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Asset Management Manual - PART I

Introduction

The purpose of this manual is to define the operational structure, procedures, and program controls related to the Asset Management Program. The document is prepared in support of, and supplemental to:

- the Asset Management Plan adopted by the Board in January, 2009
- the Asset Management Funding Policy adopted by the Board in January, 2010

This manual is constructed in two parts.

The first part outlines the structure, controls and procedures to be implemented i.e. the ‘how to’ portion of the manual. This will be the standard approach to asset management and will be updated only when required.

The second part of the manual is a living document and will reflect the current status of the Asset Management Program as it relates to the near and long term business goals i.e. ‘what’ we are currently doing to achieve those goals. This section will include; risk analysis data, repair / replacement schedules, budget information, cash flow projections, status and progress reports etc., updated as required.
Asset Classes

The program is the primary management structure for maintaining, maximizing, and (where possible) extending the life of existing tangible assets that directly support the Water Authority’s mission to supply a safe and reliable water supply. The assets are separated into three distinct groups defined below:

**Pipelines**
Defined as all fixed assets used to transport water to the Member Agencies, with the exception of the facilities that meter, pump, control, or treat water. The Pipelines asset class therefore includes all associated equipment such as vent structures, air-release/air-vacuum valve structures, pump wells, blow-offs, blow-off drainage, manholes, condition monitoring (e.g. AFO) stations, cathodic protection facilities, pipeline isolation valves, and other assets that are directly attributable to the operation of the pipelines.
Facilities
Facilities include those structures and associated equipment that meter, pump, control, or treat water. They include flow control facilities, diversion structure, pump stations, hydro-electric facilities, pressure control facilities, water treatment plants, aqueduct control systems, facility valves and Venturi meters, security systems, electrical/electronic, and building structures.
Equipment
Equipment is fixed or movable tangible assets to be used for operations, the benefits of which extend beyond three years from date of acquisition and rendered into service. Furniture, fixtures, computers, tools, electronic or other miscellaneous equipment should be classified as equipment.

Also included in the Equipment category are vehicles, typically passenger vehicles, such as automobiles and vans, and construction equipment such as graders, bulldozers and backhoes. These assets may be purchased, fabricated, or received by donation. Vehicles in excess of $5,000 are capitalized.

Equipment also includes specialty tools, SCADA, electronic testing equipment, and specialty software.
Operational Structure and Process Overview

The Asset Management Program is the responsibility of the Operations & Maintenance Department. Within the department there exists operating units that perform unique tasks under the Asset Management Program. There are natural similarities between the activities of managing the Pipelines and Facilities asset classes, therefore the organizational and procedural structure for these assets are identical:

- **Asset Management Committee**
  - Deputy General Manager: Frank Belock
  - Executive Leader: Gary Eaton
  - Asset Management Program Manager: Nathan Faber

- **Condition Assessment & Monitoring**
  - Daryl Akioka
  - George Smith
  - William Tsueng

- **Data Management**
  - David Dow
  - Matt Bartolome
  - Nick Ghinazzi

- **Program Management & Prioritization**
  - Martin Coghill

- **Risk Assessment & Evaluation**
  - Project Prioritization
  - Project Scope Definition
  - Program Budgeting & Controls
  - Project Decision Support
  - New Technologies Search & Evaluation
  - Business Goals

- **Project Delivery & CIP Support**
  - Tom Harpin
  - Martin Coghill
  - Daryl Akioka

- **Fund Managers**
  - Equipment: Al Garza – Fleet
  - Ali Bagherian – Systems
  - Glenn Thorpe - SCADA

- **Organization**
  - Finance Budget Manager: Lisa Celaya

- **Project Implementation Process**
The Asset Management Committee will receive recommendations on priority projects from the asset management team prior to a given 2-year budget cycle. The Committee will review the priority projects with respect to resources, economics, political matters, Member Agency impacts / support, timing and funding. The Executive Leader and Deputy General Manager will look to the Committee for concurrence on the recommendations put forward by the team. The Committee consists of the following senior managers:

Nathan Faber, O&M Manager  
Kathy Schuler, O&M Manager  
Jerry Reed, Engineering Manager  
Bob Yamada, Planning Manager  
Vic Bianes, Engineering Manager  
John Kross, Engineering Manager

