*(Extracted from Stormwater Asset Facility Asset Management, Phase I, King County Water and Land Resources Division, November 2015)*

## Section 1.    Purpose and Approach

The Water and Land Resources (WLR) Division has wide-ranging responsibilities for components of King County's stormwater management infrastructure. For a specific subset of these components, King County, with WLR as the custodian agency, is responsible for their operation and maintenance and is also their legal owner. Most of these WLR-owned and -operated components serve specific residential subdivisions and were originally constructed by developers.  The remainder were largely, constructed by the public or through a variety of other circumstances came to be under King County's charge.

A drainage facility is comprised of a set of components, such as a pond, control structure, and pipes. Henceforth, the drainage facilities that are the subject of this report and the first stage of asset management work will be referred to as "the facilities."

Since the 1980s, King County has conducted a program of facility inspection, operation and maintenance that has changed along with King County's Surface Water Management (SWM) Program, Surface Water Design Manual, and land development and environmental regulations. Because King County is the legal owner of the facilities, and is responsible for providing the drainage and water quality services they perform, it will need to renew or replace them when they can no longer fulfill their intended functions. To date, WLR has not made plans or provisions for renewing/replacing the facilities. The table below shows the total number of facilities by timeframe of their construction.

| Decade of Construction or Acceptance for Maintenance | Facility Count |
|---|---|
| 1960s and before | 7 |
| 1970s | 115 |
| 1980s | 339 |
| 1990s | 402 |
| 2000s | 194 |
| 2010s | 37 |
| Total | 1094 |

As the facilities age and competing demands on SWM revenues increase, WLR management has determined that a comprehensive strategy is needed to plan and provide for future facility replacement and to optimize the management of facilities to ensure that they perform at the lowest cost over their lifecycles. This optimization is embodied in the practice of *asset management*, which many public and private entities that provide utility-type services have begun to adopt.  As this report details, WLR has completed the initial phase of developing an asset management plan for the facilities, which will be referred to as "AMP (Asset Management Plan) Phase I."

As an indication of the geographic distribution of WLR-owned facilities in King County, the map on the following page shows WLR-owned facilities by watershed.

## AMP Model and Goals

WLR modeled its approach to asset management on a construct fostered by the U.S. Environmental Protection Agency, which describes asset management as "...a framework being widely adopted as a means to pursue and achieve sustainable infrastructure. It is the practice of managing infrastructure capital assets to minimize the total cost of owning and operating them while delivering the desired service levels. A high-performing asset management program incorporates detailed asset inventories, operation and maintenance tasks, and long-range financial planning to build system capacity, and it puts systems on the road to sustainability." [1]

The goal of system sustainability dovetails with key needs WLR has identified over the last several years. These are:

- basing facility operation and maintenance priorities on predetermined level-of-service needs rather than on arbitrary and fluctuating budgets (creating a "business case," backed by data, for funding needs);
- enabling long-term planning, especially cost-related, to address replacing facilities at the end of their lives and avoid unforeseen failures (particularly high-consequence ones); and
- mapping out facility lifecycle activities (assess needs, design, construct, operate/maintain, refurbish, replace) to maximize efficiency of operations, facilitate customer service and regulatory compliance, and support decision-making at all levels.

A key to the robustness of asset management as a planning tool is that it is based on a body of data about specific assets rather than on subjective factors or assessments. In addition, as an asset management framework develops over time, the results it produces are looped back into the system to ensure continuous improvement. Predictions and estimates become more and more precise and reliable over time. In this way, an asset management plan is never "complete"- it keeps improving.

As set out by the EPA construct, asset management development follows these steps (not necessarily in strict sequential order):

**Create Asset Registry.** The asset registry is the set of data collected and managed for all assets. Each organization builds its asset registry to best characterize its set of assets and fit its needs.
**Assess Condition and Failure Modes**. An asset's physical condition and failure modes are the bases for determining when it is likely to require actions such repair or replacement. Condition- and failure mode-related data, along with other data, populates the asset registry.

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[1]([http://water.epa.gov/infrastructure/sustain/asset_management.cfm](http://water.epa.gov/infrastructure/sustain/asset_management.cfm))

**Determine Residual Life.** Remaining useful life for each asset is calculated based on condition, failure modes and other factors such as industry standards for the materials assets are made from.

**Determine Life Cycle and Replacement Costs.** Determine costs for each stage in an asset's life cycle: planning, design, permitting, construction, operation, maintenance, refurbishment, removing from service, and replacement.

**Set Target Levels of Service.** Decide levels of service each asset is expected to provide, and/or determine the regime of actions (e.g. maintenance) that will be conducted to ensure the assets are providing services at that level.

**Determine Business Risk.** "Business risk" is the risk resulting from an asset's failure to perform. Primary risks due to asset failure that WLR is concerned with addressing are risks to human safety, property, and natural resources posed by uncontrolled runoff, flooding, erosion and pollution. A key driver of asset management is using asset data to determine the risk of each asset failing at any given time.

**Optimize Operations/Maintenance (O&M) and Capital Investment.** "Optimizing" these investments means performing the correct action at the correct time during the life of an asset so that it provides expected services at the lowest lifecycle cost.

**Determine Funding Strategy and Build Asset Management Plan.** With an optimized O&M and Capital Investment plan in place, decision-makers can plan options to provide required funding and the overall asset management plan can be put into action.

## Phase I Progress and Results

WLR worked intensively for 18 months to initiate its asset management plan. In the context of the EPA construct, outlined below are the steps completed during AMP Phase I and next steps anticipated.

### Develop Asset Registry
- Defined asset registry structure to accommodate assets, facilities, and required data fields
- Created new asset management database and user interface that will mesh with existing facility database and possible future enterprise systems
- Completed initial round of data entry for function-critical facility components

### Assess Condition, Failure Modes

- Determined facility age as a temporary stand-in for facility field condition to enable short-term business risk assessment for each facility
- Completed preliminary assessment of needed field condition data

**Determine Residual Life**
- Estimated preliminary residual life for each facility based on asset age

**Determine Life Cycle and Replacement Costs**
- Set unit price for replacement of key assets for each facility
- Created a comprehensive unit price database for asset replacement and reconstruction (the foundation for all valuation and costing information)
- Calculated valuation for each facility and set of facilities as a complete system based on key assets

**Set Target Levels of Service**
- Began identifying considerations that would go into formulating WLR-specific levels of service related to facilities

**Determine Business Risk (Criticality)**
- Calculated age-based risk scores for each facility and list of facilities ranked by relative risk

**Optimize Operations/Maintenance (O&M) and Capital Investment**
- Work to optimize investments will proceed as more information from the other phases becomes available. Optimizing requires more reliable/precise data than WLR currently has available

**Determine Funding Strategy and Build Asset Management Plan**
- Work to determine year-by-year funding needs forecasts and operation, maintenance, repair and replacement plans will be ongoing in the next phases of AMP

Subsequent report sections further describe the asset management work WLR has completed and outline next steps to shape and implement WLR's asset management program.