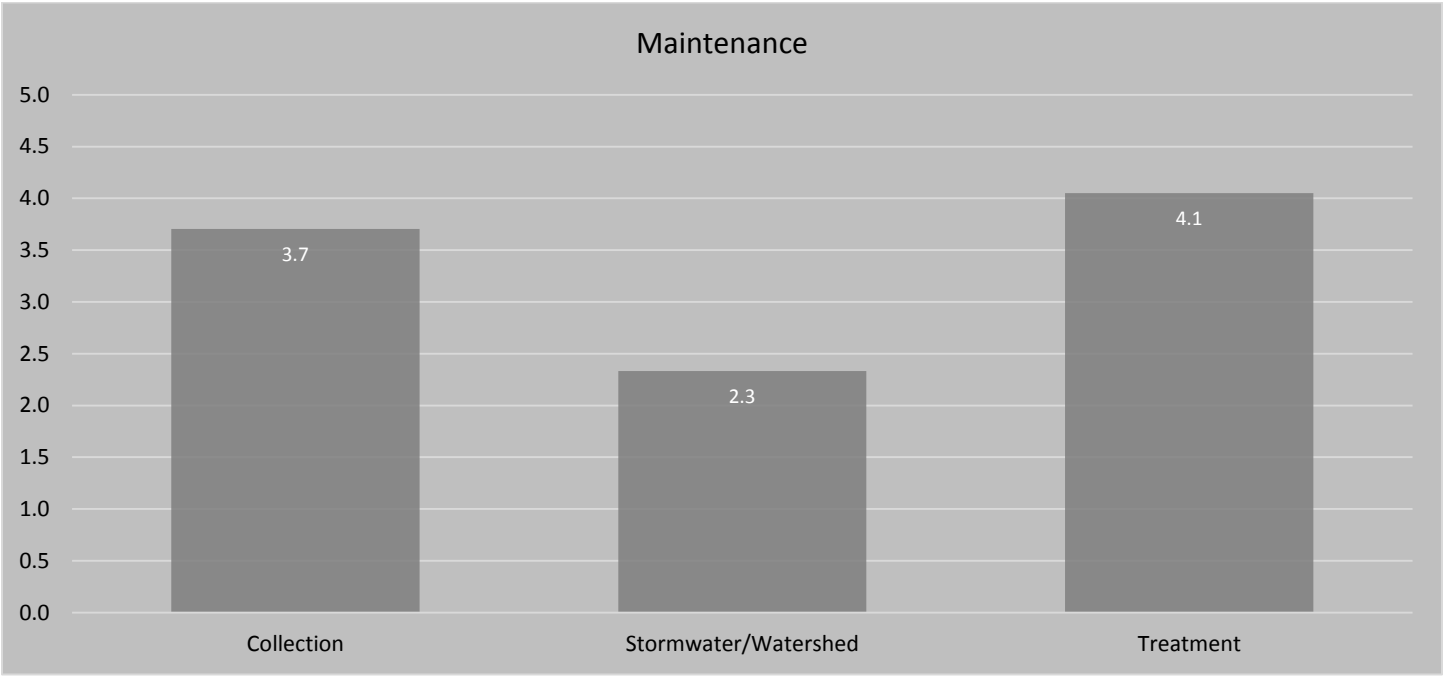
		Metric	Formula	2012 Actuals	2012 Target	Performance	Quality	Effectiveness
OPERATIONS	Reported	Wastewater Treatment Effectiveness Rate	100 (365 – Total number of standard non-compliance days)/365	94%	95%	●	4	4
		Field Call Responsiveness	100X (number of collection field calls responded to within 4 hours/total number of field calls during reporting period)	93%	Per Consent Decree	N/A	5	4
		Responsiveness/rapidity of response SBU	Percent of calls received and answered within a target timeframe	100%	Per Consent Decree	N/A	5	5
	Target Under Consideration	Call Abandonment	Number of calls abandoned per period/number of calls received	6%	Target under consideration	●		
		Sewer System Disruption per 1000 Customers	(1000) Number of Customers Experiencing Disruptions due to MSD infrastructure/Number of active customer accounts	2%	Target under consideration	●		

OPERATIONS	
Average Quality Score:	4.60
Average Effectiveness Score:	4.30
Reported Target Percentage:	
Percentage Meet or Exceeds Target	100%
Under Target:	0%

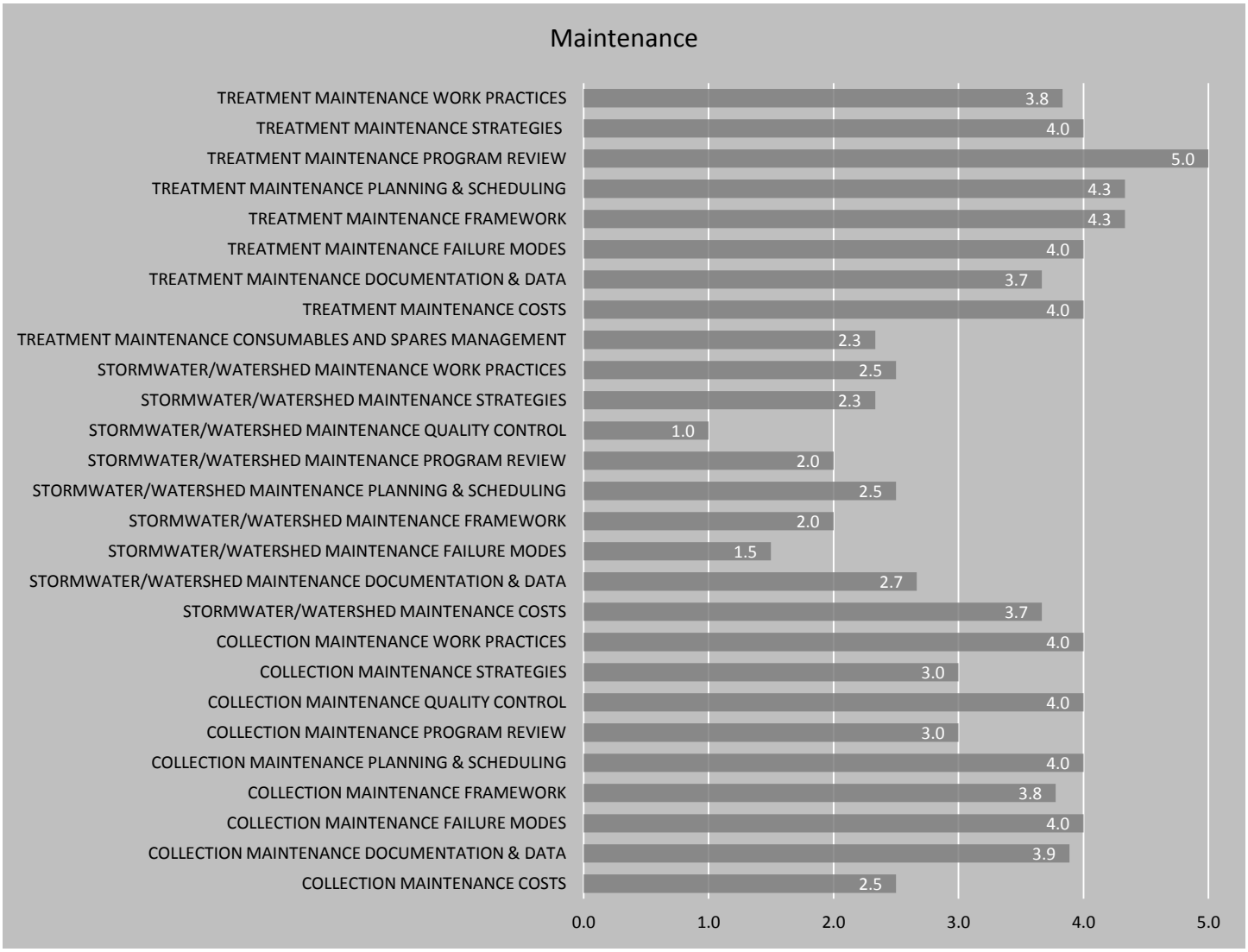
Self-Assessment Results: Maintenance

Subcategory	Definition
Maintenance	
Collection	The system that handles the collection of wastewater from residential, commercial, and industrial properties and conveyance to a wastewater treatment plant.
Treatment	Treatment is the process of removing contaminants from wastewater and household sewage, runoff (effluents), domestic, commercial and institutional sources. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce an environmentally safe treated effluent and biosolids suitable for disposal or reuse, which also meets service level or regulatory requirements.
Stormwater/Watershed	Stormwater is water that originates during precipitation events or with snowmelt which does not soak into the ground and becomes surface runoff that enters the stormwater system. Watershed is the extent of an area of land where surface water from rain and melting snow or ice converges to a single point, usually the exit of the basin, where the waters join another water body, such as a river, lake, reservoir, estuary, wetland, sea, or ocean, and includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into the channels.

Maintenance: Subcategory Scores



Maintenance: Breakdown by Practice Areas



Maintenance Metrics

● Exceeds Target ● Within Target Range ● Under Target

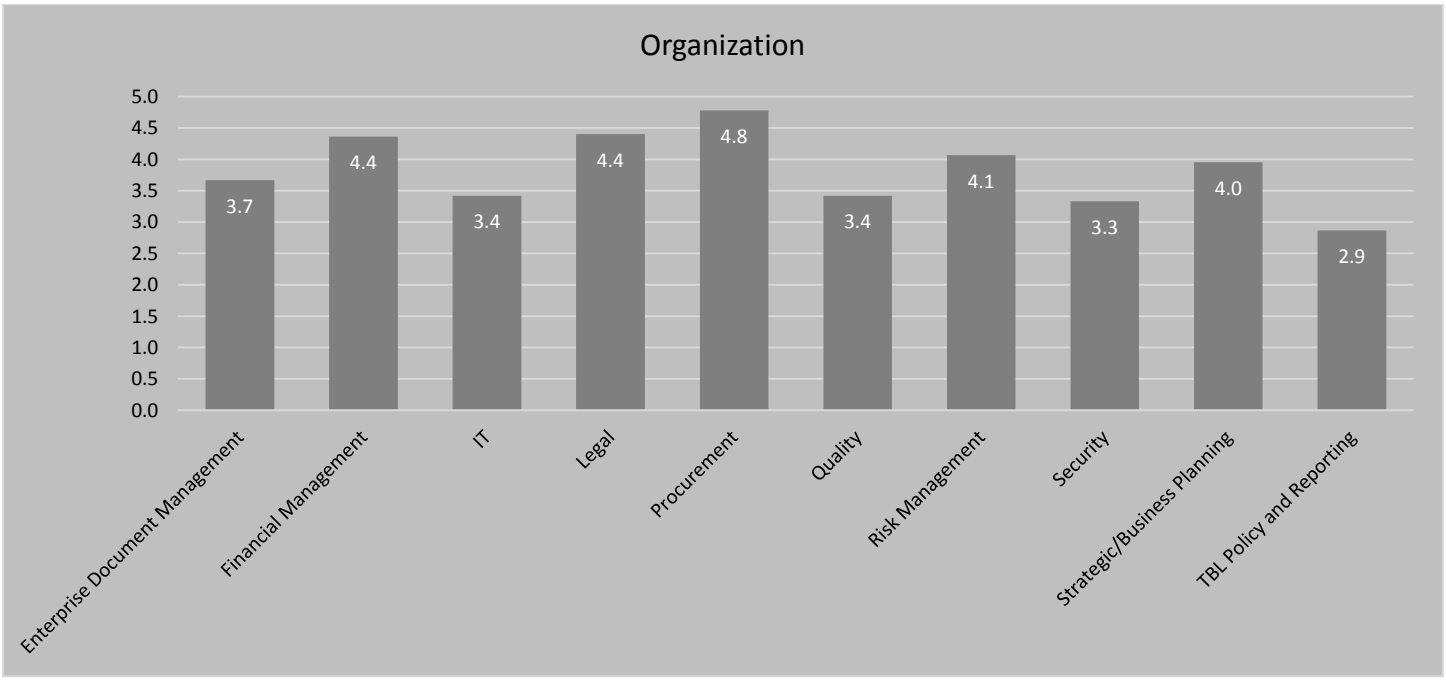
		Metric	Formula	2012 Actuals	Target	Performance	Quality	Effectiveness
MAINTENANCE	Reported	Planned Maintenance Ratio in Percent (Hours)	(100) Hours of Planned Maintenance/Hours of Planned + Corrective Maintenance	55%	80%	●	2	2
		Plant Availability (Maintenance)	Mean time between failure/(mean time between failure + mean time to restore)	99.8%	100%	●	2	2
		Plant Maintainability (MTTR - Days)	Mean time to restore a failure	7.12	7	●	2	2
		Plant Reliability (MTBF - Years)	Total time/failures	8.12	9	●	2	2
		Sewer cleaning	Percent of sewers cleaned each year	1%	2%	●	2	4
		Sewer inspections	Linear feet of sewer lines televised each year divided by total linear feet of sewer lines	8%	10%	●	2	4
		Maintenance holes inspected	Percent of maintenance holes inspected per year	2%	2%	●	2	4

MAINTENANCE	
Average Quality Score:	1.43
Average Effectiveness Score:	2.28
Target Percentage:	
Percentage Meet or Exceeds Target	86%
Under Target:	17%

