

## A user's guide to WERF's practical and reliable asset management decision support tools

### Decision Analysis/Implementation Guidance – Asset Management Tools Development: Research Digest (SAM1R06e)

#### The Central Issue

Providing wastewater service involves managing assets to meet increasing customer service-level demands. Assets have design or service lives that vary from years to decades. Therefore, utilities strive for better tactics and strategies for economic and risk factors, operations and maintenance, or other improved management practices to prolong asset life. Considering limited resources, reliably extending asset life by even a small amount may amount to substantial savings while still providing the service their customers require.

#### Context and Background

WERF's asset management decision support tools help practitioners to organize and manage their information so that they have confidence in their decisions. This digest presents an overview of the concept, description, purpose, and benefits of four new tools. Additionally, worked examples are given with each task. An appendix excerpted from the SIMPLE knowledge base, titled "What is Asset Management?" presents several views of asset management. The Five Core Questions/Ten Steps of asset management have, or will have, a tool associated with each step.

#### Findings and Conclusions

The following four tools were developed under this phase of the research.

- **Level of Service Tool** assists in establishing and measuring the targeted and actual levels of service at the strategic and asset, or operational levels. All asset management best practices are directed at assisting the management team to sustain performance at the lowest cost at an acceptable level of risk. Before a utility can determine whether it is successfully achieving its lowest cost performance, it must define that performance. The utility can use this tool to identify and measure the strategic and operational performance using the triple bottom line approach.



All of these pipes have different ages, conditions, and performance characteristics.

- **Condition Assessment/Performance Scoring Tool** helps practitioners systematically review an asset's ability to physically perform its function. The scoring is essential to determining remaining life which is used to establish the likelihood or probability of failure – a key component of risk. The tool provides a higher level of confidence in capital, maintenance, and operating investment decisions; a better understanding of the condition/performance and operating constraints of the assets; and realistic prediction of liabilities associated with differing levels of asset maintenance and renewal strategies.
- **Business Risk Exposure Tool** incorporates a multi-aspect scale for characterizing the probability and consequences of failure and mitigation factors. It is structured to allow users to go step-by-step through the risk assessment process. Knowledge of relative risk helps asset managers make improved business decisions.
- **The Capital Investment Validation and Prioritization Tool** helps asset managers determine when a proposed capital investment is sufficient to move to a budgeted funding stage. Because asset management is about investment, a decision based on incorrect or incomplete analysis can be costly. The tool helps the utility narrow its funding options and answers the questions: Which project? Why? At what level? When?

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**Intervention was made too late for this failed pipe.**

### Management and Policy Implications

Because every decision is one of investment, utilities cannot afford to make unwise selections. All of the tools in this digest are necessary to help the asset manager make asset intervention decisions. Additionally, they all “roll up” to provide information necessary to make investment decisions. The Level of Service tool helps the utility define its internal and external performance standards. The Condition Assessment/Performance Scoring tool aids in determining remaining asset life and, indirectly the probability of failure, one of the components of risk. The Business Risk Exposure tool helps to identify which assets or groups of assets require increased attention. These assets are then candidates for the Capital Improvement Validation/Prioritization tool.

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# Executive Summary



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<b>WERF Strategic Asset Management Tools</b>	
All tools are included in SIMPLE (03CTS14) unless indicated otherwise.	
<b>Tool</b>	<b>Description</b>
<b>Asset Hierarchy/Registry</b>	Provides two working examples of a hierarchical asset register structure reaching down to a maximum of seven levels. Each includes above- and below-ground assets.
<b>Condition Assessment Scoring</b>	This multi-attribute, condition-rating tool incorporates metrics of other performance-based attributes such as current operating performance and reliability across several major asset classes.
<b>Condition Assessment Selection</b>	Web-based tool assists asset management and maintenance practitioners select appropriate condition assessment tools and techniques.
<b>Remaining Effective Life</b>	Helps determine remaining useful physical life based on age/design life modified by local factors. Incorporates a table of “default” useful lives for a wide range of assets.
<b>Life Cycle Cost Projection</b>	Facilitates systematic organization and projection of life cycle costs by major cost category for an asset or class of similar assets, based on identified cost trends.
<b>Level of Service</b>	Assists a utility to establish (and periodically measure) targeted and actual levels of service, both at the enterprise (strategic) and asset (operations) levels. Tool was developed using a “triple bottom line” approach (financial, environmental, and social/community/organizational perspectives).
<b>Risk Management (SAM4C07)</b>	Guides management of risk of assets, covering cost, decision models, strategic security, the role of expert judgment, and the impact of asset standards on performance, risk, customer service, and investment requirements.
<b>Business Risk Exposure</b>	Aids in characterizing the business risk exposure (BRE) of the utility associated with assets through assigning risk scores to assets or groups of assets. Raw “risk” (business risk exposure) is score representing the probability of failure multiplied by the consequence of failure. Raw risk is then adjusted for mitigation actions.
<b>SCRAPS: Sewer Cataloging, Retrieval, and Prioritization System (97CTS7)</b>	Expert system helps users identify pipelines at risk for structural and operational failure of pipes. Not in SIMPLE. Not compatible with Windows Vista or Windows 7.
<b>End of Asset Life Reinvestment</b>	Assists asset managers determine which renewal strategy (maintenance/repair, refurbishment, replacement) is most cost effective and when in an asset’s life cycle to transition from an operations and maintenance strategy to a capital investment (renewal) strategy. Integrates many of the tools incorporated in SIMPLE and adds an economic life component.
<b>Benefit Cost Analysis (SAM7C07)</b>	Provides a step-by-step guide for developing a benefit-cost analysis. Both benefits and costs are monetized to determine the economic justification for a project, or the prioritization of a group of competing projects on a full Triple Bottom Line basis.
<b>Business Case Analysis</b>	Assists practitioners evaluate, from a business metric perspective, the relative investment merits of a range of alternative management solutions, whether operations, maintenance, or capital. For further insight, the tool incorporates an optional Triple Bottom Line.
<b>Capital Improvement Project Validation/Prioritization</b>	Helps asset managers determine when a proposed list of capital investments is ready to move to a budget funding stage by assigning a “confidence level rating” for validation. Once validated, the tool assists in the prioritization of each project so that a specific CIP list can be adopted.
<b>Asset Management Plan Template</b>	Provides a set of investment strategies (integrating operations, maintenance, and capital investment) that constitutes, through step-by-step analysis, what is determined to be the best investment plan given a defined level of performance and service and a defined level of risk. Includes a set of basic templates to assist in constructing an Asset Management Plan.
<b>SAM GAP</b>	Provides an electronic self-assessment of asset management practices to create a profile to measure performance against over 170 of the best asset management practitioners of similar size and practice level (benchmarking). Generates a customized report with a prioritized task list for implementation of an improvement program.