Jim Fisher, O&M Manager  
Denise Vedder, Public Affairs Manager  
Gary Bousquet, Engineering Manager  
Lisa Celaya, Budget & Analysis Manager  
Larry Purcell, Water Resources Manager

The Committee may also be called upon to assist with other Asset Management Program initiatives from time to time.
Condition Assessment & Monitoring

As seen in the diagram above, the process of managing an existing asset starts with the assessment of the condition of the asset, failure analysis (if applicable), and monitoring of the asset’s condition. Details of these procedures are located in Part II of this manual. Assets are expected to progressively age through the term of their lifespan, however, environmental factors can aggressively accelerate the process leading to a shortening of the lifespan. The condition assessment and monitoring function is performed by a group of specialists. Tools at their disposal include:

- Visual inspections
- Sounding
- Ultrasonic testing
- Remote Field Eddy Current
- Acoustic Fiber Optic Monitoring
- Magnetic Flux Leakage
- Cathodic protection
Data Management
The next procedural step in asset management is the collection and sorting of data performed by the Data Management team. There are hundreds of thousands of pieces of data related to existing assets. These are compiled from the known design and construction parameters, and the continual increase in data gained through condition assessment. Organization of this data is performed using a unique database designed to accommodate the huge amount of data. This was designed and built by in-house resources exclusively for Asset Management use. The database is used to support decisions relating to prioritization of assets for repair or replacement.

Interactive functionality of the Water Authority’s asset database with proprietary software such as Maximo - a Computerized Maintenance Management System (CMMS) software program - is being investigated.
Program Management & Prioritization

The asset information and data, is used by the Program Management & Prioritization team to evaluate current status, prioritize, and recommend actions to ensure asset integrity. Risk assessment is used as the primary tool, to evaluate the probability of asset failure, combined with an assessment of the consequence of failure. From the risk assessment, asset repairs or replacements are prioritized and a project scope is defined. At this point in the process, a project grouping exercise will be conducted to consolidate asset improvements in the most cost-effective manner to maximize available funds. The grouped projects will be presented to the Asset Management Committee for consideration.

The interpretation of data and prioritization of rehabilitation projects is the central core of the asset management process; therefore the functions of this team will be discussed in more detail in the next chapter, Program Management & Prioritization – Core Procedures.
Project Delivery & CIP Support
Another essential function of the Asset Management Program team is the delivery of individual projects. This may be performed by O&M staff if deemed efficient to do so, contracted by O&M, or assigned to the Engineering Department for project delivery through the design and construction phases. If a project is executed by Engineering, an O&M representative will perform a role on the project team performing functions including design and construction submittal review.
Program Management & Prioritization – Core Procedures

The following core procedures will be used to assess condition data, prioritize and scope asset rehabilitation projects, and determine budgeting and controls:

- Risk Assessment & Evaluation
- Project Prioritization
- Project Scope Definition
- Program Budgeting & Controls

Each procedure will be described in more detail below.

Risk Assessment & Evaluation

Risk assessment will be conducted to address the probability of failure and the consequence of failure on scales of 0 to 100. This will be done for individual assets or components of assets, as applicable. There are a multitude of criteria that can be evaluated, including but not limited to:

- Probability of Failure:
  Asset age, visual condition, non-destructive testing (NDT) condition assessment, monitoring activity, wire breaks, design features, construction practices, modes of operation, maintenance procedures*, and external environmental factors.

- Consequence of Failure:
  Loss of functionality, limits to water supply, damage to property, risk to other assets, buried utilities, Member Agency service, system redundancy, and function.