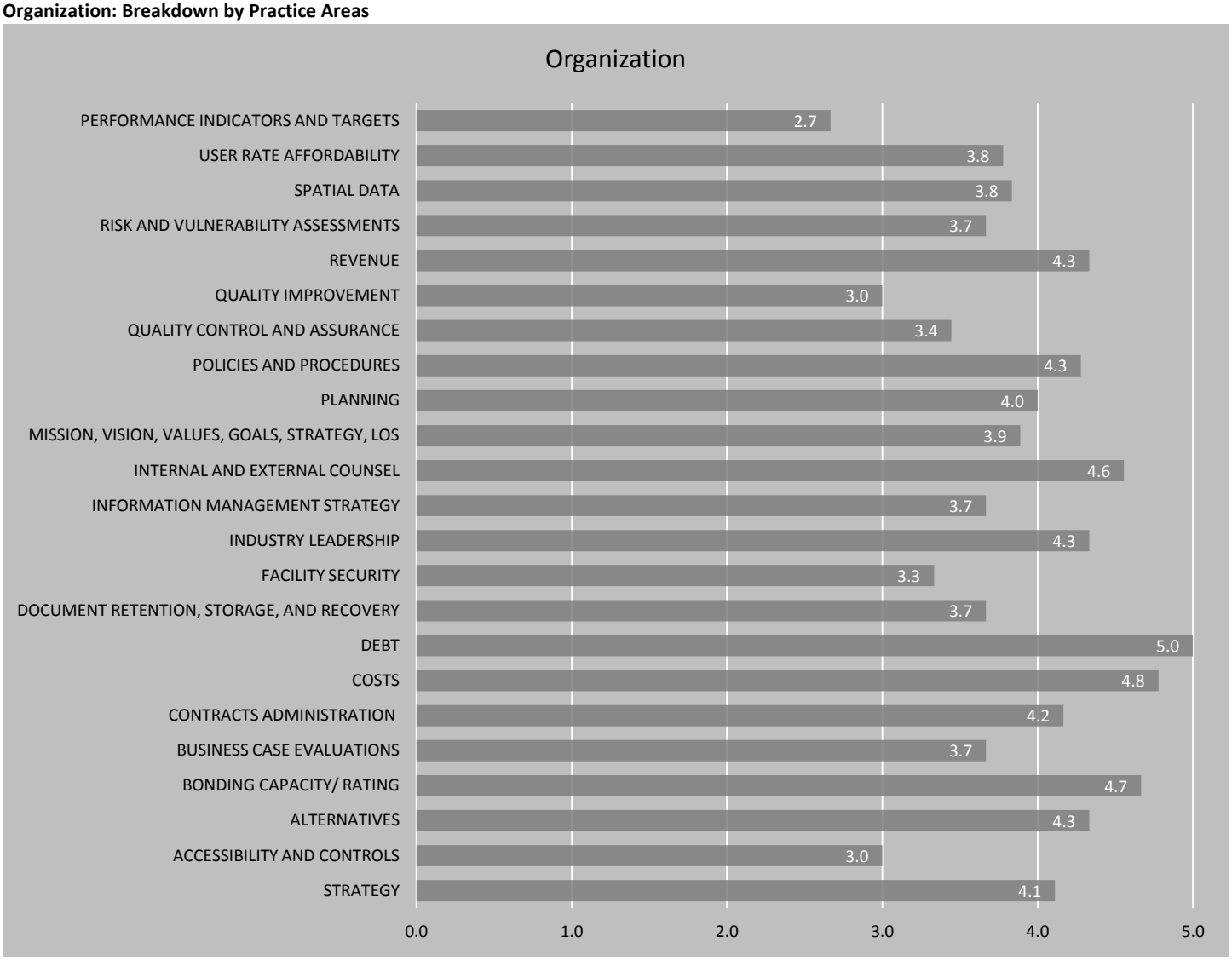
Self-Assessment Results: Organization

Subcategory	Definition
Organization	
Financial Management	Managing the full life-cycle cost of the agency and establishing and maintaining an effective balance between long-term debt, asset values, operations and maintenance expenditures, and operating revenues. Establishes predictable rates—consistent with community expectations and acceptability—adequate to recover costs, provide for reserves, maintain support from bond rating agencies, and plan and invest for future needs.
Risk Management	Risk management covers all the activities involved in identifying and management of risks, including establishment of the risk policy and business context, identification of risk, quantification of the likelihood and consequence of failure or of loss events, evaluation of the risk, prioritize mitigation for best value, implementation of mitigation, and risk monitoring.
Strategic/Business Planning	Strategic planning is an agency's process of defining its strategy and making decisions on allocating its resources to pursue this strategy. Generally, strategic planning deals with at least one of three key questions: "What do we do?", "Why do we do it?" "For whom do we do it?", and "How do we excel?" This is the process for determining where an agency is going over the next year or 3 to 5 years.
Legal	System of rules and guidelines that an agency must follow that are enforced through institutions.
Quality	Quality management system standards.
TBL Policy and Reporting	Approach for an expanded spectrum of values and criteria for measuring agency (and societal) success: economic, ecological, and social.
Enterprise Document Management	System used by an agency to track and store electronic documents by keeping track of the different versions modified by different users (history tracking). Allows publishing, editing and modifying content from a central interface and manages workflow in a collaborative environment.
Security	Security is the degree of protection to safeguard against danger, damage, loss, and crime. Security as a form of protection are structures and processes that provide or improve security as a condition.
IT	Information technology infrastructure and existing software support the storage and delivery of information. An agency employs a wide array of software products that should collectively store – or be able to store – the core information needed to support asset management decision-making in a timely manner.
Procurement	Purchasing refers to an agency attempting to acquiring goods or services to accomplish its goals.

Organization: Subcategory Scores



Organization: Breakdown by Practice Areas



Organization Metrics:

● Exceeds Target ● Within Target Range ● Under Target

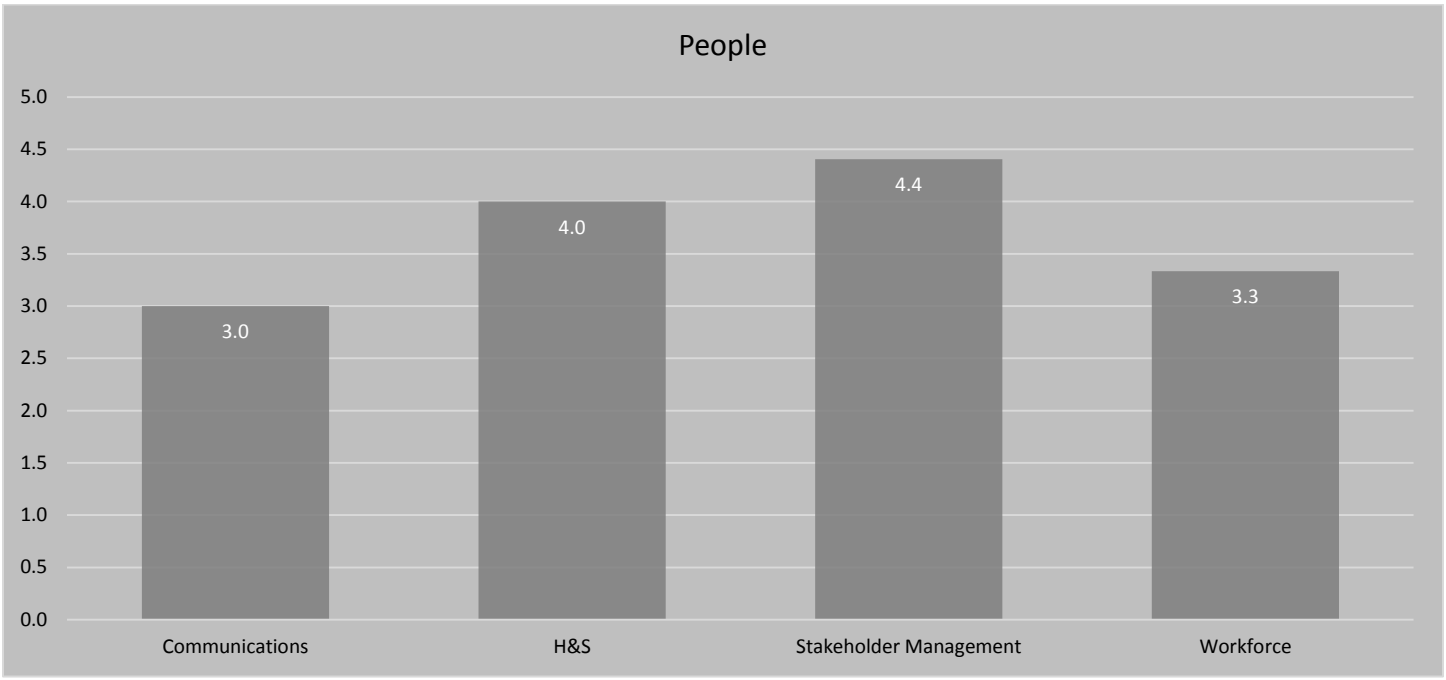
		Metric	Formula	2012 Actuals	2012 Target	Performance	Quality	Effectiveness
ORGANIZATION	Reported	Bond rating	Per Insurance/Annual	AA+	AA+	●	5	5
		Debt Service Coverage ratio	Operating net income/Debt Service	1.87	1.50	●	5	5
		Debt Coverage with Beginning Balance	(Net Income + Cash Reserve Beginning Balance excess of 90 days)/Debt Service	3.46	2.00	●	5	5
		Capital Project Execution	Percent of capital investment projects started and completed on time and on budget (according to a capital improvement plan)	85%	85%	●	4	4
		Budget: % accomplished (all projects)	$ spent / Total budget	92%	80%	●	5	5
		Budget: % accomplished (Project 1 [each consent decree project])	$ spent / Total project budget	56%	Per Consent Decree	N/A	5	4
		Schedule: % of projects on schedule	[No. of projects on schedule/ Total No. of projects	100%	85%	●	5	5
		Schedule: % complete per project	No. of days complete into project / Project duration	78%	Per Consent Decree	N/A	5	5
		No. of available float days per project milestone	● Planning ● Design ● Construction	23% PTI; 29% start; 48% Finish	Per Consent Decree Schedule	N/A	5	5
		Total spend on Small Business Enterprise (SBE), Minority-owned Business Enterprises (MEBE), and/or Women-owned Business Enterprises (WEBE)	SBE+MEBE+WEBE/total spend	18.4%	20%	●	5	5
		SBE spend on construction	SBE construction spend/total construction spend	19.8%	30%	●	5	5
		SBE spend on professional services	SBE professional services spend/total professional spend	21.7%	10%	●	5	5
		SBE spend on services & supplies	SBE services & supplies spend/total services and supplies spend	7.8%	15%	●	5	5
	Target Under Consideration	Cost per million gallons produced / treated	O&M expenses (e.g., chemical, power, labor and/or total cost) per million gallons produced and delivered	$2,099	Target under consideration			
		Rates	Average monthly residential customer bill	$63	Target under consideration			
		Average usage per customer	Average monthly usage per residential customer in gallons	5440.2 gallons	Target under consideration			
		Delinquencies	Percent of delinquent bills/national average delinquency rates % customers >30 days delinquent	Baselining	Target under consideration			

ORGANIZATION	
Average Quality Score:	4.92
Average Effectiveness Score:	4.85
Reported Target Percentage:	
Percentage Meet or Exceeds Target	80%
Under Target:	20%

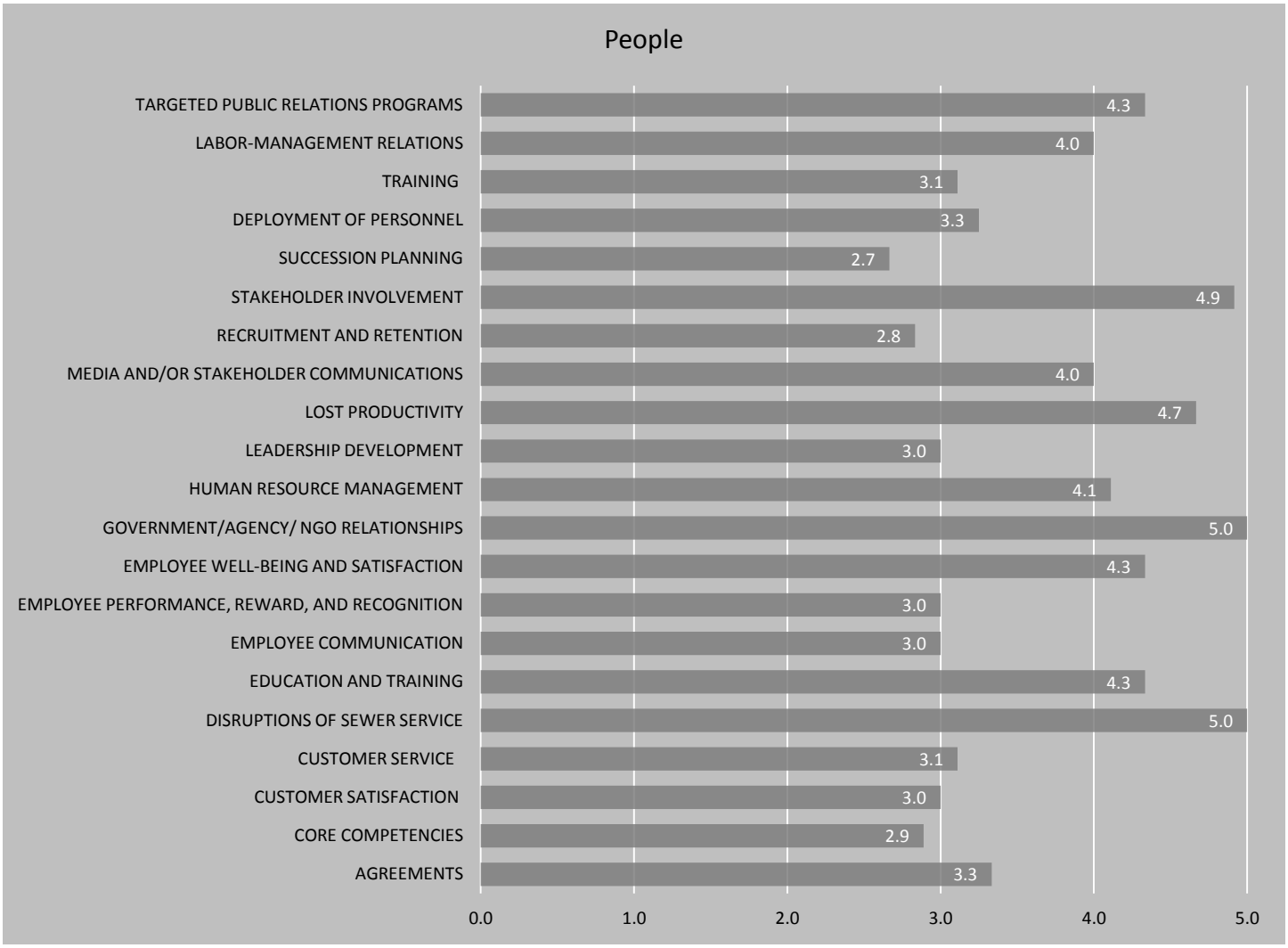
Self-Assessment Results: People

Subcategory	Definition
People	
Workforce	Workforce includes the following elements: staff skills, training & performance management, staff succession and recruitment planning, staff surveys, feedback and improvement, workplace legislation, safety, standards and agreement compliance, and managing organizational change.
Health and Safety	Cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goals of occupational safety and health programs include fostering a safe and healthy work environment.
Stakeholder Management	Stakeholder management supports an agency's strategic objectives by interpreting and influencing both the external and internal environments and by creating positive relationships with stakeholders through the appropriate management of their expectations, levels of service, and agreed objectives. Stakeholder management prepares a strategy utilizing information gathered during the following common processes: stakeholder identification, stakeholder analysis, stakeholder matrix, stakeholder engagement, and communicating information.
Communications	Process by which information is transmitted to internal and external parties.

People: Subcategory Scores



People: Breakdown by Practice Areas



People Metrics

● Exceeds Target ● Within Target Range ● Under Target

		Metric	Formula	2012 Actuals	2012 Target	Performance	Quality	Effectiveness
PEOPLE	Reported	Employee Preventable Accidents/Injuries	(# of accidents and recordable incidents-Injuries per year) / (Total # of hours worked)x200,000	3.39	0	●	2	3
		Number of customers/stakeholders attending community outreach meetings and events	Average number of attendees divided by population served number	1500	2000	●	4	4
		Overall customer satisfaction with Service Request Process	Percent of customers rating overall service request process response as "Acceptable" or better (through a representative sample customer service survey)	84%	85%	●	2	3
		Safety training	Average hours of safety-related training per employee per year	6.4	8	●	5	4
		Staff training and education - Average hours of training per year per employee	Total training hours/ total employee count	21.5	40	●	5	4
		Union grievances	Number of union grievances filed	19	17	●	5	4
		Required Consent Decree Projects: % complete	No. of Phase 1 projects complete into Phase 1 / Total number Phase 1 projects	77.6%	Per Consent Decree	N/A	5	5
		Employee Health and Safety Incident Rate	Total # of injuries & illnesses X 200,000/Total hours worked by all employees	6.77	0	●	5	2
	Target under Consideration	Customer Service Complaints	1,000X (customer service associated complaints/number of active customer accounts)	Baselining	Target under consideration			
		Customer complaints- number of customer complaints recorded	1,000X (customer service associated complaints/number of active customer accounts)	Baselining	Target under consideration			

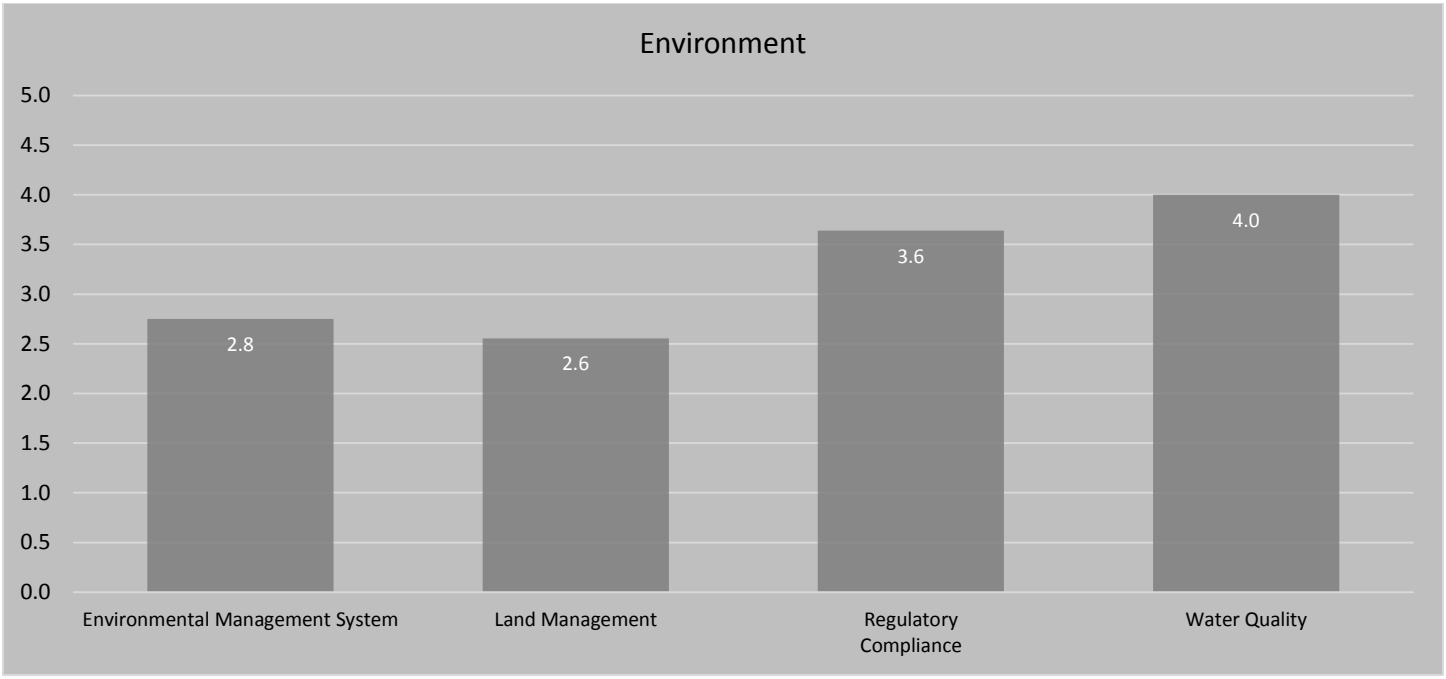
PEOPLE	
Average Quality Score:	3.62
Average Effectiveness Score:	3.62
Reported Target Percentage:	
Percentage Meet or Exceeds Target	29%
Under Target:	71%

Self-Assessment Results: Environmental

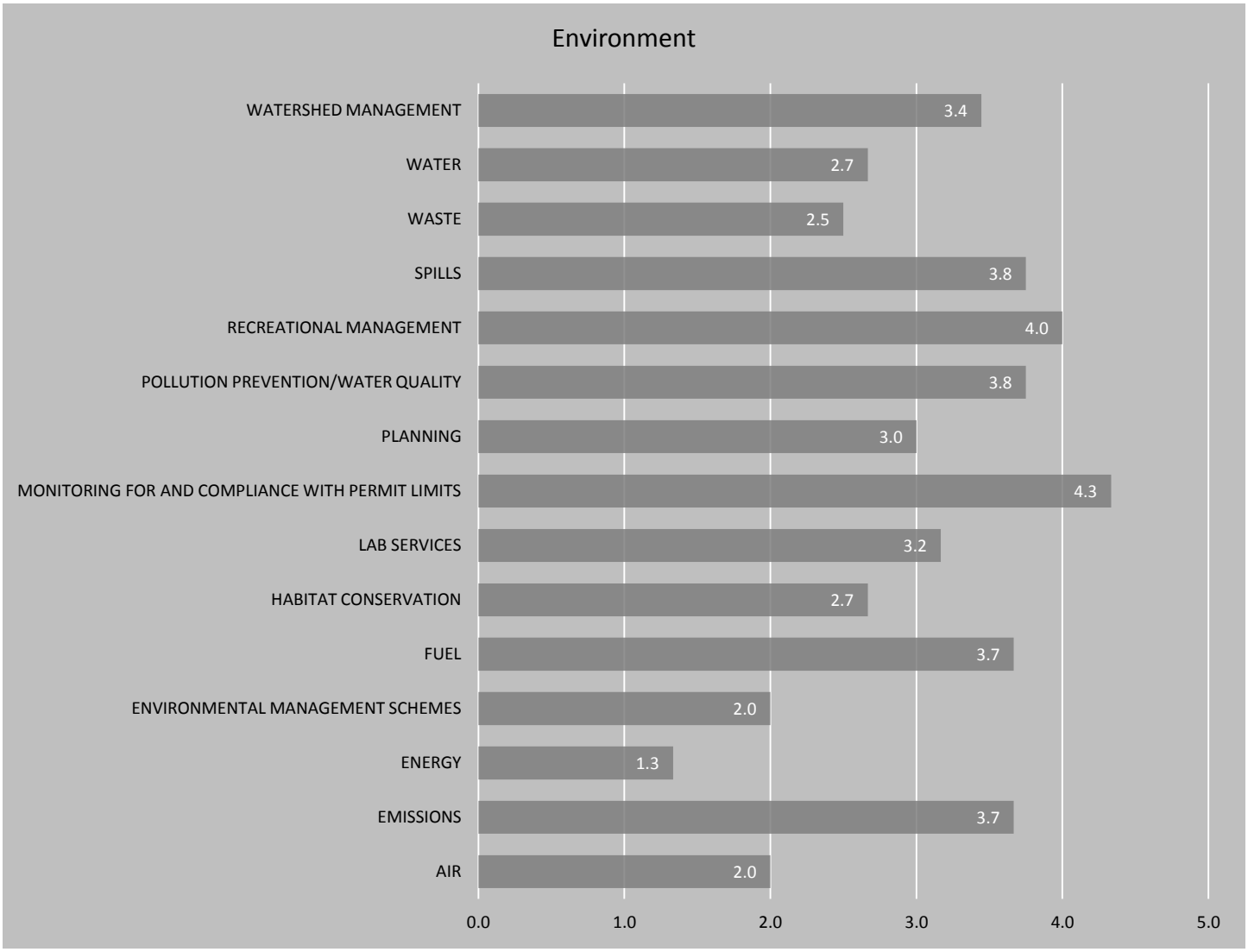
Environment—All elements pertaining to the natural environment and its interactions including living and non-living things occurring naturally including all vegetation, microorganisms, soil, rocks, air, water, climate, energy, etc.

Subcategory	Definition
Environment	
Regulatory Compliance	Regulatory compliance describes the means of conforming to a rule, such as a consent decree, specification, policy, standard, permit, or law that utilities must meet.
Water Quality	Statutory and discretionary monitoring, modeling and reporting of water quality in terms of physic/biological, chemical and aesthetic parameters.
Land Management	Management of the use and development in both urban and rural settings of land resources used for a variety of purposes which may include habitat management, organic agriculture, reforestation, water resource management and eco-tourism projects.
Environmental Management System	Management of an organization's environmental programs in a comprehensive, systematic, planned and documented manner. It includes the organizational structure, planning and resources for developing, implementing and maintaining policy for environmental protection. Serves as a tool to improve environmental performance and provides a systematic way of managing an organization's environmental affairs. It may be the aspect of the organization's overall management structure that addresses immediate and long-term impacts of its products, services and processes on the environment. Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes and focuses on continual improvement of the system.

Environment: Subcategory Scores



Environment: Breakdown by Practice Areas



Environmental Metrics

		Metric	Formula	2012 Actuals	Target	Performance	Quality	Effectiveness
ENVIRONMENT	Reported	Energy Consumption Efficiency (kWh/MG)	Direct energy consumed to collect and treat wastewater (kWh)/Volume of wastewater collected and treated (MG)	1908	1900	●	5	2
		Percent compliance with NPDES permit	Number of NPDES permit exceedances/Total number of possible NPDES permit exceedances	99.9%	100%	●	5	4
		Percent compliance with Title V permit	(Number of Title V permit exceedances)/(Total number of possible Title V permit exceedances)	98%	100%	●	5	4

ENVIRONMENT	
Average Quality Score:	5.0
Average Effectiveness Score:	3.33
Target Percentage:	
Percentage Meet or Exceeds Target	100%
Under Target:	0%

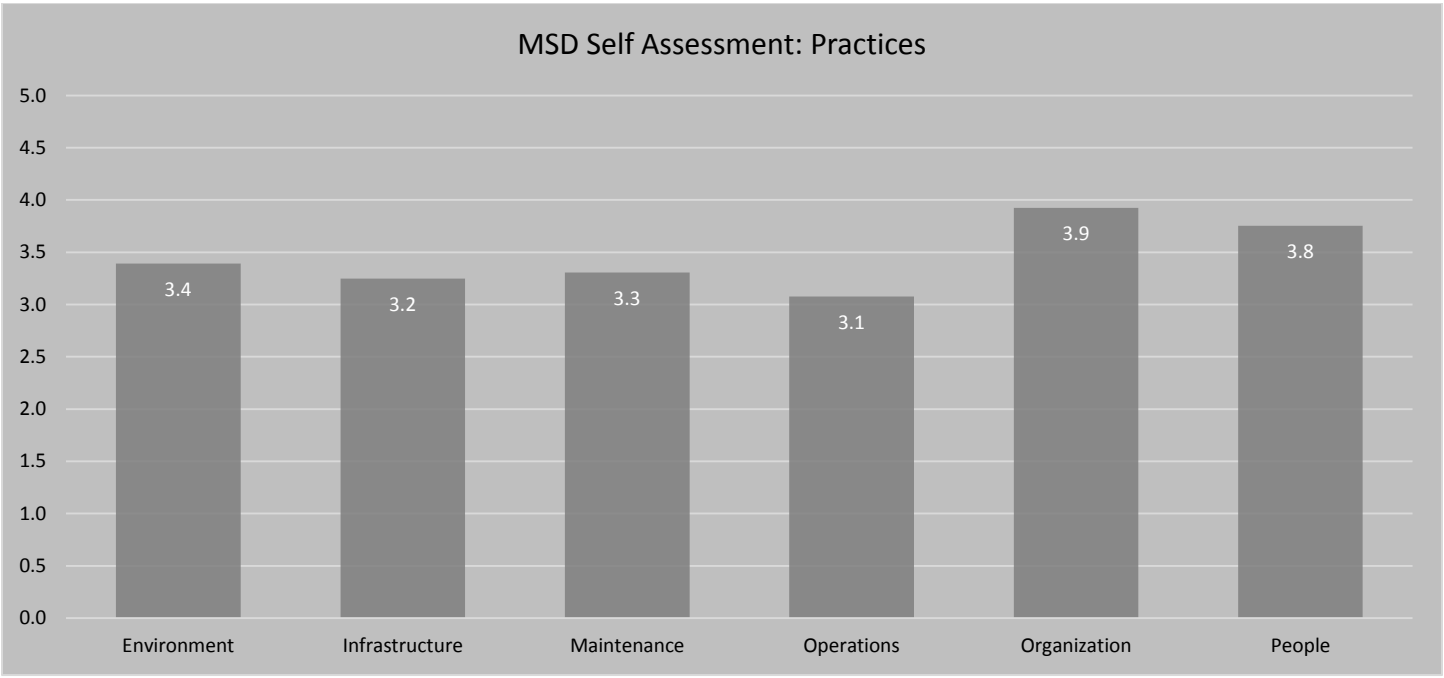
Overall Findings

Summary of Practice Findings

In mid-2013, MSD completed this self-assessment utilizing practices and metrics that are relevant to consider performance and compliance of Consent Decree requirements.

- 6 Categories
- 28 Sub-categories
- 109 Practice areas
  More than 250 measures

Practice Averages							
Average Practice Score	3.65	Average Application Score	3.26	Average Effectiveness Score	3.26	Under Target	35%



Summary of Metric Findings

Metric							
Average Quality Score	4.20	Average Effectiveness Score	3.80	Percentage Meet or Exceeds	65%	Under Target	35%

Metric Breakdown					
Environmental		**Infrastructure**		**Maintenance**	
Average Quality Score:	4.75	Average Quality Score:	4.85	Average Quality Score:	2.00
Average Effectiveness Score:	3.5	Average Effectiveness Score:	3.65	Average Effectiveness Score:	2.85
Target Percentage:		Target Percentage:		Target Percentage:	
Percentage Meet or Exceeds Target:	75%	Percentage Meet or Exceeds Target:	50%	Percentage Meet or Exceeds Target:	86%
Under Target:	25%	Under Target:	50%	Under Target:	17%
Operations		**Organization**		**People**	
Average Quality Score:	4.60	Average Quality Score:	4.92	Average Quality Score:	4.10
Average Effectiveness Score:	4.30	Average Effectiveness Score:	4.85	Average Effectiveness Score:	3.66
Target Percentage:		**Target Percentage:**		**Target Percentage:**	
Percentage Meet or Exceeds Target:	100%	Percentage Meet or Exceeds Target:	80%	Percentage Meet or Exceeds Target:	29%
Under Target:	0%	Under Target:	20%	Under Target:	71%

Benchmarking Next Steps

Path Forward

- Recruit and engage industry
    - Consent decree utilities
    - EPA, WERF, NACWA, WEF, Other
    - Seek funding from utilities and outside sources to conduct process
- Establish Steering Team
- Update benchmarking tool
    - Build on Cincinnati, EUM and other benchmarking tools and experience
    - Include metrics and practices
    - Adapt to specific utility management, environmental, regulatory, operational, and workforce challenges
- Conduct benchmarking with group of consent decree utilities- 2014
- Prepare utility and industry reports