Regardless of the criteria selected to produce probability and consequence scores for each asset, the results will be presented in a common format. This will consist of a risk matrix as follows:

* Preventive and Corrective maintenance records may indicate, for example, excessive efforts required to maintain a facility. This data, which is generated and stored with the Water Authority’s Computerized Maintenance Management System (CMMS), will be used in support of decisions regarding the evaluation of assets.
Project Prioritization
Using the risk matrix, the priority for repair or replacement would be those projects within the red sector, and those within the yellow sector with notably high probabilities or consequences of failure. Within the same asset class, the highest priorities would be those with the highest combined scores; however these need to be assessed with respect to other asset classes as there may exist the potential for efficiencies in packaging of projects. This will be further illustrated below.
Project Scope Definition

Once the risk matrices are produced for each asset class or sub-class, a project grouping exercise will be conducted to evaluate the possibility of consolidating assets requiring attention. Assets that are candidates for grouping into a single project may include those that:

- Are in close geographic proximity to each other
- Would require the same section of aqueduct to be isolated and therefore would benefit from sharing the same shutdown
- Share the same type of work where economies of scale may be a factor

From this analysis, projects will be defined for execution. A brief description of the project scope will be prepared and will include suggestions for how each asset identified is to be rehabilitated or replaced. This information will be used to establish project budgets and project delivery teams. At the conclusion of this exercise, the Asset Management Program team will present to the Asset Management Committee for approval of the grouped projects.

In most cases, the assets identified will require replacement or rehabilitation that does not impact the existing function of the asset or the facility formed by the assets in question. Therefore, the management of the projects may be administered through either the O&M Department, or Engineering Department.

In the event that a potential solution to a group of assets requires a significant remodel of the system (e.g. modified or new facility) with potential impacts beyond the original function, the Water Resources Department will be included to prepare options through the facility planning process.
An asset management project grouping flowchart is provided below to aid in the evaluation process:

Will the asset improvements change the original function?

Yes

Prepare handover package for Water Resources Facility Planning Study

No

Undertake a review of proposed asset improvements and group them into projects by considering:

- Priority
- Geographic location
- Simultaneous shutdown isolation
- Type of work

Consider viability of project implementation and consider the following factors:

- Political
- Economic
- Resources
- Member Agency Support
- Timing
- Funding

Amend asset grouping as required

Compile scope definition and commence budgeting and execution process

Seek Asset Management Committee Approval

- O&M Project Execution
- Engineering Project Execution
Program Budgeting and Controls

Overview
There are two primary funding sources that exist within the Asset Management Program. First, the CIP funding mix consists primarily of long term bonds that make up the majority of the funding. This is used for funding the Pipelines Asset Class and the Facilities Asset Class.

Secondly, current year rate revenues are subsequently split into dedicated funds and operating budget. These two sources are used to fund the Equipment asset class.

Each of the asset class funding sources is represented as follows:

CIP Funding Mix
The CIP funding mix utilizes debt and cash to create a smooth project cost profile for projects that represent a significant investment in infrastructure. This spreads the cost of these projects over the projects’ service life tying the benefits from the asset to the benefitting rate payers. Under the Asset Management Program, the CIP funding mix is applicable to the Pipelines Asset Class and the Facilities Asset Class.
As documented in the Asset Management Plan, several existing programs were consolidated to form a single budget for bond-funded Capital projects as documented below:

Aqueduct Protection Program  R0100
Miramar Pump Station Rehabilitation  N0331
Relining & Pipe Replacement Program  R0200
Valve & Venturi Meter Replacement Program  P0551
Fallbrook 7/Rainbow 14 FCF Replacement  M0201
San Diego 12 Expansion  M0291

However, the individual program budgets had remained isolated within existing financial controls. This restricted the ability to deliver efficient asset management solutions that can make use of grouping similar projects. Therefore, effective FY2014 and beyond, the budgeting structure for Capital projects shall consist of a single Capital Program fund, as shown below:
Capital Program Controls
As mentioned above, to control budget, fiscal spending profile, and to maximize the potential efficiencies for delivering similar-funded projects, existing program funds were re-allocated to a single Asset Management Capital Program fund. This is designated as the Q0100 series.

The purpose of establishing Q0100 is to control available CIP funds between the two capital funded asset classes. The Q0100 fund will therefore be established to assign funds to Pipelines projects and Facilities projects.