Appendix 1

Self-Assessment Practices and Measure Results

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Environment							
Environment	Regulatory Compliance	Monitoring for and compliance with permit limits	The agency collects monitoring data to determine whether the quality and quantity of its effluent falls within permit limits.	5	5	4	4.7
Environment	Regulatory Compliance	Monitoring for and compliance with permit limits	The agency takes steps to ensure the quality and quantity of its effluent falls within permit limits.	4	4	4	4.0
Environment	Regulatory Compliance	Lab Services	The agency's laboratory information management system (LIMS) provides complete, secured access to all monitoring data, supports random sample management, handles lab inventory, and automatically generates required regulatory reports.	3	4	3	3.3
Environment	Regulatory Compliance	Lab Services	The agency has a successful program to measure the level of regulatory compliance it achieves (self-inspection, routine monitoring, periodic compliance audits, and management systems audits).	3	2	2	2.3
Environment	Regulatory Compliance	Lab Services	Routine monitoring and laboratory analyses are used by the agency to measure treatment plant removal efficiency and effluent quality.	4	4	4	4.0
Environment	Regulatory Compliance	Lab Services	The agency has a formal quality assurance/quality control plan for its analytical laboratory facilities or contract lab services.	3	3	3	3.0
Environment	Regulatory Compliance	Spills	The agency has programs to prevent the unintentional release of treatment chemicals on the plant site	3	2	3	2.7
Environment	Regulatory Compliance	Spills	The agency has a program to respond to the unintentional release of treatment chemicals on the plant site	4	4	4	4.0
Environment	Regulatory Compliance	Spills	The agency has programs to prevent the unintentional release of untreated wastewater.	5	4	4	4.3
Environment	Regulatory Compliance	Spills	The agency has a program to respond to unintentional release of untreated wastewater.	4	4	4	4.0
Environment	Regulatory Compliance	Emissions	The agency has all appropriate air permits.	5	4	4	4.3
Environment	Regulatory Compliance	Emissions	The agency has programs to collect necessary to ensure compliance with air permits.	4	3	4	3.7
Environment	Regulatory Compliance	Emissions	The agency has programs to respond to operation of emission sources outside permitted operating parameters.	3	3	3	3.0
Environment	Water Quality	Watershed Management	Activities that address pollution on a watershed basis	2	3	2	2.3
Environment	Water Quality	Watershed Management	The agency collects data regarding water quality, and identifies sources of pollution, studies the impacts on the receiving waters, tracks the pollutant concentrations over time, and develops and implements a mitigation program to improve water quality.	4	4	4	4.0
Environment	Water Quality	Watershed Management	The agency has stakeholder outreach program to educate the public about water quality issues.	4	4	4	4.0
Environment	Water Quality	Pollution Prevention/Water Quality	The agency collects data regarding water quality. They understands the impact its wastewater has on the receiving waters and takes steps to ensure the quality and quantity of its wastewater falls within agreed limits.	4	4	3	4.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Environment	Water Quality	Pollution Prevention/Water Quality	The agency has developed or actively participated in pollution prevention programs (FOG, hazmat, pharmaceuticals, etc.)	3	3	3	3.0
Environment	Water Quality	Pollution Prevention/Water Quality	The agency identifies sources of pollution, studies the impacts on the receiving waters, tracks the pollutant concentrations over time, and develops and implements a mitigation program to improve water quality.	4	4	4	4.0
Environment	Water Quality	Recreational Management	The agency participates in local and regional watershed monitoring programs to assess their impact on the watershed.	4	4	4	4.0
Environment	Water Quality	Recreational Management	The agency communicates with the public about water quality for recreation purposes.	4	4	4	4.0
Environment	Land Management	Planning	The agency's participation in local and regional land planning protects resources while balancing multiple uses.	3	3	3	3.0
Environment	Land Management	Habitat Conservation	The agency has programs to support habitat and land conservation.	3	2	3	2.7
Environment	Land Management	Environmental Management Schemes	The agency has programs to work with landowners and others to support appropriate land management activities.	2	2	2	2.0
Environment	Environmental Management System	Waste	The agency has programs to reduce/reuse the amount of solid waste it generates.	2	2	2	2.0
Environment	Environmental Management System	Waste	The agency has programs to reuse biosolids.	3	3	3	3.0
Environment	Environmental Management System	Water	The agency has a program to reuse wastewater effluent.	2	1	1	1.3
Environment	Environmental Management System	Water	The agency has a program to manage stormwater as a resource.	4	4	4	4.0
Environment	Environmental Management System	Energy	The agency measures and tracks it GHG footprint and implements programs to reduce its footprint.	2	1	1	1.3
Environment	Environmental Management System	Air	The agency has programs to improve air quality and reduce emissions.	2	2	2	2.0
Environment	Environmental Management System	Fuel	The agency has a program to reduce fuel consumption.	3	4	4	3.7
Infrastructure							
Infrastructure	Planning Policies and Procedures	Planning Policies and Procedures	The agency assigns accountabilities and responsibilities for planning policy and procedure documentation, implementation and continual improvement and links planning data and roles and responsibilities through a framework.	3	3	3	3.0
Infrastructure	Planning Policies and Procedures	Historical and Future Demands	The agency has a process and methodology for predicting future trends in demand for services based on historic and external influences, levels of service.	2	2	1.5	1.8
Infrastructure	Planning Policies and Procedures	Historical and Future Demands	The agency understand the impacts on customers of demographic changes in customer base, growth, aging infrastructure, key stakeholders, state and nature of economy, pending or proposed changes in regulations, etc.	4	4	4	4.0
Infrastructure	Planning Policies and Procedures	Risk Management	The agency has processes for identifying, quantifying, analyzing and prioritizing risks, including the understanding of its makeup and the ranking of the risks, and for managing risk reduction, including the assessment of mitigation options based on triple bottom line analysis. (Which part of the business represents the greatest risk? What is the greatest risk? Are identified risks linked to specific mitigation strategies and responsibilities? Are the risks and associated mitigation strategies tracked and reported?)	3.5	3.5	3	3.3

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Infrastructure	Planning Policies and Procedures	Alternative Evaluation (BCEs)	The agency has processes for investigating and recording alternative options to the lowest life cycle cost option for capital expenditure projects for use in decision making to select the best value option based on a triple bottom line analysis. (Are "out of the box" solutions such as "do nothing", project deferral, "manage the risk", and "non-asset" solutions and the like considered and recorded as options?)	4.5	4	4	4.2
Infrastructure	Planning Policies and Procedures	Budgeting	The agency has processes for preparing capital and operating budget projections for near, mid, and long-term timeframes and with a certain degree of accuracy.	2.5	2.5	2.5	2.5
Infrastructure	Planning Policies and Procedures	Budgeting	The agency has processes to identify cost reduction or service level improvement opportunities. (Do the budget and rate setting processes specifically and systematically consider the trade-offs among level of service, cost of service, and business risk?)	2	3	3	2.7
Infrastructure	Planning Policies and Procedures	Capital Improvement Program/Planning/ Prioritization	The agency has a formal process for planning technical upgrades, expanding capacity, coordinating with appropriate departments/agencies, and maintaining existing assets the cover both short and long term planning horizons ranging from 5 to 50 years.	4	3	3	3.3
Infrastructure	Planning Policies and Procedures	Capital Improvement Program/Planning/ Prioritization	The agency has a policy and process for the evaluation of capital expenditure projects (CIP). (Does an agency-wide uniform policy and clear CIP process exist? Does it ensure a business-like approach to capital investment decision making? Does it define roles and responsibilities for key activities?)	4	3	3	3.3
Infrastructure	Planning Policies and Procedures	Replacement and Rehabilitation Forecasting	The agency determines end of economic life/rehabilitation / replacement projects based on economic, social and environmental considerations (including physical, capacity. Level of service, and risk).	3	3	2.5	2.8
Infrastructure	Planning Policies and Procedures	Replacement and Rehabilitation Forecasting	The agency uses a process of review to ensure that the asset replacement and rehabilitation processes accommodate the business need.	3.5	3	2.5	3.0
Infrastructure	Planning Policies and Procedures	Replacement and Rehabilitation Forecasting	The agency collects asset data from maintenance, operations, and financial sources to show total cost of asset for planning rehabilitation and replacement.	3	2	2	2.3
Infrastructure	Planning Policies and Procedures	Contracts Administration	The agency has processes for contract administration. (Are processes in place for managing all the contractors necessary for the projects and their interface with the asset owner?)	4	4	2.5	3.5
Infrastructure	Planning Policies and Procedures	Program Delivery	The agency has processes for the successful program management of the asset creation or acquisition program. (Are projects systematically tracked from the strategic planning stage (project identification) through to the final service delivery including commissioning and handover?)	4	4	4	4.0
Infrastructure	Planning Policies and Procedures	Program Delivery	The agency has processes for evaluating supply or program delivery options. (Are various methods of delivery - such as internal or external resources, private / public partnerships, design and construct - considered and evaluated for each project?)	3.5	2.5	3	3.0
Infrastructure	Planning Policies and Procedures	Monitoring and Modeling	The agency has a process to regularly update its collection system hydraulic and hydrologic models.	4.75	4.5	4	4.4
Infrastructure	Planning Policies and Procedures	Monitoring and Modeling	The agency has a process to regularly update its WWTP models.	4	3.5	3	3.5

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Infrastructure	Planning Policies and Procedures	Monitoring and Modeling	The agency has modeling guidelines and standards which are periodically updated.	4.33	4	3.5	3.9
Infrastructure	Planning Policies and Procedures	Monitoring and Modeling	The agency has standard operating procedures for its flow monitoring program which are periodically updated.	5	4	4	4.3
Infrastructure	Design	Design and Equipment Policies, Procedures, and Standards	The agency administers design according to formal policies and procedures to ensure quality, cost effectiveness, and levels of service.	4	3.5	4	3.8
Infrastructure	Design	Design and Equipment Policies, Procedures, and Standards	The agency documents detailed equipment and product standards to ensure that the intended product and equipment acquired meets the standards.	4	3.5	3.5	3.7
Infrastructure	Design	Value Engineering	The agency has processes to implement value engineering. (Does the agency systematically incorporate “value engineering”? How is the optimum design assessed and adopted?)	3.5	3.5	2.5	3.2
Infrastructure	Design	Maintainability/ Operability	The agency has processes to ensure the optimum maintainability / operability of new assets is achieved. (Are design reviews systematically and thoroughly undertaken by the operations and maintenance staff prior to final design. Are these reviews carefully assessed and appropriately incorporated?)	3.5	3	2.5	3.0
Infrastructure	Construction	Construction Policies, Procedures, and Standards	The agency administers construction according to formal policies and procedures to ensure quality and cost effectiveness.	3.5	2.5	3	3.0
Infrastructure	Construction	Construction Policies, Procedures, and Standards	The agency has processes for ensuring appropriate construction standards and quality control are achieved in all asset creation and acquisition work. (Are systematic examinations of contractor work and other quality control mechanisms used?)	4	2.5	3	3.2
Infrastructure	Construction	Construction Policies, Procedures, and Standards	The agency has an effective process for inspection of new assets that ensures they meet all standards and requirements.	2.5	2.5	3	2.7
Infrastructure	Construction	Asset Commissioning	The agency has a process for asset commissioning that links the business objectives and the levels of service and is periodically reviewed to ensure that business needs are met.	3.5	2	1.5	2.3
Infrastructure	Construction	Asset Commissioning	The agency has processes for asset commissioning and handover to ensure that they comply with the standards. (Are all required O&M information collected at time of commissioning, including as-constructed drawings, operations/maintenance procedures and manuals, and maintenance programs? Is the initial “burn-in” performance of the asset reviewed and recorded?)	4.5	3	3	3.5
Infrastructure	Asset Management Knowledge/ System	Performance Monitoring and Reporting	The agency communicates asset management performance to all stakeholders.	2	2	2	2.0
Infrastructure	Asset Management Knowledge/ System	Asset Management Plans	The agency has a framework that describes the structure and essential content of Asset Management Plans to meet business needs and processes to develop and update strategic Asset Management Plans. (Is the generation of a periodic enterprise asset management plan a systematic and efficient process? For facility asset management plans?)	3.5	3	3.5	3.3
Infrastructure	Asset Management Knowledge/System	Asset Management Plans	AMPs include links to the businesses goals which are in turned linked to levels of service through customer and stakeholder expectations. (How does the plan demonstrate that it is meeting these business goals and customer expectations?)	2	2	2	2.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Infrastructure	Asset Management Knowledge/System	Asset Hierarchy/Register	The agency has processes for defining the structure of the asset register and the level of detail of asset information that is collected and managed. (Is there a defined hierarchical registry structure that is followed consistently? Is the structure and level of detail regularly reviewed? The level to which asset information is collected and the ability to amalgamate asset costs and performance.)	4	4	4	4.0
Infrastructure	Asset Management Knowledge/System	Asset Hierarchy/Register	The agency has a process to regularly update and improve the accuracy of its asset register.	4	4	4	4.0
Infrastructure	Asset Management Knowledge/System	Asset Attribute Information	The agency has processes for the collection and management of asset attribute information. (Is there a data standard defining this and how is the standard maintained? Is it clear what information is required to be collected on assets?)	4	4	4	4.0
Infrastructure	Asset Management Knowledge/System	Asset Attribute Information	The agency captures specific asset data and information including: maintenance and operating costs; failure history; failure consequences and failure likelihood, size, material, installation date, model, manufacturer, material, date deployed, spare parts and numbers, condition, spatial data, drawings, and plans.	3	3	3	3.0
Infrastructure	Asset Management Knowledge/System	Asset Valuation	The agency has processes for undertaking asset valuations. It is clearly defined how the value of assets are calculated. (Are asset valuations undertaken at the asset level and is the method documented? Is there a method to assess the quality of that valuation?)	3	3	3	3.0
Infrastructure	Asset Management Knowledge/System	Asset Life Cycle Costs	The agency has processes for assessing and documenting the life cycle cost of all assets. The roles and responsibilities are clearly defined. (Are a costs that are associated with a specific asset systematically accounted for? Are these costs archived in a readily retrievable manner?)	4	4	4	4.0
Infrastructure	Asset Management Knowledge/System	Asset Life Cycle Costs	The agency has processes to ensure that life cycle costs are incorporated into capital and operation budgets. (Are maintenance and operation costs related to a specific CIP project forecast over the expected life of the asset?)	2	2	2	2.0
Maintenance							
Maintenance	Collection	Collection Maintenance Framework	The agency has processes for setting a strategic level collection maintenance framework (such as Reliability Centered Maintenance, Zero Breakdown Maintenance, Six Sigma, etc.) that defines how the organization undertakes maintenance of its assets.(Does such a corporate wide policy exist and is it tied to business goals and cost analysis?)	5	3	3	3.7
Maintenance	Collection	Collection Maintenance Framework	The agency has assigned collection maintenance accountabilities and responsibilities, including procedure documentation, implementation, and continuous improvement.	4	3	4	3.7
Maintenance	Collection	Collection Maintenance Framework	The agency has processes for developing and maintaining collection maintenance procedures. (Are maintenance procedures periodically reviewed with respect to lowest life cycle cost at a target level of service/performance and risk? Are new assets automatically added to the review?)	4	4	4	4.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Maintenance	Collection	Collection Maintenance Strategies	The agency has processes for developing collection maintenance strategies that incorporate the overall business drivers for maintenance, capital investment, and system performance. (Do strategic Levels of Service link directly to required asset performance levels and subsequently to maintenance planning and scheduling?)	3	3	3	3.0
Maintenance	Collection	Collection Maintenance Planning & Scheduling	The agency has processes for collection maintenance planning and scheduling. (Is there a process for defining how each asset / asset type will be maintained? Is the basis for determining the maintenance procedure or activity for a single asset clear? Does this process cover all assets? Does the organization have a clear process to determine maintenance schedules or intervals for the prescribed maintenance activity for each asset?)	4	4	4	4.0
Maintenance	Collection	Collection Maintenance Planning & Scheduling	The agency chooses collection preventive and reactive maintenance depending on the size and nature of the risk and the return on investment achieved.	5	5	5	5.0
Maintenance	Collection	Collection Maintenance Planning & Scheduling	CIP projections are incorporated in the development of the collection maintenance strategy.	3	3	3	3.0
Maintenance	Collection	Collection Maintenance Work Practices	The agency receives routine feedback from all collection maintenance staff on collection maintenance procedures and implementation.	4	4	4	4.0
Maintenance	Collection	Collection Maintenance Work Practices	The agency has a resource management plan which results in efficient and timely completion of collection maintenance work.	4	4	4	4.0
Maintenance	Collection	Collection Maintenance Documentation & Data	The agency has processes for developing and maintaining contents of collection maintenance manuals and instructions and is readily available to staff. (Are new assets automatically included and how often are they reviewed? What is the process by which the responsible staff can update them? Is the format specified?)	4	3	3	3.3
Maintenance	Collection	Collection Maintenance Documentation & Data	Key maintenance changes to the collection system are properly documented. The documentation clearly indicated who made the change and why the change was made.	4	3	3	3.3
Maintenance	Collection	Collection Maintenance Documentation & Data	The agency maintains detailed collection maintenance history of its assets, including activity and timing. This information is accessible to personnel.	5	5	5	5.0
Maintenance	Collection	Collection Maintenance Costs	The agency has processes for recording and reporting collection maintenance costs down to the maintenance item level. (Are asset costs reported and accessible? Is there a clear methodology on what is required?)	3	3	3	3.0
Maintenance	Collection	Collection Maintenance Costs	The agency performs economic analyses to optimize return on investment for reactive and preventive collection strategy options.	2	2	2	2.0
Maintenance	Collection	Collection Maintenance Failure Modes	The agency has processes for predicting expected failure modes for all collection assets. (Does the organization understand the likely failure modes – that is, how the asset is likely to fail - for individual assets? Does it understand which of the major failure modes is most imminent? Does it link the imminent failure mode with projecting remaining useful life?)	4	4	4	4.0
Maintenance	Collection	Collection Maintenance Failure Modes	The agency adjusts collection maintenance procedures as a result of root cause analysis of equipment failures to prevent recurrence.	4	4	4	4.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Maintenance	Collection	Collection Maintenance Quality Control	The agency has processes for assuring the quality of collection maintenance manuals and instructions. (Do these exist and cover all business units/divisions and assets types?)	4	4	4	4.0
Maintenance	Collection	Collection Maintenance Program Review	The agency has processes to review, analyze, and if necessary update collection maintenance programs. (Have key maintenance performance indictors been adopted and reported? Are maintenance trigger points understood by all? Are maintenance strategies matched to condition and stage in the life cycle? Are "problem assets" periodically identified and associated failure modes assessed? Are failure codes relevant to the class of asset incorporated in the work order process? Is condition and other asset attribute data updated as work orders are executed and closed? Is the "return on maintenance investment" regularly calculated and reported?)	3	3	3	3.0
Maintenance	Treatment	Treatment Maintenance Framework	The agency has processes for setting a strategic level treatment maintenance framework (such as Reliability Centered Maintenance, Zero Breakdown Maintenance, Six Sigma, etc.) that defines how the organization undertakes maintenance of its assets.(Does such a corporate wide policy exist and is it tied to business goals and cost analysis?)	5	4	4	4.3
Maintenance	Treatment	Treatment Maintenance Framework	The agency periodically reviews its treatment maintenance processes to ensure that they accommodate the business need through performance standards.	5	4	4	4.3
Maintenance	Treatment	Treatment Maintenance Strategies	The agency has processes for developing treatment maintenance strategies that incorporate the overall business drivers for maintenance, capital investment, and system performance. (Do strategic Levels of Service link directly to required asset performance levels and subsequently to maintenance planning and scheduling?)	4	4	4	4.0
Maintenance	Treatment	Treatment Maintenance Planning & Scheduling	The agency has processes for treatment maintenance scheduling. (Does the organization have a clear process to determine maintenance schedules or intervals for the prescribed maintenance activity for each asset?)	5	4	4	4.3
Maintenance	Treatment	Treatment Maintenance Work Practices	The agency receives routine feedback from all treatment maintenance staff on treatment maintenance procedures and implementation.	5	3	3	3.7
Maintenance	Treatment	Treatment Maintenance Work Practices	The agency has a resource management plan which results in efficient and timely completion of treatment maintenance work.	4	4	4	4.0
Maintenance	Treatment	Treatment Maintenance Documentation & Data	The agency has processes for developing and maintaining contents of treatment maintenance manuals and instructions and is readily available to staff. (Are new assets automatically included and how often are they reviewed? What is the process by which the responsible staff can update them? Is the format specified?)	3	3	3	3.0
Maintenance	Treatment	Treatment Maintenance Documentation & Data	Key maintenance changes to the collection system are properly documented. The documentation clearly indicated who made the change and why the change was made.	3	3	3	3.0
Maintenance	Treatment	Treatment Maintenance Documentation & Data	The agency maintains detailed treatment maintenance history of its assets, including activity and timing. This information is accessible to personnel.	5	5	5	5.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Maintenance	Treatment	Treatment Maintenance Costs	The agency has processes for recording and reporting treatment maintenance costs down to the maintenance managed item level. (Are asset costs reported and accessible? Is there a clear methodology on what is required?)	4	4	4	4.0
Maintenance	Treatment	Treatment Maintenance Costs	The agency performs economic analyses to optimize return on investment for reactive and preventive treatment strategy options.	4	4	4	4.0
Maintenance	Treatment	Treatment Maintenance Consumables and Spares Management	The agency has processes for managing treatment maintenance inventory/stock, and allocates costs. (Are work orders linked to the required spare parts? Are these spare parts ordered in advance of completing the work order?)	3	2	2	2.3
Maintenance	Treatment	Treatment Maintenance Failure Modes	The agency has processes for predicting expected failure modes for all treatment assets. (Does the organization understand the likely failure modes – that is, how the asset is likely to fail - for individual assets? Does it understand which of the major failure modes is most imminent? Does it link the imminent failure mode with projecting remaining useful life?)	4	4	4	4.0
Maintenance	Treatment	Treatment Maintenance Program Review	The agency has processes to review, analyze, and if necessary update treatment maintenance programs. (Have key maintenance performance indictors been adopted and reported? Are maintenance trigger points understood by all? Are maintenance strategies matched to condition and stage in the life cycle? Are “problem assets” periodically identified and associated failure modes assessed? Are failure codes relevant to the class of asset incorporated in the work order process? Is condition and other asset attribute data updated as work orders are executed and closed? Is the “return on maintenance investment” regularly calculated and reported?)	5	5	5	5.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Framework	The agency has processes for setting a strategic level stormwater/watershed maintenance framework (such as Reliability Centered Maintenance, Zero Breakdown Maintenance, Six Sigma, etc.) that defines how the organization undertakes maintenance of its assets.(Does such a corporate wide policy exist and is it tied to business goals and cost analysis?)	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Framework	The agency has processes for developing and maintaining stormwater/watershed maintenance procedures. (Are maintenance procedures periodically reviewed with respect to lowest life cycle cost at a target level of service/performance and risk? Are new assets automatically added to the review?)	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Strategies	The agency has processes for developing stormwater/watershed maintenance strategies that incorporate the overall business drivers for maintenance, capital investment, and system performance. (Do strategic Levels of Service link directly to required asset performance levels and subsequently to maintenance planning and scheduling?)	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Strategies	The agency regularly analyses and improves the implementation of the stormwater/watershed maintenance strategy.	3	3	3	3.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Strategies	Stormwater/watershed maintenance strategies are aligned with the results of business case analyses.	2	2	2	2.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Planning & Scheduling	The agency chooses stormwater/watershed preventive and reactive maintenance depending on the size and nature of the risk and the return on investment achieved.	3	3	3	3.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Planning & Scheduling	CIP projections is incorporated in the development of the stormwater/watershed maintenance strategy.	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Work Practices	The agency receives routine feedback from all stormwater/watershed maintenance staff on stormwater/watershed maintenance procedures and implementation.	3	3	3	3.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Work Practices	The agency has a resource management plan which results in efficient and timely completion of stormwater/watershed maintenance work.	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Documentation & Data	The agency has processes for developing and maintaining contents of stormwater/watershed maintenance manuals and instructions and is readily available to staff. (Are new assets automatically included and how often are they reviewed? What is the process by which the responsible staff can update them? Is the format specified?)	1	1	1	1.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Documentation & Data	The agency maintains detailed stormwater/watershed maintenance history of its assets, including activity and timing. This information is accessible to personnel.	4	4	4	4
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Costs	The agency has processes for recording and reporting stormwater/watershed maintenance costs down to the maintenance managed item level. (Are asset costs reported and accessible? Is there a clear methodology on what is required?)	4	4	4	4
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Costs	The agency performs economic analyses to optimize return on investment for reactive and preventive stormwater/watershed strategy options.	3	3	3	3.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Failure Modes	The agency has processes for predicting expected failure modes for all stormwater/watershed assets. (Does the organization understand the likely failure modes – that is, how the asset is likely to fail - for individual assets? Does it understand which of the major failure modes is most imminent? Does it link the imminent failure mode with projecting remaining useful life?)	2	2	2	2.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Failure Modes	The agency adjusts stormwater/watershed maintenance procedures as a result of root cause analysis of equipment failures to prevent recurrence.	1	1	1	1.0
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Quality Control	The agency has processes for assuring the quality of stormwater/watershed maintenance manuals and instructions. (Do these exist and cover all business units/divisions and assets types?)	1	1	1	1.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Maintenance	Stormwater/Watershed	Stormwater/Watershed Maintenance Program Review	The agency has processes to review, analyze, and if necessary update stormwater/watershed maintenance programs. (Have key maintenance performance indictors been adopted and reported? Are maintenance trigger points understood by all? Are maintenance strategies matched to condition and stage in the life cycle? Are "problem assets" periodically identified and associated failure modes assessed? Are failure codes relevant to the class of asset incorporated in the work order process? Is condition and other asset attribute data updated as work orders are executed and closed? Is the "return on maintenance investment" regularly calculated and reported?)	2	2	2	2.0
Operations							
Operations	Collection	Collection Operations Policies and Procedures	The agency has assigned collection operation accountabilities and responsibilities, including procedure documentation, implementation, and continuous improvement. The agency periodically reviews its processes.	4	4	4	4.0
Operations	Collection	Collection Operations Policies and Procedures	The agency has processes (standard operating procedures) for the successful operation of all collection assets during normal and emergency operations. (Do such procedures exist, and do they cover all areas and assets down to the maintenance managed item level?)	4	4	4	4.0
Operations	Collection	Collection Operations Policies and Procedures	The agency manages collection operation risks through design changes and changes in collection operating procedures.	3	3	3	3.0
Operations	Collection	Collection Operations Policies and Procedures	The agency has resource allocation processes, collection operating procedures, and contingency plans that are readily available operators.	3	3	3	3.0
Operations	Collection	Collection Operations Strategy Development	The agency has a process for collection operation that links the business objectives, strategic plans, and the levels of service.	3	3	3	3.0
Operations	Collection	Collection Operations Strategy Development	There are defined levels of service with defined measures to meet the collection operational strategies and maintain regulatory compliance.	4	3	3	3.3
Operations	Collection	Collection Operational Knowledge	As part of its risk management processes, asset consequence of failure and likelihood is defined and this information is available to and understood by operations, CIP managers, and is incorporated into collection tools.	5	5	5	5.0
Operations	Collection	Collection Operational Knowledge	The agency has processes for tracking and reporting collection operational costs. (Are these costs capable of being aggregated from a suitably low asset level up to a facility level and reported on?)	4	4	4	4.0
Operations	Collection	Collection Operational Knowledge	The agency uses operational models for the collection system.	3	3	3	3.0
Operations	Collection	Collection Operations Data & Documentation	The agency has data on operational history and operational aspects of collection asset failure. Operational data is sufficient for day to day operations, meeting levels of service, regulatory compliance, and continuous improvement. Collection operating data is readily accessible to operations and CIP managers.	3	3	3	3.0
Operations	Collection	Collection Operations Data & Documentation	The agency has processes for developing and maintaining collection operation manuals. (Are new assets automatically included; are they periodically updated and purged?)	3	3	3	3.0
Operations	Collection	Collection Operations	The agency routinely monitors collection assets to ensure they	4	4	4	4.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
		Monitoring	are available to operate when needed.				
Operations	Collection	Collection Operations Productivity Optimization	Collection maintenance and operations work groups have been formed and meet regularly to maximize efficiency and effectiveness.	4	4	4	4.0
Operations	Collection	Collection Operations Productivity Optimization	The agency operates collection assets so that the greatest productivity is achieved by providing the required level of service for the lowest cost.	4	4	4	4.0
Operations	Collection	Collection Operations Modeling & Wet Weather Management	The agency collects data on collection system flows and rainfall data for troubleshooting and/or modeling.	4	4	4	4.0
Operations	Collection	Collection Operations Modeling & Wet Weather Management	The agency has a formal wet weather management protocols to prepare for and manage high flow and overflow conditions in the collection system.	2.5	2	2	2.2
Operations	Collection	Collection Operations Energy Management	The agency has a formal documented program and processes to reduce energy consumption in the collection system.	2	2	2	2.0
Operations	Collection	Collection Operations Emergency Response	The agency has a comprehensive emergency response plan that addresses all major circumstances that could disrupt normal collection operations. The plan is reviewed, updated, and tested with strong processes to ensure response team, regulators, government agencies, media, and the general public are informed of the collection emergency situation.	3	3	3	3.0
Operations	Collection	Collection Operations Emergency Response	The agency investigates the causes of collection emergencies and takes the necessary corrective actions to prevent a recurrence.	4	4	4	4.0
Operations	Treatment	Treatment Operations Policies and Procedures	The agency has processes (standard operating procedures) for the successful operation of all treatment assets during normal and emergency operations. (Do such procedures exist, and do they cover all areas and assets down to the maintenance managed item level?)	4	3	3	3.3
Operations	Treatment	Treatment Operations Policies and Procedures	The agency manages treatment operation risks through design changes and changes in collection operating procedures.	3	3	3	3.0
Operations	Treatment	Treatment Operations Strategy Development	The agency has a process for treatment operation that links the business objectives and the levels of service.	4	4	4	4.0
Operations	Treatment	Treatment Operations Strategy Development	There are defined levels of service with defined measures to meet the treatment operational strategies and maintain regulatory compliance.	4	4	4	4.0
Operations	Treatment	Treatment Operational Knowledge	As part of its risk management processes, asset consequence of failure and likelihood is defined and this information is available to and understood by operations, CIP managers, and is incorporated into treatment models.	3	2	2	2.3
Operations	Treatment	Treatment Operational Knowledge	The agency has processes for tracking and reporting treatment operational costs. (Are these costs capable of being aggregated from a suitably low asset level up to a facility level and reported on?)	2	2	2	2.0
Operations	Treatment	Treatment Operational Knowledge	The agency uses operational models of the treatment system.	4	3	4	3.7
Operations	Treatment	Treatment Operations Documentation	The agency has processes for developing and maintaining treatment operation manuals. (Are new assets automatically included; are they periodically updated and purged?)	3	3	3	3.0
Operations	Treatment	Treatment Operations Monitoring	The agency routinely monitors treatment assets to ensure they are available to operate when needed.	3	3	3	3.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Operations	Treatment	Treatment Operations Productivity Optimization	Treatment maintenance and operations work groups have been formed and meet regularly to maximize efficiency and effectiveness.	3	4	4	3.7
Operations	Treatment	Treatment Operations Productivity Optimization	The agency operates treatment assets so that the greatest productivity is achieved by providing the required level of service for the lowest cost.	3	3	3	3.0
Operations	Treatment	Treatment Operations Modeling & Wet Weather Management	The agency collects data on treatment system flows and rainfall data for troubleshooting and/or modeling.	4	3	3	3.3
Operations	Treatment	Treatment Operations Modeling & Wet Weather Management	The agency has a formal wet weather management program to prepare for and manage high flow and overflow conditions in the treatment system.	4	4	4	4.0
Operations	Treatment	Treatment Operations Consumables Management	The agency has processes for managing treatment operations inventory/stock, and allocates costs against the treatment system across the organization. (Are work orders linked to the required spare parts? Are these spare parts ordered in advance of completing the work order?)	3	4	4	3.7
Operations	Treatment	Treatment Operations Energy Management	The agency has a formal documented program and processes to reduce energy consumption in the treatment system.	2	4	3	3.0
Operations	Treatment	Treatment Operations Emergency Response	The agency has a comprehensive emergency response plan that addresses all major circumstances that could disrupt normal treatment operations. The plan is reviewed, updated, and tested with strong processes to ensure response team, regulators, government agencies, media, and the general public are informed of the treatment emergency situation.	3	3	3	3.0
Operations	Treatment	Treatment Operations Emergency Response	The agency investigates the causes of treatment emergencies and takes the necessary corrective actions to prevent a recurrence.	2	3	3	2.7
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Policies and Procedures	The agency has processes (standard operating procedures) for the successful operation of all stormwater/watershed assets during normal and emergency operations. (Do such procedures exist, and do they cover all areas and assets down to the maintenance managed item level?)	3	3	3	3.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Policies and Procedures	The agency manages stormwater/watershed operation risks through design changes and changes in stormwater/watershed operating procedures.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Policies and Procedures	The agency has a resource allocation process which results in efficient and timely completion of stormwater/watershed operation work.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	The agency has a process for stormwater/watershed operation that links the business objectives and the levels of service.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	The agency uses a combination of internal and external resources to deliver stormwater/watershed operations best value.	3	3	3	3.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	The agency has a stormwater/watershed operation level of service tied to performance standards.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	The stormwater/watershed operational business plan links to the strategic plan.	2	2	2	2.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	There are defined levels of service with defined measures to meet the stormwater/watershed operational strategies and maintain regulatory compliance.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Strategy Development	Business processes are structured and implemented to maintain the desired stormwater/watershed levels of service with clearly defined roles and responsibilities.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operational Knowledge	As part of its risk management processes, asset consequence of failure is defined and this information is available to and understood by operations, CIP managers, and is incorporated into stormwater/watershed models.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operational Knowledge	The agency has processes for tracking and reporting stormwater/watershed operational costs. (Are these costs capable of being aggregated from a suitably low asset level up to a facility level and reported on?)	3	3	3	3.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operational Knowledge	The agency uses operational models of the stormwater/watershed system.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Data & Documentation	The agency has data on operational history and operational aspects of stormwater/watershed asset failure. Operational data is sufficient for day to day operations, meeting levels of service, regulatory compliance, and continuous improvement. Stormwater/watershed operating data is readily accessible to operations, CIP managers, and models.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Monitoring	The agency participates in local and regional watershed monitoring programs to assess their impact on the watershed.	4	4	4	4.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Monitoring	The operations of the stormwater/watershed system are continuously monitored and controlled.	3	3	3	3.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Inspection	The agency has process for inspection of new stormwater/watershed assets that ensures they meet standards.	3	3	3	3.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Modeling	The agency collects data on stormwater/watershed system flows and rainfall data for troubleshooting and/or modeling.	4	4	4	4.0
Operations	Stormwater/Watershed	Stormwater/Watershed Wet Weather/Overflow Management	The agency has a wet weather management program to prepare for and manage high flow and overflow conditions in the stormwater/watershed system.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Energy Management	The agency has a formal documented program and processes to reduce energy consumption in the stormwater/watershed system.	2	2	2	2.0
Operations	Stormwater/Watershed	Stormwater/Watershed Coordination	The agency has established partnerships with other government organizations, environmental groups (NGOs), districts, and authorities to manage regional watershed issues.	4	4	4	4.0
Operations	Stormwater/Watershed	Stormwater/Watershed Coordination	The agency's participation in local and regional land planning protects resources while balancing multiple uses.	4	4	4	4.0
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Emergency Response	The agency has a comprehensive emergency response plan that addresses all major circumstances that could disrupt normal stormwater/watershed operations. The plan is reviewed, updated, and tested with strong processes to ensure response team, regulators, government agencies, media, and the general public are informed of the stormwater/watershed emergency situation.	3	3	3	3.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Operations	Stormwater/Watershed	Stormwater/Watershed Operations Emergency Response	The agency investigates the causes of stormwater/watershed emergencies and takes the necessary corrective actions to prevent a recurrence.	3	3	3	3.0
Organization							
Organization	Financial Management	User Rate Affordability	The agency uses its rate structure to influence customer behavior (conserving water, using reclaimed water, etc.).	5	2	4	3.7
Organization	Financial Management	User Rate Affordability	The agency conducts analyses of customer rates and account information and uses this information in the long-range planning process.	5	5	4	4.7
Organization	Financial Management	User Rate Affordability	The agency has a process to measure the affordability of its program to its stakeholders and adjust if it becomes unaffordable to stakeholders.	3	3	3	3.0
Organization	Financial Management	Costs	The agency has financial performance targets.	5	5	5	5.0
Organization	Financial Management	Costs	The agency has a process to measure and track operating expenditures.	5	5	3	4.3
Organization	Financial Management	Costs	The agency has a process to measure the cash contributed to capital.	5	5	5	5.0
Organization	Financial Management	Revenue	The agency has an effective financial planning process (with checkpoints throughout the year) to ensure it has the capital and cash it needs to meet its business plan.	4	4	3	3.7
Organization	Financial Management	Revenue	The agency measures revenue from users and special revenue funds.	5	5	5	5.0
Organization	Financial Management	Debt	The agency measures total debt and debt service coverage.	5	5	5	5.0
Organization	Financial Management	Debt	The agency measures total debt service to total operating.	5	5	5	5.0
Organization	Financial Management	Planning	The agency has a system to record and store asset cost information, chart of accounts, general ledger, approved budget appropriations, encumbrances, etc.	5	5	2	4.0
Organization	Financial Management	Bonding Capacity/ Rating	The agency maintains a bond rating that meets their financial and business needs. (AAA = best, Junk bonds = worst)	5	5	4	4.7
Organization	Risk Management	Risk and Vulnerability Assessments	The agency has a formal program that is reviewed and updated annually to manage financial risks related to operations and capital investments with support from all departments and used to consider day to day operations. Recommendations are implemented.	3	5	3	3.7
Organization	Risk Management	Strategy	The agency has processes for analyzing risks and implementing mitigation measures based on the greatest benefit, including the understanding of its makeup and the ranking of the risks. (Which part of the business represents the greatest risk? What is the greatest risk?)	5	4	5	4.7
Organization	Risk Management	Strategy	The agency has a corporate risk policy and framework and identifies and prioritizes risks annually.	4	5	3	4.0
Organization	Risk Management	Strategy	The agency has a strategy to weigh costs versus benefits to reduce risk exposure.	4	4	3	3.7
Organization	Risk Management	Alternatives	The agency has processes for identifying and tracking capital risks, including the assessment of mitigation options. (Are identified risks linked to specific mitigation strategies and responsibilities? Are the risks and associated mitigation strategies tracked and reported)	5	5	3	4.3
Organization	Strategic/Business Planning	Industry Leadership	The agency stays abreast of industry trends, has a methodology for adopting needed changes, and a plan to implement that	4	4	4	4.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
			benefits the agency.				
Organization	Strategic/Business Planning	Industry Leadership	The agency supports and participates in industry organizations and events.	4	5	5	4.7
Organization	Strategic/Business Planning	Policies and Procedures	The agency's strategic planning process is based on the agency's vision and mission and level of service which include performance measures that are tracked. Efforts are coordinated with other entities (County, utilities, etc.).	5	4	3	4.0
Organization	Strategic/Business Planning	Policies and Procedures	Strategic and business plans clearly define who, or which departments, are responsible for each task.	5	4	3	4.0
Organization	Strategic/Business Planning	Policies and Procedures	The agency tracks and communicates progress on meeting strategic plan objectives.	5	3	2	3.3
Organization	Strategic/Business Planning	Mission, Vision, Values, Goals, Strategy, LOS	The agency's strategic or business plan commit to long term environmental, economic, and social goals.	5	5	4	4.7
Organization	Strategic/Business Planning	Mission, Vision, Values, Goals, Strategy, LOS	The agency reconciles possible and proposed levels of service against the economic, social and environmental requirements.	5	5	5	5.0
Organization	Strategic/Business Planning	Mission, Vision, Values, Goals, Strategy, LOS	The agency knows the customer expectation regarding levels of service and price.	2	2	2	2.0
Organization	Legal	Internal and External Counsel	Legal documents are efficiently and effectively reviewed in a timely manner.	4	4	4	4.0
Organization	Legal	Internal and External Counsel	The agency works to prevent sewer backups in households.	5	5	5	5.0
Organization	Legal	Internal and External Counsel	The agency works to obtain favorable rulings in court cases.	5	5	4	4.7
Organization	Legal	Contracts Administration	The agency has processes for contract administration. (Are processes in place for managing all the contractors necessary for the projects and their interface with the asset owner?)	4	5	4	4.3
Organization	Legal	Contracts Administration	The agency has processes to ensure high quality contracts / specifications for contracts and service agreements. (Do contracts deliver the full requirements of the organization and are they regularly updated?)	5	3	4	4.0
Organization	Quality	Quality Control and Assurance	The agency has established control and resourcing of its processes and procedures.	3	3	3	3.0
Organization	Quality	Quality Control and Assurance	The agency has an audit to assess compliance with processes and procedures and identifies and documents opportunities for improvement.	5	5	3	4.3
Organization	Quality	Quality Control and Assurance	The agency has processes for internal quality assurance. (Are internal review processes in place to ensure that those best appropriate asset management practices adopted by the business are followed across all business units?)	3	3	3	3.0
Organization	Quality	Quality Improvement	The agency requires that improvements and recommendations are addressed and implementation is tracked and reported.	3	3	2	2.7
Organization	Quality	Quality Improvement	The employees of the agency are continually developing and implementing way to improve efficiency and effectiveness.	4	3	3	3.3
Organization	TBL Policy and Reporting	Business Case Evaluations	The agency used business case evaluations that consider environmental, economic, and social considerations to guide decisions.	5	3	3	3.7
Organization	TBL Policy and Reporting	Performance Indicators and Targets	The agency has established quantified targets for improvement in environmental, social and economic performance.	2	2	2	2.0
Organization	TBL Policy and Reporting	Performance Indicators and Targets	Targets address using all TBL dimensions, future service levels, and the consequence of providing those service levels.	4	2	3	3.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
Organization	TBL Policy and Reporting	Performance Indicators and Targets	The agency selects KPIs and has a mechanism to ensure that they are interpreted consistently. Targets are specific, measurable, achievable, realistic and time-bound.	5	3	3	3.7
Organization	TBL Policy and Reporting	Performance Indicators and Targets	The agency reports on TBL results and successes, has continuous improvement, and is implemented throughout project lifecycles.	2	2	2	2.0
Organization	Enterprise Document Management	Document Retention, Storage, and Recovery	The agency has a process for document retention at each stage of a project that is adhered to by employees and internal and external stakeholders.	3	2	4	3.0
Organization	Enterprise Document Management	Document Retention, Storage, and Recovery	The agency has processes for data searching, mining, and destruction.	4	4	4	4.0
Organization	Enterprise Document Management	Document Retention, Storage, and Recovery	The agency has an easily accessible system that produces documents in a timely manner to address the request of internal and external users.	4	4	4	4.0
Organization	Security	Facility Security	The agency takes appropriate measures to protect its property and facilities from unauthorized entry and activity.	4	3	3	3.3
Organization	IT	Spatial Data	The agency has accurate spatial data stored within GIS, especially all linear assets and locations of facilities, and has a mechanism in place to update the data on a regular basis.	3	4	4	3.7
Organization	IT	Spatial Data	The agency has measures in place to assure that the data which is held in the system has been subject to verification. The data verified or verification carried out statistically.	4	4	4	4.0
Organization	IT	Accessibility and Controls	The agency has information management measures and support in place to access, manipulate, and transfer data easily and securely when needed.	2	4	3	3.0
Organization	IT	Accessibility and Controls	The agency's information systems are well integrated. (The information systems are linked and data can be accessed from different access / entry points, e.g. GIS /CMMS. Only one point of data input is required.)	2	4	3	3.0
Organization	IT	Information Management Strategy	The agency appropriately invests in information technology to address business issues and maximize return on investment.	4	4	3	3.7
Organization	Procurement	Policies and Procedures	The agency uses a structured supplier evaluation process to ensure that the best value for money is achieved through the procurement process.	4	5	4	4.3
Organization	Procurement	Policies and Procedures	The agency has procurement policies and procedures which include small business participation.	5	5	5	5.0
Organization	Procurement	Policies and Procedures	The agency has processes for assessing and selecting procurement of good and services. (Is there a systematic process for different sized jobs? Is more than cost taken into account?)	5	5	5	5.0
People							
People	Workforce	Leadership Development	The agency has processes and practices in place to support leadership development.	3	3	3	3.0
People	Workforce	Core Competencies	The agency has clearly defined roles and responsibilities for all job positions with individual accountability for job performance.	4	3	2	3.0
People	Workforce	Core Competencies	Practices for person/professional development are in place related to knowledge management and employee retention.	3	3	3	3.0
People	Workforce	Core Competencies	The agency has processes for reviewing whether the appropriate skills and staff numbers are available. (Can the required skills be accessed? Are staff levels appropriate for implementing best practices?)	4	2	2	2.7
People	Workforce	Succession Planning	The agency has formal objectives related to knowledge sharing	4	2	2	2.7