Each budget allocation would be distributed to individual projects. These will be managed initially as follows:

Q0201 – Q0299 Series – 5-Year Scheduled Pipelines Projects
Q0301 – Q0399 Series – 5-Year Scheduled Facilities Projects

To manage future projects beyond the typical 5-year window, all remaining budget shall be controlled within Q0100:

Q0198 – Unallocated (beyond 5 years) Pipeline & Facilities Funds

During the building of the budget for each 2-year fiscal period, an estimate of budget and cash flow projection will be made for Q0100 series segments. A list of priority projects will be provided showing the buildup of the budget estimate. The Q0100 rolled up appropriation will seek Board approval for the forthcoming fiscal period. This approval request will list the top priority projects to be administered with an estimate of which projects can be completed for the allotted appropriation. The request will also clarify which projects may be executed in the event that surplus funds become available, and identify these as “reserve projects”. These are likely to be lower cost priority projects for the subsequent fiscal period. If this situation were to occur, the Board will be notified and requested to approve the required actions.

To illustrate, consider the following example:

One of the assigned projects for the fiscal period, a large pipeline project (Q0201), is successfully bid several million dollars under estimate in the first fiscal year. Surplus funds would be returned to the Capital Program for re-distribution to initiate a facility project that is shovel-ready (e.g. Q0304). That way, impacts to cash flow forecasting (at the Q0100 level) is minimized, and maximum use is made of the available CIP funded budget.
Historic Data
Historic programs and projects that make up the Asset Management Program will also roll up to Q0100 so that realized costs can be tracked against lifetime budget of the Program.

Emergency Repairs
Emergency repairs are sudden and unexpected, caused by unforeseen issues. Maintaining an emergency repair allowance each year can significantly add to the unrealized contingencies already assigned to individual projects. Therefore, emergency projects will continue to be administered on an as-needed basis and will be funded from within the Asset Management Program unallocated budget at the time required (by Board approval).

Redundant Assets
Some assets are decommissioned due to changing Member Agency needs or reconfigurations of the supply network (e.g. changing from untreated to treated use). Those assets that will not be used in the future, and have therefore become redundant, may be identified for demolition. The costs associated with a demolition project can be charged to the Capital Program.
The diagram below reflects the structure of the project delivery to be established from FY2014 onwards.

* Refer to the Asset Management intranet page for a list of current priority and reserve projects
**Current Year Rate Revenues**

In a similar fashion to the budgeting process for capital-funded projects, dedicated and operating fund budgets will be established for Board approval and commitment to the 2-year budget cycle. Accumulated spending will be monitored against the budget monthly, with quarterly reviews undertaken to evaluate potential under or over-runs.

**Dedicated Funds & Operating Budget Controls**

Dedicated funds will establish budgets for replacement of equipment while the Operating budget will cover the cost of new equipment purchases. The diagram below shows the distribution of funds from current year rate revenues:

![Diagram showing the distribution of funds from current year rate revenues]

- **Dedicated Funds**
  - 2-Year Fund Deposits

- **Operating Budget**
  - 2-Year Budget Cycle

### Equipment Asset Class

- **Equipment Replacement Fund**
  - Fleet Vehicles
  - Construction Equipment
  - Computers (Business Systems)
  - Specialty Tools
  - SCADA
  - Electronic Testing Equipment
  - Specialty Software

- **New Equipment Purchase**
  - Fleet Vehicles
  - Construction Equipment
  - Computers (Business Systems)
  - Specialty Tools
  - SCADA
  - Electronic Testing Equipment
  - Specialty Software
Staff costs within the Asset Management Program will primarily be controlled under the Operating budget unless project-specific work is conducted in which case costs may be attributed to the Capital Program.

A summary chart is provided on the next page showing the overall structure of fiscal allocations.
Asset Management Manual Part II

Overview
Part II of this manual is a living document and will reflect the current status of the Asset Management Program as it relates to the near and long term business goals i.e. ‘what’ we are currently doing to achieve those goals. This section will include risk analysis data, repair / replacement schedules, budget information, cash flow projections, status and progress reports etc., updated as frequently as required.

Part II will be stored and maintained electronically via an intranet link.

Accessibility & Ownership
Access to the data stored in Part II, as applicable, will be made available to all staff. Editing rights will be determined and documented.

It is imperative that ownership for individual sections is assigned and clearly documented. Those individuals assigned as owners will be responsible for the continual upkeep of their data fields.

Link
Part II of the Asset Management Manual can be found via the Water Authority Intranet site under Departments/Operations & Maintenance/Asset Management Program.