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
			and processes for succession planning.				
People	Workforce	Recruitment and Retention	The agency develops and retains engaged employees for the agency's future success.	4	3	3	3.3
People	Workforce	Recruitment and Retention	The agency does a good job of attracting and hiring qualified staff that are a "good fit" with position requirements in a timely manner.	3	2	2	2.3
People	Workforce	Human Resource Management	The agency has written policies to ensure a fair workplace according to equal opportunity regulations.	4	4	4	4.0
People	Workforce	Human Resource Management	The agency is committed to equal opportunity and equal treatment of all employees regardless of age, sex, race, religion, or other workforce diversity issues.	4	4	3	3.7
People	Workforce	Human Resource Management	The agency provides its employees with a comprehensive benefits package, including health insurance, short-term disability, and long-term disability insurance protection.	5	5	4	4.7
People	Workforce	Deployment of Personnel	Employee roles and responsibilities are clear at the agency and people are sure about what to do in specific situations.	5	4	4	4.3
People	Workforce	Deployment of Personnel	The agency has processes for matching skills to the demand for services / activities and allocating resources across the organization. (Is resource demand for designated maintenance skills matched with available supply? Is it across the organization?)	3	3	3	3.0
People	Workforce	Deployment of Personnel	The agency has processes for planning future work load and required resources. (Does the organization predict and balance future work load for different skills and numbers of staff for all life cycle functions?)	3	3	2	2.7
People	Workforce	Deployment of Personnel	The agency has as process to measure employee performance and implement recommendations.	5	2	2	3.0
People	Workforce	Training	The agency has formal programs for training, certification, and education.	5	4	4	4.3
People	Workforce	Training	The agency has implemented skills-based incentives to encourage employees to learn new skills.	2	2	2	2.0
People	Workforce	Training	Employees receive adequate training to successfully complete their jobs.	3	3	3	3.0
People	Workforce	Employee Performance, Reward, and Recognition	A formal employee recognition and reward system has been implemented.	3	3	3	3.0
People	Workforce	Employee Well-Being and Satisfaction	The agency has processes in place to encourage and track employee health and wellness.	5	4	4	4.3
People	Workforce	Labor-Management Relations	Labor (unions) and management work together effectively to improve working conditions.	5	3	3	3.7
People	Workforce	Labor-Management Relations	Labor (unions) and management at the agency work together to develop new job classifications and pay systems that are flexible and support strategic direction.	5	5	3	4.3
People	H&S	Lost Productivity	Safety is tracked with performance measures (lost work days, lost time-accidents, absenteeism, work related fatalities, injuries, occupational diseases, etc.).	5	5	4	4.7
People	H&S	Education and Training	The agency's employees receive education and training on health and safety topics, including OSHA, hazmat, confined space entry, etc.	5	5	4	4.7

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
People	H&S	Education and Training	Health and safety training and equipment provided to employees conforms to the highest industry standards considering the job classification, type of work performed, and risk exposure of each employee.	5	4	3	4.0
People	H&S	Agreements	Health and safety is covered in agreements between the agency and unions.	5	4	3	4.0
People	H&S	Agreements	The agency has a formal health and safety program.	4	2	2	2.7
People	Stakeholder Management	Media and/or Stakeholder Communications	The agency effectively uses different media outlets to communicate with its customers and gets feedback to ensure that the methods are effective.	4	4	4	4.0
People	Stakeholder Management	Government/Agency/ NGO Relationships	Representatives of the agency regularly interact with local, state/province, and federal government entities and maintains a proactive dialogue and overall good communication with regulators.	5	5	5	5.0
People	Stakeholder Management	Government/Agency/ NGO Relationships	The agency proactively participates in legislative and regulatory affairs that affect the agency.	5	5	5	5.0
People	Stakeholder Management	Government/Agency/ NGO Relationships	The agency works with other local governments to coordinate efforts and manage the interface on projects (road/sewer).	5	5	5	5.0
People	Stakeholder Management	Government/Agency/ NGO Relationships	The agency has established partnerships with other government organizations, environmental groups (NGOs), districts, and authorities to manage regional watershed issues.	5	5	5	5.0
People	Stakeholder Management	Targeted Public Relations Programs	The agency provides clear, accurate, easy to understand information about the agency and its services to customers through a number of different programs., such as social media, print media, etc.	5	5	4	4.7
People	Stakeholder Management	Targeted Public Relations Programs	The agency has an active education and outreach program to involve customers in planning and decision-making processes, especially for rate-making, capital improvements, and permitting.	4	4	4	4.0
People	Stakeholder Management	Stakeholder Involvement	The agency knows their stakeholders, has regular communications with stakeholders, and solicits and acts on stakeholder feedback.	5	5	4	4.7
People	Stakeholder Management	Stakeholder Involvement	There is adequate representation of environmental, social oriented and economically focused organizations.	5	5	5	5.0
People	Stakeholder Management	Stakeholder Involvement	The agency's reporting (internal or external) is developed in conjunction with stakeholders.	5	5	5	5.0
People	Stakeholder Management	Stakeholder Involvement	The agency's key information is available to customers and the general public.	5	5	5	5.0
People	Stakeholder Management	Customer Service	The agency has processes for handling customer and stakeholder complaints. (Are these tracked through the business from receipt to resolution? Is the customer kept informed of the progress of the complaint?)	4	4	4	4.0
People	Stakeholder Management	Customer Service	Customer service guidelines are provided to all employees (covering telephone etiquette, field repairs, response times, and follow up) on an on-going basis.	3	2	2	2.3
People	Stakeholder Management	Customer Service	The agency ensures that field staff know basic things about agency operations, have information about current events, and know where to refer customers for more information.	4	3	2	3.0
People	Stakeholder Management	Disruptions of Sewer Service	The agency has systems and performance target to mitigate and effectively respond to sewer disruptions.	5	5	5	5.0
People	Communications	Customer Satisfaction	The agency has a multi-channel (phone, web, etc.) contact center	3	3	3	3.0

Category	Subcategory	Practice	Measure	Documentation	Application	Effectiveness	MSD Total Score
			where customers can contact one location for anything the need, including service activation and termination, account information and bill payment, information inquires and complaints.				
People	Communications	Employee Communication	Information regarding agency organization and management are effectively communicated to all employees.	3	3	3	3.0

Appendix 2

Index of Measures

Category	Practice	Definition
Environment		
Environment	Air	Processes to manage air emissions.
Environment	Emissions	Management around the unintentional release of a gas.
Environment	Energy	Processes to manage the energy cycle.
Environment	Environment	All elements pertaining to the natural environment and its interactions including living and non-living things occurring naturally including all vegetation, microorganisms, soil, rocks, air, water, climate, energy, etc.
Environment	Environmental Management System	Management of an organization's environmental programs in a comprehensive, systematic, planned and documented manner. It includes the organizational structure, planning and resources for developing, implementing and maintaining policy for environmental protection. Serves as a tool to improve environmental performance and provides a systematic way of managing an organization's environmental affairs. Is the aspect of the organization's overall management structure that addresses immediate and long-term impacts of its products, services and processes on the environment. Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes and focuses on continual improvement of the system.
Environment	Fuel	Processes to manage the consumption and production of fuel.
Environment	Habitat Conservation	Land management practice that seeks to conserve, protect and restore habitat areas for wild plants and animals, especially conservation reliant species, and prevent their extinction, fragmentation or reduction in range.
Environment	Lab Services	Testing, sampling, and analytical methods used by a laboratory to ensure compliance with regulations.
Environment	Planning	Planning regarding the use and development in both urban and rural settings of land resources used for a variety of purposes which may include organic agriculture, reforestation, water resource management and eco-tourism projects.
Environment	Pollution Prevention/Water Quality	Activities that reduce the amount of pollution released into the wastewater system.
Environment	Recreational Management	Processes to manage water quality as it pertains to the use of water for recreational activities.
Environment	Spills	Management around the unintentional release of a liquid.
Environment	Waste	Processes to manage the production and disposal of waste, which are materials that are not prime products for which the user has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded.
Environment	Water Quality	Statutory and discretionary monitoring, modeling and reporting of water quality in terms of physic/biological, chemical and aesthetic parameters to assure that all parts of the supply system deliver water quality to required standards. Measures to include chlorine residual, plate counts, fiscal and total coliforms, turbidity, magnesium, iron, acidity, taste.
Infrastructure		
Infrastructure	Alternative Evaluation (BCEs)	Identify the need, timing and phasing for system augmentation, reconfiguration or asset disposal by considering demand projections, level of service, the capability of the existing asset, various alternative service levels and supply alternatives, and demand management options. Ensure that all alternatives are identified, analyzed and the optimal solution from a social, economic and environmental perspective is identified.

Category	Practice	Definition
Infrastructure	Asset Attribute Information	Data related to an asset.
Infrastructure	Asset Commissioning	Asset commissioning includes: a) Formal and documented testing procedures and results b) Review and archiving of technical information package d) Asset entry into the asset register e) Post acceptance design and standards review
Infrastructure	Asset Hierarchy/Register	Asset/Equipment register is a register kept of all operational assets and equipment. The register holds asset and equipment details necessary and sufficient to manage the operation, maintenance and replacement of the asset and for valuation of the asset through out its life and includes: a) register of assets and equipment b) logical structure c) equipment identification code d) physical details of equipment e) appropriate resolution f) links to asset performance history g) links to asset valuation, remaining life h) records of replaced and replacement equipment.
Infrastructure	Asset Life Cycle Costs	Total cost of ownership over the life of an asset, referred to as "cradle to grave".
Infrastructure	Asset Management Knowledge/System	The asset management system comprises the agency asset management policy, asset management objectives, asset management strategy, asset management plans, and the activities, processes and organizational structures necessary for their development, implementation and continual improvement.
Infrastructure	Asset Management Plans	Asset management plans are produced as part of the agency's short and long term business planning process. This process considers the following: a) Business objective linkages to AMPs b) Asset acquisition c) Operations d) Maintenance e) Replacement and rehabilitation f) Service supply/resourcing g) Integrated asset management planning
Infrastructure	Asset Performance, Reliability, and Utilization	Ability of asset to perform and maintain its required functions. Measure of how much an asset is used.
Infrastructure	Asset Valuation	Process of estimating the worth of an asset.
Infrastructure	Budgeting	Budgeting addresses the allocation of available budgetary resources to improve the productivity of scarce resources and to improve the efficiency and effectiveness of the planning and budgetary process through the use of business cases.
Infrastructure	Capital Improvement Program/Planning/ Prioritization	Capital program prioritization includes the processes and procedures that govern how the agency prioritizes investments. The approach to prioritization should support the agency's policies for investment decision making, which in turn should support the achievement of the agency's objectives. Aspects considered include: a) Governance and policy b) Management of inputs to prioritization c) Capital prioritization d) Managing program volatility or uncertainty e) Program deliverability f) Monitoring and reporting of outcomes
Infrastructure	Construction Policies, Procedures, and Standards	Principles or rules to guide decisions and achieve rational outcomes as they pertain to construction. Political, management, financial, and administrative mechanisms arranged to reach construction goals. Includes support documentation that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the construction policy.
Infrastructure	Contracts Administration	Management of contracts, includes negotiating the terms and conditions in contracts and ensuring compliance with the terms and conditions, as well as documenting and agreeing on any changes or amendments that may arise during its implementation or execution. Process of systematically and efficiently managing contract creation, execution, and analysis for the purpose of maximizing financial and operational performance and minimizing risk.
Infrastructure	Design and Equipment Policies, Procedures, and Standards	Design procedure manuals are documented and cover the internal and external procedures from conceptual design through to configuration management.
Infrastructure	Historical and Future	Project future demands using historical demands and projections of customer growth, climate, usage patterns, residential-commercial-industrial use, alternative

Category	Practice	Definition
	Demands	technologies, fire-flow, inflow/infiltration, water loss, water sensitive design and reuse, and include a measure of confidence in those projections. This covers the need for system augmentation, configuration change or asset disposal and is managed using the growth and level of service projections in conjunction with the monitoring and analysis of current demands to provide risk based “just in time" augmentation.
Infrastructure	Maintainability/ Operability	Ensure there is input to both concept and detailed design by maintenance and operations personnel, and constructors, both in the selection of equipment and its configuration.
Infrastructure	Monitoring and Modeling	The use of models to make decisions.
Infrastructure	Performance Monitoring and Reporting	The performance monitoring and reporting process refers to the establishment of a framework for asset management performance reporting. The framework should include tools, reports, reporting frequencies and responsibilities and authorities for review and action of those reports.
Infrastructure	Planning Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to planning. Political, management, financial, and administrative mechanisms arranged to reach planning goal, organizational values, and levels of service. Includes support documentation that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the planning policy.
Infrastructure	Program Delivery	Program delivery refers to the: - ability to schedule and complete capital programs as planned in order to meet service level outcomes such as meeting demand by building additional capacity, or meeting legislative/regulatory requirements through treatment plant upgrades, or reducing service loss or risk exposure through renewal projects. - monitoring and reporting of capital program performance in order to manage the program and timeliness of commissioning, and on-budget delivery - ability to manage changes to the program, where emergent works modify priorities, or where external influences limit or enhance the ability to deliver a program of work.
Infrastructure	Replacement and Rehabilitation Forecasting	Replacement and rehabilitation forecasting determines the optimal time to replace or rehabilitate the asset such that business objectives are met at the lowest triple bottom line life cycle cost.
Infrastructure	Risk Management	Assessment that evaluates the likelihood and consequence of failure as they pertain to planning level decisions, projects, etc, and leads to the development of feasible and effective risk mitigation strategies.
Infrastructure	Value Engineering	Systematic method to improve the "value" of a project or study by using an examination of function as it relates to cost. Value can be increased by either improving the function or reducing the cost - the value of the outputs is optimized by a mix of function and costs. Identifies and removes unnecessary expenditures, thereby increasing the value.
Maintenance		
Maintenance	Collection Maintenance Costs	Value of money that has been spent on collection maintenance tasks.
Maintenance	Collection Maintenance Documentation & Data	Information that is collected or used in the maintenance of the collection system. Documentation of collection maintenance planned maintenance procedures and schedules, unplanned maintenance procedures, dissemination of written procedures, quality controlled procedures, procedure revision with configuration change, and maintenance personnel training.
Maintenance	Collection Maintenance Failure Modes	Identify the collection consequences and likelihood of each failure mode and use to quantify the risk it represents to the agency directly, or indirectly by way of social, economic or environmental consequences.
Maintenance	Collection Maintenance Framework	Management system used to accomplish collection maintenance goals/tasks.
Maintenance	Collection Maintenance Planning & Scheduling	Implement the collection maintenance strategy and plans. Process of deciding how to commit resources between a varieties of possible collection maintenance tasks.
Maintenance	Collection Maintenance Program Review	Evaluation of the collection maintenance tasks, activities, and results for improvement.
Maintenance	Collection Maintenance Quality Control	Process by which the agency reviews the quality of all factors involved in collection maintenance.
Maintenance	Collection Maintenance Strategies	Collection maintenance strategy development requires asset/equipment failure modes, likelihood of each failure mode, consequences of each failure mode, and risk to the agency of each mode, maintenance options, and strategy documentation. Risks resulting from potential nonperformance are managed by a maintenance strategy, chosen to return the greatest reduction in risk per maintenance dollar invested. The strategy may comprise reactive and preventive maintenance. The information requirements are met and the whole maintenance action and information collection process is subject to regular audit.
Maintenance	Collection Maintenance Work Practices	Collection maintenance work practices include compliance with relevant legislation, work group structural efficiency, maintenance organization structural efficiency, work by party representing "best value", and resource management.
Maintenance	Stormwater/Watershed Maintenance Costs	Value of money that has been spent on stormwater/watershed maintenance tasks.

Category	Practice	Definition
Maintenance	Stormwater/Watershed Maintenance Documentation & Data	Information that is collected or used in the maintenance of the stormwater/watershed system. Documentation of collection maintenance planned maintenance procedures and schedules, unplanned maintenance procedures, dissemination of written procedures, quality controlled procedures, procedure revision with configuration change, and maintenance personnel training.
Maintenance	Stormwater/Watershed Maintenance Failure Modes	Identify the stormwater/watershed consequences and likelihood of each failure mode and use to quantify the risk it represents to the agency directly, or indirectly by way of social, economic or environmental consequences.
Maintenance	Stormwater/Watershed Maintenance Framework	Management system used to accomplish stormwater/watershed maintenance goals/tasks.
Maintenance	Stormwater/Watershed Maintenance Planning & Scheduling	Implement the stormwater/watershed maintenance strategy and plans. Process of deciding how to commit resources between a varieties of possible collection maintenance tasks.
Maintenance	Stormwater/Watershed Maintenance Program Review	Evaluation of the stormwater/watershed maintenance tasks, activities, and results for improvement.
Maintenance	Stormwater/Watershed Maintenance Quality Control	Process by which the agency reviews the quality of all factors involved in stormwater/watershed maintenance.
Maintenance	Stormwater/Watershed Maintenance Strategies	Stormwater/watershed maintenance strategy development requires asset/equipment failure modes, likelihood of each failure mode, consequences of each failure mode, and risk to the agency of each mode, maintenance options, and strategy documentation. Risks resulting from potential nonperformance are managed by a maintenance strategy, chosen to return the greatest reduction in risk per maintenance dollar invested. The strategy may comprise reactive and preventive maintenance. The information requirements are met and the whole maintenance action and information collection process is subject to regular audit.
Maintenance	Stormwater/Watershed Maintenance Work Practices	Stormwater/watershed maintenance work practices include compliance with relevant legislation, work group structural efficiency, maintenance organization structural efficiency, work by party representing "best value", and resource management.
Maintenance	Treatment	Treatment is the process of removing contaminants from wastewater and household sewage, both runoff (effluents), domestic, commercial and institutional. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce an environmentally safe treated effluent and biosolids suitable for disposal or reuse.
Maintenance	Treatment Maintenance Consumables and Spares Management	Treatment maintenance consumables and spares management includes spares and consumables strategy, management system, supplier selection, and purchasing strategy for collection maintenance.
Maintenance	Treatment Maintenance Costs	Value of money that has been spent on treatment maintenance tasks.
Maintenance	Treatment Maintenance Documentation & Data	Information that is collected or used in the maintenance of the treatment system. Documentation of collection maintenance planned maintenance procedures and schedules, unplanned maintenance procedures, dissemination of written procedures, quality controlled procedures, procedure revision with configuration change, and maintenance personnel training.
Maintenance	Treatment Maintenance Failure Modes	Identify the treatment consequences and likelihood of each failure mode and use to quantify the risk it represents to the agency directly, or indirectly by way of social, economic or environmental consequences.
Maintenance	Treatment Maintenance Framework	Management system used to accomplish treatment maintenance goals/tasks.
Maintenance	Treatment Maintenance Planning & Scheduling	Process of deciding how to commit resources between a varieties of possible treatment maintenance tasks.
Maintenance	Treatment Maintenance Program Review	Evaluation of the treatment maintenance tasks, activities, and results for improvement.
Maintenance	Treatment Maintenance Strategies	Implement the treatment maintenance strategy and plans. Process of deciding how to commit resources between a varieties of possible collection maintenance tasks.
Maintenance	Treatment Maintenance Work Practices	Treatment maintenance work practices include compliance with relevant legislation, work group structural efficiency, maintenance organization structural efficiency, work by party representing "best value", and resource management.
Operations		
Operations	Stormwater/Watershed	Interaction with other organizations related to stormwater/watersheds.

Category	Practice	Definition
	Coordination	
Operations	Stormwater/Watershed Operational Knowledge	Relevant asset information is available and timely for stormwater/watershed operations decisions. Asset records and information are accurate, processes are in place to ensure changes are approved and documented, and treatment operators understand asset operation, criticality, condition, and capability.
Operations	Stormwater/Watershed Operations Data & Documentation	Documentation of procedures for normal and emergency stormwater/watershed system operation that are available to operators, quality controlled and updated as needed. Operators provide feedback for improvement. Information that is collected or used in the operation of the collection system.
Operations	Stormwater/Watershed Operations Emergency Response	Continuous cycle of planning, managing, organizing, training, equipping, exercising, creating, evaluating, monitoring and improving activities to ensure effective coordination and the enhancement of capabilities to prevent, protect against, respond to, recover from, create resources and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters on the stormwater/watershed system.
Operations	Stormwater/Watershed Operations Energy Management	Operation of energy-related production and consumption units within the stormwater/watershed system to reduce consumption and increase production in a sustainable manner.
Operations	Stormwater/Watershed Operations Inspection	Methods to ensure the physical integrity of the stormwater/watershed system.
Operations	Stormwater/Watershed Operations Modeling	Conceptual representation of physical results in the stormwater/watershed system due to various parameters.
Operations	Stormwater/Watershed Operations Monitoring	Stormwater/watershed operations monitoring includes failure detection, performance monitoring and management, operator knowledge capture and communication and stormwater/watershed asset operation, availability, and capability.
Operations	Stormwater/Watershed Operations Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to Stormwater/watershed operations. Political, management, financial, and administrative mechanisms arranged to reach Stormwater/watershed operations goals. Includes support documentation that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the Stormwater/watershed operations policy.
Operations	Stormwater/Watershed Operations Strategy Development	The stormwater/watershed operating strategy is the approach to operating the stormwater/watershed system in order to meet specific service level, cost and risk exposure outcomes. The operating strategy is supported by standard operating procedures and contingency plans that outline what is to be done, when and how under normal operating conditions, and under extraneous operating conditions, as well as risks.
Operations	Stormwater/Watershed Wet Weather/Overflow Management	Strategies to prevent or manage operational conditions in the stormwater/watershed system that arise from wet weather events in order to prevent overflows.
Operations	Treatment Operations Documentation	Treatment documentation is the documentation of procedures for normal and emergency treatment system operation that are available to operators, quality controlled and updated as needed. Operators provide feedback for improvement.
Operations	Treatment Operations Emergency Response	Continuous cycle of planning, managing, organizing, training, equipping, exercising, creating, evaluating, monitoring and improving activities to ensure effective coordination and the enhancement of capabilities to prevent, protect against, respond to, recover from, create resources and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters on the treatment system.
Operations	Treatment Operations Energy Management	Operation of energy-related production and consumption units within the treatment system to reduce consumption and increase production in a sustainable manner.
Operations	Treatment Operations Modeling & Wet Weather Management	Conceptual representation of physical results in the treatment system due to various parameters. Strategies to prevent or manage operational conditions in the treatment system that arise from wet weather events in order to prevent overflows.
Operations	Treatment Operations Monitoring	Treatment operations monitoring includes failure detection, performance monitoring and management, operator knowledge capture and communication and treatment asset operation, availability, and capability.
Operations	Treatment Operations Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to treatment operations. Political, management, financial, and administrative mechanisms arranged to reach treatment operations goals. Includes support documentation that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the treatment operations policy.
Operations	Treatment Operations Productivity Optimization	Asset productivity optimization includes treatment system productivity improvement and physical system optimization, capacity solutions, capability solutions, labor, materials, and energy, life cycle costs, design input, maintenance input, and retirement input.
Operations	Treatment Operations Strategy Development	The treatment operating strategy is the approach to operating the treatment system in order to meet specific service level, cost and risk exposure outcomes. The operating strategy is supported by standard operating procedures and contingency plans that outline what is to be done, when and how under normal operating conditions, and under extraneous operating conditions, as well as risks.
Operations	Collection Operations Strategy Development	The collection operating strategy is the approach to operating the collection system in order to meet specific service level, cost and risk exposure outcomes. The operating strategy is supported by standard operating procedures and contingency plans that outline what is to be done, when and how under normal operating conditions, and under extraneous operating conditions, as well as risks.

Category	Practice	Definition
Operations	Collections Operations Productivity Optimizations	Asset productivity optimization includes collection systems productivity improvement and physical system optimization, capacity solutions, capability solutions, labor, materials, and energy, life cycle costs, design input, maintenance input, and retirement input.
Operations	Collections Operations Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to collection operations. Political, management, financial, and administrative mechanisms arranged to reach collection operations goals. Includes support document that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the collection operations policy.
Operations	Collection Operations Monitoring	Collection operations monitoring includes failure detection, performance monitoring and management, operator knowledge capture and communication and collection asset operation, availability, and capability.
Operations	Collections Operations Modeling & Wet Weather Management	Conceptual representation of physical results in the collection system due to various parameter. Strategies to prevent or manage operation conditions in the collection system that arise from wet weather events in order to prevent overflows.
Operations	Collections Operations Energy Management	Operation of energy related production and consumption units with the collection system to reduce consumption and increase production in a sustainable manner.
Operations	Collection Operations Emergency Response	Continuous cycle of planning, managing, organizing, training, equipping, exercising, creating, evaluating, monitoring and improving activities to ensure effective coordination and the enhancement of capabilities to prevent, protect against, respond to, recover from, create resources and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters on the collections system.
Operations	Collections Operations Data & Documentation	Documentation of procedures for normal and emergency collection systems operation that are available to operators, quality controlled and updated as needed. Operators provide feedback from improvement. Information that is collected or used in the operation of the collection systems.
Operations	Collection Operational Knowledge	Relevant asset information is available and timely for collection operations decisions. Asset records and information are accurate, processes are in place to ensure changes are approved and documented, and collection operators understand asset operations, criticality, condition, and capability.
Organizations		
Organization	Strategy	Approach use to assess and mitigate risk in order to reduce risk exposure to the agency.
Organization	Alternatives	Approach to evaluate various options to reduce risk exposure to the agency.
Organization	Bonding Capacity/ Rating	Assesses the credit worthiness of an agency's debt issues.
Organization	Business Case Evaluations	Management of decisions through the use of decision science and process
Organization	Contracts Administration	Management of contracts, includes negotiating the terms and conditions in contracts and ensuring compliance with the terms and conditions, as well as documenting and agreeing on any changes or amendments that may arise during its implementation or execution. Process of systematically and efficiently managing contract creation, execution, and analysis for the purpose of maximizing financial and operational performance and minimizing risk.
Organization	Costs	Value of money that has been spent by the agency.
Organization	Debt	Obligation owed by the agency to a second party, the creditor, created when a creditor agrees to lend a sum of assets to an agency. Debt is usually granted with expected repayment; this includes repayment of the original sum, plus interest.
Organization	Facility Security	Protecting facilities from destructive forces and the unwanted actions of unauthorized users.
Organization	Industry Leadership	Instruments that create change that affect an agency's strategic/business planning, i.e. population growth or decline, regulatory changes, aging infrastructure.
Organization	Document Retention, Storage, and Recover	Information technology infrastructure and existing software support the storage and delivery of information. An agency employs a wide array of software products that should collectively store – or be able to store – the core information needed to support asset management decision-making in a timely manner.
Organization	Internal and External Counsel	Legal advice for both internal and external issues.
Organization	Mission, Vision, Values, Goals, Strategy, LOS	The strategic direction, culture, and approach the agency uses to conduct its business.
Organization	Planning	Assures an agency's long term financial solvency through a multi-year strategic planning perspective that identifies long term trends that will likely affect investment (capital and O&M) decision making, especially with respect to long term financial sustainability.
Organization	Policies and Procedures	Principles or rules to guide decisions and achieve rational outcomes as they pertain to agency's strategic/business planning. Political, management, financial, and administrative mechanisms arranged to reach strategic/business planning goals. Includes support documentation that describes Who, What, Where, When, and Why to establish accountability in support of the implementation of the strategic/business planning policy.
Organization	Policies and Procedures	Consumables and spares management includes spares and consumables strategy, management system, supplier selection, and purchasing strategy for collection maintenance.
Organization	Quality Control and Assurance	Process by which an agency reviews the quality of all factors with emphasis on elements such as controls, job management, defined and well managed processes, performance and integrity criteria, and identification of records, competencies, such as knowledge, skills, experience, and qualifications, and soft elements, such as personnel integrity, confidence, organizational culture, motivation, team spirit, and quality relationships.
Organization	Quality Improvement	System which an agency uses improves performance of the product or service.

Category	Practice	Definition
Organization	Revenue	Income that an agency receives from its normal business activities, usually from the sale of goods and services to customers.
Organization	Risk and Vulnerability Assessments	Risk identification requires a process to identify risks, both internal and external to the agency, and a method such as a risk register for monitoring risks and their mitigation and management.
Organization	Risk Management	Risk management covers all the activities involved in identifying and management of risks, including establishment of the risk policy and business context, identification of risk, quantification of the likelihood and consequence of failure or of loss events, evaluation of the risk, priorities mitigation for best value, implementation of mitigation, and risk monitoring
Organization	Security	Document Retention, Storage, and Recovery
Organization	Spatial Data	Identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth, typically represented by points, lines, polygons, and/or complex geographic features. Includes original and interpreted geospatial data, such as those derived through remote sensing including, but not limited to, images and raster data sets, aerial photographs, and other forms of geospatial data or data sets in both digitized and non-digitized forms.
Organization	Strategic/Business Planning	Strategic planning is an agency's process of defining its strategy and making decisions on allocating its resources to pursue this strategy. Generally, strategic planning deals with at least one of three key questions: 1."What do we do?" 2."For whom do we do it?" 3."How do we excel?" This is the process for determining where a agency is going over the next year or 3 to 5 years.
Organization	User Rate Affordability	Ease with which customers can pay their respective bills owed to the agency.
Organization	Accessibility and Controls	Activities related to storing, retrieving, or acting on data housed in a database or other repository.
People		
People	Deployment of Personnel	Process of assigning resources to perform work.
People	Labor-Management Relations	Study and practice of managing unionized employment situations, including labor law, union organizing, bargaining, contract administration, etc.
People	Targeted Public Relations Programs	Managing the flow of information between an agency and the public to persuade the public, employees, and other stakeholders to maintain a certain point of view about the agency, its leadership, service, or decisions.
People	Training	Acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies with specific goals of improving one's capability, capacity, and performance.
People	Customer Satisfaction	Measure of how products and services supplied by a agency meet or surpass customer expectation.
People	Customer Service	Issues raised by customers regarding the services they receive from the agency.
People	Education and Training	Process of transferring knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies with specific goals of improving one's capability, capacity, and performance.
People	Employee Communication	Process by which information is transmitted to employees.
People	Employee Performance, Reward, and Recognition	Formulation and implementation of strategies and policies that aim to recognize and reward people fairly, equitably and consistently in accordance with their performance in the agency. Consists of analyzing and controlling employee remuneration and all of the other benefits for the employees and aims to create and efficiently operate a reward and recognition structure for an agency.
People	Employee Well-Being and Satisfaction	Covers benefits, mental, emotional, and physical health, etc.
People	Government/Agency/ NGO Relationships	Relationships with government organizations and other agencies.
People	Human Resource Management	Management of an agency's workforce, or human resources, responsible for the attraction, selection, training, assessment, and rewarding of employees, while also overseeing organizational leadership and culture, and ensuring compliance with employment and labor laws.
People	Lost Productivity	Amount of work time lost due to various issues such as sickness, injury, absenteeism, etc.
People	Media and/or Stakeholder Communications	Working with various media/stakeholders for the purpose of communicating an agency's mission, policies and practices in a positive, consistent and credible manner.
People	Recruitment and Retention	Develop skills retention plans for key positions and plan recruitment over the short term.
People	Stakeholder Involvement	Process by which an agency involves people who may be affected by the decisions it makes or can influence the implementation of its decisions. They may support or oppose the decisions, be influential in the agency or within the community in which it operates, holds relevant official positions or be affected in the long term.
People	Succession Planning	Development of employees to effectively take over the current leadership when their time comes to exit their positions over the long term.

Category	Practice	Definition
People	Leadership Development	Any activity or process that enhances the quality of leadership within an individual or agency.
People	Disruption of Sewer Services	Periods in which customers are without wastewater service.
People	Core Competencies	Specific factor that a agency sees as being central to the way it, or its employees, works. A core competency can take various forms, including technical/subject matter know-how, a reliable process and/or close relationships with customers and suppliers.

Appendix 3

Acronyms & Abbreviations

- AMWA – Association of Metropolitan Water Agencies
- AWWA – American Water Works Association
- APWA – American Public Works Association
- ASCE – American Society of Civil Engineers
- CSO – Combined sewer overflow
- EPA – United States Environmental Protection Agency
- EWRI – Environmental and Water Resource Institute of the American Society of Civil Engineers
- FHA – Federal Highway Administration
- GFOA – Government Finance Officers Association
- IWA – International Water Association
- Kwh – Kilowatt hours
- MGD – Million gallons per day
- MG – Million gallons
- NACWA – National Association of Clean Water Agencies
- NAWC – National Association of Water Companies
- NSF – National Science Foundation
- TBL – Triple bottom line
- TMDL – Total maximum daily load
- WaterRF – Water Research Foundation
- WEF – Water Environment Federation
- WERF – Water Environment Research Foundation
- WSAA – Water Services Association of Australia

Appendix 4

Definitions

- Benchmarking: “Benchmarking is a tool for performance improvement through systematic search and adaptation of leading practices” (Cabrera, Enrique, Jr., Peter Dane, Scott Haskins, and Heimo Theuretzbacher-Fritz. Benchmarking Water Services. American Water Works Association. 2011).
- Category: A division within a system of classification
- Subcategory: Subordinate parts to a category
- Practice: Professional activities that are carried out, applied, and measured quantitatively.
- Metric: An indicator that has a standard of measurement.